MADISON COUNTY, ALABAMA

NATURAL HAZARDS MITIGATION PLAN

April 1, 2016

Prepared under the direction of the

Madison County Hazard Mitigation Planning Committee
by:
The Huntsville-Madison County Emergency Management Agency

Madison County, Alabama
Natural Hazards Mitigation Plan

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In 2009, this document was updated in accordance with the Disaster Mitigation Act of 2000, 44 CFR 201.6(d)(3) which requires local jurisdictions to review and revise this plan, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

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*****Note: Madison County has jurisdiction within all incorporated and unincorporated areas of the County and, through normal business practices, performs services, such as planning, engineering, public works, emergency management, and any other services authorized by intergovernmental agreement, to support municipal operations. The Madison County Committee members represent all municipalities within Madison County as well as unincorporated communities within the County. Although municipalities of Madison and Huntsville reside in two counties, the Madison County Mitigation Plan addresses the hazards for these two municipalities.

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Chapter 1
Background and Purposes of the Plan

1.1 About the Plan (Historical and Present)

The Madison County, Alabama, Natural Hazards Mitigation Plan is a multi-jurisdictional guide for all communities that have participated in the preparation of this plan through the Hazard Mitigation Planning Committee (HMPC). The jurisdictions that participated in the development of this plan include Madison County; the cities of Huntsville, Madison and New Hope; and the towns of Owens Cross Roads, Gurley, and Triana. There were no jurisdiction changes during the first five year plan maintenance cycle. This plan fulfills the requirements of the Federal Disaster Mitigation Act of 2000 (DMA 2000), as administered by the Alabama Emergency Management Agency (AEMA) and the Federal Emergency Management Agency (FEMA), Region IV.

This plan complies with all of the eligibility requirements for FEMA grant assistance to participating localities, including the Hazard Mitigation Grant Program (HMGP), the National Flood Insurance Program's Community Rating System (CRS), and the Flood Mitigation Assistance Program (FMA).

The initial planning process began in February 2003 with the appointment of the Hazard Mitigation Planning Committee (HMPC) by the Local Emergency Planning Committee (LEPC) and the Huntsville-Madison County Emergency Management Agency (EMA). The original plan was approved by FEMA

Two annual reviews of the plan took place between the plan's adoption by local jurisdictions in 2004 and the submission of the five-year update for review by AEMA and FEMA in 2009. These annual reviews were held in 2005 and 2006 by the HMPC and overseen by the EMA and the LEPC. Documentation of these annual reviews is maintained by the EMA.

During the second annual review, in 2006, the HMPC made several edits to chapters 5, 6, and 7 of the plan. Additional structural projects were added to the plan in 2006 by the HMPC. A mitigation effort for the town of Owens Cross Roads was also added to the plan. A public meeting was held in regards to these revisions on May 24, 2006. As per Chapter 7 of the 2004 plan, the revised chapters were submitted to the jurisdictions affected by the revisions for adoption in May 2006. Each jurisdiction held a public meeting prior to adoption.

The 2009 update process began in September 2009. Two HMPC meetings were held in September along with a series of one-on-one visits with participating jurisdictions and email correspondence with surrounding counties. Committee members and their respective agencies provided updates to data sets in the plan and added or subtracted mitigation strategies and goals. During the update process, the current version and draft revisions of the plan were made available on the EMA website: www.madisoncountyema.com/mplan.html

for public review and comment via an email link. Also, a public meeting was held for public review of the updated draft of the plan on September 30, 2009.

Four annual reviews of the plan took place between the plan's adoption by local jurisdiction in 2009 and the submission of the five-year update for review by AEMA and FEMA in 2014. These annual reviews were held in 2010, 2011, 2012, and 2013 by the HMPC and overseen by the EMA and the LEPC. Documentation of these annual reviews is maintained by the EMA.

During the second annual review, which took place after the devastating April 27, 2011 tornado outbreak in Alabama, the HMPC filed a limited amendment to the plan with the AEMA and FEMA. This amendment was to chapter 5 and 6 to include two new mitigation measures numbered 1.7.2 and 1.7.3, regarding community storm shelters and individual safe rooms.

During the third annual review, in 2012, the HMPC made extensive edits throughout the plan to incorporate 2010 Census data in all pertinent maps, charts and demographic figures throughout the plan.

Two HMPC meetings were held, first in July 2014, then in September, along with a series of one-on-one visits with participating jurisdictions and email correspondence with HMPC members. Committee members and their respective agencies provided updates to data sets in the plan and added or subtracted mitigation strategies and goals.

During the 2014 update process, a public meeting was held for public review of the updated draft of the plan on November 5, 2014.

1.2 Chapter Update and Review

During the 2014 update process, new paragraphs were added under "1.1 About the Plan," as well as a sentence in "1.5 Funding." No other changes were deemed necessary to this chapter.

1.3 Scope

The scope of the Madison County, Alabama, Natural Hazards Mitigation Plan is the unincorporated and incorporated areas within the county. The plan addresses all natural hazards deemed to threaten property and persons within Madison County. Both short-term and long-term hazard mitigation strategies are addressed, and implementation tasks are assigned, with funding alternatives identified.

In addition to this chapter, the plan contains the following elements:

1. A profile of the County's geography, history, physical features, and socioeconomic characteristics (Chapter 2. County Profile).

2. A description of the planning process that opens participation to all local governments, the public, academia, businesses, non-profit agencies, and regional, state, and federal governments (Chapter 3. Planning Process).

3. A general assessment of the County's past and predicted exposure to natural hazards and the risks that it faces, including impact on buildings, critical facilities and infrastructure with loss estimates (Chapter 4. Risk Assessment).

4. An assessment of local governments' capabilities to implement hazard mitigation measures, and the goals, objectives, policies and action items intended to effectively mitigate the county's natural hazard risks (Chapter 5. Mitigation Strategies).

5. The short-range (5-year) mitigation action programs for each participating jurisdiction (Chapter 6. Community Mitigation Action Programs).

6. Procedures for maintaining an active and effective, long-range hazard mitigation planning and implementation program (Chapter 7. Plan Maintenance).

1.4 Authority

Section 409 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288, as amended), Title 44 CFR, as amended by Section 102 of the Disaster Mitigation Act of 2000, provides the framework for state and local governments to evaluate and mitigate all hazards as a condition of receiving Federal disaster assistance. A major requirement of the law is the development and five-year maintenance update of a local hazard mitigation plan.

1.5 Funding

The original planning process in 2003-04 was funded through a grant. During the 2009 update process, grant funding was not available. The 2009 plan update process was funded entirely through in-kind services provided by the EMA and members of the HMPC. The 2014 plan update process was also funded entirely through in-kind services provided by the EMA and members of the HMPC.

1.6 Purposes

Hazard mitigation is any action taken to permanently reduce or eliminate long-term risk to people and their property from the effects of hazards. These natural hazards can be of any type - tornadoes, floods, hurricanes, severe storms, winter freezes, droughts, landslides, or dam failures – resulting from natural disaster crises. The communities within the county can take steps to prepare and implement mitigation measures for almost any type of hazard that may threaten its citizens, businesses and institutions.

Hazard mitigation plans can identify a range of structural approaches to lower the costs of future disasters by meeting the unique needs of the community. For example, structural mitigation projects for flooding could involve modifying a stream channel to increase the conveyance of floodwaters or retarding the flow rate by the construction of detention facilities.

Mitigation strategies can also involve non-structural initiatives, such as educational programs to inform the community about the risks the public and its property face in order to encourage them to purchase insurance or retrofit their homes. Non-structural programs can also include developing and enforcing regulations to prevent construction in hazard areas, or to ensure that development that does occur will be resistant to the hazards threatening the area.

Mitigation programs and projects serve to lessen a community's vulnerability to the hardships and costs of disasters. The implementation of mitigation programs is a key component to achieving a sustainable community, one in which the economic and social needs of people, businesses, and institutions coexist with natural environmental constraints and are protected from the disruptions and impacts of emergencies and disasters. Hazard mitigation planning must be closely coordinated with a community's overall planning and development efforts. The most effective way for a community to initiate this objective is through a comprehensive local mitigation planning program. Comprehensive planning can provide Madison County citizens a safe, healthy and prosperous place to live and work.

The purpose of the Madison County, Alabama, Natural Hazards Mitigation Plan is to develop a unified approach among its local governments for dealing with identified hazards and hazard management problems. This plan serves as a guide for local governments in their ongoing efforts to reduce vulnerability to the impacts produced by natural hazards.

Further, the plan seeks to accomplish the following additional purposes:

- Establish an ongoing hazard mitigation planning program
- Identify and assess the hazards that pose a threat to life and property
- Evaluate additional mitigation measures that should be undertaken
- Outline procedures for monitoring the implementation of mitigation strategies

This plan provides guidance for local mitigation activities over the next five-year planning cycle. It encourages activities that are most effective and appropriate for mitigating the effects of all natural hazards.

Chapter 2
County Profile

2.1. Geographic Setting and History

Madison County, located in north-central Alabama as shown on Map 2-1, contains approximately 813 square miles, including eight square miles of water surface area. The State of Tennessee is located to the north; Jackson County to the east; Marshall and Morgan Counties to the south; and Limestone County to the west. The Paint Rock and Tennessee Rivers serve as its southern boundary. Located in the eastern third of the county, the Flint River flows from north to south and empties into the Tennessee River. The City of Huntsville is the major municipality and county seat. Huntsville is located 103 road miles from Nashville; 180 from Atlanta; 101 from Birmingham; and 69 miles east of Florence.

Map 2-1: General Location

In 1804 the first white man is said to have settled in the vicinity of Madison County in what was then Cherokee and Chickasaw Indian country. A few years later, in 1808, the Mississippi Territorial Governor officially created the county and named it in honor of President James Madison (1751-1836). The introduction of cotton and later relocation of a federal land office from Nashville to Huntsville in 1811 stimulated the migration of many new settlers into the area with hopes of homesteading some of the fertile Tennessee River valley.

Cotton thrived in the rich soil and the textile industry emerged when the first cotton mill started up in 1809 (it operated until 1885 and is recognized as the oldest in the state). In 1818 the first courthouse was constructed in Huntsville, and the city served briefly as Alabama's temporary capital when it first obtained statehood in 1819. Huntsville's commercial importance was further enhanced when a canal to the Tennessee River was constructed in 1831, enabling cotton to be floated all the way to New Orleans, and later when the Memphis and Charleston Railroad was completed in 1855.

Like the other large, cotton-based commercial centers of the South, Huntsville did not escape the Civil War unscathed. Federal troops took the city by surprise attack in 1862, converting it into a vital communications center for its forces operating in the area. For the rest of the war it was the site of several skirmishes and guerilla raids.

After the Civil War, new mills engaged in some facet of the cotton or textile business were constructed by northern industrialists to exploit the region's low wage rates. A new railroad, the Nashville, Chattanooga and St. Louis, ensured reliable transportation for the mills' production. By 1920, Huntsville boasted a population of some 8,018 citizens. Huntsville and Madison County once again enjoyed prosperous times as a major commercial center until the dark days of the Depression.

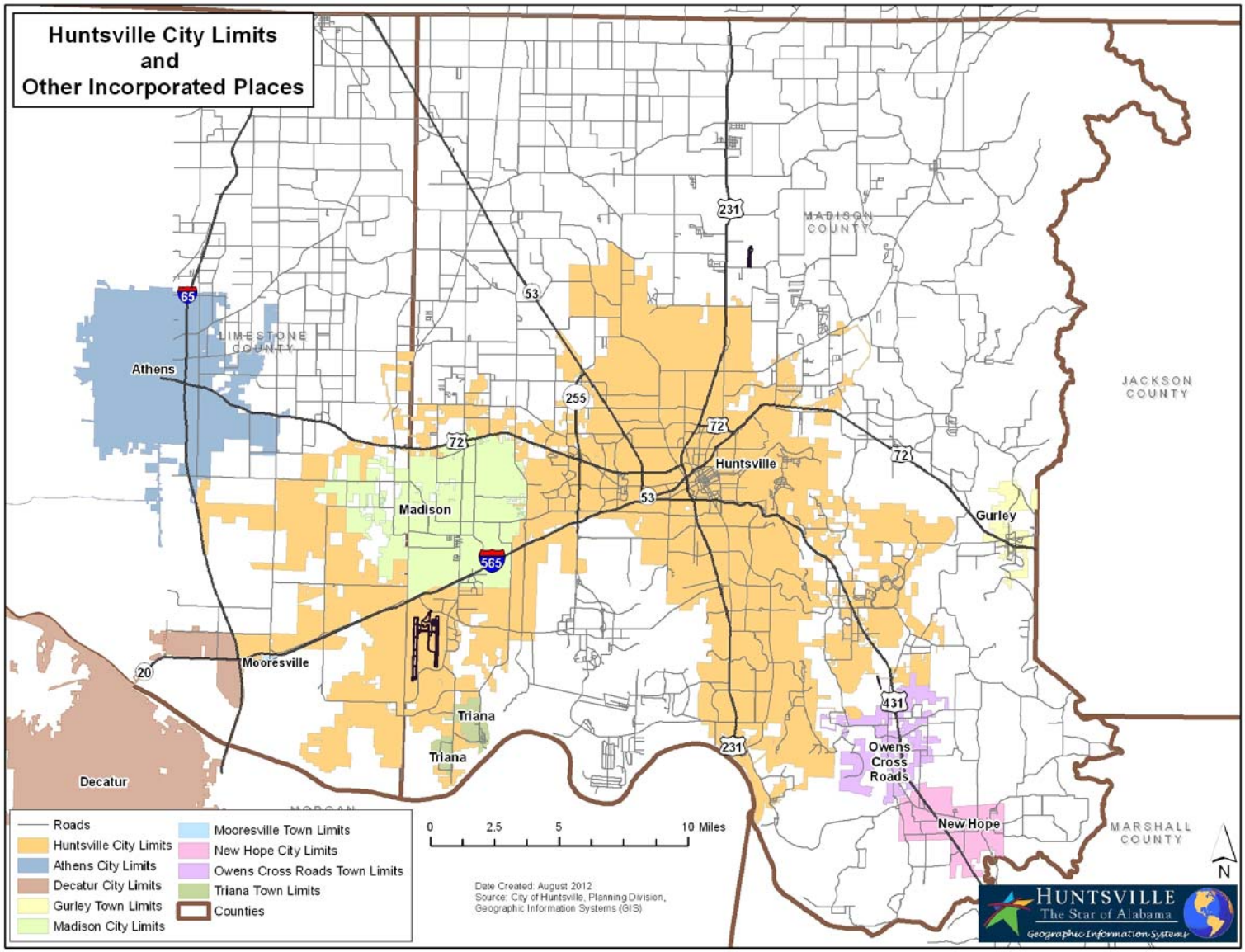
President Roosevelt's New Deal and the TVA Act of May 1933 not only helped to revive the local economy from the Depression but prompted big changes for Madison County and North Alabama. The construction of dams and electricity generation had the most impact on the area, providing many new opportunities to the largely agrarian society and attracting the attention of new industries. Huntsville's population increased to 13,150 by 1940.

Probably the most significant event in Madison County's history occurred in 1941 when the Huntsville Arsenal and Redstone Ordnance Plant were built on the Tennessee River to support the war effort. These facilities merged in 1949 into the Redstone Arsenal and became the headquarters of the Army's new rocket program. In 1950, Wernher von Braun and his team of scientists came in and began the space program for which Huntsville is so noted. Named the Marshall Space Flight Center in 1960, it is world re-known for the storied Apollo program which succeeded in putting a man on the moon in July 1969. The U.S. Space and Rocket Center was established in Huntsville in 1970, and it continues to attract thousands of visitors each year with its museums and popular Space Camp.
Source: Richter-Haaser, Mrs. Elfriede. History of Madison County from the County's web site.

2.2 Government

A seven-member County Commission governs Madison County. Six of the members represent different county districts, while the seventh member serves as the chair and is elected by the entire county. Commissioners serve four-year terms.

As shown on **Map 2-2**, Madison County has a total of six incorporated communities: Huntsville, Madison, New Hope, Gurley, Owens Cross Roads and Triana. Huntsville and Madison are the largest cities and they extend over into adjoining Limestone County. All cities and towns in Madison County have a mayor/council form of government.



Map 2-2. Madison County Municipalities

2.3 Demographics

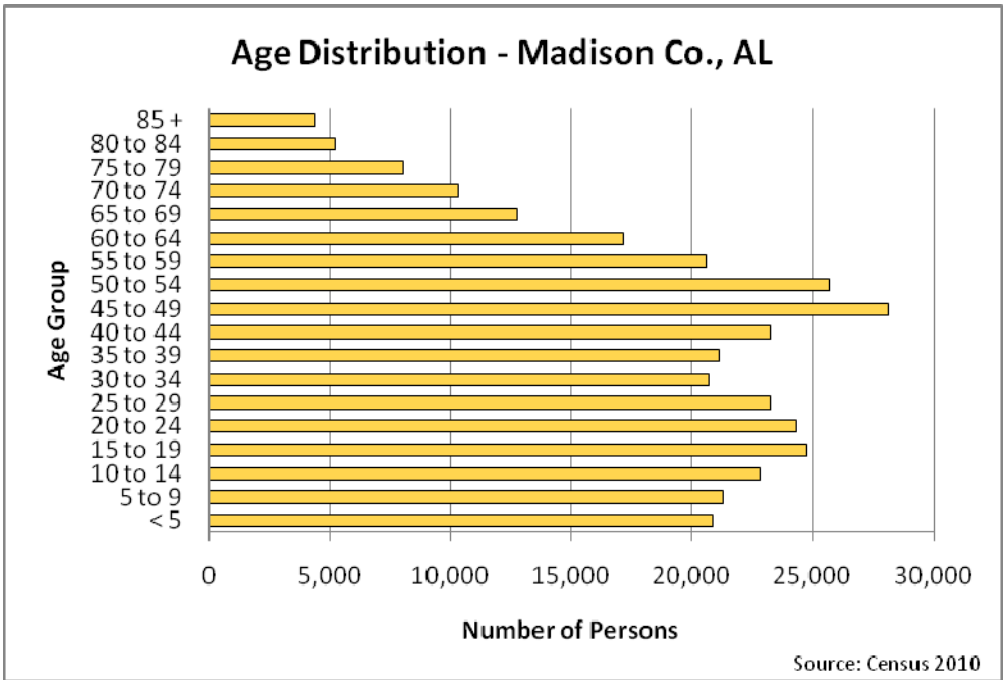
Census 2010 reported Madison County's population at approximately 334,811, divided between females and males 50.9 and 49.1 percent respectively. The County contains approximately seven percent of the state population of 4,779,736. Map 2-3 shows the county's population density. The cities of Huntsville and Madison, which extend over into adjoining Limestone County, with populations of 180,105 and 42,938 respectively, account for 65% of the Madison County population. The population of each municipality in Madison County is shown in **Table 2-1**.

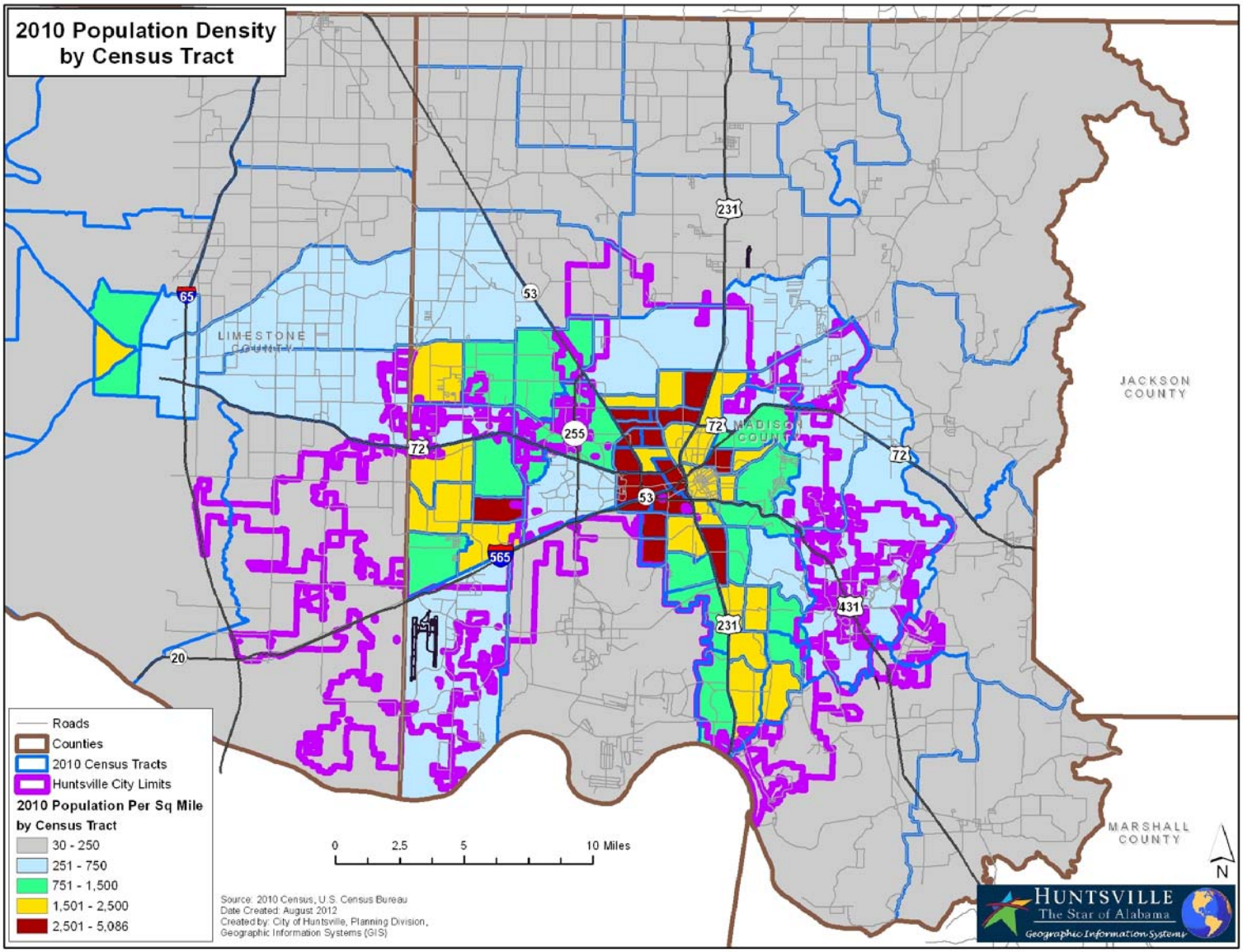
Table 2-1. Population

Location	Population
Madison County	334,811
Huntsville	178,584
Madison	39,485
New Hope	2,810
Owens Cross Roads	1,521
Gurley	801
Triana	496
Un-incorporated areas	111,114

The median age of Madison County residents is 37.3 years. **Chart 2-1** shows the county's complete age distribution.

Chart 2-1. Age Distribution



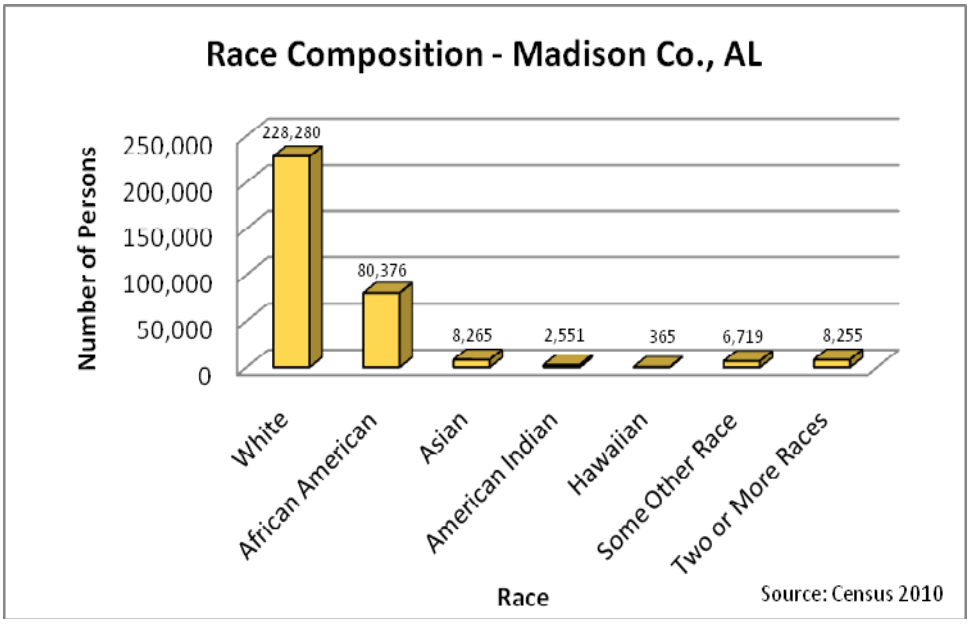


Map 2-3. Population Density

Approximately 94.5% of the county's inhabitants were born in the United States. Of those born outside the U.S., 38% were born in Latin America, followed by Asia (34.7%) and Europe (15.2%). Others were born in Africa, Northern America and Oceania.

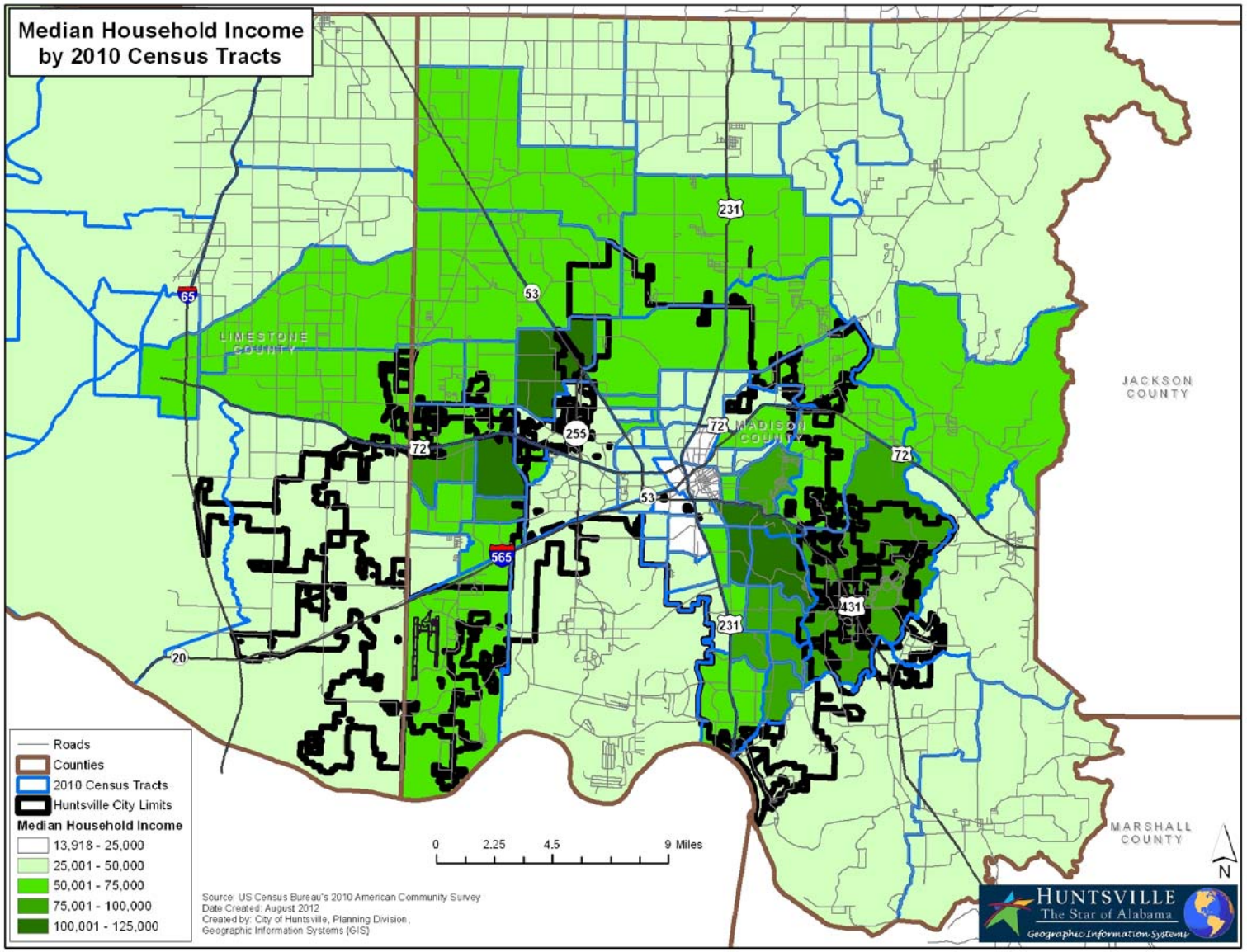
The majority of Madison County's population is white (68.2%) and African American (24.0%). The third largest race represented is Asian at 2.5%. **Chart 2-2** represents race composition.

Chart 2-2. Race Composition

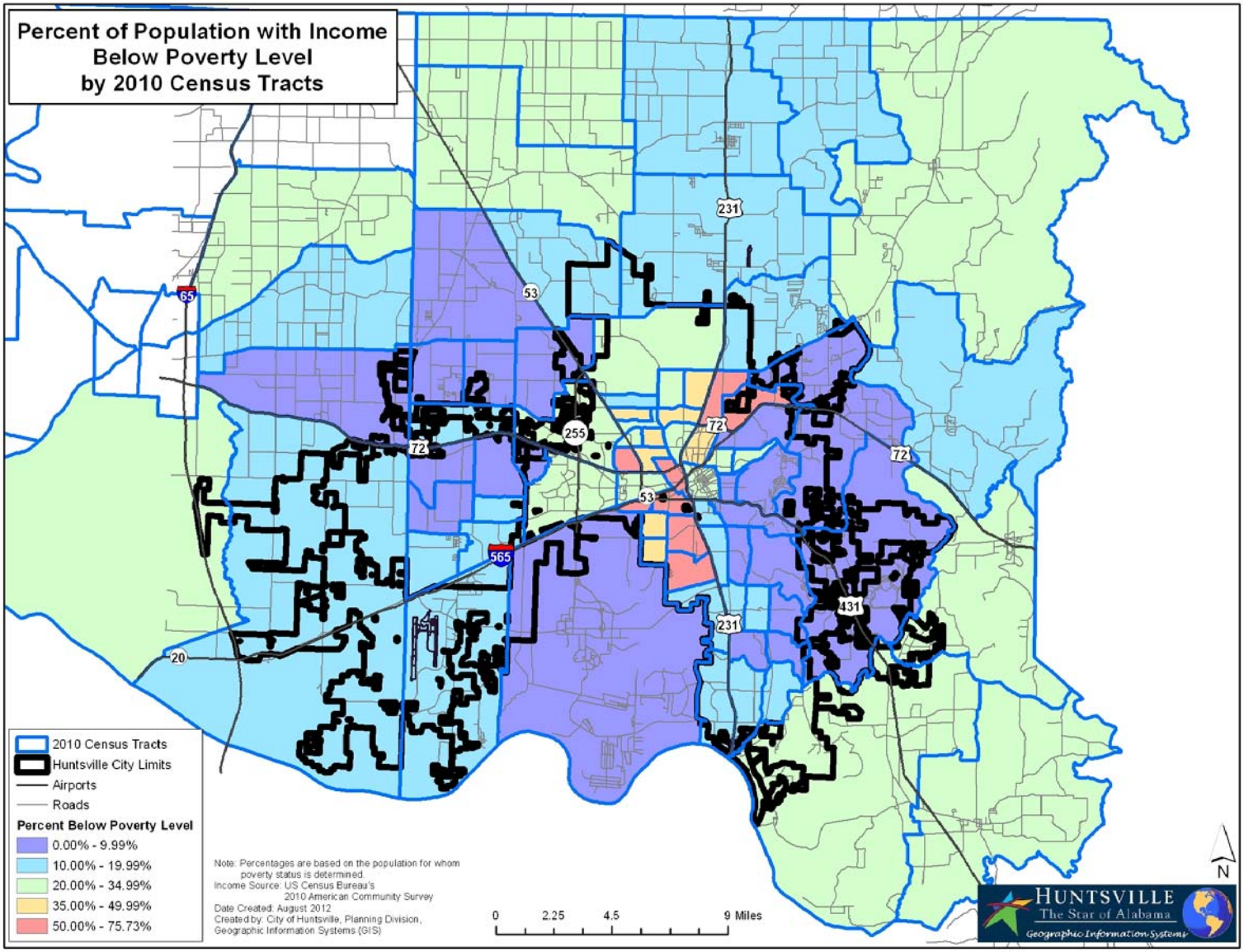


The county's population is divided into 134,700 total households, of which 92,153 are owner-occupied and 42,547 are renter-occupied. The average household size is 2.43 living in a home.

The median household income for Madison County is $55,851 compared to a state average of $42,081. Only 12.0% of the population is classified as below the poverty level which is significantly lower than the statewide average of 17.1%. **Maps 2-4** and **2-5** depict household income and percent of population below the poverty level. **Chart 2-3** represents household income distribution.

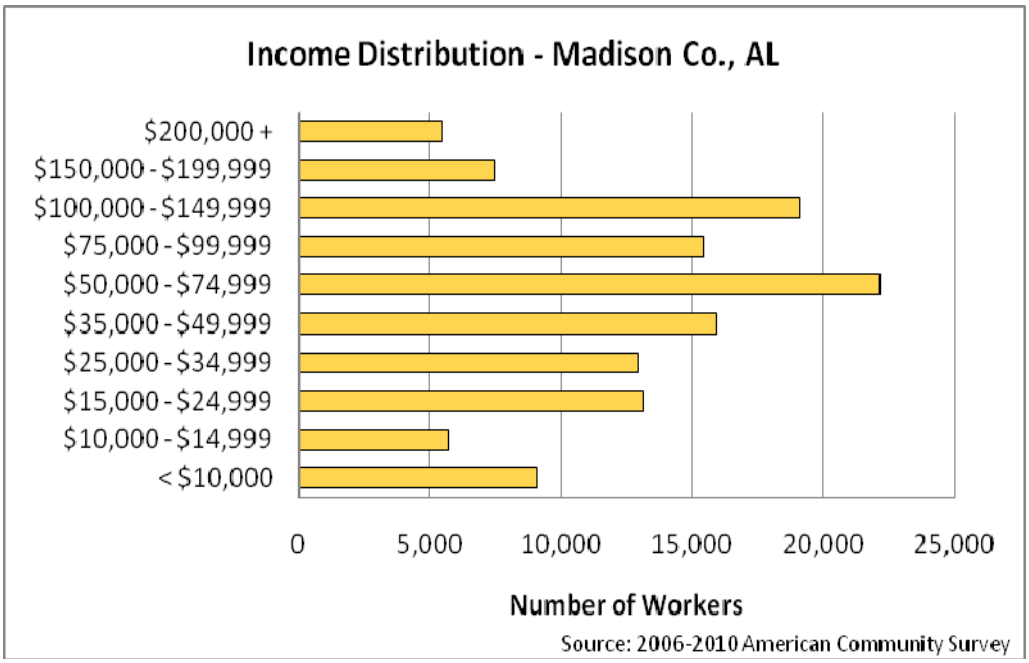


Map 2-4. Household Income Distribution



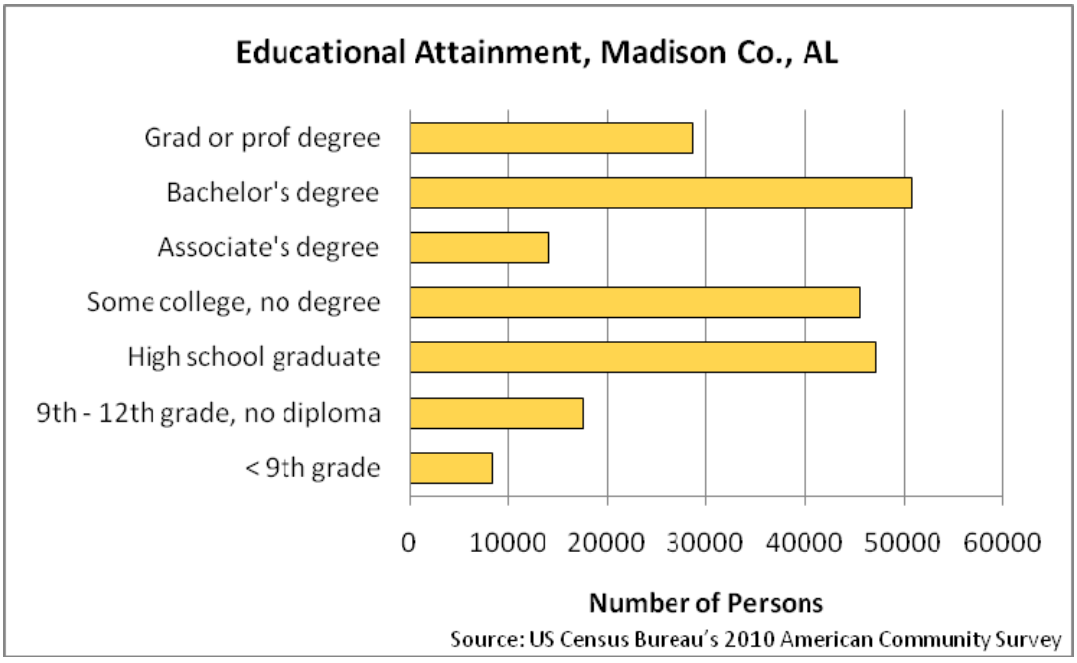
Map 2-5. Percent of Population Below the Poverty Level

Chart 2-3. Income Distribution



As shown on **Chart 2-4**, 37.4% of Madison County residents age 25 years and up have obtained a Bachelor's degree, compared to a statewide average of only 21.7%. Approximately 87.8% have at least completed high school, also higher than the state average of 81.4%. The next highest category is those that attended college but did not obtain a degree.

Chart 2-4. Educational Attainment



2.4 Economy

Madison County's total employed civilian population age 16 years and older is 158,009. There are 13,137 workers or 7.7% classified as unemployed.

As shown in **Chart 2-5**, professional, scientific, and technical services account for the largest industry in Madison County with 22.49% of the workforce. Following next are health services (13.2%), manufacturing (12.2%) and retail trade (11.99%). Agriculture and forestry operations employ the fewest number of workers in the county (.09%). It is interesting to note that 85% of the work force drives to work alone and 9.6% carpool. Approximately 1.3% regularly walk to work. Only 0.4% utilizes public transportation. A small percentage (2.7%) work from home. **Table 2-2** lists the largest employers in the county.

Chart 2-5. Employment by Industry Type

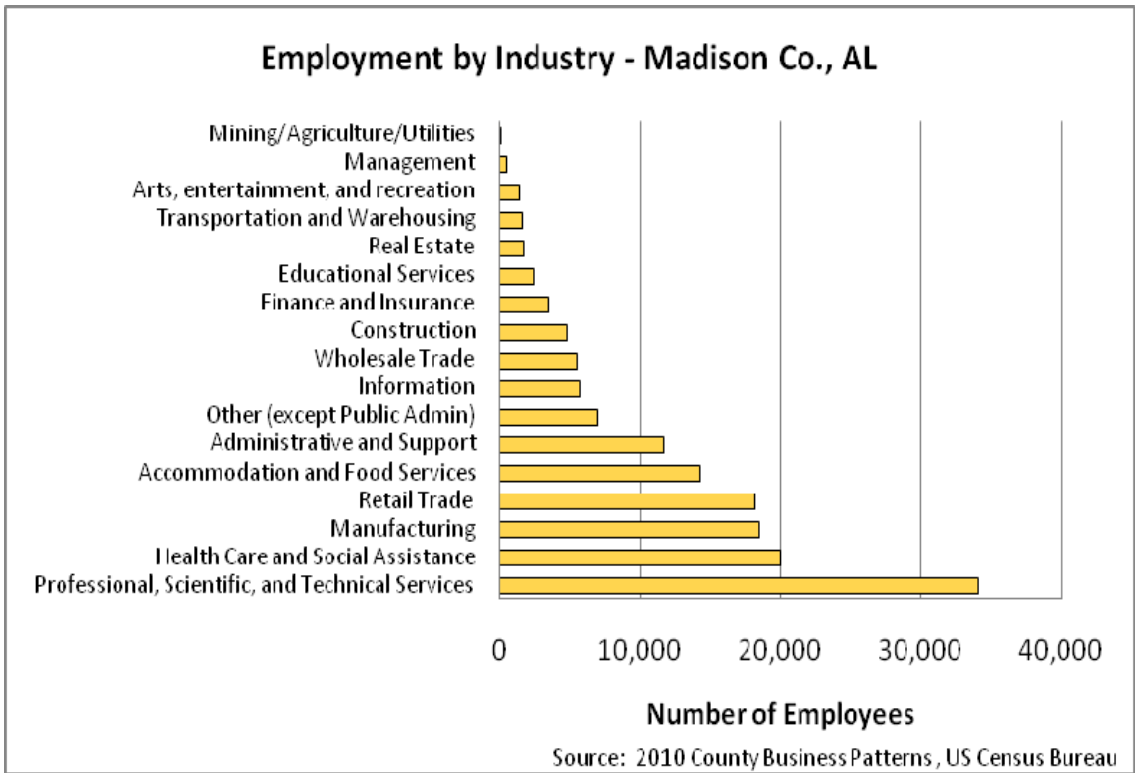


Table 2-2. Largest Employers

Organization	Employees
U.S. Army/Redstone Arsenal	31,500
Huntsville Hospital System	7,129
NASA/Marshall Space Flight Center	6,000
Huntsville City Schools	3,079
The Boeing Company	2,600
Madison County Schools	2,389
SAIC	2,229
City of Huntsville	2,206
ADTRAN, Inc.	1,740
UAHuntsville	1,675
CINRAM, Inc.	1,450
Dynetics	1,400
Sanmina-SCI Corporation	1,365
Qualitest	1,350
Intergraph Corporation	1,325
Madison County Commission	1,242
Northrop Grumman Corporation	1,238
Verizon Wireless	1,200
Wyle CAS Group	1,156
Lockheed Martin Corporation	1,150
Toyota Motor Manufacturing Alabama, Inc.	1,150
Madison City Schools	976
Teledyne Brown Engineering	900
DirecTV	858
Science & Engineering Services, LLC	825
Crestwood Medical Center	822

Source: Chamber of Commerce of Huntsville/Madison County, September 2014

2.5 Climate

Madison County's weather is characterized by mild, wet winters and hot, humid summers. Winter weather is the product of a succession of cold fronts advancing from the west and sometimes producing heavy rainfall when mixed with warm moist air rising from the Gulf. Occasionally it results in damaging thunderstorms and tornadoes. In summers the Gulf moisture produces very humid conditions and occasional afternoon thunderstorms which may produce high winds, dangerous lighting, hail or tornadoes. Snowfall is very rare. **Table 2-3** presents temperature and precipitation averages observed in Huntsville during the period 1/1/1959 through 4/30/2012.

Table 2-3. Climate

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (°F)	48.8	54.0	63.0	73.2	80.1	87.2	89.7	89.2	83.1	73.3	62.2	52.5	71.4
Average Min. Temperature (°F)	29.8	33.2	41.1	49.5	57.9	65.7	69.4	68.3	61.9	49.5	40.3	33.4	50.0
Average Total Precipitation (in.)	5.16	4.72	6.61	4.88	5.10	4.15	4.64	3.62	4.23	3.48	4.76	5.75	57.09
Average Total SnowFall (in.)	1.7	0.9	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9	4.1

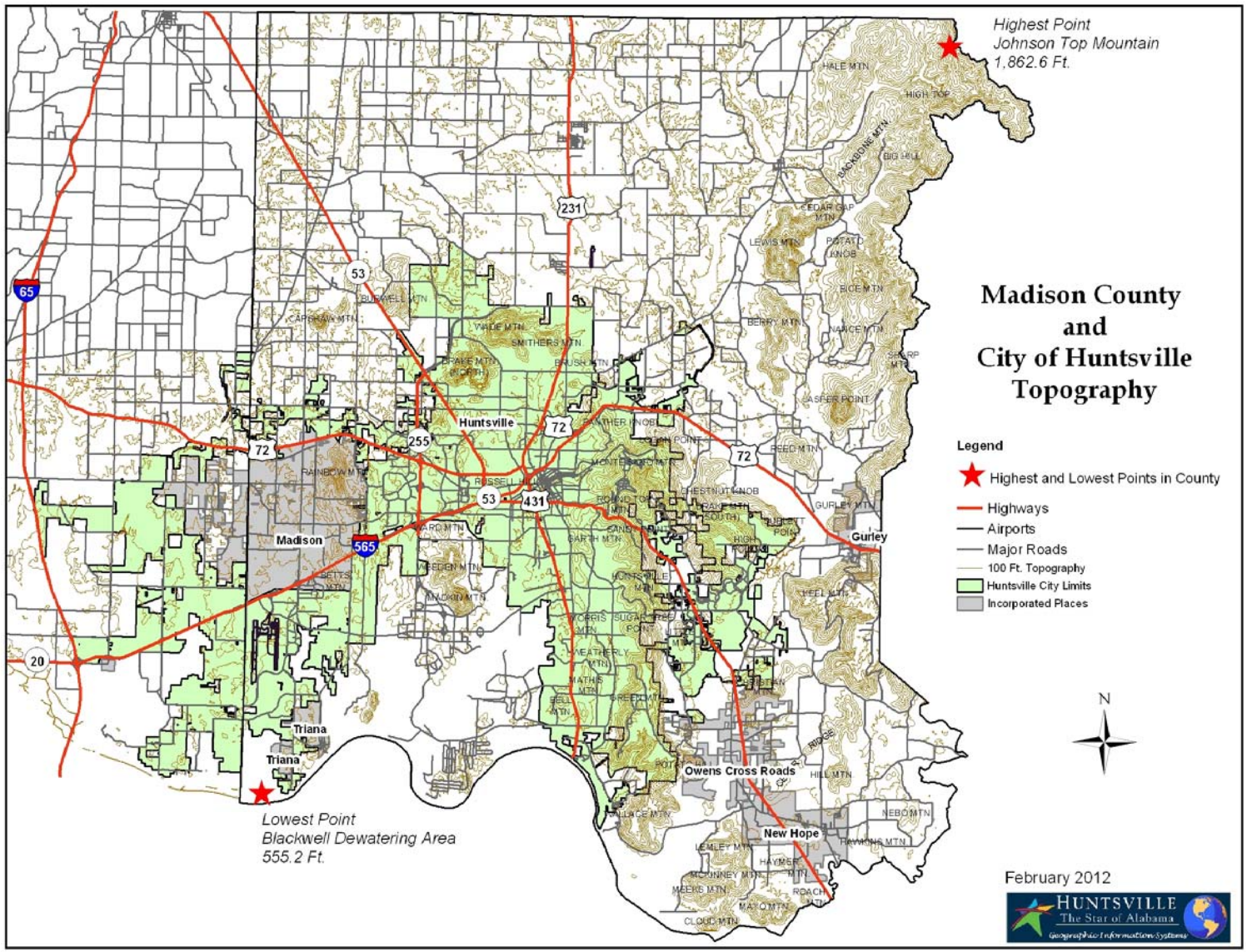
Source: Southeast Regional Climate Center

2.6 Physical Features

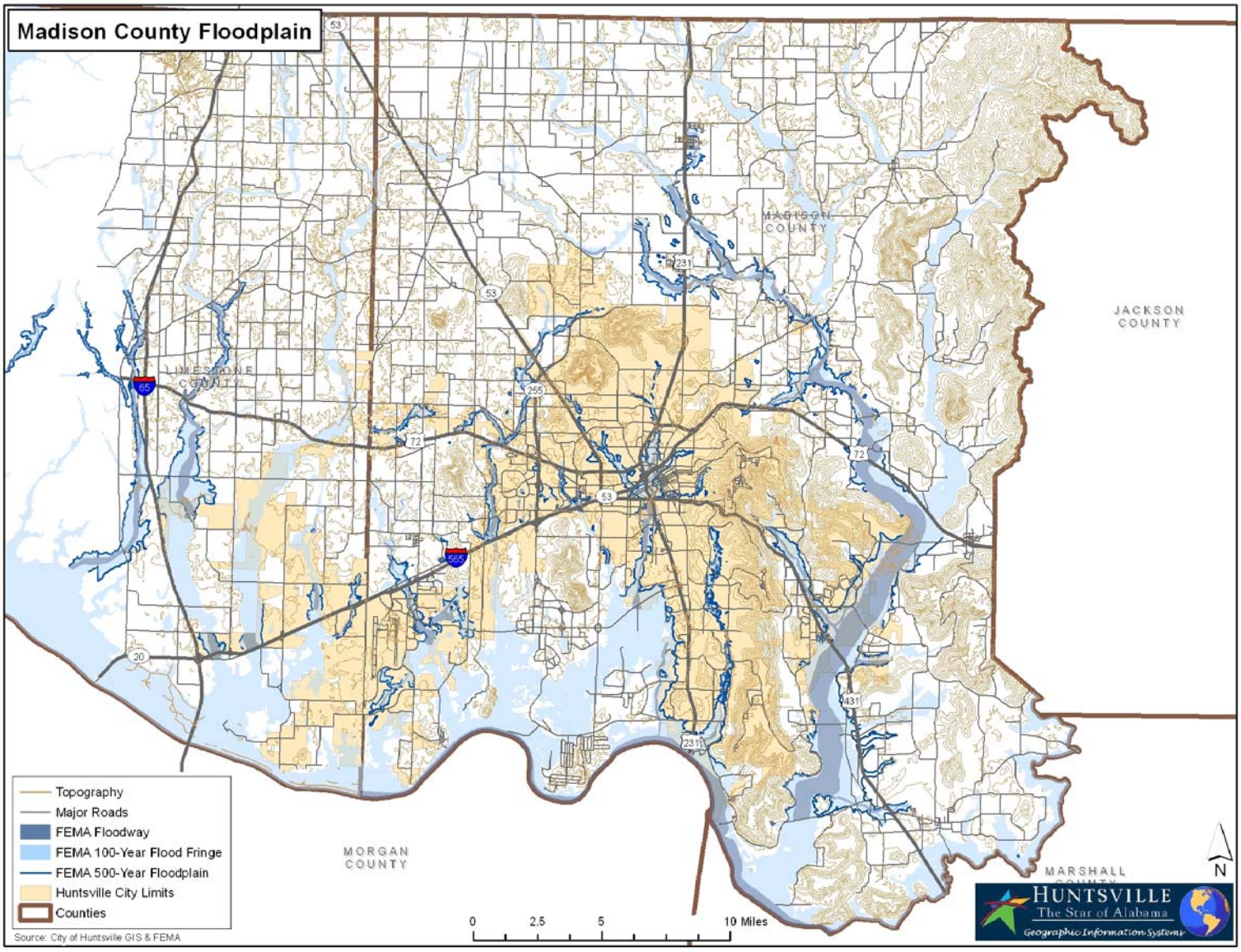
Eastern and Southeastern Madison County have many mountainous regions. Approximately one-third of the county is forested, mostly on these mountain slopes. Western Madison County consists of broad, rolling hills of slight to moderate relief with elevations ranging from 600 to 800 feet. **Map 2-6** is a topographic map of the County.

The Flint River flows southerly through the county through broad, agricultural valleys. It drains a total of 568 square miles and includes most of north-central, northeastern and east-central Madison County. Other drainage basins include Brier Fork, Beaverdam Creek, Indian Creek, Aldridge Creek, Huntsville Spring Branch, Pinhook Creek, Fagan Creek, Dallas Branch and Broglan Branch. **Maps 2-7** and **2-8** depict the floodplains and wetland areas, respectively.

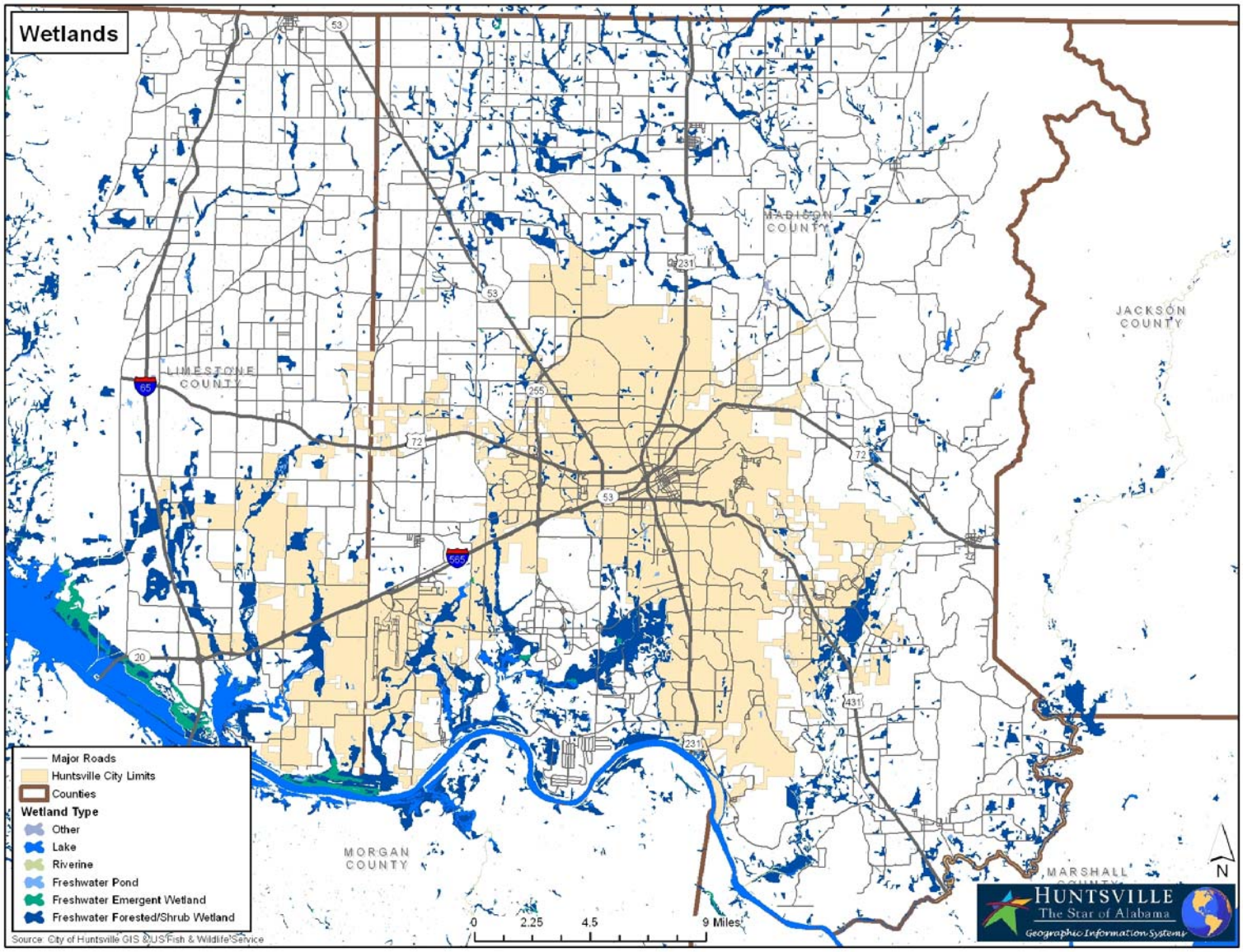
Madison County's soils are derived primarily from sedimentary rocks and are moderately well to extremely well-drained. The City of Huntsville is located in the Highland Rim region, and has primarily a rolling topography consisting of limestone soils. Surface drainage in Huntsville is dendritic, flowing southward to the Tennessee River. **Map 2-9** shows the type of soils found in the County.



Map 2-6. Topography

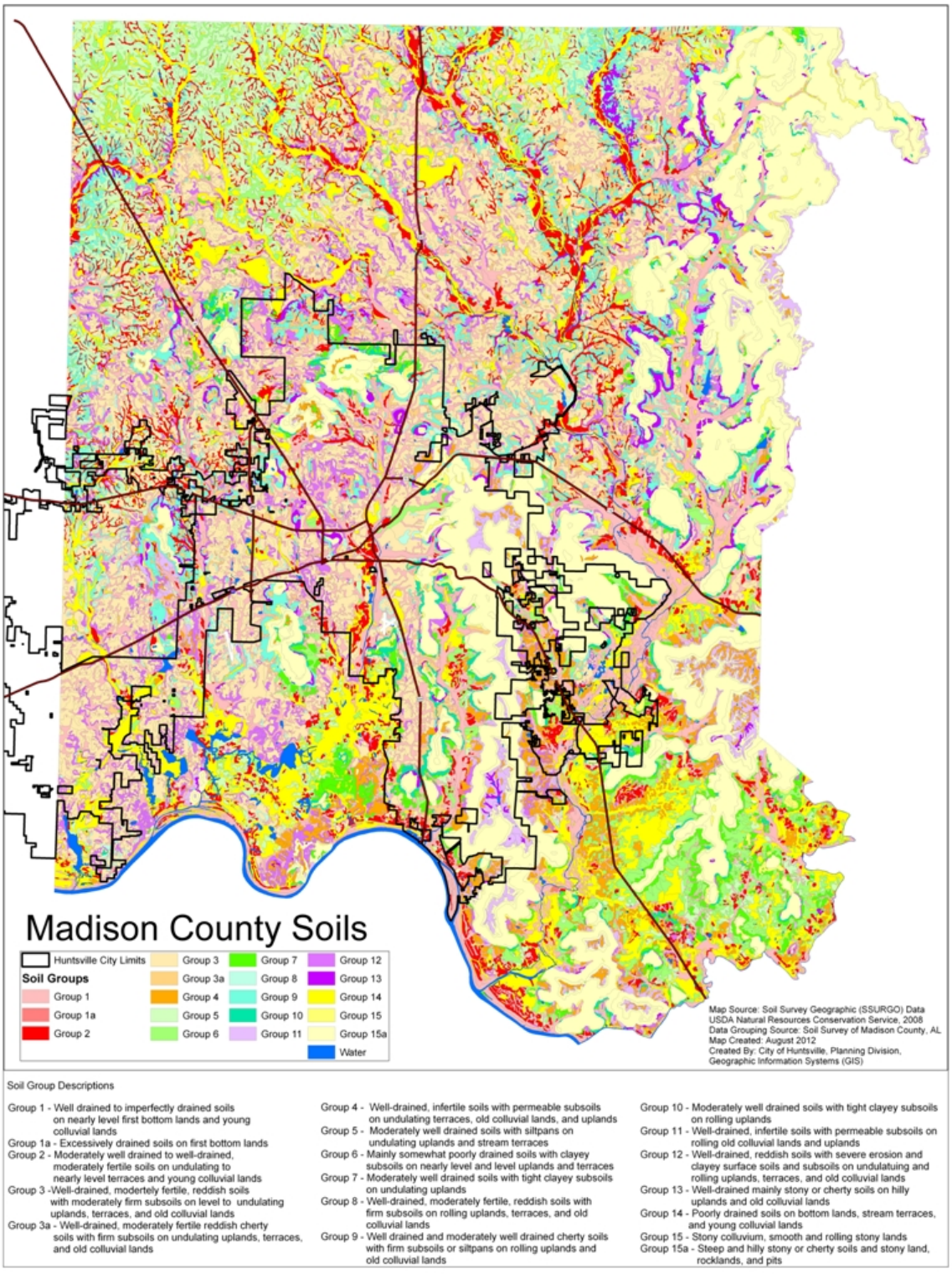


Map 2-7. Floodplains



Map 2-8. Wetland Areas

Map 2-9. Madison County Soils



Soil Group Descriptions

Group 1 - Well drained to imperfectly drained soils on nearly level first bottom lands and young colluvial lands

Group 1a - Excessively drained soils on first bottom lands

Group 2 - Moderately well drained to well-drained, moderately fertile soils on undulating to nearly level terraces and young colluvial lands

Group 3 -Well-drained, modertely fertile, reddish soils with moderately firm subsoils on level to undulating uplands, terraces, and old colluvial lands

Group 3a - Well-drained, moderately fertile reddish cherty soils with firm subsoils on undulating uplands, terraces, and old colluvial lands

Group 4 - Well-drained, infertile soils with permeable subsoils on undulating terraces, old colluvial lands, and uplands

Group 5 - Moderately well drained soils with siltpans on undulating uplands and stream terraces

Group 6 - Mainly somewhat poorly drained soils with clayey subsoils on nearly level and level uplands and terraces

Group 7 - Moderately well drained soils with tight clayey subsoils on undulating uplands

Group 8 - Well-drained, moderately fertile, reddish soils with firm subsoils on rolling uplands, terraces, and old colluvial lands

Group 9 - Well drained and moderately well drained cherty soils with firm subsoils or siltpans on rolling uplands and old colluvial lands

Group 10 - Moderately well drained soils with tight clayey subsoils on rolling uplands

Group 11 - Well-drained, infertile soils with permeable subsoils on rolling old colluvial lands and uplands

Group 12 - Well-drained, reddish soils with severe erosion and clayey surface soils and subsoils on undulatuing and rolling uplands, terraces, and old colluvial lands

Group 13 - Well-drained mainly stony or cherty soils on hilly uplands and old colluvial lands

Group 14 - Poorly drained soils on bottom lands, stream terraces, and young colluvial lands

Group 15 - Stony colluvium, smooth and rolling stony lands

Group 15a - Steep and hilly stony or cherty soils and stony land, rocklands, and pits

2.7 Transportation

Map 2-10 shows the major transportation routes in Madison County. Interstate 565 provides a direct connection from Huntsville to Interstate 65 in Limestone County. US Highways 72, 231 and 431 and State Highway 53 provide access to most of the county. Huntsville International Airport is the major air transportation provider in the region, providing over 70 flights daily. Three other public or military airports are located in the county. Norfolk Southern and the Huntsville and Madison County Railroad are the county's two rail lines. The Huntsville Inland Docks provides access to the Tennessee River.

2.8 Utilities

Huntsville Utilities, owned by the City of Huntsville, provides gas, water and electric service to Madison County residents. The company is governed by three separate boards appointed by the Huntsville City Council. They operate in conjunction with most of the Madison County water systems, city and county sanitation departments, and the City Water Pollution Control Department. By sharing management and combining services on a single bill, utilities are provided at the lowest possible cost.

Gas

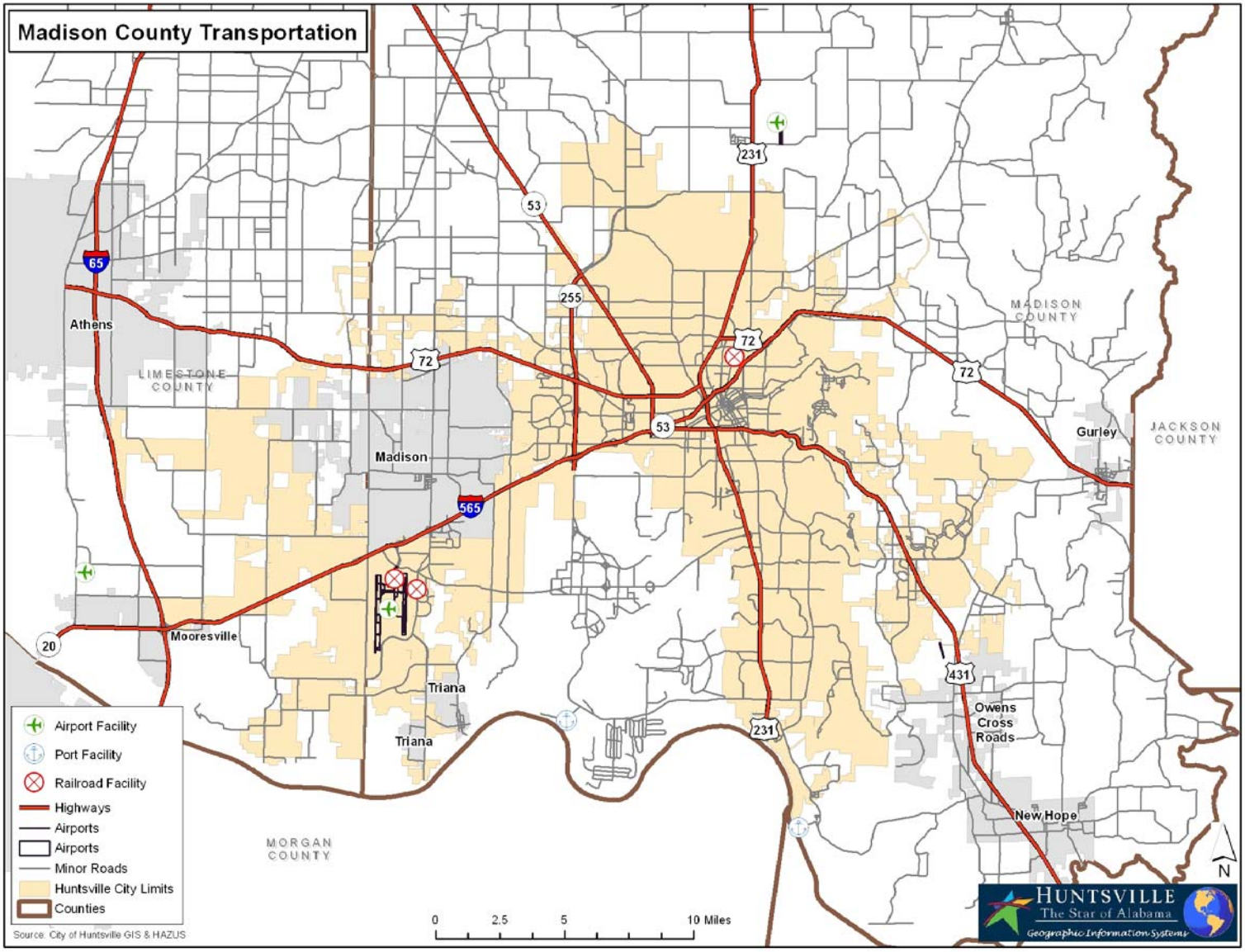
Natural gas is piped in from the Gulf of Mexico to Huntsville Utilities. At this writing, a new supply line is being constructed to North Alabama. During emergencies, it will be possible to supplement natural gas from this line with a propane/air mixture.

Water

Water is supplied from underground aquifers and the Tennessee River and purified in accordance with government regulations. An on-site, certified laboratory closely monitors water quality.

Electricity

Electricity is purchased from the Tennessee Valley Authority and distributed throughout the county**.**



Map 2-10. Transportation System

2.9 Chapter Update and Review

This chapter was updated jointly by the EMA and City of Huntsville Geographic Information Systems (GIS). The Hazard Mitigation Planning Committee (HMPC) reviewed and approved the updates. Updates included the reformation of every map in the chapter. No additional maps were added to this chapter, nor were any maps or charts removed. Text in this chapter was unaltered, as all text is factual information about the history and makeup of Madison County, AL.

Charts 2-1 through 2-5 and Tables 2-1 through 2-2, as well as any text referencing them have been updated based on 2010 Census data.

During the 2014 five-year update process, Huntsville GIS provided updated versions of several maps and tables in this chapter. The HMPC reviewed and approved several updates to the maps and tables. Additionally, EMA updated Table 2.2 with September, 2014 Chamber of Commerce data.

Chapter 3
The Planning Process

3.1. A Multi-Jurisdictional Planning Process

The Madison County Hazard Mitigation Planning Committee represents all incorporated cities and towns – City of Huntsville, City of Madison, City of New Hope, Town of Gurley, Town of Owens Cross Roads, and Town of Triana- and all unincorporated communities and areas of Madison County. These jurisdictions were also involved in the 2003-2004 planning process; no jurisdiction changes took place during the first five year plan maintenance period.

This integrated planning process combines the risks, issues, goals, and mitigation measures of each community into a consolidated plan whereby all jurisdictions have equal opportunity for participation and full representation in the planning process. This process, therefore, satisfies the requirements of CFR Section 201.6(a)(3) of the DMA 2000 in which "multi-jurisdictional plans may be accepted, as appropriate, as long as each jurisdiction has participated in the process." All jurisdictions fully participated in all committee meetings, committee assignments and exercises, public meetings, and other planning activities completed during the drafting and updating phases of this Plan. In addition to Committee representation, each jurisdiction conducted an independent public hearing to receive public comments prior to final action by each governing body to adopt the plan.

3.2 Hazard Mitigation Planning Committee

A special planning committee – the Madison County Hazard Mitigation Planning Committee – comprised of representatives from all jurisdictions and other organizations in Madison County concerned with natural disasters, guided the development of this natural hazards mitigation plan. The members of the planning committee and the organizations they represent are shown in **Table 3-1**.

Table 3-1. Hazard Mitigation Planning Committee

Title	Name	Agency	Representing
Emergency Plans Coordinator	Jared Cassidy	Huntsville-Madison County EMA	Madison County*
Emergency Management Officer	Paige Colburn,	Huntsville-Madison County EMA	Madison County*
Chairman	Dale Strong	Madison County Commission	Madison County*
Chairman	Don Webster	Madison County Emergency Planning Committee	Madison County*
Engineer	Houston Matthews	Madison County Engineering	Madison County*
Engineer	Fritz Mucke	Madison County Water Department	Madison County*

Title	Name	Agency	Representing
Engineer	John Buxton	Madison County Water Department	Madison County*
	Cheryl Clay	Madison County Health Department	Madison County*
Mayor	Tommy Battle	City of Huntsville	City of Huntsville
Hydrologist	Gary Gleason	City of Huntsville Engineering	City of Huntsville
Engineer	Marty Calvert	City of Huntsville Engineering	City of Huntsville
Planner	Ben Ferrill	City of Huntsville Planning	City of Huntsville
GIS Analyst	Amy Kenum	City of Huntsville GIS	City of Huntsville
Mayor	Troy Trulock	City of Madison	City of Madison
	Mike Gentle	City of Madison	City of Madison
Engineer	Greg Bates	City of Madison Engineering	City of Madison
Mayor	Tony Craig	Town of Owens Crossroads	Town of Owens Crossroads
Police Officer	Scott Worsham	Town of Owens Crossroads	Town of Owens Crossroads
Mayor	Robert Sentell	Town of Gurley	Town of Gurley
Town Administrato	Bob Hammons	Town of Gurley	Town of Gurley
Mayor	Butch Taylor	City of New Hope	City of New Hope
	Kim Passalaqua	City of New Hope	City of New Hope
Mayor	Mary Caudle	Town of Triana	Town of Triana
	Theresa Nelson	Town of Triana	Town of Triana
	Joseph A. Lee, AICP	Alabama A&M University	Alabama A&M University
	Brian Kotrous	NASA Marshall Space Flight Center	NASA Marshall Space Flight Center
Emergency Management Coordinator	Kevin Bennett	University of Alabama in Huntsville	University of Alabama in Huntsville
Meteorologist In Charge	Chris Darden	National Weather Service Huntsville	National Weather Service Huntsville
Warning Coordination Meteorologist	David Nadler	National Weather Service Huntsville	National Weather Service Huntsville
Chief	Greg Garner	Huntsville-Madison County Airport Authority	Huntsville-Madison County Airport Authority
	Harry Hobbs	Huntsville Utilities	Huntsville Utilities

**Note: Madison County has jurisdiction within all incorporated and unincorporated areas of the County and, through normal business practices, performs services, such as planning, engineering, public works, emergency management, and any other services authorized by intergovernmental agreement, to support municipal operations. The Madison County Committee members represent all municipalities within Madison County as well as unincorporated communities within the County. Although Madison and Huntsville reside in two counties, the Madison County Mitigation Plan addresses the hazards for these two municipalities.*

Initial members were recommended by the Director of the Huntsville-Madison County EMA and then appointed by the Local Emergency Planning Committee for the entire five-year cycle of this mitigation plan. The staff of the Huntsville-Madison County EMA and the City of Huntsville's Planning Department staff serve the committee in a support role as facilitator with the participating municipalities and the County Commission.

The Committee adopted the following mission statement at its first meeting:

To oversee and establish a comprehensive hazard mitigation planning process that:

- *Engages public participation and support;*
- *Facilitates Federal, state, regional and local agencies' coordination;*
- *Constantly monitors and evaluates the potential risks of hazards to life and property;*
- *Actively mobilizes all available community resources and measures to mitigation the threats of hazards; and,*
- *Results in programmed actions with specific results.*

During the 2014 update process, the Mayor of the City of New Hope created an ad-hoc EMA Task Force for his jurisdiction, which met with the Committee Vice Chair on Wednesday, September 3, 2014 to discuss New Hope's edits to the plan. The Town of Owens Cross Roads appointed a town police officer to attend Committee meetings on the Town's behalf. The Towns of Gurley's planner met with both Committee Chairs. The Town of Triana sent representatives to Committee meetings. All other jurisdictions participated thoroughly in the plan update process through Committee membership, attendance at each of the 2009-2014 Committee meetings and regular correspondence with the Committee Chair and Vice-Chair via email and telephone.

Over the course of the 2003-2004 committee meetings, each Committee member was asked to participate in five exercises designed by the Committee's consultant to solicit input into the planning process by each member. (**Section 5.2** in **Chapter 5** presents complete descriptions of the exercises and their application in the planning process). Representatives from all jurisdictions completed all of the exercises. The information provided from the members' participation in Committee meetings and in Committee exercises form the basis for this Plan. Results of all exercises are maintained in the EMA offices.

During the 2014 update process, the Committee met on July 31, 2014 and again on September 30, 2014 with email and telephone exchanges between meetings. The results of the five exercises in 2003 were deemed applicable to the current planning and update process and the exercises were not repeated by the Committee. Meeting minutes included section-by-section edits and updates to the plan. Meeting agendas, sign-in sheets and minutes are attached in Appendix 1.

Those Committee members unable to attend a meeting received agendas and completed Committee minutes and assignments presented via e-mail, telephone, or personal meetings with the Committee Chair or Vice Chair.

3.3 Public Involvement

The Planning Committee solicited public input into the mitigation plan through a public survey, public meetings, the local news media, and an internet website. Residents were encouraged to provide input through their representative on the Committee from each jurisdiction. They were also invited to attend meetings and provide their comments and concerns. On the following pages is a copy of the notification for the public meeting.

During the 2014 update process, as was done in the 2009 update process, the current version of the plan was posted on the Madison County EMA website: www.madisoncountyema.com/mplan.html with an invitation for the public to comment and suggest updates for the plan via a direct link to email the vice-chair of the Committee. As updates were approved to the plan by the committee and a draft updated version was completed, these were also posted on the website for public comment.

During the 2014 update process, a public meeting was held at 320 Fountain Circle, Huntsville, AL on November 5, 2014. The following public notice was sent as an Advisory SMS text and email message using the EMA Nixle public notification system; tweeted by the EMA Twitter account; and ran as a legal ad in the Huntsville Times on October 29, 2014 (a copy of the legal ad can be found in the Appendix):

PUBLIC NOTICE

A public meeting will be held Wednesday November 5, 2014 in the Huntsville Public Service Building, 320 Fountain Circle, Huntsville, AL 35801 to review the Natural Hazards Mitigation Plan (NHMP). The Madison County Hazard Mitigation Committee invites the public to ask questions or offer comments at the meeting.

The public may view the current NHMP online at www.madisoncountyema.com/mplan.html and make comments via an email link on the website. Call 256-427-5130 for information regarding the meeting or the NHMP.

At the public meeting on November 5, 2014, four members of the public signed the sign-in sheet (one representing Huntsville City Schools). The Chair and Vice-chair spoke about the purpose of the Natural Hazards Mitigation Plan to those in attendance and the public was invited to make comments and ask questions. Representatives from the various agencies involved in the development of the plan were on hand to answer questions. The Vice-chair was interviewed by local media representatives at the meeting. The sign-in sheets from the public meeting are maintained in the EMA office.

Photos from the November 5, 2014 Public Meeting:

3.4 Interagency and Intergovernmental Coordination

During the 2014 update process, the makeup of the Committee changed only slightly. Because the Committee met every year between 2009-2014, the membership was updated annually. Additions since 2009 include: Huntsville Utilities, Huntsville-Madison County Airport Authority, NASA Marshall Spaceflight Center office of Emergency Management, Alabama A&M University and Oakwood University.

The following agencies participated in the 2014 update process:

Federal Agencies

- National Weather Service – Huntsville Office
- NASA Marshall Spaceflight Center office of Emergency Management

State Agencies

- Alabama Emergency Management Agency
- Alabama Department of Public Health

Regional Agencies

- North Alabama Mutual Aid Association (NAMAA)

Businesses, Academia, Non-Profit Agencies

- University of Alabama at Huntsville
- Voluntary Organizations Active in Disaster (VOAD)- Madison County
- Alabama A&M University
- Oakwood University (invited for 30th)
- Huntsville Utilities (non-profit, not a City department)
- Huntsville-Madison County Airport Authority

Adjoining Counties

- Limestone County EMA

Organizations to invite for future plan maintenance and development

- Huntsville City Schools
- Madison County Schools
- City of Madison Schools
- Alabama Department of Transportation
- Alabama Department of Conservation
- Jackson County EMA
- Marshall County EMA
- Morgan County EMA

3.5 Participating Jurisdictions

During the 2014 update process, the jurisdictions within Madison County have participated in the planning process by direct representation on the planning committee and have committed to adopting the final plan by formal resolution. These jurisdictions include the Madison County Commission and the municipalities of Madison, Huntsville, Owens Crossroads, New Hope, Triana and Gurley.

3.6 Integration with Existing Plans

Since 2004, this document has been incorporated into the Madison County Emergency Operations Plan (EOP) administered through the Emergency Management Agency office. The Huntsville-Madison County EMA conducts a yearly review of the EOP in conjunction with the mitigation strategies that are currently in progress or planned for implementation. The EMA will ensure that mitigation strategies are adequately addressed and incorporated to the furthest extent possible in the review cycle for the EOP.

The requirements of this mitigation plan should also be integrated into any revisions of existing comprehensive plans and/or future planning documents at the appropriate time. Specific measures for plan integration are included in the Community Mitigation Action Programs for each jurisdiction (see **Chapter 6**).

Integrated into this Plan is information from the following plans, studies, and reports, among other resources:

- City of Huntsville Flood Mitigation Plan, Flood Mitigation Planning Committee, 6/01 and subsequent annual evaluation reports
- Year 2025 Transportation Plan, Huntsville Planning Division, 1/00
- Alabama Data Center demographic and economic reports
- NOAA and NWS records
- FEMA and local disaster reports

- Flood Insurance Studies and Flood Insurance Rate Maps
- United States Geological Survey
- US Census
- University of Alabama Data Center information

During the 2009 update process, the City of Huntsville Planning Department discussed with the Committee two Huntsville plans updated since the Natural Hazard Mitigation Plan (NHMP) was adopted in 2004. These plans are the current versions and were also discussed during the 2014 update process:

- City of Huntsville Greenway Plan 2006 update
- City of Huntsville Open Spaces Plan 2004

City of Huntsville Planning has proactively implemented concepts from the NHMP in writing and updating of these two plans. Acquisition of property has been prioritized on the floodplain hazard risk; the highest criteria based on floodplain data. Protecting these areas for habitats, water quality and flood attenuation is a primary goal of the Planning department since adoption of the NHMP. Additionally, the City of Huntsville Planning department has proactively acquired and restored parking lots into green spaces and habitable areas with mitigation in mind.

During the 2014 update process, it was noted by the EMA that the NHMPC was incorporated into a new state required document:

- 2014 Madison County Threat and Hazard Identification and Risk Assessment (THIRA)

HMCEMA will work with all jurisdictions as their plans are revised to ensure mitigation specific information is incorporated.

3.7 Planning Process

During the 2014 update process, the services of a consultant were not utilized. The Hazard Mitigation Planning Committee updated the plan in-house with the guidance and support of the Huntsville-Madison County EMA.

3.8 Chapter Update and Review

Updates to this chapter in 2014 included: the revision of the Committee Membership Table 3.1,; general updating procedures for the five-year update process, throughout; and inclusion of the NHMPC in the Madison County THIRA document.

Chapter 4
Risk Assessment

4.1 The Risk Assessment Process

This risk assessment identifies all known natural hazards affecting Madison County. It provides information on the history and extents of hazards, evaluates the possible effects, identifies vulnerable populations and assets (buildings, critical facilities, and essential infrastructure), and estimates potential losses that might occur. The risk assessment process identifies the most critical problems and issues that require mitigation actions.

4.2 Identification of Hazards

The Hazard Mitigation Planning Committee (HMPC) completed exercise two to identify and rate the natural hazards within Madison County. The committee reviewed a list of all potential hazards and identified those that threaten the county. Next, members ranked the risk or probability that the hazard will occur in the county and the threat of damage that might be incurred should the event take place. The current HMPC determined that these hazards and risks have not changed. **Table 4-1** summarizes the results of this exercise. (Lowest= N/A, Highest= Very Severe)

Table 4-1. Hazard Identification/Risk Assessment Exercise

Hazard	Exp.*	Risk**	Threat***	Comments
Tornadoes				
Madison Co.	Y	Very Severe	Very Severe	Has caused loss of life and extensive property damage
Madison	Y	Very Severe	Very Severe	
Huntsville	Y	Very Severe	Very Severe	
New Hope	Y	Very Severe	Very Severe	
Gurley	Y	Very Severe	Very Severe	
Owens Crossroads	Y	Very Severe	Very Severe	
Triana	Y	Very Severe	Very Severe	
Severe Thunderstorms/ Lightning/Hail				
Madison Co.	Y	Severe	Severe	
Madison	Y	Severe	Severe	
Huntsville	Y	Severe	Severe	
New Hope	Y	Severe	Severe	
Gurley	Y	Severe	Severe	
Owens Crossroads	Y	Severe	Severe	
Triana	Y	Severe	Severe	
Flooding				
Madison Co.	Y	Severe	Moderate	City of Huntsville is in the planning stages to lower the risk
Madison	Y	Severe	Moderate	
Huntsville	Y	Severe	Moderate	

Table 4-1. Hazard Identification/Risk Assessment Exercise				
Hazard	**Exp.***	**Risk****	**Threat*****	**Comments**
New Hope	Y	Severe	Moderate	
Flooding (cont.)				
Gurley	Y	Severe	Moderate	
Owens Crossroads	Y	Severe	Moderate	
Triana	Y	Severe	Moderate	
Winter storms/freezes				
Madison Co.	Y	Moderate	Moderate	Occurs almost annually with power loss
Madison	Y	Moderate	Moderate	
Huntsville	Y	Moderate	Moderate	Results in travel impairments and $ expended on sanding/salting roads
New Hope	Y	Moderate	Moderate	
Gurley	Y	Moderate	Moderate	
Owens Crossroads	Y	Moderate	Moderate	
Triana	Y	Moderate	Moderate	
Landslides				
Madison Co.	Y	Moderate	Slight	
Madison	Y	Moderate	Slight	
Huntsville	Y	Moderate	Slight	
New Hope	Y	Moderate	Slight	
Gurley	Y	Moderate	Slight	
Owens Crossroads	Y	Moderate	Slight	
Triana	Y	Moderate	Slight	
Droughts/heat waves				
Madison Co.	Y	Slight	Slight	Significant impact on public water systems, requiring customers to cut back on usage
Madison	Y	Slight	Slight	
Huntsville	Y	Slight	Slight	
New Hope	Y	Slight	Slight	
Gurley	Y	Slight	Slight	
Owens Crossroads	Y	Slight	Slight	
Triana	Y	Slight	Slight	
Wildfires				
Madison Co.	Y	Slight	Slight	Perceived as rare in Madison County
Madison	Y	Slight	Slight	
Huntsville	Y	Slight	Slight	
New Hope	Y	Slight	Slight	
Gurley	Y	Slight	Slight	
Owens Crossroads	Y	Slight	Slight	
Triana	Y	Slight	Slight	
Sinkholes				
Madison Co.	Y	Slight	Slight	Usually small in size, but frequent
Madison	Y	Slight	Slight	
Huntsville	Y	Slight	Slight	

Table 4-1. Hazard Identification/Risk Assessment Exercise				
Hazard	**Exp.***	**Risk****	**Threat*****	**Comments**
New Hope	Y	Slight	Slight	
Sinkholes (cont.)				
Gurley	Y	Slight	Slight	
Owens Crossroads	Y	Slight	Slight	
Triana	Y	Slight	Slight	
Hurricanes				
Madison Co.	Y	Minimal	Minimal	Heavy rains and winds from a Hurricane landing on the Gulf Coast, cause flooding and wind damage
Madison	Y	Minimal	Minimal	
Huntsville	Y	Minimal	Minimal	
New Hope	Y	Minimal	Minimal	
Gurley	Y	Minimal	Minimal	
Owens Crossroads	Y	Minimal	Minimal	
Triana	Y	Minimal	Minimal	
Dam/levee failures				
Madison Co.	Y	Minimal	Minimal	A failure of a TVA dam would impact County
Madison	Y	Minimal	Minimal	
Huntsville	Y	Minimal	Minimal	
New Hope	Y	Minimal	Minimal	
Gurley	Y	Minimal	Minimal	
Owens Crossroads	Y	Minimal	Minimal	
Triana	Y	Minimal	Minimal	
Earthquakes				
Madison Co.	Y	Minimal	Minimal	
Madison	Y	Minimal	Minimal	
Huntsville	Y	Minimal	Minimal	
New Hope	Y	Minimal	Minimal	
Gurley	Y	Minimal	Minimal	
Owens Crossroads	Y	Minimal	Minimal	
Triana	Y	Minimal	Minimal	
Tsunamis	N	N/A	N/A	
Volcanoes	N	N/A	N/A	

Exp – exposure.

****Risk*** is the probability of the hazard event occurring within the County.

*****Threat*** is the impact of the hazard on property damage, injury and loss of life should the event occur.

4.3 Significant Hazard Events

In *Committee Exercise #3 - Hazard Profiles*, the Committee profiled past hazards. The committee evaluated natural hazards for all jurisdictions. Numerous sources have been utilized to profile significant hazards, including: the Storm Events Database of the National Climatic Data Center (NCDC); FEMA Region IV –Presidential Declarations; the National Weather Service; the Huntsville-Madison County EMA; the Alabama Geologic Survey and

the NHMPC members. The Storm Events Database may be queried at the following link: http://www.ncdc.noaa.gov/stormevents/.

Madison County has been included in 14 federal disaster declarations from 1973 through 2015. These declarations are listed in the following table. All of these events did not necessarily occur within the boundaries of Madison County. When major damage from a natural disaster occurs, FEMA, as a matter of practice, includes a "buffer" area of adjoining counties in the event it is later determined the damage was more widespread. In addition to the listed disasters the committee profiled past hazards in exercise three. Specific instances of this practice are discussed as they are encountered in the following hazard profiles.

Table 4-2. Federally Declared Disasters, 1973-2015

Disaster Number	Disaster Type	Date	Declaration Type / Description
369	Tornado	03/27/1973	IA, PA-ABCDEFG, DH, DUA, IFG
422	Tornado	04/04/1974	IA, PA-ABCDEFG, DH, DUA, IFG
3045	Drought	08/18/1977	PA-AB
848	Tornado	11/17/1989	IA, PA-ABCDEFG, DH, DUA, IFG
890	Flood	01/04/1991	IA, PA-ABCDEFG, DH, DUA, IFG
3096	Snow	03/15/1993	PA-AB
1104	Severe storms/ wind	04/22/1997	IA, PA-ABCDEFG, DH, DUA, IFG
1261	Winter Storm/Ice storm	01/15/1999	PA-ABCDEFG
1399	Severe storms/ wind	12/07/2001	IA, CC, DH, DUA, IFG
1466	Flood, severe storms	05/12/2003	IA, PA-ABCDEFG, DH, DUA, IFG
1549	Hurricane Ivan	09/15/2004	IA, HM
3237	Hurricane Katrina	09/10/2005	PA-B
3292	Hurricane Gustav	08/20/2008	PA-B
1971	Tornado	04/28/2011	IA, PA-ABCDEFG, HM

* Declaration Type Key

IA – Individual assistance	A – Debris removal
PA – Public assistance	B – Protective measures
DH – Disaster housing	C – Roads and bridges
CC – Crisis counseling	D – Water control facilities
DFA – Direct federal assistance	E – Public buildings
DUA – Disaster unemployment assistance	F – Public utilities
HM – Hazard mitigation	G – Recreation
IFG – Individual and family grant	SA – Stafford Act
SBA – Small Business Administration	403C – Department of Defense

Source: http://www.fema.gov/disasters?field_state_tid=28&field_disaster_type_term_tid=All&field_disaster_declaration_type_value=DR&items_per_page=10&=GO

4.4 Tornadoes

Hazard Description. A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm (or hurricane) and produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. Tornado season is generally March through August, although tornadoes can occur at

any time of year. They tend to occur in the afternoons and evenings. Over 80 percent of all tornadoes strike between noon and midnight.

Hazard Profile. Table 4-3 depicts the damage-causing tornado events for Madison County occurring during the period 1950-2015 that are contained in the Storm Events Database. The damage from a tornado is a result of the high wind velocity and wind-blown debris. Tornado winds can approach speeds as high as 300 miles per hour, travel distances over 100 miles and reach heights over 60,000 feet above ground. The potential damage resulting from a tornado is directly correlated to the strength of the particular tornado and is quantified utilizing the Fujita Tornado Scale., shown in **Table 4-4**.

Beginning in February 2007, the National Weather Service implemented the Enhanced Fujita Scale (EF). A comparison between the original Fujita Scale and the Enhanced Fujita Scale is shown in **Table 4-4a**.

According to the database, a total of 17 tornadoes have resulted in 47 deaths and 871 injuries. The cumulative number of tornadoes has caused over $532 million dollars in property damage.

The county has suffered three major damage-causing incidents by tornadoes. In April of 1974 two consecutive F5 tornadoes touched down causing a total of 220 injuries and 14 deaths. On November 15, 1989, a similar situation occurred when two consecutive F4 tornadoes touched down in the county. On April 27, 2011, seven tornadoes touched down in Madison County, including an EF4 tornado, which resulted in 9 deaths and over 80 injuries, and causing over $8 million in damage to public infrastructure alone. The April 27, 2011 event is considered to be Alabama's worst natural disaster. The following is a report on the November 15, 1989 tornado.

The first tornado touchdown began at 34°39'N/86°39'W and ended at 34°44'N/ 86°26'W cutting a path 13 miles long and 880 yards wide that caused the death of 21 people, injured 463 and $250.0 million in property damage. The second tornado touched down in the same location the previous one ended and continued the path of destruction for 6 addition miles (end point 34°47'N/86°22'W) at the same width causing $250 million more in damage but no additional injuries or deaths.

The following is a report on the April 27, 2011 EF4 tornado.

The tornado crossed in Madison County east of Limestone County Prison…along Orvil Smith Road with a path width of ½ mile. The tornado maintained an EF-3 strength with winds of 140 to 160 MPH and a path width between ¼ and ½ mile for much of its track northeast across Old Railroad Bed Road and Ford Chapel Road, before narrowing to around 300 yards in Anderson Hills. Dozens of well-constructed homes were destroyed, in some cases with all exterior walls collapsing in both single and two-story homes. At least 3-5 mobile

homes were either destroyed or swept completely clean with no evidence of debris. At least 2 other well-constructed homes had complete wall collapse in Anderson Hills and were shifted off their foundation. This damage was once again consistent with low end EF-4 wind speeds of around 170 MPH. Numerous tall pines and other hardwood trees were snapped, uprooted and debarked along the entire path. The path width widened once again to around ½ mile as the tornado tracked through residential areas along Bald Eagle Lane, Old Eli Road and Ginnery Row. At least 2 of these homes had complete wall collapse, but these structures had foundation straps and nails in lieu of bolts. At least one fatality was confirmed at one of these residences. Eight additional fatalities occurred in Madison County along the track of this violent tornado. The damage was consistent with high end EF-3 wind speeds between 140 and 160 MPH. The tornado lifted just south of the Patterson Lane after twisting irrigation equipment and snapping additional trees. Just to the northeast of this location, the tornado touched down again as an EF-0 tornado with peak wind speeds of 70 MPH. Along Grimwood Road and Walker Lane, south of Hazel Green, the tornado uprooted and snapped several trees. The tornado weakened or may have lifted briefly across extreme northeast Madison County before re-strengthening again as it entered Lincoln County in Southern Middle Tennessee.

Table 4-3. Tornado Events, 1951-2015

Location	Date	Time	Type	Mag	Deaths	Injuries	Property Damage	Crop Damage
1 Madison	06/08/1951	9:00 PM	Tornado	F2	0	2	3K	0
2 Madison	04/05/1958	10:30 PM	Tornado	F1	0	0	25K	0
3 Madison	06/06/1961	3:00 PM	Tornado	F1	0	0	$3K	0
4 Madison	03/11/1963	5:40 PM	Tornado	F2	0	0	2.5M	0
5 Madison	11/24/1967	1:05 PM	Tornado	F2	0	7	250K	0
6 Madison	12/18/1967	3:25 AM	Tornado	F2	0	27	2.5M	0
7 Madison	12/21/1967	7:30 PM	Tornado	F1	0	1	250K	0
8 Madison	04/24/1970	6:30 AM	Tornado	F2	0	0	0K	0
9 Madison	04/26/1970	8:00 AM	Tornado	F1	0	0	25K	0
10 Madison	05/19/1973	2:40 PM	Tornado	F2	0	10	250K	0
11 Madison	11/27/1973	6:33 PM	Tornado	F3	0	42	2.5M	0
12 Madison	04/01/1974	9:40 PM	Tornado	F3	1	6	2.5M	0
13 Madison	04/03/1974	6:15 PM	Tornado	F5	9	110	0K	0
14 Madison	04/03/1974	7:00 PM	Tornado	F5	5	110	0K	0
15 Madison	04/03/1974	9:35 PM	Tornado	F3	2	3	2.5M	0
16 Madison	03/20/1976	10:08 PM	Tornado	F1	0	0	0	0
17 Madison	03/20/1976	10:22 PM	Tornado	F0	0	0	0	0
18 Madison	03/20/1976	10:22 PM	Tornado	F2	0	0	250K	0
19 Madison	03/20/1976	10:25 PM	Tornado	F1	0	0	0	0
20 Madison	07/17/1977	1:45 PM	Tornado	F2	0	0	250K	0

Table 4-3. Tornado Events, 1951-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
21 Madison	04/17/1982	4:25 AM	Tornado	F1	0	0	250K	0
22 Madison	04/14/1985	7:20 PM	Tornado	F1	0	0	25K	0
23 Madison	08/16/1985	2:08 PM	Tornado	F2	0	0	250K	0
24 Madison	08/16/1985	3:30 PM	Tornado	F1	0	0	25K	0
25 Madison	07/28/1986	8:00 PM	Tornado	F0	0	0	0K	0
26 Madison	11/15/1989	4:30 PM	Tornado	F4	21	463	250.0M	0
27 Madison	11/15/1989	4:42 PM	Tornado	F4	0	0	250.0M	0
28 Madison	11/22/1992	6:55 AM	Tornado	F2	0	5	2.5M	0
29 Madison	05/03/1993	5:35 PM	Tornado	F0	0	0	0	0
30 Madison	06/26/1994	10:11 PM	Tornado	F2	0	2	5.0M	0
31 Meridianville	05/02/1997	4:26 PM	Tornado	F2	0	1	600K	0
32 Owens Xrds	05/02/1997	4:34 PM	Tornado	F0	0	0	85K	0
33 Owens Xrds	05/02/1997	4:40 PM	Tornado	F0	0	0	100K	0
34 Huntsville	05/25/1997	6:23 PM	Tornado	F0	0	0	10K	0
35 Toney	05/07/1998	5:03 AM	Tornado	F1	0	0	100K	0
36 New Market	05/07/1998	5:27 AM	Tornado	F1	0	0	110K	0
37 Huntsville	02/16/2001	1:39 PM	Tornado	F0	0	0	40K	0
38 New Hope	11/24/2001	1:50 PM	Tornado	F2	0	0	500K	0
39 Meridianville	09/18/2002	1:40 PM	Tornado	F0	0	0	0K	0
40 Meridianville	10/12/2002	12:30 PM	Tornado	F0	0	0	1K	0
41 Toney	03/19/2003	9:20 AM	Tornado	F0	0	0	0	0
42 Madison	05/06/2003	6:58 AM	Tornado	F0	0	0	0	0
43 Meridianville	05/06/2003	7:16 AM	Tornado	F1	0	0	100K	0
44 New Sharon	05/30/2004	11:55 PM	Tornado	F1	0	0	75K	0
45 Owens Xrds	07/06/2004	5:28 PM	Tornado	F0	0	0	0	0
46 Huntsville	07/14/2004	3:20 PM	Tornado	F0	0	1	10K	0
47 Sulphur Spgs	04/07/2006	6:45 PM	Tornado	F0	0	0	8K	0
48 Skinem	04/07/2006	6:48 PM	Tornado	F0	0	0	0	0
49 Elkwood	04/03/2007	9:26 PM	Tornado	F0	0	0	0	0
50 Mt Leventov	04/11/2008	1:07 PM	Tornado	EF0	0	0	10K	0
51 Triana	05/08/2008	1:37 PM	Tornado	EF1	0	0	10K	0
52 Huntsville	04/02/2009	7:09 PM	Tornado	EF0	0	0	8K	0
53 Cave Spg	05/03/2009	5:00 PM	Tornado	EF1	0	0	30K	0
54 Madison	05/06/2009	8:03 AM	Tornado	EF1	0	0	1.0M	0
55 Madison Co Jet Port	06/03/2009	11:48	Tornado	EF0	0	0	0	0
56 Huntsville Park	01/21/2010	5:15 PM	Tornado	EF2	0	1	0	0
57 Fairview	02/28/2011	12:18 AM	Tornado	EF1	0	0	30.0K	0

Table 4-3. Tornado Events, 1951-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Deaths**	**Injuries**	**Property Damage**	**Crop Damage**
58 Nebo	04/27/2011	10:37 AM	Tornado	EF1	0	0	0	0
59 Capshaw	04/27/2011	10:39 AM	Tornado	EF1	0	0	0	0
60 Normal	04/27/2011	10:50 AM	Tornado	EF1	0	0	0	0
61 Bloucher Ford	04/27/2011	10:55 AM	Tornado	EF0	0	0	0	0
62 Cluttsville	04/27/2011	3:36 PM	Tornado	EF4	9	80+*	0	0
63 Cluttsville	04/27/2011	3:40 PM	Tornado	EF1	0	0	0	0
64 Madison	04/27/2011	4:02 PM	Tornado	EF1	0	0	0	0
65 Maple Hill	05/25/2011	11:05 PM	Tornado	EF0	0	0	0	0
66 Mt Leventov	05/25/2011	11:17 PM	Tornado	EF0	0	0	0	0
67 Cluttsville	03/02/2012	9:25 AM	Tornado	EF3	0	0	0	0
68 Meridianville	03/02/2012	10:06 AM	Tornado	EF2	0	0	0	0
69 Farley	04/11/2013	3:20 PM	Tornado	EF1	0	0	0	0
70 Dug Hill	04/11/2013	3:32 PM	Tornado	EF1	0	0	0	0
71 New Sharon	04/28/2014	4:50 PM	Tornado	EF1	0	0	0	0
72 Redstone AAR	10/03/2014	2:12 AM	Tornado	EF0	0	0	0	0
73 Huntsville Jones Field	07/14/2015	5:35 PM	Tornado	EF0	0	0	0	0
TOTALS:					47	871	524.653M	0

Source: NOAA; http://www.ncdc.noaa.gov/stormevents/

*Injuries reported in April 27, 2011 Madison County Tornado Response After Action Report

Table 4-4. Fujita Tornado Damage Scale		
Scale	**Wind Estimate (MPH)**	**TYPICAL DAMAGE**
F0	< 73	**Light damage.** Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	**Moderate damage.** Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	**Considerable damage.** Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	**Severe damage.** Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260	**Devastating damage.** Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.

F5	261-318	**Incredible damage.** Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds); trees debarked; incredible phenomena will occur.

Source: http://www.spc.noaa.gov/faq/tornado/f-scale.html

Table 4-4A. Fujita F-Scale Converted to EF Scale

F Scale	Wind Speed (MPH)	EF-Scale	Wind Speed (MPH)
F0	45-78	**EF0**	65-85
F1	79-117	**EF1**	86-109
F2	118-161	**EF2**	110-137
F3	162-209	**EF3**	138-167
F4	210-261	**EF4**	168-199
F5	262-317	**EF5**	200-234

Wind speeds in mph, 3-second gust

Source: http://wdtb.noaa.gov/courses/EF-scale/

Charts 4-1 through **4-4** show the characteristics of tornadoes since 1950 within a 20-mile radius of the center of Madison County. (Source: VorTek, LLC. SATT 3.0 Site Assessment of Tornado Threat software)

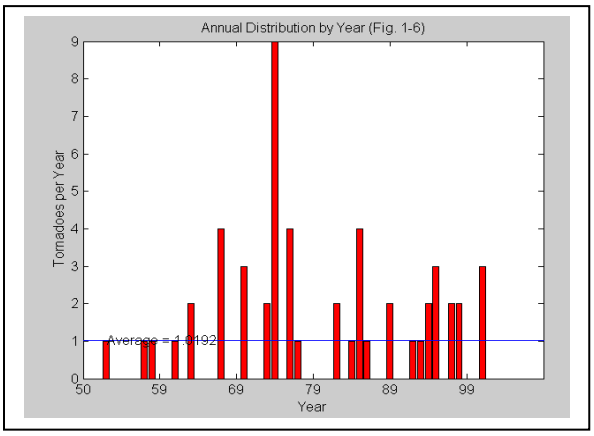


Chart 4-1. Annual Dist. by Year

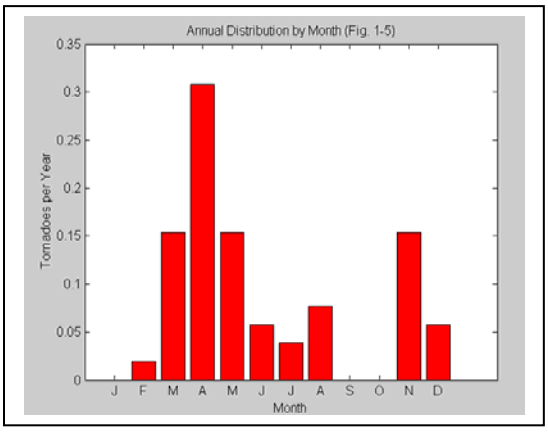


Chart 4-2. Annual Dist. by Month

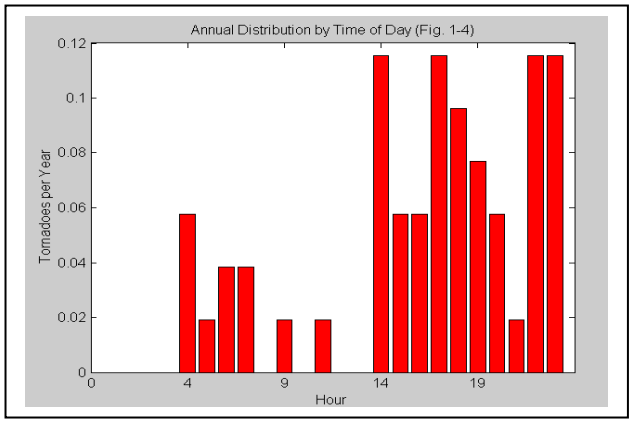


Chart 4-3. Annual Dist. by Time of Day

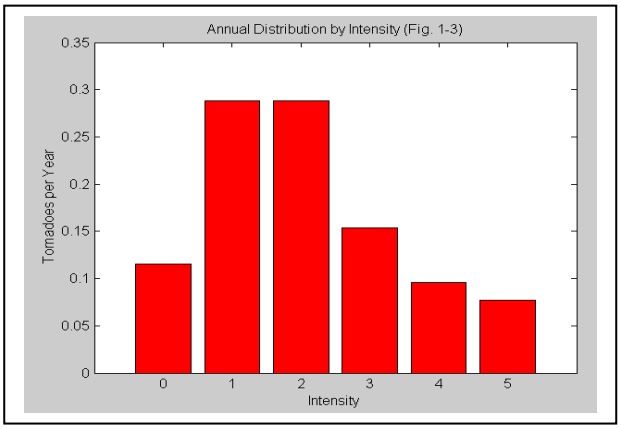
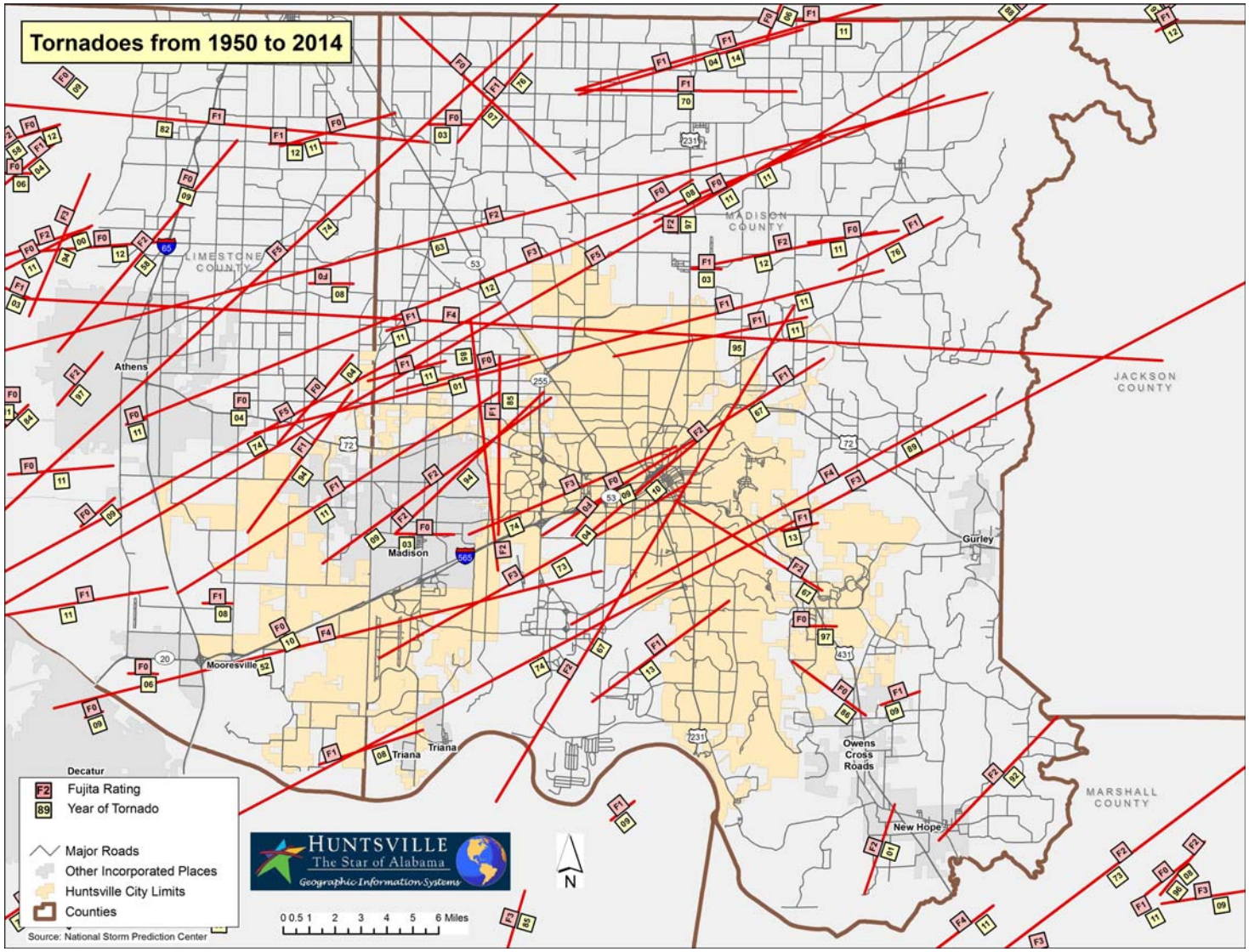


Chart 4-4. Annual Dist. by Intensity

Community Impacts. The damage from a tornado is a result of the high wind velocity and wind-blown debris. Tornado winds can approach speeds as high as 300 miles per hour, travel distances over 100 miles and reach heights over 60,000 feet above ground. The potential damage resulting from a tornado is directly correlated to the strength of the particular tornado and is quantified utilizing the Fujita Tornado Scale, shown in **Table 4-4**.

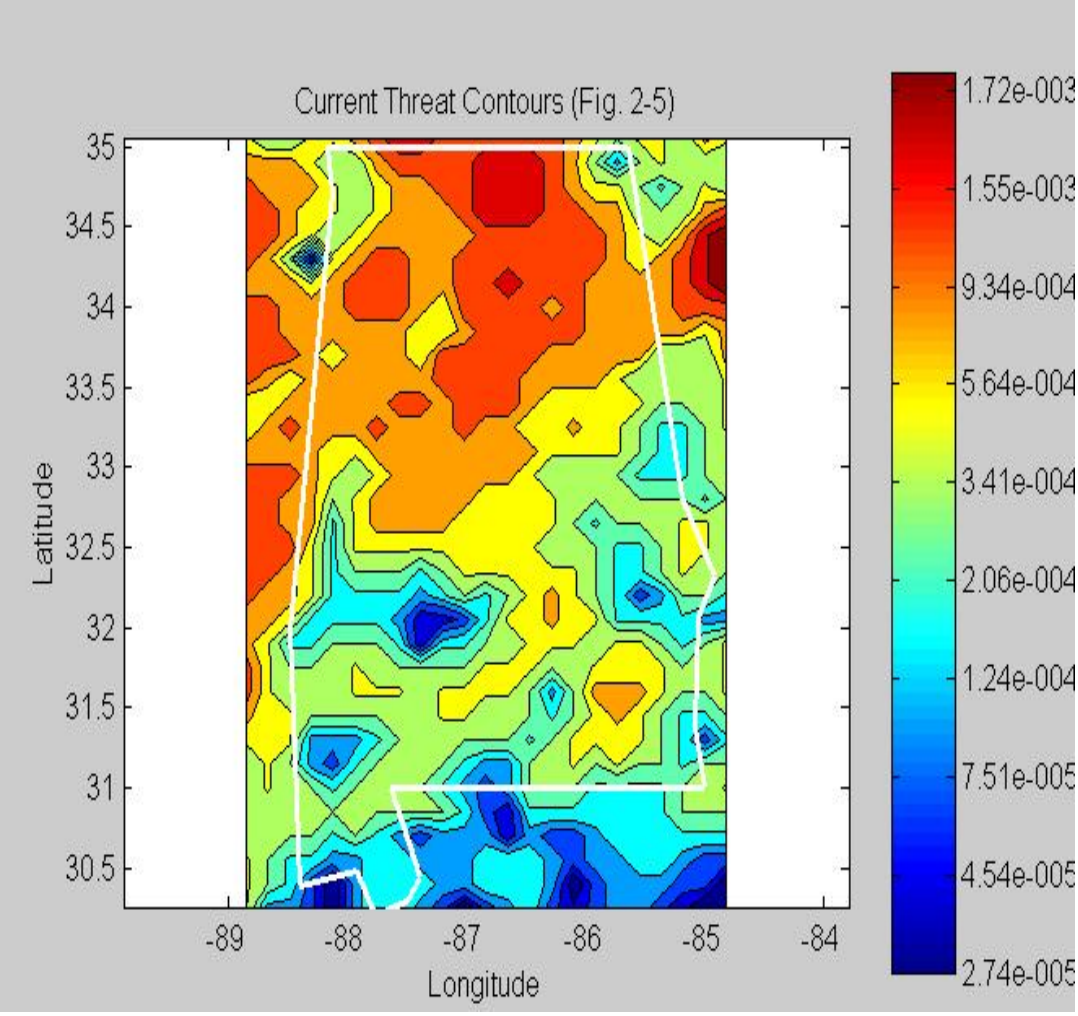
Location and Extents. During 2015, there was one Tornado event. Paths of tornadoes within Madison County since 1950 are shown on **Map 4-1**. The entire county is equally susceptible to damage from tornadoes. The extent for tornadoes is an F5/EF5 tornado.



Source: City of Huntsville GIS Department

Map 4-1. Tornado Paths, 1950-2014

Probability of Future Occurrences. Map 4-2 depicts the relative probability of tornado occurrences, based on historical data since 1950**.** Based on historical averages, Madison County has experienced $3.6 million in damages over a 52 year period or $70,000 per year with 0.8 annual events. A death or injury causing tornado has occurred on average once every 15 and 6 years, respectively. Historical data cannot predict the paths and severity of future tornadic activity. Consequently, all areas should be regarded as equally at risk for tornadoes.



Source: VorTek, LLC, generated by SATT 3.0 tornado threat assessment software

Map 4-2. Tornado Threat Probabilities

4.5 Severe Thunderstorms

Hazard Description. A severe thunderstorm is a storm containing damaging winds of 58 miles per hour or more, or hail that measures three-quarters of an inch in diameter or greater (in January 2010, hail criteria will increase to an inch or larger). All severe thunderstorms contain lightning. Another by-product of severe

thunderstorms is straight-line winds or downburst winds. These winds can be strong and concentrated. Falling rain and sinking air create the strong winds. Winds can reach speeds of 125 mph.

Hazard Profile. The Storm Events Database contains 565 reports of damage from severe thunderstorms in Madison County since 1956. These have caused 14 deaths, 23 injuries, $110.473 million in property damage and $10.018 million in crop damage. A listing of these events is presented in **Table 4-5**.

Table 4-5. Significant Thunderstorm/High Wind Events 1956-2015

Location	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 Madison	02/17/1956	2200	Tstm Wind	0 kts.	0	0	0	0
2 Madison	05/22/1957	0945	Tstm Wind	0 kts.	0	0	0	0
3 Madison	04/24/1958	2000	Tstm Wind	65 kts.	0	0	0	0
4 Madison	03/18/1961	0415	Tstm Wind	0 kts.	0	0	0	0
5 Madison	05/08/1961	2200	Tstm Wind	0 kts.	0	0	0	0
6 Madison	07/05/1962	1400	Tstm Wind	0 kts.	0	0	0	0
7 Madison	03/11/1963	1900	Tstm Wind	60 kts.	0	0	0	0
8 Madison	03/19/1963	1900	Tstm Wind	85 kts.	0	0	0	0
9 Madison	07/20/1963	1715	Tstm Wind	65 kts.	0	0	0	0
10 Madison	07/23/1963	2130	Tstm Wind	50 kts.	0	0	0	0
11 Madison	04/15/1965	1610	Tstm Wind	53 kts.	0	0	0	0
12 Madison	06/30/1965	1430	Tstm Wind	50 kts.	0	0	0	0
13 Madison	07/10/1965	1530	Tstm Wind	0 kts.	0	0	0	0
14 Madison	02/13/1966	0239	Tstm Wind	0 kts.	0	0	0	0
15 Madison	06/16/1966	1700	Tstm Wind	0 kts.	0	0	0	0
16 Madison	05/07/1967	0130	Tstm Wind	0 kts.	0	0	0	0
17 Madison	05/07/1967	0130	Tstm Wind	0 kts.	0	0	0	0
18 Madison	07/11/1967	1700	Tstm Wind	0 kts.	0	0	0	0
19 Madison	10/24/1967	2000	Tstm Wind	50 kts.	0	0	0	0
20 Madison	03/11/1968	2217	Tstm Wind	60 kts.	0	0	0	0
21 Madison	03/11/1968	2300	Tstm Wind	57 kts.	0	0	0	0
22 Madison	04/14/1968	1800	Tstm Wind	50 kts.	0	0	0	0
23 Madison	05/25/1968	1820	Tstm Wind	50 kts.	0	0	0	0
24 Madison	06/30/1969	1530	Tstm Wind	0 kts.	0	0	0	0
25 Madison	04/01/1970	2226	Tstm Wind	51 kts.	0	0	0	0
26 Madison	07/13/1971	2000	Tstm Wind	0 kts.	0	0	0	0
27 Madison	07/15/1971	2310	Tstm Wind	0 kts.	0	0	0	0
28 Madison	03/21/1974	0210	Tstm Wind	0 kts.	0	0	0	0
29 Madison	03/12/1975	1130	Tstm Wind	0 kts.	0	0	0	0
30 Madison	04/02/1975	1800	Tstm Wind	0 kts.	0	0	0	0
31 Madison	01/13/1976	1725	Tstm Wind	0 kts.	0	0	0	0
32 Madison	06/18/1977	1720	Tstm Wind	55 kts.	0	0	0	0
33 Madison	06/20/1977	1630	Tstm Wind	52 kts.	0	0	0	0
34 Madison	06/26/1977	1600	Tstm Wind	0 kts.	0	0	0	0

Table 4-5. Significant Thunderstorm/High Wind Events 1956-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
35 Madison	07/17/1977	1415	Tstm Wind	0 kts.	0	0	0	0
36 Madison	05/26/1978	1605	Tstm Wind	54 kts.	0	0	0	0
37 Madison	02/24/1979	2203	Tstm Wind	0 kts.	0	0	0	0
38 Madison	04/12/1979	0530	Tstm Wind	0 kts.	0	0	0	0
39 Madison	09/04/1980	1305	Tstm Wind	52 kts.	0	0	0	0
40 Madison	06/19/1981	1540	Tstm Wind	0 kts.	0	0	0	0
41 Madison	06/22/1981	1810	Tstm Wind	0 kts.	0	0	0	0
42 Madison	01/03/1982	2250	Tstm Wind	0 kts.	0	0	0	0
43 Madison	06/30/1982	1600	Tstm Wind	0 kts.	0	0	0	0
44 Madison	06/30/1982	1600	Tstm Wind	0 kts.	0	0	0	0
45 Madison	06/30/1982	1600	Tstm Wind	0 kts.	0	0	0	0
46 Madison	07/22/1982	1200	Tstm Wind	0 kts.	0	0	0	0
47 Madison	09/01/1982	1440	Tstm Wind	0 kts.	0	0	0	0
48 Madison	03/05/1983	1700	Tstm Wind	57 kts.	0	0	0	0
49 Madison	03/05/1983	1705	Tstm Wind	0 kts.	0	0	0	0
50 Madison	03/05/1983	1807	Tstm Wind	0 kts.	0	0	0	0
51 Madison	04/01/1983	2100	Tstm Wind	0 kts.	0	0	0	0
52 Madison	05/19/1983	0305	Tstm Wind	52 kts.	0	0	0	0
53 Madison	08/22/1983	1705	Tstm Wind	0 kts.	0	0	0	0
54 Madison	08/22/1983	1800	Tstm Wind	0 kts.	0	0	0	0
55 Madison	08/22/1983	1800	Tstm Wind	0 kts.	0	0	0	0
56 Madison	08/23/1983	1600	Tstm Wind	0 kts.	0	0	0	0
57 Madison	11/23/1983	1245	Tstm Wind	0 kts.	0	0	0	0
58 Madison	03/28/1984	0115	Tstm Wind	0 kts.	0	0	0	0
59 Madison	04/22/1984	0339	Tstm Wind	0 kts.	0	0	0	0
60 Madison	05/07/1984	1619	Tstm Wind	0 kts.	0	0	0	0
61 Madison	06/14/1984	1510	Tstm Wind	0 kts.	0	0	0	0
62 Madison	06/22/1984	1830	Tstm Wind	0 kts.	0	0	0	0
63 Madison	07/07/1984	1027	Tstm Wind	61 kts.	11	2	0	0
64 Madison	04/05/1985	1548	Tstm Wind	0 kts.	0	0	0	0
65 Madison	04/05/1985	1554	Tstm Wind	50 kts.	0	0	0	0
66 Madison	04/05/1985	1604	Tstm Wind	0 kts.	0	0	0	0
67 Madison	04/05/1985	1613	Tstm Wind	50 kts.	0	0	0	0
68 Madison	06/17/1985	1516	Tstm Wind	52 kts.	0	0	0	0
69 Madison	07/05/1985	1236	Tstm Wind	54 kts.	0	0	0	0
70 Madison	07/05/1985	1236	Tstm Wind	54 kts.	0	0	0	0
71 Madison	07/10/1985	1920	Tstm Wind	0 kts.	0	0	0	0
72 Madison	08/16/1985	1408	Tstm Wind	0 kts.	0	0	0	0
73 Madison	08/24/1985	1100	Tstm Wind	0 kts.	0	0	0	0
74 Madison	08/24/1985	1315	Tstm Wind	0 kts.	0	0	0	0
75 Madison	12/01/1985	0850	Tstm Wind	0 kts.	0	0	0	0
76 Madison	03/12/1986	0715	Tstm Wind	0 kts.	0	0	0	0
77 Madison	07/28/1986	1940	Tstm Wind	0 kts.	0	0	0	0
78 Madison	08/07/1986	1850	Tstm Wind	0 kts.	0	0	0	0
79 Madison	08/09/1986	1927	Tstm Wind	0 kts.	0	0	0	0

Table 4-5. Significant Thunderstorm/High Wind Events 1956-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
80 Madison	08/10/1986	1820	Tstm Wind	51 kts.	0	0	0	0
81 Madison	08/16/1986	1430	Tstm Wind	0 kts.	0	0	0	0
82 Madison	08/26/1986	1510	Tstm Wind	0 kts.	0	0	0	0
83 Madison	08/26/1986	1510	Tstm Wind	55 kts.	0	0	0	0
84 Madison	02/15/1987	2040	Tstm Wind	60 kts.	0	0	0	0
85 Madison	07/13/1987	1655	Tstm Wind	0 kts.	0	0	0	0
86 Madison	01/19/1988	1630	Tstm Wind	0 kts.	0	0	0	0
87 Madison	01/19/1988	1657	Tstm Wind	0 kts.	0	0	0	0
88 Madison	05/16/1988	2225	Tstm Wind	60 kts.	0	0	0	0
89 Madison	05/16/1988	2230	Tstm Wind	0 kts.	0	0	0	0
90 Madison	09/24/1988	1130	Tstm Wind	0 kts.	0	0	0	0
91 Madison	09/24/1988	1130	Tstm Wind	0 kts.	0	0	0	0
92 Madison	06/14/1989	1200	Tstm Wind	0 kts.	0	0	0	0
93 Madison	08/06/1989	1200	Tstm Wind	0 kts.	0	0	0	0
94 Madison	11/06/1989	0400	Tstm Wind	0 kts.	0	0	0	0
95 Madison	02/09/1990	2020	Tstm Wind	0 kts.	0	0	0	0
96 Madison	02/09/1990	2245	Tstm Wind	0 kts.	0	0	0	0
97 Madison	05/01/1990	1306	Tstm Wind	60 kts.	0	0	0	0
98 Madison	05/01/1990	1330	Tstm Wind	0 kts.	0	0	0	0
99 Madison	07/08/1990	1540	Tstm Wind	0 kts.	0	0	0	0
100 Madison	07/22/1990	1615	Tstm Wind	0 kts.	0	0	0	0
101 Madison	08/29/1990	2127	Tstm Wind	66 kts.	0	0	0	0
102 Madison	12/18/1990	1100	Tstm Wind	0 kts.	0	0	0	0
103 Madison	03/27/1991	1940	Tstm Wind	61 kts.	0	0	0	0
104 Madison	03/27/1991	2029	Tstm Wind	70 kts.	0	0	0	0
105 Madison	04/29/1991	0640	Tstm Wind	0 kts.	0	0	0	0
106 Madison	04/29/1991	0640	Tstm Wind	0 kts.	0	0	0	0
107 Madison	04/30/1991	1310	Tstm Wind	60 kts.	0	0	0	0
108 Madison	03/10/1992	0102	Tstm Wind	0 kts.	0	0	0	0
109 Madison	07/03/1992	0515	Tstm Wind	0 kts.	0	0	0	0
110 Madison	07/03/1992	0525	Tstm Wind	0 kts.	0	0	0	0
111 Madison	07/05/1992	1212	Tstm Wind	50 kts.	0	0	0	0
112 Madison	07/05/1992	1215	Tstm Wind	0 kts.	0	0	0	0
113 Madison	07/05/1992	1230	Tstm Wind	0 kts.	0	0	0	0
114 Madison	08/10/1992	2215	Tstm Wind	0 kts.	0	0	0	0
115 Madison	08/27/1992	1315	Tstm Wind	0 kts.	0	0	0	0
116 Madison	04/15/1993	0545	Tstm Wind	0 kts.	0	0	0	0
117 Madison	08/20/1993	1630	Tstm Wind	0 kts.	0	0	0	0
118 Madison	08/20/1993	1730	Tstm Wind	0 kts.	0	0	0	0
119 Madison	09/26/1993	1210	Tstm Wind	0 kts.	0	0	0	0
120 Huntsville	05/15/1994	1815	Tstm Wind	0 kts.	0	0	50K	0
121 Madison	06/26/1994	2130	Tstm Wind	70 kts.	0	1	500K	0
122 Airport	06/26/1994	2139	Tstm Wind	58 kts.	0	0	0	0
123 Redstone Arsenal	06/26/1994	2203	Tstm Wind	60 kts.	0	0	500K	0

Table 4-5. Significant Thunderstorm/High Wind Events 1956-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
124 Redstone Arsenal	06/29/1994	1015	Tstm Wind	48 kts.	0	0	0	0
125 Airport	06/29/1994	1020	Tstm Wind	45 kts.	0	0	0	0
126 Madison	06/29/1994	1020	Tstm Wind	0 kts.	0	0	0	0
127 Madison	08/31/1994	1515	Thunderstorm Wind	0 kts.	0	0	0	0
128 Huntsville	11/27/1994	2330	Tstm Wind	0 kts.	0	0	0	0
129 Huntsville	03/07/1995	1730	Tstm Wind	0 kts.	0	0	35K	0
130 Huntsville	04/11/1995	1230	Tstm Wind	0 kts.	0	0	50K	0
131 Countywide	06/06/1995	1805	Tstm Wind	0 kts.	0	0	1.0M	0
132 Huntsville	06/06/1995	1916	Tstm Wind	0 kts.	0	0	0	0
133 Huntsville	06/11/1995	1153	Tstm Wind	50 kts.	0	0	50K	0
134 Huntsville	06/19/1995	1340	Tstm Wind	0 kts.	0	0	2K	0
135 Huntsville	07/03/1995	1647	Tstm Wind	56 kts.	0	0	42K	0
136 Madison	07/03/1995	1700	Tstm Wind	0 kts.	0	0	8K	0
137 Toney	07/24/1995	1746	Tstm Wind	0 kts.	0	0	5K	0
138 Huntsville	07/24/1995	1810	Tstm Wind	0 kts.	0	0	45K	0
139 Huntsville	08/08/1995	1415	Tstm Wind	0 kts.	0	0	10K	0
140 ALZ001>050	10/04/1995	1200	Hurricane Opal/high Winds	N/A	2	0	0.1B	10.0M
141 ALZ001>018 - 020 - 022	01/18/1996	1800	High Wind	40 kts.	0	0	400K	0
142 Huntsville	04/23/1996	0225	Tstm Wind	50 kts.	0	0	8K	0K
143 Huntsville	04/29/1996	1430	Tstm Wind	50 kts.	0	0	10K	0K
144 Huntsville	05/27/1996	1525	Tstm Wind	55 kts.	0	0	15K	0K
145 Huntsville	05/27/1996	1530	Tstm Wind	50 kts.	0	0	10K	0K
146 Huntsville	05/27/1996	1545	Tstm Wind/hail	50 kts.	0	0	15K	0K
147 Huntsville	05/27/1996	1612	Tstm Wind	55 kts.	0	0	10K	0K
148 Huntsville	05/28/1996	0100	Tstm Wind	50 kts.	0	0	10K	0K
149 Huntsville	07/22/1996	2145	Tstm Wind	50 kts.	0	0	10K	0K
150 Huntsville	08/25/1996	1228	Tstm Wind	0 kts.	0	0	10K	0K
151 Huntsville	09/16/1996	1547	Tstm Wind	50 kts.	0	0	7K	1K
152 Huntsville	09/16/1996	0730	Tstm Wind	0 kts.	0	0	25K	0K
153 Huntsville	01/04/1997	2350	Tstm Wind	50 kts.	0	1	15K	1K
154 Huntsville	01/24/1997	1706	Tstm Wind	50 kts.	0	0	10K	0K
155 Huntsville	02/21/1997	0717	Tstm Wind	54 kts.	0	0	18K	0K
156 Madison	03/05/1997	1425	Tstm Wind	0 kts.	0	0	5K	0K
157 Huntsville	06/13/1997	1540	Tstm Wind	52 kts.	0	0	6K	0K
158 Hazel Green	07/04/1997	1512	Tstm Wind	52 kts.	0	0	5K	0K
159 Huntsville	09/09/1997	1700	Tstm Wind	0 kts.	0	0	6K	0K

Table 4-5. Significant Thunderstorm/High Wind Events 1956-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
160 ALZ006	02/16/1998	0304	High Wind	42 kts.	0	0	4K	0K
161 Meridianville	03/08/1998	1655	Tstm Wind	50 kts.	0	0	2K	0K
162 New Hope	03/19/1998	2239	Tstm Wind	65 kts.	0	0	382K	0K
163 Huntsville	04/16/1998	1925	Tstm Wind	50 kts.	0	0	20K	5K
164 Countywide	06/05/1998	0410	Tstm Wind	55 kts.	0	0	45K	10K
165 Huntsville	07/20/1998	1320	Tstm Wind	60 kts.	0	0	25K	0K
166 ALZ006	01/02/1999	1000	High Wind	45 kts.	0	0	15K	0K
167 Huntsville	01/22/1999	1740	Tstm Wind	55 kts.	0	0	25K	0K
168 Harvest	05/05/1999	2105	Tstm Wind	50 kts.	0	0	0K	0K
169 Huntsville	05/05/1999	2110	Tstm Wind	50 kts.	0	0	5K	0K
170 Huntsville	06/03/1999	1300	Tstm Wind	50 kts.	0	0	2K	0K
171 Owens Xrds	07/19/1999	1720	Tstm Wind	65 kts.	0	0	150K	0K
172 Meridianville	07/21/1999	1454	Tstm Wind	50 kts.	0	0	3K	0K
173 Huntsville	07/22/1999	1600	Tstm Wind	50 kts.	0	0	10K	0K
174 Huntsville	07/24/1999	1700	Tstm Wind	55 kts.	0	0	8K	0K
175 Huntsville	07/29/1999	1645	Tstm Wind	50 kts.	0	0	8K	0K
176 Huntsville	07/29/1999	1715	Tstm Wind	55 kts.	0	0	15K	0K
177 Madison	08/12/1999	1530	Tstm Wind	55 kts.	0	0	15K	0K
178 Meridianville	08/12/1999	1530	Tstm Wind	55 kts.	0	0	0K	0K
179 Harvest	08/13/1999	1855	Tstm Wind	50 kts.	0	0	2K	0K
180 Huntsville	08/13/1999	1930	Tstm Wind	50 kts.	0	0	5K	0K
181 Owens Xrds	08/19/1999	1720	Tstm Wind	65 kts.	0	0	100K	0K
182 Huntsville	01/03/2000	2210	Tstm Wind	55 kts.	0	0	2K	0K
183 New Market	01/03/2000	2220	Tstm Wind	55 kts.	0	0	10K	0K
184 Huntsville	02/13/2000	1928	Tstm Wind	65 kts.	0	2	250K	0K
185 Redstone AAF	02/13/2000	1929	Tstm Wind	75 kts.	0	0	100K	0K
186 Huntsville	02/13/2000	1942	Tstm Wind	65 kts.	0	0	20K	0K
187 Hazel Green	04/20/2000	1950	Tstm Wind	55 kts.	0	0	2K	0K
188 Countywide	07/20/2000	1600	Tstm Wind	65 kts.	0	2	40K	0K
189 Owens Xrds	08/04/2000	0800	Tstm Wind	50 kts.	0	0	2K	0K
190 New Hope	08/07/2000	1300	Tstm Wind	50 kts.	0	0	8K	0K
191 Huntsville	08/10/2000	1612	Tstm Wind	55 kts.	0	0	0K	0K
192 Huntsville	08/17/2000	1600	Tstm Wind	50 kts.	0	0	1K	0K
193 Hazel Green	11/08/2000	2310	Tstm Wind	50 kts.	0	0	2K	0K
194 ALZ006>010 - 016>019 - 023>025 - 027	11/24/2000	1500	High Wind	50 kts.	0	0	26K	0K
195 Countywide	12/16/2000	1610	Tstm Wind	50 kts.	0	0	5K	0K
196 Countywide	02/16/2001	1325	Tstm Wind	60 kts.	0	0	25K	0K
197 Madison Co Jet Port	06/04/2001	1650	Tstm Wind	65 kts.	0	0	75K	0K

Table 4-5. Significant Thunderstorm/High Wind Events 1956-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
198 Huntsville	06/04/2001	1740	Tstm Wind	50 kts.	0	0	9K	0K
199 Huntsville	06/21/2001	1745	Tstm Wind	50 kts.	0	0	2K	0K
200 Countywide	07/04/2001	1640	Tstm Wind	50 kts.	0	0	4K	0K
201 Countywide	07/05/2001	1125	Tstm Wind	55 kts.	0	0	3K	0K
202 Huntsville	10/24/2001	2055	Tstm Wind	50 kts.	0	0	4K	0K
203 Meridianville	04/28/2002	1925	Tstm Wind	50 kts.	0	0	25K	0K
204 New Market	05/02/2002	1705	Tstm Wind	60 kts.	0	0	30K	0K
205 Harvest	05/13/2002	1030	Tstm Wind	50 kts.	0	0	5K	0K
206 Countywide	05/13/2002	1045	Tstm Wind	60 kts.	0	0	8K	0K
207 Huntsville	06/04/2002	1635	Tstm Wind	50 kts.	0	0	2K	0K
208 Huntsville	06/13/2002	1520	Tstm Wind	55 kts.	0	0	8K	0K
209 New Market	07/01/2002	1550	Tstm Wind	50 kts.	0	0	3K	0K
210 Huntsville	07/01/2002	1600	Tstm Wind	50 kts.	0	0	2K	0K
211 Huntsville	07/30/2002	1635	Tstm Wind	59 kts.	0	0	15K	0K
212 Maysville	08/02/2002	2115	Tstm Wind	50 kts.	0	0	4K	0K
213 Elkwood	08/04/2002	1730	Tstm Wind	50 kts.	0	0	25K	0K
214 Huntsville	08/18/2002	1530	Tstm Wind	50 kts.	0	0	10K	0K
215 Huntsville	08/20/2002	1410	Tstm Wind	50 kts.	0	0	25K	0K
216 Monrovia	09/18/2002	1600	Tstm Wind	50 kts.	0	0	8K	0K
217 ALZ001 - 003-006-009-024	09/26/2002	1500	High Wind	40 kts.	0	0	27K	0K
218 Hazel Green	03/19/2003	0915	Tstm Wind	60 kts.	0	0	0	0
219 Hazel Green	03/19/2003	0920	Tstm Wind	60 kts.	0	0	0	0
220 Huntsville	05/01/2003	1630	Tstm Wind	60 kts.	0	0	0	0
221 Madison	05/05/2003	1315	Tstm Wind	60 kts.	0	0	0	0
222 New Market	05/06/2003	2140	Tstm Wind	50 kts.	0	0	0	0
223 Huntsville	05/06/2003	2205	Tstm Wind	50 kts.	0	0	0	0
224 Hazel Green	06/11/2003	1415	Tstm Wind	50 kts.	0	0	0	0
225 Hazel Green	06/11/2003	1415	Tstm Wind	60 kts.	0	0	0	0
226 Huntsville	07/10/2003	1535	Tstm Wind	60 kts.	0	0	0	0
227 Madison	07/21/2003	1445	Tstm Wind	60 kts.	0	0	0	0
228 Harvest	07/21/2003	1506	Tstm Wind	50 kts.	0	0	0	0
229 Huntsville	07/22/2003	0910	Tstm Wind	70 kts.	0	0	150K	0
230 New Market	07/28/2003	1831	Tstm Wind	50 kts.	0	0	0	0
231 Meridianville	08/22/2003	2056	Tstm Wind	50 kts.	0	0	0	0
232 Huntsville	11/18/2003	1320	Tstm Wind	80 kts.	0	0	20K	0
233 Huntsville	03/05/2004	2225	Tstm Wind	70 kts.	0	0	0	0
234 Madison	04/22/2004	1727	Tstm Wind	60 kts.	0	0	5K	0
235 Harvest	05/30/2004	2346	Tstm Wind	70 kts.	0	0	15K	0
236 Huntsville	05/31/2004	0002	Tstm Wind	50 kts.	0	0	0	0
237 Huntsville	05/31/2004	0008	Tstm Wind	50 kts.	0	0	0	0
238 Owens Xrds	06/22/2004	1645	Tstm Wind	50 kts.	0	0	0	0

Table 4-5. Significant Thunderstorm/High Wind Events 1956-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
239 Owens Xrds	06/22/2004	1658	Tstm Wind	50 kts.	0	0	0	0
240 Harvest	07/06/2004	1728	Tstm Wind	50 kts.	0	0	0	0
241 Huntsville	07/06/2004	1745	Tstm Wind	50 kts.	0	0	0	0
242 Hazel Green	07/13/2004	2215	Tstm Wind	50 kts.	0	0	0	0
243 Hazel Green	07/14/2004	1433	Tstm Wind	60 kts.	0	0	0	0
244 Brownsboro	07/14/2004	1449	Tstm Wind	60 kts.	0	0	0	0
245 Huntsville	07/14/2004	1540	Tstm Wind	50 kts.	0	0	0	0
246 Huntsville	07/14/2004	1706	Tstm Wind	50 kts.	0	0	0	0
247 ALZ001>010 - 016	09/16/2004	0455	High Wind	50 kts.	0	3	2.5M	0
248 Huntsville	01/13/2005	0958	Tstm Wind	60 kts.	0	0	0	0
249 Toney	01/13/2005	0958	Tstm Wind	50 kts.	0	0	0	0
250 Harvest	02/21/2005	1358	Tstm Wind	65 kts.	0	0	200K	0
251 ALZ004 - 006 - 006	04/30/2005	0040	High Wind	50 kts.	0	0	5K	0
252 Madison	05/20/2005	1130	Tstm Wind	50 kts.	0	0	0	0
253 Whitesburg	05/20/2005	1135	Tstm Wind	50 kts.	0	0	0	0
254 Harvest	06/06/2005	1245	Tstm Wind	50 kts.	0	0	0	0
255 New Market	06/20/2005	1715	Tstm Wind	50 kts.	0	0	0	0
256 Normal	06/20/2005	1732	Tstm Wind	50 kts.	0	0	0	0
257 Hazel Green	07/01/2005	1333	Tstm Wind	55 kts.	0	0	20K	0
258 Huntsville	07/22/2005	2100	Tstm Wind	50 kts.	0	0	0	0
259 Huntsville	07/22/2005	2105	Tstm Wind	50 kts.	0	0	0	0
260 Hazel Green	07/22/2005	2115	Tstm Wind	50 kts.	0	0	0	0
261 Huntsville	07/22/2005	2125	Tstm Wind	50 kts.	0	0	0	0
262 Huntsville	08/06/2005	0200	Tstm Wind	50 kts.	0	0	0	0
263 Huntsville	08/15/2005	1530	Tstm Wind	50 kts.	0	0	0	0
264 Huntsville	08/15/2005	1535	Tstm Wind	50 kts.	0	0	0	0
265 Huntsville	08/16/2005	1420	Tstm Wind	50 kts.	0	0	0	0
266 Maysville	08/22/2005	1625	Tstm Wind	50 kts.	0	0	0	0
267 Gurley	08/22/2005	1645	Tstm Wind	50 kts.	0	0	0	0
268 Huntsville	09/15/2005	1545	Tstm Wind	50 kts.	0	0	0	0
269 Madison	09/25/2005	2102	Tstm Wind	50 kts.	0	0	0	0
270 Huntsville	12/04/2005	0119	Tstm Wind	60 kts.	0	0	0	0
271 Huntsville	03/09/2006	1725	Tstm Wind	60 kts.	0	0	0	0
272 Berkley	03/13/2006	1820	Tstm Wind	60 kts.	0	0	0	0
273 Moores Mill	04/07/2006	1845	Tstm Wind	60 kts.	0	0	15K	0
274 Maysville	04/20/2006	1850	Tstm Wind	60 kts.	0	0	0	0
275 Meridianville	04/21/2006	1420	Tstm Wind	65 kts.	0	0	0	0
276 Meridianville	04/21/2006	1425	Tstm Wind	60 kts.	0	0	0	0
277 Meridianville	04/21/2006	1425	Tstm Wind	60 kts.	0	0	0	0
278 Harvest	05/09/2006	1630	Tstm Wind	50 kts.	0	0	0	0

Table 4-5. Significant Thunderstorm/High Wind Events 1956-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
279 Huntsville	05/09/2006	1640	Tstm Wind	60 kts.	0	0	0	0
280 Hazel Green	05/09/2006	1645	Tstm Wind	60 kts.	0	0	0	0
281 Hazel Green	05/11/2006	1927	Tstm Wind	50 kts.	0	0	0	0
282 Harvest	05/11/2006	1938	Tstm Wind	50 kts.	0	0	0	0
283 Union Grove	05/26/2006	1335	Tstm Wind	60 kts.	0	0	0	0
284 Triana	05/26/2006	1510	Tstm Wind	50 kts.	0	0	0	0
285 Madison	05/26/2006	1520	Tstm Wind	50 kts.	0	0	0	0
286 Madison	05/27/2006	2230	Tstm Wind	50 kts.	0	0	0	0
287 Huntsville	05/30/2006	1550	Tstm Wind	60 kts.	0	0	5K	0
288 Huntsville	06/01/2006	1620	Tstm Wind	50 kts.	0	0	0	0
289 Huntsville	06/01/2006	1620	Tstm Wind	58 kts.	0	0	0	0
290 Huntsville	06/02/2006	1325	Tstm Wind	50 kts.	0	0	0	0
291 Ryland	06/23/2006	1327	Tstm Wind	50 kts.	0	0	0	0
292 Huntsville	07/28/2006	1333	Tstm Wind	65 kts.	0	0	0	0
293 Madison	07/28/2006	1339	Tstm Wind	50 kts.	0	0	0	0
294 Huntsville	07/28/2006	1150	Tstm Wind	50 kts.	0	0	0	0
295 Countywide	08/04/2006	1320	Tstm Wind	50 kts.	0	0	0	0
296 Harvest	08/10/2006	0200	Tstm Wind	50 kts.	0	0	0	0
297 Harvest	08/10/2006	1410	Tstm Wind	50 kts.	0	0	0	0
298 ALZ006	10/17/2006	0032	Strong Wind	47 kts.	0	0	0K	1K
299 Moores Mill	02/24/2007	2235	Tstm Wind	50 kts.	0	0	0K	0K
300 Madison Xrds	04/03/2007	2135	Tstm Wind	70 kts.	0	0	0K	0K
301 Monrovia	06/08/2007	1435	Tstm Wind	52 kts.	0	0	0K	0K
302 Huntsville	07/25/2007	1740	Tstm Wind	52 kts.	0	0	0K	0K
303 Huntsville	11/14/2007	1940	Tstm Wind	55 kts.	0	0	0K	0K
304 Madison	11/14/2007	1940	Tstm Wind	55 kts.	0	0	0K	0K
305 Mt Leventov	01/10/2008	1605	Tstm Wind	52 kts.	0	0	500K	0K
306 Jeff	01/10/2008	1607	Tstm Wind	52 kts.	0	0	500K	0K
307 ALZ006>008 - 016	01/29/2008	2000	High Wind	43 kts.	0	0	10K	0K
308 Bell Factory	02/06/2008	0400	Tstm Wind	50 kts.	0	0	0K	0K
309 Meridianville	04/11/2008	1306	Tstm Wind	56 kts.	0	0	3K	0K
310 Plevna	04/11/2008	1322	Tstm Wind	56 kts.	0	0	5K	0K
311 Hazel Green	06/01/2008	1444	Tstm Wind	52 kts.	0	0	0K	0K
312 Bell Factory	06/01/2008	1512	Tstm Wind	61 kts.	0	0	3K	0K
313 Oakwood College	06/23/2008	1448	Tstm Wind	43 kts.	0	0	1K	0K
314 Huntsville Mills Arp	06/23/2008	1452	Tstm Wind	52 kts.	0	0	2K	0K
315 Huntsville Park	06/23/2008	1452	Tstm Wind	43 kts.	0	0	2K	0K

Table 4-5. Significant Thunderstorm/High Wind Events 1956-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
316 Cave Spg	06/23/2008	1458	Tstm Wind	52 kts.	0	0	1K	0K
317 Hazel Green	06/25/2008	1800	Tstm Wind	61 kts.	0	0	10K	0K
318 (HSV) Huntsville Jones Field	06/29/2008	1305	Tstm Wind	41 kts.	1	12	1.0M	0K
319 Madison Xrds	07/04/2008	1308	Tstm Wind	56 kts.	0	0	2K	0K
320 Huntsville	07/09/2008	1517	Tstm Wind	56 kts.	0	0	2K	0K
321 Normal	07/09/2008	1526	Tstm Wind	52 kts.	0	0	2K	0K
322 Oakwood College	07/09/2008	1526	Tstm Wind	52 kts.	0	0	1K	0K
323 Normal	07/09/2008	1530	Tstm Wind	52 kts.	0	0	0K	0K
324 Nebo	07/12/2008	1445	Tstm Wind	56 kts.	0	0	5K	0K
325 Triana	07/12/2008	1515	Tstm Wind	52 kts.	0	0	0K	0K
326 Gurley	07/22/2008	1145	Tstm Wind	52 kts.	0	0	2K	0K
327 Harvest Epps Arpt	07/22/2008	1250	Tstm Wind	56 kts.	0	0	1K	0K
328 Madison Xrds	07/22/2008	1250	Tstm Wind	56 kts.	0	0	1K	0K
329 Gladstone	07/22/2008	1300	Tstm Wind	56 kts.	0	0	1K	0K
330 Gladstone	07/22/2008	1300	Tstm Wind	56 kts.	0	0	1K	0K
331 Hazel Green	07/22/2008	1300	Tstm Wind	52 kts.	0	0	0K	0K
332 Monrovia	07/22/2008	1300	Tstm Wind	56 kts.	0	0	1K	0K
333 Bugge Chapel	07/22/2008	1315	Tstm Wind	52 kts.	0	0	1K	0K
334 New Hope	07/22/2008	1315	Tstm Wind	52 kts.	0	0	1K	0K
335 Jeff	07/22/2008	1452	Tstm Wind	52 kts.	0	0	1K	0K
336 Huntsville Park	08/07/2008	1037	Tstm Wind	52 kts.	0	0	3K	0K
337 Chase	08/07/2008	1048	Tstm Wind	52 kts.	0	0	2K	0K
338 Maysville	08/07/2008	1048	Tstm Wind	52 kts.	0	0	3K	0K
339 Huntsville Mills Arp	09/08/2008	1730	Tstm Wind	43 kts.	0	0	1K	0K
340 Huntsville Mills Arp	10/08/2008	0455	Tstm Wind	56 kts.	0	0	4K	0K
341 Fletcher Chapel	12/24/2008	1548	Tstm Wind	56 kts.	0	0	4K	0K
342 Redstone AAF	12/24/2008	1548	Tstm Wind	52 kts.	0	0	2K	0K
343 Countywide	01/17/2009	0000	Cold/wind Chill	N/A	0	0	0K	0K
344 Countywide	02/11/2009	1200	High Wind	56 kts.	0	0	15K	0K

Table 4-5. Significant Thunderstorm/High Wind Events 1956-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
345 Hazel Green	02/11/2009	1226	Tstm Wind	52 kts.	0	0	1K	0K
346 Hazel Green Arpt	02/11/2009	1230	Tstm Wind	60 kts.	0	0	2K	0K
347 Hazel Green	02/11/2009	1235	Tstm Wind	60 kts.	0	0	5K	0K
348 Triana	02/11/2009	1235	Tstm Wind	60 kts.	0	0	1K	0K
349 Huntsville	03/28/2009	1753	Tstm Wind	52 kts.	0	0	1K	0K
350 Cluttsville	04/02/2009	1558	Tstm Wind	52 kts.	0	0	2K	0K
351 Nebo	04/02/2009	1607	Tstm Wind	52 kts.	0	0	1K	0K
352 Huntsville	04/02/2009	1910	Tstm Wind	56 kts.	0	0	45K	0K
353 Huntsville Mills Arp	04/02/2009	1915	Tstm Wind	52 kts.	0	0	6K	0K
354 Huntsville Mills Arp	04/02/2009	1918	Tstm Wind	50 kts.	0	0	0K	0K
355 Harvest Epps Arpt	04/10/2009	1305	Tstm Wind	52 kts.	0	0	2K	0K
356 Meridianville	04/10/2009	1317	Tstm Wind	52 kts.	0	0	6K	0K
357 Sulphur Spgs	04/10/2009	1323	Tstm Wind	56 kts.	0	0	12K	0K
358 Fisk	04/10/2009	1324	Tstm Wind	52 kts.	0	0	6K	0K
359 Triana	04/10/2009	1340	Tstm Wind	56 kts.	0	0	0K	0K
360 Hobbs Is	04/10/2009	1410	Tstm Wind	56 kts.	0	0	4K	0K
361 ALZ006	04/12/2009	2208	Strong Wind	45 kts.	0	0	50K	0K
362 Oak Grove	05/03/2009	1645	Tstm Wind	50 kts.	0	0	10K	0K
363 Hillsboro	05/15/2009	1044	Tstm Wind	50 kts.	0	0	2K	0K
364 Plevna	05/15/2009	1240	Tstm Wind	50 kts.	0	0	2K	0K
365 New Sharon	6/10/2009	1128	Tstm Wind	52 kts.	0	0	1000	0
366 Elkwood	6/10/2009	1133	Tstm Wind	52 kts.	0	0	2000	0
367 Oakwood College	6/10/2009	1138	Tstm Wind	52 kts.	0	0	5000	0
368 New Market	6/10/2009	1145	Tstm Wind	52 kts.	0	0	1000	0
369 Nebo	6/15/2009	1841	Tstm Wind	52 kts.	0	0	8000	0
370 Nebo	6/15/2009	1841	Tstm Wind	52 kts.	0	0	3000	0
371 Nebo	6/15/2009	1843	Tstm Wind	52 kts.	0	0	0	0
372 Madison	6/15/2009	1846	Tstm Wind	52 kts.	0	0	8000	0
373 Madison	6/15/2009	1848	High Wind	52 kts.	0	0	8000	0
374 Cluttsville	7/12/2009	2235	Tstm Wind	50 kts.	0	0	2000	0
375 Berkley	7/12/2009	2315	Tstm Wind	50 kts.	0	0	6000	0
376 Cave Spg	7/12/2009	2317	Tstm Wind	50 kts.	0	0	6000	0
377 New Hope	7/12/2009	2325	Tstm Wind	52 kts.	0	0	6000	0
378 Huntsville Park	7/15/2009	2154	Tstm Wind	35 kts.	0	0	2000	0
379 Triana	7/30/2009	1833	Tstm Wind	61 kts.	0	0	25000	0
380 Nebo	10/9/2009	1512	Tstm Wind	58 kts.	0	0	2000	0

Table 4-5. Significant Thunderstorm/High Wind Events 1956-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
381 Monrovia	10/9/2009	1513	Tstm Wind	50 kts.	0	0	4000	0
382 Monrovia	10/9/2009	1514	Tstm Wind	50 kts.	0	0	3000	0
383 Oakwood College	10/9/2009	1516	Tstm Wind	52 kts.	0	0	0	0
384 Oakwood College	10/9/2009	1517	Tstm Wind	50 kts.	0	0	2000	0
385 Monrovia	10/30/2009	1945	Tstm Wind	43 kts.	0	0	1000	0
386 Chase	5/28/2010	1240	Tstm Wind	43 kts.	0	0	7000	0
387 Oakwood College	6/9/2010	1730	Tstm Wind	52 kts.	0	0	8000	0
388 Elkwood	6/9/2010	1752	Tstm Wind	52 kts.	0	0	0	0
389 Huntsville	6/9/2010	1815	Tstm Wind	52 kts.	0	0	0	0
390 New Market	6/25/2010	1357	Tstm Wind	50 kts.	0	0	3000	0
391 Harvest Epps Arpt	7/9/2010	1251	Tstm Wind	52 kts.	0	0	3000	0
392 Nebo	7/9/2010	1635	Tstm Wind	52 kts.	0	0	1000	0
393 Nebo	7/9/2010	1635	Tstm Wind	52 kts.	0	0	4000	0
394 Harvest Epps Arpt	7/9/2010	1635	Tstm Wind	52 kts.	0	0	1000	0
395 Nebo	7/9/2010	1640	Tstm Wind	43 kts.	0	0	1000	0
396 Jeff	7/9/2010	1640	Tstm Wind	52 kts.	0	0	0	0
397 Harvest Epps Arpt	7/9/2010	1649	Tstm Wind	52 kts.	0	0	2000	0
398 Huntsville Mills Arp	7/9/2010	1650	Tstm Wind	52 kts.	0	0	5000	0
399 Harvest Epps Arpt	7/9/2010	1655	Tstm Wind	52 kts.	0	0	1000	0
400 Huntsville	7/9/2010	1700	Tstm Wind	52 kts.	0	0	15000	0
401 Huntsville	7/9/2010	1705	Tstm Wind	52 kts.	0	0	1000	0
402 Huntsville	7/9/2010	1708	Tstm Wind	52 kts.	0	0	10000	0
403 Mt Leventov	8/21/2010	1915	Tstm Wind	43 kts.	0	0	4000	0
404 Fairview	8/21/2010	1915	Tstm Wind	52 kts.	0	0	15000	0
405 Normal	8/21/2010	1925	Tstm Wind	50 kts.	0	0	5000	0
406 Farley	10/26/2010	1350	Tstm Wind	61 kts.	0	0	12000	0
407 Madison	10/26/2010	1500	Tstm Wind	52 kts.	0	0	8000	0
408 Madison	11/30/2010	245	Tstm Wind	43 kts.	0	0	2000	0
409 Redstone AAF	2/24/2011	0	Tstm Wind	52 kts.	0	0	4000	0
410 Madison Xrds	2/24/2011	2310	Tstm Wind	52 kts.	0	0	2000	0
411 Madison Xrds	2/24/2011	2310	Tstm Wind	52 kts.	0	0	2000	0

Table 4-5. Significant Thunderstorm/High Wind Events 1956-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
412 Harvest Epps Arpt	2/24/2011	2310	Tstm Wind	47 kts.	0	0	500	0
413 Huntsville Mills Arp	2/24/2011	2315	Tstm Wind	52 kts.	0	0	100	0
414 Bell Factory	2/28/2011	1240	Tstm Wind	52 kts.	0	0	0	0
415 Monrovia	2/28/2011	1245	Tstm Wind	56 kts.	0	0	5000	0
416 Fletcher Chapel	2/28/2011	1255	Tstm Wind	56 kts.	0	0	500	0
417 Harvest	4/4/2011	1417	High Wind	50 kts.	0	0	25000	0
418 Dan	4/4/2011	1424	Tstm Wind	50 kts.	0	0	2000	0
419 Maple Hill	4/4/2011	1424	Tstm Wind	50 kts.	0	0	2000	0
420 Harvest Epps Arpt	4/4/2011	1424	Tstm Wind	50 kts.	0	0	0	0
421Madison	4/4/2011	1427	Tstm Wind	50 kts.	0	0	0	0
422 Madison	4/4/2011	1504	Tstm Wind	50 kts.	0	0	0	0
423 Huntsville	4/4/2011	1510	Tstm Wind	40 kts.	0	0	100	0
424 Huntsville	4/11/2011	1743	Tstm Wind	52 kts.	0	0	5000	0
425 Chase	4/11/2011	1815	Tstm Wind	52 kts.	0	0	10000	0
426 Huntsville Park	4/11/2011	1824	Tstm Wind	43 kts.	0	0	500	0
427 Madison Co Jet Port	4/27/2011	1049	Tstm Wind	51 kts.	0	0	0	0
428 Gladstone	4/27/2011	1547	Tstm Wind	70 kts.	0	0	0	0
429 Oakwood College	5/22/2011	1224	Tstm Wind	40 kts.	0	0	2000	0
430 Fletcher Chapel	5/25/2011	2344	Tstm Wind	56 kts.	0	0	0	0
431 Madison Co.	6/15/2011	1929	Tstm Wind	43 kts.	0	0	500	0
432 Madison Co.	6/15/2011	1930	Tstm Wind	43 kts.	0	0	1000	0
433 Madison Co.	6/16/2011	1937	Tstm Wind	48 kts.	0	0	1000	0
434 Madison Co.	6/18/2011	1305	Tstm Wind	39 kts.	0	0	500	0
435 Madison Co.	6/18/2011	1313	Tstm Wind	50 kts.	0	0	2000	0
436 Madison Co.	6/18/2011	1313	Tstm Wind	36 kts.	0	0	500	0
437 Madison Co.	6/18/2011	1315	Tstm Wind	39 kts.	0	0	500	0
438 Madison Co.	6/18/2011	1316	Tstm Wind	39 kts.	0	0	5000	0
439 Madison Co.	6/18/2011	1316	Tstm Wind	39 kts.	0	0	1000	0
440 Madison Co.	6/18/2011	1318	Tstm Wind	50 kts.	0	0	10000	0
441 Madison Co.	6/18/2011	1318	Tstm Wind	50 kts.	0	0	8000	0
442 Madison Co.	6/18/2011	1318	Tstm Wind	39 kts.	0	0	2000	0
443 Madison Co.	6/18/2011	1318	Tstm Wind	39 kts.	0	0	500	0
444 Madison Co.	6/18/2011	1318	Tstm Wind	52 kts.	0	0	8000	0
445 Madison Co.	6/18/2011	1318	Tstm Wind	39 kts.	0	0	8000	0

Table 4-5. Significant Thunderstorm/High Wind Events 1956-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
446 Madison Co.	6/18/2011	1319	Tstm Wind	52 kts.	0	0	25000	0
447 Madison Co.	6/18/2011	1320	Tstm Wind	50 kts.	0	0	16000	0
448 Madison Co.	6/18/2011	1320	Tstm Wind	52 kts.	0	0	15000	0
449 Madison Co.	6/18/2011	1322	Tstm Wind	36 kts.	0	0	200	0
450 Madison Co.	6/18/2011	1323	Tstm Wind	39 kts.	0	0	2000	0
451 Madison Co.	6/18/2011	1324	Tstm Wind	35 kts.	0	0	1000	0
452 Madison Co.	6/18/2011	1324	Tstm Wind	35 kts.	0	0	1000	0
453 Madison Co.	6/18/2011	1333	Tstm Wind	48 kts.	0	0	12000	0
454 Madison Co.	6/18/2011	1335	Tstm Wind	39 kts.	0	0	5000	0
455 Madison Co.	6/21/2011	1430	Tstm Wind	57 kts.	0	0	0	0
456 Madison Co.	6/21/2011	1435	Tstm Wind	54 kts.	0	0	0	0
457 Madison Co.	6/21/2011	1435	Tstm Wind	50 kts.	0	0	3000	0
458 Madison Co.	6/21/2011	1448	Tstm Wind	50 kts.	0	0	2000	0
459 Madison Co.	6/21/2011	1448	Tstm Wind	60 kts.	0	0	20000	0
460 Madison Co.	6/21/2011	1451	Tstm Wind	50 kts.	0	0	2000	0
461 Madison Co.	6/21/2011	1458	High Wind	50 kts.	0	0	2000	0
462 Madison Co.	6/21/2011	1513	Tstm Wind	65 kts.	0	0	8000	0
463 Madison Co.	6/21/2011	1514	Tstm Wind	56 kts.	0	0	5000	0
464 Madison Co.	6/21/2011	1514	Tstm Wind	70 kts.	0	0	10000	0
465 Madison Co.	6/21/2011	1517	Tstm Wind	52 kts.	0	0	0	0
467 Madison Co.	6/21/2011	1520	Tstm Wind	50 kts.	0	0	5000	0
468 Madison Co.	6/21/2011	1520	Tstm Wind	50 kts.	0	0	2000	0
469 Madison Co.	6/21/2011	1523	Tstm Wind	65 kts.	0	0	8000	0
470 Madison Co.	6/21/2011	1530	Tstm Wind	60 kts.	0	0	8000	0
471 Madison Co.	6/21/2011	1532	Tstm Wind	65 kts.	0	0	8000	0
472 Madison Co.	6/22/2011	1450	Tstm Wind	48 kts.	0	0	500	0
473 Madison Co.	6/22/2011	1502	Tstm Wind	50 kts.	0	0	2000	0
474 Madison Co.	6/22/2011	1506	Tstm Wind	48 kts.	0	0	1000	0
475 Madison Co.	6/24/2011	1305	Tstm Wind	48 kts.	0	0	500	0
476 Madison Co.	6/26/2011	1303	Tstm Wind	52 kts.	0	0	2000	0
477 Madison Co.	6/26/2011	1305	Tstm Wind	61 kts.	0	0	5000	0
478 Madison Co.	6/26/2011	1305	Tstm Wind	52 kts.	0	0	2000	0
479 Madison Co.	6/28/2011	800	Tstm Wind	43 kts.	0	0	500	0
480 Huntsville Mills Arp	7/12/2011	1406	Tstm Wind	52 kts.	0	0	5000	0
481 Cherrytree	7/14/2011	1803	Tstm Wind	52 kts.	0	0	5000	0
482 Harvest	8/3/2011	2250	Tstm Wind	52 kts.	0	0	5000	0
483 Huntsville Jones Arp	8/3/2011	2304	Tstm Wind	60 kts.	0	0	0	0
484 Harvest	8/3/2011	2315	Tstm Wind	60 kts.	0	0	25000	0
485 Triana	8/3/2011	2320	Tstm Wind	45 kts.	0	0	5000	0
486 Huntsville	8/8/2011	1419	Tstm Wind	43 kts.	0	0	5000	0

Table 4-5. Significant Thunderstorm/High Wind Events 1956-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
487 Meridianville	8/8/2011	1428	Tstm Wind	52 kts.	0	0	5000	0
488 Meridianville	8/8/2011	1515	Tstm Wind	52 kts.	0	0	10000	0
489 Normal	11/16/2011	907	Tstm Wind	61 kts.	0	0	20000	0
490 Fletcher Chapel	11/16/2011	915	Tstm Wind	64 kts.	0	0	0	0
491 Monrovia	11/16/2011	915	Tstm Wind	56 kts.	0	0	0	0
492 Normal	11/16/2011	917	Tstm Wind	52 kts.	0	0	2000	0
493 Madison Co Jet Port	3/15/2012	1823	Tstm Wind	62 kts.	0	0	0	0
494 Hazel Green	5/29/2012	1900	Tstm Wind	52 kts.	0	0	3000	0
495 Monrovia	5/29/2012	1910	Tstm Wind	35 kts.	0	0	500	0
496 Huntsville Park	5/29/2012	1938	Tstm Wind	52 kts.	0	0	2000	0
497 New Hope	5/29/2012	2011	Tstm Wind	35 kts.	0	0	500	0
498 Huntsville	7/5/2012	1615	Tstm Wind	43 kts.	0	0	1000	0
499 Meridianville	7/5/2012	1629	Tstm Wind	52 kts.	0	0	0	0
500 New Hope	7/5/2012	1947	Tstm Wind	52 kts.	0	0	20000	0
501 Owens Xrds	7/8/2012	1240	Tstm Wind	35 kts.	0	0	500	0
502 Owens Xrds	7/10/2012	1411	Tstm Wind	52 kts.	0	0	500	0
503 Owens Xrds	7/10/2012	1411	Tstm Wind	61 kts.	0	0	5000	0
504 Madison Xrds	7/16/2012	520	Tstm Wind	35 kts.	0	0	100	0
505 Gurley	7/18/2012	1315	Tstm Wind	43 kts.	0	0	1000	0
506 Maple Hill	8/10/2012	1444	Tstm Wind	43 kts.	0	0	10000	0
507 Madison	8/10/2012	1647	Tstm Wind	43 kts.	0	0	10000	0
508 Madison	8/10/2012	1648	Tstm Wind	43 kts.	0	0	10000	0
509 Madison	8/13/2012	1715	Tstm Wind	52 kts.	0	0	10000	0
510 Huntsville	9/2/2012	1625	Tstm Wind	52 kts.	0	0	15000	0
511 Huntsville	9/2/2012	1628	Tstm Wind	52 kts.	0	0	10000	0
512 Owens Xrds	9/2/2012	1636	Tstm Wind	43 kts.	0	0	5000	0
513 Madison	12/10/2012	326	Tstm Wind	52 kts.	0	0	2000	0
514 Huntsville Mills Arp	12/10/2012	338	Tstm Wind	61 kts.	0	0	4000	0
515 Huntsville Mills Arp	12/10/2012	338	Tstm Wind	52 kts.	0	0	2000	0
516 Huntsville	12/10/2012	338	Tstm Wind	61 kts.	0	0	2000	0
517 (HSV) Huntsville Jones	1/30/2013	605	Tstm Wind	60 kts.	0	0	0	0
518 Huntsville Park	4/19/2013	42	Tstm Wind	61 kts.	0	0	0	0
519 Madison Co.	6/1/2013	1717	Tstm Wind	43 kts.	0	0	200	0
520 Madison Co.	6/16/2013	1718	Tstm Wind	43 kts.	0	0	1000	0

Table 4-5. Significant Thunderstorm/High Wind Events 1956-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
521 Madison Co.	6/17/2013	1241	Tstm Wind	43 kts.	0	0	500	0
522 Madison Co.	6/17/2013	1245	Tstm Wind	52 kts.	0	0	0	0
523 Madison Co.	6/17/2013	1245	Tstm Wind	35 kts.	0	0	100	0
524 Madison Co.	6/17/2013	1247	Tstm Wind	35 kts.	0	0	100	0
525 Madison Co.	6/17/2013	1247	Tstm Wind	43 kts.	0	0	500	0
526 Madison Co.	6/17/2013	1300	Tstm Wind	35 kts.	0	0	100	0
527 Madison Co.	6/17/2013	1308	Tstm Wind	52 kts.	0	0	500	0
528 Madison Co.	6/27/2013	533	Tstm Wind	43 kts.	0	0	2000	0
529 Madison Co.	6/27/2013	548	Tstm Wind	52 kts.	0	0	3000	0
530 Madison	7/10/2013	2028	Tstm Wind	43 kts.	0	0	10000	0
531 Harvest	7/10/2013	2123	Tstm Wind	52 kts.	0	0	15000	0
532 Madison Co.	9/2/2013	200	Tstm Wind	52 kts.	0	0	15000	0
533 New Hope	12/22/2013	135	Tstm Wind	52 kts.	0	0	5000	0
534 Dug Hill	2/20/2014	2236	Tstm Wind	62 kts.	0	0	0	0
535 Cave Spg	2/20/2014	2239	Tstm Wind	52 kts.	0	0	2000	0
536 (HSV) Huntsville Jones Field	06/05/2014	15:53	Tstm Wind	51 kts.	0	0	0.00K	0
537 Madison	06/05/2014	15:54	Tstm Wind	52 kts.	0	0	1.00K	0
538 Madison	06/05/2014	15:54	Tstm Wind	52 kts.	0	0	0.00K	0
539 Monrovia	06/05/2014	15:55	Tstm Wind	52 kts.	0	0	0.00K	0
540 Monrovia	06/05/2014	15:56	Tstm Wind	52 kts.	0	0	0.00K	0
541 Monrovia	06/05/2014	16:03	Tstm Wind	52 kts.	0	0	0.00K	0
542 New Sharon	06/05/2014	16:06	Tstm Wind	52 kts.	0	0	0.00K	0
543 Ryland	06/05/2014	16:06	Tstm Wind	52 kts.	0	0	0.00K	0
544 Huntsville Mills Arp	06/05/2014	16:06	Tstm Wind	52 kts.	0	0	0.00K	0
545 Monrovia	06/05/2014	16:51	Tstm Wind	52 kts.	0	0	0.00K	0
546 Huntsville	06/07/2014	19:30	Tstm Wind	43 kts.	0	0	1.00K	0
547 New Hope	06/07/2014	20:05	Tstm Wind	52 kts.	0	0	3.00K	0
548(HSV) Huntsville Jones Field	06/09/2014	20:41	Tstm Wind	52 kts.	0	0	5.00K	0
549 Nebo	09/05/2014	13:55	Tstm Wind	43 kts.	0	0	1.00K	0
550 Farley	10/13/2014	15:55	Tstm Wind	60 kts.	0	0	0.00K	0
551 Bloucher Ford	10/13/2014	16:07	Tstm Wind	55 kts.	0	0	0.00K	0
552 Meridianville	04/03/2015	18:48	Tstm Wind	52 kts.	0	0	0.00K	0
553 Harvest	04/03/2015	18:53	Tstm Wind	52 kts.	0	0	0.00K	0
554 Moores Mill	04/19/2015	15:25	Tstm Wind	52 kts.	0	0	0.00K	0
555 Huntsville	04/19/2015	15:29	Tstm Wind	52 kts.	0	0	0.00K	0
556 Elkwood	04/20/2015	00:49	Tstm Wind	43 kts.	0	0	5.00K	0

Table 4-5. Significant Thunderstorm/High Wind Events 1956-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
557 Huntsville	04/20/2015	01:01	Tstm Wind	52 kts.	0	0	0.00K	0
558 Elkwood	04/20/2015	01:11	Tstm Wind	52 kts.	0	0	0.00K	0
559 Hazel Green	04/20/2015	01:11	Tstm Wind	43 kts.	0	0	1.00K	0
560 Harvest	06/23/2015	23:35	Tstm Wind	52 kts.	0	0	0.00K	0
561 Redstone AAF	06/23/2015	23:44	Tstm Wind	52 kts.	0	0	0.00K	0
562 Madison	07/14/2015	17:20	Tstm Wind	50 kts.	0	0	0.00K	0
563 Madison	07/14/2015	17:39	Tstm Wind	50 kts.	0	0	0.00K	0
564 Oakwood College	08/10/2015	11:30	Tstm Wind	52 kts.	0	0	0.00K	0
565 Madison	09/09/2015	16:20	Tstm Wind	43 kts.	0	0	6.00K	0
TOTALS:					14	23	110.473 M	10.018 M

Source: NOAA; http://www.ncdc.noaa.gov/stormevents/

Table 4-6. Significant Lightning Events 1994-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Deaths**	**Injuries**	**Prop Dam**	**Crop Dam**
1 Huntsville	06/18/1994	1500	Lightning	N/A	0	0	500K	0
2 Huntsville	02/15/1995	1800	Lightning	N/A	0	0	50K	0
3 Huntsville	02/15/1995	2320	Lightning	N/A	0	0	50K	0
4 Huntsville	07/03/1995	1715	Lightning	N/A	0	0	0.2M	0
5 Huntsville	07/25/1995	2239	Lightning	N/A	0	0	25K	0
6 Gurley	06/23/1996	1955	Lightning	N/A	0	0	20K	0
7 Huntsville	07/14/1996	1930	Lightning	N/A	0	0	10K	0
8 Huntsville	07/20/1996	1311	Lightning	N/A	0	0	20K	0
9 Huntsville	01/24/1997	1700	Lightning	N/A	0	1	10K	0
10 Huntsville	03/18/1997	2315	Lightning	N/A	0	0	8K	0
11 Huntsville	07/18/1997	1305	Lightning	N/A	0	0	35K	0
12 Huntsville	07/18/1997	1247	Lightning	N/A	0	0	50K	0
13 Huntsville	09/02/1997	1509	Lightning	N/A	0	0	15K	0
14 Huntsville	05/06/1998	1724	Lightning	N/A	0	0	100K	0
15 Huntsville	07/20/1998	1315	Lightning	N/A	0	1	75K	0
16 Toney	04/23/1999	1640	Lightning	N/A	0	0	15K	0
17 Huntsville	05/05/1999	2145	Lightning	N/A	0	0	30K	0
18 Huntsville	06/03/1999	1230	Lightning	N/A	0	0	15K	0
19 Huntsville	07/07/1999	1800	Lightning	N/A	0	0	3K	0
20 Huntsville	07/24/1999	1700	Lightning	N/A	0	0	2K	0
21 Huntsville	08/12/1999	1533	Lightning	N/A	0	0	5K	0
22 Huntsville	08/19/1999	1715	Lightning	N/A	0	0	30K	0
23 Huntsville	04/04/2001	1430	Lightning	N/A	0	0	45K	0
24 Countywide	07/22/2002	1600	Lightning	N/A	0	0	15K	0

25 Huntsville	08/18/2002	1505	Lightning	N/A	1	1	100K	0
26 Huntsville	04/07/2006	2200	Lightning	N/A	0	0	5K	0
27 Huntsville	05/26/2006	1513	Lightning	N/A	0	1	0	0
28 Harvest	05/26/2006	1600	Lightning	N/A	0	0	20K	0
29 Huntsville	05/26/2006	2220	Lightning	N/A	0	1	0	0
30 Huntsville	05/30/2006	1545	Lightning	N/A	0	0	20K	0
31 Huntsville	07/28/2006	1423	Lightning	N/A	0	0	0	0
32 Moores Mill	08/10/2006	1425	Lightning	N/A	0	0	0	0
33 Farley	08/29/2007	1730	Lightning	N/A	0	0	1K	0
34 Oakwood College	08/29/2007	1730	Lightning	N/A	0	0	2K	0
35 Normal	10/08/2008	0207	Lightning	N/A	0	0	3K	0
36 Normal	12/09/2008	2345	Lightning	N/A	0	0	2K	0
37 Madison	05/01/2009	1700	Lightning	N/A	0	0	2K	0
38 Meridianville	6/15/2009	1844	Lightning	N/A	0	0	500	0
39 Moores Mill	6/15/2009	1846	Lightning	N/A	0	0	500	0
40 Hazel Green	8/4/2009	2355	Lightning	N/A	0	0	20K	0
41 Nunn Store	9/8/2009	1410	Lightning	N/A	0	0	600K	0
42 Bell Factory	7/26/2010	1430	Lightning	N/A	0	0	50K	0
43 Huntsville	8/21/2010	2040	Lightning	N/A	0	0	0	0
44 New Sharon	3/26/2011	2048	Lightning	N/A	0	0	5K	0
45 Monrovia	7/10/2011	1830	Lightning	N/A	0	0	250K	0
46 Nebo	8/8/2011	1415	Lightning	N/A	0	0	1K	0
47 Huntsville	8/8/2011	1420	Lightning	N/A	0	0	10K	0
48 Madison	8/13/2011	1640	Lightning	N/A	0	0	15K	0
49 Huntsville	9/14/2011	2338	Lightning	N/A	0	0	50K	0
50 Brownsboro	9/14/2011	2345	Lightning	N/A	0	0	10K	0
51 Huntsville	1/11/2012	923	Lightning	N/A	0	0	1K	0
52 Huntsville	4/5/2012	1800	Lightning	N/A	0	0	0	5K
53 Huntsville	6/3/2012	2200	Lightning	N/A	0	0	250K	0
54 Harvest	7/4/2012	1725	Lightning	N/A	0	0	25K	0
55 Lily Flag	7/16/2012	1630	Lightning	N/A	0	0	1K	0
56 Bell Factory	7/16/2012	1700	Lightning	N/A	1	0	0	0
57 New Sharon	7/16/2012	1750	Lightning	N/A	0	0	250K	0
58 Huntsville	9/2/2012	1636	Lightning	N/A	0	0	25K	0
59 Mt Leventov	3/5/2013	1308	Lightning	N/A	0	0	250K	0
60 Countywide	9/2/2013	155	Lightning	N/A	0	0	200K	0
61 Farley	1/11/2014	400	Lightning	N/A	0	0	10K	0
62 Huntsville	10/06/2014	1550	Lightning	N/A	0	1	0K	0K

63 Madison	03/29/2015	0220	Lightning	N/A	0	0	10K	0K
64 Moontown	06/30/2015	1045	Lightning	N/A	0	0	200K	0K
65 Union Grove	08/10/2015	1124	Lightning	N/A	0	0	10K	0K
66 Oakwood College	08/10/2015	1125	Lightning	N/A	0	0	10K	0K
TOTALS:					2	6	3.737M	5K

Source: NOAA; http://www.ncdc.noaa.gov/stormevents/

Table 4-7. Significant Hail Events 1961-2015

Location	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 Madison	06/06/1961	1445	Hail	1.75 in.	0	0	0	0
2 Madison	05/16/1962	1522	Hail	0.75 in.	0	0	0	0
3 Madison	07/23/1963	2130	Hail	1.00 in.	0	0	0	0
4 Madison	04/23/1967	1850	Hail	1.25 in.	0	0	0	0
5 Madison	04/23/1967	1850	Hail	1.75 in.	0	0	0	0
6 Madison	04/23/1967	1854	Hail	1.50 in.	0	0	0	0
7 Madison	11/21/1967	2115	Hail	1.75 in.	0	0	0	0
8 Madison	04/23/1971	0330	Hail	0.75 in.	0	0	0	0
9 Madison	04/25/1973	2130	Hail	1.00 in.	0	0	0	0
10 Madison	11/15/1973	1815	Hail	0.75 in.	0	0	0	0
11 Madison	06/27/1974	1630	Hail	1.75 in.	0	0	0	0
12 Madison	03/22/1975	0830	Hail	1.00 in.	0	0	0	0
13 Madison	03/29/1975	0325	Hail	1.75 in.	0	0	0	0
14 Madison	06/19/1975	1510	Hail	1.75 in.	0	0	0	0
15 Madison	06/21/1976	1348	Hail	1.00 in.	0	0	0	0
16 Madison	06/21/1976	1359	Hail	0.75 in.	0	0	0	0
17 Madison	12/05/1977	0535	Hail	2.00 in.	0	0	0	0
18 Madison	05/27/1982	1715	Hail	1.75 in.	0	0	0	0
19 Madison	06/04/1983	0045	Hail	1.00 in.	0	0	0	0
20 Madison	08/06/1983	1743	Hail	1.75 in.	0	0	0	0
21 Madison	08/22/1983	1710	Hail	1.75 in.	0	0	0	0
22 Madison	08/23/1983	1600	Hail	0.75 in.	0	0	0	0
23 Madison	03/27/1984	2140	Hail	1.00 in.	0	0	0	0
24 Madison	04/16/1984	1445	Hail	1.75 in.	0	0	0	0
25 Madison	05/07/1984	1616	Hail	1.75 in.	0	0	0	0
26 Madison	06/14/1984	1440	Hail	0.75 in.	0	0	0	0
27 Madison	06/07/1985	1640	Hail	0.75 in.	0	0	0	0
28 Madison	08/24/1985	1315	Hail	1.75 in.	0	0	0	0
29 Madison	07/28/1986	1810	Hail	0.75 in.	0	0	0	0
30 Madison	09/26/1986	1312	Hail	1.00 in.	0	0	0	0
31 Madison	04/14/1987	1828	Hail	0.75 in.	0	0	0	0

Table 4-7. Significant Hail Events 1961-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
32 Madison	03/31/1989	0020	Hail	1.00 in.	0	0	0	0
33 Madison	06/09/1990	1745	Hail	0.75 in.	0	0	0	0
34 Madison	02/13/1991	2140	Hail	0.75 in.	0	0	0	0
35 Madison	02/13/1991	2148	Hail	1.74 in.	0	0	0	0
36 Madison	04/09/1991	1818	Hail	1.75 in.	0	0	0	0
37 Madison	06/18/1992	1450	Hail	1.00 in.	0	0	0	0
38 Meridianville	05/15/1994	1746	Hail	0.75 in.	0	0	0	0
39 Madison	06/26/1994	2128	Hail	0.75 in.	0	0	0	0
40 Madison	06/26/1994	2149	Hail	1.00 in.	0	0	0	0
41 Airport	06/29/1994	0547	Hail	1.00 in.	0	0	0	0
42 Airport	06/29/1994	0550	Hail	1.00 in.	0	0	0	0
43 Hazel Green	01/28/1995	1600	Hail	1.75 in.	0	0	0	0
44 SW Huntsville	01/28/1995	1620	Hail	1.00 in.	0	0	0	0
45 Chase	05/10/1995	1508	Hail	1.75 in.	0	0	0	0
46 Madison	05/18/1995	1700	Hail	1.75 in.	0	0	0	0
47 Chase	06/11/1995	1225	Hail	0.75 in.	0	0	0	0
48 Gurley	07/15/1995	1502	Hail	1.75 in.	0	0	0	0
49 New Market	03/06/1996	1745	Hail	1.00 in.	0	0	12K	0
50 Madison	03/06/1996	2033	Hail	0.75 in.	0	0	10K	0
51 Madison	03/15/1996	1257	Hail	2.75 in.	0	0	50K	0
52 Huntsville	04/20/1996	2125	Hail	0.75 in.	0	0	8K	0K
53 Huntsville	05/06/1996	1535	Hail	0.75 in.	0	0	10K	0K
54 Huntsville	05/27/1996	1545	Tstm Wind/hail	50 kts.	0	0	15K	0K
55 Hazel Green	06/03/1996	1444	Hail	1.75 in.	0	0	15K	2K
56 Huntsville	08/30/1996	1636	Hail	1.00 in.	0	0	15K	0K
57 Huntsville	01/24/1997	1715	Hail	0.75 in.	0	0	5K	0K
58 Huntsville	01/24/1997	1946	Hail	0.75 in.	0	0	5K	0K
59 Nebo	04/28/1997	1619	Hail	0.75 in.	0	0	2K	0K
60 Hazel Green	07/04/1997	1513	Hail	0.75 in.	0	0	3K	0K
61 Hazel Green	11/30/1997	1327	Hail	0.75 in.	0	0	3K	0K
62 Huntsville	11/30/1997	1345	Hail	1.75 in.	0	0	8K	0K
63 Meridianville	03/08/1998	1655	Hail	0.75 in.	0	0	0K	0K
64 Brownsboro	03/08/1998	1715	Hail	0.88 in.	0	0	0K	0K
65 New Market	03/08/1998	1716	Hail	1.00 in.	0	0	0K	0K
66 Harvest	03/19/1998	2112	Hail	0.75 in.	0	0	0K	0K
67 Toney	03/19/1998	2112	Hail	0.75 in.	0	0	0K	0K
68 Hazel Green	03/19/1998	2124	Hail	0.75 in.	0	0	0K	0K
69 Huntsville	03/19/1998	2234	Hail	0.75 in.	0	0	0K	0K
70 Owens Xrds	04/03/1998	1432	Hail	0.75 in.	0	0	0K	0K
71 Harvest	04/03/1998	1627	Hail	0.75 in.	0	0	0K	0K
72 Hazel Green	04/03/1998	1640	Hail	1.00 in.	0	0	2K	0K
73 Huntsville	04/08/1998	2100	Hail	0.75 in.	0	0	0K	0K
74 Nebo	04/16/1998	1954	Hail	0.88 in.	0	0	0K	0K
75 Toney	05/07/1998	1533	Hail	0.75 in.	0	0	0K	0K
76 Hazel Green	05/07/1998	1543	Hail	1.00 in.	0	0	2K	0K

Table 4-7. Significant Hail Events 1961-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
77 New Market	05/07/1998	1604	Hail	1.75 in.	0	0	10K	5K
78 Huntsville	05/07/1998	1915	Hail	1.00 in.	0	0	2K	0K
79 Huntsville	01/17/1999	2353	Hail	0.75 in.	0	0	0K	0K
80 Huntsville	05/05/1999	2225	Hail	0.75 in.	0	0	0K	0K
81 New Market	02/12/2000	0400	Hail	0.75 in.	0	0	0K	0K
82 Harvest	02/13/2000	1923	Hail	0.75 in.	0	0	0K	0K
83 Huntsville	02/13/2000	1949	Hail	0.75 in.	0	0	0K	0K
84 Toney	04/27/2000	1557	Hail	0.75 in.	0	0	0K	0K
85 Hazel Green	04/27/2000	1602	Hail	1.75 in.	0	0	5K	0K
86 Huntsville	08/10/2000	1545	Hail	0.75 in.	0	0	0K	0K
87 Huntsville	08/10/2000	1635	Hail	0.75 in.	0	0	0K	0K
88 Huntsville	09/24/2000	1430	Hail	0.88 in.	0	0	0K	0K
89 Meridianville	12/16/2000	1339	Hail	0.75 in.	0	0	0K	0K
90 Madison	05/11/2001	1509	Hail	1.00 in.	0	0	0K	0K
91 Hazel Green	06/04/2001	1655	Hail	1.00 in.	0	0	0K	0K
92 Huntsville	06/04/2001	1710	Hail	0.75 in.	0	0	0K	0K
93 Hazel Green	06/21/2001	1730	Hail	0.75 in.	0	0	0K	0K
94 Redstone Aaf	06/21/2001	1740	Hail	0.75 in.	0	0	0K	0K
95 Huntsville	06/26/2001	1515	Hail	0.75 in.	0	0	0K	0K
96 Owens Xrds	06/26/2001	2142	Hail	0.75 in.	0	0	0K	0K
97 Hazel Green	04/28/2002	1826	Hail	0.75 in.	0	0	0K	0K
98 New Market	04/28/2002	1828	Hail	1.50 in.	0	0	3K	0K
99 Madison	04/28/2002	1956	Hail	1.75 in.	0	0	5K	0K
100 Huntsville	04/28/2002	2025	Hail	1.75 in.	0	0	5K	0K
101 Toney	04/30/2002	2214	Hail	1.00 in.	0	0	3K	0K
102 Meridianville	04/30/2002	2228	Hail	0.75 in.	0	0	0K	0K
103 Moores Mill	04/30/2002	2238	Hail	0.88 in.	0	0	0K	0K
104 New Market	04/30/2002	2240	Hail	1.75 in.	0	0	3K	0K
105 Hazel Green	05/02/2002	1656	Hail	0.88 in.	0	0	0K	0K
106 Toney	05/30/2002	1605	Hail	0.75 in.	0	0	0K	0K
107 Huntsville	06/04/2002	1635	Hail	0.75 in.	0	0	0K	0K
108 Huntsville	08/18/2002	1530	Hail	0.75 in.	0	0	0K	0K
109 Huntsville	08/20/2002	1355	Hail	1.00 in.	0	0	0K	0K
110 Monrovia	08/20/2002	1355	Hail	0.75 in.	0	0	0K	0K
111 Huntsville	08/20/2002	1410	Hail	1.00 in.	0	0	0K	0K
112 Huntsville	08/26/2002	1448	Hail	0.75 in.	0	0	0K	0K
113 Hazel Green	08/26/2002	1537	Hail	0.88 in.	0	0	0K	0K
114 Maysville	08/26/2002	1557	Hail	1.00 in.	0	0	0K	0K
115 Huntsville	03/19/2003	0910	Hail	0.75 in.	0	0	0K	0K
116 New Market	03/19/2003	1040	Hail	0.75 in.	0	0	0K	0K
117 Huntsville	03/19/2003	1055	Hail	0.75 in.	0	0	0K	0K
118 New Market	03/19/2003	1110	Hail	0.88 in.	0	0	0K	0K
119 Toney	05/02/2003	1450	Hail	1.75 in.	0	0	0K	0K
120 Hazel Green	05/02/2003	1500	Hail	1.75 in.	0	0	0K	0K
121 Hazel Green	05/02/2003	1506	Hail	1.00 in.	0	0	0K	0K
122 Hazel Green	05/02/2003	1508	Hail	1.75 in.	0	0	0K	0K

Table 4-7. Significant Hail Events 1961-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
123 New Market	05/02/2003	1520	Hail	1.75 in.	0	0	0K	0K
124 Toney	08/27/2003	1355	Hail	1.75 in.	0	0	0K	0K
125 Madison	04/22/2004	1725	Hail	1.00 in.	0	0	0K	0K
126 Madison	04/22/2004	1726	Hail	0.75 in.	0	0	0K	0K
127 Madison	04/22/2004	1727	Hail	0.75 in.	0	0	0K	0K
128 Harvest	02/21/2005	1400	Hail	1.00 in.	0	0	0K	0K
129 Harvest	02/21/2005	1402	Hail	0.75 in.	0	0	0K	0K
130 Harvest	02/21/2005	1408	Hail	1.00 in.	0	0	0K	0K
131 Huntsville	02/21/2005	1410	Hail	0.75 in.	0	0	0K	0K
132 Huntsville	02/21/2005	1415	Hail	1.00 in.	0	0	0K	0K
133 New Market	02/21/2005	1418	Hail	1.00 in.	0	0	0K	0K
134 Moores Mill	02/21/2005	1423	Hail	0.75 in.	0	0	0K	0K
135 Gurley	02/21/2005	1433	Hail	1.75 in.	0	0	0K	0K
136 Huntsville	02/21/2005	1450	Hail	1.00 in.	0	0	0K	0K
137 Harvest	02/21/2005	1451	Hail	0.75 in.	0	0	0K	0K
138 Harvest	02/21/2005	1453	Hail	0.75 in.	0	0	0K	0K
139 Madison	02/21/2005	1455	Hail	0.75 in.	0	0	0K	0K
140 Huntsville	02/21/2005	1505	Hail	0.75 in.	0	0	0K	0K
141 Huntsville	02/21/2005	1517	Hail	0.88 in.	0	0	0K	0K
142 Huntsville	02/21/2005	1520	Hail	1.00 in.	0	0	0K	0K
143 Harvest	02/21/2005	1610	Hail	0.75 in.	0	0	0K	0K
144 New Hope	03/31/2005	0130	Hail	0.75 in.	0	0	0K	0K
145 Maysville	03/31/2005	0146	Hail	1.00 in.	0	0	0K	0K
146 Toney	04/21/2005	2245	Hail	1.75 in.	0	0	0K	0K
147 Huntsville	07/04/2005	1330	Hail	1.00 in.	0	0	0K	0K
148 Huntsville	08/15/2005	1530	Hail	0.88 in.	0	0	0K	0K
149 Huntsville	08/15/2005	1533	Hail	1.00 in.	0	0	0K	0K
150 Huntsville Jones Arp	12/04/2005	0113	Hail	0.75 in.	0	0	0K	0K
151 Hazel Green	04/07/2006	1840	Hail	1.75 in.	0	0	10K	0K
152 Toney	04/07/2006	1842	Hail	2.75 in.	0	0	40K	0K
153 Elkwood	04/07/2006	1849	Hail	1.00 in.	0	0	15K	0K
154 Fisk	04/07/2006	1852	Hail	1.75 in.	0	0	35K	0K
155 Elkwood	04/07/2006	1900	Hail	1.75 in.	0	0	25K	0K
156 Harvest	04/07/2006	2046	Hail	1.00 in.	0	0	0K	0K
157 Madison	04/07/2006	2046	Hail	0.75 in.	0	0	0K	0K
158 Madison	04/07/2006	2132	Hail	2.00 in.	0	0	10K	0K
159 Huntsville	04/07/2006	2140	Hail	1.00 in.	0	0	0K	0K
160 Huntsville	04/07/2006	2153	Hail	1.50 in.	0	0	0K	0K
161 Gurley	04/07/2006	2158	Hail	1.00 in.	0	0	0K	0K
162 Gurley	04/07/2006	2206	Hail	2.75 in.	0	0	100K	0K
163 New Hope	04/07/2006	2230	Hail	0.88 in.	0	0	0K	0K
164 Huntsville	04/20/2006	1822	Hail	0.75 in.	0	0	0K	0K
165 Huntsville	04/20/2006	1822	Hail	1.00 in.	0	0	0K	0K
166 Huntsville	04/20/2006	1838	Hail	0.88 in.	0	0	0K	0K
167 Huntsville	04/20/2006	1850	Hail	1.25 in.	0	0	0K	0K

Table 4-7. Significant Hail Events 1961-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
168 Maysville	04/20/2006	1850	Hail	1.00 in.	0	0	0K	0K
169 New Market	04/20/2006	1850	Hail	1.00 in.	0	0	0K	0K
170 Huntsville	04/21/2006	0600	Hail	0.88 in.	0	0	0K	0K
171 Huntsville	05/03/2006	1555	Hail	0.75 in.	0	0	0K	0K
172 Owens Xrds	05/10/2006	0540	Hail	0.75 in.	0	0	0K	0K
173 Harvest	05/13/2006	1934	Hail	0.88 in.	0	0	0K	0K
174 Huntsville	05/13/2006	2000	Hail	1.00 in.	0	0	0K	0K
175 Meridianville	05/13/2006	2030	Hail	0.75 in.	0	0	0K	0K
176 Hazel Green	05/13/2006	2127	Hail	0.88 in.	0	0	0K	0K
177 New Market	05/13/2006	2140	Hail	0.88 in.	0	0	0K	0K
178 Huntsville	05/30/2006	1545	Hail	1.75 in.	0	0	0K	0K
179 Meridianville	06/23/2006	1322	Hail	0.75 in.	0	0	0K	0K
180 Meridianville	06/23/2006	1327	Hail	1.75 in.	0	0	0K	0K
181 Madison	04/03/2007	1236	Hail	0.88 in.	0	0	0K	0K
182 Huntsville	04/03/2007	1251	Hail	1.00 in.	0	0	0K	0K
183 Huntsville Park	04/03/2007	1253	Hail	0.88 in.	0	0	0K	0K
184 Huntsville Park	04/03/2007	1301	Hail	0.75 in.	0	0	0K	0K
185 Brownsboro	04/03/2007	1325	Hail	0.75 in.	0	0	0K	0K
186 Madison Xrds	04/03/2007	1930	Hail	0.88 in.	0	0	0K	0K
187 Maple Hill	04/14/2007	0909	Hail	1.00 in.	0	0	0K	0K
188 Maple Hill	04/14/2007	0909	Hail	1.00 in.	0	0	0K	0K
189 Madison	07/01/2007	1240	Hail	1.00 in.	0	0	0K	0K
190 Huntsville	07/25/2007	1740	Hail	0.75 in.	0	0	0K	0K
191 Lily Flag	07/25/2007	1753	Hail	0.75 in.	0	0	0K	0K
192 Farley	07/25/2007	1754	Hail	0.88 in.	0	0	0K	0K
193 New Market	04/11/2008	1318	Hail	0.88 in.	0	0	0K	0K
194 Maysville	05/20/2008	1418	Hail	0.75 in.	0	0	0K	0K
195 Normal	06/01/2008	1501	Hail	0.88 in.	0	0	0K	0K
196 Bell Factory	06/01/2008	1503	Hail	0.75 in.	0	0	0K	0K
197 Huntsville Mills Arp	06/01/2008	1508	Hail	0.88 in.	0	0	0K	0K
198 Monrovia	06/25/2008	1720	Hail	0.88 in.	0	0	0K	0K
199 Madison	07/12/2008	1452	Hail	0.75 in.	0	0	0K	0K
200 Cluttsville	08/02/2008	1319	Hail	0.88 in.	0	0	0K	0K
201 Gurley	08/02/2008	1350	Hail	0.75 in.	0	0	0K	0K
202 Gurley	08/02/2008	1410	Hail	1.75 in.	0	0	0K	0K
203 New Market	08/02/2008	1439	Hail	0.88 in.	0	0	0K	0K
204 Bloucher Ford	08/02/2008	1442	Hail	1.00 in.	0	0	0K	0K
205 Buckhorn	08/02/2008	1445	Hail	0.75 in.	0	0	0K	0K
206 Deposit	08/02/2008	1448	Hail	1.00 in.	0	0	1K	0K
207 Bell Factory	08/02/2008	1500	Hail	0.75 in.	0	0	0K	0K
208 Lily Flag	08/02/2008	1530	Hail	1.00 in.	0	0	0K	0K
209 Huntsville	08/02/2008	1533	Hail	1.00 in.	0	0	0K	0K
210 Haden	08/02/2008	1535	Hail	0.88 in.	0	0	0K	0K
211 Haden	08/02/2008	1538	Hail	1.75 in.	0	0	0K	0K
212 Lily Flag	08/02/2008	1542	Hail	0.88 in.	0	0	0K	0K

Table 4-7. Significant Hail Events 1961-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
213 Farley	08/02/2008	1545	Hail	1.75 in.	0	0	10K	0K
214 Farley	08/02/2008	1547	Hail	0.75 in.	0	0	0K	0K
215 Hazel Green	03/28/2009	1739	Hail	0.75 in.	0	0	0K	0K
216 Chase	03/28/2009	1750	Hail	0.75 in.	0	0	0K	0K
217 New Market	03/28/2009	1750	Hail	1.00 in.	0	0	0K	0K
218 Madison	04/10/2009	1300	Hail	1.00 in.	0	0	0K	0K
219 Nebo	04/10/2009	1302	Hail	2.75 in.	0	0	0K	0K
220 Madison	04/10/2009	1303	Hail	2.00 in.	0	0	0K	0K
221 Madison	04/10/2009	1304	Hail	2.50 in.	0	0	0K	0K
222 Fletcher Chapel	04/10/2009	1305	Hail	2.00 in.	0	0	0K	0K
223 Madison	04/10/2009	1305	Hail	1.75 in.	0	0	0K	0K
224 Nebo	04/10/2009	1305	Hail	2.00 in.	0	0	0K	0K
225 Nebo	04/10/2009	1305	Hail	2.75 in.	0	0	0K	0K
226 Madison	04/10/2009	1306	Hail	1.75 in.	0	0	0K	0K
227 Fletcher Chapel	04/10/2009	1308	Hail	1.50 in.	0	0	0K	0K
228 Oakwood College	04/10/2009	1309	Hail	3.00 in.	0	0	0K	0K
229 Fletcher Chapel	04/10/2009	1310	Hail	1.50 in.	0	0	0K	0K
230 Fletcher Chapel	04/10/2009	1310	Hail	2.00 in.	0	0	0K	0K
231 Fletcher Chapel	04/10/2009	1310	Hail	2.00 in.	0	0	0K	0K
232 Fletcher Chapel	04/10/2009	1310	Hail	2.50 in.	0	0	0K	0K
233 Monrovia	04/10/2009	1310	Hail	2.75 in.	0	0	0K	0K
234 Oakwood College	04/10/2009	1310	Hail	1.75 in.	0	0	0K	0K
235 Huntsville	04/10/2009	1312	Hail	1.50 in.	0	0	0K	0K
236 Huntsville	04/10/2009	1314	Hail	1.00 in.	0	0	0K	0K
237 Oakwood College	04/10/2009	1314	Hail	1.00 in.	0	0	0K	0K
238 Huntsville Mills Arp	04/10/2009	1315	Hail	1.25 in.	0	0	0K	0K
239 Oakwood College	04/10/2009	1315	Hail	2.00 in.	0	0	0K	0K
240 Huntsville	04/10/2009	1316	Hail	1.75 in.	0	0	0K	0K
241 Moores Mill	04/10/2009	1317	Hail	1.00 in.	0	0	0K	0K
242 Bell Factory	04/10/2009	1322	Hail	1.75 in.	0	0	0K	0K
243 Moores Mill	04/10/2009	1323	Hail	2.75 in.	0	0	0K	0K
244 Bell Factory	04/10/2009	1330	Hail	1.75 in.	0	0	0K	0K
245 Redstone AAF	04/10/2009	1332	Hail	1.00 in.	0	0	0K	0K
246 Fletcher Chapel	04/10/2009	1333	Hail	1.00 in.	0	0	0K	0K

Table 4-7. Significant Hail Events 1961-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
247 Chelsea	04/10/2009	1334	Hail	1.75 in.	0	0	0K	0K
248 Redstone AAF	04/10/2009	1334	Hail	1.50 in.	0	0	0K	0K
249 Bugge Chapel	04/10/2009	1342	Hail	1.75 in.	0	0	0K	0K
250 New Hope	04/10/2009	1344	Hail	1.75 in.	0	0	0K	0K
251 Union Grove	04/13/2009	2015	Hail	0.75 in.	0	0	0K	0K
252 Cluttsville	6/1/2009	1820	Hail	0.75 in.	0	0	0K	0K
253 Huntsville	9/8/2009	1406	Hail	1 in.	0	0	0K	0K
254 Lily Flag	9/8/2009	1417	Hail	0.75 in.	0	0	0K	0K
255 Huntsville	9/8/2009	1418	Hail	1.75in.	0	0	0K	0K
256 Monrovia	3/12/2010	455	Hail	0.75 in.	0	0	0K	0K
257 Madison	3/12/2010	530	Hail	1 in.	0	0	0K	0K
258 Madison	3/12/2010	540	Hail	0.75 in.	0	0	0K	0K
259 Farley	5/28/2010	1415	Hail	0.88 in.	0	0	0K	0K
260 New Hope	6/26/2010	1540	Hail	1 in.	0	0	0K	0K
261 Gladstone	7/8/2010	1615	Hail	0.88 in.	0	0	0K	0K
262 New Hope	10/24/2010	2215	Hail	1.5 in.	0	0	0K	0K
263 Harvest Epps Arpt	10/24/2010	2225	Hail	1 in.	0	0	0K	0K
264 Moontown	3/29/2011	2330	Hail	1 in.	0	0	0K	0K
265 Lily Flag	3/29/2011	2355	Hail	1 in.	0	0	0K	0K
266 Moontown	3/30/2011	5	Hail	1 in.	0	0	0K	0K
267 Moontown	3/30/2011	5	Hail	1 in.	0	0	0K	0K
268 Huntsville Park	4/4/2011	1510	Hail	1 in.	0	0	0K	0K
269 Harvest Epps Arpt	4/27/2011	846	Hail	0.75 in.	0	0	0K	0K
270 Madison Xrds	4/27/2011	850	Hail	1.75 in.	0	0	0K	0K
271 Mt Leventov	4/27/2011	905	Hail	1 in.	0	0	0K	0K
272 Cluttsville	4/27/2011	1628	Hail	1.75 in.	0	0	0K	0K
273 Nebo	4/27/2011	1817	Hail	1.75 in.	0	0	0K	0K
274 Oakwood College	5/22/2011	1230	Hail	1 in.	0	0	0K	0K
275 Huntsville Park	5/26/2011	959	Hail	0.88 in.	0	0	0K	0K
276 Owens Xrds	5/26/2011	1037	Hail	0.75 in.	0	0	0K	0K
277 Madison Co.	6/15/2011	1020	Hail	0.75 in.	0	0	0K	0K
278 Madison Co.	6/15/2011	1029	Hail	1.25 in.	0	0	0K	0K
279 Madison Co.	6/15/2011	1240	Hail	1 in.	0	0	0K	0K
280 Madison Co.	6/15/2011	1242	Hail	1.75 in.	0	0	0K	0K
281 Madison Co.	6/15/2011	1242	Hail	1 in.	0	0	0K	0K
282 Madison Co.	6/15/2011	1243	Hail	1 in.	0	0	0K	0K
283 Madison Co.	6/15/2011	1245	Hail	2.5 in.	0	0	0K	0K
284 Madison Co.	6/15/2011	1250	Hail	0.88 in.	0	0	0K	0K
285 Madison Co.	6/15/2011	1716	Hail	0.88 in.	0	0	0K	0K
286 Madison Co.	6/15/2011	1935	Hail	1 in.	0	0	0K	0K
287 Madison Co.	6/15/2011	1943	Hail	1 in.	0	0	0K	0K
288 Madison Co.	6/24/2011	1247	Hail	1 in.	0	0	0K	0K
289 Meridianville	3/2/2012	1005	Hail	1.75 in.	0	0	0K	0K

Table 4-7. Significant Hail Events 1961-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
290 Hazel Green	3/2/2012	1545	Hail	1.25 in.	0	0	0K	0K
291 Harvest	3/2/2012	1548	Hail	1.75 in.	0	0	0K	0K
292 Hazel Green	3/2/2012	1559	Hail	1.75 in.	0	0	0K	0K
293 Hazel Green	3/2/2012	1600	Hail	1.75 in.	0	0	0K	0K
294 Hazel Green	3/2/2012	1603	Hail	0.75 in.	0	0	0K	0K
295 Skinem	3/2/2012	1603	Hail	1.25 in.	0	0	0K	0K
296 Union Grove	3/2/2012	1605	Hail	1 in.	0	0	0K	0K
297 Mint Spg	3/2/2012	1606	Hail	1.75 in.	0	0	0K	0K
298 New Sharon	3/2/2012	1609	Hail	1 in.	0	0	0K	0K
299 Triana	3/2/2012	1638	Hail	0.88 in.	0	0	0K	0K
300 Huntsville	3/2/2012	1645	Hail	1 in.	0	0	0K	0K
301 Lily Flag	3/2/2012	1649	Hail	1 in.	0	0	0K	0K
302 Lily Flag	3/2/2012	1650	Hail	0.75 in.	0	0	0K	0K
303 Lily Flag	3/2/2012	1650	Hail	0.75 in.	0	0	0K	0K
304 Harvest	3/15/2012	1745	Hail	0.88 in.	0	0	0K	0K
305 Fletcher Chapel	3/15/2012	1827	Hail	0.88 in.	0	0	0K	0K
306 Owens Xrds	3/16/2012	1145	Hail	1 in.	0	0	0K	0K
307 Madison	4/5/2012	1505	Hail	0.75 in.	0	0	0K	0K
308 New Hope	4/5/2012	1729	Hail	0.75 in.	0	0	0K	0K
309 Huntsville Mills Arp	5/6/2012	500	Hail	0.88 in.	0	0	0K	0K
310 Huntsville Mills Arp	5/6/2012	502	Hail	1 in.	0	0	0K	0K
311 Huntsville Mills Arp	5/6/2012	504	Hail	0.75 in.	0	0	0K	0K
312 Huntsville	7/5/2012	1534	Hail	1 in.	0	0	0	0
313 Redstone AAF	7/5/2012	1553	Hail	0.75 in.	0	0	0	0
314 Huntsville	7/5/2012	1627	Hail	1 in.	0	0	0	0
315 Meridianville	7/5/2012	1629	Hail	1 in.	0	0	0	0
316 Madison Co Jet Port	3/5/2013	1149	Hail	0.75 in.	0	0	0	0
317 Maysville	3/5/2013	1200	Hail	0.88 in.	0	0	0	0
318 Redstone AAF	3/18/2013	1336	Hail	1 in.	0	0	0	0
319 Madison Co.	6/17/2013	1240	Hail	1 in.	0	0	0	0
320 Madison	8/22/2013	1539	Hail	0.88 in.	0	0	0	0
321 Harvest	04/03/2015	1849	Hail	1.00 in.	0	0	0K	0K
322 New Hope	04/03/2015	1950	Hail	1.00 in.	0	0	0K	0K
323 Jeff	04/16/2015	0450	Hail	0.88 in.	0	0	0K	0K
324 Harvest	06/23/2015	2342	Hail	1.00 in.	0	0	0K	0K
TOTALS:					0	0	447K	7K

Source: NOAA; http://www.ncdc.noaa.gov/stormevents/

Community Impacts. Since 1975 Madison County has experienced over 500 severe thunderstorms. Large hail, though very rare, can cause injury or loss of life. Normally it only causes damage to automobiles, trees and crops. Both lightning and high winds frequently cause loss of life and considerable property damage. The power of lightning's electrical charge and intense heat can electrocute on contact, split trees, ignite fires, and cause electrical failures.

Location and Extents. During 2015, there were 14 Significant Thunderstorm/High Wind events, four Lightning events, and four Hail events. As depicted in the above tables, severe thunderstorms occur throughout the entire county. The extent of thunderstorm/wind events is 85 knots, lightning causing one or more deaths or injuries and damage of $600,000, and hail is 3.00 inches. The extent/range of magnitude or severity that could be experienced by Madison County due to a lightning event is based on the Vaisala's National Lightning Detection Network (NLDN) at NOAA.gov and is 6-8 average flash density fl/sq mi/yr cloud-to-ground lightning incidences.

Probability of Future Occurrences. The probability of a severe thunderstorm occurring depends on certain atmospheric and climatic conditions. Although the threat may be low, the potential for severe thunderstorms is great. The residents of Madison County can expect to experience annual damages of approximately $280,000 from severe thunderstorms. The damages include the sum of annual damages resulting from high wind, hail and lightning. The probability of annual occurrence, based on historical averages, is 2.8 events per year. Although we can extract data and probability of occurrence from historical information, the risk of a thunderstorm occurring and the location of damage appear to be a random event.

4.6 Floods

Hazard Description. Flooding is defined as the accumulation of water within a water body and the overflow of excess water onto adjacent floodplain lands. The floodplain is the land adjoining the channel or a river, stream, ocean, lake, or other watercourse or water body that is susceptible to flooding.

Riverine flooding occurs when the water overtops the streams banks and encroaches into the flood plain. Flooding in large rivers usually results from large-scale weather systems that generate prolonged rainfall over wide areas. Small rivers and streams are susceptible to flooding from more localized weather systems that cause intense rainfall over small areas.

"Flash Flood" is a term widely used by flood experts and the general population. However there is no single definition and method to distinguish flash flooding from riverine and other floods. For the purposes of this plan, we will define flash flooding as flooding that occurs due to localized drainage and is outside the boundaries of the FIRM floodplain.

Hazard Profile. The list of federally declared disasters, input from the planning committee, and the Storm Events Database were utilized to profile the history of flood events in Madison County. The Storm Events Database contains damage-causing flood events from 1994 through 2015. During that time, twenty-seven different flood events have resulted in two deaths, three injuries and $3.471 million in property and $5,000 in crop damages. A summary of flood events is shown in **Table 4-8**. Most flooding in Madison County is of a flash type, along streams and tributaries.

Table 4-8. Flooding Events 1994-2015

Location	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 ALZ001>007	02/09/1994	2200	Ice Storm/flash Flood	N/A	0	2	0	0
2 Madison	03/06/1996	0240	Flash Flood	N/A	0	0	15K	0
3 Countywide	01/07/1998	0930	Flash Flood	N/A	0	0	25K	5K
4 Countywide	05/05/1999	2300	Flash Flood	N/A	0	0	6K	0K
5 Huntsville	06/28/1999	0045	Flash Flood	N/A	1	1	1.5M	0K
6 Countywide	04/03/2000	1330	Flash Flood	N/A	0	0	5K	0K
7 Countywide	07/05/2001	1300	Flash Flood	N/A	0	0	6K	0K
8 Countywide	08/10/2001	0700	Flash Flood	N/A	0	0	8K	0K
9 Countywide	08/12/2001	1700	Flash Flood	N/A	0	0	5K	0K
10 Madison	08/18/2002	1550	Flash Flood	N/A	0	0	18K	0K
11 Owens Xrds	02/22/2003	0200	Flash Flood	N/A	0	0	0	0
12 Harvest	02/22/2003	0240	Flash Flood	N/A	0	0	0	0
13 Hazel Green	02/22/2003	0240	Flash Flood	N/A	0	0	0	0
14 Moores Mill	02/22/2003	0240	Flash Flood	N/A	0	0	0	0
15 Huntsville	02/22/2003	0330	Flash Flood	N/A	0	0	0	0
16 Countywide	02/22/2003	0645	Flash Flood	N/A	0	0	0	0
17 Countywide	02/22/2003	0946	Flash Flood	N/A	0	0	0	0
18 Countywide	05/06/2003	0830	Flash Flood	N/A	0	0	1.5M	0
19 Huntsville	07/10/2003	1640	Flash Flood	N/A	0	0	0	0
20 Toney	08/27/2003	1345	Flash Flood	N/A	0	0	0	0
21 ALZ002 - 004>005 - 005>006 - 016	02/05/2004	1716	Flood	N/A	0	0	0	0
22 ALZ004 - 006 - 016	02/05/2004	2040	Flood	N/A	0	0	0	0
23 Madison	03/05/2004	2252	Flash Flood	N/A	0	0	0	0
24 Huntsville	07/14/2004	1538	Flash Flood	N/A	0	0	0	0
25 Countywide	09/16/2004	1555	Flash Flood	N/A	0	0	0	0
26 Toney	10/19/2004	0519	Flash Flood	N/A	0	0	0	0
27 Countywide	12/06/2004	1430	Flash Flood	N/A	0	0	0	0
28 Madison	12/09/2004	0630	Flash Flood	N/A	0	0	0	0
29 Harvest	02/21/2005	1451	Flash Flood	N/A	0	0	0	0
30 Huntsville	02/21/2005	1500	Flash Flood	N/A	0	0	0	0
31 Huntsville	02/21/2005	1900	Flash Flood	N/A	0	0	0	0
32 Meridianville	06/06/2005	1308	Flash Flood	N/A	0	0	0	0

Table 4-8. Flooding Events 1994-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
33 Huntsville	07/12/2005	2042	Flash Flood	N/A	0	0	0	0
34 Gurley	07/12/2005	2130	Flash Flood	N/A	0	0	0	0
35 Meridianville	07/22/2005	2150	Flash Flood	N/A	0	0	0	0
36 Huntsville	08/15/2005	1519	Flash Flood	N/A	0	0	0	0
37 Harvest	09/25/2005	2200	Flash Flood	N/A	0	0	0	0
38 Huntsville	04/07/2006	2055	Flash Flood	N/A	0	0	0	0
39 Huntsville	04/07/2006	2100	Flash Flood	N/A	0	0	0	0
40 Huntsville	04/07/2006	2115	Flash Flood	N/A	0	0	0	0
41 Huntsville	04/07/2006	2136	Flash Flood	N/A	0	0	0	0
42 Huntsville	07/25/2007	1751	Flash Flood	N/A	0	0	0	0
43 Lily Flag	07/25/2007	1758	Flash Flood	N/A	0	0	0	0
44 Huntsville	08/29/2007	1800	Flash Flood	N/A	0	0	20K	0
45 Huntsville Park	08/29/2007	1830	Flash Flood	N/A	0	0	1K	0
46 Bell Factory	06/01/2008	1535	Flash Flood	N/A	0	0	0	0
47 Normal	07/09/2008	1559	Flash Flood	N/A	0	0	0	0
48 Madison	10/08/2008	0745	Flash Flood	N/A	0	0	5K	0
49 Huntsville Jones Field	11/14/2008	1900	Flash Flood	N/A	0	0	0	0
50 Madison Co Jet Port	12/09/2008	2345	Flash Flood	N/A	0	0	120K	0
51 Gurley	12/11/2008	0730	Flood	N/A	0	0	0	0
52 New Hope	01/06/2009	1455	Flood	N/A	0	0	0	0
53 Gurley	01/06/2009	1502	Flood	N/A	0	0	0	0
54 Gurley	01/06/2009	1526	Flash Flood	N/A	0	0	0	0
55 Huntsville	04/02/2009	1730	Flash Flood	N/A	0	0	0	0
56 Monrovia	04/02/2009	1915	Flash Flood	N/A	0	0	0	0
57 Lily Flag	04/02/2009	1924	Flash Flood	N/A	0	0	0	0
58 Fletcher Chapel	04/02/2009	1930	Flood	N/A	0	0	0	0
59 Cluttsville	04/02/2009	1935	Flash Flood	N/A	0	0	0	0
60 Dug Hill	04/02/2009	1935	Flash Flood	N/A	0	0	0	0
61 Jeff	04/02/2009	1950	Flash Flood	N/A	0	0	0	0
62 Huntsville Park	05/01/2009	1625	Flash Flood	N/A	0	0	0	0
63 Cave Spg	05/03/2009	1653	Flash Flood	N/A	0	0	7K	0
64 Farley	05/03/2009	1738	Flash Flood	N/A	0	0	1K	0
65 Farley	05/06/2009	0525	Flash Flood	N/A	0	0	0	0
66 Hillsboro	05/15/2009	1050	Flash Flood	N/A	0	0	0	0
67 Roseboro	05/15/2009	1900	Flash Flood	N/A	0	0	0	0
68 Roseboro	05/16/2009	1630	Flash Flood	N/A	0	0	0	0
69 Elkwood	6/4/2009	1610	Flash Flood	N/A	0	0	0	0
70 Chase	6/12/2009	1930	Flash Flood	N/A	0	0	0	0
71 Madison Xrds	7/12/2009	2230	Flash Flood	N/A	0	0	0	0
72 Huntsville	7/12/2009	2240	Flash Flood	N/A	0	0	0	0
73 Huntsville Park	9/8/2009	1431	Flash Flood	N/A	0	0	0	0
74 Chelsea	9/8/2009	1450	Flash Flood	N/A	0	0	0	0
75 Oakwood College	9/8/2009	1454	Flash Flood	N/A	0	0	0	0

Table 4-8. Flooding Events 1994-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
76 Normal	9/8/2009	1547	Flash Flood	N/A	0	0	0	0
77 Huntsville	9/8/2009	1600	Flash Flood	N/A	0	0	0	0
78 Harvest Epps Arpt	9/26/2009	1030	Flash Flood	N/A	0	0	2000	0
79 Harvest Epps Arpt	9/26/2009	1220	Flood	N/A	0	0	0	0
80 Toney	9/26/2009	1245	Flood	N/A	0	0	0	0
81 Elkwood	12/8/2009	2030	Flash Flood	N/A	0	0	40000	0
82 Bloucher Ford	12/08/2009	2127	Flood	N/A	0	0	10000	0
83 Jeff	12/18/2009	919	Flood	N/A	0	0	0	0
84 Normal	5/2/2010	1500	Flash Flood	N/A	0	0	10000	0
85 Sulphur Spgs	5/2/2010	1500	Flash Flood	N/A	0	0	0	0
86 Huntsville	5/2/2010	2128	Flood	N/A	0	0	0	0
87 Redstone AAF	5/2/2010	2135	Flood	N/A	0	0	0	0
88 Oakwood College	5/2/2010	2135	Flash Flood	N/A	0	0	30000	0
89 Oakwood College	5/2/2010	2135	Flash Flood	N/A	0	0	0	0
90 Oakwood College	5/2/2010	2135	Flash Flood	N/A	0	0	0	0
91 Sulphur Spgs	5/2/2010	2157	Flash Flood	N/A	0	0	0	0
92 Normal	6/9/2010	1754	Flash Flood	N/A	0	0	0	0
93 Nebo	6/9/2010	1815	Flash Flood	N/A	0	0	0	0
94 Monrovia	7/9/2010	1700	Flash Flood	N/A	0	0	0	0
95 Hazel Green	11/30/2010	532	Flash Flood	N/A	0	0	0	0
96 Gurley	1/1/2011	515	Flash Flood	N/A	0	0	0	0
97 Owens Xrds	3/9/2011	620	Flash Flood	N/A	0	0	0	0
98 Bell Factory	3/9/2011	630	Flash Flood	N/A	0	0	0	0
99 Nebo	3/9/2011	630	Flash Flood	N/A	0	0	0	0
100 Madison County Jet Port	3/9/2011	1200	Flood	N/A	0	0	0	0
101 Jeff	7/15/2011	1715	Flash Flood	N/A	0	0	5000	0
102 Harvest Epps Arpt	7/15/2011	1725	Flash Flood	N/A	0	0	2000	0
103 Huntsville	8/8/2011	1423	Flash Flood	N/A	0	0	0	0
104 Jeff	1/11/2012	956	Flash Flood	N/A	0	0	0	0
105 Nebo	1/11/2012	956	Flash Flood	N/A	0	0	0	0
106 Huntsville	1/11/2012	956	Flash Flood	N/A	0	0	0	0
107 Monrovia	1/11/2012	956	Flash Flood	N/A	0	0	0	0
108 Hazel Green	1/11/2012	956	Flash Flood	N/A	0	0	0	0
109 Elkwood	1/17/2012	1520	Flash Flood	N/A	0	0	25000	0
110 Madison	1/23/2012	210	Flash Flood	N/A	0	0	100000	0
111 Madison Co Jet Port	3/15/2012	1830	Flash Flood	N/A	0	0	0	0
112 Madison	8/10/2012	1645	Flash Flood	N/A	0	0	0	0
113 Harvest	9/2/2012	1618	Flash Flood	N/A	0	0	0	0

Table 4-8. Flooding Events 1994-2015								
Location	**Date**	**Time**	**Type**	**Mag**	**Dth**	**Inj**	**PrD**	**CrD**
114 Harvest	9/2/2012	1620	Flash Flood	N/A	0	0	0	0
115 Harvest	9/2/2012	1622	Flash Flood	N/A	0	0	0	0
116 Huntsville	9/2/2012	1640	Flash Flood	N/A	0	0	5000	0
117 Madison	7/4/2013	1220	Flash Flood	N/A	0	0	0	0
118 Ardmore	7/4/2013	1800	Flood	N/A	0	0	0	0
119 Owens Xrds	7/10/2013	2150	Flash Flood	N/A	0	0	0	0
120 Redstone AAF	7/10/2013	2151	Flash Flood	N/A	0	0	0	0
121 Dug Hill	7/10/2013	2300	Flash Flood	N/A	0	0	0	0
122 Dug Hill	7/10/2013	2300	Flash Flood	N/A	0	0	0	0
123 Huntsville Park	8/6/2013	830	Flash Flood	N/A	0	0	0	0
124 Lily Flag	8/6/2013	851	Flash Flood	N/A	0	0	0	0
125 Madison	8/22/2013	1550	Flash Flood	N/A	0	0	0	0
126 Madison Co.	9/2/2013	400	Flash Flood	N/A	0	0	0	0
127 Madison Co.	9/21/2013	802	Flood	N/A	0	0	0	0
128 Meridianville	12/22/2013	215	Flash Flood	N/A	0	0	0	0
129 Meridianville	12/22/2013	0215	Flash Flood	N/A	0	0	0	0
130 Redstone AAF	12/23/2014	2030	Flash Flood	N/A	0	0	0	0
131 Jeff	03/11/2015	0800	Flood	N/A	0	0	0	0
132 Mt Leventov	04/16/2015	0745	Flood	N/A	0	0	0	0
133 Madison	11/18/2015	1017	Flash Flood	N/A	0	0	0	0
134 Madison	11/18/2015	1030	Flash Flood	N/A	0	0	0	0
135 Madison	11/18/2015	1030	Flash Flood	N/A	0	0	0	0
136 Madison	11/18/2015	1034	Flash Flood	N/A	0	0	0	0
137 Madison	11/18/2015	1034	Flash Flood	N/A	0	0	0	0
138 Madison	11/18/2015	1038	Flash Flood	N/A	0	0	0	0
139 Monrovia	12/25/2015	0923	Flash Flood	N/A	0	0	0	0
140 Nebo	12/25/2015	0923	Flood	N/A	0	0	0	0
141 Elon	12/25/2015	1000	Flood	N/A	1	0	0	0
TOTALS:					1	3	3.471M	5K

Source: NOAA; http://www.ncdc.noaa.gov/stormevents/

The event on June 28, 1999 is further described on the NCDC website as follows:

> *Heavy rainfall of four to seven inches, most of which occurred in just less than two hours, flooded the Huntsville area. According to newspaper reports, one woman was killed when her car stalled on a flooded bridge on Vermont Road. As she exited the car, she was swept away in the water. A television cameraman was injured when he was swept away by high water while filming. He was rescued by the Huntsville Fire Department. Several other motorists were stranded in high water and were rescued by the fire department. Numerous roads in the area were flooded and subsequently closed. Many local streams and creeks were out of their banks, sending several feet of water into*

approximately 300 homes and businesses. Several residents were rescued from their homes. Several thousand area customers were without power through the early morning hours due to lightning strikes. A mudslide occurred in Monte Sano State Park covering part of the park road.
http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms

The flooding that occurred between May 6 and May 9, 2003 resulted in a Federal Disaster Declaration on May 12, 2003 for 38 counties, including Madison. Four weeks following the declaration, state and federal financial assistance to help individuals, families and businesses recover from losses suffered in the severe storms, floods and tornadoes of May exceeded $13.4 million.

The impact on Madison County was significant. In the years since 2003, Madison County has been awarded $1.8 million dollars in mitigation funding related to this disaster.

Community Impacts. Floods are capable of undermining buildings and bridges, eroding shorelines and riverbanks, tearing out trees, washing out access routes, and causing loss of life and injuries. Floods occur in all 50 states and FEMA estimates that 9 million households and $390 billion in property are at risk from flooding.

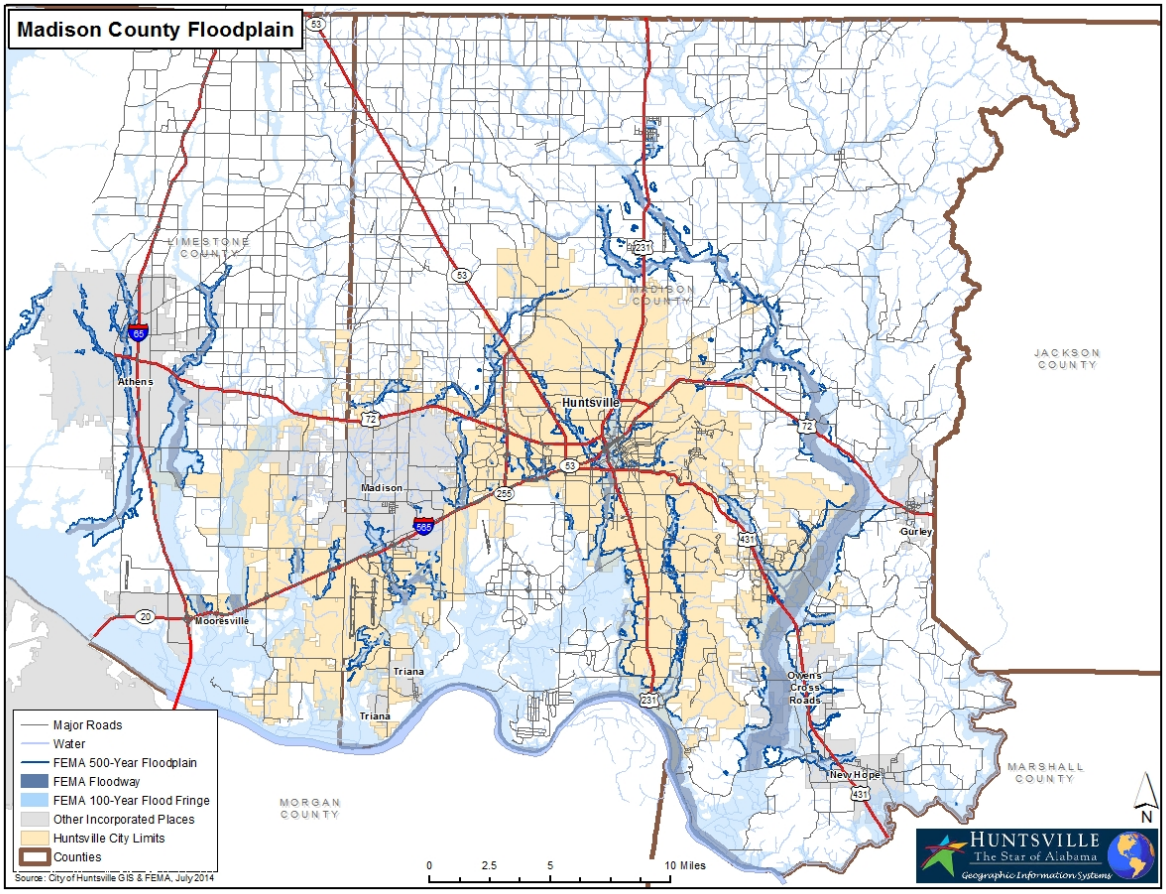
The measurement used to determine the limits of the floodplain was developed with the enactment of the National Flood Insurance Act of 1968 (NFIP). Under the NFIP it was determined that the base standard was the 100-year or "base flood". This means that the limits of the floodplain are set by the limits of a rain event that has a 1% annual chance of occurrence. There are established techniques for determining the base flood limits. These techniques have been used to develop Flood Insurance Rate Maps or FIRMs. FIRMs illustrate elevation of the base flood and the 500-year event (0.2% annual chance of occurrence) in areas where a model has been developed.

The risks associated with flash flooding are the same as riverine flooding. One clear distinction is the element of surprise. Flash flooding, as the name implies, occurs quickly and without much warning. In riverine flooding, the time and height of the crest can be accurately predicted, and warnings can be issued several hours in advance.

Location and Extents. During 2015, there were 11 Flood events. Madison County contains the following waterways: Aldridge Creek, Barren Fork Creek, Flint River, Huntsville Spring Branch, Hurricane Creek, Indian Creek, Limestone Creek, Mountain Fork, and Paint Rock River. Each waterway ends in the Tennessee River which is the southern border of Madison County. The extent of flooding is from a crest of 26.10 feet at Whitesburg on the Tennessee River. **Map 4-3**, identifies the floodway for each stream.

Repetitive Flood Insurance Losses. A repetitive loss property is a property that has two or more flood insurance claims with the NFIP. During the first five year maintenance cycle of this plan, Madison County had very few repetitive loss properties. The City of Huntsville Engineering Department reported that there were six residential repetitive loss properties from 2009-2014. Madison County Engineering reported there were three residential repetitive loss structures in the County and two residential repetitive loss properties in the Town of Owens Cross Roads from 2009-2014. The City of Madison Planning Department reported one residential repetitive loss flood insurance claim from 2009-2014.

Probability of Future Occurrence. Based on the information available from NOAA as shown in **Table 4-8**, it appears Madison County can expect to experience flash flooding 2 times per year. The expected damage resulting from flooding is approximately $682,166 per year. Although we can extract data and probability of occurrence from historical information, they do not necessarily predict future occurrences.



Source: City of Huntsville GIS Department

Map 4-3. Madison County Floodplain

4.7 Winter Storms/Freezes

Hazard Description. Winter storms and blizzards originate as mid-latitude depressions or cyclonic weather systems, sometimes following the meandering path of the jet stream. A blizzard combines heavy snowfall, high winds, extreme cold, and ice storms. The origins of the weather patterns that cause severe winter storms are primarily from four sources in the continental United States. Winter storms in the southeast region are usually a result of Canadian and Arctic cold fronts from the north and mid-western states combining with tropical cyclonic weather systems in the Gulf of Mexico.

Hazard Profile. Madison County frequently experiences winter storms and extreme cold. The greatest single event (since 1993) occurred in 1993 with a total of 13 inches of snowfall within 24 hours. Since 1993, there have been 53 recorded events shown in the table below.

Table 4-9. Winter Storms, 1993-2015

Location	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 Statewide	03/12/1993	2200	Winter Storm	N/A	4	0	5.0B	0
2 North Alabama	02/09/1994	2200	Ice Storm/flash Flood	N/A	0	2	0	0
3 North Alabama	02/06/1995	2100	Snow/ice	N/A	0	0	0	0
4 North Alabama	02/11/1995	1300	Snow/ice	N/A	0	0	0	0
5 No. & Central AL	01/06/1996	2000	Winter Storm	N/A	0	0	380K	38K
6 No. & Central AL	02/01/1996	1500	Winter Storm	N/A	0	0	595K	0
7 North Alabama	02/16/1996	0200	Winter Storm	N/A	0	0	195K	0
8 North Alabama	01/10/1997	1000	Winter Storm	N/A	0	0	64K	0K
9 No. & Central AL	12/29/1997	0100	Winter Storm	N/A	0	0	0K	0K
10 North Alabama	02/04/1998	0130	Winter Storm	N/A	0	0	27K	0K
11 North Alabama	12/23/1998	0200	Ice Storm	N/A	1	0	14.4M	0K
12 North Alabama	01/06/1999	1200	Winter Storm	N/A	0	0	0K	0K
13 North Alabama	12/21/1999	0400	Ice Storm	N/A	0	0	0K	0K
14 NE Alabama	01/28/2000	0400	Winter Storm	N/A	0	0	75K	0K
15 North Alabama	03/20/2001	1200	Heavy Snow	N/A	0	0	0K	0K
16 North Alabama	02/05/2002	2330	Winter Storm	N/A	0	0	30K	0K
17 NE Alabama	01/28/2005	2102	Ice Storm	N/A	0	0	0	0
18 North Alabama	03/15/2005	0430	Winter Weather/mix	N/A	0	0	0	0
19 North Alabama	12/01/2008	0130	Winter Weather	N/A	0	0	0K	0K
20 Madison County	12/23/2008	1010	Winter Weather	N/A	0	0	0K	0K
21 North Alabama	03/01/2009	0653	Winter Weather	N/A	0	0	0K	0K
22 Madison County	12/4/2009	2330	Winter Weather	N/A	0	0	0K	0K
23 Madison County	1/7/2010	630	Winter	N/A	0	0	0K	0K

			Weather					
24 Madison County	1/29/2010	830	Winter Weather	N/A	0	0	0K	0K
25 Madison County	2/14/2010	630	Winter Weather	N/A	0	0	0K	0K
26 Madison County	2/15/2010	100	Winter Weather	N/A	0	0	0K	0K
27 Madison County	2/15/2010	1400	Winter Weather	N/A	0	0	0K	0K
28 Madison County	2/28/2010	800	Winter Storm	N/A	0	0	0K	0K
29 Madison County	12/12/2010	1053	Winter Weather	N/A	0	0	0K	0K
30 Madison County	12/15/2010	1100	Winter Weather	N/A	0	0	0K	0K
31 Madison County	12/26/2010	200	Winter Weather	N/A	0	0	0K	0K
32 Madison County	1/20/2011	1723	Winter Weather	N/A	0	0	0K	0K
33 Madison County	1/26/2011	130	Winter Weather	N/A	0	0	0K	0K
34 Madison County	2/3/2011	620	Winter Weather	N/A	0	0	0K	0K
35 Madison County	12/7/2011	1000	Winter Weather	N/A	0	0	0K	0K
36 Madison County	1/12/2012	1500	Winter Weather	N/A	0	0	0K	0K
37 Madison County	1/14/2013	1427	Winter Weather	N/A	0	0	0K	0K
38 Madison County	1/14/2013	1615	Winter Weather	N/A	0	0	0K	0K
39 Madison County	2/2/2013	745	Winter Weather	N/A	0	0	0K	0K
40 Madison County	2/2/2013	750	Winter Weather	N/A	0	0	0K	0K
41Madison County	3/1/2013	1300	Winter Weather	N/A	0	0	0K	0K
42 Madison County	3/6/2013	130	Winter Weather	N/A	0	0	0K	0K
43 Madison County	3/26/2013	300	Winter Weather	N/A	0	0	0K	0K
44 Madison County	12/10/2013	400	Winter Weather	N/A	0	0	0K	0K
45 Madison County	02/11/2014	0300	Heavy Snow	N/A	0	0	0K	0K
46 Madison County	02/12/2014	1500	Heavy Snow	N/A	0	0	0K	0K
47 Madison County	01/13/2015	1730	Winter Weather	N/A	0	0	0K	0K
48 Madison County	01/15/2015	0700	Winter Weather	N/A	0	0	0K	0K
49 Madison County	02/20/2015	1155	Winter Weather	N/A	0	0	0K	0K

50 Madison County	02/20/2015	1935	Ice Storm	N/A	0	0	0K	0K
51 Madison County	02/23/2015	0000	Winter Weather	N/A	0	0	0K	0K
52 Madison County	02/25/2015	1400	Winter Storm	N/A	0	0	0K	0K
53 Madison County	03/05/2015	0150	Winter Storm	N/A	0	0	0K	0K
TOTALS:					5	2	5.016B	38K

Source: NOAA; http://www.ncdc.noaa.gov/stormevents/

Community Impacts. Risks associated with winter storms are a direct correlation to the strength of the storm and the region's ability to handle a storm. The risks include loss of life due to cold and disruption of transportation routes, loss of electricity for extended periods, and impact on agriculture.

Location and Extents. During 2015, there were seven Winter Storm events and one Extreme Cold event. The entire county is equally at risk for winter storms and freezes. The extent of cold temperature is -11 degrees Fahrenheit and snowfall of 24.0 inches.

Probability of Future Occurrence. As indicated in the Committee's hazard identification exercise, Madison County does have a considerable risk of a winter storm occurring and it has a high threat of a winter storm affecting the area. This is a direct result to the area's ability to handle a severe winter storm as well as the terrain of the county. **Tables 4-9** and **4-10** show the winter storms and extreme cold events that have affected Madison County from 1993-2015, respectively. Based on the information available from NOAA as shown in **Table 4-9**, Madison County can expect a significant winter storm almost two times per year (1.78 times annually).

Table 4-10. Extreme Cold Incidents from 2000-2015

Extreme Cold Events	Deaths	Injuries	Property Damage/ Avg. Annual	Crop Damage/ Avg. Annual
23	0	0	$0/$0	$0/$0

Source: NOAA; http://www.ncdc.noaa.gov/stormevents/

4.8 Landslides

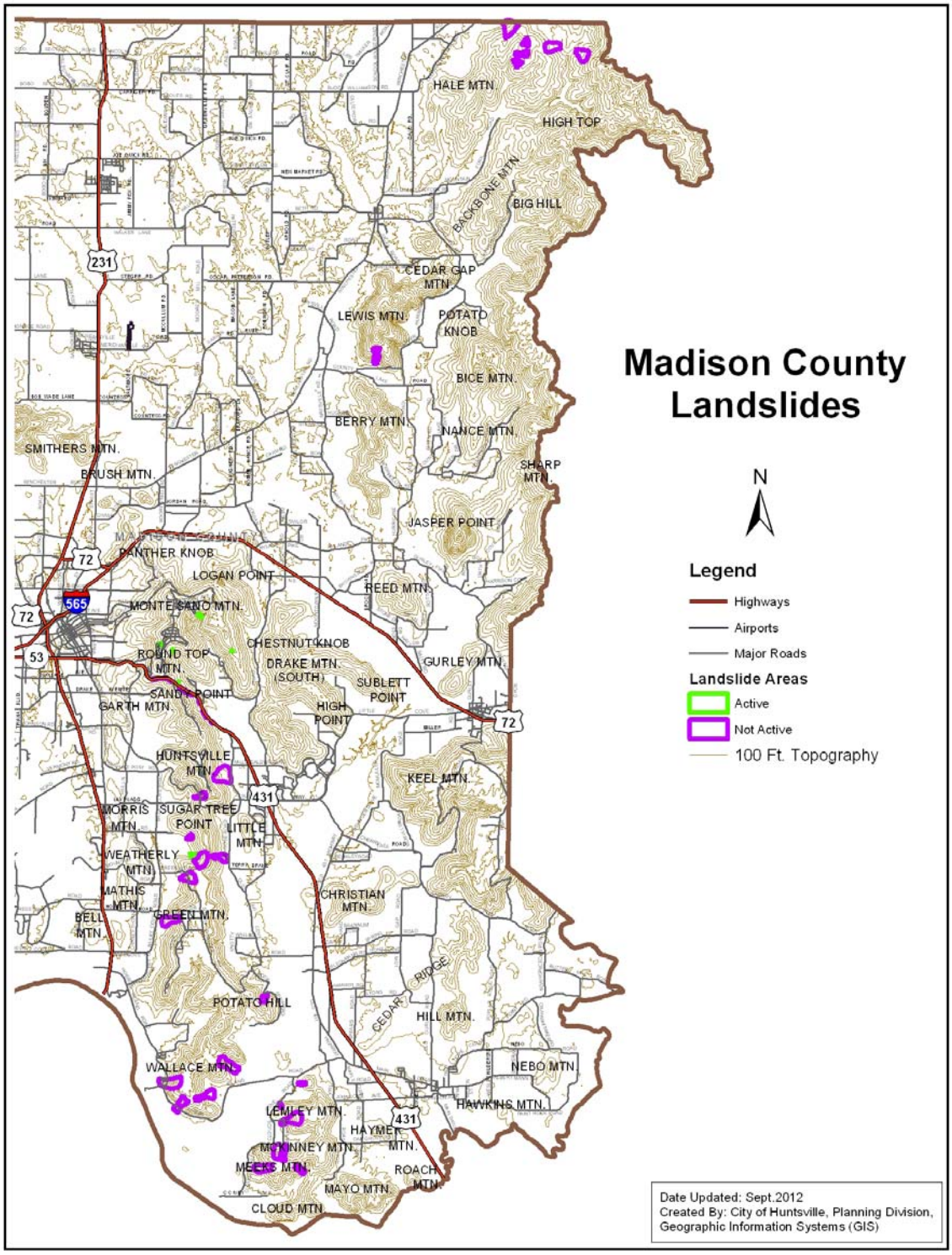
Hazard Description. A "landslide" is the downward and outward movement of slope-forming materials acting under the force of gravity. The term covers a broad category of events, including mudflows, mudslides, debris flows, and rock falls, rockslides, debris avalanches, debris slides and earth flows. Landslides may consist of natural rock, soil, artificial fill, or combinations of these materials. Landslides are classified by type of movement, including; slides, flows, lateral spreads, and falls and topples.

Hazard Profile. Several events occurred during the 1990's. One such event was on June 28, 1999. The landslide occurred in Monte Sano State Park covering part of the park's road.

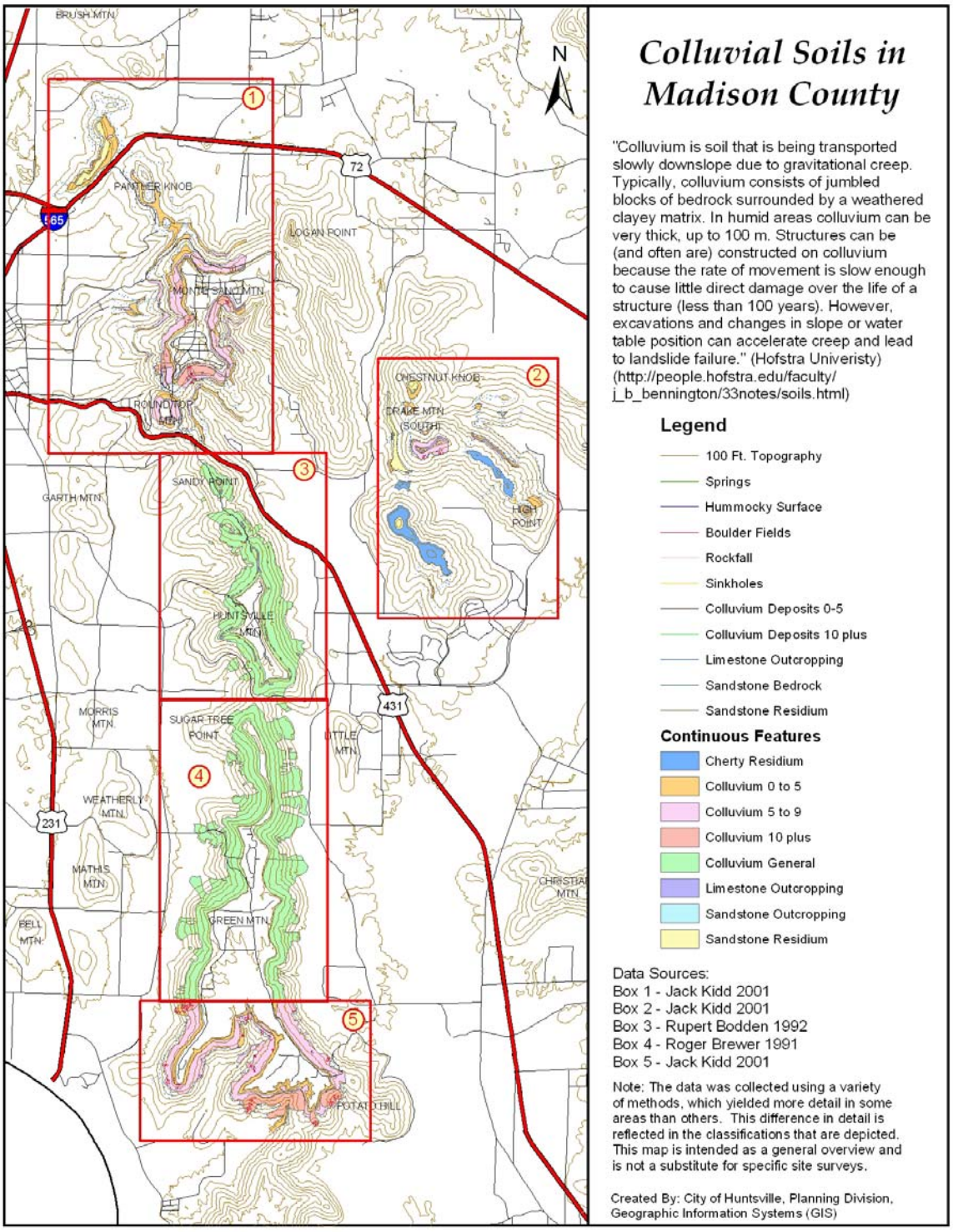
Community Impacts. The effects of landslides are often misrepresented as being the result of the landslide's trigger event, such as a flood, earthquake, volcanic eruption, hurricane, or coastal storm. Madison County has a risk of landslide occurrences.

Location and Extents. During 2015 no Landslide events were reported. **Map 4-4** indicates the locations of previous landslides within Madison County. These areas are also susceptible to future landslides. The extent for landslides is 2500 feet by ¼ to ½ mile wide (per City of Huntsville Planning Department).

Probability of Future Occurrences. The topography and geology of Madison County is susceptible to the effects of landslides, especially in the eastern areas of the county where colluvial soils are present. Colluvial soils and increased development in areas with colluvial soils increase the likelihood of landslides having an impact on Madison County. **Map 4-5** identifies the areas in Madison County with colluvial soils. The impact from a landslide can include loss of life (According to FEMA: 25 – 50 people annually in the United States), damage to buildings, lost productivity, disruption in utilities and transportation systems, and reduced property values.



Map 4-4. Madison County Landslides



Map 4-5. Colluvial Soils in Madison County

4.9 Droughts / Heat Waves

Hazard Description. Temperatures that hover ten degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat. Humid or muggy conditions occur when a "dome" of high atmospheric pressure traps hazy, damp air near the ground. The combination of high temperatures and humid conditions increase the level of discomfort and the potential for danger to humans. A sibling to the heat wave is the drought. Droughts occur when a long period passes without any substantial rainfall. A heat wave combined with a drought is a very dangerous situation. Droughts can lead to sinkholes.

Hazard Profile. Madison County occasionally experiences short droughts and extreme summer heat. According to NOAA, there were 113 incidents of extreme heat recorded between 1996 and 2015, and 26 droughts were recorded between 1998 and 2015.

Community Impacts. The human risks associated with extreme heat include heatstroke, heat exhaustion, heat syncope, and heat cramps. A description of each of these conditions follows:

- Heatstroke is considered a medical emergency and is often fatal. It exists when rectal temperature rises above 105°F as a result of environmental temperatures. Patients may be delirious, stuporous, or comatose. The death-to-care ratio in reported cases averages about 15%.
- Heat Exhaustion is much less severe than heatstroke. The body temperature may be normal or slightly elevated. A person suffering from heat exhaustion may complain of dizziness, weakness or fatigue. The primary cause of heat exhaustion is fluid and electrolyte imbalance. The normalization of fluids will typically alleviate the situation.
- Heat Syncope is typically associated with exercise by people who are not acclimated to exercise. The symptom is a sudden loss of consciousness. Consciousness returns promptly when the person lies down. The cause is primarily associated with circulatory instability as a result of heat. The condition typically causes little or no harm to the individual.
- Heat Cramps are typically a problem for individuals who exercise outdoors but are unaccustomed to heat. Similar to heat exhaustion it is thought to be a result of a mild imbalance of fluids and electrolytes.

In 1979, R. G. Steadman, a meteorologist, developed the heat index, which is a relationship between dry bulb temperatures (at different humidity levels) and the skin's resistance to heat and moisture transfer. Utilizing Steadman's heat index, **Table 4-11** was developed to show the risk associated with ranges in apparent temperature or heat index.

Table 4-11. Heat Index / Heat Disorders		
Danger Category	**Heat Disorders**	**Apparent Temperature (°F)**
IV Extreme Danger	Heatstroke or sunstroke imminent.	>130
III Danger	Sunstroke, heat cramps, or heat exhaustion likely; heat stroke possible with prolonged exposure and physical activity.	105-130
II Extreme Caution	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure and physical activity.	90-105
I Caution	Fatigue possible with prolonged exposure and physical activity.	80-90

Source: National Weather Service, 1997

The sibling to extreme heat is drought. Risks associated with drought include, effects to the water supply, impact on agriculture, increase in wildfires, negative impact on hydroelectric power, and other activities dependent upon water such as recreation and navigation.

Table 4-12. Heat Incidents, 1996-2015				
Excessive Heat Events	**Deaths**	**Injuries**	**Property Damage/ Average Annual**	**Crop Damage/ Average Annual**
113 days of excessive heat	0	78	$0 / $0	$0

Source: NOAA; http://www.ncdc.noaa.gov/stormevents/

Table 4-13. Drought 1998-2015				
Reported Droughts	**Deaths**	**Injuries**	**Property Damage/ Average Annual**	**Crop Damage/ Average Annual**
26 events	0	0	$0 / $0	$100,000 (9/1/1998)

Source: NOAA; http://www.ncdc.noaa.gov/stormevents/

Location and Extents. During 2015, there were two Heat Incident events and no Drought events. Madison County falls in an area that may experience humid, short droughts and extreme summer heat. This event has an impact on electric, water service providers, and the agricultural industry in Madison County. The extent of extreme heat is 111 degrees Fahrenheit.

Probability of Future Occurrence. Based on limited historical information from the Storm Events Database, Madison County can anticipate up to 14 days annually of excessive heat and drought conditions. Though historically drought has not caused major problems, the region is susceptible to extreme drought conditions.

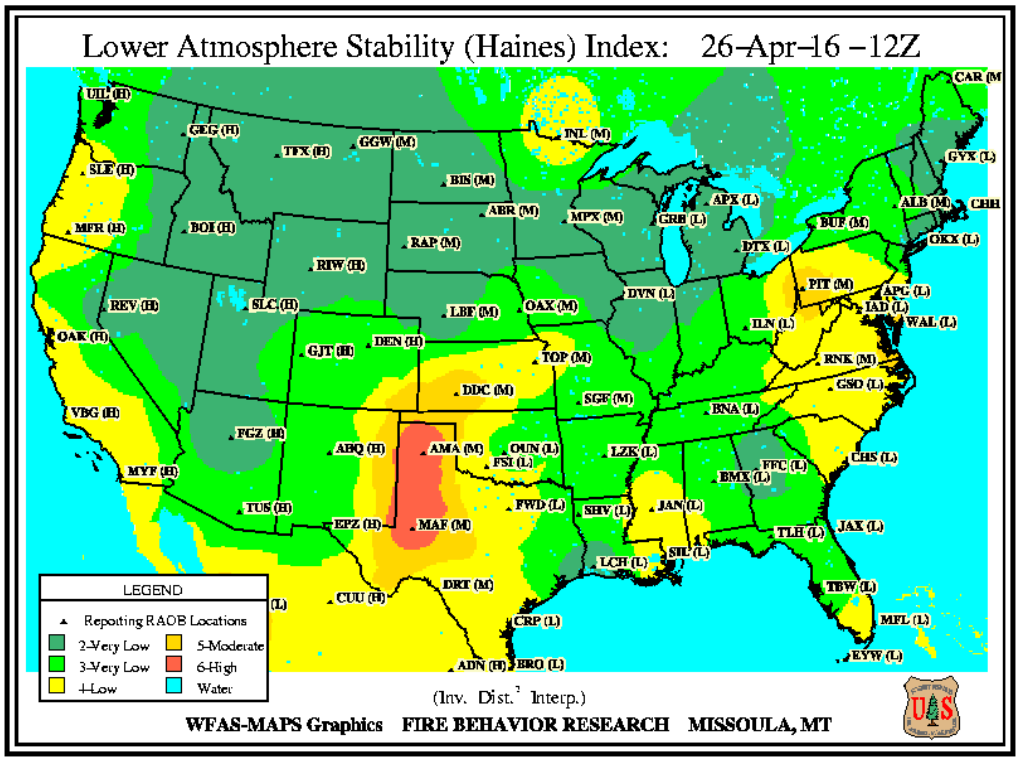
4.10 Wildfires

Hazard Description. There are four categories of wildfires that are experienced throughout the United States, as follows:

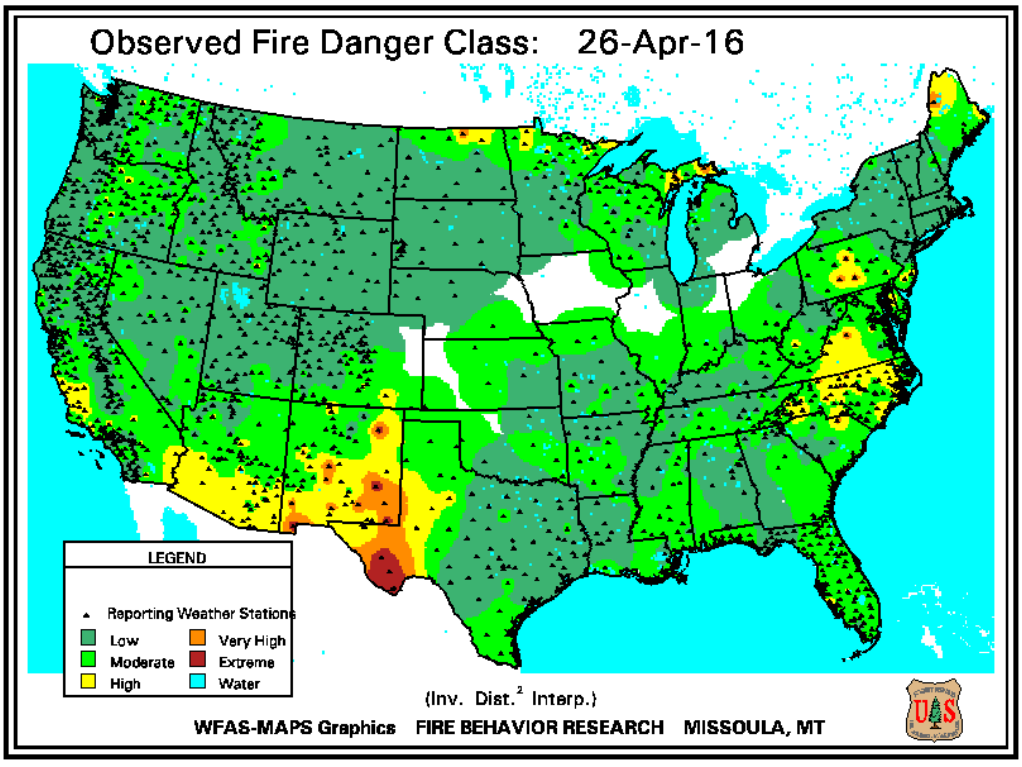
- wild land fires and brush fires,
- interface or intermix fires,
- firestorms, and
- prescribed fires and prescribed natural fires.

The two primary categories experienced in Madison County are wild land fires and interface or intermix. Wild land fires are fueled exclusively by natural vegetation. Interface or intermix fires are fueled by both vegetation and the built up environment.

Three factors have a direct impact on wildfire formation including topography, fuel, and weather. Topography can have a powerful influence on wildfire behavior: slope, canyons, gulches, and can greatly increase the rate of spread. **Maps 4-6** and **4-7** demonstrate the areas within the country that are highly susceptible to wildfires.



Map 4-6. Lower Atmosphere Stability Index



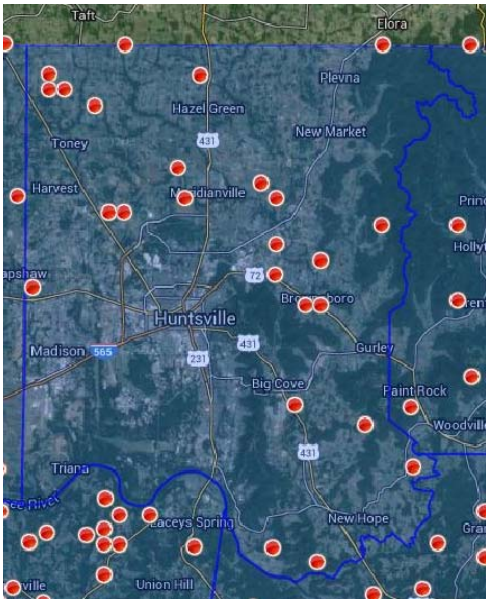
Map 4-7. Observed Fire Danger Class

Hazard Profile. **Table 4-14** below shows the number of fires responded to and suppressed by the Madison County forester's office and volunteer fire departments from 1995 to 2015. The fires listed are the number that required assistance by the Forestry Commission to control the blaze. Madison County averaged 18 wildfires resulting in damage of 87 acres per year since 1995. The Alabama Forestry Commission was unable to provide data from 2004 to 2008.

Table 4-14. Wildfires in Madison County, 1995-2015

Year	# of Fires	Acres Burned
1995	43	149.4
1996	23	223.6
1997	9	15
1998	16	75
1999	60	231.1
2000	33	142.1
2001	41	265.3
2002	16	80
2003	4	62.2
*2009	9	10
2010	10	46
2011	4	23
2012	4	7
2013	9	47
2014	1	5
2015	4	7

Source: Alabama Forestry Commission



Source: Alabama Forestry Commission

Map 4-7A. Wildfires in Madison County 2011-2015

Community Impacts – Wildfires can cause considerable damage and loss of life especially in areas where there is an interface between wild land and urban development.

Locations and extent. During 2015, there were four Wildfire events. **Map 4-7A**, prepared by the Alabama Forestry Commission, indicates fire occurrence in Madison County over the last 5 years. There have been two larger fires (20+ acres) in the last five years. These are shown as the two southern most points on the map in Madison County. The terrain most likely contributed to the larger fire size. The majority of rural Madison County is farm land with the exception of the mountains that are still timbered. In general the majority of fires are small (< 5acres). The small fire size can be contributed to the abundance of farm land in the area. There have been zero fires in the SW portion of the county. The lack of fires can be attributed to the urban areas surrounding Decatur and Huntsville, the Wheeler National Wildlife Refuge, and Redstone Arsenal being located in the SW portion of Madison County. The 25 fires displayed on the map are fairly evenly distributed across the map, excluding the aforementioned areas in the SW portion of Madison County. The extent of wildfires is 300 acres across the county.

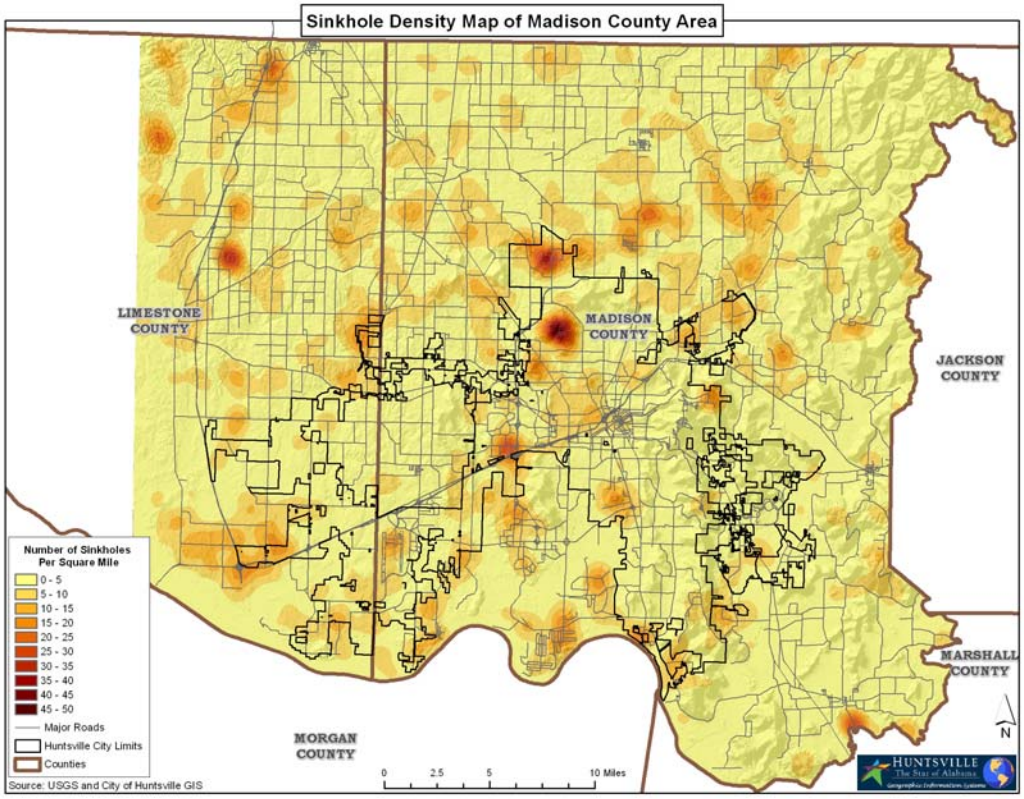
Possibility of Future Occurrences. Wildfires do not have a significant impact on the communities in Madison County. When a wildfire does encroach upon a community, the impact can be loss of life, injury and property destruction.

4.11 Land Subsidence

Hazard Description. Land subsidence, the loss of surface elevation due to the removal of subsurface support, ranges from broad, regional lowering of the land surface to localized collapse. While the majority of sinkholes in the county have formed slowly over time from natural geologic processes, sinkhole formation can also be influenced by human activities. The human activities that may trigger subsidence include mining and the withdrawal of groundwater and/or petroleum. Droughts and excessive rainfall can also lead to the formation of sinkholes. The most dramatic form of subsidence is the collapse of surficial material into underground voids.

Hazard Profile. Numerous large and small sinkholes are present throughout Madison County.

Map 4-8, prepared by the City of Huntsville GIS Department, indicates that active subsidence is possible throughout the County.



Map 4-8. Sinkhole Density Map of Madison County Area

Community Impacts. Madison County is located in a part of the state where the geology is highly susceptible to subsidence. When subsidence occurs in developed areas it can have a significant impact on the communities including loss of property value, increased cost on insurance and potential injury.

Location and Extents. Madison County is underlain by carbonate rocks, primarily limestone. The County is underlain by a dense karst network of sinkholes, swallow holes, springs, and caves, and is part of the TAG (Tennessee-Alabama-Georgia) region - one of the densest karstic areas of the country. Although there are no State or County regulations requiring reporting of sinkholes, the Geological Survey of Alabama (GSA) receives an average of 10 calls per year about Madison County sinkholes forming along roadsides and on private property. Ongoing karst research and mapping by the GSA has identified an active karst system across the County, including 450 sinkhole depressions and over 80 springs (on USGS topographic maps).

Probability of Future Occurrences. Given past occurrences of sinkholes and the geologic setting of the County, sinkhole development and active natural growth will continue on an annual basis (100% probability of occurrence) in Madison County. Factors that may increase sinkhole growth and occurrence rates include (but are not limited to) drought, heavy rain storms, and urban development. Prediction of numbers

of new sinkholes per year is not possible at this time given lack of reporting regulations.

*The above section regarding Land Subsidence and Sinkholes was compiled with considerable input from Dr. Sandy Ebersole at the Geological Survey of Alabama.

4.12 Hurricanes

Hazard Description. A "tropical cyclone" is a generic term for a cyclonic, low-pressure system over tropical or sub-tropical waters. Tropical cyclones with maximum sustained winds of less than 39 mph are called tropical depressions. A tropical storm is a cyclone with maximum sustained winds greater than 39 mph but less than 74 mph and a tropical storm with winds that have reached a constant speed of 74 miles per hour or more becomes a hurricane.

Hazard Profile. Since 1994 nineteen significant hurricanes/tropical storms have affected the state of Alabama. Although not all had an impact on Madison County, it is difficult to estimate how many severe thunderstorms and tornadoes may have been caused by a tropical storm or hurricane. All of the tropical systems were well below tropical storm strength when they affected Madison County. The strongest of these storms was Hurricane Ivan. **Table 4-15** lists these eighteen hurricanes.

Table 4-15. Hurricane Events, 1994-2015

Name	Date
Ike	September 11, 2008
Gustav	August 31-September, 2008
Fay	August 23-25, 2008
Katrina	August 27-29, 2005
Dennis	July 9-10, 2005
Cindy	July 5-6, 2005
Arlene	June 10-11, 2005
Ivan	September 13-16, 2004
Lili	October 2-3, 2002
Isidore	September 24-26, 2002
Hanna	September 14-15, 2002
Barry	August 6, 2001
Allison	June 11-12, 2001
Helene	September 22, 2000
Georges	September 29-October 1, 1998
Danny	July 20-22,1997
Opal	October 3-5,1995
Alberto	July 4-7, 1994

Beryl	August 16-17, 1994

Source: http://www.ncdc.noaa.gov/stormevents/

NOAA reported the impact of the most significant event, Hurricane Ivan, as follows along with other significant hurricanes:

Table 4-16. Most Significant Hurricanes, 1995-2015

Event	Deaths	Injuries	Statewide Property Damage	Statewide Crop Damage
Hurricane Katrina on 8/29/2005	0	0	$1 billion	0
Hurricane Dennis on 7/10/2005	0	0	$120 million	$100,000
Hurricane Ivan 9/16/2004	0	0	$2.5 billion	$25 million
Hurricane Georges on 9/28/1998	1	0	$174.2 million	$5 million
Hurricane Opal on 10/4/95	2	0	$100 million	$10 million

Source: NOAA; http://www.ncdc.noaa.gov/stormevents/

Community Impacts. Madison County is susceptible to the effects of coastal storms. Since Madison County is inland, the primary risk is the impact of high winds, the formation of tornados, and flooding. Ten percent of deaths in the United States that are associated with hurricanes are due to tornadoes.

Location and Extents. During 2015, there were no Hurricane or Tropical Storm incidents that affected Madison County. Owing to its distance from the coast, Madison County is not susceptible to the direct impacts of hurricanes or tropical storms with regards to storm surge. However, the extent of impact would be comparable with that of severe thunderstorms, flooding, and tornadoes, as tropical systems have the potential to produce those hazards.

Probability of Future Occurrences. Based on limited historical information from the Storm Events Database, a hurricane or tropical storm impacts the county every couple of years and usually indirectly. Average annual damages for Madison County are unavailable due to the fact that county-by-county damage estimates are not available. Although one can extract data and probability of occurrence from historical information, the risk of a hurricane or tropical storm and the location of damage are random.

4.13 Dam/Levee Failures

Hazard Description. Dam failures are potentially the worst flood events. A dam failure is usually the result of neglect, poor design, or structural damage caused by a major event such as an earthquake.

Hazard Profile. Dam/levee failure events are rare in Madison County and historical information does not exist.

Community Impact. The risks associated with dam/levee failures are the same as those risks associated with flooding and it is confined to a well-defined area.

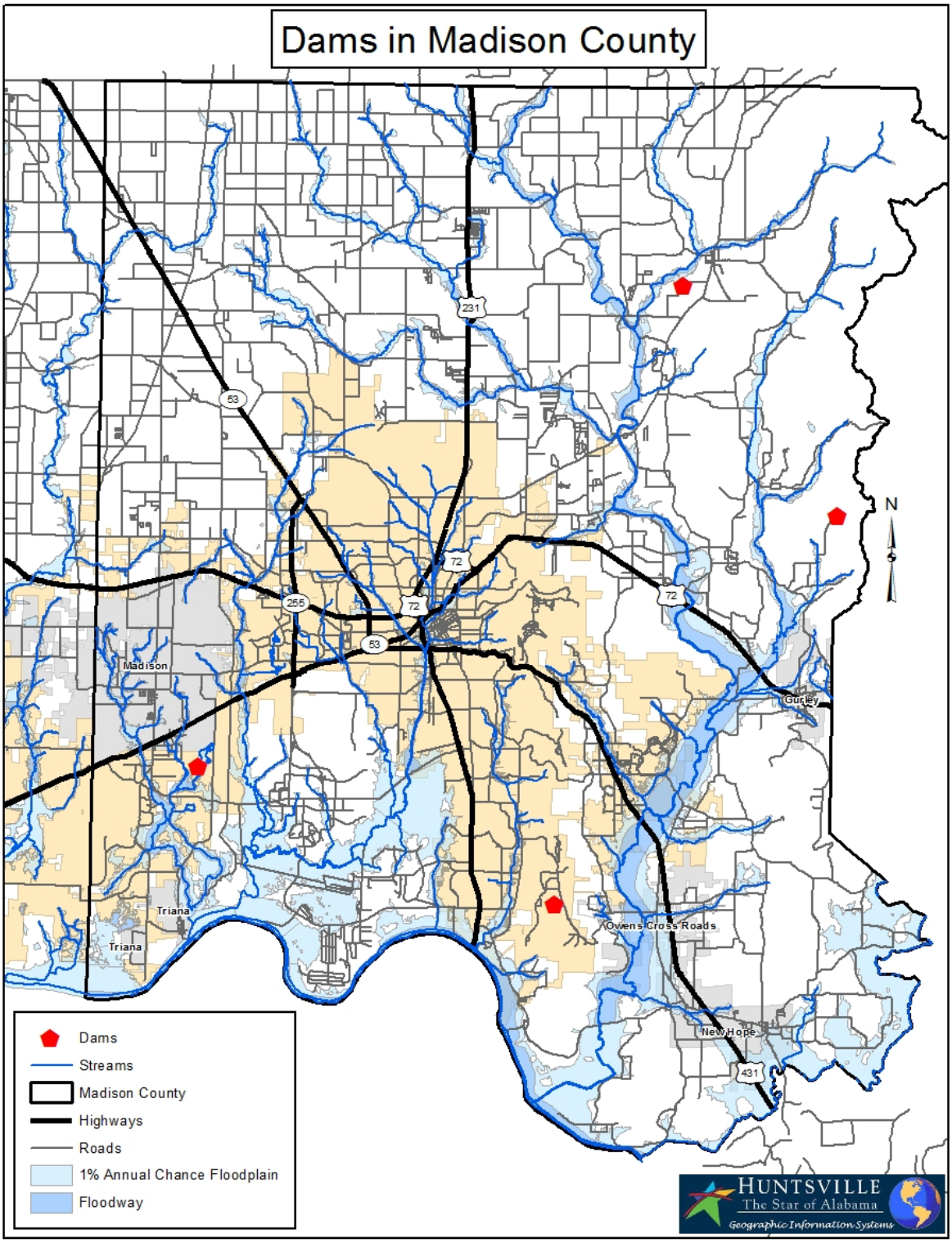
Location and Extents. Map 4-9 depicts the location of dams in Madison County. During 2015, there were no dam/levee failure events in Madison County. In 2014, a debate among the Committee on the definition of a dam for the purposes of this plan, and the inaccuracy of HAZUS 2012 dam data, reduced the number of dams listed on this map from eleven in the October, 2012 version to four in the new 2014 update. A resolution to this debate is one of the planning goals for the Committee outlined in Chapter 7. The extent for dam failure is a failure of the Guntersville Dam on the Tennessee River during probable maximum flood conditions for which the potential is low.

Probability of Future Occurrences. The greatest risk to Madison County would result from a failure of TVA's Guntersville Lake Dam located outside of Madison County on the Tennessee River about 25 miles upstream from Huntsville.

During the 2014 update process, the validity of this paragraph, in prior versions of the plan, was brought into question:

"Madison County has many small dams. Nine are large enough to be listed on the Corps of Engineer's Dam Inventory. None of the dams are known to directly threaten life or residences. One dam would affect property in Madison County in the event of failure: the Madison Lake Dam."

The Committee will further explore the nine dams on the Corps of Engineer's Dam Inventory, as well as all other dam information, discussed above, during the 2016-2021 update process. A resolution to this debate is one of the planning goals for the Committee outlined in Chapter 7.

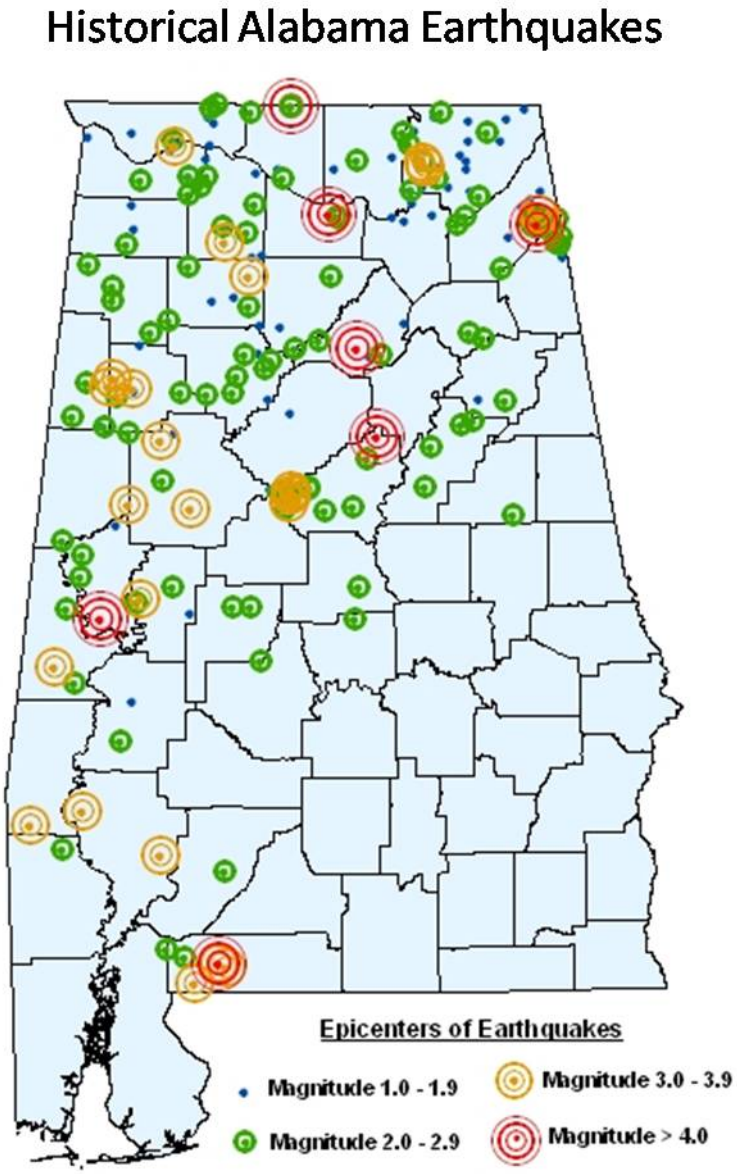


Map 4-9. Dams in Madison County

4.14 Earthquakes

Hazard Description. An earthquake is a sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the Earth's surface.

Hazard Profile. Numerous earthquakes have been recorded in the state of Alabama. **Map 4-10** illustrates the location and intensity of earthquakes in the State. A number of the recorded tremors have occurred in north Alabama near Madison County. **Table 4-17** identifies the Earthquakes recorded in Madison County since 1916.



Map 4-10. Historical Alabama Earthquakes
(Source: Geological Survey of Alabama)

Table 4-17. Earthquakes with Epicenters in Madison County, 1916-2015			
Date	**County**	**Epicenter area**	**Richter Scale Magnitude**
6/24/1939	Madison	Huntsville	4.2
4/23/1957	Madison	Farley	0.2
8/9/1984	Madison	Huntsville	3.0
8/24/1984	Madison	Huntsville	1.4
11/18/1984	Madison	Huntsville	2.7
12/28/1988	Madison	Madison	1.9
2/20/1989	Madison	Huntsville	1.3
3/28/1991	Madison	Huntsville	1.8
3/19/2011	Madison	New Market	2.5

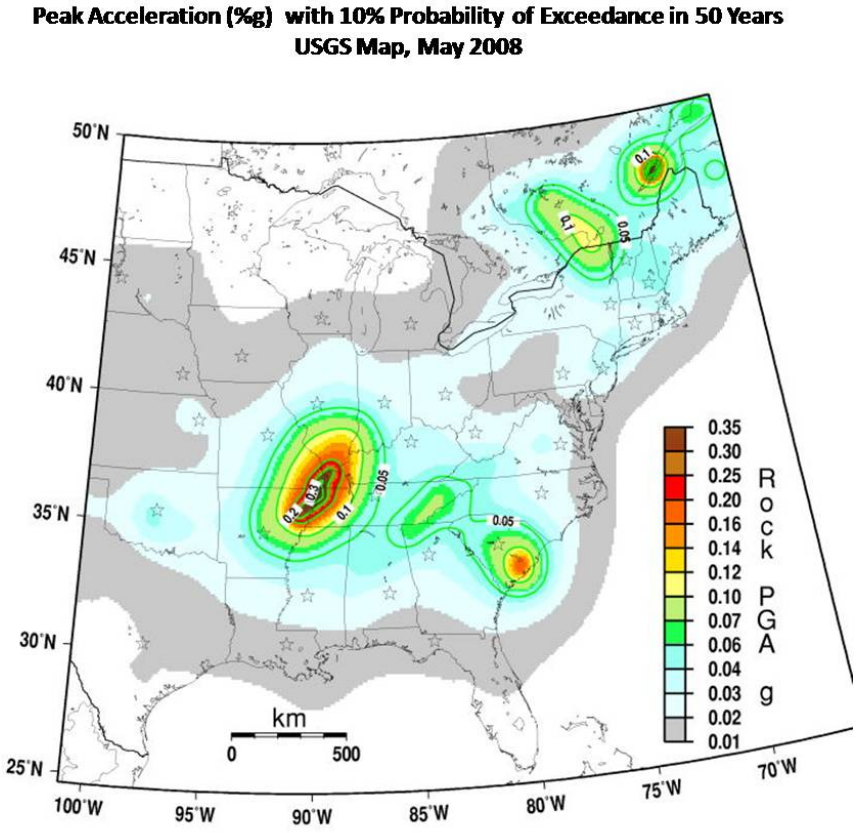
Source: Geological Survey of Alabama

Table 4.17a. Comparison of Richter Scale and Modified Mercalli Intensity Scale and Typical Effects		
Richter Scale Magnitude	**Typical Max Modified Mercalli Intensity**	**Typical Effect**
1.0-3.0	I	Not felt except by very few
3.0-3.9	II-III	II-Felt only by few persons at rest III-Felt noticeably by persons indoors, especially on upper floors
4.0-4.9	IV-V	IV-Felt indoors by many; walls may make cracking sound V-Felt ny nearly everyone, many awakened; unstable objects overturned
5.0-5.9	VI-VII	VI-Felt by all; some heavy furniture moved, slight property damage VII-Slight damage to well-built structures; considerable damage to poorly built structures
6.0-6.9	VIII-IX	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. IX-Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
7.0 and higher	X and higher	Large scale destructrion

Source: http://earthquake.usgs.gov/learn/topics/mag_vs_int.php

Community Impacts. The USGS has developed a methodology for identifying an area's vulnerability to the occurrence of an earthquake. Areas are identified by their relative seismic risk.



Map 4-11. Earthquake Risk Zones

In accordance with FEMA guidelines, an area with 3% or greater probability of exceedance in 50 years should be further assessed for vulnerability. In the case of Madison County, the risk exceeds the 3% threshold.

Location and Extents. During 2015, there were no Earthquake events with epicenters in Madison County. In addition to earthquakes with epicenters in Madison County, numerous earthquakes have been felt in the County but have originated elsewhere. The most recent occurred Tuesday morning April 29, 2003, at 3:59 A.M. A strong earthquake with a magnitude of 4.9 occurred in DeKalb County, Alabama, just east of Desoto State Park and 10 miles East/Northeast of Fort Payne, Alabama. Pictures moved on walls, items fell off shelves, and a trailer was shook off its foundation. The quake was felt in eight states and woke people as far away as Tuscaloosa and Montgomery Counties. The tremor was felt throughout Madison County. The extent in Madison County is a 4.9 magnitude earthquake on the Richter Scale.

Probability of Future Occurrences. Madison County is located in an area with a probability of exceedance between 5% and 6% in 50 years. This is an area of slight to moderate risk as illustrated in **Map 4-11**.

4.15 Vulnerability Assessment: Identification of Assets

This section assesses vulnerability of types and numbers of existing buildings and critical facilities (including infrastructure) located within each identified hazard area. The only identified natural hazards which are area specific within the county are flooding and landslides. Consequently, all buildings and critical facilities are exposed to all remaining hazards.

Tables 4-18 and **4-19** show the total building inventory and the value of buildings by type, respectively.

The available HAZUS data is limited by software compatibility issues at City of Huntsville GIS. Attempts to resolve these issues have been largely unsuccessful. Additionally, the Committee voted to incorporate 2010 Census data into the plan during the next five-year maintenance cycle. The plan to update **Tables 4-18** and **4-19** with HAZUS and 2010 Census data is detailed in Chapter 7.

In 2014, **Tables 4-18** and **4-19** were updated with new information made available by the Madison Count Tax Assessor's office.

Designation of a facility as critical is based on the HAZUS definitions, as follows:

- Essential Facilities. These facilities are critical to the health and welfare of the entire county population and are essential following hazard events, including emergency response facilities (police, fire, and emergency management), medical

care facilities (hospitals and other care facilities), schools, and shelters for evacuation.

- Lifeline Utility Systems. These facilities are essential lifelines that include potable water, wastewater, natural gas, electric, and communications systems. HAZUS data is not available for this county.
- Transportation Systems. These facilities include highways, bridges, railways, and waterways.
- High Potential Loss Facilities. These facilities include military installations and high potential loss dams.
- Hazardous Materials Facilities. These facilities may pose a threat if disrupted by natural hazards and include hazardous industrial chemicals, explosives, flammables, toxins, and radioactive materials.

Building Assets

The county has over 135,599 buildings valued at over $22.3 billion. All of the buildings are at risk for natural hazards damages.

Table 4-18. Total County Building Inventory

Type of Building						
Residential	Commercial	Industrial	Agriculture	Religious	Education	Total
123,098	8,031	358	3432	575	105	135,599

Source: Madison County Tax Assessor's Office

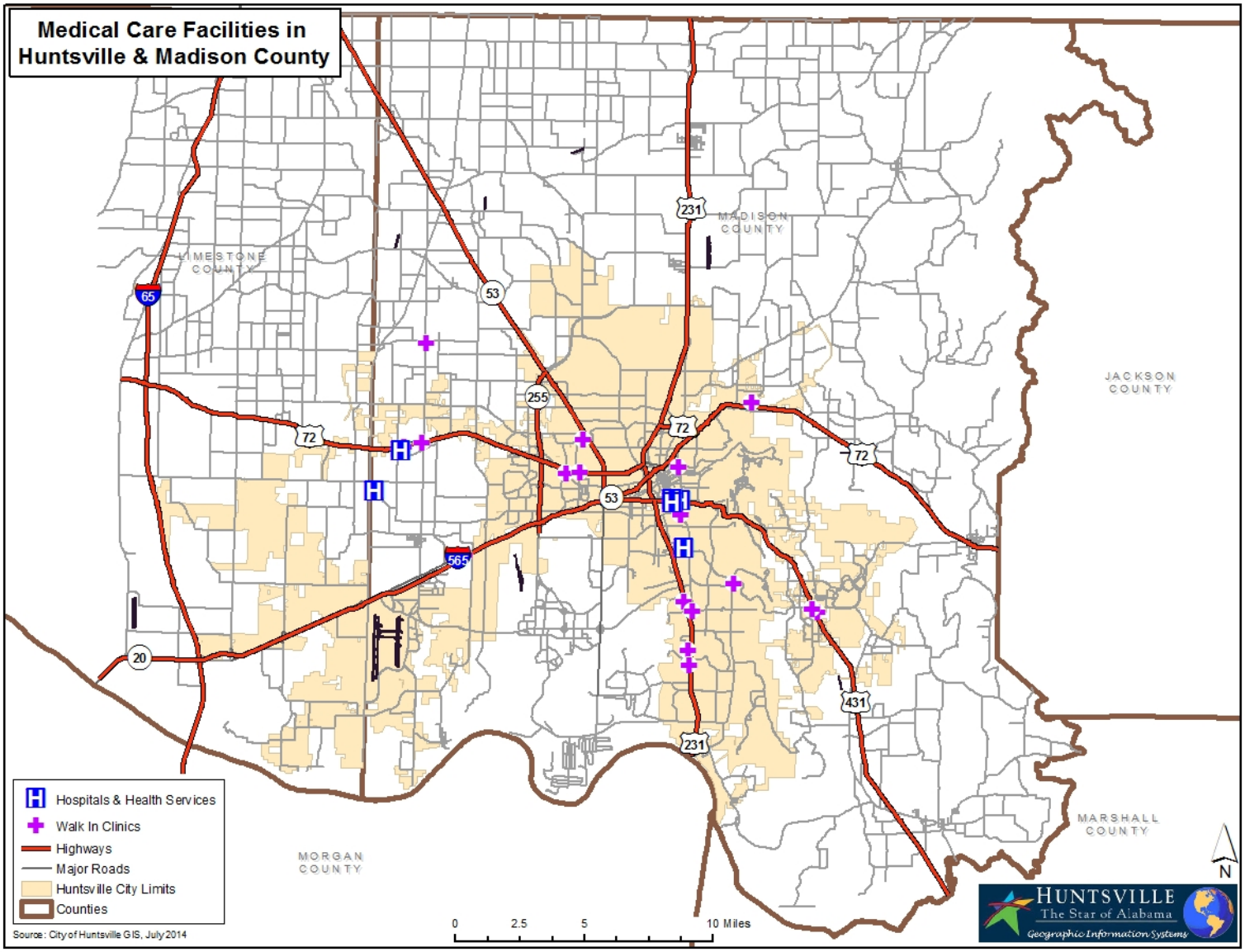
Table 4-19. Value of Buildings by Type

Residential	Commercial	Industrial	Agriculture	Religious	Education	Total
$ 17,321,954,641	$ 4,260,722,324	$ 488,068,000	$26,920,400	$ 283,776,700	Unknown Value	$ 22,381,442,065

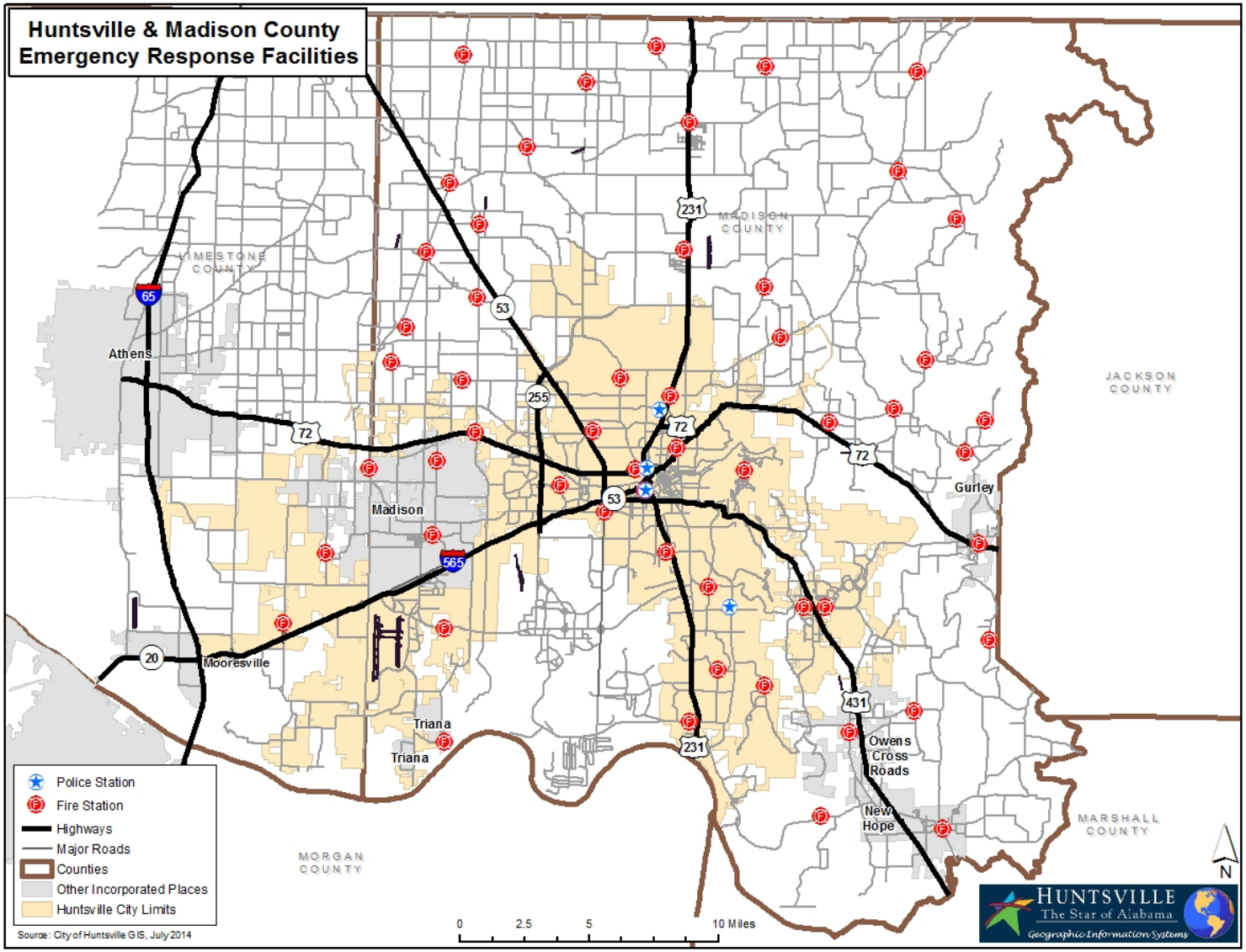
Source: Madison County Tax Assessor's Office

Critical Facilities

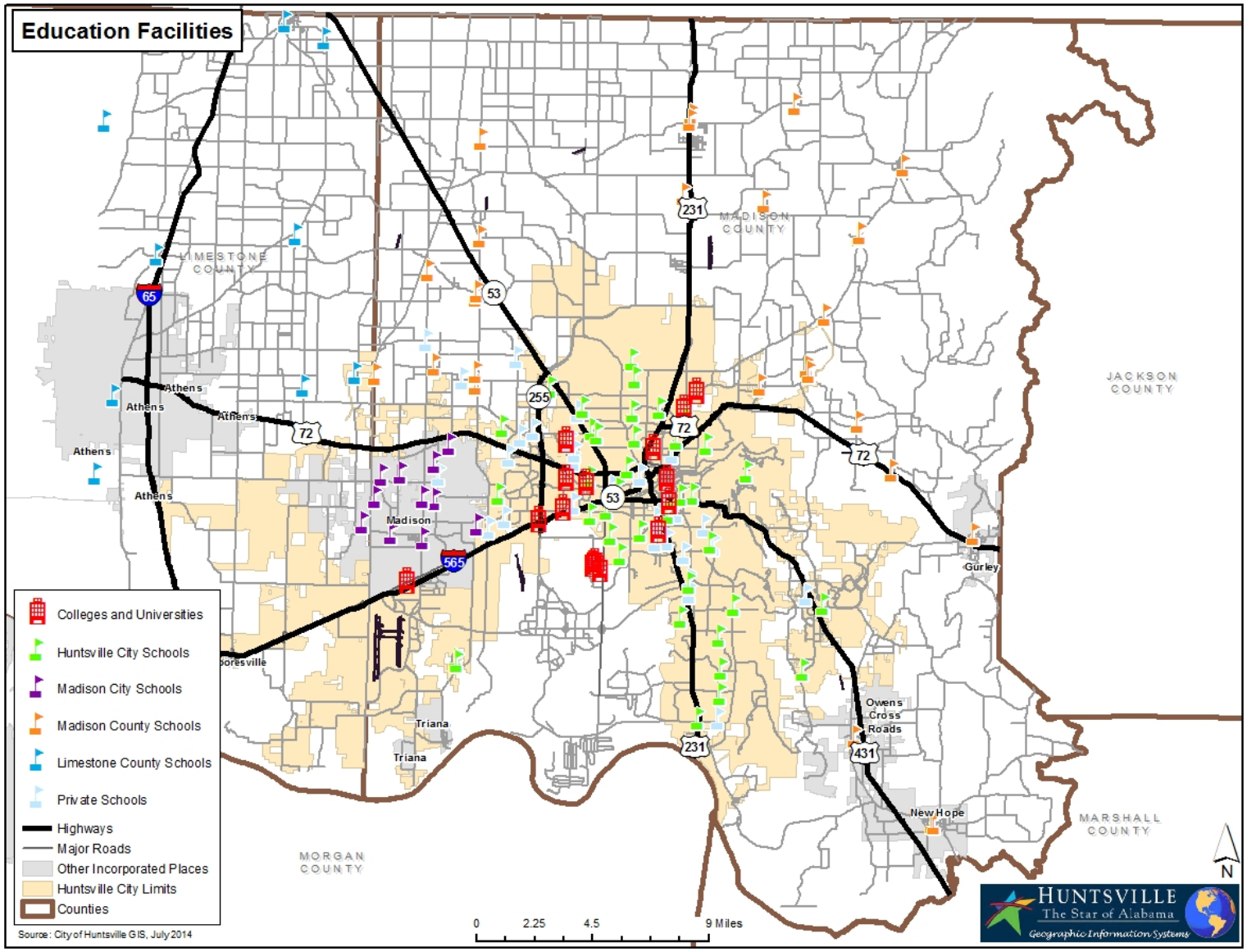
The maps on the following pages show the distribution of critical facilities throughout the county. Utility and shelter data is not available through HAZUS and is consequently, not mapped. Most facilities are concentrated within the urbanized portion of the county. Exposure to flooding is shown on each map, where applicable.



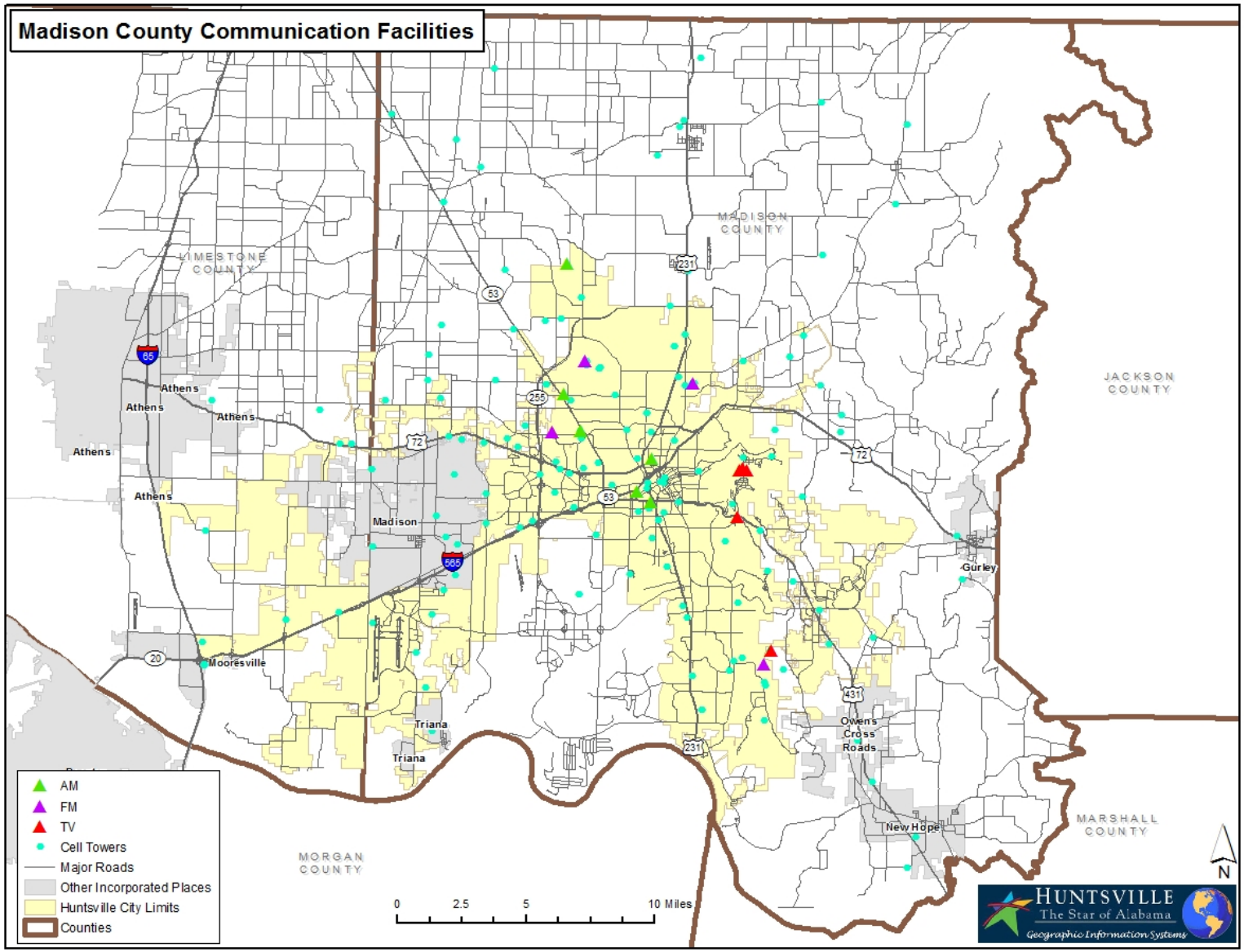
Map 4-12. Emergency Care



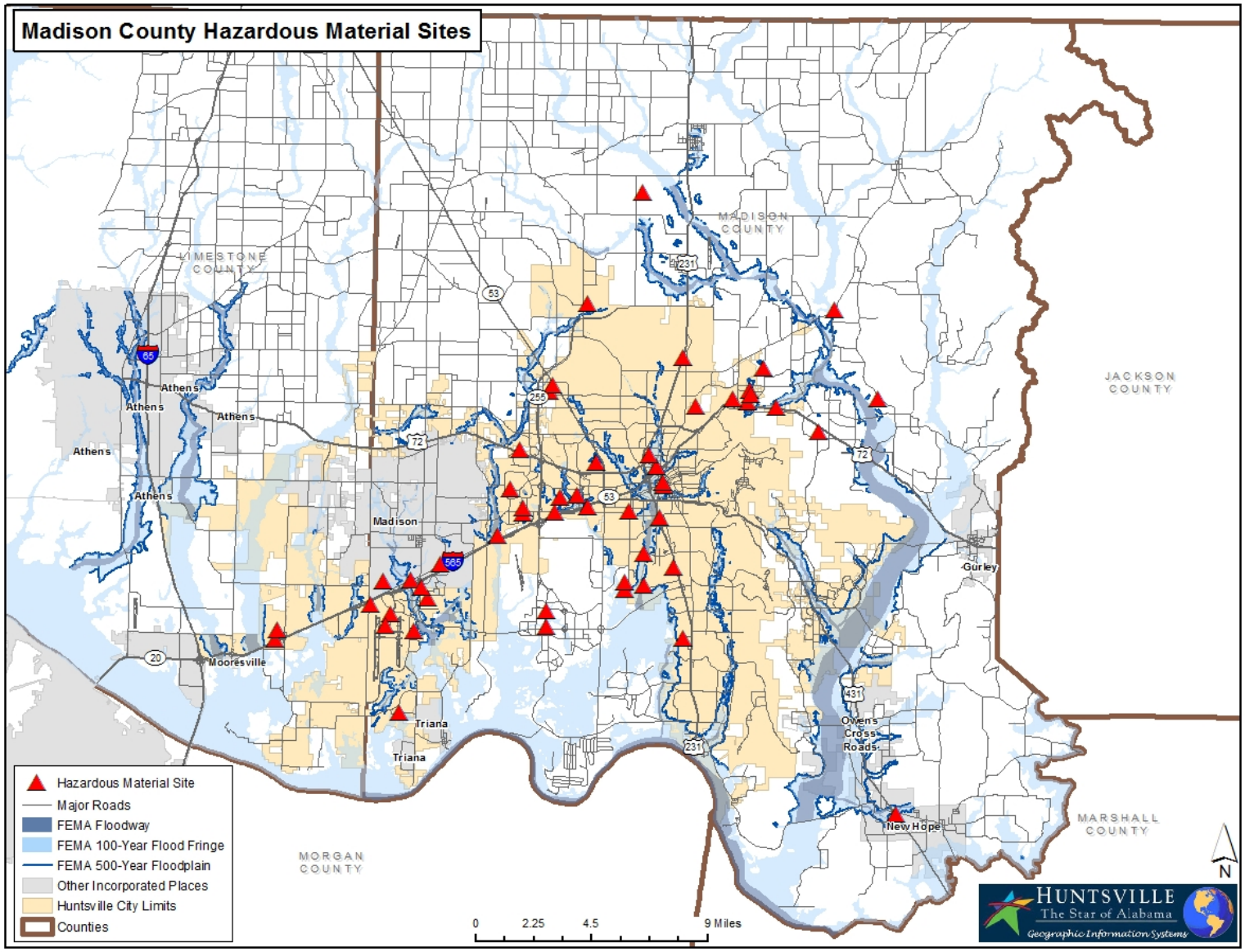
Map 4-13. Emergency Response



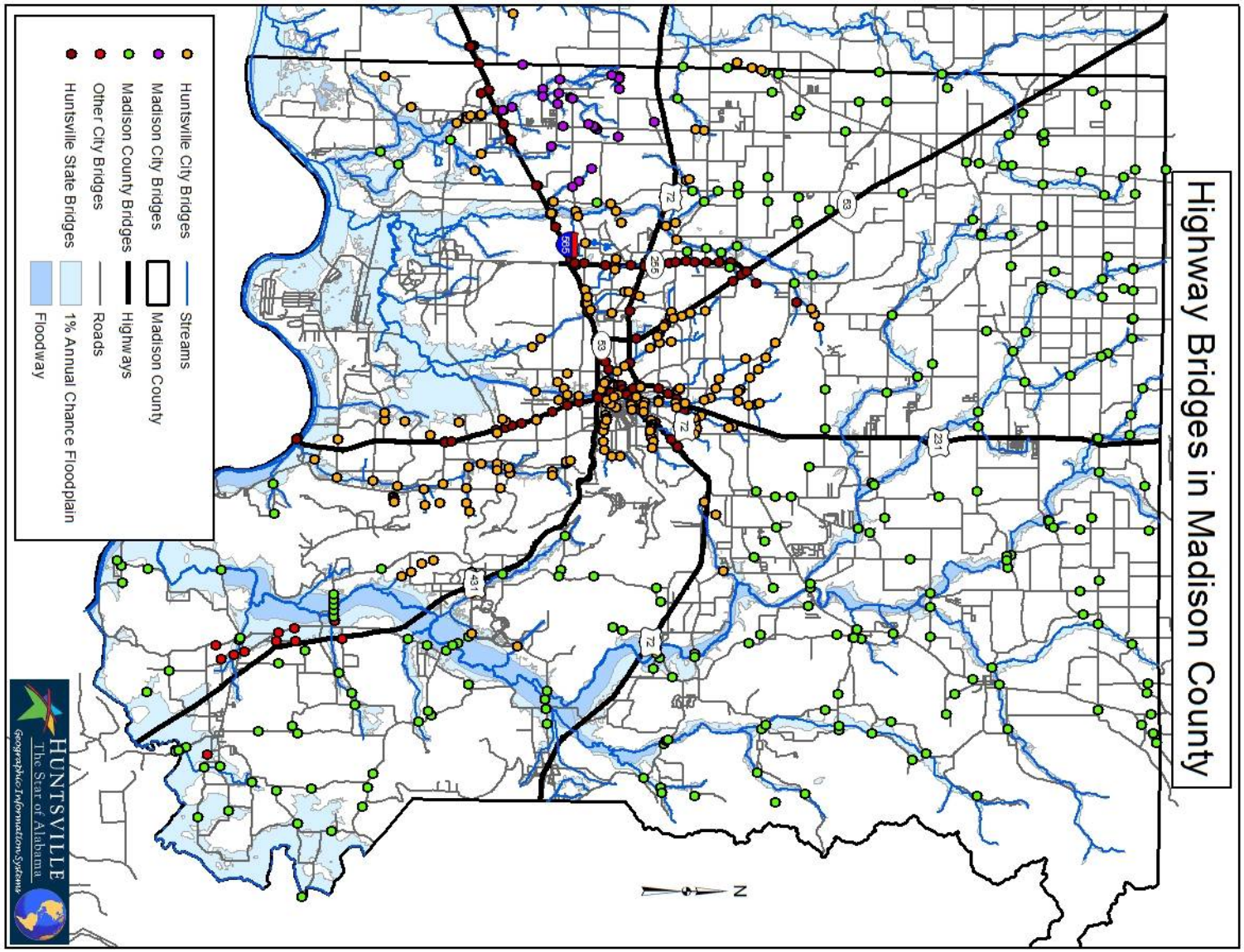
Map 4-14. Education



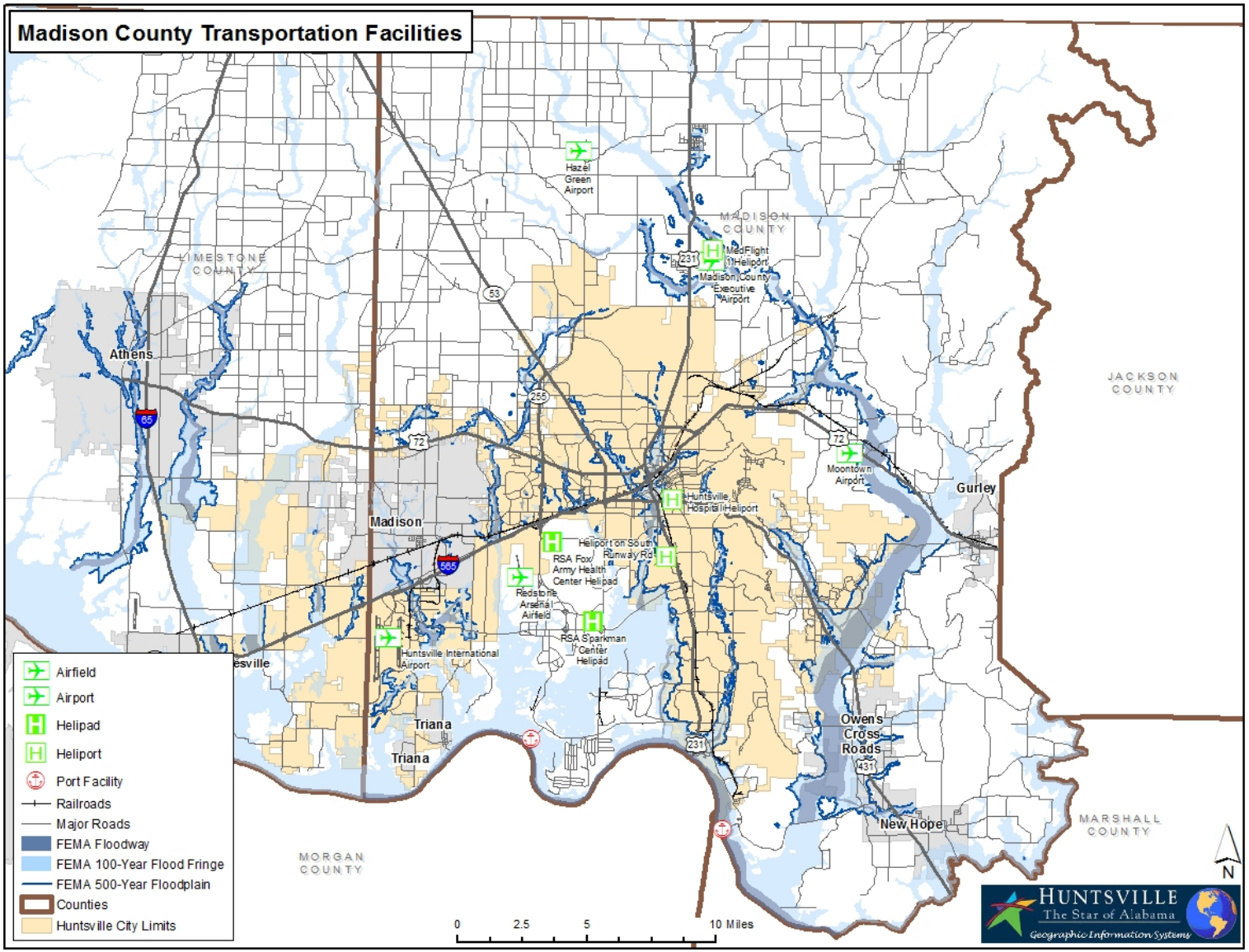
Map 4-15. Communication



Map 4-16. Hazardous Material Sites



Map 4-17. Highway Bridges



Map 4-18. Transportation Facilities

4.16 Vulnerability Assessment: Impacts on Population, Buildings, Critical Facilities

Tables 4-20, **4-21, 4-21A, 4-22,** and **4-22A** depict populations and buildings in Madison County that are vulnerable to each natural hazard. It is estimated that less than 10% of the population and buildings are vulnerable to flooding. Since the area affected by landslides is very sparsely populated, it is assumed that no significant populations would be effected. Data to estimate the population or buildings subject to dam failure or earthquakes is not available.

In 2014, **Tables 4-20, 4-21** and **4-22** were updated with information from the Madison County Tax Assessor's office. **Tables 4-21A and 4-22A** were added due to expanded residential details from the Tax Assessor.

Impact on Population

Table 4-20. Population Vulnerable to Hazards

Hazard	Population	Households
Flood	18,505	7,240
Tornado	334,811	134,700
Drought	334,811	134,700
Hail	334,811	134,700
Wildfire	334,811	134,700
Lightning	334,811	134,700
Hurricane	334,811	134,700
Thunderstorm	334,811	134,700
Winter storm	334,811	134,700
Subsidence	334,811	134,700

Source: City of Huntsville GIS

Impact on Buildings

Table 4-21. Number of Buildings Exposed to Hazards							
Hazard	**Type of Building**						
	Residential	**Commercial**	**Industrial**	**Agriculture**	**Religious**	**Education**	**Total**
Flood	7,728	1523	73	651	72	4	10,051
Tornado	123,098	8,031	358	3432	575	105	135,599
Drought	123,098	8,031	358	3432	575	105	135,599
Hail	123,098	8,031	358	3432	575	105	135,599
Wildfire	123,098	8,031	358	3432	575	105	135,599
Lightning	123,098	8,031	358	3432	575	105	135,599
Hurricane	123,098	8,031	358	3432	575	105	135,599
Thunderstorm	123,098	8,031	358	3432	575	105	135,599
Winter storm	123,098	8,031	358	3432	575	105	135,599
Subsidence	123,098	8,031	358	3432	575	105	135,599

Source: Madison County Tax Assessor's Office

Table 4-21A. Residential Buildings Exposed to Hazards				
Hazard	**Type of Building**			
	Single Family	**Multi-Family**	**Manufactured Housing**	**Total**
Flood	6815	706	207	7,728
Tornado	113,628	6,958	2,512	123,098
Drought	113,628	6,958	2,512	123,098
Hail	113,628	6,958	2,512	123,098
Wildfire	113,628	6,958	2,512	123,098
Lightning	113,628	6,958	2,512	123,098
Hurricane	113,628	6,958	2,512	123,098
Thunderstorm	113,628	6,958	2,512	123,098
Winter storm	113,628	6,958	2,512	123,098
Subsidence	113,628	6,958	2,512	123,098

Source: Madison County Tax Assessor's Office

Table 4-22. Value of Buildings Exposed to Hazards in Dollars

Hazard	Type of Building						
	Residential	Commercial	Industrial	Agriculture	Religious	Education	Total
Flood *	1,194,883,400	935,051,400	56,835,800	6,396,500	38,516,900	Unknown Value	$2,231,684,000
Tornado	17,321,954,641	4,260,722,324	488,068,000	26,920,400	283,776,700	Unknown Value	$22,381,442,065
Drought	17,321,954,641	4,260,722,324	488,068,000	26,920,400	283,776,700	Unknown Value	$22,381,442,065
Hail	17,321,954,641	4,260,722,324	488,068,000	26,920,400	283,776,700	Unknown Value	$22,381,442,065
Wildfire	17,321,954,641	4,260,722,324	488,068,000	26,920,400	283,776,700	Unknown Value	$22,381,442,065
Lightning	17,321,954,641	4,260,722,324	488,068,000	26,920,400	283,776,700	Unknown Value	$22,381,442,065
Hurricane	17,321,954,641	4,260,722,324	488,068,000	26,920,400	283,776,700	Unknown Value	$22,381,442,065
Thunderstorm	17,321,954,641	4,260,722,324	488,068,000	26,920,400	283,776,700	Unknown Value	$22,381,442,065
Winter storm	17,321,954,641	4,260,722,324	488,068,000	26,920,400	283,776,700	Unknown Value	$22,381,442,065
Subsidence	17,321,954,641	4,260,722,324	488,068,000	26,920,400	283,776,700	Unknown Value	$22,381,442,065

Source: Madison County Tax Assessor's Office

Table 4-22A. Value of Residential Buildings Exposed to Hazards in Dollars

Hazard	Type of Building			
	Single Family	Multi-Family	Manufactured Housing	Total
Flood	975,120,800	215,840,800	3,921,800	1,194,883,400
Tornado	16,069,484,500	1,215,851,100	36,619,041	17,321,954,641
Drought	16,069,484,500	1,215,851,100	36,619,041	17,321,954,641
Hail	16,069,484,500	1,215,851,100	36,619,041	17,321,954,641
Wildfire	16,069,484,500	1,215,851,100	36,619,041	17,321,954,641
Lightning	16,069,484,500	1,215,851,100	36,619,041	17,321,954,641
Hurricane	16,069,484,500	1,215,851,100	36,619,041	17,321,954,641
Thunderstorm	16,069,484,500	1,215,851,100	36,619,041	17,321,954,641
Winter storm	16,069,484,500	1,215,851,100	36,619,041	17,321,954,641
Subsidence	16,069,484,500	1,215,851,100	36,619,041	17,321,954,641

Source: Madison County Tax Assessor's Office

Impact on Critical Facilities

Critical known facilities subject to flooding are shown on the maps in the previous section. All critical facilities are subject to all other natural hazard disasters, with the exception of landslides. Critical facilities located on moderate to steep slopes with colluvial soils are vulnerable to landslides.

4.18 Vulnerability Assessment: Analysis of Development Trends

As depicted in **Tables 4-23** and **4-24**, Madison County's population grew by 58,111 persons, or 21 percent, in the decade between 2000 and 2010. The city of Huntsville experienced a population increase of 21,889 people, or 13.83 percent, while the population of Madison grew by 13,609 people, or 46.4 percent. Between 2000 and 2010, population growth occurred in the north, east, and west portions of the Huntsville metropolitan area where land was available, while remaining stagnant in the southern portion due to lack of land and an aging population. The major economic development event of the 2000s was the announcement of the 2005 Base Realignment and Closure (BRAC), which brought 5,000 direct jobs to Redstone Arsenal and numerous indirect job opportunities. Because of this, Huntsville was not as negatively affected as other metro areas during the recession of 2007-2009.

Table 4-23. Historical and Projected Population Growth Trends, 1990-2035

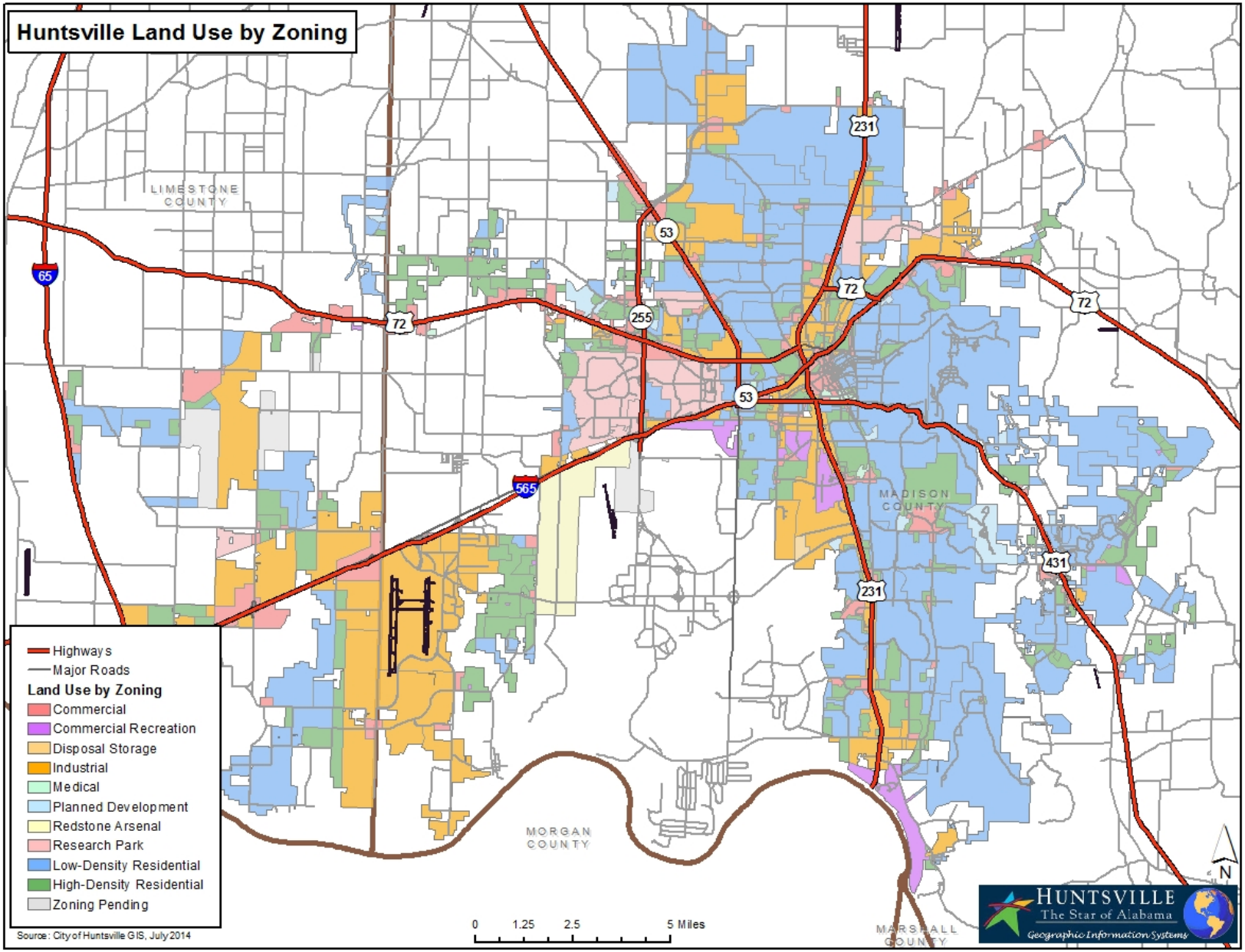
Item	Madison County	State of Alabama
Historical		
1990 Population	238,912	4,040,389
2000 Population	276,700	4,447,100
Percent Change 1990-2000	15.8%	10.1%
Number Change 1990-2000	37,788	406,711
2010 Population	334,811	4,779,736
Percent Change 2000-2010	21.0%	7.5%
Number Change 2000-2010	58,111	332,636
Projected		
2015 Population	362,180	4,943,866
2025 Population	413,858	5,242,423
2035 Population	459,519	5,471,880

Table 4-23. Historical and Projected Population Growth Trends, 1990-2035		
Item	**Madison County**	**State of Alabama**
Percent Change 2010-2035	37.3%	14.5%
Number Change 2010-2035	124,708	692,144

Source: Center for Business and Economic Research, University of Alabama

Table 4-24. Historical Population Growth by Jurisdiction				
Jurisdiction	**2000 Population**	**2010 Population**	**Number Change 2000-2010**	**Percent Change 2000-2010**
Madison Co.	276,700	334,811	58,111	21.00%
Gurley	876	801	-75	-8.56%
Huntsville	158,216	180,105	21,889	13.83%
Madison	29,329	42,938	13,609	46.40%
New Hope	2,539	2,810	271	10.67%
Owens C.R.	1,124	1,521	397	35.32%
Triana	458	496	38	8.30%

Madison County's population is projected to increase by nearly 125,000 persons between 2010 and 2035. Huntsville is expected to become the largest city in Alabama in the early 2020s, but will continue to be the second-largest metro area in the state (behind Birmingham) for the foreseeable future. Contrary to trends seen in the past fifty years, growth is expected to slow in suburban areas during this time while increasing in core urban areas. This is largely due to two large generations of people-- Boomers and Millennials—choosing to live in walkable, mixed-use neighborhoods due to physical and financial reasons. More than 800 apartments will be built in Downtown Huntsville by 2020, and this influx of residents and investment will spill over to other nearby neighborhoods. After 2020, growth is expected to slow in the eastern part of the metro area and in Madison, as developable land becomes scarcer. Undeveloped areas of eastern Limestone County are not expected to grow significantly without major industrial development in the area. Huntsville will continue in its role as a leading city for the defense and aerospace industries, while diversifying into other sectors such as manufacturing and biotechnology.



Map 4-19. Land Use

4.19 Multi-Jurisdictional Risk Assessment

The risk of each jurisdiction associated with each hazard identified in this report depends upon several factors including topography, geology and density of development. **Table 4-25** depicts the relative risk assessment for each jurisdiction, and **Table 4-26** depicts the order of risk for each jurisdiction.

Table 4-25. Multi-Jurisdictional Risk Assessment

Jurisdiction	Flood	Tornado	Drought/Heat	Earthquake	Wildfire	Hurricane	Severe Thunderstorm	Dam/Levee Failure	Winter Storm	Land Subsidence	Landslide
Madison Co.	2	3	1	1	1	1	3	1	2	2	2
Huntsville	3	3	1	1	1	1	3	1	2	2	2
Madison	2	3	1	1	1	1	3	1	2	2	2
New Hope	2	3	1	1	1	1	3	1	2	2	2
Owens C. R.	3	3	1	1	1	1	3	1	2	2	2
Gurley	2	3	1	1	1	1	3	1	2	2	2
Triana	2	3	1	1	1	1	3	1	2	2	2

Degree of Risk: 0-None; 1-Slight; 2-Moderate; 3-Severe
HMPC Exercise Two

Table 4-26. Priority of Hazard Risks by Jurisdiction

Jurisdiction	Flood	Tornado	Drought/ Heat	Earthquake	Wildfire	Hurricane	Severe Thunderstorm	Dam/Levee Failure	Winter Storm	Land Subsidence	Landslide
Madison Co.	3	1	7	11	8	9	2	10	4	6	5
Huntsville	2	1	7	11	8	9	3	10	4	6	5
Madison	3	1	7	11	8	9	2	10	4	6	5
New Hope	3	1	7	11	8	9	2	10	4	6	5
Owens C. R.	2	1	7	11	8	9	3	10	4	6	5
Gurley	3	1	7	11	8	9	2	10	4	6	5
Triana	3	1	7	11	8	9	2	10	4	6	5

Rating: 1 most severe, 11 least severe
HMPC Exercise Two

4.20 Chapter Update and Review

In 2014, this chapter was updated collaboratively by the EMA, the City of Huntsville GIS department, the National Weather Service (NWS) office in Huntsville, City of Huntsville Planning, and the Madison County Tax Assessor's Office. Several maps were updated in this chapter with new information from City of Huntsville GIS. Several tables referencing historical natural hazard occurrences were updated with severe weather historical information supplied by the NWS. Tables 2-26 and 4-26 were reviewed and no changes were made.

Six tables, 4-18 through 4-23, presented a challenge during the 2014 update process similar to issues encountered in 2009. The Madison County Tax Assessor's Office provided new data for all of the tables except number 4-23. However, the Committee voted to remove Table 4-23 due to lack of updated source material. As a result of renumbering, the new Table 4-23 provides data on historical and projected population growth trends. Two additional tables, 4-21A and 4-22A, were added due to additional distinctions in quantity and value of residential properties available in the 2014 Tax Assessor's data.

The Tax Assessor's data did not include government buildings. The Committee determined government building figures to be important to the plan and voted to find alternate sources of government building data during the next five-year update process, 2016-2021.

The ongoing planning strategies of the Committee moving forward for the 2016-2021 planning cycle can be found in Chapter 7. All changes and updates were reviewed and approved by the Hazard Mitigation Planning Committee.

Chapter 5
Mitigation Strategies

5.1 Purpose of the Mitigation Strategies

The mitigation strategies presented in this chapter provide a long-range blueprint for all participating communities within Madison County to consolidate their resources and efforts to cooperatively reduce the potential losses identified in the risk assessment. This chapter presents a shared vision and comprehensive, long-range plan of goals, objectives, and available mitigation measures for all participants in the planning process. Those short-range mitigation measures supported by each community over the next five-year planning cycle are presented in **Chapter 6 - Community Action Programs**.

5.2 Steps in Developing the Strategies

At its organizational meeting in 2003, the Hazard Mitigation Planning Committee adopted a mission statement and a shared vision for disaster resistance among all communities within the county. These statements were prepared with *Committee Exercise #1 - Mission/Vision Statements*. Refer to **Section 3.1** Hazard Mitigation Planning Committee for the Mission Statement. The Committee created this Vision Statement:

Vision Statement: A Vision for Disaster Resistance

> Madison County and its municipalities envision active resistance to the threats of nature to human life and property through publicly supported mitigation measures with proven results. The communities within Madison County commit to reduce the exposure and risk of natural hazards by activating all available resources through cooperative intergovernmental and private sector initiatives and augmenting public knowledge and awareness.

At subsequent 2003 Committee meetings, each jurisdiction completed risk and capabilities assessments. *Committee Exercise #2 - Hazard Identification* was used to generally identify the hazard threats to each community and the probability or risks of future occurrences. More detailed research and analyses of the risks supplemented the committee exercise, and the Committee reviewed the results. The next exercise, *Committee Exercise #3 - Hazard Profiles,* compiled the records of past hazard events. This exercise was completed through evaluation of available data, such as local damage reports, news accounts, and Federal Emergency Management Agency (FEMA) disaster declaration records, as well as Committee members' recollections of past events. *Committee Exercise #4 - Capabilities Assessment for Hazard Mitigation* was completed by each jurisdiction to determine existing capabilities to implement mitigation measures. The Committee representatives examined the regulatory tools, staff resources, possible funding, and other capabilities of each jurisdiction.

The "Issues and Opportunities" – major problems and opportunities facing each community's mitigation efforts – were derived from the risk and capability assessments, Committee discussions, public participation, and interagency coordination activities. The statements of issues and opportunities form the basis for determining appropriate mitigation measures for each community, given their particular risks and capabilities.

Committee Exercise #5 - Alternative Mitigation Measures, was used by the Committee to select among the broad range of alternatives that might be available to each community. The Committee supplemented this exercise with its own exercise designed to define common goals, issues, and mitigation measures to be undertaken jointly by all jurisdictions. Through these exercise, goals were established for high-risk hazards and each of the six categories of mitigation activities. Mitigation program objectives define achievable targets that are consistent with goals. The Committee evaluated the alternative mitigation measures that would advance the goal and selected the preferred measures that would best address each issue. The Committee also identified the most critical hazard issues in each jurisdiction and recommended mitigation projects for potential FEMA funding.

Finally, the Committee completed the Mitigation Action Program that schedules the implementation of mitigation measures. The action program for each participating community assigns implementation responsibility, sets a timeline, identifies funding needs, and establishes the priority for implementation. (See **Chapter 6**). **Figure 5.1** illustrates the process and components that lead to the Mitigation Strategies and Mitigation Action Program.

During the 2009 Update process, the Committee did not repeat any of the exercises completed during the initial planning phase in 2003 and 2004, as described above. The Committee determined that the results of the original Committee exercises were still valid.

In 2014, the Committee sought participation from the public and coordinated its efforts with other agencies. This was accomplished through open Committee meetings, access to the plan on the EMA website www.madisoncountyema.com , public meetings, media announcements and public hearings before the plan's adoption by each of the participating jurisdictions. Sign in sheets and minutes from meetings can be found in Appendix **1**.

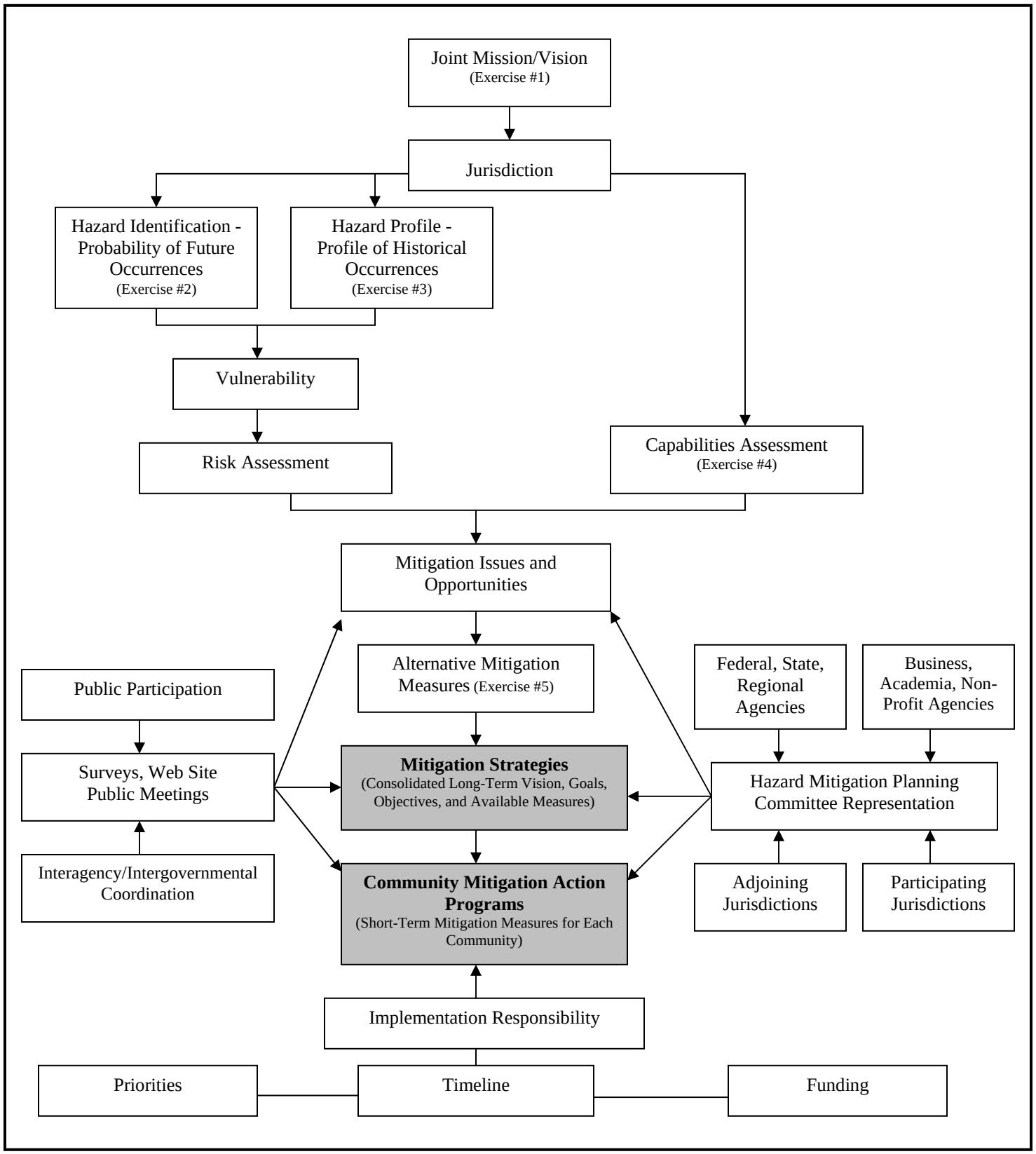


Figure 5-1. Steps in the Development of the Mitigation Strategies and Action Programs

5.3 The Planning Approach

The planning approach presented here follows the six categories of a comprehensive hazard mitigation program. These program categories have been developed by FEMA for managing a successful mitigation program and are used here as guidelines for identifying and selecting among alternative mitigation measures.

1. **Prevention.** Adopting and administering ordinances, regulations, and programs that manage the development of land and buildings to minimize risks of loss due to natural hazards.
2. **Property Protection.** Protecting structures and their occupants and contents from the damaging effects of natural hazard occurrences, including retrofitting existing structures to increase their resistance to damage and exposure of occupants to harm; relocating vulnerable structures and occupants from hazard locations; and conversion of developed land to permanent open space through acquisition and demolition of existing structures.
3. **Public Education and Outreach.** Educating and informing the public about the risks of hazards and the techniques available to reduce threats to life and property.
4. **Natural Resources Protection.** Preserving and restoring the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.
5. **Emergency Services.** Responding to and recovering from a natural hazard disaster.
6. **Structural Projects.** Engineering structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of a hazard on a community.

5.4 Issues and Opportunities

The mitigation measures of this plan respond to the issues and opportunities listed in this section. These statements summarize the principal hazard issues and mitigation opportunities and are based upon the findings of the risk assessment and capability assessment, participation by members of the Committee at meetings and through planning exercises, the results of the public survey, public participation at community meetings, and coordination among interested agencies. The 2014 HMPC determined these issues and opportunities were still valid.

Prevention

- Madison County does not have a planning department, and by State law cannot exercise planning and zoning controls in unincorporated areas without a special act.

- The City of Madison and the City of Huntsville maintain comprehensive plans and have fully staffed planning departments.
- The County expects a significant growth rate of 26.4% through the years 2000-2025.
- The City of Huntsville maintains a county-wide GIS; the City of Madison maintains GIS for its jurisdiction.
- A few areas depicted on the FEMA National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM) are designated "approximate" zones (A Zones) where no detailed studies and flood elevation data exist.
    - Between 2009 and 2014 detailed flood studies were conducted in several of the A Zones.

Property Protection

- Many older homes have been constructed before the establishment of the FEMA NFIP, and consequently do not meet the existing flood protection standards required by local flood hazard prevention ordinances.
- Standard homeowner insurance policies do not cover flood, sinkhole, and earthquake damages.

Public Education and Outreach

- Real estate agents, lenders, insurance providers and property owners have a continuing need for FIRM information.
- The public is generally unaware of risks associated with hazards and the mitigation measures available for property protection.
- Real estate agents and lending institutions often neglect to, or inaccurately, disclose whether property and/or structures are in the 100 year flood plain.
- Local libraries are available to serve as repositories for information on hazards and methods of protection.
- Technical assistance materials are available through FEMA to assist property owners on alternative property protection measures.
- School environmental education programs provide excellent opportunities for public education on hazard mitigation alternatives.
- Local cable offers public service access.
- A number of public outreach opportunities and resources are available.
- Public information activities are among the least expensive mitigation measures but often the most effective.

Natural Resources Protection

- The Land Trust of North Alabama's mission is to preserve and protect land and its legacies, including wildlife habitats, farms,

historic sites, waterways, and mountains for conservation, public recreation, and environmental education to enhance quality of life in North Alabama. The Land Trust manages and maintains over 6500 acres in the top ten counties of North Alabama;
    - 5200 acres in Madison County with
    - 200 acres being in the City of Madison and
    - 3900 acres being in the City of Huntsville.
- Stream and river banks and riparian zones help manage floods and filter runoff.

Natural Resources Problems

- Accidental or intentional dumping of household and commercial waste, such as household garbage, tires, shopping carts, and landscape debris, can obstruct flows.
- Storm-damaged trees - resulting from hurricanes, tornadoes, severe thunderstorms, wind storms, winter freezes, and snow storms - can clog streets and block access routes during periods of disaster response, obstruct the natural discharge of flood waters, disrupt utility services, increase debris removal, damage property, and increase disaster recovery costs.

Emergency Services

- Modern technology has created new opportunities for monitoring hazard events as they happen or, in some cases, forecast events in advance. Establishing a gage network to cover high-risk flood areas allows local emergency management officials to share direct access to gage readings with the NWS and USGS. A comprehensive disaster warning system can tie a variety of gages into a single automated network to monitor icy bridges and highways, tornadoes, winds, heavy precipitation, hazardous materials spills into water ways, or hazardous air emissions. Remote cameras can enhance the monitoring capabilities of the system.
- Huntsville ranks in the top 3 U.S. cities (population > 100,000) of tornado occurrences, according to published research. The National Weather Service (NWS) WSR-88D Doppler Radar is capable of detecting rotation within a thunderstorm. However, due to various scientific limitations, the 88D radar cannot always determine if this rotation will result in a tornado touchdown. Due to this uncertainty, the general public must avoid demonstrating/accepting a false sense of security and be prepared to take necessary action when tornado warnings are issued by the NWS. In addition, measures need to be taken for quick action in the event a tornado occurs with little or no advanced warning.
- Weather radios in homes and businesses provide inexpensive means for advance warning.

- Between 2009 and 2014, the City of Huntsville Traffic Engineering Department installed four Pan/Tilt/Zoom cameras for hazard and traffic monitoring at some of the busiest intersections in the City of Huntsville. Those intersections include:
    - Holmes Ave between John Wright Drive and Sparkman Drive on the UAH campus
    - Airport Road at Balmoral Drive
    - California Street at Governors Drive
    - Franklin Street at Governors Drive

Structural Projects

- Regular maintenance of streams and drainage ways is critical to their effective operation for storm water discharge.

5.5 Existing Hazard Mitigation Activities

This plan expands upon and improves existing local mitigation activities, as described in this section.

NFIP Participation

To date, Madison County and its municipalities have been involved in the (NFIP) as shown in **Table 5-1**. All communities with areas of special flood hazards identified are regular members of the NFIP.

Table 5-1. National Flood Insurance Program (NFIP) Participants

Community Name	Date of Entry to NFIP
Madison County	07/02/1981
City of Huntsville	11/01/1979
City of Madison	12/15/1978
Town of New Hope	11/24/1978
Town of Gurley	03/01/1995
City of Owens Cross Roads	03/02/1981
Town of Triana	09/29/1986

NFIP Compliance Actions

The City of Huntsville enforces its City Zoning Ordinance, Article 62, Flood Hazard District Regulations. This ordinance is in accordance with CFR 44 federal regulations governing NFIP compliance and can be viewed at the City of Huntsville's Code of Ordinances website:
http://www.municode.com/resources/gateway.asp?sid=1&pid=12962

Madison County enforces the Madison County Flood Damage Prevention Ordinance for all unincorporated areas in Madison County. This ordinance is in accordance with CFR 44 federal regulations governing NFIP compliance.

This ordinance is available to view at their website: http://madisoncountyal.gov/home/showdocument?id=1001

The City of Madison enforces its City Flood Ordinance, 2010-324, in accordance with CFR 44 federal regulations governing NFIP compliance. City of Madison ordinances are currently not available to view online.

The towns of Triana, Gurley, and Owens Cross Roads and the City of New Hope each have similar ordinances consistently maintained and enforced based on CFR 44 federal regulations. Their ordinances are not available to view online.

FEMA Community Rating System Program (CRS)

The City of Huntsville entered the CRS Program on 10/1/91. The City obtained a Class 8 rating on 10/1/96 and improved to a Class 7 rating on 5/1/03.

Hazard Mitigation Grant Program (HMGP)

The City of Huntsville implemented the following hazard mitigation projects through the HMGP:

- Aldridge Creek, Phase I Floodplain Acquisition Project. Removed 33 single family dwellings, within the City of Huntsville, from the floodway of Aldridge Creek. The City of Huntsville entered into an Unmet Needs 1261 Project Agreement with the State of Alabama, Emergency Management Agency March 22, 2001. This project was funded by a FEMA grant and City of Huntsville matched funds. The last home was purchased 10/15/01.

    - Since the completion of the grant-funded purchase and demolition of the family dwellings in 2001, City of Huntsville Engineering has completed other mitigation projects related to Aldridge Creek as follows:

      The City of Huntsville completed the Aldridge Creek Channelization Improvements Project in 2007. This project was planned after the June 28, 1999 flood event to reduce flooding potential along Aldridge Creek. Following the purchase of houses in the floodway using FEMA and City funds, an overflow "bench" was notched into the channel along various reaches of the creek (from north to south): east bank from Four Mile Post Rd. to Mira Vista Dr., east & west banks just upstream and east bank just downstream of

the Lily Flagg Rd. crossing (concrete paved), west bank from Esslinger Rd. to Willow Cove Cir., east (some retaining wall) and west banks just south of Welch Cir. to just south of Torino Dr., and from the previous reach on the east bank (some retaining wall) to just north of Savannah Ct. The bench was generally cut about1.5-ft. above the channel at approximately a 2% layback, and then a bank was cut at around a 3 or 4 to 1 slope to existing grade. The bench varied in width with the widest cut around 165-ft. Additionally, bridge improvements/widening were done at Sherwood Dr., Lily Flagg Rd., and Green Mountain Rd., and a berm created around a small subdivision (Savannah Ct. and Old Albany Cir.) in the northeast quadrant of the Mountain Gap Rd. crossing

- Aldridge Creek, Phase II Floodplain Acquisition Project. Removed one single family dwelling, within the City of Huntsville, from the floodway of Aldridge Creek. The City of Huntsville entered into HMGP Project 1362-0003 Agreement with the State of Alabama, Emergency Management Agency June 27, 2002. The home was purchased 7/19/02.

- Huntsville Slope Stabilization Project. This project responded to the 1998 Monte Santo landslide. Permanent corrective measures to stabilize and reclaim the areas were applied, including land reclamation and revegetation measures. During the 2009 update process, City of Huntsville Planning confirmed this project has been completed.

During the 2009 update process, these two projects were added to the plan:

- HMGP 1549-003 Huntsville Spring Branch acquisition of land and structure at 1900 South Memorial Parkway (approximately 2.1 acres), demolition of structure and site reclamation for open space. Completed: March 30, 2006.

- HMGP 1605-0217 Dallas Branch and Pinhook Creek Flood Mitigation Project – Phase 1 (Design). Project reach on Pinhook Creek from twin Railroad bridge north on Holmes, north to the confluence with Dallas Branch, and on Dallas Branch generally to the east-northeast to Coleman Street. Project includes acquisition of several structures, channel expansion, a detention basin, expansion and replacement of bridges, demolition of some bridges and new bridge construction. Phase 1 design scheduled for completion December 31, 2009. Upon AEMA and FEMA review and approval of Phase 1 submittal, Phase II

grant construction funds may be awarded with construction starting in 2010.

Flood Mitigation Assistance Program (FMA)

The FMA program partially funded the preparation of the City of Huntsville Flood Mitigation Plan, which was completed in June 2001. That plan remains in effect and the 2014 HMPC concurred.

Community Storm Shelter Program

After the April 27, 2011 disaster, the following jurisdictions built community storm shelters for citizens in Madison County:

1. The City of New Hope built a community storm shelter at 5507 Main Drive, New Hope, AL 35760.

2. The unincorporated community of Harvest added a community storm shelter at the Harvest Youth Club at 230 Lockhart Rd, Harvest, AL 35749.

3. In 2010, the state passed a law requiring all new school construction to include a tornado shelter following a tornado that struck Enterprise High School in March 2007, killing eight students and severely damaging several buildings.

   As a result of the law, the Alabama Building Commission adopted International Code Council 500 to set standards for the construction of safe rooms in conjunction with schools.

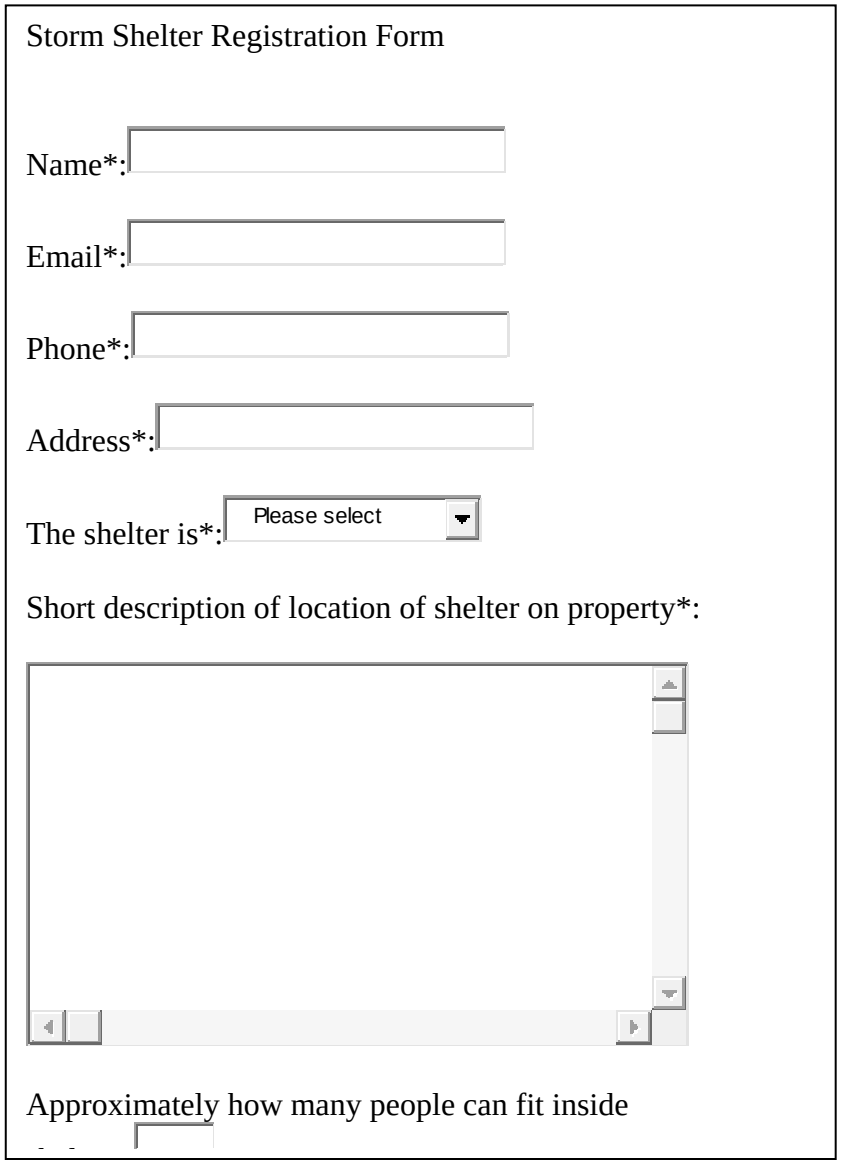
   Madison County schools with storm shelters may or may not open their shelters to the general public. There is no requirement for them to do so and the choice is up to school administrations.

Individual Safe Room Program

The Huntsville-Madison EMA actively participated in the State Storm Shelter Program. During FY2001 and FY2003 the County installed five safe rooms.

After the April 27, 2011 disaster, the Huntsville-Madison County EMA received Hazard Mitigation Grant Program funds to install individual safe rooms in homes in Madison County. Thousands of people signed up for the grant program and in the end, 110 safe rooms were installed in people's homes between the years 2012 and 2014 through the grant program.

Additionally, the City of Huntsville, City of Madison, and Madison County Commission created a “Register Your Safe Room” program for individuals to fill out basic information about private safe rooms online, for example (varies by jurisdiction):


Storm Shelter Registration Form

Name*:

Email*:

Phone*:

Address*:

The shelter is*: Please select

Short description of location of shelter on property*:

Approximately how many people can fit inside

This information is gathered by Huntsville Fire and Rescue, Madison Fire and Rescue, and the Madison County Volunteer Fire Association. The data populates maps that can then be overlaid by tornado paths.

Underground safe rooms, particularly those under the floor of a garage, became popular in Madison County between 2009 and 2014. First responders were concerned survivors may be trapped underground in their safe room by debris. This program lets first responders know the location of

safe rooms, and potential survivors, within the path of tornado damage. This is a very popular new program with a large public response. To date, over 1100 safe rooms were registered countywide.

Shelter Madison County Website

In 2014, the Huntsville-Madison County Emergency Management Agency partnered with the United Way of Madison County to implement a new "Shelter Madison County" program. This partnership created a Shelter Madison County website which lists all community storm shelters in Madison County. If facilities are not FEMA 361 compliant, these are listed as Areas of Refuge on the site, rather than shelters. The website contains an interactive map and detailed information about each shelter location including: photo, address, status of open or closed, accessibility for people with disabilities, and whether or not pets are allowed at the facility.

U.S. Department of Interior

U.S. Department of Interior, Office of Surface Mining Reclamation and Enforcement. The City of Huntsville obtained technical advice from experts in coal mine landslides.

State of Alabama, Department of Industrial Relations

Abandoned Mined Land Program. The City of Huntsville obtained two grants for emergency landslide mitigation: $350,000 in 1998 and $65,000 in 1999.

Existing Capabilities

In response to Committee Exercise #4, Capability Assessment for Mitigation Plan Implementation, jurisdictions noted regulatory tools, staff/personnel resources, and available funding sources. The results are maintained in the EMA office, and a summary of regulatory tools is presented in **Table 5-2**. The 2014 HMPC recognized and utilized the tools as they had not changed.

Table 5-2. Planning and Regulatory Tools by Jurisdiction

Jurisdiction	Comprehensive Plan	Capital Improvements Plan	Zoning Ordinance	Building Codes
Madison County			X	X
City of Madison	X	X	X	X
Huntsville	X	X	X	X
Triana				X
New Hope	X		X	X
Owens Crossroads				X
Gurley	X	X	X	X

Notes:
1. A *Comprehensive Plan* is a current and active plan for managing existing and future growth and development throughout the jurisdiction.
2. A *Capital Improvement Plan* is a five- to ten-year plan for capital facilities improvements tied directly to the comprehensive plan.

5.7 Comprehensive Mitigation Strategies

This section presents the long-term strategies for mitigation of natural hazards. Each locality within Madison County derives its five-year mitigation action program (see **Chapter 6 - Community Mitigation Action Programs**) from the program goals, objectives and available long-term mitigation measures presented here.

1 Goal for Prevention. Manage the development of land and buildings to minimize risks of loss due to natural hazards.

1.1 Comprehensive Plans. Establish an active comprehensive planning program that guides future development and duly considers the vulnerability of areas exposed to natural hazards.

Mitigation Measures:

1.1.1 Maintain up-to-date comprehensive plans for all municipalities.

1.1.2 Integrate the findings and recommendations of this plan into comprehensive plan amendments for the cities of Huntsville and Madison. Update the comprehensive plan, zoning ordinance, and subdivision regulations for the City of New Hope.

1.1.3 Review and amend existing planning documents to be certain the vulnerability and environmental suitability of lands for future development are clearly addressed; local plans should address the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.

1.1.4 Continue to implement the action items included in the adopted City of Huntsville Flood Mitigation Plan, which are incorporated into this Plan in their entirety here by reference.

1.2 Geographic Information Systems (GIS). Maintain a comprehensive database of hazards locations, socio-economic data, infrastructure, and critical facilities inventories.

During the 2009 update process, several GIS mitigation measures identified in 2003/2006 have been recognized by the Committee as completed:

- City of Madison established a GIS to collect a comprehensive database of critical infrastructure and all geographical features necessary for decision making within the city along with assessment data for disaster events.
- City of Huntsville has finished a mapping program of geological features including colluvium, landslides, sinkholes and other natural hazards on Huntsville mountainsides, measure 1.2.3 in the original plan
- City of Huntsville has completed a city-wide sinkhole map, measure 1.2.5 in the original plan.

The City of Madison added new measures: 1.2.4, 1.2.5, and 1.2.6, described below.

During the 2014 update process, the Town of Gurley expressed intent to gather GIS data in a planning grant project to map out all of Town of Gurley drainage. New mitigation measures 1.2.8 and 1.2.9 were added, accordingly.

Mitigation Measures:

1.2.1 Maintain risk assessment data in GIS, including flood zones, tornado tracks, landslide hazards,

sinkhole threat areas, disaster events, and a comprehensive inventory of critical facilities within all jurisdictions.

1.2.2 Integrate FEMA HAZUS-MH applications for hazard loss estimations within local GIS programs. Maintain up-to-date data within GIS to apply the full loss estimation capabilities of HAZUS.

1.2.3 Update landslide hazard maps. Identify those areas of greatest risk for new landslides or reactivation of previous landslides within the City of Huntsville. Develop mitigation program for sites at highest risk.

1.2.4 City of Madison- obtain GPS data and attribute data of all critical infrastructure within the City

1.2.5 City of Madison- build and maintain risk assessment data including flood hazard zones, tornado tracks and other hazard events specific to City of Madison

1.2.6 City of Madison- integrate storm water management applications into GIS

1.2.7 City of Huntsville- Create accurate field-based measurements sinkhole map specific to COH.

1.2.8 Town of Gurley- integrate storm water management applications into GIS

1.2.9 Town of Gurley- obtain GIS data and attribute data of all critical infrastructure within the City

1.3 Detailed Plans and Targeted Studies. Conduct special studies, as needed, to identify hazard risks and mitigation measures.

During the 2009 update process, the Committee recognized that measure 1.3.1 had been partially completed. Through their Map Modernization program, FEMA completed Limestone County including some portions of the City of Huntsville in that county. Through their Map Maintenance program measure 1.3.1 will be completed in Madison Co., including local municipalities, during the next five years. The original measure 1.3.2 is now the new measure 1.3.1 and so on for the subsequent measures.

Mitigation Measures:

1.3.1 Seek a county-wide update of all FIRMs (Flood Insurance Rate Maps) in digital format, with an emphasis on detailed studies of developed and developing areas with elevations provided and floodways delineated.

1.3.2 Prepare a Countywide HAZUS-MH risk assessment of earthquakes, floods, and hurricanes.

1.3.3 Monitor known landslides that have exhibited movement within the last 20 years.

During the 2014 update process, the Town of Gurley recognized a targeted study needed to begin a flood mitigation project for the municipality. The study would be Phase One of the overall project.

1.3.4 Comprehensive drainage study for the Town of Gurley specifically to respond to clogging and minor flooding issues. Flooding may affect these streets in Gurley: Gurley Pike, Gate Street, Wood Street, Capers Drive, Rosedown Avenue, Chain Road, Malibu Road, Highway 72, Railroad Street, and Rockcut Road.

During the 2014 update process, the City of Madison notified the Committee of a goal for the study of several drainage basins and associated hazard mitigation actions.

1.3.5 Study several drainage basins in the City of Madison and modify the drainage structures within each drainage basin to reduce flooding risk.

1.4 Zoning. Establish effective zoning controls, where applicable, to vulnerable land areas to discourage environmentally incompatible land use and development.

Mitigation Measures:

1.4.1 Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous

materials, restrictive development of flood ways, among others.

1.5 Floodplain Management Regulations. Effectively administer and enforce local floodplain management regulations.

During the 2014 update process, the City of Huntsville notified the Committee that mitigation measure 1.5.1 was no longer necessary for the plan. All subsequent measure numbers were changed, accordingly. Additionally, the City of Madison added a new flood mitigation measure, now 1.5.4.

Mitigation Measures:

1.5.1 Maintain a library of technical assistance and guidance materials to support the local floodplain manager.

1.5.2 Obtain membership for local floodplain managers in the Association of State Floodplain Managers.

1.5.3 Evaluate the effectiveness of higher regulatory standards, such as additional building elevation requirements and limitation of fill within floodplains, to be included in local floodplain management regulations.

1.5.4 Propose that land owners in the City of Madison define by plat floodways and major drainage ways as Public Utility and Drainage Easements and dedicate said land to the City of Madison.

1.6 Building and Technical Codes. Review local codes for effectiveness of standards to protect buildings and infrastructure from hazard damages.

Mitigation Measures:

1.6.1 Evaluate building code standards for roof construction to assure protection against wind damage from hurricanes, tornadoes, and windstorms; require installation of "hurricane clips," where feasible.

1.7 Community Shelter and Safe Room Requirements. Ensure the protection of communities from tornadoes, hurricanes, and windstorms.

During the 2011 update process, due to the April 27, 2011 tornado disaster in Madison County, the Madison County Natural Hazard Mitigation Planning Committee determined to re-introduce both individual safe rooms and community shelters mitigation measures via a limited amendment to the plan. The new measures are 1.7.2 and 1.7.3.

Mitigation Measures:

1.7.1 Require the construction of safe rooms within new public buildings, libraries, community centers, and other public buildings, where feasible.

1.7.2 Organizations or agencies may build community shelters. EMA will advise and review federal assistance processes with eligible organizations or agencies.

1.7.3 Individual citizens are encouraged to install in-home safe rooms in their homes. The EMA will advise and assist individuals seeking federal assistance.

1.8 CRS Program. Increase participation of NFIP member communities in the CRS Program.

Mitigation Measures:

1.8.1 Apply for and maintain membership in the CRS Program.

2 Property Protection Goal. Protect structures and their occupants and contents from the damaging effects of natural hazards.

2.1 Building Retrofits. Encourage retrofitting of homes not compliant with flood plain regulations to safeguard against damages.

Mitigation Measures:

2.1.1 Provide technical assistance to owners to advise on available retrofits to protect against flood damage.

2.1.2 Seek funding sources, such as Community Development Block Grant funds, to assist low income home owners with building retrofits to protect against flood damage.

2.2 Insurance. Maintain insurance riders for special coverage for flood and sinkhole damages.

Mitigation Measures:

2.2.1 Promote the purchase of insurance coverage for flooding, earthquake, and sinkhole damages in high-risk areas by property owners and renters.

2.3 Acquisition/Relocation. Acquire or relocate flood prone buildings and establish permanent open space within high-risk floodplain locations.

Mitigation Measures:

2.3.1 Acquire or relocate high-risk, flood prone buildings and convert those properties to permanent open space with covenants that prevent future development. The emphasis should be buildings located within floodways, substantially damaged buildings, repetitive flood insurance loss properties, pre-FIRM buildings (constructed prior to the enactment of local floodplain regulations), and critical facilities. Where feasible, acquisition or relocation is preferred over elevating or flood proofing structures.

2.3.2 Acquire all floodway properties within the City of Huntsville and/or remove all structures from the floodway.

During the 2006 update and revision, the Town of Owens Cross Roads requested a mitigation measure added to the plan specifically for their Town Hall, which was located in a floodplain:

2.3.3 Relocate the Town of Owens Cross Roads Town Hall out of the floodplain

During the 2009 update process, the Town of Owens Cross Roads reported to the Committee that the new location was

complete and full relocation would take place before the end of 2009. Mitigation measure 2.3.3 is not included in Chapter 6- Community Mitigation Action Programs- of this updated version of the plan, as it has been completed.

2.4 Building Elevation. Elevate buildings in hazardous flood areas to safeguard against damages.

Mitigation Measures:

2.4.1 Elevate buildings, where feasible, to reduce potential flood damages. The emphasis should be on certain buildings where acquisition or relocation is not feasible and on buildings not compliant with floodplain regulations. Elevating structures may be an alternative to acquisition/relocation and is preferred over flood proofing, where most feasible.

2.5 Flood Proofing. Encourage flood proofing of buildings in hazardous flood areas to safeguard against damages.

Mitigation Measures:

2.5.1 Flood proof buildings, where feasible, to reduce potential flood damages. The emphasis should be on non-residential buildings constructed before the enactment of flood plain regulations (pre-FIRM buildings). Flood proofing should only be considered if acquisition/relocation or building elevation is not feasible.

2.6 Power Generation. Install generators at critical facilities.

Mitigation Measures:

2.6.1 Installation of emergency power generation at critical facilities, as outlined in a separate critical facilities document maintained by EMA.

3 Public Education and Outreach Goal. Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.

3.1 Map Information. Increase public access to Flood Insurance Rate Map (FIRM) information.

Mitigation Measures:

3.1.1 Publicize the availability of FIRM (Flood Insurance Rate Map) information to real estate agents, builders, developers, and homeowners through local trade publications and newspaper announcements.

3.2 Outreach Projects. Conduct regular public events to inform the public of hazards and mitigation measures.

Mitigation Measures:

3.2.1 Establish an annual Severe Weather Awareness Day in conjunction with the NWS.

3.2.2 Identify other environmental awareness events to integrate public information on hazard exposure and protection measures.

3.2.3 Provide speakers to educate public on certain hazard topics upon request by organizations, civic clubs, etc.

3.3 Real Estate Disclosure. Encourage real estate agents to disclose floodplain location for property listings.

During the 2009 update process, the Committee discussed this mitigation measure. City of Huntsville Planning noted that the local level has attempted to "require" real estate agents to discuss floodplains in relationship to properties, but this is not possible at the local level, requirements must be in State Code. MLS service, since 2003, has added some floodplain searchable information. As such, mitigation measure 3.3.1 has been deleted.

3.4 Library. Use local library resources to educate the public on hazard risks and mitigation alternatives.

Mitigation Measures:

3.4.1 Obtain free publications from FEMA, NWS, USGS, and other federal and state agencies and deposit these materials with local libraries.

3.4.2 Maintain local library repositories with the latest available publications.

3.5 Environmental Education. Use school resources for public education on hazards and mitigation measures.

Mitigation Measures:

3.5.1 Distribute hazard mitigation brochures to area schools for distribution to students.

4 Natural Resources Protection Goal. Preserve and restore the beneficial functions of the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.

4.1 Open Space Easements and Acquisitions. Preserve significant natural resources and highly vulnerable areas in permanent open space.

Mitigation Measures:

4.1.1 Acquire open space, purchase easements, and accept donations of lands within environmentally significant and vulnerable locations through the Land Trust of Huntsville and North Alabama and other agencies.

4.2 River/Stream Corridor Restoration and Protection. Restore and protect river and stream corridors within urban areas.

Mitigation Measures:

4.2.1 Enforce dumping regulations.

4.2.2 Enforce erosion and sedimentation control regulations.

4.3 Urban Forestry Programs. Maintain a healthy forest that can help mitigate the damaging impacts of flooding, erosion, landslides, and wild fires within urban areas.

Mitigation Measures:

4.3.1 Seek technical assistance through the Alabama Cooperative Extension System with Best Management Practices (BMP) for channel and drainage system maintenance.

5 Emergency Services Goal. Improve the efficiency, timing, and effectiveness of response and recovery efforts for natural hazard disasters.

5.1 Disaster Warning. Improve public warning systems.
Mitigation Measures:

5.1.1 Establish a flood warning system at strategic locations in the county to cover vulnerable flood locations. Sensors should provide real-time access to stream flow, stream stage, and precipitation data, at the minimum. The system should link data into GIS with the ability to use measured and forecasted rainfall to predict potential flood levels and create real-time maps of flooded areas.

5.1.2 Enhance the flood warning network into an All-Hazards Detection Network, including capabilities to monitor icy bridges and highways, water quality and hazardous materials spills into water ways, and air quality or hazardous air emissions. Include camera devices at select locations.

During the 2009 update process, the Madison County EMA responded to mitigation measure 5.1.3 by documenting the number of outdoor warning sirens installed since 2004 in Madison County, excluding sirens installed on Redstone Arsenal. Since 2004, six new sirens have been installed as outlined in the comprehensive warning study. Installation of more sirens continues to be a mitigation goal, so measure 5.1.3 will remain in the plan unchanged.

The 2014 HMPC in conjunction with the Madison County EMA added a mitigation measure to upgrade the activation system for the outdoor warning sirens; this is a new measure number 5.1.4.

5.1.3 Install additional outdoor warning sirens as outlined in the comprehensive warning study published under separate cover by the Huntsville-Madison County Emergency Management Board.

5.1.4 Upgrade the outdoor warning siren system's activation system to provide enhanced warning capability.

During the 2009 update process, the University of Alabama in Huntsville (UAHuntsville) participated as a member of the Committee and requested inclusion of their current and future mitigation efforts in the plan. Both measures pertain to disaster warning services as follows:

5.1.5 Upgrade and/or install mass notification/alert systems within UAHuntsville buildings to include voice alert capability. These upgrades or additions will allow building occupants to receive specific life safety and shelter instructions in the event that a tornado or other severe weather poses an imminent threat to the university. Outdoor warning sirens do not adequately penetrate sound attenuating structures such as buildings, and cannot communicate the nature of disaster conditions or convey instructional life safety information. The primary object of this measure is to provide an improved disaster alert system capable of alerting a very high percentage of campus population inside buildings of impending or existing natural disaster, and conveying the exact nature of the threat.

5.1.6 Install 'giant voice' alert systems in three strategic locations on the UAHuntsville campus. These systems would allow persons outdoors on campus to receive specific life safety and shelter instructions in the event of impending or existing natural disaster. These systems would supplement the existing outdoor warning sirens on campus, which cannot communicate the nature of disaster conditions or convey instructional life safety information. Additionally, one of the three systems would extend coverage to the University Place Elementary School and one would extend coverage to the daycare facility on campus.

5.2 Weather Radios. Improve public access to weather alerts.

During the 2014 update process, the National Weather Service of Huntsville informed the Committee that mitigation measure 5.2.1 about the Alabama Skywarn Foundation was out of date and should be removed. The original measure 5.2.2 is now 5.2.1.

Mitigation Measures:

5.2.1 Promote the use of weather radios in households, businesses, and schools.

6 Structural Projects Goal. Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards where feasible, cost effective, and environmentally suitable.

6.1 Drainage System Maintenance. Maintain drainage systems and streams and river channels for flood reduction.

During the 2014 update process, the City of Madison notified the Committee of many new drainage system maintenance projects to be added to this section of the plan.

Mitigation Measures:

6.1.1 Prepare and implement standard operating procedures for drainage system and channel maintenance.

6.1.2 City of Madison: Channel improvements and bench cut to improve hydraulic capacity at un-named tributary to Indian Creek at Highland Drive & Windstone area.

6.1.3 City of Madison: Channel improvements and four road crossing structural improvements and detention pond at un-named tributary to Betts Spring Branch at Old Madison Pike to I-565.

6.1.4 City of Madison: Channel improvements and road crossing structural improvements to un-named tributary to Indian Creek at Rainbow Landing Subdivision area.

6.2 Floodwater Conveyance Improvements. Construct cost effective improvements to control and improve the conveyance of floodwaters.

During the 2009 update process, the Town of Gurley approached the Committee to add a broad drainage improvement for the municipality. This has been added both as mitigation measure 1.3.4 and as mitigation measure 6.2.10, below.

During the 2014 update process, the City of Madison approached the Committee to add two new projects to this section of the plan, measures 6.2.12 and 6.2.13.

Mitigation Measures:

6.2.1 Implement drainage improvement project within the City of New Hope.

6.2.2 Evaluate, design, and implement cost effective flood control (structural) projects, including, but not limited to, channel expansions, bridge expansions, pipes and culverts, detention basins, and bridge demolitions within the City of Huntsville.

6.2.3 Aldridge Creek and Four Mile Post Road Flood Control Project (Bridge Expansion and Channel Improvements): Engineering design and constructions project to modify and expand the existing bridge opening in order to increase the hydraulic capacity of the existing bridge structure. Improvements will include channel modifications as necessary to construct smooth hydraulic transitions upstream and downstream of the bridge. The improvements are necessary to prevent overtopping of the existing roadway causing extensive flooding and damages of homes in the nearby subdivision.

6.2.4 Broglan Branch and Clinton Avenue flood control project (bridge expansion and channel improvements): engineering design and construction project to replace the existing undersized bridge structure in order to maximize the hydraulic capacity of the bridge. Improvements will include channel modifications as necessary to construct smooth hydraulic transitions upstream and downstream of the bridge. The improvements are necessary to prevent overtopping of the bridge and creating dangerous flood elevations and velocities across the roadway and in adjacent commercial and residential areas. The flooded roadway also interrupts emergency service through this major thoroughfare.

6.2.5 Broglan Branch flood control project bridge expansion and channel improvements): engineering

design and construction project to increase the capacity of Broglan Branch between Holmes Avenue and Clubview Drive. Project includes channel improvements along the project limits and bridge expansion at University Drive and possible acquisition of property and homes (see mitigation measure # 2.3.2) to perform the necessary improvements. The improvements are necessary to lower dangerous flood elevations and velocities experienced by public housing residents and residential areas along the watercourse.

6.2.6 Peavy Creek flood control project bridge expansion and channel improvements): engineering study, design, and construction project to decrease the peak flood discharges along Peavy Creek. Project will include acquisition of property (see mitigation measure # 2.3.2), construction of a detention/retention facility, channel improvements and replacement of existing undersized bridge structure at Little Cove Road. The improvements are necessary to reduce flood heights and velocities along Peavy Creek to minimize the risk of flooding in existing homes along Peavy Creek. Existing homes were constructed using BFEs from an older FIRM that is scheduled to be updated with much higher BFEs.

6.2.7 Governors Drive/U.S. Hwy 431 drainage improvements: engineering design and construction project to increase capacity of the existing undersized drainage facilities that drain Governors Drive and convey flood waters from Governors Drive to Fagan Creek. The improvements are necessary to prevent flooding of Governors Drive. The flooding causes interruption of access by emergency vehicles due to the significant flooding of the roadway. Governors Drive is a major street (state highway) and a major thoroughfare for commercial and emergency vehicles. Huntsville's major hospital facility is located on Governors Drive.

6.2.8 Pinhook Creek Flood Mitigation Project: flood control project in conjunction with the U.S. Army Corps of Engineers; on Pinhook Creek from

Memorial Parkway north to twin RR bridge immediately north of Holmes Avenue; and in conjunction with a previous FEMA hazard mitigation grant. Project is currently in design phase.

6.2.9 Dallas Branch and Pinhook Creek Flood Mitigation Project: on Pinhook Creek, from twin RR bridge immediately north of Holmes Avenue, north to confluence of Dallas Branch, and Dallas Branch, upstream to Coleman Street. The city is actively pursuing projects with both the Corps of Engineers and Alabama EMA/FEMA.

6.2.10 Implement drainage improvement plan for the Town of Gurley.

6.2.11 Flood Conveyance Improvements; evaluate, design, and implement cost effective flood control (structural) projects, including, but not limited to, channel expansions, bridge expansions, pipes and culverts, detention basins, and bridge demolitions within Madison County.

6.2.12 Bradford Creek-bridge replacements on Mill Road and Palmer Road, channel improvements at railroad crossing adjacent to Palmer Road in the City of Madison.

6.2.13 Bradford Creek- Greenway Extension Phase II from Palmer Road to I-565

7 Public Health Mitigation Goal. Mitigation measures to alleviate potential vector borne diseases via mosquitos.

During the 2014 update process, the Madison County Health Department made some new information about vector control clear to the committee which altered the language of Mitigation Measure 7.1.1.

The Clean Water Act of 2011 states any jurisdiction that treats 6,400 acres in a calendar year is required to be permitted by the Alabama Department of Environmental Management. If pesticide application is necessary during a declared pest emergency and the jurisdiction does not have a permit, they may commence with

application due to the emergency. They must submit a "Notice of Intent" to ADEM within 30 days following application.

7.1.1 Madison County Health Department will conduct vector control measures for mosquitos within the City of Huntsville to include larviciding, street level spraying, etc. following tropical systems, heavy rains or flooding, to augment or supplement normal vector control operations in accordance with the Clean Water Act of 2011. Vector Control would provide services outside its jurisdiction with the consent of the Mayor and City Council and/or declaration from the Governor.

5.8 Chapter Update and Review

This Chapter was updated collaboratively by all member agencies of the Hazard Mitigation Planning Committee. Each member agency reviewed Chapter 5 and all Comprehensive Mitigation Measures listed in this chapter. Comments and discussion via email and telephone took place between the Chair and Vice Chair of the Committee and every member of the Committee, regarding changes and updates to various measures.

The first five-year update, 2009, included new measures added by The University of Alabama in Huntsville, The City of Madison, and the Madison County Health Department to the 2009 updated plan. The City of Huntsville Planning and Engineering departments commented on progress for several measures or replaced completed measures with new measures. The EMA changed the wording on the community and individual shelter mitigation section and deleted two related measures.

The second five-year update, 2014, included new drainage system measures added by The City of Madison. The City of Huntsville Planning and Engineering departments commented on progress for several measures or replaced completed measures with new measures. The EMA changed wording on many measures throughout the chapter to reflect changes presented by Committee members; especially the Town of Gurley, the NWS and the Health Department. The EMA also added detailed narrative sections on Community Storm Shelters, Individual Safe Rooms and the “Register Your Safe Room” program, all of which were implemented during the five year maintenance period between 2009 and 2014. During 2015 there were no mitigation strategy changes.

Edits made to measures in this chapter were carried over to Chapter 6 where the summary of measures was edited to match the new measure numbers and descriptions in Chapter 5. All changes were reviewed and approved by the Committee.

Chapter 6
Community Mitigation Action Programs

6.1 Purpose of the Community Mitigation Action Programs

This chapter presents the five-year mitigation action programs for each participating community and a listing of proposed priority projects to be considered for funding over the five-year planning cycle by FEMA grant programs. The mitigation action program of each jurisdiction assigns priority for implementation of each measure, lead responsibility for implementation, and the time frame for implementation. For each mitigation measure, the program goal, program objectives, hazard(s) addressed, and the possible funding sources for all measures are also noted in the tables. The overall intent of these mitigation action programs and priority projects is to reduce the effects of each hazard, with a special emphasis on new and existing buildings and infrastructure. The key to abbreviations used in the tables may be found at the end of this chapter.

6.2 Chapter Update and Review

During the 2009 update process, representatives of each jurisdiction reviewed the mitigation action programs listed for their jurisdiction and edited the list as appropriate. Edits included updates of program lead responsibility and program timelines, as well as additions and deletions of mitigation measures. Detailed explanations of mitigation measure addition and deletion can be found in Chapter 5.

The 2014 update process for this chapter was very similar to 2009. The primary difference being that in 2014, both the City of New Hope and the City of Madison created task forces to review their mitigation action programs and discuss future mitigation measures outside of regular Committee meetings.

Many program timelines were changed to “ongoing” to reflect projects beginning during the first five year maintenance period that are expected to continue throughout the next five year maintenance period.

During the 2014 update process, many specific AEMA, ADECA and FEMA funding sources listed in section 6.5, on tables 6.2 through 6.8, were no longer and were updated, where applicable. These projects will only be completed if funding becomes available.

The reasoning for edits to program responsibilities, funding sources and timelines has been documented and is kept on file with EMA.

Edits made to measures in this chapter were carried over from Chapter 5. All changes were reviewed and approved by the Committee.

6.3 Prioritization of Mitigation Actions

The Hazard Mitigation Planning Committee established the process described in this section to guide its selection and prioritization of available mitigation measures to be included within each community's mitigation action program.

Plan Consistency

In selecting among available mitigation measures, the Planning Committee evaluated the consistency of each available mitigation measure with the long-term mitigation strategy - the vision, goals, and objectives presented in this plan. Each of the prioritized measures are intended to advance the shared vision, goals, and objectives and respond to the issues and opportunities set forth in this plan by all of the participating localities. Further, the Committee has determined that all of the mitigation measures selected for each jurisdiction's community action program are fully consistent with established community goals and plans currently in force and with comments and concerns presented through public participation and interagency coordination efforts of this planning process.

Prioritization Criteria

The Planning Committee prioritized the available mitigation measures and projects according to the following principal criteria:

1. Economic Considerations.

    a. *Availability of funds.* Will the measure require Federal or other outside funding sources? Are local funds available? Can in-kind services reduce local obligations? What is the projected availability of required funds during the timeframe for implementation? Where funding is not apparently available, should the project still be considered but at a lower priority?
    b. *Benefits to be derived from the proposed measure.* Will the measure likely reduce dollar losses from property damages in the event of a hazard? To what degree?
    c. *Costs.* Are the costs reasonable in relation to the likely benefits? Do economic benefits to the community outweigh estimated project costs? What cost reduction alternatives might be available?
    d. *Economic feasibility.* Have the costs and benefits of the preferred measure been compared against other alternatives? What is the economic impact of the no-action alternative? Is this the most economically effective solution?
    e. *Impact on local economy.* Will the proposed measure improve local economic activities? What impact might the measure have on the tax base?

f. *Economic development goals.* Will the proposal advance the overall economic goals and objectives of the community?

2. Social Considerations.

a. *Environmental justice.* Will the proposed measure be socially equitable to minority, disadvantaged, and special needs populations, such as the elderly and handicapped?
b. *Neighborhood impact.* Will the measure disrupt established neighborhoods or improve quality of life for affected neighborhoods?
c. *Community support.* Is the measure consistent with community values? Will the affected community support the measure?
d. *Impact on social and cultural resources.* Does the measure adversely affect valued local resources or enhance those resources?

3. Environmental Considerations.

a. *National Environmental Policy Act (NEPA).* Will the measure be consistent with Federal NEPA criteria? How will the measure affect environmental resources, such as land, water, air, wildlife, vegetation, historic properties, archaeological sites, etc.? Can potentially adverse impacts be sufficiently mitigated through reasonable methods?
b. *State and local environmental regulations.* Will the measure be in compliance with State and local environmental laws, such as floodplain management regulations, water quality standards, and wetlands protection criteria?
c. *Environmental conservation goals.* Will the proposal advance the overall environmental goals and objectives of the community?

4. Administrative, Legal, and Political Considerations.

a. *Staffing.* Does the jurisdiction have adequate staff resources and expertise to implement the measure? Will additional staff, training, or consultants be necessary? Can local funds support staffing demands? Will the measure overburden existing staff loads?
b. *Maintenance.* Does the jurisdiction have the capabilities to maintain the proposed project once it is completed? Are staff, funds, and facilities available for long-term project maintenance?
c. *Timing.* Can the measure be implemented in a timely manner? Are the timeframes for implementation reasonable?
d. *Legal authority.* Does the jurisdiction have the legal authority to implement the measure? What are the legal consequences of taking action to implement the measure as opposed to an alternative action or taking no action? Will new legislation be required?
e. *Political support.* Does the local governing body support the proposed measure? Does the public support the measure? Do stakeholders

support the measure? What advocates might facilitate implementation of the proposal?

5. Technical Considerations.

Technical feasibility. Is the proposal technically possible? Are there technical issues that remain? Does the measure effectively solve the problem or create new problems? Are there secondary impacts that might be considered? Have professional experts been consulted?

The 2014 HMPC determined that all actions will be addressed as soon as possible depending on available funding and resources; however, actions labeled high priority will be addressed first, medium priority will be addressed secondly, and low priority will be addressed last. The most important determining factor is funding, which greatly affects which projects can be completed.

Cost-Benefit Review

Priority mitigation projects will only be implemented if the benefits are maximized and outweigh the associated costs of the proposed projects. The Planning Committee performed a general evaluation of each mitigation measure, which might require FEMA funds. The Committee weighed the estimated costs for each mitigation measure against the projected benefits to be derived. For example, a project to acquire properties within the floodplain would provide the following benefits: (1) the project eliminates flood damages to acquired properties, (2) the project reduces flood response costs, (3) the project reduces flood insurance claims, and (4) the project could increase the Community Rating System (CRS) rating. A more detailed benefit-cost analysis will be required for each priority project to determine economic feasibility during the project planning phase. Projects will also require a more detailed evaluation for eligibility and feasibility including social impact, environmental impact, technical feasibility and other criteria that measure project effectiveness. This detailed evaluation of projects will be performed in the pre-application phase of a grant request. Further, project implementation will be subject to the availability of FEMA grants and other sources of funds from year-to-year.

6.4 Available Mitigation Measures

The Mitigation Action Program tables for each community reference "Mitigation Measures" by number to the comprehensive mitigation strategies contained in **Section 5.9** of **Chapter 5**. All of the available mitigation measures presented in **Chapter 5** are again listed in this section for ease of reference. Each Community Mitigation Action Program lists only those mitigation measures endorsed by that particular jurisdiction.

Table 6-1. Mitigation Measures

MITIGATION MEASURES			
Mitigation Measure #	**Goal**	**Program Objective**	**Mitigation Measure**
1.1.1	Prevention	Comprehensive Plans	*Maintain up-to-date comprehensive plans for all municipalities.*
1.1.2	Prevention	Comprehensive Plans	*Integrate the findings and recommendations of this plan into comprehensive plan amendments for the cities of Huntsville and Madison. Update the comprehensive plan, zoning ordinance, and subdivision regulations for the City of New Hope.*
1.1.3	Prevention	Comprehensive Plans	*Review and amend existing planning documents to be certain the vulnerability and environmental suitability of lands for future development are clearly addressed; local plans should address the vulnerability of designated hazard areas and encourage open space planning to create amenities for recreation and conservation of fragile resources.*
1.1.4	Prevention	Comprehensive Plans	*Continue to implement the action items included in the adopted City of Huntsville Flood Mitigation Plan, which are incorporated into this Plan in their entirety here by reference.*
1.2.1	Prevention	Geographic Information Systems	*Maintain risk assessment data in GIS, including flood zones, tornado tracks, landslide hazards, sinkhole threat areas, disaster events, and a comprehensive inventory of critical facilities within all jurisdictions.*
1.2.2	Prevention	Geographic Information Systems	*Integrate FEMA HAZUS-MH applications for hazard loss estimations within local GIS programs. Maintain up-to-date data within GIS to apply the full loss estimation capabilities of HAZUS.*

MITIGATION MEASURES			
Mitigation Measure #	**Goal**	**Program Objective**	**Mitigation Measure**
1.2.3	Prevention	Geographic Information Systems	*Update landslide hazard maps. Identify those areas of greatest risk for new landslides or reactivation of previous landslides within the City of Huntsville. Develop mitigation program for sites at highest risk.*
1.2.4	Prevention	Geographic Information Systems	*City of Madison- obtain GPS data and attribute data of all critical infrastructure within the City*
1.2.5	Prevention	Geographic Information Systems	*City of Madison- build and maintain risk assessment data including flood hazard zones, tornado tracks and other hazard events specific to City of Madison*
1.2.6	Prevention	Geographic Information Systems	*City of Madison- integrate storm water management applications into GIS*
1.2.7	Prevention	Geographic Information Systems	*City of Huntsville- Create accurate field-based measurements sinkhole map specific to COH.*
1.2.8	Prevention	Geographic Information Systems	*Town of Gurley- integrate storm water management applications into GIS*
1.2.9	Prevention	Geographic Information Systems	*Town of Gurley- obtain GIS data and attribute data of all critical infrastructure within the City*
1.3.1	Prevention	Detailed Plans and Targeted Studies	*Seek a Countywide update of all FIRMs (Flood Insurance Rate Maps) in digital format, with an emphasis on detailed studies of developed and developing areas with elevations provided and floodways delineated.*
1.3.2	Prevention	Detailed Plans and Targeted Studies	*Prepare a Countywide HAZUS-MH risk assessment of earthquakes, floods, and hurricanes.*

MITIGATION MEASURES			
Mitigation Measure #	**Goal**	**Program Objective**	**Mitigation Measure**
1.3.3	Prevention	Detailed Plans and Targeted Studies	*Monitor known landslides that have exhibited movement within the last 20 years.*
1.3.4	Prevention	Detailed Plans and Targeted Studies	*Comprehensive drainage study for the Town of Gurley specifically to respond to clogging and flooding issues.*
1.3.5	Prevention	Detailed Plans and Targeted Studies	*Study several drainage basins in the City of Madison and modify the drainage structures within each drainage basin to reduce flooding risk.*
1.4.1	Prevention	Zoning	*Evaluate additional land use restrictions within designated flood zones, such as prohibition of storage of buoyant materials, storage of hazardous materials, restrictive development of flood ways, among others.*
1.5.1	Prevention	Flood Plain Management Regulations	*Maintain a library of technical assistance and guidance materials to support the local floodplain manager.*
1.5.2	Prevention	Flood Plain Management Regulations	*Obtain membership for local floodplain managers in the Association of State Floodplain Managers.*
1.5.3	Prevention	Flood Plain Management Regulations	*Evaluate the effectiveness of higher regulatory standards, such as additional building elevation and limitation of fill within floodplains, to be included in local floodplain management regulations.*
1.5.4	Prevention	Flood Plain Management Regulations	*Propose that land owners in the City of Madison define by plat floodways and major drainage ways as Public Utility and Drainage Easements and dedicate said land to the City of Madison.*
1.6.1	Prevention	Building and Technical Codes	*Evaluate building code standards for roof construction to assure protection against wind damage from hurricanes, tornadoes, and windstorms; require installation of "hurricane clips," where feasible.*

MITIGATION MEASURES			
Mitigation Measure #	**Goal**	**Program Objective**	**Mitigation Measure**
1.7.1	Prevention	Community Shelter and Safe Room Requirements	*Require the construction of safe rooms within new public buildings, libraries, community centers, and other public building, where feasible.*
1.7.2	Prevention	Community Shelter and Safe Room Requirements	*Organizations or agencies may build community shelters. EMA will advise and review federal assistance processes with eligible organizations or agencies.*
1.7.3	Prevention	Community Shelter and Safe Room Requirements	*Individual citizens are encouraged to install in-home safe rooms in their homes. The EMA will advise and assist individuals seeking federal assistance.*
1.8.1	Prevention	Community Rating System (CRS)	*Apply for and maintain membership in the CRS Program.*
2.1.1	Property Protection	Building Retrofits	*Provide technical assistance to owners to advise on available retrofits to protect against flood damage.*
2.1.2	Property Protection	Building Retrofits	*Seek funding sources, such as Community Development Block Grant funds, to assist low-income homeowners with building retrofits to protect against flood damage.*
2.2.1	Property Protection	Insurance	*Promote the purchase of insurance coverage for flooding, earthquake, and sinkhole damages in high-risk areas by property owners and renters.*

MITIGATION MEASURES			
Mitigation Measure #	**Goal**	**Program Objective**	**Mitigation Measure**
2.3.1	Property Protection	Acquisition/ Relocation	*Acquire or relocate high-risk, flood prone buildings and convert those properties to permanent open space with covenants that prevent future development. The emphasis should be buildings located within floodways, substantially damaged buildings, repetitive flood insurance loss properties, pre-FIRM buildings (constructed prior to the enactment of local floodplain regulations), and critical facilities. Where feasible, acquisition or relocation is preferred over elevating or flood proofing structures.*
2.3.2	Property Protection	Acquisition/ Relocation	*Acquire all floodway properties within the City of Huntsville and/or remove all structures from the floodway.*
2.4.1	Property Protection	Building Elevation	*Elevate buildings, where feasible, to reduce potential flood damages. The emphasis should be on certain buildings where acquisition or relocation is not feasible and on buildings not compliant with floodplain regulations. Elevating structures may be an alternative to acquisition/relocation and is preferred over flood proofing, where most feasible*
2.5.1	Property Protection	Flood Proofing	*Flood proof buildings, where feasible, to reduce potential flood damages. The emphasis should be on non-residential buildings constructed before the enactment of flood plain regulations (pre-FIRM buildings). Flood proofing should only be considered if acquisition/relocation or building elevation is not feasible.*
2.6.1	Property Protection	Power Generation	*Installation of emergency power generation at critical facilities, as outlined in a separate critical facilities document maintained by EMA*

MITIGATION MEASURES			
Mitigation Measure #	**Goal**	**Program Objective**	**Mitigation Measure**
3.1.1	Public Education and Outreach	Map Information	*Publicize the availability of FIRM (Flood Insurance Rate Map) information to real estate agents, builders, developers, and homeowners through local trade publications and newspaper announcements.*
3.2.1	Public Education and Outreach	Outreach Projects	*Establish an annual Severe Weather Awareness Day in conjunction with the NWS.*
3.2.2	Public Education and Outreach	Outreach Projects	*Identify other environmental awareness events to integrate public information on hazard exposure and protection measures.*
3.2.3	Public Education and Outreach	Outreach Projects	*Provide speakers to educate public on certain hazard topics upon request by organizations, civic clubs, etc.*
3.4.1	Public Education and Outreach	Library	*Obtain free publications from FEMA, NWS, USGS, and other federal and state agencies and deposit these materials with local libraries.*
3.4.2	Public Education and Outreach	Library	*Maintain local library repositories with the latest available publications.*
3.5.1	Public Education and Outreach	Environmental Education	*Distribute hazard mitigation brochures to area schools for distribution to students.*
4.1.1	Natural Resources Protection	Open Space Easements and Acquisitions	*Acquire open space, purchase easements, and accept donations of lands within environmentally significant and vulnerable locations through the Land Trust of Huntsville and North Alabama and other agencies.*

MITIGATION MEASURES			
Mitigation Measure #	**Goal**	**Program Objective**	**Mitigation Measure**
4.2.1	Natural Resources Protection	River/Stream Corridor Restoration and Protection	*Enforce dumping regulations.*
4.2.2	Natural Resources Protection	River/Stream Corridor Restoration and Protection	*Enforce erosion and sedimentation control regulations.*
4.3.1	Natural Resources Protection	Urban Forestry Programs	*Seek technical assistance through the Alabama Cooperative Extension System with Best Management Practices (BMP) for channel and drainage system maintenance.*
5.1.1	Emergency Services	Disaster Warning	*Establish a flood warning system at strategic locations in the county to cover vulnerable flood locations. Sensors should provide real-time access to stream flow, stream stage, and precipitation data, at the minimum. The system should link data into GIS with the ability to use measured and forecasted rainfall to predict potential flood levels and create real-time maps of flooded areas.*
5.1.2	Emergency Services	Disaster Warning	*Enhance the flood warning network into an All-Hazards Detection Network, including capabilities to monitor icy bridges and highways, water quality and hazardous materials spills into water ways, and air quality or hazardous air emissions. Include camera devices at select locations.*
5.1.3	Emergency Services	Disaster Warning	*Install additional outdoor warning sirens as outlined in the Comprehensive Warning Study published under separate cover by the Huntsville-Madison County Emergency Management Board.*
5.1.4	Emergency Services	Disaster Warning	*Upgrade the outdoor warning siren system's activation system to provide enhanced warning capability.*

MITIGATION MEASURES			
Mitigation Measure #	**Goal**	**Program Objective**	**Mitigation Measure**
5.1.5	Emergency Services	Disaster Warning	*Upgrade and/or install mass notification/alert systems within UAHuntsville buildings to include voice alert capability. Outdoor warning sirens do not adequately penetrate sound attenuating structures such as buildings. The primary object of this measure is to provide an improved disaster alert system capable of alerting a very high percentage of campus population inside buildings.*
5.1.6	Emergency Services	Disaster Warning	*Install 'giant voice' alert systems in three strategic locations on the UAHuntsville campus. One of the three systems would extend coverage to the University Place Elementary School and one would extend coverage to the daycare facility on campus.*
5.2.1	Emergency Services	Weather Radios	*Promote the use of weather radios in households, businesses, and schools.*
6.1.1	Structural Projects	Drainage System Maintenance	*Prepare and implement standard operating procedures for drainage system maintenance.*
6.1.2	Structural Projects	Drainage System Maintenance	*City of Madison: Channel improvements and bench cut to improve hydraulic capacity at un-named tributary to Indian Creek at Highland Drive & Windstone area.*
6.1.3	Structural Projects	Drainage System Maintenance	*City of Madison: Channel improvements and four road crossing structural improvements and detention pond at un-named tributary to Betts Spring Branch at Old Madison Pike to I-565.*
6.1.4	Structural Projects	Drainage System Maintenance	*City of Madison: Channel improvements and road crossing structural improvements to un-named tributary to Indian Creek at Rainbow Landing Subdivision area.*
6.2.1	Structural Projects	Flood Conveyance Improvements	*Implement drainage improvement project within the City of New Hope.*

MITIGATION MEASURES			
Mitigation Measure #	**Goal**	**Program Objective**	**Mitigation Measure**
6.2.2	Structural Projects	Flood Conveyance Improvements	*Evaluate, design, and implement cost effective flood control (structural) projects, including, but not limited to, channel expansions, bridge expansions, pipes and culverts, detention basins, and bridge demolitions within the City of Huntsville.*
6.2.3	Structural Projects	Flood Conveyance Improvements	*Aldridge Creek and Four Mile Post Road flood control project (bridge expansion and channel improvements): engineering design and construction project to modify and expand the existing bridge opening in order to increase the hydraulic capacity of the existing bridge structure.*
6.2.4	Structural Projects	Flood Conveyance Improvements	*Broglan Branch and Clinton Avenue flood control project (bridge expansion and channel improvements): engineering design and construction project to replace the existing undersized bridge structure in order to maximize the hydraulic capacity of the bridge.*
6.2.5	Structural Projects	Flood Conveyance Improvements	*Broglan Branch flood control project bridge expansion and channel improvements): engineering design and construction project to increase the capacity of Broglan Branch between Holmes Avenue and Clubview Drive. Project includes channel improvements along the project limits and bridge expansion at University Drive and possible acquisition of property and homes*
6.2.6	Structural Projects	Flood Conveyance Improvements	*Peavy Creek flood control project bridge expansion and channel improvements): engineering study, design, and construction project to decrease the peak flood discharges along Peavy Creek. Project will include acquisition of property (see mitigation measure # 2.3.2), construction of a detention/retention facility, channel improvements and replacement of existing undersized bridge structure at Little Cove Road.*

MITIGATION MEASURES			
Mitigation Measure #	**Goal**	**Program Objective**	**Mitigation Measure**
6.2.7	Structural Projects	Flood Conveyance Improvements	*Governors Drive/U.S. Hwy 431 drainage improvements: engineering design and construction project to increase capacity of the existing undersized drainage facilities that drain Governors Drive and convey flood waters from Governors Drive to Fagan Creek.*
6.2.8	Structural Projects	Flood Conveyance Improvements	*Pinhook Creek Flood Mitigation Project: flood control project in conjunction with the U.S. Army Corps of Engineers; on Pinhook Creek from Memorial Parkway north to twin RR bridge immediately north of Holmes Avenue; and in conjunction with a previous FEMA hazard mitigation grant.*
6.2.9	Structural Projects	Flood Conveyance Improvements	*Dallas Branch and Pinhook Creek Flood Mitigation Project: on Pinhook Creek, from twin RR bridge immediately north of Holmes Avenue, north to confluence of Dallas Branch, and Dallas Branch, upstream to Coleman Street. The city is actively pursuing projects with both the Corps of Engineers and Alabama EMA/FEMA.*
6.2.10	Structural Projects	Flood Conveyance Improvements	*Implement drainage improvement plan for the Town of Gurley.*
6.2.11	Structural Projects	Flood Conveyance Improvements	*Evaluate, design, and implement cost effective flood control (structural) projects, including, but not limited to, channel expansions, bridge expansions, pipes and culverts, detention basins, and bridge demolitions within Madison County.*
6.2.12	Structural Projects	Flood Conveyance Improvements	*Bradford Creek-bridge replacements on Mill Road and Palmer Road, channel improvements at railroad crossing adjacent to Palmer Road in the City of Madison.*
6.2.13	Structural Projects	Flood Conveyance Improvements	*Bradford Creek- Greenway Extension Phase II from Palmer Road to I-565*

MITIGATION MEASURES			
Mitigation Measure #	**Goal**	**Program Objective**	**Mitigation Measure**
7.1.1	Public Health	Vector Control	*Madison County Health Department will conduct vector control measures for mosquitos within the City of Huntsville to include larviciding, street level spraying, etc. following tropical systems, heavy rains or flooding, to augment or supplement normal vector control operations in accordance with the Clean Water Act of 2011. Vector Control would provide services outside its jurisdiction with the consent of the Mayor and City Council and/or declaration from the Governor.*

6.5 Mitigation Action Programs

The following tables provide the Mitigation Action Programs for each jurisdiction. An explanation for each abbreviation is included at the end of this chapter.

Table 6-2. Madison County Mitigation Action Program
(See key to abbreviations at end of this chapter).

Note: *Mitigation Measures shown in italics are countywide actions that apply to all jurisdictions and are coordinated through the Huntsville-Madison County EMA.*

MADISON COUNTY MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
1.1.3	Prevention	Comprehensive Plan	High	LEPC, HMPC	ALL	2014-2019	EXIST
1.2.1	*Prevention*	*GIS*	*High*	*HUDD, MCE*	*ALL*	*2014-2019*	*EXIST*
1.2.2	*Prevention*	*GIS*	*High*	*HUDD, MCE*	*ALL*	*Ongoing*	*EXIST*
1.3.1	*Prevention*	*Detailed Plans and Targeted Studies*	*High*	*MCE, FP*	*FL*	*Ongoing*	*FEMA Map Update Program*
1.5.1	Prevention	Flood Plain Management Regulations	High	FP	FL	Ongoing	EXIST
1.5.2	Prevention	Flood Plain Management Regulations	Low	FP	FL	2010+	EXIST

MADISON COUNTY MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
1.5.3	Prevention	Flood Plain Management Regulations	High	FP	FL	2010+	EXIST
1.6.1	Prevention	Building and Technical Codes	High	BO	H, T, SS	2010+	EXIST
1.7.2	Prevention	Community Shelter and Safe Room Requirements	High	County Commission	T, SS	Ongoing	HMGP
1.7.3	Prevention	Community Shelter and Safe Room Requirements	High	EMA	T, SS	Ongoing	HMGP
1.8.1	Prevention	Community Rating System Program	High	MCE	ALL	Ongoing	EXIST
2.1.1	Property Protection	Building Retrofits	Low	BO, FP	FL	Ongoing	EXIST
2.2.1	*Property Protection*	*Insurance*	*High*	*EMA, FP*	*FL, SH*	*Ongoing*	*EXIST*
2.3.1	Property Protection	Acquisition/ Relocation	Low	FP	FL	Ongoing	HMGP, PDM
2.4.1	Property Protection	Building Elevation	Low	FP	FL	Ongoing	HMGP, PDM
2.5.1	Property Protection	Flood Proofing	Low	FP	FL	Ongoing	HMGP

MADISON COUNTY MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
2.6.1	Property Protection	Power Generation	High	EMA	ALL	Ongoing	HMGP
3.1.1	*Public Education and Outreach*	*Map Information*	*High*	*EMA, FP*	*ALL*	*2014-2019*	*EXIST*
3.2.1	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA, NWS*	*ALL*	*2014-2019*	*EXIST*
3.2.2	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
3.2.3	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
3.4.1	*Public Education and Outreach*	*Library*	*High*	*EMA, FP*	*ALL*	*Ongoing*	*EXIST*
3.4.2	*Public Education and Outreach*	*Library*	*High*	*EMA, FP*	*ALL*	*Ongoing*	*EXIST*
3.5.1	*Public Education and Outreach*	*Environmental Education*	*High*	*EMA*	*ALL*	*Ongoing*	*EXIST*
4.1.1	Natural Resource Protection	Open Space Easements and Acquisitions	High	Land Trust of Huntsville and North Alabama	ALL	Ongoing	EXIST
4.3.1	Natural Resource Protection	Urban Forestry Programs	High	MCE	FL, L, WF	2014-2016	EXIST

MADISON COUNTY MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
5.1.1	*Emergency Services*	*Disaster Warning*	*Low*	*EMA*	*FL*	*Ongoing*	*HMGP*
5.1.2	*Emergency Services*	*Disaster Warning*	*Low*	*EMA*	*ALL*	*Ongoing*	*HMGP*
5.1.3	*Emergency Services*	*Disaster Warning*	*High*	*EMA*	*ALL*	*2014-2019*	*HMGP, PDM*
5.1.4	*Emergency Services*	*Disaster Warning*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
5.2.1	*Emergency Services*	*Weather Radios*	*High*	*EMA*	*ALL*	*Ongoing*	*EXIST*
6.1.1	Structural Projects	Drainage System Maintenance	High	MCE	FL	2014-2019	EXIST
6.2.11	Structural Projects	Flood Conveyance Improvements	High	MCE	FL	Ongoing	HMGP
7.1.1	*Public Health*	*Vector Control*	*High*	*MCHD*	*PH*	*Ongoing*	*EXIST*

Table 6-3. Town of Gurley Mitigation Action Program
(See key to abbreviations at end of this chapter).

Note: *Mitigation Measures shown in italics are countywide actions that apply to all jurisdictions and are coordinated through the Huntsville-Madison County EMA.*

TOWN OF GURLEY MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
1.1.1	Prevention	Comprehensive Plans	Low	CP	ALL	2014-2019	EXIST
1.1.3	Prevention	Comprehensive Plan	High	CP	ALL	2014-2019	EXIST
1.2.1	*Prevention*	*GIS*	*High*	*HUDD*	*ALL*	*2014-2019*	*EXIST*
1.2.2	*Prevention*	*GIS*	*High*	*HUDD, EMA*	*ALL*	*Ongoing*	*EXIST*
1.3.1	*Prevention*	*Detailed Plans and Targeted Studies*	*High*	*HUDD, MCE, FP*	*FL*	*Ongoing*	*FEMA Map Update Program*
1.3.4	Prevention	Detailed Plans and Targeted Studies	High	CP,CE	FL	Ongoing	EXIST, HMGP
1.5.1	Prevention	Flood Plain Management Regulations	High	FP	FL	Ongoing	EXIST
1.5.2	Prevention	Flood Plain Management Regulations	Low	FP	FL	Ongoing	EXIST

TOWN OF GURLEY MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
1.5.3	Prevention	Flood Plain Management Regulations	High	FP	FL	Ongoing	EXIST
1.6.1	Prevention	Building and Technical Codes	High	BO	H, T, SS	Ongoing	EXIST
1.7.1	Prevention	Community Shelter and Safe Room Requirements	High	Town Council	H, T, SS	Ongoing	EXIST
1.7.2	Prevention	Community Shelter and Safe Room Requirements	High	Town Council	T, SS	Ongoing	HMGP
1.7.3	Prevention	Community Shelter and Safe Room Requirements	High	EMA	T, SS	Ongoing	HMGP
2.2.1	*Property Protection*	*Insurance*	*High*	*EMA, FP*	*FL, SH*	*Ongoing*	*EXIST*
2.3.1	Property Protection	Acquisition/ Relocation	Low	FP	FL	Ongoing	HMGP, PDM
2.4.1	Property Protection	Building Elevation	Low	FP	FL	Ongoing	HMGP, PDM
2.5.1	Property Protection	Flood Proofing	Low	FP	FL	Ongoing	HMGP
2.6.1	*Property Protection*	*Power Generation*	*High*	*EMA*	*ALL*	*Ongoing*	*HMGP*

TOWN OF GURLEY MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
3.1.1	*Public Education and Outreach*	*Map Information*	*High*	*EMA, FP*	*ALL*	*Ongoing*	*EXIST*
3.2.1	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA, NWS*	*ALL*	*Ongoing*	*EXIST*
3.2.2	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA*	*ALL*	*Ongoing*	*EXIST*
3.2.3	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA*	*ALL*	*Ongoing*	*EXIST*
3.4.1	*Public Education and Outreach*	*Library*	*High*	*EMA, FP*	*ALL*	*Ongoing*	*EXIST*
3.4.2	*Public Education and Outreach*	*Library*	*High*	*EMA, FP*	*ALL*	*Ongoing*	*EXIST*
3.5.1	*Public Education and Outreach*	*Environmental Education*	*High*	*EMA*	*ALL*	*Ongoing*	*EXIST*
4.1.1	Natural Resource Protection	Open Space Easements and Acquisitions	High	Land Trust of Huntsville and North Alabama	ALL	Ongoing	EXIST
4.2.1	Natural Resource Protection	River/Stream Corridor Restoration and Protection	High	BO, MCE	FL	*Ongoing*	HMGP
4.2.2	Natural Resource Protection	River/Stream Corridor Restoration and Protection	High	MCE	FL, L	*Ongoing*	EXIST

TOWN OF GURLEY MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
4.3.1	Natural Resource Protection	Urban Forestry Programs	High	MCE	FL, L, WF	*Ongoing*	EXIST
5.1.1	*Emergency Services*	*Disaster Warning*	*Low*	*EMA*	*FL*	*Ongoing*	*HMGP*
5.1.2	*Emergency Services*	*Disaster Warning*	*Low*	*EMA*	*ALL*	*Ongoing*	*HMGP*
5.1.3	*Emergency Services*	*Disaster Warning*	*High*	*EMA*	*ALL*	*Ongoing*	*HMGP, PDM*
5.1.4	*Emergency Services*	*Disaster Warning*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
5.2.1	*Emergency Services*	*Weather Radios*	*High*	*EMA*	*ALL*	*Ongoing*	*EXIST*
6.1.1	Structural Projects	Drainage System Maintenance	High	MCE	FL	Ongoing	EXIST
6.2.10	Structural Projects	Flood Conveyance Improvements	High	TBD	FL	Ongoing	HMGP
7.1.1	*Public Health*	*Vector Control*	*High*	*MCHD*	*PH*	*Ongoing*	*EXIST*

Table 6-4. City of Huntsville Mitigation Action Program
(See key to abbreviations at end of this chapter).

Note(s): (1) *Mitigation Measures shown in italics are countywide actions that apply to all jurisdictions and are coordinated through the Huntsville-Madison County EMA; (2) The action items included in the City of Huntsville Flood Mitigation Plan are incorporated into this Mitigation Action Program by reference.*

CITY OF HUNTSVILLE MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
1.1.1	Prevention	Comprehensive Plans	High	HUDD	ALL	2014-2019	EXIST
1.1.2	Prevention	Comprehensive Plans	High	HUDD	ALL	2014-2019	EXIST/
1.1.3	Prevention	Comprehensive Plan	High	HUDD	ALL	2014-2019	EXIST
1.1.4	Prevention	Comprehensive Plan	High	HUDD	FL	2014-2019	EXIST
1.2.1	*Prevention*	*GIS*	*High*	*HUDD*	*ALL*	*2014-2019*	*EXIST*
1.2.2	*Prevention*	*GIS*	*High*	*HUDD*	*ALL*	*Ongoing*	*EXIST*
1.2.3	Prevention	GIS	Low	HUDD - Planning	L, SH	Ongoing	EXIST
1.2.4	Prevention	GIS	High	HUDD – Planning	L	Ongoing	EXIST
1.2.5	Prevention	GIS	High	HUDD - Engineering	SH	Ongoing	EXIST
1.2.7	Prevention	GIS	Moderate	Engineering	L, SH	Ongoing	EXIST

CITY OF HUNTSVILLE MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
1.3.1	*Prevention*	*Detailed Plans and Targeted Studies*	*High*	*HUDD, FP, MCE*	*FL*	*Ongoing*	*FEMA Map Update Program*
1.3.3	Prevention	Detailed Plans and Targeted Studies	High	HUDD - Planning	L	Ongoing	EXIST
1.4.1	Prevention	Zoning	Low	FP	FL	2010+	EXIST
1.5.1	Prevention	Flood Plain Management Regulations	High	FP	FL	Ongoing	EXIST
1.5.2	Prevention	Flood Plain Management Regulations	High	FP	FL	Ongoing	EXIST
1.5.3	Prevention	Flood Plain Management Regulations	High	FP	FL	Ongoing	EXIST
1.6.1	Prevention	Building and Technical Codes	High	BO	H, T, SS	Ongoing	EXIST
1.7.1	Prevention	Community Shelter and Safe Room Requirements	High	HUDD	H, T, SS	Ongoing	EXIST
1.7.2	Prevention	Community Shelter and Safe Room Requirements	High	City Council	T, SS	Ongoing	HMGP
1.7.3	Prevention	Community Shelter and Safe Room Requirements	High	EMA	T, SS	Ongoing	HMGP

CITY OF HUNTSVILLE MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
2.1.1	Property Protection	Building Retrofits	Low	BO, FP	FL	2010+	EXIST
2.1.2	Property Protection	Building Retrofits	Low	HUDD – Engineering, Planning	FL	Ongoing	CDBG
2.2.1	*Property Protection*	*Insurance*	*High*	*EMA, FP*	*FL, SH*	*Ongoing*	*EXIST*
2.3.1	Property Protection	Acquisition/ Relocation	High	HUDD – Engineering, Planning	FL	Ongoing	HMGP, PDM
2.3.2	Property Protection	Acquisition/ Relocation	High	HUDD – Engineering, Planning	FL	Ongoing	HMGP, PDM
2.4.1	Property Protection	Building Elevation	Low	HUDD – Engineering, Planning	FL	Ongoing	HMGP, PDM
2.5.1	Property Protection	Flood Proofing	Low	HUDD – Engineering, Planning	FL	Ongoing	HMGP
2.6.1	*Property Protection*	*Power Generation*	*High*	*EMA*	*ALL*	Ongoing	*HMGP*
3.1.1	*Public Education and Outreach*	*Map Information*	*High*	*EMA, FP*	*ALL*	*2014-2019*	*EXIST*
3.2.1	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA, NWS*	*ALL*	*2014-2019*	*EXIST*

CITY OF HUNTSVILLE MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
3.2.2	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
3.2.3	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
3.4.1	*Public Education and Outreach*	*Library*	*High*	*EMA, FP*	*ALL*	*Ongoing*	*EXIST*
3.4.2	*Public Education and Outreach*	*Library*	*High*	*EMA, FP*	*ALL*	*Ongoing*	*EXIST*
3.5.1	*Public Education and Outreach*	*Environmental Education*	*High*	*EMA*	*ALL*	*Ongoing*	*EXIST*
4.1.1	Natural Resource Protection	Open Space Easements and Acquisitions	High	HUDD - Planning	ALL	Ongoing	EXIST
4.2.1	Natural Resource Protection	River/Stream Corridor Restoration and Protection	High	HWPCD	FL	Ongoing	EXIST
4.2.2	Natural Resource Protection	River/Stream Corridor Restoration and Protection	High	HWPCD, HUDD	FL, L	Ongoing	EXIST
4.3.1	Natural Resource Protection	Urban Forestry Programs	High	Huntsville Urban Forestry and Horticulture	FL, L, WF	2014-2016	EXIST
5.1.1	*Emergency Services*	*Disaster Warning*	*Low*	*EMA*	*FL*	Ongoing	*HMGP*

CITY OF HUNTSVILLE MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
5.1.2	*Emergency Services*	*Disaster Warning*	*Low*	*EMA*	*ALL*	Ongoing	*HMGP*
5.1.3	*Emergency Services*	*Disaster Warning*	*High*	*EMA*	*ALL*	*2014-2019*	*HMGP*
5.1.4	*Emergency Services*	*Disaster Warning*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
5.2.1	*Emergency Services*	*Weather Radios*	*High*	*EMA*	*ALL*	*Ongoing*	*EXIST*
6.1.1	Structural Projects	Drainage System Maintenance	High	Huntsville Public Works Department	FL	2013	EXIST
6.2.2	Structural Projects	Flood Conveyance Improvements	High	HUDD – Planning and Engineering	FL	Ongoing	EXIST
6.2.3	Structural Projects	Flood Conveyance Improvements	High	HUDD – Planning and Engineering	FL	Ongoing	HMGP
6.2.4	Structural Projects	Flood Conveyance Improvements	High	HUDD – Planning and Engineering	FL	Ongoing	HMGP
6.2.5	Structural Projects	Flood Conveyance Improvements	High	HUDD – Planning and Engineering	FL	Ongoing	HMGP
6.2.6	Structural Projects	Flood Conveyance Improvements	High	HUDD – Planning and Engineering	FL	Ongoing	HMGP

CITY OF HUNTSVILLE MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
6.2.7	Structural Projects	Flood Conveyance Improvements	High	HUDD – Planning and Engineering	FL	Ongoing	HMGP
6.2.8	Structural Projects	Flood Conveyance Improvements	High	HUDD – Planning and Engineering	FL	Ongoing	HMGP
6.2.9	Structural Projects	Flood Conveyance Improvements	High	HUDD – Planning and Engineering	FL	Ongoing	HMGP
7.1.1	*Public Health*	*Vector Control*	*High*	*MCHD*	*PH*	Ongoing	*EXIST*

Table 6-5. City of Madison Mitigation Action Program
(See key to abbreviations at end of this chapter).

Note: *Mitigation Measures shown in italics are countywide actions that apply to all jurisdictions and are coordinated through the Huntsville-Madison County EMA.*

CITY OF MADISON MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
1.1.1	Prevention	Comprehensive Plans	High	CP, CE	ALL	2014-2019	EXIST
1.1.2	Prevention	Comprehensive Plans	High	CP, CE	ALL	2014-2019	EXIST
1.1.3	Prevention	Comprehensive Plan	High	CP, CE	ALL	2014-2019	EXIST
1.2.1	*Prevention*	*GIS*	*High*	*CP, CE*	*ALL*	*2014-2019*	*EXIST*
1.2.2	Prevention	GIS	High	CP, CE	ALL	Ongoing	EXIST
1.2.4	Prevention	GIS	High	CE	FL, TR	Ongoing	EXIST
1.2.5	Prevention	GIS	High	CE	ALL	Ongoing	EXIST
1.2.6	Prevention	GIS	High	CE	TR	Ongoing	EXIST
1.3.1	Prevention	Detailed Plans and Targeted Studies	High	FP, MCE	FL	2011	FEMA Map Update Program

CITY OF MADISON MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
1.3.5	Prevention	Detailed Plans and Targeted Studies	Med	CE	FL	2016	EXIST
1.4.1	Prevention	Zoning	Low	FP	FL	2010+	EXIST
1.5.1	Prevention	Flood Plain Management Regulations	High	FP	FL	Ongoing	EXIST
1.5.4	Prevention	Flood Plain Management Regulations	High	FP	FL	Ongoing	EXIST
1.6.1	Prevention	Building and Technical Codes	High	BO	H, T, SS	Ongoing	EXIST
1.7.1	Prevention	Community Shelter and Safe Room Requirements	High	CP	H, T, SS	Ongoing	EXIST
1.7.2	Prevention	Community Shelter and Safe Room Requirements	High	City Council	T, SS	Ongoing	HMGP
1.7.3	Prevention	Community Shelter and Safe Room Requirements	High	EMA	T, SS	Ongoing	HMGP
1.8.1	Prevention	Community Rating System Program	High	FP	ALL	Ongoing	EXIST
2.1.1	Property Protection	Building Retrofits	Low	BO	FL	2010+	EXIST
2.2.1	*Property Protection*	*Insurance*	*High*	*EMA, FP*	*FL, SH*	*Ongoing*	*EXIST*

CITY OF MADISON MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
2.3.1	Property Protection	Acquisition/ Relocation	Low	FP	FL	Ongoing	HMGP, PDM
2.4.1	Property Protection	Building Elevation	Low	FP	FL	Ongoing	HMGP, PDM
2.5.1	Property Protection	Flood Proofing	Low	FP	FL	Ongoing	HMGP
2.6.1	*Property Protection*	*Power Generation*	*High*	*EMA*	*ALL*	Ongoing	*HMGP*
3.1.1	*Public Education and Outreach*	*Map Information*	*High*	*EMA, FP*	*ALL*	*2014-2019*	*EXIST*
3.2.1	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA, NWS*	*ALL*	*2014-2019*	*EXIST*
3.2.2	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
3.2.3	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
3.4.1	*Public Education and Outreach*	*Library*	*High*	*EMA, FP*	*ALL*	*Ongoing*	*EXIST*
3.4.2	*Public Education and Outreach*	*Library*	*High*	*EMA, FP*	*ALL*	*Ongoing*	*EXIST*

CITY OF MADISON MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
3.5.1	*Public Education and Outreach*	*Environmental Education*	*High*	*EMA*	*ALL*	*Ongoing*	*EXIST*
4.1.1	Natural Resource Protection	Open Space Easements and Acquisitions	High	Land Trust of Huntsville and North Alabama	ALL	Ongoing	EXIST
4.2.1	Natural Resource Protection	River/Stream Corridor Restoration and Protection	High	CE	FL	Ongoing	EXIST
4.2.2	Natural Resource Protection	River/Stream Corridor Restoration and Protection	High	CE	FL, L	Ongoing	EXIST
4.3.1	Natural Resource Protection	Urban Forestry Programs	High	CP	FL, L, WF	2014-2016	EXIST
5.1.1	*Emergency Services*	*Disaster Warning*	*Low*	*EMA*	*FL*	Ongoing	*HMGP*
5.1.2	*Emergency Services*	*Disaster Warning*	*Low*	*EMA*	*ALL*	Ongoing	*HMGP*
5.1.3	*Emergency Services*	*Disaster warning*	*High*	*EMA*	*ALL*	*2014-2019*	*HMGP*
5.1.4	*Emergency Services*	*Disaster Warning*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
5.2.1	*Emergency Services*	*Weather Radios*	*High*	*EMA*	*ALL*	*Ongoing*	*EXIST*

CITY OF MADISON MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
6.1.1	Structural Projects	Drainage System Maintenance	High	CE	FL	Ongoing	EXIST
7.1.1	*Public Health*	*Vector Control*	*High*	*MCHD*	*PH*	Ongoing	*EXIST*

Table 6-6. City of New Hope Mitigation Action Program
(See key to abbreviations at end of this chapter).

Note: *Mitigation Measures shown in italics are countywide actions that apply to all jurisdictions and are coordinated through the Huntsville-Madison County EMA.*

CITY OF NEW HOPE MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
1.1.1	Prevention	Comprehensive Plans	Low	CP	ALL	2014-2019	EXIST
1.1.2	Prevention	Comprehensive Plan	High	CP	ALL	2014-2019	EXIST
1.1.3	Prevention	Comprehensive Plan	High	CP	ALL	2014-2019	EXIST
1.2.1	*Prevention*	*GIS*	*High*	*HUDD*	*ALL*	*2014-2019*	*EXIST*
1.2.2	*Prevention*	*GIS*	*High*	*HUDD, EMA*	*ALL*	Ongoing	*EXIST/*
1.3.1	*Prevention*	*Detailed Plans and Targeted Studies*	*High*	*HUDD, MCE, FP*	*FL*	Ongoing	*FEMA Map Update Program*
1.3.2	Prevention	Detailed Plans and Targeted Studies	High	CP	FL, EQ, H	Ongoing	HMGP
1.5.1	Prevention	Flood Plain Management Regulations	High	FP	FL	Ongoing	EXIST

CITY OF NEW HOPE MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
1.5.2	Prevention	Flood Plain Management Regulations	Low	FP	FL	2010+	EXIST
1.5.3	Prevention	Flood Plain Management Regulations	High	FP	FL	Ongoing	EXIST
1.6.1	Prevention	Building and Technical Codes	High	BO	H, T, SS	Ongoing	EXIST
1.7.1	Prevention	Community Shelter and Safe Room Requirements	High	City Council	H, T, SS	Ongoing	EXIST
1.7.2	Prevention	Community Shelter and Safe Room Requirements	High	City Council	T, SS	Ongoing	HMGP
1.7.3	Prevention	Community Shelter and Safe Room Requirements	High	EMA	T, SS	Ongoing	HMGP
2.2.1	*Property Protection*	*Insurance*	*High*	*EMA, FP*	*FL, SH*	*Ongoing*	*EXIST*
2.3.1	Property Protection	Acquisition/ Relocation	Low	FP	FL	Ongoing	HMGP, PDM
2.4.1	Property Protection	Building Elevation	Low	FP	FL	Ongoing	HMGP, PDM
2.5.1	Property Protection	Flood Proofing	Low	FP	FL	Ongoing	HMGP

CITY OF NEW HOPE MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
2.6.1	*Property Protection*	*Power Generation*	*High*	*EMA*	*ALL*	Ongoing	*HMGP*
3.1.1	*Public Education and Outreach*	*Map Information*	*High*	*EMA, FP*	*ALL*	*Ongoing*	*EXIST*
3.2.1	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA, NWS*	*ALL*	*2014-2019*	*EXIST*
3.2.2	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
3.2.3	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
3.4.1	*Public Education and Outreach*	*Library*	*High*	*EMA, FP*	*ALL*	*Ongoing*	*EXIST*
3.4.2	*Public Education and Outreach*	*Library*	*High*	*EMA, FP*	*ALL*	*Ongoing*	*EXIST*
3.5.1	*Public Education and Outreach*	*Environmental Education*	*High*	*EMA*	*ALL*	*Ongoing*	*EXIST*
4.1.1	Natural Resource Protection	Open Space Easements and Acquisitions	High	Land Trust of Huntsville and North Alabama	ALL	Ongoing	EXIST
4.2.1	Natural Resource Protection	River/Stream Corridor Restoration and Protection	High	BO, MCE	FL	Ongoing	EXIST

CITY OF NEW HOPE MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
4.2.2	Natural Resource Protection	River/Stream Corridor Restoration and Protection	High	MCE	FL, L	Ongoing	EXIST
4.3.1	Natural Resource Protection	Urban Forestry Programs	High	MCE	FL, L, WF	2010-2012	EXIST
5.1.1	*Emergency Services*	*Disaster Warning*	*Low*	*EMA*	*FL*	Ongoing	*HMGP*
5.1.2	*Emergency Services*	*Disaster Warning*	*Low*	*EMA*	*ALL*	Ongoing	*HMGP*
5.1.3	*Emergency Services*	*Disaster Warning*	*High*	*EMA*	*ALL*	*2014-2019*	*HMGP*
5.1.4	*Emergency Services*	*Disaster Warning*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
5.2.1	*Emergency Services*	*Weather Radios*	*High*	*EMA*	*ALL*	*Ongoing*	*EXIST*
6.1.1	Structural Projects	Drainage System Maintenance	High	MCE	FL	Ongoing	EXIST
6.2.1	Structural Projects	Flood Conveyance Improvements	High	CE, CP	FL	Ongoing	HMGP
7.1.1	*Public Health*	*Vector Control*	*High*	*MCHD*	*PH*	*Ongoing*	*EXIST*

Table 6-7. Town of Owens Crossroads Mitigation Action Program
(See key to abbreviations at end of this chapter).

Note: *Mitigation Measures shown in italics are countywide actions that apply to all jurisdictions and are coordinated through the Hazard Mitigation Planning Committee and the Huntsville-Madison EMA.*

TOWN OF OWENS CROSSROADS MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
1.1.1	Prevention	Comprehensive Plans	Low	CP	ALL	2014-2019	EXIST
1.1.3	Prevention	Comprehensive Plan	High	CP	ALL	2014-2019	EXIST
1.2.1	*Prevention*	*GIS*	*High*	*HUDD*	*ALL*	*2014-2019*	*EXIST*
1.2.2	*Prevention*	*GIS*	*High*	*HUDD, EMA*	*ALL*	Ongoing	*EXIST*
1.3.1	*Prevention*	*Detailed Plans and Targeted Studies*	*High*	*HUDD, MCE, FP*	*FL*	Ongoing	*FEMA Map Update Program*
1.5.1	Prevention	Flood Plain Management Regulations	High	FP	FL	Ongoing	EXIST
1.5.2	Prevention	Flood Plain Management Regulations	Low	FP	FL	2010+	EXIST
1.5.3	Prevention	Flood Plain Management Regulations	High	FP	FL	Ongoing	EXIST

TOWN OF OWENS CROSSROADS MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
1.6.1	Prevention	Building and Technical Codes	High	BO	H, T, SS	Ongoing	EXIST
1.7.1	Prevention	Community Shelter and Safe Room Requirements	High	Town Council	H, T, SS	Ongoing	EXIST
1.7.2	Prevention	Community Shelter and Safe Room Requirements	High	Town Council	T, SS	Ongoing	HMGP
1.7.3	Prevention	Community Shelter and Safe Room Requirements	High	EMA	T, SS	Ongoing	HMGP
2.2.1	*Property Protection*	*Insurance*	*High*	*EMA, FP*	*FL, SH*	*Ongoing*	*EXIST*
2.3.1	Property Protection	Acquisition/ Relocation	Low	FP	FL	Ongoing	HMGP, PDM
2.4.1	Property Protection	Building Elevation	Low	FP	FL	Ongoing	HMGP, PDM
2.5.1	Property Protection	Flood Proofing	Low	FP	FL	Ongoing	HMGP
2.6.1	*Property Protection*	*Power Generation*	*High*	*EMA*	*ALL*	Ongoing	*HMGP*

TOWN OF OWENS CROSSROADS MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
3.1.1	*Public Education and Outreach*	*Map Information*	*High*	*EMA, FP*	*ALL*	*2014-2019*	*EXIST*
3.2.1	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA, NWS*	*ALL*	*2014-2019*	*EXIST*
3.2.2	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
3.2.3	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
3.4.1	*Public Education and Outreach*	*Library*	*High*	*EMA, FP*	*ALL*	*Ongoing*	*EXIST*
3.4.2	*Public Education and Outreach*	*Library*	*High*	*EMA, FP*	*ALL*	*Ongoing*	*EXIST*
3.5.1	*Public Education and Outreach*	*Environmental Education*	*High*	*EMA*	*ALL*	*Ongoing*	*EXIST*

TOWN OF OWENS CROSSROADS MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
4.1.1	Natural Resource Protection	Open Space Easements and Acquisitions	High	Land Trust of Huntsville and North Alabama	ALL	Ongoing	EXIST
4.2.1	Natural Resource Protection	River/Stream Corridor Restoration and Protection	High	BO, MCE	FL	Ongoing	EXIST
4.2.2	Natural Resource Protection	River/Stream Corridor Restoration and Protection	High	MCE	FL, L	Ongoing	EXIST
4.3.1	Natural Resource Protection	Urban Forestry Programs	High	MCE	FL, L, WF	2014-2016	EXIST
5.1.1	*Emergency Services*	*Disaster Warning*	*Low*	*EMA*	*FL*	Ongoing	*HMGP*
5.1.2	*Emergency Services*	*Disaster Warning*	*Low*	*EMA*	*ALL*	Ongoing	*HMGP*
5.1.3	*Emergency Services*	*Disaster Warning*	*High*	*EMA*	*ALL*	*2014-2019*	*HMGP*
5.1.4	*Emergency Services*	*Disaster Warning*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
5.2.1	*Emergency Services*	*Weather Radios*	*High*	*EMA*	*ALL*	*Ongoing*	*EXIST*

TOWN OF OWENS CROSSROADS MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
6.1.1	Structural Projects	Drainage System Maintenance	High	MCE	FL	Ongoing	EXIST
7.1.1	*Public Health*	*Vector Control*	*High*	*MCHD*	*PH*	*Ongoing*	*EXIST*

Table 6-8. Town of Triana Mitigation Action Program
(See key to abbreviations at end of this chapter).

Note: *Mitigation Measures shown in italics are countywide actions that apply to all jurisdictions and are coordinated through the Huntsville-Madison County EMA.*

TOWN OF TRIANA MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
1.1.1	Prevention	Comprehensive Plans	Low	CP	ALL	2014-2019	EXIST
1.1.3	Prevention	Comprehensive Plan	High	CP	ALL	2014-2019	EXIST
1.2.1	*Prevention*	*GIS*	*High*	*HUDD*	*ALL*	*2014-2019*	*EXIST*
1.2.2	*Prevention*	*GIS*	*High*	*HUDD, EMA*	*ALL*	*Ongoing*	*EXIST*
1.3.1	*Prevention*	*Detailed Plans and Targeted Studies*	*High*	*HUDD, MCE, FP*	*FL*	*Ongoing*	*FEMA Map Update Program*
1.5.1	Prevention	Flood Plain Management Regulations	High	FP	FL	Ongoing	EXIST
1.5.2	Prevention	Flood Plain Management Regulations	Low	FP	FL	2010+	EXIST
1.5.3	Prevention	Flood Plain Management Regulations	High	FP	FL	TBD	EXIST

TOWN OF TRIANA MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
1.6.1	Prevention	Building and Technical Codes	High	BO	H, T, SS	Ongoing	EXIST
1.7.1	Prevention	Community Shelter and Safe Room Requirements	High	Town Council	H, T, SS	Ongoing	EXIST
1.7.2	Prevention	Community Shelter and Safe Room Requirements	High	Town Council	T, SS	Ongoing	HMGP
1.7.3	Prevention	Community Shelter and Safe Room Requirements	High	EMA	T, SS	Ongoing	HMGP
2.2.1	*Property Protection*	*Insurance*	*High*	*EMA, FP*	*FL, SH*	Ongoing	*EXIST*
2.3.1	Property Protection	Acquisition/ Relocation	Low	FP	FL	Ongoing	HMGP, PDM
2.4.1	Property Protection	Building Elevation	Low	FP	FL	Ongoing	HMGP, PDM
2.5.1	Property Protection	Flood Proofing	Low	FP	FL	Ongoing	HMGP, PDM
2.6.1	*Property Protection*	*Power Generation*	*High*	*EMA*	*ALL*	Ongoing	*HMGP*
3.1.1	*Public Education and Outreach*	*Map Information*	*High*	*EMA, FP*	*ALL*	*2014-2019*	*EXIST*

TOWN OF TRIANA MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
3.2.1	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA, NWS*	*ALL*	*2014-2019*	*EXIST*
3.2.2	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
3.2.3	*Public Education and Outreach*	*Outreach Projects*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
3.4.1	*Public Education and Outreach*	*Library*	*High*	*EMA, FP*	*ALL*	*Ongoing*	*EXIST*
3.4.2	*Public Education and Outreach*	*Library*	*High*	*EMA, FP*	*ALL*	*Ongoing*	*EXIST*
3.5.1	*Public Education and Outreach*	*Environmental Education*	*High*	*EMA*	*ALL*	*Ongoing*	*EXIST*
4.1.1	Natural Resource Protection	Open Space Easements and Acquisitions	High	Land Trust of Huntsville and North Alabama	ALL	Ongoing	EXIST
4.2.1	Natural Resource Protection	River/Stream Corridor Restoration and Protection	High	BO, MCE	FL	Ongoing	EXIST
4.2.2	Natural Resource Protection	River/Stream Corridor Restoration and Protection	High	MCE	FL, L	Ongoing	EXIST
4.3.1	Natural Resource Protection	Urban Forestry Programs	High	MCE	FL, L, WF	2014-2016	EXIST

TOWN OF TRIANA MITIGATION ACTION PROGRAM							
Mitigation Measure #	**Goal**	**Program Objective**	**Priority**	**Lead Responsibility**	**Hazard(s)**	**Timeline**	**Possible Funding Source**
5.1.1	*Emergency Services*	*Disaster Warning*	*Low*	*EMA*	*FL*	Ongoing	*HMGP*
5.1.2	*Emergency Services*	*Disaster Warning*	*Low*	*EMA*	*ALL*	Ongoing	*HMGP*
5.1.3	*Emergency Services*	*Disaster Warning*	*High*	*EMA*	*ALL*	*2014-2019*	*HMGP*
5.1.4	*Emergency Services*	*Disaster Warning*	*High*	*EMA*	*ALL*	*2014-2019*	*EXIST*
5.2.1	*Emergency Services*	*Weather Radios*	*High*	*EMA*	*ALL*	*Ongoing*	*EXIST*
6.1.1	Structural Projects	Drainage System Maintenance	High	MCE	FL	Ongoing	EXIST
7.1.1	*Public Health*	*Vector Control*	*High*	*MCHD*	*PH*	*Ongoing*	*EXIST*

Table 6-9. Planned Projects for FEMA Funding
(See key to abbreviations at end of this chapter).

Note: *Mitigation Measures shown in italics are countywide actions that apply to all jurisdictions and are coordinated through the Huntsville-Madison County EMA.*

PLANNED PROJECTS FOR FEMA FUNDING					
Mitigation Measure #	**Project Description**	**Hazard(s) Addressed**	**Jurisdiction(s)**	**Responsibility**	**Possible Funding Source**
1.2.2	*Integrate FEMA HAZUS-MH applications for hazard loss estimations within local GIS programs. Maintain up-to-date data within GIS to apply the full loss estimation capabilities of HAZUS.*	*FL, H, EQ*	*ALL*	HUDD, EMA	*EXIST*
1.3.1	*Seek a countywide update of all FIRMs (Flood Insurance Rate Maps) in digital format, with an emphasis on detailed studies of developed and developing areas with elevations provided and floodways delineated.*	*FL*	*ALL*	*HUDD, MED, MCE*	*FEMA Map Update Program*
1.3.2	Prepare a HAZUS-MH risk assessment of earthquakes, floods, and hurricanes for the Town of New Hope.	FL, H, EQ	New Hope	CP	HMGP

PLANNED PROJECTS FOR FEMA FUNDING					
Mitigation Measure #	**Project Description**	**Hazard(s) Addressed**	**Jurisdiction(s)**	**Responsibility**	**Possible Funding Source**
2.3.1	Acquire or relocate high-risk, flood prone buildings and convert those properties to permanent open space with covenants that prevent future development. The emphasis should be buildings located within floodways, substantially damaged buildings, repetitive flood insurance loss properties, pre-FIRM buildings (constructed before the enactment of local flood plain regulations) (constructed prior to the enactment of local flood plain regulations), and critical facilities. Acquisition/relocation is preferred over building elevation or flood proofing, where most feasible.	FL	City of Huntsville, Others TBD	HUDD – Engineering, Planning, FP	HMGP, PDM
2.3.2	Acquire all floodway properties within the City of Huntsville and/or remove all structures from the floodway.	FL	City of Huntsville	HUDD – Engineering, Planning	HMGP, PDM

PLANNED PROJECTS FOR FEMA FUNDING					
Mitigation Measure #	**Project Description**	**Hazard(s) Addressed**	**Jurisdiction(s)**	**Responsibility**	**Possible Funding Source**
2.4.1	Elevate buildings, where feasible, to reduce potential flood damages. The emphasis should be on certain buildings where acquisition or relocation is not feasible and on buildings constructed before the enactment of flood plain regulations (pre-FIRM buildings (constructed before the enactment of local flood plain regulations). Elevation may be an alternative to acquisition/relocation and is preferred over flood proofing, where most feasible.	FL	TBD	FP	HMGP, PDM
2.5.1	Flood proof buildings, where feasible, to reduce potential flood damages. The emphasis should be on non-residential buildings constructed before the enactment of flood plain regulations (pre-FIRM buildings (constructed before the enactment of local flood plain regulations)). Flood proofing should only be considered if acquisition/relocation or building elevation is not feasible.	FL	TBD	FP	HMGP, PDM
2.6.1	*Installation of emergency power generation at critical facilities, as outlined in a separate critical facilities document maintained by EMA.*	*ALL*	*TBD*	*EMA*	*HMGP*

PLANNED PROJECTS FOR FEMA FUNDING					
Mitigation Measure #	**Project Description**	**Hazard(s) Addressed**	**Jurisdiction(s)**	**Responsibility**	**Possible Funding Source**
5.1.1	*Establish an ALERT flood warning system at strategic locations in the county to cover vulnerable flood locations. Sensors should provide real-time access to stream flow, stream stage, and precipitation data, at the minimum. The system should link data into GIS with the ability to use measured and forecasted rainfall to predict potential flood levels and create real-time maps of flooded areas.*	*FL*	*ALL*	*EMA*	*HMGP*
5.1.2	*Enhance the flood warning network into an All-Hazards Detection Network, including capabilities to monitor icy bridges and highways, water quality and hazardous materials spills into water ways, and air quality or hazardous air emissions. Include camera devices at select locations.*	*All*	*ALL*	*EMA*	*HMGP*
5.1.3	*Install additional outdoor warning sirens as outlined in the Comprehensive Warning Study published under separate cover by the Huntsville-Madison County Emergency Management Board.*	*All*	*ALL*	*EMA*	*HMGP*
5.1.4	*Upgrade the outdoor warning siren system's activation system to provide enhanced warning capability.*	*All*	*ALL*	*EMA*	*EXIST*

PLANNED PROJECTS FOR FEMA FUNDING					
Mitigation Measure #	**Project Description**	**Hazard(s) Addressed**	**Jurisdiction(s)**	**Responsibility**	**Possible Funding Source**
5.1.5	Upgrade and/or install mass notification/alert systems within UAHuntsville buildings to include voice alert capability. Outdoor warning sirens do not adequately penetrate sound attenuating structures such as buildings. The primary object of this measure is to provide an improved disaster alert system capable of alerting a very high percentage of campus population inside buildings.	All	UAHuntsville	UAHuntsville	HMGP
5.1.6	Install 'giant voice' alert systems in three strategic locations on the UAHuntsville campus. One of the three systems would extend coverage to the University Place Elementary School and one would extend coverage to the daycare facility on campus.	All	UAHuntsville	UAHuntsville	HMGP
6.2.1	Implement drainage improvement project within the City of New Hope.	FL	New Hope	CE, CP	EXIST/HMGP

PLANNED PROJECTS FOR FEMA FUNDING					
Mitigation Measure #	**Project Description**	**Hazard(s) Addressed**	**Jurisdiction(s)**	**Responsibility**	**Possible Funding Source**
6.2.3	Aldridge Creek and Four Mile Post Road flood control project (bridge expansion and channel improvements): engineering design and construction project to modify and expand the existing bridge opening in order to increase the hydraulic capacity of the existing bridge structure. Improvements will include channel modifications as necessary to construct smooth hydraulic transitions upstream and downstream of the bridge. The improvements are necessary to prevent overtopping of the existing roadway causing extensive flooding and damages of homes in the nearby subdivision. The flooded roadway also interrupts emergency service along Four Mile Post including a major emergency route for a nearby fire station located on Four Mile Post Road, ¼ mile east of the bridge.	FL	City of Huntsville	CE,CP	$1.5 million HMGP funds

PLANNED PROJECTS FOR FEMA FUNDING					
Mitigation Measure #	**Project Description**	**Hazard(s) Addressed**	**Jurisdiction(s)**	**Responsibility**	**Possible Funding Source**
6.2.4	Broglan Branch and Clinton Avenue flood control project (bridge expansion and channel improvements): engineering design and construction project to replace the existing undersized bridge structure in order to maximize the hydraulic capacity of the bridge. Improvements will include channel modifications as necessary to construct smooth hydraulic transitions upstream and downstream of the bridge. The improvements are necessary to prevent overtopping of the bridge and creating dangerous flood elevations and velocities across the roadway and in adjacent commercial and residential areas. The flooded roadway also interrupts emergency service through this major thoroughfare.	FL	City of Huntsville	CE,CP	$1.0 million HMGP funds

PLANNED PROJECTS FOR FEMA FUNDING					
Mitigation Measure #	**Project Description**	**Hazard(s) Addressed**	**Jurisdiction(s)**	**Responsibility**	**Possible Funding Source**
6.2.5	Broglan Branch flood control project bridge expansion and channel improvements): engineering design and construction project to increase the capacity of Broglan Branch between Holmes Avenue and Clubview Drive. Project includes channel improvements along the project limits and bridge expansion at University Drive and possible acquisition of property and homes (see mitigation measure # 2.3.2) to perform the necessary improvements. The improvements are necessary to lower dangerous flood elevations and velocities experienced by public housing residents and residential areas along the watercourse.	FL	City of Huntsville	CE,CP	$4.0 million HMGP funds

PLANNED PROJECTS FOR FEMA FUNDING					
Mitigation Measure #	**Project Description**	**Hazard(s) Addressed**	**Jurisdiction(s)**	**Responsibility**	**Possible Funding Source**
6.2.6	Peavy Creek flood control project bridge expansion and channel improvements): engineering study, design, and construction project to decrease the peak flood discharges along Peavy Creek. Project will include acquisition of property (see mitigation measure # 2.3.2), construction of a detention/retention facility, channel improvements and replacement of existing undersized bridge structure at Little Cove Road. The improvements are necessary to reduce flood heights and velocities along Peavy Creek to minimize the risk of flooding in existing homes along Peavy Creek. Existing homes were constructed using BFEs from an older firm that is scheduled to be updated with much higher BFEs.	FL	City of Huntsville	CE,CP	$4.0 million HMGP funds

PLANNED PROJECTS FOR FEMA FUNDING					
Mitigation Measure #	**Project Description**	**Hazard(s) Addressed**	**Jurisdiction(s)**	**Responsibility**	**Possible Funding Source**
6.2.7	Governors Drive/U.S. Hwy 431 drainage improvements: engineering design and construction project to increase capacity of the existing undersized drainage facilities that drain Governors Drive and convey flood waters from Governors Drive to Fagan Creek. The improvements are necessary to prevent flooding of Governors Drive. The flooding causes interruption of access by emergency vehicles due to the significant flooding of the roadway. Governors Drive is a major street (state highway) and a major thoroughfare for commercial and emergency vehicles. Huntsville's major hospital facility is located on Governors Drive.	FL	City of Huntsville	CE	$900,000 HMGP funds
6.2.8	Pinhook Creek Flood Mitigation Project: in conjunction with the U.S. Army Corps of Engineers; on Pinhook Creek from Memorial Parkway north to twin RR bridge immediately north of Holmes Avenue; and in conjunction with a previous FEMA hazard mitigation grant.	FL	City of Huntsville	CE	$28.37 million HMPG, COH, COE

PLANNED PROJECTS FOR FEMA FUNDING					
Mitigation Measure #	**Project Description**	**Hazard(s) Addressed**	**Jurisdiction(s)**	**Responsibility**	**Possible Funding Source**
6.2.9	Dallas Branch and Pinhook Creek Flood Mitigation Project: on Pinhook Creek, from twin RR bridge immediately north of Holmes Avenue, north to confluence of Dallas Branch, and Dallas Branch, upstream to Coleman Street. The city is actively pursuing projects with both the Corps of Engineers and Alabama EMA/FEMA.	FL	City of Huntsville	CE	$764,071 HMGP

Key to Abbreviations Used in Tables 6-2 through 6-9

Hazards	
FL	Flood
T	Tornado
SS	Severe Storm
EQ	Earthquake
H	Hurricane
L	Landslide
SH	Land Subsidence/Sinkholes
DH	Drought/Heat Wave/Extreme Heat
WC	Winter Storm/Extreme Cold
WF	Wildfire
DF	Dam Failure
ALL	All hazards
Responsible Party	
EMA	Huntsville-Madison County EMA
MCE	Madison County Engineer
FP	Local Flood Plain Manager
BO	Building Official
HWPCD	Huntsville Water Pollution Control Department
HUDD	Huntsville Urban Development Department
MED	City of Madison Engineering Department
CE	City/Town Engineer
MCDD	City of Madison Community Development Department
CP	City/Town Planning Consultant
AFC	Alabama Forestry Commission
TVA	Tennessee Valley Authority
COE	Corps of Engineers
MCHD	Madison County Health Department
TBD	Responsible party to be determined
Timeline	
200x	Target Year for Implementation
200x+	Target Implementation after this Year
TBD	Timeline to be Determined
Funding	
HMGP	FEMA Hazard Mitigation Grant Program (HMGP)
PDM	FEMA Pre-Disaster Mitigation Grant Program (PDM)
FMA	FEMA Flood Mitigation Assistance Grant Program (FMA)
FEMA	FEMA Grant Program – HMGP, PDM, or FMA
EXIST	Existing Local Funds
ADECA	Alabama Department of Economic and Community Affairs Funds
COE	U.S. Army Corps of Engineers
AEMA	Alabama Emergency Management Agency Funds
OTHER	Other FEMA or AEMA funding program
TBD	Funding to be Determined

Chapter 7
Plan Maintenance

7.1 The Planning Cycle

This chapter presents a continuous cycle for monitoring, evaluating and updating the plan; the process for incorporating mitigation strategies into other, ongoing planning activities; and methods for continuing public involvement. Continual plan maintenance ensures an active and relevant hazard mitigation planning process.

7.2 Procedures

The Hazard Mitigation Planning Committee (HMPC) will oversee plan maintenance during the next five-year maintenance cycle of the plan. The Huntsville Planning department and EMA staff will continue to serve as the Committee's facilitators, responsible for holding regularly-scheduled meetings, assigning specific tasks necessary to monitor and update the plan to Committee members, and serving as the Committee's liaison with those assigned implementation responsibilities in the plan. The facilitator will also serve as the Committee's liaison with participating municipalities and the County Commission. New Committee members may be nominated by any Committee member and then approved by the Committee.

After this five-year update of the plan is finalized and adopted, the Committee will meet once per year to perform the following activities:

- Evaluate the effectiveness of previously implemented mitigation actions;
- Explain why any actions are not completed or behind schedule;
- Address changing land use patterns and new developments; and,
- Identify any changes in risk assessment and/or risk vulnerability.

The facilitator will schedule the annual meeting at a time and location convenient to a majority of the Committee members. All annual meetings after FEMA approval of the plan will be advertised in the local newspaper and open to the public.

In the event modifications to the plan are warranted as a result of the annual review or other conditions, the Committee will oversee and approve all revisions to the plan. Conditions which might warrant revisions to this plan would include, but not be limited to, special opportunities for funding and/or response to a natural disaster. The Committee will submit all revisions for adoption by jurisdictions affected by the changes. Those jurisdictions will hold a public hearing before adoption of the amendments. Minor revisions (e.g. additional projects) require only approval by the HMPC and EMA director. A copy of the plan revisions will be submitted to all holders of the original plan in a timely manner.

At the end of the next five-year cycle, the Committee will oversee another major update to the plan that follows the federal planning criteria in effect at the time of the update. The updated plan will again be submitted to the AEMA and FEMA for approval.

7.3 Implementation Through Existing Programs

During the first five-year maintenance cycle, 2004-2009, this document was incorporated into the Huntsville-Madison County Emergency Operations Plan administered through the EMA office. Furthermore, this plan was adopted as an amendment to all local comprehensive plans in localities that have an adopted plan in place. Capital budgeting requirements will be incorporated into local budgeting processes.

During the second five-year maintenance cycle, 2009-2014, this document was incorporated into the Huntsville-Madison County Threat and Hazard Identification and Risk Assessment (THIRA) administered through the EMA office. Furthermore, this plan was heavily used in the recovery phase of the April 27, 2011 super tornado outbreak and F5 tornado touchdown in Madison County. The plan was edited due to community response to this disaster to include public and community storm shelters as a mitigation measure, as well as a private individual safe room program.

During the next five year maintenance cycle, 2016-2021, this plan will continue to serve as a starting point for all current and future mitigation activities. New mitigation measures discussed by the Committee will be incorporated into this plan using the process discussed above

7.4 Continuing Public Involvement

A critical part of maintaining an effective and relevant natural hazards mitigation plan is ongoing public review and comment. Consequently, the HMPC is dedicated to direct involvement of its citizens in providing feedback and comments on the plan throughout the five-year implementation cycle.

To this end, a hard copy of the plan will be available for viewing at the Huntsville-Madison County EMA Office and a digital copy of the plan will be available at www.madisoncountyema.com/mplan.html with an invitation for the public to comment and suggest updates for the plan via a direct link to email the vice-chair of the Committee.. The EMA will coordinate any public comments and feedback to the HMPC.

Public meetings will be held when deemed necessary by the HMPC. The public will be able express their concerns, ideas and opinions at the meetings. Public hearings will be held during the drafting stage of the five-year plan update and to present the final plan to the public before adoption by each of the participating jurisdictions.

7.5 Ongoing Planning Needs

The mitigation planning program detailed in this plan has become a continuous process of profiling new natural hazard events; assessing vulnerabilities as new information arises and conditions change; monitoring changing assets and affected populations; and keeping current on evolving mitigation measures. This ongoing planning program was established during the first five-year maintenance cycle by all jurisdictions. All participating

jurisdictions will continue to use this plan as a starting-point for any future mitigation actions or discussion of new mitigation ideas.

The 2014 update process was hindered by HAZUS 2012 software and data update issues. However, the Committee worked around the HAZUS 2012 software problem and found a new source of data, the Madison County Tax Assessor's Office, for tables 4-18 through 4-22. In fact, data provided by the Tax Assessor was so extensive and detailed that the Committee chose to add two additional tables, 4-21A and 4-22A, to detail quantities and values of different types of residential properties in Madison County. The usefulness of this plan was enhanced by accounting for differing values of mobile homes, multi-family residences and single family residences in the new 2014 update.

However, two ongoing planning needs were identified due to the incompatibility of HAZUS 2012 data. Firstly, tables 4-18 through 4-23 in Chapter 4 no longer contain the column for "government buildings". The Madison County Tax Assessor does not collect taxes on government buildings and thus did not have inventory or value data for these buildings. This data is considered by the Committee to be important to the plan. It is the goal of the Committee to find alternate sources for this data by autumn 2015.

Secondly, map 4-9 and map 4-17 were unable to be accurately updated due to HAZUS 2012 inaccuracies. Fortunately, City of Huntsville GIS found accurate bridge data from the State of Alabama for updating map 4-17.

Map 4-9, titled "Dams in Madison County" continues to be a problem for the Committee, due to a lack of consensus among jurisdictions, or at the state level, for the definition of a dam. Section 4.13 of the plan, "Dam/Levee Failures," is no longer complete. Previous versions of the plan included two paragraphs discussing eleven dams in Madison County and a rating system for those dams from HAZUS 2012 data. Additionally, one paragraph in this section described "nine dams" on the Corps of Engineers inventory. The Committee concurred during the 2014 update process that these two paragraphs were inaccurate. The Madison County Engineer provided data on four dams in Madison County for which the Madison County Engineering Department has responsibility. None of the municipalities reported any dams within their jurisdictions, based primarily on their inability to define what constitutes a "dam". Huntsville GIS used the County Engineer's data to create the new Map 4-9 with four dams. The Committee intends to agree upon the definition of a dam for the purposes of this plan; and to gather actual data for any additional dams inside Madison County not currently included on Map 4-9. It is the goal of the Committee to resolve the dam data discrepancy between the "eleven dams" listed in HAZUS and the four dams monitored by the County Engineer during the next 5-year update process.

Otherwise, the 2014 update process went very smoothly. 2010 Census data was incorporated into the plan during the 2012 update process. However, the Committee chose to update several statistics, demographics and maps in Chapters 2 and 4 with the most current 2014 data available. The City of Huntsville GIS department was integral to this effort.

7.6 Results of Plan Maintenance 2009-2014

The Committee, the LEPC and the EMA have maintained the plan based on the original guidelines in Chapter 7 of the initially approved 2004 version of the plan. Much of these guidelines still apply to the goals of the Committee for maintaining the plan during the next 5-year cycle. The planning cycle, procedures and goals of implementation, continued public involvement and ongoing mitigation planning, as listed above, have been observed throughout the recent 5-year plan maintenance period.

During the last five-year planning cycle, 2009-2014, the Committee met annually to review the plan; and made annual updates and edits to the plan, as required. Many of those edits and updates are discussed throughout the plan in detail. Minor edits were voted on by the HMPC. One major revision, a Limited Amendment, was sent upward and approved by AEMA and FEMA in July of 2011 in response to the April 27, 2011 disaster. This Limited Amendment was in direct response to public comment as well as public requests to EMA and many of the Plan's participating jurisdictions. The public was integral to this Limited Amendment.

Public opportunity to view the plan online continued throughout the 2009-2014 planning cycle and during the 2014 update process. A public meeting was held on November 5, 2014. Additionally, public hearings will take place before each jurisdiction adopts the fully revised 2014 plan.

This chapter was edited to reflect the progress made by the Committee and Madison County as a community to mitigate for natural hazards over the first five year maintenance period of this plan since its initial adoption in 2004. Additionally, the Committee chose to describe necessary data updates and improvements to be made to the plan over the next five-year maintenance period in this chapter.

The Madison County community will continue to refer to this plan for all natural hazard mitigation planning purposes and will incorporate this plan into future mitigation agendas.

Appendix
Sign-In Sheets, Agendas, Minutes, Public Meeting Notice Legal Ad and Twitter Notice

Natural Hazard Mitigation Planning Committee
Plan Review and Update Meeting
Huntsville-Madison County EMA EOC
July 31, 2014

NAME	Organization/Jurisdiction Representing
Chris Goins	City of Madison PWD
Greg Bates	City of Madison Eng.
Mike Gentle	City of Madison
Paige Colburn	HSV-Madison County EMA
Harry Hobbs	Huntsville Utilities
Cheryl Clay	Madison Co Health Dept.
Brian Kilgore	MSFC NASA
Don Webster	HEMSI
Jared Cassidy	EMA
Ben Ferrill	Hsv Planning Dept
Kevin Bennett	UAH
Dave Nadler	NWS
Amy Kenum	COHSV
Greg Garvey	HMCPA
Barry Gleason	City of Huntsville - Engineering
Kim Passalacqua	City of New Hope
Troy Trulock	City of Madison
Scott Worsham	Town of Owens Cross Roads

New Hope EMA Task Force
Mitigation Plan Meeting
Sept. 3, 2014 5PM

Name	Agency
Paige Colburn	Huntsville-Madison Co. EMA
Kay Manley	City Council-New Hope
Ronald Schrimsher	New Hope Vol Fire Dept.
Butch Taylor	mayor city of New Hope
Steven Dick	Chief of Police
Billy R. Colburn	Citizen-Storm Shelter Key Holder
Kim Passalaqua	City Clerk, City of New Hope

Natural Hazard Mitigation Planning Committee
Plan Review and Update Meeting
September 30, 2014

NAME	Organization/Jurisdiction Representing
Jared Cassidy	EMA
Mike Gentle	MPW
Greg Bates	COM
Chris Coins	Madison Public Works.
Paige Colburn	HSV-Mad. Co. EMA
Bob Hammons	Gurley Town Administrator
Bill Dean	Gurley Council
Kevin Bennett	UAH
Hosea Matthews	Madison County
Cheryl Clay	Madison Co. Health Dept.
Ben Ferrill	City of Hsv - Planning Div.
Amy Kenum	COH GIS.
Susie Russell	EMA
Shannon Hunsucker	Town of Triana
Gary Gleason	COH Eng.

Sign In Sheet

Town of Gurley Mitigation Plan Meeting 10/10/14

Name	Agency/Organization
Bob HAMMONS	Town Administration, Town of Gurley
Jared Cassidy	Madison Co. EMA
Paige Colburn	HSU-Madison Co. EMA

2014 Madison County Natural Hazard Mitigation Plan
Open House Public Meeting
Location: City of Huntsville Public Service Building, 320 Fountain Circle
November 5, 2014
2:30 PM – 4:30 PM

NAME	Organization/Community Representing	Email or Phone
Amy Kenum	COH GIS	amy.kenum@huntsvilleal.gov
BOB HAMMONS	GURLEY, AL	2013gurleyxc@gmail.com
Tom Cash	ARES / RACES CERT	tomcash@hiwaay.net
Mike Gentle	MPW	mike.gentle@madisonal.gov
GREG BATES	CITY OF MADISON ENGINEERING	GREG.BATES@MADISONAL.GOV
Keith Ward	HSV	Keith.Ward@hsv-k12.org
Jared Cassidy	EMA	jared.cassidy@huntsvilleal.gov
Paige Colburn	EMA	Paige.Colburn@huntsvilled.gov
Kevin Bennett	UAH	kevin.bennett@uah.edu
Cheryl Clay	Health Dept.	Cheryl.clay@alph.state.al.us

2014 Madison County Natural Hazard Mitigation Plan
Open House Public Meeting
Location: City of Huntsville Public Service Building, 320 Fountain Circle
November 5, 2014
2:30 PM – 4:30 PM

NAME	Organization/Community Representing	Email or Phone
Harry Hobbs	Huntsville Utilities	256-783-1793 harry.hobbs@hsvutil.org
Michael Fitzgibbon	Individual - public	michael@realestate.com
Megan Brooks	COH	megan.brooks@huntsvilleal.gov
Gary L. Gleason	COH - Eng.	gary.gleason@huntsvilleal.gov
Lauren Nash	NOAA-NWS	Lauren.Nash@noaa.gov
Tina LaFountain	PAR & CERT	tlafountle3@yahoo.com 256-337-0819
DAVID NADLER	NWS	
JOHN "ROCK" ROSSER	EMA	
Ben Ferrill	COH Planning Div	Ben.Ferrill@huntsvilleal.gov
HOWARD MATTHEWS	MADISON CO. DRW	HMATTHEWS@MADISONCOUNTYAL.GOV

2014 Madison County Natural Hazard Mitigation Plan
Open House Public Meeting
Location: City of Huntsville Public Service Building, 320 Fountain Circle
November 5, 2014
2:30 PM – 4:30 PM

NAME	Organization/Community Representing	Email or Phone
Scott Worsham	Town of Owens Cross Roads	(256) 725-9163
Kim Passalaqua	City of New Hope	256-653-0223

Madison County Hazard Mitigation Planning Committee
Meeting Agenda
July 31, 2014 10:30AM

1. Introduction and Housekeeping items — Jared Cassidy

2. Brief Overview of 2014 Mandatory 5-year Update — Jared Cassidy
   a. Additional Committee meetings this year
   b. Public Meeting
   c. All municipalities, townships, County sign plan
   d. State and FEMA review process timeline

3. Mitigation Action Programs and Measures Charts — Paige Colburn

4. Additional necessary plan updates — Paige Colburn
   a. Narrative sections
   b. NWS data update 2013/14

5. Other Committee Discussion
   Committee

6. Set next meeting date- September, 2014
   Committee

7. Adjourn
   Madison County Hazard Mitigation Planning Committee

Meeting Agenda
September 30, 2014 2:00PM

1. Introduction and Housekeeping items — Jared Cassidy

2. Brief Overview of 2014 Mandatory 5-year Update — Jared Cassidy
    a. Updates so far – maps, charts, NWS data

3. Narrative plan updates — Paige Colburn

4. Jurisdiction updates — Paige Colburn

5. Other Committee Discussion
    Committee

6. Set public meeting date- October, 2014
    Committee

7. Adjourn

Madison County Hazard Mitigation Planning Committee
Meeting Minutes
July 31, 2014 10:30AM

1. Introduction and Housekeeping Items
    a. Co-Chair, Jared Cassidy welcomed the committee and covered house-keeping items.
    b. Committee members conducted introductions around the room.

2. Brief Overview of 2014 Mandatory 5-year Update
    a. Jared Cassidy covered the annual review timeline.
    b. The current plan expires in May of 2015.
    c. The newly updated plan must be submitted to FEMA within six months of the expiration date, so December of 2014.
    d. There will be a public meeting this year, tentatively October.

3. Mitigation Action Programs and Measures Charts
    a. Paige Colburn covered the two handouts for the Committee.
    b. The Mitigation Action Measures chart is in Chapter 6 of the plan, as well as the individual jurisdiction breakdown, also in Chapter 6.
        i. The chapters can be found online at: www.madisoncountyema.com/mplan.html
        ii. Each jurisdiction should download Chapter 6 and review the landscape-oriented chart at the end specific to their jurisdiction. It lists each mitigation measure and/or mitigation action program by jurisdiction. Additions, edits, or deletions are required for the 2014 update, and need to be submitted to EMA prior to the September meeting.
        iii. The second chart, oriented vertically, or portrait, lists the measures and action programs numerically and incorporates paragraph summaries of each measure. This chart should be used by jurisdiction representatives to reference the measure/action program numbers listed for their jurisdiction in the first chart to learn greater details about each measure or action program from the second chart.
    c. This is “homework” to be completed between now and the next Mitigation Planning Committee meeting in September.
    d. EMA representatives are available to meet one-on-one to discuss changes to these charts with jurisdictions.
    e. The changes to these mitigation action programs and measures represent the majority of the 5-year update process in 2014.
    f. Funding may not currently be available for all programs/measures listed.
        i. Jurisdictions should add “desired” programs or measures, in hopes of future funding.
        ii. Remember in order for a project to receive future post-disaster mitigation funds, it must be listed in this plan.

4. FEMA Plan Update Evaluation Worksheet
    a. Paige Colburn walked the Committee through Worksheet 7.2 from FEMA 2013 Local Mitigation Handbook.
    b. Under Planning Process: A change in public support and decision maker priorities needs to be added to the plan due to the addition of private safe rooms and community storm shelters to the plan during the 2011 update process.
    c. Under Capability Assessment: Cheryl Clay, Madison County Health Department discussed the October 2011 Clean Water Act and how any jurisdiction with 6400 acres per year or more sprayed for mosquitos must receive a permit from the health department unless the Governor has declared a disaster in which case the jurisdictions have 30 days to conduct emergency vector control and coordinate with ADEM and ADPH.
    d. Don Webster, HEMSI, asked Health Department about its jurisdiction capabilities since they are funded by City of Huntsville. Cheryl responded that the Health Department can conduct vector control throughout the county as requested only when the Governor has declared an emergency.
    e. NFIP Participation: Gary Gleason, City of Huntsville Engineering, stated no new participation changes in the participating jurisdictions since the last plan update.
    f. Under Risk Assessment: Amy Kenum, City of Huntsville GIS, has updated all the maps for Chapter 2 and Chapter 4 of the plan for the 2014 update process.
        i. Critical facilities need to be added by the jurisdictions to include the community storm shelters.
    g. Under Mitigation Strategy: Jared Cassidy informed the Committee, elements of the plan have been incorporated into other planning mechanisms, specifically the THIRA in 2013, which used many aspects of the MCNHMP and added man-made disasters and terrorism.

5. Other Committee Discussion
    a. Rusty Russell, EMA, discussed the issue of the City of Huntsville and the City of Madison having jurisdiction in Limestone County. Does this mean Huntsville and Madison have to adopt the mitigation plan for Limestone County as well as Madison County?
        i. EMA will research this question and present the answer at the September meeting.
6. Set next Committee meeting
    a. September, 2014
    b. Kim Passalaqua, City of New Hope, requested a date not at the end of the month as municipalities run annual budget reports at that time.
    c. Don Webster, HEMSI, requested to avoid September 11th, as memorial events happen throughout that week.
    d. Paige Colburn will email the proposed meeting date with the minutes from this meeting.

7. Adjourn

Madison County Hazard Mitigation Planning Committee
Meeting Minutes
September 30, 2014 2:00PM

1. Introduction and Housekeeping Items
    a. Co-Chair, Jared Cassidy, called the meeting to order at 2:07PM, welcomed the committee and covered house-keeping items.
    b. Committee members conducted introductions around the room.

2. Brief Overview of 2014 Mandatory 5-year Update
    a. Jared Cassidy covered the annual review timeline.
    b. Public Meeting date set: November 5, 2014.
    c. The current plan expires in May of 2015. All jurisdictions have to adopt the new plan before then.
    d. The updated plan must be submitted to FEMA within six months of the expiration date, so December of 2014.

3. Updates to Chapter 2 and 4
    a. Co-Chair walked the Committee through all the updated narratives, charts and maps in Chapter 2 and Chapter 4.
    b. Since our July meeting, Committee members sent emails with plan updates to the Co-Chairs.
    c. Table 2-1 population is 2010 Census Data
        i. Amy Kenum, City of Huntsville GIS, stated that she made updates to Chapter 2 population and city limits maps current to July 2014.
    d. Table 2-3, Climate Data, was last updated in 2012 and now has most recent data from Climate Center.
    e. Chapter 4 Hazard Risk Assessment is legacy material from the original 2004 plan.
    f. Chapter 4: Review of historical data, no new disaster declarations since 2011.
    g. Map 4-9 and Map 4-17
        i. GIS is incapable of updating these maps with HAZUS data because it is incompatible.
        ii. GIS can get bridge data from the State.
        iii. Each jurisdiction should send their dam data to Amy Kenum, GIS.
        iv. GIS may be able to get both of these maps updated by Nov 5, 2014.
    h. Table 4-19 and 4-20
        i. These tables were updated with Tax Assessor data which does not include government buildings.
        ii. In Chapter Seven of the plan, Co-Chair Paige Colburn set a goal date of January 2016 to update these tables to include government buildings.
        iii. Greg Bates, City of Madison, asked if the government building value the Committee was looking for is assessed value or insured value.
            1. Amy Kenum, GIS, says total value of buildings, <u>not</u> property, just the buildings.

iv. School buildings and values are also not in these tables.
    1. Schools were not in Tax Assessor's data.
    2. Goal date for inclusion of this data is January, 2016.

i. Table 4-23
    i. EMA was unable to find a new source of data to update this table.
    ii. City of Madison suggested insurance companies.
    iii. Houston Matthews, Madison County, suggested deleting the table.
    iv. EMA will continue to look into updating the table, but can delete if necessary.
    v. Committee voted to delete Table 4-23 if a suitable data cannot be found.

4. Narrative updates to all other chapters
    a. Co-Chair Paige Colburn walked the Committee through Chapter 0
        i. The membership of the Committee was discussed.
            1. Representatives from Gurley corrected the Mayor of Gurley's name to Robert Sentell.
    b. Chapter 1 : Discussion of Public Meeting, November 5, 2:30PM to 4:30PM
    c. Chapter 3: Table 3-1
        i. Several inconsistences between Committee membership in Chapter 0 & Chapter 3.
        ii. The consensus of the Committee was to remove Table 3-1.
    d. Chapter 5: Section 5-5
        i. Rusty Russell, EMA, suggested removing specific reference to James Clemens High School as a Community Shelter.
            1. Add language to the effect: "schools may or may not open shelters to the general public."
        ii. Add "To date," to last sentence of shelter registration paragraph.
    e. Ben Ferrill, City of Huntsville, said there is another floodplain mitigation project to be added to the plan. Shane Davis will contact Committee with wording.
    f. Madison County Health Department asked that Vector Control measure reference mosquitos specifically; consider adding a measure for rats and other vermin.

5. Public Meeting Date: November 5, 2014 at Public Services Building, 320 Fountain Circle, Huntsville, 35801. 2:30PM-4:30PM.

6. Adjourn

LEGALS

documents online: Alabama Graphics. Ad-[illegible] direct prior to bid date, otherwise deposit will be forfeited. Deposit will be refunded in full on sets issued to each General Contractor Bidder submitting a bonafide bid, upon the return of documents in good, reusable condition within ten (10) days after receipt of proposals.

Bids received from General Contractors who are not on the Official Bidders List may not be accepted or opened. Lathan Associates Architects, P.C. makes no guarantee for plans and specifications obtained by Contractors and Vendors from sources other than the printed contract documents provided by their firm. Contractors and Vendors who base their pricing from contract documents obtained from other electronic sources, either in part or whole, do so at their own risk.

Bids must be submitted on proposal forms furnished by the Architect or copies thereof, issued either with the original contract documents or by addendum. General Contractors shall not use Proposal Forms created by use of electronic scan or other electronic means.

All bidders bidding in amounts exceeding that established by the State Licensing Board for General Contractors must be licensed under the provisions of Title 34, Chapter 8, Code of Alabama, 1975. The Bidder must display current General Contractor's License Number on the outside of the sealed envelope in which the proposal is delivered or it will not be considered by the Architect or Owner. The Owner reserves the right to reject any or all proposals and to waive technical errors if, in the Owner's judgment, the best interests of the Owner will thereby be promoted.

In awarding the Contracts, preference will be given to Alabama resident contractors and a nonresident bidder domiciled in a state having laws granting preference to local contractors shall be awarded the Contract only on the same basis as the nonresident bidder's state awards contracts to Alabama contractors bidding under similar circumstances.

Vestavia Hills City Board of Education
Awarding Authority
Lathan Associates Architects, P.C.
205-988-9112
Huntsville Times: October 29, 2014

ADVERTISEMENT FOR BIDS

Sealed proposals will be received by the Vernon Water and Sewer Board at the office of the Board,
located at: 141 1st Ave. NE (PO Box 481), Vernon, Alabama 35592, until 2:00 PM Local Time, Tuesday,
December 9, 2014, for the below mentioned project, at which time the proposals will be publically opened and read.

LAGOON IMPROVEMENTS
FY 2014 CLEAN WATER STATE REVOLVING FUND
for the
VERNON WATER AND SEWER BOARD
VERNON, ALABAMA

A cashiers check or bid bond payable to the VERNON WATER AND SEWER BOARD in an amount not
less than five (5) percent of the amount of the bid must accompany the bidder's proposal. Performance and statutory
Labor and material Payment Bonds, and insurance in compliance with requirements, [illegible]

PO Box 481
Vernon, AL 35592
Jeff Randolph, Chairman
(205) 695-9274
GOODWYN, MILLS & CAWOOD, INC.
44750 Hwy 17 (PO Box 577)
[illegible]

30 days from the last date of publication, exclusive of the last date of publication, or judgment by default may be entered and the cause set for hearing ex parte as to said respondents. If there is no answer, a hearing on Petitioner's motion for default judgment shall be heard on December 2, 2014. Failure to answer or appear may result in termination of Respondents' parental rights to the children referenced above.

This 8th day of October, 2014.
Pat M Fraley
Attorney
Rebecca N. Bartlett
Clerk and Master
Huntsville Times: Oct 8, 15, 22, 29, 2014

MORTGAGE FORECLOSURE SALE

Default having been made in the payment of the indebtedness secured by that certain mortgage executed by TEX MAYHALL AND MELVA MAYHALL, INDIVIDUALLY AND AS HUSBAND AND WIFE, to ALFA FINANCIAL CORPORATION on AUGUST 31, 2005, said mortgage being recorded in the Office of the Judge of Probate of MADISON County, Alabama, at INSTRUMENT NUMBER 20061004000580450, the undersigned ALFA FINANCIAL CORPORATION, as mortgagee (or transferee), under and by virtue of the power of sale contained in said mortgage, will sell at public outcry to the highest bidder for cash, at the entrance of the Courthouse of MADISON County, Alabama, on DECEMBER 12, 2014, between the legal hours of sale, the following described real estate situated in MADISON County, Alabama, to wit:

LOT 2, BLOCK 6, ACCORDING TO THE MAP OF SURVEY OF REDSTONE SUBDIVISION, SECOND ADDITION, AS RECORDED IN PLAT BOOK 1, PAGE 259, PROBATE RECORDS OF MADISON COUNTY, ALABAMA.

Subject to all zoning, easements, restrictions, restrictive covenants and reservations appearing of record. Said sale will also be made subject to any Federal Tax Liens, Ad Valorem Real Estate Taxes and/or Special Assessments of any nature, if any, which might adversely affect the title to the property. The property is being sold "as is, where is". Said property is sold without warranty or recourse, expressed or implied as to title, use, enjoyment or condition. The mortgagee or transferee reserves the right to bid for and purchase the real estate and credit its purchase price against the expenses of sale and the indebtedness secured by the real estate. All bidders will be required to execute a bidding agreement prior to sale. Copies of the bidding agreement may be obtained prior to the sale. The successful bidder will be required to pay the bid amount at the time of sale in cash or certified funds.

This sale is made for the purpose of paying the indebtedness secured by said mortgage, as well as the attorneys fees and expenses of foreclosure. This sale is subject to cancellation or postponement.

ALFA FINANCIAL CORPORATION,
Mortgagee-Transferee
Leonard N. Math
Chambless Math - Carr, P.C.
P.O. Box 230759
Montgomery, Alabama 36123-0759
334-272-2230
Huntsville Times: Oct. 29, Nov. 5, 12, 2014

MORTGAGE FORECLOSURE SALE

Default having been made in the payment of the indebtedness secured by that certain [illegible]

might adversely affect the title to the property. The property is being sold "as is, where is". Said property is sold without warranty or recourse, expressed or implied as to title, use, enjoyment or condition. The mortgagee [illegible]

[illegible] subsequently transferred to Citimortgage, Inc; Citimortgage, Inc, under and by virtue of the power of sale contained in said mortgage, will sell at public outcry to the highest bidder for cash, in front of the main entrance of the Madison County Courthouse, in Huntsville, Alabama, on November 12, 2014, during the legal hours of sale, the following described real estate, situated in Madison County, Alabama, to-wit:

ALL THAT PARCEL OF LAND IN CITY OF HUNTSVILLE, MADISON COUNTY, STATE OF ALABAMA, AS MORE FULLY DESCRIBED IN DEED BOOK 777, PAGE 493, ID#2473, BEING KNOWN AND DESIGNATED AS LOT 8, BLOCK 7, CEDAR VALLEY, FILED IN PLAT BOOK 5, PAGE 67.

BY FEE SIMPLE DEED FROM FRANK HAYES III AND REBECCA SPIERS HAYES, HUSBAND AND WIFE AS SET FORTH IN BOOK 777 PAGE 493 DATED 08/30/1991 AND RECORDED 09/03/1991, MADISON COUNTY RECORDS, STATE OF ALABAMA.

This sale is made for the purpose of paying the indebtedness secured by said mortgage, as well as the expense of foreclosure.

Citimortgage, Inc
Transferee
Jauregui & Lindsey, LLC
2110 Devereux Circle
Birmingham, AL 35243
205-983-8888
Huntsville Times: Oct. 15, 22, 29, 2014

NOTICE OF MORTGAGE FORECLOSURE SALE
ALABAMA, MADISON COUNTY Default having been made pursuant to the terms of that certain mortgage executed by Denise Lashore, an unmarried woman to Mortgage Electronic Registration Systems, Inc., acting solely as nominee for Countrywide Home Loans, Inc. its successors and assigns dated October 31, 2006, said mortgage being recorded in Instrument No. 20061102000790580 in the Office of the Judge of Probate of Madison County, AL said Mortgage was last sold, assigned and transferred to The Bank of New York Mellon FKA The Bank of New York, as Trustee for the certificateholders of the CWABS, Inc., ASSET-BACKED CERTIFICATES, SERIES 2006-25. The Bank of New York Mellon FKA The Bank of New York, as Trustee for the certificateholders of the CWABS, Inc., ASSET-BACKED CERTIFICATES, SERIES 2006-25, under and by virtue of the power of sale contained in said mortgage, will sell at public outcry to the highest bidder for cash before the courthouse door at Madison County, AL during the legal hours of sale, on November 6, 2014 the following real estate, situated in Madison County, AL, to-wit: Lot 5, Block A, according to the map of survey of Davis Hills Estates Subdivision, as recorded in Plat Book 3, Page 120, in the Office of the Judge of Probate, Madison County, Alabama. Said property is commonly known as 3803 Knollwood Dr NW, Huntsville, AL 35810. The indebtedness has been and is hereby declared due and payable because of default under the terms of said Mortgage and Note, including but not limited to the nonpayment of the indebtedness as and when due. The indebtedness remaining in default, this sale will be made for the purpose of paying the same, all expenses of the sale, including attorney's fees and all other payments provided for under the terms of the Mortgage and Note. Said property will be sold subject to the following items which may affect the ti- [illegible]

NOTICE OF MORTGAGE FORECLOSURE SALE
ALABAMA, MADISON COUNTY Default having been made pursuant to the terms of that certain mortgage executed by Julie A. [illegible]

Default having been made in the payment of the indebtedness secured by that certain Mortgage executed by Barry D. Jackson, a single person, to Regions Mortgage, Inc., dated the 28th day of June, 1996, which Mortgage was recorded in the Office of the Judge of Probate of Madison County, Alabama, in Book 2202, at Page 1043; said Mortgage having been transferred and assigned by Regions Mortgage, Inc. to Alabama Housing Finance Authority by virtue of that certain Assignment of Mortgage dated September 9, 1996 and recorded in said Probate Office in Book 2222, at Page 390; said Mortgage having been transferred and assigned by Alabama Housing Finance Authority to Regions Mortgage, Inc. by virtue of that certain Assignment of Mortgage dated January 8, 1997 and recorded in said Probate Office in Book 2262, at Page 1018; said Mortgage having been further transferred and assigned by Regions Bank dba Regions Mortgage, as successor by merger to Regions Mortgage, Inc. formerly known as Real Estate Financing, Inc. to Alabama Housing Finance Authority by virtue of that certain Assignment of Mortgage dated August 2, 2005 and recorded in said Probate Office as Instrument Number 20050809000395070. The undersigned Alabama Housing Finance Authority as Assignee of said Mortgage will, under and by virtue of the power of sale contained in said Mortgage, sell at auction to the highest bidder for cash before the main entrance of the Madison County Courthouse in the City of Huntsville, Alabama, during the legal hours of sale on December 10, 2014, the real property described in said Mortgage, which said description is hereby referred to and made a part hereof, said property being situated in Madison County, Alabama, to-wit:

Lot 15, Block 7, according to the map of survey of Hillandale Addition, Huntsville, Alabama, as recorded in Plat Book 1, Page 222, in the Office of the Judge of Probate of Madison County, Alabama.

This sale is made for the purpose of realizing the mortgage debt, together with all expenses of the sale, including a reasonable attorney's fee.

SASSER, SEFTON & BROWN, P.C.
Bowdy J. Brown, Esq.
445 Dexter Avenue, Suite 8050
Montgomery, Alabama 36104
Our File No.: 49696-1372
ATTORNEYS FOR ASSIGNEE
ALABAMA HOUSING FINANCE AUTHORITY
ASSIGNEE
Huntsville Times: Oct. 29, Nov. 5, 12, 2014

NOTICE OF MORTGAGE FORECLOSURE SALE

Default having been made in the payment of the indebtedness secured by that certain Mortgage executed by Delannie P. Pettus, an unmarried woman, to CTX Mortgage Company, dated the 30th day of June, 1998, which Mortgage was recorded in the Office of the Judge of Probate of Madison County, Alabama, in Book 2338, at Page 772; said Mortgage having been transferred and assigned by CTX Mortgage Company to Alabama Housing Finance Authority by virtue of that certain Assignment of Mortgage dated June 30, 1998 and recorded in said Probate Office in Book 2590, at Page 665, as corrected and re-recorded in Book 2663, at Page 281; said Mortgage having been transferred and assigned by Alabama Housing Finance Authority to Regions Mortgage, Inc. by virtue of [illegible]

Block 1: Lot 1 & 2, Block 2: Lot 1, Block 6: Lot 1 and 24, Block 7: Lot 1 and 24, Block 8: Lot 1 & 14, Block 9, of Green Hills Subdivision as recorded in Plat Book 2, Page 115, as recorded in Plat Book 2, Page 153, in the Office of the [illegible]

[illegible] corded in the Office of the Judge of Probate of Madison County, Alabama, as Instrument Number 20080129000049560; said Mortgage having been transferred and assigned by Mortgage Electronic Registration Systems, Inc. (solely as nominee for Lender, Consumer First Mortgage, Inc., and Lender's successors and assigns) to Alabama Housing Finance Authority by virtue of that certain Assignment of Mortgage dated November 6, 2013 and recorded in said Probate Office as Instrument Number 20131113000722840. The undersigned Alabama Housing Finance Authority as Assignee of said Mortgage will, under and by virtue of the power of sale contained in said Mortgage, sell at auction to the highest bidder for cash before the main entrance of the Madison County Courthouse in the City of Huntsville, Alabama, during the legal hours of sale on December 2, 2014, the real property described in said Mortgage, which said description is hereby referred to and made a part hereof, said property being situated in Madison County, Alabama, to-wit:

Lot 224, according to the plat of survey of Bainbridge Phase Three, a resubdivision of Tract III of Bainbridge Phase Two (recorded in document number 20051220000652700), a resubdivision of Tract II of Bainbridge Phase One (recorded in document number 20041015000438130), as recorded in document number 20070316000189600, in the Office of the Judge of Probate of Madison County, Alabama.

This sale is made for the purpose of realizing the mortgage debt, together with all expenses of the sale, including a reasonable attorney's fee.

SASSER, SEFTON & BROWN, P.C.
Bowdy J. Brown, Esq.
445 Dexter Avenue, Suite 8050
Montgomery, Alabama 36104
Our File No.: 49686-1058
ATTORNEYS FOR ASSIGNEE
ALABAMA HOUSING FINANCE AUTHORITY
ASSIGNEE
Huntsville Times: Oct. 22, 29, Nov. 5, 2014

NOTICE OF MORTGAGE FORECLOSURE SALE

Default having been made in the payment of the indebtedness secured by that certain Mortgage executed by Sonia K. Kitchens and Gary Kitchens, wife and husband, to BancorpSouth Bank, dated the 10th day of August, 2009, which Mortgage was recorded in the Office of the Judge of Probate of Madison County, Alabama, as Instrument Number 20090810000529870. The undersigned Mortgagee, BancorpSouth Bank, will, under and by virtue of the power of sale contained in said Mortgage, sell at auction to the highest bidder for cash before the main entrance of the Madison County Courthouse in the City of Huntsville, Alabama, during the legal hours of sale on December 10, 2014, the real property described in said Mortgage, which said description is hereby referred to and made a part hereof, said property being situated in Madison County, Alabama, to-wit:

Lots No. 12, 13, 14 and 15 in Block A according to the plat of Mann Addition situated in New Hope as shown by record of said plat in Deed Book 117, pages 94 and 95 of the Probate Records of Madison County, Alabama.

This sale is made for the purpose of realizing the mortgage debt, together with all expenses of the sale, including a reasonable attorney's fee.

SASSER, SEFTON & BROWN, P.C.
[illegible]

2014 the following property, situated in Madison County, Alabama, to-wit: All that certain land situated in the State of Alabama, County of Madison, City of Huntsville, described as follows: Lot 11, Block H, [illegible] this 22nd day of October, 2014.
/s/ Tommy Ragland
Judge of Probate Court
Huntsville Times: Oct. 29, Nov. 5, 12, 2014

PUBLIC NOTICE

A public meeting will be held Wednesday, November 5, 2014 from 2:30PM to 4:30PM in the Huntsville Public Service Building, 320 Fountain Circle, Huntsville, AL 35801 to review the Natural Hazards Mitigation Plan (NHMP). The Madison County Hazard Mitigation Committee invites the public to ask questions or offer comments at the meeting. The public may view the current NHMP online at
www.madisoncountyema.com/mplan.html and make comments via an email link on the website. Call 256-427-5130 for information regarding the meeting or the NHMP.
Huntsville Times: October 29, 2014

REED CONTRACTING SERVICES, INC. hereby gives notice of completion of contract with Aldridge Creek Bank Stabilization located in the City of Huntsville, Alabama (Periodic Project). This notice will appear for four (4) consecutive weeks beginning on 10/29/14 and ending on 11/19/14. All claims should be filed at 2512 Triana Boulevard, SW, Huntsville, AL 35805 during this period.
Huntsville Times: October 29, November 5, 12, 19, 2014

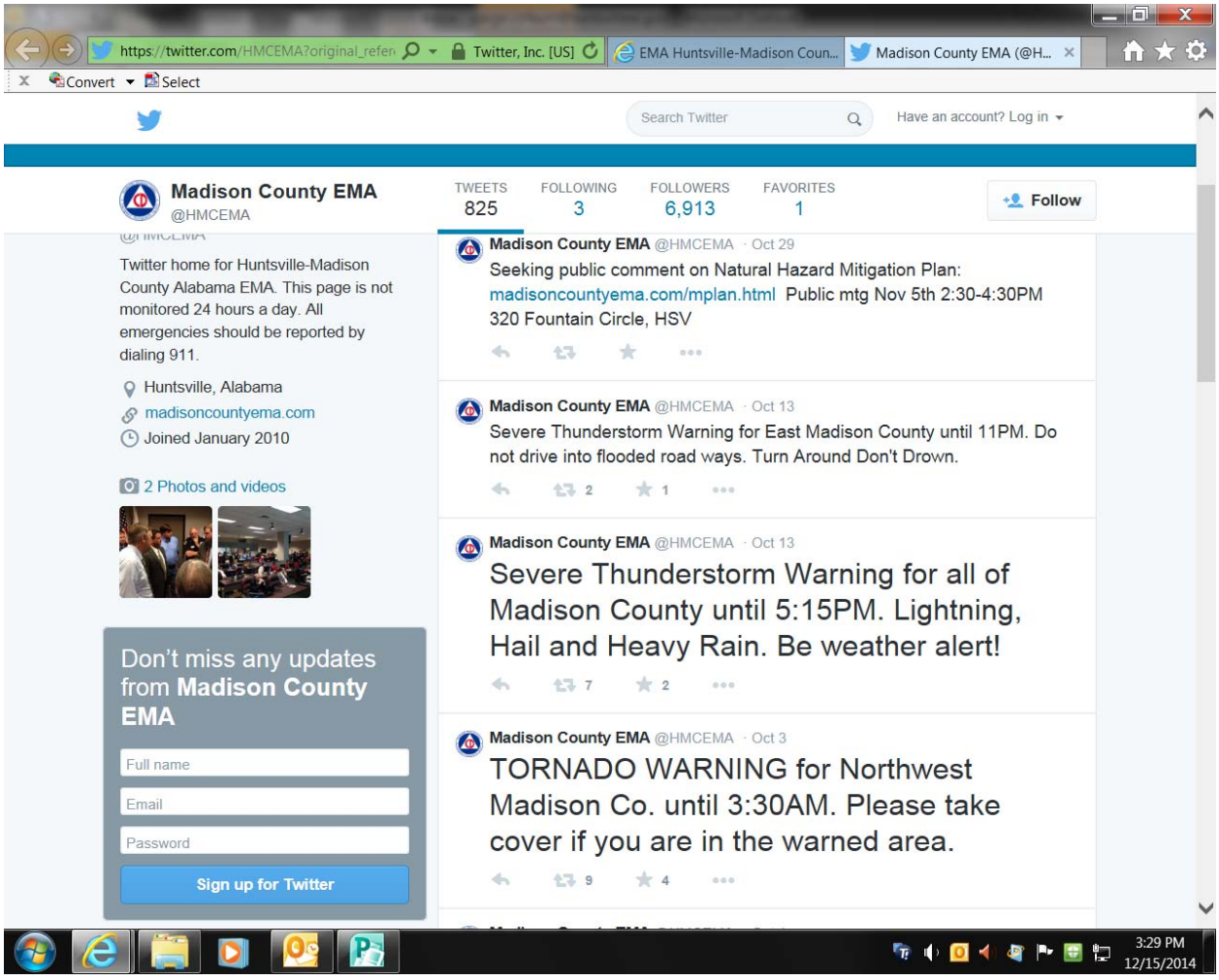
REED CONTRACTING SERVICES, INC. hereby gives notice of completion of contract with Caldwell Lane Resurfacing located in the City of Huntsville, Alabama (Periodic Project). This notice will appear for four (4) consecutive weeks beginning on 10/29/14 and ending on 11/19/14. All claims should be filed at 2512 Triana Boulevard, SW, Huntsville, AL 35805 during this period.
Huntsville Times: October 29, November 5, 12, 19, 2014

REED CONTRACTING SERVICES, INC. hereby gives notice of completion of contract with Gaboury Lane Drainage located in the City of Huntsville, Alabama (Periodic Project). This notice will appear for four (4) consecutive weeks beginning on 10/29/14 and ending on 11/19/14. All claims should be filed at 2512 Triana Boulevard, SW, Huntsville, AL 35805 during this period.
Huntsville Times: October 29, November 5, 12, 19, 2014

REED CONTRACTING SERVICES, INC. hereby gives notice of completion of contract with Halsey Avenue Drainage located in the City of Huntsville, Alabama (Periodic Project). This notice will appear for four (4) consecutive weeks beginning on 10/29/14 and ending on 11/19/14. All claims should be filed at 2512 Triana Boulevard, SW, Huntsville, AL 35805 during this period.
Huntsville Times: October 29, November 5, 12, 19, 2014

REED CONTRACTING SERVICES, INC. hereby gives notice of completion of contract with Hickory Hill Road Drainage located in the City of Huntsville, Alabama (Periodic Project). This notice will appear for four (4) consecutive weeks beginning on 10/29/14 and ending on 11/19/14. All claims should be filed at 2512 Triana Boulevard, SW, Huntsville, AL 35805 during this period.
Huntsville Times: October 29, Nov. 5, 12, 19, 2014

REED CONTRACTING SERVICES, INC. hereby gives notice of completion of contract with Huntington Road Drainage located in the [illegible]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Huntsville, Alabama
madisoncountyema.com
Joined January 2010
2 Photos and videos
Don't miss any updates from Madison County EMA
Full name
Email
Password
Sign up for Twitter
Madison County EMA @HMCEMA · Oct 29
Seeking public comment on Natural Hazard Mitigation Plan: madisoncountyema.com/mplan.html Public mtg Nov 5th 2:30-4:30PM 320 Fountain Circle, HSV
Madison County EMA @HMCEMA · Oct 13
Severe Thunderstorm Warning for East Madison County until 11PM. Do not drive into flooded road ways. Turn Around Don't Drown.
Madison County EMA @HMCEMA · Oct 13
Severe Thunderstorm Warning for all of Madison County until 5:15PM. Lightning, Hail and Heavy Rain. Be weather alert!
Madison County EMA @HMCEMA · Oct 3
TORNADO WARNING for Northwest Madison Co. until 3:30AM. Please take cover if you are in the warned area.
3:29 PM
12/15/2014