Douglas County, Georgia
2015 Multi-Jurisdictional Hazard Mitigation Plan

Developed in cooperation with:
Douglas County
City of Douglasville
Douglasville-Douglas County Water and Sewer Authority

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DRAFT for FEMA Review

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Chapter 1
The Planning Process

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Table 1-1 below highlights the significant changes made to Chapter 1 of the 2010 Douglas County HMP.

Table 1-1
Changes to the Planning Process Section of this Mitigation Plan

2010 HMP Chapter 1 Section	Updates to Section
n/a	Enumerated all sections in Chapter 1
• Background • Purpose • Scope • Authority	Four sections from 2010 HMP combined into 1.1 *Background and Purpose of the Mitigation Plan,* consisting of the following subsections : 1.1.1 Background 1.1.2 Purpose 1.1.3 Scope 1.1.4 Authority Subsections were updated to reflect 2015 HMP.

2010 HMP Chapter 1 Section	Updates to Section
• Overview Of Hazard Mitigation Planning • Local Methodology and Update Process • The Planning Team • Planning Meetings And Documentation • Public And Stakeholder Participation • Multi-Jurisdictional Planning And Participation	Six sections from 2010 HMP update combined into 1.2 *Mitigation Plan Update: Methodology, Process, Participants,* consisting of the following subsections : 1.2.1 Overview Of Hazard Mitigation Planning 1.2.2 Local Methodology and Update Process 1.2.3 The Planning Team 1.2.4 The State of Georgia Hazard Mitigation Plan Subsection 1.2.3 contains information on Hazard Mitigation Planning Committee, the Stakeholders Group, and the participating communities. Subsection 1.2.3 also contains information on HMPC and SH meetings, with detailed agenda, minutes and presentation materials provided subsequently in Appendix E. Subsection 1.2.4 added to provide information on 2014 State of Georgia Hazard Mitigation Plan review to ensure consistency between the two plans.
New Sections Added for 2015 Plan update	Section 1.3 *How the 2010 Hazard Mitigation Plan was Reviewed, Analyzed and Revised* was added as part of the 2015 Plan update. Section includes detailed table on all changes form 2010 Hazard Mitigation Plan update The following section were added to Chapter 1 of the 2015 HMP update, to briefly introduce the planning process, expended in detail in the subsequent chapters. Section 1.4 *Hazard Mitigation Plan Organization* Section 1.5 *Local Hazard, Risk and Vulnerability Summary* Section 1.6 *Local Mitigation Goals and Objectives* Section 1.7 *Multi-Jurisdictional Special Considerations*
• Existing Planning Mechanisms	Section from 2010 HMP update incorporated and expanded into section 1.8 *Adoption, Implementation, Monitoring and Evaluation,* consisting of the following subsections : 1.8.1 Adoption 1.8.2 Implementation 1.8.3 Monitoring the Plan 1.8.4 Method and Schedule for Future Updates of the HMP
• Community Profile • Land Use And Development Trends • Jurisdictional Profiles	Three sections from 2010 HMP update were combined into 1.9 *Community Profile,* consisting of the following subsections : 1.9.1 Geography 1.9.2 History 1.9.3 Demographics 1.9.4 Land Use and Development Trends Subsections were updated to reflect 2015 HMP.

1.1 Background and Purpose of the Mitigation Plan

1.1.1 Background

In the year 2000, the U.S. Congress passed legislation known as the *Disaster Mitigation Act of 2000 (DMA2K).* The DMA2K legislation established a requirement that jurisdictions nationwide must develop and implement natural hazard mitigation plans in order to remain eligible for various FEMA grant programs, including those that provide funding for hazard mitigation projects.

Douglas County developed its initial Hazard Mitigation Plan (HMP) in September of 2005 which provided momentum for making homes, businesses, and communities as safe as possible against the impacts of floods, tornadoes, wildfires, and other natural hazards. The initial Plan assessed the effectiveness of prior and current programs and activities in the community and identified shortfalls; mitigation measures were further developed to help reduce Douglas County's exposure to these natural hazards.
The first update of the plan was completed in 2010, to update the original HMP and to bring it in line with 2008 State of Georgia Hazard Mitigation Strategy (State Plan). The second update of the Plan was scheduled for 2015.

1.1.2 Purpose

In 2014, FEMA and the Georgia Emergency Management Agency (GEMA) provided Douglas County with a grant to fund the second update of the County's HMP. The second update of the Plan is envisioned to bring further refinements of the pertinent mitigation actions and to comply with the general state-wide guidelines outlined in 2014 State of Georgia Hazard Mitigation Strategy. The present section of this second HMP update provides general background about Douglas County, City of Douglasville and other participating municipalities to provide context for the planning process and resulting actions.

Douglas County has remained dedicated in continuing the work started in 2005 and 2010 by updating this Plan in 2015 to:

- Protect life and property by reducing the potential for future damages and economic losses that result from natural hazards;
- Qualify for additional grant funding, in both the pre-disaster and post-disaster environment;
- Provide quick recovery and redevelopment following future disasters;
- Integrate existing flood mitigation documents;
- Demonstrate a firm local commitment to hazard mitigation principles; and
- Comply with state and federal legislative requirements tied to local hazard mitigation planning

1.1.3 Scope

This Plan update has been prepared to meet requirements set forth by the Federal Emergency Management Agency (FEMA) and the Georgia Emergency Management Agency (GEMA) in order for Douglas County to be eligible for 10funding and technical assistance from state and federal hazard mitigation programs. It wil4l continue to be updated and maintained to continually address those natural and technological hazards determined to be of high and moderate risk as defined by the updated results of the local hazard, risk, and vulnerability summary. Other natural hazards will continue to be evaluated during future updates to the Plan in order to determine if they warrant additional attention, including the development of specific mitigation measures intended to reduce their impact. This Plan will be updated and FEMA approved within a five-year cycle.

1.1.4 Authority

This Hazard Mitigation Plan was adopted by Douglas County in accordance with the authority granted to counties by the State of Georgia. This Plan was updated in accordance with current state and federal rules and regulations governing local hazard mitigation plans. The Plan shall be monitored and updated on a routine basis to maintain compliance with the following legislation and guidance:

- Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C., Section 322, Mitigation Planning, as enacted by Section 104 of the Disaster Mitigation Act of 2000 (P.L. 106- 390) and by FEMA's Interim Final Rule published in the Federal Register on February 26, 2002, at 44 CFR Part 201
- Georgia Emergency Management Act of 1981
- Authorized the Douglas County Emergency Management Agency

The following Federal Emergency Management Agency (FEMA) guides and reference documents were used to prepare this document:

- FEMA. 386-1: Getting Started. September 2002.
- FEMA. 386-2: Understanding Your Risks: Identifying Hazards and Estimating Losses. August 2001.
- FEMA. 386-3: Developing the Mitigation Plan. April 2003.
- FEMA. 386-4: Bringing the Plan to Life. August 2003.
- FEMA. 386-5: Using Benefit-Cost Review in Mitigation Planning. May 2007.
- FEMA. 386-6: Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning. May 2005.
- FEMA. 386-7: Integrating Manmade Hazards into Mitigation Planning. September 2003.
- FEMA. 386-8: Multi-Municipality Mitigation Planning. August 2006.
- FEMA. 386-9: Using the Hazard Mitigation Plan to Prepare Successful Mitigation Projects. August 2008.
- FEMA. Local Multi-Hazard Mitigation Planning Guidance. July 1, 2008.

1.2 Mitigation Plan Update: Methodology, Process, Participants

1.2.1 Overview Of Hazard Mitigation Planning

Local hazard mitigation planning is the process of organizing community resources, identifying and assessing hazard risks, and determining how to best minimize or manage those risks. This process results in a hazard mitigation plan that identifies specific mitigation actions, each designed to achieve both short term planning objectives and a long-term community vision. To ensure the functionality of each mitigation action, responsibility is assigned to a specific individual, department or agency along with a schedule for its implementation. Plan maintenance procedures are established to implement, as well as evaluate and enhance the Plan as necessary. Developing clear plan maintenance procedures ensures that Douglas County's Hazard Mitigation Plan remains a current, dynamic and effective planning document over time.

1.2.2 Local Methodology and Update Process

This updated Plan contains a narrative description of the process followed to prepare it. All cities were notified in early 2015 of the requirement concerning the HMPC and the process. Subsequent meetings were held to ensure that all information is correct, and that all agencies, organizations and the public's input were included as presented. In all, the plan update process was conducted over the course of twelve months, from March of 2015 to April of 2016. Throughout the planning update process, the Douglas County Mitigation Planning Committee reviewed and analyzed

each section of the plan. In preparing the updated Plan, documentation indicates that the committee utilized a multi-jurisdictional planning process consistent with the one recommended by FEMA (Publication Series 386).

The 2010 Plan addressed six natural hazards, two technological hazards and all-encompassing hazards ("all hazards"). Each of those hazards were assessed by previous occurrences, vulnerability and exposure to County and municipal assets, and potential loss estimates. An update to the 2010 Plan was initiated in March of 2015 with funding support from Georgia Emergency Management Agency and the Federal Emergency Management Agency. Pudar Mitigation Consulting, Inc. provided planning support and guidance to Douglas County throughout the update process.

The planning process used for the 2015 Plan update was based on Section 322 of the Disaster Mitigation Act of 2000 and supporting guidance developed by FEMA. The planning process followed these steps:

- Conduct kickoff meeting and reestablish the Mitigation Planning Committee/Team
- Review and update the local hazard, risk, and vulnerability summary
- Determine capability for the county and each municipality
- Update the mitigation strategy
- Update the Plan maintenance procedures
- Complete a draft plan for review by Douglas County
- Provide final draft to GEMA for review
- Provide final draft to FEMA for review
- Advertise opportunity/hold public meeting for comment on final draft
- Present Plan to municipalities for adoption
- Present Plan to Douglas County for adoption

Each of the planning steps described above resulted in key products and outcomes that collectively make up the Hazard Mitigation Plan. These work elements are further discussed below for introductory purposes.

The Community Profile, located later in this chapter, describes the general makeup of Douglas County and its municipalities, including prevalent geographic, demographic, and economic characteristics. This baseline information provides a snapshot of the Countywide planning area and thereby assists participating officials in recognizing those social, environmental, and economic factors that ultimately play a role in determining community vulnerability to natural and technological hazards.

The Local Hazard, Risk, and Vulnerability Summary (HRV), found in Chapter 2, is presented as three different elements: Hazard Identification/Profile, Hazard Analysis and a Vulnerability Assessment. Together, these elements serve to identify, analyze, and assess Douglas County's overall risk to natural and technological hazards. The HRV builds on available historical data from previous occurrences, establishes hazard-by-hazard profiles, and culminates in a hazard risk priority or ranking based on conclusions about the frequency of occurrence, potential impact, spatial extent, warning time, and duration of each hazard. FEMA's HAZUS-MH loss estimation methodology was also used in evaluating known flood risks according to their relative long-term cost, measured in expected damages. The HRV is designed to assist communities in seeking the most appropriate mitigation actions to pursue and implement by focusing their efforts on those hazards of greatest concern and those structures or planning areas facing the greatest risk(s).

The Community Profile and HRV collectively serve as a basis for updating goals for this Plan update, each contributing to the development, adoption, and implementation of a meaningful Mitigation Strategy update that is based on accurate background information.

The Mitigation Strategy, located in Chapter 3, consists of broad goal statements as well as specific mitigation actions for each jurisdiction participating in the planning process. This updated strategy provides the foundation for detailed Mitigation Action Plans that link jurisdictionally specific mitigation actions to locally assigned implementation mechanisms and target completion dates. Together, these sections are designed to make the Plan more strategic and functional through the identification of both long-term goals and near-term actions that will guide day-to-day decision-making and project implementation.

In addition to the identification and prioritization of possible mitigation projects, emphasis is placed on the use of program and policy alternatives to help make Douglas County and participating municipalities less vulnerable to the

damaging forces of nature while improving the economic, social, and environmental health of the community. The concept of multi-objective planning is emphasized throughout this Plan update, identifying ways to link hazard mitigation policies and programs with complimentary community goals that may be related to housing, economic development, community revitalization, recreational opportunities, transportation improvements, environmental quality, land development, and public health and safety. This Hazard Mitigation Plan update should be seen as a proactive document that represents a concerted effort to make Douglas County and participating jurisdictions more livable communities.

The Plan Maintenance Procedures, found in Chapter 4, includes the measures Douglas County and participating jurisdictions will take to ensure the Plan's continuous long-term implementation. The procedures also include the manner in which the Plan will be regularly monitored, reported upon, evaluated and updated to remain a current and meaningful planning document. The Mitigation Planning Committee reviewed the current plan, identified new information that needed to be included in the Plan update and incorporated it as required by state and federal guidelines. The planning committee was also tasked with collecting all accurate data from plan participants and provided outreach to the public and business stakeholders to ensure that everyone's information is included in this Plan update.

1.2.3 The Planning Team

Hazard Mitigation Planning Committee

The Hazard Mitigation Planning Committee (HMPC) was established as the primary working group for development of the 2015 HMP update. It was comprised of representatives from various County and community departments, as shown in the table below. The HMPC had various functions as the HMP update was taking place. The most important of these duties was to provide information and input on technical or procedural aspects of the work, and to review drafts of various parts of the document as they were created and provide detailed feedback. Sections of the plan were circulated to HMPC members via email whenever possible. Comments were generally provided via email, although some of the discussions during HMPC meetings were also a source of additional information and plan edits.

Table 1.2
Douglas County Hazard Mitigation Planning Committee

Name	Department or Affiliation
Mr. Jason Milhollin	Douglas County EMA Director
Mr. Scott Spenser	Douglas County Fire Chief
Mr. Randy Hulsey	Douglas County DOT Director
Mr. James Worthington	Douglas County Developmental Services Director
Mr. Sidney Miller	Douglasville-Douglas County Water and Sewer Authority
Mr. Greg Roberts	City Of Douglasville Public Works Director

Composition of the Stakeholders Group

A Stakeholders group is a typical component of a hazard mitigation plan update process, and it is intended to address the FEMA requirement that the community at large be involved. The purpose of such a group is to review the HMP during its development, and to provide feedback from the perspective of organizations outside the immediate HMPC group. Early in the update process the County determined that a group of interested neighboring communities, groups, businesses, academia and other organizations and individuals with an interest in the Douglas County Plan update should be identified. During its first HMPC meeting, the committee identified the initial composition of the stakeholder group, which is shown in the table below. This Stakeholders Group was provided regular updates on the planning process and given the opportunity to review the Plan at key points in its

development. At two points in the HMP development process, the County provided copies of the Plan drafts to the Stakeholders, and requested that the group provide feedback via email. Members of the Stakeholders group were also invited to attend and participate in the public meeting.

Table 1.3
Douglas County Mitigation Plan Update Stakeholders Group
(in addition to members of HM Planning Committee from Table 1.2)

Name	Department or Affiliation
Mr. Edward Dean	Douglas County GIS Director
Mr. Matt Laverne	Douglas County Risk Safety Director
Captain Zach Ardis	City of Douglasville Police
Mr. Jim Flach	Douglas Wellstar Hospital
Mr. Herb Franklin	Douglas County citizen/business owner

The Hazard Mitigation Planning Committee and stakeholders met multiple times during the update of the HMP. Minutes of these meetings are included in this HMP as Appendix E.

Meeting 1	March 30, 2015 Kick-off meeting with HMPC
Meeting 2	April 23, 2015 Full HMP/stakeholders meeting to determine and rank the hazards
Meeting 3	June 22, 2015 Informal GIS and hazard data reconciliation meeting with pertinent staff
Meeting 4	August 25, 2015 Work meeting with HMPC/stakeholders review and update mitigation strategies and actions.
Meeting 5	December 17, 2015 Preliminary draft HMP presentation (beginning the review process)
Meeting 6	TBD Final HMP presentation

Participating Communities

Douglas County nominally has three incorporated communities: Douglasville, Villa Rica and Austell. Of those, only the City of Douglasville is fully incorporated within Douglas County, while Villa Rica and Austell are jurisdictionally overlapping with Carroll and Cobb Counties, respectively.
The only community participating in 2015 HMP is the City of Douglasville. Villa Rica is proposing a new mitigation action (2.1.14), aimed at reducing flood risk at its jurisdiction within Douglas County.

Table 1.4 shows the jurisdictions that participated in mitigation plan development in 2010 and 2015.

Table 1.4
Participation in Douglas County Mitigation Plan

Jurisdiction	2015 Plan Update	2010 Plan Update	Initial 2005 Plan
Douglas County	✓	✓	✓
City of Douglasville	✓	✓	✓

To ensure the consistency of the Douglas County HMP with regional goals and objectives, the plan was reviewed by the EMA departments of the surrounding counties: Paulding, Cobb, Fulton, and Carroll (Appendix E).

Public Participation and Involvement

The public input was solicited throughout the Plan update process. The County initially determined that the stakeholders group would also serve a secondary purpose in the process by promulgating information about the plan update to the community. Citizens who participated in the 2010 Plan update were again included in the 2015 Stakeholders group.
The HMPC also determined that the most efficient way to solicit public input on the final draft of the HMP update was to place a legal ad in the Douglas County Sentinel, indicating that the document was available for review at the Douglas County Web site, with contact email for comments (the entire text of the press release is available in Appendix E). The legal ad indicated the location of the document, and how the public could provide feedback to the County (via email to a designated point of contact) during the 45-day public review period.

1.2.4 The State of Georgia Hazard Mitigation Plan

As part of this update, Douglas County reviewed the 2014 Georgia Hazard Mitigation Plan. This was done to ensure that consistency between this plan and the State-level document. Where appropriate, there are cross-references to the State HMP, and in some cases material is quoted and integrated into the County Plan.

1.3 How the 2010 Hazard Mitigation Plan was Reviewed, Analyzed and Revised

1.3.1 Review of 2010 Hazard Mitigation Plan

One of the initial steps in the update process was to review the original 2010 HMP and perform a gap analysis, a specific process for evaluating each section and determining which portions require updating. As part of the gap analysis each section was reviewed in detail to identify data needs and which areas of the plan required re-evaluation.

As part of the 2015 update, certain elements of the original Plan have been retained, while outdated information has been either summarized or removed. For the current version, there is a particular focus on incorporating new hazard information, updating the risk assessment, providing status for actions listed in the original plan, identifying new actions, and describing meetings and presentations held as part of the update.

Table 1.5
Summary of Significant Changes to the 2010 Plan

2010 HMP Chapter & Sections	Description of Update
CHAPTER 1	
n/a	Enumerated all sections in Chapter 1
Background Purpose Scope Authority	Four sections from 2010 HMP combined into 1.1 *Background and Purpose of the Mitigation Plan,* consisting of the following subsections : 1.1.1 Background 1.1.2 Purpose 1.1.3 Scope 1.1.4 Authority Subsections were updated to reflect 2015 HMP update

2010 HMP Chapter & Sections	Description of Update
Overview Of Hazard Mitigation Planning Local Methodology and Update Process The Planning Team Planning Meetings And Documentation Public And Stakeholder Participation Multi-Jurisdictional Planning And Participation	Six sections from 2010 HMP update combined into 1.2 *Mitigation Plan Update: Methodology, Process, Participants,* consisting of the following subsections : 1.2.1 Overview Of Hazard Mitigation Planning 1.2.2 Local Methodology and Update Process 1.2.3 The Planning Team 1.2.4 The State of Georgia Hazard Mitigation Plan Subsection 1.2.3 contains information on Hazard Mitigation Planning Committee, the Stakeholders Group, and the participating communities. Subsection 1.2.3 also contains information on HMPC and SH meetings, with detailed agenda, minutes and presentation materials provided subsequently in Appendix E. Subsection 1.2.4 added to provide information on 2014 State of Georgia Hazard Mitigation Plan review to ensure consistency between the two plans.
New Sections Added for 2015 Plan update	Section 1.3 *How the 2010 Hazard Mitigation Plan was Reviewed, Analyzed and Revised* was added as part of the 2015 Plan update. Section includes detailed table on all changes form 2010 Hazard Mitigation Plan update The following section were added to Chapter 1 of the 2015 HMP update, to briefly introduce the planning process, expended in detail in the subsequent chapters. Section 1.4 *Hazard Mitigation Plan Organization* Section 1.5 *Local Hazard, Risk and Vulnerability Summary* Section 1.6 *Local Mitigation Goals and Objectives* Section 1.7 *Multi-Jurisdictional Special Considerations*
Existing Planning Mechanisms	Section from 2010 HMP update incorporated and expanded into section 1.8 *Adoption, Implementation, Monitoring and Evaluation,* consisting of the following subsections : 1.8.1 Adoption 1.8.2 Implementation 1.8.3 Monitoring the Plan 1.8.4 Method and Schedule for Future Updates of the HMP
Community Profile Land Use And Development Trends Jurisdictional Profiles	Three sections from 2010 HMP update were combined into 1.9 *Community Profile,* consisting of the following subsections : 1.9.1 Geography 1.9.2 History 1.9.3 Demographics 1.9.4 Land Use and Development Trends Subsections were updated to reflect 2015 HMP update.
CHAPTER 2	
n/a	Enumerated all sections in Chapter 2

2010 HMP Chapter & Sections	Description of Update
Introduction and Update Summary	Enumerated and divided into several sections: Section 2.1 *Introduction*. Removed reference to State of Georgia 2008 Plan. The 2015 HMP update HRV process included modifications to the 2010 Douglas County hazard list with pertinent hazard name modifications to match State of Georgia 2014 Plan. *Section 2.2 Overview of the Type and Location of all Hazards that can affect Douglas County* describes hazard name updates, historical disaster and emergency declarations, HMPC survey, risk calculations and hazard ranking to reflect 2015 HMP update. Included extensive discussion (Table 2.9) on the extent and potential effects of all natural and technological hazards.
n/a	In new section 2.1, added *General Summary of Extent and Potential Hazard in Douglas County*
All Natural Hazards	Incorporated all natural hazards into Section 2.3 *Natural Hazards Risk and Vulnerability Assessment*
Severe Storms and Lighting	Renamed and incorporated into subsection 2.3.1 *Severe Weather.* Reduced Hazard identification, given that 20105 HMP is a second update. Inserted tables 2.10-2.12 with losses from Severe wind weather, hail events and lightning strikes in Douglas County. Performed comprehensive HAZUS-MH potential loss analysis form high wind. Inserted Figure 2.2 with a Douglas County census tract map indicating highest potential losses from high winds. The rest of the section was updated to reflect 2015 HMP.
Flooding	Renamed and incorporated into subsection 2.3.2 *Inland Flooding*. Reduced Hazard identification section. Performed comprehensive HAZUS-MH potential loss analysis form inland flooding Created internal depth maps and compared them with the existing DFIRM maps, all presented in Figures 2.3-2.4. Inserted Fig 2.4 with a Douglas County census block map indicating highest potential losses from inland flooding. The rest of the section was updated to reflect 2015 HMP.
Drought	Enumerated as subsection 2.3.5 *Drought* and repositioned it in the list of hazards, due to lower hazard ranking in 2015. Reduced Hazard identification section Added graphic (Fig 2.9) showing Georgia drought conditions for September 15, 2015. The rest of the section was updated to reflect 2015 HMP.
Winter Storms	Renamed and incorporated into subsection 2.3.4 *Severe Winter Weather*. Incorporated traffic accidents as a secondary effect of severe winter weather and presented projected losses for 50-year and 100-year planning horizons. Reduced Hazard identification section. The rest of the section was updated to reflect 2015 HMP.

2010 HMP Chapter & Sections	Description of Update
Tornadoes	Enumerated as subsection 2.3.3 *Tornadoes* and repositioned it in the list of hazards, due to higher hazard ranking in 2015. Performed comprehensive loss estimates for building losses, injuries, and deaths due to tornado hazard for 50-year and 100-year planning horizons. Reduced Hazard identification section. The rest of the section was updated to reflect 2015 HMP.
Wildfire	Enumerated as subsection 2.3.6 *Wildfire.* Reduced Hazard identification section Added Douglas County Wildfire Urban Interface map (Fig 2.10) with location of all Douglas County critical facilities and their proximity to high risk areas. Incorporated value of assets exposed to wildfire hazard. The rest of the section was updated to reflect 2015 HMP.
Technological and All Hazards	Incorporated technological and all hazards into section 2.4 *Technological and All Hazards Risk and Vulnerability Assessment*
Hazardous Materials	Enumerated as subsection 2.4.1 *Hazardous Materials.* Updated list of toxic release facilities and the rest of the section to reflect 2015 HMP update.
Dam Failure	Enumerated as subsection 2.4.2 *Dam Failure.* Updated inventory of dams in Douglas County from the USACE's National Inventory of Dams (NID). Added table summarizing the dams in Douglas County and the City of Douglasville. Updated map with Class I and II dam locations (Fig. 2.11). Investigated potential losses caused by the Morgan Falls Dam failure in Cobb County. Added Fig. 2.12, illustrating the comparison of the resulting inundation floodplain with 100-year flood zone on Chattahoochee River.
n/a	Added subsection 2.4.3 *All Hazards Risk and Vulnerability Assessment.*
CHAPTER 3	
Section 3.1 – Section 3.4 (Hazards from the original plan)	Removed Table 3-1 (2005-2010 Goals and Objectives Update) Subsection changed to 4.2.1 – 4.2.10. In Section 3.1, added Tables 3.1-1 and 3.1-2. Listed mitigation action changes and modifications per each hazard. Listed STAPLEE scoring for all natural, technological and all hazards For each hazard, the action items have been grouped by objective. Separate tables have been developed to identify the actions under each mitigation objective.
Severe Weather (originally "Severe Storms and Lighting")	Revised Ranking from Natural Hazard 3 to Natural Hazard 1. Reviewed goals and objectives. Added one mitigation action and removed one mitigation action. Mitigation actions listed in table format under each objective.
Inland Flooding (originally "Flooding")	Revised Ranking from Natural Hazard 1 to Natural Hazard 2. Reviewed goal and objectives. Added one mitigation action. Mitigation actions listed in table format under each objective.
Tornadoes	Revised Ranking from Natural Hazard 2 to Natural Hazard 3. Reviewed goal and objectives. Added one mitigation action. Mitigation actions listed in table format under each objective.

2010 HMP Chapter & Sections	Description of Update
Severe Winter Weather (originally "Winter Weather")	Reviewed goal and objectives. Added one mitigation action. Mitigation actions listed in table format under each objective.
Drought	Reviewed goals and objectives. Removed one objective and its mitigation action. Mitigation actions listed in table format under each objective.
Wildfire	Reviewed goal and objectives. Mitigation actions listed in table format under each objective.
Hazardous Materials	Revised Ranking from Technological Hazard 2 to Technological Hazard 1. Reviewed goal and objectives. Added one mitigation action. Mitigation actions listed in table format under each objective.
Dam Failure	Revised Ranking from Technological Hazard 1 to Technological Hazard 2. Reviewed goals and objectives. Mitigation actions listed in table format under each objective.
All Hazards	Reviewed goals and objectives. Removed two mitigation actions. Mitigation actions listed in table format under each objective
CHAPTER 4	
Implementation Action Plan	Enumerated section to 4.1 *Implementation Action Plan* and updated to reflect 2015 Hazard Mitigation Plan.
Evaluation, Monitoring, Updating	Enumerated section to 4.2 *Evaluation, Monitoring, and Updating* and modified to reflect 2015 Hazard Mitigation Plan.
Plan Update and Maintenance	Enumerated section to 4.3 *Plan Update and Maintenance* and modified to reflect 2015 Hazard Mitigation Plan.
Implementation Action Plan	Enumerated section to 4.1 *Implementation Action Plan* and updated to reflect 2015 Hazard Mitigation Plan.
CHAPTER 5	
	Updated to reflect 2015 Hazard Mitigation Plan.

1.4 Hazard Mitigation Plan Organization

As mentioned elsewhere in this section, this mitigation plan is organized to follow the template provided by Georgia Emergency Management Agency (GEMA) which describes specific elements that must be included as part of updating local hazard mitigation plans.

1.5 Local Hazard, Risk and Vulnerability Summary

The local hazards, risk, and vulnerabilities related to Douglas County are addressed in Chapter 2 of the Plan update. The historical hazards of Douglas County and City of Douglasville were recorded and analyzed in this chapter. The information was identified by using both primary and secondary research materials, including FEMA and GEMA resources and reports from local, state, and national agencies, media accounts, state and local weather records, and conversations with key personnel and residents in the County. The analysis explains the possible severity and magnitude, and the potential impact of damage within each governing jurisdiction from future hazards.

Hazard Identification, Naming and Ranking

In accordance with IFR requirements, and as part of its efforts to support and encourage hazard mitigation initiatives, the Douglas County Hazard Mitigation Planning Committee (HMPC) identified hazards that have affected Douglas County in the past, and can be expected to do so in the future. As a result of the planning process, the HMPC determined that six natural hazards, two technological hazards and “all-hazard” compendium pose a direct, measurable threat to Douglas County.

When compared to 2010 HMP, the list of hazards remained the same. The names of some hazards were modified to correspond to the 2014 State Plan hazard naming convention. The respective order of hazards was also modified from 2010 Plan to reflect updated hazard ranking for the 2010-2015 period.

1.6 Local Mitigation Goals and Objectives

1.6.1 Mitigation Goals

Goals are general descriptions of desired long-term outcomes of the mitigation strategy. State and federal guidance and regulations pertaining to mitigation planning require the development of mitigation goals to reduce or avoid long-term vulnerabilities to identified hazards.

Douglas County’s hazard mitigation goals were determined by reviewing the 2010 HMP update and making any necessary modifications. There are a total of nine mitigation goals, each corresponding to a particular natural or technological hazard. All mitigation goals are listed and described in full in Chapter 3 of this HM Plan update.

1.6.2 Mitigation Objectives

Mitigation objectives are courses of action designed and intended to achieve the mitigation goal. These are not as specific as individual mitigation actions, but are more general, and encompass various other actions. Douglas County’s hazard mitigation objectives were determined by reviewing the 2010 HMP and making any necessary modifications. There are a total of twelve mitigation objectives (one fewer than in 2010). All mitigation objectives are listed and described in full in Chapter 3 of this 2015 HM Plan update.

1.7 Multi-Jurisdictional Special Considerations

The City of Douglasville was an active participant and equal partner in the planning process. As an active part of the HMPC, the City contributed to the identification of mitigation goals and objectives and potential mitigation measures contained within the HMP. The hazards, the mitigation goals, objectives and measures were developed jointly between Douglas County and City of Douglasville. The only exception to this is a new mitigation action (2.1.14) aimed at portion of Villa Rica within Douglas County.

1.8 Adoption, Implementation, Monitoring and Evaluation

1.8.1 Adoption

On February 9, 2016, Douglas County submitted the initial draft of the 2015 HMP update to the Georgia Emergency Management Agency (GEMA) for review and comment.

After addressing GEMA comments in the document, the HMP was resubmitted for final consideration and approval by GEMA and FEMA Region IV. FEMA provided a letter of approvability on [insert date], and the Plan was forwarded to the Douglas County Board of Commissioners for adoption, which occurred on [insert date].

Douglas County formally adopted the 2015 HMP update on [insert date]. The adoption resolution is included as Appendix E. As noted in the Appendix, the City of Douglasville adopted the overall HMP on [insert date]. The FEMA approval letter is also included as Appendix E.

1.8.2 Implementation

Upon adoption of the Plan update by the Douglas County Board of Commissioners and the City of Douglasville, the Plan will be posted on the official websites for both the County and City. In addition, a copy of the plan will be made available to appropriate department heads within Douglas County and City of Douglasville. The Plan will also be distributed to any local, state and federal agencies that were notified and invited to participate in the planning process and development of the Plan update.

As part of the mitigation planning process, the HMPC and other agencies involved in managing hazards and implementing measures to minimize future risk considered a range of mitigation actions. Actions were identified and prioritized, and are listed under each goal in Chapter 3. For each mitigation action, the tables identify the lead agency, support agencies, priority level, and time period for implementation. Each lead agency is responsible for factoring the action into its work plan and schedule over the indicated time period. See Chapter 3 for specific mitigation actions.

1.8.3 Monitoring the Plan

The Douglas County Emergency Management Agency (EMA) Director, or his designee, will be charged with ensuring that this Plan update is monitored and reviewed (and possibly updated) at least annually, after the occurrence of any major disaster, or more often if deemed necessary. The method of evaluation will consist of utilizing a checklist to determine what mitigation actions were undertaken, the completion date of these actions, the cost associated with each completed action, and whether actions were deemed to be successful. A committee, perhaps with much of the same membership as the existing Hazard Mitigation Planning Committee (HMPC), will convene quarterly in order to

accomplish the annual Plan review and evaluation. These meetings will provide an opportunity to discuss the progress of the action items and maintain the partnerships that are essential for the sustainability of the HMP. The EMA Director, or his designee, should document the progress of quarterly meetings, and ensure the results are reported to the Douglas County Board of Commissioners, as well as to any agencies or organizations having an interest in the hazard mitigation activities identified in the plan update.

This Plan will be monitored by the Douglas County EMA Director for several related purposes:

1. Maintain the currency of hazard and risk information.
2. Ensure that mitigation projects and actions are accurately represented in the document, and reflect the priorities of the County and the City of Douglasville.
3. Comply with FEMA and State of Georgia requirements for Plan maintenance, and maintain the County's eligibility for federal disaster assistance and mitigation grants.

The EMA Director will continuously monitor the Plan with respect to the purposes noted above, and with respect to the update triggers noted below.

Although the representatives filling the positions may change from year to year, the future HMPC and Stakeholders group will continue to be comprised of the same job functions or titles. However, the decision of specific job duties will be left to the EMA Director.

1.8.4 Method and Schedule for Future Updates of the HMP

Douglas County has a method to ensure a regular review and update of the 2015 Hazard Mitigation Plan. The actions described below are the responsibility of the HMPC and the Douglas County EMA Director. The composition and responsibilities of the HMPC are described in detail in subsection 1.2.3 of this hazard mitigation plan. The DMA2K legislation requires that local jurisdictions review and update their hazard mitigation plans at least every five years. The present HMP will be adopted in 2016, and thus must undergo another update no later than the same date in 2020. At the direction of the EMA Director, the Douglas County HMPC will reconvene at the beginning of 2019 to accomplish this requirement. The revision process should include a firm schedule and timeline, and identify any agencies or organizations participating in the Plan revision. The committee will review the mitigation goals, objectives and action items to determine their relevance to changing situations in the County, as well as changes in state or federal policy, and to ensure they are addressing current and expected conditions. The committee will also review the risk assessment portion of the plan to determine if this information should be updated or modified, given any new available data.

Specifically, the following key topics and questions below will be addressed by the HMPC at the initial meeting in 2019.

- Changes to hazard profiles either for the County or the City of Douglasville.
- Availability of any new hazard or vulnerability studies, including maps.
- Availability of new loss estimation (risk) studies or information.
- Changes in development patterns or rates, especially development in proximity to hazard areas.
- Presence of any new special high risk populations, or significant changes to existing ones.
- Status of actions listed in this plan, and any new actions being contemplated.

If a disaster occurs or as action items are completed, the County will review, revise, and update the Plan before the required date, using the process described in this section. The EMA Director will take the following criteria into consideration when determining if a review and update should be initiated:

- Changes in mitigation Plan requirements for funding programs, i.e. any updates that are required to maintain the County's eligibility for grant funds.
- Required changes or revisions to existing mitigation action items specific to either Douglas County or the City of Douglasville. The review will consider the current status and progress on these actions and strategies.
- Information derived from the annual meetings suggesting that the Mitigation Strategies section of the Plan should be modified.
- Changes to membership or responsibilities of the HMPC or Stakeholders groups.

The mitigation plan review and update will be accomplished by reviewing each action item to determine its relevance to changing situations in the County or the City of Douglasville as well as changes to State or Federal policy, and to ensure that they are addressing current and expected conditions. The HMPC will also review the Vulnerability Assessment and Loss Estimation sections completed for the County and City of Douglasville and determine if it should be updated or modified.

The Douglas County EMA Director is also responsible for ensuring that any modifications required by the HMPC are included in future updates. The HMPC will work together as a team, with each member sharing responsibility for completing the evaluation and updates. It will be the responsibility of the EMA Director to ensure that any future Plan updates are completed on time and meet all requirements established by FEMA and the Georgia Emergency Management Agency (GEMA). All necessary revisions will be completed at least three months prior to the end of the five year period to allow the HMPC time to review the updated HMP. During the revision process, the EMA Director will send a status report (meeting minutes) to the Douglas County Board of Commissioners after each HMPC meeting. Any required revisions will be implemented into existing Plans, as applicable, within six months following the review process. This process will be repeated for each five year review of the Plan.

The EMA Director will ensure the revised plan is presented to the Douglas County Board of Commissioners for formal adoption. In addition, all holders of the HMP will be notified of affected changes. No later than the conclusion of the five-year period following initial approval of the plan, the EMA Director shall submit a revised Hazard Mitigation Plan to GEMA and FEMA for review and approval. FEMA and GEMA have the authority to evaluate the progress of existing mitigation Plans to determine if the Plan is fulfilling program requirements.

1.9 Community Profile

1.9.1 Geography

Located due west and 20 miles from Atlanta on Interstate-20, Douglas County is 20 0 square miles of gently rolling foothills of the Appalachian Piedmont bordered on the south by the Chattahoochee River, east by Cobb County, north by Paulding County, and west by Carroll County (Fig. 1.1). The Dog River in the western portion of the County is the County's potable water source (managed by the Douglasville-Douglas County Water and Sewer Authority, State-chartered). Other water ways include Sweetwater Creek, Anneewakee Creek, and Gothard's Creek.

Douglas County is strategically located as the western gateway to Atlanta, and is in close proximity to Atlanta's Hartsfield-Jackson International Airport. Douglas County is included in the Atlanta-Sandy Springs-Marietta, Georgia metropolitan statistical area, known to most as metro Atlanta.

Figure 1.1
Douglas County – Location Map

(Source: PMC)

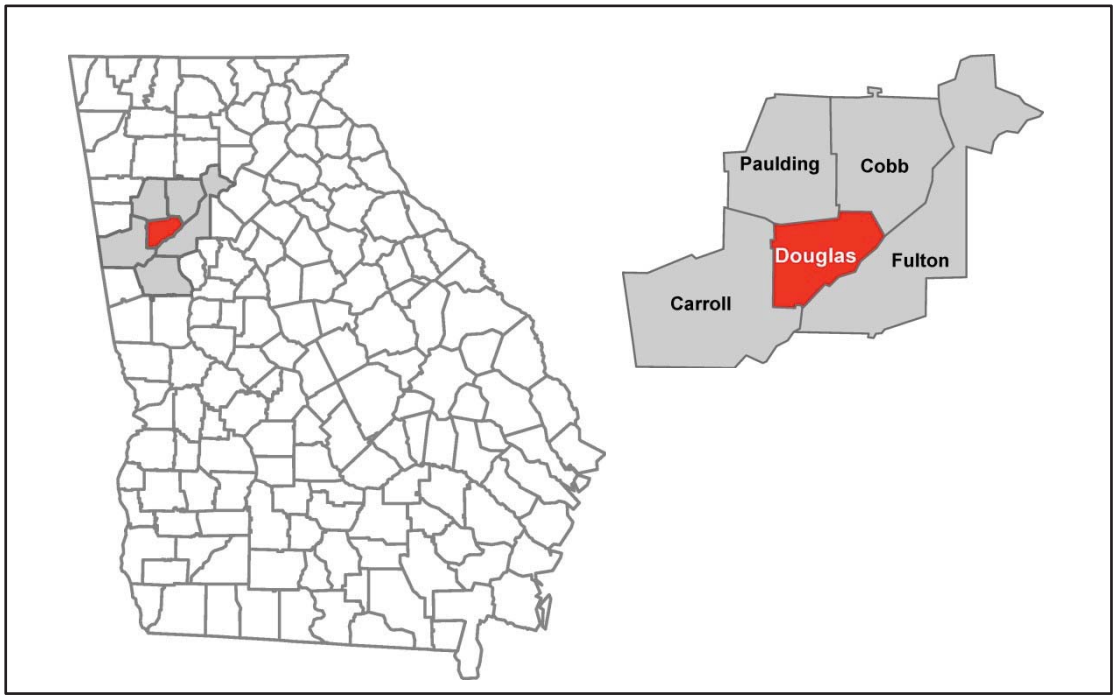
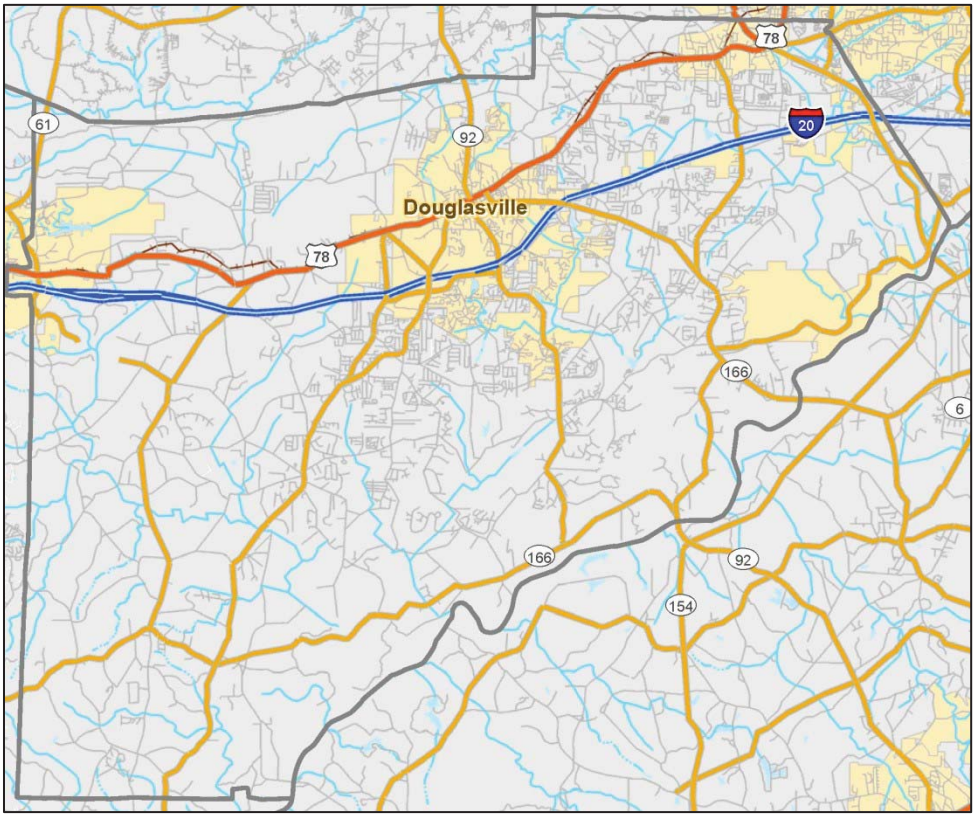


Figure 1.2
Douglas County Map

(Source: PMC)



1.9.2 History

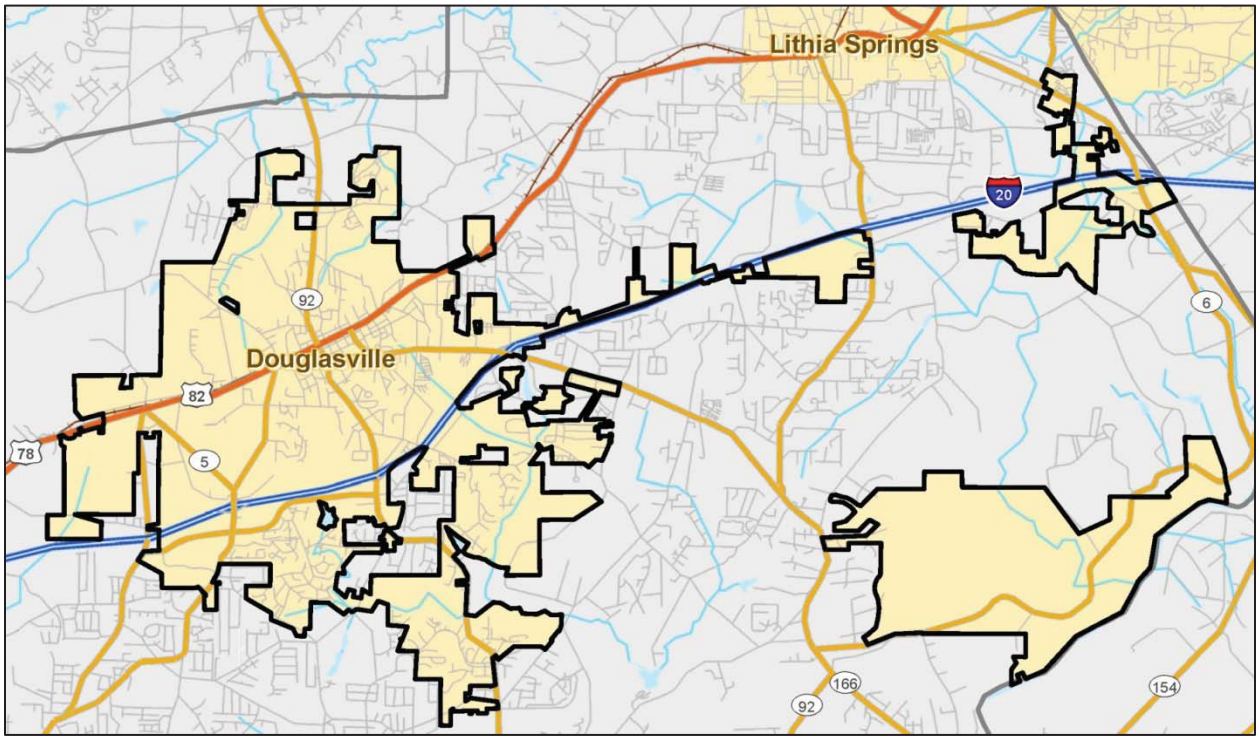
Douglas County was created on October 17, 1870 during the Reconstruction period after the Civil War, and was first named for Fredrick Douglas, the African-American abolitionist, due to the Republican/military control of the Georgia General Assembly, and later changed to honor Stephen A. Douglas, the Illinois Senator who opposed Abraham Lincoln for the Presidency, when local control of the General Assembly was re-established when Reconstruction ended. Prior to the creation of the County, the Creek and Cherokee Indian Nations called Douglas Count y home and a 10-mile wide area atop Tallapoosa Ridge was ""no man's land", the border between the two Nations.

Douglasville is the sole municipality and the county seat of Douglas County. The population was 30,961 at the 2010 census and with a jump from 20,065 at the 2000 census, is considered to be one of the fastest growing cities in the State of Georgia. The City covers 21.5 square miles and as 2014, has an estimated population of 32,523.
Located at a natural rise in the topography, Douglasville was originally known as Skint Chestnut. The name derived from a large tree used by Indians as a landmark, which was stripped of its bark so as to be more conspicuous. The Town of Douglasville was established by thee Georgia General Assembly on February 25, 1875.

Figure 1.3 depicts the City of Douglasville boundaries.

Figure 1.3
Map of the City of Douglasville, Georgia

(Source: PMC)



1.9.3 Demographics

As of the 2010 US Census, Douglas County's population was 132,403 and the City of Douglasville had population at 30,961. For the City of Douglasville, this is a 57 %increase from the 2000 Census count which was 19,740. To a somewhat lesser degree, for the County it was a 44% increase from 92,241 inhabitants in 2000. This unprecedented growth can partially be explained by urban Atlanta population moving to suburban counties and also by large population influx following Hurricane Katrina in 2005. Table 1.6 illustrates the population growth in Georgia and in Douglas County between 200 and 2010:

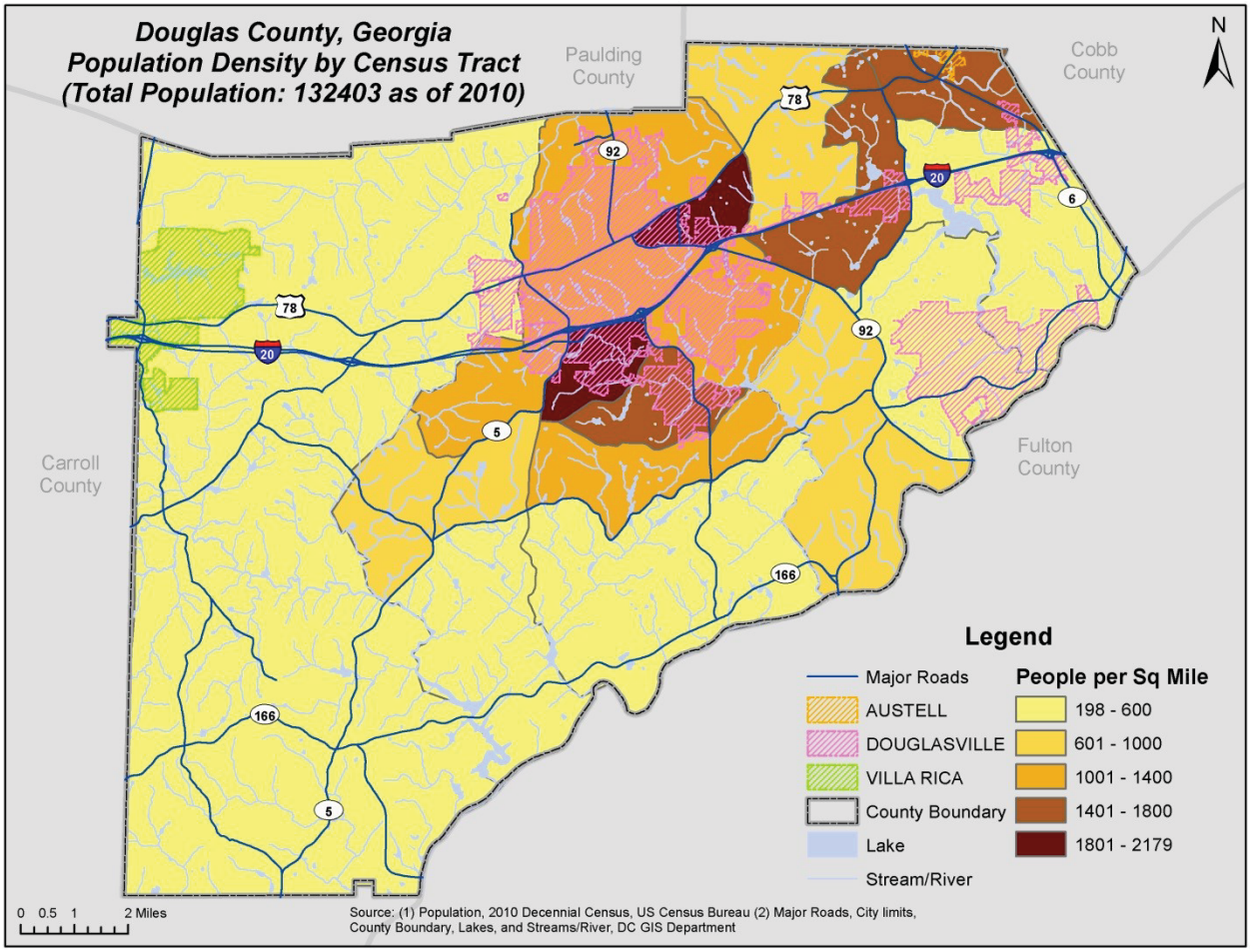
Table 1.6
Population Growth for Georgia and Douglas County, 2000 - 2010
(Source: U.S. Census Bureau)

Geographic Area	2010	2000	% change
State of Georgia	9,687,653	8,186,446	18.34
Douglas County	132,403	92,241	43.54
Unincorporated County	101,442	72,501	39.91
City of Douglasville	30,961	19,740	56.84

Approximately 77% of Douglas County residents (101,442) live outside the City of Douglasville, the only incorporated area in the County. Figure 1.4 shows the population distribution by density of census tracts for Douglas County. According to the 2000 U.S. Census data, the map shows the highest population concentrations in Douglas County are located in the central and northeastern part of the County (shaded dark brown), roughly covering the area (an including) City of Douglasville and small part of Austell.

Figure 1.4
Douglas County Population Distribution Map

(Source: Douglas County GIS)



1.9.4 Land Use and Development Trends

Douglas County comprises 200 square miles of land area and one square mile of water area. There are currently 104,777.21 acres within the unincorporated areas of Douglas County. The current land use by acreages shows the amount of land being used under the various land use categories in the County. Of the total acres, almost 72 % of the land within the current county limits is currently developed with residences or businesses, schools and other facilities, churches, cemeteries or parks. Of the developed acreage, the clear majority is residential, and of the residential acreage, the overwhelming majority, is single-family detached houses. The second largest land use category is undeveloped and vacant parcels at over 31%. Currently 33,417.68 acres are considered vacant within the county. This figure does not include the many large parcels that are underdeveloped, and will soon change uses.

Table 1.7
Douglas County Land Use distribution

Land Use	Acres
Agricultural	3,362.89
Agricultural/Timber	4,870.13
Single Family Residential (<5 ac tracts)	17,167.88
Single Family Residential (5 to 25 ac tracts)	16,713.73
Single Family Residential (>25 ac tracts)	7,840.26
Townhouse	9.82
Commercial	1,711.25
Industrial	1,682.21
Transportation, Communication, and Utilities	297.86
Public/Institutional	2,286.50
Parks and Recreation/Conservation	15,417.01
Vacant	33,417.68
TOTAL	104,777.21

Douglas County has long had strong environmental regulations in place, such as effective flood plain restrictions, watershed protection areas and has enforced erosion control regulations for many years. The Douglasville-Douglas County Water & Sewer Authority is in charge of enforcing both storm water and the soil erosion and sedimentation control regulations within the county to ensure greater protection and coordination.

The County's newly adopted Unified Development Code (UDC) advances sustainable Greenfield development. The UDC provides for master planned and open space subdivision development that protects the integrity of the land and environment, while creating a quality product. All primary resources whether in a master planned open space or conventional subdivision within the county must be protected with a natural resource conservation easement to ensure their sustainability.

The following assumptions of land use assessments are referenced to the Douglas County Comprehensive Land Use Plan.

- There are currently 27,300 jobs among all economic sectors outside of the City of Douglasville and by the year 2025, the number of jobs could more than double to 67,500, a 148% increase
- Douglas County is still primarily a bedroom county to the Metro area. 63% of residents commuted outside the county in 2000.
- A strong and diverse economy is important to provide a stable and balanced tax base.
- Commuter patterns suggest that there are limited employment opportunities for upper management, professional and skilled employees living within the county.
- Education levels lag below surrounding counties. Continued economic growth and stability will depend on increased educational levels for all age groups and degree levels.
- Legitimate start-up businesses cannot afford even the low commercial lease rates that Douglas County has to offer. County needs to develop mechanisms for fledgling companies to effectively do business and get off the ground.
- Infrastructure and available land will play a critical role in attracting the appropriate mix of employment opportunities.
- Upwards of 600 acres of additional office and commercially zoned land is needed to accommodate future retail and service uses, both of which will be attracted to the county by its population growth and resulting increase in disposable income.

Chapel Hill Road south of the City of Douglasville is still likely to continue to feel development pressures due to the proximity of Arbor Place Mall. In addition, the County just recently completed a Highway 92 Livable Centers Initiative (LCI) Study and a supplemental LCI Transportation Study to prioritize a phasing plan of the recommended transportation projects as outlined in the original LCI. Highway 92 is one of the most significant north-south corridors within Douglas County and is ripe for redevelopment. In addition, this plan calls for a new east-west connector to the Lee Road extension, providing for development opportunities in the area.

In the southern portion of Douglas County, along Capps Ferry Road, a mixed-use, master planned resort development on approximately 1,200 acres was recently approved in zoning. The development includes hotels, conference center, spas, sporting activities, 18-hole golf course, housing and a retail village. It is anticipated that the first phase of development will be reviewed prior to the end of 2009 with construction beginning in 2010. Once this development occurs, it is likely that development will continue in the area at a greater pace. Future development will extend the commercial corridors along Highway 5 and Chapel Hill Road and redevelopment along Highway 92 and Bankhead Highway is also predicted. As development continues to thrive, the current land use plan will need to be integrated more and more with both natural and technological hazards elements to ensure sustainability throughout Douglas County.

Figure 1.5 depicts future land use trends in Douglas County, whereas figure 1.6 indicates Douglas County future development trends (as of 2009) and areas that require special attention.

Figure 1.5
Douglas County Future Land Use Map

(Source: Douglas County GIS, 2013)

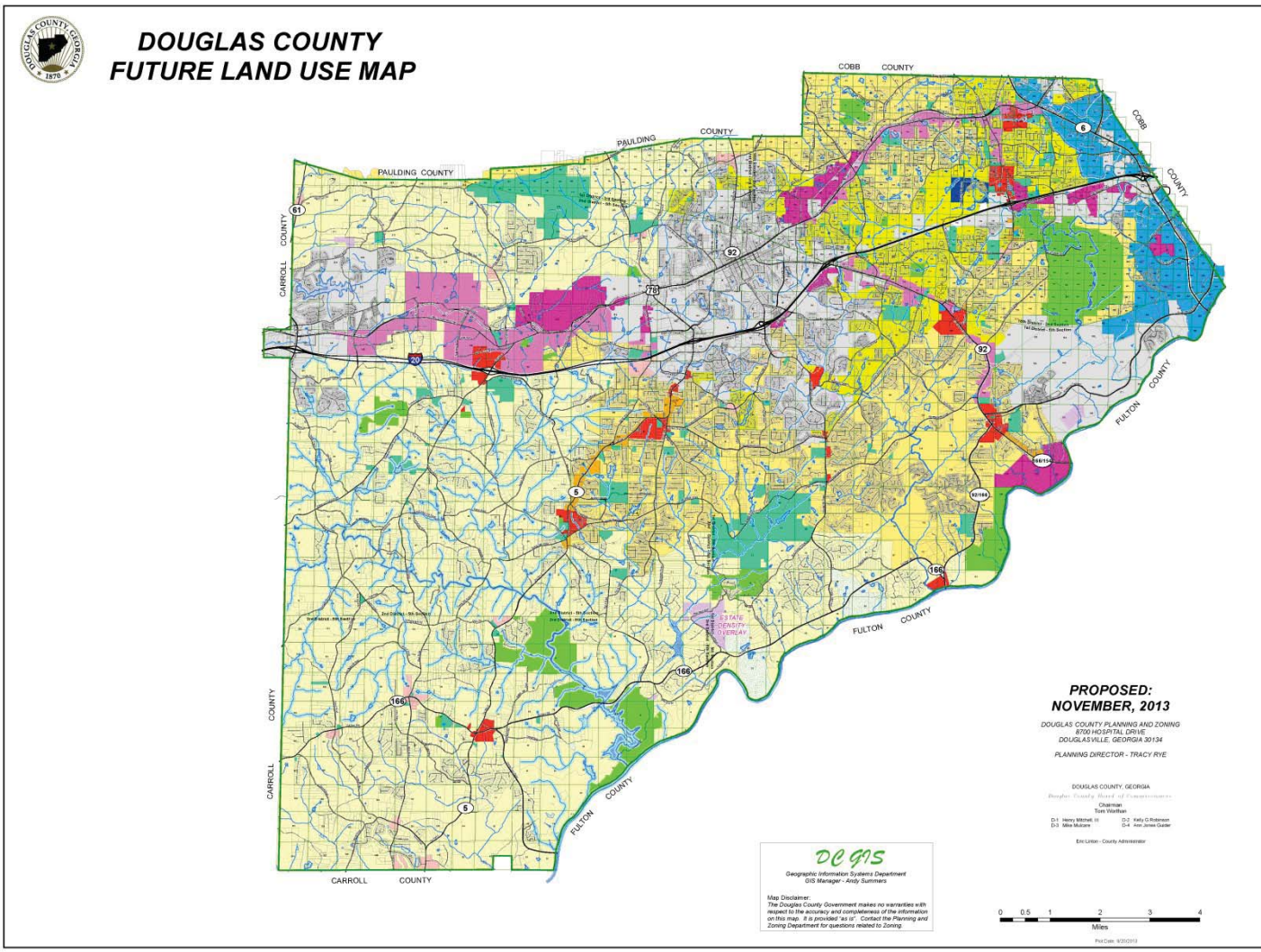
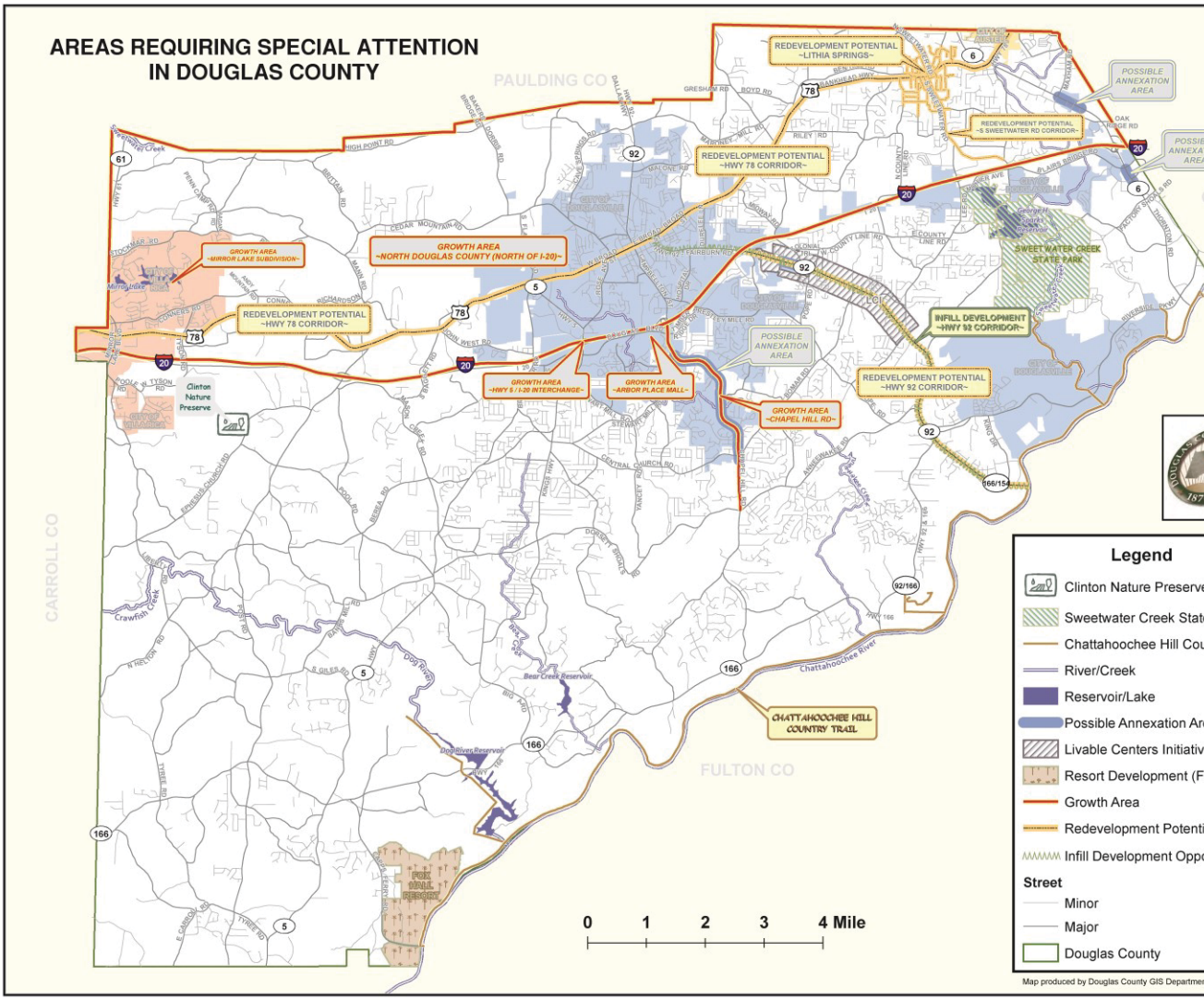


Figure 1.6
Douglas County Development Trends and Areas Requiring Special Attention

(Source: Douglas County GIS, 2009)



Chapter 2
Local Hazards, Risk and Vulnerability Assessment

This chapter describes the Natural and Technological Hazards, Risk, and Vulnerability (HRV) summary undertaken by Douglas County and the City of Douglasville. This section consists of the following subsections

2.1 Introduction
2.2 Overview of the Type and Location of all Hazards that can affect Douglas County
2.3 Natural Hazards Risk and Vulnerability Assessment
- 2.3.1 Severe Weather
- 2.3.2 Inland Flooding
- 2.3.3 Tornadoes
- 2.3.4 Severe Winter Weather
- 2.3.5 Drought
- 2.3.6 Wildfire

2.4 Technological and All Hazards Risk and Vulnerability Assessment
- 2.4.1 Hazardous Materials
- 2.4.2 Dam Failure
- 2.4.3 All Hazards

Table 2.1 below highlights the significant changes made to Chapter 2 of the original HMP.

Table 2.1
Changes to the Local Hazard Risk and Vulnerability Sections of the 2010 Douglas County Hazard Mitigation Plan

2010 HMP Chapter 2 Sections	Description of Update
n/a	Enumerated all sections in Chapter 2
• Introduction and Update Summary	Enumerated and divided into several sections: Section 2.1 *Introduction*. Removed reference to State of Georgia 2008 Plan. The 2015 HMP update HRV process included modifications to the 2010 Douglas County hazard list with pertinent hazard name modifications to match State of Georgia 2014 Plan. *Section 2.2 Overview of the Type and Location of all Hazards that can affect Douglas County* describes hazard name updates, historical disaster and emergency declarations, HMPC survey, risk calculations and hazard ranking to reflect 2015 HMP update. Included extensive discussion (Table 2.9) on the extent and potential effects of all natural and technological hazards.
n/a	In new section 2.1, added *General Summary of Extent and Potential Hazard in Douglas County*
• All Natural Hazards	Incorporated all natural hazards into Section 2.3 *Natural Hazards Risk and Vulnerability Assessment*

2010 HMP Chapter 2 Sections	Description of Update
• Severe Storms and Lighting	Renamed and incorporated into subsection 2.3.1 *Severe Weather.* Reduced Hazard identification, given that 20105 HMP is a second update. Inserted tables 2.10-2.12 with losses from Severe wind weather, hail events and lightning strikes in Douglas County. Performed comprehensive HAZUS-MH potential loss analysis form high wind. Inserted Figure 2.2 with a Douglas County census tract map indicating highest potential losses from high winds. The rest of the section was updated to reflect 2015 HMP.
• Flooding	Renamed and incorporated into subsection 2.3.2 *Inland Flooding*. Reduced Hazard identification section. Performed comprehensive HAZUS-MH potential loss analysis form inland flooding Created internal depth maps and compared them with the existing DFIRM maps, all presented in Figure 2.3-2.4. Inserted Fig 2.4 with a Douglas County census block map indicating highest potential losses from inland flooding. The rest of the section was updated to reflect 2015 HMP.
• Drought	Enumerated as subsection 2.3.5 *Drought* and repositioned it in the list of hazards, due to lower hazard ranking in 2015. Reduced Hazard identification section Added graphic (Fig 2.9) showing Georgia drought conditions for September 15, 2015. The rest of the section was updated to reflect 2015 HMP.
• Winter Storms	Renamed and incorporated into subsection 2.3.4 *Severe Winter Weather*. Incorporated traffic accidents as a secondary effect of severe winter weather and presented projected losses for 50-year and 100-year planning horizons. Reduced Hazard identification section. The rest of the section was updated to reflect 2015 HMP.
• Tornadoes	Enumerated as subsection 2.3.3 *Tornadoes* and repositioned it in the list of hazards, due to higher hazard ranking in 2015. Performed comprehensive loss estimates for building losses, injuries, and deaths due to tornado hazard for 50-year and 100-year planning horizons. Reduced Hazard identification section. The rest of the section was updated to reflect 2015 HMP.
• Wildfire	Enumerated as subsection 2.3.6 *Wildfire.* Reduced Hazard identification section Added Douglas County Wildfire Urban Interface map (Fig 2.10) with location of all Douglas County critical facilities and their proximity to high risk areas. Incorporated value of assets exposed to wildfire hazard. The rest of the section was updated to reflect 2015 HMP.
• Technological and All Hazards	Incorporated technological and all hazards into section 2.4 *Technological and All Hazards Risk and Vulnerability Assessment*
• Hazardous Materials	Enumerated as subsection 2.4.1 *Hazardous Materials.* Updated list of toxic release facilities and the rest of the section to reflect 2015 HMP update.

2010 HMP Chapter 2 Sections	Description of Update
• Dam Failure	Enumerated as subsection 2.4.2 *Dam Failure.* Updated inventory of dams in Douglas County from the USACE's National Inventory of Dams (NID). Added table summarizing the dams in Douglas County and the City of Douglasville. Updated map with Class I and II dam locations (Fig. 2.11). Investigated potential losses caused by the Morgan Falls Dam failure in Cobb County. Added Fig. 2.12, illustrating the comparison of the resulting inundation floodplain with 100-year flood zone on Chattahoochee River.
n/a	Added subsection 2.4.3 *All Hazards Risk and Vulnerability Assessment.*

2.1 Introduction

A key step in preventing disaster losses in Douglas County is developing a comprehensive understanding of the hazards that pose risks to its communities. The following terms can be found throughout this Plan (FEMA, 2001):

Hazard: Event or physical conditions that have the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, interruption of business, other types of harm or loss.
Risk: Product of a hazard's likelihood of occurrence and its consequences to society
Vulnerability: Degree of susceptibility and resilience of the community and environment to hazards

The Local Hazard, Risk, and Vulnerability (HRV) summary is a process or application of a methodology for evaluating risk as defined by probability and frequency of occurrence of a hazard event, exposure to people and property to the hazard, and consequences of that exposure. Different methodologies exist for assessing the risk of hazard events, ranging from qualitative to quantitative.
Douglas County and its communities are vulnerable to a wide range of natural and technological hazards that threaten life and property. The hazards identified by the Douglas County Mitigation Planning Committee for inclusion in this HRV summary are those determined to be of actual potential threat to Douglas County and its incorporated jurisdiction, the City of Douglasville, and are consistent with the hazards identified by the State of Georgia and the Federal Emergency Management Agency for this part of the State and this region of the country. These hazards are analyzed in greater detail in the following paragraphs.

2.2 Overview of the Type and Location of all Hazards That Can Affect Douglas County

As a mandatory step in HMP process, hazards are identified and ranked to provide structure, prioritization, and feasibility of proposed mitigation goals and actions. Ranking is both quantitative and qualitative. First, the quantitative analysis considers all the GIS and HAZUS data available. Then, a qualitative approach is used to provide additional insights on the specific risks and exposure associated with each hazard. This process is a valuable cross-check or validation of the quantitative analysis performed. This qualitative approach can vary, but for Douglas County it used HMPC survey methodology and Risk Factor Approach.

For the 2015 Douglas County HM Plan update, members of the local HMPC reviewed and re-evaluated six natural and two technological hazards from the 2010 Plan. The Committee completed a thorough review of the hazards identified, the hazard data and the community risks. As part of their review, the HMPC decided to retain all of the original hazards included in the 2010 Plan with some name modifications to streamline the plan with the 2014 State of Georgia Hazard Mitigation Strategy. Table 2.2 documents some of the name changes. The order of hazards in 2015 HMP update is slightly modified from the 2010 HMP and reflects new hazard ranking by HMPC.

Table 2.2
List of Natural and Technological Hazards Included in 2015 Plan Update

2015 HAZARDS	STATUS	CHANGES FROM 2010 HMP
Severe Weather	Renamed	Name changed from Severe Storms and Lightning
Tornadoes	Unchanged	None
Inland Flooding	Renamed	Name changed from Flooding
Severe Winter Weather	Renamed	Name changed from Winter Storms
Drought	Unchanged	None
Wildfire	Unchanged	None
Dam Failure	Unchanged	None
Hazardous Materials	Unchanged	None

Table 2.3 presents a list of all federal disaster and emergency declarations that have occurred in Douglas County since 1953, according to the Federal Emergency Management Agency. This list presents the foundation for identifying what hazards pose the greatest risk within Douglas County. There were a total of eleven major declarations in Douglas County, of which seven Presidential Declarations and four Emergency Declarations[1] (including the most recent Severe Thunderstorms, Flash Flooding and Flooding declaration FEMA-4259-DR, from events in December of 2015).

[1] (per FEMA definition "A **Presidential Major Disaster Declaration** puts into motion long-term federal recovery programs, some of which are matched by state programs and designed to help disaster survivors, businesses and public entities.
An **Emergency Declaration** is more limited in scope and without the long-term federal recovery programs of a Major Disaster Declaration. Generally, federal assistance and funding are provided to meet a specific emergency need or to help prevent a major disaster from occurring." www.FEMA.gov)

Table 2.3
Presidential Disaster and Emergency Declarations in Douglas County
(Source: Federal Emergency Management Agency)

DECLARATION NUMBER	DATE OF DECLARATION	EVENT TYPE
FEMA-4259-DR	02/26/2016	Presidential Declaration, Severe Thunderstorms, Flash Flooding and Flooding
FEMA-3368-EM	02/11/2014	Emergency Declaration; Severe Winter Storm
FEMA-1858-DR	09/24/2009	Presidential Declaration; Severe Storms and Flooding
FEMA-1761-DR	05/23/2008	Presidential Declaration; Severe Storms and Flooding
FEMA-3218-EM	09/05/2005	Emergency Declaration; Hurricane Katrina Evacuation
FEMA-1311-DR	01/28/2000	Presidential Declaration; Winter Storm
FEMA-1209-DR	03/11/1998	Presidential Declaration; Severe Storm, Tornadoes and Flooding
FEMA-1071-DR	10/10/1995	Presidential Declaration; Hurricane Opal
FEMA-3097-EM	03/15/1993	Emergency Declaration; Winter Storm, Snowfall
FEMA-857-DR	02/23/1990	Presidential Declaration; Flooding, Severe Storm, Tornado
FEMA-3044-EM	07/20/1977	Emergency Declaration; Drought

HMPC Survey Approach

Once the hazards were identified for the 2015 Plan update, each member of the HMPC then ranked the hazards for *concern* (probability) and for *severity* (extent). The survey on *concern* addressed the perceived level of risk for each listed hazard (i.e. probability of occurrence and concern associated with it). The values in this survey ranged from Low and Medium to High. The survey results were numerically scored from 1 (low concern) to 3 (high concern).
The survey on severity addressed primarily the perceived physical extent of the hazard (the physical impact) and ranged from Minor and Limited, to Critical and Catastrophic. The results of the *severity* survey were numerically scored form 1 (Minor severity) to 4 (Catastrophic severity). The results of both HMPC surveys were combined into a single number per each hazard. The values were weight averaged, to account for a different number of possible answers in each survey.
As it will be demonstrated in this section, the results of the HMPC survey accounted for 40 percent of the overall hazard ranking. Table 2.4 presents combined results of the HMPC survey.

Risk Factor (RF) Approach.

In addition to a subjective HMPC survey, hazards were also ranked using RF approach. This methodology combines historic hazard data, local knowledge, and consensus risk assessment evaluations to produce numerical values to compare identified hazards in determining community vulnerability.

Table 2.4
Combined HMPC Survey Results of Natural and Technological Hazards
(Average Score for Probability and Extent Across the HMPC)

HAZARDS	HMPC MEMBER									
	A	B	C	D	E	F	G	H	I	J
Severe Weather	3.50	3.50	1.17	3.50	2.33	3.50	1.67	2.83	2.33	2.33
Tornadoes	4.00	2.83	2.33	4.00	2.33	4.00	2.83	2.83	4.00	2.33
Inland Flooding	2.83	3.50	1.17	3.33	0.00	2.83	3.33	2.83	1.67	2.33
Severe Winter Weather	3.50	2.50	1.17	3.50	2.33	2.33	1.67	2.83	1.83	2.33
Drought	2.33	2.33	3.50	2.17	2.33	1.17	1.67	1.67	1.83	1.17
Wildfire	1.67	1.67	1.17	1.17	1.67	1.67	1.67	1.17	1.67	1.17
Dam Failure	2.33	2.83	3.50	2.67	2.83	2.17	2.83	2.17	2.33	1.67
Hazardous Materials	2.83	2.50	3.00	2.83	3.33	1.67	1.67	2.17	2.33	2.33

The process allows identified hazards to be comparatively ranked (higher RF values = greater hazard risk). RF values ar
degrees of risk in five categories for each hazard: *probability, impact, spatial extent, warning time*, and *duration*. Each d
a value range of 1 to 4 and a weighting factor for each category agreed upon by the HMPC. The HMPC adjusted the v
on unique concerns or circumstances in the planning area.
To calculate RF value for each hazard, risk values are multiplied by the weighting factor. The sum of the five catego
value, revealed in the RF Value equation and RF criteria in Table 2.5 below:

RF Value = [(Probability x 30%) + (Impact x 30%) + (Spatial Extent x 20%) + (Warning Time x 10%) + (Dur

Note that all rankings are for the County and the City of Douglasville as a whole, and do not refer to specific sites in
note that probability rankings in the table are independent of severity rankings, i.e. they do not refer to probabilities
hazards, but rather the likelihood of events occurring somewhere in the planning area during any given year period. RF
in Douglas County is presented in Table 2.6

Table 2.5
Douglas County HMPC Hazard, Risk and Vulnerability (HRV) Risk Factor Criteria

RISK ELEMENT	SCALE TERM	DESCRIPTION	INDEX	WEIGHT
PROBABILITY What is the likelihood of a hazard event occurring in a given year?	**UNLIKELY**	Less than 1% annual probability	1	30%
	POSSIBLE	2% to 10% annual probability	2	
	LIKELY	More than 10% but less than 100% annual probability.	3	
	HIGHLY LIKELY	100% annual probability.	4	
IMPACT In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?	**MINOR**	Few if any injuries. Only minor property damage and minimal disruption to quality of life. Temporary shutdown of critical facilities.	1	30%
	LIMITED	Some minor injuries. More than 10% of property in planning area is impacted, in various severities. Partial shutdown of critical facilities is likely, but limited in duration.	2	
	CRITICAL	Multiple deaths and injuries likely. More than 25% of property in affected area is impacted, and some impacts are severe. Critical facility operations are limited or completely shut down, in some cases for up to a week.	3	
	CATASTROPHIC	High number of deaths/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.	4	
SPATIAL EXTENT How large of an area could be impacted by a hazard event? Are impacts localized or regional?	**NEGLIGIBLE**	Less than 1% of area affected	1	20%
	SMALL	Between 1 & 10% of area affected	2	
	MODERATE	Between 10 & 50% of area affected	3	
	LARGE	Between 50 and 100% of area affected	4	
WARNING TIME Is there usually some lead time associated with the hazard event? Have warning measures been implemented?	**24 HOURS +**	Self-defined	1	10%
	12-24 HOURS	Self-defined	2	
	6-12 HOURS	Self-defined	3	
	< 6 HOURS	Self-defined	4	
DURATION How long does the hazard event usually last?	**< 6 HOURS**	Self-defined	1	10%
	< 24 HOURS	Self-defined	2	
	< ONE WEEK	Self-defined	3	
	ONE WEEK +	Self-defined	4	

Table 2.6
Risk Factor Hazard Scoring
For Natural and Technological Hazards

HAZARDS	30% PROBABILITY	30% IMPACT	20% SPATIAL EXTENT	10% WARNING TIME	10% DURATION	RF Score
Severe Weather	4	2	4	4	1	**3.10**
Tornadoes	2	4	1	4	1	**2.50**
Inland Flooding	3	3	3	3	3	**3.00**
Severe Winter Weather	2	2	3	3	3	**2.40**
Drought	2	1	4	1	4	**2.20**
Wildfire	1	1	2	4	2	**1.60**
Dam Failure	2	4	1	4	1	**2.50**
Hazardous Materials	3	3	1	4	3	**2.70**

Final Scoring and Ranking Methodology

The final natural hazard scoring (and subsequent ranking) took into account both the subjective (local) input of the County's HMP Committee, and the objective RF approach. The formula used for the final scoring is as follows:

Final Score = (HMPC Survey Score) x 40% + (RF Score) x 60%

Table 2.7 presents final scoring and ranking for the six natural and two technological hazards in Douglas County.

Table 2.7
Final Composite Scoring and Ranking
For Natural and Technological Hazards

HAZARDS	HMPC Score	RF SCORE	FINAL SCORE	FINAL RANK
NATURAL HAZARDS				
Severe Weather	2.68	3.10	2.93	**1**
Tornadoes	3.08	2.50	2.73	**3**
Inland Flooding	2.33	3.00	2.73	**2**
Severe Winter Weather	2.39	2.40	2.40	**4**
Drought	1.94	2.20	2.10	**5**
Wildfire	1.44	1.60	1.54	**6**
TECHNOLOGICAL HAZARDS				
Dam Failure	2.52	2.50	2.51	**2**
Hazardous Materials	2.55	2.70	2.64	**1**

Based on the composite scoring, the natural hazard with the highest risk potential is "Severe Weather", which has a value of 2.93. This is primarily due to the probability of the hazard occurring and the spatial extent of the potential widespread damage within the affected areas of the County. This hazard was also the highest ranked in the 2010 HMP update.

"Flooding" was qualitatively calculated as second in risk potential, with a value of 2.73. Albeit the "Tornadoes" and the "Inland Flooding" hazards share the same overall score of 2.73 and rank of 2/3, "Inland Flooding" is ranked higher in this report, due to its higher probability of occurrence and larger spatial extent. The technological or human-made hazard with the highest risk potential was found to be "Hazardous Materials", with a value of 2.64. This is primarily due to a lack of warning time and a high level of probability. With Interstate-20 being a heavy volume transportation route through the County, this is also a contributing factor. The conclusions drawn from the qualitative and quantitative assessments were fitted into two categories for a final summary of hazard risk for Douglas County based on Moderate or Low risk designations, as depicted in Table 2.8 below:

Table 2.8
Categorizations of Hazard Risks for Douglas County

HAZARD RISK CATEGORY	HAZARD
MODERATE RISK (2.0 – 3.0)	Severe Weather, Inland Flooding, Tornadoes, Severe Winter Weather , Drought, Hazardous Materials, Dam Failure
LOW RISK (0.1 – 1.9)	Wildfire

General Summary of Extent and Effects of Potential Natural Hazards in Douglas County

Table 2.9 briefly summarizes the extent (potential severity) and possible effects of a range of natural and technological hazards in Douglas County. Note that each of these hazards is part of a separate and more detailed subsection later in this part of the hazard mitigation plan. Further note that the extent of many hazards in this table cannot be accurately characterized in a general statement such as this. This is because risks from hazards such as floods and dam failure are highly site-specific. As such, this table should be used only as a general indication of the parameters.

Table 2.9
Extent and Potential Effects of Hazards in Douglas County

Hazard	Extent (Potential Severity)	Discussion of Potential Effects
Severe Weather	Severe thunderstorms are a fairly regular occurrence in Georgia, and events with winds above 60 mph, with large hail and torrential rains occur fairly often. The maximum potential extent of this hazard is winds above 100 mph, baseball-sized hail and rains exceeding several inches per hour.	Effects of thunderstorms are usually localized, particularly hail. Effects would include damage to roofs from wind and hail, and dangerous local flooding, including flash floods.
Inland Flooding	Floods are highly localized events, and thus "extent", i.e. potential severity, cannot be accurately described in general terms. In extreme floods, there is potential for areas of the County to be flooded by extreme flow in streams, or via overland flow in areas without channels.	Floods have among the highest potential for affecting large areas and populations in the county. In worst cases up to 10% of the population and about the same percentage of the land area of Douglas County could be affected.

Hazard	Extent (Potential Severity)	Discussion of Potential Effects
Tornadoes	Douglas County is not in an area of the country that is particularly prone to tornadoes, especially those more severe than EF-3s. The maximum possible tornado strength is and EF-5, but the maximum likely event in Douglas County is not expected to be above EF-3.	Tornadoes generally impact smaller areas than most other hazards. In areas that are directly impacted by tornadoes (particularly more severe ones such as EF-4s and EF-5s), there will be widespread devastation, with most structures significantly damaged or destroyed, with relatively long recovery times.
Severe Winter Weather	As noted in text, Georgia is in an area with a subtropical climate, and thus the extent (potential severity) of winter storms is likely temperatures below freezing for a few days, with dangerous ice accumulations during more severe events.	Potential effects of severe winter storms are relatively limited compared to other hazards in this part of the country. There could be widespread tree damage and utility (mainly overhead wires) effects during extreme ice events, and there is always potential for road accidents as a result of ice and snow. These effects are usually small, however.
Drought	There is potential for drought extending over a period of years in this part of the country, although as discussed in text, there are various levels of drought, as expressed by the PDSI scale.	The entire County and most of its population would be affected by a severe and prolonged drought.
Wildfire	There is some potential for wildfires of hundreds of acres or more occurring in the County, depending on factors as antecedent conditions, the timeliness of detection, and the effectiveness of the fire department in suppressing the event.	The hazard has relatively little potential to affect large areas of the County (as noted, hundreds of acres would be a large fire). Structures numbering in the dozens would be affected in a serious scenario.
Hazardous Materials	The extent of hazardous materials release depends on type and amount of the material, and the manner in which it was released. The worst case would be a catastrophic failure of the facility with the atmospheric release reaching highly populated areas. The extent of such a hazard would need to be carefully studied on a case by case basis.	The area in the immediate vicinity and most of its population would be affected by a release of hazardous materials.
Dam Failure	The “extent” (which is actually potential severity) of a dam failure is related to the nature of the failure itself, the amount of water impounded, and the areas of potential inundation downstream. The worst case would be for a dam of large impoundment failing without warning. In this case, hundreds of acres downstream could be quickly inundated. This could include hundreds of structures and potentially thousands of people. However, these effects must be studied in order to accurately characterize the “extent” of this hazard.	A significant dam failure would likely impact hundreds of acres and possibly hundreds of structures. Populations affected would depend on warning time, among other factors.

2.3 Natural Hazard Risk and Vulnerability Assessment

2.3.1 Severe Weather

a. Profile of the Severe Weather Hazard

Under the "severe weather" we usually refer to inclement weather during summer and spring months, characterized by strong thunderstorms with strong winds, occasional hail, and lighting. Equally severe winter weather is analyzed separately under "Severe Winter Weather" hazard, in Section 2.3.4.

Background. Thunderstorms are local storms produced by cumulonimbus clouds. By definition they are accompanied by lightning and thunder. Thunderstorms are the by-products of atmospheric instability, which promotes vigorous rising of air particles. A typical thunderstorm may cover an area three miles wide. A Severe Thunderstorm is defined as a thunderstorm producing wind at or above 58 mph and/or hail ¾ of an inch in diameter or larger. This threshold is met by approximately 10% of all thunderstorms. These storms can strike any time of year, but similar to tornadoes, are most frequent in the spring and summer months. They are nature's way of providing badly needed rainfall, dispersing excessive atmospheric heat buildup and cleansing the air of harmful pollutants. Not only can severe thunderstorms produce injury and damage from violent straight-line winds, hail, and lightning, but these storms can produce tornadoes very rapidly and without warning.

The extent of thunderstorms may be measured by the cell intensity: ordinary cell, multi-cellular, and super cell. The most common type of thunderstorm is termed the "ordinary" cell, which is limited in size and lifespan, but can produce short bursts of severe weather. Several other variants also exist, but the most dangerous form is termed the "super cell" thunderstorm. The super cell is typically an isolated form and always has the potential to be severe because of its strong and persistent rotating updraft, which dissipates at the upper levels forming the characteristic anvil and overshoot of clouds. Vertical wind shear (i.e., wind speed increasing with height) is important in the development of severe storms such as super cells. The shearing effect serves to separate the updrafts from the downdrafts, thus creating a circulation. In a normal thunderstorm, the downdraft tends to fall back into the updraft, effectively dissipating the storm's energy. Hail and heavy rain are associated with the downdraft zones and under some specific conditions may also form a tornado towards the left rear flank of the storm cell. This small but rapidly rotating column of air descends below the cloud base, reaching the surface with devastating consequences. As the storms translate at speeds typically in the range of 25 to 30 mph, these relatively narrow impact widths become long swaths of potentially very high damage. Super cells may have a lifespan of several hours and present an impact front as wide as 25 miles. Records of damage generally indicate "pulsing" whereby the ground level impacts tend to fluctuate, probably depending on the supply of material held aloft by the updrafts. Very severe super cells can exhibit almost continuous damage fronts for several hours as combinations of wind, rain, and hail. All these types of thunderstorms are possible in the planning area.

Thunderstorms produce several kinds of wind, including rotational (also known as cyclonic), downbursts, and straight-line. Nearly every thunderstorm produces some downbursts, which are small areas of rapidly descending air beneath a thunderstorm that strike the ground, and may cause significant damage. The typical downburst consists of only a 25 mph gusty breeze, accompanied by a temperature drop of as much as 20 degrees within a few minutes. However, severe downburst winds can reach from 58 to 100 mph or more, significantly increasing the potential for damage to structures. Downbursts develop quickly with little or no advance warning and come from thunderstorms whose radar signatures appear non-severe. There is no sure method of detecting these events, but atmospheric conditions have

been identified that favor the development of downbursts. Severe downburst winds have been measured in excess of 120 mph, or the equivalent of an F2 tornado. Such winds have the potential to produce both a loud "roaring" sound and the widespread damage typical of a tornado.
Such winds tend to affect areas of Douglas County with significant concentrations of trees, as well as areas with exposed property, infrastructure, and aboveground utilities. Resulting damage often includes power outages, transportation and economic disruptions, and significant property damage. Severe thunderstorms can ultimately leave a population with injuries and loss of life.

Hail can also be a destructive aspect of severe thunderstorms. Hailstones are created when strong rising currents of air called updrafts carry water droplets high into the upper reaches of thunderstorms where they freeze. These frozen water droplets fall back toward the earth in downdrafts. In their descent, these frozen droplets bump into and coalesce with unfrozen water droplets and are then carried back up high within the storm where they refreeze into larger frozen drops. This cycle may repeat itself several times until the frozen water droplets become so large and heavy that the updraft can no longer support their weight. Eventually, the frozen water droplets fall back to earth as hailstones. Hail causes more monetary loss than any other type of severe weather related to thunderstorms. Annually, the United States suffers about $1 B in crop damage from hail. Storms that produce hailstones only the size of a dime can produce dents in the tops of vehicles, damage roofs, break windows and cause significant injury or even death. Unfortunately, hail is often much larger than a dime and can fall at speeds in excess of 100 mph.

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

Location. The entire planning area is subject to the wind effects from the severe wind hazard. Figure 2.1 shows how the frequency and strength of extreme windstorms vary across the United States. The map is based on a combination of all past occurrences and shows that Douglas County, falls within wind Zone III, where wind speeds can reach as high as 200 mph.[2]

[2] Source: FEMA, Wind Zone map

Figure 2.1
Wind Zones in the United States
(Source: FEMA)

Impact on Life and Property. All people and assets within the Douglas County are considered to have the same degree of exposure to the severe weather hazard. Within the county, the risk to people and property from the high wind hazard cannot be distinguished by area; the hazard is expected to have a relatively uniform probability of occurrence across the entire planning area.

Several meteorological conditions can result in winds severe enough to cause property damage. In Douglas County, most wind damage has been limited to downed trees, blocked roads, and disabled power lines. Typically, assets of lighter construction (such as mobile homes) are most vulnerable to the high winds hazard. The NCDC/NOAA database indicates that between 1950 and 2015 Douglas County experienced no deaths and no injuries from severe thunderstorm high wind events (the actual event range from 12/20/1957 to 8/9/2014). During this same time period, property damage totaled $4,638,250. For hail, the NCDC/NOAA indicates that between 1955 and 2013 there were no injuries or deaths from hail, with $16,082,000 in damages. For lighting, for the period 1998-2012 (available records), the same source sites no deaths, five injuries, and property damage in the amount of $2,636,500. These numbers are presented below in Tables 2.10 to 2.12 below.

Table 2.10
Severe Wind Weather in Douglas County, since 1957
(Source: NCDC/NOAA)

Jurisdiction Affected	Number of Events	Fatalities	Injuries	Property Damage
Douglas County	42	0	0	$3,229,250
City of Douglasville	63	0	0	$1,409,000
TOTALS	**105**	**0**	**0**	**$4,638,250**

Table 2.11
Hail Events in Douglas County, since 1955
(Source: NCDC/NOAA)

Jurisdiction Affected	Number of Events	Fatalities	Injuries	Property Damage
Douglas County	50	0	0	$11,490,000
City of Douglasville	40	0	0	$4,592,000
TOTALS	**90**	**0**	**0**	**$16,082,000**

Table 2.12
Lightning Strikes in Douglas County, since 1998
(Source: NOAA/NCDC)

Jurisdiction Affected	Number of Events	Fatalities	Injuries	Property Damage
Douglas County	7	0	1	$171,250
City of Douglasville	11	0	4	$2,465,250
TOTALS	**18**	**0**	**5**	**$2,636,500**

Occurrences. The NCDC database documents 105 severe thunderstorm events, 90 hail events, and 18 lightning events during the past 60 years in Douglas County (this range varies for different even type). Of the 90 hail storms, the event causing the most property damage occurred on July, 2008, when strong thunderstorms produced golf ball- to baseball-sized hail across the Douglas County. The hailstorm caused an estimated $5 million in damage. The NCDC indicated the most significant thunderstorm event occurred on May 11, 2008 when high winds caused damage in the amount of $1,500,000. Of the 18 lightning events, a strike on July 22, 2008 caused the greatest amount of damage in Douglas County. The event caused approximately $1,250,000. Despite relatively large number of the
Severe weather events, there were no presidential declared severe disasters in Douglas County, since the FEMA-GA-DR-1858 disaster (Georgia Severe Storms and Flooding) of September 2009.

With 105 severe thunderstorm events between 1957 and 2014, Douglas County experiences on average about two severe thunderstorm event per year (1.84/yr). Most likely the number of events is slightly higher and there are historical events that were never documented by the NCDC. Based on the data from the NCDC, with this number of events per year there is a 100% annual probability of future severe

thunderstorms events occurring in Douglas County. Although the probability of future events is high for future thunderstorm high, the impact on life and property in the planning area is probably not very high.

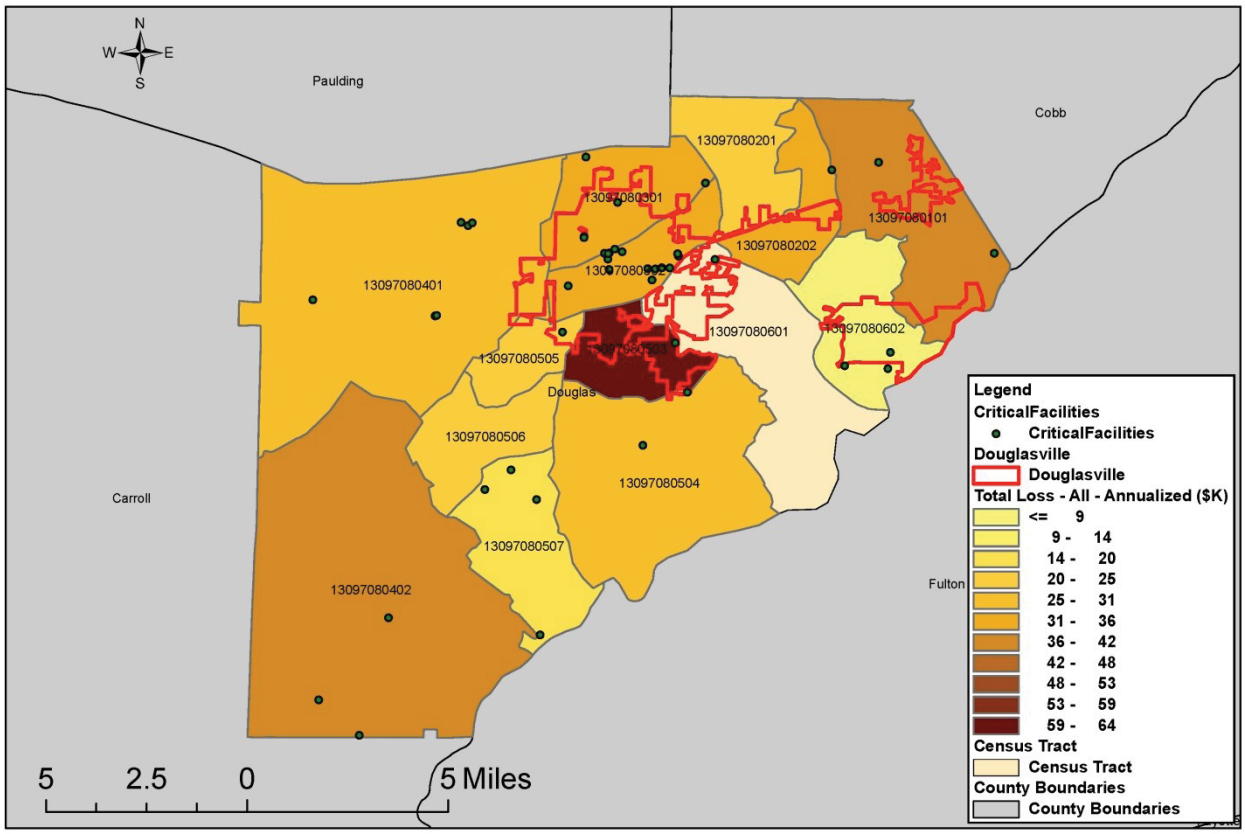
With 18 lightning events between 1998 and 2011, Douglas County experiences on average about one significant lightning event per year (using only NCDC data, which is based on reporting that likely under-represents the actual number of serious strikes). With roughly one event per year there is a 100% annual probability of future lightning events occurring in Douglas County. With 90 hail events between 1955 and 2013, Douglas County experiences on average about two hail events per year. With roughly two events per year there is a 100% annual probability of future hail events occurring in Douglas County.

b. Inventory of Assets Exposed to Severe Thunderstorms

In evaluating assets that are susceptible to severe thunderstorms, hail, and lightning, since this hazard is not spatially defined, all public and private property is susceptible to severe thunderstorms, including all critical facilities. For the purpose of using standardized inventory information, with details related to structural occupancy class of the buildings, the consultant used FEMA HAZUS-MH model and its database. The database includes FEMA-provided, comprehensive national building inventory stock for the continental United States. The data was based on 2000 census with additional structural categorization developed at the later date. According to HAZUS database, there are approximately 35,518 structures in Douglas County, all of which are exposed to the severe weather hazard. Of those 35,518 structures, 13,441 are located in the City of Douglasville. All structures in Douglasville are also exposed to the severe summer thunderstorm hazard. See Appendix A for HAZUS-MH report on wind hazard calculation. These numbers are also presented in Tables 2.13 and 2.14 below. The assets are presented both through seven general occupancy classes on the County level (Table 2.13) or on jurisdictional level (Table 2.14). The total exposure of building assets in Douglas County is $11.5 billion ($11,550,923,000), of which almost $5 billion ($4,935,717,000) in the city of Douglasville.

As of August of 2015, there were 65 critical facilities located within Douglas County (this information was provided by the Douglas County EMA and is current). Of this total, 23 were located within the City of Douglasville (55 listed as under the City's jurisdiction). The map below identifies all 65 critical facilities located within the hazard area which, in the case of severe weather, includes the entire County. Figure 2.2 illustrates the location of critical facilities in Douglas County.

Figure 2.2
Douglas County Severe Weather Hazard Map
Annualized Building Loss per Census Tract
(Source: Douglas County GIS, HAZUS MH-2.1)



c. Estimate of Potential Losses from Severe Thunderstorm

High winds can damage roofs, ranging from loss of roofing materials to total loss of the roof structure. A great deal of wind damage is due to wind-borne debris that breaks windows and opens building envelopes to additional wind damage, as well as the entry of wind-driven rains that soak contents and interiors. Debris can inflict injuries on people who have not sought shelter, or even in result death. High winds dislodge manufactured homes that are not adequately anchored, and bring down electric and telephone lines and poles. In general, older structures are expected to be more susceptible to wind damage in part because their construction pre-dated building codes but also because older structures may not have been maintained. The type of construction also influences the likelihood of damage, with shingled, overhanging roofs (common on residences) more vulnerable to wind damage than are flat asphalt roofs (common on non-residential buildings).

To determine short-term and long-term severe weather risk projection, the consultant performed risk modelling with FEMA HAZUS-MH V2.1 wind module. The HAZUS-MH model utilized probabilistic hurricane wind scenario with building information available in HAZUS database. The resulting annualized losses were then projected to 50-year and 100-year horizons, using multiplication factors of 13.801 and 14.269, respectively. These factors were based on FEMA-approved and Federal OMB-regulated discount rate of 7%. The building exposure was also adopted from HAZUS database. The results indicate that even for the 100-year horizon, the projected losses of $6.5 million ($6,551,605) are small in comparison of total exposure ($11.5 billion). Table 2.13 indicates that most of those losses are associated with the residential occupancy class, and within the City of Douglasville (Table 2.14).

Table 2.13
Severe Weather Risks for Occupancy Class Types, Combined Douglas County and City of Douglasville, Annualized and 50- and 100-year Planning Horizons
(Source: HAZUS-MH, PMC)

Occupancy Class	Building Count	Total SF ($1,000s)	Total Building Exposure ($1,000s)	Annualized Damages ($1,000s)	50-year Risk ($1,000s)	100-year Risk ($1,000s)
Residential	32,256	4,059,973	$7,747,736	$432.203	$5,964.836	$6,167.107
Commercial	2,131	464,269	$2,500,138	$19.029	$262.619	$271.525
Industrial	725	126,871	$737,073	$4.843	$66.844	$69.111
Agricultural	137	26,249	$29,986	$0.303	$4.181	$4.323
Religious	187	48,096	$273,988	$1.412	$19.486	$20.147
Government	23	5,064	$36,012	$0.280	$3.869	$4.001
Education	59	16,229	$225,990	$1.079	$14.887	$15.391
TOTALS	**35,518**	**73,351**	**$11,550,923**	**$459.150**	**$6,336.723**	**$6,551.605**

d. Land Use and Development Trends related to Severe Thunderstorms

Severe thunderstorms are expected to impact the planning area equally, so land use and development trends have negligible influence on the vulnerability of the community. There are various characteristics of structures that make them more (or less) vulnerable to the effects of high winds. These characteristics include roof profile, the type and strength of windows, and the nature of the structural system. Modern building codes are very effective in ensuring that structures can withstand all but the most extreme events. In some cases hail can severely damage vehicles and roofs of structures, but there are few mitigation measures that have any effectiveness in preventing such damages.

e. Multi-jurisdictional Hazards

Douglas County and the City of Douglasville are geographically equally exposed to the effects of severe weather. Table 2.14 illustrates the breakdown of exposure, losses, and long term risk-projections for the severe weather hazard.

Table 2.14
Severe Weather Risks for City of Douglasville and Douglas County
Annualized and 50- and 100-year Planning Horizons
(Source: HAZUS-MH, PMC)

Jurisdiction Affected	Building Count	Total SF ($1,000s)	Total Building Exposure ($1,000s)	Annualized Damages ($1,000s)	50-year Risk ($1,000s)	100-year Risk ($1,000s)
Douglas County	22,077	42,771	$6,615,206	$81.893	$1,130.202	$1,168.528
City of Douglasville	13,441	30,580	$4,935,717	$377.257	$5,206.521	$5,383.077
TOTALS	**35,518**	**73,351**	**$11,550,923**	**$459.150**	**$6,336.723**	**$6,551.605**

f. General Summary of Severe Thunderstorms and their Effects on the Planning Area

The entire planning area is about equally subject to the effects of severe weather. Thunderstorm effects are generally localized. These are often related to trees and branches falling on structures, and roof and building envelope damage. Generally speaking, private-sector insurance addresses more extreme damage from high winds, so with exception of NCDC/NOAA portal, there are few readily available open source records from which to extract information about past losses. As previously shown in Tables 2.10, 2.11, and 2.12, the County is impacted by thunderstorms fairly often, but damages are generally small.

2.3.2 Inland Flooding

a. Profile of the Flood Hazard

Background. Inland (riverine) Flooding is defined as the accumulation of water within a water body and the overflow of excess water onto the adjacent floodplain. Hundreds of floods occur each year, making them one of the most common hazards in all 50 States and U.S. territories. Floods are also the most widespread of all natural disasters except fire. Flooding typically results from large-scale weather systems generating prolonged rainfall. Most communities in the United States have experienced some kind of flooding after spring rains, heavy thunderstorms, or winter snow thaws.

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

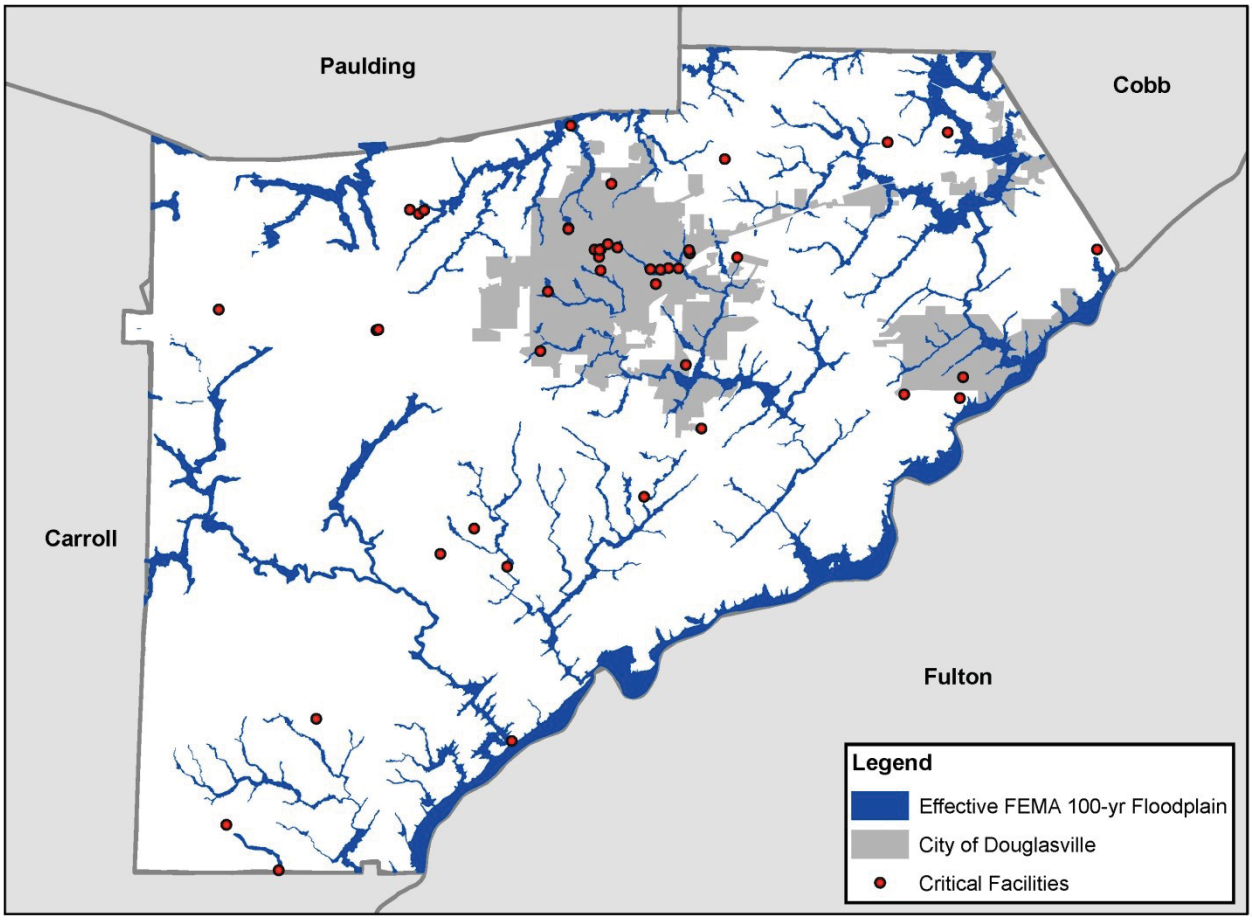
Location. Douglas County encompasses 201 square miles, and is located in northwest Georgia, approximately 15 miles west of the City of Atlanta. The incorporated communities within county boundaries are the Cities of Douglasville (the County seat), Austell and Villa Rica, of which the last two jurisdictionally under Cobb and Carroll Counties, respectively, and not included in this study. The City of Douglasville is the county seat. Douglas County is bordered by Paulding County to the north and northwest, Carroll County to the west and southwest, and Cobb County to the northeast. Chattahoochee River constitutes a boundary of Fulton County, from northeast to southwest of Douglas County.

The entire county is located within the Chattahoochee River drainage basin. Mud Creek and Gothard's Creek drain the northwestern portion of Douglas County. The Dog River-Mobley Creek watershed lies in the western portion of the county. The Anneewakee watershed drains the central portions of the county, and Sweetwater Creek drains eastern part of Douglas County.

As stated in the 2010 HMP, Douglas County and the City of Douglasville continue to work together to enforce the local floodplain management ordinance that exceeds requirements set forth by the National Flood Insurance Program(NFIP). The Douglasville-Douglas County Water and Sewer Authority, as the local storm water utility, also devotes resources to enforcing local floodplain management requirements. This ordinance exists as Section 1105 of Article 11 of the Douglas County Unified Development Code, Article 8 of the City of Douglasville Development Code, Appendix B and Chapter 9 of the Douglasville-Douglas County Water and Sewer Authority’s Rules and Regulations. Intergovernmental agreement establishes that these three ordinances will be identical to each other so that floodplain management regulations are consistent.

As part of the NFIP, Douglas County and City of Douglasville have their flood insurance rate maps (FIRMs) updated on a regular basis. Douglas County (CID number 130306) had its initial FIRMs dated January 2, 1980. City of Douglasville (CID number 130305) had their initial FIRMs dated June 25, 1982. Both jurisdictions had their Digital FIRMs updated March 4, 2013. Figure 2.3 identifies the Special Flood Hazard Areas (or 100-year floodplain) for Douglas County.

Figure 2.3
Douglas County Floodplain Map with Critical Facilities
(Douglas County GIS, 2015)



Impact on Life and Property. The NCDC/NOAA database indicates that there have been eighteen floods in Douglas County in the period from 1950 to 2015 (actual range of records is 1996 to 2013), with property damages reported at $22,031,000. Reports from Douglas County FIS and other sources indicate other historical floods, as listed in the section below Figures maintained by NCDC indicate that Douglas County has experienced seven fatalities (all in September of 2009) and no injuries due to floods.

Occurrences. The 18 flood events in NCDC/NOAA database are summarized below in Table 2.15. The event causing the greatest amount of damage was a flood caused by torrential rains in Georgia, between September 21, and 23, 2009 (FEMA-1858-DR). The greatest damage caused by this event in Douglas County was recorded on 9/21/2009 in the amount of $10,440,000. The total reported damages for this event in Douglas County (per NCDC/NOAA) were $20,010,000.

Table 2.15
Douglas County: Flood Events, 1996 – 2013
(Source: NCDC/NOAA)

Date	Event Type	Location	Fatalities	Injuries	Property Damage
5/19/2013	Flash Flood	Lithia Springs	0	0	$15,000
5/3/2010	Flash Flood	Fairplay	0	0	$50,000
9/21/2009	Flood	Douglasville	0	0	$10,440,000
9/21/2009	Flood	Douglasville	1	0	$8,700,000
9/20/2009	Flash Flood	Douglasville	6	0	$870,000
7/11/2005	Flash Flood	East Douglas County	0	0	$750,000
7/11/2005	Flood	Countywide	0	0	$0
7/9/2005	Flood	Countywide	0	0	$100,000
7/6/2005	Flood	Countywide	0	0	$25,000
9/16/2004	Flash Flood	Lithia Springs	0	0	$1,000
7/1/2003	Flash Flood	Fairplay	0	0	$0
6/30/2003	Flash Flood	Fairplay	0	0	$0
6/18/2003	Flash Flood	Countywide	0	0	$25,000
6/17/2003	Flash Flood	North Douglas County	0	0	$30,000
5/7/2003	Flash Flood	Lithia Springs	0	0	$5,000
5/6/2003	Flash Flood	Countywide	0	0	$10,000
3/8/1998	Flood	Countywide	0	0	$10,000
8/11/1996	Flash Flood	Douglasville	0	0	$1,000,000
TOTALS			**7**	**0**	**$22,031,000**

Major floods have affected Douglas County in July 1916, November 1948, February 1961, February 1982, July 2005, and September 2009.
In addition to the events listed in the NCDC, the Douglas FIS indicates that the flood causing the greatest damage occurred in July 1916, November 1948, February 1961 and February 1982.

- The July 1916 flood was generated by a tropical storm. This storm caused discharges of 12,600 cubic feet per second (cfs) on Sweetwater Creek, in the vicinity of the City of Austell.

- In November 1948, a well-developed, low-pressure center produced a maximum recorded rainfall of 8.25 inches at the City of Douglasville. A maximum 24-hour total of 3.75 inches fell on November 29th.
- The February 1961 flood resulted from a tropical air mass across the Gulf of Mexico and the southeastern states combined with a long wave trough in the western states. The City of Douglasville recorded a total of 12.38 inches, with 5.19 inches reported on February 25th. This storm caused discharges of 10,100 cfs on Sweetwater Creek near the City of Austell.
- The February 1982 flood had discharges of 10,700 cfs, on Sweetwater Creek near the City of Austell.

From the available records, it appears that the stream most susceptible to catastrophic flooding is Sweetwater Creek, mentioned in all of the above FIS reports (NCDC/NOAA reports do not include the source of flooding). Additional sources also list an event from April 1979, when "heavy rain caused a crest of 19.9' above flood stage (of Sweetwater Creek). Damage estimates are $800,000". Since this event was not listed in Flood Insurance Study, it is unclear as to what portion of the listed damages actually occurred in Douglas County. SHELDUS reports property damages at $12,000.

With a total of twenty-four flood events between 1948 and 2013 (incorporating records from NCDC, SHELDUS and FIS, but without the 1916 event), Douglas County experiences on average one flood every 2.75 years. With one event roughly every 2.75 years, there is a 36% annual probability of a future flood event occurring in Douglas County. This method is not intended to be an exact, scientific assessment of probability – site-specific engineering studies such as FISs should be used to determine flood probability on a case-by-case basis when specific metrics are needed.

After Presidentially-Declared disasters, FEMA engineers visit communities to determine the nature and dollar amount of damages, so that federal funds can be provided to eligible applicants. As mentioned above, the floods of September, 2009 caused significant damage within portions of Douglas County. No further FEMA assistance and no additional FEMA Project Worksheets (PWs) were filed since the 2009 floods, i.e. since the 2010 HMP update.

Inventory of Assets Exposed to Inland Flooding

Figure 2.3 depicts Douglas County critical facilities in relationship to the effective FEMA known flooding hazard areas. Of the current 65 critical facilities located within Douglas County, only two are located within the 100-year FEMA flood zone:

- Kings Highway Pump Station, on Bear Creek; and
- St. Andrews Main Pump Station, on Little Wolf Creek

Both facilities are operated by the Douglasville/Douglas County Water and Sewer Authority (DDCWSA)

NFIP considerations

Douglas County and City of Douglasville have been with NFIP since 1980, and 1982, respectively. The table below compares the number of policies and claim statistics for the City of Douglasville with Douglas County. There are 89 flood insurance policies in City of Douglasville and 415 in the rest of Douglas County (which includes 170 policies in Austell, and 26 in Villa Rica). There were 14 insurance claims in Douglasville and 241 in the rest of Douglas County (of which 96 in Austell, and one in Villa Rica). Of over $13 million in claims for Douglas County, almost $6.8 million was paid out in claims in City of Austell.

All information was extracted from FEMA NFIP program in April 2015.

Table 2.16
Comparison of NFIP Policies and Claims for the City of Douglasville with Douglas County
(Source: FEMA – NFIP Statistics, April, 2015)

City/County Name	# of Policies In-Force	# of Losses	Total Paid Claims
Douglas County	415	241	$13,252,452
City of Douglasville	89	14	$437,062
TOTALS	504	255	$13,689,514

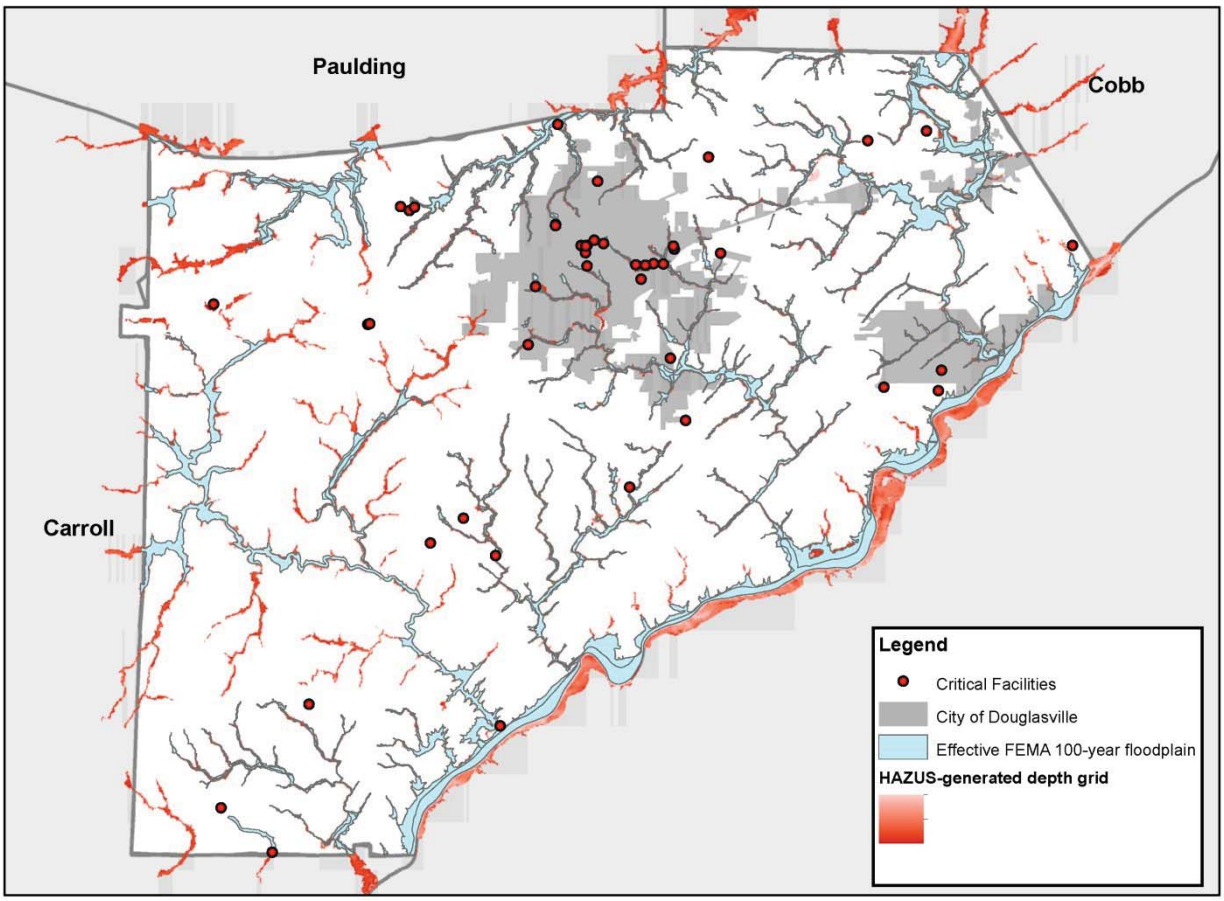
At the time of 2010 Plan update, there were eighteen residential repetitive loss[3] properties in Douglas County (of which, one in the city of Douglasville). Since 2010, there were numerous acquisitions of flood prone buildings (incomplete records indicate 21 structures), through FEMA grants HMGP-1686, HMGP-1761, HMGP-1858, and HMGP-1973. As of April 2015, NFIP reports indicate that there is one residential repetitive loss structure in Douglas County (City of Austell), and no such structures in Douglasville. There are no residential severe repetitive loss structures in Douglass County or in the City of Douglasville.

[3] Per FEMA, **Repetitive loss properties** are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978.
Severe repetitive loss properties are residential properties that have at least four NFIP payments over $5,000 each and the cumulative amount of such claims exceeds $20,000, or at least two separate claims payments with the cumulative amount exceeding the market value of the building.

b. Estimate of Potential Losses From Inland Flooding

To estimate long-term risks of inland flooding hazard, the consulting team performed analysis using the Flood Module of FEMA loss estimation tool, HAZUS-MH V2.1. HAZUS performed Level 1 analysis for several scenarios , including a 100-year scenario and a long-term estimation for 50-year and 100-year planning horizons. In performing hydraulic study as a precursory phase to economic analysis, HAZUS created 100-year floodplain boundaries based on a GIS-topography and known hydrologic parameters. HAZUS utilized these boundaries to create 3-D 100-year depth grids for the entire county, which are essential for running a subsequent GIS-based economic loss model. The digital GIS version of the effective FEMA 100-year floodplain boundaries could not be utilized successfully, given that the grid can only be created for a known water surface elevation, ie for the FEMA AE zones. Figure 2.4 illustrates good agreement of HAZUS-generated floods boundaries with the ones generated by FEMA. HAZUS generated flood boundaries further up the streams, given that the minimum drainage for each stream was set to 0.25 square miles, which is lower than one used for FEMA study. The size of the minimum drainage area may affect some of the HAZUS estimates, but in this case, the error is on a conservative (safety) side.

Figure 2.4
Douglas County; Comparison of FEMA 100-year Floodplain Boundaries with HAZUS
(Source: 2013 Douglas County Flood Maps, HAZUS)



HAZUS-MH Annualized Scenario: To determine short-term and long-term interior flooding risk projection, the HAZUS-MH model utilized probabilistic suite of five return interval floods (10-yr, 25-yr,

50-yr, 100-yr, and 500-yr) with building information available in HAZUS database. The resulting annualized losses were then projected to 50-year and 100-year horizons, using multiplication factors of 13.801 and 14.269, respectively. These factors were based on FEMA-approved and Federal OMB-regulated discount rate of 7%. The building exposure was also adopted from HAZUS database. The results indicate that for the 50-year horizon, the projected losses are 214 million ($214,826), and for the 100-year horizon, the risk is at $222,111,000. Table 2.17 indicates that most of those losses (approximately 65%) are associated with the residential occupancy class.

Table 2.17
Inland Flooding Risks for Occupancy Class Types, Combined Douglas County and City of Douglasville, Annualized and 50- and 100-year Planning Horizons
(Source: HAZUS-MH, PMC)

Occupancy Class	Annualized Damages ($1,000s)	50-year Risk ($1,000s)	100-year Risk ($1,000s)
Residential	$10,079	$139,100	$143,817
Commercial	$3,200	$44,163	$45,661
Industrial	$1,406	$19,404	$20,062
Agricultural	$13	$179	$185
Religious	$665	$9,178	$9,489
Government	$26	$359	$371
Education	$177	$2,443	$2,526
TOTALS	$15,566	$214,826	$222,111

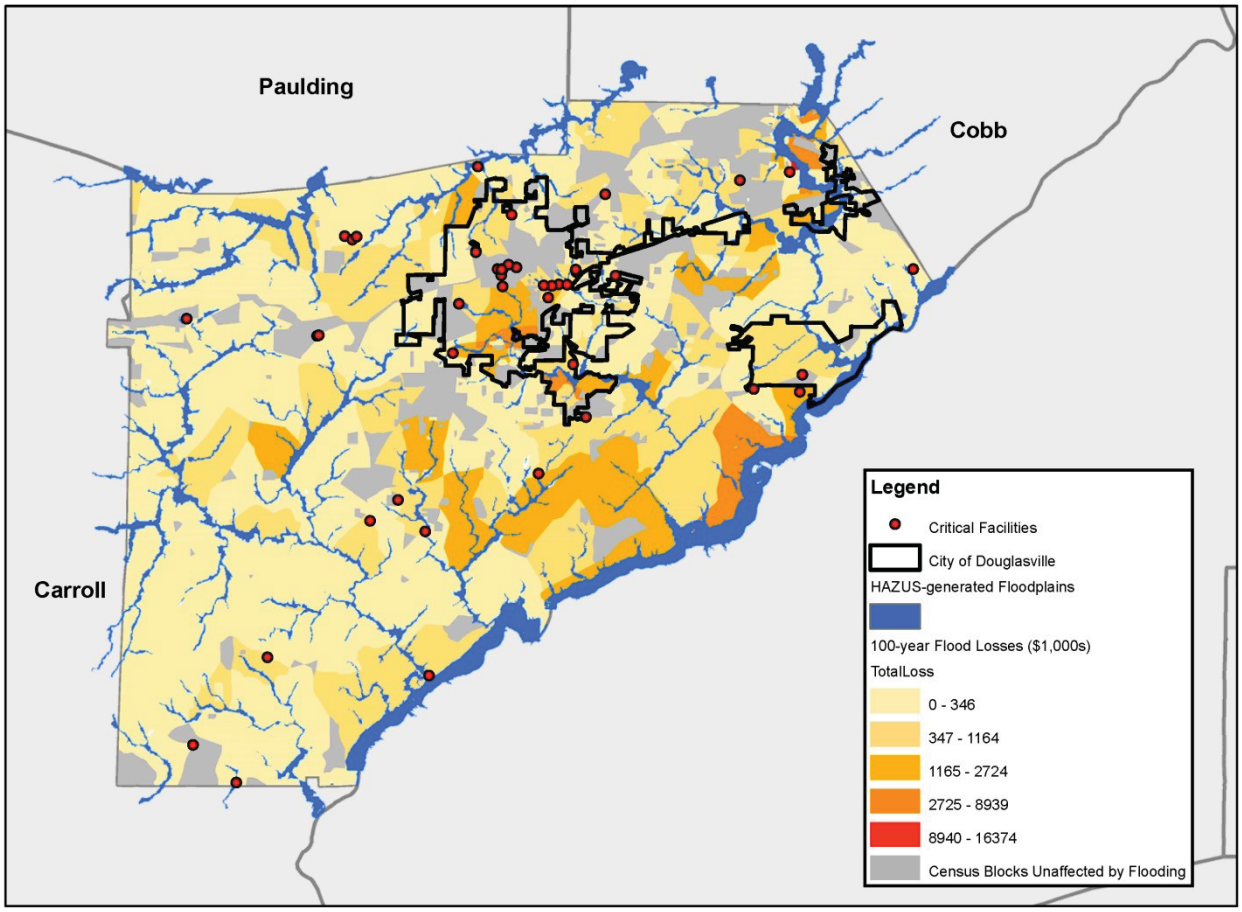
HAZUS-MH 100-year Scenario: To illustrate magnitude of risk for a particular level of catastrophic interior flooding, the HAZUS model was utilized for a 100-year return interval. Using HAZUS floodplain boundaries that are somewhat more detailed than the FEMA ones, it is possible that the results are somewhat estimated, but the estimates will still be well within the order of magnitude.

The total projected losses for all occupancy classes (building losses and all economic losses combined) for the 100-year interior flooding event are almost $189 million ($188,746,000), of which $60,859,000 of losses are projected within City of Douglasville and $127,887 elsewhere in the County. Again, the majority of these losses ($129,763,000 or 64%) are associated with the residential occupancy class.

Figure 2.5 illustrates 100-year flood losses per census block, as calculated by HAZUS. It is worth mentioning that even for the high-resolution flood hazard zones, only 494 (out of 1,312) census blocks in Douglas County are affected by inland flooding hazard. The unaffected census blocks are depicted in grey.

The 100-year HAZUS scenario also projected the amount of debris created by flood event. The structural debris is being calculated in three distinct categories: finishes (dry wall, insulation, plaster), structural (brick, wood), and foundation (concrete and steel). This breakdown helps in determining the equipment and the methodology of handling different types of debris material. HAZUS predicted that for a 100-year event, 13,754 tons of debris would be generated; of those, approximately 36% (5,000 tons) of finishing material, 31% (4,300 tons) of brick, wood and mortar, and 33% (4,500 tons) of concrete and steel

Figure 2.5
Douglas County HAZUS Flood Analysis
Calculated 100-year Total Losses Damages per Business Tract
(Source: 2010 Douglas County Flood Maps, HAZUS)



c. Land Use and Development Trends Related to Inland Flooding

The two major streams in Douglas County are the Chattahoochee River and Sweetwater Creek. While Chattahoochee River is regulated by Morgan Falls Dam further upstream and only occasionally may become a serious flooding hazard, the Sweetwater Creek has been a principal source of flooding in almost all historic floods mentioned before, most notably in September of 2009. The dwellings along Sweetwater Creek preceded National Flood Insurance Program and were built with no exact knowledge of potential flooding risks. For the City of Douglasville, it is mainly located in the central part of the County, along the ridge which is a part of the Appalachian mountains system and which also carries the I-20 roadway/railroad corridor. There are few flooding problems in the city; however, some areas are densely populated and developed resulting in a higher density of impervious ground cover. New development in unmapped areas could potentially occur in areas prone to flooding and increase vulnerabilities and potential losses; however, most of the current land use regulations require the consideration of flood hazards during the development review process.

d. Multi-Jurisdictional Differences

While Douglas County has substantially more land area than that of the City of Douglasville, this means that the majority of floodplains and overtopping roads (70%) are located in unincorporated Douglas County. Additionally, areas of highest-magnitude flooding are along the Chattahoochee River and Sweetwater Creek which are mostly in unincorporated Douglas County. For these reasons, significant flooding will have a higher impact on the County because there is a greater exposure of people to floodwaters. More overtopping roads means there is a higher risk in the County than the City that a motorist could be swept away by flood waters. Also, higher magnitude flooding in the County produces a greater need for evacuation and emergency response, when compared to the City. While the degree of impact varies, both jurisdictions are moderately vulnerable to flood.

e. General Summary of Inland Flooding and Their Effects on the Planning Area.

Flooding has the potential to inflict significant damage within Douglas County. Mitigation of flood damage requires the community to have knowledge of flood-prone areas, including roads, bridges, bodies of water, and critical facilities, as well as the location of the County's designated shelters. The Douglas Co. HMPC identified inland flooding as a hazard requiring mitigation measures and identified specific mitigation goals, objectives and action items they deemed necessary to lessen the impact of flooding. These findings are found in Chapter 3, Section 3.3.2.

2.3.3 Tornadoes

a. Tornadoes Hazard Profile

A tornado is a rapidly rotating vortex or funnel of air extending ground ward from a cumulonimbus cloud. Most of the time, vortices remain suspended in the atmosphere. When the lower tip of a vortex touches the ground, the tornado becomes a force of destruction. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 mph or more. In extreme cases, winds may approach 300 mph. Damage paths can be in excess of 1 mile wide and 50 miles long. Tornado statistics from the National Weather Service (NWS) indicated that the United States averaged 1,315 tornadoes between 2007 and 2009. The highest monthly average during this time period occurred in May with an average of 305 tornadoes. Georgia averages 30 tornadoes annually, with the most critical months of March and April (5 and 4 tornadoes per month, respectively).

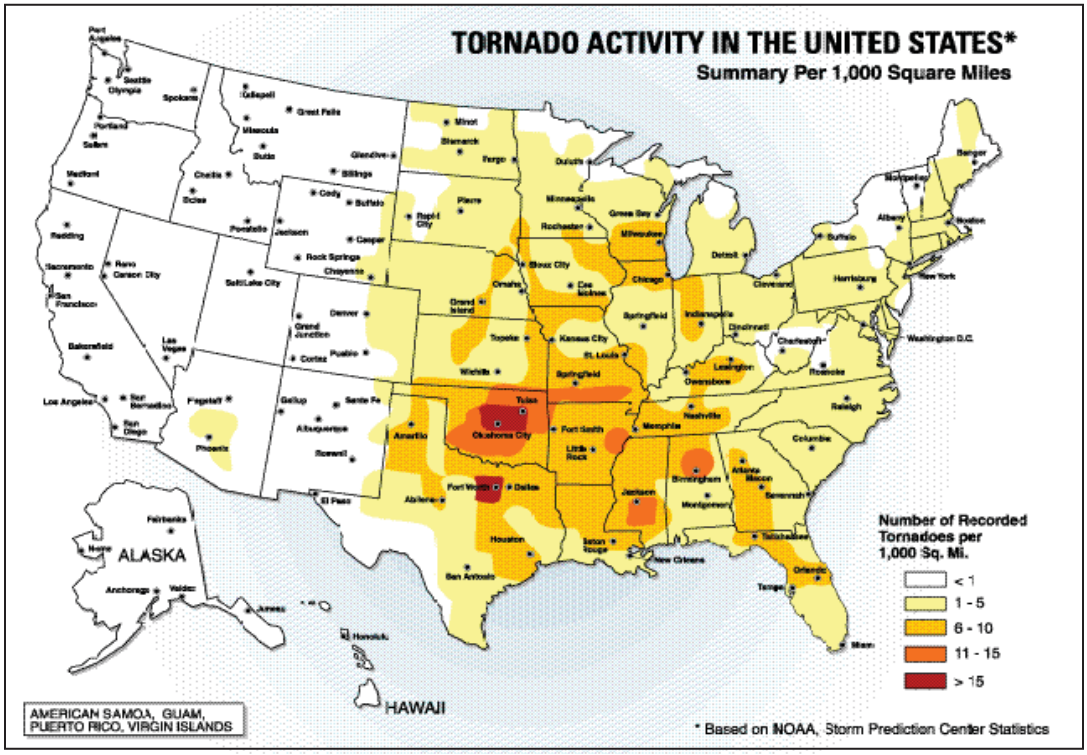
Tornadoes are most hazardous when they occur in populated areas. Tornadoes can topple mobile homes, lift cars, snap trees, and turn objects into destructive missiles. Among the most unpredictable of weather phenomena, tornadoes can occur at any time of day, almost anywhere in the country, and in any season. In Louisiana, tornadoes have a higher frequency in the spring months of March, April, and May. While the majority of tornadoes cause little or no damage, some are capable of tremendous destruction. Additionally, tornadoes are often generated from hurricanes, so the entire hurricane season has to be viewed as a risk period for this hazard. For additional information about tornadoes visit NOAA's *Severe Weather* page located at:

http://www.nws.noaa.gov/os/severeweather/

b. Location of the Tornado Hazard

Location. Figure 2.3.3-1 illustrates the frequency of tornado strikes in the U.S. per 1,000 square miles. The map indicates that NOAA has recorded 6-10 tornadoes per 1,000 square miles in the western half of Georgia, including Douglas County.

Figure 2.6
Tornado Activity in the United States
(Source: http://www.tornadochaser.net/tornalley.html)



c. Severity (or Extent) of Tornado Hazard

Tornado damage severity is measured by the Fujita Tornado Scale (F-Scale), named after Dr. T. Theodore Fujita who first introduced the scale in 1971. The Fujita Scale assigns numerical values based on wind speed and categorizes tornadoes from 0 to 5. The scale is based on damage caused by a tornado related to the fastest quarter-mile wind speed at the height of a damaged structure. The letter "F" precedes the numerical value. Tornadoes are related to larger vortex formations, and therefore often form in convective cells such as thunderstorms or in the right forward quadrant of a hurricane, far from the hurricane eye. See Table 2.18 for a description of the Fujita Tornado Measurement Scale.

Table 2.18
Fujita Tornado Measurement Scale
(Source: NOAA)

Category	Wind Speed	Examples of Possible Damage
F0	Gale (40 mph-72 mph)	Light damage. Some damage to chimneys; break branches of trees; push over shallow rooted trees; damage to sign boards.
F1	Moderate (73 mph-112 mph)	Moderate damage. Peel surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off roads.
F2	Significant (113 mph-157 mph)	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.
F3	Severe (158 mph-206 mph)	Severe damage. Roofs and some walls torn off well constructed houses; trains overturned; most trees in forest uprooted; cars lifted off ground and thrown.
F4	Devastating (207 mph-260 mph)	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
F5	Incredible (261 mph-318 mph)	Incredible damage. Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile sized missiles fly through air in excess of 100 yards; trees debarked; incredible phenomena will occur.

In February of 2007 the F-Scale was replaced with a more accurate Enhanced Fujita Scale (Enhanced F-scale). It was the Jarrell, Texas tornado of May 27, 1997 and the Oklahoma City/Moore tornado of May 3, 1999 that brought to the forefront the problem that perhaps the wind estimates were too high in the F-Scale. The changes to the original scale were proposed by a committee of meteorologist and engineers searching for a more accurate method of assessing the magnitude of tornadoes. The modifications made to the F-scale were limited to ensure that the new Enhanced F-scale could continue to support the original tornado database found within the NDCD.

The Enhanced F-scale is a set of wind estimates (not measurements) based on observed damages after a tornado. Its uses three-second gusts estimated at the point of damage based on a judgment of eight levels of damage to 28 indicators that include various commercial and residential building types, transmission towers, poles, and trees.

Similar to the original scale, the new Enhanced F-scale includes five classes ranging from EF0 to EF5.[4] The wind speeds from the Fujita Scale were used as basis for development of the Enhanced F-scale. The following Table 2.19 displays the wind speed ranges for the original Fujita Scale, the derived wind speeds (Enhanced F-scale), and the new Enhanced F-scale currently in use since February of 2007.

Table 2.19
Wind Speed Comparison of the Fujita Scale and Enhanced Fujita Scale
(Source: NOAA – National Weather Service)

Fujita Scale			Derived EF Scale		Operational EF Scale	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	**EF Number**	**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**

Georgia currently ranks twelfth for frequency of tornadoes when compared to other states.[5] Tornadoes have an impact on Douglas County equally and uniformly. The severity of the tornadoes identified in the NCDC database for Douglas County ranged from EF0 to EF2.

d. Impact on Life and Property (Vulnerability and Risks)

The NCDC database reports there have been no deaths and 21 injuries from tornadoes in Douglas County. Tornadoes have caused an estimated $37.28 million in property damage (according to NCDC database; over $57 million as per SHELDUS) . The most property damage occurred from an F2 tornado on March 29, 1991, in north Douglasville area. The tornado was 200 yards wide and was on the ground for approximately three miles. The tornado caused an estimated $25 million in damages and injured two people.[6] The NCDC database provides no additional details about the event. The most damaging event from the human loss perspective occurred on April 4, 1985, in the same general area of nort Douglasville. This F1 tornado 33 yards wide and was on the ground for two miles. It generated $2.5 million in losses, but it also injured 16 people.

People living in manufactured or mobile homes are most exposed to damage from tornadoes. Even if anchored, mobile homes do not withstand high wind speeds as well as permanent, site-built structures. Older residential structures are also more vulnerable to damages from a tornado.

All residents of Douglas County are subject to the effects of tornadoes. As noted elsewhere, potential effects include direct impacts on specific structures and (perhaps more significantly) power interruptions. There is always the risk of injury and deaths in tornadoes as well. Property losses from

[4] NOAA - Enhanced F-scale
[5] http://www.disastercenter.com/tornado/rank.htm
[6] NOAA/NCDC database

tornadoes are generally general borne by either property owners or insurance companies, so it is usually not possible to obtain any information about wind damage to structures, except publicly owned-ones.

e. Occurrences of the Tornado Hazard

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The NCDC and SHELDUS report a total of ten tornadoes in Douglas County between 1954 and 2008. There were no new tornado events since the 2010 HMP update. The databases indicate there were two F0, seven F1/EF1 and one F2 tornado. These events are listed below in Table 2.20, where the highlights indicate either the most damaging, or the most threatening tornadoes.

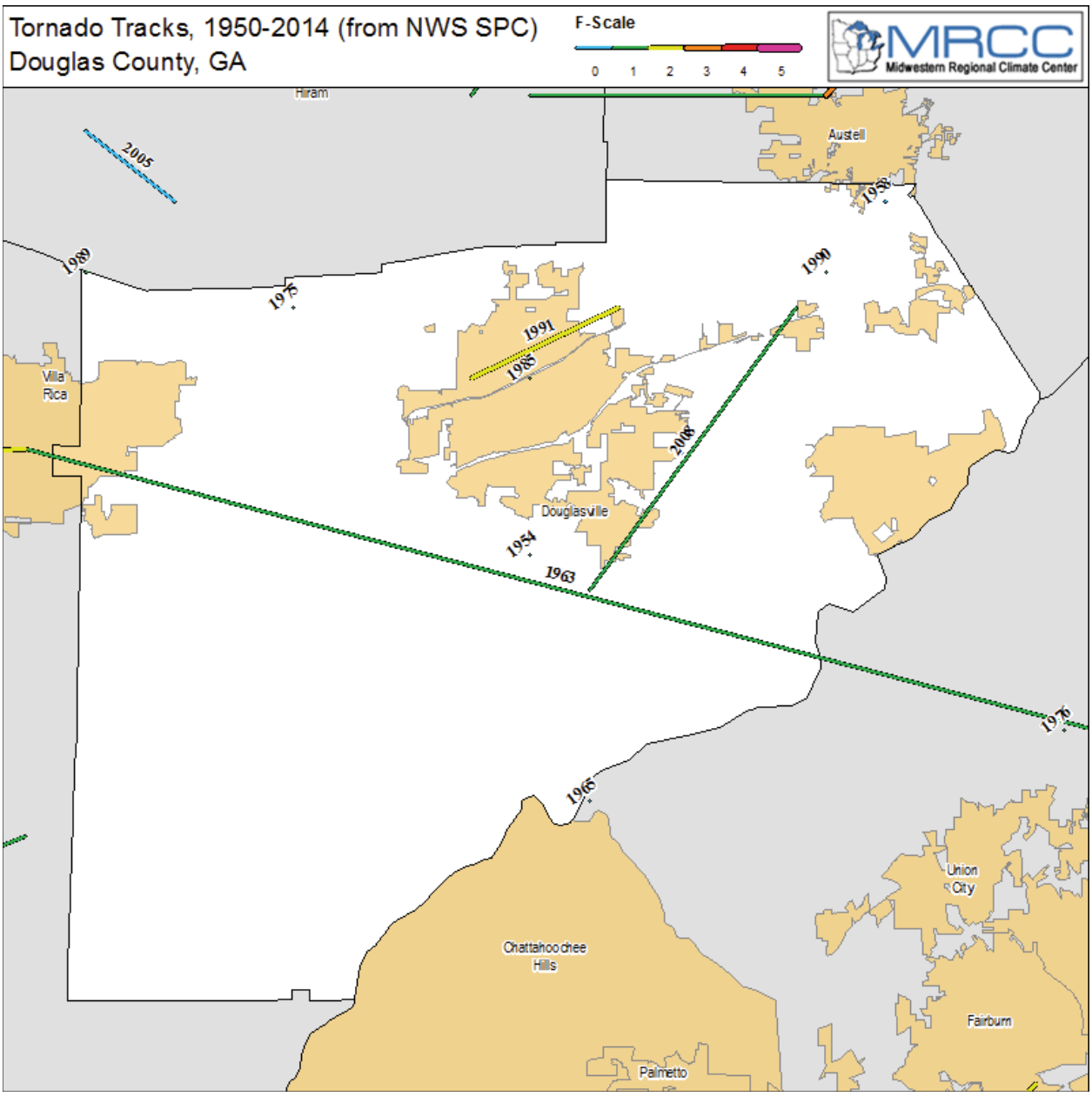
Table 2.20
Tornado Events, Douglas County, 1950–2015
(Source: NOAA/NCDC, SHELDUS)

Date	Location	Magnitude	Fatalities	Injuries	Property Damage	Source
3/7/2008	***Chapel Hill***	***EF1***	***0***	***1***	***$2,000,000***	***NCDC***
3/29/1991	***North Douglasville***	***F2***	***0***	***2***	***$25,000,000***	***NCDC***
2/10/1990	***Douglas County***	***F1***	***0***	***0***	***$2,500,000***	***NCDC***
8/17/1989	Douglas County	F1	0	0	$25,000	NCDC
4/5/1985	***North Douglasville***	***F1***	***0***	***16***	***$2,500,000***	***NCDC***
2/23/1975	Douglas County	F1	0	2	$250,000	NCDC
5/28/1968	Douglas County	F0	0	0	$500	SHELDUS
9/18/1965	Douglas County	F0	0	0	$0	NCDC
3/17/1963	***Douglas County***	***F1***	***0***	***0***	***$5,000***	***SHELDUS***
12/5/1954	Douglas County	F1	0	0	$2,500	NCDC
TOTALS			**0**	**21**	**$37,278,000**	

Figure 2.7 identifies paths of significant tornadoes in Douglas County between 1950 and 2014. The visual tornado data is from the National Weather Service's Storm Prediction Center, and appears to only include some of the past events. Highlighted on the map are the tornado paths/touchdown locations for events that occurred in 1963, 1985, 1991, and 2008, with some other event locations as well.

With a total of ten past tornado events between 1950 and 2014 (1954 and 2008 effectively), the County experiences a tornado event on average roughly every five years. The overall impact to the planning area from tornadoes is moderate considering the frequency and magnitude of the past occurrences. With one event roughly every five years, there is a 20% annual empirical probability of a future tornado events occurring in Douglas County.

Figure 2.7
Douglas County Tornadoes, 1950-2014
(Source: NWS SPC/MRCC)



To quantify tornado risks further, the methodology used in this assessment applied Tornado Module FEMA BCAR 4.8 software and related references (FEMA BCAR Tornado Methodology, May 2009). A statistical count for Douglas County was developed for all six levels of the Enhanced Fujita (EF) scale, formulated through its annual probability of occurring. For each of the EF levels, an analysis was performed for the probability of human injury and death, and degree of damage inflicted upon a typical residential structure in Douglas County. The results are presented in Table 2.21 below:

Table 2.21
Tornado Event, Probabilities of Losses, Injuries and Deaths in Douglas County, 1950–2015
(Source: FEMA BCAR, PMC)

Tornado Class	Tornado Count [1950-2008]	Annual Probability of Occurrence	Level of Damage Caused to Single Family Residential Structure	Degree of Damage	Probability of Average Injury	Probability of Death
EF0	14.05	0.00015%	None or very minor damage	1%	0%	0%
EF1	30.00	0.00239%	Minor damage	5%	5%	0%
EF2	17.29	0.00617%	Moderate damage	20%	10%	0%
EF3	6.12	0.00961%	Severe damage/partial collapse	55%	10%	5%
EF4	1.55	0.00823%	Total collapse	90%	20%	10%
EF5	0.23	0.00187%	Complete destruction	95%	30%	50%

In quantifying tornado risks, the values for average human injury and death were assumed at the default level of $748,509 and $6,412,265, respectively. These values were adopted from FEMA guidance documentation and are derived from FAA and insurance studies. The value for the average residential structure is at $50/sqft, at the average size of 2,000 sqft (based on average value of newly permitted single-family housing in 2008-2009)[7].
Tornado risk was calculated by applying composite annualized number of injuries and deaths to the 2010 population of the county (132,403). Similarly, the annualized direct structural losses (where the representative structure is a 2,000 sqft single-family residence) were applied to the total number of structures in the County (35,518). Same methodology was applied for the City of Douglasville and the rest of the Douglas County.

The analysis showed that the annual count for average injury at the county level is at 5.17 and for the death almost 3 (2.965). While these numbers may seem high on a annualized level, we should remember that the 1985 tornado alone caused 16 injuries. Depending on the zone of impact and its population density, the above annualized counts may be realistic. That may become increasingly important, given the rising Douglas County population and ever increasing population density.

In monetary terms, tables 2.22, 2.23, and 2.24 present the risk for direct losses, injuries, and death in annualized terms, as well as long-term projections for the 50-year, and 100-year planning horizons.

f. Land Use and Development Trends related to Tornadoes.

In Douglas County there is specific effort to minimize the impacts of tornadoes, including the initiative to build tornado shelters, expand tornado warning system and harden the structures to minimize the wind-induced damages. Figure **2.1** identifies the wind zones in the United States. The wind zone map shows how the frequency and strength of extreme windstorms vary across the United States, based on 40 years of tornado history. Douglas County is located in Wind Zone III, where winds can reach up to 200 mph, but is also very close to Wind Zone IV, with maximum winds at 250 mph. All efforts are made to regulate new construction to minimize the effects of such winds, including the anchoring of the existing mobile housing.

[7] http://www.city-data.com/county/Douglas_County-GA.html

Table 2.22
Tornado Hazard – Direct Loss Risks for the City of Douglasville and Douglas County Annualized and for 50-year and 100-year Planning Horizons
(Source: HAZUS-MH, PMC)

Jurisdiction Affected	Annualized Losses	50-year Risk	100-year Risk
City of Douglasville	$212,693	$2,935,170	$3,035,136
Douglas County	$349,351	$4,821,050	$4,985,246
TOTALS	**$562,045**	**$7,756,220**	**$8,020,381**

Table 2.23
Tornado Hazard – Injury Risks for the City of Douglasville and Douglas County Annualized and for 50-year and 100-year Planning Horizons
(Source: HAZUS-MH, PMC)

Jurisdiction Affected	Annualized Count	Annualized Losses	50-year Risk	100-year Risk
City of Douglasville	1.209	$904,839	$12,486,776	$12,912,051
Douglas County	3.961	$2,964,654	$40,912,231	$42,305,618
TOTALS	**5.170**	**$3,869,493**	**$53,399,007**	**$55,217,669**

Table 2.24
Tornado Hazard –Death Risks for the City of Douglasville and Douglas County Annualized and for 50- year and 100-year Planning Horizons
(Source: HAZUS-MH, PMC)

Jurisdiction Affected	Annualized Count	Annualized Losses	50-year Risk	100-year Risk
City of Douglasville	0.693	$4,445,251	$61,344,465	$63,433,733
Douglas County	2.271	$14,564,619	$200,991,738	$207,837,108
TOTALS	**2.965**	**$19,009,870**	**$262,336,202**	**$271,270,841**

2.3.4 Severe Winter Weather

a. Severe Winter Weather Profile

The science of meteorology and records of severe weather are not quite sophisticated enough to identify what areas of the county are at greater risk for damages. Therefore, all areas of the county are assumed to have the same winter weather risk countywide.

Severe winter weather can result in the closing of primary and secondary roads, particularly in rural locations, loss of utility services, and depletion of oil heating supplies. Environmental impacts often include damage to shrubbery and trees due to heavy snow loading, ice build-up, and/or high winds which can break limbs or even bring down large trees. Gradual melting of snow and ice provides excellent groundwater recharge; however, high temperatures following a heavy snowfall can cause rapid surface water runoff and severe flash flooding.

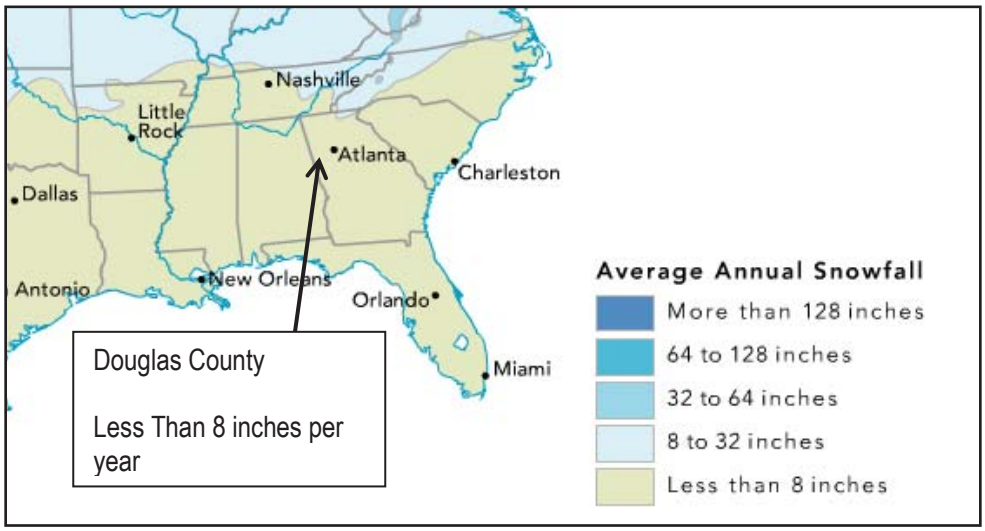
The State of Georgia does have an extensive history of severe winter weather. In the winter of 2000, the state was hit by a series of protracted winter storms. The severity and nature of these storms combined with colder temperatures mixing with mid-tropospheric moisture posed a major threat to the lives, safety and well-being of Georgia residents as freezing rain and snow gradually fell over much of northern Georgia. As many as 500,000 customers lost power in northern Georgia and several injuries and automobile accidents were reported. The governor of Georgia declared a state of emergency for 39 counties and a federal disaster declaration covered 34 Georgia counties, including Douglas. The Georgia Emergency Management Agency estimated 48 million dollars in damage and the devastation from the storm was compared to Hurricane Opal in 1995 and the blizzard of 1993.

More specifically, winter weather is a common occurrence in Georgia throughout the winter, and early spring months. According to the National Climatic Data Center, there have been 18 winter events in Northeast Georgia since 1950. storms bring various forms of precipitation that occur only at cold temperatures. These include snow, sleet, or a rainstorm where ground temperatures are cold enough to allow icy conditions. These cold weather storms can also take the form of freezing rain or a wintry mix. A winter storm is defined as “the occurrence of hazardous winter weather due to a variety of elements, occurring either independently or in combination, including freezing rain, sleet, snow, ice and windy conditions that may contribute to low wind chill temperatures.” Accumulations of sleet, snow and/or ice may render roads impassable and trigger utility outages.

Most winter storms last less than a week, but can be much longer in some cases, although this is very rare in the southern U.S. An extreme cold event with temperatures in the single digits and wind chills below zero is possible in Douglas County, but not likely. Damages from extreme cold temperatures are generally minimal with effects mainly limited to humans, although occasionally there may be relatively minor effects on infrastructure such as freezing pipes or electrical grids. Normally, the mercury falls below freezing about 10 to 15 times each winter, but rarely are readings lower than 25 degrees experienced. Heavy snowfall and extreme cold can immobilize an entire region. Even areas that normally experience mild winters can be hit with a major snowstorm or extreme cold. Winter storms can result in flooding, storm surge, closed highways, blocked roads, downed power lines and hypothermia.

Location. The potential for winter storms is uniform for the entire planning area. All people and assets are considered to have the same degree of exposure. Figure 2.8 shows the average annual snowfall totals for the southeastern United States. The map shows that the State of Georgia, and Douglas County, receives less than eight inches of snow per year.

Figure 2.8
Southeastern United States Average Annual Snowfall Map



Impact on Life and Property. Although severe winter storms occur relatively infrequently, they have the potential to wreak havoc on the community when they do strike. Winter weather affects the planning area nearly every year although there is a low probability of severe winter storms of such magnitude and severity that widespread property damage and power outages occurs. Winter storms within Douglas County typically cause damage to power lines, trees, buildings, structures, and bridges, to varying degrees. Due to the County's high elevation, many highways have steep grades, resulting in very hazardous travel conditions when they are covered with frozen precipitation. Another hazard exists due to the large tree population. Trees and branches weighed down by snow and ice become very dangerous to person and property.

Occurrences of the Hazard. Albeit in the South, the State of Georgia (and specifically its northern part) is often exposed to winter weather. Most recently, February 2014 brought severe winter weather with freezing temperatures covering the entire north half of the State. The four day (2/10-2/14) brought metro Atlanta traffic to a standstill ,and resulted in Federal Emergency Declaration FEMA-3368-EM. Additionally, in winter of 2000, Georgia was hit by a series of protracted winter storms, bringing freezing rain and snow over much of northern Georgia. As many as 500,000 customers lost power in northern Georgia and several injuries and automobile accidents were reported. The governor of Georgia declared a state of emergency for 39 counties and a federal disaster declaration (FEMA-1311-DR) covered 34 Georgia counties, including Douglas. The Georgia Emergency Management Agency estimated 48 million dollars in damage and the devastation from the storm was compared to Hurricane Opal in 1995 (non-winter event) and the blizzard of 1993 (emergency declared as FEMA-3097-EM).

Table 2.25 lists NCDC entries for severe winter weather in Douglas County. Property damage information was not available at the time. Table 2.26 also lists a summary of severe winter weather events in Douglas County from 1996 to 2014. The database does not list some other events, most notably the 1993 blizzard.

Table 2.25
Douglas County Severe Winter Weather Events, 2010- 2014
(Source: NCDC)

Date	Event Type	Fatalities	Injuries	Property Damage
2/11/2014	Winter Storm	0	0	$0
1/28/2014	Winter Storm	0	0	$0
2/9/2011	Winter Weather	0	0	$0
2/3/2011	Winter Weather	0	0	$0
1/9/2011	Heavy Snow	0	0	$0
12/25/2010	Heavy Snow	0	0	$0
*3/2/2010**	*Winter Weather*	*0*	*0*	*$0*
2/12/2010	Heavy Snow	0	0	$0
1/7/2010	Winter Weather	0	0	$0
TOTALS		**0**	**0**	**$0**

Note: (*) indicates the last entry in 2010 Douglas County Hazard Mitigation Plan

Table 2.26
Douglas County Severe Winter Weather Events, 1996- 2014
(Source: NCDC)

Winter Weather Event Type	Injuries	Fatalities	Property Damage	Number of Events
Cold/Wind Chill	0	0	$0	3
Dense Fog	0	0	$0	2
Extreme Cold/Wind Chill	0	0	$0	10
Freezing Fog	0	0	$0	1
Frost/Freeze	0	0	$0	1
Heavy Snow	0	0	$5,000	5
Ice Storm	0	0	$1,012,790	3
Winter Storm	0	0	$50,000	6
Winter Weather	0	0	$0	12
Grand Total	**0**	**0**	**$1,067,790**	**43**

Based solely on data presented in Table 2.26, during the last 20 years, there have been 43 documented severe winter events (of various magnitudes). It is important to point out that some of the type of event are not mutually exclusive and can accompany each other during the same time period. Based on the entire fifty-year period, severe winter weather is likely to occur in the planning area approximately once a year – about 100% annual probability based on the historical record.

As an additional factor in estimating losses from the severe winter weather, an inquiry was made with Georgia Department of Transportation on traffic accidents related to winter weather. During the period January 2005 to January 2014 (20 years), there were 470 traffic accidents during winter months, caused by ice, slush, or snow. There were 166 reported injuries, which brings it to approximately 8.3 injuries on an annual level. With the average valuation of bodily injury at $748,509, this amounts to $6,212,625 in annual losses on winter weather-related traffic accidents. In long-term, these losses add up to $86 million, and $89 million for the 50-year and the 100-year planning horizon respectively. These numbers are presented in Table 2.27 below:

Table 2.27
Severe Winter Weather Hazard – Traffic Accidents Injury Risks for Douglas County
For the period 2005-2014
Annualized and for 50-year and 100-year Planning Horizons
(Source: GDOT, PMC)

Number of Traffic Accidents	Number of Injuries	Annualized Count	Annualized Losses	50-year Risk	100-year Risk
470	166	8.30	$6,212,625	$85,734,221	$88,654,154

b. Inventory of Assets Exposed to Severe Winter Storms

In evaluating assets that may potentially be impacted by the effects of severe winter weather, all critical facilities, public and private property, are susceptible to it. According to HAZUS database, Douglas County had 22,077 structures, all of which are exposed to the severe winter weather hazard. Additional 13,441 structures are located in the City of Douglasville, all of which are also exposed to the severe winter weather hazard. All 65 critical facilities (including 23 in Douglasville) are susceptible to the hazard.

c. Estimate of Potential Losses from Severe Winter Weather

Severe winter storms, especially those with heavy icing, generate a lot of downed trees and limbs, requiring cleanup of the resulting debris. The costs of managing debris are not included in regular budgets. When events prompt debris cleanup, staff from the Public Services and Recreation & Parks departments are diverted from other work, often causing delays in scheduled projects.

In recent years, events with large quantities of debris may prompt communities to waive landfill fees, thus reducing potential income. Icing of roads and bridges affects traffic, but is not considered a major factor in physical damage to roads. A growing problem associated with periods of freezing weather is road icing due to automatic outdoor sprinkler systems and building damage from frozen interior sprinkler systems.

d. Land Use and Development Trends related to Severe Winter Storm

Douglas County currently has no land use or development trends related to winter storms. All new buildings must be designed and constructed to meet current building code requirements, including snow loads in Douglas County and City of Douglasville. The effects of winter storms are not influenced by land use and development trends.

e. Multi-jurisdictional Hazards

Any portion of Douglas County, including the City of Douglasville, can be negatively impacted by winter storms. Consequently, any mitigation actions related to winter storms should be pursued on a countywide basis and include the City of Douglasville.

f. General Summary of Severe Winter Storms and their Effects on the Planning Area

Winter storms, unlike other natural hazards, typically provide communities some advance warning. The National Weather Service issues winter storm warnings and advisories as these storms approach. Unfortunately, even with advance warning, some of the most destructive winter storms have occurred in the Southern United States, where buildings, infrastructure, crops, and livestock are not well-equipped for severe winter conditions. Motorists, not accustomed to driving in snow and icy conditions, pose an additional danger on roads and highways. The 2015 Douglas County HMPC recognized the potential threats of winter storms and identified specific mitigation actions. These can be found in Chapter 3, Section 3.3.4.

2.3.5 Drought

a. Drought Profile

Background. The definition of drought is a prolonged period of moisture deficiency. Drought is a normal, recurrent feature of climate. It occurs almost everywhere, although its features vary from region to region. These conditions originate from a deficiency of precipitation over an extended period of time, resulting in a water shortage. Drought conditions affect the development of crops and livestock as well as a water availability and water quality. Drought is also a key factor in wildfire development by making natural fuels (grass, brush, trees, dead vegetation) more prone to fires**.**

Drought is a deficiency of moisture that results in adverse impacts on people, animals, or vegetation over a sizeable area. Severe drought conditions can profoundly impact agriculture, water resources, tourism, ecosystems, and human welfare. According to NOAA, the economic impact of drought in the United States has been estimated to be $6-8 billion annually (FEMA, 1995). Drought may become a more common issue in the future, as suggested by NOAA climate data, showing increased warm U.S. and global temperatures since the mid-1990s. Climate models have also suggested that the likelihood of heat waves could increase in intensity and frequency over several decades, strengthening the environmental conditions for drought and wild fire events, (NOAA, National Oceanic and Atmospheric Administration, 2011).

Drought Identity
Drought is a complex physical and social process of widespread significance, although rarely does a single period of drought affect an entire state. The most commonly used definitions of drought are based on meteorological, agricultural, hydrological and socioeconomic effects:

Meteorological drought is defined by a period of substantially diminished precipitation duration and/or intensity. This definition is usually expressed as an interval of time, generally on the order of months or years, during which the actual moisture supply at a given place consistently falls below the climatically appropriate (or normal) moisture supply.

Agricultural drought occurs when there is inadequate soil moisture to meet the needs of a particular crop at a particular time. Agricultural drought usually occurs after or during meteorological drought, but before hydrological drought, and can also affect livestock and other dry-land agricultural operations.

Hydrological drought refers to deficiencies in surface and subsurface water supplies. It is measured in terms of stream flow and as lake, reservoir and groundwater levels. There is usually a delay between lack of rain and resultant reduction in measurable water in streams, lakes and reservoirs. Therefore, hydrological measurements tend to lag other drought indicators.

Socio-economic drought occurs when physical water shortages start to affect the health, well-being, and quality of life of residents, or when restricted water supplies affect the supply and demand of an economic product.

The Standardized Precipitation Index (SPI) is a drought index based on the probability of an observed precipitation deficit occurring over a given prior time period. The assessment periods considered range from 1 to 36 months. The variable time scale allows the SPI to describe drought conditions important for a range of meteorological, agricultural, and hydrological applications. For example, soil moisture conditions respond to precipitation deficits occurring on a relatively short time scale, whereas groundwater, streamflow, and reservoir storage respond to precipitation deficits arising over many months.

The Palmer Drought Severity Index (PDSI) was developed by Wayne Palmer in the 1960s and uses temperature and rainfall information in a formula to determine dryness. It has become the semi-official drought index. The Palmer Index is most effective in determining long term drought—a matter of several months—and is not as good with short-term forecasts (a matter of weeks). It uses a 0 as normal, and drought is shown in terms of negative numbers; for example, -2 is moderate drought, -3 is severe drought, and -4 is extreme drought. Anything below minus 5 is considered an exceptional drought, as presented in Table 2.28.

Table 2.28
Drought Severity Classification
(Source: National Drought Mitigation Center, Drought Monitor)

NDMC Category	Description	Possible Impacts	Ranges	
			Standardized Precipitation Index (SPI)	Palmer Drought Severity Index (PDSI)
D0	Abnormally Dry	Going into drought: • Short-term dryness slowing planting, growth of crops or pastures Coming out of drought: • Some lingering water deficits • Pastures or crops not fully recovered	-0.5 to -0.7	-1.0 to -1.9
D1	Moderate Drought	• Some damage to crops, pastures • Streams, reservoirs, or wells low, some water shortages developing or imminent • Voluntary water-use restrictions requested	-0.8 to -1.2	-2.0 to -2.9
D2	Severe Drought	• Crop or pasture losses likely • Water shortages common • Water restrictions imposed	-1.3 to -1.5	-3.0 to -3.9
D3	Extreme Drought	• Major crop/pasture losses • Widespread water shortages or restrictions	-1.6 to -1.9	-4.0 to -4.9
D4	Exceptional Drought	• Exceptional and widespread crop/pasture losses • Shortages of water in reservoirs, streams, and wells creating water emergencies	-2.0 or less	-5.0 or less

It should be noted that drought and extreme heat are two different hazards that have several overlapping characteristics. One of the more important distinctions between these hazards is that extreme heat is associated with very high temperatures for extended periods of time, while drought results from below normal rainfall.

Location. Any or all residents may be affected within a drought-afflicted area, as well as any residents beyond the immediate area who are dependent upon water resources from a drought-afflicted area. The drought hazard is equally distributed across the planning area.

Impact on Life and Property. No significant damage to facilities is anticipated as a result of drought conditions, aside from the threat of wildfire. Crop damage cannot be accurately quantified due to several unknown variables: duration of the drought, temperatures during the drought, severity of the drought, rainfall requirements for specific crops and livestock, and the different growing seasons. There may also be financial losses related to water system shortages and emergency efforts required to supply residents with fresh drinking water.

Unlike other hazard events, drought causes damage slowly. A sustained drought can cause severe economic stress to the agricultural interests of the County and even the entire State or Region. The potential negative effects of sustained drought are numerous. In addition to an increase threat of wildfires, drought can affect water supplies, stream-water quality, water recreation facilities, hydropower generation, as well as agricultural and forest resources.

Occurrences of the Hazard. According to the National Climatic Data Center, north-central Georgia, including Douglas County has experienced drought conditions in 1997, 1999, 2000, 2002, 2007, 2008, 2011, and 2012. One of the most severe droughts in Douglas County occurred in 2007. In September 2007, the director of the Georgia Environmental Protection Division (EPD) declared a level four drought response across the northern third of Georgia, to include Douglas County, which prohibits most types of outdoor residential water use. “The drought of 2007 has reached historic proportions, so it’s critical that we take immediate action to ensure that Georgians have a sufficient supply of safe drinking water,” said EPD Director Carol A. Couch. “All of the counties included in the level four declaration are located in areas of either exceptional or extreme drought.”

Based on historical records, drought created no significant property damage loss since 1950, however, significant damages to agriculture has occurred. The most notable event occurred in 2000 when extremely dry conditions pushed into the month of June. These same dry conditions had persisted for most of the prior 2 years resulting in significant cotton crop losses throughout the northern portion of Georgia. Summarized in Table 2.29 are drought events that have occurred since 1950 in Douglas County.

Most of Georgia also experienced a significant drought between April and September 2011. By the end of August, 91 counties in central and southern Georgia were classified in a severe to extreme drought situation. In Douglas County there were no injuries or deaths related to the drought. Central Georgia, including Douglas County, again experienced a significant drought in 2012. In September of 2012, Douglas County was classified as being between an extreme drought (D3) and an exceptional drought (D4). Since April of 2013, Douglas County has been experiencing no drought conditions (except for the second half of 2014, when the conditions were abnormally dry (D0)). It is unclear if any emergency declarations were made for 2012 and 2013 droughts, as well as what the recorded damages were.

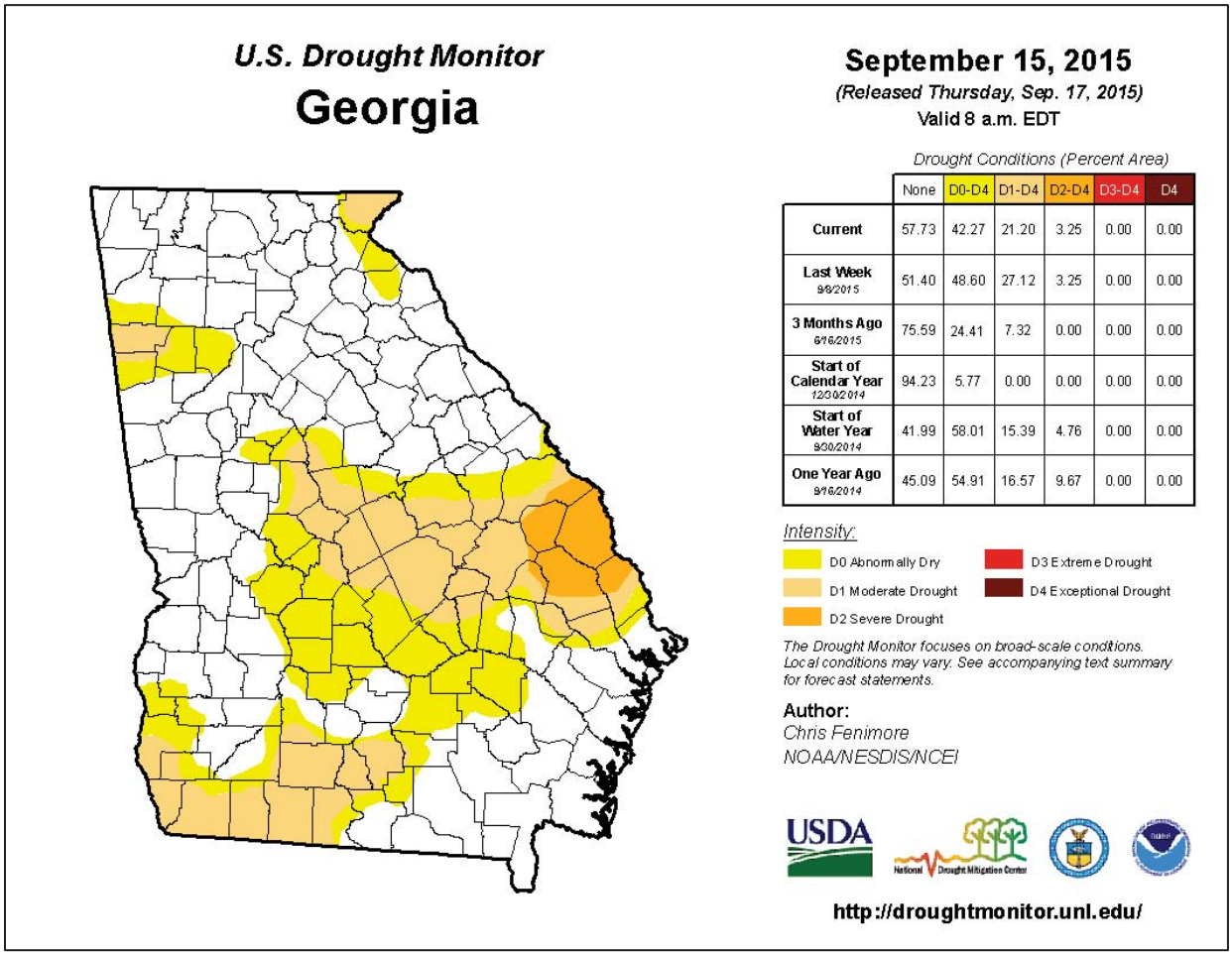
Table 2.29
Drought Events, Douglas County, 1950–2015
(Source: NOAA/NCDC)

Date	Event Type	Fatalities	Injuries	Property Damage	Crops Damage
2013	Drought	Unknown	Unknown	Unknown	Unknown
2012	Drought	Unknown	Unknown	Unknown	Unknown
9/1/2011	Drought	0	0	0	0
12/1/2007	Drought	0	0	0	0
11/1/2007	Drought	0	0	0	0
10/1/2007	Drought	0	0	0	0
9/1/2007	Drought	0	0	0	0
5/1/2007	Drought	0	0	0	0
3/1/2004	Drought	0	0	0	0
1/1/2003	Drought	0	0	0	0
8/1/2002	Drought	0	0	0	0
4/1/2002	Drought	0	0	0	0
12/1/2001	Drought	0	0	0	0
11/1/2001	Drought	0	0	0	0
10/1/2001	Drought	0	0	0	0
10/1/2000	Drought	0	0	0	0
7/1/2000	Drought	0	0	0	0
6/1/2000	Drought	0	0	0	$466,030
5/1/2000	Drought	0	0	0	0
4/1/2000	Drought	0	0	0	0
2/1/2000	Drought	0	0	0	0
8/1/1999	Drought	0	0	0	0
5/1/1999	Drought	0	0	0	0
9/1/1997	Drought	0	0	0	0
TOTALS		**7**	**0**		**$466,030**

With a total of 24 drought events between 1997 and 2013, Douglas County experiences a drought on average approximately once every year. Based on this information it is possible to infer an approximate 100% annual probability of occurrence County-wide.

Figure 2.9 illustrates drought conditions in Georgia in September of 2015, indicating Douglas County as not being affected by drought.

Figure 2.9
Georgia Drought Conditions, September 2015
(Source: Western Regional Climate Center, Drought Monitor)



	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	57.73	42.27	21.20	3.25	0.00	0.00
Last Week 9/8/2015	51.40	48.60	27.12	3.25	0.00	0.00
3 Months Ago 6/16/2015	75.59	24.41	7.32	0.00	0.00	0.00
Start of Calendar Year 12/30/2014	94.23	5.77	0.00	0.00	0.00	0.00
Start of Water Year 9/30/2014	41.99	58.01	15.39	4.76	0.00	0.00
One Year Ago 9/16/2014	45.09	54.91	16.57	9.67	0.00	0.00

b. Inventory of Assets Exposed to Drought. The entire planning area is equally exposed to the drought hazard. Drought conditions typically pose little threat to structures. With the occasional exception of impacts such as rail line or road buckling, damage to buildings and other infrastructure is typically not associated with droughts. However, wildfires can occur as a result of prolonged drought and the risk from wildfires can present a significant threat to a majority of public and private property within the County, including critical facilities. In addition, water resources may become scarce during periods of drought. Any or all residents may be affected within a drought-afflicted area, as well as any residents beyond the immediate area who are dependent upon water resources from a drought-afflicted area.

According to HAZUS database, there are approximately 35,518 structures in Douglas County, all of which are exposed to the drought hazard. This number includes 13,441 structures that are located in the City of Douglasville. All structures in Douglasville are also exposed to the drought hazard. All 65 listed critical facilities in Douglas County (including 23 in Douglasville) are exposed to drought hazard, albeit this exposure is limited.

c. Estimate of Potential Losses from Drought. The Douglas County EMA reported during prolonged dry periods water resources to fight fires are insufficient. Prolonged drought conditions can increase the risk of wildfires.

d. Land Use and Development Trends related to Drought. Douglas County has a growing population with an increasing need for additional water resources. This phenomenon may make drought more of a concern in years to come. Metropolitan North Georgia Water Planning District (MNGWPD) has addressed the issue of water shortage in Metro Atlanta area, frequently exacerbated by the drought conditions. On May 7, 2009, MNGWPD adopted the updated Water Supply and Water Conservation Management Plan. This Plan defines a framework for water supply facilities and strategies for resource management for all 15 participating counties, including Douglas County as well.

e. Multi-jurisdictional Hazards. In addition to wildfires**,** agricultural losses associated with drought are more likely to occur in the rural, less populated areas of the County. This would mainly consist of unincorporated areas outside of the City of Douglasville. Although the City may be somewhat less likely to experience drought-related agricultural losses, all portions of the County and City can be impacted by water system supply shortages due to drought.

f. General Summary of Drought and its Effects on the Planning Area. Unlike other hazard events, drought causes damage slowly. A sustained drought can cause severe economic stress to the agricultural interests of the County and even the entire State or Region. The potential negative effects of sustained drought are numerous. In addition to an increased threat of wildfires, drought can affect water supplies, stream-water quality, water recreation facilities, hydropower generation, as well as agricultural and forest resources.

2.3.6 Wildfire

a. Wildfire Profile

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

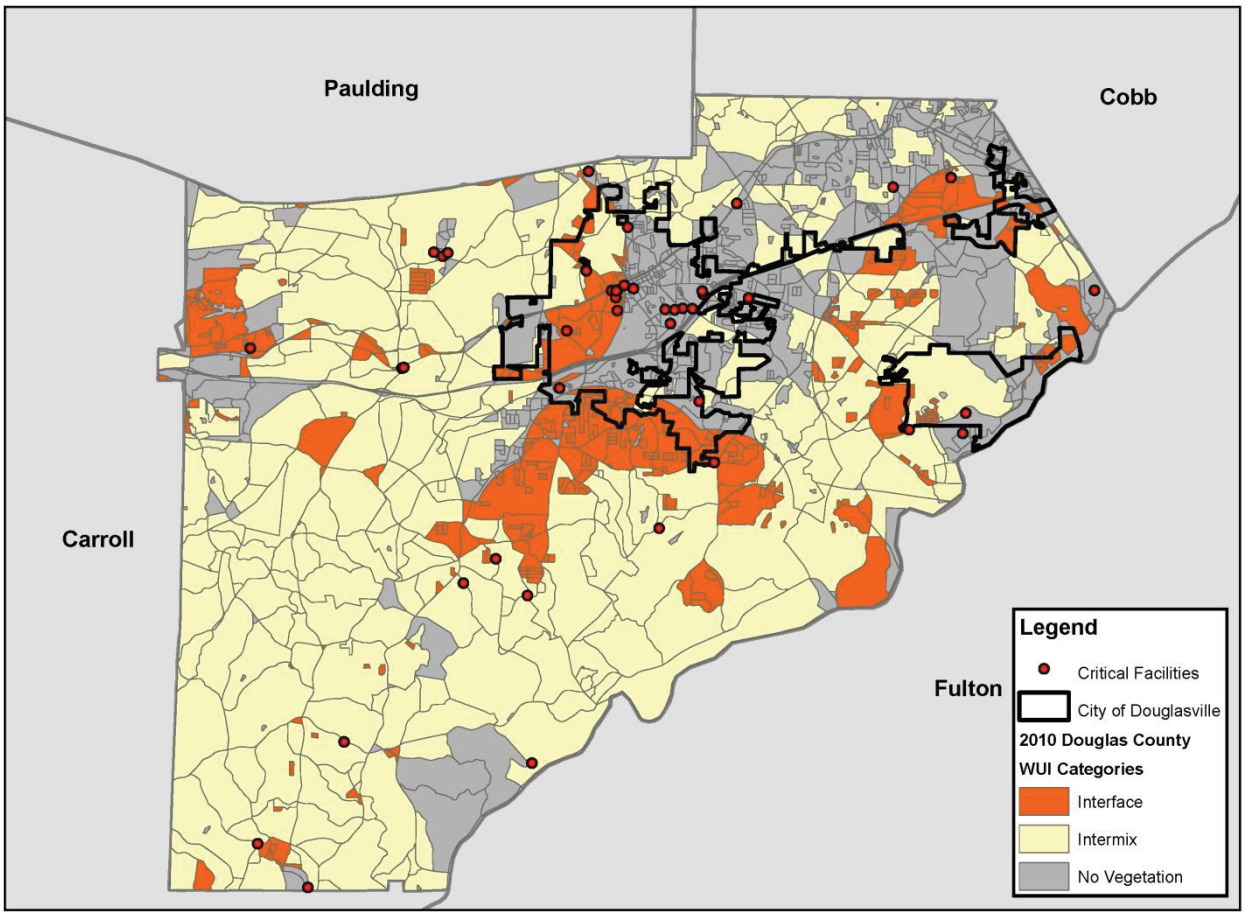
Three classes of fires are presented: understory fires, crown fires, and ground fires. Naturally-induced wildfires burn at relatively low intensities, consuming grasses, woody shrubs, and dead trees. These understory fires often play an important role in plant reproduction and wildlife habitat renewal and self-extinguish by low fuel loads or precipitation. Crown fires, which consist of fires consuming whole living tress, are low probability but high consequence type events. Crown fires typically match perceptions of wildfires. In areas with high concentrations of organic materials in the soil, ground fires may burn, sometimes persisting undetected for long periods until the surface is ignited.

Location. The State of Georgia face the possibility of major fire occurrences each year. The wildfires that cause the greatest impact to loss of life and property are those located in the Wildland-Urban Interface. There are many definitions of the Wildland-Urban Interface (WUI), however from a fire management perspective it is commonly defined as an area where structures and other human development meet or intermingles with undeveloped wildland or vegetative fuels. Wildfires are dependent on a certain set of conditions which includes type of vegetation, building construction, accessibility, lot size, topography and other factors such as weather and humidity. When these conditions are present in certain combinations, they make some communities more vulnerable to wildfire damage than others.
This “set of conditions” method is perhaps the best way to define wildland-urban interface areas when planning for wildfire prevention, mitigation, and protection activities. There are three major categories of WUI: Boundary, Intermix and Island. Depending on the set of conditions present, any of these areas may be at risk from wildfire.
1. **“Boundary”** wildland-urban interface is characterized by areas of development where homes, especially new subdivisions, press against public and private wildlands, such as private or commercial forest land or public forests or parks. This is the classic type of wildland-urban interface, with a clearly defined boundary between the suburban fringe and the rural countryside. Due to the higher concentration of development that abuts the wildland areas, Boundary or Interface as it commonly called presents the highest level of risk of the three categories.
2. **“Intermix”** wildland-urban interface areas are places where improved property and/or structures are scattered and interspersed in wildland areas. These may be isolated rural homes or an area that is just beginning to go through the transition from rural to urban land use.
3. **“Island”** wildland-urban interface, also called occluded interface, are areas of wildland within predominately urban or suburban areas. As cities or subdivisions grow, islands of undeveloped land may

remain, creating remnant forests. Sometimes these remnants exist as parks, or as land that cannot be developed due to site limitations, such as wetlands.

Figure 2.10 identifies the wildfire hazard areas in Douglas County. The map is color coded and identifies major WUI categories. The map shows the greatest wildfire threat in the county in the orange areas of central Douglas County, on the fringes of City of Douglasville. Smaller interface areas are also distributed in the northeast and northwest of the County, along the periphery of the communities of Austell and Villa Rica. The actual urban areas are mostly without vegetation and are marked in grey, being of very low risk to wildfires. The rest of the county is marked as intermix area (marked in pale yellow), indicating low wildfire risk.

Figure 2.10
Douglas County Wildfire Urban Interface Map
(Source: SILVIS Lab, Douglas County GIS, PMC)



Impact on Life and Property. Review of the NCDC database indicates that since 1950, there was only one significant fire in the County, on 03/09/2004, in the South Villages and Carrington subdivisions in Villa Rica. According to Douglas County Fire Department, since January 6, 2010, there were 22 wildfires in the County, of which 18 were classified as “forest, woods, or wildland fire” and four as “brush or brush and grass mixture fire”. There were no reported injuries or deaths from wildfire in the planning area. See Appendix A for Douglas County Fire Department records of past wildfire events. Appendix C contains Douglas County Fire Plan, which provides additional information related to extend of wildfires in the county and firefighting organizational structure. The Douglas County Community Wildfire Protection Plan (CWPP) is presently being prepared.

Occurrences of the Hazard. Based on the period 01/2010-03/2015 and 22 reported events, it is likely that a significant wildfire event will occur approximately four times per year in Douglas County, or every three months. However, it should be noted that there are probably many more wildfires that are relatively minor and are extinguished quickly or otherwise burn themselves out.

b. **Inventory of Assets Exposed to Wildfire**

According to HAZUS database, Douglas County had 35,518 structures, of which 13,441 in the City of Douglasville. The exact methodology of estimating number of structures within the wildfire hazard area will be determined at the later time. As of now, there are 65 critical facilities located within Douglas County, of which 23 within the City of Douglasville. Figure 2.10 depicts all 65 critical facilities with respect to location of wildfire hazard zones in the County.

c. Estimate of Potential Losses from Wildfire

A significant growth of Douglas County population from 2000 to 2014 (92,174 to 138,776, as per US Census) increases risk to human lives, given that most of urban growth is taking place in the interface area. There is also the probability of population displacement during a wildfire event, and especially in the urban wildland interface areas.

At this time, there is very limited information on damage for wildfires. The only information available is from NCDC database, where the 2004 fire caused $1 million in damage. The existing list of critical facilities does not contain replacement values for all facilities and it is unclear as to what their vulnerability to wildfire is. Total exposure of all structures in Douglas County to wildfire is $11.55 billion, including $4.94 billion in the City of Douglasville.

d. **Land Use and Development Trends related to Wildfire**

The 2008 report, *Fire in the South, the Southern Wildfire Risk Assessment,* prepared by the Southern Group of State Foresters indicated that the southern United States consistently has the highest number of wildfires per year. Population growth is pushing housing developments further into natural and forested areas where most of these wildfires occur.

This is also occurring in Douglas County, which has experienced significant population growth over the past fifteen years as people move out of Atlanta and into the suburbs. This population restructuring has resulted in rapid development in the rural areas with attractive recreational and aesthetic amenities and increased green space, such as Douglas County. This demographic change is increasing the size of the wildland-urban interface (WUI). The expansion of the WUI in recent years (especially the last decade) has significant implications for wildfire management and impact for Douglas County. The WUI creates an environment in which fire can move readily between structural and vegetation fuels. Its expansion has increased the likelihood that wildfires will threaten structures and people.

e. **Multi-jurisdictional Hazards**

As unincorporated Douglas County continues to grow, according to the Douglas County Comprehensive Plan, by 2025 the residential areas of unincorporated Douglas County will be completely built out, therefore increasing the risk of building and infrastructure exposure to wildfire. The City of Douglasville is also expected to grow significantly thereby also increasing the risk of both people and property to wildfire.

f. General Summary of Wildfires and their Effects on the Planning Area

Wildfires pose a serious threat to Douglas County in terms of property damage, as well as injuries and loss of life. Wildfires are one of the most frequently occurring natural hazards within the County each year. Based on the frequency of this hazard, as well as the ability of wildfires to cause damages most anywhere in the County, the mitigation measures identified in this Plan update should be continued. Specific mitigation actions related to wildfire are identified in Chapter 3, Section 3.3.6.

2.4 Technological Hazard Risk and Vulnerability Assessment

2.4.1 Hazardous Materials

a. Hazardous Materials Profile

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

A hazmat spill or release occurs when hazardous material or waste gets into the environment in an uncontrolled fashion. Many manufacturing processes use hazardous materials or generate hazardous waste, but a hazardous spill doesn't always come from a chemical plant or a factory. Any substance in the wrong place at the wrong time in too large an amount can cause harm to the environment. The response to a spill depends on the situation. When the emergency response team is notified of a spill, it must quickly decide what sort of danger is likely. Members of the team collect appropriate clothing and equipment and travel to the scene. There they try to contain the spill, sometimes testing a sample to identify it. If necessary, they decontaminate themselves before leaving the area. Once material has been identified, other personnel arrive to remove it.

According to the Georgia Toxics Release Inventory Report (for year 2013, released March 2015), six facilities reported toxics release information to the State of Georgia's Environmental Protection Division (down from eight from the 2010 HMP update). If and when a hazardous material incident occurs in Douglas County, there is a chance it will not only contaminate dirt or surface material but may also contaminate flowing water in ditches, rivers, or small streams. Other potential concerns for spills/leaks are icy road conditions during winter months, sabotage, and terrorism.
According to the inventory report, no accidents are reported to have occurred at these six facilities.

The USEPA Toxic Release Inventory program, in 2013, lists one facility that has reported toxics release information. This facility is located in Douglasville. With a hazardous material release, whether accidental or intentional, there are potentially exacerbating or mitigating circumstances that will affect its severity or impact. Mitigating conditions are precautionary measures taken in advance to reduce the impact of a release on the surrounding environment. Primary and secondary containment or shielding by sheltering-in-place protects people and property from the harmful effects of a hazardous material release. Exacerbating conditions, characteristics that can enhance or magnify the effects of a hazardous material release include:

- Weather conditions: affects how the hazard occurs and develops
- Micro-meteorological effects of buildings and terrain: alters dispersion of hazardous materials
- Non-compliance with applicable codes (e.g. building or fire codes) and maintenance failures (e.g. fire protection and containment features): can substantially increase the damage to the facility itself and to surrounding buildings

The severity of the incident is dependent not only on the circumstances described above, but also with the type of material released and the distance and related response time for emergency response

teams. The areas within closest proximity to the releases are generally at greatest risk, yet depending on the agent, a release can travel great distances or remain present in the environment for a long period of time (e.g. centuries to millennia for radioactive materials), resulting in extensive impacts on people and the environment.

Occurrences of the Hazard. As part of the 2015 Plan update, various sources were reviewed to identify information about toxic releases. Although there is no single, comprehensive source of open-source information about hazardous materials in the state, there are several specific sources that can be queried. One of the best sources for the release of hazardous materials into the environment is the Right-to-Know (RTK) network (which also acts as a switchboard for access to several other related databases.

The Right-to-Know (RTK) network contains data related to hazardous materials that has been compiled from various EPA databases. Several databases from the RTK site include the following:

- **Toxic Release Inventory (TRI).** Releases and transfers of toxic chemicals from large facilities. See Occurrences of Hazardous Material for additional details about the TRI database and releases for Douglas County.
- **Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS).** Information on potential and actual Superfund Sites.
- **Emergency Response Notification System.** Toxic chemicals and spills reported to the National Response Center.
- **Facility Registry System.** Names, addresses, and ID numbers of all facilities regulated by the EPA.
- **Biennial Reporting System (BRS).** The BRS is one of EPA's primary tools for tracking the generation, shipment, and receipt of hazardous waste. The BRS appears to be the best U.S. hazardous waste tracking database. It contains information from the Hazardous Waste Reports that must be filed every two years under the RCRA program. RCRA (the Resource Conservation and Recovery Act) is the Federal statute that regulates the generation, treatment, storage, disposal, or recycling of solid and hazardous waste. Facilities must report their activities involving hazardous waste to BRS if they fulfill one of two criteria: they are a Large Quantity Generator (LQG) of waste, or they treated, stored, or disposed of RCRA hazardous waste on site in units subject to RCRA permitting requirements. A Large Quantity Generator is defined as any site that generates more than 2,200 lbs of RCRA waste in a single month, accumulates more than 2.2 pounds of RCRA acute hazardous waste in any single month, or accumulates more than 220 lbs of spill cleanup material contaminated with RCRA acute hazardous waste in any month. The RTK site includes BRS records from 1989 through 2011.

According to RTK compendium of environmental databases, from 1982 to 2014, there have been 101 total recorded hazardous materials spills and accidents, of which 53 were transportation related. The large number of instances may be partly due to the increasing industrial base for fixed facility spills and the presence of Interstate-20, SR-5, SR-6, SR- 78, and SR-92 corridors for transportation related events.
Another factor in the high incidence rate of transportation related events is the location of the Norfolk Southern Rail Road intermodal facility in Austell, Georgia. Although this facility is located in Cobb County, the main thoroughfare for access to the facility is Thornton Road (through Douglas County) to Interstate-20.
The events that can produce a hazardous materials release vary greatly and therefore future releases are statistically independent of past events. The fact that all releases have a human component makes prediction difficult. Unfortunately, the short period of recorded and observed historical data that

contribute to the risk make it difficult to develop return periods for hazardous material release areas in Douglas County.

Hazardous materials incidents can have an obvious, direct environmental impact and cause long-term, insidious environmental damage. Water pollution is an immediate concern for direct human consumption, recreation, crop irrigation, and fish and wildlife consumption. Depending on the material, pollutants can bioaccumulate to differing degrees, affecting animals high on the food chain long after a spill. Hazardous material incidents would not likely affect geology, but could significantly impact soils and farmlands, requiring expensive remediation. Unless a spill is directly adjacent, hazardous materials incidents are unlikely to affect historic or archeological sites. In terms of location and extent, when a hazard material incident occurs in Douglas County, there is a chance it will not only involve dirt or surface material but will also involve flowing water in ditches, rivers, or small streams. Other potential concerns for spills/leaks are icy road conditions during winter months, sabotage, and terrorism.

Inventory Assets Exposed To Hazardous Materials

Communities close to highway, railroad, pipeline, air, and water transportation systems are at risk from HAZMAT events that occur during transport. In addition, Douglas and surrounding counties are major corridors for Amtrak, CSX and Norfolk Southern rail services. As noted above, there are many avenues for routinely transporting hazardous materials in and through Douglas County. Reports of spills and releases of hazardous materials are becoming increasingly commonplace. The Douglas County Hazard Mitigation Planning Committee reviewed and considered all the above data as well as historical data maintained by the Coast Guard, EPA, GEMA, FEMA, and the National Response Center to research hazardous material or radiological vulnerabilities in Douglas County.

Potential Losses

Most hazardous material releases do not usually have an effect on infrastructure, particularly underground infrastructure. Some critical facilities use hazardous materials to operate such as chlorine for water treatment and PCB's for electric transformers. Similarly, the contamination of the water supply may be treated like a hazardous material release. Propane, oil, and natural gas, necessary fuels for heating, can also be hazardous if released during their delivery due to their explosive potential. Transportation may be limited if a key roadway or railway is blocked by an incident. Possible losses to critical facilities include:

- Critical functional losses
- Contamination
- Structural and contents losses, if an explosion is present

Possible losses to structures include:

- Inaccessibility
- Contamination
- Structural and contents losses, if an explosion is present

Possible economic losses include:

- Business closures and associated business disruption losses

Possible ecologic losses include:

- Loss of wildlife
- Habitat damage
- Reduced air and water quality

Possible social losses include:

- Cancelled activities
- Emotional impacts of significant population losses and illnesses

Land Use and Development Trends

The population impacts are often greater than the structural impacts during a hazardous material release. Depending on the material, the health impacts to humans can be long and short term. A release in Douglas County could threaten the population. Greater population concentrations may be found in communities, special needs facilities, and businesses. Generally, an incident will affect only a subset of the total population at risk. In a hazardous material release, those in the immediate isolation area would have little to no warning, whereas, the population further away in the dispersion path may have some time to evacuate, depending on the weather conditions, material released, and public notification.

There are no land use regulations that restrict building around industrial facilities or along transportation routes. As the population increases, development will also continue to increase in these areas thereby exposing a greater number of individuals to the risk of a hazardous materials release. Increase development will lead to increased vulnerability and increased potential losses. Douglas County and the surrounding areas are rich in natural resources and the continued development of industries related to these natural resources is a distinct possibility. New development may increase the number of people and facilities exposed to hazardous material releases.

Multi-Jurisdictional Differences

As the state highway and railway corridors travel through and around Douglas County, much of Douglas County could potentially be affected by a hazardous spill or radiological event. The Emergency Planning and Right-To-Know Act require that the USEPA be notified of releases. The USEPA, DOT and U.S. Coast Guard maintain spill data.

Hazardous Materials HRV Summary

Hazardous materials incidents can pose a series of threats to human safety and welfare, as well as the environment. Incidents occur regularly, but are not often of a size to cause a significant threat. However, it seems likely that incidents will continue and the potential for a significant release is present. Incidents often occur in conjunction with, or as a result of, natural hazards impacting facilities which house hazardous materials. Depending upon the materials released, as well as atmospheric conditions, an incident has the potential to cause significant disruption to Douglas County and its jurisdictions along with injury or even death to residents in the immediate area.

Education is very important when it comes to hazardous material mitigation. Workers should receive proper training in the use, safety, and regulations regarding hazardous materials. Workers and emergency response personnel should be trained in the appropriate techniques and safety measures for dealing with spills and incidents. The general public should be made aware of the hazards of household chemical products and of methods for properly disposing of these products. In addition, numerous regulations and codes have been created to address containment, hazard communication, and controls. Hazardous materials are best managed through suitable containment. When properly contained, hazardous materials are unlikely to cause harm. The design of chemical containers for transportation and storage should be based on chemical and physical characteristics, the degree of hazard offered by the product, and to some extent on economic considerations. Most regulations and codes require containers to resist the most severe stresses that may reasonably be expected during normal handling, storage and use.

Hazard communication is also an important regulatory measure. Where required by USDOT regulations, hazard communication information is provided in the form of container markings and labels, vehicle placarding, and shipping paper entries. Facilities are required to identify chemicals in buildings, tanks and other storage facilities using the NFPA 704 system. USDOT regulations impose certain controls on

the types of chemicals that may be shipped together, how they must be loaded and secured on vehicles, levels of allowable radiation exposure and radiological contamination and, for certain high level radioactive shipments, highway routing. Codes and zoning requirement may address allowable locations for chemical storage and use.

2.4.2 Dam Failure

a. Dam Failure Profile

Background

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

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

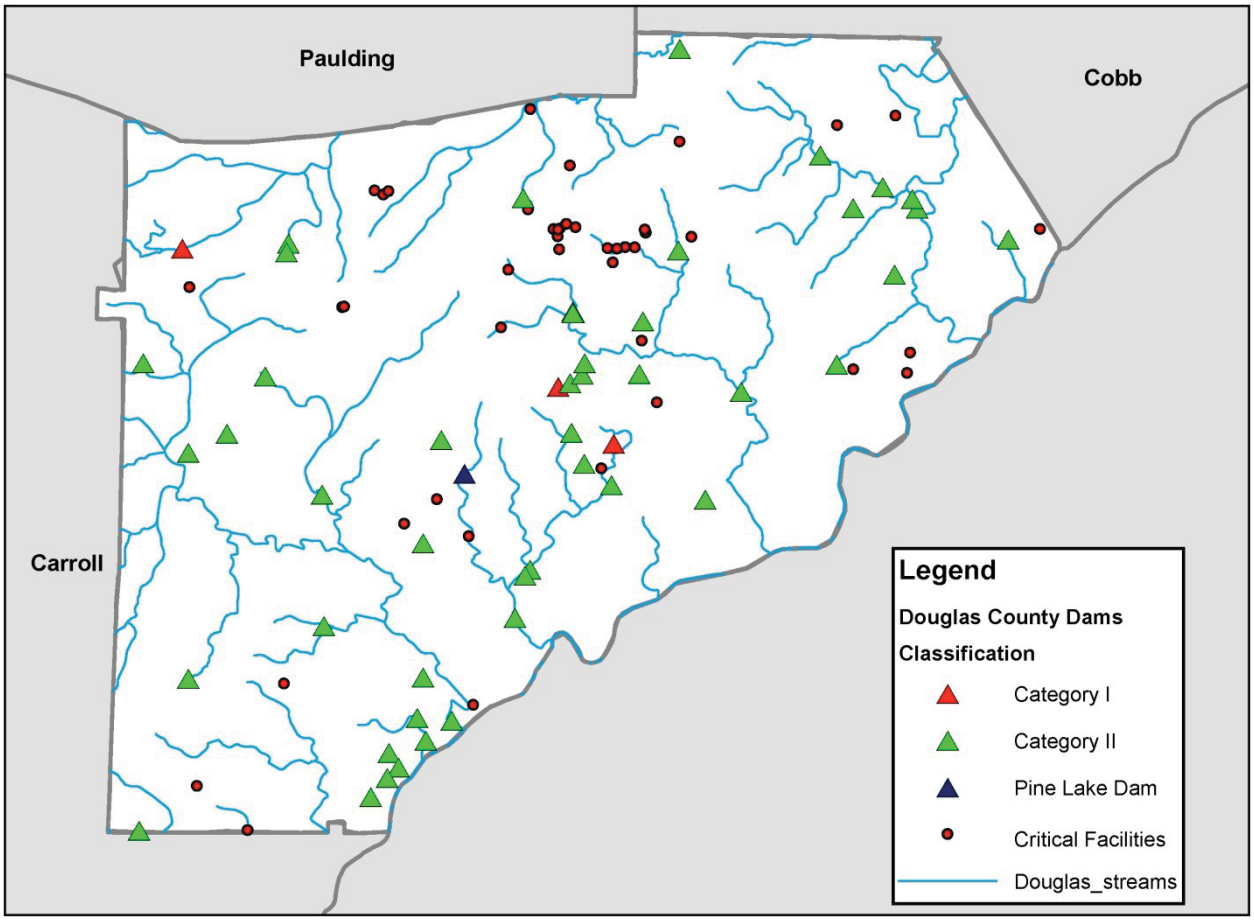
Location

Currently, the Douglas-Douglasville Water Sewer Authority (WSA) maintains maps and a database of all dams in the County and the City of Douglasville. This inventory is administered under the Georgia Safe Dams Program (GASD).

Per GASD 2014 Annual Report, there were 72 dams in Douglas County. Dams are typically ranked by hazard classification, which is determined by the potential for infrastructure and property damages downstream if a dam failure were to occur. A Category I classification indicates probable loss of life if the dam failed, while a Category II classification indicates loss of life would not be probable, as determined by the Safe Dams Program. A Category I dam has specific rules and regulations that must be applied to its design and operation, while a Category II dam does not. In addition, the Safe Dams Program does not regulate dams that are 6 feet in height or less regardless of storage, or dams that have storage volume of 15 acre-feet or less regardless of height. Of 72 dams listed in Douglas County, there are 3 Category I dams and 49 Category II dams. These numbers have changed, compared to the 2010 Hazard Mitigation Plan; Category I dams decreased from 4, and Category II increased from 39. The Pine Lake Dam (State ID 048-09-01841) on Bear Creek was reclassified from High Hazard (Category I) to Low Hazard (Category II), with nine more dams added to Category II.

These 53 dams are listed in the table 2.30. Figure 2.11 also depicts the dams with reference to Douglas County and its critical facilities.

Figure 2.11
Douglas County Class I and II Dams Locations
(Source: GASD, PMC)



In addition to the afore mentioned dams, of particular interest and of concern is the Morgan Falls Dam on Chattahoochee River, owned and operated by Georgia Power. This Category I dam is located approximately 22 miles upstream from Douglas County; connecting Fulton and Cobb Counties. It is 896 ft long and 57 feet high. Even though it is not a flow control structure (unlike the Buford Dam further upstream), its Bull Sluice Lake still retains 2,250 acre-feet of water.

Table 2.30
Inventory of Douglas County Dams, ordered by Hazard Classification
(Source: Georgia Safe Dams Program, Douglas County 2015)

Dam Name	Hazard Class	State ID
Mill Glen Lake Dam	I	048-004-00351
Mirror Lake Dam	I	048-025-02827
Plantation Subdivision Lake Dam	I	048-072-05532
Anneewakee Lake Dam	II	048-017-05702
Arbor Place Mall Stormwater Management Pond Dam 1	II	048-066-05186
Austin Lake Dam North	II	048-014-02788
Austin Lake Dam South	II	048-015-02789
Basket Creek Dam	II	048-035-02833
Battle Pond Lake Dam	II	048-046-04243
Bear Creek Reservoir	II	048-039-03927
Bear Creek Water Treatment Plant	II	048-070-05418
Camp Lake Dam	II	048-013-04113
Cedar Lake Dam	II	048-033-02832
Chapel Hills Farms	II	048-044-04152
Chapel Hills Lake Dam	II	048-055-04776
Chennault Lake Dam	II	048-052-04732
Cohen Lake Dam	II	048-021-02844
Coursey Lake Dam	II	048-016-02759
Crystal Lake Dam	II	048-038-02967
Ddcwsa Reject Lake Dam	II	048-069-05279
Ddcwsa Reuse Lake Dam	II	048-068-05278
Dog River Reservoir Dam	II	048-048-04519
Douglasville Lake Dam	II	048-043-00154
Echo Pond Lake Dam	II	048-051-04731
Flyblow Creek Dam	II	048-034-02848
Foxhall Farm Lake Dam No 4	II	048-057-04881
Foxhall Farms Lake Dam No 2	II	048-061-04885
Foxhall Farms Lake Dam No 1	II	048-060-04885
Foxhall Farms Lake Dam No. 3	II	048-058-04882

Dam Name	Hazard Class
George H Sparks Reservoir Dam #1	II
George H Sparks Reservoir Dam #2	II
George H. Sparks Dam #3	II
George H. Sparks Dam #4	II
Gerrell Pond Lake Dam	II
Green Lake Dam	II
Greystone Pond	II
Groover Lake Dam	II
Hay North Lake Dam	II
Hudson Lake Dam	II
Jacks Hill Lake Dam	II
Johnson Lake Dam	II
Lake Sarah Glenn Dam	II
Leatherwood Lake Dam	II
Mocasin Lake Dam	II
Monroe Lake Dam	II
Noland Lake Dam	II
Pine Lake Dam	II
Proposed Northern B Lake Dam	II
Shawnee Lake Dam	II
Sims Lake Dam	II
Strickland Lake Dam	II
Thurmon Lake Dam	II
Southern Lake Dam	P-II

Figure 2.12
Morgan Falls Dam Inundation Zone, Compared to 100-year FEMA Floodplain
At Sweetwater Creek Confluence with Chattahoochee River
(Source: Georgia Power GIS, PMC)

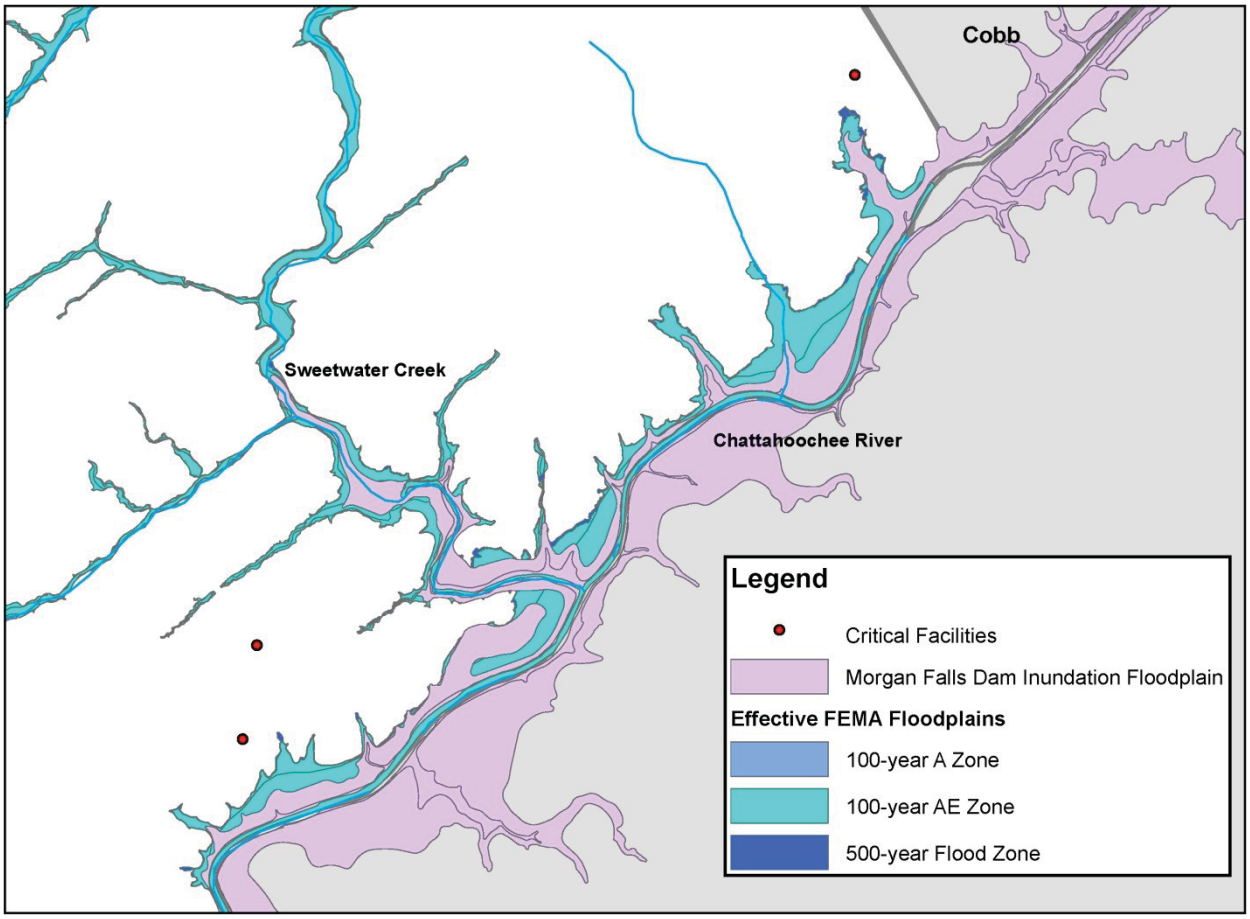


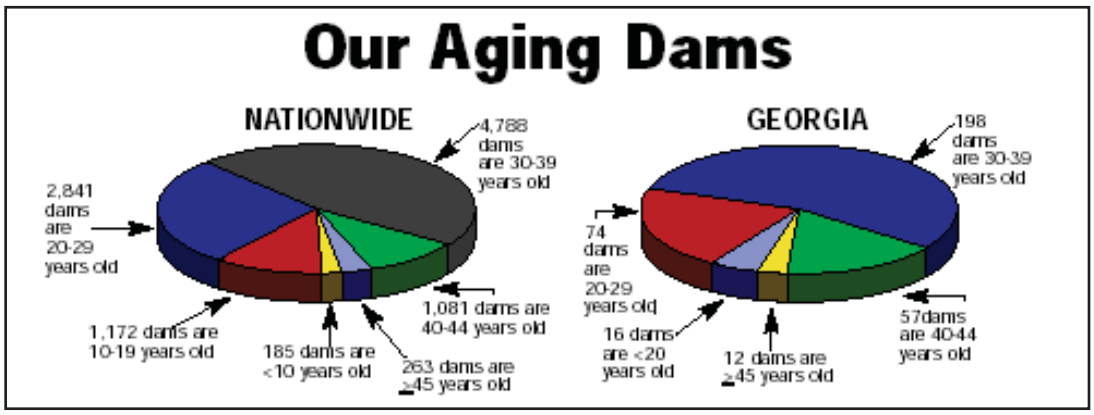
Figure 2.12 (above) graphically depicts a detail of, probably the most sensitive location (flood-hazard wise) in Douglas County; a confluence of Sweetwater Creek and Chattahoochee River. It appears that the Morgan Falls inundation floodplain is almost completely contained within the existing 100-year FEMA flood boundaries. According to Georgia Power Emergency Action Plan for Morgan Falls Dam, it would take peak wave approximately 11 hours to reach this location in Douglas County.
Potentially of much bigger concern would be a breach of Bufford Dam, further upstream the river, but containing almost 1.1 million acre-feet. It would take additional 12 hours for the peak wave to reach Douglas County, but the extent of this hazard is presently unclear.
For the three Category I dams in Douglas County, according to GASD, there is no study performed with respect to downstream hazard.

Although physical damages associated with dam failure would be limited to certain areas, the damage to the local economy and problems associated with delivery of water and other utilities could be felt Countywide.

Impact on Life and Property

The potential severity (extent) of a dam failure event depends on several factors, including the size of the dam, the nature of the failure (i.e., catastrophic structural failure versus a small breech), the velocity of the floodwater released, the density of built environment and populations downstream, and the volume of water impounded by the dam. There is no common scale for describing the "extent" of dam failure (meaning potential severity, not geographic extent). The USACE and the States have established a dam hazard rating system, and the former organization maintains the National Inventory of Dams Program, According to the USACE, as of 2005 there were 79,500 dams in the United States. Approximately one third of these pose a "high" or "significant" hazard to life and property if failure occurs. Table 2.30 above provides hazard classifications for dams in Douglas County. Absent detailed studies of individual dams, this rating system is the best proxy for extent presently available in Douglas County.

Figure 2.13
Age Comparison of Dams in the US vs. Georgia



Occurrences of the Hazard

A review of current literature and open data sources including historical data from the Environmental Protection Division (EPD) within the Georgia Department of Natural Resources (DNR) as well as County records revealed no known past dam failures in or near Douglas County. As of 2012, Douglas County has never experienced a major dam failure. It is possible that some small private dams have been breached at some point in the past, but no records have been found to indicate any type of emergency response related to such a failure, or even that such a failure has taken place. Based on no past dam failures in the County, the probability of future failures is most likely low.

For reasons previously mentioned in this section and uncontrollable by humans, it is possible a dam can fail at any time, given the right circumstances. However the probability of future occurrence is for regulated dams can be reduced due to proactive preventative action in compliance with the Georgia Department of Natural Resources – Dam Safety Program. Georgia's Dam Safety Program provides for the regulation and safety of high hazard dams and reservoirs throughout the state in order to protect the health, safety, and welfare of its citizens and their property.

Inventory Assets Exposed To Dams

Dam or levee failures can have a greater environmental impact than that associated with a flood event. Large amounts of sediment from erosion can alter the landscape changing the ecosystem. Hazardous materials can be carried away from flooded out properties and distributed throughout the floodplain. Industrial and agricultural chemicals and wastes, solid wastes, raw sewage, and common household chemicals comprise the majority of hazardous materials spread by flood waters along the flood zone, polluting the environment and contaminating private property and the community's water supply. The soil loss from erosion and scouring would be significantly greater because of a large amount of fast moving water affecting a small localized area, which would likely change the ecosystem.

Potential Losses

For reasons previously mentioned in this section and uncontrollable by humans, it is highly possible a dam can fail at any time, given the right circumstances. However the probability of future occurrence for regulated dams is reduced through compliance with the Georgia's Department of Natural Resources, Dam Safety Program.

Land Use & Development Trends

Public awareness measures such as notices on final plats and public education on dam safety are proactive mitigation measures that should be implemented by local communities. Also, Emergency Action Plans that identify potential dam failure inundation areas, notification procedures, and thresholds are also prepared for response to potential dam related disaster events.

Multi-Jurisdictional Differences

Property and populations located downstream from any dam may be vulnerable to dam failure. However, communities downstream of high hazard dams should pay particular attention to inspection and maintenance activities that keep their communities safe.

Dam Failure HRV Summary

As dams continue to age, the likelihood for failure increases as undesirable woody vegetation on the embankment, deteriorated concrete, inoperable gates, and corroded outlet pipes become problems. Since dam failures are often exacerbated by flooding, the probability of dam failures can be associated with projected flood frequencies.

Without these activities and oversight from the Georgia Department of Natural Resources, vulnerability increases significantly. The probability of a dam failure throughout the state should remain low with continued maintenance of dams. Additionally, warning plans in place for designated high hazard dams will continue to decrease the danger for those residents in potential risk areas.

2.4.3 All Hazards Risk and Vulnerability Assessment

The HMPC determined that an all hazards approach to analyze the impacts of current policies, ordinances, and plans on community safety from technological hazard risks due to growth decisions losses in Douglas County and City of Douglasville would provide a holistic methodology to address community risk.

The specific mitigation strategy and action is the production of a Safe Community Audit Report to inform citizens and decision makers in Douglas County and City of Douglasville about important safety issues and to relay needed changes in community ordinances, processes, and policies, (Godschalk, 2009).

Chapter 3
Local Hazard Mitigation Goals and Objectives

3.1 Introduction
3.2 Community Values, Historic And Special Considerations
3.3 Natural Hazard Mitigation Goals and Objectives Update Summary

3.3.1 Severe Weather Mitigation Strategy
3.3.2 Inland Flooding Mitigation Strategy
3.3.3 Tornadoes Mitigation Strategy
3.3.4 Severe Winter Weather Mitigation Strategy
3.3.5 Drought Mitigation Strategy
3.3.6 Wildfire Mitigation Strategy

3.4 Technological and All Hazard Mitigation Goals and Objectives Update Summary

3.4.1 Hazardous Materials Mitigation Strategy
3.4.2 Dam Failure Mitigation Strategy
3.4.3 All Hazards Mitigation Strategy

Table 3.1 below summarizes the updates for the hazard goals and objectives from the 2010 Douglas County Hazard Mitigation Plan update.

Table 3.1
Changes to the Local Hazard Mitigation Goals and Objectives

2010 HP – Chapter 3	Section updates
Section 3.1 – Section 3.4 (Hazards from the original plan)	• Removed Table 3-1 (2005-2010 Goals and Objectives Update) Subsection changed to 4.2.1 – 4.2.10. • In Section 3.1, added Tables 3.1-1 and 3.1-2. Listed mitigation action changes and modifications per each hazard. • Listed STAPLEE scoring for all natural, technological and all hazards • For each hazard, the action items have been grouped by objective. Separate tables have been developed to identify the actions under each mitigation objective.
Severe Weather (originally "Severe Storms and Lighting")	• Revised Ranking from Natural Hazard 3 to Natural Hazard 1. Reviewed goals and objectives. Added one mitigation action and removed one mitigation action. Mitigation actions listed in table format under each objective.
Inland Flooding (originally "Flooding")	• Revised Ranking from Natural Hazard 1 to Natural Hazard 2. Reviewed goal and objectives. Added one mitigation action. Mitigation actions listed in table format under each objective.

2010 HP – Chapter 3	Section updates
Tornadoes	• Revised Ranking from Natural Hazard 2 to Natural Hazard 3. Reviewed goal and objectives. Added one mitigation action. Mitigation actions listed in table format under each objective.
Severe Winter Weather (originally "Winter Weather")	• Reviewed goal and objectives. Added one mitigation action. Mitigation actions listed in table format under each objective.
Drought	• Reviewed goals and objectives. Removed one objective and its mitigation action. Mitigation actions listed in table format under each objective.
Wildfire	• Reviewed goal and objectives. Mitigation actions listed in table format under each objective.
Hazardous Materials	• Revised Ranking from Technological Hazard 2 to Technological Hazard 1. Reviewed goal and objectives. Added one mitigation action. Mitigation actions listed in table format under each objective.
Dam Failure	• Revised Ranking from Technological Hazard 1 to Technological Hazard 2. Reviewed goals and objectives. Mitigation actions listed in table format under each objective.
All Hazards	• Reviewed goals and objectives. Removed two mitigation actions. Mitigation actions listed in table format under each objective

3.1 Introduction

The intent of the Mitigation Strategy Section is to provide Douglas County and its participating municipalities with the goals that will serve as the guiding principles for future mitigation policy and project administration, along with a list of proposed actions deemed necessary to meet those goals and reduce the impact of natural hazards. It is designed to be comprehensive and strategic in nature. The development of the strategy included a thorough review of natural hazards and identified policies and projects intended to not only reduce the future impacts of hazards, but also to help Douglas County and participating municipalities achieve compatible economic, environmental and social goals. The development of this section is also intended to be strategic, in that all policies and projects are linked to establish priorities assigned to specific departments or individuals responsible for their implementation and assigned target completion deadlines. Funding sources are identified that can be used to assist in project implementation.

- **Mitigation Goals** are general guidelines that explain what the County wants to achieve. Goals are usually expressed as broad policy statements representing desired long-term results.
- **Mitigation Objectives** describe strategies or implementation steps to attain the identified goals. Objectives are more specific statements than goals; the described steps are usually measurable and can have a defined completion date
- **Mitigation Actions** provide more detailed descriptions of specific work tasks to help the County and its municipalities achieve prescribed goals and objectives.

Based on participation from the Douglas County Mitigation Planning Committee, the mitigation strategy was modified and updated. Objectives were clarified to better document roles and responsibilities. Completed actions were noted and deleted. New actions have been added to address particular hazards facing Douglas County and the consensus achieved in how to address those actions.

The last step in updating the Mitigation Strategy is the creation of jurisdictionally specific Mitigation Action Plans (MAPs). The MAPs represent the key outcome of the mitigation planning process. MAP's include a prioritized list of proposed hazard mitigation actions (policies and projects) for Douglas County and its municipalities, including accompanying information such as those agencies or individuals assigned responsibility for their implementation, potential funding sources, estimated target date for completion, and a current status. The MAPs provide those individuals or agencies responsible for implementing mitigation actions with a clear roadmap that also serves as an important tool for monitoring progress over time. The collection of actions listed in each jurisdictions MAP also serves as an easily understood synopsis of activities for local decision makers.

In preparing their own Mitigation Action Plan, each jurisdiction considered their overall hazard risk and capability to mitigation hazards, in addition to meeting the adopted countywide mitigation goals. Prioritizing mitigation actions for each jurisdiction was completed using FEMA's STAPLEE methodology. The STAPLEE approach allows for a careful review of the feasibility of mitigation actions by using seven criteria. The criteria are described below:

- **S** - Social
- **T** - Technical
- **A** - Administrative
- **P** - Political
- **L** - Legal
- **E** - Economic
- **E** - Environmental

FEMA mitigation planning requirements indicate that any prioritization system used shall include a special emphasis on the extent to which benefits are maximized according to a cost-benefit review of the proposed projects. To do this in an efficient manner that is consistent with FEMA's guidance on using cost-benefit review in mitigation planning, the STAPLEE method was adapted to include a higher weighting for two elements of the economic feasibility factor – Benefits of Action and Costs of Action. This method incorporates concepts similar to those described in Method C of FEMA 386-5: Using Benefit Cost Review in Mitigation Planning (FEMA, 2007).

For the individual action plans, a STAPLEE score was calculated based on the number of favorable considerations that can be found on the STAPLEE document. Up to 23 considerations can be used to prioritize each action using this evaluation methodology.

To ensure that a broad range of mitigation actions were considered, the Douglas County Mitigation Planning Committee analyzed a comprehensive range of specific mitigation actions for each hazard after it had completed the risk assessment. This helped to ensure that there was sufficient span and creativity in the mitigation actions considered.

There are six categories of mitigation actions which Douglas County considered in developing its mitigation action plan. Those categories were used previously in 2010 Plan update and they include:

Prevention: Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning, zoning, building codes, subdivision regulations, hazard specific regulations (such as floodplain regulations), capital improvement programs, and open-space preservation and stormwater regulations.

Property Protection: Actions that involve modifying or removing existing buildings or infrastructure to protect them from a hazard. Examples include the acquisition, elevation and relocation of structures, structural retrofits, flood-proofing, storm shutters, and shatter resistant glass. This category also includes insurance.

Public Education and Awareness: Actions to inform and educate citizens, elected officials, and property owners about potential risks from hazards and potential ways to mitigate them. Such actions include hazard mapping, outreach projects, library materials dissemination, real estate disclosures, the creation of hazard information centers, and school age / adult education programs.

Natural Resource Protection: Actions that, in addition to minimizing hazard losses also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, forest and vegetation management, wetlands restoration or preservation, slope stabilization, and historic property and archeological site preservation.

Structural Project Implementation: Mitigation projects intended to lessen the impact of a hazard by using structures to modify the environment. Structures include stormwater controls (culverts); dams, dikes, and levees; and safe rooms.

Emergency Services: Actions that typically are not considered mitigation techniques but reduce the impacts of a hazard event on people and property. These actions are often taken prior to, during, or in response to an emergency or disaster. Examples include warning systems, evacuation planning and management, emergency response training and exercises, and emergency flood protection procedures.

STAPLEE Mitigation Development, Analysis, and Scoring

As stated previously, **STAPLEE** is a method for assessing actions based on six general criteria: **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic, and **E**nvironmental. The HMPC STAPLEE analysis of proposed mitigation projects focused on these key areas. Selected options were considered the best fit for Douglas County and the City of Douglasville to meet the criteria of feasibility analysis.

The result was a concise report of whether the strategies and/or projects worked and recommendations for improvements to existing strategies, deletions of ineffective strategies, and effective new strategies to accomplish the Goals and Objectives of the Plan in a cost effective manner. The STAPLEE Summary below reveals the assessment and prioritization of the Mitigation Strategies, Goals, and Objectives.

Using the 23 assessment criteria in the STAPLEE worksheet, respondents were asked to mark each mitigation measure that would result in a positive effect to a STAPLEE factor with +1 (positive one), or with the adverse effect in that particular STAPLEE category with -1 (negative one). The mitigation measure that had no pronounced effect or wasn't applicable to the particular STAPLEE category was to be marked with 0 (zero). Each one of the mitigation measures had a theoretical range from -23 to +23. The results from all nine respondents were averaged and then ranked within each Hazard. The results are presented in the STAPLEE Scoring Summary Table below (green fields indicate new mitigation actions for 2015 HM Plan update).

Table 3.2
STAPLEE Scoring Summary

Mitigation Action Number	Mitigation Action	STAPLEE Score
NATURAL HAZARD: SEVERE WEATHER		
1.1.1	Install Uninterruptible Power Supplies On Critical Electronic Equipment In County And City Facilities	**14/23**
1.1.2	Equip All County And Public Gathering Places With Lightning Detectors	**14/23**
1.1.3	Install Surge Protectors On Electronic Equipment In County And City Facilities	**14/23**
1.2.1	Review Existing Building Codes And Seek Areas For Improvement	**16/23**
1.2.2	Support Tree Trimming To Prevent Limb Breakage And For Safeguarding Roadways, Emergency Traffic and Evacuation Routes During Severe Weather Events	**17/23**
NATURAL HAZARD: INLAND FLOODING		
2.1.1	Continue To Acquire Structures In Identified Repetitive Loss Areas Throughout Douglas County	**21/23**
2.1.2	Continue the Inspection and Maintenance of the Public Storm Water Drainage System	**18/23**
2.1.3	Conduct Flood Studies, As Needed, To Identify Flood Prone Areas Throughout Douglas County And Submit To FEMA For Inclusion On The Flood Insurance Rate Maps	**14/23**
2.1.4	Apply Local Ordinance And Design Standards To New Development To Prevent New Residential Structures In The Future Conditions 100 Year Floodplain	**14/23**
2.1.5	Acquire Flood Prone Structures Throughout Douglas County	**21/23**
2.1.6	Ensure That NFIP Requirements Are Being Met Concerning Repairs, Renovations, And Remodeling Of Structures Located In The Regulatory Floodplain	**15/23**
2.1.7	Identify Structures Within The 100 Year Floodplain And Maintain A Database Of Flood Prone Properties	**13/23**
2.1.8	Notify Owners In Writing Of Flood Prone Properties And Recommend The Need For Flood Insurance	**14/23**
2.1.9	Evaluate The Feasibility Of Upstream Surface Flood Storage For Flood Prone Structures That Cannot Be Mitigated By Conventional Techniques	**14/23**
2.1.10	Assess The Feasibility Of An Early Flood Warning System	**14/23**
2.1.11	Installation Of Bridges And Upsized Culverts In Identified Areas Where Urban Flooding Repetitively Occurs	**17/23**
2.1.12	Promote Through Public Education The “Turn Around Don’t Drown” Campaign	**14/23**

Mitigation Action Number	Mitigation Action	STAPLEE Score
2.1.13	Create A Database To House Data Of Mapped Areas Throughout The County Where Flooding Inundates Roadways	14/23
2.1.14	City of Villa Rica – Protection of Roadway over Mirror Lake Dam Spillway	18/23
NATURAL HAZARD: TORNADOES		
3.1.1	Continue To Support And Manage The Tornado Safety Public Awareness Campaign In Douglas County	14/23
3.1.2	Promote Enhanced Anchoring Of Manufactured Homes	16/23
3.1.3	Construct Community Safe Rooms In Downtown Douglasville	21/23
3.1.4	Acquisition of Additional Sirens for the Outdoors Early Warning System	18/23
NATURAL HAZARD: SEVERE WINTER WEATHER		
4.1.1	Continue To Support Tree Trimming To Prevent Limb Breakage And For Safeguarding Nearby Utility Lines During Severe Events	17/23
4.1.2	Purchase The Equipment Necessary To Efficiently Remove Snow And Ice From County Roads During Severe Winter Weather	13/23
4.1.3	Installation of Road Weather Information System (RWIS)	18/23
NATURAL HAZARD: DROUGHT		
5.1.1	Continue To Promote The Public Awareness Campaign To Promote Water Saving Techniques (Such As Low Flow Water Saving Showerheads And Toilets)	14/23
NATURAL HAZARD: WILDFIRE		
6.1.1	Encourage The Installation Of Fire Sprinklers In New Residential Construction	14/23
6.1.2	Continue To Promote Fire Prevention And Public Education Programs	14/23
6.1.3	Continue To Promote And Require The Use Of Fire Retardant Materials In New Construction	14/23
6.1.4	Develop A Public Awareness Campaign To Heighten Awareness About Brush Fires And Preventative Maintenance For Homeowners	14/23
6.1.5	Continue To Promote And Require Smoke/Carbon Monoxide Detectors For Residential And Commercial Properties	14/23
6.1.6	Inventory Exposed Assets To Wildfire Throughout Douglas County	14/23
TECHNOLOGICAL HAZARD: HAZARDOUS MATERIALS		
7.1.1	Purchase The Equipment Necessary To Sustain Hazardous Materials Emergency Response Teams	13/23

Mitigation Action Number	Mitigation Action	STAPLEE Score
7.1.2	Develop Site Specific Emergency Plans For Hazardous Materials Facilities Throughout The City And County	14/23
7.1.3	Maintain An Inventory Of Hazardous Waste Generators And Storage Facilities And Mail Facility Owner(S) Education And Awareness Information	13/23
7.1.4	Identify Hazardous Materials Transportation Corridors in Douglas County	18/23
TECHNOLOGICAL HAZARD: DAM FAILURE		
8.1.1	Maintain An Inventory Of Category 1 And 2 Dams In GIS Format	14/23
8.1.2	Develop Land Use Strategies To Promote The Safe Use Of Land Downstream From Dams	18/23
ALL HAZARDS		
9.1.1	Install A Countywide Hi Band Radio Trunked System	14/23
9.1.2	Integrate All Public Safety Records Management Systems With The 911 Dispatch System And The County And City GIS Departments	15/23
9.2.1	Formally Organize A Local Emergency Planning Committee	14/23
9.2.2	Purchase Emergency Generators For All Water Pumping Stations And Lift Stations	14/23
9.2.3	Update Site Specific Emergency Plans For Schools And Other High Hazard Facilities Within Douglas County	14/23
9.2.4	Review Current Land Use Plans To Modify Or Incorporate Into The Plan Guidelines To Direct Development Away From The Hazardous Areas	18/23
9.2.5	Encourage Local Businesses To Develop COOP's	14/23
9.2.6	Investigate The Need For Heating And Cooling Centers For Vulnerable Population	16/23
9.2.7	Promote A Public Awareness Campaign To Educate Citizens About Evacuation Procedures, Sheltering In Place, And Public Shelter Locations	14/23
9.2.8	Develop And Implement A Public Awareness Campaign Encouraging Residents To Develop Family Disaster Plans	14/23
9.2.9	Promote Fireplace And Chimney Maintenance Public Safety	14/23
9.2.10	Conduct Public Education Reminding Residents About The Dig Safe Program	15/23
9.2.11	Develop A Public Education Campaign To Encourage Homeowners To Buy Hazard Insurance To Protect Belongings	14/23
9.2.12	Ensure That Future Land Use Planning Takes Into Consideration The Possible Effects Of All Hazards	12/23

3.2 Community Values, Historic and Special Considerations

Historic Resources serve as visual reminders of a community's past, providing a link to its cultural heritage and a better understanding of the people and events that shaped the patterns of its development. Preservation of these important resources makes it possible for them to continue to play an integral, vital role in the community. As of November 2015, the County has eight properties listed on the National Register of Historic Places:

- The John Thomas Carnes Family Log House at Clinton Nature Preserve;
- The old Douglas County Courthouse;
- The Douglasville Commercial Historic District;
- The Col. William T. Roberts House;
- The Sweetwater Manufacturing Site at Sweetwater Creek State Park;
- Basket Creek Cemetery;
- Beulah Grove Lodge No. 372 in Douglasville; and
- Pine Mountain Gold Mine in Villa Rica.

Douglas County is characterized by a series of broad to narrow, gently sloping ridge tops and moderately steep hillsides adjacent to numerous, small drainage ways. Availability of water and water quality are major concerns for Douglas County as the Dog River is the County's primary source of water and Bear Creek is a secondary source of water. The County has developed significant environmental standards for the protection of both Dog River and Bear Creek in addition to strict environmental standards for Sweetwater Creek.

Known archeological sites and historic structures are mapped and administered by the County as a first cautionary measure during the development process. Private organizations, such as the Friends of Sweetwater Park and the historic society will continue to promote the preservation of the county's cultural resources.

Depending on the number of historic resources within a community, it can be unrealistic to assume that all of the necessary mitigation activities can be done at once to protect these resources. The work must be done in a manner that retains the character-defining features of a historic property, and can be costly. Therefore, it makes sense to set priorities in terms of which resources and mitigation projects should be the point of focus.

Douglas County recognizes that the preservation and maintenance of archaeological sites and historic structures contribute to the cultural heritage of the county and are in the long-term best interest of the county. The Historic Resources Survey of 1999 involved the identification and documentation of all buildings, structures and sites, which contribute to the historic character of the area. The survey also identified potential threats to their survival. Although very few sites remain, the County is taking proactive steps within its new Unified Development Code (UDC) to preserve the culture of Douglas County wherever possible.

While the County has begun work toward the goal of preserving the county's historic resources, there are additional steps that should be taken as long term preservation goals. These include:

- Adoption of a countywide historic preservation ordinance in compliance with the Georgia Historic Preservation act of 1980
- Seek certification as Certified Local Government under the Historic Preservation Division of the Georgia Department of Natural Resources.
- Investigate preservation incentives.
- Utilize current state and federal programs, which provide funding, staff and services in the area of historic preservation.

3.3 Natural Hazard Mitigation Goals and Objectives

In developing natural hazard mitigation goals and objectives for the Plan update, Douglas County and the City of Douglasville worked together as a team within the framework of the Hazard Mitigation Planning Committee (HMPC). Both of the jurisdictions realized the importance of protecting both incorporated and unincorporated areas of the County. Though the County facilitated this planning process, the City of Douglasville provided input relating to their natural hazard mitigation goals, objectives, and measures.

Goals and objectives were considered for the following natural hazards: severe weather, inland flooding, tornadoes, severe winter weather, drought, and wildfire. Each of these hazards has the potential to impact any portion of the planning area. Therefore, creating a narrowly-defined "hazard area" for each of the natural hazards above proved a difficult and imprecise effort. The exceptions to some extent are flooding and wildfire. Although these two hazards can occur in any portion of the County, they tend to occur in certain spatially-defined areas.

Due to the fact that there were no significant differences in jurisdictional risks for each of the natural hazards identified within this Plan update, with the exception of flooding, the County and the City worked together to create a single set of goals and objectives to help mitigate these hazards. Therefore, the HMPC combined the goals and objectives for Douglas County and the City of Douglasville.

Goals are general descriptions of desired long-term outcomes. State and federal guidance and regulations pertaining to mitigation planning require the development of mitigation goals to reduce or avoid long-term vulnerabilities to identified hazards.

As part of the 2015 Plan update the HMPC reviewed the goals from the 2010 Plan and established the following six goals (with supporting objectives) related to natural hazards:

2015 GOALS AND OBJECTIVES

GOAL 1: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **SEVERE WEATHER**.

- **OBJECTIVE 1.1:** Minimize the effects of electrical storms to public and private property in Douglas County and the City of Douglasville.
- **OBJECTIVE 1.2:** Minimize the effects of high winds to public and private property in Douglas County and the City of Douglasville.

GOAL 2: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **INLAND FLOODING**.

- **OBJECTIVE 2.1:** Minimize the impact of flooding to life and property to include buildings, infrastructure, and critical infrastructure in Douglas County and the City of Douglasville.

GOAL 3: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **TORNADOES**.

OBJECTIVE 3.1: Increase the sustainability to the effects of high winds from tornadoes on public and private property in Douglas County and the City of Douglasville.

GOAL 4: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **SEVERE WINTER WEATHER**.

OBJECTIVE 4.1: To minimize the impact of winter weather to life and property to include buildings, infrastructure, critical facilities and critical infrastructure in Douglas County and the City of Douglasville.

GOAL 5: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **DROUGHT**.

OBJECTIVE 5.1: Educate the citizens of Douglas County and the City of Douglasville on methods to reduce the effects of drought.

GOAL 6: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **WILDFIRE**.

OBJECTIVE 6.1: Minimize the effects of wildfire to public and private property in Douglas County and the City of Douglasville.

3.3.1 Severe Weather Mitigation Strategy

COMMUNITY MITIGATION GOALS

Mitigation Goal 1: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **SEVERE WEATHER**.

IDENTIFICATION AND ANALYSIS OF RANGE OF MITIGATION OPTIONS

The Douglas County Mitigation Planning Committee considered a range of mitigation options for the Severe Weather Mitigation Strategy. They included prevention, property protection, public education and awareness, natural resource protection, structural project implementation and emergency services.

EXISTING POLICIES, REGULATIONS, ORDINANCES, AND LAND USE

Mitigation of building damage has been most successful where strict building codes for high-wind influence areas have been adopted and enforced by local governments and complied with by builders. County and municipal construction and zoning ordinances are applicable within their respective jurisdictions.

NEW BUILDINGS AND INFRASTRUCTURE

Mitigation opportunities for severe winds are similar to mitigation measures for other wind hazards (such as severe storms and lightning). Attention to the type of structure used in tornado-prone areas may yield benefits, particularly by avoiding highly susceptible manufactured or mobile homes. The greatest protection is afforded by quality construction and reinforcement of walls, floors, and ceilings. Proper anchoring of walls to foundations and roofs to walls is essential for a building to withstand certain wind speeds. Code adoption by local jurisdictions, compliance by builders, and local government inspection of new homes could reduce the risk of destruction in tornado-prone areas.

Construction of safe rooms has also shown great success in protecting life and reducing injuries during severe storm events. These are typically areas within an existing structure that are reinforced to serve as temporary shelters during the duration of an event. Walls and other structural components are heavily reinforced with concrete and rebar to provide an area designed to withstand high wind speeds and protect occupants from windborne debris. Safe rooms can be constructed not only in critical facilities such as police stations and hospitals but also in residential and commercial buildings. They can be built into any new structure during the construction phase which often proves to be the most cost beneficial time to do such an activity. Douglas County along with the City of Douglasville will consider incorporating safe room areas into all new construction projects as well as retrofitting existing facilities to include safe room areas. All projects should be designed to meet FEMA 320 standards or beyond.

EXISTING BUILDINGS AND INFRASTRUCTURE

Existing manufactured or mobile homes are most exposed to damage from severe storms. Even if anchored, mobile homes do not withstand high wind speeds as well as some permanent, site-built structures. Existing structures can be retrofitted to withstand higher winds and safe rooms may be constructed in existing buildings or as standalone facilities. Safe room construction includes very specific design and engineering standards set forth by FEMA for structures to withstand tornado force winds. Retrofitting existing structures to meet safe room criteria involves making improvements to walls, roofs, window, doors, among other structural elements of the building.

MITIGATION ACTION PLAN

GOAL 1: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **SEVERE WEATHER**.

Similar to the 2010 Plan update, Mitigation Action Plan for Severe Weather Mitigation includes two mitigation objectives, as listed below:

OBJECTIVE 1.1: Minimize the effects of electrical storms to public and private property in Douglas County and the City of Douglasville. This objective has three mitigation actions carried over from the 2010 Plan.

GOAL: 1 OBJECTIVE: 1.1 MITIGATION ACTION: 1.1.1	
Install Uninterruptible Power Supplies On Critical Electronic Equipment In County And City Facilities	
Responsible Department	Douglas County EMA, Douglas County I.T.
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County
Timeframe	5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 1 OBJECTIVE: 1.1 MITIGATION ACTION: 1.1.2	
Equip All County And Public Gathering Places With Lightning Detectors	
Responsible Department	Douglas County EMA, Douglas County Parks And Rec.
Anticipated Cost	$500-$1000 For Each Park
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County
Timeframe	5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 1 OBJECTIVE: 1.1 MITIGATION ACTION: 1.1.3	
Install Surge Protectors On Electronic Equipment In County And City Facilities	
Responsible Department	Douglas County EMA, Douglas County I.T.
Anticipated Cost	$300-$1000 For Each Building
Existing & Potential Funding Sources	Douglas Count, City Of Douglasville
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	2 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

OBJECTIVE 1.2: Minimize the effects of high winds to public and private property in Douglas County and the City of Douglasville. This objective has one mitigation action carried over from the 2010 Plan, one action cancelled, and one new mitigation action.

GOAL: 1 OBJECTIVE: 1.2 MITIGATION ACTION: 1.2.1	
Review Existing Building Codes And Seek Areas For Improvement	
Responsible Department	City Of Douglasville
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	City Of Douglasville
Jurisdiction	City Of Douglasville
Timeframe	2 Years
STAPLEE Ranking	16/23
Status (Deferred Or New)	Deferred

GOAL: 1 OBJECTIVE: 1.2 MITIGATION ACTION: 1.2.2 (NEW)	
Support Tree Trimming To Prevent Limb Breakage And For Safeguarding Roadways, Emergency Traffic and Evacuation Routes During Severe Weather Events	
Responsible Department	Douglas Co. DOT, Douglasville Public Works Department
Anticipated Cost	Depending on the need
Existing & Potential Funding Sources	Internal/ General Funds
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	17/23
Status (Deferred Or New)	New

Table 3.3
Updated Mitigated Actions for Douglas County 2015 HM Plan
Severe Weather

SEVERE WEATHER GOAL: 1 OBJECTIVE: 1.1		
Mitigation Action	**Status From 2010 HMP Update**	**Notes**
Install Uninterruptible Power Supplies On Critical Electronic Equipment In County And City Facilities	Deferred; changed; relabeled from 3.1.1 to 1.1.1	Action is being continued.
Equip All County And Public Gathering Places With Lightning Detectors	Deferred; changed; relabeled from 3.1.2 to 1.1.2	Action is being continued.
Install Surge Protectors On Electronic Equipment In County And City Facilities	Deferred; changed; relabeled from 3.1.3 to 1.1.3	Action is being continued.
GOAL: 1 OBJECTIVE: 1.2		
Promote the use of special roofing shingles designed to interlock and resist uplift forces for both new construction and retrofits	Cancelled; removed	Action is cancelled, due to lack of interest.
Review Existing Building Codes And Seek Areas For Improvement	Deferred; relabeled from 3.2.2 to 1.2.1	Action is being continued.
Support Tree Trimming To Prevent Limb Breakage And For Safeguarding Roadways, Emergency Traffic and Evacuation Routes During Severe Weather Events	New Mitigation Action	

3.3.2 Inland Flooding Mitigation Strategy

COMMUNITY MITIGATION GOALS

Mitigation Goal 2: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **INLAND FLOODING**.

IDENTIFICATION AND ANALYSIS OF RANGE OF MITIGATION OPTIONS

The Douglas County Mitigation Planning Committee considered a range of mitigation options for the Inland Flooding Mitigation Strategy. They included prevention, property protection, public education and awareness, natural resource protection, structural project implementation and emergency services.

With sufficient warning of a flood, a community and its residents can take protective measures such as moving personal property, cars, and people out of harm's way. New radar technologies, improved river forecast models, computer visualization, automated data transmission, and improved data collection techniques hold significant promise for improving the timeliness and accuracy of flood forecasts and warnings.

A comprehensive education and outreach program is critical to the success of early warning systems so that the general public, operators of critical facilities, and emergency response personnel will know what actions to take when warning is disseminated.

EXISTING POLICIES, REGULATIONS, ORDINANCES, AND LAND USE

Floodplain management ordinances are intended to addresses methods and practices to minimize flood damage to new and substantial home improvement projects as well as address zoning and subdivision ordinances and state regulations. With that said, Douglas County joined the National Flood Insurance Program (NFIP) on February 3, 1978 and continues to participate and support floodplain management. The City of Douglasville joined the NFIP on August 6, 1979.

In the majority of the County riverine, floodplains tend to be narrow, except in the southern part of the County where they are moderately wide. The upland soils are generally well drained. The bottomlands along floodplains may be usable to some extent for non-intensive uses such as agriculture, recreation, etc.

In 2007, a grant was awarded to fund the development of a stand-alone flood hazard mitigation plan. Work was completed in September 2009, and the Douglas County Flood Hazard Mitigation Plan was approved by FEMA in December 2009 and adopted in January 2010. Floodplain management is required under the National Flood Insurance Act of 1963 and the Flood Disaster Protection Act of 1973. The County has incorporated Flood Damage Prevention within the Unified Development Code (UDC).

Additional restrictions prohibit the construction of new residential structure in the regulatory floodplain.

NEW BUILDINGS AND INFRASTRUCTURE

The greatest protection is afforded by quality construction and compliance with local ordinances which exceed NFIP requirements. Code adoption by local jurisdictions, compliance by builders, and local government inspection of new homes can reduce the risk of flooding. Douglas County will continue to support monitoring, analysis, modeling, and the development of decision-support systems and geographic information applications for floodplain activities.

EXISTING BUILDINGS AND INFRASTRUCTURE

In addition to land-use planning and codes applicable to new development, flood mitigation measures include structural and non-structural measures to address susceptibility of existing structures. Flood mitigation measures such as acquisition, relocation, elevation-in-place, wet/dry floodproofing, and enhanced storm drainage systems all have the potential to effectively reduce the impact of flood in Douglas County.

MITIGATION ACTION PLAN

GOAL 2: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **INLAND FLOODING**.

Similar to the 2010 Plan update, Mitigation Action Plan for Interior Flooding includes a single objective:

OBJECTIVE 2.1: Minimize the impact of flooding to life and property to include buildings, infrastructure, and critical infrastructure in Douglas County and the City of Douglasville. This objective has 13 mitigation actions carried over from the 2010 Plan, and one new mitigation action.

GOAL: 2 **OBJECTIVE: 2.1** **MITIGATION ACTION: 2.1.1**	
Continue To Acquire Structures In Identified Repetitive Loss Areas Throughout Douglas County	
Responsible Department	Douglas County EMA, DDCWSA
Anticipated Cost	TBD
Existing & Potential Funding Sources	FEMA HMA Programs, Storm Water Utility Funds
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	21/23
Status (Deferred Or New)	Deferred
Continued Compliance With NFIP	Yes

GOAL: 2 OBJECTIVE: 2.1 MITIGATION ACTION: 2.1.2	
Continue the Inspection and Maintenance of the Public Storm Water Drainage System	
Responsible Department	DDCWSA, Douglas County DOT
Anticipated Cost	Staff Time and Resources
Existing & Potential Funding Sources	Storm Water Utility Funds
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	18/23
Status (Deferred Or New)	Deferred
Continued Compliance With NFIP	Yes

GOAL: 2 OBJECTIVE: 2.1 MITIGATION ACTION: 2.1.3	
Conduct Flood Studies, As Needed, To Identify Flood Prone Areas Throughout Douglas County And Submit To FEMA For Inclusion On The Flood Insurance Rate Maps	
Responsible Department	DDCWSA
Anticipated Cost	TBD By Study Area
Existing & Potential Funding Sources	Storm water Utility Funds
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred
Continued Compliance With NFIP	Yes

GOAL: 2 OBJECTIVE: 2.1 MITIGATION ACTION: 2.1.4	
Apply Local Ordinance And Design Standards To New Development To Prevent New Residential Structures In The Future Conditions 100 Year Floodplain	
Responsible Department	Douglas County, City Of Douglasville
Anticipated Cost	TBD
Existing & Potential Funding Sources	Douglas County, City Of Douglasville, SW Utility Funds
Jurisdiction	Douglas County & City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred
Continued Compliance With NFIP	Yes

GOAL: 2 OBJECTIVE: 2.1 MITIGATION ACTION: 2.1.5	
Acquire Flood Prone Structures Throughout Douglas County	
Responsible Department	DDCWSA, Douglas County
Anticipated Cost	TBD By Project Scope And Size
Existing & Potential Funding Sources	FEMA HMA Programs, Douglas County, SW Utility Funds
Jurisdiction	Douglas County
Timeframe	3-5 Years
STAPLEE Ranking	21/23
Status (Deferred Or New)	Deferred
Continued Compliance With NFIP	Yes

GOAL: 2 OBJECTIVE: 2.1 MITIGATION ACTION: 2.1.6	
Ensure That NFIP Requirements Are Being Met Concerning Repairs, Renovations, And Remodeling Of Structures Located In The Regulatory Floodplain	
Responsible Department	Douglas County, City Of Douglasville
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County, City Of Douglasville
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	15/23
Status (Deferred Or New)	Deferred
Continued Compliance With NFIP	Yes

GOAL: 2 OBJECTIVE: 2.1 MITIGATION ACTION: 2.1.7	
Identify Structures Within The 100 Year Floodplain And Maintain A Database Of Flood Prone Properties	
Responsible Department	Douglas County EMA, DDCWSA
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Storm Water Utility Funds
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	2 Years
STAPLEE Ranking	13/23
Status (Deferred Or New)	Deferred
Continued Compliance With NFIP	Yes

GOAL: 2 OBJECTIVE: 2.1 MITIGATION ACTION: 2.1.8	
Notify Owners In Writing Of Flood Prone Properties And Recommend The Need For Flood Insurance	
Responsible Department	County And City Floodplain Administrators
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County, City Of Douglasville
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	2 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 2 OBJECTIVE: 2.1 MITIGATION ACTION: 2.1.9	
Evaluate The Feasibility Of Upstream Surface Flood Storage For Flood Prone Structures That Cannot Be Mitigated By Conventional Techniques	
Responsible Department	Douglas County EMA, DDCWSA
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Storm Water Utility Funds and Other Sources (Grants)
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 2 OBJECTIVE: 2.1 MITIGATION ACTION: 2.1.10	
Assess The Feasibility Of An Early Flood Warning System	
Responsible Department	Douglas County EMA
Anticipated Cost	$15,000/year
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County
Timeframe	3 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 2 OBJECTIVE: 2.1 MITIGATION ACTION: 2.1.11	
Installation Of Bridges And Upsized Culverts In Identified Areas Where Urban Flooding Repetitively Occurs	
Responsible Department	City Of Douglasville, Douglas County, DDCWSA
Anticipated Cost	TBD By Scope
Existing & Potential Funding Sources	Storm Water Utility Funds
Jurisdiction	Douglas County
Timeframe	5 Years
STAPLEE Ranking	17/23
Status (Deferred Or New)	Deferred

GOAL: 2 OBJECTIVE: 2.1 MITIGATION ACTION: 2.1.12	
Promote Through Public Education The "Turn Around Don't Drown" Campaign	
Responsible Department	Douglas County EMA
Anticipated Cost	$2000 per Street Sign
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County
Timeframe	3 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 2 OBJECTIVE: 2.1 MITIGATION ACTION: 2.1.13	
Create A Database To House Data Of Mapped Areas Throughout The County Where Flooding Inundates Roadways	
Responsible Department	Douglas County EMA &DDCWSA
Anticipated Cost	TBD By Scope
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County
Timeframe	5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 2 OBJECTIVE: 2.1 MITIGATION ACTION: 2.1.14 (NEW)	
City of Villa Rica – Protection of Roadway Over Mirror Lake Dam Spillway	
Responsible Department	City of Villa Rica
Anticipated Cost	TBD By Scope
Existing & Potential Funding Sources	City of Villa Rica, local DOT Funds
Jurisdiction	City of Villa Rica
Timeframe	3-5 Years
STAPLEE Ranking	18/23
Status (Deferred Or New)	New

Table 3.4
Updated Mitigated Actions for Douglas County 2015 HM Plan
Inland Flooding

INLAND FLOODING **GOAL: 2** **OBJECTIVE: 2.1**		
Mitigation Action	**Status From 2010 HMP Update**	**Notes**
Continue To Acquire Structures In Identified Repetitive Loss Areas Throughout Douglas County	Deferred; relabeled from 1.1.1 to 2.1.1	Acquired over 30 structures using 3-4 different FEMA grants; presently one rep-loss structure listed in NFIP database (Austell)
Continue the Inspection and Maintenance of the Public Storm Water Drainage System	Deferred; relabeled from 1.1.2 to 2.1.2	3-4 Storm Water crews on call; action is being continued.
Conduct Flood Studies, As Needed, To Identify Flood Prone Areas Throughout Douglas County And Submit To FEMA For Inclusion On The Flood Insurance Rate Maps	Present phase completed; deferred; relabeled from 1.1.3 to 2.1.3	All studies have been completed for the existing update of FEMA flood maps; action is being continued for the next FEMA flood mapping cycle.
Apply Local Ordinance And Design Standards To New Development To Prevent New Residential Structures In The Future Conditions 100 Year Floodplain	Deferred; relabeled from 1.1.4 to 2.1.4	Action is being continued.
Acquire Flood Prone Structures Throughout Douglas County	Partially completed; relabeled from 1.1.5 to 2.1.5	Action is being continued.
Ensure That NFIP Requirements Are Being Met Concerning Repairs, Renovations, And Remodeling Of Structures Located In The Regulatory Floodplain	Deferred; relabeled from 1.1.6 to 2.1.6	Action is being continued.
Identify Structures Within The 100 Year Floodplain And Maintain A Database Of Flood Prone Properties	Deferred; relabeled from 1.1.7 to 2.1.7	Action is being continued.
Notify Owners In Writing Of Flood Prone Properties And Recommend The Need For Flood Insurance	Deferred; relabeled from 1.1.8 to 2.1.8	Action is being continued.

INLAND FLOODING GOAL: 2 OBJECTIVE: 2.1		
Evaluate The Feasibility Of Upstream Surface Flood Storage For Flood Prone Structures That Cannot Be Mitigated By Conventional Techniques	Deferred; changed; relabeled from 1.1.9 to 2.1.9	The need is recognized, but slow progress due to lack of funding. Potential funding sources expanded.
Assess The Feasibility Of An Early Flood Warning System	Deferred; changed; relabeled from 1.1.10 to 2.1.10	Cost of CodeRED is determined at $15,000/year, agency responsibility directed to DC EMA.
Installation Of Bridges And Upsized Culverts In Identified Areas Where Urban Flooding Repetitively Occurs	Deferred; changed; relabeled from 1.1.11 to 2.1.11	Number of responsible agencies expanded, funding sources and jurisdictional authority changed.
Promote Through Public Education The “Turn Around Don’t Drown” Campaign	Deferred; relabeled from 1.1.12 to 2.1.12	10,000 – 12,000 citizens reached through e-mail campaign
Create A Database To House Data Of Mapped Areas Throughout The County Where Flooding Inundates Roadways	Deferred; changed; relabeled from 1.1.13 to 2.1.13	Funding sources modified. Action is being continued.
City of Villa Rica – Protection of Roadway Over Mirror Lake Dam Spillway	New Mitigation Action	

3.3.3 Tornadoes Mitigation Strategy

COMMUNITY MITIGATION GOALS

Mitigation Goal 3: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **TORNADOES**.

IDENTIFICATION AND ANALYSIS OF RANGE OF MITIGATION OPTIONS

The Douglas County Mitigation Planning Committee considered a range of mitigation options for the Tornado Mitigation Strategy. They included prevention, property protection, public education and awareness, natural resource protection, structural project implementation and emergency services.

EXISTING POLICIES, REGULATIONS, ORDINANCES, AND LAND USE

Mitigation of building damage has been most successful where strict building codes for high-wind influence areas have been adopted and enforced by local governments and complied with by builders. County and municipal construction and zoning ordinances are applicable within their respective jurisdictions.

NEW BUILDINGS AND INFRASTRUCTURE

Mitigation opportunities for tornadoes are similar to mitigation measures for general high wind hazards. Attention to the type of structure used in, for example hurricane-prone areas may yield benefits, particularly by avoiding highly susceptible manufactured or mobile homes.

The greatest protection is afforded by quality construction and reinforcement of walls, floors, and ceilings. Proper anchoring of walls to foundations and roofs to walls is essential for a building to withstand certain wind speeds. Code adoption by local jurisdictions, compliance by builders, and local government inspection of new homes could reduce the risk of destruction in tornado prone areas.

EXISTING BUILDINGS AND INFRASTRUCTURE

Tornadoes affect the entire planning area, including all above ground structures and utilities. Due to the erratic movement of tornadoes, destruction is often random. Buildings constructed prior to adoption of buildings codes remain more susceptible to damage. Some retrofit projects, for example specially designed shutters and windows for public schools and retrofitted safe rooms are expected to reduce future damage and reduce loss of life and injury. Modification of existing buildings to incorporate wind-resistant measures may come about slowly as buildings are substantially improved. Post-disaster mitigation efforts include retrofits and the construction of safe rooms.

MITIGATION ACTION PLAN

GOAL 3: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **TORNADOES**.

Similar to the 2010 Plan update, Mitigation Action Plan for Tornadoes includes a single objective:

OBJECTIVE 3.1: Increase the sustainability to the effects of high winds from tornadoes on public and private property in Douglas County and the City of Douglasville. This objective has three mitigation actions carried over from the 2010 Plan, and one new mitigation action.

GOAL: 3 OBJECTIVE: 3.1 MITIGATION ACTION: 3.1.1	
Continue To Support And Manage The Tornado Safety Public Awareness Campaign In Douglas County	
Responsible Department	Douglas County EMA
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County
Timeframe	5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 3 OBJECTIVE: 3.1 MITIGATION ACTION: 3.1.2	
Promote Enhanced Anchoring Of Manufactured Homes	
Responsible Department	Douglas County EMA
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County
Timeframe	2 Years
STAPLEE Ranking	16/23
Status (Deferred Or New)	Deferred

GOAL: 3 OBJECTIVE: 3.1 MITIGATION ACTION: 3.1.3	
Assess Needs And Feasibility For Tornado Safe Rooms In Douglasville And Douglas County	
Responsible Department	City Of Douglasville, Douglas County
Anticipated Cost	$200,000 Each
Existing & Potential Funding Sources	FEMA HMA Programs
Jurisdiction	City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	21/23
Status (Deferred Or New)	Deferred

GOAL: 3 OBJECTIVE: 3.1 MITIGATION ACTION: 3.1.4 (NEW)	
Acquisition of Additional Sirens for the Outdoors Early Warning System	
Responsible Department	Douglas County, City Of Douglasville
Anticipated Cost	$24,000 Each for Douglas County (18 Sirens) $ 35,000 Each for City of Douglasville (18 Sirens)
Existing & Potential Funding Sources	FEMA HMA Grants, General Funds
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	3 Years
STAPLEE Ranking	18/23
Status (Deferred Or New)	New

Table 3.5
Updated Mitigated Actions for Douglas County 2015 HM Plan
Tornadoes

TORNADOES GOAL: 3 OBJECTIVE: 3.1		
Mitigation Action	**Status From 2010 HMP Update**	**Notes**
Continue To Support And Manage The Tornado Safety Public Awareness Campaign In Douglas County	Deferred; relabeled from 2.1.1 to 3.1.1	Support provided through offering NWS tornado-spotter courses
Promote Enhanced Anchoring Of Manufactured Homes	Deferred; relabeled from 2.1.2 to 3.1.2	Action is being continued.
Changed from "Construct Community Safe Rooms In Downtown Douglasville" to "Assess needs and feasibility for tornado safe rooms in Douglasville and Douglas County"	Changed; deferred; relabeled from 2.1.3 to 3.1.3	Douglas County added as a responsible agency. Action is being continued.
Acquisition of Additional Sirens for the Outdoors Early Warning System	New Mitigation Action	

3.3.4 Severe Winter Weather Mitigation Strategy

COMMUNITY MITIGATION GOALS

Mitigation Goal 4: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **SEVERE WINTER WEATHER**.

IDENTIFICATION AND ANALYSIS OF RANGE OF MITIGATION OPTIONS

The Douglas County Mitigation Planning Committee considered a range of mitigation options for the Severe Winter Weather Mitigation Strategy. They included prevention, property protection, public education and awareness, natural resource protection, structural project implementation and emergency services.

EXISTING POLICIES, REGULATIONS, ORDINANCES, AND LAND USE

The standard building codes (IBS) adopted by Douglas County provides reasonable guidance for development throughout the County. However, contractors and builders should be aware of winter hazards such as extreme cold, high winds, and snow loads that can result from severe winter weather.

NEW BUILDINGS AND INFRASTRUCTURE

As development rapidly grows in the County, it will be a priority to improve the roads, utilities, and storm water management systems in the area. Any structures and infrastructure built should be considered vulnerable to severe winter weather. New structures and infrastructure built in Douglas County should take into account snow loads when constructed it may be the case of going above and beyond what current codes require.

EXISTING BUILDINGS AND INFRASTRUCTURE

The entire inventory in the County is vulnerable to winter weather. Severe winter weather in Douglas County causes widespread impacts with the greatest threat is to public safety on major roads and highways. Power outages caused by snow, ice, and wind accompanied by cold temperatures creates needs for additional shelter. It is the priority of Douglas County to continue operation of existing buildings and infrastructure, especially critical facilities and services like emergency services and hospitals in times of severe winter weather.

MITIGATION ACTION PLAN

GOAL 4: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **SEVERE WINTER WEATHER**.

Similar to the 2010 Plan update, Mitigation Action Plan for Severe Winter Weather includes a single objective:

OBJECTIVE 4.1: To minimize the impact of winter weather to life and property to include buildings, infrastructure, critical facilities and critical infrastructure in Douglas County and the City of Douglasville. This objective has two mitigation actions carried over from the 2010 Plan, and one new mitigation action.

GOAL: 4 OBJECTIVE: 4.1 MITIGATION ACTION: 4.1.1	
Continue To Support Tree Trimming To Prevent Limb Breakage And For Safeguarding Nearby Utility Lines During Severe Events	
Responsible Department	Douglas County EMA
Anticipated Cost	$50,000
Existing & Potential Funding Sources	Douglas County, City Of Douglasville
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	17/23
Status (Deferred Or New)	Deferred

GOAL: 4 OBJECTIVE: 4.1 MITIGATION ACTION: 4.1.2	
Purchase The Equipment Necessary To Efficiently Remove Snow And Ice From County Roads During Severe Winter Weather	
Responsible Department	Douglas County EMA, Douglas County Roads DOT
Anticipated Cost	TBD By Scope Of Affected Area
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County
Timeframe	3 Years
STAPLEE Ranking	13/23
Status (Deferred Or New)	Deferred

GOAL: 4 OBJECTIVE: 4.1 MITIGATION ACTION: 4.1.3 (NEW)	
Installation of Road Weather Information System (RWIS)	
Responsible Department	Douglas County DOT
Anticipated Cost	$200,000 Each Station
Existing & Potential Funding Sources	Grants and Other Funds
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	18/23
Status (Deferred Or New)	New

Table 3.6
Updated Mitigated Actions for Douglas County 2015 HM Plan
Severe Winter Weather

SEVERE WINTER WEATHER GOAL: 4 OBJECTIVE: 4.1		
Mitigation Action	**Status From 2010 HMP Update**	**Notes**
Continue To Support Tree Trimming To Prevent Limb Breakage And For Safeguarding Nearby Utility Lines During Severe Events	Deferred	Action is being continued.
Purchase The Equipment Necessary To Efficiently Remove Snow And Ice From County Roads During Severe Winter Weather	Deferred	Action is being continued.
Installation of Road Weather Information System (RWIS)	New Mitigation Action	Data will be uploaded in State and National Weather System database.

3.3.5 Drought Mitigation Strategy

COMMUNITY MITIGATION GOALS

Mitigation Goal 5: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **DROUGHT**.

IDENTIFICATION AND ANALYSIS OF RANGE OF MITIGATION OPTIONS

The Douglas County Mitigation Planning Committee considered a range of mitigation options for the Drought Mitigation Strategy. They included prevention, property protection, public education and awareness, natural resource protection, structural project implementation and emergency services.

EXISTING POLICIES, REGULATIONS, ORDINANCES, AND LAND USE

As Douglas County continues to grow exponentially, it will consider practical guidelines for determining the impacts of drought such as measuring the economic value of water in alternative uses and objective methods for quantifying non-market impacts of drought on those uses. Douglas County will follow guidance found within the Georgia Drought Management Plan as approved by the Georgia Department of Natural Resources Board on March 26, 2003 which consists of pre-drought mitigation strategies and drought response strategies.

NEW BUILDINGS AND INFRASTRUCTURE

New water and sewer systems or significant well and septic sites could use up more of the water available, particularly during periods of drought. Public water systems are monitored, but individual wells and septic systems are not as strictly regulated. Therefore, future development could have an impact on the drought vulnerabilities to new buildings and infrastructure.

EXISTING BUILDINGS AND INFRASTRUCTURE

Although drought conditions rarely affect existing buildings, infrastructure, and critical infrastructure, the economic livelihood could be negatively impacted due to crop loss, timberland damage, water shortages, and wildfires as a result of drought. Possible losses/impacts to critical facilities include the loss of critical function due to low water supplies.

MITIGATION ACTION PLAN

GOAL 5: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **DROUGHT**.

Compared to 2010 HM plan update, the 2015 Plan has one of the two Mitigation Objectives removed, due to its overlap with the similar objective in Wildfire Mitigation Strategy.

OBJECTIVE 5.1: Educate the citizens of Douglas County and the City of Douglasville on methods to reduce the effects of drought. This objective has a single mitigation action carried over from the 2010 Plan.

GOAL: 5 OBJECTIVE: 5.1 MITIGATION ACTION: 5.1.1	
Continue To Promote The Public Awareness Campaign To Promote Water Saving Techniques (Such As Low Flow Water Saving Showerheads And Toilets)	
Responsible Department	Douglas County EMA, DDCWSA
Anticipated Cost	Staff Time and Resources
Existing & Potential Funding Sources	Douglas County and Utility Funds
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

Table 3.7
Updated Mitigated Actions for Douglas County 2015 HM Plan
Drought

DROUGHT GOAL: 5 OBJECTIVE: 5.1		
Mitigation Action	**Status From 2010 HMP Update**	**Notes**
Continue To Promote The Public Awareness Campaign To Promote Water Saving Techniques (Such As Low Flow Water Saving Showerheads And Toilets)	Deferred	Action is being continued.
OBJECTIVE: 5.2 OBJECTIVE 5.2 CANCELLED AND REMOVED		
Develop A Public Awareness Campaign To Heighten Awareness About Brush Fires And Preventative Maintenance For Homeowners	Cancelled; removed	Action is cancelled, due to duplication with wildfire mitigation actions.

3.3.6 Wildfire Mitigation Strategy

COMMUNITY MITIGATION GOALS

Mitigation Goal 6: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **WILDFIRE**.

IDENTIFICATION AND ANALYSIS OF RANGE OF MITIGATION OPTIONS

The Douglas County Mitigation Planning Committee considered a range of mitigation options for the Wildfire Mitigation Strategy. They included prevention, property protection, public education and awareness, natural resource protection, structural project implementation and emergency services.

EXISTING POLICIES, REGULATIONS, ORDINANCES, AND LAND USE

Douglas County and the City of Douglasville are experiencing a rapid population growth and because of this, there has been a substantial change in land use as well as the wildland urban interface over the years bringing a diverse range of challenges. Douglas County and the City of Douglasville adhere to a comprehensive list of policies and regulations including the National Fire Protection Association Codes, International Fire Code, and the Douglas County Code of Ordinances. It is also a priority for Douglas County to address the primary concern regarding protection of existing and future development in the wildland urban interface areas within the County and the City.

NEW BUILDINGS AND INFRASTRUCTURE

As residential developments expand into wild land areas, people and property are increasingly at risk from wildfire. A cleared safety zone of at least 30 feet (100 feet in pine forests) should be maintained between structures and combustible vegetation, and fire-resistant ground cover, shrubs, and trees should be used for landscaping (for example, hardwood trees are less flammable than pines, evergreens, eucalyptus or firs). Only fire-resistant or non-combustible materials should be used on roofs and exterior surfaces. Roofs and gutters should be regularly cleaned and chimneys should be equipped with spark arrestors. Vents, louvers, and other openings should be covered with wire mesh to prevent embers and flaming debris from entering. Overhangs, eaves, porches, and balconies can trap heat and burning embers and should also be avoided or minimized and protected with wire mesh. Windows allow radiated heat to pass through and ignite combustible materials inside, but dual- or triple-pane thermal glass, fire-resistant shutters or drapes, and noncombustible awnings can help reduce this risk.

The term “fireproof” does not necessarily mean that an item cannot ever burn: It relates to measured performance under specific conditions of testing and evaluation. Fireproofing does not allow treated items to be entirely unaffected by any fire, as conventional materials are not immune to the effects of fire at a sufficient intensity and/or duration. As stated above, safety zones can be created around structures by reducing or eliminating brush, trees, and vegetation around a home or facility. FEMA

recommends using a 30-foot safety zone; including keeping grass below 2 feet tall and clearing all fallen leaves and branches promptly.

Firebreaks are areas of inflammable materials that create a fuel break and reduce the ability for fires to spread and roads and pathways can be planned and designed to serve as breaks. The use of Geographic Information System-based wildfire hazard assessment tools for use by Douglas County should be considered for future planning and mitigation efforts. Increased public education on fire safety is critical in Douglas County due to its rapidly growing population, especially when many of the areas being developed are larger lots scattered throughout wildland fuels.

EXISTING BUILDINGS AND INFRASTRUCTURE

Wildfire mitigation in the urban/wildland interface has primarily been the responsibility of property owners who choose to build and live in vulnerable zones. In practice, successful wildfire strategies can be quite involved. The most important aspect of successful suppression is disruption of the continuity of fuels, achieved by creating breaks or defensible areas. For interface fires, where homes and other structures fill the space, fuel reduction is best accomplished before the fires begin.

The Georgia Forestry Commission provides several services that help reduce wildfire risk. These include community outreach and education, fuels management, development review, hazardous activity permitting, fire danger monitoring, operational support, burn bans and restrictions, grant administration, and a volunteer program. This rigorous mitigation strategy shares responsibilities amongst agencies, and promotes safer communities in the process.

MITIGATION ACTION PLAN

GOAL 6: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **WILDFIRE**.

Similar to the 2010 Plan update, Mitigation Action Plan for Wildfire includes a single objective:

OBJECTIVE 6.1: Minimize the effects of wildfire to public and private property in Douglas County and the City of Douglasville. This objective has six mitigation actions carried over from the 2010 Plan.

GOAL: 6 **OBJECTIVE: 6.1** **MITIGATION ACTION: 6.1.1**	
Encourage The Installation Of Fire Sprinklers In New Residential Construction	
Responsible Department	Douglas County EMA, Douglas County Fire, City Of Douglasville
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County, City Of Douglasville
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 6 OBJECTIVE: 6.1 MITIGATION ACTION: 6.1.2	
Continue To Promote Fire Prevention And Public Education Programs	
Responsible Department	Douglas County EMA, Douglas County Fire, City Of Douglasville
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County, City Of Douglasville
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 6 OBJECTIVE: 6.1 MITIGATION ACTION: 6.1.3	
Continue To Promote And Require The Use Of Fire Retardant Materials In New Construction	
Responsible Department	Douglas County EMA, Douglas County Fire, City Of Douglasville
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County, City Of Douglasville
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 6 OBJECTIVE: 6.1 MITIGATION ACTION: 6.1.4	
Develop A Public Awareness Campaign To Heighten Awareness About Brush Fires And Preventative Maintenance For Homeowners	
Responsible Department	Douglas County EMA, Douglas County Fire, City Of Douglasville
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County, City Of Douglasville
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	3 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 6 OBJECTIVE: 6.1 MITIGATION ACTION: 6.1.5	
Continue To Promote And Require Smoke/Carbon Monoxide Detectors For Residential And Commercial Properties	
Responsible Department	Douglas County EMA, Douglas County Fire, City Of Douglasville
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County, City Of Douglasville
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 6 OBJECTIVE: 6.1 MITIGATION ACTION: 6.1.6	
Inventory Exposed Assets To Wildfire Throughout Douglas County	
Responsible Department	Douglas County EMA, Douglas County Fire, City Of Douglasville
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County, City Of Douglasville
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	2 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

Table 3.8
Updated Mitigated Actions for Douglas County 2015 HM Plan
Wildfire

WILDFIRE GOAL: 6 OBJECTIVE: 6.1		
Mitigation Action	**Status From 2010 HMP Update**	**Notes**
Encourage The Installation Of Fire Sprinklers In New Residential Construction	Deferred	Action is being continued.
Continue To Promote Fire Prevention And Public Education Programs	Deferred	Action is being continued.
Continue To Promote And Require The Use Of Fire Retardant Materials In New Construction	Deferred	Action is being continued.
Develop A Public Awareness Campaign To Heighten Awareness About Brush Fires And Preventative Maintenance For Homeowners	Deferred	Action is being continued.
Continue To Promote And Require Smoke/Carbon Monoxide Detectors For Residential And Commercial Properties	Deferred	Action is being continued.
Inventory Exposed Assets To Wildfire Throughout Douglas County	Deferred	Action is being continued.

3.4 Technological and All Hazard Mitigation Goals and Objectives

In developing technological hazard mitigation goals and objectives for the Plan update, Douglas County and the City of Douglasville worked together as a team within the framework of the Hazard Mitigation Planning Committee (HMPC). Both jurisdictions recognize the importance of protecting both incorporated and unincorporated areas of the County. Though the County facilitated this planning process, the City of Douglasville provided input relating to their natural hazard mitigation goals, objectives, and measures.

For the 2015 Plan update, goals and objectives were considered for the hazardous materials release, dam failure, and for all hazards. The hazardous materials release has the potential to impact any portion of the planning area.
Due to the fact that there were no significant differences in jurisdictional risks for each of the technological hazards identified within this Plan update the County and the City worked together to create a single set of goals and objectives to help mitigate these hazards. Therefore, the HMPC combined many of the goals and objectives for Douglas County and the City of Douglasville.

Goals are general descriptions of desired long-term outcomes. State and federal guidance and regulations pertaining to mitigation planning require the development of mitigation goals to reduce or avoid long-term vulnerabilities to identified hazards.

As part of the 2015 Plan update, HMPC reviewed the goals from the 2010 Plan and established the following three goals (with supporting objectives) related to technological and all hazards:

2015 GOALS AND OBJECTIVES

GOAL 7: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to incidents involving **HAZARDOUS MATERIALS**.

> **OBJECTIVE 7.1:** Continue to provide enhanced trainings, equipment, and plans for hazardous materials emergency response and mitigation in Douglas County and the city of Douglasville.

GOAL 8: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **DAM FAILURE**.

> **OBJECTIVE 8.1:** Minimize the effects of dam failure to public and private property in Douglas County and the City of Douglasville.

GOAL 9: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **ALL HAZARDS**.

> **OBJECTIVE 9.1:** Minimize the effects of all hazards in Douglas County and the City of Douglasville through effective communications systems and infrastructure.
>
> **OBJECTIVE 9.2:** To protect people and property from the effects of all hazards in Douglas County and the City of Douglasville.

3.4.1 Hazardous Materials Mitigation Strategy

COMMUNITY MITIGATION GOALS

Mitigation Goal 7: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **HAZARDOUS MATERIALS**.

IDENTIFICATION AND ANALYSIS OF RANGE OF MITIGATION OPTIONS

The Douglas County Mitigation Planning Committee considered a range of mitigation options for the Hazardous Materials Mitigation Strategy. They included prevention, property protection, public education and awareness, natural resource protection, structural project implementation and emergency services.

EXISTING POLICIES, REGULATIONS, ORDINANCES, AND LAND USE

Restricting the use of land and establishing minimum standards for avoiding hazardous sites and conditions are one approach that Douglas County is aware of and will continue to remain proactive in this regard.

NEW BUILDINGS AND INFRASTRUCTURE

Physical adjustments for avoiding the effects of hazardous materials with new buildings and infrastructure include planning and building HAZMAT facilities to withstand prevalent natural hazards and identifying sites where hazards are highly likely to occur. It also remains a priority for Douglas County to institute public awareness campaigns in areas prone to hazards in the vicinity of HAZMAT sites and areas.

EXISTING BUILDINGS AND INFRASTRUCTURE

Transportation accidents/incidents remain a major concern and vulnerability for Douglas County. The continued increase in the number of shipments also brings the potential increase in frequency of accidents/incidents.

MITIGATION ACTION PLAN

GOAL 7: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to incidents involving **HAZARDOUS MATERIALS**.

Similar to the 2010 Plan update, Mitigation Action Plan for Hazardous Materials includes a single objective:

OBJECTIVE 7.1: Continue to provide enhanced trainings, equipment, and plans for hazardous materials emergency response and mitigation in Douglas County and the City of Douglasville. This objective has three mitigation actions carried over from the 2010 Plan, and one new mitigation action.

GOAL: 7 OBJECTIVE: 7.1 MITIGATION ACTION: 7.1.1	
Purchase The Equipment Necessary To Sustain Hazardous Materials Emergency Response Teams	
Responsible Department	Douglas County EMA, Douglas County Fire
Anticipated Cost	TBD By Scope and Amount Of Equipment
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County
Timeframe	5 Years
STAPLEE Ranking	13/23
Status (Deferred Or New)	Deferred

GOAL: 7 OBJECTIVE: 7.1 MITIGATION ACTION: 7.1.2	
Develop Site Specific Emergency Plans For Hazardous Materials Facilities Throughout The City And County	
Responsible Department	Douglas County EMA, Douglas County Fire
Anticipated Cost	Staff Time and Resources
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County
Timeframe	5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 7 OBJECTIVE: 7.1 MITIGATION ACTION: 7.1.3	
Maintain An Inventory Of Hazardous Waste Generators And Storage Facilities And Mail Facility Owner(S) Education And Awareness Information	
Responsible Department	Douglas County EMA, Douglas County Fire, DDCWSA
Anticipated Cost	Staff Time and Resources
Existing & Potential Funding Sources	Douglas County, Storm Water Utility Funds
Jurisdiction	Douglas County
Timeframe	5 Years
STAPLEE Ranking	13/23
Status (Deferred Or New)	Deferred

GOAL: 7 OBJECTIVE: 7.1 MITIGATION ACTION: 7.1.4 (NEW)	
Identify Hazardous Materials Transportation Corridors in Douglas County	
Responsible Department	Douglas County EMA, Douglas County Fire, DOT
Anticipated Cost	Staff Time and Resources
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County
Timeframe	2 Years
STAPLEE Ranking	18/23
Status (Deferred Or New)	New

Table 3.9
Updated Mitigated Actions for Douglas County 2015 HM Plan
Hazardous Materials

HAZARDOUS MATERIALS GOAL: 7 OBJECTIVE: 7.1		
Mitigation Action	**Status From 2010 HMP Update**	**Notes**
Purchase The Equipment Necessary To Sustain Hazardous Materials Emergency Response Teams	Deferred; relabeled from 2.1.1 to 3.1.1	Support provided through offering NWS tornado-spotter courses
Develop Site Specific Emergency Plans For Hazardous Materials Facilities Throughout The City And County	Deferred; relabeled from 2.1.2 to 3.1.2	Action is being continued.
Maintain An Inventory Of Hazardous Waste Generators And Storage Facilities And Mail Facility Owner(S) Education And Awareness Information	Changed; deferred; relabeled from 2.1.3 to 3.1.3	Changed to now read: "Assess needs and feasibility for tornado safe rooms in Douglasville and Douglas County. Douglas County added as a responsible agency. Action is being continued.
Identify Hazardous Materials Transportation Corridors in Douglas County	New Mitigation Action	Initial screening identified Norfolk-Southern Railroad, Interstate I-20, SR-6 Thornton Rd., Bankhead Highway

3.4.2 Dam Failure Mitigation Strategy

COMMUNITY MITIGATION GOALS

Mitigation Goal 8: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **DAM FAILURE**.

IDENTIFICATION AND ANALYSIS OF RANGE OF MITIGATION OPTIONS

The primary rationale for mitigating dams and levees is the potential loss of life and economic loss due to dam and/or levee failure. Dam and levee failures result from the failure of manmade water impoundment structures, which often results in catastrophic down grade flooding. Dam-safety and dam construction, although improving, remains imperfect and the necessity for hazard mitigation remains.

Mitigation of hazards associated with dam failure differs depending on whether the hazard is associated with a new or existing dam. New dams can be designed to meet stringent safety criteria, including passage of extreme flood discharges and resistivity to earthquakes. Land downstream of new dams can be zoned or other-wise regulated to limit new construction and exposure.

EXISTING POLICIES, REGULATIONS, ORDINANCES, AND LAND USE

Douglas County and the City of Douglasville participate in the National Flood Insurance Program (NFIP) and the International Building Code provides reasonable guidance for development within flood prone areas.

NEW BUILDINGS AND INFRASTRUCTURE

As new buildings and infrastructure are developed and constructed in inundation areas resulting in population growth and rural-to-urban migration, the potential for greater losses and impact rises. This development pattern will continue for the foreseeable future unless proper mitigation measures are taken. Public awareness measures such as notices on final plats and public education on dam safety are proactive mitigation measures that should be implemented by local communities.

This situation may create more potential debris flow during major flood events or dam failures and could damage or destroy downstream dams. Any additional development downstream of a dam and within the inundation area could elevate the dam hazard ranking and the level of risk.

EXISTING BUILDINGS AND INFRASTRUCTURE

Inundation maps are required for each dam with an Emergency Action Plan (EAP). An inundation map illustrates which properties may be affected by floodwaters and show the extent of flooding expected spatially within a geographic area. These maps will not be included in this Plan for security reasons, but remain on file with the owners of the dam associated with the EAP.

GOAL 8: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **DAM FAILURE**.
Similar to the 2010 Plan update, Mitigation Action Plan for Dam Failure includes a single objective:

OBJECTIVE 8.1: Minimize the effects of dam failure to public and private property in Douglas County and the City of Douglasville. This objective has two mitigation actions carried over from the 2010 Plan.

GOAL: 8 **OBJECTIVE: 8.1** **MITIGATION ACTION: 8.1.1**	
Maintain An Inventory Of Category 1 And 2 Dams In GIS Format	
Responsible Department	Douglas County EMA, DDCWSA, City Of Douglasville
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County, Storm Water Utility Funds
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 8 **OBJECTIVE: 8.1** **MITIGATION ACTION: 8.1.2**	
Develop Land Use Strategies To Promote The Safe Use Of Land Downstream From Dams	
Responsible Department	Douglas County EMA, DDCWSA, City Of Douglasville
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County, City Of Douglasville, Storm Water Utility Funds
Jurisdiction	Douglas County, City Of Douglasville
Timeframe	5 Years
STAPLEE Ranking	18/23
Status (Deferred Or New)	Deferred

Table 3.10
Updated Mitigated Actions for Douglas County 2015 HM Plan
Dam Failure

DAM FAILURE GOAL: 8 OBJECTIVE: 8.1		
Mitigation Action	**Status From 2010 HMP Update**	**Notes**
Maintain An Inventory Of Category 1 And 2 Dams In GIS Format	Deferred; relabeled from 7.1.1 to 8.1.1	Action is being continued.
Develop Land Use Strategies To Promote The Safe Use Of Land Downstream From Dams	Deferred; relabeled from 7.1.2 to 8.1.2	Action is being continued.

3.4.3 All Hazards Mitigation Strategy

COMMUNITY MITIGATION GOALS

Mitigation Goal 9: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **ALL HAZARDS.**

IDENTIFICATION AND ANALYSIS OF RANGE OF MITIGATION OPTIONS

The Douglas County Mitigation Planning Committee considered a range of mitigation options for the All Hazards Mitigation Strategy. They included prevention, property protection, public education and awareness, natural resource protection, structural project implementation and emergency services.

EXISTING POLICIES, REGULATIONS, ORDINANCES, AND LAND USE / NEW BUILDINGS AND INFRASTRUCTURE

Regulations, codes, standards, and best practices will guide the design of buildings to resist natural hazards. For new buildings, code requirements serve to define the minimum mitigation requirements, but compliance with regulations in building design is not sufficient to guarantee that a facility will perform adequately when impacted by the forces for which it was designed. Indeed, individual evaluation of the costs and benefits of specific hazard mitigation alternatives can lead to effective strategies that will exceed the minimum requirements. Additionally, special mitigation requirements may be imposed on projects in response to locale-specific hazards. When a change in use or occupancy occurs, the designer must determine whether this change triggers other mitigation requirements and must understand how to evaluate alternatives for meeting those requirements.

EXISTING BUILDINGS AND INFRASTRUCTURE

Buildings in any geographic location are subject to a wide variety of natural phenomena such as windstorms, floods, wildfire, and other hazards. While the occurrence of these incidents cannot be precisely predicted, their impacts are well understood and may be reduced through a comprehensive program of hazard mitigation planning.

A variety of techniques are available to mitigate the effects of natural hazards on the built environment. Depending on the hazards identified, the location and construction type of a proposed building or facility, and the specific performance requirements for the building, the structure can be designed to resist hazard effects such as induced loads. Later in the building's life cycle, additional opportunities to further reduce the risk from natural hazards may exist when renovation projects and repairs of the existing structure is undertaken. When incorporating disaster reduction measures into building design, some or all of the issues outlined below should be considered in order to protect lives, properties, and operations from damages caused by natural hazards.

MITIGATION ACTION PLAN

GOAL 9: Minimize the loss of life and property and other economic losses in Douglas County and the City of Douglasville due to **ALL HAZARDS**.

Similar to 2010 Plan update, Mitigation Action Plan for Severe Weather Mitigation includes two mitigation objectives, as listed below:

OBJECTIVE 9.1: Minimize the effects of all hazards in Douglas County and the City of Douglasville through effective communications systems and infrastructure. This objective has two mitigation actions carried over from the 2010 Plan.

GOAL: 9 OBJECTIVE: 9.1 MITIGATION ACTION: 9.1.1	
Install A Countywide Hi Band Radio Trunked System	
Responsible Department	Douglas county EMA
Anticipated Cost	$10 - $15 Million
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County
Timeframe	5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 9 OBJECTIVE: 9.1 MITIGATION ACTION: 9.1.2	
Integrate All Public Safety Records Management Systems With The 911 Dispatch System And The County And City GIS Departments	
Responsible Department	Douglas County EMA, 911, County/City GIS Departments
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County
Timeframe	3 Years
STAPLEE Ranking	15/23
Status (Deferred Or New)	Deferred

OBJECTIVE 9.2: To protect people and property from the effects of all hazards in Douglas County and the City of Douglasville. This objective has two mitigation actions deleted (one completed, one cancelled), and 12 mitigation actions carried over from the 2010 Plan.

GOAL: 9 OBJECTIVE: 9.2 MITIGATION ACTION: 9.2.1	
Formally Organize A Local Emergency Planning Committee	
Responsible Department	Douglas County EMA
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County
Timeframe	2 Years
STAPLEE Ranking	18/23
Status (Deferred Or New)	Deferred

GOAL: 9 OBJECTIVE: 9.2 MITIGATION ACTION: 9.2.2	
Purchase Emergency Generators For All Water Pumping Stations And Lift Stations	
Responsible Department	Douglas County EMA & DDCWSA
Anticipated Cost	$75,000 Per Station
Existing & Potential Funding Sources	Douglas County & Utility Funds
Jurisdiction	Douglas County
Timeframe	5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 9 OBJECTIVE: 9.2 MITIGATION ACTION: 9.2.3	
Update Site Specific Emergency Plans For Schools And Other High Hazard Facilities Within Douglas County	
Responsible Department	Douglas County EMA
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County
Timeframe	3 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 9 OBJECTIVE: 9.2 MITIGATION ACTION: 9.2.4	
Review Current Land Use Plans To Modify Or Incorporate Into The Plan Guidelines To Direct Development Away From The Hazardous Areas	
Responsible Department	Douglas County EMA & Douglas County Planning/Dev. & City Of Douglasville Planning & Zoning
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County & City Of Douglasville
Timeframe	2 Years
STAPLEE Ranking	18/23
Status (Deferred Or New)	Deferred

GOAL: 9 OBJECTIVE: 9.2 MITIGATION ACTION: 9.2.5	
Encourage Local Businesses To Develop COOP's	
Responsible Department	Douglas County EMA
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County & City Of Douglasville
Timeframe	3-5 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 9 OBJECTIVE: 9.2 MITIGATION ACTION: 9.2.6	
Investigate The Need For Heating And Cooling Centers For Vulnerable Population	
Responsible Department	Douglas County EMA
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County & City Of Douglasville
Timeframe	3 Years
STAPLEE Ranking	16/23
Status (Deferred Or New)	Deferred

GOAL: 9 OBJECTIVE: 9.2 MITIGATION ACTION: 9.2.7	
Promote A Public Awareness Campaign To Educate Citizens About Evacuation Procedures, Sheltering In Place, And Public Shelter Locations	
Responsible Department	Douglas County EMA
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County & City Of Douglasville
Timeframe	3 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 9 OBJECTIVE: 9.2 MITIGATION ACTION: 9.2.8	
Develop And Implement A Public Awareness Campaign Encouraging Residents To Develop Family Disaster Plans	
Responsible Department	DOUGLAS COUNTY EMA
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County & City Of Douglasville
Timeframe	3 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 9 OBJECTIVE: 9.2 MITIGATION ACTION: 9.2.9	
Promote Fireplace And Chimney Maintenance Public Safety	
Responsible Department	Douglas County EMA
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County & City Of Douglasville
Timeframe	3 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 9 OBJECTIVE: 9.2 MITIGATION ACTION: 9.2.10	
Conduct Public Education Reminding Residents About The Dig Safe Program	
Responsible Department	Douglas County EMA
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County
Timeframe	3 Years
STAPLEE Ranking	15/23
Status (Deferred Or New)	Deferred

GOAL: 9 OBJECTIVE: 9.2 MITIGATION ACTION: 9.2.11	
Develop A Public Education Campaign To Encourage Homeowners To Buy Hazard Insurance To Protect Belongings	
Responsible Department	Douglas County EMA
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County
Jurisdiction	Douglas County & City Of Douglasville
Timeframe	3 Years
STAPLEE Ranking	14/23
Status (Deferred Or New)	Deferred

GOAL: 9 OBJECTIVE: 9.2 MITIGATION ACTION: 9.2.12	
Ensure That Future Land Use Planning Takes Into Consideration The Possible Effects Of All Hazards	
Responsible Department	Douglas County EMA, Douglas County Planning/Dev. & City Of Douglasville Planning And Zoning
Anticipated Cost	Staff Time And Resources
Existing & Potential Funding Sources	Douglas County & City Of Douglasville
Jurisdiction	Douglas County & City Of Douglasville
Timeframe	3-5 Years
STAPLEE Ranking	22/23
Status (Deferred Or New)	Deferred

Table 3.11
Updated Mitigated Actions for Douglas County 2015 HM Plan
All Hazards

ALL HAZARDS GOAL: 9 OBJECTIVE: 9.1		
Mitigation Action	**Status From 2010 HMP Update**	**Notes**
Install A Countywide Hi Band Radio Trunked System	Deferred; changed; relabeled from 8.1.1 to 9.1.1	Cost estimated at $10M- $15M.
Integrate All Public Safety Records Management Systems With The 911 Dispatch System And The County And City GIS Departments	Deferred; changed; relabeled from 8.1.2 to 9.1.2	Responsible departments added.
GOAL: 9 OBJECTIVE: 9.2		
Build A New Emergency Operations Center (EOC)	Completed; removed	New EOC completed in November of 2011. Action is completed and removed.
Formally Organize A Local Emergency Planning Committee	Deferred; relabeled from 8.2.2 to 9.2.1	Action is being partially completed and continued. The committee is active.
Purchase Emergency Generators For All Water Pumping Stations And Lift Stations	Deferred; changed; relabeled from 8.2.3 to 9.2.2	Action is partially completed (major stations were mitigated). Cost is changed to $75,000 per station.
Update Site Specific Emergency Plans For Schools And Other High Hazard Facilities Within Douglas County	Deferred; changed; relabeled from 8.2.4 to 9.2.3	Action is being continued.
Review Current Land Use Plans To Modify Or Incorporate Into The Plan Guidelines To Direct Development Away From The Hazardous Areas	Deferred; changed; relabeled from 8.2.5 to 9.2.4	Action is being continued.
Acquire Zoning Application Software Linked To All Development Service Departments Including GIS	Cancelled; removed	Action is cancelled, due to lack of further need for such software.
Encourage Local Businesses To Develop COOP's	Deferred; relabeled from 8.2.7 to 9.2.5	Action is being continued.

ALL HAZARDS GOAL: 9 OBJECTIVE: 9.1		
Investigate The Need For Heating And Cooling Centers For Vulnerable Population	Deferred; changed; relabeled from 8.2.8 to 9.2.6	Needs are being assessed based on weather, primarily in churches and other basic shelters.
Promote A Public Awareness Campaign To Educate Citizens About Evacuation Procedures, Sheltering In Place, And Public Shelter Locations	Deferred; relabeled from 8.2.9 to 9.2.7	Action is being continued.
Develop And Implement A Public Awareness Campaign Encouraging Residents To Develop Family Disaster Plans	Deferred; relabeled from 8.2.10 to 9.2.8	Action is being continued. Campaign is using www.ready.ga.gov
Promote Fireplace And Chimney Maintenance Public Safety	Deferred; relabeled from 8.2.11 to 9.2.9	Action is being continued.
Conduct Public Education Reminding Residents About The Dig Safe Program	Deferred; relabeled from 8.2.12 to 9.2.10	Action is being continued.
Develop A Public Education Campaign To Encourage Homeowners To Buy Hazard Insurance To Protect Belongings	Deferred; relabeled from 8.2.13 to 9.2.11	Action is being continued.
Ensure That Future Land Use Planning Takes Into Consideration The Possible Effects Of All Hazards	Deferred; relabeled from 8.2.14 to 9.2.12	Action is being continued.

Chapter 4
Plan Execution and Maintenance

4.1 Implementation Action Plan
4.1.1 Incorporation into Other Local Planning Mechanisms
4.1.2 Review and Incorporation of Existing plans, Studies, Reports and Technical Information
4.2 Evaluation, Monitoring, Updating
4.3 Plan Update and Maintenance

Chapter 4 of this Plan update discusses how the Mitigation Strategies will be implemented by Douglas County and the City of Douglasville and how the overall updated Hazard Mitigation Plan will be evaluated and enhanced over time. This chapter also describes how the public and participating stakeholders will continue to be involved in the hazard mitigation planning process.

Table 4.1
Overview of updates to Chapter 4: Plan Execution and Maintenance

2009 HP – Chapter 6	Section updates
Implementation Action Plan	Enumerated section to 4.1 *Implementation Action Plan* and updated to reflect 2015 Hazard Mitigation Plan.
Evaluation, Monitoring, Updating	Enumerated section to 4.2 *Evaluation, Monitoring, and Updating* and modified to reflect 2015 Hazard Mitigation Plan.
Plan Update and Maintenance	Enumerated section to 4.3 *Plan Update and Maintenance* and modified to reflect 2015 Hazard Mitigation Plan.

4.1 Implementation Action Plan

As with the 2005 Plan and 2010 update, the planning process was overseen by the Douglas County Emergency Management Agency. The Douglas County Board of Commissioners has authorized the submission of this Plan to both the Georgia Emergency Management Agency and the Federal Emergency Management Agency for their respective reviews and subsequent approvals. Upon State and Federal approval, the Douglas County Board of Commissioners will act to formally adopt this Plan.

4.1.1 Incorporation into Other Local Planning Mechanisms

As required by the FEMA Interim Final Rule (IFR) that governs mitigation planning, actions and strategies from the Douglas County mitigation plan must be incorporated into other planning mechanisms, as applicable, during the routine re-evaluation and update of the County HMP. Both the County and the City of Douglasville will use specific actions from Chapter 3 of this Plan update as part of their capital

budgeting processes, in particular when projects require local match for federal grants. The County will also look for opportunities to use the updated HMP in conjunction with drainage plans.

Where applicable, portions of the 2015 Douglas County Hazard Mitigation Plan update will be considered for incorporation into other local plans and programs. This includes some form of incorporation into the Douglas County Comprehensive Plan at the next scheduled update. The Comprehensive Plan, which focuses on land use and community development, is required of all local governments by the Georgia Department of Community Affairs (DCA). Portions of the HMP may also be integrated into the Douglas County Local Emergency Operations Plan (LEOP), emergency plans for the City of Douglasville, and other existing or future public safety-related plans.

Where applicable, action items related to the flood hazard from the Plan update will be incorporated into the County's Floodplain Management Ordinance, discussed previously in Section 2.3.2 of this Plan.

Table 4.2 lists hazard mitigation goals and actions that can be incorporated into five most significant long term plans by Douglas County and the City of Douglasville. The mitigation goals and actions listed in Table 4.2 correspond to mitigation strategies listed in Chapter 3 of this Plan, and, more concisely, to mitigation actions summarized in Table 3.2.

Table 4.2
Incorporation of hazard mitigation strategies into other planning mechanisms

Plans	Jurisdiction	Mitigation actions from 2015 HMP that can be incorporated into pertinent plan
Comprehensive Master Plan	Douglas County City of Douglasville	Mitigation goal 1: 1.2.1,1.2.2 Mitigation goal 2: 2.1.1,2.1.3 – 2.1.7, 2.1.9 Mitigation goal 3: 3.1.3 Mitigation goal 6: 6.1.1, 6.1.2 - 6.1.3 Mitigation goal 7: 7.1.2 Mitigation goal 8: 8.1.1 - 8.1.2 Mitigation goal 9: 9.2.3 - 9.2.7, 9.2.9 - 9.2.10, 9.2.12
Local Emergency Operations Plan	Douglas County and City of Douglasville (joint)	Mitigation goal 1: 1.1.1 – 1.1.3 Mitigation goal 2: 2.1.2, 2.1.5 – 2.1.6, 2.1.9 – 2.1.12, 2.1.14* Mitigation goal 3: 3.1.1 – 3.1.4 Mitigation goal 4: 4.1.1 – 4.1.3 Mitigation goal 5: 5.1.1 Mitigation goal 6: 6.1.1 – 6.1.6 Mitigation goal 7: 7.1.1 – 7.1.4 Mitigation goal 8: 8.1.1 - 8.1.2 Mitigation goal 9: 9.1.1 – 9.2.4, 9.2.6 – 9.2.8, 9.2.11
Transportation Plan	Douglas County and City of Douglasville (joint)	Mitigation goal 2: 2.1.2, 2.1.11, 2.1.13 – 2.1.14* Mitigation goal 3: 3.1.1 – 3.1.4 Mitigation goal 4: 4.1.2 – 4.1.3 Mitigation goal 7: 7.1.2, 7.1.4
Community Wildfire Protection Plan	Douglas County and City of Douglasville (joint)	Mitigation goal 1: 1.1.2 Mitigation goal 6: 6.1.1 – 6.1.6

* Mitigation Action 2.1.14 is in jurisdiction of City of Villa Rica

4.1.2 Review and Incorporation of Existing plans, Studies, Reports and Technical Information

Other planning documents can be used as a valuable resource for integrating information related to hazard mitigation into the HMP.

Presented herein is a list of plans, studies and other documents that were considered during the 2015 Douglas County Plan update. This HMP Plan update has been made available to each committee leader responsible for updating these other Plans. This list includes plans such as Douglas County 2025 Comprehensive Plan as well as studies such as the March, 2013 Flood Insurance Study (FIS), and Flood Insurance Rate Maps (FIRMs). The specific plans, studies and reports are listed below along with a discussion on how they were incorporated into the Plan update. More detailed description of some of the comprehensive plans and updates for Douglas County and City of Douglasville are presented in Appendix B of this Plan.

- **State of Georgia Hazard Mitigation Strategy**: The update of the 2008 Plan became effective April 1, 2014. The updated definitions of natural and technological hazards in the 2014 State Plan and corresponding mitigation goals and strategies were considered by the HMPC as the planning team updated the Douglas County Plan, and to the extent possible the team patterned the update to reflect the spirit and details of the State document.
- **Douglasville-Douglas County Emergency Operations Plan.** This plan describes the management and coordination of resources and personnel during periods of major emergency. The Douglas EOP was reviewed to understand the incident management structure in Douglas County.
- **Douglas County 2025 Comprehensive Plan: 2013 Update**. This Plan was used to identify land use patterns, future population projections, and future development trends in Douglas County.
- **Update of the Comprehensive Plan, City of Douglasville, Georgia, 2013**. This Plan was used to identify land use patterns, future population projections, and future development trends in the City of Douglasville.
- **Douglas County Comprehensive Transportation Plan, November, 2009.** The Comprehensive Transportation Plan was review and elements incorporated into the Plan update.
- **Douglas County Flood Insurance Rate Maps (FIRM).** The Douglas County effective FIRM dated March 4, 2013 was reviewed to identify flood-prone areas of the County.
- **Douglas County (And Incorporated Areas) Flood Insurance Study (FIS), March 4, 2013**. The FIS compiles all previous flood information and includes data collected on numerous waterways. The current FISs was used to identify flood-prone areas of the County and historical flood events. The FIS was also used to describe the major rivers and drainage system within Douglas County. The existing flood-prone areas were confirmed with the HAZUS-MH-generated flood maps.

4.2 Evaluation, Monitoring, and Updating

Monitoring, evaluating, and updating this plan is critical to maintaining its value and success in Douglas County's hazard mitigation efforts. Ensuring effective implementation of mitigation activities paves the way for continued momentum in the planning process and gives direction for the future. This section explains who will be responsible for maintenance activities and what those responsibilities entail. It also provides a methodology and schedule of maintenance activities including a description of how the public will be involved on a continued basis. While the methodology and schedule are similar to what is

outlined in the 2010 Douglas County Hazard Mitigation Plan, slight revisions were made based on the County's experience with actually maintaining the existing plan between 2010 and 2015.

The Douglas County Mitigation Planning Committee established for this 2015 Plan update is designated to lead plan maintenance processes of monitoring, evaluation and updating with support and representation from all participating municipalities. The Mitigation Planning Committee will coordinate maintenance efforts, but the input needed for effective periodic evaluations will come from community representatives, local emergency management coordinators and planners, the general public, and other important stakeholders. In addition, the committee will serve in an advisory capacity to the Douglas County Board of Commissioners and the Douglas County Emergency Management Agency.

Each municipality will designate a community representative to monitor implementation of mitigation activities and hazard events within their respective communities. This individual will be asked to work with the Douglas County Mitigation Planning Committee to provide updates on applicable mitigation actions and feedback on changing hazard vulnerabilities within their community.

In addition, the municipal monitor will be responsible for reviewing the planning and land use regulatory element of the municipality's capability assessment to identify potential opportunities for incorporating appropriate elements of this Plan into local planning mechanisms and will also identify locally generated plans, information, reports, etc.

The Mitigation Planning Committee will oversee the progress made on the implementation of action items identified and modify actions, as needed, to reflect changing conditions. The Douglas County Mitigation Planning Committee will meet annually to evaluate the plan and discuss specific coordination efforts that may be needed with participating jurisdictions and other stakeholders. The annual evaluation may include the participation of individual municipal monitors, or at least will include reports prepared by them.

The annual evaluation of the 2015 Hazard Mitigation Plan will not only include an investigation of whether mitigation actions were completed, but also an assessment of how effective those actions were in mitigating losses. A review of the qualitative and quantitative benefits (or avoided losses) of mitigation activities will support this assessment. Results of the evaluation will then be compared to the goals and objectives established in the plan and decisions will be made regarding whether actions should be discontinued, or modified in any way in light of new developments in the community. Progress will be documented by the Mitigation Planning Committee for use in the next Hazard Mitigation Plan update and submitted to the Douglas County Emergency Management Agency. Finally, the Mitigation Planning Committee will monitor and incorporate elements of this Plan into other planning mechanisms such as the county's comprehensive land use plan and flood mitigation plan. The annual reviews will be coordinated by Jason Milhollin, Director of the Douglas County Emergency Management Agency.

This Plan will be updated by the FEMA approved five year anniversary date, as required by the Disaster Mitigation Act of 2000, or following a disaster event. Future plan updates will account for any new hazard vulnerabilities, special circumstances, or new information that becomes available. During the five-year review process, the following questions will be considered as criteria for assessing the effectiveness of the Douglas County Hazard Mitigation Plan.

- Has the nature or magnitude of hazards affecting the County changed?
- Are there new hazards that have the potential to impact the County?
- Do the identified goals and actions address current and expected conditions?
- Have mitigation actions been implemented or completed?
- Has the implementation of identified mitigation actions resulted in expected outcomes?
- Are current resources adequate to implement the plan?
- Should additional local resources be committed to address identified hazards?

Issues that arise during monitoring and evaluation which require changes to the local hazard, risk and vulnerability summary, mitigation strategy, and other components of the plan will be incorporated during future updates.

Update process for plan prior to 5-year update. Any interested party wishing for an update of the Plan sooner than the 5-year update will submit such a request to the Douglas County Emergency Management Agency for consideration through Jason Milhollin, Director of the Douglas County Emergency Management Agency and Chairman of the Douglas County Mitigation Planning Committee. The request shall be accompanied by a detailed rationale. The Douglas County Emergency Management Agency will evaluate all such requests and determine whether the update request should be acted upon. If the decision is in the affirmative, an assignment will be made for an individual to author the update. The draft updated section along with a detailed rationale will be submitted to the Douglas County Mitigation Planning Committee. The committee will circulate the draft updated section to every jurisdiction participating in the plan for comment and after an appropriate period of time, the committee shall make a decision to update the plan at least partially based on the feedback received from the other jurisdiction. County and municipal adoptions will then occur.

4.3 Plan Update and Maintenance

As was done during the development of both the 2005 and 2010 Hazard Mitigation Plans, the Douglas County Mitigation Planning Committee will involve the public during the evaluation and update of this Plan through any workshops and meetings. The public will have access to the current Plan through their local municipal office and the Douglas County Emergency Management Agency. Information on upcoming events related to this Plan or solicitation for comments will be announced via newsletters, newspapers, mailings, and the County website which can be accessed at:

www.douglascountyema.com

The public is encouraged to submit comments on the Plan at any time. The Douglas County Mitigation Planning Committee will review and determine relevant comments to include during the next update of the hazard mitigation plan.

Chapter 5
Conclusion

Douglas County has gained a great deal of knowledge relating to the County's disaster history and future potential for disaster as a result of the hazard mitigation planning process. This includes an extensive hazard history of recorded hazard events from the past sixty years, a detailed critical facilities database with valuable information on some of most critical County and city structures, as well as some valuable ideas from the community abroad concerning measures that should be considered for future hazard mitigation opportunities.

The general planning process picked up from where the 2010 Plan left off and that is with the identification and re-evaluation of hazards that have occurred within Douglas County throughout the past. This was followed with data collection throughout the County and within its communities.
Assessments were then made to determine the vulnerability of the community to various hazards, and to determine hazard-specific losses. After evaluation of potential losses within the community, mitigation goals, objectives, and related action items were then re-evaluated and prioritized using FEMA's STAPLEE method.

Community involvement has been at the heart of this effort. The 2015 planning process included re-establishing the Hazard Mitigation Planning Committee (HMPC) with representatives from a variety of backgrounds and disciplines. The process also included involving the public, by conducting public meetings to provide all Douglas County citizens with the opportunity to comment on, and offer suggestions concerning potential hazard mitigation measures within the community. As part of the 2015 Plan update, Douglas County, the City of Douglasville all worked in concert to ensure a broad range of citizens were represented. GEMA and FEMA provided valuable assistance as well. These efforts have all had the effect of better protecting the planning area from the threats from both natural and technological hazards. While it would be naïve to believe this Plan provides complete protection to Douglas County and its residents, it is the hope of all parties involved in this planning process that the recommended mitigation measures contained within the Plan update will provide some level of increased preparedness as well as spur further discussion and planning related to the important subject of Hazard Mitigation.