Section 4 Hazard Vulnerability Analysis and Loss Assessment

NOTE: Although this section has been modified with new historical data, narrative, identified hazards and maps; there are portions unchanged from the 2004 Autauga County Hazard Mitigation Plan. The narrative within this section of the plan that have not changed for the 2004 Plan are indicated by italicized type.

Table 4.1 Summary of Plan Updates (Section 4)

Section		Modifications
4.1	Tornado	• Restructured data • Updated event history • Newer map • Newer diagrams • Preformed vulnerability review
4.2	Windstorm	• Addressed as an independent element from tornados with complete data review and assessment • Updated event history • Preformed vulnerability review
4.3	Drought and Heat Wave	• Updated event history • Preformed vulnerability review
4.4	Wild Fire	• Restructured data • Updated event history • Preformed vulnerability review
4.5	Thunderstorm/lightning	• Addressed as an independent element from tornados • Restructured data • Updated event history • Newer diagrams • Preformed vulnerability review
4.6	Flooding-riverine/flash	• Restructured data • Updated event history • Newer map • Newer diagrams • Preformed vulnerability review

Once the Hazard Exposure Profile was completed, the hazards were ranked, and the hazards Autauga County was most at risk of were identified, the next step in the planning process was the Hazard Vulnerability Analysis and Loss Assessment. A Hazard Vulnerability Analysis is defined as the process of

evaluating the risk associated with a specific hazard, defined in terms of probability and frequency of occurrence, magnitude and severity, exposure and consequences. Four main criteria were used in evaluating each hazard:

1. Risk
2. Previous Occurrence
3 Probability of Future Events
4. Vulnerability
a. Population
b. Critical Facilities and Structures
c. Geographical Areas
d. Loss Assessment

4.1 Tornadoes

Tornadoes are violently rotating columns of air that descend from thunderstorm clouds and come in contact with the ground. Tornadoes can cause extensive damage. Tornadoes often form in convective cells such as thunderstorms or at the front of hurricanes.

As of February 1, 2007, the Fujita Tornado Scale has since been revised and is now called the Enhanced Fujita (EF) Tornado Scale. See the difference in wind speed below.

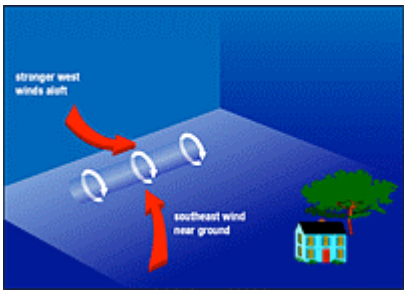
Fujita Scale (mph)

F0	40-72
F1	73-112
F2	113-157
F3	158-207
F4	208-260
F5	261-318

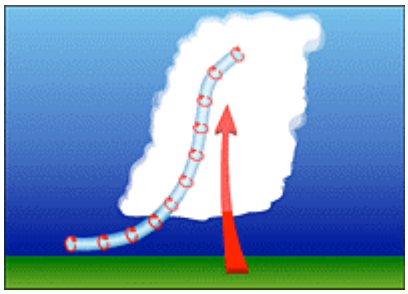
Enhanced Fujita Scale (mph)

EF0	65-85
EF1	86-110
EF2	111-135
EF3	136-165
EF4	166-200
EF5	>200

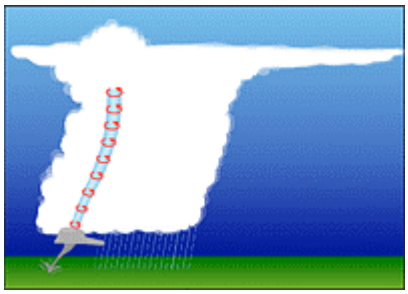
How Do Tornadoes Form?



▲Before thunderstorms develop, a change in wind direction and an increase in wind speed with increasing height create an invisible, horizontal spinning effect in the lower atmosphere.



▲Rising air within the thunderstorm updraft tilts the rotating air from horizontal to vertical.



▲An area of rotation, 2-6 miles wide, now extends through much of the storm. Most strong and violent tornadoes form within this area of strong rotation.

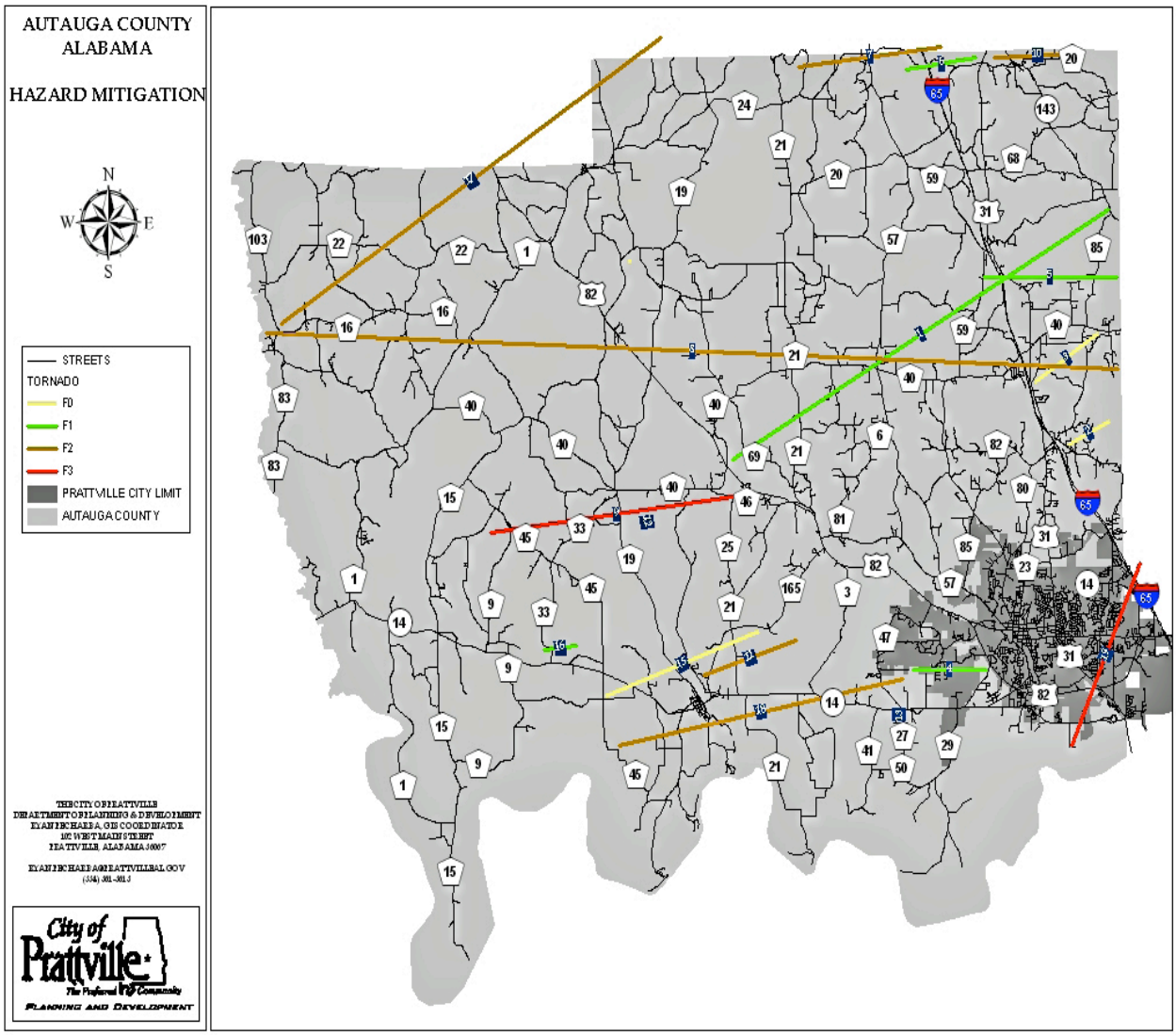
Risk

Records show that hundreds of tornadoes touched down in Alabama from 1916 to 1990 killing over 900 people. It is not uncommon for multiple tornadoes to strike the same or different areas at about the same time. Every county in the state has an equal chance of being struck by a tornado. Therefore, Autauga County's tornado risk is the same throughout the county. The risk is equal in all areas, including the three municipalities (Prattville, Billingsley and Autaugaville) as well as for the many small communities in the unincorporated areas of the county.

Autauga's risk of a tornado hit is the probability that damage to life and property will occur due to a tornado. Its probability is determined by historical data from the National Weather Service presented in tabular form in this section. Tornadoes in Autauga County have demonstrated their own individual characteristics of magnitude (strength), duration, frequency, and area affected. A map is included in this section showing Autauga County tornadoes and their tracks. Records were studied from several sources:

National Weather Service

U.S. Hazards Research Lab, University of South Carolina ("SHELDUS")



Anecdotal survey of Autauga County's hazard mitigation plan committee

Previous Occurrence

Historically, severe thunderstorms and tornadoes combined have caused damage, inconvenience and social ramifications here in Autauga County. The 19 incidents listed on the NWS chart have caused millions of dollars in damages and loss. Although none of those listed received a federal disaster declaration, Autauga's losses have, in some cases, been combined with those of neighboring counties, and have been used to bring in such federal help as low-rate SBA loans.

The research done by the U.S. Hazards Research Lab indicates costlier damages in many cases. The numbers on the SHELDUS chart list severe

storms and tornadoes, wind, hail and flood events costing millions of dollars in property and crop damage in Autauga County. It also shows an increase in the number of events since about 1990 for this area. This could be construed as a pattern of increasing risk for Autauga County.

Referring to the report by the NWS, Autauga's damage and/or destruction from tornadoes generally is to homes, mobile homes, trees down, outbuildings and equipment, cars, businesses, churches, and personal injury to residents.

The County's worst tornado according to the Fujita scale is the 1976 twister. It is also the county's costliest, at $5 million, according to the U.S. Hazards Lab.

The SHELDUS Lab and NWS records the following tornado events for Autauga County.

Table 4.2
Autauga County Tornado Events

HAZARD BEGIN DATE	HAZARD END DATE	HAZARD TYPE COMBO	INJURIES	FATALITIES	PROPERTY DAMAGE	CROP DAMAGE	REMARKS
3/12/1976	3/12/1976	Tornado	4	0	$5,000,000.00	$500.00	Jones, Poses Cross Roads, Alpine areas
3/29/1977	3/29/1977	Tornado	1	0	$ 25,000.00	$ -	
1/3/1982	1/3/1982	Tornado	3	0	$ 25,000.00	$ -	N AUTAGUA TO SE CHILTON
4/26/1982	4/26/1982	Tornado	0	0	$ 25,000.00	$ -	
5/7/1999	5/7/1999	Tornado	0	0	$ 1,000.00	$ -	
11/24/2001	11/24/2001	Tornado	0	0	$ 40,000.00	$ -	
11/24/2004	11/24/2004	Tornado	1	0	$ 900,000.00	$ -	TORNADO
11/24/2004	11/24/2004	Tornado	0	0	$ 30,000.00	$ -	TORNADO
7/6/2005	7/6/2005	Tornado	0	0	$ 14,000.00	$ -	Tornado (F1)
7/6/2005	7/6/2005	Tornado	0	0	$ 3,000.00	$ -	Tornado (F0)
7/6/2005	7/6/2005	Tornado	0	0	$ 2,000.00	$ -	Tornado (F0)
11/28/2005	11/28/2005	Tornado	0	0	$ 34,000.00	$ -	Tornado (F0)
2/13/2007	2/13/2007	Tornado	0	0	$ 10,000.00	$ -	Tornado (F1)
2/17/2008	2/17/2008	Tornado	50	0	$10,000,000.00		Tornado (EF3)

Totals		59	0	$11,609,000	$500.00	

Probability of Future Events

History has shown that there is 25% probability of future tornado events in Autauga County. *Tornadoes have touched down in Autauga County virtually every one to five years, as shown on the data chart, causing millions of dollars in damages. Repercussions of these storms, as documented in EMA files, include home and mobile home damage, trees down, vehicle damage, wind and hail damage, business damage and interruption of services.*

The extent (magnitude) to which Autauga County could be affected by severe storms and/or tornadoes are great, based on previous occurrences, previous damage, and the high probability of future events.

Vulnerability

The entire county is vulnerable to tornadoes, and to hail, lightning and heavy wind-driven rains that often accompany them. The most likely time for tornadoes is during the spring months from March through April and into May, with a secondary peak of tornado activity in November, but tornadoes have occurred in every month of the year. While every place in the county may have an equal chance of being struck, some places have experienced many tornadoes and others have been struck by a few.

Because of the high vulnerability of severe storms and tornadoes to all areas of the county, the Autauga Emergency Management Agency has worked to secure grant funding for storm shelters (safe rooms). The grant funds received are through a FEMA mitigation grant program (Project Impact, HMGP, or PDM). Over the past 5 years Autauga county residents have installed 40 individual storm shelters. *To date 56 households have installed individual storm shelters (safe room) through grant funding. To further breakdown, 15 have been placed in the City of Prattville and 41 have been placed throughout the county. Programs such as these do help to mitigate the possible effects of severe storms and tornadoes.*

The Autauga Emergency Management Agency has worked to secure grant funding for outdoor warning sirens. Over the past 5 years Autauga County has installed 14 weather sirens. To date Autauga County has 27 weather sirens, 13 are installed in the City of Prattville, and the other 14 are placed in populated rural areas and around schools. According to the 2007 Alert Notification System Survey conducted Sept 2007 for the Alabama EMA, Autauga County would need to install approx 20 more outdoor warning sirens to provide adequate coverage. Also, as of October 1, 2007 the NWS converted over to a polygon warning system. To keep sirens from sounding

county wide for a tornado warning, an upgrade to the siren software to accept polygon warnings is needed.

There are some specific characteristics for certain areas in the county which make them even more vulnerable to severe storms and tornadoes. Local authorities, citizens, and the Hazard Mitigation Plan Committee agree that Autauga County's vulnerability increases when local conditions are taken into consideration. Loss of life and property resulting from the wind, rain and flooding of severe thunderstorms and tornadoes increases when the following Autauga County characteristics are factored in: the topography of Autauga County (low-lying populated areas and high water table such as in Autaugaville); the abundance of waterways; 30% of the population living in rural setting (meaning all of the county outside of the City of Prattville); the high population density of the City of Prattville (70% of the county's population); lack of coverage of warning sirens, particularly in the rural area; and lack of use of weather radios.

Population

If a tornado were to occur in Autauga County, it is uncertain the total number of people that would be impacted. This figure would depend on the factors such as location of the event, wind speed, time frame of the event, distance the storm was on the ground, and proximity to population centers. The population centers such as City of Prattville, Towns of Autaugaville and Billingsley, and Pine Level (unincorporated community northeast Autauga County) would sustain a greater impact of a tornado than the more rural areas of Autauga County.

Critical Facilities

As with the review of population, it is uncertain to determine which facilities are directly at risk. All critical facilities share equal risk with this natural hazard, but the City of Prattville houses the City and County government facilities, and would sustain the greatest impact of a tornado.

Geographical Areas

All geographical areas within the County are equally at risk of this natural hazard. Loss of life and property resulting from tornadoes increases when the population density is high, especially in the areas such as Prattville, Autaugaville, Billingsley and Pine Level.

Loss Assessment

The entire county (100%) is vulnerable to tornadoes. The next major event will likely impact 5% of the county, damaging 42 structures valued at $352,090.

4.2 Windstorm

Wind hazards, which include hurricanes, tornadoes, and other windstorms, are threats to all 50 states, causing high levels of injuries, deaths, business interruption, and property damage. On September 15, 1999, Hurricane Floyd hit the coast of South Carolina, killing 51 people and causing $6 billion in damage. A record 384 tornados touched down in 19 states the week of May 4-10, 2003, resulting in 42 fatalities. In addition, federal disaster aid has risen from $3.9 billion in the 1980's to $25.4 billion today. The National Oceanic and Atmospheric Administration (NOAA) have estimated that if a Category 4 hurricane were to hit Miami, it would cost $80 billion in damages. Statistics such as these have lead Congress to propose the National Windstorm Impact Reduction Program (NWIRP), or H.R. 3980, to improve our understanding of wind hazards and research possible mitigation strategies with the hope of minimizing the amount of damage and loss of lives from these windstorms.

On October 25, President Bush signed the National Earthquake Hazards Reduction Program (NEHRP) Reauthorization Act of 2004. Known as H.R. 2608, this new public law includes authorization for a new National Windstorm Impact Reduction Program for three years. According to the American Society of Civil Engineers, "The new wind hazards program would promote research and other activities at FEMA, NIST, the National Oceanic and Atmospheric Administration (NOAA) and NSF. The program is modeled after NEHRP and is aimed at studying the impact of wind on structures and on developing cost-effective ways to mitigate those impacts. The legislation authorizes $72.5 million over three years for this program." Rapid population growth and development in high wind risk coastal areas and an estimated $4.5 billion in windstorm damage each year between 1995 and 2002 have provided great impetus for the passage of this bill. *(10/26/04)*

Risk

Severe wind storms pose a significant risk to life and property in the region by creating conditions that disrupt essential systems such as public utilities, telecommunications, and transportation routes. High winds can and do occasionally cause tornado-like damage to local homes and businesses. Severe windstorms can present a very destabilizing effect on the dry brush

that covers local hillsides and urban wild land interface areas. High winds can have destructive impacts, especially to trees, power lines, and utility services

Microbursts

Unlike tornados, microbursts are strong, damaging winds which strike the ground and often give the impression a tornado has struck. They frequently occur during intense thunderstorms. The origin of a microburst is downward moving air from a thunderstorm's core. But unlike a tornado, they affect only a rather small area. University of Chicago storm researcher Dr Ted Fujita first coined the term "downburst" to describe strong, downdraft winds flowing out of a thunderstorm cell that he believed were responsible for the crash of Eastern Airlines Flight 66 in June of 1975.

A downburst is a straight-direction surface wind in excess of 39 mph caused by a small-scale, strong downdraft from the base of convective thundershowers and thunderstorms. In later investigations into the phenomena he defined two sub-categories of downbursts: the larger macrobursts and small microbursts.

Macrobursts are downbursts with winds up to 117 mph which spread across a path greater than 2.5 miles wide at the surface and which last from 5 to 30 minutes. The microburst, on the other hand is confined to an even smaller area, less than 2.5 miles in diameter from the initial point of downdraft impact. An intense microburst can result in damaging winds near 270 km/hr (170 mph) and often last for less than five minutes.

> "Downbursts of all sizes descend from the upper regions of severe thunderstorms when the air accelerates downward through either exceptionally strong evaporative cooling or by very heavy rain which drags dry air down with it. When the rapidly descending air strikes the ground, it spreads outward in all directions, like a fast-running faucet stream hitting the sink bottom.
>
> When the microburst wind hits an object on the ground such as a house, garage or tree, it can flatten the buildings and strip limbs and branches from the tree. After striking the ground, the powerful outward running gust can wreak further havoc along its path. Damage associated with a microburst is often mistaken for the work of a tornado, particularly directly under the microburst. However, damage patterns away from the impact area are

characteristic of straight-line winds rather than the twisted pattern of tornado damage."

Tornados, like those that occur every year in the Midwest and Southeast parts of the United States, with most tornado-like activity coming from microbursts.

Previous Occurrence

Historically, severe windstorms, are combined with thunderstorms and/or tornadoes have caused damage, inconvenience and social ramifications here in Autauga County. There are 79 record events since 1962. These events have caused millions of dollars in damages and loss.

Table 4.3
Autauga County Windstorm Events

HAZARD BEGIN DATE	HAZARD END DATE	HAZARD TYPE COMBO	INJURIES	FATALITIES	PROPERTY DAMAGE	CROP DAMAGE	REMARKS
4/10/1962	4/12/1962	Hail - Severe Storm/Thunder Storm - Wind	0.01	0	$ 746.27	$ 746.27	WIND, RAIN, HAIL
4/26/1964	4/27/1964	Severe Storm/Thunder Storm - Wind	0.08	0	$ 1,315.79	$ 1,315.79	RAIN, WIND
3/6/1967	3/6/1967	Wind	0	0	$ 819.67	$ -	WIND
8/24/1968	8/24/1968	Lightning - Wind	0	0	$ 1,315.79	$ 13.16	Wind, Electrical
3/23/1969	3/23/1969	Severe Storm/Thunder Storm - Wind	0	0	$ 7,462.68	$ -	WIND, RAIN
6/20/1969	6/20/1969	Hail - Lightning - Wind	0	0	$ 8,333.33	$ -	WIND, ELECTRICAL HAIL
4/1/1970	4/2/1970	Hail - Severe Storm/Thunder Storm - Wind	0	0	$ 746.27	$ 74.63	WIND, RAIN, HAIL
3/22/1971	3/22/1971	Hail - Wind	0	0	$ 1,136.36	$ 454.55	HAIL, WIND
4/23/1971	4/23/1971	Hail - Severe Storm/Thunder Storm - Wind	0	0	$ 7,462.69	$ 746.27	WIND,HAIL, RAIN
5/12/1971	5/12/1971	Hail - Lightning - Wind	0.04	0	$ 2,083.33	$ 208.33	WIND, HAIL, ELECTRICAL
3/2/1972	3/2/1972	Hail - Wind	0	0	$ 12,820.51	$ 1,282.05	WIND, HAIL
3/16/1972	3/16/1972	Wind	0	0	$ 6,250.00	$ 625.00	WIND
5/23/1973	5/23/1973	Wind	0.18	0	$ 29,411.76	$ -	WIND
11/27/1973	11/27/1973	Wind	0	0	$ 2,941.18	$ -	WIND
1/28/1974	1/28/1974	Wind	3	0	$ 5,000.00	$ -	WIND
2/21/1974	2/21/1974	Wind	0.05	0	$ 2,272.73	$ -	WIND
3/20/1974	3/21/1974	Wind	1.13	0	$ 16,129.00	$ -	WIND
6/12/1974	6/12/1974	Hail - Wind	0	0	$ 1,666.67	$ 16,666.67	WIND & HAIL
3/2/1979	3/4/1979	Flooding - Severe	0	0.12	$ 74,626.87	$ -	wind, rain, flooding

		Storm/Thunder Storm - Wind					
4/12/1979	4/13/1979	Flooding - Severe Storm/Thunder Storm - Wind	0.13	0.3	$ -	$ 21,739.10	windstorm, rain, flood
3/20/1980	3/21/1980	Flooding - Severe Storm/Thunder Storm - Wind	0.22	0	$ 746.27	$ 7.46	rain, flood, wind
6/29/1980	6/29/1980	Lightning - Severe Storm/Thunder Storm - Wind	0.18	0	$ 1,000.00	$ 100.00	wind, rain, lightning
3/7/1995	3/7/1995	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	THUNDERSTORM WIND
4/11/1995	4/11/1995	Severe Storm/Thunder Storm - Wind	0	0	$ 35,000.00	$ -	THUNDERSTORM WIND
7/29/1995	7/29/1995	Severe Storm/Thunder Storm - Wind	0	0	$ 5,000.00	$ -	THUNDERSTORM WIND
8/19/1995	8/19/1995	Severe Storm/Thunder Storm - Wind	0	0	$ 3,000.00	$ -	THUNDERSTORM WINDS
4/14/1996	4/14/1996	Severe Storm/Thunder Storm - Wind	0	0	$ 15,000.00	$ -	TSTM WIND
1/24/1997	1/24/1997	Severe Storm/Thunder Storm - Wind	0	0	$ 15,000.00	$ -	THUNDERSTORM WIND
2/21/1997	2/21/1997	Severe Storm/Thunder Storm - Wind	0	0	$ 8,000.00	$ -	THUNDERSTORM WIND
4/5/1997	4/5/1997	Severe Storm/Thunder Storm - Wind	0	0	$ 7,000.00	$ -	THUNDERSTORM WIND
4/22/1997	4/22/1997	Severe Storm/Thunder Storm - Wind	0	0	$ 5,000.00	$ -	THUNDERSTORM WIND
5/3/1997	5/3/1997	Severe Storm/Thunder Storm - Wind	0	0	$ 3,000.00	$ -	THUNDERSTORM WIND
6/20/1997	6/20/1997	Hail - Severe Storm/Thunder Storm - Wind	0	0	$ 7,000.00	$ -	THUNDERSTORM WIND/HAIL
1/7/1998	1/7/1998	Severe Storm/Thunder Storm - Wind	0	0	$ 7,000.00	$ -	THUNDERSTORM WIND
6/5/1998	6/5/1998	Severe Storm/Thunder Storm - Wind	0	0	$ 30,000.00	$ 5,000.00	THUNDERSTORM WIND
6/8/1998	6/8/1998	Severe Storm/Thunder Storm - Wind	0	0	$ 20,000.00	$ -	THUNDERSTORM WIND
6/15/1998	6/15/1998	Severe Storm/Thunder Storm - Wind	0	0	$ 15,000.00	$ 4,000.00	THUNDERSTORM WIND
3/3/1999	3/3/1999	Severe Storm/Thunder Storm - Wind	2	0	$ 295,000.00	$ -	TSTM WIND
6/30/1999	6/30/1999	Severe Storm/Thunder Storm - Wind	0	0	$ 10,000.00	$ -	TSTM WIND
7/6/1999	7/6/1999	Severe Storm/Thunder Storm - Wind	0	0	$ 5,000.00	$ -	TSTM WIND

9/6/1999	9/6/1999	Wind	0	0	$ 2,000.00	$ -	HIGH WIND
1/9/2000	1/9/2000	Severe Storm/Thunder Storm - Wind	0	0	$ 10,000.00	$ -	THUNDERSTORM WIND
3/19/2000	3/19/2000	Severe Storm/Thunder Storm - Wind	0	0	$ 10,000.00	$ -	THUNDERSTORM WIND
4/3/2000	4/3/2000	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	THUNDERSTORM WIND
7/20/2000	7/20/2000	Severe Storm/Thunder Storm - Wind	0	0	$ 15,000.00	$ -	THUNDERSTORM WIND
8/10/2000	8/10/2000	Severe Storm/Thunder Storm - Wind	0	0	$ 10,000.00	$ -	THUNDERSTORM WIND
3/15/2001	3/15/2001	Severe Storm/Thunder Storm - Wind	0	0	$ 22,000.00	$ -	
6/4/2001	6/4/2001	Severe Storm/Thunder Storm - Wind	0	0	$ 8,000.00	$ -	
6/4/2001	6/4/2001	Severe Storm/Thunder Storm - Wind	0	0	$ 5,000.00	$ -	
6/4/2001	6/4/2001	Severe Storm/Thunder Storm - Wind	0	0	$ 1,000.00	$ -	
5/30/2002	5/30/2002	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	
7/12/2002	7/12/2002	Severe Storm/Thunder Storm - Wind	0	0	$ 4,000.00	$ -	
11/11/2002	11/11/2002	Severe Storm/Thunder Storm - Wind	0	0	$ 75,000.00	$ -	
3/13/2003	3/13/2003	Severe Storm/Thunder Storm - Wind	0	0	$ 5,000.00	$ -	
3/14/2003	3/14/2003	Severe Storm/Thunder Storm - Wind	0	0	$ 3,000.00	$ -	
4/7/2003	4/7/2003	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	
4/25/2003	4/25/2003	Severe Storm/Thunder Storm - Wind	3	0	$ 1,000,000.00	$ -	
8/4/2003	8/4/2003	Severe Storm/Thunder Storm - Wind	0	0	$ 3,000.00	$ -	
4/7/2004	4/7/2004	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	
7/12/2004	7/12/2004	Severe Storm/Thunder Storm - Wind	0	0	$ 4,000.00	$ -	
9/16/2004	9/16/2004	Wind	0	0	$ 2,600,000.00	$ 100,000.00	High Wind
3/7/2005	3/7/2005	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	Thunderstorm Wind
3/31/2005	3/31/2005	Severe Storm/Thunder Storm - Wind	0	0	$ 4,000.00	$ -	Thunderstorm Wind
4/1/2005	4/1/2005	Severe Storm/Thunder	0	0	$ 350,000.00	$ -	THUNDERSTORM WIND

		Storm - Wind					
4/12/2005	4/12/2005	Wind	0	0	$ 1,000.00	$ -	STRONG WIND
4/21/2005	4/21/2005	Severe Storm/Thunder Storm - Wind	0	0	$ 12,000.00	$ -	THUNDERSTORM WIND
4/30/2005	4/30/2005	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	THUNDERSTORM WIND
5/20/2005	5/20/2005	Severe Storm/Thunder Storm - Wind	0	0	$ 4,000.00	$ -	Thunderstorm Wind
6/11/2005	6/12/2005	Wind	0	0	$ 4,952.38	$ -	Strong Wind
2/13/2006	2/13/2006	Severe Storm/Thunder Storm - Wind	0	0	$ 3,000.00	$ -	Thunderstorm Wind
4/19/2006	4/19/2006	Severe Storm/Thunder Storm - Wind	0	0	$ 5,000.00	$ -	Thunderstorm Wind (G50)
4/19/2006	4/19/2006	Severe Storm/Thunder Storm - Wind	0	0	$ 1,000.00	$ -	Thunderstorm Wind (G50)
5/10/2006	5/10/2006	Severe Storm/Thunder Storm - Wind	0	0	$ 10,000.00	$ -	Thunderstorm Wind (G50)
7/29/2006	7/29/2006	Severe Storm/Thunder Storm - Wind	0	0	$ 1,000.00	$ -	Thunderstorm Wind (G50)
8/15/2006	8/15/2006	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	Thunderstorm Wind
2/13/2007	2/13/2007	Severe Storm/Thunder Storm - Wind	0	0	$ 3,000.00	$ -	Thunderstorm Wind
4/4/2007	4/4/2007	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	Thunderstorm Wind (39 EG)
10/23/2007	10/23/2007	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	Thunderstorm Wind (50EG)

Total		10.02	0.42	$ 4,865,239.55	$ 152,979.28

Probability of Future Events

History has shown that there is a 100% probability of future windstorm events in Autauga County. Windstorms and severe storms have hit Autauga County virtually every year, as shown on the data chart, causing millions of dollars in damages. Repercussions of these storms, as documented in EMA files, include home and manufactured home damage, trees down, vehicle damage, wind and hail damage, business damage and interruption of services.

Vulnerability

With an analysis of the high wind and tornado events, we can deduce the common windstorm impact areas including impacts on life, property, utilities, infrastructure and transportation. Additionally, if a windstorm

disrupts power to local residential communities, the American Red Cross and County resources might be called upon for care and shelter duties. Displacing residents and utilizing County resources for shelter staffing and disaster cleanup can cause an economic hardship on the community.

- *Windstorm Issues*

- *What is Susceptible to Windstorm? Life and Property*

Based on the history of the region, windstorm events can be expected, perhaps annually, across widespread areas of the region which can be adversely impacted during a windstorm event. This can result in the involvement of Autauga County, emergency response personnel during a wide-ranging windstorm or microburst tornado activity. Both residential and commercial structures with weak reinforcement are susceptible to damage. Wind pressure can create a direct and frontal assault on a structure, pushing walls, doors, and windows inward. Conversely, passing currents can create lift suction forces that pull building components and surfaces outward. With extreme wind forces, the roof or entire building can fail causing considerable damage.

Debris carried along by extreme winds can directly contribute to loss of life and indirectly to the failure of protective building envelopes, siding, or walls. When a severe windstorm strikes a community, downed trees, power lines, and damaged property can be major hindrances to emergency response and disaster recovery.

Disruption of Critical Services

Critical facilities include police stations, fire stations, hospitals, shelters, and other facilities that provide important services to the community. These facilities and their services need to be functional after a windstorm event.

Utilities

Historically, falling trees have been the major cause of power outages in the region. Windstorms such as strong microbursts gravity waves and straight line wind, conditions can cause flying debris and downed utility lines. For example, tree limbs breaking in winds of only 45 mph can be thrown over 75 feet. As such, overhead power lines can be damaged even in relatively minor windstorm events. Falling trees can bring electric power lines down to the pavement, creating the possibility of lethal electric shock. Rising population growth and new infrastructure in the region creates a higher probability for

damage to occur from windstorm as more life and property are exposed to risk.

Infrastructure

Windstorms can damage buildings, power lines, and other property and infrastructure due to falling trees and branches. During wet winters, saturated soils cause trees to become less stable and more vulnerable to uprooting from high winds.

Windstorms can result in collapsed or damaged buildings or blocked roads and bridges, damaged traffic signals, streetlights, and parks, among others. Roads blocked by fallen trees during a windstorm may have severe consequences to people who need access to emergency services. Emergency response operations can be complicated when roads are blocked or when power supplies are interrupted. Industry and commerce can suffer losses from interruptions in electric services and from extended road closures. They can also sustain direct losses to buildings, personnel, and other vital equipment. There are direct consequences to the local economy resulting from windstorm related to both physical damages and interrupted services.

Population

Windstorms do occur in Autauga County county-wide, it is uncertain the total number of people that would be impacted. This figure would depend on the factors such as location of the event, wind speed, time frame of the event, and proximity to population centers. The populations that lie in older communities (West Prattville) and rural areas (Autauga County, Autaugaville and Billingsley) have a higher risk on impact to a windstorm event due to the potential of damage due to falling trees and limbs.

Critical Facilities

As with the review of population, it is uncertain to determine which facilities are directly at risk. All critical facilities share equal risk with this natural hazard. Power facilities have a greatest risk of impact due to downed lines from falling trees.

Geographical Areas

All geographical areas within the County are equally at risk of this natural hazard. Older communities and rural areas have a higher risk of structural damage due to falling trees and limbs. Older communities and rural areas have a higher risk of structural damage due to falling trees and limbs. Also,

due to the lack of building codes in the unincorporated area of Autauga County, these structures could be more vulnerable to damage from windstorms.

Loss Assessment

The entire county (100%) is vulnerable to windstorms. The next major event will likely impact 10% of the county, damaging 84 structures valued at $704,180.

4.3 Drought and Heat Wave

A drought is the result of a natural decline in the expected precipitation over an extended period of time, typically one or more seasons in length. The severity of drought can be aggravated by other climatic factors, such as prolonged high winds and low relative humidity (AEMA, 1997).

A drought's severity depends on numerous factors, including duration, intensity, and geographic extent as well as regional water supply demands by humans and vegetation. Due to its multidimensional nature, drought is difficult to define in exact terms and also poses difficulties in terms of comprehensive risk assessments.

Droughts may cause a shortage of water for human and industrial consumption, hydroelectric power, recreation, and navigation. Water quality may also decline and the number and severity of wildfires may increase. Severe droughts may result in the loss of agricultural crops and forest products, undernourished wildlife and livestock, and lower land values.

A Heat Wave is defined by the National Weather Service as a period of abnormally and uncomfortably hot and unusually humid weather. Typically a heat wave last two to more days.

Risk

According to information shared by the hazard mitigation planning committee's technical subcommittee, droughts have not had an adverse effect on every community in Autauga County. Although droughts do not occur every year in Autauga County, they do occur with some regularity, every five or six years. The dollar value of losses, $6.9 million, reflects the fact that crop-producing fields are laid to waste by the dry weather (this includes urban, rural and water resources that are impacted). The areas of the county outside of the City of Prattville have a much greater risk from drought and heat wave because of the fact that much of the land use is

farming and agriculture, and due to the fact that the water supply is not as available there. Prattville has a water system with backup power generation capabilities.

Previous Occurrence

Past events are shown by the chart below, Historical Drought Areas of Autauga County, according to SHELDUS and NWS.

Table 4.4

DROUGHT AND HEAT WAVES
Previous Occurrence according to historical records

Date	Event	Damage
06/01/1977	Drought	$128,205.13
07/05/1980	Heat	$74,626.87
06/02/1985	Heat	$7,462.69
01/01/1986	Drought	$753,731.35
08/01/1995	Heat	$5,970,149.25
	TOTAL	$6,934,175.20

Below is courtesy of the NOAA's Birmingham Forecast Offices 2007 Weather in Review Statistics Summary

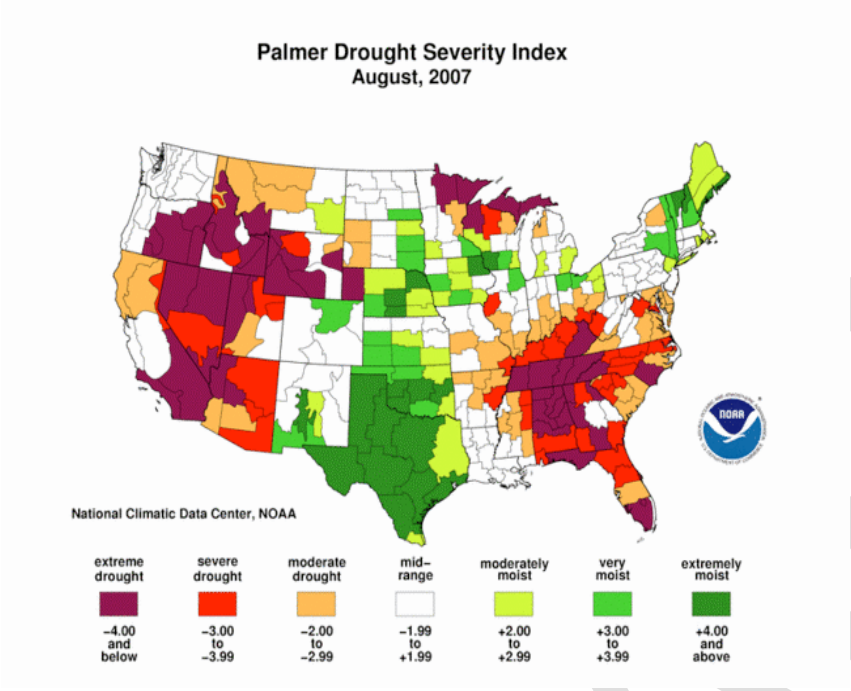
Date	New Record	Old Record
August 6th	100	99 in 1963
August 7th	101	100 in 2006
August 8th	103	102 in 2006
August 9th	104 Tie	104 in 1954
August 10th	106	99 in 2000
August 11th	106	101 in 1954
August 12th	106	102 in 1954
August 13th	104	103 in 1874
August 14th	106	103 in 1954
August 15th	105	102 in 1995
August 16th	102 tie	102 in 1990
August 22nd	104	101 in 1983

Heat Wave Numbers

...2007 Heat Wave Boiled Central Alabama... The strong upper level ridge that produced record heat across the Western United States during July redeveloped eastward and produced another round of record heat across the Southeastern United States. This oppressive heat was greatest during the weeks of August 12th and August 19th when Heat Advisories were in effect for the entire area. But due to the prolonged heat, many heat illnesses were not felt until the last week of August and into September.

Probability of Future Events

History has shown that there is a 20 % probability of future drought and heat waves to affect Autauga County. *Because of the generally higher risk and vulnerability facing the areas of the county outside of the City of Prattville, the probability of future events for those areas remains high. Also, the magnitude of such events is significant, based on the farming, agriculture and timber operations that would be affected, as well as the populations that would be affected. Residents of these areas would face not only water shortages but also a potential loss of income.*



Courtesy of the National Climate Data Center

Vulnerability

Large areas of farm land, pasture land and timber land spread throughout the county increase its vulnerability to drought and heat wave. The majority of the farm land and pasture land is in the southern part of the county, and the timber land is spread throughout.

The drought areas in the southern part of the county are areas of extensive open farm land and timber land. Drought areas in other parts of the county are mainly timber land. These areas are evenly dispersed about the county.

The criticality of water systems in rural areas points to the importance of evaluating and monitoring water systems and supplies, and to the need for water conservancy plans and public education, with particular importance placed on special populations.

Although water is available to everyone in the county some citizens prefer to have wells. In 2007 due to the extreme drought and heat wave, some wells in the county went dry and citizens were forced to drill deeper wells or pay

for connections to the rural water systems. During the past three years, drought conditions have impacted local water systems productions, due to dropping water tables.

Drought has a low effect in the City of Prattville. This is because city water is available to all residents, and also because there are not extensive farm, pasture and timber lands in the city. Further, Prattville's vulnerability to drought and heat are basically only in a long-range period.

Population

It is uncertain the total number of people that would be impacted. This figure would depend on the factors such as location of the event, and time frame of the event. The population in the city of Prattville has the greatest risk and impact to Heat Wave; but lower risk and impact from Drought. The populations in the Towns of Autaugaville and Billingsley, and Autauga County have lower risk and impact from Heat Wave; but a greater risk and impact from Drought.

Critical Facilities

As with the review of population, it is uncertain to determine which facilities are directly at risk. All critical facilities share equal risk with this natural hazard. The water authorities in the town of Autaugaville and Billingsley, along with the water authorities located within rural Autauga County sustain the greatest risk and impact from Drought and Heat Wave. The 10 Volunteer Fire Departments also sustain a greater impact from Drought and Heat Wave as their call volume increase due to Wildfires.

Geographical Area

All geographical areas within the County are equally at risk of this natural hazard. Prattville has a lower risk from drought due to the abundant artisan wells in the city, but has a higher risk to Heat Waves as due to the higher amounts of asphalt and concrete which hold more heat. In-turn the areas outside the City of Prattville have a higher risk from Drought, but a lower risk to Heat Wave.

Loss Assessment

The entire county (100%) is vulnerable to Drought and Heat Wave events. Historical tends indicated that one or both events occur every five years and the next anticipated major event will occur in 2013. The next major event will likely impact 100% of the county, damaging livestock

and agriculture economic resources mainly valued at $2.5 million. If a longer timeframe damage to the economy will be higher and impact on human life with reduction of water and power generation.

4.4 Wildfire

A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures. The often begin unnoticed, spread quickly, and are usually signaled by dense smoke that may fill the area for miles around. Wildfires can be human-caused through acts such as arson, campfires, or unauthorized burning, or can be caused by natural events such as lightning.

Risk

Wildfires are Autauga County's most consistent hazard, meaning there are annual occurrences. The county forester reports that since written records started being kept in October 1986 the county has had wildfires every year. Significant dollar value losses of timberland are figured by the Hazard Mitigation Plan committee using a land value of about $500 per acre. Forest land makes up 76% or approximately 288,700 acres of the county. Therefore, annual fires have added up to over $5.2 million in damages and losses since 1986.

Previous Occurrence

The following chart shows fire events as recorded by the Hazard Mitigation Plan committee's technical subcommittee.

TABLE 4.5
AUTAUGA COUNTY WILDFIRE EVENTS

Date	Event	Damage
1986	Forest fire	**$243,250.00**
1987	Forest fire	**$619,750.00**
1988	Forest fire	**$225,850.00**
1989	Forest fire	**$430,700.00**
1990	Forest fire	**$275,450.00**
1991	Forest fire	**$318,100.00**
1992	Forest fire	**$125,800.00**
1993	Forest fire	**$288,700.00**
1994	Forest fire	**$492,400.00**
1995	Forest fire	**$91,650.00**
1996	Forest fire	**$102,000.00**

1997	Forest fire	**$98,550.00**
1998	Forest fire	**$194,650.00**
1999	Forest fire	**$449,150.00**
2000	Forest fire	**$43,900.00**
2001	Forest fire	**$148,700.00**
2002	Forest fire	**$149,450.00**
2003	Forest fire	**$75,950.00**
2004	Forest fire	**$345,900.00**
2005	Forest fire	**$62,450.00**
2006	Forest fire	**$230,500.00**
2007	Forest fire	**$358,000.00**
	TOTAL	**$5,370,850.00**

Probability of Future Events

There is a 100% probability of future fire events in Autauga County. This is based on records of previous occurrence. The magnitude of future fires, or the extent to which fires may affect the county, is considered to be at least equal to that of the past, and could actually increase as more and more land area is developed for housing, business and industry.

Vulnerability

Because of the predominance of timber land in the county, the vulnerability to wildfire remains a constant concern. The main area of concern is keeping fuel load low in these sparsely populated areas, and keeping trained the ten volunteer fire departments, which respond to these fires throughout the county. The volunteer fire departments serve along with the Alabama Forestry Commission in fire suppression.

As mentioned above, the vulnerability to damage from forest fires increases as developed areas encroach upon the previously timbered covered areas of the county.

Below is an excerpt from NOAA's Birmingham Forecasting Office *2007* Weather Year in Review Statistics Summary on Red Flag Warnings.

Fire Weather

Central Alabama Red Flag Warnings Issued	740
Central Alabama Red Flag Conditions Measured	602

Red Flag conditions are a combination of High Fire Danger and critical weather conditions. High Fire Danger conditions are slowly evolving situations with little rainfall. Critical weather elements include temperatures, winds and humidity.

The **Alabama Forestry Commission** put much of Alabama in either a Fire Alert or a Drought Emergency for long periods at a time.

Population

It is uncertain the total number of people that would be impacted. This figure would depend on the factors such as location of the event, and time frame of the event. The population of rural Autauga County, Autaugaville and Billingsley has the greatest risk impact from wildfire than the other populated of Prattville.

Critical Facilities

As with the review of population, it is uncertain to determine which facilities are directly at risk. The water authorities and fire departments have the greatest risk on impact from a Wildfire.

Geographical Area

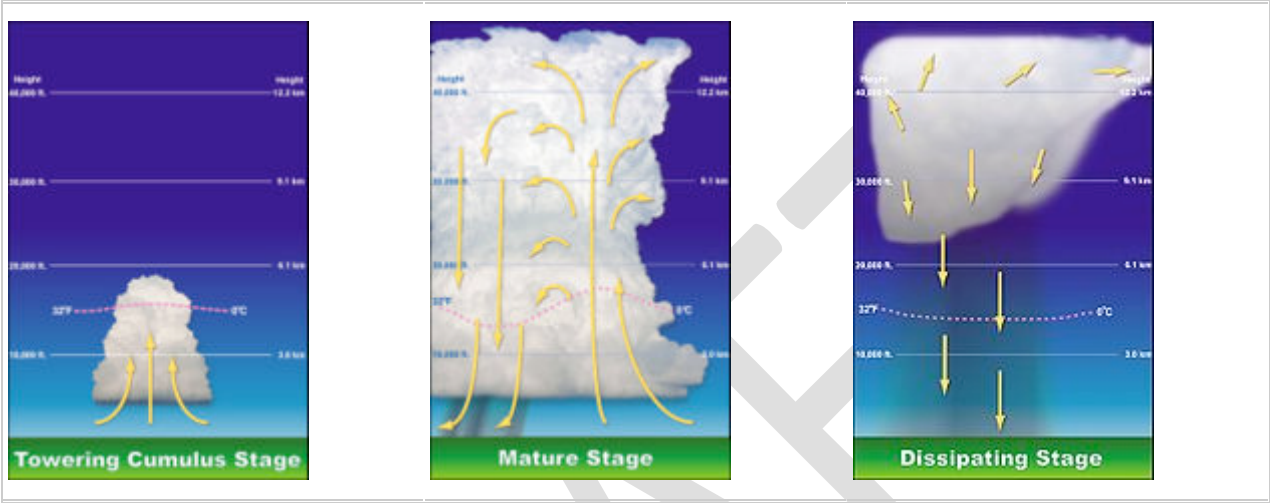
Autaugaville and Billingsley and Autauga County have greater risk for Wildfires due to the abundance of fuel from forest and grasslands. Also, Autaugaville, Billingsley, and Autauga County do not issue burn permits unlike the City of Prattville to limit open burning.

Loss Assessment

The Towns of Autaugaville and Billingsley along with Rural Autauga County are (100%) vulnerable to wildfires. On average each year 511 acres of land is burned due to wildfires, with an estimated land value of $255,500.00.

4.5 Thunderstorm/Lightning

Thunderstorms: Thunderstorms are a common occurrence in Alabama. Although they can strike at anytime, thunderstorms are most frequent in the spring and summer months, between March and August. Lightning, damaging winds, large hail, tornadoes, and floods are the hazards from thunderstorms.



Airflow diagrams showing three stages of a thunderstorm life cycle.

A thunderstorm, also known as an electrical storm or a lightning storm, is a form of weather characterized by the presence of lightning and its effect: thunder. It is usually accompanied by heavy rain and sometimes snow, hail, or no precipitation at all. Thunderstorms may line up in a series, and strong or severe thunderstorms may rotate.

Warm air has a lower density than cool air, so warm air rises within cooler air, similar to hot air balloons. Clouds form as warm air carrying moisture rises within cooler air. As the warm air rises, it cools. The moist water vapor begins to condense. When the moisture condenses, this releases energy that keeps the air warmer than its surroundings, so that it continues to rise. If enough instability is present in the atmosphere, this process will continue long enough for cumulonimbus clouds to form, which support lightning and thunder.

All thunderstorms, regardless of type, go through three stages: the cumulus stage, the mature stage, and the dissipation stage. Depending on the conditions present in the atmosphere, these three stages can take anywhere from 20 minutes to several hours to occur.

Cloud to ground lightning over Pentagon City in Arlington, Virginia

Lightning: Lightning is an electrical discharge that occurs in a thunderstorm. It can be seen in the form of a bright streak (or bolt) from the sky. Lightning occurs when an electrical charge is built up within a cloud, due to static electricity generated by super cooled water droplets colliding with ice crystals near the freezing level. When a large enough charge is built up, a large discharge will occur and can be seen as lightning. The temperature of a lightning bolt can be five times hotter than the surface of the sun. Although the lightning is extremely hot, the duration is short and 90% of strike victims survive. Contrary to the popular ideas that lightning does not strike twice in the same spot, some people have been struck by lightning over three times and skyscrapers like the Empire State Building have been struck numerous times in the same storm. The loud bang that is heard is the super heated air around the lightning bolt expanding at the speed of sound. Because sound travels slower than light the flash is seen before the bang, although both occur at the same moment. There are several types of lightning:

- In-cloud lightning is the most common. It is lightning within a cloud and is sometimes called intra-cloud or sheet lightning.
- Cloud to ground lightning is when a bolt of lightning from a cloud strikes the ground. This form poses the greatest threat to life and property.
- Ground to cloud lightning is when a lightning bolt is induced from the ground to the cloud.
- Cloud to cloud lightning is rarely seen and is when a bolt of lightning arcs from one cloud to another.
- Ball lightning is extremely rare and has several hypothesized explanations. It is seen in the form of a 20 to 200 centimeter ball.
- Cloud to air lightning is when lightning from a cloud hits air of a different charge.
- Dry lightning is a misnomer which can refer to a thunderstorm whose precipitation does not reach the ground.
- Heat Lightning is a misnomer of a lightning flash that is seen from the horizon that does not have accompanying thunder.

Risk

Thunderstorms and Lightning pose a significant risk to life and property in the region by creating conditions that disrupt essential systems such as public utilities, telecommunications, and transportation routes. High wind can and do occasionally cause tornado-like damage to local homes and

businesses. Lightning can present a very destabilizing effect on the dry brush that covers local hillsides and urban wild land interface areas.

Previous Occurrence

A synopsis of Autauga's severe thunderstorms taken from the SHELDUS and NWS data shows that severe storms occur almost every year. The years that do not have severe storms do have wind, hail and flooding events associated with thunderstorms. So, the risk or probability of having severe storms in Autauga County in a given year is near 100%.

Table 4.6
Autauga County Thunderstorm Events

HAZARD BEGIN DATE	HAZARD END DATE	HAZARD TYPE COMBO	INJURIES	FATALITIES	PROPERTY DAMAGE	CROP DAMAGE	REMARKS
2/17/1961	2/25/1961	Severe Storm/Thunder Storm	0	0	$ 7,462.69	$ 7,462.69	RAINS
12/9/1961	12/10/1961	Severe Storm/Thunder Storm	0	0	$ 8,333.33	$ 833.33	HEAVY RAIN
4/10/1962	4/12/1962	Hail - Severe Storm/Thunder Storm - Wind	0.01	0	$ 746.27	$ 746.27	WIND, RAIN, HAIL
4/26/1964	4/27/1964	Severe Storm/Thunder Storm - Wind	0.08	0	$ 1,315.79	$ 1,315.79	RAIN, WIND
3/23/1969	3/23/1969	Severe Storm/Thunder Storm - Wind	0	0	$ 7,462.68	$ -	WIND, RAIN
4/1/1970	4/2/1970	Hail - Severe Storm/Thunder Storm - Wind	0	0	$ 746.27	$ 74.63	WIND, RAIN, HAIL
5/31/1970	5/31/1970	Severe Storm/Thunder Storm	0	0	$ 8,333.33	$ 833.33	RAIN
4/23/1971	4/23/1971	Hail - Severe Storm/Thunder Storm - Wind	0	0	$ 7,462.69	$ 746.27	WIND,HAIL, RAIN
9/7/1974	9/8/1974	Severe Storm/Thunder Storm	0	0	$ 8,333.33	$ -	RAIN
2/16/1975	2/16/1975	Severe Storm/Thunder Storm	0	0	$ 13,157.89	$ -	Rain
7/31/1975	7/31/1975	Severe Storm/Thunder Storm	0	0	$ 2,941.18	$ -	RAIN
3/2/1979	3/4/1979	Flooding - Severe Storm/Thunder Storm - Wind	0	0.12	$ 74,626.87	$ -	wind, rain, flooding
4/12/1979	4/13/1979	Flooding - Severe Storm/Thunder Storm - Wind	0.13	0.3	$ -	$ 21,739.10	windstorm, rain, flood

3/16/1980	3/17/1980	Flooding - Severe Storm/Thunder Storm	0	0	$ 746.27	$ -	heavy rain, flooding
3/20/1980	3/21/1980	Flooding - Severe Storm/Thunder Storm - Wind	0.22	0	$ 746.27	$ 7.46	rain, flood, wind
3/28/1980	3/29/1980	Flooding - Severe Storm/Thunder Storm	0	0	$ 746.27	$ -	rain, flood
6/29/1980	6/29/1980	Lightning - Severe Storm/Thunder Storm - Wind	0.18	0	$ 1,000.00	$ 100.00	wind, rain, lightning
1/20/1983	1/20/1983	Severe Storm/Thunder Storm - Winter Weather	0	0	$ 7,462.69	$ -	Severe Storm-Snow
3/7/1995	3/7/1995	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	THUNDERSTORM WIND
4/11/1995	4/11/1995	Severe Storm/Thunder Storm - Wind	0	0	$ 35,000.00	$ -	THUNDERSTORM WIND
7/29/1995	7/29/1995	Severe Storm/Thunder Storm - Wind	0	0	$ 5,000.00	$ -	THUNDERSTORM WIND
8/19/1995	8/19/1995	Severe Storm/Thunder Storm - Wind	0	0	$ 3,000.00	$ -	THUNDERSTORM WINDS
4/14/1996	4/14/1996	Severe Storm/Thunder Storm - Wind	0	0	$ 15,000.00	$ -	TSTM WIND
1/24/1997	1/24/1997	Severe Storm/Thunder Storm - Wind	0	0	$ 15,000.00	$ -	THUNDERSTORM WIND
2/21/1997	2/21/1997	Severe Storm/Thunder Storm - Wind	0	0	$ 8,000.00	$ -	THUNDERSTORM WIND
4/5/1997	4/5/1997	Severe Storm/Thunder Storm - Wind	0	0	$ 7,000.00	$ -	THUNDERSTORM WIND
4/22/1997	4/22/1997	Severe Storm/Thunder Storm - Wind	0	0	$ 5,000.00	$ -	THUNDERSTORM WIND
5/3/1997	5/3/1997	Severe Storm/Thunder Storm - Wind	0	0	$ 3,000.00	$ -	THUNDERSTORM WIND
6/20/1997	6/20/1997	Hail - Severe Storm/Thunder Storm - Wind	0	0	$ 7,000.00	$ -	THUNDERSTORM WIND/HAIL
1/7/1998	1/7/1998	Severe Storm/Thunder Storm - Wind	0	0	$ 7,000.00	$ -	THUNDERSTORM WIND
6/5/1998	6/5/1998	Severe Storm/Thunder Storm - Wind	0	0	$ 30,000.00	$ 5,000.00	THUNDERSTORM WIND

6/8/1998	6/8/1998	Severe Storm/Thunder Storm - Wind	0	0	$ 20,000.00	$ -	THUNDERSTORM WIND
6/15/1998	6/15/1998	Severe Storm/Thunder Storm - Wind	0	0	$ 15,000.00	$ 4,000.00	THUNDERSTORM WIND
3/3/1999	3/3/1999	Severe Storm/Thunder Storm - Wind	2	0	$ 295,000.00	$ -	TSTM WIND
6/30/1999	6/30/1999	Severe Storm/Thunder Storm - Wind	0	0	$ 10,000.00	$ -	TSTM WIND
7/6/1999	7/6/1999	Severe Storm/Thunder Storm - Wind	0	0	$ 5,000.00	$ -	TSTM WIND
1/9/2000	1/9/2000	Severe Storm/Thunder Storm - Wind	0	0	$ 10,000.00	$ -	THUNDERSTORM WIND
3/19/2000	3/19/2000	Severe Storm/Thunder Storm - Wind	0	0	$ 10,000.00	$ -	THUNDERSTORM WIND
4/3/2000	4/3/2000	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	THUNDERSTORM WIND
7/20/2000	7/20/2000	Severe Storm/Thunder Storm - Wind	0	0	$ 15,000.00	$ -	THUNDERSTORM WIND
8/10/2000	8/10/2000	Severe Storm/Thunder Storm - Wind	0	0	$ 10,000.00	$ -	THUNDERSTORM WIND
3/15/2001	3/15/2001	Severe Storm/Thunder Storm - Wind	0	0	$ 22,000.00	$ -	
6/4/2001	6/4/2001	Severe Storm/Thunder Storm - Wind	0	0	$ 8,000.00	$ -	
6/4/2001	6/4/2001	Severe Storm/Thunder Storm - Wind	0	0	$ 5,000.00	$ -	
6/4/2001	6/4/2001	Severe Storm/Thunder Storm - Wind	0	0	$ 1,000.00	$ -	
5/30/2002	5/30/2002	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	
7/12/2002	7/12/2002	Severe Storm/Thunder Storm - Wind	0	0	$ 4,000.00	$ -	
11/11/2002	11/11/2002	Severe Storm/Thunder Storm - Wind	0	0	$ 75,000.00	$ -	
3/13/2003	3/13/2003	Severe Storm/Thunder Storm - Wind	0	0	$ 5,000.00	$ -	

3/14/2003	3/14/2003	Severe Storm/Thunder Storm - Wind	0	0	$ 3,000.00	$ -	
4/7/2003	4/7/2003	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	
4/25/2003	4/25/2003	Severe Storm/Thunder Storm - Wind	3	0	$ 1,000,000.00	$ -	
8/4/2003	8/4/2003	Severe Storm/Thunder Storm - Wind	0	0	$ 3,000.00	$ -	
4/7/2004	4/7/2004	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	
7/12/2004	7/12/2004	Severe Storm/Thunder Storm - Wind	0	0	$ 4,000.00	$ -	
3/7/2005	3/7/2005	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	Thunderstorm Wind
3/31/2005	3/31/2005	Severe Storm/Thunder Storm - Wind	0	0	$ 4,000.00		Thunderstorm Wind
4/1/2005	4/1/2005	Severe Storm/Thunder Storm - Wind	0	0	$ 350,000.00	$ -	THUNDERSTORM WIND
4/21/2005	4/21/2005	Severe Storm/Thunder Storm - Wind	0	0	$ 12,000.00	$ -	THUNDERSTORM WIND
4/30/2005	4/30/2005	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	THUNDERSTORM WIND
5/20/2005	5/20/2005	Severe Storm/Thunder Storm - Wind	0	0	$ 4,000.00	$ -	Thunderstorm Wind
2/13/2006	2/13/2006	Severe Storm/Thunder Storm - Wind	0	0	$ 3,000.00	$ -	Thunderstorm Wind
4/19/2006	4/19/2006	Severe Storm/Thunder Storm - Wind	0	0	$ 5,000.00	$ -	Thunderstorm Wind (G50)
4/19/2006	4/19/2006	Severe Storm/Thunder Storm - Wind	0	0	$ 1,000.00	$ -	Thunderstorm Wind (G50)
5/10/2006	5/10/2006	Severe Storm/Thunder Storm - Wind	0	0	$ 10,000.00	$ -	Thunderstorm Wind (G50)
7/29/2006	7/29/2006	Severe Storm/Thunder Storm - Wind	0	0	$ 1,000.00	$ -	Thunderstorm Wind (G50)
8/15/2006	8/15/2006	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	Thunderstorm Wind

2/13/2007	2/13/2007	Severe Storm/Thunder Storm - Wind	0	0	$ 3,000.00	$ -	Thunderstorm Wind
4/4/2007	4/4/2007	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	Thunderstorm Wind (39 EG)
10/23/2007	10/23/2007	Severe Storm/Thunder Storm - Wind	0	0	$ 2,000.00	$ -	Thunderstorm Wind (50EG)
	Total		5.62	0.42	$ 2,224,623.82	$ 42,858.87	

There have been 70 thunderstorm events reported in Autauga County over the past 48 years resulting in over $2.2 million of damage.

Form 1965 – 2000 there have been eight (8) lightning evens recorded within Autauga County. Of these events there were 1 death, 2 injuries and $23,053.95 in damage.

Table 4.7
Autauga County Lightning Events

HAZARD BEGIN DATE	HAZARD END DATE	HAZARD TYPE COMBO	INJURIES	FATALITIES	PROPERTY DAMAGE	CROP DAMAGE	REMARKS
7/7/1965	7/7/1965	Lightning	0	1	$ -	$ -	Electrical
8/24/1968	8/24/1968	Lightning - Wind	0	0	$ 1,315.79	$ 13.16	Wind, Electrical
6/20/1969	6/20/1969	Hail - Lightning - Wind	0	0	$,333.33	$ -	WIND, ELECTRICAL HAIL
5/12/1971	5/12/1971	Hail - Lightning - Wind	0.04	0	$ 2,083.33	$ 208.33	WIND, HAIL, ELECTRICAL
6/29/1980	6/29/1980	Lightning - Severe Storm/Thunder Storm - Wind	0.18	0	$ 1,000.00	$ 100.00	wind, rain, lightning
7/16/1999	7/16/1999	Lightning	0	0	$ 10,000.00	$ -	LIGHTNING
4/2/2000	4/2/2000	Lightning	1	0	$ -	$ -	LIGHTNING
9/1/2000	9/1/2000	Lightning	1	0	$ -	$ -	LIGHTNING
	Total		2.22	1	$ 22,732.45	$ 321.49	

Probability of Future Events

History has shown that there is a 100% probability of future thunderstorm and lightning events in Autauga County. This is based on records of previous occurrence. The magnitude of future thunderstorms, or the extent to which lightning may affect the county, is considered to be at least equal to that of the past, and could actually increase as more and more land area is developed for housing, business and industry.

Vulnerability

Thunderstorms are a common occurrence in Autauga County, and as such, residents are generally well versed in protecting their lives and property from these hazards. The impact on the health of residents will likely be *Negligible*, while the most severe hail storms can result in *Critical* damage to crops and structures. Overall, the next thunderstorm event is likely to result in a *Limited* impact.

Thunderstorm hazards are generally considered path hazards, with areas along or adjacent to the storm path receiving some degree of damage, correspondent to the severity of the storm.

Population

It is uncertain the total number of people that would be impacted. This figure would depend on the factors such as location of the event, and time frame of the event. Populations residing in older communities in Prattville and rural areas of Autauga County have a greater risk of impact from a thunderstorm/lightning due to lack of building codes and close proximity to trees and falling limbs.

Critical Facilities

As with the review of population, it is uncertain to determine which facilities are directly at risk. All critical facilities share equal risk with this natural hazard. Water towers and communication towers are at the greatest risk to receive lightning damage. Power facilities have the greatest risk of impact due to downed power lines from falling debris.

Geographical Area

All geographical areas within the County are equally at risk of this natural hazard. Older communities and rural areas have a higher risk of structural damage due to falling trees and limbs. Also, due to the lack of building codes in the unincorporated area of Autauga County, these structures could be more vulnerable to damage from thunderstorm/lightening.

Loss Assessment

The entire county (100%) is vulnerable to severe thunderstorms. The next major event will likely impact 10% of the county, damaging 84 structures valued at $704,180.

4.6 Flooding - Riverine/Flash Flooding

The Autauga County Hazard Vulnerability Analysis provided historic and probability information on flooding in Autauga County. Flooding is one of the most prevalent types of natural disaster occurring in Alabama as well as in Autauga County.

Risk

Autauga County's flood risk can be attributed to the Alabama River and some of its larger tributaries. The River runs the length of the county's southern border. Mainstream flooding in the Alabama River's watershed occurs just about every year. Flooding occurs most frequently between November and April with a peak from February through April. However, flooding in this system can and does occur at other times. The Alabama River is an extensive waterway system, with both natural sections and those improved for navigation. A review of records reveals that a great deal of minor flooding occurs each year along the River, with most of it occurring particularly in the undeveloped rural areas. Extensive rains have the potential for creating heavy flooding conditions on the River. As a whole, Alabama receives more annual rainfall than any other state, creating the potential for devastating floods.

Previous Occurrence

Autauga County is prone to annual flooding. Stream and river flooding can occur at anytime during the year. Flooding may be in the form of flash floods caused by fall and spring rains. Flooding may also be in the form of river flooding caused by prolonged rains attributed to multiple storm systems crossing the area over a period of time or from a tropical disturbance.

Autauga County has experienced multiple floods over the last 24 years causing millions of dollars in damages. Of the twenty–seven floods in this time period, four were federally declared disasters. Flooding has occurred

most often in Prattville and Autaugaville, both of which are situated along major tributaries of the Alabama River.

Table 4.8 provides a listing of the major flooding in Autauga County from 1975-2008.

Table 4.8
Autauga County Flood Events

HAZARD BEGIN DATE	HAZARD END DATE	HAZARD TYPE	INJURIES	FATALITIES	PROPERTY DAMAGE	CROP DAMAGE	REMARKS
2/20/1975		Flooding					Sunshine Acres, Highway 14
4/10/1975		Flooding					Spring Hill
10-0201975		Flooding					Allenville Road - Hurricane Eloise
3/15/1976	3/16/1976	Flooding	0	0	$ 83,333.33	$ 33.33	Flash Flooding
3/2/1979	3/4/1979	Flooding - Severe Storm/Thunder Storm - Wind	0	0.12	$ 4,626.87	$ -	wind, rain, flooding
4/12/1979	4/13/1979	Flooding - Severe Storm/Thunder Storm - Wind	0.13	0.3	$ -	$ 21,739.10	windstorm, rain, flood
3/16/1980	3/17/1980	Flooding - Severe Storm/Thunder Storm	0	0	$ 746.27	$ -	heavy rain, flooding
3/20/1980	3/21/1980	Flooding - Severe Storm/Thunder Storm - Wind	0.22	0	$ 746.27	$ 7.46	rain, flood, wind
3/28/1980	3/29/1980	Flooding - Severe Storm/Thunder Storm	0	0	$ 746.27	$ -	rain, flood
2/2/1982	2/3/1982	Flooding	0	0	$ 227.27	$ -	flooding
8/8/1996	8/8/1996	Flooding	0	0	$ 10,000.00	$ -	FLOODS
12/1/1996	12/1/1996	Flooding	0	0	$ 8,000.00	$ -	FLOODS
1/7/1998	1/7/1998	Flooding	0	0	$ 25,000.00	$ 5,000.00	FLASH FLOOD
6/15/1999	6/15/1999	Flooding	0	0	$ 50,000.00	$ -	FLASH FLOOD
6/27/1999	6/27/1999	Flooding	0	0	$ 35,000.00	$ -	FLASH FLOOD
9/1/2000	9/1/2000	Flooding	0	0	$ 200,000.00	$ -	FLASH FLOOD
3/3/2001	3/3/2001	Flooding	0	0	$ 22,000.00	$ -	
3/12/2001	3/12/2001	Flooding	0	0	$ 15,000.00	$ -	
3/21/2001		Flooding					Rain/Snow
8/7/2001		Flooding					Tropical Storm Berry
4/7/2003	4/7/2003	Flooding	0	0	$ 50,000.00	$ -	
5/23/2003		Flooding					Rain - Prattville
7/1/2003	7/1/2003	Flooding	0	0	$ 8,000.00	$ -	

9/16/2004	9/16/2004	Flooding	0	0	$ 8,000.00	$ -	Flash Flood
4/1/2005	4/1/2005	Flooding	0	0	$ 8,000.00	$ -	FLASH FLOOD
4/1/2005	4/3/2005	Flooding	0	0	$ 4,400.00	$ -	FLOOD
6/8/2005	6/8/2005	Flooding	0	0	$ 11,000.00	$ -	Flash Flood

Total			0.35	0.42	$ 714,826.28	$ 27,579.89	

Twenty-seven flood events over the last 24 years were researched for the purpose of this mitigation plan. Areas of repetitive flooding are in Prattville, Autaugaville, and areas in the southern part of the county.

Table 4.9
LOSS STATISTICS
ALABAMA
AS OF 02/28/2009

COMMUNITY NAME	TOTAL LOSSES	CLOSED LOSSES	OPEN LOSSES	CWOP LOSSES	PAYMENTS
AUTAUGA COUNTY *	28	22	0	6	$ 487,503.85
PRATTVILLE, CITY OF	24	22	0	2	$ 383,549.10

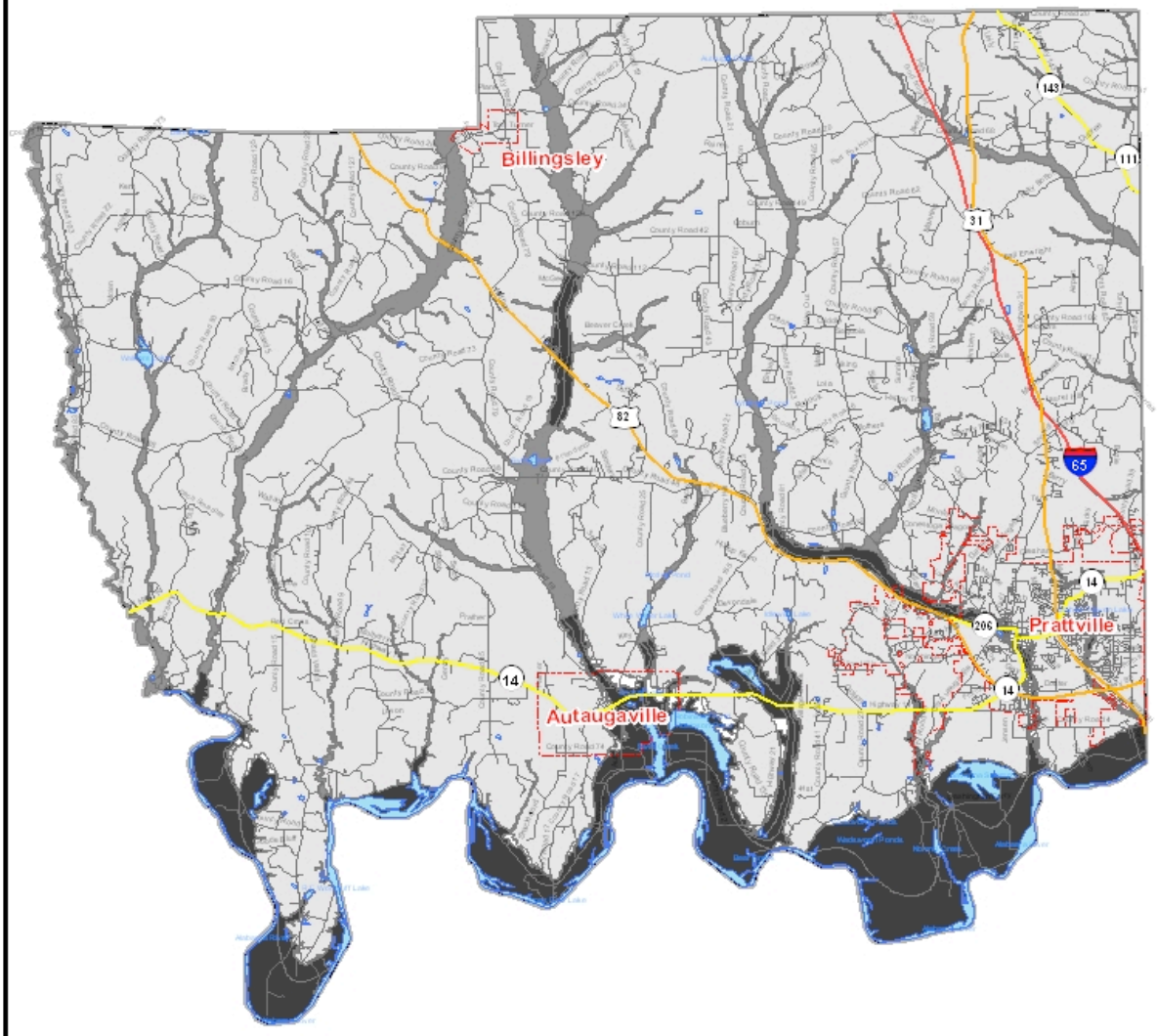
There are a total of 39 repetitive loss residential structures (primarily manufactured houses within the City of Prattville) in Autauga County. According to FEMA a Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

Probability of Future Events

As seen from the previous hazard events occurrence charts, the probability or risk of flooding is higher in two of the three municipalities -- Prattville and Autaugaville, than it is in other population centers such as the unincorporated areas of Marbury, Jones, Independence, White City or Booth. In addition to having a lower risk in these other communities, there is also a lower vulnerability, as discussed below.

Flooding events in Autauga County can occur on an average of three to four times a year, normally with little reported damage. Major flooding damage can be expected once every ten years, or an approximate 10% annual probability. The County can expect to experience some type of minor flooding on an annual basis. A one hundred year flood has a 1% chance of occurring in any given year (FEMA 386-2, *Understanding Your Risks*).

Flood Zone Map
Autauga County, Alabama



Vulnerability

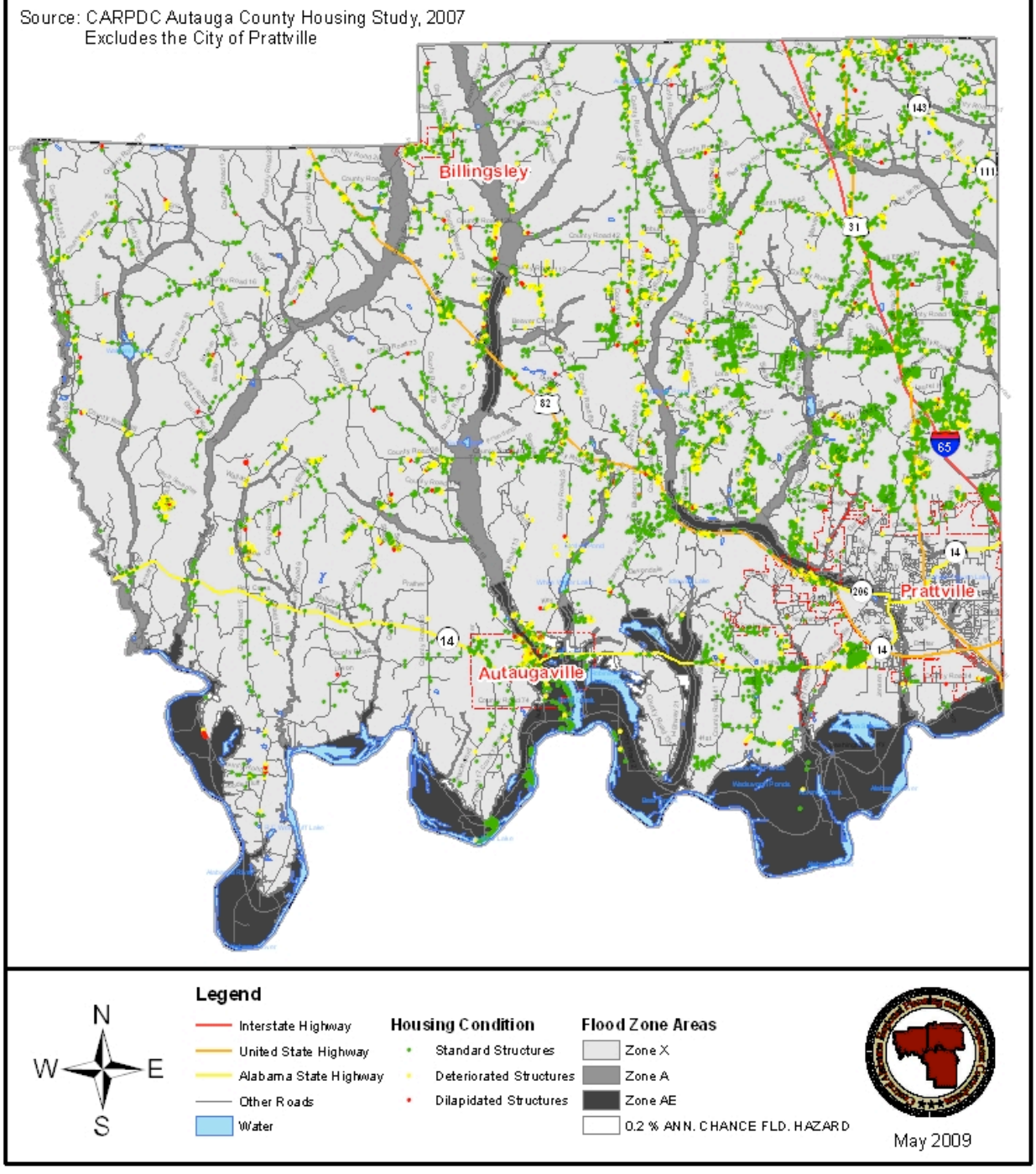
Not only is the flood risk higher for Prattville and Autaugaville, but vulnerability to damaging floods is higher as well. Because of topography, soil composition and percolation, population density and location, and proximity to the river and stream banks, neighborhoods in these communities and the nearby farmlands in the Alabama River watershed have a greater vulnerability to floods. The vast majority of the flooding is minor and occurs near Autaugaville on the vast farm lands in the fertile Alabama River floodplain. However, this area has recently become more attractive as location for year-round and vacation homes with a river view. Autauga County's other population centers mentioned above are generally located at higher elevations and farther up the watershed, have better soil drainage, and have less population near a river or stream bank. Autauga County has a plethora of waterways large and small. Two main creeks drain Autauga County: Autauga Creek and Swift Creek. The Alabama River forms the southern border of the county, running from its easternmost point to its westernmost point. Other smaller creeks run through the county including Pine Creek, Ivy Creek, Noland Creek, Mortar Creek, Mulberry Creek, Bear Creek Swamp, Breakfast Creek, Bridge Creek Swamp, etc. These waterways are fed by rainfall as surface runoff or by seepage of ground water into the channels. The following map depicts the sub-watersheds in Autauga County, illustrating why the county has so many flood-prone areas. The magnitude of future events, or the extent to which flood prone areas could be affected by future events, continues to be high in those areas of the flood plain.

As stated earlier, Autauga County is one of the fastest growing counties in the state. Most of that growth is occurring in Prattville the areas immediately surrounding the city and the northeast quadrant of the county. Urbanization and construction have increased dramatically over the last thirty years. Urbanization generally changes the character of floodplains by creating higher volume of stormwater runoff, which reaches the stream in less time than when the watershed was forested or used for agriculture. Construction activities such as home building and highway construction create erosion and high volumes of sediment that can negatively impact a stream. Sediment can clog drainage structures and fill in the stream channel lessening the stream carrying capacity during a storm event.

The City of Prattville, the Town of Autaugaville and Autauga County are participates in NFIP. In an effort to mitigate flood within their communities and county all address development in the flood plain or floodway. Both communities and the county have established regulations and requirement

on property owners who wish to develop properties within flood porn areas. In an effort to mitigate flooding in some vulnerable, flood prone areas, the

Housing Condition Map
Autauga County, Alabama



City of Prattville undertook two Hazard Mitigation Grants. In the 1999/2000 and 2001/2002 fiscal years applied for and implemented two Hazard Mitigation Grants to remove eight (8) *site-built homes* and a manufactured home park with 6 units *from the regulatory floodway with the goal of reducing the potential loss of life and property and the need for emergency response in a flood event. This project was completed in 2006 and successfully removed 2 structures from Holly Court and 6 structures and 1 manufactured home park consisting of 6 units from Allenville Road. The City implemented the buyout program recognizing that it was the most effective means to eliminate the flood danger to residents and personal and repetitive flood insurance claims.*

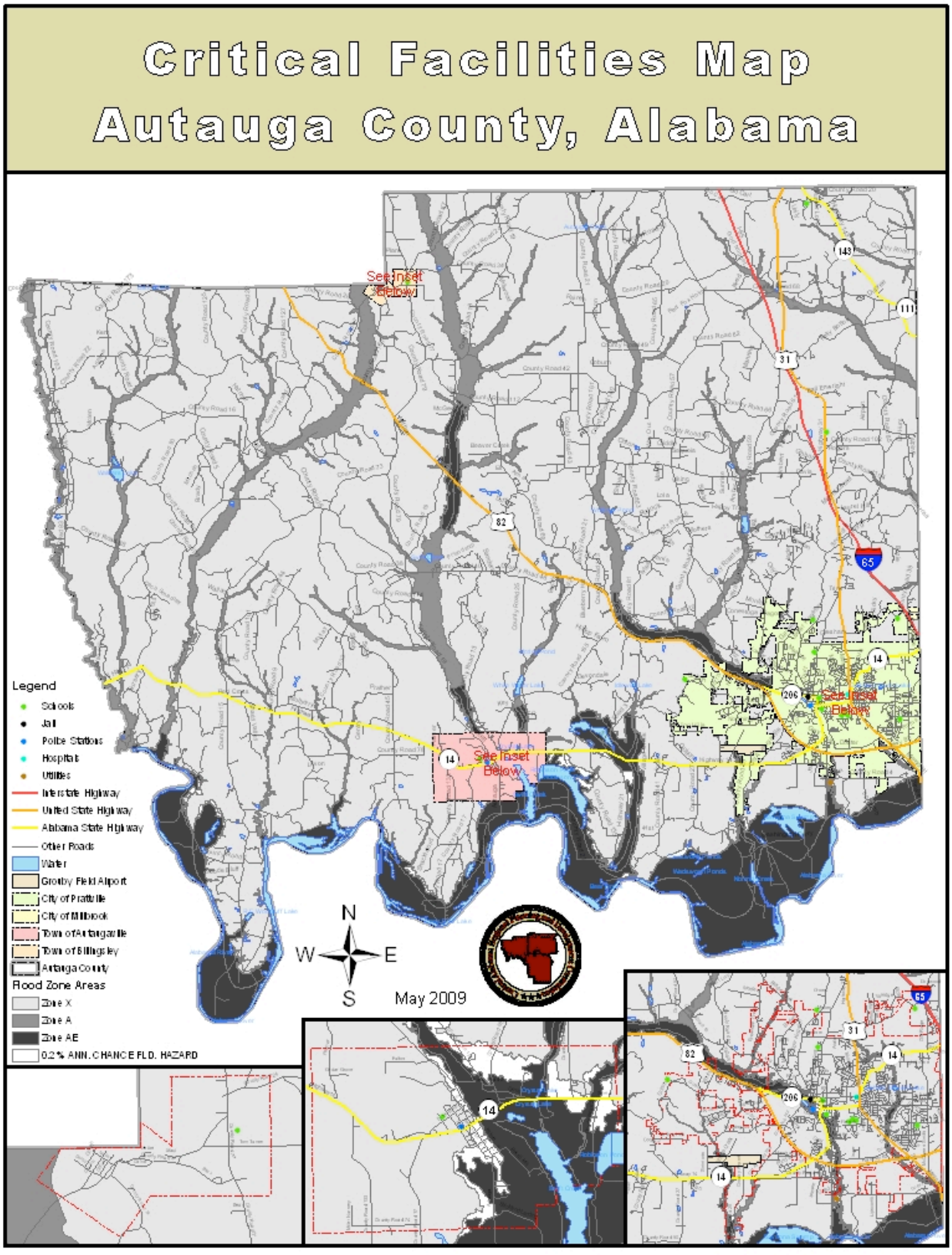
This was the first phase of a multi-application project that the City of Prattville will submit as the Alabama Emergency *Management Agency and FEMA make grant funds available. The City of Prattville hopes to acquire as many as thirty structures over the next ten years in both the Pine Creek and Autauga Creek floodways.*

While the buyout program has proven effective for dealing with residential structures, it is not as practical for dealing with the majority of Prattville's flood vulnerability. Prattville's central business district, which is also the historic heart of the city, is located in the Autauga Creek floodplain. Flood losses in the business district have been significantly reduced since the construction of the flood control levee in the 1940's. The levee, constructed by the US Army Corps of Engineers, protects the district from most minor flooding. However, larger events such as the September 1, 2000 flood have still flooded significant portions of the district. Since it is impractical to relocate or demolish the historic center of the community Prattville has chosen to use elevation or flood-proofing of commercial structures and elevation of residential structures as the primary mitigation technique for this area. At this time, only minor flood-proofing projects have taken place.

Two separate analyses were completed to determine the vulnerability of Autauga County to flooding. The first analysis involved Geographic Information Systems (GIS). The second analysis involved the use of tax assessments and property locations.

Analysis Method 1

The Autauga County Hazard Mitigation Committee performed the first analysis using Geographic Information Systems (GIS). Using Digital Q3 data from FEMA (floodplains digitized from FIRM maps at a scale of 1:24,000), areas in Zones A or AE (also known as Significant Flood Hazard Areas (SFHA)) were mapped. Zone A are areas that the base floodplain was


Critical Facilities Map
Autauga County, Alabama
See Inset Below
See Inset Below
See Inset Below
Legend
Schools
Jail
Police Stations
Hospitals
Utilities
Interstate Highway
United State Highway
Alabama State Highway
Other Roads
Water
Grouby Field Airport
City of Prattville
City of Millbrook
Town of Autaugaville
Town of Billingsley
Autauga County
Flood Zone Areas
Zone X
Zone A
Zone AE
0.2 % ANN. CHANCE FLD. HAZARD
N
W
E
S
May 2009

mapped by approximate methods, meaning base flood elevations (BFE's) are not determined. Zone AE are areas where the floodplain was mapped and BFE's were determined (FEMA 386-2, *Understanding Your Risks*). Paper FIRM maps for each municipality were also reviewed. Because of scale and accuracy concerns, a 250 foot buffer was created around the 100 year floodplain to show structures that may still be at risk of flooding. This buffer has been used to study specific areas of the County, which have experienced flooding in the past.

Population

In the second method of analysis, HAZUS MH-1 was used to estimate the number of people at risk.

Critical Facilities and Structures

Nearly 10% of all addressable structures in Autauga County are located in a 100 year floodplain. The majority of these structures are residential, which includes single and multi-family housing units, and manufactured homes. Eight of the County's critical facilities lie in a floodplain.

Geographical Areas

The Town of Billingsley does not have any addressable structures in the 100 year floodplain.

Analysis Method 2

After completing the first analysis using county data and FEMA floodplain boundaries, an estimate of the monetary loss was still lacking. In order to determine these potential losses, the Autauga County Hazard mitigation Committee used tax assessments to perform a flood analysis.

Loss Assessment

It is estimated that there are 121 residential structures or manufactured homes within the flood plain; this translates to a value of $9.6 million. The critical facilities within the flood plain primarily within Prattville have an estimated value of over $75 million.

TABLE 4.10
Critical Facilities Within Floodways
By Government

GOVERNMENT		ESTIMATED COST
AUTAUGA COUNTY		
134 N. Court St. - Courthouse		$ 22,332,252.84
Courthouse Security		$ 392,251.40
Courthouse Renovation		$ 980,098.37
Lobby-Courthouse Security		$ 621,833.06
Parking Lot Improvements - Courthouse		$ 33,263.12
Honeywell Energy Management System - Courthouse		$ 386,007.30
136 N. Court St. - Jail		$ 3,025,691.70
Autauga Jail Annex Renovation		$ 71,144.75
203 N. Court St. - Human Resources/Pensions& Security		$ 923,216.08
153 W. 4th St. - Board of Education Building		$ 325,033.91
511m W. 4th St. - Engineer Building		$ 530,117.05
Co. Maintenance Shop Building		$ 488,998.47
101 Walker St. - Newton Park Voting Site		$ 584,669.41
176 W. 5th St. - Probate Building		$ 1,144,174.68
218 N. Court St. - Revenue Building		$ 649,724.36
164 W. 4th St. - Sheriff Dept Renovation		$ 318,917.91
Sheriff Dept Renovation		$ 1,989,811.71
	Total	**$34,797,206.12**
CITY OF PRATTVILLE		
Autauga Creek Wastewater Treatment Plant - Reuben Road		$ 15,642,630.45
Pine Creek Wastewater Treatment Plan - 100 Pine Creek Drive		$ 2,717,379.75
Prattville City Hall -101 West Main Street		$ 3,082,905.90
Prattville City Hall Annex - 102 West Main Street		$ 1,103,953.15
	Total	**$ 22,546,869.25**
	Grand Total	**$57,344,075.37**