PART 1

Jefferson County
Multi-Hazard Mitigation Plan

A Multi-Jurisdictional Plan

Prepared under the direction of the
Jefferson County Hazard Mitigation Planning Committee

With the support of the Jefferson County EMA

December 2015

2014 Jefferson County Multi-Hazard Mitigation Plan

Jefferson County Hazard Mitigation Planning Committee

Participating Jurisdictions

Jefferson County
City of Adamsville
City of Bessemer
City of Birmingham
City of Brighton
Town of Brookside
City of Center Point
City of Clay
Town of County Line
City of Fairfield
City of Fultondale
City of Gardendale
City of Graysville
City of Homewood
City of Hoover
City of Hueytown
City of Irondale
Town of Kimberly
City of Leeds
City of Lipscomb
City of Midfield
Town of Morris
City of Mountain Brook
Town of Mulga
City of Pinson
City of Pleasant Grove
Town of Sylvan Springs
City of Tarrant
Town of Trafford
City of Trussville
City of Vestavia Hills
City of Warrior
Town of West Jefferson

Non-Participating Jurisdictions
Town of Cardiff
City of Maytown
Town of North Johns

Contact

James A. Coker, Director, Jefferson County EMA
709 North 19th Street
Birmingham, AL 35203
205-254-2039
cokerj@jccal.org

Part of the preparation and publication of this plan was funded by a FEMA grant under the Hazard Mitigation Grant Program awarded by the Alabama EMA to the Jefferson County EMA.

Table of Contents

PART 1 – MULTI–HAZARD MITIGATION PLAN

Executive Summary i
Chapter 1. Introduction 1–1
Chapter 2. Prerequisites 2–1
Chapter 3. Community Profiles 3–1
Chapter 4. The Planning Process 4–1
Chapter 5. Risk Assessment 5–1
Chapter 6. Mitigation Strategy 6–1
Chapter 7. Plan Maintenance Process 7–1

PART 2 – COMMUNITY ACTION PROGRAMS

Jefferson County (UNINCORPORATED) Community Action Program JC–1
Adamsville Community Action Program AD–1
Bessemer Community Action Program BE–1
Birmingham Community Action Program BI–1
Brighton Community Action Program BR–1
Brookside Community Action Program BRI–1
Center Point Community Action Program CE–1
Clay Community Action Program CL–1
County Line Community Action Program COL–1
Fairfield Community Action Program FA–1
Fultondale Community Action Program FU–1
Gardendale Community Action Program GA–1
Graysville Community Action Program GR–1
Homewood Community Action Program HO–1
Hoover Community Action Program HOO–1
Hueytown Community Action Program HU–1
Irondale Community Action Program IR–1
Kimberly Community Action Program KI–1
Leeds Community Action Program LE–1
Lipscomb Community Action Program LI–1
Midfield Community Action Program MI–1
Morris Community Action Program MO–1
Mountain Brook Community Action Program MOU–1
Mulga Community Action Program MU–1
Pinson Community Action Program PI–1
Pleasant Grove Community Action Program PL–1
Sylvan Springs Community Action Program SY–1

Table of Contents (continued)

Tarrant Community Action Program TA–1
Trafford Community Action Program TR–1
Trussville Community Action Program TRU–1
Vestavia Hills Community Action Program VE–1
Warrior Community Action Program WA–1
West Jefferson Community Action Program WJ–1

PART 3 – APPENDICES

Appendix A: Acronyms
Appendix B: Community Mitigation Capabilities
Appendix C: Presidential Declarations in Jefferson County since 2009 and Mitigation Projects
Appendix D: Citizen Input for Hazard Mitigation Planning Survey
Appendix E: Survey Monkey Citizen Input Results for Jefferson County
Appendix F: Hazard Mitigation Plan Development Timeline
Appendix G: Initial Planning Process Documentation
Appendix H: Second Planning Process Documentation
Appendix I: Plan Adoption Resolutions

Executive Summary

Background

Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), 42 U. S.C. 5165 as amended by the Disaster Mitigation Act of 2000 (DMA) (P.L. 106-390), provides for States, Tribes, and Local Governments to undertake a risk-based approach to reducing risks to natural hazards through mitigation planning.

The National Flood Insurance Act of 1968, as amended, 42 U. S. C. 4001 et seq. reinforced the need and requirement for mitigation plans, linking flood mitigation assistance to State, Tribal and Local Mitigation Plans. FEMA has implemented the various hazard mitigation planning provisions through regulations in 44 CFR Part 201, which also permit man-made hazards to be addressed in a local mitigation plan. These Federal regulations describe the requirement for a State Mitigation Plan as a condition of pre- and post-disaster assistance as well as the mitigation plan requirement for Local and Tribal governments as a condition of receiving hazard mitigation assistance. 44 CFR 201.6(d)(3) requires that a local jurisdiction must review and revise its local plan to reflect any changes and resubmit it for approval within five years in order to remain eligible for mitigation grant funding.

Organization of the Plan

The 2014 Jefferson County Multi-Hazard Mitigation Plan, is organized to parallel the 44 CFR Section 201.6 Federal requirements for a local mitigation plan, as interpreted by Local Mitigation Planning Handbook, FEMA March 2013. The organization of this plan is consistent with the organization of the 2013 Alabama Hazard Mitigation Plan, which also parallels the Federal requirements. The plan has seven chapters, as follows:

Chapter 1. Introduction
Chapter 2. Prerequisites
Chapter 3. Community Profiles
Chapter 4. The Planning Process
Chapter 5. Risk Assessment
Chapter 6. Mitigation Strategy
Chapter 7. Plan Maintenance Process

This plan is also organized similar to the 2009 Jefferson County, Alabama Natural Hazards Mitigation Plan, which allows for easy cross reference. Each chapter of the 2014 plan references the requirements of 44 CFR Section 201.6 that it addresses.

Highlights of the Plan

Each hazard that is viewed as a possible risk to Jefferson County is described in detail; the vulnerability of the county and each jurisdiction to the hazards are addressed; goals, objectives, and mitigation strategies and actions are stated and mitigation plans that direct each jurisdiction in the implementation and monitoring of the measures are included in the plan.

Chapter 1. Introduction

Provides a general introduction to the plan. Explains the purpose of the plan and which jurisdictions participated in the plan. The chapter mentions the regulations that require the active participation of local jurisdictions in the mitigation planning process. Also included is the explanation of various funding sources that can be applied for if a plan update is submitted to FEMA and approved.

Chapter 2. Prerequisites

Addresses the different regulations governing the development and updating of the mitigation plan. Addresses 44 CFR Sec. 201.6 and the prerequisites required through this Code. Goes into greater detail about the various mitigation grants and other federal money available for the County's use for mitigation planning.

Also addresses multi-jurisdictional participation and plan adoption. Describes the relationship and responsibilities of the various entities involved in the planning process. Explains various means through which entities could participate in the planning process. The multi-jurisdictional plan adoption procedure is explained in the last section of the chapter.

Chapter 3. Community Profiles

Profiles the participating jurisdictions. Each jurisdiction within Jefferson County is described in detail. The overall geographic setting and history of Jefferson County and the participating jurisdictions are addressed. Summaries about the jurisdictions' government, demographics, economy, utilities, media, transportation and climate are included.

Chapter 4. The Planning Process

Explains the planning process in detail. Explains how the public was involved in the planning process, what steps the HMPC took in developing the plan, what documents were consulted in the plan and how the plan was prepared, reviewed and updated.

Chapter 5. Risk Assessment

Describes the process used to identify and prioritize the hazard risks to each Jefferson County jurisdiction. Describes the resources used to identify the hazards and provides detailed descriptions of each identified hazard. A hazard profile for each identified hazard includes a general description of

the nature of the hazard in Jefferson County, followed by an explanation of the location, extents, previous occurrences, and the probabilities of future occurrences.

Vulnerability assessments are reported for each identified hazard, including a summary of the impact of each hazard on each jurisdiction.

Chapter 6. Mitigation Strategies

Addresses the full range of mitigation strategies evaluated by the HMPC. Explains the common community vision for disaster resistance, the goals that the plan is trying to achieve, and objectives to be used to achieve these goals. Identifies and analyzes mitigation actions and projects. Discusses participation and compliance with the National Flood Insurance Program.

Chapter 7. Plan Maintenance Process

Describes the maintenance process for the 2014 Jefferson County Multi-Jurisdictional Hazard Mitigation Plan. Explains the monitoring, evaluation and updating procedures and the need to incorporate the plan into other planning mechanisms. Also describes the means of soliciting continued public participation in the plan maintenance process.

Chapter 1 – Introduction

Background
Authority
Funding
Eligibility for FEMA Hazard Mitigation Assistance Grants
Jefferson County Natural Hazard Mitigation Plan (2004)
Jefferson County Multi-Hazard Mitigation Plan (2009)
Jefferson County Multi-Hazard Mitigation Plan (2014)

Background

The 2014 Jefferson County Multi-Hazard Mitigation Plan is a multi-jurisdictional guide for all communities within Jefferson County. It 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. It has been written to address the need for continued eligibility for the FEMA Hazard Mitigation Assistance (HMA) Grant Programs.

Authority

Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), 42 U. S.C. 5165 as amended by the Disaster Mitigation Act of 2000 (DMA) (P.L. 106-390), provides for States, Tribes, and local governments to undertake a risk- based approach to reducing risks to natural hazards through mitigation planning. The National Flood Insurance Act of 1968, as amended, 42 U. S. C. 4001 et seq. reinforced the need and requirement for mitigation plans, linking flood mitigation assistance to State, Tribal and local mitigation plans.

FEMA has implemented the various hazard mitigation planning provisions through regulations in 44 CFR Part 201, which also permit man-made hazards to be addressed in a local mitigation plan. These Federal regulations describe the requirement for a State mitigation plan as a condition of pre- and post-disaster assistance as well as a mitigation plan requirement for local and Tribal governments as a condition for receiving hazard mitigation assistance. 44 CFR 201.6(d)(3) requires that a local jurisdiction must review and revise its local plan to reflect any changes and resubmit it for approval within five years of FEMA approval in order to remain eligible for mitigation grant funding.

Funding

The Jefferson County EMA received funding from the Alabama EMA to complete the 2014 update of this plan.

Eligibility for FEMA Hazard Mitigation Assistance Grants

Adoption of this plan is the initial step towards continuing eligibility for FEMA Hazard Mitigation Assistance (HMA) grant assistance to participating localities. These FEMA grants include the following programs:

1. The Hazard Mitigation Grant Program (HMGP). The HMGP provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

2. The Pre-Disaster Mitigation (PDM) Program. The PDM program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.

3. The Flood Mitigation Assistance (FMA) Program. The FMA program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FEMA provides FMA funds to assist states and communities implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP).

4. The Repetitive Flood Claims (RFC) Program. The Repetitive Flood Claims program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108–264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). Up to $10 million is available annually for FEMA to provide RFC funds to assist states and communities reduce flood damages to insured properties that have had one or more claims to the National Flood Insurance Program (NFIP).

5. The Severe Repetitive Loss (SRL) Program. The Severe Repetitive Loss program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, which amended the National Flood Insurance Act of 1968 to provide funding to reduce or eliminate the long- term risk of flood damage to severe repetitive loss structures insured under the National Flood Insurance Program.

Jefferson County Natural Hazard Mitigation Plan (2004)

The planning process began in January 2003 with the appointment of the Hazard Mitigation Planning Committee (HMPC) by the Jefferson County Emergency Management Agency (JCEMA). The committee first convened in January 2003. FEMA approved the final plan on June 21, 2004.

Jefferson County Multi-Hazard Mitigation Plan (2009)

The HMPC re-convened in June 2009 to update the 2004 Hazard Mitigation plan as the 2009 Jefferson County Multi-Hazard Mitigation Plan. Due to the timing of the planning grant award, there was the potential for a lapse in eligibility for Jefferson County and its participating jurisdictions. In order to maintain eligibility for mitigation grant programs, an interim plan was developed while a major update was underway. The interim plan was approved by FEMA on December 3, 2009. Subsequently, work on the full update continued until it was completed in 2011. The HMPC adopted a resolution to approve the 2011 update as an amendment to the 2009 plan in November 2011.

The following jurisdictions failed to adopt the 2009 Plan:

- Bessemer
- Brighton
- Brookside
- Cardiff
- Clay
- Gardendale
- Kimberly
- Leeds
- Lipscomb
- Maytown
- Morris
- Mulga
- North Johns
- Trafford
- West Jefferson

Jefferson County Multi-Hazard Mitigation Plan (2014)

The 2014 Plan Update development was conducted in two separate sessions. ERI International was initially contracted by JCEMA to prepare the plan update with submission to AEMA for review prior to the 2009 plan expiration date of December 2, 2014. Members of the HMPC were invited to a meeting on August 8, 2014 to review the plan update. Submission of this update was sent to AEMA for review in October 2014. In January 2015, following an initial review, AEMA advised JCEMA that the plan update had many deficiencies. A recommendation was made to JCEMA to conduct a more complete planning process and address the plan deficiencies. JCEMA began this second planning process in February 2015. See Chapter 4 – The Planning Process and Appendix B for a full description of the plan development

process. .

From the beginning of this second planning process, it was clear to members of the HMPC that plan maintenance had not been done in the intervening years between the adoption of the 2009 Plan and the development of the initial 2014 plan update. Additionally, the requirement of active participation in the planning process by jurisdictions covered under the plan resulted in jurisdictions reviewing the 2009 mitigation actions and feeling that those actions did not appropriately reflect what their jurisdiction was capable of accomplishing. Consequently, the participating jurisdictions of the HMPC determined that the 2014 Hazard Mitigation Plan would be updated using newly-developed mitigation actions, without reference to the previous actions.

The HMPC is comprised of representatives from incorporated and unincorporated areas of Jefferson County as well as other stakeholders and interested parties. Thirty-three of the 36 jurisdictions in Jefferson County participated in the planning process for the 2014 Plan Update. Three jurisdictions did not participate: the Town of Cardiff, the City of Maytown, and the Town of North Johns.

Through a comprehensive planning process and risk assessment, the plan creates a unified approach for Jefferson County communities to deal with identified hazards and associated risk issues. The plan serves as a guide for local governments in their ongoing efforts to reduce community vulnerabilities.

Chapter 2 – Prerequisites

Federal Prerequisites
Plan Approval Required for Mitigation Grants Eligibility
Multi-Jurisdictional Participation
Multi-Jurisdictional Plan Adoption

Federal Prerequisites

This Chapter of the Plan addresses the Prerequisites of 44 CFR Section 201.6(a) Plan Requirements (1), (4) and Section 201.6(c) Plan Content (5).
Section 201.6(a) Plan Requirements:

(1) A local government must have a mitigation plan approved pursuant to this section in order to receive HMGP project grants. ... A local government must have a mitigation plan approved pursuant to this section in order to apply for and receive mitigation project grants under all other mitigation grant programs.

(4) Multi-jurisdictional plans (e.g. watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan...

Section 201.6(c) Plan Content. The plan shall include the following:

(5) Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

Plan Approval Required for Mitigation Grants Eligibility

FEMA approval of this plan is the initial step towards continuing eligibility for FEMA grant assistance to participating localities and school districts under the following hazard mitigation assistance programs: the Hazard Mitigation Grant Program (HMGP), the Pre-Disaster Mitigation (PDM) Grant Program, the Flood Mitigation Assistance (FMA) Program, the Repetitive Flood Claims (RFC) Program, and the Severe Repetitive Loss (SRL) Program.

Once the plan is approved pending adoption, the governing bodies of the participating jurisdictions and school districts must formally adopt the plan and submit their adopting resolutions to FEMA through the Alabama EMA to receive official FEMA approval. This process must take place within twelve months of FEMA's notification of conditional approval pending adoption. If the plan is not approved by FEMA and locally adopted by resolution of the governing body, the jurisdiction or school board will not be eligible to apply for and receive project grants under any of the FEMA hazard

mitigation assistance programs. Hazard mitigation assistance programs have additional requirements for grant eligibility depending on the program funding source.

Multi-Jurisdictional Participation

The Jefferson County Emergency Management Agency (JCEMA) serves as the lead coordinating agency for mitigation planning. JCEMA works in conjunction with the Hazard Mitigation Planning Committee (HMPC). Admittedly, neither JCEMA nor the participating jurisdictions of the HMPC have conducted proper plan maintenance of the 2009 Jefferson County Multi-Hazard Mitigation Plan. However, during the 2014 Plan Update planning process, JCEMA and the HMPC have come to understand the importance and requirement of monitoring, evaluating, and updating the Hazard Mitigation Plan (HMP) prior to plan expiration and/or update and, thus, re-commit themselves to performing the necessary plan maintenance for this 2014 Plan Update.

In addition to the participating jurisdictions, other stakeholders affected by this plan – including Federal, State, business interests, academia, non-profits, and the general public – have contributed to the drafting of this plan (See Chapter 4 – The Planning Process and Appendix B for more detailed explanation of the organization of the HMPC and the participation of stakeholders in the planning process).

School districts are defined as local governments, according to Federal regulations at 44 CFR Section 201.2, and are therefore required to have a FEMA-approved local mitigation plan to be eligible for project grants under FEMA's Hazard Mitigation Assistance (HMA) programs. A school district may also demonstrate their participation as a separate government entity in another local government's approved mitigation plan to be eligible for project grants under FEMA hazard mitigation assistance programs.

The planning process for the interim plan presented opportunities for multi-jurisdictional participation. These multi-jurisdictional participation opportunities included the following activities:

- Attendance and participation in HMPC committee meetings during the drafting phase of the 2014 plan.
- Providing key staff support to complete HMPC questionnaires regarding local capabilities for conducting mitigation activities, identifying and rating hazards, profiling hazards and hazard events, evaluating alternative mitigation measures, and updating plan goals and objectives.
- Reviewing and providing comments on draft plan sections.
- Reviewing plans, studies, reports, regulations, ordinances, and codes related to hazard mitigation.
- Conferring with JCEMA personnel and others during individual jurisdictional meetings during the drafting phase of the plan update.
- Providing information to the HMPC on critical facilities and infrastructure.
- Communicating with elected officials and other jurisdictional constituents on the scope and contents of the draft plan.

Residents of each jurisdiction and other stakeholders were provided the following opportunities for participation in the planning process for the plan update:

- Attending HMPC meetings as observers of these open public forums, which were publicly announced.
- Attending and participating in the individual jurisdictional meetings which were publicly announced.
- Completing the Citizen Input for Hazard Mitigation Planning Surveys.
- Attending public hearings of the local governing bodies and offering comments.

Multi-Jurisdictional Plan Adoption

The governing bodies of each participating jurisdiction will adopt the 2014 Jefferson County Multi-Hazard Mitigation Plan by resolution following public notice and hearing. Adoption by all participating jurisdictions will take place within one year of the notification by FEMA conditional approval, and afterwards, a certified copy of each adopting resolution will be transmitted to FEMA through the Alabama EMA. Once the resolution has been received by FEMA, the 2014 plan will be formally approved on that date, which begins the next five year planning cycle. FEMA will issue a final approval notification.

Chapter 3 – Community Profiles

Community Profiles
Geographic Setting and History
Government
Physical Features
Climate
Demographics
Economy
Utilities
Media
Transportation

Community Profiles

The information in the chapter provides a context for understanding the mitigation actions that will be implemented to reduce the jurisdiction's vulnerability.

Geographic Setting and History

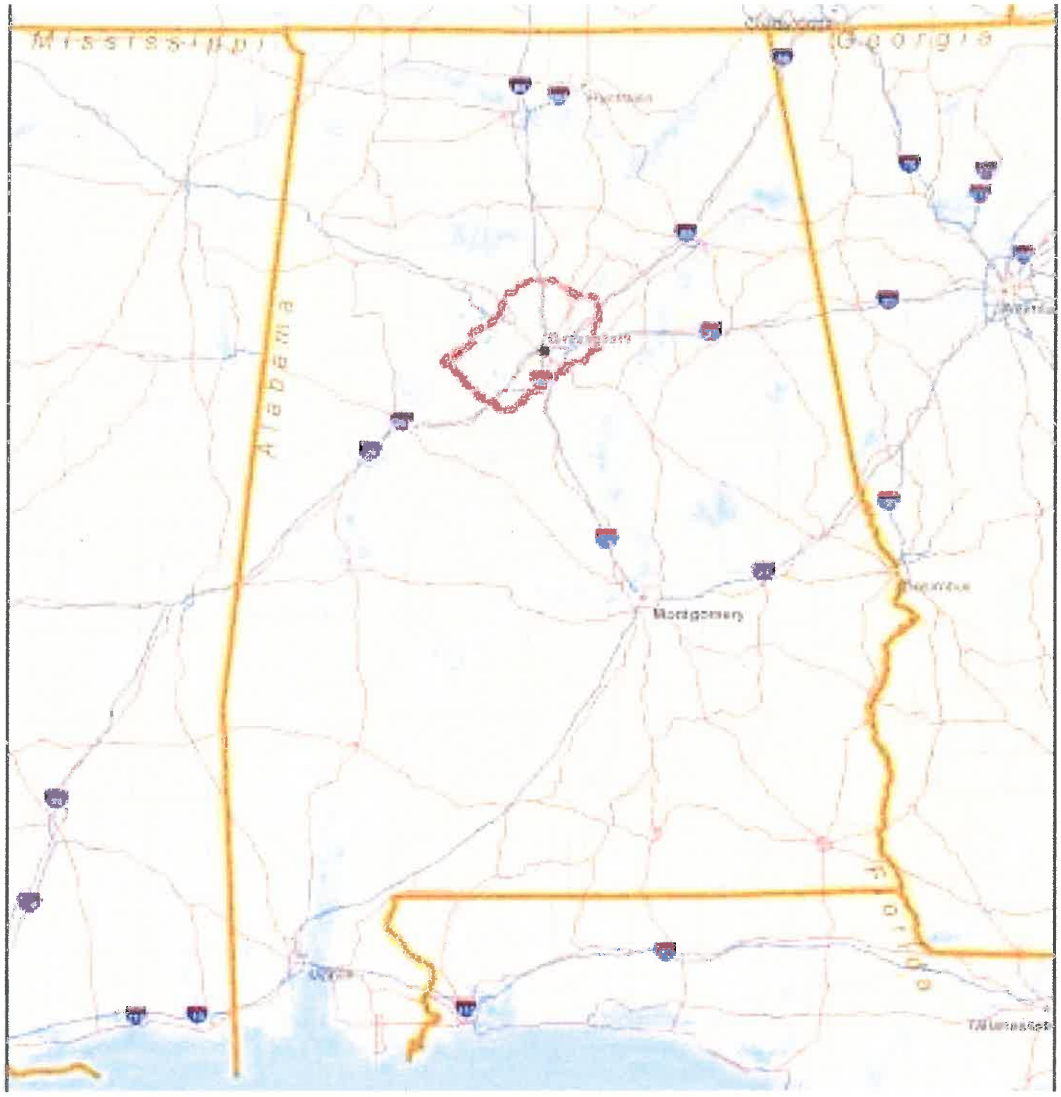
Jefferson County is the most populous county in Alabama. The 2010 population of Jefferson County was 658,466, and has a total area of 1,124 square miles. It was the setting of Alabama's industrial revolution during the nineteenth and early twentieth centuries and the site of many important moments in the civil rights movement. Today, the county is a business center, especially for the banking industry and the medical field.

Jefferson County, created from portions of Blount County by the Alabama Territorial Legislature December 13, 1819, is older than the State of Alabama. The land was ceded in 1814 from the Creek Indian Nation in compliance with the Treaty of Fort Jackson, which resulted from General Andrew Jackson's victory at Horseshoe Bend. Soldiers who had fought under Jackson first settled the area.

The county was named for Thomas Jefferson in honor of his many accomplishments, among them being: one of the authors of the Declaration of Independence; the founder of the University of Virginia, and the third President of the United States.

Jefferson County is located within the Tennessee Valley Ridge physiographic section of the State. Due to its location in north-central Alabama, amid the foothills of the Appalachian Mountains, the county's topography is characterized by rolling hills and valleys. Jefferson County's location is highlighted on Map 3.1 – Jefferson County Location.

Map 3.1 – Jefferson County Location



Source: Lehe Planning

Jefferson County's neighboring counties are Bibb, Blount, St. Clair, Shelby, Tuscaloosa and Walker. Thirty-five municipalities are located within the county's 1,119 square miles of land, including Birmingham, which is the largest city in Alabama and Jefferson County's county seat. From Birmingham, Atlanta is located 142 highway miles to the northeast, Montgomery 90 miles to the southeast, Tuscaloosa 58 miles to the southwest, and Huntsville 101 miles north as shown on Table 3.1 – Driving Distances to Nearby Cities.

Table 3.1 – Driving Distances to Nearby Cities

City	Distance (miles)
Tuscaloosa, AL	58
Montgomery, AL	90
Huntsville, AL	101
Atlanta, GA	142
Nashville, TN	200

City	Distance (miles)
Mobile, AL	241
New Orleans, LA	241

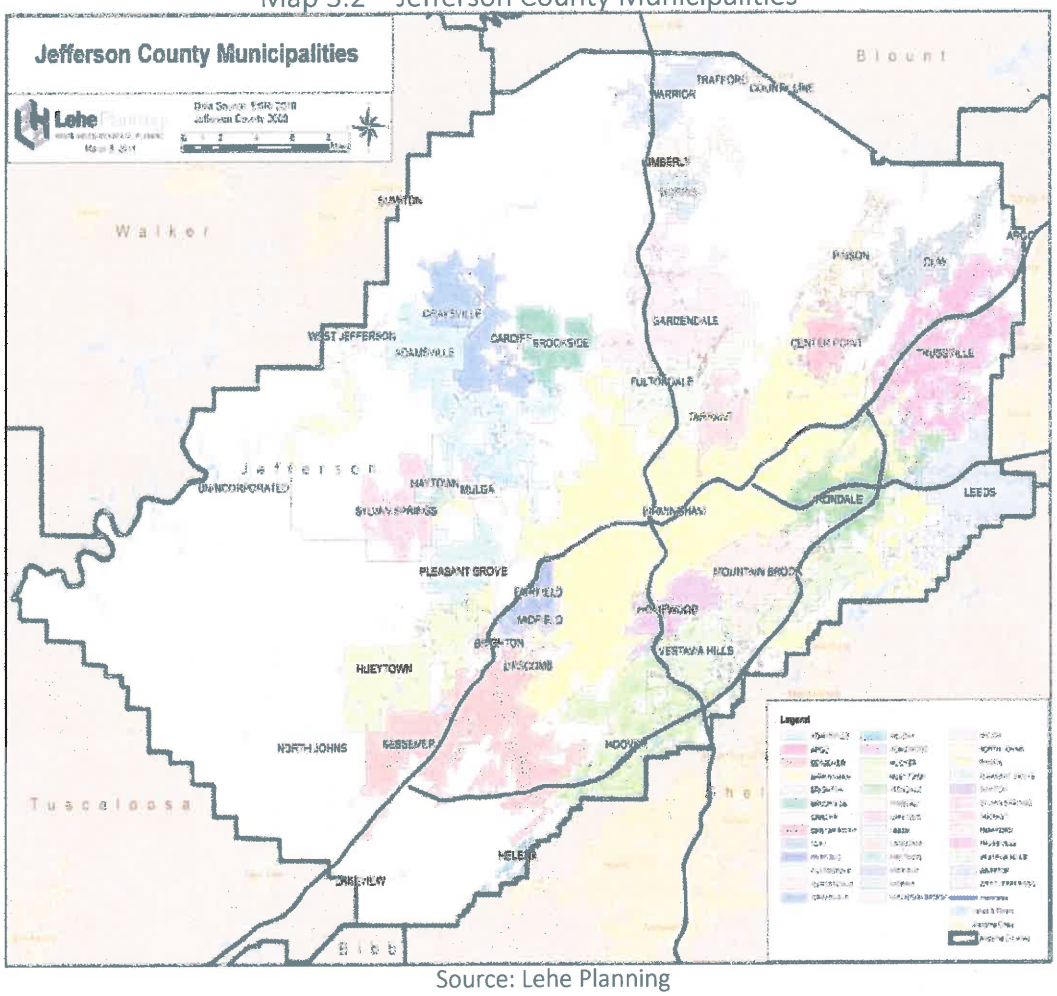
Jefferson County is comprised of thirty-five incorporated communities, which are shown on Map 3.2 – Jefferson County Municipalities, as follows:

City of Adamsville
City of Bessemer
City of Birmingham *(partially in Shelby County)*
City of Brighton
Town of Brookside
Town of Cardiff
City of Center Point
City of Clay
Town of County Line *(partially in Blount County)*
City of Fairfield
City of Fultondale
City of Gardendale
City of Graysville
City of Homewood
City of Hoover *(partially in Shelby County)*
City of Hueytown
City of Irondale
City of Kimberly
City of Leeds *(partially in St. Clair and Shelby Counties)*
City of Lipscomb
Town of Maytown
City of Midfield
Town of Morris
City of Mountain Brook
Town of Mulga
Town of North Johns
City of Pinson
City of Pleasant Grove
Town of Sylvan Springs
City of Tarrant
Town of Trafford
City of Trussville *(partially in St. Clair County)*
City of Vestavia Hills *(partially in Shelby County)*
City of Warrior
Town of West Jefferson

The following municipalities are primarily located in the counties indicated but are partially located in Jefferson County; they are not included in this plan:

Town of Argo *(partially in St. Clair County)*
City of Helena *(partially in Shelby County)*
City of Sumiton *(partially in Walker County)*

Map 3.2 – Jefferson County Municipalities



Source: Lehe Planning

City of Adamsville

The City of Adamsville is located in western Jefferson County. It has a 2010 population of 4,522 and an area of approximately 19.6 square miles. The city is named for William Adams, who gave land to the Kansas City, Memphis, and Birmingham Railroad to build a railroad depot on the site of modern-day Adamsville in 1886. Adamsville was incorporated on October 13, 1953.

City of Bessemer

The City of Bessemer is located in southwestern Jefferson County. It has a 2010 population of 27,456 and an area of 40.8 square miles. The city was founded by Henry Debardeleben in 1887 and named after Sir Henry Bessemer, a British industrialist who invented the Bessemer process of steel production. The City of Bessemer was also called "The Marvel City" because of its initial rapid growth. Bessemer was incorporated on September 9, 1887.

City of Birmingham

The City of Birmingham is located in central Jefferson County. It has a 2010 population of 210,609 and an area of approximately 149.9 square miles. Birmingham was founded on June 1, 1871, as an industrial enterprise but not officially incorporated until December 19, 1871. It was named after Birmingham, the major industrial city of England. The rapid pace of Birmingham's growth through the turn of the century earned it the nicknames "The Magic City" and "The Pittsburgh of the South." Much like Pittsburgh, Birmingham's major industries were iron and steel production. In the 1960s, Birmingham received national and international attention as a center of the Civil Rights Movement. In 1963, Martin Luther King, Jr., imprisoned for organizing a nonviolent protest, wrote the now famous Letter from Birmingham Jail. Today, the iron and steel industries have been eclipsed by banking and medical services as the core of the city's economic base.

City of Brighton

The City of Brighton is located in southwestern Jefferson County. It has a 2010 population of 2,945 and an area of approximately 1.4 square miles. Brighton was originally named Woodward Crossing after a railroad spur that connected it to Woodward. When the post office was established in 1894, the city was renamed Brighton after an English resort town.

Town of Brookside

The Town of Brookside is located in western Jefferson County. It has a 2010 population of 1,363 and an area of 6.0 square miles. Brookside received its name from Five Mile Creek that flows through the town. The Brookside mine was opened in 1886 by the Coalburg Coal and Coke Company and purchased a year later by Sloss as a source of fuel for their Birmingham blast furnaces. Recruitment efforts for skilled laborers extended internationally, and Brookside became the home of many Eastern European immigrants. These immigrants built the only Russian Orthodox Church south of the Mason-Dixon Line in 1916. In 2003, Five Mile Creek overflowed its banks and washed away most of the town's old commercial buildings and destroyed the Brookside Town Hall, along with several homes. Many residents were displaced. In September, 2008, Brookside opened its doors to the new municipal complex located off Brookside Coalburg Road. Brookside was incorporated in 1898.

Town of Cardiff

The Town of Cardiff is located in western Jefferson County. It has a 2010 population of 55 and an area of 0.2 square miles. Cardiff is the smallest incorporated community in Jefferson County. It is named after the capital of Wales. Cardiff is one of four Jefferson County cities named after cities in Great Britain. Cardiff began as a town centered on coal mining. In May 2003, a flood destroyed a swatch of buildings closest to the Five Mile Creek. The town is now but a dent in the land and covered with kudzu, Cardiff is becoming a ghost town. Cardiff was incorporated in 1900.

City of Center Point

The City of Center Point is located in northeastern Jefferson County. It has a 2010 population of 16,921 and an area of 8.1 square miles. In the 1960's, the residential growth in the area was so dramatic that its population of over 60,000 by the 1970s gave Center Point the distinction of being the most populous unincorporated place in the United States. Center Point was incorporated on March 12, 2002.

City of Clay

The City of Clay is located in northeastern Jefferson County. It has a 2010 population of 9,708 and an area of approximately 10.3 square miles. Clay was founded in 1878 and is known for its clay soil. Clay was the first site for the YMCA for Jefferson County. Clay was incorporated on June 6, 2000.

Town of County Line

The Town of County line is located in northeastern Jefferson County. It has a 2010 population of 61 and an area of 0.9 square miles. County Line was incorporated in March 1, 1972.

City of Fairfield

The City of Fairfield is located in southwestern Jefferson County. It has a 2010 population of 11,117 and an area of approximately 3.5 square miles. The Tennessee Coal, Iron and Railroad Company created Fairfield to house workers for the Fairfield Works plant, which is now owned by U.S. Steel. In the 1960's, Fairfield opened up Western Hills Mall, which was the second enclosed mall in the Birmingham area. Fairfield was incorporated in 1910 when Theodore Roosevelt spoke at its dedication ceremony.

City of Fultondale

The City of Fultondale is located in northern Jefferson County. It has a 2010 population of 8,380 and an area of approximately 12.2 square miles. The town's name is derived from the combination of the names of two nearby communities, Fulton Springs and Glendale. Several businesses in Fultondale were damaged by the April 27, 2011 tornado outbreaks. Fultondale was incorporated in 1947.

City of Gardendale

The City of Gardendale is located in northern Jefferson County. It has a 2010 population of 13,893 and an area of approximately 57 square miles. The area today known as Gardendale was first settled in 1825 under the name of Jugtown, after a jug and churn factory. The name was changed to Gardendale in 1906. The city was officially incorporated in 1955. In 1996, the Olympic Torch passed through Gardendale in route to the Summer Olympic Games in Atlanta.

City of Graysville

The City of Graysville is located in northwestern Jefferson County. It has a 2010 population of 2,165 and an area of approximately 6.3 square miles. Graysville was originally called Gin Town, named after a cotton gin that had operated there. It was later renamed for a local family. The city has hosted an annual "Mayberry Comes to Graysville" festival to celebrate the legacy of television's "Andy Griffith Show." Graysville was incorporated in November 17, 1945.

City of Homewood

The City of Homewood is located in southeastern Jefferson County. It has a 2010 population of 25,167 and an area of approximately 8.3 square miles. Homewood is the densest city in Alabama. The Homewood High School Patriots Marching Band has marched in the Macy's Thanksgiving Day Parade in New York City and the Tournament of Roses Parade in Pasadena, California. Homewood was incorporated on October 29, 1926.

City of Hoover

The City of Hoover is located in southwestern Jefferson County. It has a 2010 population of 58,582 and an area of approximately 43.1 square miles. The city is named for William H. Hoover, founder of Employers Insurance of Alabama, who initially developed the area for the employees of his company. Hoover is home to the Riverchase Galleria, one of Alabama's largest shopping malls and one of the largest enclosed malls in the southeastern United States. Hoover's population has more than doubled since 1990, making Hoover the sixth largest city in Alabama. The City of Hoover was incorporated in 1967.

City of Hueytown

The City of Hueytown is located in western Jefferson County. It has a 2010 population of 16,105 and an area of 14 square miles. Hueytown was home to the legendary "NASCAR Alabama Gang," a family of NASCAR drivers, and several thoroughfares in the city are named for the drivers. It also made international headlines in 1992 with the unexplained "Hueytown Hum", a mysterious noise believed to be related to large ventilation fans for an underground coal mine in the area. Hueytown was incorporated on May 6, 1960.

City of Irondale

The City of Irondale is located in eastern Jefferson County. It has a 2010 population of 12,349 and an area of 9 square miles. The city began as a mining and railroad community. The book Fried Green Tomatoes at the Whistle Stop Cafe, written by Irondale native Fannie Flagg, is loosely based on the town and the landmark Irondale Cafe. In 1916, a magnitude 5.1 earthquake struck Irondale. The earthquake was felt in neighboring states. In 1981, Mother Angelica founded the Eternal Word Television Network (EWTN) in the city. Irondale was incorporated October 19, 1887.

City of Kimberly

The City of Kimberly is located in northern Jefferson County. It has a 2010 population of 2,711 and an area of 4 square miles. Beginning June 29, 2011, due to the population increasing from 1,801 persons in 2000 to 2,711 persons in 2010, the town began operating as a city, per Alabama law. Like other jurisdictions north of Birmingham, Kimberly was originally settled as a coal-mining town. Kimberly was incorporated in 1951.

City of Leeds

The City of Leeds is located in eastern Jefferson County. It has a 2010 population of 11,773 and an area of 22.5 square miles. The tale of John Henry was believed to have originated in Leeds. In this folk story, John Henry, the "steel-drivin' man", raced and won against a steam engine in the laying of railroad that penetrated the Oak Mountain Tunnel in Leeds. Today, Leeds is known for the Barber Vintage Motorsports Museum and Racetrack. Leeds was incorporated on April 27, 1887.

City of Lipscomb

The City of Lipscomb is located in southwestern Jefferson County. It has a 2010 population of 2,210 and an area of 1.1 square miles. Originally it was named Wheeling after Wheeling, West Virginia because the owners of Woodward Iron Company, employed many of the residents. Lipscomb was named for L.Y. Lipscomb, one of three brothers who first settled in the area in 1885 and ran a general store on the old South Bessemer car line which opened in 1890. Lipscomb was incorporated in June 30, 1910.

Town of Maytown

The Town of Maytown is located in northwest Jefferson County. It has a 2010 population of 385 and an area of 2.7 square miles. On May 28, 2007 the only business in the town limits, the Tri-Cities Convenience Store, was destroyed by fire. Maytown suffered damages by an F5 tornado on April 8, 1998. Maytown was incorporated in 1956.

City of Midfield

The City of Midfield is located in southwestern Jefferson County. It has a 2010 population of 5,365 and an area of 2.6 square miles. Midfield grew rapidly after World War II with the construction of the Bessemer Superhighway, the first lighted four-lane highway in Alabama. Midfield obtained its name because of the fact that it is situated between Birmingham and Bessemer. Midfield was incorporated on October 7, 1953.

Town of Morris

The Town of Morris is located in northern Jefferson County. It has a 2010 population of 1,859 and an area of 3.1 square miles. The town is named after Mary Hunter "Mae" Morris, an early female pioneer

of the region. According to Wikipedia Morris is named as the most Conservative town in Alabama. Morris was incorporated in 1885.

City of Mountain Brook

The City of Mountain Brook is located in southeastern Jefferson County. It has a 2010 population of 20,413 and an area covering 12.2 square miles. Mountain Brook was originally developed in 1929 by Robert Jemison, Jr. as an extensive residential subdivision. Warren H. Manning, a Boston-based landscape architect, formulated the plan to create estate-sized lots along winding scenic roads with commercial development. Home to the nation's first office park, built in 1955, it featured the then novel concepts of ample free parking and low-profile office buildings surrounded by waterspouts and landscaped grounds. Mountain Brook is the wealthiest municipality in Alabama; and, in 2008, Mountain Brook was ranked as the 9th wealthiest city in the United States. Mountain Brook was incorporated in May 24, 1942.

Town of Mulga

The Town of Mulga is located in western Jefferson County. It has a 2010 population of 836 and an area of 0.6 square miles. Mulga was a coal mining community built by the Birmingham Coal and Iron Company around the Mulga Mine. Mulga was first recognized as a distinct community in 1907, with the establishment of a post office. Its communities were damaged by an F5 tornado on April 8, 1998. Mulga was incorporated in 1947.

Town of North Johns

The Town of North Johns is located in southwestern Jefferson County. It has a 2010 population of 145 and an area of 0.2 square miles. The community was founded as a coal mining settlement and named for Welsh mining engineer Llewelyn Johns, who worked for the DeBardeleben Coal Company. A post office was established at Johns in 1889 and closed in 1973. It is the second smallest incorporated town in Jefferson County. North Johns was incorporated in 1912.

City of Pinson

The City of Pinson is located in northeastern Jefferson County. It has a 2010 estimated population of 7,163 and an area of 7.0 square miles. The community was originally known as Hagood's Crossroads for the early settler Zachariah Hagood and his family. It was later re-named Mount Pinson, presumably after Pinson, Tennessee. In the early 1800's, Andrew Jackson's soldiers became the area's first settlers following their victory at Horseshoe Bend. Pinson is one of the oldest communities in Alabama. Pinson was incorporated March 30, 2004.

City of Pleasant Grove

The City of Pleasant Grove is located in western Jefferson County. It has a 2010 population of 10,110 and an area of 8.8 square miles. The community was originally known as Frog Pond, and was renamed for Pleasant Grove Baptist Church before 1884. The community became incorporated in order to

apply for federal funding for a municipal water system because many family wells had been drained as a result of coal mining operations in the area. Pleasant Grove was incorporated in January 1937.

Town of Sylvan Springs

The town of Sylvan Springs is located in western Jefferson County. It has a 2010 population of 1,542 and an area of 3.5 square miles. The town arose in an area where a few families had settled in the 1880s and built the Old Grove Methodist Church. It was first known as "Hoagtown", for William T. Hogan, stepson of early Sylvan Springs Community Center settler Dudley Goolsby. It was renamed for a nearby fresh water source. This area was damaged by an F5 tornado on April 8, 1998. Sylvan Springs was incorporated in May 22, 1957.

City of Tarrant

The City of Tarrant is located in east-central Jefferson County. It has a 2010 population of 6,397 and an area of 6.4 square miles. A contest was held to name the new town in 1915. Several people suggested Tarrant in honor of Benjamin Tarrant, who had lived in this community most of his life. Other sources claim the city was named for Felix I. Tarrant, President of National Cast Iron Pipe Company, which built the first major industrial plant in the area in 1912. Tarrant was incorporated in August 17, 1918.

Town of Trafford

The Town of Trafford is located in northern Jefferson County. It has a 2010 population of 646 and an area of 2.4 square miles. Trafford initially called itself Union City; it grew up along the Louisville and Nashville Railroad. Because another town in the state was already named Union City, town inhabitants changed it to Trafford after a prominent landowner in the area. Trafford was incorporated in 1948.

City of Trussville

The City of Trussville is located in eastern Jefferson County. It has a 2010 population of 19,450 and an area of 22.2 square miles. In 1821, Warren Truss and his brothers, John and Sam, constructed a grist mill on the Cahaba River. In recent years, Trussville has been one of the fastest growing communities in the Birmingham metropolitan area. Trussville has been recognized as one of the most livable cities in the state and country. It was named one of the ten best towns in Alabama and included in Money magazine's list of 100 best places to live in America. Trussville was incorporated on June 10, 1947.

City of Vestavia Hills

The City of Vestavia Hills is located in southern Jefferson County. It has a 2010 population of 34,019 and an area of 19.41 square miles. Vestavia Hills is named after Birmingham Mayor George B. Ward's 20-acre estate, which featured a house built to resemble the Temple of Vesta in Rome, Italy. A domed gazebo, built to resemble the Roman goddess Sybil in Tivoli, is now situated on a major intersection at the northern entrance to Vestavia Hills. The city sits at the top of Shades Mountain, which is part

of the southernmost reaches of the Appalachian Mountains. Vestavia Hills was incorporated on November 8, 1950.

City of Warrior

The City of Warrior is located in northern Jefferson County. It has a 2010 population of 3,176 and an area of 908 square miles. Once the home of a Creek Indian town, the area on which Warrior now stands was opened for settlement after the Creek defeat in the Creek War of 1813-14. The city takes its name from the Warrior coal fields, which J.T. Pierce opened in 1872. The coal fields were named after the Black Warrior River that drains them. The town, which was built on a spur of the L&N Railroad, was originally Warrior Station. The Warrior Post Office was established in 1872, Warrior is one of the oldest incorporated communities in Jefferson County. In 1996, the Olympic torch passed through on the way to the 1996 Summer Olympics in Atlanta. Warrior was incorporated in either 1889 or 1899, though most records cite the 1889 date.

Town of West Jefferson

The Town of West Jefferson is located in northwestern Jefferson County. It has a 2010 population of 338 and an area of 0.7 square miles. The first settlers in what would become West Jefferson were primarily farmers who arrived in the 1880s. During the next decade, mines began opening in the area, spurred by the expanding steel and iron industry. The Alabama Power Miller Steam Plant is located nearby the town. West Jefferson was incorporated in October 1964.

Government

A five-member County Commission is the governing body of Jefferson County. Commissioners are elected from five districts within the County for four-year terms. All of the Jefferson County municipalities have a mayor. In 2009, the Alabama Legislature authorized the County to appoint a County Manager.

The Jefferson County Commission, by resolution on November 13, 1951, (pursuant to federal and state law) created the Birmingham/Jefferson County Civil Defense Corps. The local governing bodies within the county passed resolutions/ordinances joining in this organization, creating a "Civil Defense Council" to govern the joint "civil defense program." This was later changed to the Emergency Management Council and the Emergency Management Agency. The Council is authorized and empowered to make, amend, and rescind any and all necessary orders, rules and regulations for direction and control of the civil defense program. As needed, the Council requests municipalities to adopt proper ordinances implementing within each municipality the orders, rules, and regulations of the council.

The Council is charged with establishing and maintaining an emergency management organization, and developing policies to prepare for, respond to, and recover from emergencies and disasters that threaten or occur in Jefferson County. The policies are established through the promulgation of a Comprehensive Emergency Management Plan.

A Chairperson and Vice Chairperson govern the Council. In the absence of the Chairperson and the Vice Chairperson, the EMA Coordinator has the responsibility to carry out Council policy in all matters.

The Jefferson County Emergency Management Council has designated the EMA Director to be responsible for day-to-day operations, including the implementation of policies and procedures issued by the Council. The EMA Director reports to the Emergency Management Council President.

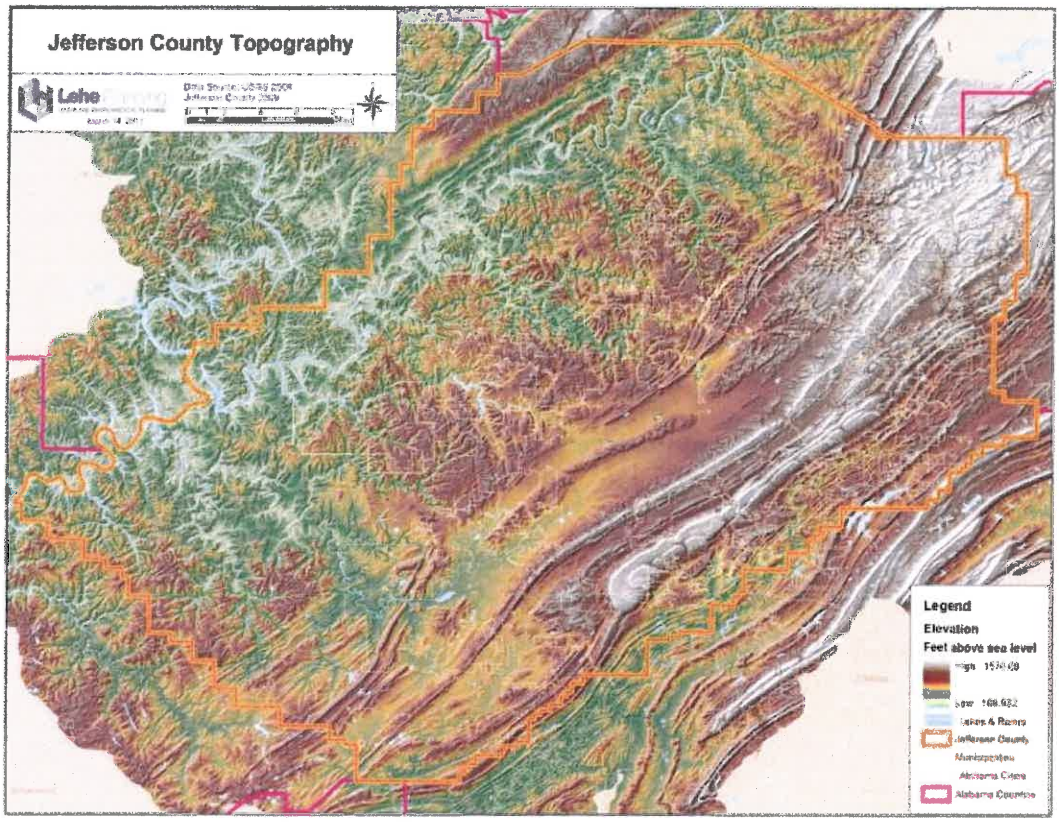
Physical Features

Jefferson County is located in the foothills of the Appalachian Mountains. The primary topographic features are a series of parallel ridges and valleys ranging from 300 to 1,200 feet in elevation running through the county in a northeast to southwest direction. Located in southeastern Jefferson County, Shades Mountain at 1,150 feet is the county's highest elevation, followed by Red Mountain at 950 feet. Shades Valley, which is characterized by steep valley walls and a narrow floor, lies between the two mountains. Shades Valley is split by a low, meandering ridge known as Little Shades Mountain. See Map 3.3 – Jefferson County Topography.

Sand Mountain, which rises to an elevation of 700 feet, is located northwest of Red Mountain. Jones and Opossum Valleys, which are wide and flat-bottomed valleys, lie between Red Mountain and Sand Mountain. Slopes generally range from 0 to 20 percent. Most of the flat land is located in the Jones, Opossum, and Pinson and Shade valleys. Most of the county's geology consists of deposits of sandstone, shale, chert, dolomite and limestone.

The county generally drains in a westerly direction into either the Warrior or Cahaba River. Shades Creek, Little Shades Creek, and Patton Creek flow into the Cahaba, while Valley Creek and Village Creek are the major streams draining into the Warrior River. Numerous other smaller tributaries feed into these larger basins. *(Source: Encyclopedia of Alabama)*

Map 3.3 – Jefferson County Topography



Source – Lehe Planning

Climate

Jefferson County has a mild, temperate climate. Summers are generally hot and humid with scattered afternoon thunderstorms. Winter weather is influenced by successive cold fronts moving from west to east that draw moisture out of the Gulf and sometimes produce heavy downpours. Rainfall occur an Average of 117 days per year. Snowfall and freezing temperatures are infrequent. Table 3.2 – Climate Information provides average temperatures and precipitation amounts.

Table 3.2 – Climate Information

Item	Average
Average Annual Minimum Temperature	51.3 degrees
Average Annual Maximum Temperature	72.7 degrees
Average Annual Temperature	62.0 degrees
Average Annual Rainfall	52.6 inches
Average Annual Snowfall	2.1 inches

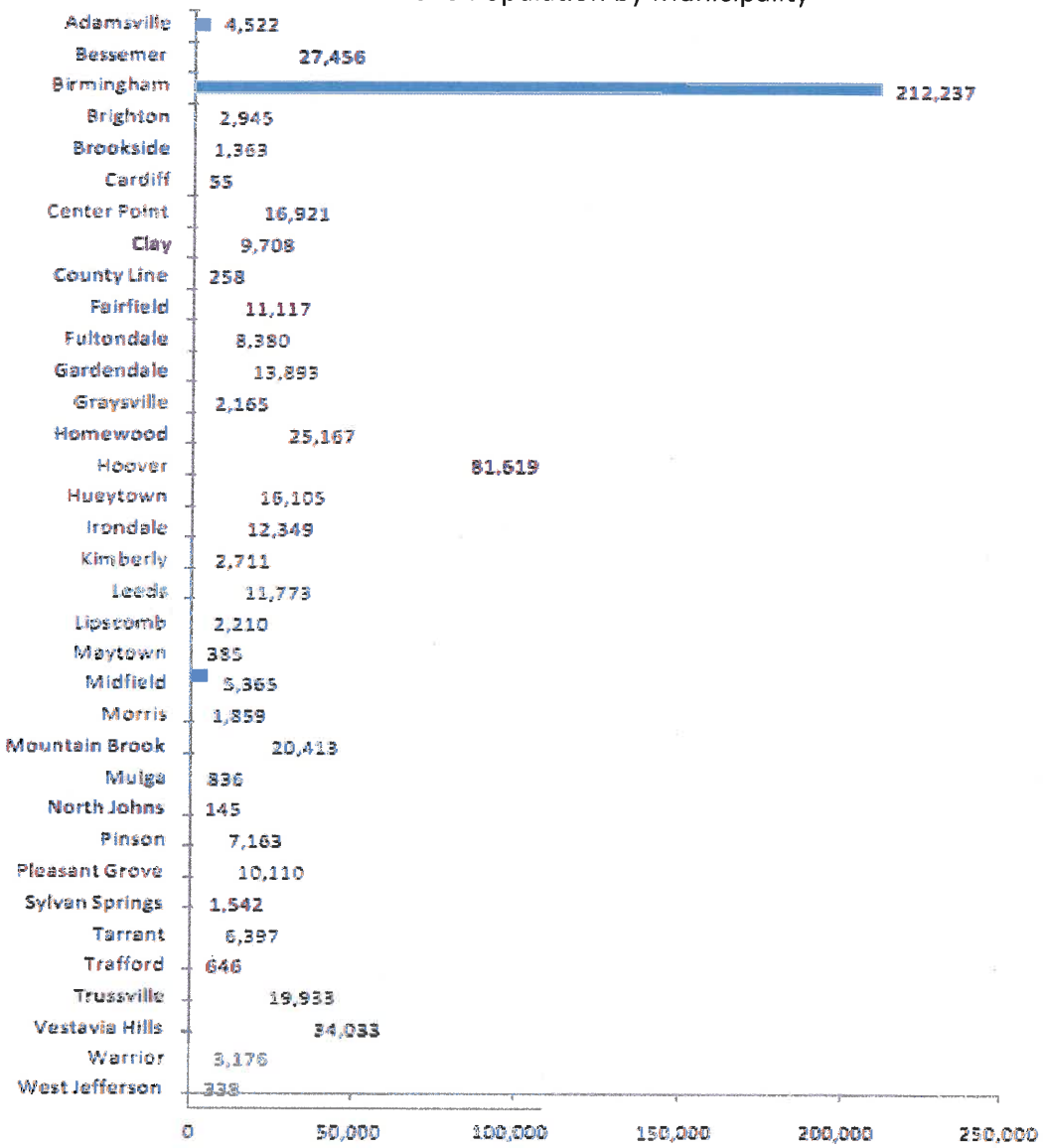
Source: National Weather Service

Demographics

2010 US Census Population

The 2010 US Census provides the population for Jefferson County and its municipalities. Jefferson County, with an estimated population of 658,466, is the largest county in Alabama. With a population of 210,609, the City of Birmingham is the largest city in Alabama and home to 32 percent of the county's total population, as shown on Chart 3.1 – 2010 Population by Municipality. Hoover is the sixth largest city in Alabama. Twenty-one of Jefferson County's 35 municipalities have populations below 10,000.

Chart 3.1 – 2010 Population by Municipality



Source: US Census 2010

Population Growth

Table 3.3 – Jefferson County Population Changes 1970-2010 shows the changing populations of Jefferson County and its jurisdictions over the past fifty years. The State of Alabama population changes are included for comparison.

After three decades of modest growth, Jefferson County began to lose population in 2000. The population of the City of Birmingham has declined in both decades since 1980 and is down 38.8% for the 1970 to 2010 period as a whole. Growth data is not available for Center Point, Clay or Pinson, as these communities were not incorporated during the 2000 Census. See also section 5.7 "General Description of Land Use and Development Trends" for a discussion of population growth rates.

Table 3.3 – Jefferson County Population Changes 1970-2010

JURISDICTION	1970	1980	1990	2000	2010	Pop Change 1970-2010	% Change 1970-2010	Pop Change 2000-2010	% Change 2000-2010
State of Alabama	3,444,354	3,894,025	4,040,389	4,447,100	4,779,736	1,335,382	38.8%	332,636	7.5%
Jefferson County	644,991	671,371	651,520	662,047	658,466	13,475	2.1%	-3,581	-0.5%
Adamsville	2,412	2,498	4,161	4,965	4,522	2,110	87.5%	-443	-8.9%
Bessemer	33,428	31,729	33,497	29,672	27,456	-5,972	-17.9%	-2,216	-7.5%
Birmingham	300,910	284,413	265,986	242,820	212,237	-88,673	-29.5%	-30,583	-12.6%
Brighton	2,277	5,308	4,518	3,640	2,945	668	29.3%	-695	-19.1%
Brookside	990	1,409	1,365	1,393	1,363	373	37.7%	-30	-2.2%
Cardiff	127	140	72	82	55	-72	-56.7%	-27	-32.9%
Center Point*	-	-	-	15,877	16,921	-	-	1,044	6.6%
Clay*	-	-	-	8,640	9,708	-	-	1,068	12.4%
County Line	199	199	189	257	258	59	29.6%	1	0.4%
Fairfield	14,369	13,242	12,200	12,381	11,117	-3,252	-22.6%	-1,264	-10.2%
Fultondale	5,163	6,217	6,400	6,595	8,380	3,217	62.3%	1,785	27.1%
Gardendale	6,537	8,005	9,251	11,626	13,893	7,356	112.5%	2,267	19.5%
Graysville	3,182	2,642	2,241	2,344	2,165	-1,017	-32.0%	-179	-7.6%
Homewood	21,245	21,412	22,922	25,043	25,167	3,922	18.5%	124	0.5%
Hoover	688	18,996	39,788	62,742	81,619	80,931	11763.2%	18,877	30.1%
Hueytown	7,095	13,452	15,280	15,364	16,105	9,010	127.0%	741	4.8%
Irondale	3,166	6,510	9,454	9,813	12,349	9,183	290.1%	2,536	25.8%
Kimberly	847	1,043	1,096	1,801	2,711	1,864	220.1%	910	50.5%
Leeds	6,991	8,638	9,946	10,353	11,773	4,782	68.4%	1,420	13.7%
Lipscomb	3,225	3,741	2,892	2,458	2,210	-1,015	-31.5%	-248	-10.1%
Maytown	667	538	651	435	385	-282	-42.3%	-50	-11.5%
Midfield	6,621	6,182	5,559	5,626	5,365	-1,256	-19.0%	-261	-4.6%
Morris	519	623	1,136	1,827	1,859	1,340	258.2%	32	1.8%
Mountain Brook	19,474	19,718	19,810	20,604	20,413	939	4.8%	-191	-0.9%
Mulga	582	405	261	973	836	254	43.6%	-137	-14.1%
North Johns	241	243	177	142	145	-96	-39.8%	3	2.1%
Pinson**	-	-	-	-	7,163	-	-	-	-
Pleasant Grove	5,090	7,102	8,458	9,983	10,110	5,020	98.6%	127	1.3%
Sylvan Springs	344	450	1,470	1,465	1,542	1,198	348.3%	77	5.3%
Tarrant	6,835	8,148	8,046	7,022	6,397	-438	-6.4%	-625	-8.9%
Trafford	628	673	739	523	646	18	2.9%	123	23.5%
Trussville	2,985	3,507	8,266	12,924	19,933	16,948	567.8%	7,009	54.2%
Vestavia Hills	12,250	15,722	19,749	24,476	34,033	21,783	177.8%	9,557	39.0%

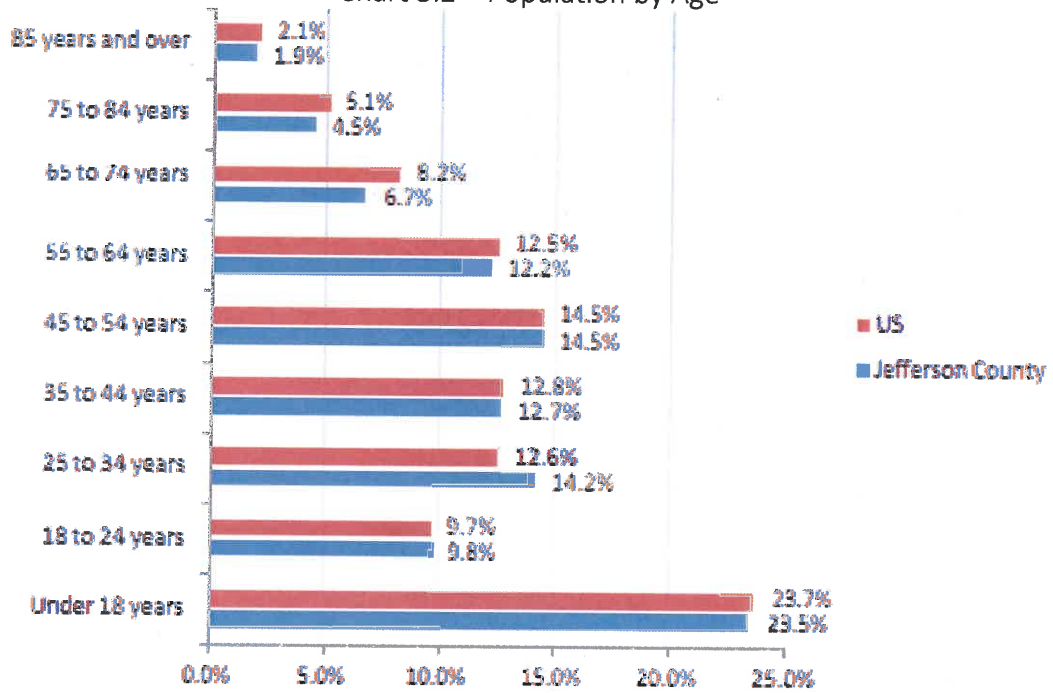
JURISDICTION	1970	1980	1990	2000	2010	Pop Change 1970-2010	% Change 1970-2010	Pop Change 2000-2010	% Change 2000-2010
Warrior	2,621	3,260	3,280	3,169	3,176	555	21.2%	7	0.2%
West Jefferson	233	357	388	344	338	105	45.1%	-6	-1.7%
*Not incorporated in 2000; based on July 1, 2000 estimate									
**Not incorporated in 2000; no estimate available									

Source: U.S. Census Bureau, 2010

Age Distribution

The 2010 American Community Survey indicates that 33.3 percent of Jefferson County's population is under the age of 25. This age group will have a substantial impact on common facility requirements for schools and parks. The 25-64 age groups constitute most of the labor force and collectively represent a majority—53.6%--of Jefferson County's population. The age group composed of citizens aged 65 years or older represents approximately 13.1 percent of the population. Individuals in this senior age group have special health, housing, and transportation needs, which can become particularly acute during natural hazards. Chart 3.2 – Population by Age, depicts the breakdown of Jefferson County by the age of residents.

Chart 3.2 – Population by Age



Source: US Census 2010 American Community Survey

Racial Composition

The racial composition of Jefferson County varies considerably, as shown in Table 3.4 – Population by Race and Hispanic Origin. According to the 2010 Census, African Americans composed a majority of the population in the jurisdictions of Bessemer (71.2%), Birmingham (73.4%), Brighton (81.0%), Center Point (62.9%), Fairfield (94.6%), Lipscomb (61.0%), Midfield (81.6%), and Tarrant (52.3%). Residents of all races who self-identified as "Hispanic" accounted for more than 5% of the population in Brighton

(13.8%), Fultondale (10.8%), Hoover (6.0%), Irondale (7.8%), Leeds (6.6%), Lipscomb (19.7%), and Tarrant (9.0%). A majority of Jefferson County residents—53.0%--are classified as white by the Census Bureau.

Table 3.4 – Population by Race and Hispanic Origin

Location	2010 Population	White	Black	American Indian	Asian	Other Race	Two or More Races	Hispanic (of any race)
Jefferson County	658,466	53.0%	42.0%	0.3%	1.4%	2.2%	1.1%	3.9%
Adamsville	4,522	52.3%	44.9%	0.5%	0.3%	1.1%	0.8%	2.3%
Bessemer	27,456	24.3%	71.2%	0.3%	0.2%	3.1%	0.9%	4.1%
Birmingham	212,237	22.3%	73.4%	0.2%	1.0%	2.0%	1.0%	3.6%
Brighton	2,945	6.5%	81.0%	1.0%	0.0%	10.8%	0.9%	13.8%
Brookside	1,363	79.5%	18.5%	0.3%	0.1%	0.2%	1.4%	0.7%
Cardiff	55	94.5%	5.5%	0.0%	0.0%	0.0%	0.0%	0.0%
Center Point*	16,921	32.6%	62.9%	0.2%	0.4%	2.8%	1.1%	4.8%
Clay*	9,708	84.1%	13.3%	0.3%	0.6%	0.6%	1.1%	1.3%
County Line	258	94.2%	1.2%	3.1%	1.2%	0.0%	0.4%	0.4%
Fairfield	11,117	4.2%	94.6%	0.0%	0.0%	0.7%	0.4%	1.1%
Fultondale	8,380	75.1%	16.6%	0.4%	1.0%	4.7%	2.0%	10.8%
Gardendale	13,893	88.4%	8.6%	0.3%	1.2%	0.6%	1.0%	1.5%
Graysville	2,165	73.9%	23.6%	0.4%	0.2%	0.4%	1.4%	1.7%
Homewood	25,167	74.6%	17.3%	0.2%	2.2%	4.4%	1.4%	1.7%
Hoover	81,619	75.1%	14.8%	0.2%	5.1%	3.2%	1.5%	6.0%
Hueytown	16,105	70.0%	27.2%	0.3%	0.5%	1.1%	1.0%	2.0%
Irondale	12,349	56.3%	35.4%	0.3%	1.4%	5.1%	1.4%	7.8%
Kimberly	2,711	96.2%	1.8%	0.4%	0.6%	0.3%	0.7%	0.8%
Leeds	11,773	78.7%	14.3%	0.4%	0.6%	4.0%	2.0%	6.6%
Lipscomb	2,210	22.0%	61.0%	1.1%	0.0%	15.0%	0.9%	19.7%
Maytown	385	89.4%	9.6%	0.3%	0.0%	0.0%	0.8%	0.0%
Midfield	5,365	16.4%	81.6%	0.1%	0.2%	0.7%	0.9%	1.4%
Morris	1,859	97.7%	1.0%	0.1%	0.3%	0.5%	0.4%	1.1%
Mountain Brook	20,413	97.2%	1.0%	0.1%	0.9%	0.2%	0.6%	1.0%
Mulga	836	81.0%	16.9%	0.1%	0.0%	0.7%	1.3%	0.6%
North Johns	145	49.7%	46.2%	4.1%	0.0%	0.0%	0.0%	0.0%
Pinson*	7,163	79.0%	17.0%	0.2%	0.4%	2.2%	1.0%	3.7%
Pleasant Grove	10,110	53.7%	44.8%	0.3%	0.2%	0.2%	0.7%	0.6%
Sylvan Springs	1,542	97.3%	1.4%	0.5%	0.0%	0.1%	0.7%	0.5%
Tarrant	6,397	39.0%	52.3%	0.8%	0.3%	6.1%	1.5%	9.0%
Trafford	646	92.7%	6.2%	0.2%	0.0%	0.2%	0.8%	0.9%
Trussville	19,933	90.3%	6.6%	0.2%	1.6%	0.6%	0.8%	0.9%
Vestavia Hills	34,033	90.4%	3.8%	0.2%	3.8%	0.8%	1.0%	2.5%
Warrior	3,176	83.1%	14.2%	0.2%	0.4%	0.3%	1.8%	0.8%
West Jefferson	338	96.7%	1.2%	0.0%	0.0%	0.0%	2.1%	0.3%
Unincorporated Census Designated Place (CDP)								

Source: U.S. Census Bureau, 2010

Gender

Table 3.5 – Population by Gender, shows the percentage of male to female within incorporated and unincorporated Jefferson County. Nationally, the female population is proportionately higher than males due to their higher longevity.

Table 3.5 – Population by Gender

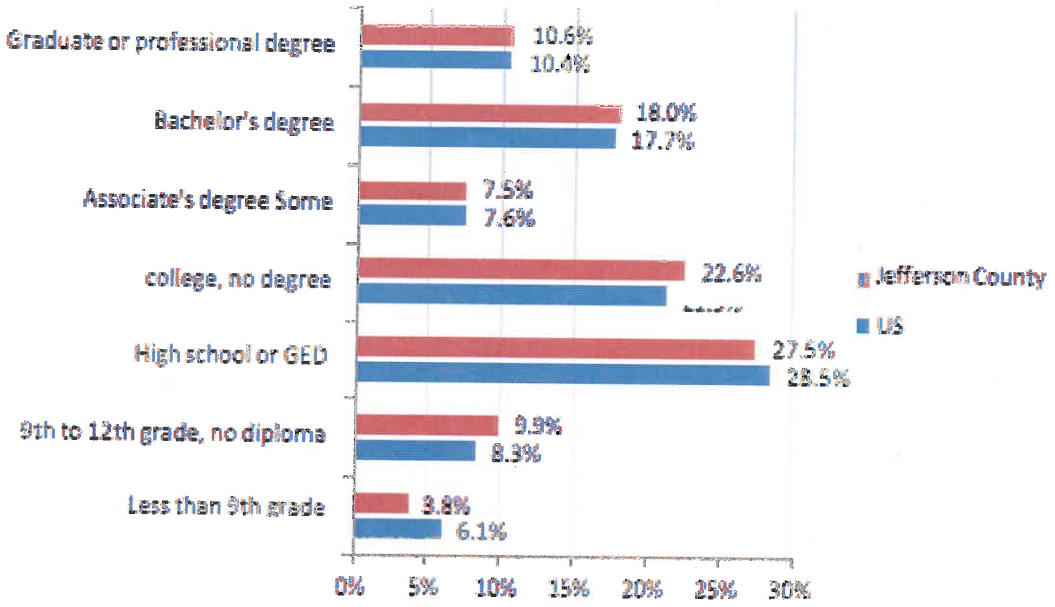
Community	Male	Female
Jefferson County	47.4%	47.1%
Adamsville	52.6%	52.4%
Bessemer	45.0%	54.7%
Birmingham	47.0%	53.9%
Brighton	44.9%	53.5%
Brookside	43.0%	51.5%
Cardiff	47.1%	53.7%
Center Point*	45.3%	52.8%
Clay*	48.5%	50.5%
County Line	48.1%	46.7%
Fairfield	44.8%	55.8%
Fultondale	50.2%	52.1%
Gardendale	48.1%	53.2%
Graysville	50.1%	53.7%
Homewood	49.3%	53.8%
Hoover	48.6%	51.3%
Hueytown	49.0%	52.6%
Irondale	48.5%	52.2%
Kimberly	51.4%	50.1%
Leeds	47.1%	52.1%
Lipscomb	49.0%	50.9%
Maytown	46.5%	51.3%
Midfield	41.9%	53.9%
Morris	43.9%	51.5%
Mountain Brook	46.4%	52.7%
Community	Male	Female
Mulga	50.9%	53.9%
North Johns	45.5%	51.4%
Pinson*	48.7%	51.7%
Pleasant Grove	44.2%	52.6%
Sylvan Springs	48.5%	51.7%
Tarrant	44.1%	53.1%
Trafford	51.8%	52.6%
Trussville	47.9%	51.3%
Vestavia Hills	46.1%	53.0%
Warrior	47.6%	53.4%
West Jefferson	42.9%	51.2%
*Unincorporated Census Designated Place (CDP) in 2000		

Source: U.S. Census Bureau, American Community Survey

Educational Attainment

Chart 3.3 – Education Attainment of Population Ages 25 Years or Older, compares Jefferson County and the U.S. population, according to the 2010 American Survey by the Census Bureau. The share of Jefferson County's population with a bachelor's degree or higher—28.6%-- is slightly above the national average of 28.1%.

Chart 3.3 – Education Attainment of Population Ages 25 Years or Older



Source: US Census 2010 American Community Survey

Economy

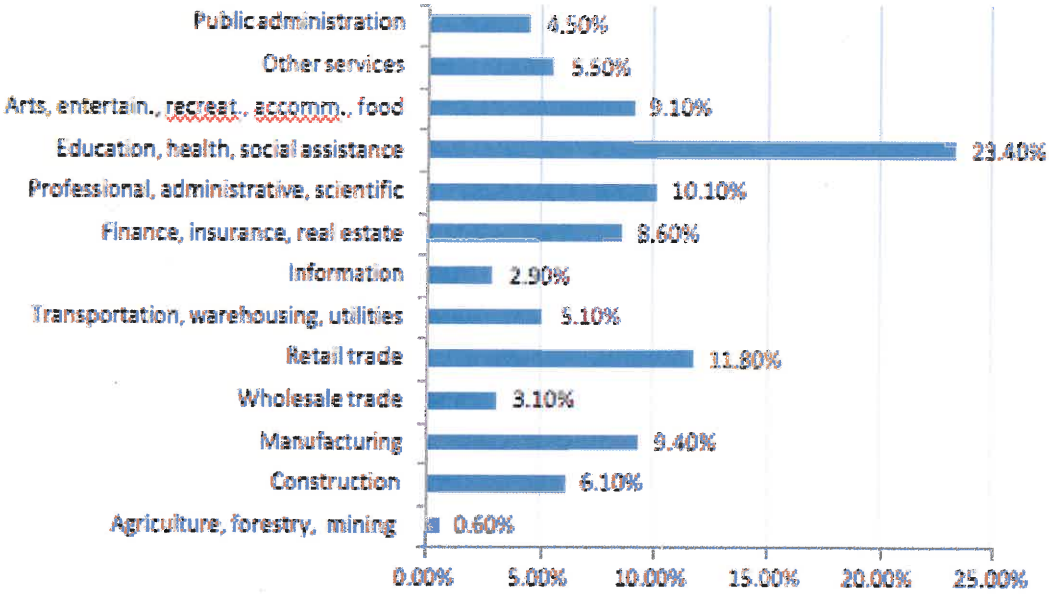
Business and Industry

Birmingham and the surrounding area developed rapidly around the steel industry in the early 1900's. The area was once known as "The Pittsburgh of the South." Now, Birmingham is recognized for its health services, medical research, engineering, and financial services industries. Half of the Fortune 500 companies maintain offices in the Birmingham metro area. As of 2010, Birmingham has one Fortune 500 public company: Regions Financial Corporation (#447).

Chart 3.4 – Employment by Occupational Group and Chart 3.5 – Major Employers with 1200+ Employees depict Jefferson County's employment by industry type and major employers, respectively. The education / health / social services fields host more jobs than any other category in Jefferson County. The field includes employers such as University of Alabama at Birmingham, Baptist Health System, and some government agencies.

Retail trade and employs the second highest numbers of workers. Although many of the largest steel mills have closed, Jefferson County is still the site of major manufacturers including Motion Industries, the largest distributor of bearing, mechanical, electric, and fluid power components in the U.S., and Vulcan Materials, the world's largest producer of construction aggregates. Though not located in the county, the automobile industry is the newest manufacturer in the area. Mercedes-Benz and Honda have located automotive manufacturing facilities just west and east of Jefferson County, respectively.

Chart 3.4 – Employment by Occupational Group



Source: US Census 2010 American Community Survey

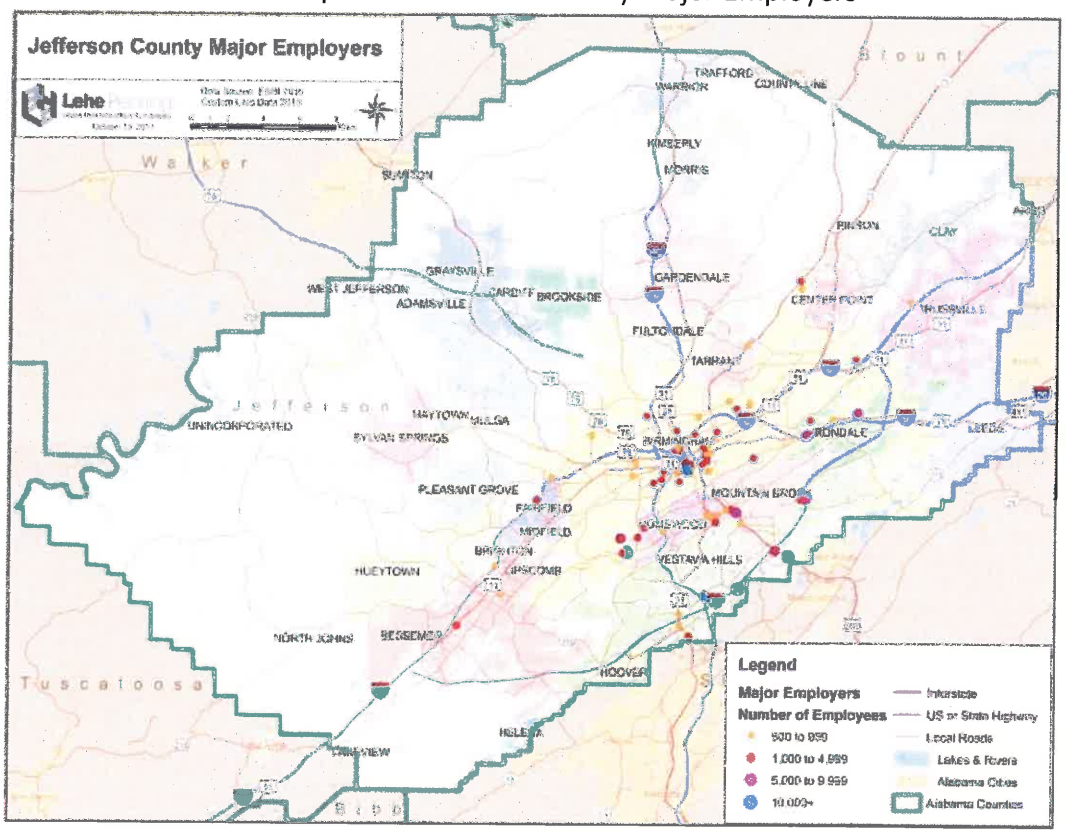
Chart 3.5 – Jefferson County Major Employers

Jefferson County Major Employers

Company	Employment	Service Description
University of Alabama at Birmingham*	23,000	Education and health care services
Regions Financial Corporation	7,668	Banking, corporate headquarters and operations center
AT&T	5,750	Information, regional operations
St. Vincent's Health System	4,644	Health care services, hospital network serving metro Birmingham
Children's of Alabama	4,497	Health care services, regional specialized health care
Blue Cross Blue Shield of Alabama	4,000	Insurance, employee benefits, corporate headquarters
Alabama Power Company	3,982	Utilities services, electrical
Baptist Health System	3,200	Health care services, management
BBVA Compass	2,606	Banking, financial services, North American headquarters
American Cast Iron Pipe Company	2,400	Manufacturing, primary metals manufacturer of ductile iron products
Buffalo Rock Company	2,200	Manufacturing, food products, independent Pepsi bottler
Southern Company Services	2,116	Utilities, operations, shared services division of Southern Company
Brookwood Medical Center	2,037	Health care services, hospital
U.S. Steel	1,900	Manufacturing, pipe mill
Trinity Medical Center	1,879	Health care services, hospital
Social Security Administration	1,800	Financial services, social security benefits processing
Drummond Company	1,625	Natural resources and mining, corporate headquarters
Birmingham Veterans Affairs Medical Center	1,525	Health care services, regional comprehensive medical facility
Wells Fargo	1,466	Banking, Customer operations center
Protective Life Corporation	1,340	Insurance, North American headquarters
McDonalds (CLP Corporation)	1,300	Management, retail, Alabama's largest McDonald's franchisee
State Farm Insurance	1,300	Insurance, regional operations center
Samford University	1,231	Education services, post-secondary, university

Source: Birmingham Business Alliance, April 2014 *Includes UAB Health Services Foundation Employment

Map 3.4 – Jefferson County Major Employers

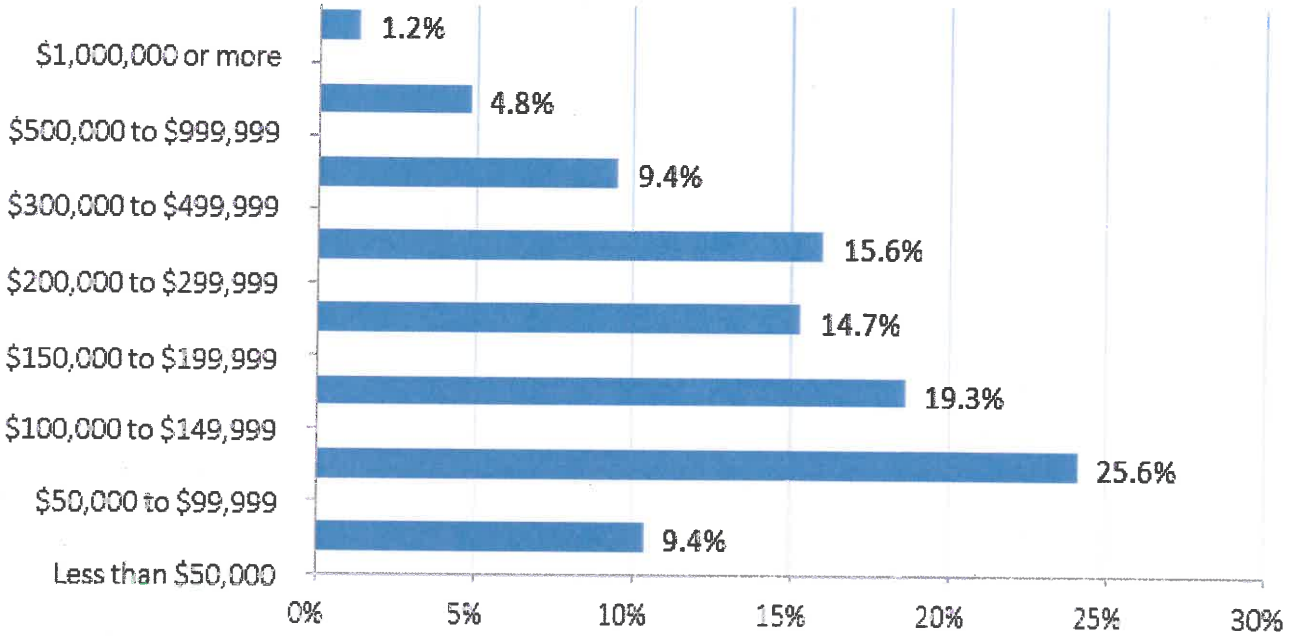


Source: Lehe Planning

Income and Housing

The median household income for Jefferson County is $41,853 compared to a state median of $40,474; according to 2010 Census. Approximately 14.4 percent of families live below the poverty line, while the statistic for Alabama as a whole is 14.7 percent. The number of housing units by range of value is shown in Chart 3.6 – Housing Units by Range of Value. The median value for a home in Jefferson County in 2010 was $141,500.

Chart 3.6 – Housing Units by Range of Value



Source: U.S. Census Bureau, 2010 American Community Survey

Utilities

Alabama Power, a Southern Company subsidiary, provides most of the electrical power for Jefferson County, with Tennessee Valley Authority (TVA) serving some areas. Alabama Gas Company provides natural gas to Jefferson County homes and businesses. The Birmingham Water Works Board furnishes drinking water to approximately 700,000 people in the Central Alabama region through almost 4,000 miles of pipe, making it one of the largest water providers in the country. Raw water is drawn from the Sipsey Fork, Mulberry Fork and Inland Lake/Blackburn Fork in the Black Warrior Basin; and from the Big Cahaba River, Little Cahaba River and Lake Purdy in the Cahaba Basin. The water system has its own laboratory testing facility for water quality analyses. The sanitary sewer collection system in Jefferson County consists of over 2,500 miles of pipe, 60,000 manholes, and nine wastewater treatment facilities. Jefferson County manages a maximum capacity of 250 million gallons of sanitary sewer volume per day through its treatment facilities.

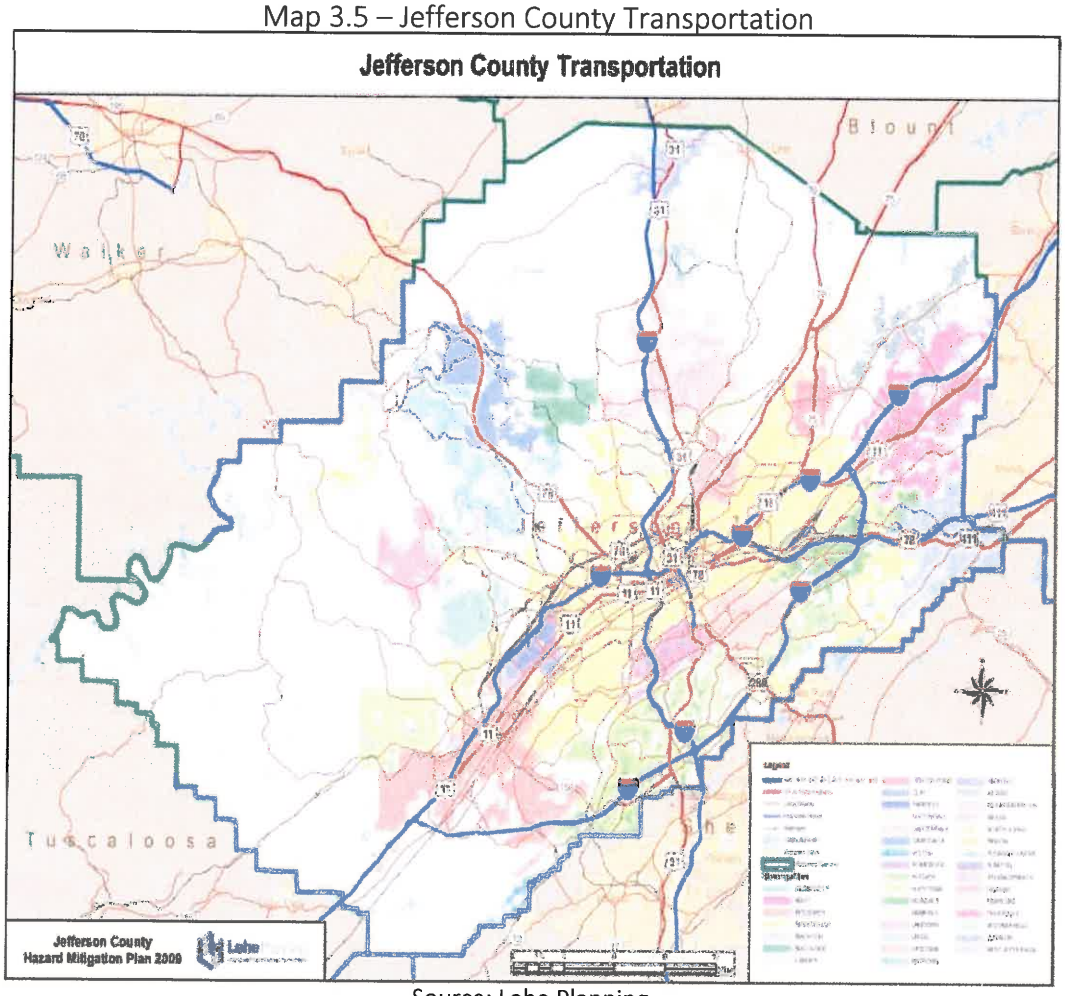
Media

The Jefferson County area is served by over thirty radio stations and seven television stations. The Eternal World Television Network, the worldwide Catholic cable television network, is headquartered in the county. The two cable providers are Charter Communications and BrightHouse. The main providers of satellite television service are Direct TV and DishNetwork. The Birmingham News provides daily news coverage to the people living in the metropolitan area through an online website.

Transportation

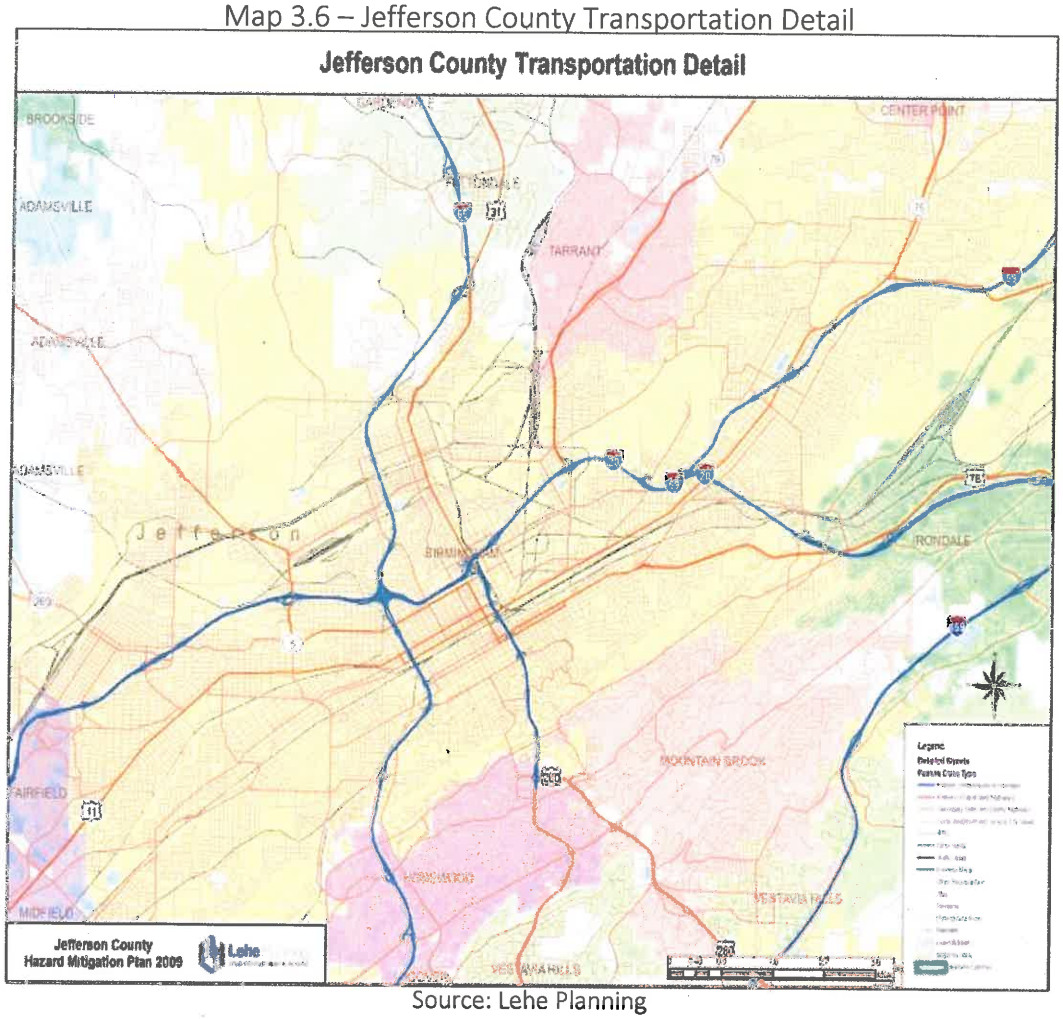
Interstates: I-20, I-22, I-59, I-65, and I-459 all pass through Jefferson County, with I-459 serving as a southern beltway for the Birmingham metropolitan area. Jefferson County is served by most major regional trucking lines as well as seven major railroads: BNSF Railway, CXS Transportation, Norfolk Southern Railway, Birmingham Southern Railway, Alabama and Tennessee Railway, Birmingham Southern Railroad, and Jefferson Warrior Railroad. Greyhound bus service and AMTRAK passenger service are available in downtown Birmingham. The Birmingham-Shuttlesworth International Airport, located in the city of Birmingham, is Alabama's largest and busiest airport. The Port of Birmingham, located in the western part of the county on the Warrior River, is the largest inland commodities shipping center on the Tennessee-Tombigbee waterway system.

Map 3.5 – Jefferson County Transportation



Source: Lehe Planning

Map 3.6 – Jefferson County Transportation Detail



Source: Lehe Planning

Chapter 4 - The Planning Process

Federal Requirements for the Planning Process
Summary of Plan Updates
Preparation of the Plan
How the Plan was updated
The Hazard Mitigation Planning Committee
Review and Incorporation of Applicable Plans and Documents
How the Public was involved in the Planning Process
Interagency and Intergovernmental Participation in the Planning Process
The Plan Review and Update Process

Federal Requirements for the Planning Process

This chapter of the Plan addresses the Planning Process requirements of 44 CFR Section 201.6 (b) and (c)(1) and the process for the plan review and update requirements of Section 201.6 (d)(3), as follows:

"201.6 (b) Planning process. An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;

An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and

Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

"201.6 (c) Plan content. The plan shall include the following:

(1) Documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved."

"201.6 (d) Plan review.

(3) A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding."

Summary of Plan Updates

Table 4.1 – Summary of Plan Updates. Summarizes changes in the 2014 Plan Update as a result of the planning process:

Table 4.1 – Summary of Plan Updates

Section	Change
Opportunities for Public Comment on the Plan	The public was invited to and involved in HMPC meetings and jurisdictional meetings and encouraged to comment on all parts of the 2014 Plan Update. The public will be invited to comment on the Plan prior to adoption and will be invited to scheduled HMPC and jurisdictional meetings throughout the 5-year plan maintenance period.
Opportunities for Involvement in the Planning Process	Attendance at meetings; review of previous Mitigation Actions; Completion of Citizen Input for HM Planning Survey; Supply of jurisdictional-specific capabilities and mitigation strategies and actions.
Review of Plans and Documents	The planning process included a thorough review and incorporation of local, State, and Federal plans and guidance.
How the Plan was Prepared	HMPC meetings; Jurisdictional meetings; Public education meetings on Hazard Mitigation; more direct involvement and oversight by Jefferson County EMA; more direct involvement in plan development by jurisdictions and the HMPC.; Solicitation of citizen involvement.
Who was Involved in the Planning Process	HMPC members; other stakeholders; citizens; neighboring county personnel.
The Plan Review and Update Process	The second planning session of the 2014 Plan Update involved a change from use of a paid contractor to produce the plan to direct involvement and plan update by the HMPC and jurisdictions, other stakeholders, and citizens.

Preparation of the Plan

The initial 2014 Plan Update was prepared by ERI International. This current 2014 Plan Update was prepared under the direction of the HMPC with the support of JCEMA.

How the Plan was updated

Initial Planning Process

Using grant funds provided to Jefferson County EMA from Alabama EMA, JCEMA entered into a contract effective February 15, 2014 with ERI International to update the 2014 Jefferson County HMP. Work on the 2014 HMP Update was to begin on March 1, 2014 with completion by August 31, 2014.

In April 2014, a "kick-off" meeting was held at the JCEMA office with ERI staff to review the scope of work, deliverables, and timelines to satisfy the HMP update contract terms. On July 7, 2014, a letter was sent to all Mayors and Commissioners in Jefferson County from JCEMA requesting the completion of a Mitigation Actions Tool, with submission to JCEMA no later than July 25, 2014. On July 29, 2014, a Media Advisory was distributed advising of a Public Meeting to be held on August 8, 2014 from 1:00pm-3:00pm in the JCEMA Training Room to review the updated 2014 Jefferson County Multi-Hazard Mitigation Plan prepared by ERI International. On November 18, 2014, the plan was submitted to Alabama EMA. In January 2015, JCEMA was informed by AEMA via conference call that the plan had major deficiencies and plan approval was unlikely. AEMA recommended that JCEMA start over with the development of the 2014 HMP Update due to the number deficiencies in the submitted update. Because the contract for the rejected plan update did not contain a performance clause and the planning funds had already been used, the decision was made by JCEMA personnel to start over with the plan development using the HMPC and local stakeholders (See Appendix G for the Initial Planning Process Documentation).

Second Planning Process

During the second planning process, the HMPC was re-activated and an effort made to include participation by representatives from each jurisdiction in Jefferson County. A letters were sent to the Mayor of each jurisdiction explaining the rejection of the initial Plan Update, the expiration of the 2009 HMP, and the start of another plan update planning session (See Appendix H for a copy of the letter). Emails and phone calls followed urging jurisdictional representatives and other stakeholders to attend the 2014 Hazard Mitigation Plan Update Kick-off Meeting to be held on February 20, 2015 and asking for on-going participation on the HMPC. JCEMA served as the coordinator of the HMPC and conducted several meetings to assist with the planning process. HMPC meetings were held in the JCEMA Training Room on the following dates:

- February 20, 2015 - 10:00am
- March 20, 2015 - 10:00am
- April 24, 2015 - 10:00am
- May 22, 2015 - 10:00am
- June 30, 2015 - 10:00am
- December 9, 2015 - 1:00pm

Each jurisdiction was asked to review and adjust, as necessary, the Hazard Mitigation Actions included in the rejected Plan Update, and to provide specific information for consideration in the current Plan Update, including: greatest vulnerabilities and hazards affecting their jurisdictions; municipal and capital improvement plans as well as building and zoning codes which could affect Hazard Mitigation strategies; critical facilities in the jurisdiction, and current development plans.

Most jurisdictions were unfamiliar with Hazard Mitigation Plan development – having previously relied on paid contractors hired by JCEMA to produce the county's multi-jurisdictional plan – so jurisdictional meetings were scheduled to provide one-on-one education of and assistance with the requirements of

the Hazard Mitigation Plan Update (See Appendix F for the HMP Development Timeline and Appendix H for sign-in sheets for the HMPC, jurisdictional, and public education meetings). As the jurisdictions began to review the 2009 Mitigation Actions during this second planning process, the jurisdictions determined that developing new actions would be more appropriate than updating the 2009 Mitigation Actions because the previous actions did not appropriately reflect what the jurisdictions had or could accomplish.

The Hazard Mitigation Planning Committee

The Jefferson County Hazard Mitigation Planning Committee (HMPC), comprised of representatives from the jurisdictions and organizations concerned with hazard mitigation in Jefferson County, guided the development of this plan. The Jefferson County Emergency Management Agency (JCEMA) serves as the lead local agency supporting the drafting, adoption, and ongoing implementation of the plan. JCEMA supports committee activities and represents the interests of all Jefferson County jurisdictions and agencies, including school boards and utilities. Jefferson 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 inter-governmental agreement for support of municipal operations. JCEMA members of the HMPC represent all municipalities within Jefferson County as well as unincorporated communities within the county.

The membership may change from time to time, as a result of elections and staff changes that affect the appointed representatives from the participating jurisdictions.

Table 4.2 – The Hazard Mitigation Planning Committee

Jurisdiction	Title	Representative
Adamsville	Fire Chief	Scott Harbison
Bessemer	Fire Chief	Paul Syx
Birmingham	Flood Plain Manager	Denise Bell
Brighton	City Clerk	Hazel Williams
Brookside	Police Chief	Jason Springfield
Center Point	Public Works Director	Bobbie Loggins
Clay	City Manager	Ronnie Dixon
County Line	Town Clerk	Brenda Philpot
Fairfield	Fire Chief	Kevin Sutton
Fultondale	Fire Marshall	Scott Fassina
Gardendale	Police Lieutenant	Bobby Price
Graysville	Mayor	Mary Sue Morgan
Homewood	Chief of Staff	J.J. Bischoff
Hoover	Executive Officer for Fire Dept.	Rusty Lowe
Hueytown	Fire Chief	Terry Hagood
Irondale	Asst. Fire Chief	James Doss
Kimberly	City Clerk	Sandy Waid
Leeds	Planner	Brad Watson
Lipscomb	City Clerk	Thelma Ford
Midfield	Public Works Director	Jeff Zissette
Morris	Mayor	Joe Pylant
Mountain Brook	Fire Battalion Chief	Chris Mullins
Mulga	Town Clerk	Miranda Black

Jurisdiction	Title	Representative
Pinson	Zoning Administrator	Bob Jones
Pleasant Grove	Fire Chief	Robert Knight
Sylvan Springs	Fire Chief	Rusty Johnson
Tarrant	Fire Chief	Ricky Milligan
Trafford	Town Council Member	Carolyn Tyler
Trussville	Fire Chief	Russell Ledbetter
Vestavia Hills	Asst. Fire Chief	Marvin Green
Warrior	Building Inspector	Mike Tumlin
West Jefferson	Town Council Member	Charles Hughes
Unincorporated Jefferson County	Emergency Management Officer	Annette Davis

See Appendix H for the full email list of members of the HMPC including all jurisdictional representatives and other stakeholders and meeting sign in sheets for all HMPC and other HMP Update meetings.

The Mission of the Hazard Mitigation Planning Committee

The HMPC adopted the following mission statement in 2004 and retained it for this update:

The mission of the Jefferson County Hazard Mitigation Planning Committee is to oversee and establish a comprehensive hazard mitigation planning process that:

- Engages public participation and support;
- Helps to facilitate Federal, State, regional and local agencies' assistance;
- Constantly monitors and evaluates the potential risks of hazards to life and property;
- Actively mobilizes all available community resources and measures to mitigate the threats of hazards.

Review and Incorporation of Applicable Plans and Documents

HMPC and other jurisdictional members reviewed local plans, studies, reports, ordinances, regulations and technical information pertaining to hazard mitigation as applicable. These documents were examined to see what mitigation measures were currently being pursued and what new measures could be included in the 2014 Plan Update.

Integrated into this 2014 Plan Update is information from the following plans, studies, and reports, among other resources:

- Jurisdictional Comprehensive Plans
- Jurisdictional Zoning and Building Codes
- NOAA and NWS records
- FEMA and local disaster reports
- Flood Insurance Studies and Flood Insurance Rate Maps
- United States Geological Survey data
- US Census data
- National Climatic Data Center records

- State of Alabama Hazard Mitigation Plan

How the Public was involved in the Planning Process

In an effort to involve the public in the planning process, a Citizen Input Survey was developed and distributed to citizens across Jefferson County. The survey solicited information on the natural hazards which have affected citizens, hazards expected to affect citizens in the future, and the community assets and mitigation priorities important to citizens. Copies of the survey were distributed and completed copies collected: at all meetings/activations at Jefferson County EMA; at all meetings attended by JCEMA staff; in the jurisdictions by members of the HMPC; in the lobby of the Jefferson County Department of Health by JCDH personnel; and at meetings and service calls conducted by American Red Cross personnel. Additionally, the survey was posted on the websites of Jefferson County jurisdictions who had a site. (See Appendix D for a copy of the Citizen Input Survey). The completed hard copies of the Citizen Input Survey are on file at Jefferson County EMA.

To expand the outreach to the public, members of the HMPC established a Survey Monkey site to receive online completions of the Citizen Input Survey. The address of the Survey Monkey website was https://www.surveymonkey.com/s/JeffersonCoHazardMitigation. The website was opened on March 30, 2015 and remained open until June 24, 2015 (87 days). In order to track the results from both the hard copies and the online surveys, American Red Cross volunteers logged all hard copy information into the Survey Monkey site. The address of the Survey Monkey results site was https://www.surveymonkey.com/results/SM-RVDNZWK9/. Over 1530 survey responses were tabulated. (See Appendix E for overall results for Jefferson County from the Survey Monkey site).

Residents of each jurisdiction and other stakeholders were provided the following opportunities for participation in the planning process for the 2014 Plan Update:

- Attend HMPC meetings which were publicly announced and posted on the JCEMA Facebook page.
- Attend and participate in the individual jurisdictional meetings which were publicly announced.
- Complete the Citizen Input for Hazard Mitigation Planning Surveys.
- Attend public hearings of the local governing bodies and offer comments on mitigation strategies.

The public will be invited to attend the public meeting and plan review conducted by each jurisdiction prior to plan adoption by its governing body. This will give the public yet another opportunity for involvement in the planning process. Additionally, as part of the ongoing monitoring, evaluation, and updating of the plan, each jurisdiction will schedule an annual public meeting to review their mitigation goals, strategies, risk assessment, and potential funding sources. The public will be invited to these annual meetings.

Interagency and Intergovernmental Participation in the Planning Process

Efforts to include stakeholders from a cross-section of the county in the planning process involved meetings with:
Federal Agencies:
National Weather Service

State Agencies:
Alabama Emergency Management Agency
Alabama Department of Health (Jefferson County Department of Health)
Geological Survey of Alabama
Alabama Forestry Commission
Alabama Department of Economic and Community Affairs

Academia and Non-profit Agencies:
University of Alabama at Birmingham (UAB)
University of Alabama
School Board Superintendents in Jefferson County – requested to be included under jurisdictions
American Red Cross
Jefferson County VOAD

Neighboring Counties: (See Appendix H for 12/17/15 Meeting Sign-in where the JC HMP was reviewed)
Shelby County EMA
Walker County EMA
Tuscaloosa County EMA
Blount County

The Plan Review and Update Process

The plan review and update process resulted in a comprehensive update of the 2014 HMP which was achieved through a process that involved the following tasks, among others:

- Review and evaluation of the appropriateness of Community Mitigation Action Programs adopted in the 2009 plan, with a decision made by the jurisdictions and HMPC to create new Mitigation Actions more aligned with the current capabilities of each participating jurisdiction.
- Review of local capabilities to carry out mitigation measures.
- Reprioritization of mitigation actions and projects.
- Review of the Community Profiles to reflect changed demographics, economic characteristics, and growth and development trends.
- A review of risks to include recorded as well as anecdotal information on hazards which have affected the jurisdictions.
- Identification and analysis of a comprehensive range of mitigation alternatives.
- A review of and recommitment to the vision of disaster-resistant communities and support of the 2013 State goals for hazard mitigation.

Chapter 5 – Risk Assessment

Federal Requirements for Risk Assessments
Identification and Description of Hazards
Hazard Profiles
Summary of Hazards and Community Impacts
Repetitively-Damaged NFIP-Insured Structures
Risks that Vary Among the Jurisdictions

Federal Requirements for Risk Assessments

This chapter of the Plan addresses the Risk Assessment requirements of 44 CFR Section 201.6(c)(2), as follows:

201.6(c)(2) A Risk Assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards. The risk assessment shall include:

(i) A description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

(ii) A description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:

A. The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
B. An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate;
C. Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

(iii) For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

Identification and Description of Hazards

Identification of Hazards Affecting Each Jurisdiction

Types of Hazards

The types of hazards affecting each Jefferson County jurisdiction are listed in Table 5.1 – Identified Jefferson County Hazards. This table of identified hazards also notes multiple natural hazards that may be associated with and caused by certain hazard events.

Table 5.1 – Identified Jefferson County Hazards

Hazards	Associated Hazards	Jurisdictions Affected
Flooding		All jurisdictions affected; some more severe than others.
Tornadoes	High Winds Severe Storms	All jurisdictions affected equally.
Severe Storms	Thunderstorms Hail; Lightning High Winds Tornadoes Floods	All jurisdictions affected equally.
Winter Storms/Freezes	Snow Storms; Ice Storms; Extreme Cold	All jurisdictions affected equally.
Wildfires		All jurisdictions affected equally.
Hurricanes	Tropical Storms Tropical Depressions Severe Storms; High Winds Floods	All jurisdictions affected equally.
Droughts / Heat Waves	Extreme Heat; Wildfires; Sinkholes	All jurisdictions affected equally.
Landslides		Varies among jurisdictions.
Sinkholes / Land Subsidence		Varies among jurisdictions.
Earthquakes	Landslides	All jurisdictions affected equally.
Dam / Levee Failures	Floods	Varies among jurisdictions.

Source: Jefferson County EMA

Sources for Identifying Jefferson County Hazards

The planning team used the following sources for identifying hazards in Jefferson County:

2013 Alabama State Plan. The 2013 update of the State Plan served as an additional resource for identifying local hazards in this plan update. All new hazards identified by the State were compared against the local list and differences were noted. Table 5.2 – Comparison of Identified Jefferson County Hazards to the State Plan, compares the hazards identified in this 2014 plan update to those identified in the 2013 Alabama State Plan and explains the differences.

Table 5.2 – Comparison of Identified Jefferson County Hazards to State Plan

Hazards Identified in 2013 Alabama State Plan	Equivalent 2014 Jefferson County Identified Hazards	Differences
Floods (storm surge, riverine, flash floods, etc.)	Floods	Coastal and riverine flooding; Storm surge not applicable to Jefferson County.
High Winds (hurricanes, tornadoes and windstorms)	Tornadoes – High Winds Severe Storms – High Winds Hurricanes – High Winds	High winds included as components of tornadoes, severe storms, and hurricanes in Jefferson County plan.
Winter/ice Storms	Winter Storms/Freezes	Jefferson County plan identifies extreme cold as an associated hazard.
Landslides	Landslides	Jefferson County plan identifies mudslides as an associated natural hazard.
Land Subsidence	Sinkholes (Land Subsidence)	Difference in terminology.

Earthquakes	Earthquakes	Jefferson County plan identifies landslides as an associated natural hazard.
Droughts	Droughts/Heat Waves	Included as a component of droughts/heat waves in Jefferson County plan. Jefferson County plan identifies sinkholes as a consequence of droughts/heat waves.
Hail	Severe Storms – Hail	Included as a component of severe storms in Jefferson County plan.
Wildfires	Wildfires	Jefferson County plan associates wildfires with droughts/heat waves.
Extreme Temperatures	Droughts/Heat Waves – Extreme Heat Winter Storms/Freezes – Extreme Cold	Included as components of droughts/heat waves and winter storms/freezes in Jefferson County plan.
Lightning	Severe Storms – Lightning	Included as a component of severe storms in Jefferson County plan.
Dam Failures	Dam/Levee Failures	Jefferson County plan associates floods with dam/levee failures.
Tsunamis	None	Scientists agree that tsunamis are not a threat to coastal Alabama.

Source: Jefferson County EMA

Floods Description

A flood is a natural event for rivers and streams. Excess water from snowmelt, rainfall, or storm surge accumulates and overflows onto the banks and adjacent floodplains. Floodplains are lowlands, adjacent to rivers, lakes, and oceans that are subject to recurring floods.

Hundreds of floods occur each year, making it one of the most common hazards in all 50 states and U.S. territories. Floods kill an average of 150 people a year nationwide. They can occur at any time of the year, in any part of the country, and at any time of day or night. Floodplains in the U.S. are home to over nine million households. Most injuries and deaths occur when people are swept away by flood currents, and most property damage results from inundation by sediment-filled water.

Several factors determine the severity of floods, including rainfall intensity (or other water source) and duration. A large amount of rainfall over a short time span can result in flash flood conditions. A small amount of rain can also result in floods in locations where the soil is saturated from a previous wet period or if the rain is concentrated in an area of impermeable surfaces such as large parking lots, paved roadways, or other impervious developed areas.

Topography and ground cover are also contributing factors for floods. Water runoff is greater in areas with steep slopes and little or no vegetative ground cover. Frequency of inundation depends on the climate, soil, and channel slope. In regions where substantial precipitation occurs in a particular season each year, or in regions where annual flooding is derived principally from snowmelt, the floodplains may be inundated nearly every year. In regions without extended periods of below-freezing temperatures, floods usually occur in the season of highest precipitation. In areas where flooding is caused by melting snow, and occasionally compounded by rainfall, the flood season is spring or early summer.

Fortunately, most of the known floodplains in the United States have been mapped by FEMA, which administers the National Flood Insurance (NFIP). When a flood study is completed for the NFIP, the information and maps are assembled into a Flood Insurance Study (FIS). A FIS is a compilation and presentation of flood risk data for specific watercourses, lakes, and coastal flood hazard areas within a community and includes causes of flooding. The FIS report and associated maps delineate Special

Flood Hazard Areas (SFHAs), designate flood risk zones, and establish base flood elevations (BFEs), based on the flood that has a 1% chance of occurring annually, or the 100-year flood. Paper Flood Insurance Rate Maps (FIRMs) and FIS reports are gradually being replaced by DFIRMs (digital FIRMs).

The 100-year flood designation applies to the area that has a 1 percent chance, on average, of flooding in any given year. However, a 100-year flood could occur two years in a row, or once every 10 years. The 100-year flood is also referred to as the base flood. The base flood is the standard that has been adopted for the NFIP. It is a national standard that represents a compromise between minor floods and the greatest flood likely to occur in a given area and provides a useful benchmark.

Base Flood Elevation (BFE), as shown on the FIRM, is the elevation of the water surface resulting from a flood that has a 1% chance of occurring in any given year. The BFE is the height of the base flood, usually in feet, in relation to the National Geodetic Vertical Datum (NGVD) of 1929, the North American Vertical Datum (NAVD) of 1988, or other datum referenced in the FIS report.

Special Flood Hazard Area (SFHA) is the shaded A-Zone or V-Zone area on a FIRM that identifies an area that has a 1% chance of being flooded in any given year or the 100-year floodplain. FIRMs show different floodplains with different zone designations, as shown on Table 5.3 – Flood Zone Designations. These are used for insurance rating purposes, but are also necessary for flood permitting and flood hazard mitigation planning purposes. The 500-Year Floodplain is the shaded X-Zone area shown on a FIRM that has a 0.2% chance of being flooded in any given year.

Floodway is the stream channel and that portion of the adjacent floodplain that must remain open to permit passage of the base flood without substantial increases in flood heights. The Flood Fringe is the remainder of the 100-year floodplain. The following graphic shows the components of a floodplain along a stream:

Table 5.3 – Flood Zone Designations

Zones	Flood Zones
100-year floodplain areas of high risk.	
A	The base floodplain mapped by approximate methods, i.e., BFEs are not determined. This is often called an unnumbered A zone or an approximate A zone.
AE	The base floodplain where base flood elevations are provided.
AO	The base floodplain with sheet flow, ponding, or shallow flooding. Base flood depths (feet above ground) are provided.
AH	Shallow flooding base floodplain. BFEs are provided.
A99	Area to be protected from base flood by levees or Federal flood protection systems under construction. BFEs are not determined.
AR	The base floodplain that results from the de-certification of a previously accredited flood protection system that is in the process of being restored to provide a 100-year or greater level of flood protection.
100-year coastal floodplain areas of high risk	
V	The coastal area subject to a velocity hazard (wave action) where BFEs are not determined on the FIRM.
VE	The coastal area subject to a velocity hazard (wave action) where BFEs are provided on the FIRM.
Zone	Areas of minimal to moderate risk outside the 100-year floodplain.
X Shaded	Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. Also includes areas protected by levees from the 100-year flood and shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.
Unshaded	Area of minimal flood hazard determined to be outside the 500-year floodplain.
Area of undetermined but possible flood hazards.	

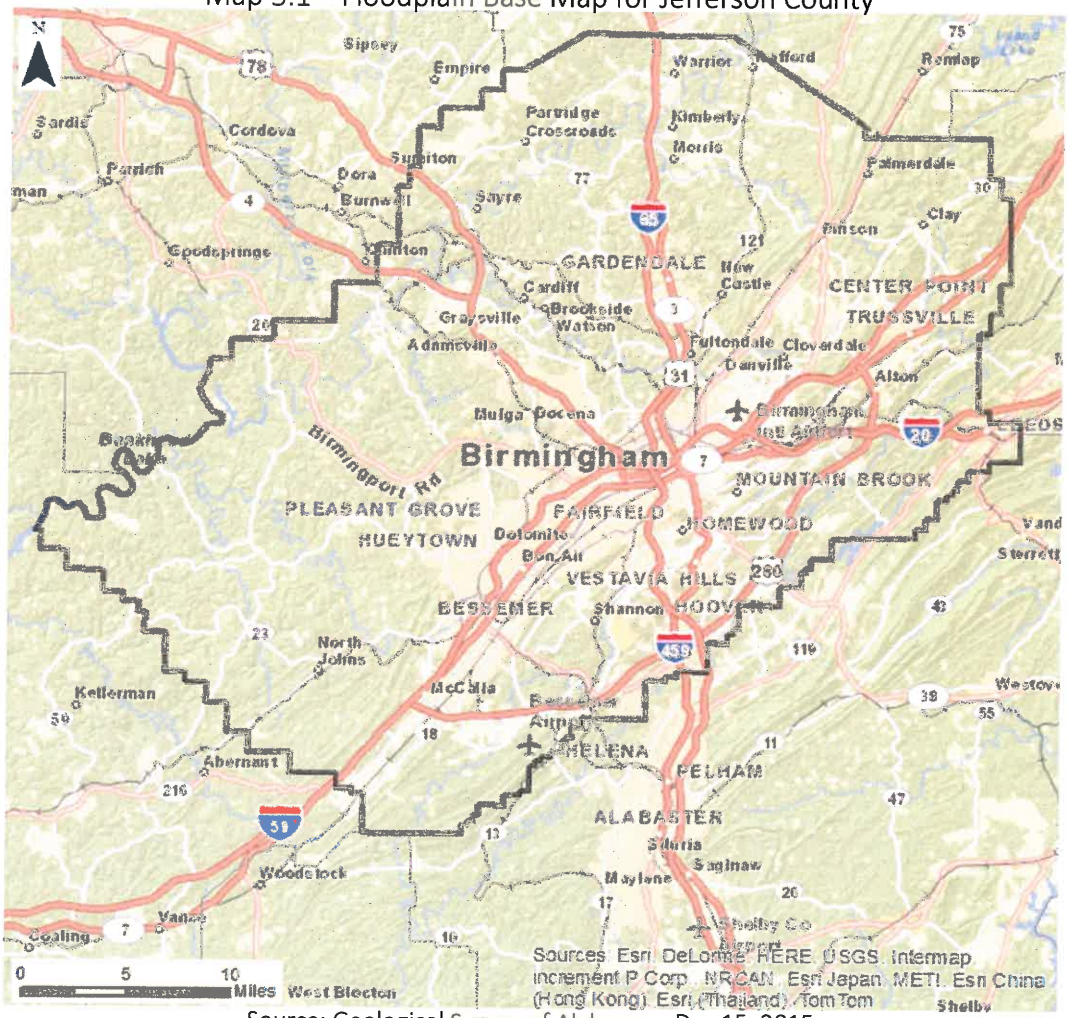
Source: FEMA

Table 5.4 – Jefferson County Flood Data

Jefferson County Zone	March 7, 1996
Jefferson County Zone	May 6, 2003
Jefferson County Zone	May 7, 2003
Jefferson County Zone	May 18, 2003
Jefferson County Zone	April 1, 2005
Jefferson County Zone	May 20, 2010
Vestavia Hills	September 5, 2011
Jefferson County Zone	April 7, 2014

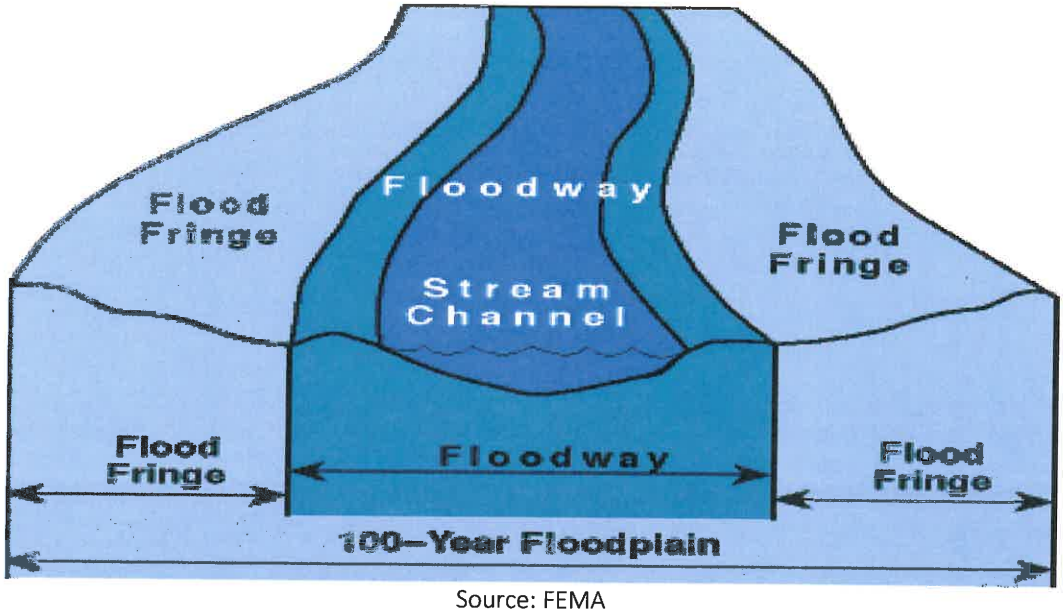
According to the data listed in Table 5.4 – Jefferson County Flood Data, flooding caused property damage in the amount of $220,000. The flooding extent for Jefferson County is 4.95 inches of flood depth.

Map 5.1 – Floodplain Base Map for Jefferson County



Source: Geological Survey of Alabama – Dec 15, 2015

Figure 5.1 – Flood Plain Cross Section



Source: FEMA

A range of floods, other than just the 100-year flood, could happen within an area. Buildings in very close proximity to a stream or shore line, for example, might experience flooding much more frequently.

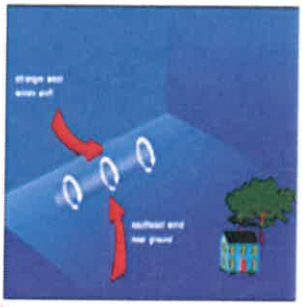
Tornadoes Description

Tornadoes are one of nature's most violent storms, which are characterized by a rapidly rotating column of air extending from the base of a thunderstorm to the ground. In an average year, approximately 1,000 tornadoes are reported across the United States, resulting in over 1,500 injuries and 80 deaths, the greatest number of wind-related deaths. The most violent tornadoes, with wind speeds of 250 mph or more, are capable of tremendous destruction. Damage paths can be more than one mile wide and 50 miles long. Tornadoes can occur anywhere and come in all shapes and sizes.

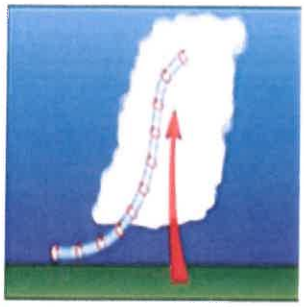
In Alabama, peak tornado season is generally March through May with a secondary season in late fall; however, tornadoes can strike at any time of the year if the essential conditions are present. Tornadoes in the peak season are often associated with strong, frontal systems that form in central states and move east. Occasionally, large outbreaks of tornadoes occur with this type of weather pattern. Several states may be affected by numerous severe storms and tornadoes.

Tornadoes can occur in thunderstorms that develop in warm, moist air masses in advance of eastward-moving cold fronts. These thunderstorms often produce large hail and strong winds, in addition to tornadoes. Thunderstorms spawn tornadoes when cold air overrides a layer of warm air, causing the warm air to rise rapidly. Tornadoes occasionally accompany tropical storms and hurricanes that move over land. They are most common to the right and ahead of the path of the storm center as it comes onshore. The winds produced from wildfires have also been known to produce tornadoes. The following graphic describes the formation of a tornado:

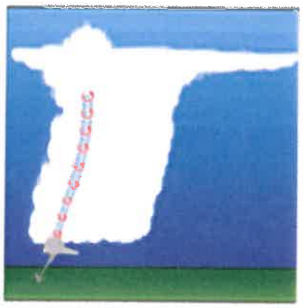
Figure 5.2 – How a Tornado Forms



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.

Woodward OK (Ron Przybylinski)

A lower cloud base in the center of the photograph identifies an area of rotation known as a rotating wall cloud. This area is often nearly rain-free. Note rain in the background.

Woodward OK (Ron Przybylinski)

Moments later a strong tornado develops in this area. Softball-size hail and damaging "straight-line" winds also occurred with this storm.

Source: Tornadoes – A Preparedness Guide, National Weather Service, February 1995

Meteorologists rely on weather radar to provide information on developing storms. The National Weather Service is strategically locating Doppler radars across the country which can detect air movement toward or away from the radar. Early detection of increasing rotation aloft within a thunderstorm can allow life-saving warnings to be issued before the tornado forms.

When conditions are favorable for severe weather to develop, a severe thunderstorm or tornado WATCH is issued. Weather Service personnel use information from weather radar, spotters, and other sources to issue severe thunderstorm and tornado WARNINGS for areas where severe weather is imminent. Severe thunderstorm warnings are passed to local radio and television stations and are broadcast over local NOAA Weather Radio stations serving the warned areas. These warnings are also relayed to local emergency management and public safety officials who can activate local warning systems to alert communities.

In 1971, Dr. T. Theodore Fujita of the University of Chicago developed the original F-scale for wind damages, including tornadoes. The original F-scale, however, was recently replaced by an enhanced version effective February 1, 2007. The Enhanced F-scale is a more precise method of tornado damage assessment that classifies damage according to calibrations developed by engineers and meteorologists across 28 different types of damage indicators. The underlying premise is that a tornado scale needs to take into account the varying strengths and weaknesses of different types of

construction. As with the original F-scale, the enhanced version rates the tornado as a whole based on most intense damage within the path. Historical tornadoes before February 1, 2007, will not be re-evaluated using the Enhanced F-scale.

Table 5.5 – Enhanced F Scale for Tornado Damage

Fujita Scale		Derived EF Scale		Operational EF Scale		
F#	Fastest ¼ mile mph	3 Second Gust mph	EF #	3 Second Gust mph	EF #	3 Second Gust mph
0	40-72	45-78	0	65-85	0	65-85
1	73-112	79-117	1	86-109	1	86-110
2	113-157	118-161	2	110-137	2	111-135
3	158-207	162-209	3	138-167	3	136-165
4	208-260	210-261	4	168-199	4	166-200
5	261-318	262-317	5	200-234	5	Over 200

Source: NOAA Storm Prediction Center's On-Line Frequently Asked Questions about Tornadoes

Table 5.6 – Fujita Tornado Damage Scale

Scale	Wind Estimate	Damage	Description
F0	<73 mph	Light	Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112 mph	Moderate	Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157 mph	Considerable	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 mph	Severe	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 mph	Devastating	Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261-318 mph	Incredible	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: NOAA Storm Prediction Center's On-Line Frequently Asked Questions about Tornadoes

The description of tornadoes presented in this section is based upon information extracted from the FEMA "How to Guides Understanding Your Risks" (FEMA 386-2), FEMA, August 2001, and "Using HAZUS-MH for Risk Assessment" (FEMA 433), FEMA, August 2004. "Tornadoes – A Preparedness Guide", National Weather Service, February 1995, and the "NOAA Storm Prediction Center's On-Line Frequently Asked Questions" about Tornadoes.

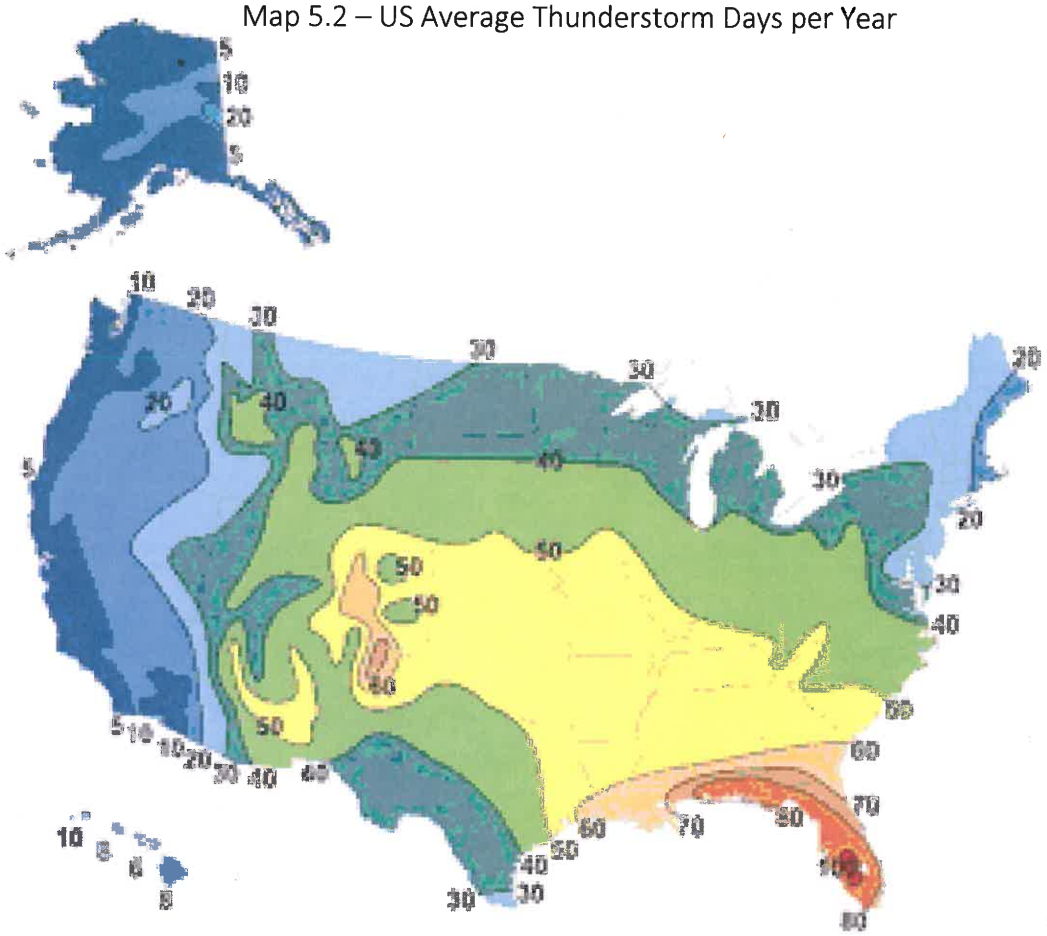
Severe Storms Description

Severe storms, as referred to in this plan, include severe thunderstorms with damaging lightning, hail, and straight-line winds. Severe storms are also associated with tornadoes, hurricanes, and floods, which are described separately in this plan. Thunderstorms affect relatively small areas when compared with hurricanes and winter storms. The typical thunderstorm is 15 miles in diameter and lasts an average of 30 minutes. Despite their small size, thunderstorms can be dangerous.

Of the estimated 100,000 thunderstorms that occur each year in the United States, about 10 percent are classified as severe. The National Weather Service considers a thunderstorm severe if it produces hail at least 3/4-inch in diameter, winds of 58 mph or stronger, or a tornado. See Map 5.2 – US Average Thunderstorm Days per Year.

Thunderstorms are formed by a combination of moisture to form clouds and rain, unstable air, that is, warm air that can rise rapidly, and lift from cold or warm fronts, sea breezes, mountains, or the sun's heat which are capable of lifting air. The National Weather Service estimates over 40,000 thunderstorms occur each day world-wide or close to 16 million annually. In the U.S., roughly 100,000 thunderstorms occur each year. The following map shows the average number of thunderstorm days each year throughout the U.S.

Map 5.2 – US Average Thunderstorm Days per Year



Source: National Weather Service

Figure 5.3 – Estimating Hail Size with Visual Clues

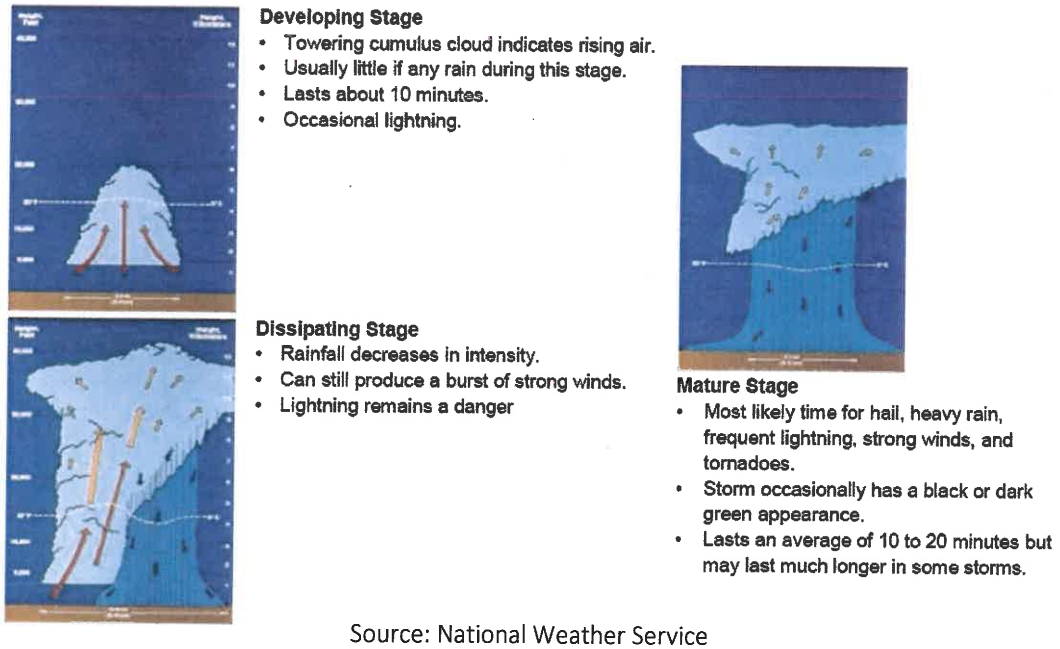
Hail Diameter Size in Inches	Size Description
.25 – .325	Pea
.5	Small Marble
.75	Penny
.875	Nickel
1	Quarter – Severe Thunderstorm Warning Threshold
1.25	Half Dollar
1.75	Golf Ball
2	Lime
2.5	Tennis Ball
2.75	Baseball
3	Large Apple
4	Softball
4.5	Grapefruit
4.75 – 5	Computer CD / DVD

Source: Vaisale National Lightning Detection Network

Extent: Jefferson County's extent for hail is 2.75 inches in diameter which is equivalent to the size of a baseball.

According to Vaisala National Lightning Detection Network 2005 – 2014, Jefferson County's extent for lightning strikes are 12 – 20 flashes per square mile per year.

Figure 5.4 – Life Cycle of a Thunderstorm



Source: National Weather Service

Lightning results from the buildup and discharge of electrical energy between positively and negatively charged areas. Rising and descending air within a thunderstorm separates these positive and negative charges. Water and ice particles also affect charge distribution. A cloud-to-ground lightning strike begins as an invisible channel of electrically charged air moving from the cloud toward the ground. When one channel nears an object on the ground, a powerful surge of electricity from the ground moves upward to the clouds and produces the visible lightning strike. Here are some facts about lightning from the National Weather Service:

- Lightning causes an average of 80 fatalities and 300 injuries each year.
- Lightning occurs in all thunderstorms.
- Each year lightning strikes the earth 20 million times. The energy from one lightning flash could light a 100-watt light bulb for more than three months.
- Most lightning fatalities and injuries occur when people are caught outdoors in the summer months during the afternoon and evening.
- Lightning can occur from cloud-to-cloud, within a cloud, cloud-to-ground, or cloud-to-air.
- Many fires in the western United States and Alaska are started by lightning. The air near a lightning strike is heated to 50,000°F--hotter than the surface of the sun!
- The rapid heating and cooling of the air near the lightning channel causes a shock wave that results in thunder.

Another damaging effect of severe storms is hail. See Figure 5.5 – Hail Stones. Hail stones are large ice particles produced by intense thunderstorms. Strong rising currents of air within a storm, called updrafts, carry water droplets to a height where freezing occurs. Ice particles grow in size, becoming too heavy to be supported by the updraft, and fall to the ground. Large stones can fall at speeds faster than 100 mph. Hail causes substantial damage to property and crops each year in the U.S.

Figure 5.5 – Hail Stones

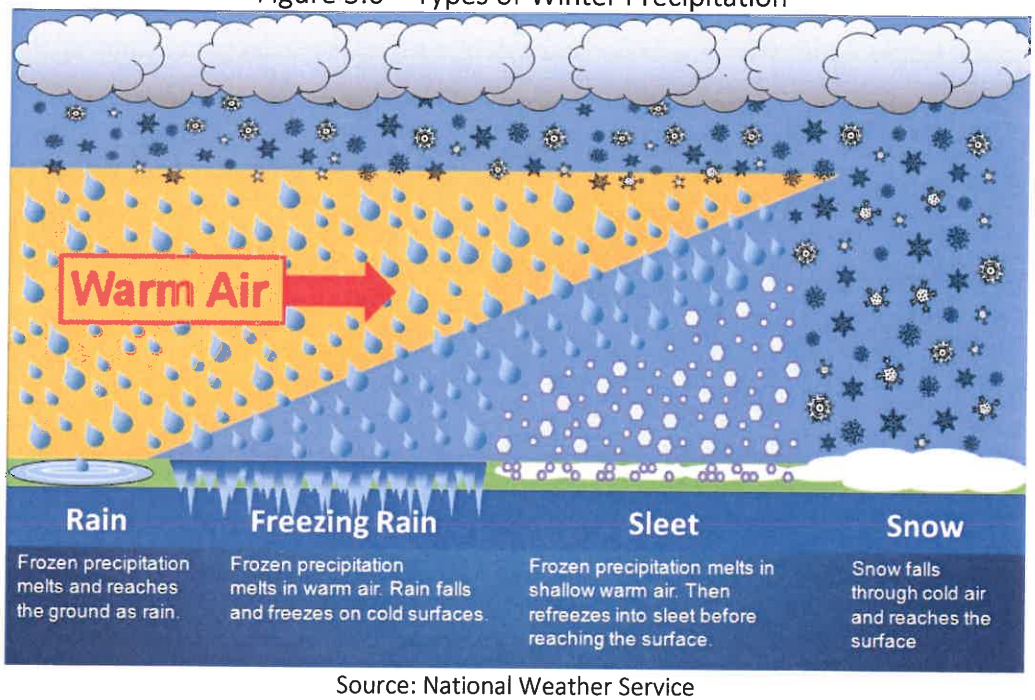
Source: Bing.com

Most thunderstorm wind damage is caused by straight-line winds, which can exceed 100 mph. One type of straight-line wind, the downburst, is a small area of rapidly descending air beneath a thunderstorm. A downburst can cause damage equivalent to a strong tornado. The description of severe storms presented in this section is based upon information extracted from National Weather Service on-line publications.

Winter Storms/Freezes 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 of the United States 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. Typical winter storms in the Southeast include ice storms, crop-killing freezes and occasional snow.

Figure 5.6 – Types of Winter Precipitation



Source: National Weather Service

Types of events that occur within a winter storm include freezing rain, sleet, blizzards, and frost/freeze. Freezing rain is rain that freezes when it hits the ground which coats roads, trees and power lines. Sleet is rain that turns into ice pellets before hitting the ground. A blizzard is snowfall with sustained winds or frequent gusts up to 35mph and considerable amounts of blowing snow. The expectation is that blizzard conditions will last 3 or more hours. Freezes occur when the temperatures will go below freezing. Many times frost/freezes cause substantial damage to crops.

Wildfires Description

Wildfires are a serious and growing hazard over much of the United States, posing great threats to life and property, particularly when moving from rural forest or rangeland into developed urban areas. Millions of acres burn every year in the United States as a result of wildfires, causing millions of dollars in damage. Each year more than 100,000 wildfires occur in the United States, almost 90 percent of which are started by humans; the rest are caused by lightning. Weather is one of the most significant factors in determining the severity of wildfires. The intensity of fires and the rate with which they spread is directly related to wind speed, temperature, and relative humidity. Climatic conditions, such as long-term drought, also play a major role in the number and the intensity of wildfires.

A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures. They often begin unnoticed and spread quickly and are usually signaled by dense smoke that fills the area for miles around. Naturally occurring and non-native species of grasses, brush, and trees fuel wildfires.

A wildland fire is a wildfire in an area in which development is essentially nonexistent, except for roads, railroads, power lines and similar facilities. An Urban-Wildland Interface fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels.

States with a large amount of wooded, brush and grassy areas, such as Alabama, are at highest risk of wildfires. Additionally, areas anywhere that have experienced prolonged droughts or are excessively dry, are also at risk of wildfires.

People start more than four out of every five wildfires, usually as debris burns, arson, or carelessness. Lightning strikes are the next leading cause of wildfires. Wildfire behavior is based on three primary factors:

- Fuel, topography, and weather.

  The type, and amount of fuel, as well as its burning qualities and level of moisture affect wildfire potential and behavior. The continuity of fuels, expressed in both horizontal and vertical components is also a factor, in that it expresses the pattern of vegetative growth and open areas. Topography is important because it affects the movement of air (and thus the fire) over the ground surface. The slope and shape of terrain can change the rate of speed at which the fire travels. Weather affects the probability of wildfire and has a significant effect on its behavior. Temperature, humidity and wind (both short and long term) affect the severity and duration of wildfires.

- Protecting Alabama's rural areas from wildfire is the number one priority of the Alabama Forestry Commission. Wildfires burn thousands of acres of forestlands in Alabama every year. Through the efforts of the Forestry Commission and local volunteer fire departments, those wildfires are decreasing, but they still take a major toll on Alabama's forest resources.

The Forestry Commission has a modern aggressive detection system that allows it to discover and suppress wildfires in the most efficient way possible. A fleet of airplanes regularly patrols over the forest and looks for wildfires. In addition, the public can report wildfires 24 hours a day through a toll-free telephone system. When a fire is reported, a dispatch center sends Forestry Commission crews and volunteer fire departments as needed to suppress it.

Volunteer fire departments are an essential part of the team when it comes to suppressing wildfires. The Forestry Commission works to help establish, train and maintain rural community fire departments in every county. This strong partnership of government and volunteer agencies working together provides cost efficient, effective fire service.

The Forestry Commission suppresses a wildfire by building a —fire break || which contains the fire by removing fuel from the fire so it cannot spread. These breaks are built using a bulldozer outfitted with a fire plow, which cuts a three foot wide trench across the site, removing all vegetation and exposing bare soil. On hilly sites, these firebreaks are built by hand using rakes and other tools by 20 person crews.

In extreme circumstances where several homes are threatened by a wildfire, the Forestry Commission can call in helicopters with large water buckets. These buckets do not put out the fire, but reduce its intensity so that the Commission crew can plow it out. The helicopter service is extremely expensive and is only done in severe fire conditions.

The description of wildfires presented in this section is based upon information extracted from the FEMA How to Guides Understanding Your Risks (FEMA 386-2), August 2001, Using HAZUS-MH for Risk Assessment How to Guide (FEMA 433), August 2004, and the Alabama Forestry Commission.

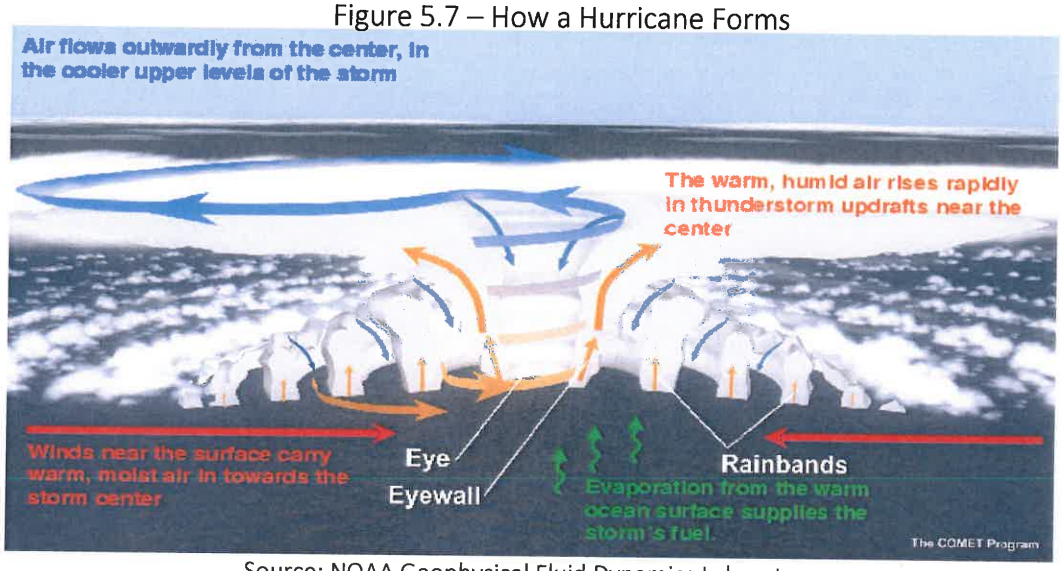
Hurricanes Description

Hurricanes, as referred to in this plan, include all types of tropical cyclones: hurricanes, tropical storms, and tropical depressions. A tropical cyclone is a rotating weather system that develops in the tropics. A tropical depression is an organized system of persistent clouds and thunderstorms with low level closed circulation and maximum sustained winds of 38 mph or less. A tropical storm is an organized system of strong thunderstorms with a well-defined circulation and maximum sustained winds of 39 to 73 mph. All of these tropical cyclones begin as a disturbance.

A disturbance may result from a number of different weather events including Easterly Waves, West African Disturbance Line, Tropical Upper Tropospheric Trough or an Old Frontal Boundary. In order for a tropical disturbance to develop into a hurricane, three things must occur. First, the disturbance must gather energy and heat through contact with warm ocean waters. Next, added moisture evaporated from the sea surface then provides power to the tropical storm. And last, the seedling storm forms a wind pattern near the ocean surface that spirals inward. Warm water is the most important of the three, as it provides the fuel for a disturbance to eventually develop into a hurricane.

A hurricane is a tropical weather system with a well-defined circulation and sustained winds of 74 mph or higher. Even inland areas, well away from the coastline, can experience destructive winds, tornadoes and floods from tropical storms and hurricanes.

Figure 5.7 – How a Hurricane Forms



Source: NOAA Geophysical Fluid Dynamics Laboratory

The Atlantic hurricane season begins on June 1 and lasts through November. Within the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico annually there are an average of 11 tropical storms, 6 of which become hurricanes. In a typical three-year span, the US coastline is struck an average five times; two that are major hurricanes, category 3 or higher.

Hurricanes pose the greatest threat to life and property, but tropical depressions and storms can also cause extensive damage and loss of life. Hurricanes are categorized on a scale of 1 to 5 based on their sustained wind speed. Herbert Saffir, a consulting engineer in Coral Gables, Florida, and Dr. Robert Simpson, then director of the National Hurricane Center, developed this scale in the 1970's. Category 3–5 hurricanes are considered to be major storms. The Saffir-Simpson scale is based primarily on wind speeds and includes estimates of barometric pressure and storm surge associated with each of the five categories.

Table 5.7 – Saffir-Simpson Scale

Cat.	Wind Speed	Storm Surge	Expected Damage
1	74-95 mph	4 – 5 feet above normal sea level	Minimal: Damage is done primarily to shrubbery and trees, unanchored mobile homes are damage, some signs are damaged, no real damage is done to structures
2	96-110 mph	6 – 8 feet above normal sea level	Moderate: Some trees are toppled, some roof coverings are damaged, major damage is done to mobile homes
3	111-130 mph	9 – 12 feet above normal sea level	Extensive: Large trees are toppled, some structural damage is done to roofs, mobile homes are destroyed, and structural damage is done to small homes and utility buildings.
4	131-155 mph	13 – 18 feet above normal sea level	Extreme: Extensive damage is done to roofs, windows, and doors; roof systems on small buildings completely fail, some curtain walls fail
5	>155 mph	>18 feet above normal sea level	Catastrophic: Roof damage is considerable and widespread, window and door damage is severe, there are extensive glass failures and entire buildings could fail.

Source: National Hurricane Center

According to the Saffir Simpson Scale show on Table 5.7 – Saffir-Simpson Scale, Jefferson County's extent is a Category 4 Hurricane.

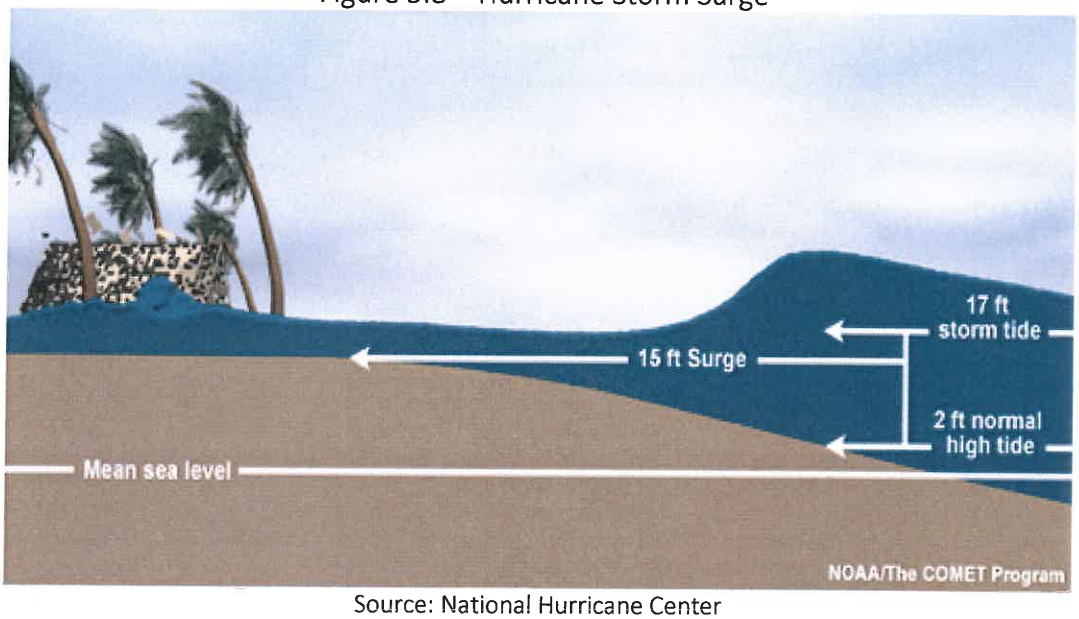
The main parts of a hurricane are the eye, the eye wall, and rain bands. The eye of a hurricane is the calmest part. The eye is typically 20-40 miles across and has light winds that don't exceed 15 mph. An eye will usually develop when the maximum sustained wind speed is more than 74mph. The strong rotation around the cyclone balances inflow to the center, causing air to ascend about 10-20 miles from the center forming the eyewall. A vacuum of air at the center is caused due to the strong rotation, the vacuum allows air flowing out of the top of the eyewall to turn inward and sink to replace the loss of air mass near the center. Due to the sinking air, cloud formation is suppressed. The passage of the eye is the calmest part of the hurricane. Since there is a light wind and fair weather, many believe that the storm has passed, which can prove dangerous. Immediately after the passage of the eye, the eyewall winds return but in an opposite direction.

The eyewall is the part of a hurricane where the strong winds meet the eye. The eyewall is a group of tall thunderstorms that produce heavy rain and the strongest winds within the storm. Changes in the structure of the eye and eyewall can cause changes in the wind speed, which is an indicator of the storm's intensity. An eye may grow or shrink in size and additional eyewalls can form.

The rain bands are the outermost part of the hurricane. They are bands of clouds and thunderstorms that trail away from the eyewall in a spiral fashion. These bands produce heavy rain and strong winds, as well as tornadoes.

A hurricane also has additional hazards associated with it, both direct and indirect. The secondary hazards include storm surge, wind gusts, squalls, inland flooding and tornadoes. Storm surge is water that is pushed toward the shore by the winds around the storm. Storm surge combines with the normal tides to create the hurricane storm tide. Wind driven waves also combine into hurricane storm tide. The rise in water level can cause severe flooding in coastal areas. The level of surge is dependent upon the slope of the continental shelf. A shallow slope off of the coast allows a higher surge to inundate the area.

Figure 5.8 – Hurricane Storm Surge



Source: National Hurricane Center

In addition to storm surge, hurricanes are also known for damaging winds. They are rated according to their sustained wind speed. This scale does not account for gusts and squalls. Gusts are short and rapid bursts in wind speed. They are caused by turbulence over land mixing faster air aloft to the surface. Squalls are longer period of increased wind speeds; they are normally located within the outer rain bands.

Hurricanes, tropical storms, and depressions many times bring torrential rains and flooding. This flooding may last many days after the storm has passed. The strength of the storm does not always affect the level of flooding. A slow, weak tropical storm can cause more damage due to flooding than a more powerful fast moving hurricane.

Tornadoes also occur within a tropical cyclone. They are most likely to occur in the right-front quadrant of the storm, but can be embedded within the rain bands well away from the center of the storm. Some hurricanes produce no tornadoes, while others develop numerous ones. According to NOAA studies, half of all land falling hurricanes produce at least one tornado. The effects of a tornado, in addition to hurricane force winds, can produce substantial wind damages. A tornado can develop at any point during landfall, but normally occur within 12 hours after landfall, during daylight hours. Due to the likelihood of a tornado within a hurricane, a tornado watch is normally issued along the anticipated path of a hurricane before landfall.
The description of hurricanes presented in this section is based upon information extracted from the NOAA publication Hurricanes Unleashing Nature's Fury, A Preparedness Guide, Revised January 2007 and the NWS Jet Stream Online School for Weather.

Droughts/Heat Waves Description

A drought can occur almost anywhere, and its features vary from place to place depending on culture and geography. According to the National Drought Mitigation Center (NDMC), there are four ways of measuring drought.

First is a meteorological drought, which is a decrease in precipitation in some period of time. These are usually region-specific, and based on a thorough understanding of regional climatology. Meteorological measurements are the first sign of drought.

An agricultural drought occurs when there is not enough soil moisture to meet the needs of a particular crop at a particular time. Agricultural drought occurs after a meteorological drought, but before hydrological drought.

Hydrological drought is deficiencies in surface and subsurface water supplies. It is measured as stream flow and at lake, reservoir and groundwater levels. There is a time lag between lack of rain and less water in rivers, streams, reservoirs and lakes. When precipitation is deficient over time, it will show in these water levels.

The last type of drought defined by NDMC is a socioeconomic drought, which occurs when water shortages begin to affect people. In addition to the impacts discussed above, water level decline due to drought can also cause sinkholes to form.
The Alabama Drought Management Plan, by the Office of Water Resources of the Alabama Department of Economic and Community Affairs (ADECA) explains the potential threats of droughts to Alabama and the need for effective drought planning and management, as follows:

In recent years, drought conditions have endangered Alabama's water resources and adversely affected the livelihood of many people. Drought is a natural event that, unlike floods or tornadoes, does not occur in a violent burst but gradually happens; furthermore, the duration and extent of drought conditions are unknown because rainfall is unpredictable in amount, duration and location. The devastation (environmental, social, and economic) experienced in recent years due to drought conditions has not been successfully mitigated because previous responses to drought conditions at all levels of government has been slow and fragmented, with little focus on preparedness and mitigation. In an effort to be more proactive, the Office of Water Resources worked closely with numerous local, state, and federal agencies and other water resources professionals to develop and implement this statewide approach to drought planning and management.

The State drought plan establishes four phases of drought conditions – drought watch, advisory, warning, and emergency – identified by a compilation of drought indices, which include Crop Moisture Index, Palmer Drought Severity Index, Stream Flow, Reservoir Elevation Level, and Groundwater. Each of these phases requires varying levels of management.

The U.S. Drought Monitor by the National Drought Mitigation Center (NDMC) uses a four-tier system to continuously monitor drought intensity based on another combination of drought indices. D1 is the first drought stage with severe conditions, and D4 is most intense drought stage with exceptional

drought conditions. D0 includes drought watch areas that are abnormally dry and on the verge of drought or recovering from drought. The primary adverse physical effects of drought are classified as "A" - adverse impacts to agricultural crops, pastures, and grasslands or "H" - adverse impacts to hydrologic resources for water supply, including rivers, reservoirs, and groundwater.

According to NOAA, extreme heat is the number one weather related killer taking an average of 1,500 people in the U.S. annually. The National Weather Service will issue watches and warnings when the heat index is expected to exceed 105 -110F for at least two consecutive days. The heat index is given in degrees Fahrenheit (*F) and is a measure of how hot it really feels when the relative humidity is added to the actual air temperature.

Chart 5.1 – NOAA's National Weather Service Heat Index

NWS Heat Index

Temperature (°F)

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

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution | Extreme Caution | Danger | Extreme Danger

Source: National Weather Service

The description of droughts/extreme heat presented in this section is extracted from: National Drought Mitigation Center, Defining Drought: Overview and NOAA, Heat Wave: A Major Summer Killer.

Landslide (Debris Flow) Description

Landslides occur and can cause damage in all 50 States, at an estimated annual cost of about $3.5 billion per year. Between 25 and 50 deaths per year in the U.S. are attributable to debris flows. Landslides cause damage to the natural environment and economic losses, due to reduced real estate values, decreased agricultural and forestry productivity, among other adverse economic effects. Severe storms, earthquakes, coastal wave attack, and wildfires can cause widespread slope instability and result in landslides. Landslide danger may be high, even as emergency personnel are providing rescue and recovery services for these other hazard events.

A Landslide is a downward and outward movement of slope-forming soil, rock, and vegetation under the influence of gravity, which includes a wide range of ground movement. Numerous types of events,

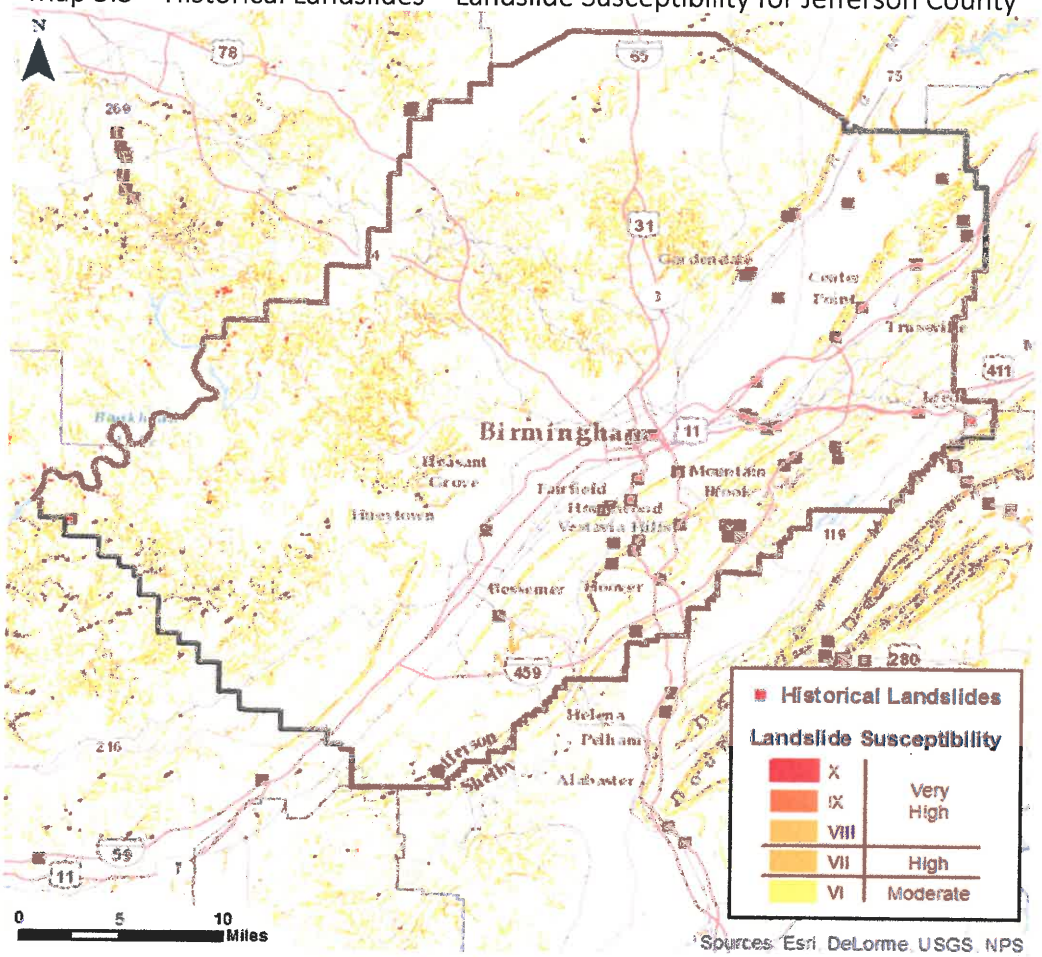
including natural and man-made changes within the environment, can trigger debris flows. Examples of these changes that cause weaknesses in the composition or structures of the rock or soil include heavy rain, changes in ground water level, seismic activity, or construction activity. Man-made landslides may result from activities such as terracing, cut and fill construction, building construction, mining operations, and changes in irrigation or surface runoff.

There are different types of landslides. Rock falls are rapid movement of bedrock characterized by free-fall, bouncing and rolling. Slides are movements of soil or rock along a distinct surface of rupture that separates the slide material from the more stable underlying material. There are two major types of slides: rotational and translational slides. In a rotational slide the surface of rupture is curved concavely upward and the slide block rotates around an axis parallel to the slope contours. A translational slide is a mass that moves down and outward along a relatively planar surface with little rotational movement or backward tilting. Flows are mass movements of water-saturated material. The movement of flows can be extremely rapid (debris avalanche), very rapid (debris flow) or very slow (earth flow). Here are some significant landslide facts from the USGS:

- Landslides often accompany earthquakes, floods, storm surges, hurricanes, wildfires, or volcanic activity. They are often more damaging and deadly than the triggering event (examples: the 1964 Alaska earthquake-induced landslides and the 1980 Mount St. Helens volcanic debris flow).
- Human activities and population expansion are major factors in increased landslide damage and costs.
- The May 1980 eruption of Mount St. Helens caused the largest landslide in history— a rock slide-debris avalanche large enough to fill 250 million dump trucks to the brim traveled about 14 miles, destroying nine highway bridges, numerous private and public buildings, and many miles of highways, roads, and railroads. The debris avalanche also formed several new lakes by damming the North Fork Toutle River and its tributaries. These lakes posed hazards to downstream communities because of the possible failure of the dams, which could have resulted in catastrophic flooding.
- Although the National Flood Insurance Act covers certain damage from mudflows, insurance against landslides is generally unavailable in most areas of the United States. As a result, many victims of landslides resort to litigation in order to recover damages.

The description of landslides presented in this section is extracted from the Geological Survey of Alabama, Geologic Hazards Section and the USGS Landslides Hazards Program.

Map 5.3 – Historical Landslides – Landslide Susceptibility for Jefferson County



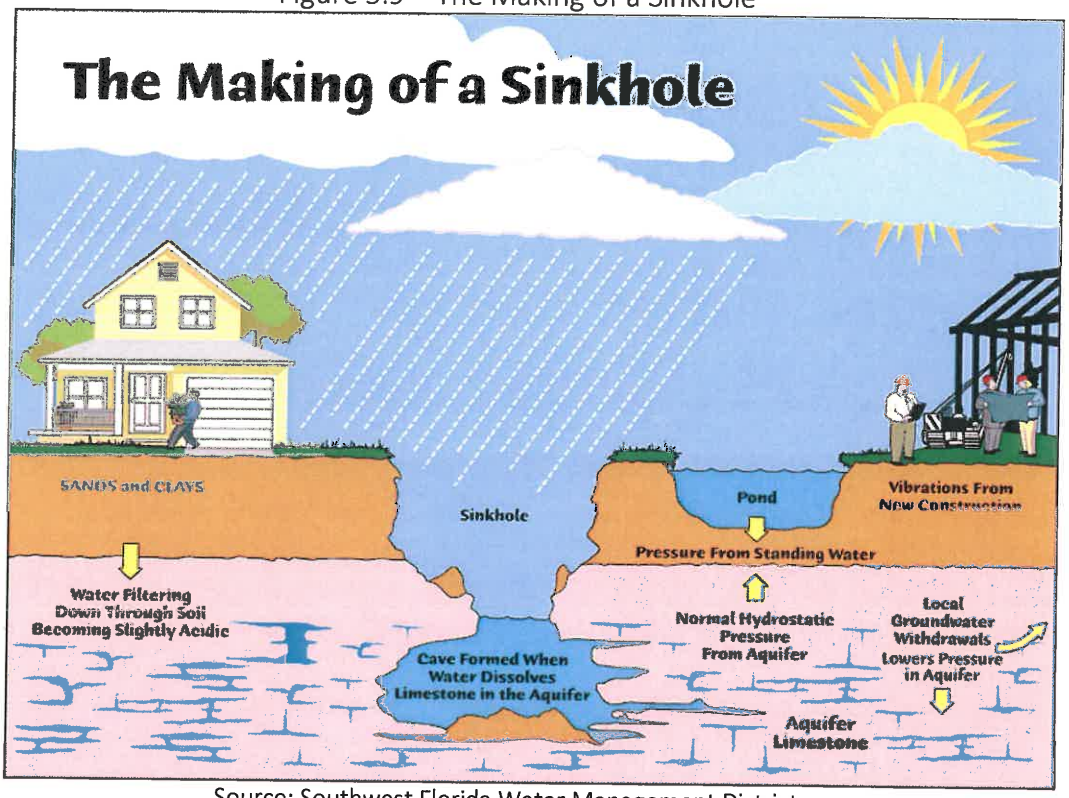
Source: Geological Survey of Alabama – Dec 15, 2015

Sinkholes (Land Subsidence) Description

Sinkholes are a common, naturally occurring geologic feature that is hazardous to property and the environment. Although many new sinkholes develop naturally, their increasing frequency corresponds to the accelerated development of ground-water and land resources. Usually little more than a nuisance, new sinkholes can sometimes cause substantial property damage and structural problems for buildings and roads. See Figure 5.9 – The Making of a Sinkhole below.

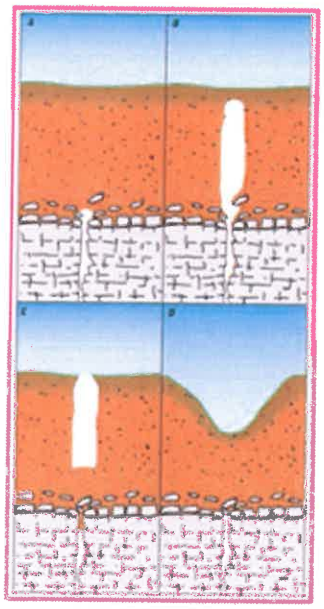
Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that can naturally be dissolved by ground water circulating through them. As the rock dissolves, spaces and caverns develop underground. Sinkholes are dramatic because the land usually stays intact for a while until the underground spaces get too big. If there is not enough support for the land above the spaces, then a sudden collapse of the land surface can occur. These collapses can be small or they can be huge and can occur where a house or road is on top. See Figure 510 – Formation of a Collapse below.

Figure 5.9 – The Making of a Sinkhole



Source: Southwest Florida Water Management District

Figure 5.10 – Formation of a Collapse



A - Soil bridges gap where sediment has been washing into a solution enlarged fracture.

B - Over time, the void migrates upward through the soil.

C - After the bridge thins, a sudden collapse occurs.

D - The collapse often plugs the drain and erosion will, after many years, transform the collapse into a more bowl- shaped sinkhole.

Source: USGS Publication – *Science of Changing the World*

Sinkholes range in size from several square yards to hundreds of acres. They may be quite shallow or may extend hundreds of feet deep. The most damage from sinkholes tends to occur in Florida, Texas, Alabama, Missouri, Kentucky, Tennessee, and Pennsylvania. Figure 5.11 – Sinkhole Collapse of a House shows a sinkhole that quickly opened up causing major damage to a house and yard.

Figure 5.11 – Sinkhole Collapse of a House

Source: newsmax.com

A change in the local environment affecting the soil mass initiates sinkhole collapses and areas of subsidence. This change is called the "triggering mechanism." Water, either surface or ground water, is generally the most important agent effecting environmental changes that cause subsidence. Triggering mechanisms for subsidence include water level decline, changes in ground-water flow, increased loading, and deterioration (relates to abandoned coal mines).

New sinkholes have been correlated to land-use practices, especially from ground-water pumping and from construction and development practices. Sinkholes can also form when natural water-drainage patterns are changed and new water-diversion systems are developed. Some sinkholes form when the land surface is changed, such as when industrial and runoff-storage ponds are created. The substantial weight of the new material can trigger an underground collapse of supporting material, thus causing a sinkhole.

Increased numbers of sinkholes can generally be attributed to changing or loading of the earth's surface with development such as retention ponds, buildings, changes in drainage patterns, heavy traffic, drilling vibrations or a sudden or gradual decline in groundwater levels. In urban areas, all these impacts may occur at the same time, accelerating any sinkhole tendencies. Urban construction, coupled with limestone depths of less than 200 feet, contributes to the development of many of the modern sinkholes.

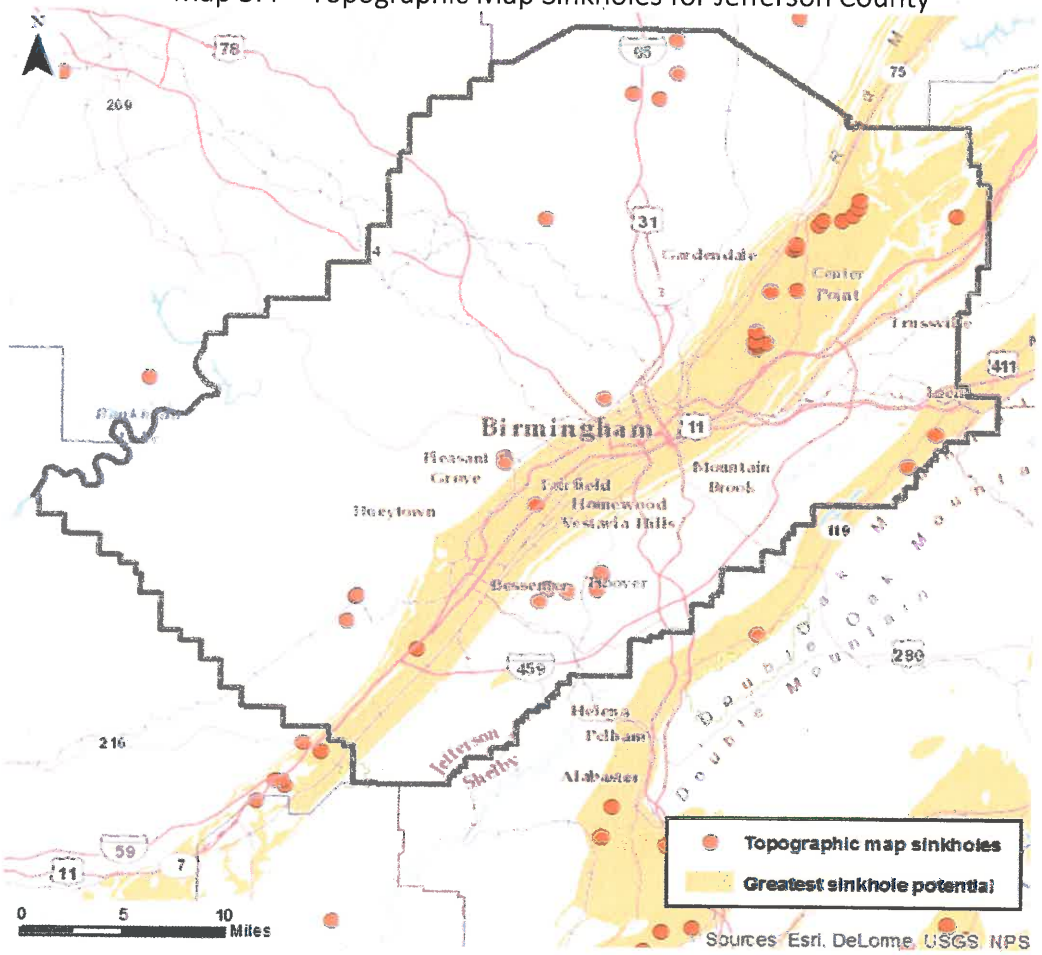
The built-up sediments that cover buried cavities in the aquifer systems are delicately balanced by ground-water fluid pressure. The water below ground is actually helping to keep the surface soil in place. Ground-water pumping for urban water supply and for irrigation can produce new sinkholes in sinkhole-prone areas. If pumping results in a lowering of ground-water levels, then underground structural failure, and thus, sinkholes, can occur.

Lowering water levels is one of the most significant triggering mechanisms for subsidence in a karst terrain. Water-level decline may occur naturally or be induced by man. Factors leading to a decline in water levels include the pumping of water from wells, localized drainage from construction, dewatering from mining, and periods of drought.

Sinkholes also threaten water and environmental resources by draining streams, lakes, and wetlands, and creating pathways for transmitting surface waters directly into underlying aquifers. Where these pathways are developed, movement of surface contaminants into the underlying aquifer systems can persistently degrade ground-water resources. In some areas, sinkholes are used as storm drains, and because they are a direct link with the underlying aquifer systems it is important that their drainage areas be kept free of contaminants. Conversely, when sinkholes become plugged, they can cause flooding by capturing surface-water flow and can create new wetlands, ponds, and lakes.

The description of sinkholes presented in this section is based upon information extracted from the FEMA How to Guide Understanding Your Risks (FEMA 386-2), FEMA, August 2001, and other sources from the Geological Survey of Alabama Geological Hazards Program, Southwest Florida Water Management District, and the U.S. Geological Survey Mid-Continent Geographic Science Center.

Map 5.4 – Topographic Map Sinkholes for Jefferson County



Source: Geological Survey of Alabama – Dec 15, 2015

Earthquakes Description

An earthquake is the shaking and vibration at the surface of the earth resulting from underground movement along a fault plane. Earthquakes are caused by the release of built-up stress within rocks along geologic faults or by the movement of magma in volcanic areas. They usually occur without warning and are usually followed by aftershocks. Earthquakes can affect hundreds of thousands of square miles and cause tens of billions of dollars of damage to property. An earthquake event can cause injury and loss of life to hundreds of thousands of persons and can greatly disrupt the social and economic functioning of the affected area. Secondary hazards during an earthquake may occur, such as surface faulting, sinkholes, and landslides.

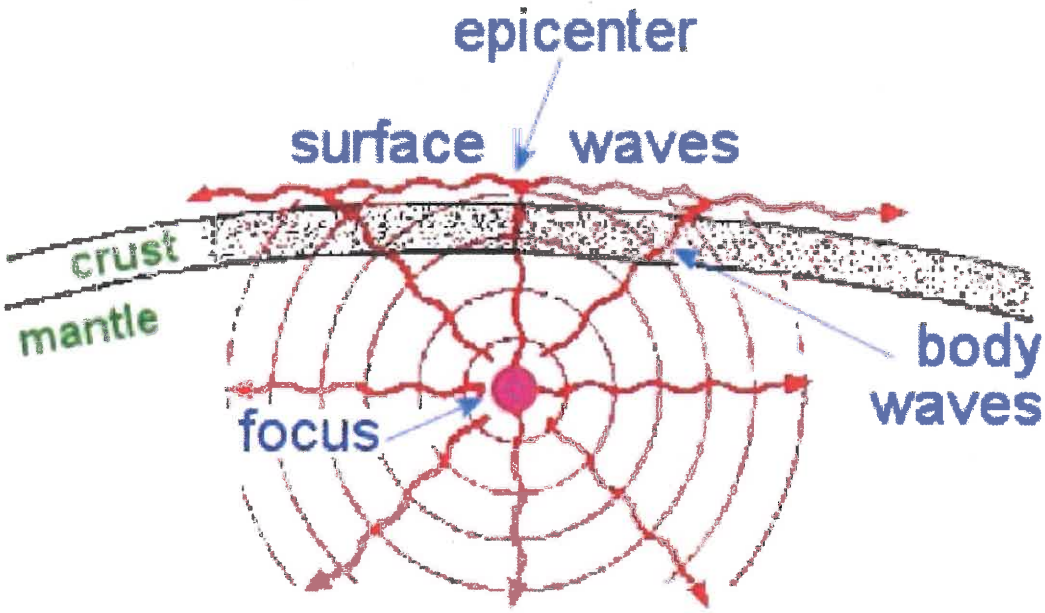
Earthquakes are caused by the rupture or sudden movement of a fault where stresses have accumulated along opposing fault planes of the earth's outer crust. These fault planes are usually found along the borders of the earth's tectonic plates which generally follow the outlines of the continents. However, fault planes may occur at the interior of the plates. The plates range from 50 to 60 miles in thickness and move slowly and continuously over the earth's interior. Where the plates move past each other, they continually bump, slide, catch, and hold. When the stress exceeds the elastic limit of the rock, an earthquake occurs. Generally, the larger the earthquake, the greater the potential for surface fault rupture.

The area of greatest seismic activity in the United States is along the Pacific coast in California and Alaska, but as many as forty states can be characterized as having at least moderate earthquake risk. For example, seismic activity has been recorded in Boston, Massachusetts; New Madrid, Missouri; and Charleston, South Carolina, places not typically thought of as earthquake zones. Areas prone to earthquakes are relatively easy to identify in the Western United States based on known geologic formations; however, predicting exactly when and where earthquakes will occur is very difficult everywhere. Records show that building inventories in over 40 states are vulnerable to earthquake damage.

Most property damage and earthquake-related deaths result from the failure and collapse of structures caused by ground shaking or ground motion. Ground shaking is the motion felt on the earth's surface caused by seismic waves generated by an earthquake. The strength of the ground shaking is determined by the magnitude of the earthquake, the surface distance from the earthquake's epicenter and type of fault, and by the site and regional geology.

Ground shaking causes waves in the earth's interior, known as seismic waves, and along the earth's surface, known as surface waves. There are two types of seismic waves: primary waves which are longitudinal that cause back-and-forth oscillation along the direction of travel (vertical motion); and secondary waves or shear waves which are slower than primary waves and cause structures to vibrate from side-to-side (horizontal motion). Surface waves travel more slowly than and are usually significantly less damaging than seismic waves, as illustrated by Figure 5.12 – Seismic and Surface Waves.

Figure 5.12 – Seismic and Surface Waves



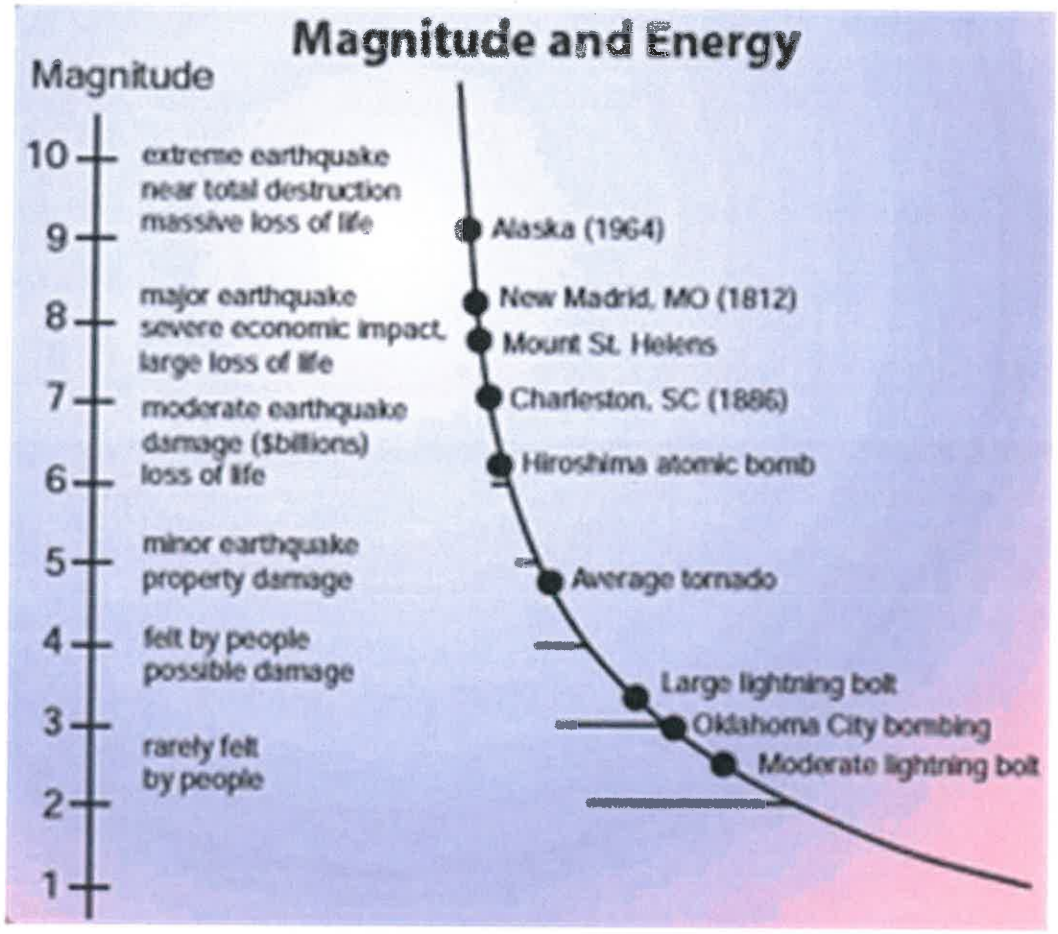
Source: Studyblue.com

Additional earthquake related hazards include landslides, liquefaction, and amplification. Earthquake-induced landslides are secondary earthquake hazards that occur from ground shaking. They can destroy roads, buildings, utilities, and other critical facilities necessary to respond to or recover from an earthquake. As sloped lands are developed, earthquake-induced landslides pose additional threats to homes and infrastructure.

Soil type can substantially increase earthquake risk. Liquefaction occurs, when ground shaking causes saturated soft soils to change from a solid to a liquid state. Liquefaction results in the loss of soil strength and three potential types of ground failure: lateral spreading, flow failure, and loss of bearing strength. Buildings and their occupants are at risk when the ground can no longer support buildings and structures. Areas susceptible to liquefaction include areas with high ground water tables and sandy soils. The extreme earthquake damage to San Francisco in 1989 was due to liquefaction of the soil used to fill in waterfront properties.

Amplification (strengthening) of shaking also results in areas of soft soils which includes fill, loose sand, waterfront, and lake bed clays. Amplification increases the magnitude of the seismic waves generated by the earthquake.

Chart 5.2 – Earthquake Magnitude Scale



Source: USGS

Seismic activity is described in terms of magnitude and intensity. Magnitude describes the total energy released and intensity describes the effects at a particular location. Magnitude is defined as the measure of the amplitude of the seismic wave and is expressed by the Richter scale. The Richter scale is a logarithmic measurement where an increase in the scale by one whole number represents a tenfold increase in the measured amplitude of the earthquake

Intensity is defined as the measure of the strength of the shock at a particular location and is expressed by the Modified Mercalli Intensity (MMI) scale. It was developed in 1931 by the American seismologists Harry Wood and Frank Neumann. The scale consists of a series of certain key responses such as people awakening, movement of furniture, the damage to structures, and total destruction. The lower numbers of the intensity scale generally deal with the manner in which the earthquake is felt by people. The higher numbers of the scale are based on observed structural damage. This scale, composed of 12 increasing levels of intensity that range from imperceptible shaking to catastrophic destruction, is designated by Roman numerals. It does not have a mathematical basis; instead it is an arbitrary ranking based on observed effects. Table 5.8 – Earthquake Scales Comparison below compares the Modified Mercalli Intensity scale with the Richter scale.

Table 5.8 – Earthquake Scales Comparison

Modified Mercalli Intensity and Richter Scale Comparison			
Scale	Intensity	Description of Effects	Corresponding Richter Scale Magnitude
I	Instrumental	Detected only on seismographs	
II	Feeble	Some people feel it	<4.2
III	Slight	Felt by people resting; like a truck rumbling past	
IV	Moderate	Felt by people walking	
V	Slightly Strong	Sleepers awake; church bells ring	<4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves	<5.4
VII	Very Strong	Mild Alarm; walls crack; plaster falls	<6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged	
IX	Ruinous	Some houses collapse; ground cracks; pipes break open	<6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread	<7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards	<8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves	>8.1

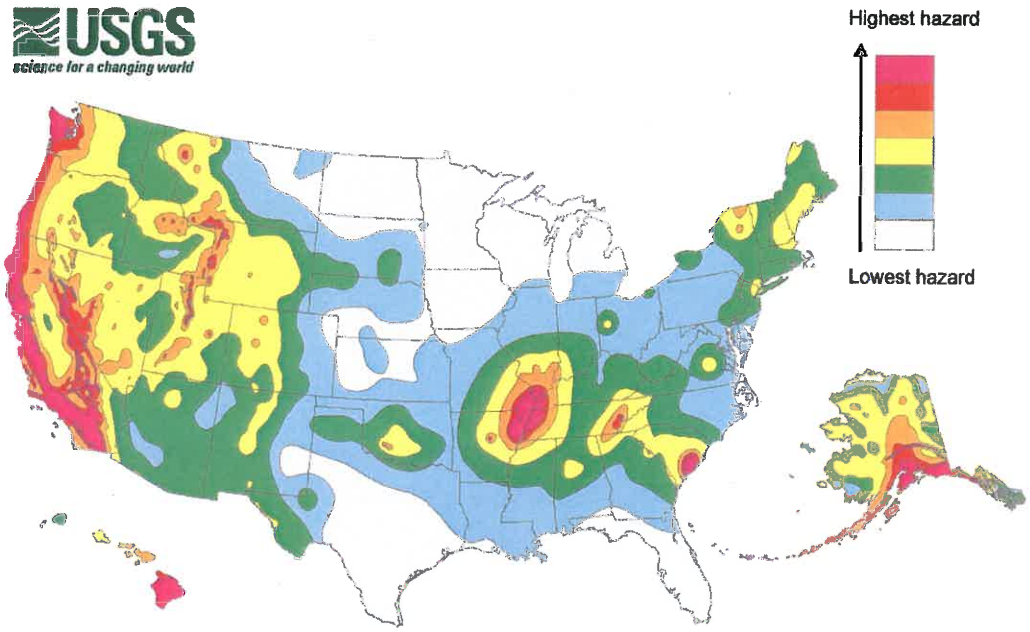
Source: FEMA

Another measurement of seismic activity is Peak Ground Acceleration (PGA) which measures the rate of change of motion relative to the rate of acceleration due to gravity. An object falling to earth will fall faster and faster, until it reaches terminal velocity. This principle is known as acceleration and represents the rate at which speed is increasing. This movement can be described by its changing position as a function of time, or by its acceleration as a function of time.

The peak acceleration is the maximum acceleration experienced by the object during the course of the earthquake motion. Peak ground acceleration can be measured in g (the acceleration due to gravity at the earth's surface is 9.8 meters per second squared). For example, acceleration of the ground surface of 244 cm/sec/sec (where g equals 9.8 meters per second squared) equals a PGA of 25.0 percent.

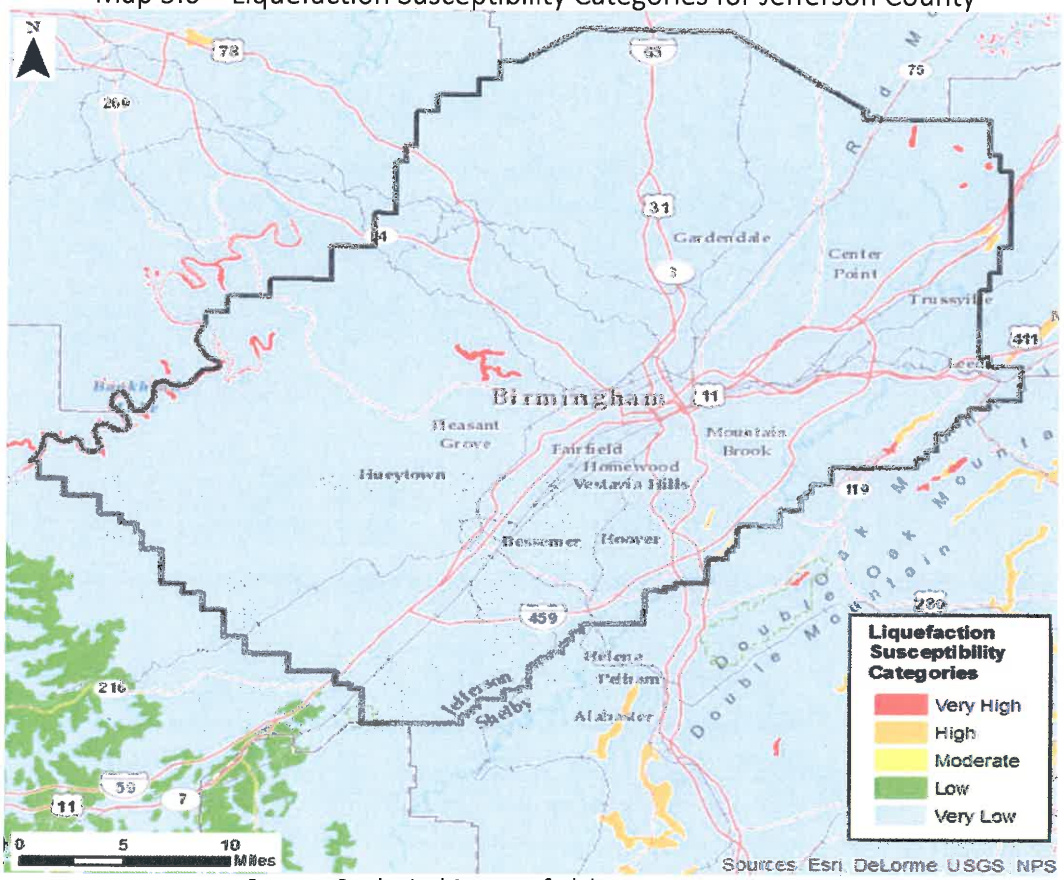
This is a common earthquake measurement that shows three things: the geographic area affected (the areas shown in color), the probability of an earthquake at each given level of severity, and the severity (the PGA is indicated by color) as shown below:

Map 5.5 – PGA Acceleration for 2014 Southeast w/2% Probability of Exceedance in 50 Years



Source: US Geological Survey

Map 5.6 – Liquefaction Susceptibility Categories for Jefferson County



Source: Geological Survey of Alabama – Dec 15, 2015

The description of earthquakes presented in this section is based upon information extracted from the FEMA How to Guides Understanding Your Risks (FEMA 386-2), August 2001, Using HAZUS-MH for Risk Assessment How to Guide (FEMA 433), August 2004, 2007 Alabama State Hazard Mitigation Plan, U.S. Geological Survey Earthquakes Hazard Program, and various FEMA-adopted plans.

Dam/Levee Failures Description

Dam failure or levee failure can occur with little warning. Strong storms may produce a flood in a few hours or minutes for upstream locations, which can cause a dam or levee failure. Flash floods occur within six hours of the beginning of heavy rainfall and dam failure may occur within hours of the first sign of a breach. Dam failures are potentially the worst flood event.

There are more than 80,000 dams in the United States according to the 2007 update of the National Inventory of Dams. According to FEMA, one third of these pose a high or significant hazard to life and property if failure occurs. 56% of dams are privately owned, and the dam owner is responsible for the safety and liability of the dam as well for upkeep, upgrade and repair. This compounds the risk that is posed due to dam or levee failure.

The description of dam/levee failures presented in this section is extracted from FEMA, Disaster Types, and Dam Failure.

Hazard Profiles

Floods Profile

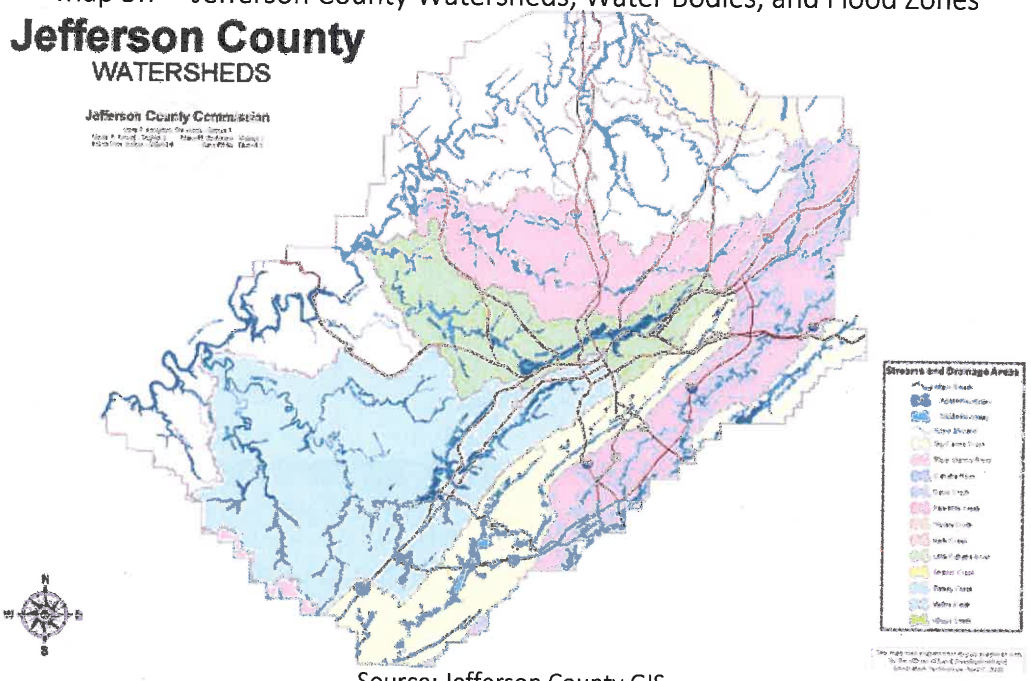
Jefferson County has experienced significant flood damages over the past 35 years. Most flooding is of a flash type, along streams and tributaries. Floods are one of the most significant hazards of concern and many recent events have been reported in local newspapers.

Location, Extent and Intensity of Potential Floods

The location and extent of potential flooding can be seen on Map 5.7 – Jefferson County Watersheds, Water Bodies, and Flood Zones, which shows the locations of floodplains as indicated by the Flood Insurance Rate Maps (FIRMs) of the National Flood Insurance Program (NFIP) as well as the watershed boundaries of each waterway. Jefferson County contains the following drainage basins: Big Canoe Creek, Black Warrior River, Cahaba River, Davis Creek, Five Mile Creek, Gurley Creek, Kelly Creek, Little Cahaba River, Shades Creek, Turkey Creek, Valley Creek, and Village Creek.

The watersheds that have historically experienced the greatest flooding include: Village Creek, Valley Creek, Five Mile Creek, Upper Shade Creek, and Turkey Creek. The extent of each flood varies according to the amount of rainfall, the rate of storm water flow, and the capacity of the receiving channel to discharge flood waters.

Map 5.7 – Jefferson County Watersheds, Water Bodies, and Flood Zones



Source: Jefferson County GIS

Previous Occurrences of Floods

Extensive flooding in Jefferson County has occurred both historically and during present times. Several areas in the County have been identified as chronic flood-prone areas and are listed below:

- Five Mile Creek basin, communities of Tarrant, Fultondale, Brookside
- Areas of unincorporated Jefferson County,
- Turkey Creek floods
- Pinson
- Shades Creek Area
- Mountaindale areas
- City of Birmingham
- Mountain Brook Village area
- Portions of Homewood
- Unincorporated Jefferson County near intersection of Greensprings Highway and Lakeshore Parkway.
- Griffin Creek in Homewood
- Roseland Drive and Broadway Avenue.
- Cahaba River
- Trussville
- Patton Creek

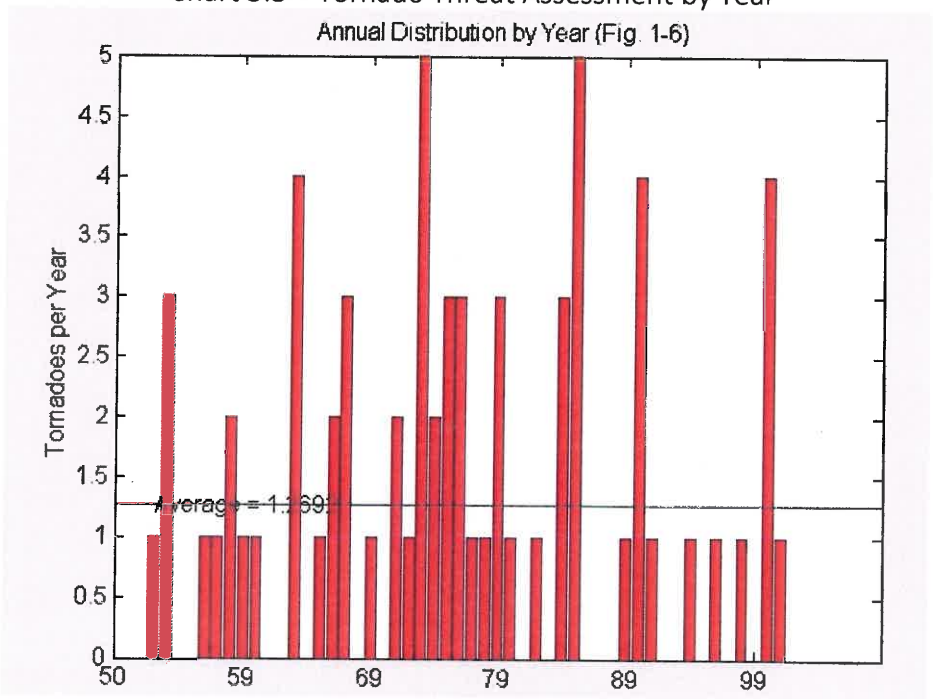
Probability of Future Flood Events

The communities identified during the Plan update data lists areas of the county that have experienced flooding during the last update period are likely to continue to experience flood hazard impacts. However, recent and on-going mitigation projects should lessen the impact of flood events among many jurisdictions.

Tornadoes Profile

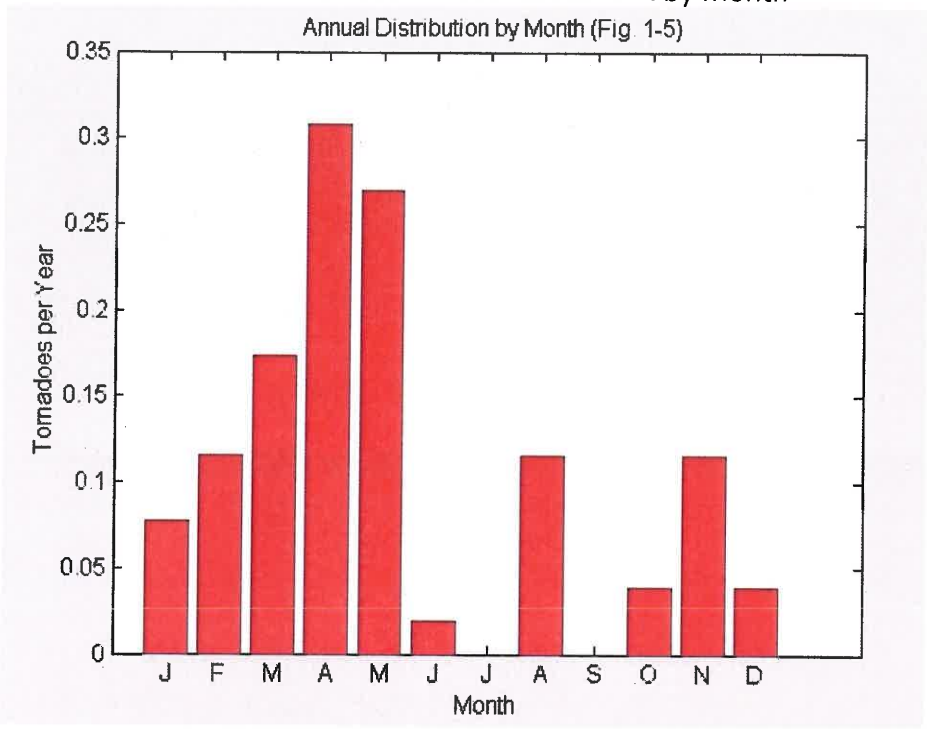
On average, Jefferson County has been visited by more than one tornado per year. Assessment of Tornado Threat software indicates tornado activity typically occurs within a 20-mile radius of the center of Jefferson County and happen typically during the Spring months of March, April and May; and significantly more frequently in the afternoon and evening, rather than the morning.

Chart 5.3 – Tornado Threat Assessment by Year



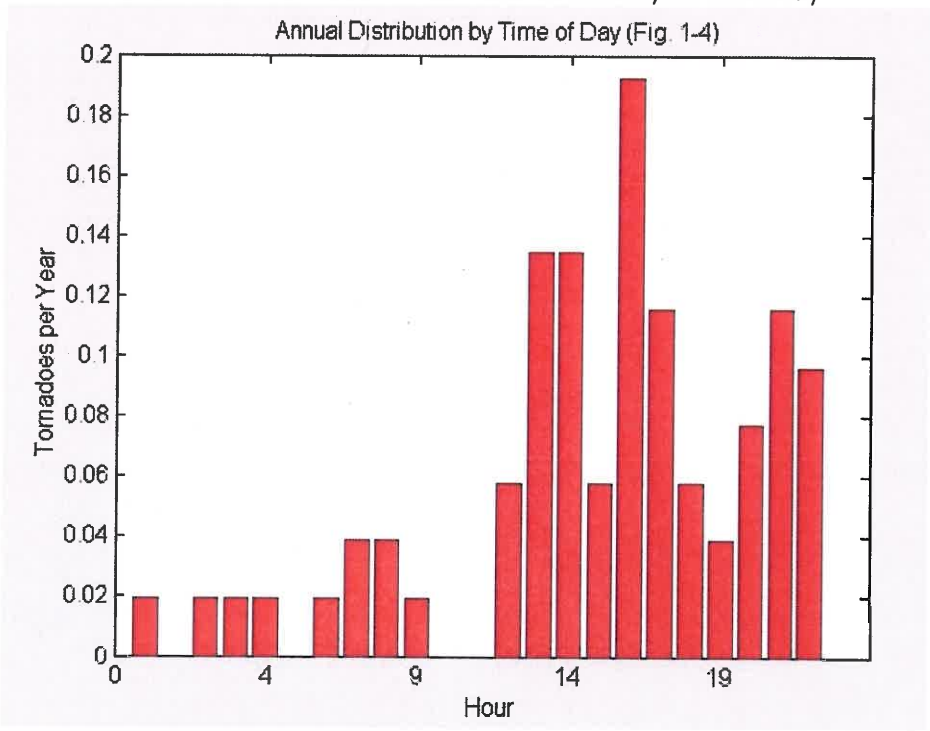
Source: VorTek, LLC. SATT 3.0 Tornado Threat software

Chart 5.4 – Tornado Threat Assessment by Month



Source: VorTek, LLC. SATT 3.0 Tornado Threat software

Chart 5.5 – Tornado Threat Assessment by Time of Day



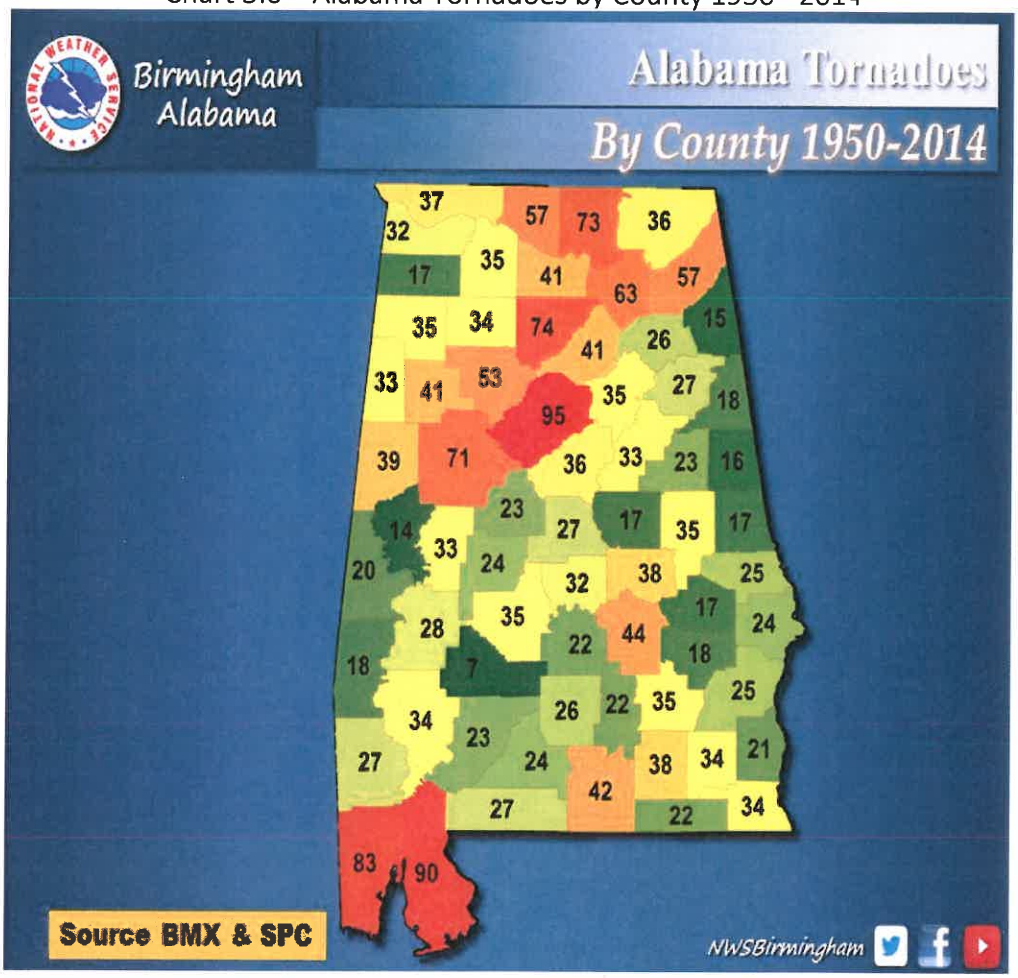
Source: VorTek, LLC. SATT 3.0 Tornado Threat software

Location, Extent and Intensity of Potential Tornadoes

Tornadoes are location-specific random events. It has been shown historically that all areas and jurisdictions in Jefferson County are equally at risk for tornadoes.

Jefferson County tornadoes, on average, tend to be severe and the average intensity of tornadoes overall is rated as an F-2 category.

Chart 5.6 – Alabama Tornadoes by County 1950 - 2014



Source: NWS Birmingham

Previous Occurrences of Tornadoes

National Climatic Data Center records for tornadoes indicates that Jefferson County has been visited by at least one tornado annually, from 1952 to 2014 (for the complete NCDC listing, see Appendix E Hazard Profile Data). During this period, the county experienced a total of 95 events, averaging about 1.5 per year. Those tornadoes have accounted for 109 deaths and 1608 injuries and over $1 billion in property damage as summarized in Table 5.9 – Annual Summary of Tornado Events, 1952-2014 below.

Table 5.9 – Annual Summary of Tornado Events, 1952-2014

Location	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Jefferson County	Wednesday, February 13, 1952	F3	1	26	250,000	250,000
Jefferson County	Monday, April 06, 1953	F3	0	12	2,500	2,500
Jefferson County	Friday, May 01, 1953		0	0	2,500	2,500
Jefferson County	Monday, May 04, 1953	F0	0	0	25,000	25,000
Jefferson County	Sunday, April 15, 1956	F4	25	200	25,000,000	2,500,000
Jefferson County	Monday, November 18, 1957	F2	1	35	25,000,000	2,500,000
Jefferson County	Tuesday, April 29, 1958	F1	0	0	25,000	25,000
Jefferson County	Tuesday, April 29, 1958	F2	0	0	25,000	25,000
Jefferson County	Tuesday, May 12, 1959	F3	0	5	250,000	250,000
Jefferson County	Saturday, October 08, 1960	F0	0	0	0	0
Jefferson County	Tuesday, March 05, 1963	F4	0	35	250,000	250,000
Jefferson County	Monday, May 27, 1963	F2	0	0	25,000	25,000
Jefferson County	Thursday, March 03, 1966	F1	0	2	25,000	25,000
Jefferson County	Tuesday, April 26, 1966	F0	0	0	0	0
Jefferson County	Thursday, November 10, 1966	F1	0	0	25,000	25,000
Jefferson County	Saturday, May 06, 1967	F3	1	25	2,500,000	2,500,000
Jefferson County	Tuesday, December 19, 1967	F2	0	0	25,000	25,000
Jefferson County	Saturday, May 17, 1969	F1	0	0	25,000	25,000
Jefferson County	Friday, February 26, 1971	F1	3	0	25,000	25,000
Jefferson County	Saturday, March 06, 1971	F2	0	2	25,000	25,000
Jefferson County	Friday, October 27, 1972	F2	0	0	250,000	250,000
Jefferson County	Sunday, May 27, 1973	F2	0	3	250,000	250,000
Jefferson County	Sunday, May 27, 1973	F3	1	44	25,000,000	25,000,000
Jefferson County	Saturday, December 29, 1973	F1	0	0	0	0
Jefferson County	Wednesday, April 03, 1974	F2	0	0	25,000	25,000
Jefferson County	Monday, November 04, 1974	F1	0	0	25,000	25,000
Jefferson County	Friday, January 10, 1975	F2	0	4	250,000	250,000
Jefferson County	Friday, January 10, 1975	F1	0	0	250,000	250,000
Jefferson County	Tuesday, January 13, 1976	F2	0	1	250,000	250,000
Jefferson County	Thursday, May 06, 1976	F2	0	0	25,000	25,000
Jefferson County	Sunday, August 15, 1976	F2	0	0	2,500	2,500
Jefferson County	Monday, April 04, 1977	F5	22	130	25,000,000	25,000,000
Jefferson County	Friday, July 08, 1977	F2	0	0	250,000	250,000
Jefferson County	Monday, April 24, 1978	F0	0	0	2,500	2,500
Jefferson County	Friday, May 04, 1979	F0	0	0	0	0
Jefferson County	Wednesday, May 30, 1979	F1	0	1	250,000	250,000
Jefferson County	Friday, November 09, 1979	F1	0	0	25,000	25,000
Jefferson County	Thursday, March 20, 1980	F1	0	0	0	0
Jefferson County	Friday, April 25, 1980	F2	0	0	250,000	250,000
Jefferson County	Monday, June 28, 1982	F1	0	1	250,000	250,000
Jefferson County	Sunday, July 11, 1982	F1	0	0	2,500	2,500
Jefferson County	Wednesday, March 28, 1984	F1	0	0	25,000	25,000
Jefferson County	Wednesday, May 02, 1984	F0	0	0	25,000	25,000
Jefferson County	Monday, May 07, 1984	F1	0	2	5,000	25,000
Jefferson County	Friday, August 16, 1985	F2	0	0	250,000	250,000
Jefferson County	Friday, August 16, 1985	F1	0	0	25,000	25,000
Jefferson County	Friday, August 16, 1985	F1	0	0	25,000	25,000
Jefferson County	Friday, August 16, 1985	F1	0	0	25,000	25,000
Jefferson County	Sunday, March 05, 1989	F0	0	0	2,500	2,500
Jefferson County	Saturday, February 03, 1990	F1	0	2	2,500,000	2,500,000
Jefferson County	Saturday, February 03, 1990	F1	0	15	2,500,000	2,500,000
Jefferson County	Saturday, February 03, 1990	F1	0	0	2,500,000	2,500,000
Jefferson County	Monday, April 29, 1991	F0	0	0	0	0
Birmingham	Saturday, April 20, 1996	F0	0	0	75,000	75,000
Oak Grove	Wednesday, April 08, 1998	F5	32	258	200,000,000	200,000,000

Location	Date	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Hoover	Friday, March 10, 2000	F1	0	0	500,000	500,000
Forestdale	Sunday, April 02, 2000	F1	0	0	150,000	150,000
Oak Grove	Monday, April 03, 2000	F2	0	0	75,000	75,000
Oak Grove	Monday, April 03, 2000	F0	0	0	20,000	20,000
Vestavia Hills	Monday, April 03, 2000	F1	0	0	4,000,000	4,000,000
Argo	Saturday, November 24, 2001	F2	0	1	200,000	200,000
McCalla	Sunday, November 10, 2002	F2	0	0	500,000	500,000
Hueytown	Monday, May 31, 2004	F0	0	0	250,000	250,000
Bluff Park	Monday, May 31, 2004	F0	0	0	500,000	500,000
McCalla	Wednesday, November 24, 2004	F0	0	0	70,000	70,000
Graysville	Monday, November 28, 2005	F0	0	0	16,000	16,000
Hueytown	Monday, November 28, 2005	F0	0	0	39,000	39,000
Gardendale	Saturday, April 08, 2006	F1	0	1	500,000	500,000
Roebuck Plaza	Saturday, April 08, 2006	F1	0	0	300,000	300,000
Oakwood	Thursday, March 01, 2007	EF1	0	0	100,000	100,000
Sayre	Wednesday, April 11, 2007	EF1	0	0	20,000	20,000
Leeds	Tuesday, February 26, 2008	EF1	1	0	1,000,000	1,000,000
Hopkins	Friday, April 11, 2008	EF0	0	0	5,000	5,000
Vestavia Hills	Friday, April 11, 2008	EF0	0	0	50,000	50,000
Warrior	Wednesday, May 06, 2009	EF1	0	0	50,000	50,000
Corner	Saturday, April 24, 2010	EF1	0	0	50,000	50,000
Huffman	Tuesday, October 26, 2010	EF1	0	0	50,000	50,000
Homewood	Monday, April 11, 2011	EF1	0	0	65,000	65,000
Kimbrel	Wednesday, April 27, 2011	EF0	0	0	80,000	80,000
Warrior	Wednesday, April 27, 2011	EF1	0	0	5,300,000	5,300,000
Cahaba Heights	Wednesday, April 27, 2011	EF0	0	0	15,000	15,000
Cahaba Heights	Wednesday, April 27, 2011	EF2	0	20	18,000,000	18,000,000
Weller	Wednesday, April 27, 2011	EF4	20	700	700,000,000	700,000,000
Clay	Wednesday, April 27, 2011	EF1	0	0	105,000	105,000
Oak Grove	Monday, January 23, 2012	EF2	1	1	0	0
Ketona	Monday, January 23, 2012	EF3	1	75	0	0
Greenwood	Sunday, October 14, 2012	EF0	0	0	0	0
Thomas Junction	Monday, December 10, 2012	EF1	0	0	0	0
Morris	Monday, April 28, 2014	EF1	0	4	0	0
Mulga Mines	Monday, April 28, 2014	EF2	0	3	0	0
Weller	Monday, April 28, 2014	EF1	0	0	0	0
Weller	Monday, April 28, 2014	EF0	0	0	0	0
Ishkooda	Monday, April 28, 2014	EF2	0	0	0	0
	Totals:	109	1608		1,045,830,000	1,000,850,000

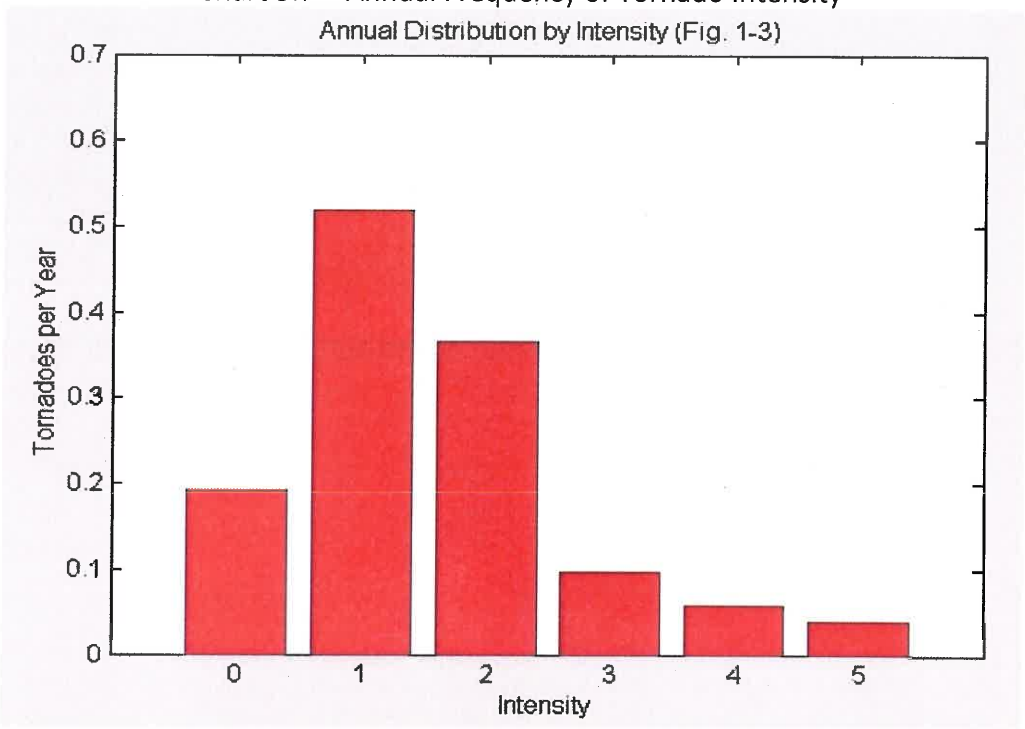
Source: National Climatic Data Center

Probability of Future Tornado Events

Meteorologists are quick to point out that tornado frequency, intensities, and locations are totally unpredictable. Past records are no guarantee of the probability of future events. If however, past trends were to continue, Jefferson County can anticipate continued frequent, and often intense, tornadic activity, as indicated by Table 5.9 – Annual Summary of Tornado Events, 1952-2014 above. The threat of a strike is distributed uniformly among all communities. The average intensity of a Jefferson County tornado has historically been around an EF-2 often causing a significant amount of damage, injuries and loss of life see Chart 5.127 – Annual Frequency of Tornado Intensity, above. Further, the potential for hurricanes and the large number of thunderstorms annually visited upon the area, ensure a significant risk level will continue for Jefferson County (The risk of hurricanes and severe thunderstorms are addressed separately.). Chart 5.8 – Alabama Tornado Threat Contours illustrates the tornado threat levels

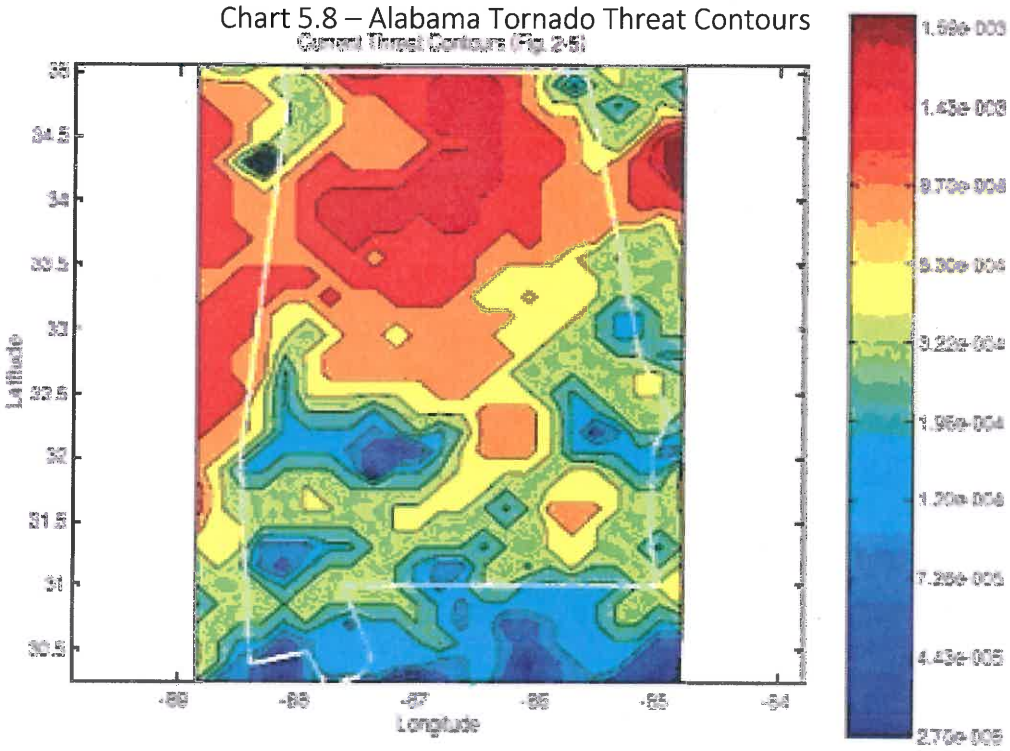
throughout Alabama, based on historical events. Jefferson County lies within a moderately high threat area in North-Central Alabama.

Chart 5.7 – Annual Frequency of Tornado Intensity



Source: VorTek, LLC. SATT 3.0 Tornado Threat software

Chart 5.8 – Alabama Tornado Threat Contours



Source: VorTek, LLC. SATT 3.0 Tornado Threat software

Severe Storms Profile

According to the HMPC and surveys of community opinions (see Appendix E, Survey Monkey Citizen Input Results for Jefferson County), severe storms are the highest natural hazard threat to Jefferson County communities. NOAA records confirm these public perceptions see Table 5.11 – Annual Summary of Severe Storm Events, 1955-2015. Severe storms bringing high winds, thunderstorms, lightning, and hail are common Jefferson County occurrences, and occasionally, tornadoes are associated with these events. National Weather Service data comparing the number of events per year with other regions of the country, suggests that Jefferson County can expect to see thunderstorms more than 1/6 of the days per year based on observations between 1950 and 2015, though not all are severe.

Location, Extent and Intensity of Potential Severe Storms

All areas of Jefferson County have experienced frequent severe storms, including thunderstorms, high winds, heavy precipitation, hail, and lightning and share equal risks for all types of severe storms. The locations of these historical events cannot be mapped.

The extent of each storm event markedly varies according to storm severity and duration. Storm severity can be measured by the storm characteristics, which may include heavy precipitation, large hail, intense lightning, and high winds. The exact extent of severe storms is not predictable. Severe storms can also result in flooding due to heavy precipitation and wildfires due to lightning and will accompany hurricanes and tornadoes.

Large hail, though very rare, can cause injury or loss of life and major property damages. Normally, however, hail damage is limited to automobiles and minor building damage. Both lightning and high winds have the potential to cause loss of life and considerable property damage. The power of lightning's electrical charge and intense heat can electrocute on contact, split trees, and ignite fires. High winds are often the cause of power outages and can cause severe damages to buildings and infrastructure by fallen trees and direct wind gusts.

Previous Occurrences of Severe Storms

National Climatic Data Center (NCDC) records indicate frequent annual severe storm occurrences in Jefferson County between 1955 and 2015; severe storms include thunderstorms, high winds, lightning and hail, as indicated in Table 5.10 – Annual Summary of Severe Storm Events, 1955-2015, below. During this period, there were over 600 severe storm events reported for Jefferson County averaging 10.33 events per year. Total damages have been substantial in some cases; even lacking unavailable damage estimates for the earlier years covered in the table. The average annual damage from severe storms still approaches $6 million.

Table 5.10 – Annual Summary of Severe Storm Events for Jefferson County, 1955-2015

Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
March 21, 1955	Thunderstorm Wind	0 kts.	0	0	0	0
April 6, 1955	Hail	1.75 in.	0	0	0	0
April 6, 1955	Thunderstorm Wind	0 kts.	0	0	0	0
July 28, 1955	Thunderstorm Wind	52 kts.	0	0	0	0
October 28, 1955	Thunderstorm Wind	0 kts.	0	0	0	0
April 15, 1956	Thunderstorm Wind	60 kts.	0	0	0	0
August 19, 1956	Thunderstorm Wind	65 kts.	0	0	0	0
April 3, 1958	Hail	2.00 in.	0	0	0	0
May 10, 1958	Hail	1.75 in.	0	0	0	0
March 21, 1959	Hail	3.00 in.	0	0	0	0
May 12, 1959	Thunderstorm Wind	0 kts.	0	0	0	0
July 12, 1959	Thunderstorm Wind	64 kts.	0	0	0	0
March 29, 1960	Hail	3.00 in.	0	0	0	0
March 30, 1960	Thunderstorm Wind	0 kts.	0	0	0	0
July 4, 1960	Thunderstorm Wind	0 kts.	0	0	0	0
March 13, 1961	Hail	2.00 in.	0	0	0	0
April 15, 1961	Hail	1.75 in.	0	0	0	0
April 15, 1961	Thunderstorm Wind	51 kts.	0	0	0	0
May 8, 1961	Thunderstorm Wind	61 kts.	0	0	0	0
July 22, 1961	Thunderstorm Wind	50 kts.	0	0	0	0
August 20, 1961	Hail	0.75 in.	0	0	0	0
February 23, 1962	Thunderstorm Wind	50 kts.	0	0	0	0
March 21, 1962	Thunderstorm Wind	50 kts.	0	0	0	0
March 30, 1962	Hail	1.50 in.	0	0	0	0
March 30, 1962	Thunderstorm Wind	50 kts.	0	0	0	0
June 24, 1962	Thunderstorm Wind	0 kts.	0	0	0	0
July 4, 1962	Thunderstorm Wind	62 kts.	0	0	0	0
August 5, 1962	Thunderstorm Wind	63 kts.	0	0	0	0
August 7, 1962	Thunderstorm Wind	50 kts.	0	0	0	0
August 20, 1962	Thunderstorm Wind	51 kts.	0	0	0	0
March 12, 1963	Hail	1.75 in.	0	0	0	0
April 29, 1963	Thunderstorm Wind	50 kts.	0	0	0	0
July 24, 1963	Thunderstorm Wind	0 kts.	0	0	0	0
March 9, 1964	Thunderstorm Wind	55 kts.	0	0	0	0
April 28, 1964	Hail	2.00 in.	0	0	0	0
December 24, 1964	Thunderstorm Wind	0 kts.	0	0	0	0
April 12, 1965	Thunderstorm Wind	55 kts.	0	0	0	0
May 20, 1965	Hail	1.25 in.	0	0	0	0
July 7, 1965	Hail	1.75 in.	0	0	0	0
July 14, 1965	Thunderstorm Wind	0 kts.	0	0	0	0
July 24, 1965	Thunderstorm Wind	0 kts.	0	0	0	0
November 10, 1966	Thunderstorm Wind	0 kts.	0	0	0	0
March 6, 1967	Thunderstorm Wind	54 kts.	0	0	0	0
May 6, 1967	Hail	1.75 in.	0	0	0	0
May 7, 1967	Thunderstorm Wind	0 kts.	0	0	0	0
December 2, 1967	Thunderstorm Wind	65 kts.	0	0	0	0
December 19, 1967	Thunderstorm Wind	0 kts.	0	0	0	0
May 11, 1968	Hail	1.00 in.	0	0	0	0
May 17, 1968	Hail	1.25 in.	0	0	0	0
June 12, 1968	Thunderstorm Wind	0 kts.	0	0	0	0
June 19, 1968	Hail	1.00 in.	0	0	0	0
June 19, 1968	Thunderstorm Wind	0 kts.	0	0	0	0
August 19, 1968	Thunderstorm Wind	0 kts.	0	0	0	0
August 22, 1968	Thunderstorm Wind	0 kts.	0	0	0	0
December 27, 1968	Thunderstorm Wind	0 kts.	0	0	0	0

Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
March 23, 1969	Thunderstorm Wind	0 kts.	0	0	0	0
April 17, 1969	Thunderstorm Wind	0 kts.	0	0	0	0
May 31, 1969	Thunderstorm Wind	60 kts.	0	0	0	0
June 19, 1969	Thunderstorm Wind	52 kts.	0	0	0	0
March 19, 1970	Hail	1.00 in.	0	0	0	0
April 1, 1970	Hail	1.75 in.	0	0	0	0
May 28, 1970	Hail	1.00 in.	0	0	0	0
July 20, 1970	Thunderstorm Wind	0 kts.	0	0	0	0
August 1, 1970	Hail	0.75 in.	0	0	0	0
November 20, 1970	Thunderstorm Wind	0 kts.	0	0	0	0
February 22, 1971	Hail	1.75 in.	0	0	0	0
February 22, 1971	Thunderstorm Wind	0 kts.	0	0	0	0
March 6, 1971	Thunderstorm Wind	0 kts.	0	0	0	0
March 22, 1971	Thunderstorm Wind	0 kts.	0	0	0	0
March 25, 1971	Hail	0.75 in.	0	0	0	0
April 23, 1971	Hail	1.75 in.	0	0	0	0
June 2, 1971	Hail	1.75 in.	0	0	0	0
June 3, 1971	Hail	1.75 in.	0	0	0	0
June 5, 1971	Hail	1.75 in.	0	0	0	0
June 18, 1971	Hail	0.75 in.	0	0	0	0
July 25, 1971	Thunderstorm Wind	0 kts.	0	0	0	0
April 7, 1972	Hail	1.00 in.	0	0	0	0
April 16, 1972	Thunderstorm Wind	50 kts.	0	0	0	0
May 2, 1972	Thunderstorm Wind	0 kts.	0	0	0	0
July 2, 1972	Hail	1.75 in.	0	0	0	0
July 3, 1972	Thunderstorm Wind	0 kts.	0	0	0	0
May 11, 1973	Thunderstorm Wind	78 kts.	0	0	0	0
May 12, 1973	Hail	1.75 in.	0	0	0	0
May 19, 1973	Hail	0.75 in.	0	0	0	0
May 19, 1973	Thunderstorm Wind	0 kts.	0	0	0	0
May 27, 1973	Thunderstorm Wind	50 kts.	0	0	0	0
June 21, 1973	Thunderstorm Wind	0 kts.	0	0	0	0
June 27, 1973	Hail	0.75 in.	0	0	0	0
July 1, 1973	Hail	0.75 in.	0	0	0	0
August 13, 1973	Hail	2.75 in.	0	0	0	0
August 13, 1973	Thunderstorm Wind	0 kts.	0	0	0	0
November 27, 1973	Thunderstorm Wind	0 kts.	0	0	0	0
January 28, 1974	Thunderstorm Wind	50 kts.	0	0	0	0
March 21, 1974	Thunderstorm Wind	58 kts.	0	0	0	0
March 29, 1974	Hail	1.75 in.	0	0	0	0
March 29, 1974	Thunderstorm Wind	0 kts.	0	0	0	0
April 1, 1974	Hail	1.75 in.	0	0	0	0
April 3, 1974	Hail	1.75 in.	0	0	0	0
April 4, 1974	Hail	1.00 in.	0	0	0	0
April 8, 1974	Hail	0.75 in.	0	0	0	0
April 22, 1974	Hail	0.78 in.	0	0	0	0
May 2, 1974	Hail	2.75 in.	0	0	0	0
July 3, 1974	Hail	0.75 in.	0	0	0	0
July 14, 1974	Thunderstorm Wind	53 kts.	0	0	0	0
August 29, 1974	Thunderstorm Wind	0 kts.	0	0	0	0
January 10, 1975	Thunderstorm Wind	57 kts.	0	0	0	0
March 7, 1975	Hail	1.75 in.	0	0	0	0
March 24, 1975	Thunderstorm Wind	0 kts.	0	0	0	0
April 2, 1975	Hail	1.75 in.	0	0	0	0
July 6, 1975	Thunderstorm Wind	0 kts.	0	0	0	0
March 20, 1976	Thunderstorm Wind	60 kts.	0	0	0	0

Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
March 26, 1976	Thunderstorm Wind	52 kts.	0	0	0	0
March 29, 1976	Hail	1.75 in.	0	0	0	0
March 29, 1976	Thunderstorm Wind	0 kts.	0	0	0	0
May 6, 1976	Hail	1.75 in.	0	0	0	0
May 15, 1976	Hail	1.00 in.	0	0	0	0
July 13, 1976	Thunderstorm Wind	0 kts.	0	0	0	0
August 16, 1976	Thunderstorm Wind	57 kts.	0	0	0	0
February 26, 1977	Thunderstorm Wind	0 kts.	0	0	0	0
March 12, 1977	Thunderstorm Wind	0 kts.	0	0	0	0
April 4, 1977	Hail	1.75 in.	0	0	0	0
April 4, 1977	Thunderstorm Wind	62 kts.	0	0	0	0
May 8, 1977	Hail	1.75 in.	0	0	0	0
June 19, 1977	Thunderstorm Wind	0 kts.	0	0	0	0
June 24, 1977	Hail	1.50 in.	0	0	0	0
June 24, 1977	Thunderstorm Wind	0 kts.	0	0	0	0
July 9, 1977	Thunderstorm Wind	0 kts.	0	0	0	0
July 14, 1977	Thunderstorm Wind	0 kts.	0	0	0	0
July 15, 1977	Hail	1.75 in.	0	0	0	0
July 15, 1977	Thunderstorm Wind	0 kts.	0	0	0	0
July 17, 1977	Hail	1.75 in.	0	0	0	0
July 17, 1977	Thunderstorm Wind	0 kts.	0	0	0	0
July 19, 1977	Thunderstorm Wind	0 kts.	0	0	0	0
September 14, 1977	Thunderstorm Wind	0 kts.	0	0	0	0
December 5, 1977	Hail	2.50 in.	0	0	0	0
January 25, 1978	Thunderstorm Wind	52 kts.	0	0	0	0
April 18, 1978	Hail	2.00 in.	0	0	0	0
May 12, 1978	Hail	1.75 in.	0	0	0	0
May 12, 1978	Thunderstorm Wind	56 kts.	0	0	0	0
May 26, 1978	Thunderstorm Wind	0 kts.	0	0	0	0
June 6, 1978	Thunderstorm Wind	61 kts.	0	0	0	0
June 12, 1978	Hail	1.75 in.	0	0	0	0
June 12, 1978	Thunderstorm Wind	0 kts.	0	0	0	0
July 10, 1978	Thunderstorm Wind	0 kts.	0	0	0	0
July 31, 1978	Thunderstorm Wind	61 kts.	0	0	0	0
August 8, 1978	Hail	2.00 in.	0	0	0	0
March 3, 1979	Thunderstorm Wind	0 kts.	0	0	0	0
March 23, 1979	Thunderstorm Wind	0 kts.	0	0	0	0
April 9, 1979	Thunderstorm Wind	52 kts.	0	0	0	0
April 26, 1979	Hail	1.75 in.	0	0	0	0
May 11, 1979	Hail	1.75 in.	0	0	0	0
July 2, 1979	Hail	1.00 in.	0	0	0	0
July 2, 1979	Thunderstorm Wind	0 kts.	0	0	0	0
July 3, 1979	Hail	1.00 in.	0	0	0	0
July 18, 1979	Thunderstorm Wind	0 kts.	0	0	0	0
August 10, 1979	Thunderstorm Wind	52 kts.	0	0	0	0
April 25, 1980	Thunderstorm Wind	0 kts.	0	0	0	0
May 16, 1980	Thunderstorm Wind	0 kts.	0	0	0	0
May 17, 1980	Thunderstorm Wind	0 kts.	0	0	0	0
June 29, 1980	Thunderstorm Wind	0 kts.	0	0	0	0
July 6, 1980	Thunderstorm Wind	0 kts.	0	0	0	0
September 17, 1980	Thunderstorm Wind	0 kts.	0	0	0	0
March 18, 1981	Hail	0.75 in.	0	0	0	0
June 12, 1981	Thunderstorm Wind	0 kts.	0	0	0	0
June 25, 1981	Hail	1.75 in.	0	0	0	0
August 7, 1981	Thunderstorm Wind	0 kts.	0	0	0	0
August 11, 1981	Thunderstorm Wind	0 kts.	0	0	0	0

Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
August 16, 1981	Thunderstorm Wind	0 kts.	0	0	0	0
January 3, 1982	Thunderstorm Wind	0 kts.	0	0	0	0
March 15, 1982	Hail	1.00 in.	0	0	0	0
March 15, 1982	Thunderstorm Wind	0 kts.	0	0	0	0
April 26, 1982	Hail	1.75 in.	0	0	0	0
May 18, 1982	Thunderstorm Wind	0 kts.	0	0	0	0
May 26, 1982	Thunderstorm Wind	0 kts.	0	0	0	0
June 4, 1982	Thunderstorm Wind	0 kts.	0	0	0	0
June 28, 1982	Thunderstorm Wind	0 kts.	0	0	0	0
July 20, 1982	Thunderstorm Wind	0 kts.	0	0	0	0
July 21, 1982	Thunderstorm Wind	0 kts.	0	0	0	0
July 21, 1982	Thunderstorm Wind	0 kts.	0	0	0	0
March 5, 1983	Thunderstorm Wind	0 kts.	0	0	0	0
March 5, 1983	Thunderstorm Wind	0 kts.	0	0	0	0
April 1, 1983	Thunderstorm Wind	0 kts.	0	0	0	0
April 23, 1983	Hail	1.00 in.	0	0	0	0
May 3, 1983	Thunderstorm Wind	0 kts.	0	0	0	0
July 17, 1983	Thunderstorm Wind	0 kts.	0	0	0	0
August 5, 1983	Thunderstorm Wind	58 kts.	0	0	0	0
August 6, 1983	Thunderstorm Wind	0 kts.	0	0	0	0
August 8, 1983	Thunderstorm Wind	0 kts.	0	0	0	0
August 22, 1983	Hail	0.75 in.	0	0	0	0
August 22, 1983	Thunderstorm Wind	50 kts.	0	0	0	0
August 25, 1983	Thunderstorm Wind	50 kts.	0	0	0	0
November 23, 1983	Thunderstorm Wind	0 kts.	0	0	0	0
December 6, 1983	Thunderstorm Wind	0 kts.	0	0	0	0
December 11, 1983	Hail	0.75 in.	0	0	0	0
March 28, 1984	Thunderstorm Wind	0 kts.	0	0	0	0
April 28, 1984	Hail	0.75 in.	0	0	0	0
May 2, 1984	Hail	1.75 in.	0	0	0	0
May 3, 1984	Thunderstorm Wind	0 kts.	0	0	0	0
May 7, 1984	Thunderstorm Wind	0 kts.	0	0	0	0
May 28, 1984	Hail	1.75 in.	0	0	0	0
June 20, 1984	Thunderstorm Wind	0 kts.	0	0	0	0
June 30, 1984	Hail	1.00 in.	0	0	0	0
June 30, 1984	Thunderstorm Wind	0 kts.	0	0	0	0
July 5, 1984	Hail	1.00 in.	0	0	0	0
July 5, 1984	Hail	1.00 in.	0	0	0	0
June 10, 1985	Hail	1.75 in.	0	0	0	0
July 11, 1985	Thunderstorm Wind	0 kts.	0	0	0	0
July 15, 1985	Thunderstorm Wind	52 kts.	0	0	0	0
July 22, 1985	Thunderstorm Wind	0 kts.	0	0	0	0
August 1, 1985	Thunderstorm Wind	0 kts.	0	0	0	0
December 1, 1985	Thunderstorm Wind	61 kts.	0	0	0	0
February 4, 1986	Thunderstorm Wind	0 kts.	0	1	0	0
March 12, 1986	Thunderstorm Wind	0 kts.	0	0	0	0
March 18, 1986	Thunderstorm Wind	0 kts.	0	2	0	0
June 24, 1986	Thunderstorm Wind	52 kts.	0	0	0	0
June 26, 1986	Thunderstorm Wind	0 kts.	0	0	0	0
July 13, 1986	Thunderstorm Wind	0 kts.	0	0	0	0
July 17, 1986	Thunderstorm Wind	0 kts.	0	0	0	0
July 21, 1986	Hail	1.75 in.	0	0	0	0
July 21, 1986	Thunderstorm Wind	0 kts.	0	0	0	0
July 28, 1986	Thunderstorm Wind	0 kts.	0	0	0	0
August 16, 1986	Thunderstorm Wind	61 kts.	0	0	0	0
August 26, 1986	Thunderstorm Wind	56 kts.	0	0	0	0

Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
September 21, 1986	Thunderstorm Wind	0 kts.	0	0	0	0
October 1, 1986	Thunderstorm Wind	0 kts.	0	0	0	0
May 25, 1987	Thunderstorm Wind	0 kts.	0	0	0	0
June 3, 1987	Hail	1.75 in.	0	0	0	0
June 3, 1987	Thunderstorm Wind	0 kts.	0	0	0	0
July 4, 1987	Thunderstorm Wind	0 kts.	0	0	0	0
August 2, 1987	Hail	1.75 in.	0	0	0	0
November 16, 1987	Thunderstorm Wind	0 kts.	0	0	0	0
December 15, 1987	Thunderstorm Wind	75 kts.	0	0	0	0
January 19, 1988	Thunderstorm Wind	52 kts.	0	0	0	0
April 25, 1988	Hail	1.00 in.	0	0	0	0
May 9, 1988	Hail	1.75 in.	0	0	0	0
May 9, 1988	Thunderstorm Wind	0 kts.	0	0	0	0
May 10, 1988	Thunderstorm Wind	0 kts.	0	0	0	0
May 23, 1988	Thunderstorm Wind	60 kts.	0	0	0	0
June 21, 1988	Thunderstorm Wind	0 kts.	0	0	0	0
June 25, 1988	Thunderstorm Wind	0 kts.	0	0	0	0
June 26, 1988	Thunderstorm Wind	0 kts.	0	0	0	0
July 15, 1988	Thunderstorm Wind	0 kts.	0	0	0	0
July 16, 1988	Thunderstorm Wind	0 kts.	0	0	0	0
August 3, 1988	Hail	1.75 in.	0	0	0	0
August 3, 1988	Thunderstorm Wind	0 kts.	0	0	0	0
August 11, 1988	Thunderstorm Wind	0 kts.	0	0	0	0
November 4, 1988	Thunderstorm Wind	0 kts.	0	0	0	0
February 21, 1989	Hail	0.75 in.	0	0	0	0
February 21, 1989	Thunderstorm Wind	0 kts.	0	0	0	0
March 5, 1989	Hail	1.00 in.	0	0	0	0
March 20, 1989	Thunderstorm Wind	0 kts.	0	0	0	0
March 20, 1989	Thunderstorm Wind	0 kts.	0	0	0	0
March 21, 1989	Thunderstorm Wind	0 kts.	0	0	0	0
March 29, 1989	Thunderstorm Wind	56 kts.	0	0	0	0
April 4, 1989	Hail	0.75 in.	0	0	0	0
April 4, 1989	Thunderstorm Wind	69 kts.	0	0	0	0
April 5, 1989	Thunderstorm Wind	0 kts.	0	0	0	0
May 5, 1989	Thunderstorm Wind	0 kts.	0	0	0	0
June 2, 1989	Hail	1.00 in.	0	0	0	0
June 4, 1989	Thunderstorm Wind	61 kts.	0	0	0	0
June 14, 1989	Thunderstorm Wind	0 kts.	0	0	0	0
August 6, 1989	Thunderstorm Wind	0 kts.	0	0	0	0
November 15, 1989	Thunderstorm Wind	57 kts.	0	0	0	0
February 10, 1990	Thunderstorm Wind	0 kts.	0	5	0	0
April 10, 1990	Thunderstorm Wind	52 kts.	0	0	0	0
May 1, 1990	Hail	1.75 in.	0	0	0	0
May 3, 1990	Hail	0.75 in.	0	0	0	0
May 3, 1990	Thunderstorm Wind	60 kts.	0	0	0	0
May 20, 1990	Thunderstorm Wind	0 kts.	0	0	0	0
June 21, 1990	Thunderstorm Wind	52 kts.	0	0	0	0
June 22, 1990	Hail	0.75 in.	0	0	0	0
June 22, 1990	Thunderstorm Wind	0 kts.	0	0	0	0
July 2, 1990	Hail	1.75 in.	0	0	0	0
July 2, 1990	Thunderstorm Wind	0 kts.	0	0	0	0
July 10, 1990	Hail	1.75 in.	0	0	0	0
July 23, 1990	Hail	1.75 in.	0	0	0	0
August 2, 1990	Thunderstorm Wind	70 kts.	0	0	0	0
August 20, 1990	Thunderstorm Wind	75 kts.	0	0	0	0
August 21, 1990	Thunderstorm Wind	0 kts.	0	0	0	0

Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
February 19, 1991	Thunderstorm Wind	0 kts.	0	0	0	0
March 29, 1991	Thunderstorm Wind	60 kts.	0	0	0	0
April 9, 1991	Hail	1.75 in.	0	0	0	0
April 27, 1991	Thunderstorm Wind	0 kts.	0	0	0	0
April 28, 1991	Thunderstorm Wind	0 kts.	0	0	0	0
May 5, 1991	Thunderstorm Wind	0 kts.	0	4	0	0
February 25, 1992	Hail	1.00 in.	0	0	0	0
April 20, 1992	Hail	0.75 in.	0	0	0	0
April 20, 1992	Thunderstorm Wind	0 kts.	0	0	0	0
June 18, 1992	Thunderstorm Wind	0 kts.	0	0	0	0
July 5, 1992	Thunderstorm Wind	56 kts.	0	0	0	0
August 27, 1992	Thunderstorm Wind	0 kts.	0	0	0	0
January 24, 1993	Thunderstorm Wind	0 kts.	0	0	0	0
April 15, 1993	Hail	0.75 in.	0	0	0	0
May 3, 1993	Hail	1.75 in.	0	0	0	0
August 20, 1993	Thunderstorm Wind	0 kts.	0	0	0	0
March 27, 1994	Hail	3.00 in.	0	0	0	0
March 27, 1994	Thunderstorm Wind	50 kts.	0	0	0	0
April 15, 1994	Hail	1.75 in.	0	0	0	0
April 15, 1994	Thunderstorm Wind	0 kts.	0	2	50,000	0
April 27, 1994	Thunderstorm Wind	0 kts.	0	0	50,000	0
May 15, 1994	Hail	0.88 in.	0	0	0	0
May 15, 1994	Thunderstorm Wind	0 kts.	0	0	50,000	0
June 7, 1994	Thunderstorm Wind	50 kts.	0	0	10,000	0
June 22, 1994	Hail	0.75 in.	0	0	0	0
June 22, 1994	Thunderstorm Wind	0 kts.	0	0	5,000	0
June 25, 1994	Hail	1.75 in.	0	0	0	0
January 6, 1995	Thunderstorm Wind	0 kts.	0	0	0	0
March 7, 1995	Hail	0.75 in.	0	0	0	0
April 11, 1995	Hail	0.88 in.	0	0	0	0
April 20, 1995	Thunderstorm Wind	60 kts.	0	0	110,000	0
April 22, 1995	Hail	0.75 in.	0	0	0	0
April 22, 1995	Thunderstorm Wind	0 kts.	0	0	0	0
May 15, 1995	Hail	0.88 in.	0	0	0	0
May 15, 1995	Thunderstorm Wind	62 kts.	0	0	525,000	0
May 25, 1995	Hail	0.75 in.	0	0	0	0
June 6, 1995	Hail	0.88 in.	0	0	0	0
June 6, 1995	Thunderstorm Wind	0 kts.	0	0	0	0
June 10, 1995	Hail	0.75 in.	0	0	0	0
June 10, 1995	Thunderstorm Wind	0 kts.	0	0	25,000	0
July 3, 1995	Hail	1.00 in.	0	0	2,000	0
March 6, 1996	Thunderstorm Wind	55 kts.	0	0	45,000	0
March 18, 1996	Hail	0.75 in.	0	0	25,000	5,000
March 18, 1996	Thunderstorm Wind	50 kts.	0	0	45,000	0
April 14, 1996	Thunderstorm Wind	58 kts.	0	0	200,000	0
April 20, 1996	Thunderstorm Wind	55 kts.	0	0	225,000	4,000
April 23, 1996	Thunderstorm Wind	52 kts.	0	0	60,000	4,000
May 24, 1996	Hail	1.00 in.	0	0	55,000	2,000
May 24, 1996	Lightning		0	0	25,000	0
May 24, 1996	Thunderstorm Wind	55 kts.	0	0	42,000	0
June 11, 1996	Hail	0.88 in.	0	0	25,000	0
July 22, 1996	Thunderstorm Wind	50 kts.	0	0	30,000	0
July 24, 1996	Thunderstorm Wind	50 kts.	0	0	25,000	0
August 24, 1996	Hail	0.75 in.	0	0	10,000	0
January 5, 1997	Thunderstorm Wind	50 kts.	0	0	10,000	0
January 24, 1997	Hail	1.75 in.	0	0	71,000	0

Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
February 27, 1997	High Wind	45 kts.	0	0	5,000	0
April 22, 1997	Hail	0.75 in.	0	0	2,000	0
May 9, 1997	Thunderstorm Wind	60 kts.	0	0	10,000	0
June 17, 1997	Hail	0.75 in.	0	0	3,000	0
July 5, 1997	High Wind	39 kts.	0	0	45,000	0
July 28, 1997	Thunderstorm Wind	50 kts.	0	0	4,000	0
August 14, 1997	Lightning		0	0	2,000	0
September 9, 1997	Hail	1.75 in.	0	0	4,000	0
November 1, 1997	Hail	0.75 in.	0	0	2,000	0
January 7, 1998	Thunderstorm Wind	50 kts.	0	0	5,000	0
February 22, 1998	High Wind	44 kts.	0	0	3,000	0
February 26, 1998	Hail	0.75 in.	0	0	0	0
March 19, 1998	Hail	0.75 in.	0	0	0	0
April 8, 1998	Hail	1.00 in.	0	0	2,000	2,000
April 14, 1998	Hail	2.50 in.	0	0	136,000	32,000
April 18, 1998	Hail	1.75 in.	0	0	95,000	15,000
May 6, 1998	Hail	1.00 in.	0	0	2,000	0
May 9, 1998	Hail	0.75 in.	0	0	0	0
May 9, 1998	Thunderstorm Wind	50 kts.	0	0	50,000	0
June 5, 1998	Thunderstorm Wind	55 kts.	0	0	90,000	0
June 15, 1998	Thunderstorm Wind	55 kts.	0	0	50,000	0
June 19, 1998	Hail	0.88 in.	0	0	0	0
June 20, 1998	Hail	0.88 in.	0	0	0	0
July 9, 1998	Lightning		0	1	0	0
July 9, 1998	Thunderstorm Wind	51 kts.	0	0	3,000	0
July 20, 1998	Thunderstorm Wind	50 kts.	0	0	5,000	0
July 26, 1998	Thunderstorm Wind	65 kts.	0	0	650,000	0
August 31, 1998	Hail	0.75 in.	0	0	0	0
January 22, 1999	Hail	1.00 in.	0	0	8,000	0
January 22, 1999	Thunderstorm Wind	65 kts.	0	0	33,000	0
February 27, 1999	Thunderstorm Wind	50 kts.	0	5	8,000	0
May 22, 1999	Hail	0.75 in.	0	0	0	0
May 23, 1999	Thunderstorm Wind	50 kts.	0	0	0	0
June 2, 1999	Hail	0.75 in.	0	0	0	0
June 5, 1999	Thunderstorm Wind	50 kts.	0	0	0	0
July 7, 1999	Thunderstorm Wind	50 kts.	0	0	50,000	0
October 3, 1999	Hail	1.75 in.	0	0	7,000	0
February 13, 2000	Hail	0.75 in.	0	0	0	0
February 13, 2000	Thunderstorm Wind	60 kts. E	0	1	300,000	0
March 10, 2000	Hail	1.75 in.	0	0	5,000	0
March 10, 2000	Thunderstorm Wind	90 kts. E	0	0	322,000	0
March 30, 2000	Hail	0.75 in.	0	0	0	0
April 2, 2000	Hail	1.00 in.	0	0	4,000	0
April 2, 2000	Thunderstorm Wind	60 kts. E	0	0	5,000	0
April 3, 2000	Hail	1.00 in.	0	0	2,000	0
April 3, 2000	Lightning		0	0	5,000	0
April 3, 2000	Thunderstorm Wind	55 kts. E	0	0	3,000	0
April 27, 2000	Hail	1.00 in.	0	0	2,000	0
May 25, 2000	Lightning		0	1	0	0
June 16, 2000	Lightning		0	1	1,000	0
June 25, 2000	Hail	1.00 in.	0	0	3,000	0
July 15, 2000	Thunderstorm Wind	55 kts. E	0	0	2,000	0
July 20, 2000	Hail	0.75 in.	0	0	0	0
July 20, 2000	Thunderstorm Wind	60 kts. E	0	0	45,000	0
July 26, 2000	Hail	0.75 in.	0	0	0	0
July 26, 2000	Thunderstorm Wind	55 kts. E	0	0	32,000	0

Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
July 31, 2000	Thunderstorm Wind	50 kts. E	0	0	2,000	0
August 4, 2000	Hail	0.75 in.	0	0	0	0
August 4, 2000	Thunderstorm Wind	50 kts. E	0	0	2,000	0
August 9, 2000	Thunderstorm Wind	50 kts. E	0	0	1,000	0
August 10, 2000	Thunderstorm Wind	55 kts. E	0	0	25,000	0
September 23, 2000	Lightning		0	5	0	0
November 8, 2000	Thunderstorm Wind	50 kts. E	0	0	2,000	0
November 24, 2000	High Wind	45 kts. E	0	0	2,000	0
December 16, 2000	Hail	2.75 in.	0	0	30,000	0
January 29, 2001	Thunderstorm Wind	50 kts. E	0	0	2,000	0
February 16, 2001	Thunderstorm Wind	75 kts. E	1	4	400,000	0
February 22, 2001	Hail	1.00 in.	0	0	0	0
April 3, 2001	Hail	1.75 in.	0	0	10,000	0
May 28, 2001	Hail	1.00 in.	0	0	0	0
May 31, 2001	Thunderstorm Wind	50 kts. E	0	0	1,000	0
June 3, 2001	Hail	0.75 in.	0	0	0	0
June 3, 2001	Thunderstorm Wind	50 kts. E	0	0	4,000	0
June 26, 2001	Hail	1.75 in.	0	0	5,000	0
July 5, 2001	Thunderstorm Wind	55 kts. E	0	0	15,000	0
July 20, 2001	Thunderstorm Wind	50 kts. E	0	0	10,000	0
July 21, 2001	Lightning		0	0	150,000	0
November 24, 2001	Hail	2.75 in.	0	0	35,000	0
March 30, 2002	Hail	2.75 in.	0	0	175,000	0
April 29, 2002	Hail	0.88 in.	0	0	0	0
April 29, 2002	Thunderstorm Wind	50 kts. E	0	0	8,000	0
May 9, 2002	Hail	1.75 in.	0	0	5,000	0
June 6, 2002	Thunderstorm Wind	55 kts. E	0	0	2,000	0
June 27, 2002	Hail	0.88 in.	0	0	0	0
June 27, 2002	Thunderstorm Wind	50 kts. E	0	0	2,000	0
July 2, 2002	Hail	0.75 in.	0	0	0	0
July 12, 2002	Lightning		0	0	8,000	0
August 20, 2002	Hail	0.88 in.	0	0	0	0
August 20, 2002	Thunderstorm Wind	50 kts. E	0	0	3,000	0
September 26, 2002	High Wind	40 kts. E	0	0	8,000	0
October 6, 2002	Hail	0.75 in.	0	0	0	0
October 6, 2002	Thunderstorm Wind	50 kts. E	0	0	10,000	0
March 18, 2003	Hail	1.00 in.	0	0	5,000	0
April 25, 2003	Hail	0.75 in.	0	0	0	0
May 2, 2003	Hail	2.75 in.	0	0	100,025,000	0
May 5, 2003	Hail	1.00 in.	0	0	0	0
May 5, 2003	Thunderstorm Wind	50 kts. EG	0	0	4,000	0
May 6, 2003	Thunderstorm Wind	50 kts. EG	0	0	8,000	0
May 7, 2003	Hail	0.75 in.	0	0	0	0
May 7, 2003	Thunderstorm Wind	50 kts. EG	0	0	4,000	0
May 16, 2003	Hail	1.75 in.	0	0	7,000	0
May 16, 2003	Lightning		0	0	60,000	0
May 16, 2003	Thunderstorm Wind	60 kts. EG	0	0	20,000	0
May 17, 2003	Hail	0.75 in.	0	0	0	0
June 2, 2003	Hail	1.25 in.	0	0	0	0
June 11, 2003	Thunderstorm Wind	55 kts. EG	0	0	14,000	0
June 12, 2003	Thunderstorm Wind	50 kts. EG	0	0	3,000	0
June 17, 2003	Thunderstorm Wind	60 kts. EG	0	0	27,000	0
June 19, 2003	Hail	0.75 in.	0	0	0	0
July 10, 2003	Lightning		0	0	12,000	0
July 10, 2003	Thunderstorm Wind	50 kts. EG	0	0	5,000	0
July 21, 2003	Thunderstorm Wind	50 kts. EG	0	0	8,000	0

Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
August 3, 2003	Thunderstorm Wind	50 kts. EG	0	0	3,000	0
November 18, 2003	Thunderstorm Wind	60 kts. EG	0	0	16,000	0
February 5, 2004	Hail	1.75 in.	0	0	6,000	0
February 5, 2004	Thunderstorm Wind	65 kts. ES	0	0	168,000	0
May 17, 2004	Lightning		0	1	0	0
May 31, 2004	Thunderstorm Wind	60 kts. EG	0	0	225,000	0
July 12, 2004	Thunderstorm Wind	61 kts. EG	0	0	35,000	0
July 25, 2004	Hail	0.88 in.	0	0	0	0
August 12, 2004	Thunderstorm Wind	50 kts. EG	0	0	7,000	0
September 16, 2004	High Wind	60 kts. EG	0	0	10,000,000	0
March 13, 2005	Hail	0.75 in.	0	0	0	0
March 30, 2005	Hail	1.00 in.	0	0	0	0
April 22, 2005	Hail	0.88 in.	0	0	6,000	0
April 30, 2005	Thunderstorm Wind	52 kts. EG	0	0	9,000	0
May 20, 2005	Hail	0.88 in.	0	0	0	0
May 20, 2005	Thunderstorm Wind	51 kts. EG	0	0	11,000	0
July 27, 2005	Thunderstorm Wind	50 kts. EG	0	0	2,000	0
August 5, 2005	Hail	1.00 in.	0	0	0	0
August 5, 2005	Thunderstorm Wind	50 kts. EG	0	0	118,000	0
August 15, 2005	Hail	0.75 in.	0	0	1,000	0
February 3, 2006	Hail	0.75 in.	0	0	0	0
February 3, 2006	Thunderstorm Wind	50 kts. EG	0	0	4,000	0
March 9, 2006	Thunderstorm Wind	50 kts. EG	0	1	20,000	0
April 3, 2006	Hail	1.00 in.	0	0	0	0
April 8, 2006	Hail	1.75 in.	0	0	0	0
April 8, 2006	Thunderstorm Wind	68 kts. MG	0	0	194,000	0
April 19, 2006	Hail	1.00 in.	0	0	0	0
April 20, 2006	Hail	1.75 in.	0	0	0	0
May 9, 2006	Thunderstorm Wind	50 kts. EG	0	0	3,000	0
June 22, 2006	Hail	1.00 in.	0	0	0	0
June 23, 2006	Thunderstorm Wind	50 kts. EG	0	0	5,000	0
July 19, 2006	Thunderstorm Wind	60 kts. EG	0	0	13,000	0
July 22, 2006	Thunderstorm Wind	50 kts. EG	0	0	3,000	0
July 29, 2006	Thunderstorm Wind	50 kts. EG	0	0	7,000	0
July 30, 2006	Thunderstorm Wind	50 kts. EG	0	0	2,000	0
November 30, 2006	Thunderstorm Wind	50 kts. EG	0	0	7,000	0
February 13, 2007	Hail	1.00 in.	0	0	0	0
March 1, 2007	Hail	1.75 in.	0	0	0	0
April 11, 2007	Thunderstorm Wind	50 kts. EG	0	0	5,000	0
June 24, 2007	Thunderstorm Wind	50 kts. EG	0	0	3,000	0
June 27, 2007	Lightning		0	0	0	0
June 28, 2007	Thunderstorm Wind	43 kts. EG	0	0	1,000	0
August 3, 2007	Hail	0.75 in.	0	0	0	0
August 3, 2007	Thunderstorm Wind	50 kts. EG	0	0	20,000	0
August 10, 2007	Thunderstorm Wind	50 kts. EG	0	0	15,000	0
August 24, 2007	Hail	0.75 in.	0	0	0	0
August 27, 2007	Thunderstorm Wind	50 kts. EG	0	0	4,000	0
February 26, 2008	Hail	0.75 in.	0	0	0	0
February 26, 2008	Thunderstorm Wind	61 kts. EG	0	0	20,000	0
March 15, 2008	Hail	1.25 in.	0	0	0	0
March 15, 2008	Thunderstorm Wind	50 kts. EG	0	0	10,000	0
April 4, 2008	Thunderstorm Wind	50 kts. EG	0	0	9,000	0
April 11, 2008	Hail	2.75 in.	0	0	0	0
May 8, 2008	Hail	0.75 in.	0	0	0	0
May 8, 2008	Thunderstorm Wind	50 kts. EG	0	0	6,000	0
June 1, 2008	Hail	1.00 in.	0	0	0	0

Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
June 1, 2008	Thunderstorm Wind	35 kts. EG	0	0	100	0
June 11, 2008	Hail	1.25 in.	0	0	0	0
June 11, 2008	Thunderstorm Wind	50 kts. EG	0	1	5,500	0
June 12, 2008	Hail	1.00 in.	0	0	0	0
June 25, 2008	Hail	0.88 in.	0	0	0	0
June 25, 2008	Thunderstorm Wind	50 kts. EG	0	0	3,000	0
July 5, 2008	Thunderstorm Wind	50 kts. EG	0	0	1,000	0
July 21, 2008	Thunderstorm Wind	52 kts. EG	0	0	25,000	0
July 22, 2008	Hail	0.75 in.	0	0	0	0
July 29, 2008	Hail	0.75 in.	0	0	0	0
July 29, 2008	Thunderstorm Wind	70 kts. EG	0	0	22,000	0
August 2, 2008	Hail	1.00 in.	0	0	0	0
August 2, 2008	Thunderstorm Wind	52 kts. MG	0	0	0	0
February 18, 2009	Hail	1.00 in.	0	0	0	0
February 27, 2009	Hail	0.75 in.	0	0	0	0
March 26, 2009	Lightning		0	0	20,000	0
March 26, 2009	Thunderstorm Wind	43 kts. EG	0	0	15,000	0
April 2, 2009	Thunderstorm Wind	50 kts. EG	0	0	15,000	0
April 10, 2009	Hail	1.00 in.	0	0	0	0
April 19, 2009	Hail	0.75 in.	0	0	0	0
May 3, 2009	Hail	1.00 in.	0	0	0	0
May 6, 2009	Thunderstorm Wind	60 kts. EG	0	0	100,000	0
June 12, 2009	Thunderstorm Wind	52 kts. EG	0	0	57,000	0
June 14, 2009	Thunderstorm Wind	56 kts. EG	0	0	9,000	0
June 15, 2009	Hail	0.88 in.	0	0	0	0
June 15, 2009	Thunderstorm Wind	52 kts. EG	0	0	2,000	0
July 12, 2009	Hail	0.75 in.	0	0	0	0
July 13, 2009	Thunderstorm Wind	40 kts. EG	0	0	1,000	0
August 20, 2009	Thunderstorm Wind	39 kts. EG	0	0	500	0
August 21, 2009	Thunderstorm Wind	39 kts. EG	0	0	10,000	0
December 8, 2009	Thunderstorm Wind	50 kts. EG	0	0	2,000	0
December 9, 2009	Thunderstorm Wind	50 kts. EG	0	0	2,000	0
February 22, 2010	Lightning		0	0	50,000	0
April 8, 2010	Lightning		0	0	200,000	0
April 24, 2010	Hail	0.75 in.	0	0	0	0
May 20, 2010	Lightning		0	1	0	0
May 20, 2010	Thunderstorm Wind	56 kts. EG	0	0	0	0
May 21, 2010	Thunderstorm Wind	50 kts. EG	0	0	5,000	0
June 4, 2010	Lightning		0	0	3,000	0
June 14, 2010	Thunderstorm Wind	58 kts. MG	0	0	0	0
June 15, 2010	Hail	1.75 in.	0	0	0	0
June 15, 2010	Thunderstorm Wind	55 kts. EG	0	0	13,500	0
June 17, 2010	Thunderstorm Wind	55 kts. EG	0	0	2,000	0
June 19, 2010	Hail	1.00 in.	0	0	0	0
June 19, 2010	Thunderstorm Wind	55 kts. EG	0	0	11,000	0
June 25, 2010	Thunderstorm Wind	50 kts. EG	0	0	3,000	0
August 15, 2010	Thunderstorm Wind	55 kts. EG	0	0	8,000	0
October 12, 2010	Hail	1.00 in.	0	0	0	0
October 12, 2010	Lightning		0	2	0	0
October 24, 2010	Hail	1.75 in.	0	0	0	0
October 24, 2010	Thunderstorm Wind	60 kts. EG	0	0	13,000	0
October 26, 2010	Hail	1.00 in.	0	0	0	0
October 26, 2010	Thunderstorm Wind	55 kts. EG	0	0	10,000	0
February 24, 2011	Thunderstorm Wind	55 kts. EG	0	0	22,000	0
February 25, 2011	Thunderstorm Wind	50 kts. EG	0	0	4,000	0
February 28, 2011	Hail	1.75 in.	0	0	0	0

Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
February 28, 2011	Thunderstorm Wind	50 kts. EG	0	0	2,000	0
March 26, 2011	Hail	1.00 in.	0	0	0	0
March 28, 2011	Hail	1.00 in.	0	0	0	0
April 4, 2011	Thunderstorm Wind	50 kts. EG	0	0	12,000	0
April 11, 2011	Thunderstorm Wind	90 kts. ES	0	0	55,000	0
April 15, 2011	Thunderstorm Wind	43 kts. EG	0	0	1,000	0
April 20, 2011	Thunderstorm Wind	50 kts. EG	0	0	8,500	0
April 27, 2011	Thunderstorm Wind	60 kts. EG	0	0	3,000	0
May 13, 2011	Thunderstorm Wind	50 kts. EG	0	0	2,000	0
May 26, 2011	Hail	1.00 in.	0	0	0	0
May 26, 2011	Thunderstorm Wind	50 kts. EG	0	0	2,000	0
June 16, 2011	Hail	0.88 in.	0	0	0	0
June 16, 2011	Thunderstorm Wind	50 kts. EG	0	0	5,000	0
June 17, 2011	Thunderstorm Wind	50 kts. EG	0	0	4,500	0
June 21, 2011	Thunderstorm Wind	61 kts. EG	0	0	19,000	0
June 24, 2011	Thunderstorm Wind	56 kts. EG	0	0	0	0
June 25, 2011	Hail	1.00 in.	0	0	0	0
June 27, 2011	Hail	1.75 in.	0	0	0	0
June 27, 2011	Thunderstorm Wind	50 kts. EG	0	0	1,000	0
July 4, 2011	Hail	1.00 in.	0	0	0	0
July 4, 2011	Thunderstorm Wind	58 kts. MG	0	0	0	0
July 13, 2011	Hail	1.00 in.	0	0	0	0
August 7, 2011	Thunderstorm Wind	50 kts. EG	0	0	4,000	0
August 20, 2011	Thunderstorm Wind	43 kts. EG	0	0	500	0
September 5, 2011	High Wind	56 kts. MG	0	0	15,000	0
February 29, 2012	Hail	0.75 in.	0	0	0	0
March 2, 2012	Hail	2.00 in.	0	0	0	0
March 2, 2012	Thunderstorm Wind	50 kts. EG	0	0	0	0
March 31, 2012	Hail	3.00 in.	0	0	0	0
April 5, 2012	Thunderstorm Wind	50 kts. MG	0	0	0	0
May 6, 2012	Hail	1.00 in.	0	0	0	0
May 21, 2012	Hail	1.00 in.	0	0	0	0
May 21, 2012	Thunderstorm Wind	60 kts. EG	0	0	0	0
May 22, 2012	Hail	1.00 in.	0	0	0	0
May 22, 2012	Thunderstorm Wind	52 kts. EG	0	0	0	0
June 3, 2012	Hail	1.75 in.	0	0	0	0
June 3, 2012	Thunderstorm Wind	50 kts. EG	0	0	0	0
June 11, 2012	Thunderstorm Wind	52 kts. MG	0	0	0	0
June 14, 2012	Hail	1.00 in.	0	0	0	0
July 1, 2012	Hail	1.00 in.	0	0	0	0
July 9, 2012	Thunderstorm Wind	50 kts. EG	0	0	0	0
July 31, 2012	Hail	1.00 in.	0	0	0	0
July 31, 2012	Thunderstorm Wind	58 kts. EG	0	0	0	0
March 5, 2013	Thunderstorm Wind	50 kts. EG	0	0	0	0
March 18, 2013	Hail	0.88 in.	0	0	0	0
March 18, 2013	Thunderstorm Wind	55 kts. EG	0	0	0	0
March 23, 2013	Hail	0.75 in.	0	0	0	0
June 13, 2013	Thunderstorm Wind	50 kts. EG	0	0	0	0
June 17, 2013	Thunderstorm Wind	50 kts. EG	0	0	0	0
July 23, 2013	Thunderstorm Wind	50 kts. EG	0	0	0	0
May 25, 2014	Hail	1.00 in.	0	0	0	0
June 7, 2014	Thunderstorm Wind	50 kts. EG	0	0	0	0
October 13, 2014	Thunderstorm Wind	50 kts. EG	0	0	0	0
January 25, 2015	Thunderstorm Wind	50 kts. MG	0	0	0	0
March 31, 2015	Hail	1.00 in.	0	0	0	0
April 19, 2015	Thunderstorm Wind	50 kts. EG	0	0	0	0

Date	Type	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
June 9, 2015	Thunderstorm Wind	60 kts. EG	0	0	0	0
June 30, 2015	Hail	1.00 in.	0	0	0	0
June 30, 2015	Thunderstorm Wind	50 kts. EG	0	0	0	0
July 14, 2015	Thunderstorm Wind	56 kts. MG	0	0	0	0
August 10, 2015	Thunderstorm Wind	50 kts. EG	0	0	0	0
		Totals:	1	38	116,571,100	64,000

Source: National Climatic Data Center

Probability of Future Severe Storm Events

Frequent annual events are certain. Past trends show multiple annual occurrences of thunderstorms, hail, and lightning, which trends are likely to continue and can be expected to affect all Jefferson County jurisdictions. High winds, which sometimes accompany severe storms as described here, are however, somewhat less frequent. Large, damaging hail does occasionally occur, but is relatively rare.

Winter Storms/Freezes Profile

Although winter storms in Alabama are not as common as in more northern regions of the U.S., Jefferson County frequently experiences winter storms and extreme colds. Such storms are usually relatively mild, characterized by an occasional dusting of snow or short freezing rainfalls. Rarely does snowfall exceed two inches nor does freezes disrupt road travel for long periods. On average the County receives about 1.14 inches of snowfall per year. When the occasional snow storm or severe freeze does occur, however, major transportation disruptions and power outages may be experienced. This is largely due to local inexperience in coping with such infrequent occurrences. Consequently, the risks associated with this type of weather are largely a direct correlation to the community's ability to handle the storm. These risks include loss of life due to cold, loss of electricity for extended periods of time, agricultural damage, and road hazards. Fallen trees and limbs and heavy snow loads can cause roof collapses and downed power and communications lines. Heavy snowfalls over two inches and long-lasting freezes are more infrequent but create higher risks. Disruptions can last for several days following these extreme winter storm conditions.

Location, Extent and Intensity of Potential Winter Storms/Freezes

Jefferson County and its participating jurisdictions are equally likely to experience winter storms/freezes, which may include snow, freezing rains, and extreme temperature lows. All areas of the county are equally exposed to these types of weather events with somewhat colder temperatures and snowfall frequency in the higher elevations.

On average, Jefferson County experiences annual disruptions and some damages due to severe winter storms/freezes. The average snowfall is 1.2 inches yearly, but some events have produced major disruptions and damages. Winter temperatures on average are above freezing, but occasional freezes do occur. The HMPC rated the extent of winter storms/freezes as moderately high.

Previous Occurrences of Winter Storms/Freezes

Table 5.11 – Winter Storm Events and Damages and Table 5.12 – Extreme Cold Events and Damages below, provide summaries of the historical data available from the National Climatic Data Center (NCDC) on winter storm and extreme cold events, respectively, since 1995. Prior to 1995, no official records are available from the NCDC. According to these records, since 1995 there have been 11 recorded winter storm events and 22 extreme cold events affecting Jefferson County.

The greatest single event in recent memory occurred in March 1993 when 13 inches of snowfall fell on most of Jefferson County within a 24 hour period, and damages statewide totaled $5.0 billion dollars. This event is commonly referred to as the — Blizzard of 1993, which had severe impacts throughout the eastern U.S., affecting 26 states and parts of Canada. The storm began on Friday March 12, 1993, and lasted through mid- day Saturday, March 13, 1993. By mid-day Saturday snow had accumulated to 13 inches over most of the County. An estimated 400,000 homes in Alabama were without electricity, many for several days. Compounding the snow and power outages, temperatures fell well into the single digits and teens across much of the state Saturday night. There were at least 14 deaths associated with the storm. The entire state was declared a Federal Disaster Area.

From January through March, 1996, a series of winter storm and extreme cold events impacted the northern approximately two-thirds of Alabama, causing over $53 million in mostly crop damage. Beginning the evening of Saturday, January 6, a winter storm brought a mixture of freezing rain, sleet, and snow to the northern two-thirds of Alabama. Precipitation began as freezing rain and sleet but quickly changed to snow. The precipitation coated roads and caused serious travel problems across the northern sections of the state, lasting through the Monday morning the 8th. Snowfall amounts were generally light with many locations in the Jefferson County area accumulating from one-quarter of an inch to an inch and a half.

Less than a month later during Thursday afternoon February 1st, a winter storm brought freezing precipitation to the northern half of Alabama, including Jefferson County. A period of freezing rain followed by light snow brought traffic to a complete standstill across the area. Power outages were widespread but not as severe as they might have been, with pockets of outages caused by downed trees due to ice accumulations. Snow accumulations ranged from one to three inches across the area and some school systems were closed for several days. Most precipitation hand ended across the state by Saturday morning, the 3rd, and was followed by a strong Arctic cold front lasting through Monday, the 5th, which saw record lows established all across the state. Birmingham experienced a record low of 4°F on February 3rd, and 6°F on February 5th.

The morning of March 7th, saw the beginning of three full days of sustained extreme cold weather across much of the state, causing $54 million dollars of crop damage. During this event, Birmingham recorded record lows of 18°F on March 8th and on March 9th 15°F.

Table 5.11 – Winter Storm Events and Damages

Date	Type	Deaths	Injuries	Property Damage	Crop Damage
Saturday, January 06, 1996	Winter Storm	0	0	10,000	1,000
Thursday, February 01, 1996	Winter Storm	0	0	25,000	0
Friday, January 28, 2000	Winter Storm	0	0	25,000	0
Sunday, January 09, 2011	Winter Storm	0	0	0	0
Tuesday, January 28, 2014	Winter Storm	0	0	0	0
Wednesday, February 12, 2014	Winter Storm	0	0	0	0
	Totals:	0	0	60,000	1,000

Source: National Climatic Data Center

Table 5.12 – Extreme Cold Events and Damages

Date	Type	Deaths	Injuries	Cost
April 9, 2000	Extreme Cold/wind Chill	0	0	0.00K
October 9, 2000	Extreme Cold/wind Chill	0	0	0.00K
October 10, 2000	Extreme Cold/wind Chill	0	0	0.00K
December 1, 2000	Extreme Cold/wind Chill	0	0	0.00K
December 31, 2000	Extreme Cold/wind Chill	1	0	0.00K
September 26, 2001	Extreme Cold/wind Chill	0	0	0.00K
October 17, 2001	Extreme Cold/wind Chill	0	0	0.00K
February 28, 2002	Extreme Cold/wind Chill	0	0	0.00K
February 28, 2002	Extreme Cold/wind Chill	0	0	0.00K
May 20, 2002	Extreme Cold/wind Chill	0	0	0.00K
January 24, 2003	Extreme Cold/wind Chill	0	0	0.00K
	Totals:	1	0	0.00K

Source: National Climatic Data Center

Probability of Future Winter Storm/Freeze Events

Based on historical information, Jefferson County can expect an average of one winter storm event per year. Although one can extract data and probability of occurrence from historical information, the risk of a winter storm occurring and the location of damage are random. The risks associated with the average annual hazard are slight, but the more infrequent but severe winter storms/freezes have potentially severe risks. These severe winter events can cause major transportation disruptions, lengthy power outages, substantial property damages, and occasional loss of life.

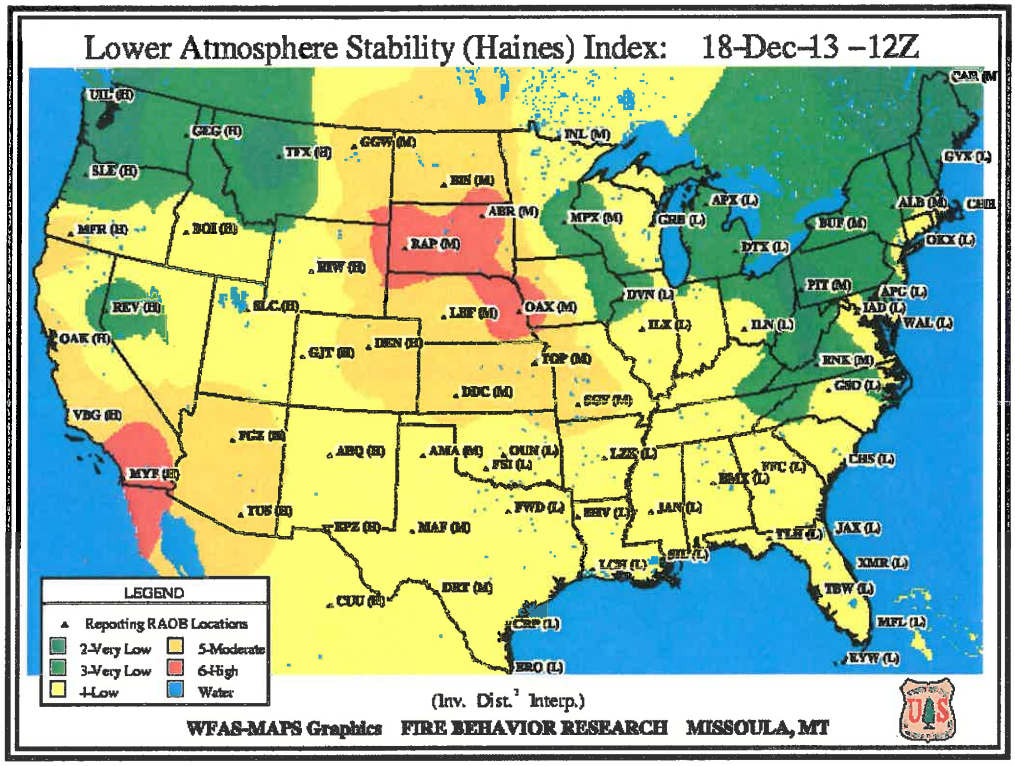
Wildfire Profile

The two primary categories of wildfires experienced in Jefferson County are wild land fires and interface fires. Wild land fires are fueled exclusively by natural vegetation. Jefferson County has significant forested lands, grass lands, and brush to fuel wildfires. Interface fires are fueled by both vegetation and the built up environment. Due to the current growth in Jefferson County, significant new development is pushing urbanization into rural landscapes. This is known as the wild land-urban interface. With this urban-to-rural movement comes the increased risk of man-made wildfires.

A major problem in relation to wildfires is non-permitted burns. These burns tend to rage out of control, leading to damaging fires. Without the practice of prescribed burns, thinning, mowing and the use of herbicides, vegetation that will spread fires can proliferate causing more of a threat with

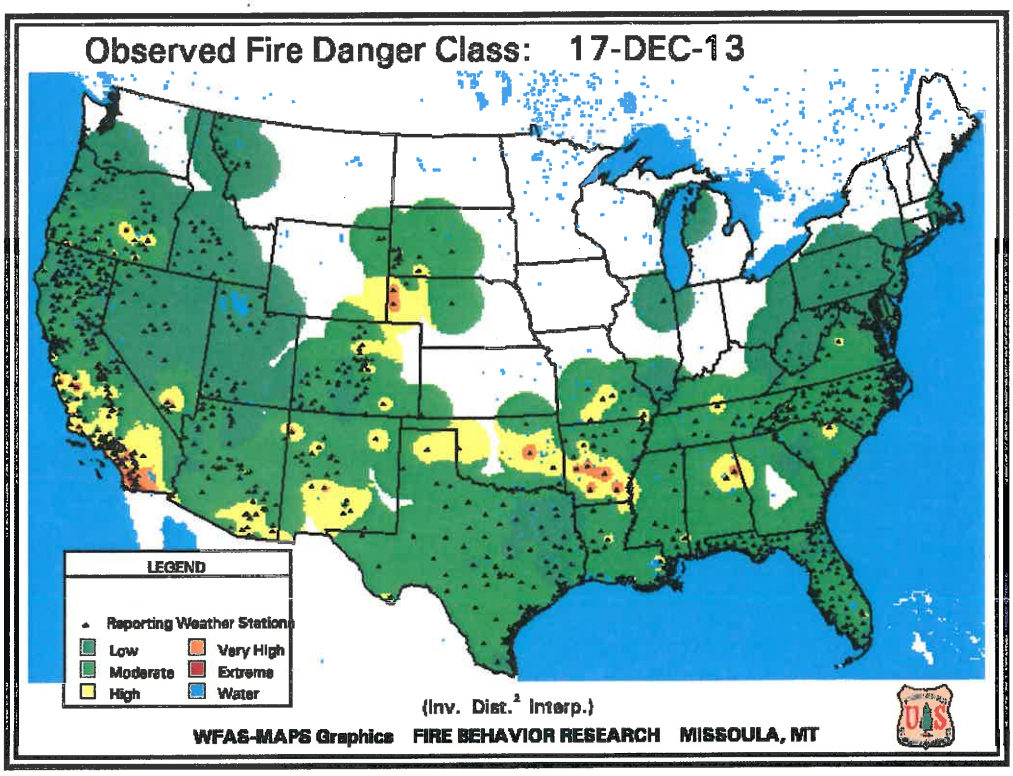
the additional fuel sources for wildfires. The practice of prescribed burns not only helps reduce the fuels available for wildfires, but also aids in the development of certain habitats and the regeneration of certain species. The following maps illustrate areas across the country and their susceptibility to wildfires.

Map 5.8 – National Fire Hazard Map 1



Source: National Climatic Data Center

Map 5.9 – National Fire Hazard Map 2



Source: National Climatic Data Center

Location Extent and Intensity of Potential Wildfires

It is primarily the rural areas of unincorporated Jefferson County that are susceptible to wildfires; however, wildfires can occur in any area where there is the proper fuel, topography, and weather mix. The vulnerable wild land-urban interface makes all cities and towns equally susceptible.

Jefferson County has multiple fuel sources and is prone to periodic drought and thunderstorms which increase the potential severity of wildfires significantly. Considerable expanses of forestland in the rural portions of the county provide an abundant fuel source. Weather conditions, given the high frequency of severe storms with lightning and periodic severe drought conditions, can exacerbate wildfires.

Another factor that has direct impact on wildfire formation and increase the risk for wildfires in Jefferson County is topography. Topography can have a powerful influence on wildfire behavior. Slope, canyons, gulches, and hollows can greatly increase the rate of spread and hamper access. These slopes lend themselves to rapid spreading fires due to their angle. The greater the slope, the faster the flames move and the longer the flames. Wildfires can reach into overhanging canopies, allowing spread not only through the lower areas of the forest, but the ability to jump to other trees. The ridge and valley pattern extent in the eastern and southern portions of Jefferson County can make suppression efforts in these areas difficult and time consuming.

The degree of exposure of properties at the wild land-urban interface also affects the extent of wildfires in Jefferson County, especially at the edge of developed areas of cities and town. High risk properties located within these interface areas have the greatest potential for property damages and threats to life.

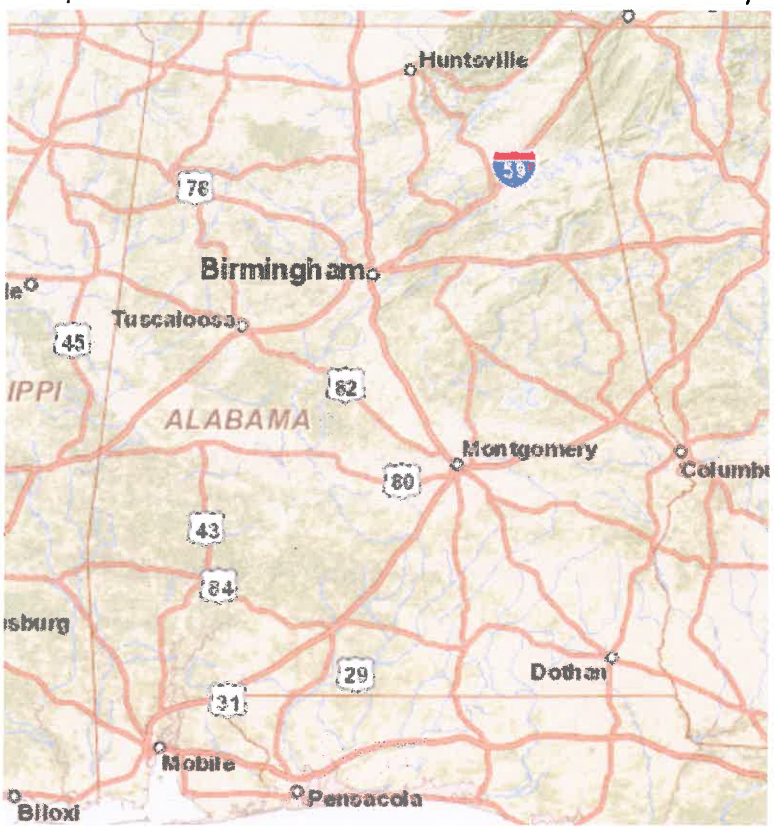
Finally, firefighting resources can affect the severity of wildfires. Rural fire departments are almost exclusively made up of volunteers and usually have limited resources that are stretched during periods when numerous fires occur. These limited firefighting resources can compound the risk and extent of wildfire damages.

Past Occurrences of Wildfires

Jefferson County has suffered many large fires in the recent past. According to the Alabama Forestry Commission, Jefferson County averages 140 wildfires per year with an average of 1,533 acres burned. Specifics on individual wildfires may be found by contacting the Alabama Forestry Commission. This data is not readily available. Recent significant events include fires that occurred in the City of Hoover and Western Jefferson County around the Towns of Maytown and Sylvan Springs in 1999.

The weather is a natural contributor to wildfire occurrences. Extreme dry weather creates the perfect conditions for woodlands ready to spread fire rapidly. Droughts increase the inflammability of vegetation and pose greater difficulty in suppressing fires. In the midst of the 2006-2008 drought, in March 2007, a very dry month, there were approximately 1,000 acres a day burned in the State of Alabama. In addition to drought, lightning can strike woodlands setting them on fire and trees that had been downed through severe weather events can add to the vegetative fuels to make timber for fires. Map 5.10 – Recent Wildfire Locations in Jefferson County identifies the location of previous wildfires shown in yellow.

Map 5.10 – Recent Wildfire Locations in Jefferson County



Source: Alabama Forestry Commission

Probability of Future Wildfire Events

Based on historical information, the county can expect an average of eight significant wildfires per year. Although one can extract data and probability of occurrence from historical information, the risk of a wildfire occurring and the location of damage appear to be random.

Hurricanes Profile

Although Jefferson County is more than 200 miles inland from the Gulf Coast, it is not immune to the damaging effects of hurricanes. Since 1994, 20 hurricanes/tropical storms have affected the state of Alabama, see Table 5.14 – Alabama Hurricane Events 1950 - 2012, below. Although not all had an impact on Jefferson 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 Jefferson County. The strongest of these storms was Hurricane Katrina.

The National Oceanic and Atmospheric Administration (NOAA) reports the impact of the most significant hurricane event to affect Jefferson County, Hurricane Katrina, as follows:

Hurricane Katrina made landfall along the Gulf Coast early Monday morning August 29, 2005, as a large category four hurricane. Sustained winds were around 145 mph in southeast Louisiana. Katrina

continued northward affecting areas from New Orleans to Mobile. Devastating damage occurred along the Gulf Coast and New Orleans sustained major damage and flooding. Katrina weakened to a tropical storm by Monday evening, August 29, 2005, northwest of Meridian. Katrina continued northward across eastern Mississippi overnight. Katrina produced local effects that were widespread across central Alabama. Numerous trees and power lines were knocked down during Katrina. Numerous structures, homes and vehicles were damaged. Power outages were extensive. Thousands of trees and power lines were brought down, minor to major structural damage occurred and power outages were lengthy and widespread. Several locations remained without power for a week or longer.

Six tornadoes occurred across central Alabama in association with Katrina, for F-0's and two F-1's. Storm total rain amounts ranged from one inch or less in the northeast to 5 to 6 inches in the northwest counties near the Mississippi state line. Only Tuscaloosa County reported flash flooding with minor flooding occurring in the upper Tombigbee River. Alabama Power reported that this was the worst event in their history for damage and power outages statewide.

A few storm total rain amounts include Hamilton - 4.82 inches, Addison -3.62 inches, Troy - 2.18 inches and Selma - 2.00 inches. A few peak wind gusts reported include Birmingham -60 mph, Cuba -80 mph, Fayette - 75 mph, Oakmulgee - 49 mph and Vance - 68 mph. Many locations west of a line from Selma to Hamilton may have experienced wind gusts up to 80 mph.

Two men were injured in Tuscaloosa County when a tree fell in front of their vehicle and then the vehicle slid under it. One person was slightly injured when a tree fell on their home in Pickens County. One man was injured when a tree fell on his car in Marengo County. In Hale County, two people were injured when a tree fell on their mobile home. One man was injured when a tree fell onto his home. One man was injured when he left his vehicle as trees fell around him and he was subsequently hit by another vehicle.

The remnants of Hurricane Katrina moved northward along the Alabama/Mississippi state line. Katrina was still a strong tropical storm as the center passed just west of North Alabama during the evening hours of August 29th. Most of North Alabama experienced tropical storm force wind gusts for several hours with a few wind gusts as high as 60 mph being reported. While structural damage was very limited, a few homes did receive minor roof damage due to the loss of a few shingles. Numerous trees and power lines were blown down across the entire area and thousands of people lost power. Katrina moved relatively quickly to the north and thus rainfall was limited. Rainfall amounts were around four to five inches near the Alabama/Mississippi line but tapered off significantly farther to the east with locations near the Alabama/Georgia line only seeing a half inch or less.

Location, Extent and Intensity of Potential Hurricanes

All Jefferson County locations and jurisdictions generally share equal risk for hurricanes. Hurricanes and tropical storms lose intensity and experience significant reductions in wind velocity as they move inland. Due to Jefferson County's inland location, therefore, the primary risk from hurricanes is the impact of high winds, the formation of tornados and flooding.

Tropical storms and depressions often bring torrential rains and flooding, which may last for days after the storm has passed. The dissipated strength of the inland storm does not necessarily affect the amount of rainfall and resultant flood levels. A weak tropical storm or depression moving slowly or lingering can cause more damage due to flooding than a fast moving hurricane. Tornadoes may also occur but not always - some produce none, while others spawn numerous ones. According to hurricane records, half produce one or more tornadoes with capabilities to compound wind damages. A tornado normally occurs within 12 hours of landfall and during daylight hours. This timeframe is within reach of Jefferson County. Normally, a tornado watch will usually follow the projected inland path of a hurricane.

Previous Occurrences of Hurricanes

Prior to Hurricane Katrina, 1995's Hurricane Opal was the most significant storm to affect Jefferson County. NOAA reports the impact of that event as follows:

Hurricane Opal moved ashore in the Florida Panhandle then moved north-northeast across the state of Alabama. Damage was extensive and no county in the state was spared some effect of the storm. Damage was the greatest in the eastern counties with damage decreasing from east-to-west across the state. Damage also decreased as you went north in the state. Damage varied with many trees, signs, and power lines downed. At the worst, 2.6 million people in Alabama were without electricity, some for over a week.

The center of the storm entered the state near the Covington/Escambia County line on the Florida border. It moved north-northeast with the center moving just west of the city of Montgomery, near the City of Talladega, and near Fort Payne before exiting the state near the northeast tip. Primary damage came from strong wind which toppled trees and power lines and damaged signs. Mobile homes were damage both by falling trees and by strong wind. Wind speeds varied across the state. Heavy rain also caused creeks and streams to swell to bank full and beyond, however, there were very few reports of water flooding buildings. Water damage occurred to structures in many locations where wind or falling trees damaged roofs.

Two people were killed in Gadsden, Etowah County, when high wind toppled a massive oak tree onto their mobile home. Several other people were killed in the state but those deaths such as house fires and asphyxiation were not directly attributable to the weather. Damage figures are estimates from information obtained from the American Red Cross, Alabama Emergency Management Agency, and newspaper articles. Additional information on Hurricane Opal can be found under the heading for Southwest Alabama prepared by the National Weather Service Office in Mobile and under Southeast Alabama prepared by the National Weather Service Office in Tallahassee, FL.

As discussed above, some 20 hurricanes have impacted Alabama since 1994, with varying impacts on Jefferson County, mostly due to high winds and severe thunderstorms, and the occasional tornado. Table 5.13 – Alabama Hurricane Events 1950 – 2012 lists these nineteen hurricanes.

Table 5.13 – Alabama Hurricane Events 1950-2012

Name	Date	Category
Baker	August 31, 1950	1
Camille	August 17, 1969	5
Eloise	September 23, 1975	1
Frederic	September 13, 1979	4
Elena	September 2, 1985	3
Juan	November 1, 1985	1
Andrew	August 28, 1992	5
Opal	October 5, 1995	4
Danny	July 22, 1997	1
Georges	October 1, 1998	4
Ivan	September 17, 2004	5
Dennis	July 11, 2005	4
Irene	August 4, 2005	3
Katrina	August 30, 2005	5
Rita	September 26, 2005	5
Gustav	September 7, 2008	4
Ike	September 15, 2008	4
Isaac	September 3, 2012	1
Sandy	October 25, 2012	3

Source: Wikipedia December 18, 2015

Table 5.14 – Most Costly Hurricanes, 1995-2011, below, provides summary statistics on the most significant hurricanes to impact Alabama by cost since 1992.

Table 5.14 – Most Costly Alabama Hurricanes, 1995-Current

Name	Cost	Year	Category
Katrina	125. Billion	2005	5
Andrew	26.5 Billion	1992	5
Ivan	23.3 Billion	2004	5
Irene	16.6 Billion	2011	3
Georges	9.72 Billion	1998	4
Gustav	6.61 Billion	2008	4
Opal	5.41 Billion	1995	4

Source: Wikipedia December 18, 2015

Probability of Future Hurricane Events

As is the case with most natural hazards, past records are no guarantee of the probability of future hurricane events affecting Jefferson County. However, based on historical data, the County can reasonably expect some impact from at least one hurricane or tropical storm per year. The level of risk and location of potential damage within Jefferson County is random, and cannot be accurately predicted with historical data.

Droughts/Heat Waves Profile

The biggest weather story of 2007 for Jefferson County and Central Alabama was the historic drought, with that year becoming the driest on record. With drought conditions carrying over from 2006, by

late spring of 2007, the drought moved up to a D4 Exceptional Drought intensity, the highest intensity, which is characterized by widespread crop and pasture losses, wildfires, and severe shortages of water resources in reservoirs, streams, and wells. The drought was not limited to Jefferson County and Central Alabama; it became widespread, affecting most of the southeastern U.S.

During this historic drought of 2006-2008, exceptional conditions affected every segment of the population: crop yields were greatly below normal; livestock suffered as ponds and wells dried up; forestry weakened; trees became more brittle and vulnerable to snapping during severe weather events; lake levels fell with many boats and docks in Central Alabama standing on dry land and marinas closing; major shipping routes throughout Alabama became almost impassable; and lawns and gardens dried up as many communities imposed strict water restrictions. Drought conditions persisted throughout 2008 until being lifted on December 16. The weather story of year 2007 was heightened by one of the warmest years of record in Central Alabama.

Location, Extent and Intensity of Potential Droughts/Heat Waves

Droughts and heat waves occur countywide, affecting all Jefferson County jurisdictions. Some areas may be more susceptible to the effects of drought such as agricultural areas and areas with vulnerable water supplies.

The drought event that occurred during 2007 was the driest time in recorded history, which dates back over a century. The National Weather Service in Huntsville indicated that Jefferson County was in a mild to moderate drought as early as June 2006 that continued to worsen through 2007. It ranks as the driest calendar year in history with only about 25% of the annual average of nearly 60 inches. During the spring of 2008 there was some needed rain when the drought status was downgraded and lifted by year's end.

Previous Occurrences of Potential Droughts/Heat Waves

Jefferson County occasionally experiences short droughts, as well as nearly four extreme summer heat events annually. Often periods of successive annual drought events are followed by several years with no recorded drought conditions. Records at the National Oceanographic and Atmospheric Administration (NOAA) and the National Climatic Data Center (NCDC) recorded one drought each, in 1999 and 2000, with no subsequent drought conditions until the major drought of 2006-2008. The events of 1999-2000 were part of the same weather pattern that impacted area streams, lakes and the public water supply, and may have contributed to the formation of numerous sinkholes in the City of Trussville during 2001. Additionally, a federal disaster resulting from drought was declared on August 16, 1977, Source: FEMA Region IV.

According to the NCDC records, there have been 25 drought events and 45 extreme heat events affecting Jefferson County since 1999 and 1995, respectively. The following tables summarize these events annually, and a more detailed account of these events is recorded in Appendix E —Hazard Profile Data.

Table 5.15 – Drought Events Annual summary 1999 - Current

Date	Type	Deaths	Injuries
8/1/1999	Drought	0	0
5/1/2000	Drought	0	0
7/18/2006	Drought	0	0
8/1/2006	Drought	0	0
9/1/2006	Drought	0	0
3/27/2007	Drought	0	0
4/1/2007	Drought	0	0
5/1/2007	Drought	0	0
6/1/2007	Drought	0	0
7/1/2007	Drought	0	0
8/1/2007	Drought	0	0
9/1/2007	Drought	0	0
10/1/2007	Drought	0	0
11/1/2007	Drought	0	0
12/1/2007	Drought	0	0
1/1/2008	Drought	0	0
2/1/2008	Drought	0	0
3/1/2008	Drought	0	0
4/1/2008	Drought	0	0
5/1/2008	Drought	0	0
6/1/2008	Drought	0	0
7/1/2008	Drought	0	0
8/1/2008	Drought	0	0
10/12/2010	Drought	0	0
8/2/2011	Drought	0	0
	Totals:	0	0

Source: National Climatic Data Center

Table 5.16 – Extreme Heat Events Annual Summary 1996-Current

Date	Type	Deaths	Injuries	Cost
2/23/1996	Heat	0	0	0
5/23/1996	Heat	0	0	0
5/24/1996	Heat	0	0	0
1/3/1997	Heat	0	0	0
3/1/1997	Heat	0	0	0
9/27/1998	Heat	0	0	0
11/1/1998	Heat	0	0	0
12/1/1998	Heat	0	0	0
12/4/1998	Heat	0	0	0
12/5/1998	Heat	0	0	0
12/6/1998	Heat	0	0	0
2/6/1999	Heat	0	0	0
2/7/1999	Heat	0	0	0
2/11/1999	Heat	0	0	0
4/1/1999	Heat	0	0	0
4/3/1999	Heat	0	0	0
8/1/1999	Heat	0	0	0
8/11/1999	Heat	0	0	0
8/13/1999	Heat	0	0	0
8/19/1999	Heat	0	0	0
1/2/2000	Heat	0	0	0
1/3/2000	Heat	0	0	0
5/1/2000	Heat	0	0	0
7/19/2000	Heat	0	0	0
7/20/2000	Heat	0	0	0

Date	Type	Deaths	Injuries	Cost
11/1/2000	Heat	0	0	0
2/16/2001	Heat	0	0	0
1/29/2002	Heat	0	0	0
1/29/2002	Heat	0	0	0
4/19/2002	Heat	0	0	0
4/20/2002	Heat	0	0	0
11/10/2002	Heat	0	0	0
11/2/2003	Heat	0	0	0
11/3/2003	Heat	0	0	0
11/5/2003	Heat	0	0	0
1/3/2004	Heat	0	0	0
1/2/2005	Heat	0	0	0
1/3/2005	Heat	0	0	0
11/8/2005	Heat	0	0	0
11/9/2005	Heat	0	0	0
1/2/2006	Heat	0	0	0
8/8/2007	Heat	1	31	0
8/1/2010	Heat	0	0	100,000
7/1/2012	Heat	0	0	0
7/5/2012	Heat	0	0	0
	Totals:	1	31	100,000

Source: National Climatic Data Center

Probability of Future Drought/Heat Wave Events

Based on historical information, the County can expect four to five excessive heat events per year and one drought every two to three years. Although one can extract data and probability of occurrence from historical information, the risk of drought and heat waves and the location of damage are random.

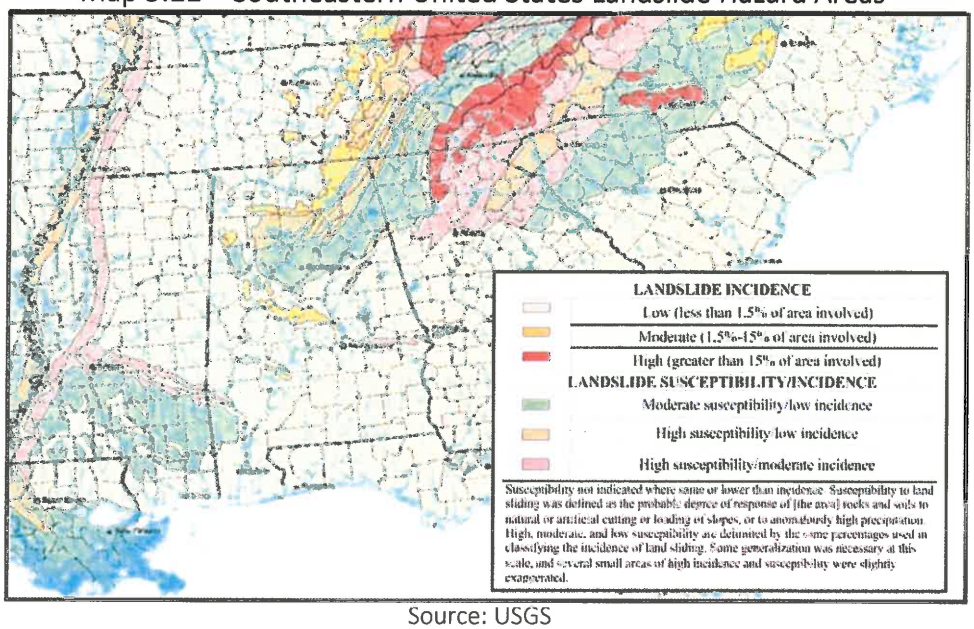
Landslide / Debris Flow

On September 22, 2011 the National Weather Service in Birmingham reported rainfall amounts of 4.95 inches which occurred near Leeds, causing a landslide to occur causing several large rocks to block Dunnavant Road. The majority of landslides in the county result in the collapse of a constructed slope during a rain event.

Location, Extent and Intensity of Potential Debris Flows.

The effects of landslides are often misrepresented as being the result of a landslide triggered event, such as a flood, earthquake, volcanic eruption, hurricane, or coastal storm. The impact from a landslide can include loss of life (FEMA, 25–50 people annually in the US) damage to buildings, lost productivity, disruption in utilities and transportation systems, and reduced property values. As can be seen on Map 5.11 – Southeastern United States Landslide Hazard Areas, Jefferson County lies in an area having a moderate level of susceptibility, but a low incidence of debris flows.

Map 5.11 – Southeastern United States Landslide Hazard Areas



Source: USGS

Previous Occurrences of Landslides

The topography and geology of Jefferson County is susceptible to the effects of landslides. Although we do not have a large history of recorded of landslides, the area prone to landslides include hilly and mountainous terrain especially in areas experiencing new development. Slope failures primarily occur due to improper excavation and failure to protect recently excavated slopes.

Probability of Future Landslide Events

Since historical data of landslide events for Jefferson County is limited, the probability of future occurrences cannot be predicted. These are random events.

Table 5.17 – Landslide Annual Summary 1995 - 2011

Date	Type	Deaths	Injuries	Cost
9/22/2011	Debris Flow	0	0	0
	Totals:	0	0	0

Source: National Climatic Data Center

Sinkholes (Land Subsidence) Profile

Located in the north central portion of the state, the southeastern approximate one-third of Jefferson County is underlain by limestone formations, see Map 5.12 – Limestone Outcrops in Alabama. When limestone interacts with underground water, the water dissolves the limestone to form karst topography which is an amalgamation of caves, underground channels, and a rough and bumpy ground surface. The underground water carves channels and caves that are susceptible to collapse from the surface. Alabama contains over 2,000 caves because of the karst topography.

Building on or near karst areas can pose potential problems and great expense because of damage to buildings or cave-ins forming along roads. When subsidence occurs in developed areas, it can have a significant community impact, including loss of property value, increased cost of insurance and potential injury.

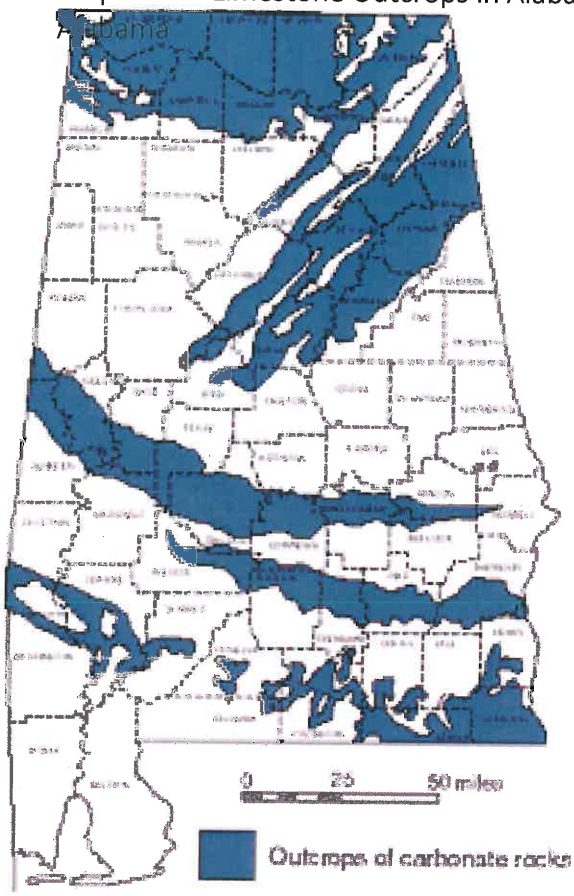
In general, the primary cause of land subsidence is human activity. The human activities that may trigger subsidence include mining and the withdrawal of groundwater. Vibrations from machinery, cars, and drilling equipment can exacerbate sinkholes. Geological Survey of Alabama (GSA) geologists estimate that the substantial increase in sinkhole activity in Alabama since 1950 parallels the period of the State's greatest economic growth.

In addition to human activity, droughts and excessive rainfall can also lead to the formation of sinkholes. According to University of Alabama at Birmingham (UAB) geologist Scott Brande, Ph.D., much of the recent sinkhole activity in Alabama is likely due to the drought of the summer of 2000. Another major period of droughts occurred in 2007 and 2008. During a drought, the groundwater table falls and caves that are normally filled with water may lose the support that the water provided. Eventually, cracks formed during the drought period will cause the roof of the cavity to fail.

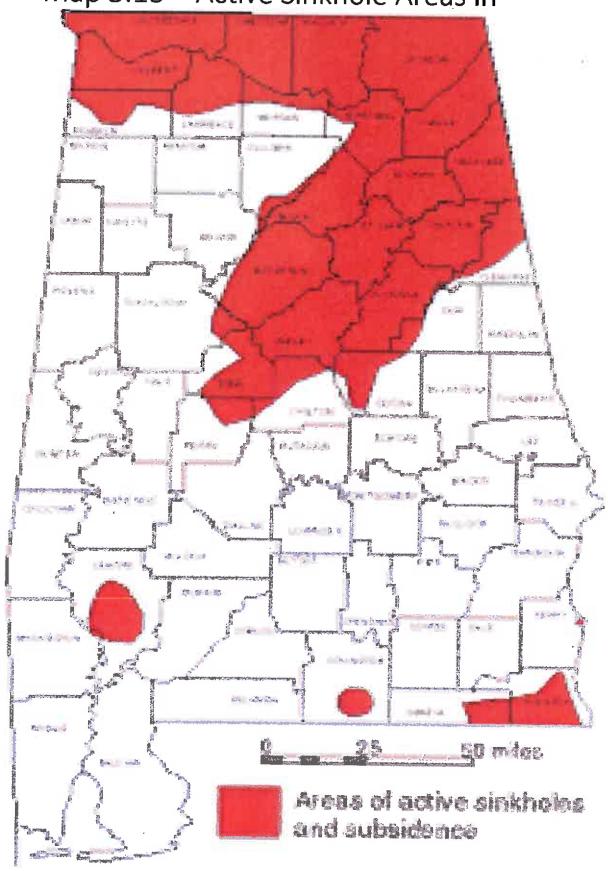
Location, Extent and Intensity of Potential Sinkholes

According to the GSA, Jefferson County is located almost entirely within an area of high sinkhole activity and subsistence, as shown on Map 5.13 – Active Sinkhole Areas in Alabama. Portions of Jefferson County are susceptible to the development of sinkholes. Those that occur are primarily due to the limestone formations or from underground mines. 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.

Map 5.12 – Limestone Outcrops in Alabama



Map 5.13 – Active Sinkhole Areas in



Source: Geological Survey of Alabama

Previous Occurrences of Sinkholes

The GSA estimates over 4,000 sinkholes in Alabama; however, no recent historic data has been compiled in Jefferson County. Further, little documentation about recent sinkhole activities has been archived. To address this informational gap, the GSA is currently creating a new statewide inventory of sinkholes.

Jefferson County is located in a part of the state where the geology is highly susceptible to subsidence, see above Map 5.12 – Limestone Outcrops in Alabama. The Trussville area and the western portion of the county have historically experienced the most damage from land subsidence. A rash of sinkholes has been documented recently, primarily in the Tarrant area, and to a lesser extent in Birmingham. This outbreak of sinkhole activity is likely a by-product of the historic 2006-2008 drought.

Probability of Future Sinkhole Events

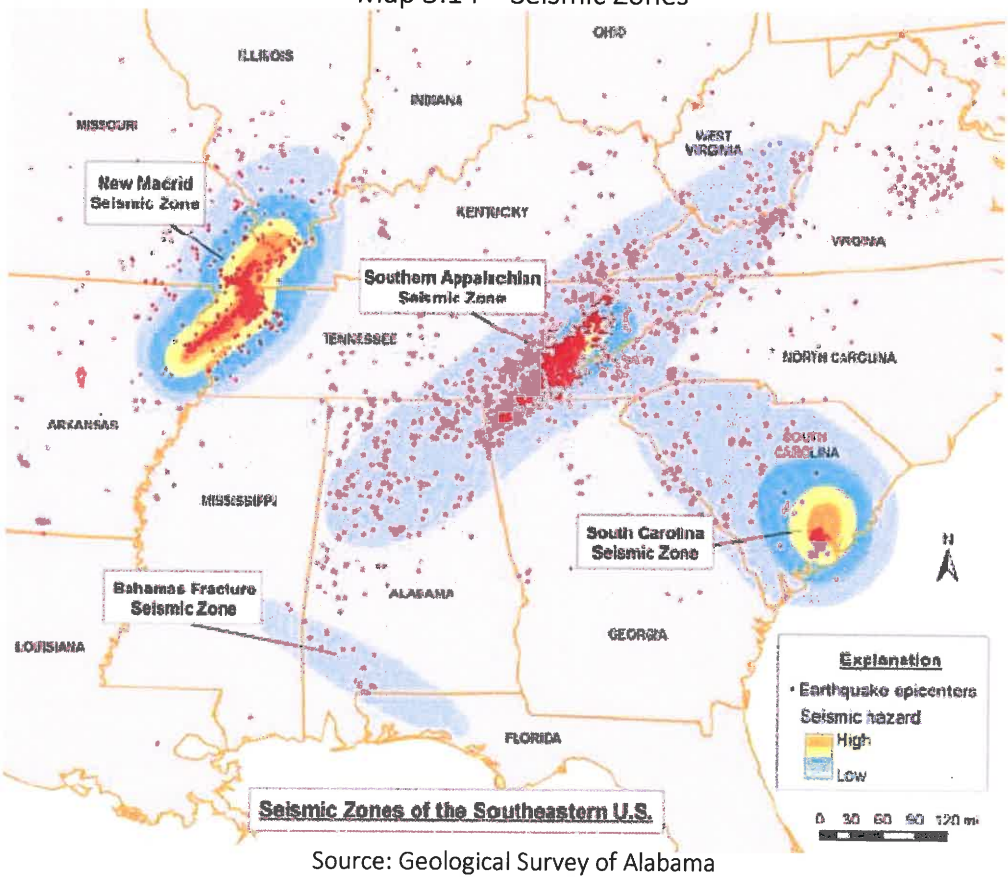
The probability of future occurrences cannot be accurately predicted. Sinkholes are random events, which can be influenced by man's activity, ground water withdrawals, or drought. However, because the county has active sinkholes within areas of increasing urbanization, the probability of future events will likely remain reasonably high, and past trends will likely continue. According to the FEMA

insurance reports, the number of sinkholes in the U.S. has steadily increased over the last several decades, and insurance claims for damages as a result of sinkholes have increased dramatically. The new data collection efforts by the Geological Survey of Alabama may help geologists better predict sinkhole activity within Jefferson County.

Earthquakes Profile

Earthquakes are not uncommon in Alabama, with hundreds of recorded events since 1886. Most of these Alabama earthquakes have been associated with the Southern Appalachian Seismic Zone, as shown on Map 5.14 – Seismic Zones below. Although the Southern Appalachian Seismic extends into an area of low seismic hazard in northern and central Alabama, the impacts of Alabama's largest earthquake of record, the 5.1 magnitude Irondale earthquake of 1916, could be felt in Jefferson County and far beyond. The April 29, 2003, earthquake near Fort Payne measured 4.9 in magnitude in adjacent Dekalb County and many aftershocks followed.

Map 5.14 – Seismic Zones



Source: Geological Survey of Alabama

Location, Extent and Intensity of Potential Earthquakes

All of Jefferson County has a low degree of susceptibility to earthquakes, but the impacts can vary depending on the magnitude and epicenter location. Damages to buildings and infrastructure depend not only on the energy released during an earthquake but also underlying soils and geological characteristics.

According to the Geological Survey of Alabama (GSA), recent seismograph records indicate that earthquakes are frequent but not strong enough to be felt on the land surface. Earthquakes can occur anywhere at any time in Alabama, but most are likely to do little or no damage. Damage reports of incidents have been relatively minor. As discussed in the earthquakes description in this chapter, the severity of an earthquake is measured according to the Modified Mercalli Intensity Scale, shown again in Table 5.18 – Modified Mercalli Intensity Scale below and the magnitude is the measure of energy released by the earthquake on a scale of 1 to 10, with a Jefferson County having a magnitude 4, being felt on land and causing some damage.

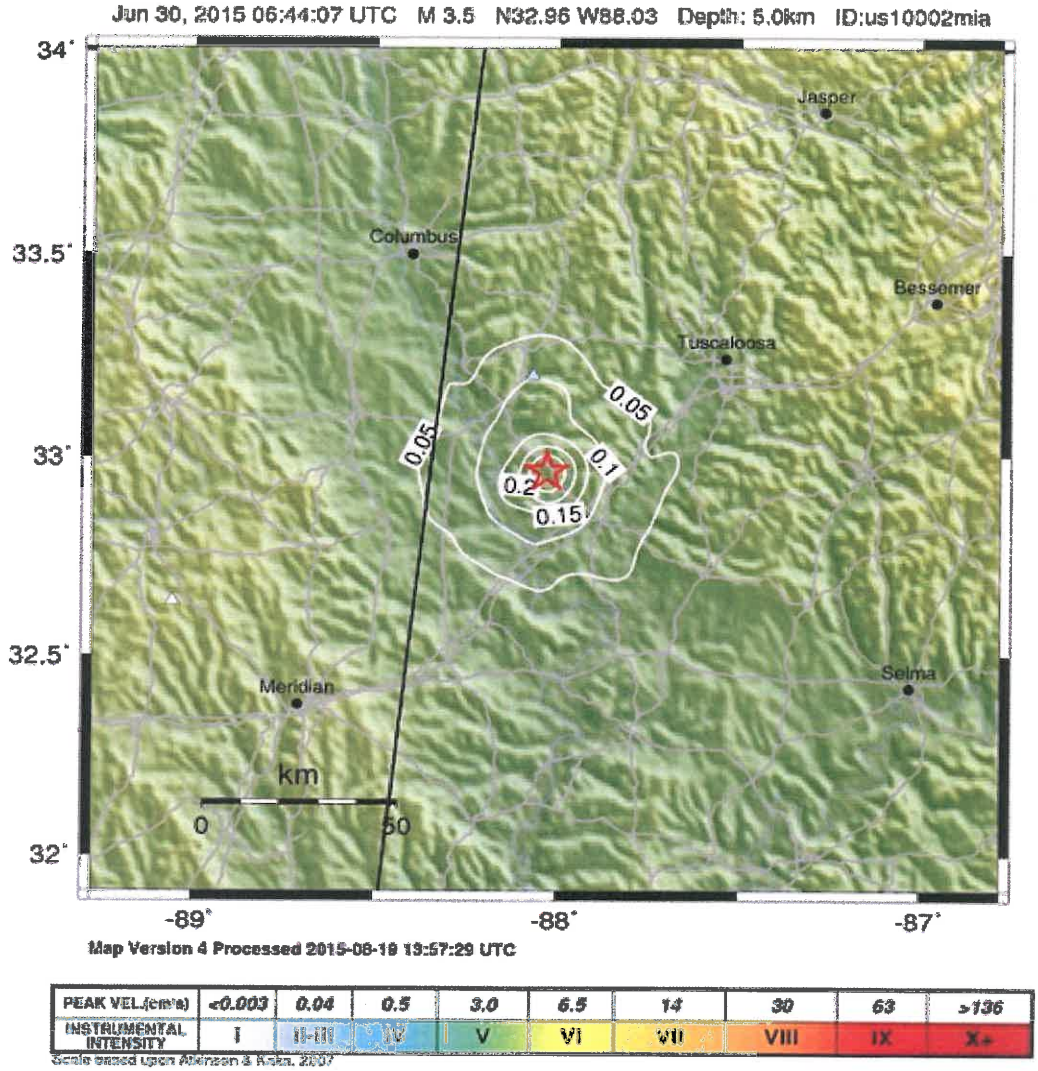
Table 5.18 – Modified Mercalli Intensity Scale

I	Not Felt	Not felt except by a very few under especially favorable conditions
II	Weak	Felt only by a few persons at rest, especially on upper floors of buildings
II	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight
VII	Very Strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent
XI	Extreme	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipe lines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly
XII	Extreme	Damage total. Waves seen on ground surfaces. Lines of sight and level distorted. Objects thrown upward into the air

Source: Geological Survey of Alabama

Ground motion maps are often used to assess the magnitude and frequency of seismic events. These maps measure the probability of exceeding a peak ground motion measured as peak ground acceleration (PGA) within a given period of years. Map 5.15 – Peak Ground Acceleration for Alabama shows the potential severity of earthquakes in northeast Alabama. Jefferson County's severity for a 50 year / 2% probabilistic event is moderately low at 12-14% g, where % g is percentage of the total horizontal ground acceleration of the earthquake event.

Map 5.15 – Peak Ground Acceleration for Alabama

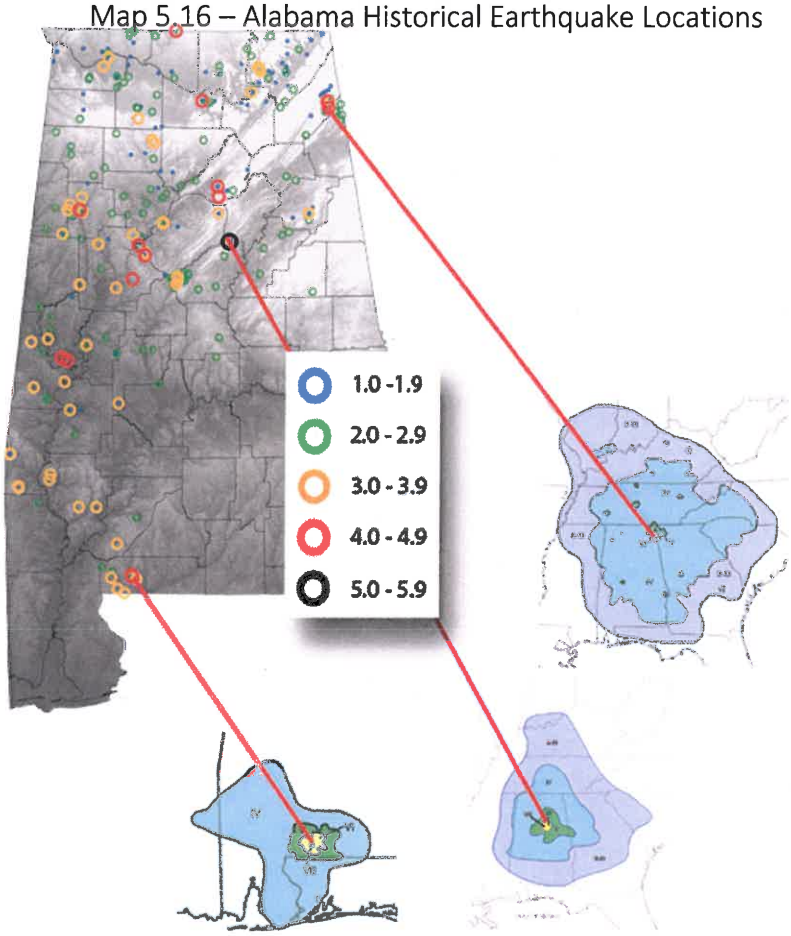


Source: USGS

Previous Occurrences of Earthquakes

Map 5.16 – Alabama Historical Earthquake Locations shows the location and magnitude of recorded earthquakes from 1886 through May 2009. Very few earthquakes with a magnitude greater than 4.0 have been recorded.

Map 5.16 – Alabama Historical Earthquake Locations



Epicenters from 1886 to 2007 and their respective magnitudes
Source: AEMA Earthquake Awareness

Table 5.19 – Historical Earthquakes, 1886 to current

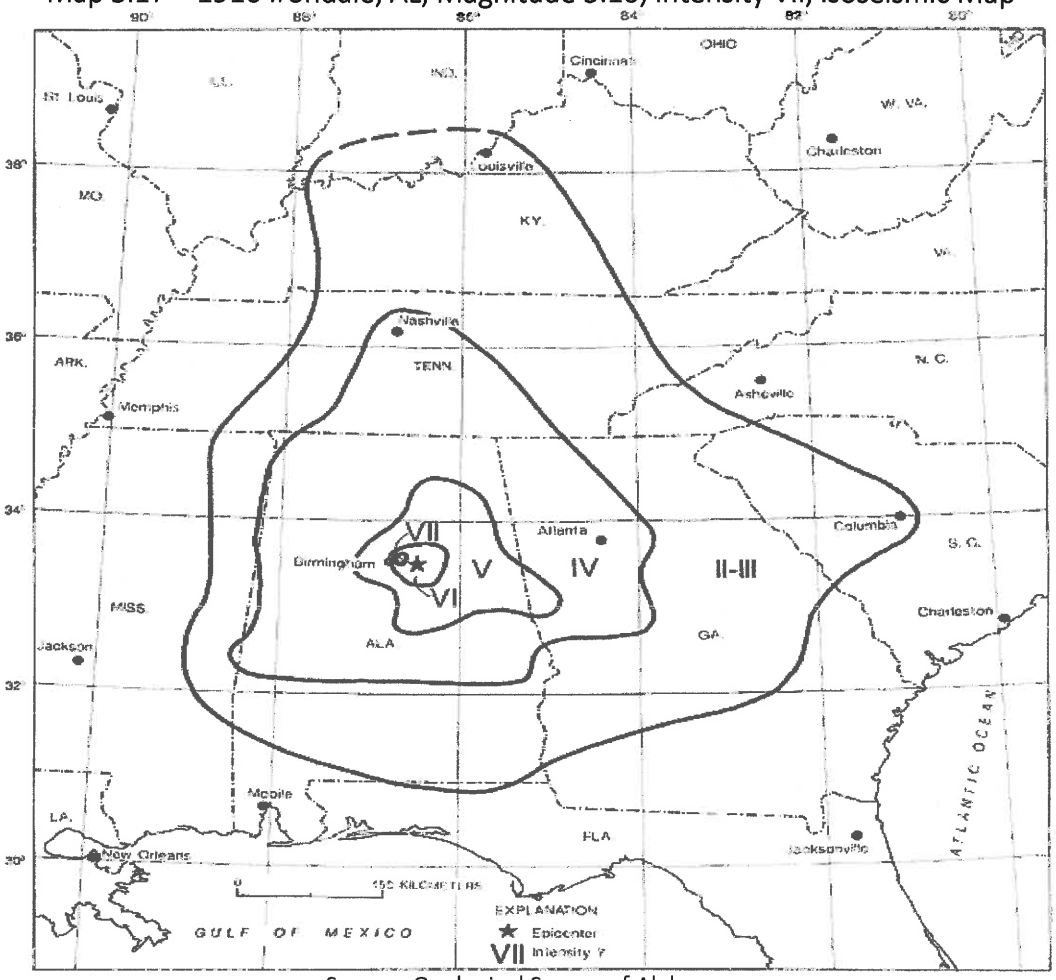
Date	County	Nearest City or Town	Magnitude	Impacts/Notes
2/4/1886	DeKalb	Valley Head	-	(III)
6/16/1927	Jackson	Scottsboro	-	(IV)
6/24/1939	Madison	Huntsville	-	(IV)
4/23/1957	Madison	Farley	-	(VI)
2/18/1964	DeKalb	Ala.-Ga.	-	(IV)
9/28/1975	Blount	Cedar Springs	-	(VI)
5/7/1981	Cullman	Cullman	2.1	Not felt
8/9/1984	Madison	Huntsville	2.9	Not felt
8/24/1984	Madison	Huntsville	1.4	Not felt
8/26/1984	Jackson	Mud Creek	1.3	Not felt
2/19/1985	Jackson	Bridgeport	1.1	Not felt
1/28/1986	Blount	Hendrix	0.9	Not felt
9/3/1986	Jackson	Fackler	1.8	Not felt
11/7/1987	DeKalb	Fort Payne	1.2	Not felt
2/3/1987	Jackson	Hollytree	2.4	Not felt
2/20/1989	Madison	Huntsville	1.3	Not felt
4/23/1989	Cullman	Jones Chapel	1.7	Not felt
6/11/1989	Jackson	Stevenson	0.8	Not felt

Date	County	Nearest City or Town	Magnitude	Impacts/Notes
9/26/1989	Cullman	Lewis Smith Lake	1.7	Not felt
12/15/1990	Morgan	Decatur	1.8	Not felt
1/21/1991	Marshall	Guntersville Dam	1.9	Not felt
3/28/1991	Madison	Huntsville	1.8	Not felt
11/4/1991	Cullman	Cullman	2.3	Not felt
11/10/1991	DeKalb	Dugout Valley	1.8	Not felt
11/17/1991	Cullman	Cullman	1.9	Not felt
3/17/1992	Morgan	Decatur	2	Not felt
4/20/1994	Blount	Blount Springs	2.3	Not felt
5/25/1994	Jackson	Stevenson	2.3	Not felt
7/4/1994	Marshall	Guntersville	0.8	Not felt
10/5/1994	Jackson	Scottsboro	1.2	Not felt
7/31/1997	Jackson	Stevenson	1.6	Not felt (possible blasting event)
8/20/1997	Jackson	Scottsboro	2.3	8 mi SE of Scottsboro
9/14/1997	DeKalb	Fort Payne	1.6	
5/10/1998	Etowah	Gadsden	2.5	
7/30/1998	Jackson	Scottsboro	2	7 mi west of Scottsboro
10/22/1998	Jackson	Scottsboro	1.6	Scottsboro
10/11/1999	Blount	Oneonta	2.5	10 miles NE of Oneonta
4/21/2000	Blount	Oneonta	2.4	7 miles SW of Oneonta
3/12/2001	Marshall	Guntersville	2.3	9 miles NW of Guntersville
6/21/2001	Jackson	Stevenson	2.3	3 miles W of Stevenson
9/10/2001	Marshall	Guntersville	1.7	10 miles NE of Guntersville
12/7/2001	Jackson	Scottsboro	1.6	11 miles WNW of Scottsboro
12/24/2001	Jackson	Scottsboro	2.4	12 miles WNW of Scottsboro.
2/4/2003	Jackson	Scottsboro	1.9	
4/29/2003	DeKalb	Mentone	4.9	10 miles ENE of Fort Payne
6/22/2003	DeKalb	Fort Payne	1.9	7 miles NNE of Fort Payne
7/6/2003	DeKalb	Mentone/aftershock	2.4	
7/15/2003	DeKalb	Mentone/aftershock	2.5	
7/25/2003	DeKalb	Rainsville	2	12 miles WSW of Rainsville
8/16/2003	DeKalb	Alpine/aftershock	2	
6/21/2004	DeKalb	Fort Payne	2.2	3 miles NE of Fort Payne
11/23/2006	Jackson	Larkinsville	1.8	5 miles WNW Scottsboro
6/2/2008	Jackson	Dutton	2.2	3 miles NNW of Dutton
7/18/2008	Jackson	Francisco	2.3	2.9 miles WSW of Francisco
8/1/2008	Jackson	Lim Rock	2.3	1 mile SW of Lim Rock
5/3/2009	Jackson	Woodville, AL	2.2	2 miles NNE from Woodville
To Current			0	NA

Source: Geological Survey of Alabama

Map 5.17 – 1916 Irondale, AL, Magnitude 5.10, Intensity VII, Isoseismic Map below shows the impact of the of the October 18, 1916, Irondale earthquake on Jefferson County, where the measured intensity was between VI and VII, shaking was felt and damages and disruptions occurred.

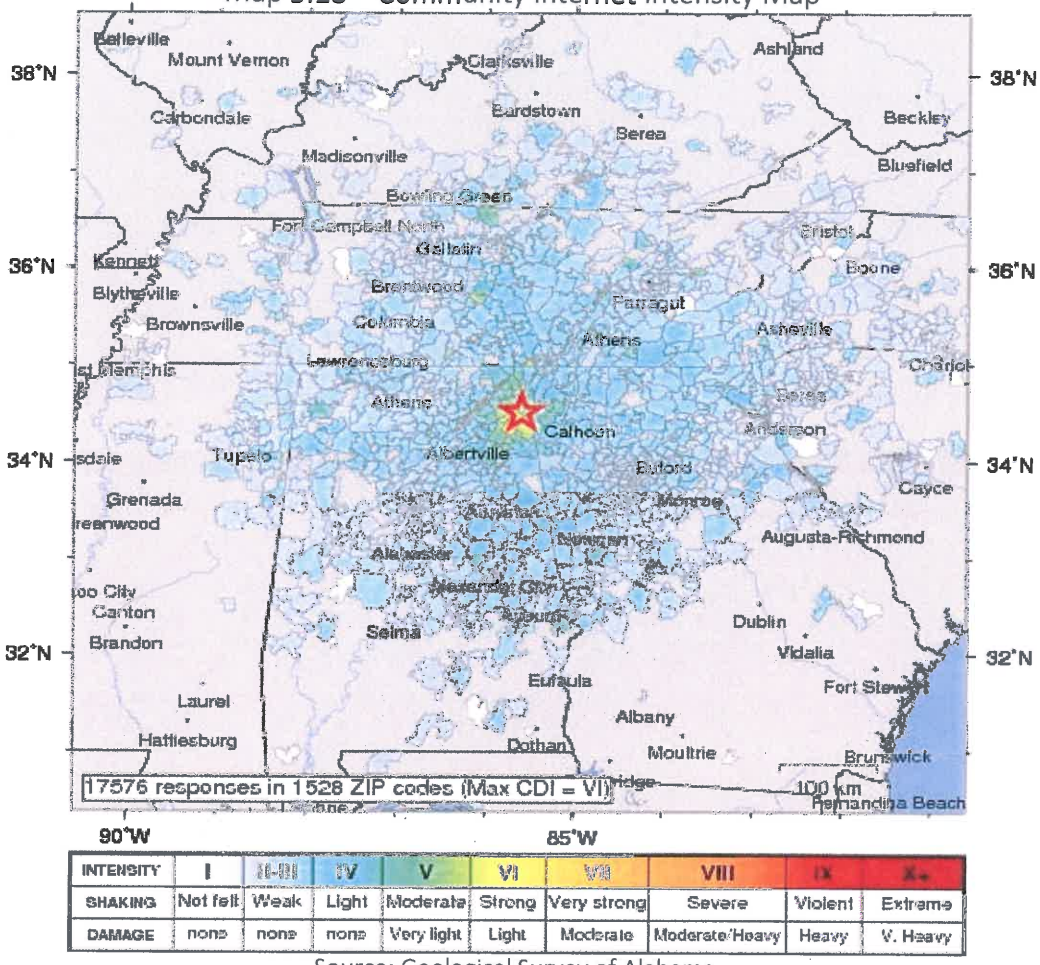
Map 5.17 – 1916 Irondale, AL, Magnitude 5.10, Intensity VII, Isoseismic Map



Source: Geological Survey of Alabama

To assess the impacts of the 2003 Fort Payne Earthquake, 10 miles north of Fort Payne, in DeKalb County, the USGS prepared a Community Internet Intensity Map, which is shown below as Map 5.18 – Community Internet Intensity Map. According to the USGS, the Community Internet Intensity Map (CIIM) summarizes the online questionnaire responses provided by Internet users. An intensity number is assigned to each community from which a completed CIIM questionnaire was received; each intensity value reflects the effects of earthquake shaking from citizens and on structures in the community. The color-coded ZIP Code zone on the map represents the average of the individual intensity values in that ZIP Code zone.

Map 5.18 – Community Internet Intensity Map



Source: Geological Survey of Alabama

Probability of Future Earthquake Events

Although the GSA records show frequent earthquake occurrences in the vicinity of Jefferson County, the probability of damaging earthquakes is not at all likely. Even though the probability of an earthquake event is high, the likelihood of a high magnitude earthquake is extremely low. The historical probability of a damage-causing earthquake with a magnitude exceeding 5.0 within close enough proximity to Jefferson County confirms the unlikelihood of a damaging event.

The 1916 Irondale earthquake is the only earthquake on record that exceeded a 5.0 magnitude over the last 123 years in Jefferson County. The results of the Hazard Mitigation Planning Committee – Hazard identification and Ratings (See Appendix D) supports this same conclusion by giving an average rating for all jurisdictions of low for both probability and extents.

Levee Failures Profile

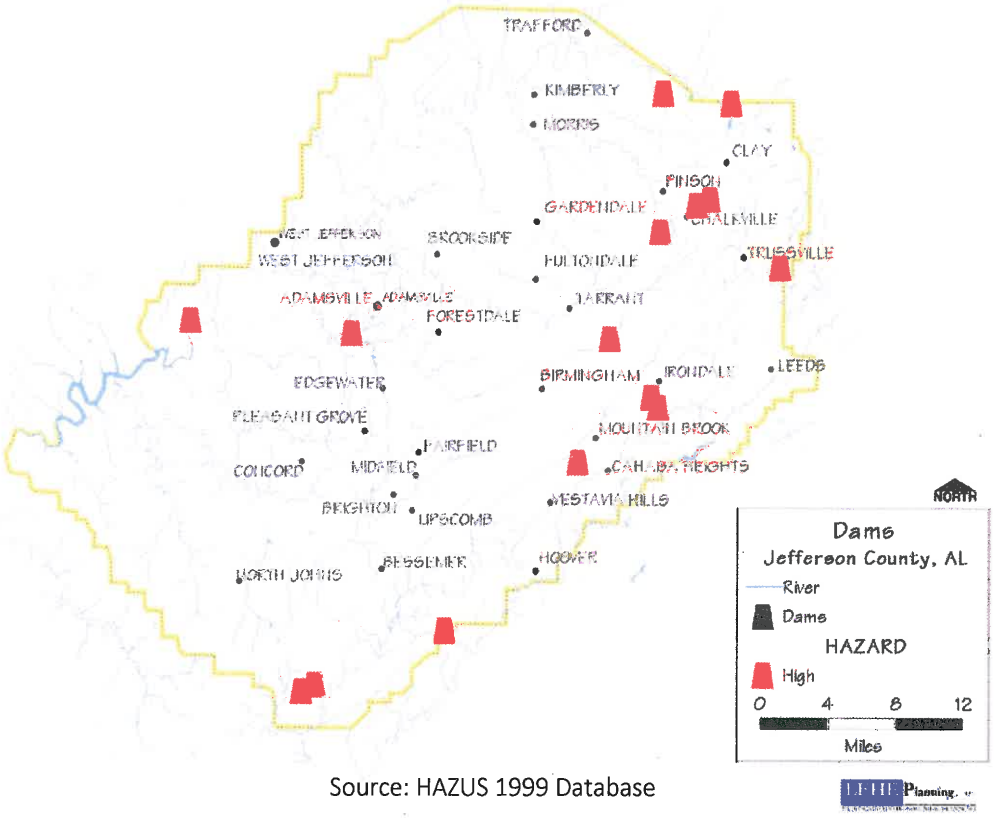
Alabama is only one of two states in the U.S. that currently has no statewide dam safety and inspection program. There have been numerous attempts, beginning in 2002, to pass dam safety legislation, with the last failed effort introduced in the Alabama legislature in February 2008 by HB 454, Alabama

Dam Inventory and Classification Act. This bill would have established the Alabama Dam Security and Safety Program within the Alabama Department of Economic and Community Affairs (ADECA) Office of Water Resources. This is the agency which also administers the National Flood Insurance Program. Once established, the program would provide for a full inventory of dams throughout the state and help benefit public safety and emergency response operations in the event of a natural disaster. The new program would have provided for the permitting and certification of dams that meet specified criteria designed to reduce dam failure.

Location, Extent and Intensity of Potential Dam/Levee Failure

The U.S. Corps of Engineers has mapped all potential inundation areas, and these maps are maintained in the offices of the Jefferson County EMA. As shown on Map 5.19 – Jefferson County Dams there are dams located throughout the county. The dams with the largest reservoirs are indicated as more significant hazards.

Map 5.19 – Jefferson County Dams



Source: HAZUS 1999 Database

Previous Occurrence of Dam/Levee Failure

There have been no documented dam/levee failures within Jefferson County.

Probability of Future Dam/Levee Failure Events

The risks to Jefferson County associated with dam/levee failure are minimal. The probability of future occurrences of dam/levee failures are described in a series of 15 dam inundation studies prepared by the Corps of Engineers in 1984, copies of which are on file in the EMA office.

Summary of Hazards and Community Impacts

Table 5.20 – Summary of Hazards and Community Impacts in this section presents an overview of Jefferson County's vulnerability to the hazards identified in this Plan. County impacts include the following descriptions and measurements:

- Location. This indicator of community impact measures the geographic extent of the identified hazard as county-wide, where the entire geographic area is affected, location specific, where a portion of the community is affected, or minimal, where none or a very insignificant area is affected by the hazard.
- Probability. This measures the likelihood of the hazard occurring within the community, based on frequency of previous occurrences noted in the hazard profiles. The probability scale for frequency is from very low (rare occurrences) to low (every ten or so years) to moderate (every three to ten years) to high (every two to five years) to very high (every year).
- Extent. This indicates the severity level of the hazard and its potential for causing casualties, business losses, and damage to structures. Very high means a potential for devastating casualties, business losses, and structure damage and not severe means insignificant impacts with no potential casualties and minimal economic losses.
- Level of Exposure. This estimates the percentage of structures within the community, including buildings, critical facilities, and infrastructure lifelines, that are exposed to the hazard. High includes more than approximately 25% of the structures, medium includes 10% to 25% of the structures, and low includes less than 10% of the structures.
- Level of Damage Potential. This rates the degree of damage that can be expected should an event take place. A high rating means that more than approximately 5% of the structures in a community could be damaged, medium means 1% to 5%, and low means less than 1% of the structures would be affected by the hazard.

Table 5.20 – Summaries of Hazards and Community Impacts

COMMUNITY IMPACTS OF TORNADOES Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Adamsville	County-wide	High	Severe	High	High
Bessemer	County-wide	High	Severe	High	High
Birmingham	County-wide	High	Severe	High	High
Brighton	County-wide	High	Severe	High	High
Brookside	County-wide	High	Severe	High	High
Cardiff	County-wide	High	Severe	High	High
Center Point	County-wide	High	Severe	High	High
Clay	County-wide	High	Severe	High	High

COMMUNITY IMPACTS OF TORNADOES Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
County Line	County-wide	High	Severe	High	High
Fairfield	County-wide	High	Severe	High	High
Fultondale	County-wide	High	Severe	High	High
Gardendale	County-wide	High	Severe	High	High
Graysville	County-wide	High	Severe	High	High
Homewood	County-wide	High	Severe	High	High
Hoover	County-wide	High	Severe	High	High
Hueytown	County-wide	High	Severe	High	High
Irondale	County-wide	High	Severe	High	High
Kimberly	County-wide	High	Severe	High	High
Leeds	County-wide	High	Severe	High	High
Lipscomb	County-wide	High	Severe	High	High
Maytown	County-wide	High	Severe	High	High
Midfield	County-wide	High	Severe	High	High
Morris	County-wide	High	Severe	High	High
Mountain Brook	County-wide	High	Severe	High	High
Mulga	County-wide	High	Severe	High	High
North Johns	County-wide	High	Severe	High	High
Pleasant Grove	County-wide	High	Severe	High	High
Sylvan Springs	County-wide	High	Severe	High	High
Tarrant	County-wide	High	Severe	High	High
Trafford	County-wide	High	Severe	High	High
Trussville	County-wide	High	Severe	High	High
Vestavia Hills	County-wide	High	Severe	High	High
Warrior	County-wide	High	Severe	High	High
West Jefferson	County-wide	High	Severe	High	High
Jefferson County	County-wide	High	Severe	High	High

COMMUNITY IMPACTS OF SEVERE STORMS Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Adamsville	County-wide	Moderate	Moderately Severe	High	Low
Bessemer	County-wide	Moderate	Moderately Severe	High	Low
Birmingham	County-wide	Moderate	Moderately Severe	High	Low
Brighton	County-wide	Moderate	Moderately Severe	High	Low
Brookside	County-wide	Moderate	Moderately Severe	High	Low
Cardiff	County-wide	Moderate	Moderately Severe	High	Low
Center Point	County-wide	Moderate	Moderately Severe	High	Low
Clay	County-wide	Moderate	Moderately Severe	High	Low
County Line	County-wide	Moderate	Moderately Severe	High	Low
Fairfield	County-wide	Moderate	Moderately Severe	High	Low
Fultondale	County-wide	Moderate	Moderately Severe	High	Low
Gardendale	County-wide	Moderate	Moderately Severe	High	Low
Graysville	County-wide	Moderate	Moderately Severe	High	Low
Homewood	County-wide	Moderate	Moderately Severe	High	Low
Hoover	County-wide	Moderate	Moderately Severe	High	Low
Hueytown	County-wide	Moderate	Moderately Severe	High	Low
Irondale	County-wide	Moderate	Moderately Severe	High	Low
Kimberly	County-wide	Moderate	Moderately Severe	High	Low

COMMUNITY IMPACTS OF SEVERE STORMS Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Leeds	County-wide	Moderate	Moderately Severe	High	Low
Lipscomb	County-wide	Moderate	Moderately Severe	High	Low
Maytown	County-wide	Moderate	Moderately Severe	High	Low
Midfield	County-wide	Moderate	Moderately Severe	High	Low
Morris	County-wide	Moderate	Moderately Severe	High	Low
Mountain Brook	County-wide	Moderate	Moderately Severe	High	Low
Mulga	County-wide	Moderate	Moderately Severe	High	Low
North Johns	County-wide	Moderate	Moderately Severe	High	Low
Pleasant Grove	County-wide	Moderate	Moderately Severe	High	Low
Sylvan Springs	County-wide	Moderate	Moderately Severe	High	Low
Tarrant	County-wide	Moderate	Moderately Severe	High	Low
Trafford	County-wide	Moderate	Moderately Severe	High	Low
Trussville	County-wide	Moderate	Moderately Severe	High	Low
Vestavia Hills	County-wide	Moderate	Moderately Severe	High	Low
Warrior	County-wide	Moderate	Moderately Severe	High	Low
West Jefferson	County-wide	Moderate	Moderately Severe	High	Low
Jefferson County	County-wide	Moderate	Moderately Severe	High	Low

COMMUNITY IMPACTS OF FLOODS Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Adamsville	Location Specific	Moderate	Somewhat Severe	Low	Low
Bessemer	Location Specific	High	Moderately Severe	Low	Med
Birmingham	Location Specific	Very High	Severe	Low	High
Brighton	Location Specific	Very High	Severe	Low	High
Brookside	Location Specific	Very High	Severe	Low	High
Cardiff	Location Specific	Very High	Severe	Low	High
Center Point	Location Specific	Very High	Severe	Low	High
Clay	Location Specific	High	Moderately Severe	Low	Med
County Line	Location Specific	Very Low	Not Severe	Low	Low
Fairfield	Location Specific	Very Low	Not Severe	Low	Low
Fultondale	Location Specific	High	Moderately Severe	Low	Med
Gardendale	Location Specific	High	Moderately Severe	Low	Med
Graysville	Location Specific	Very High	Severe	Low	High
Homewood	Location Specific	High	Moderately Severe	Low	Med
Hoover	Location Specific	Very High	Severe	Low	High
Hueytown	Location Specific	High	Moderately Severe	Low	Med
Irondale	Location Specific	Low	Somewhat Severe	Low	Low
Kimberly	Location Specific	Very High	Not Severe	Low	Low
Leeds	Location Specific	Very High	Severe	Low	High
Lipscomb	Location Specific	Low	Somewhat Severe	Low	Low
Maytown	Location Specific	Very High	Not Severe	Low	Low
Midfield	Location Specific	Low	Somewhat Severe	Low	Low
Morris	Location Specific	Very High	Not Severe	Low	Low
Mountain Brook	Location Specific	Very High	Severe	Low	High
Mulga	Location Specific	Low	Somewhat Severe	Low	Low
North Johns	Location Specific	Very High	Not Severe	Low	Low
Pleasant Grove	Location Specific	Very High	Not Severe	Low	Low
Sylvan Springs	Location Specific	Low	Somewhat Severe	Low	Low

COMMUNITY IMPACTS OF FLOODS Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Tarrant	Location Specific	Very High	Severe	Low	High
Trafford	Location Specific	Very Low	Not Severe	Low	Low
Trussville	Location Specific	Very High	Severe	Low	High
Vestavia Hills	Location Specific	Very High	Severe	Low	High
Warrior	Location Specific	Very Low	Not Severe	Low	Low
West Jefferson	Location Specific	Very High	Severe	Low	High
Jefferson County	Location Specific	Very High	Severe	Low	High

COMMUNITY IMPACTS OF HURRICANES Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Adamsville	County-wide	Low	Moderately Severe	High	Low
Bessemer	County-wide	Low	Moderately Severe	High	Low
Birmingham	County-wide	Low	Moderately Severe	High	Low
Brighton	County-wide	Low	Moderately Severe	High	Low
Brookside	County-wide	Low	Moderately Severe	High	Low
Cardiff	County-wide	Low	Moderately Severe	High	Low
Center Point	County-wide	Low	Moderately Severe	High	Low
Clay	County-wide	Low	Moderately Severe	High	Low
County Line	County-wide	Low	Moderately Severe	High	Low
Fairfield	County-wide	Low	Moderately Severe	High	Low
Fultondale	County-wide	Low	Moderately Severe	High	Low
Gardendale	County-wide	Low	Moderately Severe	High	Low
Graysville	County-wide	Low	Moderately Severe	High	Low
Homewood	County-wide	Low	Moderately Severe	High	Low
Hoover	County-wide	Low	Moderately Severe	High	Low
Hueytown	County-wide	Low	Moderately Severe	High	Low
Irondale	County-wide	Low	Moderately Severe	High	Low
Kimberly	County-wide	Low	Moderately Severe	High	Low
Leeds	County-wide	Low	Moderately Severe	High	Low
Lipscomb	County-wide	Low	Moderately Severe	High	Low
Maytown	County-wide	Low	Moderately Severe	High	Low
Midfield	County-wide	Low	Moderately Severe	High	Low
Morris	County-wide	Low	Moderately Severe	High	Low
Mountain Brook	County-wide	Low	Moderately Severe	High	Low
Mulga	County-wide	Low	Moderately Severe	High	Low
North Johns	County-wide	Low	Moderately Severe	High	Low
Pleasant Grove	County-wide	Low	Moderately Severe	High	Low
Sylvan Springs	County-wide	Low	Moderately Severe	High	Low
Tarrant	County-wide	Low	Moderately Severe	High	Low
Trafford	County-wide	Low	Moderately Severe	High	Low
Trussville	County-wide	Low	Moderately Severe	High	Low
Vestavia Hills	County-wide	Low	Moderately Severe	High	Low
Warrior	County-wide	Low	Moderately Severe	High	Low
West Jefferson	County-wide	Low	Moderately Severe	High	Low
Jefferson County	County-wide	Low	Moderately Severe	High	Low

COMMUNITY IMPACTS OF WINTER STORMS/FREEZES Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Adamsville	County-wide	Moderate	Moderately Severe	High	Low
Bessemer	County-wide	Moderate	Moderately Severe	High	Low
Birmingham	County-wide	Moderate	Moderately Severe	High	Low
Brighton	County-wide	Moderate	Moderately Severe	High	Low
Brookside	County-wide	Moderate	Moderately Severe	High	Low
Cardiff	County-wide	Moderate	Moderately Severe	High	Low
Center Point	County-wide	Moderate	Moderately Severe	High	Low
Clay	County-wide	Moderate	Moderately Severe	High	Low
County Line	County-wide	Moderate	Moderately Severe	High	Low
Fairfield	County-wide	Moderate	Moderately Severe	High	Low
Fultondale	County-wide	Moderate	Moderately Severe	High	Low
Gardendale	County-wide	Moderate	Moderately Severe	High	Low
Graysville	County-wide	Moderate	Moderately Severe	High	Low
Homewood	County-wide	Moderate	Moderately Severe	High	Low
Hoover	County-wide	Moderate	Moderately Severe	High	Low
Hueytown	County-wide	Moderate	Moderately Severe	High	Low
Irondale	County-wide	Moderate	Moderately Severe	High	Low
Kimberly	County-wide	Moderate	Moderately Severe	High	Low
Leeds	County-wide	Moderate	Moderately Severe	High	Low
Lipscomb	County-wide	Moderate	Moderately Severe	High	Low
Maytown	County-wide	Moderate	Moderately Severe	High	Low
Midfield	County-wide	Moderate	Moderately Severe	High	Low
Morris	County-wide	Moderate	Moderately Severe	High	Low
Mountain Brook	County-wide	Moderate	Moderately Severe	High	Low
Mulga	County-wide	Moderate	Moderately Severe	High	Low
North Johns	County-wide	Moderate	Moderately Severe	High	Low
Pleasant Grove	County-wide	Moderate	Moderately Severe	High	Low
Sylvan Springs	County-wide	Moderate	Moderately Severe	High	Low
Tarrant	County-wide	Moderate	Moderately Severe	High	Low
Trafford	County-wide	Moderate	Moderately Severe	High	Low
Trussville	County-wide	Moderate	Moderately Severe	High	Low
Vestavia Hills	County-wide	Moderate	Moderately Severe	High	Low
Warrior	County-wide	Moderate	Moderately Severe	High	Low
West Jefferson	County-wide	Moderate	Moderately Severe	High	Low
Jefferson County	County-wide	Moderate	Moderately Severe	High	Low

COMMUNITY IMPACTS OF DROUGHTS/HEAT WAVES Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Adamsville	County-wide	Low	Moderately Severe	High	Low
Bessemer	County-wide	Low	Moderately Severe	High	Low
Birmingham	County-wide	Low	Moderately Severe	High	Low
Brighton	County-wide	Low	Moderately Severe	High	Low
Brookside	County-wide	Low	Moderately Severe	High	Low
Cardiff	County-wide	Low	Moderately Severe	High	Low
Center Point	County-wide	Low	Moderately Severe	High	Low
Clay	County-wide	Low	Moderately Severe	High	Low
County Line	County-wide	Low	Moderately Severe	High	Low
Fairfield	County-wide	Low	Moderately Severe	High	Low

COMMUNITY IMPACTS OF DROUGHTS/HEAT WAVES Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Fultondale	County-wide	Low	Moderately Severe	High	Low
Gardendale	County-wide	Low	Moderately Severe	High	Low
Graysville	County-wide	Low	Moderately Severe	High	Low
Homewood	County-wide	Low	Moderately Severe	High	Low
Hoover	County-wide	Low	Moderately Severe	High	Low
Hueytown	County-wide	Low	Moderately Severe	High	Low
Irondale	County-wide	Low	Moderately Severe	High	Low
Kimberly	County-wide	Low	Moderately Severe	High	Low
Leeds	County-wide	Low	Moderately Severe	High	Low
Lipscomb	County-wide	Low	Moderately Severe	High	Low
Maytown	County-wide	Low	Moderately Severe	High	Low
Midfield	County-wide	Low	Moderately Severe	High	Low
Morris	County-wide	Low	Moderately Severe	High	Low
Mountain Brook	County-wide	Low	Moderately Severe	High	Low
Mulga	County-wide	Low	Moderately Severe	High	Low
North Johns	County-wide	Low	Moderately Severe	High	Low
Pleasant Grove	County-wide	Low	Moderately Severe	High	Low
Sylvan Springs	County-wide	Low	Moderately Severe	High	Low
Tarrant	County-wide	Low	Moderately Severe	High	Low
Trafford	County-wide	Low	Moderately Severe	High	Low
Trussville	County-wide	Low	Moderately Severe	High	Low
Vestavia Hills	County-wide	Low	Moderately Severe	High	Low
Warrior	County-wide	Low	Moderately Severe	High	Low
West Jefferson	County-wide	Low	Moderately Severe	High	Low
Jefferson County	County-wide	Low	Moderately Severe	High	Low

COMMUNITY IMPACTS OF WILDFIRES Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Adamsville	Location Specific	Moderate	Moderately Severe	Low	Med
Bessemer	Location Specific	Moderate	Somewhat Severe	Low	Low
Birmingham	Location Specific	Moderate	Somewhat Severe	Low	Low
Brighton	Location Specific	Moderate	Somewhat Severe	Low	Low
Brookside	Location Specific	Moderate	Somewhat Severe	Low	Low
Cardiff	Location Specific	Moderate	Somewhat Severe	Low	Low
Center Point	Location Specific	Moderate	Somewhat Severe	Low	Low
Clay	Location Specific	Moderate	Somewhat Severe	Low	Low
County Line	Location Specific	Moderate	Somewhat Severe	Low	Low
Fairfield	Location Specific	Moderate	Somewhat Severe	Low	Low
Fultondale	Location Specific	Low	Moderately Severe	Low	Med
Gardendale	Location Specific	Low	Somewhat Severe	Low	Low
Graysville	Location Specific	Moderate	Somewhat Severe	Low	Low
Homewood	Location Specific	Moderate	Somewhat Severe	Low	Low
Hoover	Location Specific	Low	Somewhat Severe	Low	Low
Hueytown	Location Specific	Moderate	Somewhat Severe	Low	Low
Irondale	Location Specific	Low	Not Severe	Low	Low
Kimberly	Location Specific	Moderate	Somewhat Severe	Low	Low
Leeds	Location Specific	Moderate	Somewhat Severe	Low	Low
Lipscomb	Location Specific	Moderate	Somewhat Severe	Low	Low

COMMUNITY IMPACTS OF WILDFIRES Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Maytown	Location Specific	Moderate	Moderately Severe	Low	Med
Midfield	Location Specific	Moderate	Somewhat Severe	Low	Low
Morris	Location Specific	Moderate	Moderately Severe	Low	Med
Mountain Brook	Location Specific	Low	Somewhat Severe	Low	Low
Mulga	Location Specific	Moderate	Somewhat Severe	Low	Low
North Johns	Location Specific	Moderate	Somewhat Severe	Low	Low
Pleasant Grove	Location Specific	Moderate	Moderately Severe	Low	Med
Sylvan Springs	Location Specific	Moderate	Somewhat Severe	Low	Low
Tarrant	Location Specific	Low	Somewhat Severe	Low	Low
Trafford	Location Specific	Moderate	Somewhat Severe	Low	Low
Trussville	Location Specific	Moderate	Somewhat Severe	Low	Low
Vestavia Hills	Location Specific	Moderate	Somewhat Severe	Low	Low
Warrior	Location Specific	Moderate	Somewhat Severe	Low	Low
West Jefferson	Location Specific	Low	Somewhat Severe	Low	Low
Jefferson County	Location Specific	Low	Somewhat Severe	Low	Low

COMMUNITY IMPACTS OF DAM/LEVEE FAILURES Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Adamsville	Location Specific	Very Low	Not Severe	Low	Low
Bessemer	Location Specific	Very Low	Not Severe	Low	Low
Birmingham	Location Specific	Very Low	Not Severe	Low	Low
Brighton	Location Specific	Very Low	Not Severe	Low	Low
Brookside	Location Specific	Very Low	Not Severe	Low	Low
Cardiff	Location Specific	Very Low	Not Severe	Low	Low
Center Point	Location Specific	Very Low	Not Severe	Low	Low
Clay	Location Specific	Very Low	Not Severe	Low	Low
County Line	Location Specific	Very Low	Not Severe	Low	Low
Fairfield	Location Specific	Very Low	Not Severe	Low	Low
Fultondale	Location Specific	Very Low	Not Severe	Low	Low
Gardendale	Location Specific	Very Low	Not Severe	Low	Low
Graysville	Location Specific	Very Low	Not Severe	Low	Low
Homewood	Location Specific	Very Low	Not Severe	Low	Low
Hoover	Location Specific	Very Low	Not Severe	Low	Low
Hueytown	Location Specific	Very Low	Not Severe	Low	Low
Irondale	Location Specific	Very Low	Not Severe	Low	Low
Kimberly	Location Specific	Very Low	Not Severe	Low	Low
Leeds	Location Specific	Very Low	Not Severe	Low	Low
Lipscomb	Location Specific	Very Low	Not Severe	Low	Low
Maytown	Location Specific	Very Low	Not Severe	Low	Low
Midfield	Location Specific	Very Low	Not Severe	Low	Low
Morris	Location Specific	Very Low	Not Severe	Low	Low
Mountain Brook	Location Specific	Very Low	Not Severe	Low	Low
Mulga	Location Specific	Very Low	Not Severe	Low	Low
North Johns	Location Specific	Very Low	Not Severe	Low	Low
Pleasant Grove	Location Specific	Very Low	Not Severe	Low	Low
Sylvan Springs	Location Specific	Very Low	Not Severe	Low	Low
Tarrant	Location Specific	Very Low	Not Severe	Low	Low
Trafford	Location Specific	Very Low	Not Severe	Low	Low

COMMUNITY IMPACTS OF DAM/LEVEE FAILURES Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Trussville	Location Specific	Very Low	Not Severe	Low	Low
Vestavia Hills	Location Specific	Very Low	Not Severe	Low	Low
Warrior	Location Specific	Very Low	Not Severe	Low	Low
West Jefferson	Location Specific	Very Low	Not Severe	Low	Low
Jefferson County	Location Specific	Very Low	Not Severe	Low	Low

COMMUNITY IMPACTS OF LANDSLIDES Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Adamsville	Location Specific	Low	Not Severe	Low	Low
Bessemer	Location Specific	Low	Not Severe	Low	Low
Birmingham	Location Specific	Low	Somewhat Severe	Low	Low
Brighton	Location Specific	Low	Not Severe	Low	Low
Brookside	Location Specific	Low	Not Severe	Low	Low
Cardiff	Location Specific	Low	Not Severe	Low	Low
Center Point	Location Specific	Very Low	Not Severe	Low	Low
Clay	Location Specific	Low	Not Severe	Low	Low
County Line	Location Specific	Low	Not Severe	Low	Low
Fairfield	Location Specific	Low	Not Severe	Low	Low
Fultondale	Location Specific	Very Low	Not Severe	Low	Low
Gardendale	Location Specific	Very Low	Not Severe	Low	Low
Graysville	Location Specific	Very Low	Not Severe	Low	Low
Homewood	Location Specific	Very Low	Not Severe	Low	Low
Hoover	Location Specific	Very Low	Not Severe	Low	Low
Hueytown	Location Specific	Very Low	Not Severe	Low	Low
Irondale	Location Specific	Very Low	Not Severe	Low	Low
Kimberly	Location Specific	Low	Not Severe	Low	Low
Leeds	Location Specific	Very Low	Not Severe	Low	Low
Lipscomb	Location Specific	Very Low	Not Severe	Low	Low
Maytown	Location Specific	Low	Somewhat Severe	Low	Low
Midfield	Location Specific	Very Low	Not Severe	Low	Low
Morris	Location Specific	Low	Not Severe	Low	Low
Mountain Brook	Location Specific	Very Low	Not Severe	Low	Low
Mulga	Location Specific	Very Low	Not Severe	Low	Low
North Johns	Location Specific	Low	Not Severe	Low	Low
Pleasant Grove	Location Specific	Low	Not Severe	Low	Low
Sylvan Springs	Location Specific	Very Low	Not Severe	Low	Low
Tarrant	Location Specific	Very Low	Not Severe	Low	Low
Trafford	Location Specific	Low	Not Severe	Low	Low
Trussville	Location Specific	Moderate	Somewhat Severe	Low	Low
Vestavia Hills	Location Specific	Very Low	Not Severe	Low	Low
Warrior	Location Specific	Low	Not Severe	Low	Low
West Jefferson	Location Specific	Very Low	Not Severe	Low	Low
Jefferson County	Location Specific	Very Low	Not Severe	Low	Low

COMMUNITY IMPACTS OF EARTHQUAKES Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Adamsville	County-wide	Very Low	Moderately Severe	High	Low
Bessemer	County-wide	Very Low	Moderately Severe	High	Low
Birmingham	County-wide	Very Low	Moderately Severe	High	Low
Brighton	County-wide	Very Low	Moderately Severe	High	Low
Brookside	County-wide	Very Low	Moderately Severe	High	Low
Cardiff	County-wide	Very Low	Moderately Severe	High	Low
Center Point	County-wide	Very Low	Moderately Severe	High	Low
Clay	County-wide	Very Low	Moderately Severe	High	Low
County Line	County-wide	Very Low	Moderately Severe	High	Low
Fairfield	County-wide	Very Low	Moderately Severe	High	Low
Fultondale	County-wide	Very Low	Moderately Severe	High	Low
Gardendale	County-wide	Very Low	Moderately Severe	High	Low
Graysville	County-wide	Very Low	Moderately Severe	High	Low
Homewood	County-wide	Very Low	Moderately Severe	High	Low
Hoover	County-wide	Very Low	Moderately Severe	High	Low
Hueytown	County-wide	Very Low	Moderately Severe	High	Low
Irondale	County-wide	Very Low	Moderately Severe	High	Low
Kimberly	County-wide	Very Low	Moderately Severe	High	Low
Leeds	County-wide	Very Low	Moderately Severe	High	Low
Lipscomb	County-wide	Very Low	Moderately Severe	High	Low
Maytown	County-wide	Very Low	Moderately Severe	High	Low
Midfield	County-wide	Very Low	Moderately Severe	High	Low
Morris	County-wide	Very Low	Moderately Severe	High	Low
Mountain Brook	County-wide	Very Low	Moderately Severe	High	Low
Mulga	County-wide	Very Low	Moderately Severe	High	Low
North Johns	County-wide	Very Low	Moderately Severe	High	Low
Pleasant Grove	County-wide	Very Low	Moderately Severe	High	Low
Sylvan Springs	County-wide	Very Low	Moderately Severe	High	Low
Tarrant	County-wide	Very Low	Moderately Severe	High	Low
Trafford	County-wide	Very Low	Moderately Severe	High	Low
Trussville	County-wide	Very Low	Moderately Severe	High	Low
Vestavia Hills	County-wide	Very Low	Moderately Severe	High	Low
Warrior	County-wide	Very Low	Moderately Severe	High	Low
West Jefferson	County-wide	Very Low	Moderately Severe	High	Low
Jefferson County	County-wide	Very Low	Moderately Severe	High	Low

COMMUNITY IMPACTS OF SINKHOLES (LAND SUBSIDENCE) Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Adamsville	Location Specific	Low	Somewhat Severe	Low	Med
Bessemer	Location Specific	Low	Somewhat Severe	Low	Med
Birmingham	Location Specific	Moderate	Somewhat Severe	Low	Med
Brighton	Location Specific	Low	Somewhat Severe	Low	Med
Brookside	Location Specific	Moderate	Somewhat Severe	Low	Med
Cardiff	Location Specific	Moderate	Somewhat Severe	Low	Med
Center Point	Location Specific	Low	Not Severe	Low	Low
Clay	Location Specific	Low	Somewhat Severe	Low	Med
County Line	Location Specific	Low	Somewhat Severe	Low	Med
Fairfield	Location Specific	Moderate	Somewhat Severe	Low	Med

COMMUNITY IMPACTS OF SINKHOLES (LAND SUBSIDENCE) Impacts on Vulnerable Community Buildings, Critical Facilities, and Infrastructure					
Jurisdiction	Location (Geographic Extent of Hazard in the Community)	Probability (Frequency of Hazard Occurrence in the Community)	Extent (Magnitude or Severity of Hazard in Event of Occurrence)	Level of Exposure (Degree of Structures Exposed to the Hazard)	Damage Level Potential (Percentage of Likely Damage to Exposed Structures)
Fultondale	Location Specific	Low	Not Severe	Low	Low
Gardendale	Location Specific	Low	Not Severe	Low	Low
Graysville	Location Specific	Low	Not Severe	Low	Low
Homewood	Location Specific	Low	Not Severe	Low	Low
Hoover	Location Specific	Low	Not Severe	Low	Low
Hueytown	Location Specific	Low	Not Severe	Low	Low
Irondale	Location Specific	Moderate	Moderately Severe	Low	Med
Kimberly	Location Specific	Low	Somewhat Severe	Low	Med
Leeds	Location Specific	Low	Not Severe	Low	Low
Lipscomb	Location Specific	Low	Not Severe	Low	Low
Maytown	Location Specific	Moderate	Somewhat Severe	Low	Med
Midfield	Location Specific	Low	Not Severe	Low	Low
Morris	Location Specific	Low	Somewhat Severe	Low	Med
Mountain Brook	Location Specific	Low	Not Severe	Low	Low
Mulga	Location Specific	Low	Not Severe	Low	Low
North Johns	Location Specific	Low	Somewhat Severe	Low	Med
Pleasant Grove	Location Specific	Low	Somewhat Severe	Low	Med
Sylvan Springs	Location Specific	Low	Not Severe	Low	Low
Tarrant	Location Specific	Low	Not Severe	Low	Low
Trafford	Location Specific	Low	Somewhat Severe	Low	Med
Trussville	Location Specific	Very Low	Not Severe	Low	Low
Vestavia Hills	Location Specific	Low	Not Severe	Low	Low
Warrior	Location Specific	Low	Somewhat Severe	Low	Med
West Jefferson	Location Specific	Low	Not Severe	Low	Low
Jefferson County	Location Specific	Moderate	Somewhat Severe	Low	Med

Repetitively-Damaged NFIP-Insured Structures

FEMA defines a repetitive loss property as those which have two or more losses of at least $1,000 and have been paid under the National Flood Insurance Program (NFIP) within any 10 year period. According to ADECA Floodplain Management Unit, there are 253 NFIP Repetitive Loss Structures within Jefferson County as of December 18, 2015. Table 5.21 – National Flood Insurance Repetitive Loss describes the number of policies in force and includes the number of repetitive loss properties by address and includes the type property was effected.

ADECA Floodplain Management Unit also states there are 5 NFIP Severe Repetitive Loss Structures within Jefferson County as of December 18, 2015. Table 5.21 – National Flood Insurance Severe Repetitive Loss describes the number of policies in force and includes the number of severe repetitive loss properties there are by address and type.

Table 5.21 – National Flood Insurance Repetitive Loss

Address	Type	Dt of Loss	Dt of Loss	Dt of Loss	Dt of Loss	Dt of Loss	Losses	Total Paid
Type Occupancy. 2-4 Family (2-4); Assumed Condo (AC); Non-Resident (NR): Other-Resident (OR); Single Family (SF)								
2501-07 Lane Park Rd	2-4	04/07/2014	07/21/2013	09/22/2002			3	$43,885.43
1308 9th St	2-4	03/10/2000	01/07/1998	01/29/1996			3	$16,589.07
1523 Coosa St	2-4	11/27/1983	05/19/1983	12/01/1982	04/13/1979	02/23/1979	5	$35,160.55

Address	Type	Dt of Loss	Dt of Loss	Dt of Loss	Dt of Loss	Dt of Loss	Losses	Total Paid
Type Occupancy: 2-4 Family (2-4); Assumed Condo (AC); Non-Resident (NR); Other-Resident (OR); Single Family (SF)								
3946-A 16th Av N	2-4	12/01/1982	04/13/1979				2	$2,277.00
4196 Glen Brook Rd	2-4	05/07/2003	03/10/2000				2	$75,962.98
8408 1st Av N	AC	04/07/2014	07/31/2012				2	$101,882.98
8420 1st Av N	AC	04/06/2014	09/16/2004	05/07/2003	07/12/2002		4	$190,771.96
2 S 41ST St	AC	07/29/2008	08/03/2003	05/07/2003	09/21/2002		4	$638,532.22
3608 Messer Airport Hwy	AC	04/13/1979	05/08/1978				2	$17,800.00
PO Box 1147	AC	07/10/1979	04/13/1979				2	$6,136.20
2122 Hillside Cir	AC	09/22/2002	04/20/2000	04/02/2000			3	$20,847.58
2821 Emerald Av	AC	09/05/2011	02/06/2004	09/08/1991	05/12/1991	02/15/1990	7	$40,187.15
2709 Lane Park Rd	AC	09/22/2002	06/14/1999	10/03/1995			3	$149,870.88
4539 Bessemer Super Hwy	NR	09/16/2004	02/06/2004	09/22/2002	01/07/1998	12/03/1983	7	$79,408.15
8707 ParkWAY E	NR	05/07/2003	05/05/2003	07/12/2002	03/10/2000		3	$195,065.31
9952 ParkWAY E	NR	09/17/2009	07/14/2005	05/09/2003	05/07/2003		3	$216,988.99
4281 Main St	NR	05/18/2013	02/05/2004	05/07/2003	03/10/2000		4	$130,257.19
50 McDonald St	NR	05/07/2003	03/11/2000				2	$52,213.78
4028 Morris Av	NR	10/05/1995	05/26/1984	12/01/1982			3	$10,158.29
216 N Oporto Madrid Blvd	NR	09/06/2011	11/10/2009	09/17/2004	09/21/2002		4	$26,315.34
3525 Richard Arrington Blvd N	NR	04/07/2014	09/05/2011	10/03/1995			3	$818,949.72
1065 Avenue V	NR	02/05/2004	05/07/2003				2	$12,601.24
3624-4210 10th Av N	NR	09/16/2004	09/21/2002	10/03/1995			3	$127,710.63
3641 10th Av N	NR	12/01/1982	04/13/1979				2	$135,565.33
1045 20th St S	NR	09/05/2011	07/13/2011				2	$18,474.56
1800 3rd St W	NR	09/16/2004	12/03/1983	12/02/1983	11/27/1983	05/19/1983	4	$478,498.77
1800 3rd St W	NR	02/05/2004	05/07/2003	10/03/1995			3	$230,326.78
1800 3rd St W	NR	02/05/2004	05/07/2003				2	$215,399.39
728 N 31ST St	NR	07/31/1982	04/13/1979	05/28/1978			3	$43,821.33
100 41ST St S	NR	07/21/2013	06/05/2013				2	$28,033.82
3520 8th Av N	NR	04/07/2014	09/05/2011	09/16/2004			3	$461,239.02
1532 Cahaba St	NR	12/03/1983	12/01/1982	04/13/1979			3	$10,705.14
103 Market St	NR	05/08/2003	05/19/1983	04/12/1979			3	$66,155.44
425 Decatur Hwy	NR	05/07/2003	03/10/2000	04/09/1998			3	$218,170.67
1650 28th Ct S	NR	07/04/2015	04/07/2014				2	$61,960.55
3118 BELWOOD Dr	NR	06/25/1999	01/07/1998				2	$49,260.86
5536 JOHNSON St	NR	03/09/2011	09/19/2009				2	$41,897.37
4278 Main St	NR	02/05/2004	05/07/2003				2	$186,963.15
4285 Main St	NR	05/18/2013	02/05/2004	05/07/2003			3	$176,067.77
4286 Main St	NR	05/07/2003	03/10/2000				2	$46,690.75
4289 Main St	NR	02/05/2004	05/07/2003				2	$31,561.40
1455 Red Hollow Rd	NR	07/15/2005	05/07/2003	03/10/2000			3	$341,748.96
1685 10th St	NR	07/14/2005	09/16/2004				2	$12,306.82
2629 2631 Cahaba Rd	NR	07/26/2004	06/14/1999				2	$2,566.84
2700 Culver Rd	NR	09/22/2002	06/14/1999				2	$192,020.45
2715 Culver Rd REAR	NR	06/14/1999	05/27/1996				2	$27,812.78
205 Overbrook Rd	NR	07/21/2013	07/10/2013	05/31/2010			3	$95,658.86
4280 Main St	NR	05/18/2013	02/06/2004	05/07/2003			3	$33,380.53
80 McDonald St	NR	05/07/2003	07/12/2002	03/10/2000	10/03/1995		4	$179,282.24
110 Morrow Av	NR	05/07/2003	04/03/2001	05/19/1983	12/01/1982		4	$63,538.71
1451 Montgomery Hwy	NR	07/26/2004	09/22/2002				2	$306,729.70
1112 26TH St S	OR	07/21/2013	07/13/2011				2	$146,520.37
1300 Avenue T	OR	07/31/1982	06/03/1982	03/30/1981	04/12/1980		4	$29,302.78
106 Saint John Dr NW	OR	05/07/2003	04/03/2001	04/02/2000	03/10/2000	07/02/1998	5	$98,293.62

Address	Type	Dt of Loss	Dt of Loss	Dt of Loss	Dt of Loss	Dt of Loss	Losses	Total Paid
Type Occupancy. 2-4 Family (2-4); Assumed Condo (AC), Non-Resident (NR): Other-Resident (OR), Single Family (SF)								
2509 Park Lane Ct S	OR	09/22/2002	06/14/1999	10/03/1995			3	$260,531.96
2517 Park Lane Ct S	OR	09/22/2002	06/14/1999	10/03/1995			3	$234,580.15
Rt 4 Box 339	SF	12/03/1983	04/12/1979				2	$13,940.66
135 Houston Dr	SF	04/08/2014	09/05/2011	09/16/2004	02/06/2004	02/05/2004	6	$140,968.13
137 Houston Dr	SF	02/05/2004	09/21/2002	01/07/1998	11/27/1983	12/01/1982	5	$15,956.52
139 Houston Dr	SF	12/03/1983	12/01/1982				2	$5,539.75
2016 Long 14th St	SF	09/05/2011	02/05/2004				2	$48,144.00
2005 Short 14th St N	SF	09/05/2011	02/06/2004	01/07/1998	01/27/1996	12/03/1983	6	$82,036.03
2031 Short 14th St N	SF	09/05/2011	02/05/2004	01/07/1998	01/26/1996		4	$108,569.34
212 1st Av W	SF	12/05/1983	04/13/1979				2	$3,449.40
2030 13th WAY	SF	04/08/2014	09/05/2011				2	$46,990.80
1305 21st St N	SF	12/03/1983	04/13/1979				2	$7,896.21
1314 22nd Av	SF	02/06/2004	01/26/1996	12/02/1983			3	$27,126.27
1338 22nd Cir N	SF	04/07/2014	09/05/2011	02/06/2004			3	$36,024.03
1300 8th Av North	SF	05/28/1996	06/30/1989				2	$13,086.73
501 8th Av N	SF	09/15/2014	09/05/2011				2	$9,209.60
7524 3rd Av N	SF	07/31/2012	09/05/2011	09/16/2004	08/03/2003	05/07/2003	7	$43,651.96
3225 Beulah Av SW	SF	09/05/2011	09/22/2002	12/01/1982			3	$38,046.73
1101 Cheyenne Blvd	SF	05/07/2003	03/10/2000				2	$16,465.52
209 Cheyenne Blvd	SF	07/12/2002	08/14/1998	07/27/1994			3	$10,722.67
213 Cheyenne Blvd	SF	05/07/2003	07/12/2002	03/10/2000			3	$55,106.73
5720 Country Club Dr	SF	09/06/2011	02/09/2004				2	$7,027.20
5748 Country Club Dr	SF	09/06/2011	09/22/2002				2	$52,567.09
5764 Country Club Dr	SF	09/05/2011	02/05/2004				2	$52,957.59
5784 Country Club Dr	SF	02/06/2004	06/13/2003	09/22/2002			3	$9,953.55
445 Camellia Rd	SF	09/16/2004	05/07/2003	03/10/2000			3	$35,644.32
529 Camellia Rd	SF	07/14/2005	05/07/2003				2	$42,840.02
533 Camellia Rd	SF	09/10/2009	07/14/2005	09/16/2004	07/12/2002		4	$43,358.77
5637 Crestwood Blvd	SF	09/05/2001	06/28/1999				2	$8,941.77
5605 Gaston Way	SF	09/07/2011	02/06/2004				2	$85,951.77
4216 Groover Dr	SF	09/16/2004	06/14/1999				2	$11,940.21
2120 Greensprings Hwy S	SF	04/20/2006	01/17/2006	10/13/2002	08/31/2001	04/03/2001	5	$81,451.93
32 Hillview Ln	SF	09/17/2009	10/22/2007	06/02/2005			3	$30,034.53
5761 King Dr	SF	04/06/2014	09/06/2011				2	$26,459.63
1644 Kestwick Dri	SF	04/07/2014	07/26/2004				2	$132,324.25
3205 Lee Av SW	SF	07/04/2015	09/05/2011	09/27/2002	12/03/1983	12/01/1982	7	$50,554.44
3216 Lee Ct	SF	02/05/2004	12/03/1983	07/31/1982			3	$4,306.94
3217 Lee Ct SW	SF	09/05/2011	02/06/2004	09/22/2002	08/31/2001		4	$50,118.83
537 Lovelin St	SF	08/28/2011	02/06/2004				2	$64,323.06
1520 Lake SITE Dr	SF	05/07/2003	04/05/2000				2	$18,672.62
50 Main St	SF	08/02/2005	09/21/2002	07/12/2002			3	$67,344.75
4236 Mountaindale Rd	SF	04/07/2014	09/16/2004				2	$19,684.62
4248 Mountaindale Rd	SF	09/16/2004	06/14/1999				2	$15,216.93
4252 Mountaindale Rd	SF	09/16/2004	06/14/1999				2	$11,773.00
4260 Mountaindale Rd	SF	04/06/2014	09/16/2004	06/14/1999			3	$31,395.32
4301 Mountaindale Rd	SF	04/07/2014	09/16/2004				2	$21,842.37
4324 Mountaindale Rd	SF	04/07/2014	06/14/1999	10/04/1995			3	$24,396.36
4341 Mountaindale Rd	SF	04/07/2014	09/16/2004				2	$24,914.72
4363 Mountaindale Rd	SF	04/07/2014	09/16/2004	06/14/1999	10/03/1995		4	$30,057.18
4369 Mountaindale Rd	SF	09/16/2004	10/03/1995				2	$7,386.18
4381 Mountaindale Rd	SF	06/12/1999	10/03/1995				2	$13,278.76

Address	Type	Dt of Loss	Dt of Loss	Dt of Loss	Dt of Loss	Dt of Loss	Losses	Total Paid
Type Occupancy: 2-4 Family (2-4); Assumed Condo (AC); Non-Resident (NR): Other-Resident (OR); Single Family (SF)								
4409 Mountaindale Rd	SF	04/07/2014	04/02/2000	06/14/1999	08/01/1998		4	$21,544.47
1470 Marlin Springs Rd	SF	07/13/2005	05/08/2003	07/12/2002	04/03/2001	03/05/1996	6	$41,128.14
6442 OLD BRADFORD Rd	SF	05/07/2003	03/10/2000				2	$29,755.51
309 Park Cir	SF	04/18/2015	04/08/2014				2	$4,481.32
1005 Park PL	SF	09/15/2004	05/07/2003				2	$27,040.96
1036 Park PL	SF	05/07/2003	03/10/2000				2	$38,063.14
802 Seven Springs Cir	SF	09/16/2004	02/05/2004				2	$24,261.08
1525 Springville Rd	SF	05/07/2003	03/10/2000				2	$10,718.32
4148 Stone River Rd	SF	06/14/1999	08/13/1998				2	$16,800.68
1012 Shelton St	SF	05/07/2003	03/10/2000				2	$34,972.03
1337 Avenue V	SF	09/05/2011	02/05/2004				2	$11,125.15
5601 Valley Creek Dr	SF	09/16/2004	10/03/1995				2	$8,327.58
5733 Valley Creek Dr	SF	09/05/2011	09/16/2004				2	$6,047.53
4317 Warren Rd	SF	04/07/2014	09/16/2004	06/27/1999			3	$15,670.70
4321 Warren Rd	SF	04/07/2014	06/15/1999	10/03/1995			3	$47,571.76
4349 Warren Rd	SF	04/07/2014	09/16/2004	06/14/1999			3	$36,749.25
1622 41ST W Ensley	SF	06/13/2003	08/31/2001				2	$12,200.20
1917 10th PL	SF	09/05/2011	02/19/2004				2	$50,033.51
237 13th Av NE	SF	05/07/2003	03/10/2000				2	$17,647.28
241 13th Av NE	SF	05/08/2003	03/10/2000				2	$4,828.37
257 13th Av NE	SF	05/07/2003	03/10/2000				2	$11,662.58
6 16th Av W	SF	09/17/2004	05/07/2003	10/04/1995			3	$18,497.62
2124 22nd Av N	SF	08/29/2005	09/16/2004	05/07/2003			3	$16,166.41
2319 24TH Av N	SF	09/05/2011	09/16/2004	05/07/2003			3	$70,898.48
3112 28th Av N	SF	03/10/2000	10/04/1995				2	$8,192.32
3121 28th Av N	SF	09/16/2004	05/07/2003				2	$24,531.72
8009 3rd Av N	SF	09/16/2004	05/07/2003				2	$12,206.56
3164 30th Ct N	SF	09/16/2004	05/05/2003				2	$12,974.73
1001 33rd St	SF	08/31/2001	12/01/1982	07/31/1982	04/13/1979		4	$8,864.38
7713 4th Av N	SF	05/07/2003	11/09/2000				2	$17,670.79
7124 4th Ct N	SF	07/07/2012	05/07/2003				2	$24,414.24
7125 4th Ct N	SF	07/10/2006	05/07/2003				2	$7,282.22
7527 5th Av N	SF	05/07/2003	03/10/2000				2	$7,088.35
4100 68th St N	SF	05/07/2003	10/05/1995				2	$9,383.71
4109 68th St N	SF	09/16/2004	05/07/2003				2	$25,097.63
616 7TH Av	SF	07/10/2005	05/07/2003				2	$22,769.53
4316 74th PL N	SF	09/16/2004	05/07/2003				2	$9,519.36
502 75TH St N	SF	09/16/2004	05/07/2003				2	$11,276.43
509 8th St	SF	05/07/2003	03/10/2000				2	$15,544.81
304 83rd St N	SF	04/20/2006	05/07/2003	07/12/2002	04/12/2001		4	$37,500.64
PO Box 847	SF	09/02/1985	09/12/1979				2	$12,997.91
1600 Cahaba St	SF	12/03/1983	12/01/1982	04/12/1979			3	$12,874.35
1331 Coosa St	SF	12/01/1982	04/13/1979				2	$3,794.82
1535 Coosa St	SF	11/28/1983	05/19/1983	12/01/1982	04/13/1979		4	$20,950.82
1618 Coosa St	SF	12/01/1982	04/13/1979				2	$9,410.84
5757 Country Club Dr	SF	02/05/2004	09/22/2002	03/17/2000	10/04/1995		4	$58,936.06
1327 Escambia St	SF	12/03/1983	12/01/1982				2	$5,160.16
1337 Escambia St	SF	12/03/1983	04/12/1979				2	$5,815.56
1214 Avenue J	SF	12/03/1983	04/13/1979				2	$10,161.54
1121 Av K	SF	12/03/1983	04/13/1979				2	$17,477.16
1100 Avenue L	SF	03/06/1996	01/26/1996				2	$17,400.00

Address	Type	Dt of Loss	Dt of Loss	Dt of Loss	Dt of Loss	Dt of Loss	Losses	Total Paid
Type Occupancy: 2-4 Family (2-4); Assumed Condo (AC), Non-Resident (NR); Other-Resident (OR); Single Family (SF)								
1116 Avenue L	SF	12/03/1983	04/13/1979				2	$5,408.08
4225 Mountaindale Rd	SF	06/28/1999	06/14/1999	01/07/1998			3	$41,939.45
4229 Mountaindale Rd	SF	06/14/1999	08/13/1998	10/03/1995			3	$17,302.76
4245 Mountaindale Rd	SF	06/14/1999	10/03/1995				2	$82,290.82
4261 Mountaindale Rd	SF	06/14/1999	10/04/1995				2	$11,427.53
4317 Mountaindale Rd	SF	06/14/1999	10/03/1995	12/01/1982			3	$25,721.84
1613 Avenue T	SF	01/08/1998	01/26/1996				2	$9,248.45
3943 14th Av N	SF	11/27/1983	12/01/1982	04/12/1979			3	$11,437.24
30 16th Av W	SF	09/16/2004	05/07/2003				2	$37,495.23
3925 16th Av N	SF	11/27/1983	12/01/1982				2	$15,280.09
313 17th Av N	SF	12/03/1983	05/19/1983				2	$16,454.91
328 17th Av N	SF	12/03/1983	05/19/1983	12/04/1982			3	$10,166.66
3132 27TH Ct N	SF	09/16/2004	05/07/2003				2	$103,121.76
809 3rd Av	SF	05/07/2003	12/26/2002	03/10/2000			3	$72,314.49
500 Lilac Dr	SF	05/07/2003	03/10/2000				2	$48,006.98
102 Dolomite Av	SF	12/03/1983	05/19/1983	03/18/1980	05/08/1978		4	$13,848.47
1031 Rose Av	SF	08/13/2013	07/17/2013	09/04/2011	07/22/2006	07/20/2000	5	$27,670.48
209 Main St	SF	05/07/2003	04/04/2001				2	$18,181.79
170 Parker St	SF	03/10/2000	01/07/1998	03/06/1996	01/26/1996		4	$136,692.12
1641 Marlin Springs Rd	SF	09/05/2011	09/17/2009				2	$39,560.63
132 GRANGER Dr	SF	06/10/1985	05/19/1983				2	$10,002.91
1507 Oxmoor Rd	SF	12/03/1983	03/03/1979				2	$6,210.07
2648 Creekview Dr	SF	04/07/2014	07/26/2004	09/22/2002	03/06/1996	01/26/1996	6	$49,431.46
1731 Humminghird Ln	SF	07/26/2004	04/03/2000	10/03/1995	11/22/1992	02/15/1990	14	$143,842.84
1641 Kestwick Dr	SF	04/07/2014	09/16/2004	12/03/1983	12/01/1982	03/17/1980	5	$87,926.42
1645 Kestwick Dr	SF	09/16/2004	07/27/2004	02/16/1990			3	$29,815.76
1644 Kestwick Dr	SF	03/17/1980	04/13/1979				2	$4,329.94
2805 Emerald Av	SF	09/06/2011	02/05/2004				2	$26,669.39
2813 Emerald Av	SF	02/05/2004	01/26/1996	10/03/1995	04/13/1979		4	$38,685.70
2816 Emerald Av	SF	09/05/2011	02/06/2004	12/02/1983			3	$98,786.71
2817 Emerald Av	SF	09/05/2011	02/05/2004				2	$93,627.96
2021 Mississippi Av	SF	04/07/2014	09/05/2011	02/06/2004	12/02/1983		4	$102,047.78
2023 Mississippi Av	SF	12/03/1983	04/12/1979				2	$27,060.84
2113 Mississippi Av	SF	09/05/2011	12/28/1983	04/13/1979			3	$37,422.66
2130 Mississippi Av	SF	12/03/1983	04/13/1979				2	$29,313.75
2839 Novel Dr	SF	02/06/2004	03/07/1998	01/26/1996			3	$18,755.15
2000 25TH Av	SF	09/16/2004	02/06/2004	01/27/1996	12/03/1983	03/06/1979	5	$42,011.03
2020 25TH Av N	SF	04/07/2014	09/05/2011				2	$46,166.77
2024 25TH Av	SF	09/06/2011	02/05/2004				2	$31,515.69
3021 Cahaba Cliffs Dr	SF	09/03/2001	04/03/2000				2	$8,812.63
405 Della Rose Dr	SF	02/05/2004	05/07/2003	07/15/2002			3	$13,133.85
4025 Dolly Ridge Rd	SF	04/20/2006	06/12/2005				2	$26,815.86
4033 Dolly Ridge Rd	SF	04/20/2006	09/16/2004				2	$35,634.80
4037 Dolly Ridge Rd	SF	07/31/2012	01/26/2012	06/14/2009	05/11/2008	05/11/2007	9	$96,849.61
1308 Echols Dr	SF	05/07/2003	03/10/2000				2	$29,617.74
713 Earline St	SF	05/07/2003	03/10/2000	08/14/1998			3	$13,826.57
1509 Griffin Dr	SF	09/05/2011	02/06/2004				2	$40,973.29
2030 Long 14th St	SF	04/07/2014	09/05/2011				2	$48,438.84
619 Macon St	SF	06/28/2001	04/02/2000	03/11/2000	08/27/1992		4	$12,122.74
6236 Moss Rock Dr	SF	05/07/2003	03/15/2000				2	$36,154.60
4421 Oak Lane Cir	SF	02/05/2004	05/07/2003	04/03/2001	04/03/2000	03/10/2000	6	$63,885.35

Address	Type	Dt of Loss	Dt of Loss	Dt of Loss	Dt of Loss	Dt of Loss	Losses	Total Paid
Type Occupancy. 2-4 Family (2-4); Assumed Condo (AC); Non-Resident (NR): Other-Resident (OR); Single Family (SF)								
4441 OAK Lane Cir	SF	04/03/2001	03/10/2000				2	$7,346.01
204 Saturn Ln	SF	08/29/2015	07/30/2012				2	$24,064.00
3213 Sweeney Hollow Rd	SF	05/07/2003	03/10/2000	03/06/1996			3	$32,930.61
612 7th Av	SF	02/05/2004	05/07/2003				2	$10,543.17
2008 25TH Av	SF	12/03/1983	04/14/1979				2	$20,579.67
1815 6TH St NW	SF	09/02/2001	03/30/2001				2	$4,741.56
4890 Bud Holmes Rd	SF	03/10/2000	03/06/1996	02/16/1990			3	$80,931.61
717 Earline St	SF	05/07/2003	03/10/2000	08/14/1998	03/06/1996		4	$33,400.45
4160 Glenbrook Rd	SF	03/10/2000	03/06/1996				2	$39,481.58
3129 Sweeney Hollow Rd	SF	03/10/2000	03/06/1996	02/15/1990			3	$57,595.33
3211 Sweeney Hollow Rd	SF	03/10/2000	01/07/1998				2	$28,794.27
3305 Sweeney Hollow Rd	SF	03/10/2000	03/06/1996				2	$28,021.96
3309 Sweeney Hollow Rd	SF	03/10/2000	03/06/1996				2	$22,472.96
6673 Tapawingo Rd	SF	03/10/2000	01/07/1998				2	$31,690.02
617 6th St	SF	05/07/2003	04/30/2002	04/03/2001			3	$22,468.09
1020 Shelton St	SF	05/07/2003	04/30/2002	03/10/2000			3	$47,752.30
1249 Ashville Rd NE	SF	09/16/2004	05/07/2003				2	$21,004.53
1400 Ashville Rd	SF	04/07/2014	09/05/2011	09/17/2009	07/14/2005		4	$59,445.58
301 Cogbill St	SF	05/07/2003	06/28/1999				2	$31,212.60
1701 Linden St	SF	07/21/2005	05/05/2003	06/28/1999			3	$49,899.44
927 1/2 Parkway Dr SE	SF	01/06/1998	02/28/1997				2	$13,008.03
1501 Griffin Dr	SF	09/05/2011	02/05/2004	12/03/1983			3	$50,387.92
1509 Griffin Dr	SF	12/03/1983	04/13/1979				2	$5,001.00
533 Lovelin St	SF	02/06/2004	09/22/2002	12/03/1983	12/01/1982	04/13/1979	5	$26,318.32
220 PINEWOOD Av	SF	09/17/2009	08/31/2001				2	$7,417.22
4147 Appomatox Ln	SF	04/07/2014	09/06/2011	06/14/1999	08/13/1998	10/03/1995	5	$322,228.31
4155 Appomatox Ln	SF	04/06/2014	06/14/1999	08/14/1998	10/04/1995		4	$90,115.55
2516 Heathermoor Rd	SF	09/16/2004	09/22/2002	04/03/2000			3	$12,504.94
3821 Knollwood Dr	SF	09/22/2002	01/24/1997				2	$8,504.01
3542 Mill Springs Rd	SF	04/15/1980	04/22/1979				2	$6,782.30
32 W Montcrest Dr	SF	05/03/2009	04/02/2000				2	$8,507.83
2850 Surrey Rd	SF	06/14/1999	05/27/1996				2	$45,081.66
4327 Warren Rd	SF	04/07/2014	09/16/2004				2	$17,051.07
534 Country Club Dr	SF	11/27/1983	04/13/1979				2	$5,519.22
600 Country Club Dr	SF	12/02/1983	04/12/1979				2	$16,776.97
601 Country Club Dr	SF	12/03/1983	11/27/1983	05/19/1983	12/01/1982	04/12/1979	4	$23,091.20
529 Valley Creek Dr	SF	12/03/1983	07/31/1982	04/13/1979			3	$8,114.26
1109 34TH St	SF	12/03/1983	03/30/1981				2	$10,119.00
18 McDonald St	SF	05/08/2003	03/10/2000				2	$63,796.43
57 McDonald St	SF	05/07/2003	07/13/2002	04/03/2001	03/11/2000		4	$65,267.60
1836 Georgia St	SF	03/10/2000	03/06/1996				2	$23,271.31
815 Georgia St	SF	03/11/2000	03/05/1996				2	$16,784.48
2475 Pinson Hwy Lot 83	SF	01/07/1998	03/13/1996				2	$4,727.06
4041 Dolly Ridge Rd	SF	04/07/2014	07/10/2013				2	$14,185.95
3436 Loch Haven Dr	SF	12/03/1983	04/12/1979				2	$13,106.26
3200 Westbrook Dr	SF	05/27/2015	08/07/2013				2	$26,491.02

Source: ADECA Floodplain Management Unit 12/15/15

Table 5.22 – National Flood Insurance Severe Repetitive Loss

Address	Type	Dt of Loss	Dt of Loss	Dt of Loss	Dt of Loss	Dt of Loss	Losses	Total Paid
Type Occupancy: Single Family (SF)								

135 Houston Dr	SF	04/08/2014	09/05/2011	09/16/2004	02/06/2004	09/22/2002	01/07/1998	$140,968.13
2648 Creekview Dr	SF	04/07/2014	07/26/2004	09/22/2002	03/06/1996	01/26/1996	10/04/1995	$49,431.46
2821 Emerald Av	SF	09/05/2011	02/06/2004	09/08/1991	05/12/1991	02/15/1990	11/19/1988	$40,187.15
1400 Ashville Rd	SF	04/07/2014	09/05/2011	09/17/2009	07/14/2005			$59,445.58
4147 Appomattox Ln	SF	04/07/2014	09/06/2011	06/14/1999	08/13/1998	10/03/1995		$322,228.31
4155 Appomatox Ln	SF	04/06/2014	06/14/1999	08/14/1998	10/04/1995			$90,115.55

Source: ADECA Floodplain Management Unit 12/15/15

Risks that Vary Among the Jurisdictions

This Plan has strongly emphasized the variations in risks among jurisdictions throughout all components of this Risk Assessment. In particular, the following sections of the Risk Assessment contain specific references to jurisdictional variations:

- Hazard identification. Each jurisdiction was independently assessed to identify hazards that could occur, based on the sources noted in Section 5.3.1 - Identification of Hazards Affecting Each Jurisdiction.
- Hazard profiles. Each of the hazard profiles in Section 5.4 note how the location, extent, previous occurrences, and probability of future events may vary or be uniform among all jurisdictions. Maps are included, where possible, to emphasize the locations of hazards in relation to jurisdictional limits.
- Summary of Community Impacts. Table 5.20 – Summaries of Hazards and Community Impacts, above provides an overview of the variations of specific hazard impacts to each jurisdiction.

Table 5.22 – Jurisdictional Risk Variations presents an overview of the common and unique risks within each jurisdiction and the unique characteristics of those risks.

Table 5.22 – Jurisdictional Risk Variations

Hazard	Jurisdiction	Variation of Risks	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
Tornadoes	Adamsville	Common Risks	Not Unique	Not Unique	Not Unique
	Bessemer	Common Risks	Not Unique	Not Unique	Not Unique
	Birmingham	Common Risks	Not Unique	Not Unique	Not Unique
	Brighton	Common Risks	Not Unique	Not Unique	Not Unique
	Brookside	Common Risks	Not Unique	Not Unique	Not Unique
	Cardiff	Common Risks	Not Unique	Not Unique	Not Unique
	Center Point	Common Risks	Not Unique	Not Unique	Not Unique
	Clay	Common Risks	Not Unique	Not Unique	Not Unique
	County Line	Common Risks	Not Unique	Not Unique	Not Unique
	Fairfield	Common Risks	Not Unique	Not Unique	Not Unique
	Fultondale	Common Risks	Not Unique	Not Unique	Not Unique
	Gardendale	Common Risks	Not Unique	Not Unique	Not Unique
	Graysville	Common Risks	Not Unique	Not Unique	Not Unique
	Homewood	Common Risks	Not Unique	Not Unique	Not Unique
	Hoover	Common Risks	Not Unique	Not Unique	Not Unique
	Hueytown	Common Risks	Not Unique	Not Unique	Not Unique
	Irondale	Common Risks	Not Unique	Not Unique	Not Unique
	Kimberly	Common Risks	Not Unique	Not Unique	Not Unique
	Leeds	Common Risks	Not Unique	Not Unique	Not Unique
	Lipscomb	Common Risks	Not Unique	Not Unique	Not Unique
	Maytown	Common Risks	Not Unique	Not Unique	Not Unique

Hazard	Jurisdiction	Variation of Risks	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
	Midfield	Common Risks	Not Unique	Not Unique	Not Unique
	Morris	Common Risks	Not Unique	Not Unique	Not Unique
	Mountain Brook	Common Risks	Not Unique	Not Unique	Not Unique
	Mulga	Common Risks	Not Unique	Not Unique	Not Unique
	North Johns	Common Risks	Not Unique	Not Unique	Not Unique
	Pleasant Grove	Common Risks	Not Unique	Not Unique	Not Unique
	Sylvan Springs	Common Risks	Not Unique	Not Unique	Not Unique
	Tarrant	Common Risks	Not Unique	Not Unique	Not Unique
	Trafford	Common Risks	Not Unique	Not Unique	Not Unique
	Trussville	Common Risks	Not Unique	Not Unique	Not Unique
	Vestavia Hills	Common Risks	Not Unique	Not Unique	Not Unique
	Warrior	Common Risks	Not Unique	Not Unique	Not Unique
	West Jefferson	Common Risks	Not Unique	Not Unique	Not Unique
	Jefferson County	Common Risks	Not Unique	Not Unique	Not Unique
Severe Storms	Adamsville	Common Risks	Not Unique	Not Unique	Not Unique
	Bessemer	Common Risks	Not Unique	Not Unique	Not Unique
	Birmingham	Common Risks	Not Unique	Not Unique	Not Unique
	Brighton	Common Risks	Not Unique	Not Unique	Not Unique
	Brookside	Common Risks	Not Unique	Not Unique	Not Unique
	Cardiff	Common Risks	Not Unique	Not Unique	Not Unique
	Center Point	Common Risks	Not Unique	Not Unique	Not Unique
	Clay	Common Risks	Not Unique	Not Unique	Not Unique
	County Line	Common Risks	Not Unique	Not Unique	Not Unique
	Fairfield	Common Risks	Not Unique	Not Unique	Not Unique
	Fultondale	Common Risks	Not Unique	Not Unique	Not Unique
	Gardendale	Common Risks	Not Unique	Not Unique	Not Unique
	Graysville	Common Risks	Not Unique	Not Unique	Not Unique
	Homewood	Common Risks	Not Unique	Not Unique	Not Unique
	Hoover	Common Risks	Not Unique	Not Unique	Not Unique
	Hueytown	Common Risks	Not Unique	Not Unique	Not Unique
	Irondale	Common Risks	Not Unique	Not Unique	Not Unique
	Kimberly	Common Risks	Not Unique	Not Unique	Not Unique
	Leeds	Common Risks	Not Unique	Not Unique	Not Unique
	Lipscomb	Common Risks	Not Unique	Not Unique	Not Unique
	Maytown	Common Risks	Not Unique	Not Unique	Not Unique
	Midfield	Common Risks	Not Unique	Not Unique	Not Unique
	Morris	Common Risks	Not Unique	Not Unique	Not Unique
	Mountain Brook	Common Risks	Not Unique	Not Unique	Not Unique
	Mulga	Common Risks	Not Unique	Not Unique	Not Unique
	North Johns	Common Risks	Not Unique	Not Unique	Not Unique
	Pleasant Grove	Common Risks	Not Unique	Not Unique	Not Unique
	Sylvan Springs	Common Risks	Not Unique	Not Unique	Not Unique
	Tarrant	Common Risks	Not Unique	Not Unique	Not Unique
	Trafford	Common Risks	Not Unique	Not Unique	Not Unique
	Trussville	Common Risks	Not Unique	Not Unique	Not Unique
	Vestavia Hills	Common Risks	Not Unique	Not Unique	Not Unique
	Warrior	Common Risks	Not Unique	Not Unique	Not Unique
	West Jefferson	Common Risks	Not Unique	Not Unique	Not Unique
	Jefferson County	Common Risks	Not Unique	Not Unique	Not Unique
Floods	Adamsville	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Bessemer	Unique Risks	Specific Location	High	Moderately Severe
	Birmingham	Unique Risks	Specific Location	Very High	Severe
	Brighton	Unique Risks	Specific Location	Very High	Severe
	Brookside	Unique Risks	Specific Location	Very High	Severe
	Cardiff	Unique Risks	Specific Location	Very High	Severe

Hazard	Jurisdiction	Variation of Risks	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
	Center Point	Unique Risks	Specific Location	Very High	Severe
	Clay	Unique Risks	Specific Location	High	Moderately Severe
	County Line	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Fairfield	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Fultondale	Unique Risks	Specific Location	High	Moderately Severe
	Gardendale	Unique Risks	Specific Location	High	Moderately Severe
	Graysville	Unique Risks	Specific Location	Very High	Severe
	Homewood	Unique Risks	Specific Location	High	Moderately Severe
	Hoover	Unique Risks	Specific Location	Very High	Severe
	Hueytown	Unique Risks	Specific Location	High	Moderately Severe
	Irondale	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Kimberly	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Leeds	Unique Risks	Specific Location	Very High	Severe
	Lipscomb	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Maytown	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Midfield	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Morris	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Mountain Brook	Unique Risks	Specific Location	Very High	Severe
	Mulga	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	North Johns	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Pleasant Grove	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Sylvan Springs	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Tarrant	Unique Risks	Specific Location	Very High	Severe
	Trafford	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Trussville	Unique Risks	Specific Location	Very High	Severe
	Vestavia Hills	Unique Risks	Specific Location	Very High	Severe
	Warrior	Unique Risks	Minimal Coverage	Very Low	Not Severe
	West Jefferson	Unique Risks	Specific Location	Very High	Severe
	Jefferson County	Unique Risks	Specific Location	Very High	Severe
Hurricanes	Adamsville	Common Risks	Not Unique	Not Unique	Not Unique
	Bessemer	Common Risks	Not Unique	Not Unique	Not Unique
	Birmingham	Common Risks	Not Unique	Not Unique	Not Unique
	Brighton	Common Risks	Not Unique	Not Unique	Not Unique
	Brookside	Common Risks	Not Unique	Not Unique	Not Unique
	Cardiff	Common Risks	Not Unique	Not Unique	Not Unique
	Center Point	Common Risks	Not Unique	Not Unique	Not Unique
	Clay	Common Risks	Not Unique	Not Unique	Not Unique
	County Line	Common Risks	Not Unique	Not Unique	Not Unique
	Fairfield	Common Risks	Not Unique	Not Unique	Not Unique
	Fultondale	Common Risks	Not Unique	Not Unique	Not Unique
	Gardendale	Common Risks	Not Unique	Not Unique	Not Unique
	Graysville	Common Risks	Not Unique	Not Unique	Not Unique
	Homewood	Common Risks	Not Unique	Not Unique	Not Unique
	Hoover	Common Risks	Not Unique	Not Unique	Not Unique
	Hueytown	Common Risks	Not Unique	Not Unique	Not Unique
	Irondale	Common Risks	Not Unique	Not Unique	Not Unique
	Kimberly	Common Risks	Not Unique	Not Unique	Not Unique
	Leeds	Common Risks	Not Unique	Not Unique	Not Unique
	Lipscomb	Common Risks	Not Unique	Not Unique	Not Unique
	Maytown	Common Risks	Not Unique	Not Unique	Not Unique
	Midfield	Common Risks	Not Unique	Not Unique	Not Unique
	Morris	Common Risks	Not Unique	Not Unique	Not Unique
	Mountain Brook	Common Risks	Not Unique	Not Unique	Not Unique
	Mulga	Common Risks	Not Unique	Not Unique	Not Unique
	North Johns	Common Risks	Not Unique	Not Unique	Not Unique

Hazard	Jurisdiction	Variation of Risks	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
	Pleasant Grove	Common Risks	Not Unique	Not Unique	Not Unique
	Sylvan Springs	Common Risks	Not Unique	Not Unique	Not Unique
	Tarrant	Common Risks	Not Unique	Not Unique	Not Unique
	Trafford	Common Risks	Not Unique	Not Unique	Not Unique
	Trussville	Common Risks	Not Unique	Not Unique	Not Unique
	Vestavia Hills	Common Risks	Not Unique	Not Unique	Not Unique
	Warrior	Common Risks	Not Unique	Not Unique	Not Unique
	West Jefferson	Common Risks	Not Unique	Not Unique	Not Unique
	Jefferson County	Common Risks	Not Unique	Not Unique	Not Unique
Winter Storms Freezes	Adamsville	Common Risks	Not Unique	Not Unique	Not Unique
	Bessemer	Common Risks	Not Unique	Not Unique	Not Unique
	Birmingham	Common Risks	Not Unique	Not Unique	Not Unique
	Brighton	Common Risks	Not Unique	Not Unique	Not Unique
	Brookside	Common Risks	Not Unique	Not Unique	Not Unique
	Cardiff	Common Risks	Not Unique	Not Unique	Not Unique
	Center Point	Common Risks	Not Unique	Not Unique	Not Unique
	Clay	Common Risks	Not Unique	Not Unique	Not Unique
	County Line	Common Risks	Not Unique	Not Unique	Not Unique
	Fairfield	Common Risks	Not Unique	Not Unique	Not Unique
	Fultondale	Common Risks	Not Unique	Not Unique	Not Unique
	Gardendale	Common Risks	Not Unique	Not Unique	Not Unique
	Graysville	Common Risks	Not Unique	Not Unique	Not Unique
	Homewood	Common Risks	Not Unique	Not Unique	Not Unique
	Hoover	Common Risks	Not Unique	Not Unique	Not Unique
	Hueytown	Common Risks	Not Unique	Not Unique	Not Unique
	Irondale	Common Risks	Not Unique	Not Unique	Not Unique
	Kimberly	Common Risks	Not Unique	Not Unique	Not Unique
	Leeds	Common Risks	Not Unique	Not Unique	Not Unique
	Lipscomb	Common Risks	Not Unique	Not Unique	Not Unique
	Maytown	Common Risks	Not Unique	Not Unique	Not Unique
	Midfield	Common Risks	Not Unique	Not Unique	Not Unique
	Morris	Common Risks	Not Unique	Not Unique	Not Unique
	Mountain Brook	Common Risks	Not Unique	Not Unique	Not Unique
	Mulga	Common Risks	Not Unique	Not Unique	Not Unique
	North Johns	Common Risks	Not Unique	Not Unique	Not Unique
	Pleasant Grove	Common Risks	Not Unique	Not Unique	Not Unique
	Sylvan Springs	Common Risks	Not Unique	Not Unique	Not Unique
	Tarrant	Common Risks	Not Unique	Not Unique	Not Unique
	Trafford	Common Risks	Not Unique	Not Unique	Not Unique
	Trussville	Common Risks	Not Unique	Not Unique	Not Unique
	Vestavia Hills	Common Risks	Not Unique	Not Unique	Not Unique
	Warrior	Common Risks	Not Unique	Not Unique	Not Unique
	West Jefferson	Common Risks	Not Unique	Not Unique	Not Unique
	Jefferson County	Common Risks	Not Unique	Not Unique	Not Unique
Droughts Heat Waves	Adamsville	Common Risks	Not Unique	Not Unique	Not Unique
	Bessemer	Common Risks	Not Unique	Not Unique	Not Unique
	Birmingham	Common Risks	Not Unique	Not Unique	Not Unique
	Brighton	Common Risks	Not Unique	Not Unique	Not Unique
	Brookside	Common Risks	Not Unique	Not Unique	Not Unique
	Cardiff	Common Risks	Not Unique	Not Unique	Not Unique
	Center Point	Common Risks	Not Unique	Not Unique	Not Unique
	Clay	Common Risks	Not Unique	Not Unique	Not Unique
	County Line	Common Risks	Not Unique	Not Unique	Not Unique
	Fairfield	Common Risks	Not Unique	Not Unique	Not Unique
	Fultondale	Common Risks	Not Unique	Not Unique	Not Unique

Hazard	Jurisdiction	Variation of Risks	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
	Gardendale	Common Risks	Not Unique	Not Unique	Not Unique
	Graysville	Common Risks	Not Unique	Not Unique	Not Unique
	Homewood	Common Risks	Not Unique	Not Unique	Not Unique
	Hoover	Common Risks	Not Unique	Not Unique	Not Unique
	Hueytown	Common Risks	Not Unique	Not Unique	Not Unique
	Irondale	Common Risks	Not Unique	Not Unique	Not Unique
	Kimberly	Common Risks	Not Unique	Not Unique	Not Unique
	Leeds	Common Risks	Not Unique	Not Unique	Not Unique
	Lipscomb	Common Risks	Not Unique	Not Unique	Not Unique
	Maytown	Common Risks	Not Unique	Not Unique	Not Unique
	Midfield	Common Risks	Not Unique	Not Unique	Not Unique
	Morris	Common Risks	Not Unique	Not Unique	Not Unique
	Mountain Brook	Common Risks	Not Unique	Not Unique	Not Unique
	Mulga	Common Risks	Not Unique	Not Unique	Not Unique
	North Johns	Common Risks	Not Unique	Not Unique	Not Unique
	Pleasant Grove	Common Risks	Not Unique	Not Unique	Not Unique
	Sylvan Springs	Common Risks	Not Unique	Not Unique	Not Unique
	Tarrant	Common Risks	Not Unique	Not Unique	Not Unique
	Trafford	Common Risks	Not Unique	Not Unique	Not Unique
	Trussville	Common Risks	Not Unique	Not Unique	Not Unique
	Vestavia Hills	Common Risks	Not Unique	Not Unique	Not Unique
	Warrior	Common Risks	Not Unique	Not Unique	Not Unique
	West Jefferson	Common Risks	Not Unique	Not Unique	Not Unique
	Jefferson County	Common Risks	Not Unique	Not Unique	Not Unique
Wildfires	Adamsville	Unique Risks	Specific Coverage	Moderate	Moderately Severe
	Bessemer	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Birmingham	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Brighton	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Brookside	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Cardiff	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Center Point	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Clay	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	County Line	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Fairfield	Unique Risks	Specific Coverage	Moderate	Moderately Severe
	Fultondale	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Gardendale	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Graysville	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Homewood	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Hoover	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Hueytown	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Irondale	Unique Risks	Minimal Coverage	Low	Not Severe
	Kimberly	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Leeds	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Lipscomb	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Maytown	Unique Risks	Specific Coverage	Moderate	Moderately Severe
	Midfield	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Morris	Unique Risks	Specific Coverage	Moderate	Moderately Severe
	Mountain Brook	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Mulga	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	North Johns	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Pleasant Grove	Unique Risks	Specific Coverage	Moderate	Moderately Severe
	Sylvan Springs	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Tarrant	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Trafford	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Trussville	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe

Hazard	Jurisdiction	Variation of Risks	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
	Vestavia Hills	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Warrior	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	West Jefferson	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Jefferson County	Unique Risks	Minimal Coverage	Low	Somewhat Severe
Dam / Levee Failures	Adamsville	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Bessemer	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Birmingham	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Brighton	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Brookside	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Cardiff	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Center Point	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Clay	Unique Risks	Minimal Coverage	Very Low	Not Severe
	County Line	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Fairfield	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Fultondale	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Gardendale	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Graysville	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Homewood	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Hoover	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Hueytown	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Irondale	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Kimberly	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Leeds	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Lipscomb	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Maytown	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Midfield	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Morris	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Mountain Brook	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Mulga	Unique Risks	Minimal Coverage	Very Low	Not Severe
	North Johns	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Pleasant Grove	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Sylvan Springs	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Tarrant	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Trafford	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Trussville	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Vestavia Hills	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Warrior	Unique Risks	Minimal Coverage	Very Low	Not Severe
	West Jefferson	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Jefferson County	Unique Risks	Minimal Coverage	Very Low	Not Severe
Landslides	Adamsville	Unique Risks	Minimal Coverage	Low	Not Severe
	Bessemer	Unique Risks	Minimal Coverage	Low	Not Severe
	Birmingham	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Brighton	Unique Risks	Minimal Coverage	Low	Not Severe
	Brookside	Unique Risks	Minimal Coverage	Low	Not Severe
	Cardiff	Unique Risks	Minimal Coverage	Low	Not Severe
	Center Point	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Clay	Unique Risks	Minimal Coverage	Low	Not Severe
	County Line	Unique Risks	Minimal Coverage	Low	Not Severe
	Fairfield	Unique Risks	Minimal Coverage	Low	Not Severe
	Fultondale	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Gardendale	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Graysville	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Homewood	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Hoover	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Hueytown	Unique Risks	Minimal Coverage	Very Low	Not Severe

Hazard	Jurisdiction	Variation of Risks	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
	Irondale	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Kimberly	Unique Risks	Minimal Coverage	Low	Not Severe
	Leeds	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Lipscomb	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Maytown	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Midfield	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Morris	Unique Risks	Minimal Coverage	Low	Not Severe
	Mountain Brook	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Mulga	Unique Risks	Minimal Coverage	Very Low	Not Severe
	North Johns	Unique Risks	Minimal Coverage	Low	Not Severe
	Pleasant Grove	Unique Risks	Minimal Coverage	Low	Not Severe
	Sylvan Springs	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Tarrant	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Trafford	Unique Risks	Minimal Coverage	Low	Not Severe
	Trussville	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Vestavia Hills	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Warrior	Unique Risks	Minimal Coverage	Low	Not Severe
	West Jefferson	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Jefferson County	Unique Risks	Minimal Coverage	Very Low	Not Severe
Earthquakes	Adamsville	Common Risks	Not Unique	Not Unique	Not Unique
	Bessemer	Common Risks	Not Unique	Not Unique	Not Unique
	Birmingham	Common Risks	Not Unique	Not Unique	Not Unique
	Brighton	Common Risks	Not Unique	Not Unique	Not Unique
	Brookside	Common Risks	Not Unique	Not Unique	Not Unique
	Cardiff	Common Risks	Not Unique	Not Unique	Not Unique
	Center Point	Common Risks	Not Unique	Not Unique	Not Unique
	Clay	Common Risks	Not Unique	Not Unique	Not Unique
	County Line	Common Risks	Not Unique	Not Unique	Not Unique
	Fairfield	Common Risks	Not Unique	Not Unique	Not Unique
	Fultondale	Common Risks	Not Unique	Not Unique	Not Unique
	Gardendale	Common Risks	Not Unique	Not Unique	Not Unique
	Graysville	Common Risks	Not Unique	Not Unique	Not Unique
	Homewood	Common Risks	Not Unique	Not Unique	Not Unique
	Hoover	Common Risks	Not Unique	Not Unique	Not Unique
	Hueytown	Common Risks	Not Unique	Not Unique	Not Unique
	Irondale	Common Risks	Not Unique	Not Unique	Not Unique
	Kimberly	Common Risks	Not Unique	Not Unique	Not Unique
	Leeds	Common Risks	Not Unique	Not Unique	Not Unique
	Lipscomb	Common Risks	Not Unique	Not Unique	Not Unique
	Maytown	Common Risks	Not Unique	Not Unique	Not Unique
	Midfield	Common Risks	Not Unique	Not Unique	Not Unique
	Morris	Common Risks	Not Unique	Not Unique	Not Unique
	Mountain Brook	Common Risks	Not Unique	Not Unique	Not Unique
	Mulga	Common Risks	Not Unique	Not Unique	Not Unique
	North Johns	Common Risks	Not Unique	Not Unique	Not Unique
	Pleasant Grove	Common Risks	Not Unique	Not Unique	Not Unique
	Sylvan Springs	Common Risks	Not Unique	Not Unique	Not Unique
	Tarrant	Common Risks	Not Unique	Not Unique	Not Unique
	Trafford	Common Risks	Not Unique	Not Unique	Not Unique
	Trussville	Common Risks	Not Unique	Not Unique	Not Unique
	Vestavia Hills	Common Risks	Not Unique	Not Unique	Not Unique
	Warrior	Common Risks	Not Unique	Not Unique	Not Unique
	West Jefferson	Common Risks	Not Unique	Not Unique	Not Unique
	Jefferson County	Common Risks	Not Unique	Not Unique	Not Unique
Sinkholes	Adamsville	Unique Risks	Minimal Coverage	Low	Somewhat Severe

Hazard	Jurisdiction	Variation of Risks	Hazard's Unique Risk Characteristics		
			Location	Probability	Extent
Land Subsidence	Bessemer	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Birmingham	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Brighton	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Brookside	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Cardiff	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Center Point	Unique Risks	Minimal Coverage	Low	Not Severe
	Clay	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	County Line	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Fairfield	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Fultondale	Unique Risks	Minimal Coverage	Low	Not Severe
	Gardendale	Unique Risks	Minimal Coverage	Low	Not Severe
	Graysville	Unique Risks	Minimal Coverage	Low	Not Severe
	Homewood	Unique Risks	Minimal Coverage	Low	Not Severe
	Hoover	Unique Risks	Minimal Coverage	Low	Not Severe
	Hueytown	Unique Risks	Minimal Coverage	Low	Not Severe
	Irondale	Unique Risks	Minimal Coverage	Moderate	Moderately Severe
	Kimberly	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Leeds	Unique Risks	Minimal Coverage	Low	Not Severe
	Lipscomb	Unique Risks	Minimal Coverage	Low	Not Severe
	Maytown	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe
	Midfield	Unique Risks	Minimal Coverage	Low	Not Severe
	Morris	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Mountain Brook	Unique Risks	Minimal Coverage	Low	Not Severe
	Mulga	Unique Risks	Minimal Coverage	Low	Not Severe
	North Johns	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Pleasant Grove	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Sylvan Springs	Unique Risks	Minimal Coverage	Low	Not Severe
	Tarrant	Unique Risks	Minimal Coverage	Low	Not Severe
	Trafford	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	Trussville	Unique Risks	Minimal Coverage	Very Low	Not Severe
	Vestavia Hills	Unique Risks	Minimal Coverage	Low	Not Severe
	Warrior	Unique Risks	Minimal Coverage	Low	Somewhat Severe
	West Jefferson	Unique Risks	Minimal Coverage	Low	Not Severe
	Jefferson County	Unique Risks	Minimal Coverage	Moderate	Somewhat Severe

Chapter 6 Mitigation Strategy

Federal Requirements for the Mitigation Strategy
Goals for Hazard Mitigation
Participation and Compliance with the National Flood Insurance Program (NFIP)
Identification and Analysis of Mitigation Actions and Projects
Implementation of Mitigation Actions
Jurisdictional Mitigation Actions

Federal Requirements for the Mitigation Strategy

This chapter of the Plan addresses the Mitigation Strategy requirements of 44 CFR Section 201.6(c)(3), as follows:

> "201.6(c)(3) A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

This section shall include:

> A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
>
> A section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
>
> An action plan describing how the actions identified in paragraph (c)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan."

Goals for Hazard Mitigation

Description of How the Goals Were Developed

The goals in the 2014 plan have been updated based on current conditions. The Hazard Mitigation Planning Committee (HMPC) evaluated the validity and effectiveness of the goals from the previous

2009/2011 plan update and determined that most of the goal statements should be retained in the 2014 Plan Update. Although many were considered lofty, the HMPC decided to keep these goals and strive to achieve them as swiftly as possible. The previously approved plan also included objectives and this update carries forward many of the same objectives.

Among the considerations reviewed by the HMPC during the process of updating this goals section of the mitigation strategy in the 2014 plan were the following concerns:

- Whether the 2014 goals and objectives reflected the updates to the local risk assessment and the 2010 update to the State risk assessment;
- Whether the goals and objectives effectively directed mitigation actions and projects that helped reduce vulnerability to property and infrastructure;
- Whether the goals and objectives support the changed 2014 Mitigation Actions established by the jurisdictions; and
- Whether the goals reflect the adopted goals in the 2013 Alabama State Hazard Mitigation Plan.

The Vision for Disaster-Resistant Jefferson County Communities

Jefferson 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. Jefferson County is committed to reduce the exposure and risk of natural hazards to its communities by activating all available resources through cooperative inter-governmental and private sector initiatives, and augmenting public knowledge and awareness.

This shared vision among all Jefferson County local governments can be achieved through a long-term hazard mitigation strategy that fully responds to the following hazards identified by this plan:

- floods
- tornadoes
- severe storms
- earthquakes
- winter storms/freezes
- droughts/heat waves
- wildfires
- sinkholes (land subsidence)
- hurricanes
- landslides
- dam/levee failures

The attainment of this vision requires successful implementation of a comprehensive range of mitigation measures that promote the following underlying principles and purposes:

- reduce or eliminate risks from natural hazards

- reduce the vulnerability of existing, new, and future development of buildings and infrastructure
- minimize exposure and vulnerability of people, buildings, critical facilities, and infrastructure to identified hazards
- increase public awareness and support of hazard mitigation
- establish interagency cooperation for conducting hazard mitigation activities
- strengthen communications and coordination among individuals and organizations
- integrate local hazard mitigation planning with State hazard mitigation planning, local comprehensive planning activities, and emergency operations planning
- protect people and property and reduce losses and damages to buildings and infrastructure

Community Goals and Objectives

The goals and objectives to guide the Mitigation Strategy and achieve the long-range vision shared among Jefferson County communities are presented here:

Local Planning and Regulations. Manage the development of land and buildings to minimize risks of loss due to natural and man-made hazards. Protect structures and their occupants and contents from the damaging effects of natural and man-made hazards.

Major Objectives:

- Incorporating risk assessment and hazard mitigation principles into comprehensive planning efforts.
- Incorporating a stand-alone element for hazard mitigation into the local comprehensive (land use) plan.
- Incorporating hazard mitigation into broader growth management (i.e., Smart Growth) initiatives.
- Incorporating a hazard risk assessment into the local development and subdivision review process.
- Adding hazard mitigation measures to existing adequate public facilities (APF) tests and programs.
- Ensuring natural hazards are considered in all land suitability analyses (LSA).
- Determining and enforcing acceptable land uses to alleviate the risk of damage by limiting exposure in such hazard areas.
- Developing a post-disaster reconstruction plan to facilitate decision making following a hazard event.
- Involving citizens in comprehensive planning activities that identify and mitigate hazards.
- Using bonus/incentive zoning to encourage mitigation measures for private land development.
- Using conditional use zoning to require or exact mitigation measures for private land development.
- Establishing a process to use overlay zones to require mitigation techniques in high-hazard districts.

- Adopting a post-disaster recovery ordinance based on a plan to regulate repair activity, generally depending on property location.
- Adopting environmental review standards.
- Incorporating proper species selection, planting, and maintenance practices into landscape ordinances.

Structure and Infrastructure Projects. Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where found to be feasible, cost effective, and environmentally suitable.

Major Objectives:

- Incorporating hazard mitigation principles into all aspects of public-funded building.
- Incorporating mitigation retrofits for public facilities into the annual capital improvements program.
- Engineering or retrofitting roads and bridges to withstand hazards.
- Relocating or undergrounding electrical infrastructure.
- Designing and building water tanks or wells for use in times of water outage.
- Installing quick-connect emergency generator hook-ups for critical facilities

Natural Systems Protection. 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.

Major Objectives:

- Protecting and enhancing landforms that serves as natural mitigation features (i.e., riverbanks, wetlands, dunes, etc.).
- Using vegetative management, such as vegetative buffers, around streams and water sources.
- Protecting and preserving wetlands to help prevent flooding in other areas.
- Establishing and managing riparian buffers along rivers and streams.
- Retaining natural vegetative beds in storm water channels.
- Retaining thick vegetative cover on public lands flanking rivers.

Education and Awareness Programs. Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property.

Major Objectives:

- Developing and implementing a multi-hazard public awareness program.
- Providing information on all types of hazards, preparedness and mitigation measures, and responses during hazard events.
- Establishing a "hazard awareness week" in coordination with the media to promote hazard

awareness (seasonal).

- Establishing an interactive website for educating the public on hazard mitigation and preparedness measures.
- Annually hosting a public hazards workshop or exposition for all residents.
- Establishing hazard information centers.
- Creating a speakers bureau for disaster-related topics that focus on mitigation and preparedness measures.
- Enhancing hazard awareness of the private sector, particularly lenders, insurance agents, and realtors.
- Scheduling an annual "what's new in mitigation" briefing for the local governing body (possibly with SHMO, etc.).

Compatibility with 2013 Alabama State Plan Goals

The 2014 Jefferson County Multi-Hazard Mitigation Plan, vision, goals, and objectives are reflective of the goals adopted in the 2013 Alabama State Hazard Mitigation Plan. The State plan includes the following six goals for statewide hazard mitigation:

- Enhance the comprehensive statewide hazard mitigation system.
- Reduce the State of Alabama's risk from natural hazards.
- Reduce vulnerability of new and future development.
- Reduce the State of Alabama's vulnerability to natural hazards.
- Foster public support and acceptance of hazard mitigation.
- Expand and Promote interagency hazard mitigation cooperation.

Alabama local governments, including Jefferson County communities, are the fundamental building blocks of the "comprehensive statewide hazard mitigation system." The underlying principles and purposes of the 2014 Jefferson County goals, listed in Subsection 6.3.3, complement the remaining five State goals, as follows: (a) to reduce or eliminate risks from natural and man-made hazards; (b) to reduce the vulnerability of existing, new, and future development of buildings and infrastructure; (c) to minimize exposure and vulnerability of people, buildings, critical facilities, and infrastructure to identified hazards; (d) to increase public awareness and support of hazard mitigation; and (e) to establish interagency cooperation for conducting hazard mitigation activities.

Participation and Compliance with the National Flood Insurance Program (NFIP)

Jefferson County and its municipal jurisdictions, with the exception of the Town of County Line, have been mapped and the floodplains identified. Since the 2004 plan, all jurisdictions have had their flood maps digitized and updated through the FEMA Map Modernization program. Nearly all NFIP communities in Jefferson County have continued to effectively enforce and keep their floodplain ordinances current since their original entry into the program. Local flood plain ordinance administrators provide technical assistance to applicants and keep abreast of changes in flood plain management requirements through the State NFIP Coordinator. All communities, except for the Town of County Line (which has no areas of special flood hazards mapped by FEMA), have

developed five-year action programs to improve local flood plain management programs. Demonstrations of community commitment to effective implementation of the NFIP include the following actions:

- Longstanding records of continuous and effective enforcement of flood plain management ordinance requirements;
- Continuing education of local flood plain administrators;
- Community outreach to inform builders and property owners of flood plain management ordinance permitting requirements;
- Continuing updates of local flood plain ordinances for compliance with the most current NFIP standards;
- Maintaining the latest FIRM data in the County's GIS database for all communities;
- Ongoing relations by each community with the State NFIP Coordinator;
- Monitoring flooding events and damages in conjunction with the Jefferson County EMA;
- Encouragement to participate in the Community Rating System (CRS) program, through this hazard mitigation planning process and the HMPC; and
- Maintaining NFIP publications on hand by the Jefferson County EMA as technical support resources to local flood plain administrators and as public education information for the general public.

The following table provides information on the NFIP participation status of Jefferson County jurisdictions:

Table 6.2 – 2015 NFIP Community Status, Jefferson County Jurisdictions

Community ID	Jurisdiction	Date of Entry into Program	Status
010217	Jefferson County	02/17/1982	Participating
010267	Adamsville	10/10/1990	Participating
010115	Bessemer	06/01/1981	Participating
010116	Birmingham	03/16/1981	Participating
010117	Brighton	01/02/1981	Participating
010118	Brookside	02/18/1981	Participating
010119	Cardiff	05/23/2003	Participating
010445	Center Point	06/05/2003	Participating
010446	Clay	08/18/2003	Participating
***	County Line	****	Not Mapped
010120	Fairfield	09/11/1981	Participating
010121	Fultondale	05/05/1981	Participating
010269	Gardendale	11/21/1980	Participating
010266	Graysville	11/21/1980	Participating
015006	Homewood	03/30/1973	Participating
010123	Hoover	02/04/1981	Participating
010337	Hueytown	01/02/1981	Participating
010124	Irondale	02/04/1981	Participating
010265	Kimberly	06/18/1981	Participating
010125	Leeds	01/02/1981	Participating
010126	Lipscomb	01/02/1981	Participating
010421	Maytown	01/20/1999	Sanctioned
010127	Midfield	01/16/1981	Participating

010264	Morris	06/03/1986	Participating
010128	Mountain Brook	01/02/1981	Participating
010129	Mulga	09/19/1980	Participating
010396	North Johns	01/20/1999	Sanctioned
010268	Pleasant Grove	12/19/1980	Participating
010420	Sylvan Springs	09/29/2006	Sanctioned
010131	Tarrant	01/02/1981	Participating
010262	Trafford	01/20/1999	Sanctioned
010133	Trussville	11/18/1981	Participating
010132	Vestavia Hills	01/02/1981	Participating
010263	Warrior	01/02/1981	Participating
010402	West Jefferson	02/20/1980	Sanctioned

Source: NFIP Community Status Book

Since the 2004 plan, all mapped jurisdictions have updated and digitized their flood maps, as part of the Jefferson County update. The digital FIRM was made effective September 29, 2006.

Identification and Analysis of Mitigation Actions and Projects

The strategic planning approach for identifying and analyzing mitigation actions and projects follows five categories of a comprehensive hazard mitigation program, which also form the basis for the goals of this plan. These program categories have been developed by FEMA for managing a successful mitigation program and were used here as guidelines for identifying and sorting the alternative mitigation measures:

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.

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.

Public Education and Awareness.

Educating and informing the public about the risks of hazards and the techniques available to reduce threats to life and property.

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.

Structural Projects.

Engineering structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of a hazard on a community.

The process by which the jurisdictions finally selected among the available mitigation measures within each of the above categories applied the STAPLEE method. Each jurisdiction's capabilities to implement the selected mitigation measures were assessed. Related to this assessment is the review of local plans, studies, regulatory tools and other local planning and regulatory tools.

In addition to STAPLEE and jurisdictional capabilities, jurisdictions examined other evaluation criteria, including consistency with the vision, goals, and objectives; weight of benefit to cost; FEMA and State funding priorities for Hazard Mitigation Assistance grants; and the fiscal and staffing capacities of the jurisdictions for carrying out the measures.

Mitigation measures that resulted in loss reduction to existing and new buildings and infrastructure were chosen for the final list of considered measures.

Implementation of Mitigation Actions

Social, technical, administrative, political, legal, environmental, and economic considerations – often referred to as the STAPLEE method – guided the evaluation of the range of measures considered by each participating jurisdiction. The STAPLEE method addressed the following areas of concern:

Social Considerations

Environmental justice. Will the proposed measure be socially equitable to minority, disadvantaged, and special needs populations, such as the elderly and handicapped?

Neighborhood impact. Will the measure disrupt established neighborhoods or improve quality of life for affected neighborhoods?

Community support. Is the measure consistent with community values? Will the affected community support the measure?

Impact on social and cultural resources. Does the measure adversely affect valued local resources or enhance those resources?

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?

Administrative Considerations

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?

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?
Timing. Can the measure be implemented in a timely manner? Are the timeframes for implementation reasonable?

Political Considerations

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?

Legal Considerations

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?

Environmental Considerations

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?

State and local environmental regulations. Will the measure be in compliance with State and local environmental laws, such as flood plain management regulations, water quality standards, and wetlands protection criteria?

Environmental conservation goals. Will the proposal advance the overall environmental goals and objectives of the community?

Economic Considerations

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?

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?

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?
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?

Impact on local economy.

Will the proposed measure improve local economic activities? What impact might the measure have on the tax base?

Economic development goals.

Will the proposal advance the overall economic goals and objectives of the community?

The STAPLEE evaluation also facilitated the prioritization of measures. If a measure under consideration was found to be financially feasible and had high ratings, it was given a higher priority for implementation than measures that fell lower in the rating. Moreover, a general economic evaluation was performed as part of the STAPLEE method, as described above.

Weighing potential economic benefits to reducing damages against costs made it possible to select among competing projects. Especially important to the selection process is the estimated cost and availability of funds through local sources and potential FEMA Hazard Mitigation Assistance (HMA) grant programs. Prior to implementation of projects proposed for HMA funding, a detailed benefit-cost analysis (BCA) will be required.

All of the above considerations and prioritization methods resulted in the final Community Mitigation Actions Programs presented in the supplemental plan document.

Table 6.3 – Jefferson County Hazards and Goals Summary

	Community Mitigation Goals			
Hazard	Land Planning and Regulations	Structure and Infrastructure Projects	Natural Systems Protection	Education and Awareness Programs
Dams/Levee Failures (See: Flooding)	X	X	X	X
Drought/Heat Waves				X
Earthquakes	X	X		X
Flooding	X	X	X	X
Hurricanes (See: Severe Wind; Flooding)				
Landslides/Erosion	X	X	X	X
Land Subsidence	X	X		X
Severe Storms		X		X
Tornadoes		X		X
Wildfires	X			X
Winter Storms/Freezes (Severe Winter Weather)		X		X
Extreme Temperatures				X
Hail				X
Landslide	X		X	X
Lightning		X		X
Severe Wind				X
Multiple Hazards	X	X	X	X

Table 6.4 – Summary by Goals and Objectives

Goals	Objectives	Recommended Lead / Support Agencies	Affects New/Existing Building or Infrastructure	Action or Project	Funding Source
Goal 1	Local Planning and Regulations. Manage the development of land and buildings to minimize risks of loss due to natural and man-made hazards. Protect structures and their occupants and contents from the damaging effects of natural and man-made hazards.				
OBJECTIVES					
1.1	Develop comprehensive land use plans that maximize the protection of the built environment from natural and man-made hazards	County/ City Planning Agencies	Both	Action	Local, State
1.2	Create local funding mechanisms for incorporating hazard mitigation into land use plans	County/City Planning Agencies, Mayor, City Council, Legal Departments	Both	Action	Local
1.3	Monitor mitigation plan implementation and ensure compatibility with land use plans	County/City Planning Agencies, Local Building Officials	Both	Action	Local
1.4	Adopt and, if necessary, strengthen, county-wide zoning and land use regulations to prevent development in hazardous areas.	Mayor, City Council, Local Zoning Administrators, Legal Departments	Both	Action	Local, State
1.5	Develop and implement tools to assess hazards and promote wise decision-making in sitting the built environment.	EMA, County/City Planners, USGS, FEMA	Both	Action	EMA, FEMA, USGS, Local
1.6	Undertake risk assessments and map county-wide hazards.	County/City GIS Departments, County/City Planners	Both	Action	USGS, EMA, FEMA, Local
Goal 2	Structure and Infrastructure Projects. Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of hazards, where found to be feasible, cost effective, and environmentally suitable.				
OBJECTIVES					
2.1	Adopt mitigation strategies into current and	County/City Planners, Local	Both	Action	Local Capital

Goals	Objectives	Recommended Lead / Support Agencies	Affects New/Existing Building or Infrastructure	Action or Project	Funding Source
	future public capital improvement infrastructure projects.	Building Departments			Improvements Budgets,
2.2	Apply mitigation principles to the engineering and design/ modification of critical infrastructure and facilities.	Local Public Works and Building Departments	Both	Project	Local, Public Works, Private
2.3	Undertake county-wide surveys of built environment to assess risk(s) to public facilities and infrastructure from multiple hazards.	EMA, County City Planning Agencies, Public Works	Both	Action	Local Agency Budges (Public Works, Planning), EMA, FEMA Grants
2.4	Apply retrofitting techniques to public buildings and infrastructure to minimize losses from natural hazards	Public Works (Engineering Departments)	Existing	Project	Local Capital Improvements Budget, Private
2.5	Develop and disseminate information to builders on incorporating mitigation strategies in the engineering and design of public and private structures and infrastructure.	County/City Planners and Building Departments	Both	Action	EMA, FEMA Local
Goal 3	Natural Systems Protection. 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				
OBJECTIVES					
3.1	Minimize development in hazard areas by incorporating resource management techniques that preserve natural areas, such as wetlands and other riparian zones.	County/City Planners, Parks Departments	New	Action	Local, EMA
3.2	Retain natural vegetation around areas subject to flooding and land movement	County/City Planners, Parks Departments	New	Action	Local
3.3	Preserve natural systems and incorporate into comprehensive parks and recreation programs	Parks Department	Both	Action	EMA, Local
3.4	Protect county-wide water systems, aquifers, and forests by limiting development in critical areas.	Public Works, Water Dept, County/City Planners, State and Local Fire Agencies	New	Action	Local
3.5	Provide incentives to developers to preserve natural systems in the built environment.	County/City Planning, Building and Zoning Departments	Both	Both	EMA, Local, Private
Goal 4	Education and Awareness Programs. Educate and inform the public about the risks of hazards and the techniques available to reduce threats to life and property				
OBJECTIVES					
4.1	Develop and implement emergency preparedness education programs for schools, business, and industry.	County/City Public Works Departments, EMA, Local Health Departments, Fire Departments	Both	Action	EMA, FEMA, Local, Private
4.2	Develop and implement a multi-hazard public awareness program	EMA, Mayor, City Councils, Fire Departments	Both	Action	EMA, FEMA, Local, Private
4.3	Create Organize a speaker's bureau and hold community forums and discuss county-wide hazards, mitigation measures, and how effectively applied.	Mayor, City Councils, Building Departments	Both	Action	Local, EMA, FEMA
4.4	Establish an interactive website to educate the public on hazard mitigation and preparedness measures.	Mayor/City Council, IT Departments, Planning and Building Departments	Both	Action	Local, EMA, FEMA
4.5	Distribute mitigation outreach material, such as preparedness handbooks, brochures, severe weather guides, and home retrofit plans.	Planning and Building Departments	Both	Action	Local, EMA, FEMA
4.6	Provide public outreach through existing communication media on need to prepare for	Mayor, City Councils	Both	Action	Local, Private

Goals	Objectives	Recommended Lead / Support Agencies	Affects New/Existing Building or Infrastructure	Action or Project	Funding Source
	potential hazards.				
4.7	Establishing a "hazard awareness week" in coordination with the media to promote hazard awareness.	Mayor, City Councils, County/City Planning Departments	Both	Action	Local, EMA, FEMA

Chapter 7 – Plan Maintenance Process

Federal Requirements for the Plan Maintenance Process
Monitoring, Evaluating and Updating the Mitigation Plan
Incorporation of the Mitigation Plan into Other Planning Mechanisms
Continuing Public Participation in the Plan Maintenance Process

Federal Requirements for the Plan Maintenance Process

This chapter of the Plan addresses the Plan Maintenance Process requirements of 44 CFR Sec. 201.6 (c) (4), as follows:

"Sec. 201.6 (c) Plan content. The plan shall include the following:

A plan maintenance process that includes:

A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

Discussion on how the community will continue public participation in the plan maintenance process."

Monitoring, Evaluating, and Updating the Mitigation Plan

Ongoing Monitoring of the Plan

The HMPC will meet semi-annually to provide training and education in Hazard Mitigation planning. The HMPC will perform ongoing monitoring of the status of the Mitigation Actions scheduled for implementation by the jurisdictions. Annual status reports of each jurisdiction's progress will be sent to and reviewed by the JCEMA Director and the HMPC Chairperson. While JCEMA admits to having done a very poor job in the past of monitoring and evaluating the HMP Updates, JCEMA and the revitalized HMPC now understand the importance of plan maintenance, and are committed to ensuring that the activities associated with it are conducted on a regularly-scheduled basis beginning with this 2014 Plan Update. It is acknowledged that follow-through on this commitment will result in a much smoother planning process and faster plan development at the end of this five-year period.

Monitoring of Plan Updates will focus on the following information:

- Actions that have been undertaken to implement the scheduled mitigation measure, such as, obtaining funding, permits, approvals or other resources to begin implementation.
- Mitigation measures that have been completed, including public involvement activities.
- Revisions to the priority, timeline, responsibility, or funding source of a measure and cause for

such revisions or additional information or analysis that has been developed that would modify the mitigation measure assignment as initially adopted in the plan.

- Measures that a jurisdiction no longer intends to implement and justification for cancellation.

The ongoing implementation process may require adjustments to the selection of mitigation actions, priorities, timelines, lead responsibilities, and funding sources scheduled in the Community Mitigation Action Programs presented in this plan. In the event modifications to the plan are warranted as a result of the annual review or other conditions, the HMPC will oversee and approve all amendments to the plan. An amendment requires approval of a resolution by majority vote of the members present at a called meeting. Conditions that might warrant amendments to this plan would include, but are not limited to: special opportunities for funding and response to a natural disaster. A copy of the plan amendments will be submitted by JCEMA to affected jurisdictions in a timely manner and filed with the AEMA.

Each jurisdiction will track and provide a report to the mitigation planning committee about their mitigation strategies and risk assessments on an annual basis. The chairperson of the hazard committee and designated members will evaluate each jurisdictions report. Each jurisdiction will update their mitigation strategies as projects are completed. Reported project completions will be recorded and included in the 5 year update by the hazard mitigation planning committee.

Table 7.2 –Jurisdictional Points of Contacts for the 2014 HMP

Jurisdiction	Mayor
Adamsville	Mayor Palmer
Bessemer	Mayor Gulley
Birmingham	Mayor Bell
Brighton	Mayor Watkins
Brookside	Mayor McCondichie
Center Point	Mayor Henderson
Clay	Mayor Webster
County Line	Mayor Self
Fairfield	Mayor Coachman
Fultondale	Mayor Lowery
Gardendale	Mayor Hogeland
Graysville	Mayor Morgan
Homewood	Mayor McBrayer
Hoover	Mayor Ivey
Hueytown	Mayor Baumann
Irondale	Mayor Alexander
Kimberly	Mayor Ellerbrock
Leeds	Mayor Miller
Lipscomb	Mayor McDade
Midfield	Mayor Richardson
Morris	Mayor Pylant
Mountain Brook	Mayor Oden
Mulga	Mayor Jones
Pinson	Mayor Sanders
Pleasant Grove	Mayor Brasseale
Sylvan Springs	Mayor Parsons
Tarrant	Mayor Tuck

Jurisdiction	Mayor
Trafford	Mayor Motes
Trussville	Mayor Melton
Vestavia Hills	Mayor Zaragoza
Warrior	Mayor Ragland
West Jefferson	Mayor Nix

Evaluating the Plan

Within sixty days following a significant disaster or an emergency event having a substantial impact on a portion of or the entire Jefferson County area or any of its jurisdictions, the HMPC will conduct or oversee an analysis of the event to evaluate the responsiveness of the Mitigation Strategy to the event and the effects on the contents of Chapter 5 "Risk Assessment." The Risk Assessment should evaluate the direct and indirect damages, response and recovery costs (economic impacts) and the location, type, and extents of the damages. The findings of the assessment should determine any new mitigation initiatives that should be incorporated into this plan to avoid similar losses from future hazard events. The results of the assessment will be provided to those affected jurisdictions for review. These results also provide useful information when considering new mitigation initiatives as an amendment to the existing plan or during the next five-year plan update period.

Plan Update Process

Any of the following situations may require a review and update of the plan:

- Requirement for a five-year update.
- Change in federal requirements for review and update of the plan.
- Significant natural hazard event(s) before the expiration of the five-year plan update.

As stated above, the HMPC will convene within 60 days of a significant disaster to discuss the potential need for any amendments to the plan. If there are no significant disasters which trigger an update, the current Federal guidelines require a five-year update.

JCEMA will release or publish a notice to the public that an update is being initiated and provide information on meeting schedules, how and where to get information on the plan, how to provide comments on the plan, and opportunities for other public involvement activities. JCEMA will then convene the HMPC to carry out the steps necessary to update the plan.

The initial steps for the five-year update to this plan should begin at least twelve months before the current FEMA approval expiration, which takes into consideration the 90 day review process by AEMA and FEMA. Additional time for planning grants may require up to an additional year added to the start date. Once the HMPC has been organized to oversee the update, the following steps will take place in order to facilitate the process:

Step 1. Review the most recent FEMA local mitigation planning requirements and guidance.
Step 2. Evaluate the existing planning process and make necessary improvements.
Step 3. Examine and revise the risk assessment, including hazard identification, profiles,

vulnerabilities, and impacts on development trends, to ensure accuracy and up-to-date information.

Step 4. Update of mitigation strategies, goals and action items, in large part based on the annual plan implementation evaluation input.

Step 5. Evaluate the existing plan maintenance procedures and make necessary improvements.

Step 6. Comply with all applicable Federal regulations and directives.

Ninety days prior to the anniversary date, a final draft of the revised plan will be submitted to AEMA for review and comments and then to FEMA for conditional approval. Once FEMA Region IV has issued a conditional approval, the updated plan will be adopted by all participating jurisdictions.

Incorporation of the Mitigation Plan into Other Planning Mechanisms

This plan supplements the most recent edition of the Jefferson County Comprehensive Emergency Management Plan, which is administered through the Jefferson County Emergency Management Agency. Further, each governmental entity will be responsible for implementation of their individual Community Mitigation Action.

The HMPC recognizes the importance of fully integrating hazard mitigation planning and implementation into existing local plans, regulatory tools, and related programs. This plan is intended to influence each jurisdiction's planning decisions concerning land use, development, public facilities, and infrastructure. Any updates, revisions, or amendments to the Jefferson County Comprehensive Emergency Management Plan, local comprehensive plans, capital improvement budgets or plans, zoning ordinances and maps, subdivision regulations, building and technical codes, and related development controls should be consistent with the goals, objectives, and mitigation measures adopted in this plan. Each jurisdiction's commitment to this consistency is reflected in its respective mitigation action program. As part of the subsequent five-year update process, all local planning mechanisms should again be reviewed for effectiveness, and recommendations for new integration opportunities should be carefully considered.

Multi-hazard mitigation planning should not only be integrated with local planning tools but into existing public information activities, as well as household emergency preparedness. Ongoing public education programs should stress the importance of managing and mitigating hazard risks. Public information handouts and brochures for emergency preparedness should emphasize hazard mitigation options, where appropriate.

Of particular importance to incorporating hazard mitigation planning into other planning programs, is the Jefferson County EMA's commitment to full integration of multi-hazards mitigation planning into its comprehensive emergency operations planning program and associated public emergency management activities, to the furthest possible extent.

Continuing Public Participation in the Plan Maintenance Process

A critical part of maintaining an effective and relevant multi-hazard 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 and interim reviews.

To this end, public hearings will be held to present the final plan to the public before adoption. A hard copy of this 2014 Jefferson County Multi-Hazard Mitigation Plan will be maintained in the offices of the Jefferson County EMA for public review and comments, with the formal adoption resolutions added to the Plan Update as they are issued. A link to download an online copy of the plan will be listed on the JCEMA Web site at www.jeffcoema.org. Public comments on the plan can be mailed, e-mailed, or phoned to JCEMA, and/or posted to the social media sites.

As part of the ongoing monitoring, evaluation, and updating of the plan, each jurisdiction will schedule annual public meetings to review the mitigation goals, strategies, risk assessment, and funding sources. The public will be invited to these annual meetings and will be able to express their concerns, ideas, and opinions. Public opinion surveys are conducted during the community meeting and public involvement activities required for the five-year update and may be periodically administered by the Jefferson County EMA.

Public involvement activities will continue throughout the five-year implementation cycle and be evaluated for effectiveness at least annually by the HMPC. Moreover, the public outreach goal of this plan and the associated objectives and mitigation measures commit each jurisdiction to implement a range of public education and awareness opportunities. The constant monitoring of these programmed mitigation actions assures ongoing public participation throughout the plan maintenance process.