Stephens County 2019 Hazard Mitigation Plan

April, 2019

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Stephens County 2019 Hazard Mitigation Plan

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INTRODUCTION

1.1 Purpose

The Disaster Mitigation Act of 2000 helped bring attention to the need for successful hazard mitigation planning throughout the United States, emphasizing the importance of comprehensive multi-hazard planning at the local level, for both natural and technological events, and the necessity for effective coordination between State and local entities. Out of this Act, the Hazard Mitigation Grant Program (HMGP) interim final rule published in 2002 established local mitigation planning requirements. According to this rule State and local governments are required to develop, submit, and obtain Federal Emergency Management Agency (FEMA) approval of a hazard mitigation plan (HMP), completion of which will increase access to funds for local governments and allow them to remain eligible for Stafford Act assistance.

This document, the *2019 Stephens County Hazard Mitigation Plan*, serves as that strategy guide for coordinating local efforts in preparation for hazardous events within the county. 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. It is also a policy and investment tool that builds upon the *Local Emergency Response Plan* and gives area governments and stakeholders a list of priority actions and mitigation measures to be pursued in order to improve the community's ability to better prepare for and deal with hazardous events.

The HMP becomes part of the foundation for emergency management planning, exercises, training, preparedness and mitigation within the County, setting 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.

1.2 Organization of the Plan

The HMP consists of the same major components presented from past versions, but has been reduced in scope for efficiency and to feature only the required and most vital information.

The Hazard Risk and Vulnerability Assessment (HRV) is the analysis concerning the probability and potential severity of each hazard type prevalent to the county. This information is then cross referenced with the Inventory of Critical Facilities to gauge the impact on the community and what the County and its partners would need to do in order to be better prepared to minimize adverse impacts and maximize response conditions.

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 Hazard Mitigation Planning Committee ("*Committee*") and important information gathered for each one. This information is located in the *Appendix* in the Critical Facilities Database.

Hazard Identification: During the planning process, a hazard history was created based on 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 years.

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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.

Vulnerability Assessment: This step is accomplished via the Critical Facilities Database by comparing GEMA hazard maps with the inventory of affected critical facilities and population exposed to each hazard.

Estimating Losses: Using the best available data, this step involved estimating structural and other financial losses resulting from a specific hazard. For this, the Critical Facilities Database features the estimated dollar amounts for full or partial replacement.

Based on the HRV assessment, the Plan identifies some specific mitigation goals. These goals are only recommendations of the Committee. Any specific recommendation must also be individually approved by the appropriate government officials. A framework for Plan implementation and maintenance is also presented within this document.

1.3 Planning Process

The general process for updating an HMP can be found in the FEMA's 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 Stephens County HMP ("the Plan"), which was funded in part from FEMA, is designed to protect both the unincorporated areas as well as municipalities. Though the County facilitated this planning process each municipality was consulted and provided input into the process. Without this mutual cooperation the Plan would not exist in its present comprehensive form.

	Participation		Review		Adoption	
Jurisdiction	**2013**	**2018**	**2013**	**2018**	**2013**	**2018**
Stephens County	Yes	Yes	Yes	Yes	Yes	Pending
Toccoa	Yes	Yes	Yes	Yes	Yes	Pending
Avalon	Yes	Yes	Yes	Yes	Yes	Pending
Martin	Yes	Yes	Yes	Yes	Yes	Pending

An advisory Committee was appointed to assist in the update process, beginning with County and municipal staff or officials with knowledge and insight into hazard mitigation efforts at each government. Staff from fire protections services, police and emergency management services, as well as planning and information services were nominated for involvement and guided the discussion of previous County and municipal efforts as well as potential mitigation measures going forward. These stakeholders would be charged with reviewing the material, recommending changes and updates and confirming the final version of the document. The Plan was developed by the Committee, with technical assistance from Georgia Mountains Regional Commission (GMRC).

The communities of Avalon and Martin were invited but did not participate on the Committee, however both communities were provided with information and draft materials throughout the process and commented/asked questions along the way. Both Avalon and Martin are small communities with less than 1,000 residents and all emergency services provided by Stephens County, so the County staff made sure to include concerns on behalf of each municipality as well as the unincorporated County.

Preliminary material and hazard information was made available to the Committee at the outset of the update process, with the express purposes of commenting on how each community is impacted by the various hazards and identifying new mitigation measures. Throughout the process GMRC would also directly contact personnel from each community for additional comments and guidance, including Avalon and Martin. Paid personnel, elected and appointed officials were all provided opportunity to comment on the Plan to ensure all communities were consulted during the process.

Hazard Mitigation Planning Committee Members

Danielle Rhodes	Director of 911/EMA, Stephens County
Phyllis Ayers	Administrator/ Finance Director Stephens County
Connie Tabor	Director of Planning, City of Toccoa
Aaron Wilkinson	Director, Stephens County EMS
Richard Adams	Director, Stephens County Recreation Department
Jimmy Mize	Toccoa Police Department
Jason Holland	Stephens Count Road Superintendent
Andy Myers	Chief Deputy, Stephens County Sheriff's Office
Tim Wilbanks	Stephens County Schools
Jamey Gettys	Chief Coordinator, Stephens County Fire Department
Jeff Haslup	Chief, City of Toccoa Fire Department
Frankie Dietz	Asst. Chief, City of Toccoa Fire Department

Public comments and questions were permitted throughout the planning process as solicited by Advisory Committee members and County staff and officials. Once initiated, knowledge of the process was promoted via local media and at a County Commission meeting. Emergency response staff were also encouraged to solicit comment while engaging the public at various events and bring any responses to the Committee. During the course of 2018 GMRC would compile comments and information from each community to develop the draft text. Additional revisions were made and a new draft completed by 2019.

Upon completion in March, 2019 the full draft and final document were made available for full public review and comment. The draft AND FINAL materials were also made available to the public via the Stephens County website, www.stephenscountyga.com. Comments and questions could be submitted electronically to the County staff during this time and a public forum to review and comment on the final version will be scheduled for January. After the public comment period the County Commission will schedule to adopt the plan. Comments received during or after FEMA review will be evaluated as future amendments during the annual reviews of plan implementation. Throughout the process, staff from the GMRC assisted with facilitation and development of the updated text and maps.

1.4 Adoption, Implementation, Monitoring, Evaluation

The Stephens County Board of Commissioners is the authority responsible for formally adopting this Plan. The City of Toccoa and the towns of Avalon and Martin will be provided all information necessary to formally adopt the HMP as well. Once the County approves this Plan, it will be forwarded to GEMA for initial review. If no changes to the plan are required, GEMA will then forward the Plan to FEMA for final review and approval. Once final FEMA approval has been received, Stephens County and its individual municipalities will be responsible for initiating any courses of action related to this Plan that they each deem appropriate. Actions taken may be in coordination with one another or may be pursued separately. The Plan maintenance section of this document details the formal process that will ensure that the Stephens 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 Stephens Co. will develop steps to ensure public participation throughout the plan maintenance process. All or portions of this Plan may be integrated into the Stephens County Comprehensive Plan, or other

plans, sometime in the future. It should be noted that no recommendations found within this Plan are binding on the County or any municipalities therein. Such recommendations may be used by the County and municipalities as one of many tools to better protect the people and property of Stephens County and the municipalities of Avalon, Martin and Toccoa.

Copies of the approved HMP will be made available to the applicable departments that are responsible for the documents identified in fulfilling the *Documentation of the Planning Process* requirement.

1.5 Community Profiles

Government Structures

Stephens County operates on a commission/administrator form of government, with a five-member board of commissioners serving staggered terms and a chairman and vice-chairman elected annually from among the commissioners. The Stephens County Board of Commissioners is responsible for hiring a County Administrator, who oversees general day-to-day operations of the county government. The County government develops and approves the budget of each department within its administrative and operational structure, sets the millage rate each year, and provides for operational funding to all departments of the county.

The City of Toccoa is governed by a five-member commission. A mayor and vice-mayor are chosen among the commission, and serve a one-year term. The Toccoa city commission employs a city manager who oversees day to day operations**.** The Town of Martin is governed by a five member Council and an elected mayor, and Avalon has a four-member council and an elected mayor.

Successful implementation of the Plan depends upon the coordination of Stephens County, the municipalities, and other stakeholders. Tools exist within the Comprehensive plan to facilitate coordination between the county and the municipalities. One of those tools is the Service Delivery Strategy. The SDS outlines the coordination process, including all levels of personnel and elected officials. The Service Delivery Strategy is discussed in more detail later in this chapter. As outlined in the SDS, Stephens County, Martin, Avalon, and Toccoa will utilize various Memoranda of Understanding and other written agreements in implementing and coordinating the plan. Additional stakeholders and partnering organizations included:

- Stephens County Hospital
- Northeast Ga. Housing Authority
- Toccoa Falls College
- Stephens County Board of Education
- Toccoa-Stephens County Airport Authority
- Toccoa-Stephens County Chamber of Commerce
- Toccoa-Stephens County Industrial Development Authority

Bordering Stephens County are Banks, Habersham, and Franklin Counties in Georgia, and the state of South Carolina. Within Stephens County exists the municipal governments of Avalon, Martin, and Toccoa. Coordination amongst the County and these municipalities is essential to successfully implementing the Hazard Mitigation Plan. Currently emergency response services are provided by Stephens County and the City of Toccoa. Mutual aid agreements and the Service Delivery Strategy for Stephens County ensure all residents are covered for fire protection, law enforcement and emergency response services.

Geography and Climate

Stephens County, created in 1905 from parts of Franklin and Habersham counties, includes 179.3 square miles of land, and is some 960 ft. above sea level. The county is named after former Ga. Governor Alexander Stephens, who served as Vice President of the Confederacy, despite being publicly opposed to secession. In 1874, the City

of Toccoa was established. Toccoa's historic roots can be traced back to the development of a post-Civil War coaling station for the Atlanta to Charlotte Railroad.

Stephens County is characterized as a bucolic setting, and is noted for its natural beauty. Examples include Toccoa Falls, located on the campus of Toccoa Falls College, and known to be higher at 186 feet than Niagara Falls, and portions of Lake Hartwell and Currahee Mountain. Stephens County is home to Jarrett Manor (also known as Traveler's Rest), served as home to Camp Toccoa, the WWII paratrooper training camp featured in the movies Band of Brothers and Saving Private Ryan, and proudly displays documentation and relics of the history and heritage of the area at the local Historical Society Museum. Among currently ongoing historical projects in Stephens County are the restoration of the historic County Courthouse and the Toccoa Train Depot.

Stephens County's land area is roughly divided into the Piedmont Plateau area in the southern area of the county and more mountainous terrain in the northern region of the county. The northern area of the county is more forested, primarily with pines, while the southern area is more consistent with agricultural use and development. Outdoor recreational offerings of the Stephens County area include the Chattahoochee National Forest, the Blue Ridge parkway, Tugaloo State Park, Lake Hartwell, and Lake Yonah.

Stephens County typically experiences distinctive seasons with relatively moderate temperatures. With an average temperature of 76.5 F, the summers are hot, while fall and spring are typically mild, as compared to other areas of the country. Winters typically bring a few mild to moderate winter weather events, with temperatures for the season averaging around 52F. The average yearly rainfall is estimated to be 58.5 inches.

STEPHENS COUNTY, GEORGIA

TOTAL POPULATION

	2010	2016	CHANGE #	CHANGE %
Georgia	**9,713,521**	**10,310,371**	**596,850**	**6.1%**
GMRC Region	**601,216**	**670,327**	**69,111**	**11.5%**
Stephens County	**26,150**	**25,751**	**-399**	**-1.5%**
Avalon town	213	207	-6	-2.8%
Martin town (pt.)	368	358	-10	-2.7%
Toccoa city	8,533	8,412	-121	-1.4%
Balance of Stephens Co.	17,036	16,774	-262	-1.5%

AGE DISTRIBUTION 2016	
< 18 yo	22.4%
18-64	59.3%
65+	18.3%

HAZARD ASSESSMENT

The Stephens County HMP uses the results of the HRV assessment to identify mitigation goals and recommended mitigation measures. Each mitigation measure attempts to identify an organization or agency responsible for initiating the necessary action steps, as well as potential resources, which may include grant programs and human resources. An estimated timeline, when possible, is also provided for each potential mitigation measure.

This chapter summarizes the categorical assessments presented in the Appendix. The Committee identified hazards that have affected Stephens County in the past and are likely to do so in the future. As a result of the 2018 planning process, the Committee added tropical cyclonic events among those hazards that pose a measurable threat to Stephens County. Of the natural hazards severe thunderstorms, winter storms, tornados, and drought are the most serious potential threats to the County. Flooding is likewise considered a critical issue but is usually isolated to select areas of the County.

Hazard	Georgia HMP	Stephens Co. HMP
Tropical Cyclonic Events	*	*
Coastal Flooding	*	
Earthquake	*	*
Severe Storms	*	*
Tornadoes	*	*
Inland Flooding	*	*
Severe Winter Storms	*	*
Drought	*	*
Wildfire	*	*
Wind	*	*Covered under Severe Storms*

In addition to natural hazards, the Committee identified technological hazards that have affected Stephens County in the past, and are likely to do so in the future. 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, causing a greater level of uncertainty with regard to statistics and mitigation measures. However, enough information has been gathered to provide a basic look at technological hazards within Stephens County. Each of the technological hazards determined by the HPMC to pose a threat to Stephens County is addressed here.

The second element of each hazard assessment is the discussion of Mitigation Goals and Objectives. As each hazard is discussed for the possibility of occurrence and potential severity of threat, the Committee evaluated past and potential mitigation measures to ensure that Stephens County and its Cities are doing what they can to protect and serve area residents and properties. This element analyses those measures and presents the framework of what each stakeholder will do going forward to implement the plan and support the achievement of goals stated herein. The format of each hazard assessment features all the elements included in the previous plan and required of federally approved hazard mitigation plans, presented as follows:

Discussion for all Hazards
Asset Risks
Estimate of Potential Losses*
Land Use & Development Trends
Multi-Jurisdictional Concerns
Public Information and Awareness

Individual Hazard Analysis
Hazard Identification
Hazard Profile
Mitigation Goals and Options

**= Information about estimation of asset values and potential losses is included within the appendix. Only discussion of hazard related specifics is included within the general text.*

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Mitigation measures are summarized at the end of the chapter, presenting details about each recommended action or policy and a table summarizing the status, priority and applicable hazards.

2.1 Hazardous Event Profiles and Occurrences

Where possible, data about recent hazardous events has been culled from the online data available from the National Climatic Data Center of the National Oceanic and Atmospheric Administration (NOAA). (See link below) This data is considered a comprehensive and official record of major weather events within each jurisdiction as noted by respective authorities. The database used for this plan was reflective of information stretching from 1995 through 2018 (the latest available for this draft). This information was then shared with the Committee and local staff for verification, with no amendments found necessary. All events of record are considered to have impacted all of Stephens County and each municipality except where otherwise indicated.

Where no such data was available local records were reviewed or, in the case with wildfires, information was sought from the Georgia Forestry Commission.

http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=13,GEORGIA

Parameters for Event Frequency, Probability, and Severity

	VL (Very Low)	Low	Mod (Moderate)	High	Ext (Extensive)
Frequency					
Volume of occurrences per year	< 1	1	2 - 4	5 - 8	9+
# of days per year (drought & winter storms)	1 - 5	6 - 10	10 - 25	26 - 50	50+
Probability					
Chance of occurring in any year	< 10%	25%	50%	75%	100%
Severity					
Tropical Cyclonic Events		*(See Wind & Inland Flooding)*			
Coastal Flooding		NA	NA	NA	NA
Wind – Wind Speed (MPH)		≤ 36	37–50	51-70	71–91
Severe Weather		*(See Wind & Inland Flooding)*			
Tornado - Magnitude		F0- F1	F2-F3	F4	F5
Inland Flooding - Water depth		3” or less	3 – 8”	8-12”	12”+
Severe Winter Storms – Ice/ Sleet		< 1/3”	1/3” – ½ ”	¾ -1”	1”+
Severe Winter Storms - Snow		¼ ” – 1”	1 -5”	5-12”	12”+
Drought – Duration (years)		1	1 – 2	2-5	5 +
Wildfire - # of Acres		<50	50-200	200-500	500+
Earthquake - Magnitude		NA	NA	NA	NA
Dam Failure – Peak above normal pool		<1’	1’-2’	2’-4’	4’+

Hazard Risk Assessment for Stephens County

HAZARD		STEPHENS CO.	TOCCOA	AVALON	MARTIN
Severe Thunderstorms					
Contributes to downed trees, power lines, flooding, & fires	**Frequency**	H	H	H	H
	Severity	M	M	M	M
	Probability	M	M	M	M
Flooding					
Contributes to hazardous roads, some structural damage	**Frequency**	M	M	M	M
	Severity	H	H	M	M
	Probability	M	M	M	M
Winter Storms					
Contributes to hazardous roads, some fallen trees and power lines	**Frequency**	L	L	L	L
	Severity	H	H	H	H
	Probability	M	M	M	M
Wildfires					
High degree of woodlands in county, even around urban areas	**Frequency**	M	M	L	L
	Severity	H	H	M	M
	Probability	M	M	M	M
Tornadoes					
Contributes to downed trees, power lines, debris, and damaged structures	**Frequency**	L	L	L	L
	Severity	M	M	M	M
	Probability	L	L	L	L
Droughts					
Impacts water resources and contributes to threat of wildfire	**Frequency**	L	L	L	L
	Severity	M	M	M	M
	Probability	M	M	M	M
Tropical Cyclonic Events					
Contributes to downed trees, power lines, flooding	**Frequency**	VL	VL	VL	VL
	Severity	M	M	M	M
	Probability	L	L	L	L
Earthquakes					
Rare occurrence; very low in magnitude	**Frequency**	L	L	L	L
	Severity	M	M	M	M
	Probability	L	L	L	L
HazMat Release					
Risks damage to facilities and infrastructure, harmful to people	**Frequency**	L	L	L	L
	Severity	M	M	L	M
	Probability	L	L	L	M
Dam Failure					
Risks damage to facilities and infrastructure, harmful to people	**Frequency**	VL	VL	VL	VL
	Severity	M	M	L	L
	Probability	L	L	L	L

2.2 Asset Risks

For most hazardous events discussed herein any portion of Stephens County can be negatively impacted. Facilities not located in or near flood plains are not considered at major risks for flooding. Likewise facilities not located near major arterials or major industrial facilities are considered at very low-risk for hazardous materials release. The Critical Facilities Database and related maps included in the Appendix highlight specific proximity concerns and general risk levels. Apart from this any mitigation steps taken should be pursued on a county-wide basis and include the municipalities of Toccoa, Avalon, and Martin.

Any particular structures or areas within the county that are at special risk will be noted within the discussion for that particular hazard.

2.3 Estimate of Potential Losses

In evaluating assets that may potentially be impacted by the effects of winter storms, the Committee determined that all critical facilities, public and private property, are susceptible. *Note: Please see Appendix A for detailed information on critical facilities within Stephens County.*

The Committee used a straight-line method for estimating losses. In most of the documented cases of wildfire within Stephens Co. 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. *Note: See Appendix for specific loss estimates.*

2.4 Land Use & Development Trends

Since the last Plan was completed in 2014 there has been little change in land use for the bulk of Stephens County. The recession from (approximately) 2009-2012 reduced demand for new construction, so the majority of Stephens County remains agricultural and rural.

The SR 17 corridor between Toccoa and I-85 has seen some new construction, including various industrial buildings and a satellite facility for North Georgia Technical College. Land around the interchange has also seen some commercial growth as Lavonia becomes a larger regional node for services, retail and manufacturing.

Elsewhere downtown Toccoa has seen a minor renaissance of building renovation and several new buildings experiencing adaptive re-use. The lake and riverfront properties also continue to be popular, drawing steady development and redevelopment for both recreational and residential use.

2.5 Multi-Jurisdictional Concerns

Most hazard risks apply evenly to all portions of Stephens County, thus any mitigation steps taken should be pursued on a county-wide basis and include the municipalities of Toccoa, Avalon, and Martin. The County and municipalities currently feature mutual aid agreements to ensure cooperation across jurisdictions, including agreements with 3 adjoining Counties. The Stephens County *Local Emergency Operations Plan* also works to coordinate response strategies to ensure the most efficient use of resources involved.

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2.6 Public Information and Awareness

With all potential hazards identified within this plan the Committee recommends steps be taken to increase public awareness of potential hazardous events and local response resources in order to reduce the likelihood of injury, death, and property loss. These steps may include local newspaper articles detailing specific hazard mitigation techniques, distribution of informational materials, and county-wide workshops. The public will also continue to be involved in the hazard mitigation planning process, including the implementation and periodic maintenance of this Hazard Mitigation Plan.

As a result of the 2018 planning process Stephens County will place a renewed emphasis on how ongoing public awareness and education. In considering the number of hazardous that might be better addressed through changes in this same element the Committee and various stakeholders agree that a more streamlined and coordinated policy or strategy going forward should yield more effective benefits, such as improved awareness of evacuation routes and shelter locations, for instance. The County and partnering agencies will immediately evaluate all the public outreach platforms and propose a comprehensive makeover in the coming year.

2.7 Community Goals

There are three main mitigation goals for mitigation of all hazards within Stephens County:

- To minimize the loss of life and property.
- To prevent disruption of services to the public to the greatest extent possible.
- To have all the equipment, facilities and resources needed to accomplish the goals above.

As the nature of all hazards is an extraordinary event capable of large scale harm and damage, these goals apply to all hazards for all of Stephens County. They define the desire of all stakeholders for Stephens County to be fully prepared for hazardous events and poised to respond as needed, preferably in an ideal capacity. If the County, the Cities and their partners pursue the objectives outlined in this plan then it is assumed the communities will be positioned to achieve these goals and better serve their residents in times of crisis.

Within the context of those overarching goals are several more detailed objectives applicable to mitigation efforts for all hazards within Stephens County:

Structural and Non-Structural Mitigation Objectives

- To expand the public's awareness of the potential of hazardous events
- To facilitate through pre-planning activities communications and warning with a focus toward efficient, effective, and practical response to hazardous events and their dangers
- To facilitate through training and preparation the protection of lives, property, and the environment
- To provide the public and response community with information regarding prevention and protective measures where possible.

Existing Policies, Regulations, Ordinances, and Land Use

- Unless otherwise noted here there are currently no known codes or ordinances in place in Stephens County to preemptively address the referenced hazardous events outside of the International Building Codes (2000 Edition) and the uniform Building Codes adopted by Stephens County.

Community Values, Historic, and Special Considerations

- Special Consideration should be given to vulnerable populations such as the elderly and the sick as well as to the facilities that house vulnerable populations in planning and considering mitigation options in

regards to hazardous events as these populations in particular may be at higher risk during extreme conditions, etc.
- The geographic areas in which historic sites are located should be evaluated prior to designating mitigation measures specific to those locations.

New/ Existing Buildings and Infrastructure
- Aside from the NFIP guidance and requirements (addressing flooding and dam failure) and the regulations outlined by the Uniform Codes Act ad International Building Codes (2000 Edition), there are no other known measures in place as pertaining to hazardous events and new buildings and infrastructure.

Progressing from these general goals there will be listed specific objectives for each hazard type. These are the more practical and actionable performance measures related to how the various stakeholders will strive to achieve the general goals as applicable to each respective hazard.

2.8 Summary of Individual Hazard Assessments

The prevailing theme throughout the 2018 planning process was the desire to upgrade information (about area resources, critical sites, and available assistance programs) and improve communication (both to the public and between emergency response organizations). While participants in the process accepted the industry knowledge and understanding of local conditions Stephens County lacks certain policies and procedures that would greatly enhance pre-disaster mitigation efforts and disaster response. It was noted, for instance, that there is not a formal inventory of shelters and their conditions in the area, nor a standard operating procedure for responding to a hazardous materials spill. Developing and organization this information and establishing some set policies and procedures should dramatically improve the abilities to serve Stephens County and the municipalities with regard to hazard mitigation. Among the targeted needs for Stephens County:

- Development of a public awareness campaign in cooperation with local response resources and local media to increase public knowledge of hazardous event preparation and response
- Take a proactive and aggressive approach to enforcement of current burn permitting requirements
- Provide local response personnel with and appropriate equipment and training in wildfire fighting tactics and techniques
- Seek resources/ alternatives for individuals who may be left with no heating source during power outages
- Improve public awareness and education campaign concerning State-issued water restriction measures, including enforcement policies and penalties
- Obtain current mapping from NFIP for Stephens County and all municipalities therein to assist in ready identification of designated flood zones for planning purposes
- Expand tornado warning and communications capabilities
- Prevent damage and disruption of utilities to critical facilities during hazardous events
- Obtain current mapping from NFIP for Stephens County and all municipalities therein to assist in ready identification of designated flood zones for planning purposes
- Explore funding options to make available training for all emergency response personnel within the county and the municipalities therein pertinent to initial response to hazardous materials releases
- Develop standard operating procedures for emergency dispatch personnel and response personnel regarding hazardous materials release
- Increase local medical abilities to respond to hazardous materials release by considering development of a portable decontamination unit
- Improve knowledge of local dam inventory, inspection process and records

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2.9 Prioritization

Members of the Committee and others familiar with 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 this knowledge and the perceived level of needs and abilities for each community. Certain objectives and action items from previous editions of the Plan have been retained and are considered ongoing or current.

All of the mitigation actions proposed are considered possible and necessary in order for the communities within Stephens County to achieve the overarching goals cited above. While every measure may not be realized within the next planning timeframe, it is recognized that every measure fulfills a need for Stephens County and should be pursued as best as possible. A measure of prioritization of proposed mitigation measures, however, is done utilizing the GEMA recommended STAPLEE methodology, with special emphasis on the following:

- Cost effectiveness
- Comprehensiveness, i.e. addresses a specific goal and objective
- Addresses reducing effects of hazards on new / existing buildings and infrastructure
- Addresses reducing effects of hazards on critical facilities where necessary
- Identification of future public buildings and infrastructure

A list of mitigation goals, objectives and related action items was compiled from the inputs of the Committee, as well as from others within the community. Through this prioritization process, several projects have been identified with a greater priority than others. Some of the projects involved great expense to initiate the required actions while others allowed the community to pursue completion of the project using potential grant funding. Still others required no significant financial commitment by the community, like policy changes. All proposed mitigation actions were evaluated to determine how the County would benefit in relation to the costs. Further, all of the actions and strategies are subject to the funds and manpower available to the respective parties responsible. To this end, the local government staff cited for each measure will oversee the implementation as resources permit, with the intention to pursue all measures as possible.

Priority Classification	
High	Task/Objective addresses a critical need and is achievable with accessible resources
Medium	Task/Objective addresses a moderate need but may require outside assistance
Low	Task/Objective addresses a minimal need and likely requires outside assistance

Generalized priorities revealed as part of the 2019 planning process fall largely in the vein of "*work smarter, not harder.*" Modest improvements in the area of public outreach and internal communication, for instance, should enhance coordination between agencies. Similarly, formalizing records about things such as status of shelters and policies for training would also help ensure more effective mitigation and response programs.

2.9 Funding Resources

Funding for each and every mitigation measure will come from a variety of sources based on availability and applicability. Where possible local funds from the governments themselves (either general funds or SPLOST funds) will be used, otherwise a variety of outside sources will be pursued through grant or loan programs. Among the funding sources available for hazard mitigation related measures are federal programs through FEMA (HMGP; PDM; FMA; SRL; RFC; Public Assistance 406 Mitigation), HUD (Community Development Block Program), USACE Mitigation funds or Appalachian Regional Commission funds. Under coordination from the Stephens County EMA, the local governments will identify those mitigation actions and strategies that are eligible for these programs and pursue funding assistance when eligible.

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PLAN EXECTUTION

3.1 Implementing the Plan

Administrative Actions

The Stephens County Commission authorized the Stephens County Emergency Management Agency to be lead agency for the development of the Plan and updates. The Plan was drafted by the Stephens County Hazard Mitigation Committee, with the final draft forwarded to FEMA and GEMA for review. Upon notification of Federal approval Stephens County and the municipalities adopted the Plan as an official document.

As with previous editions, Stephens County will incorporate the *2019 Stephens County Hazard Mitigation Plan* update as an addendum to the County's Comprehensive Plan and use the document for future capital improvement plans as well as zoning and land use planning.

A final copy of the adopted *2019 Stephens County Hazard Mitigation Plan* will be distributed to every department within Stephens County and the municipalities for access into all planning processes within Stephens County, with notification that the Stephens County EMA Director will be available for explanations if needed.

Authority and Responsibility

The Stephens County Commission will have the final responsibility for the Plan. The Stephens County Emergency Management Agency, under the authority of the Stephens County Board of Commissioners, will assume the responsibility for the maintenance and updates of the Stephens County Hazard Mitigation Plan. Stephens County will additionally develop steps in the plan maintenance process to ensure public participation throughout.

The Stephens County EMA will insure that the Stephens County Hazard Mitigation Plan is distributed to the Stephens County Board of Commissioners and to each municipality. Copies of the approved plan will also be provided to the following:

Local governments	**Service Departments and agencies to include**
Stephens County	Stephens County EMA
Town of Avalon	Stephens County Sheriff's Department
City of Martin	Stephens County EMS
City of Toccoa	Stephens County Volunteer Fire Services
	Stephens County Hospital
Planning and Development Authorities	City of Toccoa Police Department
Toccoa and Stephens County Development Authorities	City of Toccoa Fire Department
Toccoa Main Street	Stephens County Road Department
	Stephens County Public Health Department
	Stephens County DFACS
Public Information Outlets	City of Toccoa Public Works Departments (includes water, gas, streets)
Toccoa-Stephens County Public library	Martin Public Works

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Copies of the plan will be made available via the County web site or provided upon request to other persons or entities desiring a copy.

As part of monitoring the implementation efforts, the EMA Director will regularly speak with code enforcement and planning personnel to ensure the County and Cities are maintaining their NFIP compliance and participation. This includes maintenance of flood datasets and development regulations, communication with NFIP directors about program updates, and working with local landowners as flood hazard issues come about. In order to continue to comply with NFIP, flood-prone areas within the County will be re-mapped as necessary, allowing communities to obtain more accurate information with regard to flooding than would be otherwise available.

Incorporation of Local PDM Plan into other plans/planning measures

	Stephens County	Toccoa	Avalon	Martin
Policies				
Building Codes	X	X	X	X
Zoning	X	X		
Subdivision Regulations	X	X	X	X
Fire Prevention Codes	X	X	X	X
Floodplain Mgmt.	X	X	X	X
Programs/ Plans				
Comprehensive Plan	X	X	X	X
Local Emergency Response Plan	X	X	X	X
Local Hazard Mitigation Plan	X	X	X	X
Resources				
Local Emergency Mgmt.	X	o	o	o
Local Fire Station	X	X	X	
Regional Commission (Planning and Econ. Dev.)	X	X	X	X

o = Provided by County

All portions of this plan may be incorporated into the Comprehensive Plans or other plans of Stephens County, Toccoa, Martin, and Avalon in the future. Municipalities within Stephens County will also explore the possibilities of incorporating the plan into local planning documents. These additions to the planning documents will be done at the discretion of elected officials in the county and individual municipalities.

3.2 Work Program and Mitigation Strategies

The Implementation Program is the overall strategy for achieving the Plan's Goals and for addressing each of the identified needs and opportunities. It identifies specific measures, both short and long-term, that must be undertaken by the community in order realize the community's goals. The end result of this effort is the Work Program which identifies specific implementation actions the local government or other entities intend to take during the first five-year time frame of the planning period. This can include any policies, administrative systems, community improvements or investments, financing arrangements, or other programs or initiatives to be put in place to realize the Plan goals.

Action Item	Responsible Organizations	Projected Time Frame	Estimated Costs	Funding Sources	Hazards Addressed
Development of a public awareness campaign in cooperation with local response resources and local media to increase public knowledge of the hazardous event preparation and response					
Develop a multi-discipline Committee to publicly speak to groups on hazardous events	All public safety agencies and organizations, private sector, local media, Local fire services, Ga Forestry, EMA	Ongoing	$10,000	Staff Time, Labor	All
Develop partnership with local media to air public information announcements; Organize comprehensive PSA campaign	EMA, Multiple public safety agencies and organizations, private sector, local media Local fire services, Ga Forestry, local govts.	Ongoing	$10,000	Staff Time, Labor	All
Formally support and promote participation in the Firewise Community Program.	Local Govts., Local fire services, Ga Forestry, EMA	1 year	$2,500	Staff Time, Labor	Wildfires
Develop an Emergency Alert program (Code Red) advising residents of potential severe weather situations	EMA	1 year	7,000	FEMA, Stephens County	Severe Storms Winter Storms Tornadoes Drought
Develop a program supporting emergency plans for families and local businesses	EMA, public safety and public service agencies and organizations, local media, Local Govts.	1 Year	$2,000	Staff time/labor	All
Provide to the public, local businesses, and organizations planning for hazardous materials releases	Local emergency response organizations/agencies, local media, EMA, Local Governments	2 years	$2,000	Staff time/labor	HazMat
Take a proactive and aggressive approach to enforcement of current burn permitting requirements					
Air/ publicize PSAs regarding the requirement for burn permits	local fire services, Ga. Forestry, EMA	Ongoing		Staff Time, Labor	Wildfires
Establish SOP notifying Ga. Forestry of all illegal or non-permitted burns investigated by local resources	local fire services, Ga. Forestry, E-911 Communications, EMA	1 year	$3,000	Staff Time, Labor	Wildfires
Placing additional Fire	Ga. Forestry, Local	1-3 years	$25,000	Staff time, labor,	Wildfires

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Danger Rating signs in other locations such as fire stations	fire services, local media, EMA			donations or grant monies	
Update burn permit policies and enforcement	EMA, Stephens County	1-2 Years	NA	Staff Time and Labor	Wildfires
Waste tire clean-up/ disposal program	Public Works	1-3 Years	TBD	Staff Time and Labor; Grants	Wildfires
Provide local response personnel with and appropriate equipment and training in wildfire fighting tactics and techniques					
Consult Ga. Forestry and the Ga. Fire Academy in regards to training requirements, recommendations, and associated costs for training specific to wildfire	Local fire services, Ga. Forestry, Local Govts.	1-3 years	$12,000	donations or grant monies	Wildfires
Draft wildfire fighting methods, tactics, and training to be included as a requirement of local fire response personnel	Local fire services, Local Govts.	1-3 years	$500	Staff Time, Labor	Wildfires
Pursue funding for specialty wildfire equipment for all local fire response services	Local fire services, Local Govts.	1-3 years	$2,000	donations or grant monies	Wildfires
Prevent damage and disruption of utilities to critical facilities during hazardous events					
Purchase four(4) mobile three phase generators to supply power during power outages	Stephens County EMA	3 years	$100,000	Stephens County, FEMA, CDB	Severe Storms
Purchase two(2) mobile generators to supply power during power outages	City of Toccoa	3 years	$50,000	City of Toccoa, FEMA, CDBG	Severe Storms
Purchase back-up power generators for critical facilities & vulnerable population centers	EMA, medical facilities, public safety and public service organizations, Local Govts.	1-2 Years	$500,000	Grants; donations, sponsorships, or administrative support	Winter Storms
Develop policy and plan for distribution, maintenance, and installation of back-up generators	EMA, Commissions of Stephens County, Toccoa, Martin, and Avalon	3-4 years	$2,000	Staff time/labor	Winter Storms
Pursue funding options to increase sanding and	County Road Department, Stephens	3 Years	$150,000	Grants; Local governmental	Winter Storms

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scraping equipment	County, Martin, and Avalon			support; SPLOST	
Toccoa and Martin to obtain 15 backup (3-phase compatible) generators to operate water-pumping stations	City of Toccoa Water Treatment, City of Toccoa Commission, Martin Water System and Martin Commission	2 years	$900,000	Grants, SPLOST, or governmental administrative support	Flooding
Seek resources/ alternatives for individuals who may be left with no heating source during power outages					
Research sites that may possibly be used as shelter, possibly through partnership with churches or service organizations	DFACS in partnership with ARC, EMA, Local Govts.	2 Years	$2,500	Grants; Local governmental support; SPLOST	Winter Storms
Improve public awareness and education campaign concerning State-issued water restriction measures, including enforcement policies and penalties					
Publish PSAa regarding water restrictions, conservation methods, enforcement, and penalties	City of Toccoa Water Treatment, local media, Local Govts.	Ongoing	$2,000	staff time/labor	Drought
Obtain current mapping from NFIP for Stephens County and all municipalities therein to assist in ready identification of designated flood zones for planning purposes.					
Recommend NFIP to Town of Avalon	City Council of Avalon	1 year	$50,000	Local Govt.	Flooding
Incorporate a policy reporting to E-911and out to other agencies the existence of any road or bridge hazard or areas that appear susceptible to hazard events	E-911 Communications, public safety agencies and organizations servicing Stephens County	1 Year	$15,000	Staff time/labor	Flooding
Expand warning and communications capabilities to warn citizens of impending dangers					
Develop inventory and priority listing of locations in need of NOAA weather radios; Pursue funding options to obtain radios.	EMA, public safety personnel, Local Govts.	1 Year	$10,000	Grants, sponsorship, governmental funding, or donations	Tornadoes Earthquakes
Review and update public warning and alert system, including communication means in the event of power outages	E-911 Communications, EMA, local public safety agencies, local media, Local Govts.	1 Year (pending E-911 system)	$75,000+	Staff time/labor	Tornadoes Earthquakes
Pursue funding options to support a reverse E-911 or similar warning	E-911, EMA, Local Govts.	2 Years (pending E-911	TBD	TBD	Tornadoes Earthquakes

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system		system)			
Pursue funding options for obtaining warning sirens and/or a reverse 911 or similar warning system to be activated from the E-911 Center	E-911, EMA, Local Govts.	Pending	$84,000	Grants	Tornadoes
Facilitate storm spotter training for public safety personnel and the public	NWS, EMA, Local Govts.	2 Years (pending E-911 system)	NA	Staff time/labor	Tornadoes
Research sites that may possibly be used as shelter, possibly through partnership with churches or service organizations	DFACS in partnership with ARC, EMA, Local Govts.	2 Years	$2,500	Grants, donations, sponsorship, or governmental/ administrative support	Tornadoes Earthquakes
Need electronic road-side message boards	EMA, Public Works, Local emergency response resources	1-3 Years	$150,000	GEMA; SPLOST	All
Explore funding options to make available training for all emergency response personnel within the county and the municipalities therein pertinent to initial response to hazardous materials releases					
Utilize the OHS/GEMA Field Delivered Training program - Hazardous Materials (Initial Response to Hazardous Materials)	EMA, Fire Services, EMS, Law Enforcement, Communications personnel, Local Govts.	1 year	$2,000	Staff time/labor	HazMat
Consider policies requiring emergency response personnel obtain awareness level hazardous materials training	Public safety and response organizations and agencies within the counties and the jurisdictions therein, Local Govts.	1 Year	$2,500	Staff time/labor; grants	HazMat
Develop standard operating procedures for emergency dispatch personnel and response personnel regarding hazardous materials release					
Update inventory or sites with probable hazardous materials; Ensure emergency responders are aware of conditions during events.	E-911 Communications, emergency response agencies and organizations, Local Govts.	2 Years	$2,500	SPLOST	HazMat
Develop/ equip specialized response teams within services such as EMS, and Fire Services	Fire services, EMS, other first response organizations and/or agencies, Local Govts.	3 Years	$100,000	Grants, sponsorship, governmental funding, or donations	HazMat
Increase local medical abilities to respond to hazardous materials release by considering development of a					

portable decontamination unit					
Hospital staff will explore funding options to establish a decontamination unit*. (possibly deployable)	Stephens County Hospital	4 Years	$130,000	Grants, sponsorship, governmental funding, or donations	HazMat
Improve knowledge of local dam inventory, inspection process and records					
Update records of all dams in county, including dates of last and next inspections	EMA, Public Works, GEMA; EPD	2-4 Years	TBD	Staff Time and Labor; Grants	Dam Failure
Confirm Emergency Action Plans are in place and up to date (as needed)	EMA, Public Works, GEMA; EPD	2-4 Years	$5,000	Staff Time and Labor; Grants	Dam Failure
Publicize contact information for resources such as EPD Safedams Program, Soil and Water Conservation representatives, etc	EMA, local emergency response resources, local media, Local Govts.	2 Years	$1500	Staff Time and Labor	Dam Failure
Repair Lake Louise Dam	Public Works; GEMA; Dam owners	3-5 Years	$3-5 MM	GEMA; Grants; Private	Dam Failure
Upgrade/ Add to equipment and facilities					
Need storage bin/ facility for salt and winter road materials.	EMA, Public Works	2-4 Years	TBD	Staff Time and Labor; Grants; GEMA	Winter Storms
Need wood chipper	EMA, Public Works	1-3 Years	$50,000	Grants; SPLOST	Winter Storms, Severe Storms, Tornadoes, Earthquakes
Need 3+ 4-wheel drive vehicles	EMA, Public Works, Parks and Rec, Local emergency response resources	2-4 years	$150,000+	Grants, SPLOST	All
Need new vehicles	City of Toccoa Police Dept.	1-3 Years	$100,000	SPLOST; Grants	All
Need 4-5 emergency generators for private residents	EMA, Local emergency response resources	1-2 Years	$10,000	GEMA	Winter Storms, Severe Storms, Tornadoes, Earthquakes
Pursue site improvements to mitigate recurring hazards					
Clearing program at Bruce Creek; Green Valley; Andrews Rd;	EMA, Public Works	1-3 Years	TBD	Staff Time and Labor	Winter Storms, Severe Storms, Tornadoes, Wildfires
Need design plans to mitigate flooding at Blackberry Farms,	Public Works	2-4 Years	TBD	TBD	Flooding

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Buena Vista Rd, and Dortch Rd.					
Update internal communication and coordination for hazard response					
Need to update emergency communication policies and contact list	EMA	1-2 Years	NA	Staff Time and Labor	All
Need to inventory shelters (including Red Cross certification, capacity, and back up needs)	EMA, local emergency response resources, Local Govts.	2 years	$5,000	Staff Time and Labor	Winter Storms, Severe Storms, Tornadoes, Earthquakes
As needed, identify new shelter facilities	EMA, local emergency response resources, Local Govts.	3-4 Years	TBD	Staff Time and Labor	Winter Storms, Severe Storms, Tornadoes, Earthquakes

**=This would include the following items as outlined by Stephens County Hospital personnel: Communication equipment (walkie-talkies, radios), fluid warmers, bear huggers, portable isolation units, decontamination tents, decontamination suits, PAPR masks, heater for decontamination tent, lighting for decontamination tent, stretchers and wheelchairs, portable suctions, intravenous infusion pumps, oxygen pumps, security doors for all entrances, staff training on decontamination and chemical exposures*

3.3 Evaluation, Monitoring, and Updating

The Stephens County Management Agency has the responsibility to monitor, maintain and update the Stephens County Hazard Mitigation Plan. This will be accomplished by maintaining the Stephens County Mitigation Committee. This Committee will be composed of representatives from agencies of the county, municipalities within the county and private citizens.

The Stephens County Emergency Management Agency will also review the Plan on an annual basis to make any changes deemed necessary.

3.4 Plan Update and Maintenance

Public Involvement

The Stephens County Hazard Mitigation Committee will be charged to meet on a bi-yearly basis and called meetings may occur to address any problems deemed necessary by the county. All meetings will be posted in an obvious place within the Stephens County Courthouse for public notification and input. Copies of any changes made to this plan will be forwarded to Stephens County Board of Commissioners, all municipalities, and all members of the Committee and recipient departments of the plan.

Timeframe

The Stephens County Hazard Mitigation Committee will be charged to meet on a bi-yearly basis and called meetings may occur to address any problems deemed necessary by the county. The Stephens County Hazard Mitigation Plan will be completely updated every five years.

Reporting

The Stephens County EMA will insure that the Stephens County Hazard Mitigation Plan is distributed to the Stephens County Board of Commissioners and to each municipality.

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APPENDICES

Appendix A: Categorical Hazard Assessments

Appendix B: Critical Facility Data and Maps

Appendix C: Resources and References

Appendix D: Public Participation Documentation

Appendix E: Glossary

Appendix F: National Climatic Data Center Hazardous Event Information

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A.1 – SEVERE STORMS

Hazard Identification

Severe thunderstorms are defined by the National Weather Service as thunderstorms producing wind at or above 50 knots, or 58 mph and/or hail ¾ of an inch or larger in diameter. The HMC through research of newspapers, NCDC and the internet found that 102 incidences of thunderstorms occurred in the past fifty years; 44 of these occurred within the past 20 years. These storms are capable of producing high winds and lightning. Heavy rains associated with these storms may cause flash flooding. Approximately 10% of all thunderstorms meet the criteria to be considered severe. Severe thunderstorms may strike at any time of the year, but are known to be similar to tornadoes in that they tend to strike most frequently in the spring and summer months.

Thunderstorms are known to produce two types of wind; downbursts and tornadoes. Downburst is the more frequently produced type, and is characterized as a localized area of damaging winds caused by the rapid flow of air down and out of a thunderstorm. All thunderstorms are capable of producing a downburst. A downburst is further described as a gusty wind of only about 25 mph, typically, and an associated temperature drop of about 20 degrees within a time frame of a few minutes. Severe downbursts have been known to have produced winds measured in excess of 120 mph; the equivalent of an F2 tornado on the Fujita Scale. These severe winds may produce winds with a loud, roaring noise associated and the capability of causing wide spread damage typically associated with a tornado. For this reason, downbursts are sometimes mistaken for tornadoes.

Hail is also associated with thunderstorms, and increases the threat associated with thunderstorms. FEMA estimates that the U.S. annually suffers about one billion dollars in crop damage from hail. This is roughly equivalent to 1% of the world's estimated yearly crops. The potential economic impacts of crop damage resulting from hail can be significant. Damages to vehicles, structures, etc. can also be attributed to hail and be costly. Though fatalities resulting from hail are not commonly reported in the U.S., the risk of severe injury is very real.

Hail develops when the rising air currents within a storm carry water droplets to such a height that freezing occurs. These strong rising air currents are referred to as updrafts. As the updrafts continue carrying moisture upward where it freezes, the ice particles become larger and heavier. They eventually become too heavy to be supported by the updraft and begin to fall. These falling hailstones can reach speeds estimated to be faster than 100 mph before impacting with the ground, a person or animal, vehicle, structure, or whatever surface it plummets from. Hail estimated to be dime sized has been reported to have caused dents in to tops of vehicles, damage to structure roofs, break windows, and cause severe injury. The dangers of hail are then not limited to size, but to the velocity with which it falls.

Lightning is another hazard typically associated with severe thunderstorms. The National Weather Service reports that all thunderstorms can produce lightning. According to NOAA, the electrical charges causing lightning to occur originate high in the cumulonimbus clouds where low temperatures create an environment of snow crystals and ice pellets. The rising and falling motions created by the storm within the clouds cause frequent collisions

between these particles causing the snow crystals to become positively charged and ice pellets to become negatively charged. Upward motion within the storm carries the positively charged snow crystals upward while the heavier pellets fall to middle and lower portions of the storm. This increasing difference in charged layers of the storm result in cloud-to-cloud lightning. The negative charge in the lower portion of the storm results in positive charges on the ground building beneath the cloud. These positive charges created at ground level follow the storm as it travels much like a shadow. As the storm travels and the differences in the charges of the ground and the cloud increase, so does the likelihood of cloud to ground lightning. This occurs when a negatively charged channel of air that forms near the base of the cloud surges downward toward the upward reaching positive charge of buildings, trees, etc. Once this connection is complete, a visible surge of electrical current moves from the ground to the cloud as what we call lightning. ***(http://www.noaa.gov/questions/question_041702.html)***

Lightning is reported by the NWS to kill ninety-three people per year in the United States, and injure hundreds of others. Lightning is known to seek out the path of least resistance, which is typically tall or metal objects, according to FEMA. A "tall object" could be a building, a home, a tree, or a person standing in an open area. Lightning is capable of, and has been known to strike just about any object in its path. The most dangerous and intense lightning has been associated with severe thunderstorms during the summer months, when outdoor activities are at their peak. Unfortunately, this may lend to the number of injuries and deaths associated with lightning strikes.

Hazard Profile – Stephens County

The Stephens Co. Committee studied the records of the National Climatic Data Center, the National Weather Service, various weather related news articles, and any other information available in researching the impact of severe thunderstorms on Stephens County. Unfortunately, only the very basic information was available in regards to some of the most severe thunderstorms known to have occurred in Stephens County. Thus, any conclusions based on the information available should be viewed as the minimal possible threat.

Summary of Hazard Events Since 1995 - Stephens County/ Stephens Zone

Event Type	# of Events	Magnitude	Deaths Direct	Injuries Direct	Damage (Value)	
					Property	Crop
Dense Fog	1		0	0	0	0
Hail	45	0.75 - 2	0	0	100,000	0
Lightning	1		0	0	0	0
High Wind	15	50 - 70	0	0	51,000	0
Strong Wind	2	40	0	0	5,000	0
Thunderstorm Wind	81	50 - 74	0	0	125,500	0

Severe thunderstorms pose a serious threat to the residents of Stephens County and are among the most frequent hazards experienced in the area. Major rain events are particularly prevalent in the winter and spring months, with prolonged or powerful storms followed by flood conditions.

Stephens County routinely experiences major rain or sever storm events every year, sometimes experiencing more then 3-5 events in a single year. Often the elements associated with such storms (wind, hail, and lightning) can occur with the same storm. Stephens has experienced more than 130 significant storm events in the past 50 years. For Stephens County the most concerning aspects of major storms stems from the wind and hail than from lightning, as well as from the resulting flooding, which is addressed as its own hazard type. The wind is concerning with regard to impacts on aging structures and the knocking over of trees, power lines, smaller antennae, shed roofs and awnings, and in certain instances billboards. Fortunately to date the damage has been manageable and no lives have been directly or indirectly hurt or lost due to such storms.

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Hazard Specific Mitigation Strategy and Recommendations

Severe thunderstorms with lightning, high winds, heavy rainfall, and hail are present hazards to lives and property in Stephens County. Results of severe thunderstorms in this area typically include some power outages, downed trees, flash flooding, etc., and possible tornadoes. It is essential, then that mitigation planners seek to protect lives and property from the impacts of severe thunderstorms in Stephens County, Martin, Avalon, and Toccoa. With this in mind the Stephens County Hazard Mitigation Committee has determined that mitigation goals will be the same for severe thunderstorms, hail lightning and wind.

Because there are will always be various materials and elements left outside and unanchored there is little to prevent a minimum amount of debris and items being moved and damaged from wind storms or hail. The optimum goal, then, is to provide education and awareness for area residents that they can take action to mitigate possible exposure concerns. (Moving cars under cover, pre-emptively taking down aging trees or looming branches, etc.)

- Prevent damage and disruption of utilities to critical facilities during hazardous events
- Development of a public awareness campaign in cooperation with local response resources and local media to increase public knowledge of hazardous event preparation and response

A.2 – FLOODING

Hazard Identification

Floods rank second only to fire among the most common and widespread of natural disasters nationwide. The Committee found that 9 incidences of floods occurred in the past fifty years; 7 of these occurred within the past 20 years. Communities throughout the country have experienced flooding of some type. Typically, these floods are the result of heavy rains, and, in some areas of the U.S., flooding may be related to snow thaws.

The National Flood Insurance Program defines flood as "*a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties … from:*

- *Overflow of inland or tidal waters,*
- *Unusual and rapid accumulation or runoff of surface waters from any source, or*
- *A mudflow.*

(The) collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood."

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Floods generally develop over a period of days, but can develop more slowly and can rise rapidly. Mitigation activities associated with flood include any activities that prevent an emergency, reduce the chance of an emergency happening, or lessen the damaging effects of a flood emergency when it cannot be avoided altogether. Property owners taking steps now, such as engaging in floodplain management activities, constructing barriers, such as levees, and purchasing flood insurance will help to reduce structural damages to homes and financial losses from building and crop damage should a flood or flash flood occur.

Hazard Profile – Stephens County

Stephens County is the site of one of the worst floods in Georgia history, an event that triggered updates in the State's flood protection policies. On November 6, 1977, a tragic flood, which resulted in the loss of 39 lives, occurred at Toccoa Falls College. The flood was attributed to the failure of a dam at Kelly Barnes Lake above Toccoa Falls. The area had received heavy rainfall for 3 to 4 days prior to the flood. Reports indicate that at approximately 01:30, the dam broke, releasing a wall of water estimated at 30 feet high into the area of the college campus. There were houses and trailers along the creek, which served as housing for students or instructors. There was also a dormitory in the path of the floodwaters. Reports indicate that seven houses, the Forest Hall Dormitory, 25 trailers were destroyed, as were a garage, a print shop, and a warehouse. 39 men, women, and children lost their lives. Toccoa and Stephens County were declared part of a federal disaster area after the flood. Federal aid received was reportedly $1.4 million. Total damages were estimated at $ 2.8 million. A memorial to those who lost their lives stands today at the foot of Toccoa Falls. Kelly Barns Lake Dam was not rebuilt. Individuals associated with Toccoa Falls College reported that this event was the worst flooding known to have occurred there since the dam break in 1977. These reports indicate that the water rose to an estimated five feet over the bridge crossing Toccoa Creek at the lower end of the college campus. One unoccupied vehicle reportedly washed away, and three others had to be removed from a gravel parking lot near the bridge with the aid of a wrecker. Portions of fencing from the baseball field were lost because of the flooding, and the baseball field was covered with a thick layer of silt after the waters receded. Only one building there sustained flooding damage, though, and no injuries were reported.

Summary of Hazard Events Since 1995 - Stephens County/ Stephens Zone

Event Type	# of Events	Magnitude	Deaths Direct	Injuries Direct	Damage (Value)	
					Property	Crop
Flash Flood	9		0	0	4,500,000	0
Flood	5		0	0	50,000	0

The Stephens Co. Committee researched flooding incidents occurring in the County's history. Newspaper articles, the Internet, government agencies, and the National Climatic Data Center were among the resources utilized in this research. Since the previous HMP Stephens County has been subject to several flood events, including severe flash floods that have washed out roads and culverts and damaged private and public property. The flash floods are more frequent and more problematic, due to both the speed with which the hazard develops and the topography of the county that features many narrow channels to exacerbate the problem. On more than one occasion the County has had to pursue major repairs to local infrastructure following washouts.

Stephens County, including the unincorporated portions of the county, and the City of Toccoa are participants in the National Flood Insurance Program, and depend on the resources of the NFIP for guidance when applicable.

Hazard Specific Mitigation Strategy and Recommendations

Research of historic accounts of flooding revealed that most flooding incidents in Stephens County are directly related to heavy rainfall. Hazards resulting from this flooding typically include compromised or impassable roads and/or bridges, and thus, the interruption of delivery of some services or access to care in some cases, crop

damages, property damages, and erosion issues. Should the transportation flow within Stephens County be compromised or interrupted, lives and property could be likewise jeopardized. The members of the Stephens Co Committee were therefore tasked with exploring options to mitigate the damages associated with flooding in Stephens County.

As of December 2018, Stephens County (130391), Toccoa (130231), and Martin (130392) are shown as compliant and participating with the National Flood Insurance Program (NFIP). The Town of Avalon (130390) is currently identifying measures necessary to bring themselves into compliance, with assistance from the County and the GMRC.

Stephens County is home to several creeks, lakes, and rivers, which become vulnerable during periods of heavy rainfall. There are also multiple dams of various construction types in existence throughout the county, which may likewise be vulnerable to heavy rainfall. The majority of these dams, however, are privately owned and on private property, which creates a need to offer assistance to the private citizen in planning for dam safety.

Repetitive loss properties are those for which two or more losses of at least $1,000 each have been paid under the NFIP within any 10 year period since 1978. Severe repetitive loss properties are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000 or at least two separated claims payments with the cumulative amount exceeding he market value of the building. As of December 2018, Stephens County has no residential or commercial repetitive loss properties.

- Obtain current mapping from NFIP for Stephens County and all municipalities therein to assist in ready identification of designated flood zones for planning purposes
- Prevent damage and disruption of utilities to critical facilities during hazardous events

accessWDUN

Extensive rainfall results in flooding in Stephens County

By MJ Kneiser, WNEG Radio

Posted 2:49PM on Wednesday 16th May 2018 (1 year ago)

TOCCOA — Heavy rains have created some major headaches in Stephens County.

As the rain came down Wednesday morning, numerous roads in Toccoa and Stephens County experienced flooding.

Stephens County Randy Shirley told WNEG Radio many of the county's creeks are flooding their banks.

"Water is coming over the creek banks on some rural roads," Shirley said. "On Deerchase Road off Crawford Hills, the bridge over the creek has collapsed so folks will not be able to cross it."

Another affected road Wednesday morning was the Highway 123 corridor, where flooding in some spots made the road almost impassable.

Other side roads off 123, such as Fernside Drive, East Tugalo Street, Lake Louise, and Fern Valley roads, all reported flooding this morning.

And all that wet weather is causing trees to fall, blocking roads.

County road crews and Georgia DOT crews worked to clear roads all morning and will continue to work throughout the day.

The National Weather Service in Greenville-Spartanburg has issued a Flood Warning until 5:45 p.m. Wednesday for Stephens County.

A.3 – WINTER STORMS

Hazard Identification

Winter storms are characterized by freezing rain, ice, sleet, snow, and the dangers associated with them. The combination of colder air, which can affect mechanical equipment and causes everyone to become reliant on a heating source, and accumulation of winter precipitation can render outdoor conditions extremely hazardous to everyone, particularly to drivers.

Snowstorms involve packed precipitation that depending on conditions can cause blizzards and whiteouts, lead to snowdrifts, and hide black ice. Enough snow can build atop structures and weaken roofs and awnings, causing collapse.

Freezing rain is another dangerous type of winter storm. These events occur when a layer of warm air hovers over a region but the ambient temperature just above the ground is near or below 32 °F and the ground temperature is sub-freezing. While a 10 cm snowstorm is somewhat manageable a comparable 10 mm ice storm can paralyze a region as driving becomes extremely dangerous, media and power lines are damaged, and crops may be ruined.

Heavy accumulations of ice on trees and power lines can have a devastating effect, particularly when combined with high winds. These winter storms can cause travel on roads and highways and other outdoor activities to become extremely hazardous due to ice accumulations, falling trees, and other debris. Further, hazardous conditions on roadways in the area resulting from winter storms may serve to slow or impede response to emergencies, which may otherwise be addressed in more rapid fashion during fair weather.

Hazard Profile – Stephens County

In researching the hazard history of Stephens Co. pertaining to winter storms, the Stephens Co. Committee gathered data from the National Climatic Data Center, the National Weather Service, and various local newspaper articles available for the purposes of this planning project. Based on this historic data, it has been observed that Stephens County experienced two to three winter storms per year over the last ten-year period. The Committee's research found that 37 incidences of winter storms occurred in the past fifty years; 26 of these occurred within the past 20 years Damages associated with the storms tended to include downed and damaged trees and power lines, damaged structures, buildings, and bridges. The level of damages reported relative to these storms varied, but the types of damages did remain fairly consistent. Winter storms can potentially devastate a community when they strike. Accumulations of ice may make travel treacherous. Trees and branches, laden with heavy ice and snow become very dangerous to people and to property. Power outages often result from accumulations of frozen moisture on the lines. Treacherous roadways may serve to slow the repair of these lines, further increasing the risk of injury or even death to persons in the area. The cold weather itself presents a certain amount of risk to persons

and animals, particularly if exposed to the elements or in times of extended power outage when heating systems are unable to operate.

Summary of Hazard Events Since 1995 - Stephens County/ Stephens Zone

Event Type	# of Events	Magnitude	Deaths Direct	Injuries Direct	Damage (Value)	
					Property	Crop
Cold/Wind Chill	5		0	0	0	0
Extreme Cold/Wind Chill	1		0	0	0	0
Freezing Fog	1		0	0	0	0
Frost/Freeze	2		0	0	0	500,000
Heavy Snow	14		0	0	0	0
Ice Storm	7		0	0	600,000	0
Sleet	3		0	0	0	0
Winter Storm	9		0	0	0	0
Winter Weather	22		0	0	0	0

Since 1995 the County has experienced an average of 1.7 winter hazard events per year, when considering all different hazard types. Variations of winter precipitation and cold weather often occur simultaneously, compounding the effects of the hazard. In Stephens County mild ice storms are more prevalent than conventional snowfall, and cold weather is the most frequent of the winter hazards. Fortunately none of these events have resulted in any major injuries or fatalities, and property damage has been held to a minimum.

Hazard Specific Mitigation Strategy and Recommendations

Winter storms have the potential to bring a community to a standstill. Icy conditions interrupt transportation, utilities provision, cause crop damage, endanger livestock, and more importantly, put people at increased risk of injury or death. Winter storms in this area have typically resulted in icy conditions on roads, bridges, trees, and power lines; downed trees and power lines, and is sometimes a contributing factor in traffic accidents. The elderly and the sick are made more vulnerable by extreme cold and loss of power, which may be necessary in provision of medical services as well as heat. It is of great importance that planners seek alternatives to lessen the negative effects of winter storms.

- Development of a public awareness campaign in cooperation with local response resources and local media to increase public knowledge of hazardous event preparation and response
- Prevent damage and disruption of utilities to critical facilities during hazardous events
- Seek resources/ alternatives for individuals who may be left with no heating source during power outages

A4 - WILDFIRE

Hazard Identification

A wildfire is defined as an uncontrolled fire occurring in any natural vegetation. For this reason, the term wildfire encompasses events such as brush fires, which may not be in agreement with the common concept of the term. About two thirds are estimated to have been accidentally started, almost one quarter are of incendiary origin, and ten percent likely caused by lightning.

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For a wildfire to occur there must first exist a combination of oxygen, fuel, and heat to kindle the fuel supply. Wildfires fires may be the result of combustion and heat from surface and ground fires, and may quickly develop into a major conflagration. Large wildfires may crown, or spread quickly through the topmost branches of trees prior to involving growth on the ground. As a result of this, there may be violent "blow-ups" in cases of forest fire, and in rare cases, may assume the characteristics of a fire storm. A firestorm, defined as a violent convection caused by a continuous area of intense fire, is characterized by destructively violent surface in-drafts. Tornado like whirls, developing as the hot air from the burning fuel rises, sometimes accompany firestorms. Fires of this severity may be beyond human intervention, and may subside only when the fuel source is completely consumed.

Factors affecting the potential for wildfires include weather conditions such as drought, heat, and wind. These factors may lend to the drying out of timber or other fuel, making ignition more likely. Once a fire is burning, drought, heat, and wind serve to increase the intensity of the fire. Topography also affects the possibility that the wildfire may spread. Fire is more likely to spread quickly uphill and slower downhill. Flash fuels such as dried leaves and light branches ignite readily and fire spreads quickly through them, and often generate enough heat to ignite heavier fuels such as tree trunks, heavy limbs, etc. These fuels, though normally slow to kindle, are ordinarily difficult to extinguish.

In spite of the introduction of modern techniques including radio communications, rapid helicopter transport, and new types of chemical apparatus for firefighting, more than 10,000,000 acres of forest are estimated to be burned annually in the U.S., and suppression efforts cost the U.S. an estimated $100,000,000 is spent annually. Wildfires by nature spread rapidly and responders may have difficulty in accessing wildfires to be able to adequately suppress them. For these reasons the chief aim of this work is prevention.

Hazard Profile – Stephens County

Currently the Ga. Forestry Commission (GFC) utilizes Fire Danger Rating signage placed at the GFC yard as a method of facilitating public awareness. Residents are also required to obtain a burn permit from the GFC Office prior to burning in Stephens County as well as the municipalities therein. Failure to obtain a burn permit is punishable by law. Various resources within the community work together to enforce this permitting system including Ga. Forestry, local fire services, Dept. of Natural Resources, and local law enforcement officials. Illegal burns in Martin and Avalon are dealt with through the services available through the county.

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Events registered as formal wildfires exhibit significant size and duration, requiring excessive response measures and difficulty in controlling. According to sources there have been no significant wildfire events in Stephens County since 1995 but there have been multiple smaller fires manageable with just the local responders. While many fires can and have occurred in natural landscaped areas around the County most are small and were brought under control within a day by a single engine company. As such these events are not considered wildfires. There have been fires in wooded areas on personal property or small fires at campsites that have been contained before anything grew out of control. Fortunately there have been no deaths and no significant damages to property in Stephens County for over 20 years due to wildfires.

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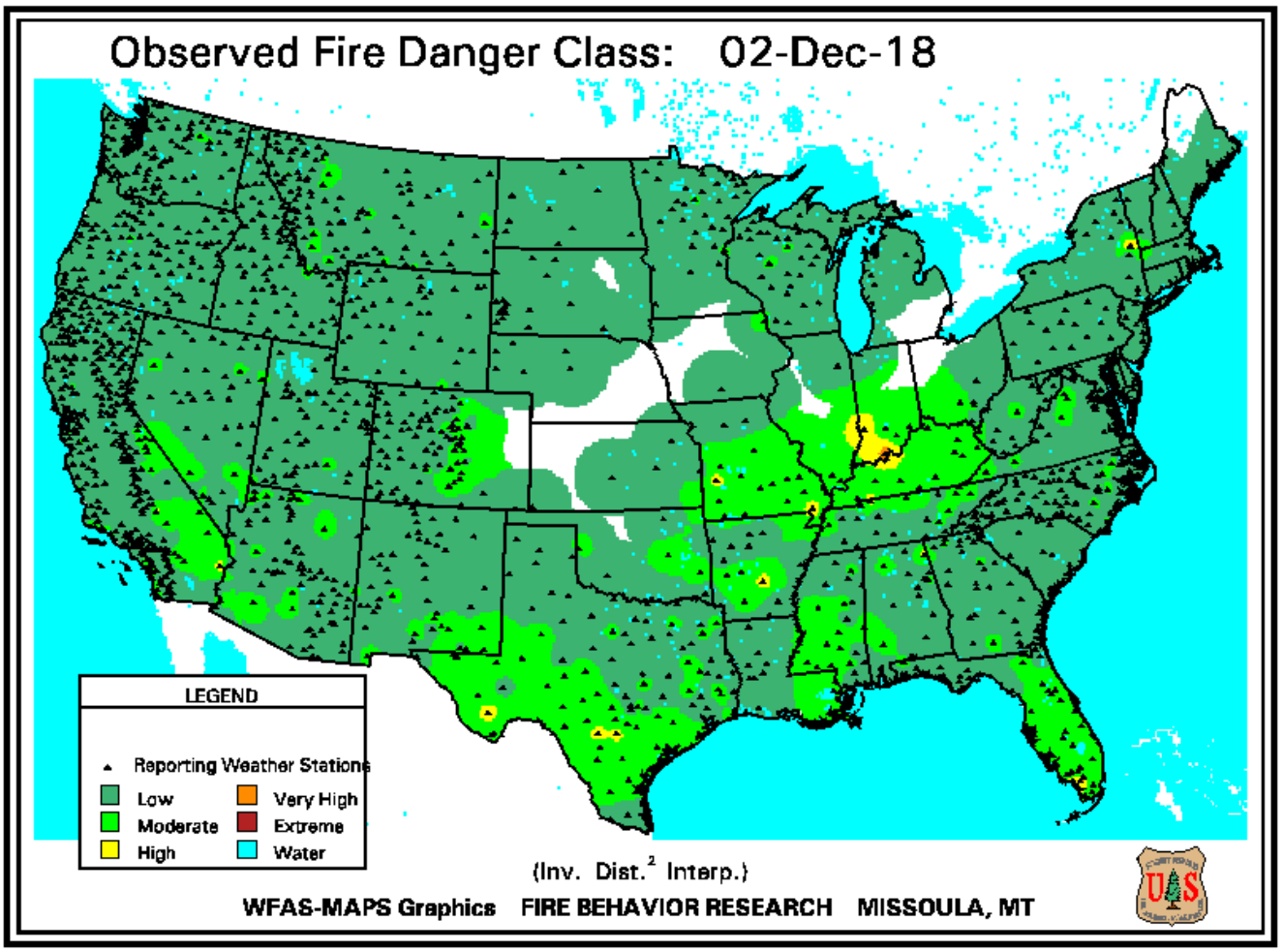
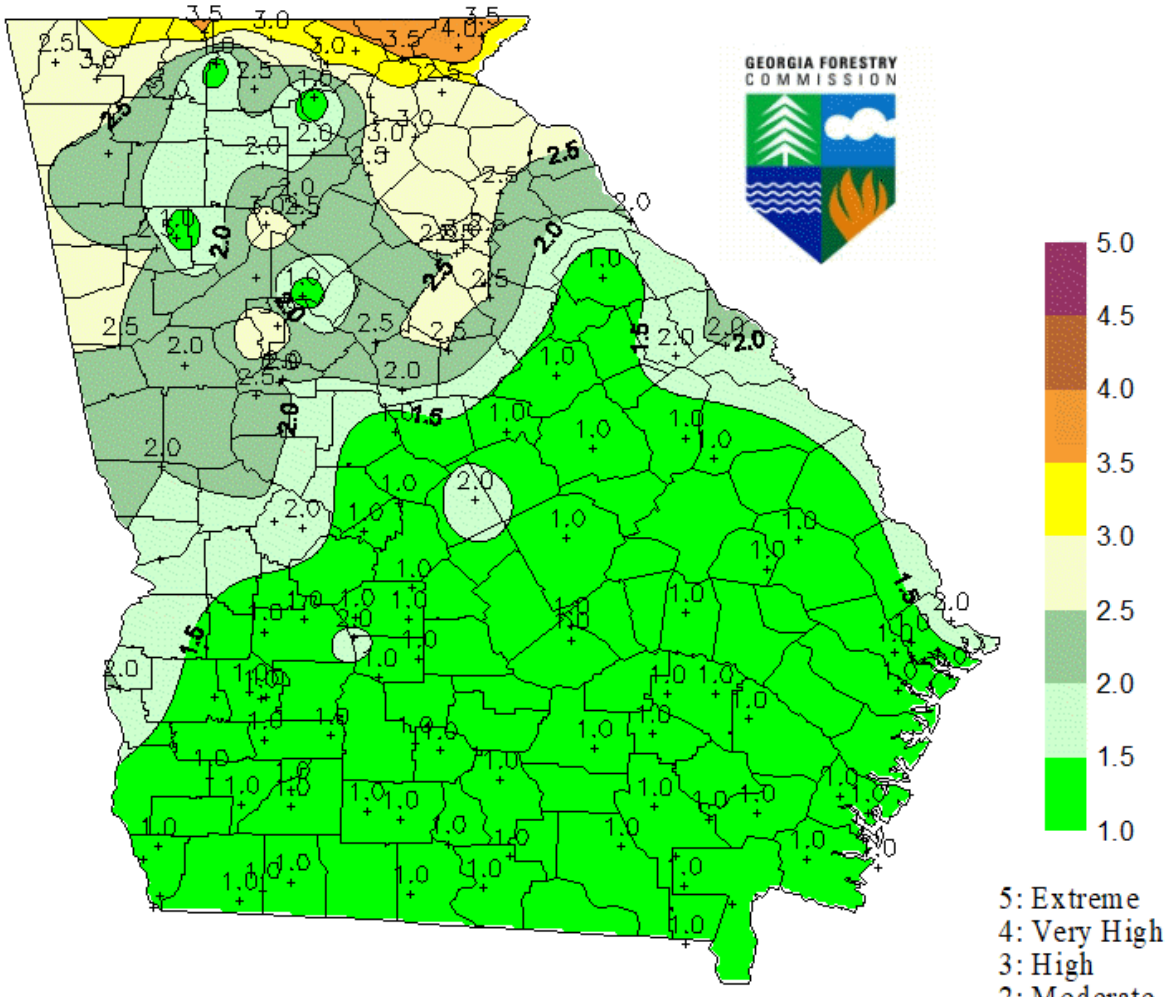


Summary of Hazard Events Since 1995 - Stephens County/ Stephens Zone

Event Type	# of Events	Magnitude	Deaths Direct	Injuries Direct	Damage (Value)	
					Property	Crop
Drought	42	-	0	0	0	0
Heat	2	-	0	0	0	0

At the time this planning effort took place, Stephens County's threat of wildfire was moderate to high. However, this status can change from week to week based on weather conditions, drought history and human activity. Stephens County has had episodes of drought and extreme heat waves that render the surrounding woodlands susceptible to wildfires. Given the potential for such prime conditions and the sheer volume of forest within the county local emergency crews must still be prepared for possible events, especially during each summer.

Fire Danger Rating
as of December 3, 2018 230pm



Georgia Automated Environmental Mornitoring Network provided 75% of the stations in the map.

Hazard Specific Mitigation Strategy and Recommendations

Statistically, wildfire is one of the most common hazards in Stephens County: According to records obtained via the Georgia Forestry Commission, internet, and local newspapers there have been over 700 wildfires within the last 50 years. Highly unpredictable in nature, and able to expand to devastating proportions in a relatively short period of time, wildfires pose a very real threat to lives and property including governmental, industrial, and private sector properties, as well as the environment. While historically, wildfire damage reported in Stephens County has largely been limited to loss of timber and other similar damages, the potential destruction associated with wildfire cannot be ignored.

The majority of industrial facilities in Stephens County are located in the unincorporated areas, while the majority of retail facilities are concentrated within the City of Toccoa. However, as previously noted, Toccoa does contain some pockets of undeveloped or agricultural use associated land. Stephens County has large sections of land

designated as agricultural use or conservation use as well as a large section of National Forest. Martin and Avalon too have a large percentage of undeveloped or agriculture use lands within their land area.

The City of Toccoa relies primarily on two paid municipal fire departments for response to fire incidents. The Town of Martin, in cooperation with the County, supports a volunteer fire service, which is a part of a seven-station county volunteer fire service currently serving the unincorporated areas of the county primarily, and serving to assist the two City of Toccoa Departments at their request.

No municipality or sector of Stephens County is immune to the threat of wildfire. Though some areas may be considered to be more vulnerable to wildfire than others, others may be more prone to sustain more devastating damages in terms of loss of life, property, or environmental impacts, compromised infrastructure, interruption or limitation of service delivery, etc. The entire community at large, in other words could be vulnerable to the damages associated with wildfire, dependent on the factors contributing to the wildfire.

- Development of a public awareness campaign in cooperation with local response resources and local media to increase public knowledge of hazardous event preparation and response
- Take a proactive and aggressive approach to enforcement of current burn permitting requirements
- Provide local response personnel with and appropriate equipment and training in wildfire fighting tactics and techniques

A.5 – TORNADO

Hazard Identification

One of natures most violent storms, tornadoes are capable of causing tremendous damage. A tornado is defined as a violent rotating column of air extending from a thunderstorm cloud to the ground. Contrary to common belief, a tornado may not have a visible funnel cloud. Some of the most violent tornadoes have caused devastating damage with winds estimated to be up to 300 mph. Large trees can be uprooted by tornado winds, buildings destroyed, and vehicles have been reportedly hurled hundreds of yards. The damage path of some of the most severe have been said to be about a mile wide and fifty miles long. Statistics indicate that about 1000 tornadoes are reported per year nationwide, resulting in an average of about 80 deaths and 1500 injuries per year.

Certain conditions must exist to create a tornado. Before thunderstorms develop, a change in wind direction and an increase in wind speed with an increasing height create an invisible, horizontal spinning effect in the lower atmosphere. Rising air within the updraft tilts this rotating air from horizontal to vertical. An area of rotation, two to six miles wide, extends through much of the storm. Most of the strong and violent tornadoes are developed within this area of strong rotation. The standard scale for rating the scale of a tornado is the Fujita Scale. Wind speeds for the scale are estimates. Different wind speeds can cause similar looking damage from place to place.

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.

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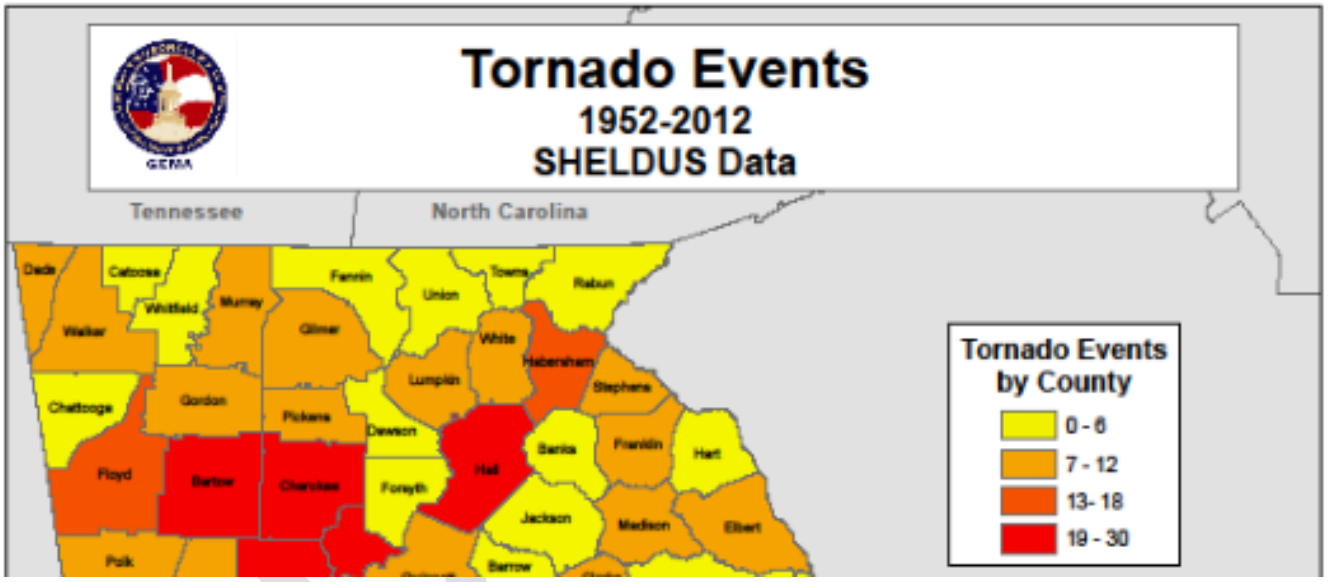
The Enhanced Fujita Scale, adopted in 2007, is the current standard scale for rating the severity of a tornado as measured by the damage it causes (see table below). Although 74% of all tornadoes nationwide are classified as either F0 or F1, it isn't surprising that the more violent F4 and F5 tornados cause 67% of tornado deaths nationwide.

Enhanced Fujita Scale		
EF-Scale	**Wind Speed**	**Damage Classification**
EF0	**65-85 mph**	**Weak**
EF1	**86-109 mph**	**Weak**
EF2	**110-137 mph**	**Strong**
EF3	**138-167 mph**	**Strong**
EF4	**168-199 mph**	**Violent**
EF5	**200-234 mph**	**Violent**

Hazard Profile – Stephens County

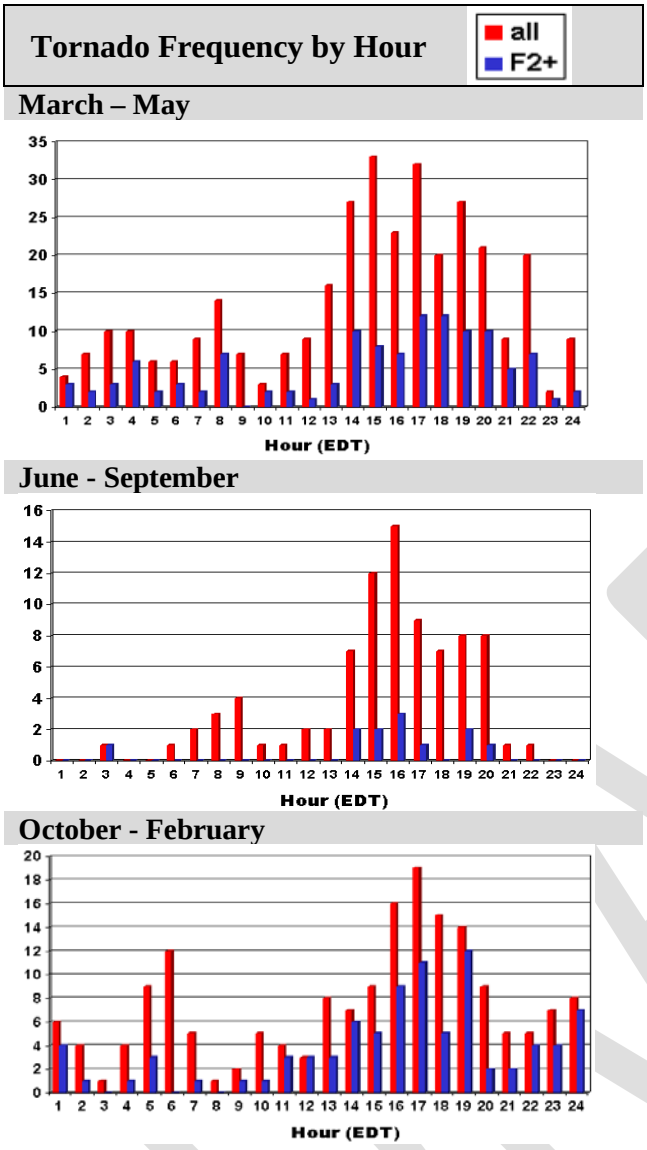
Tornadoes are not considered as prevalent within Stephens County. Historical data suggests very infrequent occurrences, and since 1995 only 1 funnel cloud and 1 identified tornado have been registered in the area, creating minimal damage. However, including more historical data the trend would suggest tornado events are more frequent, with 10 events occurring within the past 50 years.



Summary of Hazard Events Since 1995 - Stephens County/ Stephens Zone

Event Type	# of Events	F-Scale	Deaths Direct	Injuries Direct	Damage (Value)	
					Property	Crop
Funnel Cloud	1		0	0	0	0
Tornado	1	F 0	0	0	1,000	0
High Wind	15	50 - 70	0	0	51,000	0
Strong Wind	2	40	0	0	5,000	0

Tornado Frequency by Hour



Tornadoes are considered to be the most unpredictable and destructive of weather events, even though they are not the most frequently occurring natural hazard within Stephens Co. Tornado season in Georgia ordinarily runs from March through August, with the peak activity being in March and April. However, tornadoes can strike at any time of the year when certain atmospheric conditions are met. Tornadoes can also strike at any time of day or night, including early morning hours, though they are most common in the afternoon.

The main concerns over tornados in Stephens County regard the location. Since most of the population is clustered in and around Toccoa any event to strike that city would cause staggering amounts of damage and harm many lives. So though the probability of a tornado remains low, the threat posed by any event within central Stephens County is considerably higher

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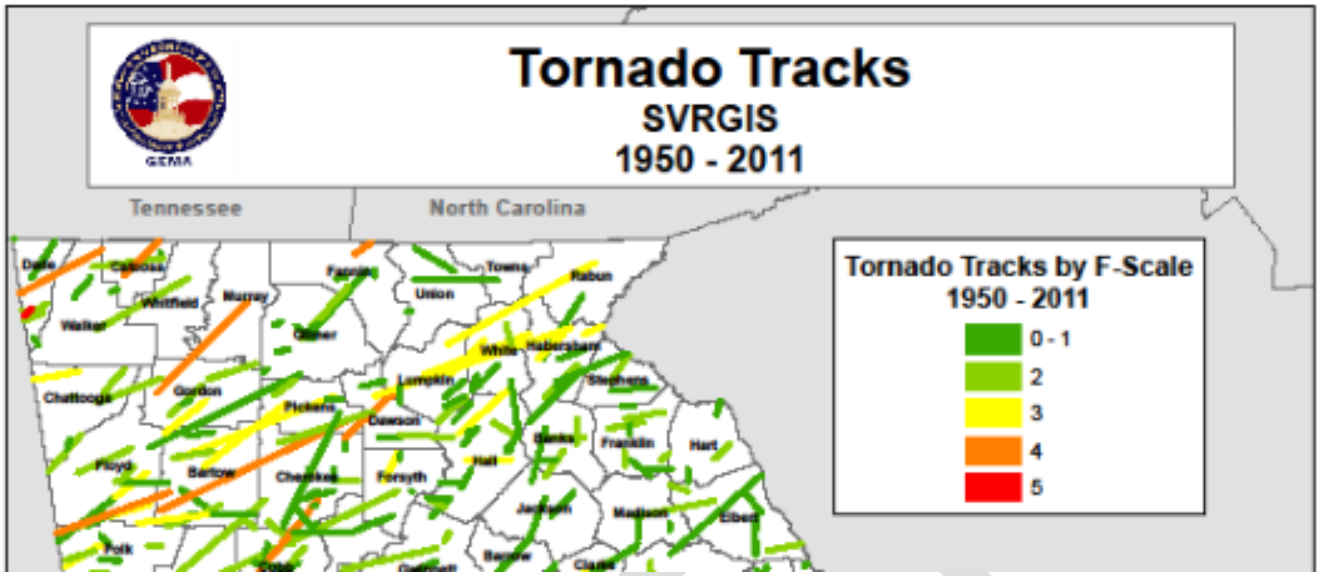


Hazard Specific Mitigation Strategy and Recommendations

Tornadoes can cause loss of life and devastating damages in a very short period of time. A tornado can jeopardize lives, property, infrastructure, livestock, crops, and historic sites. Though tornadoes can now be "tracked" and predicted to strike in a general area, it is not possible to predetermine the exact location that a tornado will strike or the magnitude of that tornado at the time it strikes a particular area. Therefore, advance warning to the people of Stephens County, Martin, Toccoa, and Avalon is an essential part of emergency preparedness planning. In planning for tornadoes, there are two areas of focus, and thus, two goals for mitigation. The primary focus is on protecting lives and property, the second is the preservation of services to the public.

- Development of a public awareness campaign in cooperation with local response resources and local media to increase public knowledge of the hazardous event preparation and response
- Expand tornado warning and communications capabilities

A.6 – DROUGHT

Hazard Identification

Drought is generally defined as a prolonged period of moisture deficiency. This is a normal and recurrent feature of our climate. Although the features of drought may vary, drought occurs almost everywhere at some point. It is important to note, however, that drought is not a localized hazard. Drought typically occurs in large regions, unlike most other hazards.

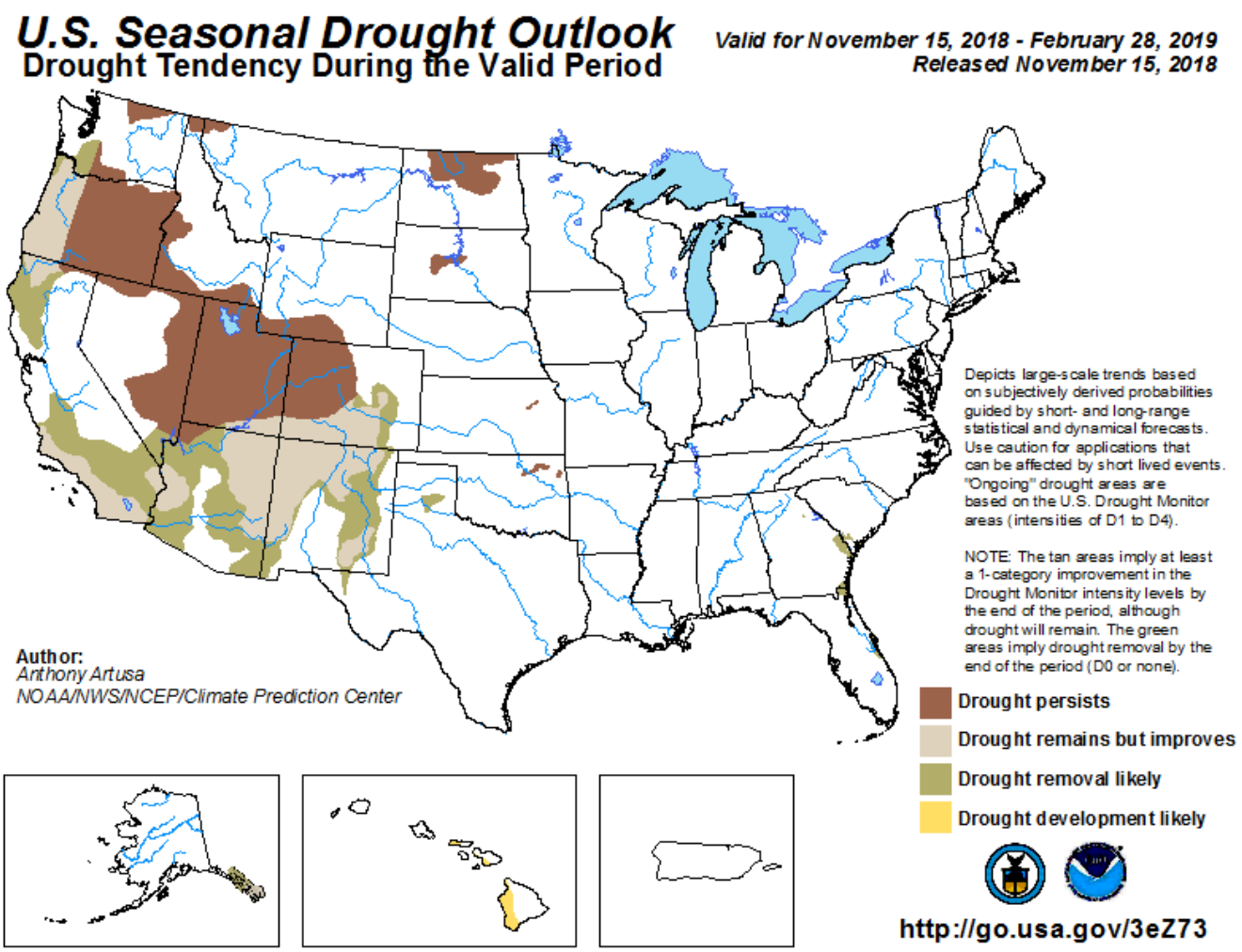
Drought conditions originate in a lack of precipitation over an extended period of time and can result in water shortages. These water shortages may have direct negative impact on livestock and crops, as well as on the availability and quality of

water. Additionally, during drought periods, the risk of wildfire increases, as the natural vegetation that typically fuels wildfire is drier, and more likely to support the burn.

Extreme heat is also generally associated with drought. Extreme heat compromises the health and welfare of people, livestock, and the environment, particularly when extremely hot weather occurs for a prolonged period of time, as with drought. The extreme heat also exacerbates water shortage and wildfire potential.

Hazard Profile – Stephens County

Information from the National Climatic Data Center, Georgia Department of Natural Resources, and the Georgia Forestry Commission were utilized by the Stephens Co. Committee in researching the historic frequency and impact(s) of wildfire in Stephens County. Like most of Georgia, Stephens County has been subject to drought level conditions several times within the past 15 years, particularly including 2007 and 2009. In terms of individual days registering as drought events, Stephens County has averaged 2 occurrences per year, though often these are bundled together in cyclical events.



Summary of Hazard Events Since 1995 - Stephens County/ Stephens Zone

Event Type	# of Events	Magnitude	Deaths Direct	Injuries Direct	Damage (Value)	
					Property	Crop
Drought	42		0	0	0	0
Heat	2		0	0	0	0

To date Stephens County has not experienced major injuries or property damage as a result of these recent drought events, but it has meant restrictions on water use and cautious times for firefighting. More frequent or more severe events could begin to tax the water system and prohibit growth conditions lead to serious concerns for the most at risk populations or industries.

It is not possible to accurately predict the duration of a drought period. As a result, there is naturally a great deal of difficulty in reliably calculating a recurrence interval for drought. It is important to note that droughts, unlike other hazards, occur over several years. Though damages develop at a slower rate than with other hazards where devastation can seem immediate, drought tends to have negative economic impacts that reach other regions and communities for significantly longer term than most hazards.

Hazard Specific Mitigation Strategy and Recommendations

The effects of drought are prolonged and can be very costly to a community. Water supplies may not be sufficient to support the community's needs, crops may be destroyed, and livestock may be in jeopardy. While those issues are very real reasons for concern, it is important to note that the extreme heat that generally accompanies periods of drought may be deadly. Additionally, it is important to realize that drought is not a hazard that reaches completion in a short period of time, as opposed to other natural hazards threatening this area. Droughts typically last for years, and can harm a community's economy for long periods after the drought event is over. Drought does not generally affect only one area of a community, but entire regions of the country. Therefore, it stands to reason that no area of Stephens County is more or less vulnerable than are the others to the potential impacts of drought. For these reasons, the Committee has made certain recommendations regarding the mitigation of drought for Stephens County and the municipalities therein.

- Development of a public awareness campaign in cooperation with local response resources and local media to increase public knowledge of the hazardous event preparation and response
- Improve public awareness and education campaign concerning State-issued water restriction measures, including enforcement policies and penalties

A.7 – TROPICAL CYCLONIC EVENTS

Hazard Identification

(Includes some material used or paraphrased from the 2011 GEMA State Mitigation Strategy)

Tropical cyclonic events, more commonly called "hurricanes" in the eastern US, is a specified strength of a rainstorm that occurs in the Atlantic Basin (Gulf of Mexico, Caribbean Sea, and Atlantic Ocean) and the eastern Pacific Ocean. Weaker tropical cyclones occurring in the Atlantic Basin are referred to as tropical depressions, tropical disturbances, or tropical waves. These tropical cyclones should be distinguished from other mid-latitude weather systems such as nor'easters and polar lows.

Although named differently (such as typhoon), tropical cyclones systems occur throughout the world. The spatial dispersion of this type of hazard spans not only the North Atlantic but also the Northwest, Northeast, and

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Australian Southwest Pacific and the North and South Indian Ocean. In terms of areal extent, these storms may dominate weather over thousands of square miles and reach from the earth's surface to the lower stratosphere.
The temporal characteristics of tropical cyclones (seasonality, rate of onset, duration, and frequency) are more defined than other hazards. In terms of seasonality, the Atlantic Basic hurricane season (only basin affecting Georgia) spans from June to November with the peak of the season occurring in the middle of September.

The rate of onset of a tropical cyclone ranges from hours up to a day depending on the size and speed of the storm. The duration of event also depends on the size and speed of the storm and can last from hours to days in a certain location. The duration of the event in terms of its lifespan (not duration of impact) varies greatly among storms but is often measured in days and weeks. The frequency of tropical cyclones (how often a specific magnitude storm will occur) is more difficult to determine and is largely based upon meteorological statistical modeling. The environmental influences that affect the number and strength of tropical cyclones in the Atlantic Basin include El Nino / La Nina, the Atlantic Multi Decadal Cycle and other synoptic systems (such as the Bermuda High). However, the National Weather Service (NWS) makes annual forecasts pre-hurricane season concerning the total number of named storms (hurricanes and tropical storms) as well as the total number of major hurricanes. These forecasts are taken into account during the hurricane planning process throughout various levels of government.

The measures of magnitude and intensity of tropical cyclones are interrelated. In the Atlantic Basin, tropical cyclones are classified based on magnitude characteristics into tropical disturbance, tropical depression, tropical storm, and hurricane according to the Saffir-Simpson Hurricane Wind Scale (the most widely used scale of magnitude in reference to tropical cyclones).

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph 64-82 kt 119-153 km/h	**Very dangerous winds will produce some damage:** Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph 83-95 kt 154-177 km/h	**Extremely dangerous winds will cause extensive damage:** Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129 mph 96-112 kt 178-208 km/h	**Devastating damage will occur:** Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156 mph 113-136 kt 209-251 km/h	**Catastrophic damage will occur:** Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157 mph or higher 137 kt or higher 252 km/h or higher	**Catastrophic damage will occur:** A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: NOAA National Hurricane Center http://www.nhc.noaa.gov/aboutsshws.php

Hazard Profile – Stephens County

Because Stephens County is an inland community, and particularly as one located in the foothills of Appalachia, it is not routinely subject to such tropical storms. However, the larger storms that do reach Georgia and South Carolina will at times be large enough that portions of the storm will extend northward/westward into northeast Georgia and create a substantial wind and rain related storm event. While the effects of these storms will often be covered through the wind and severe thunderstorm elements of this document, Stephens County recently experienced an event that showcased how advanced warning and coordinated planning on behalf of hurricanes should receive some specific attention.

Summary of Hazard Events Since 1995 - Stephens County/ Stephens Zone

Event Type	# of Events	Magnitude/ F-Scale	Deaths Direct	Injuries Direct	Damage (Value)	
					Property	Crop
Flash Flood	9		0	0	4,500,000	0
Flood	5		0	0	50,000	0
Hail	45	0.75 - 2	0	0	100,000	0
Lightning	1		0	0	0	0
High Wind	15	50 - 70	0	0	51,000	0
Strong Wind	2	40	0	0	5,000	0
Thunderstorm Wind	81	50 - 74	0	0	125,500	0

Hurricane Irma made landfall in southwest Florida on September 10, 2017 before moving northward through Georgia. Irma gradually lost intensity but continued to bring widespread wind damage and heavy rainfall such that by September 11th the then-Tropical Storm Irma still contained at least 39+ mph wind gusts. These high winds lasted several hours across most of the state, which resulted in many thousands of downed trees and caused 1.5 million customers in Georgia to lose power. Given the extensive damage, power was not restored to many areas for several days. With generally dry conditions prior to Irma's arrival, flooding issues in this area were relatively minor, though portions of southern and coastal Georgia outside of the NWS Atlanta/Peachtree City forecast area experienced more significant flooding as well as coastal storm surge.

During Hurricane Irma Stephens County was issued a high wind warning by the NWS in Greenville Spartanburg, which was the primary weather station assigned at the time. All the neighboring Georgia counties, however, while being served from the NWS in Peachtree City were placed under a tropical storm warning. In speaking to the NWS GSP they advised that technically Stephens County was experiencing tropical storm force winds but they couldn't put the county under a tropical storm warning because they did not have that responsibility. As a result, Stephens County experienced the same elevated storm conditions and winds as adjoining counties but local alert systems did not initiate the same level of warning.

Prior to Irma north Georgia felt the effects of several hurricanes since 1995. 2004 saw hurricanes Frances, Irvin, and Jeanne, which included Presidential Disaster declarations. The following year hurricane Dennis also struck

Georgia. In all these instances the upstate still received wind, rain, and other storm conditions, indicating that Stephens County needs to be ready for such conditions and monitor hurricane activity closely.

Hazard Specific Mitigation Strategy and Recommendations

The objectives for mitigating cyclonic events in Stephens County mirror those for flooding, severe storms and wind events, with an added focus on warning systems and communication because these storms can be seen before arrival. The goal with these measures is to ensure the proper communication channels and observed alert levels are correct for Stephens County, allowing the local residents and first responders a better chance to prepare and react to the event.

- Development of a public awareness campaign in cooperation with local response resources and local media to increase public knowledge of hazardous event preparation and response
- Prevent damage and disruption of utilities to critical facilities during hazardous events
- Obtain current mapping from NFIP for Stephens County and all municipalities therein to assist in ready identification of designated flood zones for planning purposes

A.8 – EARTHQUAKE

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. A primary goal of earthquake research is to increase the reliability of earthquake probability estimates. 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. Ultimately, scientists would like to be able to specify a high probability for a specific earthquake on a particular fault within a particular year.

Based on U.S. Geological Survey estimations the probability of an earthquake of Magnitude 4.75 or more occurring within the north Georgia region over the next 25 years is between 1.5% and 2% (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 even in a relatively inactive geographic area such as Stephens County.

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 table describes the Abbreviated Modified Mercalli Intensity Scale, and show intensities that are typically observed at locations near the epicenter of earthquakes of different magnitudes.

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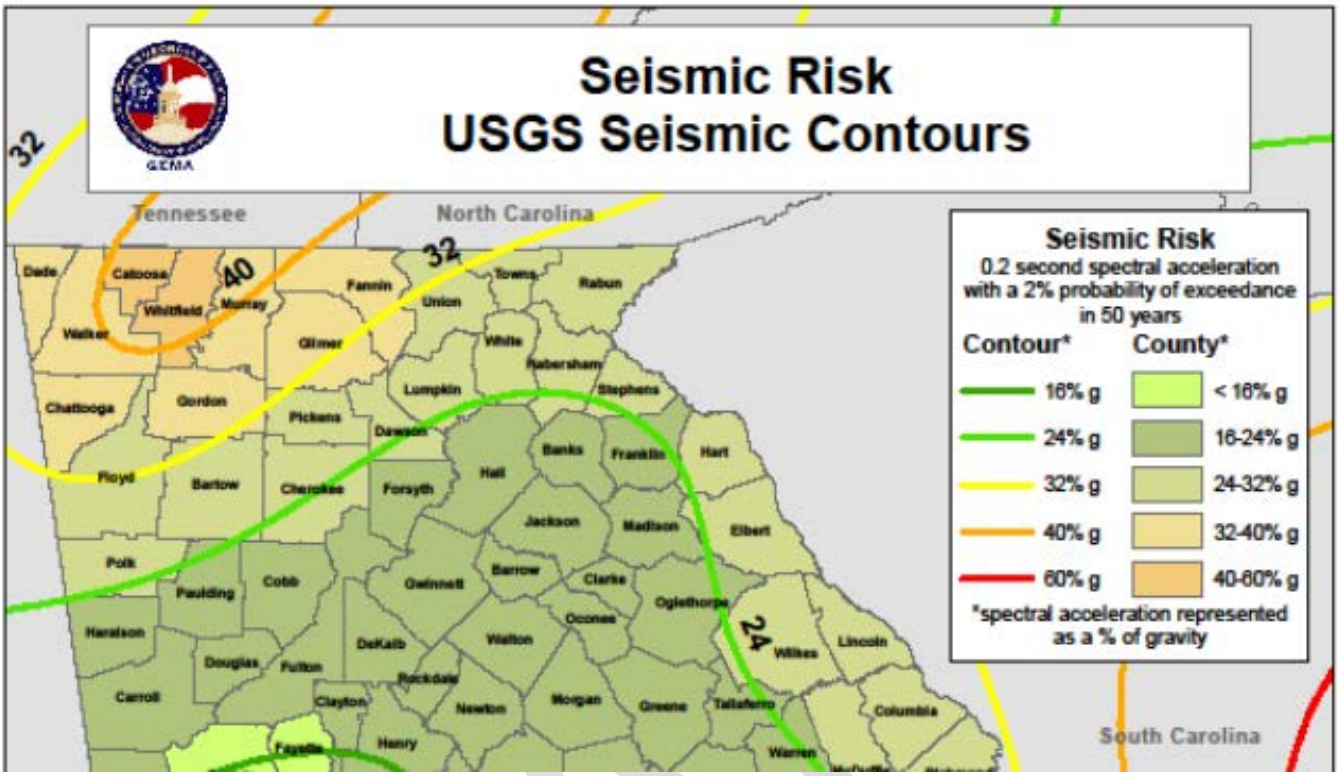
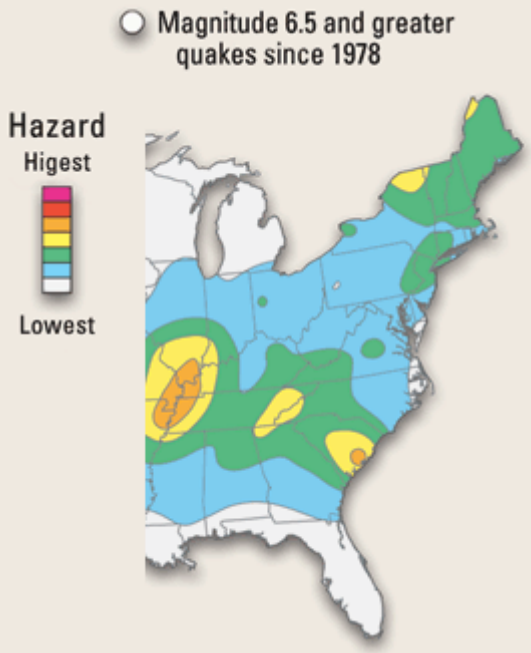


Abbreviated Modified Mercalli Intensity Scale		Magnitude
I.	Not felt except by a very few under especially favorable conditions.	**1.0 - 3.0**
II.	Felt only by few persons at rest, especially on upper floors of buildings.	
III.	Felt quite noticeably by persons indoors, especially on upper floors of buildings. 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.	**3.0 - 3.9**
IV.	Felt indoors by many, outdoors by few. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing autos rocked noticeably.	
V.	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.	**4.0 - 4.9**
VI.	Felt by all, many frightened. Some heavy furniture moved; Some 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/ 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.	**5.0 - 5.9**
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.	**6.0 - 6.9**
X.	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.	
XI.	Few/No masonry structures remain standing. Bridges destroyed. Rails bent greatly.	**7.0+**
XII.	Damage total. Lines of sight and level are distorted. Objects thrown into the air.	

Hazard Profile – Stephens County



Evidence of one local event was found within the past fifty years but Georgia has experienced several earthquakes since 1974. The Committee was unable to determine which of these additional earthquakes affected Stephens Co. and, if so, to what degree. Nevertheless, the Committee believes that these earthquakes would have occurred close enough to Stephens County (even if they occurred in south Georgia) to merit consideration. The threat of earthquakes in Stephens County may be more significant that the one documented earthquake incident would seem to indicate.

From the USGS web site: "*As shown by this… national seismic-hazard map, earthquake hazards exist throughout the United States. ... Many parts of the Central and Eastern United States have moderate to high long-term hazard, even though they have not experienced recent large quakes. Successive updates of USGS seismic-hazard maps are used to revise building codes and are also widely used by structural engineers and government agencies. The next generation of such maps will provide time-dependent probabilities that take into account the effects of prior quake occurrence on future earthquake likelihood.*"

Hazard Specific Mitigation Strategy and Recommendations

Earthquakes have a great potential to cause injury, loss of life, and serious damage to public and private property, utilities, infrastructure, historical sites, crops, and livestock. Such events are uncommon within Stephens Co. As a matter of fact, no records of serious earthquake damage have been found for Stephens Co. Nevertheless, the tremendous destructive capacity of an earthquake requires the Committee to consider mitigation strategies. The Committee developed two main mitigation goals for drought within Stephens County. The first is to minimize the loss of life and property. The second is to prevent disruption of services to the public to the greatest extent possible. The Committee has identified measures to help mitigate the destructive force of earthquakes.

The Committee has recommended certain measures that can be implemented to protect the County as a whole, and more targeted steps to protect specific vulnerable populations within the County. With regard to earthquakes, these vulnerable populations include senior citizens and children. Specific strategies could result in alterations to current policies if approved.

- Development of a public awareness campaign in cooperation with local response resources and local media to increase public knowledge of the hazardous event preparation and response
- Expand warning and communications capabilities to warn citizens of impending dangers

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A.9 - HAZARDOUS MATERIALS SPILLS

Hazard Identification

Hazardous materials, for purposes of this plan, may be defined as substances that are harmful to the health and safety of people or property. More clearly, hazardous materials are defined as any material that because of its quantity, concentration, or chemical concentrations, may pose a real hazard to human health or the environment if it is released. These substances exist in Stephens County both in fixed facilities which manufacture, store, use, dispose of, or transport them, and on the road and railways that span the county and the municipalities within. Examples of these materials include gasoline, bulk fuels, propane, propellants, asbestos, sewage, etc. The existence of these hazardous materials presents a hazard to lives, property, and the environment of Stephens County.

Transportation accidents account for a large portion of local hazardous materials spills. Stephens County is served by several highways, by railway service, and has one airport within its boundaries. The hazardous materials associated with transportation accidents vary widely in type and nature and can be extremely harmful to the people, property, and environment. Though most documented incidents of transportation accidents with hazardous materials spills associated with them consisted of fuel spilled in or adjacent to the roadways, the Stephens Co. Committee noted that the possibility of similar accidents occurring where the vehicle(s) involved could be fully loaded transports of hazardous materials was just as likely as not. Thus, measures to prevent the incidents entirely or to mitigate the effects of those incidents could be beneficial county-wide.

Hazard Profile – Stephens County

Stephens County has seen numerous hazardous materials spills in its history. This is true of the City of Toccoa and the Towns of Martin and Avalon as well, as highways and railways pass through all of these areas, increasing the probability of transportation related spills. Fixed facility spills occur when hazardous material is released on the site of a facility or industry that works with hazardous materials. Stephens County has more fixed facility exposure than do the municipalities due to the industrial parks being located primarily in the unincorporated areas of the county. Also, the number of gas stations and fuel storage type facilities is far greater within the City of Toccoa than in the county or Martin or Avalon. Based on information provided for this study, however, it is important to note that the frequency of fixed facility incidents seems to be declining. Documentation provided by the Ga. EPD indicated there were 39 hazardous materials spills in Stephens County between 1997 and 2014, 19 of which have been transportation related. The remaining incidents were classified as fixed facility releases. In consideration of the known transportation related hazardous materials releases within the past 15 years it is reasonable to assume that Stephens County has a good chance of being exposed to a transportation related hazardous materials release in any given year.

Hazardous materials are known to be dangerous to lives, property, and the environment, as well, dependent on the nature of the material released. Waterways are particularly vulnerable to exposure. The Tugaloo River, Lake Hartwell, the Broad River, and numerous creeks flow through portions of Stephens County. Transportation associated releases account for most of the waterway contamination related to this category of study. Research indicated that the waterways known to have been most frequently impacted within Stephens County are the Eastanollee Creek and Lake Hartwell. Additionally, some portions of the population utilize wells for their

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drinking water supplies. The potential impacts of exposure of waterways in Stephens County are serious. Lake Hartwell, in particular is vulnerable to transportation related exposure to hazardous materials release, as U.S. Highway 123 crosses the lake at the Georgia /South Carolina state line, and is routinely traveled by commercial trucking companies in the day to day business of transferring goods from one location to another. However, it is important to consider that the larger waterways within the county are generally accessible by vehicle, and share this vulnerability to some extent.

There were several furniture and paint manufacturers located within the county and a working rock quarry, all of whom use or store on premises large quantities of hazardous materials. Additionally there are other businesses throughout the county utilizing materials that may pose a risk to lives, property, and the environment under certain circumstances. Materials known to be stored range from fuels such as gas and propane to lacquers and finishes. The Stephens County EMA office attempts to obtain through the various facilities and through GEMA and the EPD on yearly basis copies of reporting filed by businesses required by the Superfund Amendment in order to maintain current information on the chemicals housed within the various facilities and to facilitate appropriate response measures in the event of fixed facility release.

Past evidence revealed that the vast majority of fixed facility releases in Stephens County were not considered major spills, primarily consisting of fuel spills or solid waste, plus one report of alleged improper handling of asbestos and a single release of a small amount of transformer oil into the Tugaloo River. However, though most incidents recorded have fortunately not been devastating the impact on the community must not be dismissed. Clean up costs, which are generally the responsibility of the business with whom the material is associated can be quite high. Spills cause road closures and detours for extended periods of time, may require work stoppage at some locations, and are costly to address. It is also important to note that, if needed, hazardous response teams must be summoned from other counties, as there is not one currently available locally. Also among the costs associated with hazardous materials response for local emergency services are extended or additional man-hours. Traffic and scene control may take extended periods of time, requiring that additional responders be summoned to work or costing overtime wages for those assigned to remain until the scene is cleared to prevent people from entering an unsafe area. Within Stephens County, there are currently three locations listed on the Environmental Protection Agency's Hazardous Site Inventory (H.S.I.). The EPD defines this inventory as:

> *"A list of sites in Georgia where there has been a known or suspected release of a regulated substance above a reportable quantity and which have yet to show they meet state clean-up standards found in the Rules for Hazardous Site Response. When a release of a regulated substance is found in soil or ground water, the property owner must determine if the Rules for Hazardous Site Response require him to notify EPD about the release. If so, the property owner must submit a notification, and EPD determines if a release above a reportable quantity has occurred. The EPD does this by using the Reportable Quantities Screening Method (RQSM). RQSM assigns numerical values to such factors as the toxicity, quantity, and the physical state of the regulated substance released, how close the site is to nearby residents and drinking water wells, the degree to which the release is contained, the accessibility of the site, whether or not the release has resulted in exposure to nearby residents, and the presence of on-site sensitive environments. RQSM uses a mathematical equation to combine the numerical values for these factors into a single score for soil or groundwater. If this score is above a certain number for either soil or groundwater, a release exceeding a reportable quantity has occurred and the site is placed on the H.S.I."*

The sites are divided into five classes based on corrective action required, whether a notice needs to be placed on the property deeds, and what clean-up standards need to be met. Two of the three listings in Stephens County are Class II listings. Those two include a junkyard where a PCB spill occurred (# 1266), and the site of a former textile manufacturer and distributor (# 10630). The third listing is a Class IV listing, and is identified as a municipal Solid Waste Landfill, phases 2 and 3.Specific information on these sites is maintained by the EPD. The risk posed by hazardous materials release to Stephens County as a whole is generally considered to be moderate, but focus on this issue should not be minimized by mitigation planners.

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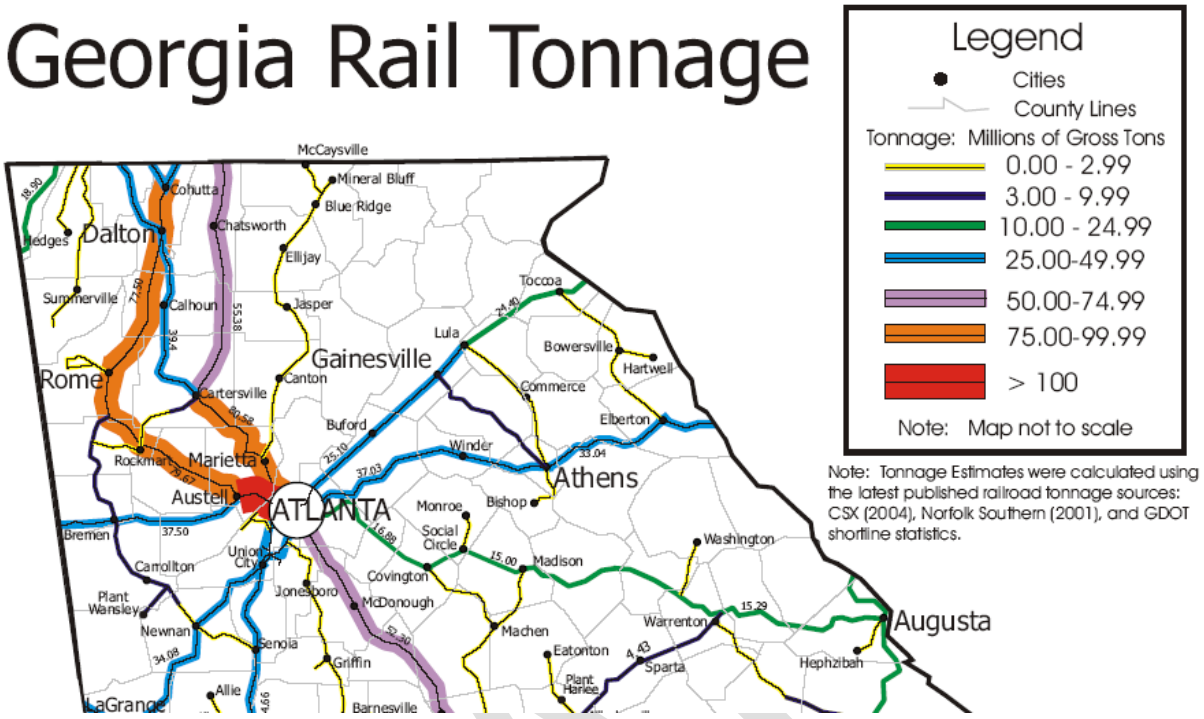

Georgia State Rail Plan (2015)

Table 17: Rail Accidents Involving Hazardous Materials in Georgia (2004-2013)

Rail Incidents	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Cars Carrying Hazmat	117	164	200	129	147	253	194	132	91	110
Hazmat Cars Damaged or Derailed	16	16	19	4	15	20	24	16	4	11
Cars Releasing Hazmat	0	1	2	2	2	1	6	1	0	1

Source: *FRA Office of Safety Analysis.*

Hazard Specific Mitigation Strategy and Recommendations

Regulatory agencies such as the Environmental Protection Agency, the Department of Transportation, and the Occupational Safety and Health Administration provide some protection under specific laws and regulations mandated at the federal level to address the proper handling, transportation, storage, use of, and reporting regarding hazardous materials. Stephens County and the municipalities therein reasonably assume that those transporting storing, and utilizing recognized hazardous materials are compliant with those regulations and laws as set forth by the federal government.

Shipments of substances which, not properly contained or handled, could have a very negative impact on lives, property, and the environment, move through the community on a routine basis. The existence of state and U.S. highways and railway add to the probability of the threat existing at any time in Stephens County. Additionally, the storage of and use of fuels and other chemicals at industrial and retail distribution facilities throughout the county also present a certain amount of danger, under some circumstances. The state and federal levels of government have in effect certain laws and regulations regarding the transportation, storage, handling, identification, and reporting of hazardous materials which are intended to provide some protection of lives, property, and the environment from the impacts of hazardous materials. These regulations are enforced by agencies such as the Environmental Protection Agency, the Department of Transportation, and the Occupational

Safety and Health Administration. For purposes of this plan, it is assumed that these regulations are strictly adhered to by all parties concerned and, further, that any release of hazardous materials is accidental in cause. Therefore, the Committee attempted to identify possible measures to address training and awareness concerns with a focus toward prevention of incidence and protection of the environment.

The existence of industrial sectors is significant as hazardous materials stored and utilized on site may potentially impact a concentrated population of individuals employed within the industrial sectors. These locations should be assessed for vulnerability prior to designation of mitigation measure specific to these areas. Additionally, the Committee recommends that assessment of these areas for vulnerability take into account the population and environment of the area surrounding the site(s) assessed to address issues such as creeks and streams that could potentially be impacted.

- Development of a public awareness campaign in cooperation with local response resources and local media to increase public knowledge of the hazardous event preparation and response
- Explore funding options to make available training for all emergency response personnel within the county and the municipalities therein pertinent to initial response to hazardous materials releases
- Develop standard operating procedures for emergency dispatch personnel and response personnel regarding hazardous materials release
- Increase local medical abilities to respond to hazardous materials release by considering development of a portable decontamination unit

A.10 – DAM FAILURE

Hazard Identification

Man strives to build and create. This includes the development of the land to create desirable homestead areas and scenic views. This often requires that what exists in nature be modified to suit the needs and desires of humanity. One of these activities which can bring with it hazards to the community is the building of dams. Dams are not simply created for aesthetic or recreational purposes, some waterways may have been dammed to facilitate the watering of crops or livestock, create a more bountiful water supply in an area where the supply may have been lacking, etc. A dam is defined 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. The construction of dams varies widely. Some dams are earthen, some constructed of concrete, rock, masonry, etc. Some dams in Stephens County have been in existence beyond the recall of the average citizen. The City of Toccoa utilizes a concrete dam in its water treatment services, as does Georgia Power in generating power from Yonah Dam.

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Most of the dams located within Stephens County are the property of private citizens, and not under the maintenance or control of the county or the municipalities therein. However, the potential impacts of failure of these dams exceed the importance of private property. Thus, the Stephens County Committee studied the hazard of dam failure in dams across the county as a part of this process.

Dam failure may be defined as the major breach and subsequent loss of contained water. Loss of life, and damage to property are serious potential impacts of dam failures. The devastating wall of fast moving water that results from a dam failure may result in loss of or damage to structures, crops, roads, and livestock, and can therefore, have great negative impact on the local economy. The expenses associated with recovery from a flood secondary to dam failure can be devastating to the local government and population. There may also be prolonged disruption of local trade, governmental services, and loss of utilities in areas experiencing dam failures. The proper maintenance of dams is a major concern to those with dams located on their property. National statistics indicate that about one third of dam failures are attributable to overtopping caused by inadequate spillway design or blockage of spillway, or settlement of the dam. These are conditions that may be monitored over time. Another third of dam failures are associated with foundation defects such as settlement and slope instability. The final third are associated with problems with piping and seepage, such as internal erosion caused by seepage and leakage through animal burrows and cracks in the dam, as well as erosion and seepage along hydraulic structures.

Hazard Profile – Stephens County

Tasked with researching the hazard of dam failure and the potential impacts of failure on Stephens County, the Committee sought information from the Ga. Dept. of Natural Resources, local newspaper archives, the Internet, records maintained at the Stephens Co. EMA office, and accounts from memory. Perhaps the most valuable resource in this study was the recollections of local residents and Committee members of flooding events that had occurred in Stephens County's history. Most memorable within the Stephens County area is the dam break at Toccoa Falls College. (Details of the event are available in the Flood chapter of this plan.) Although the dam at Kelly Barnes Lake was never rebuilt, and, therefore, there can be no recurrence of the same dam failing, the possibility of other dams in Stephens County failing is a hazard which should be considered in planning efforts.

After the devastation left in the wake of the dam break at Toccoa Falls College, the Georgia Safe Dams Program was developed to assist communities in addressing the hazards associated with the existence of dam structures. The program is administered jointly by the Ga. EPD and Ga. DNR, and serves to provide inspections and permitting of some dams. The Ga. Safe Dams Program is tasked with main functions by which they attempt to protect the health, welfare, and safety of the citizens of the state by reducing the risk of failure of some dams. Those two functions are: 1) to inventory and classify dams, and 2) to regulate and permit dams designated as high hazard dams.

Dams failing to meet the minimum height and impoundment requirements of 25 feet or more in height and an impoundment of 100 or more acre- feet are exempted from regulation by the Ga. Safe Dams Program. Classification of dams is determined dependent on study of the floodplain in which it is situated. Technological aids available to Safe Dams personnel are also utilized to construct a failure model for the dams. These failure models are useful in predicting the potential height of the flood wave and to estimate the flood path, etc. A dam is classified by the Safe Dams Program as High Hazard (Category I) if the model generated indicates that a breach in the dam structure is likely to result in human life lost. The Safe Dams Program reported the existence of almost 400 Category I dams across the state in July, 2002. Further, the report indicated that some 382 dams classified as Category II at that time, were to be re-evaluated and may be reclassified as Category I dams. These Category I dams are monitored continually through the Safe Dams program for safety. The Safe Dams program also has approval on all plans and specifications for repair and/or construction to dams designated as Category I.

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The above map, developed using the ITOS web tool provided by GEMA illustrates the locations throughout Stephens County where dams exist that are categorized by the Ga. EPD Safe Dams Program as Category I (in red) or Category II (in blue).

Though the vast majority of dams located in Stephens County are privately owned and not under the control of the county, the county has been notified by the Safe Dams Program of the existence of four Category I (High Hazard) dams within the county. These dams are located on the property of private citizens in unincorporated areas of the county. However, given their designation as Category I dams, they are a cause for concern to emergency planners and should be considered by mitigation planners.

Information gathered from the Ga. Safe Dams Program also identified 14 Category II dams and 3, which were deemed exempt. The classification of dams into category II denotes no expectation of loss of human life due to failure. Exempting a dam within this rating system indicates that the dam does not meet the pre-set classification criteria for size, impoundment, or both. Specific information regarding these dams is maintained at the Stephens County Emergency Management Agency office. While most of these dams are located on the properties of private citizens, this list does include one owned and maintained by the City of Toccoa, the Toccoa Water Reservoir Dam (also known as the Water Works Lake Dam),which is utilized in the treatment and distribution of water in areas throughout the county. Additionally, Yonah Dam is utilized by the Georgia Power Company in generation of power to serve the area. Recognition of the hazards presented by any dam is an integral step toward effective mitigation planning. The Safe Dams Program requires that dams designated as Category II be inspected at least every five years. Routine inspections such as these may be useful in addressing some issues associated with the condition and maintenance of some dams which potentially threaten lives and property within Stephens County. Another service offered through the Safe Dams Program is assistance understanding, implementing, and maintaining compliance with the National Flood Insurance Program (NFIP).

Since the 2005 HMP there have been no major incidents of dam failures or breaches within Stephens County. However, some flood events have feature minor incidents of water levels topping minor dams for brief time periods, and select facilities have been targeted for possible upgrades.

Hazard Specific Mitigation Strategy and Recommendations

The vast majority of dams located in Stephens County are situated on private properties. However, there do exist in Stephens County one power generation dam and one water treatment dam. Yonah Dam is owned, operated, and maintained by the Georgia Power Company. Toccoa Lake Dam, also known as Water Works Lake Dam is owned, operated, and maintained by the City of Toccoa. Both of these entities operate under requirements specific to the type of use for the individual dams. Both entities also conduct safety planning as a routine part of operations. There also exist several watershed dams in Stephens County, which are situated on private property. These dams can become hazardous to lives and property in the surrounding area under certain circumstances. Maintenance of the dam structures and the spillways is key to safety where dams are concerned. The Environmental Protection Division, through the Georgia Safe Dams Program, provides the county with information specific to dams classified as high hazard. Additionally, this program facilitates communication between the property owner and the EPD Safe Dams Program where appropriate to give guidance to possible maintenance and repair alternatives in the interests of preserving lives and property by avoiding the incidence of dam failure. The Committee, recognizing the issue of private property ownership, attempted to develop recommendations to prevent loss of lives and property and damage to the environment secondary to dam failure.

- Improve knowledge of local dam inventory, inspection process and records

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Appendix B – Critical Facilities Data and Maps

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Appendix C – Resources and References

The information gathered for this planning effort came from numerous sources. Committee members, EMA staff, GMRC staff, and personnel from various agencies and organizations participated in this research, collecting data from local news publications, newspaper archives, the internet, various local records, statistics available through state and federal resources, and some information was provided by individuals who related experiences through memory. The Stephens County Committee gathered data from the following sources:

Publications
(FEMA) State and Local Mitigation Planning how-to guide
GEMA Supplemental guides to State and Local Mitigation Planning how-to guide
Stephens County Local Emergency Operations Plan
Stephens County Comprehensive Plan
Toccoa Record
The Chieftain (scrapbook files—this newspaper no longer exists)
The Code of Stephens County, Ga.

Web Sites
FEMA (www.fema.gov)
GEMA (www.gema.state.ga.us)
Stephens County (www.stephenscounty-ga.gov)
Stephens County Tax Assessor (www.stephenscountymaps.com)
Stephens County Development Authority (www.scda.biz)
City of Toccoa (www.cityoftoccoa.com)
National Climatic Data Center (www.ncdc.noaa.gov)
NOAA (www.noaa.gov)

Other Resources
Ga. Department of Natural Resources
Environmental Protection Division
Georgia Safe Dams Program
American Society of Civil Engineers (ASCE)
National Weather Service
US Army Corps of Engineers
US Geological Survey
Georgia Forestry Commission
Toccoa-Stephens County Historical Society
Toccoa-Stephens County Chamber of Commerce
Stephens County Tax Assessor's Office and Staff
Georgia Mountains Regional Development Center (Gainesville, Ga.)
Hart EMC (who assisted with Critical Facilities mapping efforts)

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Appendix D – Public Participation Documentation

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Appendix E - Glossary

Disaster: the occurrence of widespread or severe damage, injury, loss of life or property, or such severe economic or social disruption that supplemental disaster relief assistance is necessary for the affected political jurisdiction(s) to recover and alleviate the
damage, loss, hardship, or suffering caused thereby.

EOC: Emergency Operations Center

Federal Emergency Management Agency (FEMA): Federal agency under the Department of Homeland Security responsible for coordinating the federal government's efforts to plan for, respond to, recover from and mitigate against the effects of natural and technological hazards.

Flash Flood Warning: Flash flooding is actually occurring or imminent in the warning area. It can be issued as a result of torrential rains, a dam failure, or ice jam.

Flash Flood Watch: Flash flooding is possible in or close to the watch area. Flash Flood Watches are generally issued for flooding that is expected to occur within 6 hours after heavy rains have ended.

Flood Insurance Rate Map (FIRM): prepared by the Federal Emergency Management Agency to show Special Flood Hazard Areas; this map is the basis for regulating development according to the Regulations for Flood Plain Management (Chapter 64) and
Standards for Construction of Streets and Drainage in Subdivisions (Chapter 82).

Flood Warning: Flooding conditions are actually occurring or are imminent in the warning area.

Flood Watch: High flow or overflow of water from a river is possible in the given time period. It can also apply to heavy runoff or drainage of water into low-lying areas. These watches are generally issued for flooding that is expected to occur at least 6 hours after heavy rains have ended.

Georgia Emergency Management Agency (GEMA): Georgia state agency responsible for coordinating state efforts to plan for, respond to, recover from, and mitigate against the effects of natural and technological hazards.

Grant: means an award of financial assistance.

Grantee: a government entity to which a grant is awarded and which is accountable for use of the funds provided. The grantee is the entire legal entity even if only a particular component of the entity is designated in the grant award document.

Hazard: the natural or technological phenomena, event or physical condition that has the potential to cause property damage, infrastructure damage, other physical losses, and injuries and fatalities.

Hurricane Warning: Hurricane conditions are expected in the warning area in 24 hours or less.

Hurricane Watch: Hurricane conditions (sustained winds greater than 73 mph) are possible in the watch area within 36 hours.

Measure: any mitigation measure, project or action proposed to reduce risk of future damage, hardship, loss or suffering from disasters.

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Mitigation: actions taken to reduce or eliminate the long-term risk to life and property from hazards. Mitigation actions are intended to reduce the need for emergency response – as opposed to improving the ability to respond.

National Flood Insurance Program (NFIP): located within FEMA, and charged with preparing FIRMs, developing regulations to guide development, and providing insurance for flood damage.

Risk: the potential losses associated with a hazard. Ideally, risk is defined in terms of expected probability and frequency of the hazard occurring, the people and property that are exposed, and the consequences.

Severe Thunderstorm Warning: A severe thunderstorm has actually been observed by spotters or indicated on radar, and is occurring or imminent in the warning area.

Severe Thunderstorm Watch: Conditions are conducive to the development of severe thunderstorms in and close to the watch area.

Special Flood Hazard Area (SFHA) or **Floodplain** is the area adjoining a river, stream, shoreline or other body of water that is subject to partial or complete inundation. The SFHA is the area predicted to flood during the 1% annual chance flood, commonly
called the "100-year" flood.

State Hazard Mitigation Program: an ongoing program involving a coordinated effort of state agencies to reduce the threat to people and property from natural hazards. During and following periods of Presidentially declared major disasters, this program or approach is the compilation of activities required under Sections 404 and 409, Federal Regulations.

Subgrant: means an award of financial assistance under a grant to an eligible subgrantee.

Subgrantee: the government or other legal entity to which a subgrant is awarded and which is accountable to the grantee for the use of the funds provided. Subgrantees may be a state agency, local government or eligible private non-profit organizations as defined in Section 206.433, 44 CFR.

Tornado Warning: A tornado has actually been sighted by spotters or indicated on radar and is occurring or imminent in the warning area.

Tornado Watch: Conditions are conducive to the development of tornadoes in and close to the watch area.

Tropical Storm Watch: Tropical storm conditions with sustained winds from 39 to 73 mph are possible in the watch area within the next 36 hours.

Tropical Storm Warning: Tropical storm conditions are expected in the warning area within the next 24 hours.

Other definitions applicable to the administration of the Hazard Mitigation Program are found in Section 206.401, 44 CFR, Part 206 and the Georgia Administrative Plan for Public Assistance

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Appendix F – National Climatic Data Center Hazardous Event Information

FOR STEPHENS COUNTY, GA, FROM 1995 – December 31, 2018

All information care of the NOAA online database of significant weather events.

Key For Attribute Table

ID #	NOAA Event ID number assigned to the incident of record
Begin Date	Initial date associated with the incident of record
County vs Zone	Indication if the incident was sited wholly within the county or regional in scope
Location	Record of particular location within the county, if applicable
Event Type	NOAA event classification
Magnitude/ F-Scale	Scale or impact of event – Measures vary by event type
Deaths	Number of deaths attributed to the event, either directly or indirectly
Injuries	Number of injuries attributed to the event, either directly or indirectly
Damage (Value)	Remediation cost for damage to property or commercial crops caused by the event, x $1,000

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ID #	Begin Date	County vs Zone	Location	Event Type	Magnitude/ F-Scale	Deaths	Injuries	Damage (x 1,000)	
								Property	Crop
5592943	04/01/97	Z		Cold/Wind Chill		0	0	$0	$0
587379	01/06/14	Z		Cold/Wind Chill		0	0	$0	$0
556998	01/07/15	Z		Cold/Wind Chill		0	0	$0	$0
561699	02/19/15	Z		Cold/Wind Chill		0	0	$0	$0
686219	03/16/17	Z		Cold/Wind Chill		0	0	$0	$0
5720333	12/13/99	Z		Dense Fog		0	0	$0	$0
5661154	07/01/98	Z		Drought		0	0	$0	$0
5713225	07/15/99	Z		Drought		0	0	$0	$0
5714144	08/01/99	Z		Drought		0	0	$0	$0
5716871	09/01/99	Z		Drought		0	0	$0	$0
5722375	10/01/99	Z		Drought		0	0	$0	$0
5170721	08/01/00	Z		Drought		0	0	$0	$0
5174011	09/01/00	Z		Drought		0	0	$0	$0
5161824	10/01/00	Z		Drought		0	0	$0	$0
5159788	11/01/00	Z		Drought		0	0	$0	$0
5232361	02/01/01	Z		Drought		0	0	$0	$0
5237938	03/01/01	Z		Drought		0	0	$0	$0
5241425	04/01/01	Z		Drought		0	0	$0	$0
5242824	05/01/01	Z		Drought		0	0	$0	$0
5266917	08/01/01	Z		Drought		0	0	$0	$0
5272490	11/01/01	Z		Drought		0	0	$0	$0
5275820	12/01/01	Z		Drought		0	0	$0	$0
5312799	08/01/02	Z		Drought		0	0	$0	$0
5403406	05/01/04	Z		Drought		0	0	$0	$0
36029	05/01/07	Z		Drought		0	0	$0	$0
42238	06/01/07	Z		Drought		0	0	$0	$0
50482	07/01/07	Z		Drought		0	0	$0	$0
58138	08/01/07	Z		Drought		0	0	$0	$0
60926	09/01/07	Z		Drought		0	0	$0	$0
64560	10/01/07	Z		Drought		0	0	$0	$0

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66011	11/01/07	Z		Drought		0	0	$0	$0
71431	12/01/07	Z		Drought		0	0	$0	$0
76262	01/01/08	Z		Drought		0	0	$0	$0
121604	06/01/08	Z		Drought		0	0	$0	$0
128240	07/01/08	Z		Drought		0	0	$0	$0
132615	08/01/08	Z		Drought		0	0	$0	$0
135725	09/01/08	Z		Drought		0	0	$0	$0
138445	10/01/08	Z		Drought		0	0	$0	$0
142129	11/01/08	Z		Drought		0	0	$0	$0
658388	08/01/16	Z		Drought		0	0	$0	$0
661138	09/01/16	Z		Drought		0	0	$0	$0
663828	10/01/16	Z		Drought		0	0	$0	$0
667179	11/01/16	Z		Drought		0	0	$0	$0
671509	12/01/16	Z		Drought		0	0	$0	$0
676325	01/01/17	Z		Drought		0	0	$0	$0
682828	02/01/17	Z		Drought		0	0	$0	$0
690017	03/01/17	Z		Drought		0	0	$0	$0
690021	04/01/17	Z		Drought		0	0	$0	$0
5168147	12/01/00	Z		Ext. Cold/Wind Chill		0	0	$0	$0
5617425	10/26/97	C	Toccoa	Flash Flood		0	0	$0	$0
5326743	12/24/02	C	Countywide	Flash Flood		0	0	$0	$0
5348434	03/20/03	C	Countywide	Flash Flood		0	0	$0	$0
5470352	07/03/05	C	Toccoa	Flash Flood		0	0	$0	$0
5470423	07/04/05	C	Toccoa	Flash Flood		0	0	$0	$0
198130	09/19/09	C	Toccoa	Flash Flood		0	0	$0	$0
197999	09/20/09	C	Toccoa Falls	Flash Flood		0	0	$4,500,000	$0
211234	01/24/10	C	Eastanollee	Flash Flood		0	0	$0	$0
473385	08/07/13	C	Fighting Pine	Flash Flood		0	0	$0	$0
5541423	03/06/96	Z		Flood		0	0	$0	$0
5329919	07/01/03	Z		Flood		0	0	$0	$0
5423153	09/07/04	Z		Flood		0	0	$0	$0
5423297	09/16/04	Z		Flood		0	0	$50,000	$0
198006	09/20/09	C	Toccoa Falls	Flood		0	0	$0	$0

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5488260	12/16/05	Z		Freezing Fog		0	0	$0	$0
5389149	03/27/04	Z		Frost/Freeze		0	0	$0	$0
29612	04/08/07	Z		Frost/Freeze		0	0	$0	$500,000
5293257	04/28/02	C	Toccoa	Funnel Cloud		0	0	$0	$0
5550733	05/06/96	C	Toccoa	Hail	1	0	0	$0	$0
5574479	10/03/96	C	Toccoa	Hail	0.75	0	0	$0	$0
5603345	06/14/97	C	Toccoa Falls	Hail	0.75	0	0	$0	$0
5603468	06/22/97	C	Toccoa	Hail	0.88	0	0	$0	$0
5635432	02/17/98	C	Toccoa	Hail	0.75	0	0	$0	$0
5651563	06/04/98	C	Toccoa	Hail	0.88	0	0	$0	$0
5651649	06/22/98	C	Toccoa	Hail	0.88	0	0	$0	$0
5254653	06/04/01	C	Toccoa	Hail	1	0	0	$0	$0
5254656	06/14/01	C	Avalon	Hail	0.75	0	0	$0	$0
5254659	06/27/01	C	Toccoa	Hail	0.88	0	0	$0	$0
5261283	07/09/01	C	Toccoa	Hail	0.88	0	0	$0	$0
5293254	04/28/02	C	Toccoa	Hail	1.75	0	0	$0	$0
5293256	04/28/02	C	Toccoa	Hail	2	0	0	$100,000	$0
5354463	04/30/03	C	Toccoa	Hail	1	0	0	$0	$0
5363613	06/16/03	C	Toccoa	Hail	0.88	0	0	$0	$0
5411405	06/12/04	C	Toccoa	Hail	0.75	0	0	$0	$0
5453630	05/10/05	C	Toccoa	Hail	0.75	0	0	$0	$0
5453631	05/10/05	C	Toccoa	Hail	1	0	0	$0	$0
5472620	08/18/05	C	Eastanollee	Hail	0.75	0	0	$0	$0
5503813	04/08/06	C	Toccoa	Hail	0.88	0	0	$0	$0
5503815	04/08/06	C	Eastanollee	Hail	0.88	0	0	$0	$0
5508207	05/20/06	C	Eastanollee	Hail	0.75	0	0	$0	$0
5508480	05/21/06	C	Toccoa	Hail	1	0	0	$0	$0
5508481	05/21/06	C	Eastanollee	Hail	1.5	0	0	$0	$0
5508601	05/25/06	C	Toccoa	Hail	0.75	0	0	$0	$0
5527884	08/04/06	C	Toccoa	Hail	0.88	0	0	$0	$0
41100	06/12/07	C	Toccoa	Hail	1	0	0	$0	$0
41299	06/15/07	C	Toccoa	Hail	0.88	0	0	$0	$0
164340	04/10/09	C	Ayersville	Hail	1	0	0	$0	$0

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164341	04/10/09	C	Eastanollee	Hail	1.75	0	0	$0	$0
245647	06/15/10	C	Toccoa	Hail	0.88	0	0	$0	$0
307181	05/03/11	C	Avalon	Hail	0.75	0	0	$0	$0
312472	05/13/11	C	Eastanollee	Hail	1	0	0	$0	$0
312474	05/13/11	C	Fighting Pine	Hail	1	0	0	$0	$0
377589	04/03/12	C	Tournapull	Hail	1	0	0	$0	$0
409080	08/02/12	C	Tournapull	Hail	1	0	0	$0	$0
464232	06/26/13	C	Toccoa	Hail	0.75	0	0	$0	$0
533893	08/20/14	C	Toccoa Arpt.	Hail	0.75	0	0	$0	$0
574028	05/10/15	C	Toccoa Falls	Hail	1	0	0	$0	$0
638736	05/11/16	C	Toccoa	Hail	0.75	0	0	$0	$0
638735	05/11/16	C	Avalon	Hail	1	0	0	$0	$0
644077	06/14/16	C	Tugalo	Hail	1.75	0	0	$0	$0
744918	03/17/18	C	Fairview	Hail	1	0	0	$0	$0
753355	04/26/18	C	Toccoa	Hail	0.75	0	0	$0	$0
767992	06/03/18	C	Fairview	Hail	1.5	0	0	$0	$0
407668	06/29/12	Z		Heat		0	0	$0	$0
407703	07/01/12	Z		Heat		0	0	$0	$0
5537467	01/11/96	Z		Heavy Snow		0	0	$0	$0
5536421	02/03/96	Z		Heavy Snow		0	0	$0	$0
5578271	12/18/96	Z		Heavy Snow		0	0	$0	$0
5166392	11/19/00	Z		Heavy Snow		0	0	$0	$0
5177026	12/03/00	Z		Heavy Snow		0	0	$0	$0
5177043	12/19/00	Z		Heavy Snow		0	0	$0	$0
5177040	12/19/00	Z		Heavy Snow		0	0	$0	$0
5278951	01/03/02	Z		Heavy Snow		0	0	$0	$0
5388294	02/26/04	Z		Heavy Snow		0	0	$0	$0
18680	02/01/07	Z		Heavy Snow		0	0	$0	$0
76109	01/16/08	Z		Heavy Snow		0	0	$0	$0
161401	03/01/09	Z		Heavy Snow		0	0	$0	$0
216757	02/12/10	Z		Heavy Snow		0	0	$0	$0
276765	01/09/11	Z		Heavy Snow		0	0	$0	$0
5537473	01/18/96	Z		High Wind		0	0	$1,000	$0

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5628588	01/07/98	Z		High Wind	50	0	0	$0	$0
5635426	02/03/98	Z		High Wind	50	0	0	$5,000	$0
5237932	03/20/01	Z		High Wind	55	0	0	$0	$0
5283534	02/04/02	Z		High Wind	50	0	0	$0	$0
5321392	11/06/02	Z		High Wind	50	0	0	$0	$0
5326498	12/13/02	Z		High Wind	70	0	0	$0	$0
5389035	03/07/04	Z		High Wind	50	0	0	$5,000	$0
5423498	09/16/04	Z		High Wind	55	0	0	$25,000	$0
5423653	09/27/04	Z		High Wind	50	0	0	$0	$0
5447274	04/02/05	Z		High Wind	55	0	0	$5,000	$0
84265	02/10/08	Z		High Wind	55	0	0	$0	$0
208571	12/09/09	Z		High Wind	55	0	0	$0	$0
618140	02/24/16	Z		High Wind	50	0	0	$0	$0
722067	09/11/17	Z		High Wind	50	0	0	$10,000	$0
5680768	01/02/99	Z		Ice Storm		0	0	$0	$0
5129346	01/23/00	Z		Ice Storm		0	0	$0	$0
5129522	01/29/00	Z		Ice Storm		0	0	$0	$0
5326422	12/04/02	Z		Ice Storm		0	0	$500,000	$0
5383155	01/25/04	Z		Ice Storm		0	0	$0	$0
5383166	01/26/04	Z		Ice Storm		0	0	$0	$0
5488657	12/15/05	Z		Ice Storm		0	0	$100,000	$0
5314096	08/26/02	C	Toccoa	Lightning		0	0	$0	$0
5673821	12/23/98	Z		Sleet		0	0	$0	$0
5680772	01/31/99	Z		Sleet		0	0	$0	$0
5237925	03/20/01	Z		Sleet		0	0	$0	$0
5160411	11/09/00	Z		Strong Wind		0	0	$0	$0
247904	06/15/10	Z		Strong Wind	40	0	0	$5,000	$0
5543343	04/29/96	C	Toccoa	Thunderstorm Wind	52	0	0	$0	$0
5589020	02/21/97	C	Eastanollee	Thunderstorm Wind	50	0	0	$5,000	$0
5609334	07/04/97	C	Countywide	Thunderstorm Wind	50	0	0	$0	$0
5609340	07/28/97	C	Countywide	Thunderstorm Wind	50	0	0	$0	$0
5628585	01/07/98	C	Toccoa	Thunderstorm Wind	54	0	0	$500	$0
5635431	02/17/98	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0

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5637246	04/17/98	C	Toccoa	Thunderstorm Wind	63	0	0	$0	$0
5651562	06/04/98	C	Toccoa	Thunderstorm Wind	53	0	0	$0	$0
5651641	06/16/98	C	Toccoa	Thunderstorm Wind	74	0	0	$50,000	$0
5651647	06/19/98	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5651650	06/22/98	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5651656	06/26/98	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5141715	04/03/00	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5144928	05/21/00	C	Martin	Thunderstorm Wind	55	0	0	$0	$0
5176652	07/13/00	C	Martin	Thunderstorm Wind	55	0	0	$0	$0
5174296	09/21/00	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5266659	08/31/01	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5293255	04/28/02	C	Toccoa	Thunderstorm Wind	60	0	0	$25,000	$0
5313899	08/02/02	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5313901	08/02/02	C	Toccoa	Thunderstorm Wind	55	0	0	$0	$0
5314095	08/26/02	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5320911	09/14/02	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5357389	05/02/03	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5363599	06/11/03	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5329745	07/17/03	C	Countywide	Thunderstorm Wind	50	0	0	$2,000	$0
5334987	07/22/03	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5411404	06/12/04	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5411501	06/22/04	C	Toccoa	Thunderstorm Wind	50	0	0	$1,000	$0
5419705	08/20/04	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5422940	09/16/04	C	Eastanollee	Thunderstorm Wind	55	0	0	$2,000	$0
5428694	11/24/04	C	Toccoa	Thunderstorm Wind	55	0	0	$0	$0
5453518	05/19/05	C	Avalon	Thunderstorm Wind	50	0	0	$0	$0
5458410	06/06/05	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5469954	07/03/05	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5472571	08/18/05	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5472621	08/18/05	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5472633	08/21/05	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5472636	08/22/05	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5503814	04/08/06	C	Avalon	Thunderstorm Wind	50	0	0	$0	$0

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5523933	07/14/06	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5527881	08/04/06	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
5527888	08/05/06	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
13236	01/05/07	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
29241	04/04/07	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
41297	06/15/07	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
41345	06/18/07	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
49206	07/01/07	C	Eastanollee	Thunderstorm Wind	55	0	0	$0	$0
49262	07/10/07	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
55719	08/05/07	C	Toccoa	Thunderstorm Wind	55	0	0	$0	$0
58101	08/25/07	C	Toccoa	Thunderstorm Wind	55	0	0	$10,000	$0
156383	02/11/09	C	Mize	Thunderstorm Wind	50	0	0	$0	$0
164339	04/10/09	C	Ayersville	Thunderstorm Wind	55	0	0	$0	$0
194872	08/27/09	C	Tugalo	Thunderstorm Wind	50	0	0	$0	$0
245648	06/15/10	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
245649	06/15/10	C	Eastanollee	Thunderstorm Wind	50	0	0	$0	$0
246172	06/29/10	C	Fighting Pine	Thunderstorm Wind	50	0	0	$0	$0
249024	07/09/10	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
261868	09/27/10	C	Eastanollee	Thunderstorm Wind	50	0	0	$0	$0
320261	06/10/11	C	Fighting Pine	Thunderstorm Wind	55	0	0	$0	$0
332867	06/18/11	C	Toccoa	Thunderstorm Wind	55	0	0	$0	$0
329939	06/22/11	C	Boydville	Thunderstorm Wind	55	0	0	$0	$0
330396	06/26/11	C	Boydville	Thunderstorm Wind	50	0	0	$0	$0
340942	08/08/11	C	Boydville	Thunderstorm Wind	50	0	0	$0	$0
402685	07/05/12	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
403790	07/18/12	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
409073	08/02/12	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
471318	07/17/13	C	Tournapull	Thunderstorm Wind	55	0	0	$0	$0
471344	07/22/13	C	Toccoa Falls	Thunderstorm Wind	65	0	0	$0	$0
493814	01/11/14	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
493815	01/11/14	C	Eastanollee	Thunderstorm Wind	50	0	0	$0	$0
517310	05/27/14	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
526592	08/07/14	C	Toccoa Arpt.	Thunderstorm Wind	50	0	0	$0	$0

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544983	10/14/14	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
574027	05/10/15	C	Toccoa Falls	Thunderstorm Wind	50	0	0	$0	$0
590434	06/24/15	C	Toccoa	Thunderstorm Wind	50	0	0	$10,000	$0
590694	06/30/15	C	Toccoa Falls	Thunderstorm Wind	50	0	0	$0	$0
596704	07/14/15	C	Toccoa Falls	Thunderstorm Wind	55	0	0	$0	$0
599711	08/10/15	C	Toccoa	Thunderstorm Wind	50	0	0	$0	$0
644072	06/14/16	C	Tugalo	Thunderstorm Wind	55	0	0	$20,000	$0
715156	07/19/17	C	Boydville	Thunderstorm Wind	50	0	0	$0	$0
723040	10/08/17	C	Boydville	Thunderstorm Wind	50	0	0	$0	$0
5330951	11/19/03	C	Toccoa	Tornado	F0	0	0	$1,000	$0
5537460	01/06/96	Z		Winter Storm		0	0	$0	$0
5692300	03/09/99	Z		Winter Storm		0	0	$0	$0
5435517	01/29/05	Z		Winter Storm		0	0	$0	$0
501126	02/11/14	Z		Winter Storm		0	0	$0	$0
561529	02/16/15	Z		Winter Storm		0	0	$0	$0
561797	02/25/15	Z		Winter Storm		0	0	$0	$0
613878	01/22/16	Z		Winter Storm		0	0	$0	$0
675125	01/06/17	Z		Winter Storm		0	0	$0	$0
727346	12/08/17	Z		Winter Storm		0	0	$0	$0
5589017	02/13/97	Z		Winter Weather		0	0	$0	$0
5624925	12/30/97	Z		Winter Weather		0	0	$0	$0
5688695	02/01/99	Z		Winter Weather		0	0	$0	$0
5688701	02/24/99	Z		Winter Weather		0	0	$0	$0
5692311	03/26/99	Z		Winter Weather		0	0	$0	$0
5177032	12/13/00	Z		Winter Weather		0	0	$0	$0
5283551	02/06/02	Z		Winter Weather		0	0	$0	$0
5338950	01/16/03	Z		Winter Weather		0	0	$0	$0
5388032	02/26/04	Z		Winter Weather		0	0	$0	$0
5435944	01/29/05	Z		Winter Weather		0	0	$0	$0
5488170	12/15/05	Z		Winter Weather		0	0	$0	$0
13334	01/18/07	Z		Winter Weather		0	0	$0	$0
213322	01/29/10	Z		Winter Weather		0	0	$0	$0
220761	03/02/10	Z		Winter Weather		0	0	$0	$0

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271650	12/16/10	Z		Winter Weather		0	0	$0	$0
273967	12/25/10	Z		Winter Weather		0	0	$0	$0
285691	02/09/11	Z		Winter Weather		0	0	$0	$0
429327	01/25/13	Z		Winter Weather		0	0	$0	$0
493797	01/28/14	Z		Winter Weather		0	0	$0	$0
501097	02/11/14	Z		Winter Weather		0	0	$0	$0
561753	02/23/15	Z		Winter Weather		0	0	$0	$0
728285	01/17/18	Z		Winter Weather		0	0	$0	$0

DRAFT