SANDY SPRINGS
GEORGIA

CITY COUNCIL AGENDA ITEM

TO: Mayor & City Council **DATE:** September 9, 2011

FROM: John McDonough, City Manager

AGENDA ITEM: Adoption of Fulton County Hazard Mitigation Plan

MEETING DATE: For Submission onto the September 20, 2011, City Council Regular Meeting Agenda

BACKGROUND INFORMATION: (Attach additional pages if necessary)

See attached:

Memorandum
Resolution
Mitigation Plan

APPROVAL BY CITY MANAGER: _____ *APPROVED*

_____ *NOT APPROVED*

PLACED ON AGENDA FOR: 9/20/2011

CITY ATTORNEY APPROVAL REQUIRED: (✓) *YES* ( ) *NO*

CITY ATTORNEY APPROVAL: _____

REMARKS:

SANDY SPRINGS
GEORGIA

TO: John McDonough, City Manager

FROM: Eden Freeman, Assistant City Manager

DATE: September 12, 2011 for submission on the Agenda of the September 20, 2011 City Council Meeting

ITEM: Adoption of Fulton County Multi-jurisdictional Hazard Mitigation Plan

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Background

Staff was recently notified by the Georgia Emergency Management Agency (GEMA) and Fulton County that the county's Multi-jurisdictional Hazard Mitigation Plan has been approved by the Federal Emergency Management Agency (FEMA) and is ready for adoption by the municipalities within the county.

Discussion

Mitigation planning is a process through which communities assess risks and identify actions to reduce vulnerability to hazards through hazard mitigation. A Mitigation Plan is a community-driven, living document that communities use to reduce their vulnerability to hazards. Plans must be developed at the County level and are then adopted by the municipalities within the county. Plans identify potential Hazard Mitigation Actions that would be eligible for funding should a disaster occur and mitigation funds made available. The City is not required to implement any of the Hazard Mitigation Actions identified in Table 6-3 of the plan.

Communities are required by federal guidelines to have a plan in order to apply for or receive a Mitigation Grant. These grants can augment local mitigation activities already being done. Ultimately, these actions reduce vulnerability and communities are able to recover more quickly from disasters.

The Fulton County Multi-jurisdictional Hazard Mitigation Plan expired on May 30, 2010 and the County undertook a planning process to develop a new plan. The new plan was completed and transmitted to GEMA in December 2010. The plan was then reviewed and edited by GEMA and transmitted to FEMA in June 2011. The plan was approved by FEMA on August 25, 2011, pending adoption by the County and municipalities (see attached letter from FEMA).

Staff Recommendation

Staff recommends adoption of the Fulton County Multi-jurisdictional Hazard Mitigation Plan to preserve eligibility for mitigation grant funds, including disaster relief funding.

Alternatives

Council could choose not to adopt the Fulton County Multi-jurisdictional Hazard Mitigation Plan thereby endangering the City's eligibility for mitigation grant funds including disaster relief.

Financial Impact

If the Fulton County Multi-jurisdictional Hazard Mitigation Plan is not adopted, the City stands to be ineligible for federal assistance for mitigation programs, including disaster relief and response, such as experienced as a result of the 2009 floods.

Attachment

1. Letter from Robert E. Lowe, Chief Risk Analysis Branch, Mitigation Division, FEMA.

2. FEMA Fact Sheet, *"State and Local Mitigation Planning."*

3. Resolution formally adopting Fulton County Multi-jurisdictional Hazard Mitigation Plan.

4. Fulton County Multi-jurisdictional Hazard Mitigation Plan, as approved by FEMA.

RESOLUTION NO. 2011-__-__

STATE OF GEORGIA
COUNTY FULTON

A RESOLUTION OF THE SANDY SPRINGS CITY COUNCIL PURSUANT TO THE DISASTER MITIGATION ACT OF 2000 AUTHORIZING ADOPTION OF THE FULTON COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN.

WHEREAS, Fulton County and its municipal governments are required to complete a Hazard Mitigation Plan by the Disaster Mitigation Act of 2000; and

WHEREAS, under the provisions of the Disaster Mitigation Act of 2000, local governments that complete Hazard Mitigation Plans will remain eligible for Federal mitigation funding; and

WHEREAS, Fulton County and its municipal governments have completed a Hazard Mitigation Plan that fulfills the Federal requirements of the Disaster Mitigation Act of 2000.

NOW THEREFORE, BE IT RESOLVED by the City Council of the City of Sandy Springs, Georgia while in regular session on September 20, 2011 at 6:00 p.m. that the Fulton County Multi-jurisdictional Hazard Mitigation Plan is formally adopted.

APPROVED AND ADOPTED this the 20th day of September, 2011.

Approved:

_____
Eva Galambos, Mayor

Attest:

_____
Michael Casey, City Clerk

(Seal)

U.S. Department of Homeland Security
FEMA Region IV
3003 Chamblee Tucker Road
Atlanta, GA 30341

FEMA

August 25, 2011

Mr. Terry Lunn
State Hazard Mitigation Officer
Georgia Emergency Management Agency
Post Office Box 18055
Atlanta, Georgia 30316-0055

Reference: Multi-jurisdictional Hazard Mitigation Plan Update: Fulton County, Georgia

Dear Mr. Lunn:

This is to confirm that we have completed a Federal/State review of the Fulton County Multi-jurisdictional Hazard Mitigation Plan Update for compliance with the federal hazard mitigation planning standards contained in 44 CFR 201.6(b)-(d). We have determined that the Fulton County Multi-jurisdictional Hazard Mitigation Plan is compliant with federal standards, subject to formal community adoption.

In order for our office to issue formal approval of the plan, Fulton County must submit adoption documentation and document that the final public meeting occurred. Upon submittal of these items to our office, we will issue formal approval of the Fulton County Multi-jurisdictional Hazard Mitigation Plan.

For further information, please do not hesitate to contact Claude Hyacinthe, of the Hazard Mitigation Assistance Branch, at (770) 220-5403 or Linda L. Byers, of my staff, at (770) 220-5498.

Sincerely,

Robert E. Lowe, Chief
Risk Analysis Branch
Mitigation Division

FEMA

Fact Sheet

State and Local Mitigation Planning

Building stronger and safer

Hazard mitigation planning is the process state, local and tribal governments use to identify risks and vulnerabilities associated with natural disasters and to develop long-term strategies for protecting people and property in future hazard events. The process results in a mitigation plan that offers a strategy for breaking the cycle of disaster damage, reconstruction and repeated damage and a framework for developing feasible and cost-effective mitigation projects. Under the Disaster Mitigation Act of 2000 (Public Law 106-390), State, local and Tribal governments are required to develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance.

Reducing risks through mitigation planning

A hazard mitigation plan is a long-term strategy for reducing disaster losses. The planning process promoted by the Disaster Mitigation Act of 2000 is as important as the resulting plan because it encourages jurisdictions to integrate mitigation with day-to-day decisionmaking regarding land-use planning, floodplain management, site design and other functions.

Mitigation planning elements

- Public involvement – In addition to government agencies involved in incident management, floodplain management and economic development, the planning process usually involves a range of stakeholders, including representatives of neighborhood groups, civic organizations, academia, environmental groups, the business community and individual citizens. Involving stakeholders is essential to determining the most vulnerable populations and facilities in the community and to assuring community wide support for the plan.

- Risk assessment – A risk assessment is the process of identifying natural hazards and risks associated with them, including threats to public health and safety, property damage and economic loss. The assessment answers the fundamental question, "What would happen if a natural disaster occurred?" and provides a factual basis for the mitigation activities proposed in the strategy. The assessment includes a description of the type, location and extent of natural hazards; the jurisdiction's vulnerability to the hazards; and the type and numbers of buildings, infrastructure and critical facilities located in identified hazard areas.

- Mitigation strategy – Based on the risk assessment, State, local and Tribal governments develop mitigation goals and objectives and a strategy for mitigating disaster losses.

The strategy sets forth an approach for implementing activities that are cost-effective, technically feasible and environmentally sound.

Hazard mitigation plan required to receive HMGP Project Grants

Local jurisdictions are required by federal law to have a FEMA-approved hazard mitigation plan in order to receive Pre-Disaster Mitigation (PDM) or Hazard Mitigation Grant Program (HMGP) project grant funding. However, in extraordinary circumstances, HMGP funds can be awarded to communities that agree to develop a hazard mitigation plan within 12 months of receiving the project grant. Every State has a FEMA approved hazard mitigation plan, though many local jurisdictions still do not.

Mitigation Examples

History shows that the physical, financial and emotional losses caused by disasters can be reduced significantly through mitigation planning. Mitigation focuses attention and resources on solving a particular problem (such as reducing repetitive flood losses) and thereby produces successive benefits over time. Through implementation of local floodplain ordinances, for example, it is estimated that $1.1 billion in flood damages are prevented annually.

Mitigation includes a broad range of activities designed to protect homes, schools, public buildings and critical facilities. Examples include the following types of projects:

- Adopting and enforcing more stringent building codes, flood-proofing requirements, seismic design standards, or wind-bracing requirements for new construction or the retrofit of existing buildings.
- Exceeding the National Flood Insurance Program (NFIP) floodplain management regulations by elevating structures above the base flood elevation (BFE) in high-risk areas.
- Adopting stricter development regulations and zoning ordinances that steer development away from areas subject to flooding, storm surge, or coastal erosion.
- Retrofitting public buildings, schools and critical facilities, such as police and fire stations, to withstand hurricane-strength winds or ground shaking from earthquakes.
- Using public funds to acquire damaged homes or businesses in flood-prone areas, demolish or relocate the structures and use the property for open space, wetlands, or recreational uses.
- Building community shelters and “safe rooms” to help protect people in public buildings and schools in hurricane- and tornado-prone areas.

Planning tool available for government agencies

FEMA has developed a number of planning tools to help government agencies develop mitigation plans. These include how-to guides, CD ROMs and online information about organizing a planning team, involving stakeholders, conducting risk assessments, evaluating potential mitigation measures, conducting benefit-cost analyses and other planning issues.

For more information

Please visit: http://www.fema.gov/plan/mitplanning/index.

For state name disaster recovery, visit www.fema.gov or your state Web-site.

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"FEMA's mission is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards."

May 2011

Chapter 1: Introduction

Chapter Overview

1.1 Background
1.2 Authority
1.3 Overview of FEMA Hazard Mitigation Assistance Grants
1.4 The 2010 Atlanta-Fulton County Hazard Mitigation Plan Update

1.1 Background

Fulton County is home to 14 local jurisdictions including the City of Atlanta, which is the major metropolitan city in the Southeast United States. There are thirteen Fortune 500 and twenty-four Fortune 1000 headquarters in Atlanta, as well as Hartsfield-Jackson International Airport – the World's Busiest Airport for four years and running. Atlanta also houses the State Capitol and the Fulton County Courthouse, both of which are listed in the National Register of Historic Places. Considering the assets that Fulton County holds, in addition to its nearly 1 million residents, it is imperative that Fulton County make hazard mitigation a primary focus.

In 2004, the Atlanta-Fulton County Emergency Management Agency (AFCEMA) developed its 2004 Atlanta-Fulton County Hazard Mitigation Plan in accordance with the Disaster Mitigation Act of 2000. As required by law, the plan must be updated every 5 years. This plan has been updated to reflect compliance with regulations and requirements that have been enacted since 2004. As with the 2004 plan, this plan is a multi-jurisdictional guide for all communities that have participated in the preparation of this plan through the Hazard Mitigation Planning Committee (HMPC). It fulfills the requirements of the Federal Disaster Mitigation Act of 2000 (DMA 2000) as administered by the Georgia Emergency Management Agency (GEMA) and the Federal Emergency Management Agency (FEMA) Region IV.

1.2 Authority

The Atlanta-Fulton County Hazard Mitigation Plan has been prepared by the Atlanta-Fulton County Emergency Management Agency, pursuant to Section 322 of the Disaster Mitigation Act of 2000 (Public Law 106-390).

Section 322 requires local governments to develop mitigation plans that include:

(1) Documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved;
(2) A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards;
(3) A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools;
(4) A plan maintenance process that includes a monitoring and evaluation schedule based on a five-year cycle, a process for the plan's incorporation into other planning mechanisms, and public involvement in the plan maintenance process;
(5) Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan.

The Atlanta-Fulton County Emergency Management Agency, through County Code, Chapter 130 (Sections 130.1 to 130.30) is designated as the Emergency Management Agency for Fulton County. In addition, Chapter 50 (Section 50.1-50.25) of the City of Atlanta ordinances designates AFCEMA as its primary emergency management organization.

1.3 Overview of the FEMA Hazard Mitigation Assistance Grants

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

1. **The Hazard Mitigation Grant Program (HMGP)**. The HMGP provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.
2. **The Pre-Disaster Mitigation Grant Program (PDM)**. The PDM program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.
3. **The Flood Mitigation Assistance Program (FMA)**. The FMA program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FEMA provides FMA funds to assist states and communities implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP).
4. **The Repetitive Flood Claims (RFC) Program**. The Repetitive Flood Claims (RFC) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108–264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). Up to $10 million is available annually for FEMA to provide RFC funds to assist states and communities reduce flood damages to insured properties that have had one or more claims to the National Flood Insurance Program (NFIP).
5. **The Severe Repetitive Loss (SRL) Program**. The Severe Repetitive Loss (SRL) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, which amended the National Flood Insurance Act of 1968 to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the National Flood Insurance Program (NFIP).

1.4 2010 Atlanta-Fulton County Hazard Mitigation Plan Update

The Hazard Mitigation Planning Committee (HMPC) began the update process in June 2010. With the exception of dam-related flooding incidents, this update addresses natural hazards only. The Atlanta-Fulton County Emergency Management Agency retained the firm of Calvin, Giordano, and Associates, Inc., to prepare the plan under the direction of the Hazard Mitigation Planning Committee and the Atlanta-Fulton County Emergency Management Director. The firm's project manager, Helene Wetherington, AICP, CEM a professional urban planner and emergency manager. She was supported by Beth McElroy, CEM, who served as the lead planner for the hazard mitigation plan update. The 2009 HMPC represents unincorporated Atlanta-Fulton County, its municipal jurisdictions which participated, regional entities such as water and wastewater, and transportation, as well as other stakeholders and interested agencies. The HMPC coordinated on a regular basis during the update process to oversee the drafting of the plan. Through a comprehensive planning process and risk assessment, the plan creates a unified approach among all Atlanta-Fulton County communities for dealing with identified hazards and associated risk issues. It serves as a guide for local governments in their ongoing efforts to reduce community vulnerabilities.

Chapter 2: Regulatory Requirements

Chapter Overview

2.1 Federal Prerequisites
2.2 Plan Approval Required for Mitigation Grants Eligibility
2.3 Multi-Jurisdictional Participation
2.4 Multi-Jurisdictional Plan Adoption

2.1 Federal Prerequisites

This chapter of the Plan addresses the Prerequisites of 44 CFR Sections 201.6(a)(1) and (4) and (c)(5), as follows:

Section 201.6(a) ***Plan requirements.***

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

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

Section 201.6(c) ***Plan content.***

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

2.2 Plan Approval Required for Mitigation Grants Eligibility

FEMA approval of this plan will permit continued eligibility for the programs listed in Chapter 1, Section 1.3. Funding can provide assistance to participating jurisdictions and entities (i.e. water districts, school boards, etc.). Once the plan is approved pending adoption, the governing bodies of the participating jurisdictions, boards and other entities, must formally adopt the plan and submit their adopting resolutions to FEMA through the Georgia Emergency Management Agency to receive official FEMA approval. This process must take place within twelve months of FEMA's notification of conditional approval pending adoption. If the plan is not approved by FEMA and locally adopted by resolution of the governing body, the entity will not be eligible to apply for and receive project grants under any of the FEMA hazard mitigation assistance programs. Hazard mitigation assistance programs have additional requirements for grant eligibility depending on the program's funding source.

2.3 Multi-jurisdictional Participation

The AFCEMA serves as the lead coordinating agency for mitigation planning and coordinates with the Hazard Mitigation Planning Committee (HMPC). Atlanta-Fulton County and the cities of Atlanta, Chattahoochee Hills, College Park, East Point, Fairburn, Hapeville, Milton, Mountain Park, Palmetto, Roswell, Sandy Springs, Union City, and Unincorporated Fulton County participated in the 2010 plan update of the existing plan. School districts are defined as local governments, according to Federal regulations at 44 CFR Section 201.2, and are therefore required to have a FEMA-approved a local mitigation plan to be eligible for project grants under FEMA hazard mitigation assistance programs. A school district may also demonstrate their participation as a separate government entity in another local government's approved mitigation plan to be eligible for project grants under FEMA hazard mitigation assistance programs.

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

- Planning sessions in which participants
  - Selected a risk assessment methodology
  - Updated the hazard vulnerability assessment
  - Reviewed and revised existing goals and develop new goals as appropriate
  - Identified mitigation projects
  - Updated list of existing mitigation actions being undertaken throughout the county
- Individualized jurisdiction assessments
  - Reviewed risk assessment and hazard vulnerability specific to each jurisdiction
  - Discussed priority hazard mitigation issues facing each jurisdiction
  - Discussed potential mitigation actions and solutions for areas of the jurisdiction vulnerable to priority hazards
  - Discussed and capture mitigation actions, policies, and ordinances undertaken or enacted by the jurisdiction that support hazard mitigation.

2.4 Public Participation

The public was invited to participate in the process and provide comment on the draft of the hazard mitigation plan. The Atlanta Fulton County Emergency Management Agency issued a press release informing the public of the opportunity to comment. A public hearing was conducted on December 8, 2010. A copy of the press release is included in Appendix C – Meeting Documentation. A public hearing for the final draft was held on {insert date and time when complete}.

Chapter 3: County Profile

Chapter Overview

3.1 Federal Prerequisites
3.2 Summary of Plan Updates
3.3 Geographic Setting and History
3.4 Climate
3.5 Government and Demographics
3.6 Transportation

3.1 Federal Requirements

This chapter of the Plan addresses the advisory on page 27 of the FEMA Local Multi-Hazard Mitigation Planning Guidance, July 1, 2008, which suggests community profile information be included to provide context for understanding the plan:

"The planning team should consider including a current description of the jurisdiction in this section or in the introduction of the plan. The general description can include a socio-economic, historic, and geographic profile to provide a context for understanding the mitigation actions that will be implemented to reduce the jurisdiction's vulnerability."

3.2 Summary of Plan Updates

Table 3-1 summarizes changes made to the 2004 plan as a result of the 2010 plan update, as follows:

Table 3-1: Summary of Plan Updates for Planning Process

Section		Change
3.3	Geographic Setting and History	Updated data
3.4	Climate	Addition of section
3.5	Government and Demographics	Addition of section
3.6	Transportation	Addition of section

3.3 Geographic Setting and History

Located in Central Northwestern Georgia, Fulton County was established in 1856 and it the most populous of all Georgia counties. It consists of 14 incorporated cities, including Atlanta, which serves as the county seat. Long and narrow in shape, the total area is approximately 528 square miles. The 2009 total population estimate of the county is approximately 1,033,756.[1] This represents a 26.7% increase since the 2000 Census.

The jurisdictions located within Fulton County are: Alpharetta, Atlanta, Chattahoochee Hills, College Park, East Point, Fairburn, Hapeville, Johns Creek, Milton, Mountain Park, Palmetto, Roswell, Sandy Springs and Union City. For a map of jurisdiction locations, see Appendix D – Maps. The jurisdictions of Sandy Springs, Milton, Johns Creek and Chattahoochee Hills were incorporated since the development of the 2004 Hazard Mitigation Plan.

3.4 Climate

The climate in Fulton County is considered to be a humid, subtropical climate. The average minimum and maximum temperatures are 52° and 72°, respectively. The average annual rainfall amount is approximately 50 inches which is distributed relatively evenly throughout the year. The average amount of snowfall is around 2.4 inches. Blizzards are rare, but possible. Frequent ice storms can typically cause more problems then snow. Table 3-2 provides monthly averages.

Table 3-2: Average monthly climate data

Month	Temperature		Rainfall	Snowfall
	Mean Low	Mean High		
January	33.5	51.9	5.03	1.0
February	36.5	56.8	4.68	.5
March	43.6	65.0	5.38	.6
April	50.4	72.9	3.62	Trace
May	59.5	80.0	3.95	.0
June	67.1	86.5	3.63	.0
July	70.6	89.4	5.12	.0
August	69.9	87.9	3.67	.0
September	64.3	82.3	4.09	.0
October	52.8	72.9	3.11	Trace
November	53.4	63.3	4.10	.0
December	45.4	54.6	3.82	.3

[1] US Census QuickFacts, http://quickfacts.census.gov/qfd/states/13/13121.html

3.5 Government and Demographics

Fulton County is governed by a seven member board of commissioners. The county has a county manager form of government in which day-to-day operation of the county is handled by a manager appointed by the board. Describe form of county government.

Fulton County is the home to the State's capital, Atlanta, and is the most populous city in the State of Georgia. As of 2009, Atlanta had an estimated population of about 541,000 people. Its metropolitan area, officially named the Atlanta Metropolitan Area is the ninth largest metropolitan area in the country, inhabited by about five and one-half million people. Moreover, the Atlanta Combined Statistical Area has a population approaching six million, making it the most populous metropolis in the Southeastern United States. Like most areas in the Sun Belt, the Atlanta region has seen explosive growth since about 1976, and it added about 1.1 million residents between 2000 and 2008. Atlanta is governed by a mayor and a city council. The city council consists of 15 representatives – one from each of the city's twelve districts and three at-large positions.

Atlanta is considered to be a top business city and is a primary transportation hub of the Southeastern United States - via highway, railroad, and air. Atlanta contains the world headquarters of such large corporations as the Coca-Cola Company, Georgia-Pacific, AT&T Mobility, the Cable News Network, Delta Air Lines, and Turner Broadcasting. Atlanta has the country's fourth-largest concentration of Fortune 500 companies and more than 75 percent of Fortune 1000 companies have business operations in the metropolitan area, helping Atlanta realize a gross metropolitan product of $270 billion, accounting for more than 2/3 of the Georgian economy. Hartsfield–Jackson Atlanta International Airport has been the world's busiest airport since 1998 (measured by number of passengers).

Atlanta is home to a large concentration of colleges and universities with more than 30 institutions of higher education. Some of these include prominent institutions such as Georgia Institute of Technology, Emory University, and Georgia State University.

In addition to the city of Atlanta, which is the largest jurisdiction, there are 14 other municipal jurisdictions in the county, with Mountain Park being the smallest. Within the county, there is wide variety in the character of the communities including industrial, agricultural, and equestrian. Some cities have been established for over a century while four communities, Milton, Chattahoochee Hills, Sandy Springs, and Johns Creek have incorporated since the last update of the hazard mitigation plan.

Although there are many large businesses and entities within the city of Atlanta, there are other noteworthy businesses and features located within other jurisdictions. For example, College Park is home to one of the busiest airports in the nation, Hartsfield-Jackson Atlanta International Airport. The Georgia International Convention Center, owned and operated by the City of College Park, is also within the city limits.

3.6 Transportation

Airports

Hartsfield-Jackson International Airport is located 7 miles south of the central business district of Atlanta. It has been the world's busiest airport by passenger traffic and number of landings and take-offs since 1999, serving 88 million passengers per year and 970,235 flights in 2009. The airport is the primary hub of AirTran Airways, Delta Air Lines, and Delta Connection partner Atlantic Southeast Airlines; the Delta hub is the world's largest airline hub. Delta Air Lines flew 55.96% of passengers from the airport in 2009, AirTran flew 17.75%, and Atlantic Southeast Airlines flew 14.35%. The airport has 171 domestic and 28 international gates. The airport is served by MARTA's Red/Gold rail line.

Fulton County Airport at Charlie Brown Field is a local Class D airport located just west of Atlanta, and run by Fulton County. It is the nearest airport to Hartsfield-Jackson Atlanta International Airport and handles much of the general aviation traffic that would otherwise go there. The airport exists below and in close proximity to Hartsfield-Jackson's Class B airspace.

Public Transportation

The Metropolitan Atlanta Rapid Transit Authority or MARTA is the principal rapid-transit system in the Atlanta metropolitan area and the ninth-largest in the United States. Formed in 1971 as strictly a bus system, MARTA operates a network of bus routes linked to a rapid transit system consisting of 48 miles of rail track with 38 train stations. MARTA operates almost exclusively in Fulton and DeKalb counties. It also maintains a single rail station at Hartsfield-Jackson Atlanta International Airport. MARTA also operates a separate paratransit service for disabled customers. As of 2009, the average total daily ridership for the system (bus and rail) was 482,500 passengers

Highways

With a comprehensive network of freeways that radiate out from the city of Atlanta, many rely on their cars as the dominant mode of transportation in the region. Atlanta is mostly encircled by Interstate 285, a beltway locally known as "the Perimeter" which has come to mark the boundary between the interior of the region and its surrounding suburbs.

Three major interstate highways converge in Atlanta; I-20 runs east to west across town, while I-75 runs from northwest to southeast, and I-85 runs from northeast to southwest. The latter two combine to form the Downtown Connector (I-75/85) through the middle of the city. The combined highway carries more than 340,000 vehicles per day. The Connector is one of the ten most congested segments of interstate highway in the United States. Metropolitan Atlanta is approached by thirteen freeways. In addition to the aforementioned interstates, I-575, Georgia 400, Georgia 141, I-675, Georgia 316, I-985, Stone Mountain Freeway (US 78), and Langford Parkway (SR 166) all terminate just within or beyond the Perimeter, with the exception of Langford Parkway, limiting the transportation options in the central city. This strong automotive reliance has resulted in heavy traffic and contributes to Atlanta's air pollution. Around 2008, the Atlanta metro area has ranked at or near the top of the longest average commute times in the U.S.

The following is a list of major highways and roadways:

- Interstate 20
- Interstate 75
- Interstate 85
- Interstate 285
- U.S. Route 19
- U.S. Route 23
- U.S. Route 29
- U.S. Route 41
- U.S. Route 78
- U.S. Route 278
- State Route 3
- State Route 6
- State Route 9
- State Route 10
- State Route 13
- State Route 14
- State Route 42
- State Route 54
- State Route 70
- State Route 74
- State Route 92
- State Route 120
- State Route 138
- State Route 139
- State Route 140
- State Route 141
- State Route 154
- State Route 400

Rail Systems

Atlanta began as a railroad town and it still serves as a major rail junction, with several freight lines belonging to Norfolk Southern and CSX intersecting below street level in downtown. It is the home of major classification yards for both railroads, Inman Yard on the NS and Tilford Yard on the CSX. Long-distance passenger service is provided by Amtrak's Crescent train, which connects Atlanta with many cities between New Orleans and New York. The Amtrak station is located several miles north of downtown.

Chapter 4: Planning Process

Chapter Overview

4.1 Federal Advisory Guidance for Community Profiles
4.2 Summary of Plan Updates
4.3 Public Comment and Involvement in the Planning Process
4.4 Multi-Jurisdictional Participation in the Planning Process
4.5 Review and Incorporation of Applicable Plans and Documents
4.6 Plan Preparation
4.7 The Plan Review and Update Process

4.1 Federal Prerequisites

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

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

(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and non-profit interests to be involved in the planning process; and
(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

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

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

"201.6(d) Plan Review.

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

4.2 Summary of Plan Updates

Table 4-1 summarizes changes made to the 2004 plan as a result of the 2010 plan update, as follows:

Table 4-1: Summary of Plan Updates for Planning Process		
Section		**Change**
4.3	Public Comment and Involvement in the Planning Process	Update public participation information
4.4	Multi-Jurisdictional Involvement in the Planning Process	Description of process used for multi-jurisdictional involvement and information gathering.
4.5	Review & Incorporation of Plans and Documents	Incorporate new or updated plans and scientific studies
4.6	Plan Preparation	Description of the process for the process for plan update
4.7	Plan Review Process and Update	This is the first 5 year review and update of the plan

4.3 Public Comment and Involvement in the Planning Process

The public was invited to participate in the process and provide comment on the draft of the hazard mitigation plan. The Atlanta Fulton County Emergency Management Agency issued a press release informing the public of the opportunity to comment. A public hearing was conducted on December 8, 2010. A copy of the press release is included in Appendix C – Meeting Documentation. A public hearing for comment on the final plan was held on {insert date and time.}

4.4 Multi-Jurisdictional Participation in the Planning Process

The original plan was drafted and reviewed by the Hazard Mitigation Planning Committee which was comprised of the following municipal membership: Alpharetta, Atlanta, College Park, East Point, Fairburn, Hapeville, Mountain Park, Palmetto, Roswell, Union City, and Unincorporated Fulton County. The City of Sandy Springs was incorporated after the original plan was approved and was later added as a participant in the original plan as well as participating in the plan update. The cities of Chattahoochee Hills, Johns Creek and Milton were incorporated during the intervening time period and are new to the Fulton County Plan. No cities have relinquished their incorporation since the last plan was approved.

Jurisdiction	Participated Original Plan	Participated Plan Update
Fulton County	yes	yes
Alpharetta	yes	no
Atlanta	yes	yes
Chattahoochee Hills	no	yes
College Park	yes	yes
East Point	yes	yes
Fairburn	yes	yes
Hapeville	yes	yes
Johns Creek	no	yes
Milton	no	yes
Mountain Park	yes	yes
Palmetto	yes	yes
Roswell	yes	yes
Sandy Springs	yes	yes
Union City	yes	yes

Through the services of a consultant, the Atlanta-Fulton County Emergency Management Agency served as the lead agency for coordination among Fulton County jurisdictions and other entities. The project began with a kickoff meeting in June 2010 in which representatives from all municipal jurisdictions as well as other entities such as health care, public schools, and Georgia Emergency Management Agency (GEMA) were invited to participate. The purpose of the kickoff meeting was to provide information to new hazard mitigation plan committee members regarding the purpose of the plan and provide an update on new or revised regulatory requirements that had occurred that had taken place since the 2004 plan. A representative from GEMA also provided an overview regarding state requirements and recommendations for the planning process.

Three multi-jurisdictional planning sessions were conducted during the update process which took place from June 2010 to December. The purpose of these meetings was to gather information and data from a countywide perspective, provide comment and feedback on draft sections the plan, and build consensus regarding various aspects of the planning process and methodology. A representative from GEMA was in attendance at these meetings to ensure planning methodologies were compatible with the state's processes and requirements as well as federal requirements.

In addition to these meetings, the guided discussions with individual jurisdiction were conducted with participating municipalities. These meetings consisted of city engineers, public works officials, land use planners, public information officers, emergency managers, zoning officials, GIS, and other interested parties as determined by the jurisdiction. The purpose of these individualized meetings was to support refinement of their hazard vulnerability analysis at it related specifically with the threats posed to their jurisdictions, and assist with identification of mitigation projects impacting their locales. Jurisdictions were also provided opportunities to participate in the planning process by their responsiveness for requests for data, information, and surveys. Appendix C – Meeting Documentation contains the template that was used to guide these discussions.

The following jurisdictions actively participated in the process through of combination of activities such as expressing an interest and coordinating the individual jurisdictions visits, attendance at the multi-jurisdictional planning meetings, and responding to requests for information, data, and surveys:

- Atlanta
- Chattahoochee Hills
- College Park
- East Point
- Fairburn
- Hapeville

- Johns Creek[1]
- Milton
- Mountain Park
- Palmetto
- Roswell
- Sandy Springs
- Unincorporated Fulton County
- Union City

Notices inviting participation were also sent to, but entities did not participate:

- Alpharetta
- MARTA
- Hartsfield-Jackson International Airport
- Fulton County Public Schools
- Atlanta Public Schools
- Grady Healthcare Systems
- Georgia Technical Institute
- Georgia State University

4.5 Review and Incorporation of Applicable Plans and Documents

The participating jurisdictions provided copies of their plans, studies, reports, ordinances, regulations and technical information to the planning team. The planning team reviewed the documents and noted relevant sections that pertained to hazard mitigation. These documents were examined to determine what mitigation measures were currently being pursued and what new measures could be included for future revisions and/or incorporation into this multi-jurisdictional hazard mitigation plan. This was particularly important for the jurisdictions that had become incorporated since the development of the last hazard mitigation plan in 2004.

The planning team discovered that there was wide variation in plan content and format. Some jurisdictions had their own hazard mitigations plans, while others "hybrid" documents that incorporated a general hazard profile as part of their emergency response/continuity of operations plans.

The following documents were reviewed by the planning team:

- Sandy Springs Hazard Mitigation Plan
- Johns Creek Emergency Response Framework
- EWP Dam Report on the September 2009 Floods
- Georgia Department of Natural Resources Guidance on Storm-Generated Debris
- GEMA Hazard Mitigation Plan
- Comprehensive plans

[1] Limited participation by Johns Creek. Jurisdiction representatives attended the kickoff and 1st planning meeting, but did not participate in subsequent planning meetings, the individual jurisdiction strategic planning session, or submit mitigation projects. They did submit their recently developed Emergency Response Framework as well as property data at risk for flooding which have been noted in this plan.

- Flood ordinances
- Storm water management plans
- Atlanta Regional Planning Commission studies and reports
- NOAA and NWS storm events records
- FEMA and local disasters reports
- Scientific and academic studies regarding climatic trends
- Camp Creek Flooding Modeling Study
- Dam Report
- Roswell Watershed Improvement Plan

4.6 Plan Preparation

On June 3, 2010, a kick off meeting was held to reactivate the HMPC and prepare for the upcoming five year plan update. The kickoff meeting was a re-introduction to hazard mitigation planning. The meeting discussions covered a review of the 2004 plan, the State's Hazard Mitigation Plan, and the 2010 update process.

During the plan drafting process, the Hazard Mitigation Planning Committee held three multijurisdictional meetings between June 2010 and Oct 2010. Documentation of these meetings in the form of agendas, sign-in sheets, and meeting minutes are on file in the AFCEMA office and are included in Appendix C – Meeting Documentation. The committee's tasks and document sharing were facilitated by an FTP site hosted by the consultant. Those committee members that were unable to attend a meeting received agendas and committee assignments via email, telephone, or personal meetings with the planning team.

The first planning meeting discussed the risk assessment methodology that should be used to conduct risk assessments for each jurisdiction. The advantages and disadvantages of each were discussed and the members ultimately voted to use the NFPA 1600 Risk Assessment Standard. The consultant outlined the individual jurisdiction meetings that would take place during the course of the planning process and the necessity for participation by certain essential stakeholders such as public works, engineering, and urban planning. The committee also reviewed the guided discussion packet that would be used for the individualized site visits.

The second meeting was conducted on August 19, 2010. The committee discussed jurisdiction-wide hazards such as severe weather and tornadoes. Potential multi-jurisdictional hazard mitigation strategies and actions were discussed that could be applied across multiple or even all jurisdictions. The discussion included strategy ideas for public education and awareness, mapping, real-time information gathering and dissemination, and greater collaboration and coordination with state and regional entities. Following the group discussion, committee members broke out into groups based upon their geographic location in the county to begin identifying priority hazard mitigation issues specific to their jurisdiction and generating ideas for potential mitigation projects, particularly as they related to flooding.

During the weeks that followed this meeting, the consultant met with each participating jurisdiction individually to discuss and rank the various hazards facing the community. Risk assessment was performed using two dimensions – Level of Severity and Probability/Likelihood of Event. This method allowed for a more

accurate assessment of the risks posed to the jurisdiction by the hazard. This risk assessment ranking, in conjunction with the discussion guidance packet, was then used to identify areas of priority hazard mitigation and potential mitigation actions that would later be used to develop the mitigation strategy.

The Committee meeting held on October 14, 2010 reviewed the final revision of mitigation goals and strategies. The initial draft of mitigation strategy was also reviewed and revised. The STAPLEE methodology which was to be used by the members to evaluate and prioritize their projects was also discussed. Members also reviewed and revised the existing mitigation strategies.

Draft sections of the plan were uploaded to the project FTP. Notices were sent to the hazard mitigation planning committee members requesting their review and comment by specified deadlines. After incorporating these revisions, a final draft of the plan was place on the project FTP site for a complete review and approval by the committee members. Once approved, the planning team assembled the final plan for submission to the Atlanta Fulton County Emergency Management Plan who in turn submitted it to the Georgia Emergency Management Agency and FEMA for review and approval in December of 2010. The update took approximately 6 months to complete.

4.7 Plan Review and Update Process

The plan review and update process resulted in a comprehensive update of the entire 2004 plan elements, which was achieved through a process that involved the following tasks, among others:

- Update of the Community Profiles to reflect changed demographics, economic characteristics, and growth and development trends.
- A detailed assessment of existing local mitigation actions and/or capabilities to carry out mitigation measures.
- A reassessment of risks to include detailed research and analysis of hazards affecting the communities, as well as adding man-made hazards to the Risk Assessment.
- A thorough update of critical facilities and assessment of vulnerabilities.
- A reexamination of development trends and exposure to risks.
- A review and recommitment to the vision for disaster-resistant communities; modifications to the 2004 goals; and support of the State goals for hazard mitigation.
- Identification and analysis of a comprehensive range of mitigation alternatives.
- A reprioritization of mitigation actions and projects.
- Revised mitigation action programs for each jurisdiction to better reflect the results of the plan update
- Revisions to the plan maintenance procedures to institute streamlined amendments and better insure continuous monitoring and implementation of mitigation actions.

Chapter 5: Risk Assessment

Chapter Overview

5.1 Federal Requirements for Risk Assessments
5.2 Summary of Plan Updates
5.3 Federal Requirements for Risk Assessments
5.4 Identification of Hazards Affecting Each Jurisdiction
5.5 Description of Hazards and Hazard Profiles
5.6 Vulnerability of Structures and Dollar Estimate of Losses
5.7 General Description of Population and Development Trends
5.8 Repetitively-Damaged NFIP-Insured Structures
5.9 NFIP Participating Communities

5.1 Federal Requirements for Risk Assessments

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

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

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

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

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

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

5.2 Summary of Plan Updates

Table 5-1 summarizes changes made to the 2004 plan as a result of the 2010 plan update, as follows:

Table 5-1: Summary of plan changes		
Section		Change
5.3	Identification of Hazards Affecting Each Jurisdiction	Adds table summarizing hazards that pose a risk to each jurisdiction
5.4	Description of Hazards and Hazard Profiles	Adds additional natural hazards not included in previous plan; Improves descriptions of hazards; Improves descriptions of locations, extent, and probabilities; updates past occurrences; adds maps.
5.5	Summary of Hazards and Community Impacts	Adds summary of the impacts of hazards to the respective communities
5.6	Vulnerability of Structures and Dollar Estimate of Losses	Updates data regarding vulnerable structures and estimated loss values; adds information regarding residential structures and values
5.7	General Description of Population and Development Trends	Updates information regarding population and development trends
5.8	Repetitively Damaged NFIP-Insured Structures	Addresses new requirement

5.3 Identification of Hazards Affecting Each Jurisdiction

Types of Hazards

The types of natural hazards affecting each Atlanta-Fulton County jurisdiction are listed in Table 5-2. This table of identified hazards also notes multiple natural hazards that may be associated with and caused by certain hazard events. The 2004 Atlanta-Fulton County Hazard Mitigation Plan lists the most of these natural hazards.

Table 5-2: Types of Hazards	
Hazards	**Associated Hazards**
Flooding	Landslide Erosion Man-made sinkholes
Tornadoes	High Winds Severe Storms
Tropical Systems	Severe Storms High Winds Floods
Severe Storms	Thunderstorms Hail Lightning High Winds Floods Tornadoes
Winter Storms	Snow storms Ice Storms Extreme Cold High Winds
Droughts	Extreme Heat Wildfire Man-made Sinkholes
Heat Wave	
Earthquakes	Landslides
Dam Failure	Flooding Landslides
Wildfire/Urban Interface	

Sources for Identifying Hazards

The planning team used the following sources for identifying hazards in Atlanta-Fulton County:

1. **State of Georgia Hazard Mitigation Plan**. The 2008 update of the State's plan provided information regarding possible additional hazards. Hazards identified in the State plan were compared to local, historical event information.
2. **Risk Assessment Matrix**. A matrix was discussed with each participating jurisdiction to determine which hazards posed a risk, the likelihood of a hazard event, and the severity and magnitude of damage that would occur. This information is included in Section 5.5.
3. **Other Sources**. Other sources of information such as NOAA's National Climatic Data Center, US Geological Survey, University research, and other sources were utilized and have been referenced appropriately throughout this plan. Appendix B – Event Data contains tables summarizing past hazard event data.

5.4 Description of Hazards and Hazard Profiles

5.4.1 Drought

5.4.1.1 Description of Hazard

Drought is a normal, recurrent feature of climate, although many erroneously consider it a rare and random event. It occurs in virtually all climatic zones, but its characteristics vary significantly from one region to another. Drought is a temporary aberration; it differs from aridity, which is restricted to low rainfall regions and is a permanent feature of climate.

It is generally defined as a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group, or environmental sector. Drought should be considered relative to some long-term average condition of balance between precipitation and evapotranspiration (i.e., evaporation + transpiration) in a particular area, a condition often perceived as "normal". It is also related to the timing (i.e., principal season of occurrence, delays in the start of the rainy season, occurrence of rains in relation to principal crop growth stages) and the effectiveness (i.e., rainfall intensity, number of rainfall events) of the rains. Other climatic factors such as high temperature, high wind, and low relative humidity are often associated with it in many regions of the world and can significantly aggravate its severity.

A few examples of direct impacts of drought are: reduced crop, rangeland, and forest productivity; increased fire hazard; reduced water levels; increased livestock and wildlife mortality rates; and damage to wildlife and fish habitats. Social impacts include public safety; health issues; conflicts between water users; reduced quality of life; and inequities in the distribution of impacts and disaster relief. Income loss is another indicator used in assessing the impacts of drought; reduced income for farmers has a ripple effect throughout the region's economy (National Drought Mitigation Center, 1998).[1]

According to the National Drought Mitigation Center (NDMC), there are four ways of measuring drought. First is a **meteorological drought**, which is a decrease in precipitation in some period of time. These are usually region-specific, and based on a thorough understanding of regional climatology. Meteorological measurements are the first sign of drought. An **agricultural drought** occurs when there is not enough soil moisture to meet the needs of a particular crop at a particular time. Agricultural drought occurs after a meteorological drought, but before hydrological drought. **Hydrological drought** is deficiencies in surface and subsurface water supplies. It is measured as stream flow and at lake, reservoir and groundwater levels. There is a time lag between lack of rain and less water in rivers, streams, reservoirs and lakes. When precipitation is deficient over time, it will show in these water levels. The last type of drought defined by NDMC is a **socioeconomic drought**, which occurs when water shortages begin to affect people. In addition to the impacts discussed above, water level decline due to drought can also cause sinkholes to form.

Drought can be measured through a variety of drought indices. The various scientific methodologies can be found in detail, along with the advantages and disadvantages for each at the NDMC's website at: http://www.drought.unl.edu/whatis/indices.htm.

[1] National Drought Mitigation Center, http://www.drought.unl.edu

5.4.1.2 Hazard Profile

In Fulton County, the primary sources of water are the Chattahoochee River Basin and the Coosa River Basin. According to the Metropolitan North Georgia Water Planning District, which services the Fulton County area, groundwater makes up less than 1% of the public water supplies for the Metro Water District. It is expected that this will remain constant through 2035.

Past Occurrences of Drought Events

According to data from the National Climatic Data Center, there have been 20 drought, very dry, or abnormally dry events since 1997. This has resulted in $670.7 million dollars in crop losses for the affected zones (which included counties in addition to Fulton). The most recent drought event was extended from September 2007 and ended in December of 2007. As a result of this drought, Lake Lanier in northeast Georgia and the main water supply for the Atlanta metropolitan area, dropped to its lowest level in history on December 28, 2007 with a reading of 1050.75 feet. New records were set nearly every day after November 20th, when the previous record low-level of 1052.63 feet was reached. This event resulted in $344 million dollars in crop damage for the affected areas.

Location of Potential Droughts

Since all location and geographic areas of Fulton County are dependent on adequate water supply, droughts affect all areas of Fulton County. Some areas, such as agricultural areas found in the Chattahoochee Hills area, may be more vulnerable to the affects of drought. High density, urban areas that demand large amounts of water may also be affected.

Extent and Intensity of Potential Droughts

Due to the recent drought events that have affected the state, and in anticipation of continued growth that will affect the demand for water, the State of Georgia has recognized the need for drought awareness and water conservations actions. On June 2, 2010, the Governor signed into effect the “Water Stewardship Act” which is designed to help secure water supplies by preparing for future growth, protecting water-sensitive industries, and equipping the State to navigate future droughts.

Probability and Range of Magnitude of Future Droughts

Droughts should continue to affect Fulton County on a mean of one every 2.5 years (median = 1.5, mode = 1). However, the historical records cannot determine future outcomes; frequency of these events is unpredictable based on other variables such as population growth resulting in demand and climate change.

On a scale of 1 to 4, with 1 being unlikely and 4 being highly likely, and magnitude ranging from negligible to catastrophic, the Hazard Mitigation Planning Committee rated the probability of future drought occurrences as follows:

- Level IV – Negligible: Likely to Highly Likely (3.33)
- Level III – Marginal: Unlikely to Possible (1.83)
- Level II – Critical: Unlikely to Possible (1.50)
- Level I – Catastrophic: Almost Unlikely (1.33)

5.4.2 Earthquakes

5.4.2.1 Description of Hazard

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

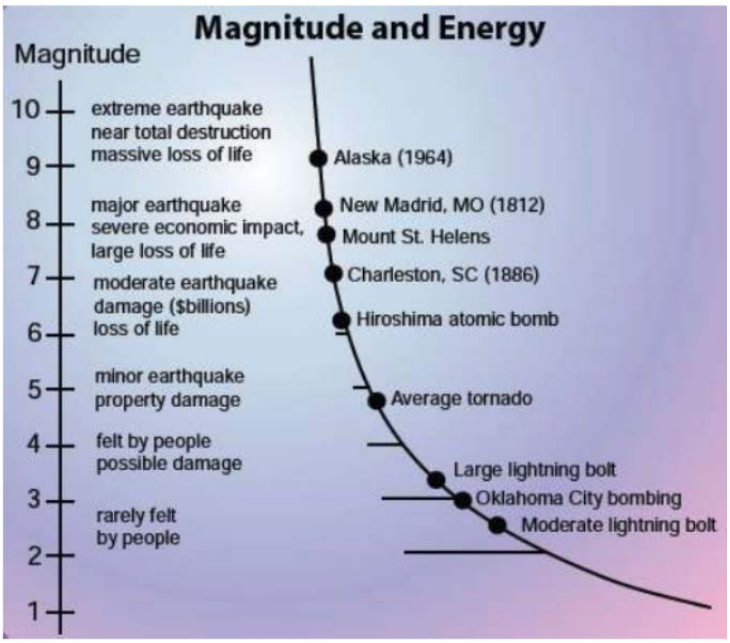
Earthquakes are caused by the rupture or sudden movement of a fault where stresses have accumulated along opposing fault planes of the earth's outer crust. These fault planes are usually found along the borders of the earth's tectonic plates which generally follow the outlines of the continents. However,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

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

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

Seismic activity is described in terms of magnitude and intensity. Magnitude describes the total energy released and intensity describes the effects at a particular location. Magnitude is defined as the measure of the amplitude of the seismic wave and is expressed by the Richter scale. The Richter scale is a logarithmic measurement where an increase in the scale by one whole number represents a tenfold increase in the measured amplitude of the earthquake. Figure 5-1 illustrates the increasing magnitude and associated affects of earthquake energy.

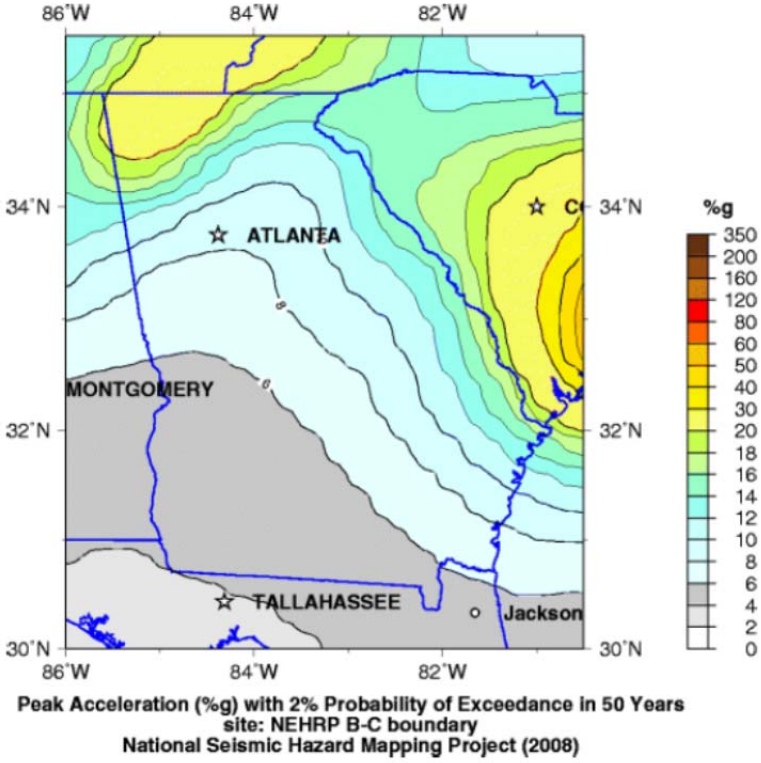
Figure 5-1: Earthquake Magnitude Scale



Source: USGS

Figure 5-2 depicts the seismic hazard map for the State of Georgia with the Atlanta area indicated.

Figure 5-2: Georgia Seismic Hazard Map



Source: USGS

5.4.2.2 Hazard Profile

Earthquakes may be felt in any area of Georgia. No area in Georgia is immune from the earthquake threat, but northern Georgia has experienced the most earthquakes in recent history. Earthquakes large enough to cause damage could be felt in most if not all of Georgia's counties. When a damaging earthquake occurs, it will affect an area covering many surrounding counties. Based on the historical seismicity three levels of seismic activity are apparent in Georgia. The northern half of Georgia has experienced moderate seismicity, with a magnitude 4 earthquake about every 10 years. When the details of the seismicity contained in the more frequent smaller earthquakes are included in a hazard assessment, two areas of northern Georgia stand out as being unusually active. These are the Central Georgia Seismic Zone and the extension of the Southeastern Tennessee Seismic Zone across northwest Georgia. The maximum damage from an earthquake will occur in the epicentral area and thus the counties located in these two zones have the greatest earthquake hazard in Georgia. There are two minor faults in northwest Georgia, the Cartersville and Rome faults; one that runs more or less along the Chattahoochee River; and two more in Central Georgia.

Past Occurrences of Earthquake Events

There have been approximately 12 earthquakes within 100 miles of the Atlanta area since 1982 which have ranged from 3.1 to 4.6 on the Richter Scale. The most recent occurrence was August 8, 2009, which was a magnitude of 3.2 and occurred about 90.75 miles from Atlanta.

Table 5-3 lists other earthquake occurrences that have affected Fulton County within the last 94 years.

Table 5-3: Past Occurrences of Earthquakes[2]

Date	Magnitude
March 5, 1916	Magnitude Unknown
March 12, 1964	Magnitude Unknown
September 30, 1973	4.1
July 12, 1976	4.8
June 18, 1985	4.8
June 30, 1985	4.5
September 13, 1985	4.5
May 9, 1992	4.6
March 21, 2002	3.5
September 9, 2002	4.4
April 29, 2003	4.9

Location of Potential Earthquake Events

Since all locations and geographic areas of Fulton County are within a potential seismic area, earthquakes affect all areas of Fulton County. Some areas such as high density, urban areas may be more vulnerable to the affects of earthquakes, particularly any buildings that were not constructed to withstand seismic activity.

[2] Source: United States Geological Survey

Extent and Intensity of Potential Earthquakes
According to Dr. Tim Long or Georgia Tech, earthquakes in this area are typically deeper focus, meaning they are down 20 to 30 kilometers in the Earth's crust. This means they are felt over a wider area, but not as strongly as some other types of earthquakes.[3]

Probability and Range of Magnitude of Earthquakes
According to Dr. Long of Georgia Tech, the area is likely to experience earthquake events about every 10 to 20 years.[4] On a scale of 1 to 4, with 1 being unlikely and 4 being highly likely, and magnitude ranging from negligible to catastrophic, the Hazard Mitigation Planning Committee rated the probability of future earthquake occurrences as follows:

- Level IV – Negligible: Unlikely to Possible (1.67)
- Level III – Marginal: Unlikely (1.08)
- Level II – Critical: Critical (1.08)
- Level I – Catastrophic: Unlikely (1.00)

5.4.3 Flood

5.4.3.1 Description of Hazard

A flood is a natural event for rivers and streams. Excess water from snowmelt, rainfall, or storm surge accumulates and overflows onto the banks and adjacent floodplains. Floodplains are lowlands, adjacent to rivers, lakes, and oceans that are subject to recurring floods. Hundreds of floods occur each year, making it one of the most common hazards in all 50 states and U.S. territories. Floods kill an average of 150 people a year nationwide. They can occur at any time of the year, in any part of the country, and at any time of day or night. Floodplains in the U.S. are home to over nine million households. Most injuries and deaths occur when people are swept away by flood currents, and most property damage results from inundation by sediment-filled water.

Several factors determine the severity of floods, including rainfall intensity (or other water source) and duration. A large amount of rainfall over a short time span can result in flash flood conditions. A small amount of rain can also result in floods in locations where the soil is saturated from a previous wet period or if the rain is concentrated in an area of impermeable surfaces such as large parking lots, paved roadways, or other impervious developed areas. Topography and ground cover are also contributing factors for floods. Water runoff is greater in areas with steep slopes and little or no vegetative ground cover. Frequency of inundation depends on the climate, soil, and channel slope. In regions where substantial precipitation occurs in a particular season each year, or in regions where annual flooding is derived principally from snowmelt, the floodplains may be inundated nearly every year. In regions without extended periods of below-freezing temperatures, floods usually occur in the season of highest precipitation. In areas where flooding is caused by melting snow, and occasionally compounded by rainfall, the flood season is spring or early summer.

Fortunately, most of the known floodplains in the United States have been mapped by FEMA, which administers the NFIP (National Flood Insurance Program). When a flood study is completed for the NFIP, the information and maps are assembled into a Flood Insurance Study (FIS). An FIS is a compilation and presentation of flood risk data for specific watercourses, lakes, and coastal flood hazard areas within a community and includes causes of flooding. The FIS report and associated maps delineate Special Flood Hazard Areas (SFHAs), designate flood risk zones, and establish base flood elevations (BFEs), based on the flood that has a 1% chance of occurring annually, or the 100-year flood. Paper FIRMs and FIS reports are gradually being replaced by DFIRMs (digital FIRMs).

[3] "Small Earthquake Shakes the South," CNN.com, http://www.cnn.com/2003/US/South/04/29/southern.tremor/
[4] Ibid.

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

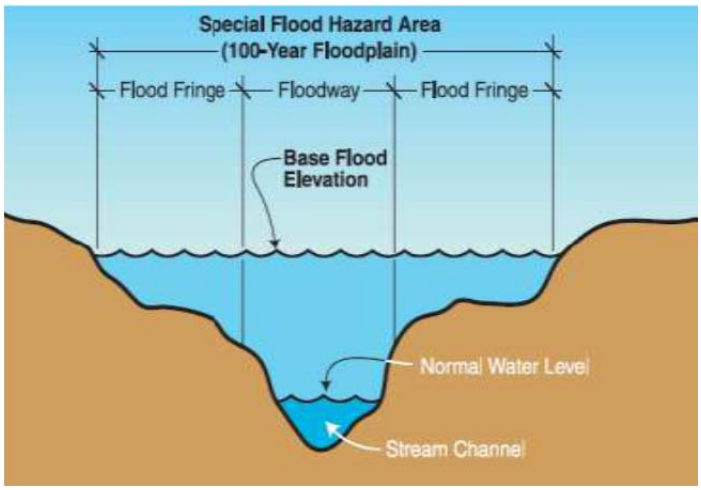
Base Flood Elevation (BFE), as shown on the FIRM, is the elevation of the water surface resulting from a flood that has a 1% chance of occurring in any given year. The BFE is the height of the base flood, usually in feet, in relation to the National Geodetic Vertical Datum (NGVD) of 1929, the North American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

Special Flood Hazard Area (SFHA) is the shaded A-Zone or V-Zone area on a FIRM that identifies an area that has a 1% chance of being flooded in any given year or the 100-year floodplain. FIRMs show different floodplains with different zone designations, as shown on Table 5-4 "Flood Zone Designations." These are used for insurance rating purposes, but are also necessary for flood permitting and flood hazard mitigation planning purposes. The 500-Year Floodplain is the shaded X-Zone area shown on a FIRM that has a 0.2% chance of being flooded in any given year.

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

Figure 5-3 illustrates the components of a floodplain along a stream.

Figure 5-3: Floodplain Cross Section



Source: FEMA

Table 5-4: Flood Zone Designations

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

5.4.3.2 Hazard Profile

Nationally, flooding is one of the most common disasters to occur. In fact, 75% of presidential disaster declarations are due to flooding. Similarly, flooding is one of the most common disasters to occur in Fulton County. The increase in urbanization throughout the County will increase the likelihood of flooding events. An increase in impervious land uses (i.e. roads, parking lots, etc.) results in the ability of the land to absorb rainfall as opposed to fields or woodlands. Due to urbanization, runoff amounts are increased by 2 to 6 times over what would occur on natural terrain. Not surprisingly, the majority of flooding occurs in the Atlanta area. Some parts of the College Park area are also vulnerable to floods.

Past Occurrences of Flood Events

There have been 60 flood events since 1991. Twenty one events of these events (35%) have occurred since 2003. The floods that occurred in the fall of 2009 in Atlanta floods set new records for most streams in the area, and Peachtree Creek at Northside Drive came a close second place, reaching a height of 23.89 feet on September 21, and causing water to flow over the bridge. The North Fork reached a record of 18.07 feet, topping the previous record of 17.70 feet in September 2004. The South Fork reached its third-highest ever at 15.21 feet, the record being a 1976 flood that brought it to 16.35 feet on March 16.[5] Jurisdictions other than Atlanta that have experienced recent flooding are Hapeville (2009), Ocee (2009), Alpharetta (2004, 2006), Union City (2005), and Sandy Springs (2004).

September 2004. The flooding that occurred during the month of September 2004 is the most recent notable events. Peachtree Creek suffered massive flooding after Hurricane Frances was followed by Hurricane Ivan in September 2004. It reached one of its highest official flood record ever on September 16th, which actually washed away its gauge. Late on September 16, 2004, it reached a stage of 22.63 feet, a flow of 14,200 cubic feet (106,223 gallons) per second, and a width of 450 feet. This was about ten times its normal width, three times its normal speed, and 300 times its normal flow.[6] The total estimated losses for the month totaled $27.5 million.

Location of Potential Flooding

As illustrated in the flood maps in Appendix D – Maps, flood zones exist in every jurisdiction in Fulton County. Historically, Peachtree Creek is one of the most commonly affected areas. Flood stage is 17.0 feet depth, and due to the heavy urbanization in the area, it often reaches above this mark during heavy storms. Peachtree Creek reacts very quickly when heavy rains occur. As is typical with smaller streams in urban areas, a heavy rain can cause the stream to rise in a matter of hours or even minutes. Also, as is typical with smaller urban streams, high water peaks quickly and then falls quickly; thus, streamflow at Peachtree Creek can go from base flow to flooding and back to near base flow in a single day.[7] The Georgia Water Information Network (GWIN) lists 24 real-time stage and streamflow data sites and can be accessed at: http://ga2.er.usgs.gov/gawater/countysites.cfm?code=121.

Extent and Intensity of Potential Floods

Flood events have ranged from localized flooding to widespread flooding. According the data listed on the National Climatic Data Center, the following types and frequency of events have been recorded since 1994: Flash flooding (37), Flooding (9), and Urban/Small Stream Flood (7).

[5] Ibid.
[6] Ibid.
[7] US Geological Survey, Peachtree Creek, http://ga2.er.usgs.gov/peachtree/floodheights.cfm

Also, although not technically considered floods, data also indicates potential vulnerability: Abnormally Wet (1), Extremely Wet (1), and Heavy Rain (4).

Probability and Range of Magnitude of Future Floods

Floods should continue to affect Fulton County on a mean annual basis of 3.93 flood events per year (median = 3, mode = 1.3). The floods that occurred in the fall of 2009 in Atlanta floods set new records for most streams in the area, and Peachtree Creek at Northside Drive reached a height of 23.89 feet on September 21. However, the historical records cannot determine future outcomes; frequency of these events is unpredictable based on other variables such as future land use decisions, current and future drainage capacity, improvements to stormwater systems, and climate change.

On a scale of 1 to 4, with 1 being unlikely and 4 being highly likely, and magnitude ranging from negligible to catastrophic, the Hazard Mitigation Planning Committee rated the probability of flood occurrences as follows:

- Level IV – Negligible: Likely to Highly Likely (3.58)
- Level III – Marginal: Possible to Likely (2.5)
- Level II – Critical: Unlikely to Possible (1.83)
- Level I – Catastrophic: Almost Unlikely (1.25)

5.4.4 Heat Wave

5.4.4.1 Description of Hazard

According to the National Weather Service, heat is the number one weather-related killer in the United States. The National Weather Service statistical data shows that heat causes more fatalities per year than floods, lightning, tornadoes, and hurricanes combined. Based on the 10-year average from 1994 to 2003, excessive heat claimed 237 lives each year. By contrast, floods killed 84; tornadoes, 58; lightning, 63; and hurricanes, 18.

NOAA's heat alert procedures are based mainly on Heat Index Values. The "Heat Index", sometimes referred to as the "apparent temperature" and given in degrees Fahrenheit, is a measure of how hot it really feels when relative humidity is added to the actual air temperature. Figure 5-4 is the NOAA Heat Index Chart.

Figure 5-4: National Weather Service Heat Index Chart

Temperature (°F)

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

Likelihood of Heat Disorders with Prolonged Exposure or Streuous Activity

Caution | Extreme Caution | Danger | Extreme Danger

Each National Weather Service (NWS) Weather Forecast Office (WFO) can issue the following heat-related products as conditions warrant:

Excessive Heat Outlook: This is issued when the potential exists for an excessive heat event in the next 3 to 7 days. An outlook is used to indicate that a heat event may develop. It is intended to provide information to those who need considerable lead time to prepare for the event, such as public utilities, emergency management and public health officials.

Excessive Heat Watch: This is issued when conditions are favorable for an excessive heat event in the next 12 to 48 hours. A watch is used when the risk of a heat wave has increased, but its occurrence and timing is still uncertain. It is intended to provide enough lead time so those who need to set their plans in motion can do so, such as established individual city excessive heat event mitigation plans.

Excessive Heat Warning/Advisory: This is issued when an excessive heat event is expected in the next 36 hours. These products are issued when an excessive heat event is occurring, is imminent, or has a very high probability of occurrence. The warning is used for conditions posing a threat to life or property. An advisory is for less serious conditions that cause significant discomfort or inconvenience and, if caution is not taken, could lead to a threat to life and/or property.

5.4.4.2 Hazard Profile

Extreme heat is no stranger to residents of the Atlanta area. The City of Atlanta is considered an "urban heat island" reaching temperatures up to 10° higher than surrounding areas. An urban heat island (UHI) is a metropolitan area which is significantly warmer than its surrounding rural areas. The main cause of the urban heat island is modification of the land surface by urban development which uses materials which effectively retain heat. Waste heat generated by energy usage is a secondary contributor. As population centers grow they tend to modify a greater and greater area of land and have a corresponding increase in average temperature. Other causes of a UHI are due to geometric effects. The tall buildings within many urban areas provide multiple surfaces for the reflection and absorption of sunlight, increasing the efficiency with which urban areas are heated. This is called the "urban canyon effect". Another effect of buildings is the blocking of wind, which also inhibits cooling by convection. Waste heat from automobiles, air conditioning, industry, and other sources also contributes to the UHI. High levels of pollution in urban areas can also increase the UHI, as many forms of pollution change the radiative properties of the atmosphere.[8] Areas of dense populations of elderly and low-income residents exist, which are more vulnerable to the effects of extreme heat.

Past Occurrences of Heat Waves

Fulton County has experienced 89 heat waves since 1952. The most recent heat wave was August 2007 which was the warmest month on record. Other notable years were 1980 and 1993 in which 11 and 13 heat waves were recorded, respectively. The heat wave in 1995 resulted in two deaths related, as did the extreme heat event in 2007.

[8] T. R. Oke (1982). "The energetic basis of the urban heat island". Quarterly Journal of the Royal Meteorological Society 108: 1–24.

Location of Potential Heat Waves
Since all locations and geographic areas of Fulton County are subject to temperature extremes, heat waves affect all areas of Fulton County. However, due to Urban Heat Island phenomenon, Atlanta may be more susceptible to temperature extremes and heat waves.

Extent and Intensity of Heat Waves
August 2007 proved to be one of the hottest months on record for much of north and central Georgia. This was the result of a large ridge of high pressure combined with abnormally dry conditions from several preceding months of below normal rainfall. Numerous daily record high temperatures were broken, especially during the mid part of the month. Furthermore, some record high minimum values were recorded during this period. It was also the warmest month ever for Atlanta and tied the record for the most number of days that 100° was reached or exceeded in one summer for Atlanta. While most of the month was above normal, the core of the intense heat was during the period from August 7th to August 22nd. Similar situations were observed at the other reporting stations. Two heat related deaths were reported, one of which was in Atlanta. The excessive heat combined with continued below normal rainfall to exacerbate the drought conditions across the region.

Probability and Range of Magnitude Future Heat Waves
Heat waves should continue to affect Fulton County less than once a year on average (mean - .56, median = 0, mode = 0). However, the historical records cannot determine future outcomes. Variables such as the Urban Heat Island and other climate change issues affect may have the potential to intensify the affect of these temperatures.

On a scale of 1 to 4, with 1 being unlikely and 4 being highly likely, and magnitude ranging from negligible to catastrophic, the Hazard Mitigation Planning Committee rated the probability of future heat waves occurrences as follows:

- Level IV – Negligible: Likely to Highly Likely (3.50)
- Level III – Marginal: Possible (2.50)
- Level II – Critical: Unlikely to Possible (1.42)
- Level I – Catastrophic: Almost Unlikely (1.08)

5.4.5 Severe Weather

5.4.5.1 Description of Hazard

A severe thunderstorm is defined as a thunderstorm containing one or more of the following phenomena: hail 3/4" or greater, winds gusting in excess of 57.5 mph, and/or a tornado. Severe weather can include lightning, tornadoes, damaging straight-line winds, and large hail. Most individual thunderstorms only last several minutes, however some can last several hours. Long-lived thunderstorms are called supercell thunderstorms. A supercell is a thunderstorm that has a persistent rotating updraft. This rotation maintains the energy release of the thunderstorm over a much longer time than typical, pulse-type thunderstorms which occur in the summer months. Supercell thunderstorms are responsible for producing the majority of severe weather, such as large hail and tornadoes (National Oceanic and Atmospheric Administration).

Downbursts are also occasionally associated with severe thunderstorms. A downburst is a strong downdraft resulting in an outward burst of damaging winds on or near the ground. Downburst winds can produce damage similar to a strong tornado. Although usually associated with thunderstorms, downbursts can even occur with showers too weak to produce thunder (National Oceanic and Atmospheric Administration). Strong squall lines can also produce widespread severe weather, primarily very strong winds and/or microbursts.

When a severe thunderstorm approaches, the National Weather Service will issue alerts. Two possible alerts are:

- Severe Thunderstorm Watch - Conditions are favorable for the development of severe thunderstorms.
- Severe Thunderstorm Warning - Severe weather is imminent or occurring in the area.

Perhaps the most dangerous and costly effect of thunderstorms is lightning. As a thunderstorm grows, electrical charges build up within the cloud. Oppositely charged particles gather at the ground below. The attraction between positive and negative charges quickly grows strong enough to overcome the air's resistance to electrical flow. Racing toward each other, they connect and complete the electrical circuit. Charges from the ground then surge upward at nearly one-third the speed of light and produce a bright flash of lightning (Cappella, 1997).

On average, more people are killed by lightning than any other weather event. From 1993 to 2003, Georgia ranked 9th in the nation for deaths caused by lightning. Nationwide, lightning related economic losses to over $5 billion dollars per year, and the airline industry alone loses approximately $2 billion a year in operating costs and passenger delays from lightning. Approximately 30% of all power outages are lightning-related with total costs approaching $1 billion.

5.4.5.2 Hazard Profile

Storm data from the National Climatic Data Center reveal that severe weather events are one of the most common threats to the Fulton County area. And recently, new evidence suggests severe storms may be enhanced by urban areas.[9] These areas produce heat and lift which are two important factors for thunderstorm formation. Results from a recent 10 year investigation of lightning and thunderstorm activity surrounding the Atlanta area identified increases in thunderstorm intensity, rainfall, and lightning over and downwind of the city center during the summer months of June, July, and August. Researched hypothesized several possible causes.

- **Urban Heat Island (UHI)**: A UHI occurs when the city registers higher temperatures than the surrounding rural area. This also includes the lack of cooling during late afternoon and evening after temperatures normally reach their highest.
- **"Canyon" Winds:** Wind also plays a vital role in the intensification of urban heat. Warmer air over the city reduces atmospheric pressure and promotes lift. As these winds encounter the urban canyons created by tall buildings, the winds tend to slow, converge and rise over the city. The UHI and converging winds cause air to ascent over the city center and sink along its periphery. The lifting of warm, humid air over the city often creates clouds that can develop into thunderstorms if the air remains unstable and continues to rise. Furthermore, thunderstorms that are already formed and moving over a city can also be enhanced by the urban area.
- **Pollution:** Pollution injects billions of small particles into the atmosphere. These particulates can be caught in the updrafts produced by the UHI and lifted into the developing thunderstorms. Pollution keeps droplets smaller and allows more water to be transported higher where temperatures are lower. Evidence suggests that their presence can alter how a thunderstorm forms. These particles are some of the best cloud embryos, as water readily condenses on to them, forming cloud droplets. Lightning may also be

[9] "The Atlanta Thunderstorm Effect." Weatherwise, March-April 2010. http://www.weatherwise.org/Archives/Back%20Issues/2010/March-April%202010/Atlanta-full.html

enhanced by pollution as the cloud droplets take on different electrical charges. This in turn can lead to greater cloud electrification.

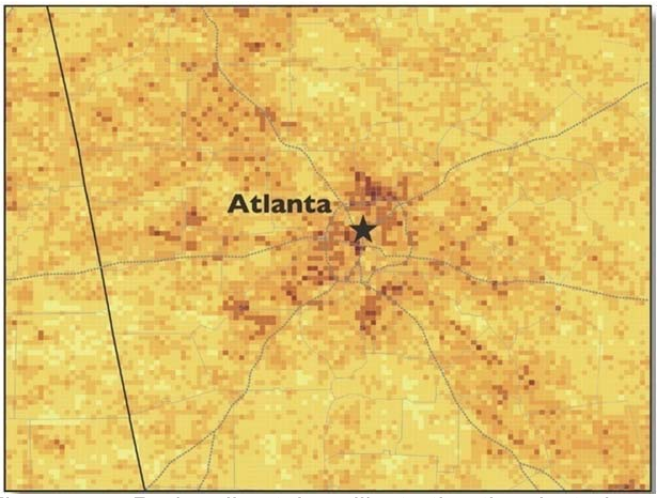


Figure 5-5: Radar climatology illustrating the clustering of strong Thunderstorm days directly over and immediately surrounding Atlanta.[10]

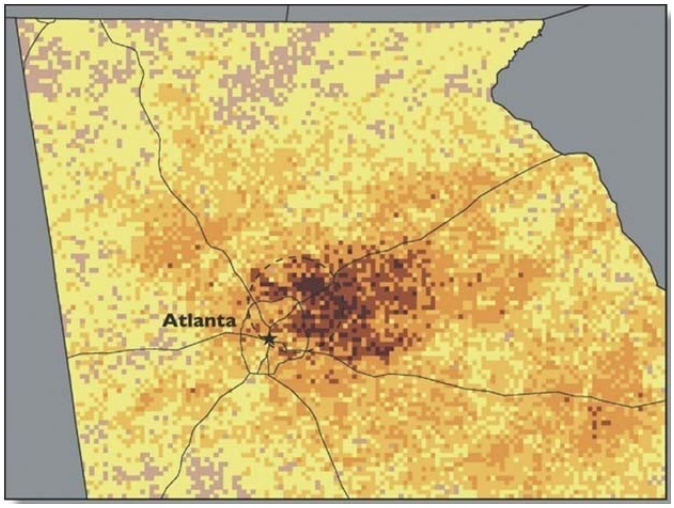


Figure 5-6: Plot of lightning events during periods of westerly flow illustrating downwind enhancement east of Atlanta.[11]

Past Occurrences of Severe Weather Events

In addition to the numerous severe weather events documented in the 2004 Hazard Mitigation Plan, Fulton County has experienced over 100 severe weather events. For the purposes of this plan, these events are defined as documented events by the National Climatic Data Center that produced hail, thunderstorms, severe lightning, strong wind events, funnel clouds, heavy fog, and/or heavy rain.

[10] Ibid.
[11] Ibid.

These events have resulted in $16,867,000 in property damage, 8 injuries, and 2 deaths. Nineteen of these events resulted in property damage $100,000 or more some of which highlighted below.

March 15, 2008. Baseball-sized hail was observed in downtown Atlanta. Because of the extensive damage caused by the tornado the previous evening, it was hard to distinguish what damage was caused by the hail, but chards of glass were reported to have been spread across much of the downtown area. In addition, the public reported golf ball-sized hail southwest of Six Flags, just south of Interstate-20 in western Fulton County, including the area around Fulton Industrial Boulevard, penny-sized hail was observed just southeast of downtown Atlanta in the Grant Park area. The National Climatic Data Center's records indicate $5,000,000 of property damage was caused by the combined damage of the tornado and hail.

February 26, 2008. A squall line caused extensive damage across Fulton County. More than 50 trees were down across the county with at least 20 structures sustaining damage. A number of power lines were also down across these areas. Damage was reported in north Fulton County from the Fulton/Cobb county line west of Roswell to just north of downtown Roswell. Hundreds of trees were blown down, several on homes. More than 300 trees along were blown down in 80-acre Roswell Park on Woodstock Road. The downed trees caused extensive damage to facilities within the park, including a children's playground, picnic shelters, and a maintenance building. Damage was reported to homes and other structures in Sandy Springs, Atlanta, Milton, and Johns Creek, College Park, and Fairburn. Heavy damage was noted in the Sandy Springs area. Two injuries were reported in the city of Atlanta when a tree fell on the structure causing the roof and wall to collapse. In Fairburn, two homes were damaged due to downed trees. This event resulted in $2,000,000 of property damage to the impacted counties.

May 11, 2008. Golf ball-sized hail was observed in the College Park area. The Fulton County 911 Center relayed a report of quarter-sized hail from the Fairburn area. Hail fell for 10 to 15 minutes in the Fairburn area. Georgia Highway 92 was reported to have been covered with hail. The storm weakened as it moved northeast, but penny-sized hail was still observed by the public as it moved through the East Point area near Atlanta's Hartsfield-Jackson International Airport. This event resulted in $2,000,000 of property damage to the impacted areas.

Extent and Intensity of Potential Severe Weather Events

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

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

Recent studies indicate that urbanization may interact and possibly increase the number and intensity of severe weather effects such as thunderstorms, lighting, and heavy rainfall.

Location of Potential Severe Weather Events
Most areas of Fulton County have experienced a high frequency of severe storms, including thunderstorms, high winds, heavy precipitation, hail, and lightning and share equal risks for all types of severe storms, with Atlanta possibly at a slightly higher risk based on recent research indicating the potential for exacerbated effects due to urbanization.

Probability and Range of Magnitude Future Severe Weather Events
Severe weather should continue to affect Fulton County on annual average of 21.78 storms per year (median = 21, mode = 18)[12]. However, the historical records cannot determine future outcomes; frequency of these events is unpredictable. Variables such as the Urban Heat Island and other climate change issues affect may have the potential to intensify the affect of these temperatures.

On a scale of 1 to 4, with 1 being unlikely and 4 being highly likely, and magnitude ranging from negligible to catastrophic, the Hazard Mitigation Planning Committee rated the probability of severe weather occurrences as follows:

- Level IV – Negligible: Highly Likely (3.92)
- Level III – Marginal: Likely (3.17)
- Level II – Critical: Unlikely to Possible (1.83)
- Level I – Catastrophic: Almost Unlikely (1.33)

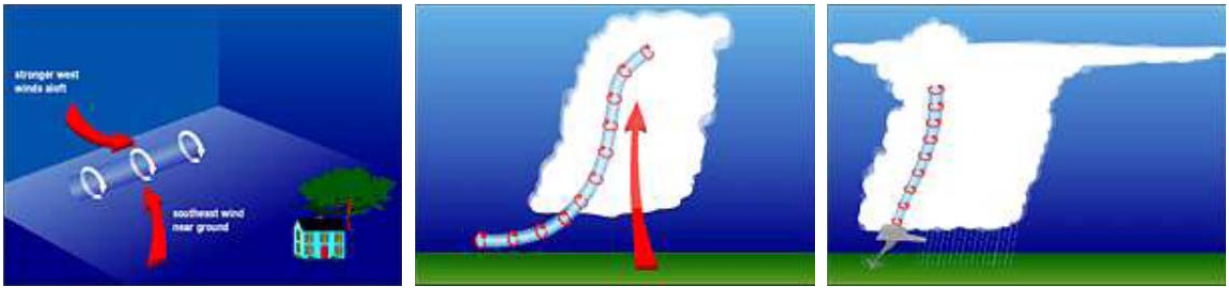
5.4.6 Tornadoes

5.4.6.1 Description of Hazard

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

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

Figure 5-7: How a Tornado Forms



[12] Data calculated from storm event data from 1996 through 2009.

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

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

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

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

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

In 1971, Dr. T. Theodore Fujita of the University of Chicago developed the original F-scale for wind damages, including tornadoes. The original F-scale, however, was recently replaced by an enhanced version effective February 1, 2007. The Enhanced F-scale is a more precise method of tornado damage assessment that classifies damage according to calibrations developed by engineers and meteorologists across 28 different types of damage indicators. The underlying premise is that a tornado scale needs to take into account the varying strengths and weaknesses of different types of construction. As with the original F-scale, the enhanced version rates the tornado as a whole based on most intense damage within the path. Historical tornadoes before February 1, 2007, will not be re-evaluated using the Enhanced F-scale.

Table 5-5: Enhanced F Scale for Tornado Damage

EF Number	3 second gusts	Damage Description
F-0	65-85 mph	**Light Damage**: Chimneys are damaged, tree branches are broken, shallow-rooted trees are toppled.
F-1	86-110 mph	**Moderate Damage**: Roof surfaces are peeled off, windows are broken, some tree trunks are snapped, unanchored manufactured homes are overturned, attached garages may be destroyed.
F-2	111-135 mph	**Considerable Damage**: Roof structures are damaged, manufactured homes are destroyed, debris becomes airborne, large trees are snapped or uprooted.
F-3	136-165 mph	**Severe Damage**: Roofs and some walls are torn from structures, some small buildings are destroyed, non-reinforced masonry buildings are destroyed, most trees in forest are uprooted.

Table 5-5: Enhanced F Scale for Tornado Damage		
F-4	166-200 mph	**Devastating Damage**: Well-constructed houses are destroyed, some structures are lifted from foundations and blown some distance, cars are blown some distance, large debris becomes airborne.
F-5	Over 200 mph	**Incredible Damage**: Strong frame houses are lifted from foundations, reinforced concrete structures are damaged, automobile-sized debris becomes airborne, trees are completely debarked.

5.4.6.2 Hazard Profile

Recent research conducted by Michael Frates of the University of Akron found that there are other regions of tornadic activity, other than the traditional "Tornado Alley." His research revealed four regions, one of which is termed "Dixie Alley" of which Georgia is part. In his study of the spatial distribution of dangerous tornadoes (ranked F3, F4, or F5), he discovered that such tornadoes occur most often in Dixie Alley which spans from eastern Texas across parts of Missouri, Arkansas, Louisiana, Mississippi, Tennessee, and Alabama into northeast Georgia (Figure 5-8). Dixie Alley has the highest frequency of long-track F3 to F5 tornadoes making it the most active region in the United States.

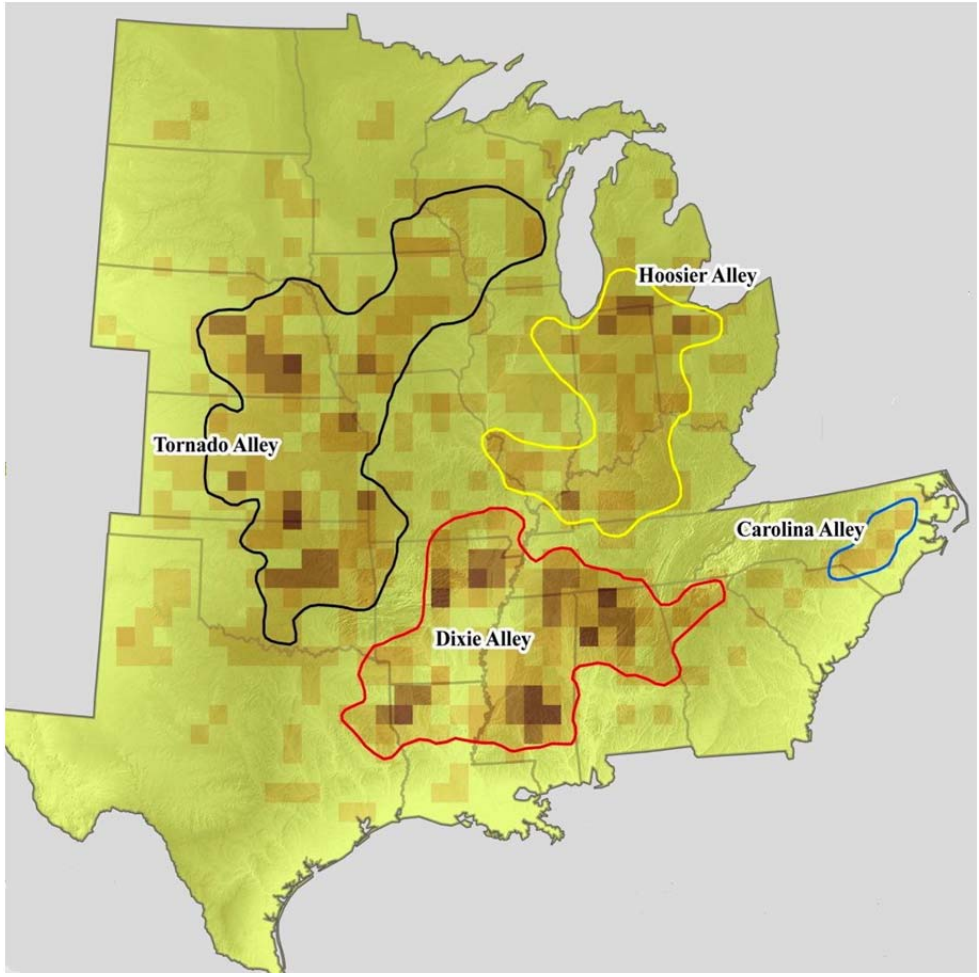


Figure 5-8: The four tornado alleys identified by major spatial pattern

According to research in 2007 by Dr. Walker Ashley, Northern Illinois University meteorologist, a number of factors explained the higher number of tornado fatalities in the Dixie Alley area. Dr. Ashley stated that the south is more susceptible to nighttime killer tornadoes, that it has the highest percentage of manufactured homes in the US (where 63% of the overall fatalities occur), that there are more heavily forested areas, that there is a lack of a focused tornado season which can lead to complacency indicating that it has tornadoes much earlier than the national peak (May and June). Complicating matters is that tornadoes are rarely visible in this area as they are more likely to be embedded in shafts of heavy rain, and that the hilly topography makes them difficult to see.[13]

Past Occurrences of Tornadoes
In addition to the numerous tornadic events documented in the 2004 Hazard Mitigation Plan, Fulton County has experienced three tornadoes, which are described below.

January 2, 2006. The Palmetto area was struck by an F-2 tornado that resulted in major damage to a number homes, and damage to powerline due to fallen trees. Damage was estimated to be at approximately $250,000.

April 8, 2006. The Mountain Park area was struck by an F-1 tornado that was 11 miles long and resulted in damage to businesses, hundreds of trees, and approximately 149 homes in Fulton County (some of which were a total loss). A dental building in Alpharetta also suffered major damage when a downed tree caused damage to the sprinkler system, flooding the building with thousands of gallons of water causing major damage to the historic building. This event caused approximately $1.5 million dollars of damage.

March 14, 2008. The City of Atlanta was struck by a high end EF-2 tornado that injured 30 people and killed 1. The twister tracked through the heart of the city of Atlanta causing $25 million dollars of damage to buildings, including several high rise business and/or hotel buildings, within the downtown Atlanta area. Fifty homes were also damaged. The tornado had a total path length of six miles, five of which fell within Fulton county, and a maximum path width of 200 yards. Maximum wind speeds were estimated at 130 mph.

Location of Potential Tornadoes
All Fulton County locations and jurisdictions are equally at risk for tornadoes.

Extent and Intensity of Potential Tornados
Historic data indicates that the intensity of tornadoes in Fulton County is between F0 and F2. However, two F3 tornadoes have been recorded. The extent of damage can vary widely depending upon the touchdown location. All but one have resulted in dollar losses ranging from $3,000 to the most mostly in 2008 totaling $25 million.

Probability and Range of Magnitude Future Tornado Events
Historic data indicates that the intensity of tornadoes in Fulton County is between F0 and F2. However, two F3 tornadoes have been recorded. Tornadoes should continue to affect Fulton County less than once a year on average (median = 0, mode = 0)[14]. However, the historical records cannot determine future outcomes; frequency of these events is unpredictable. Since tornadoes are

[13] "Deadly storms underscores new research findings: Mid-South is most vulnerable region to tornadoes." NIU News, February 8 2008. http://www.niu.edu/PubAffairs/RELEASES/2008/feb/tornado.shtml
[14] Data calculated from tornado event data from 1982 through 2008.

associated with Severe Weather, variables such as the Urban Heat Island and other climate change issues affect may have the potential to affect the frequency and intensity of these events.

On a scale of 1 to 4, with 1 being unlikely and 4 being highly likely, and magnitude ranging from negligible to catastrophic, the Hazard Mitigation Planning Committee rated the probability of tornado occurrences as follows:

- Level IV – Negligible: Highly Likely (3.75)
- Level III – Marginal: Likely (3.00)
- Level II – Critical: Possible (2.17)
- Level I – Catastrophic: Unlikely to Possible (1.67)

5.4.7 Tropical Systems

5.4.7.1 Description of Hazard

Tropical systems include several types of tropical cyclones: Hurricanes, tropical storms, and tropical depressions. A tropical cyclone is a rotating weather system that develops in the tropics. A tropical depression is an organized system of persistent clouds and thunderstorms with low level closed circulation and maximum sustained winds of 38 mph or less. A tropical storm is an organized system of strong thunderstorms with a well-defined circulation and maximum sustained winds of 39 to 73 mph. All of these tropical cyclones begin as a disturbance. A disturbance may result from a number of different weather events including Easterly Waves, West African Disturbance Line, Tropical Upper Tropospheric Trough or an Old Frontal Boundary. In order for a tropical disturbance to develop into a hurricane, three things must occur.

First, the disturbance must gather energy and heat through contact with warm ocean waters. Next, added moisture evaporated from the sea surface then provides power to the tropical storm. And last, the seedling storm forms a wind pattern near the ocean surface that spirals inward. Warm water is the most important of the three, as it provides the fuel for a disturbance to eventually develop into a hurricane. A hurricane is a tropical weather system with a well defined circulation and sustained winds of 74 mph or higher. Even inland areas, well away from the coastline, can experience destructive winds, tornadoes and floods from tropical storms and hurricanes.

The Atlantic hurricane season begins on June 1 and lasts through November. Within the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico annually there are an average of 11 tropical storms, 6 of which become hurricanes. In a typical three-year span, the US coastline is struck an average five times, two that are major hurricanes (category 3 or higher.) Hurricanes pose the greatest threat to life and property, but tropical depressions and storms can also cause extensive damage and loss of life.

5.4.7.2 Hazard Profile

Fulton County is situated approximately 230 miles from the Georgia coastline. While the County may not likely be affected by hurricane force events, it can still be affected by tropical systems. Furthermore, hurricane winds which can extend inland for hundreds of miles and spawn tornadoes. They can also trigger inland floods and landslides.

Past Occurrences of Tropical Systems

Fulton County has been exposed to the effects of tropical systems 12 times since 2002, with the most notable being Tropical Storm Fay in 2008. The slow movement of Fay and the proximity to the forecast area allowed for Fay's impacts on the Peachtree City forecast area to last several days. Outer rain bands affected the southern parts of the forecast area as Fay tracked slowly west through the Florida Panhandle. Widespread heavy rain also affected the southwest part of the forecast area

as the system tracked west across the Florida Panhandle. Estimated combined damages for the five days that tropical storm Fay affected the north and central Georgia area was $1.89 million.

Location of Potential Tropical Systems
All locations and geographic areas of Fulton County are subject to the effects of tropical systems, particularly areas that are located in flood prone areas.

Extent and Intensity of Potential Tropical Systems
Landfalling hurricanes will lose their intensity by the time they reach Fulton County. Should the path pass through or very near Fulton County, the hurricane would be downgraded to a tropical storm or depression with thunderstorms. Some of these storms have produced wind gusts up to 50 mph.

Tropical storms and depressions often bring torrential rains and flooding, which may last for days after the storm has passed. The dissipated strength of the inland storm does not necessarily affect the amount of rainfall and resultant flood levels. A weak tropical storm or depression moving slowly or lingering can cause more damage due to flooding than a fast moving hurricane. Historical storm data from events in Fulton County indicate that heavy rainfall is likely to be a greater threat due to the risk of flooding.

Tornadoes may also occur but not always - some produce none, while others spawn numerous ones. According to hurricane records, half produce one or more tornadoes with capabilities to compound wind damages. A tornado normally occurs within 12 hours of landfall and during daylight hours. This timeframe is within reach of Fulton County. Normally, a tornado watch will usually follow the projected inland path of a hurricane.

Probability and Range of Magnitude Future Tropical Systems
Historic data indicates the impacts of tropical depressions directly passing through or near Fulton County would be damages resulting from high wind gusts around 50 to 65 mph, heavy rainfall causing localized flooding of streams and drainage ways, and possible tornadoes. Tropical storms should continue to affect Fulton County on an annual basis with an average of 1.71 storms per year, (median = 1, mode = 1). However, the historical records cannot determine future outcomes; frequency of these events is unpredictable. Tropical systems are associated with high wind, severe weather, flooding, and tornadoes and variables such changes in building codes, future land use regulations, and climate change issues may have the potential to affect the frequency and intensity of these events.

On a scale of 1 to 4, with 1 being unlikely and 4 being highly likely, and magnitude ranging from negligible to catastrophic, the Hazard Mitigation Planning Committee rated the probability and magnitude of tropical systems occurrences as follows:

- Level IV – Negligible: Likely (3.00)
- Level III – Marginal: Possible (2.08)
- Level II – Critical: Unlikely (1.25)
- Level I – Catastrophic: Unlikely (1.08)

5.4.8 Sinkholes

5.4.8.1 Description of Hazard

Sinkholes are a common, naturally occurring geologic feature that is hazardous to property and the environment. Although many new sinkholes develop naturally, their increasing frequency corresponds to the accelerated development of ground-water and land resources. Usually little more than a

nuisance, new sinkholes can sometimes cause substantial property damage and structural problems for buildings and roads.

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

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

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

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

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

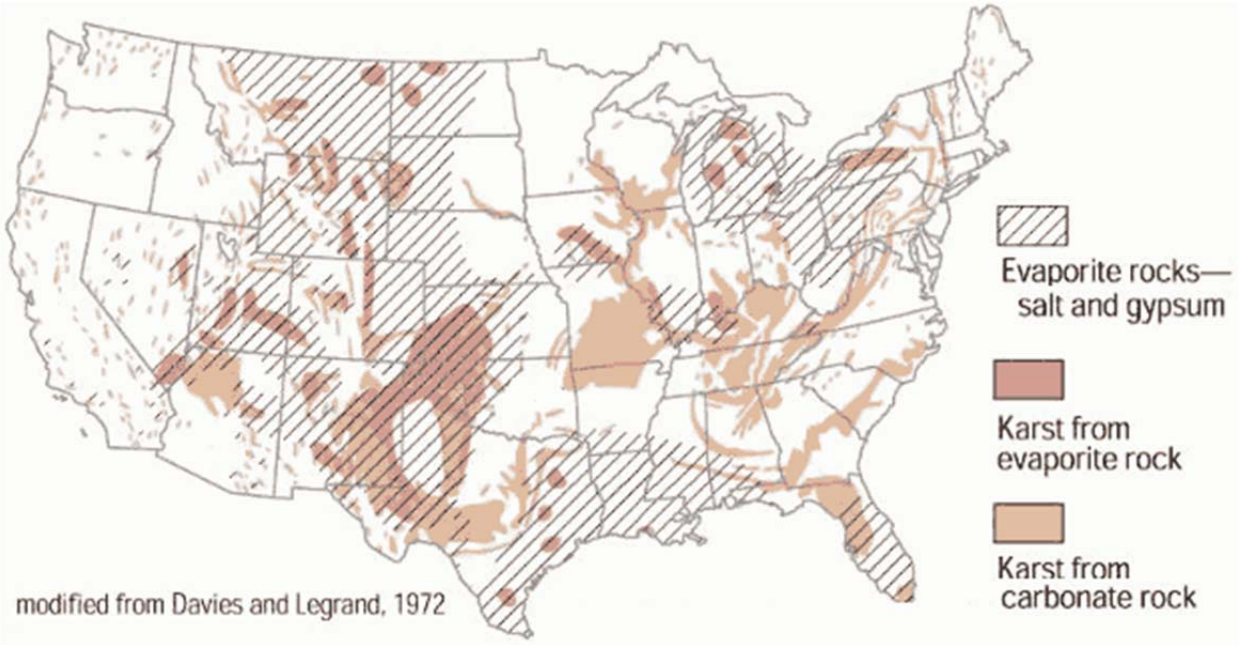
Lowering water levels is one of the most significant triggering mechanisms for subsidence in a karst terrain. Water-level decline may occur naturally or be induced by man. Factors leading to a decline in water levels include the pumping of water from wells, localized drainage from construction, dewatering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

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

5.4.8.2 Hazard Profile

Groundwater accounts for only 1% of the water source for Fulton County. Additionally, according to the USGS, the underlying rock types that make the ground prone to catastrophic sinkholes does not exist widely in this area (see Figure 5-9). The map below shows areas of the United States where certain rock types that are susceptible to dissolution in water occur. In these areas the formation of underground cavities can form and catastrophic sinkholes can happen. These rock types are evaporites (salt, gypsum, and anhydrite) and carbonates (limestone and dolomite). Evaporite rocks underlie about 35 to 40 percent of the United States, though in many areas they are buried at great depths. However, sinkholes have occurred in the county due such as failure of underground water and sewer infrastructure, land use and development practices, or combinations of these variables.

Figure 5-9: Underlying Rock Types



Past Occurrences of Sinkhole Events

Although Fulton County may not be at risk for sinkholes due to geologic causes, there have been recent documented cases of smaller sinkhole occurrences that are as a result of man-made actions. For example, NBC affiliate Channel 11 reported on June 3, 2010 that for the past 3 years a sinkhole was forming in a Southwest Atlanta subdivision due to an erosion control project undertaken by a developer that was ordered by Fulton County. This project involved the installation of a retaining wall and a new drainage system.[15] Another sinkhole was reported on June 8, 2010 due to an aging water pipe (circa 1920's) that broke and caused a sinkhole in the center lanes of Centennial Olympic Park Drive. Other similar types of

[15] NBC Channel 11, http://www.11alive.com/rss/rss_story.aspx?storyid=144883

sinkholes have been reported. In 1993, a very large sinkhole at a parking lot claimed the live of two people (Figure 5-10). The cause was severe storms that overwhelmed an old sewer pipe.

Location of Potential Sinkholes
Based on the occurrence of recent sinkholes, it appears that the areas that are vulnerable to future sinkhole events will involve areas that involve infrastructure and development decisions.

Extent and Intensity of Potential Sinkholes
Based on the underlying geological composition in the Fulton County area, it does not appear that the County is at risk for very large or catastrophic, naturally-occurring sinkholes due to the lack of salt and gypsum evaporate rock, karst from evaporate rock, or karst from carbonate rock. Fulton County, however, is at risk for localized, man-made sinkholes. The location and size of the sinkholes that have occurred have posed local public safety risks (i.e. neighborhood residents, motorists) and have disrupted delivery of basic utility services such as drinking water.

Probability and Range of Magnitude Future Sinkholes
Localized, manmade sinkholes may continue to affect Fulton County primarily as a result of failure of underground water system infrastructure. These failures cause instability in the ground above it.

On a scale of 1 to 4, with 1 being unlikely and 4 being highly likely, and magnitude ranging from negligible to catastrophic, the Hazard Mitigation Planning Committee rated the probability and magnitude of man-made sinkhole occurrences as follows:

- Level IV – Negligible: Possible (2.33)
- Level III – Marginal: Unlikely (1.00)
- Level II – Critical: Unlikely (1.00)
- Level I – Catastrophic: Unlikely (1.00)

5.4.9 Wildfire/Urban Interface Zone

5.4.9.1 Description of Hazard

The Wildfire/Urban Interface is defined as the area where structures and other human development meet with undeveloped wildland or vegetative fuels (Federal Emergency Management Agency, 1996). As residential areas expand into relatively untouched wildlands, people living in these communities are increasingly threatened by wild fires.

There are three different classes of wildland fires. A surface fire is the most common type and burns along the floor of a forest, moving slowly and killing or damaging trees. A ground fire is usually started by lightning and burns on or below the forest floor. Crown fires spread rapidly by wind and move quickly by jumping along the tops of trees. Wildland fires are usually identified by dense smoke that fills the area for miles around.

Rural and large tracts of unimproved lands are susceptible to brush and forest fires capable of threatening life, safety and property loss in adjacent developed areas if not effectively controlled. Wildfires are caused by numerous sources including arson, carelessness by smokers, individuals burning debris, operating equipment which throws sparks, and children playing with matches. However, the largest number of fires is caused by lightning strikes which coincide with the height of the thunderstorm season. A major wildland fire can leave a large amount of scorched and barren land, and these areas may not return to pre-fire conditions for decades. If the wildland fire destroys the ground cover, other potential hazards, such as erosion, may develop (Federal Emergency Management Agency, 1998).

Structures in the wildfire/urban interface zone are vulnerable to ignition in three different ways: radiation, convection, and firebrands (National Wildfire/Urban Interface Fire Protection Program). Radiating heat from a wildfire can cause ignition by exposure to the structure. The chances of ignition increase as the size of the flames increases, surface area exposed to flames increases, length of exposure time increases, and distance between the structure and the flames decreases. Another source of ignition by wildfire is convection. Ignition of a structure by convection requires the flame to come in contact with the structure. Contact with the convection column is generally not hot enough to ignite a structure. Clearing to prevent flame contact with the structure must include any materials capable of producing even small flames. Wind and steep slopes will tilt the flame and the convection column uphill increasing the chance of igniting a structure. Structures extending out over a slope have the greatest likelihood of ignition from convection.

Firebrands also pose a threat to structures in the wildland/urban interface. A firebrand is a piece of burning material that detaches from a fire due to strong convection drafts in the burning zone. They can be carried a long distance (approximately 1 mile) by fire drafts and winds. The chance of these firebrands igniting a structure depends on the size of the firebrand, how long it burns after contact, and the materials, design, and construction of the structure.

Past Occurrences of Wildfire/Urban Interface Fires
Wildfires have become a common annual occurrence in wooded areas during Georgia's dry season. Exposure to wildfire varies greatly across Fulton County. While exposure is relatively low along in the county's urbanized areas, it is quite high in the communities bordered by national parks and other heavily wooded areas. Since 2001, Fulton County has experienced 75 wildfires, for a total of 507 acres, all of which occurred in South Fulton County. Maps illustrating locations of wildfire occurrences can be found in Appendix B – Maps.

Location of Potential Wildfire/Urban Interface Fires
The following jurisdictions reported they are at particular risk for wildfire/urban interface fires:

- Union City: Approximately 3,000 homes are at risk for exposure to fire from urban interface
- Fairburn: Approximately 3,000 homes are at risk for exposure to fire from urban interface
- Chattahoochee Hills: This is a heavily forested, rural community which is also surrounded by forests managed by the State Forestry Division. Approximately 150 structures are at risk for exposure. There is also a high risk of wildland fire in this and the land that surrounds it.
- Palmetto: There are a few hundred homes that are at risk of exposure to fire from urban interface.
- Sandy Springs and Roswell: These communities are bordered by large national parks that are heavily wooded.
- Johns Creek: This community contains some area belonging to the Chattahoochee National Park creating some risk for structures in the area.
- Unincorporated South Fulton County: This area contains heavily wooded areas that adjoin residential and business communities.

Extent and Intensity of Wildfire/Urban Interface Fires
Fulton County has multiple fuel sources and is prone to drought and thunderstorms which increase the potential severity of wildfires significantly. The county has abundant fuel sources in various locations of the county. Weather conditions, given the high frequency of severe storms with lightning and periodic severe drought conditions, can exacerbate wildfires.

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

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

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

Probability and Range of Magnitude Future Wildfire/Urban Interface Events
The largest fire recorded since 1952 totaled 230 acres. However, thousands of acres of forests exist throughout the county. Therefore, the historical records cannot determine future outcomes; frequency of these events is unpredictable.

On a scale of 1 to 4, with 1 being unlikely and 4 being highly likely, and magnitude ranging from negligible to catastrophic, the Hazard Mitigation Planning Committee rated the probability and magnitude of Wildfire/Urban Interface occurrences as follows:

- Level IV – Negligible: Likely (3.17)
- Level III – Marginal: Possible (1.83)
- Level II – Critical: Unlikely (1.08)
- Level I – Catastrophic: Unlikely (1.00)

5.4.10 Dam Failure

5.4.10.1 Hazard Description

A dam is a constructed barrier across flowing water that obstructs, directs, or slows the velocity of the water, creating a reservoir, lake, or impoundment. Generally, the structure's purpose is to simply retain water for a variety of purposes such as generating power, providing water for irrigation or water supply, or controlling flooding.

The threat of dam failures is triggered by carelessness of design, construction, and maintenance. The integrity of older dams, often affected by weathering, mechanical changes, and the influence of chemical agents, is deteriorating. Not only is dam failure risk increasing (with aging infrastructure) but the population vulnerable to this hazard is also increasing due to downstream development.

Even structures outside of the known 100 year floodplain may prove affected by dam failures because of the water's often sudden release and velocity. Dam failures are generally grouped into three classifications: hydraulic, seepage, and structural. Generally, the three types of failure compound upon one another to create complex and interrelated hazard events. Hydraulic failures are a result of the uncontrolled flow of water over and around the dam structure as well as the erosive action on the dam and its foundation. The uncontrolled flow causing the failure is often classified as wave action, toe erosion, or gullying. Earthen dams are particularly susceptible to hydraulic failure

because earthen materials erode at relatively slow velocities. This type of failure constitutes approximately 40% of all dam failures.

While all dams exhibit some seepage, the velocity and amount of water are controlled to prevent failure. Seepage occurs through the structure and its foundation and erodes the structure from within. Seepage accounts for approximately 4% of all dam failures. Structural failure involves the rupture of the dam or the foundation by water movement, earthquake, or sabotage. Large earthen dams and dams constructed with weak materials (such as silt) are especially susceptible to structural failure. This type of failure accounts for approximately 30% of all dam failures.

Because of the high velocity of the water, flooding can strike beyond known floodplains. Dam failures often have a rapid rate of onset, leaving little time for evacuation. The first signs of the failure may go unnoticed upon visual inspection of the dam structure. However, continual maintenance and inspection of dams often provides knowledge on the possibility of failure with certain precipitation amounts. The duration of the flooding event caused by the failure also depends on the amount of water and downstream topography. Given smaller volumes of water and a topography suited for transporting the water rapidly downstream, the event may only last hours.

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Because of the lack of seasonality and other predictive factors, the frequency of dam failures cannot be determined. In terms of magnitude and intensity of the flooding event caused by dam failures, no measures actually exist. However, the National Dam Safety Program (NDSP) produces rankings and definitions of dam structures based on potential impact. Table 5-6 lists the dam categories and potential impact of dam failure.

Table 5-6: Dam Categories and Potential Impact

Classification	Loss of Human Life	Economic, Environmental, or Lifeline Loss
High (Cat 1)	Probable, >1	Yes (not necessary for classification)
Significant (Cat 2)	None expected	Yes
Low (Cat 3)	None expected	Low & generally limited to owner

5.4.10.2 Hazard Profile

The major dam of concern to the majority of communities along the Chattahoochee River in Fulton County is the safe operation of Buford Dam, located in Forsyth County. This dam is regulated and constructed by the Army Corp of Engineers (http://lanier.sam.usace.army.mil/) and it holds back water that creates Lake Lanier. The main dam is 192 feet high, 2,360 feet long and has 14 feet of freeboard. It was built of raw earth instead of concrete to keep costs low. The dam creates a

reservoir over 38,000-acre. This single structure is the largest risk factor for the Cities of Johns Creek, Roswell, Sandy Springs, Atlanta, Chattahoochee Hills, and Unincorporated Fulton County

In addition to Buford Dam, at the headwater of the Chattahoochee River, is another dam, Morgan Falls Dam. Morgan Falls Dam is a small hydroelectric dam located on the Chattahoochee River at the south of Roswell, Georgia, in north metro Atlanta. The dam was originally constructed in 1904 by Georgia Power to provide electricity for Atlanta's streetcars, it now provides enough power for about 4400 homes. The dam is 1031 feet long, and 56 feet tall, and holds back Bull Sluice Lake. The structure risk factor would be to the Cities of Roswell, Sandy Springs, Atlanta, Chattahoochee Hills, and Unincorporated Fulton County.

There are 11 NRCS water control structures located in northern Fulton County. These structures are managed by the USDA's Natural Resources Conservation Service (NRCS). A report prepared following the floods of September 2009 stated that while no NRCS dams have breached in Georgia to date, some of the auxiliary spillways are in need of remedial repairs. The Little River Watershed Dam (No. 39) was identified as one of these (see Figure 5-11). These dams are located in the Cities of Milton (9), Roswell (2), and Mountain Park (1).

Figure 5-11: Little River Watershed Dam Damage from September 2009

In addition to these NRCS water control structures, there are many dams and detention ponds throughout the county which are owned privately or by local jurisdictions. Many of the privately owned dams and detention ponds have not been well maintained, which increase the risk of failure.

Past Occurrences of Dam Failures

On July 28, 2001 NRCS Dam #38 in the City of Mountain Park, Lake Cherful was partially drained to allow a contractor to install a sanitary sewer line. They built temporary dam that failed and did cause some flooding downstream in Cherokee County. There have been no other known occurrences of dam breaches in Fulton County. However, other lesser types of failures have occurred that have contributed to stream bank erosion, localized flooding, and other damage to the natural environment such as that seen in Figure 5-11.

Location of Potential Dam Failures

There are 11 NRCS watershed flood control structures located in northern Fulton. Appendix D – Maps includes a map that illustrates the locations of these structures. All dams have some risk of failure. There are also numerous other dams and lakes distributed throught the county that have varying degree of risk.

Extent and Intensity of Dam Failures

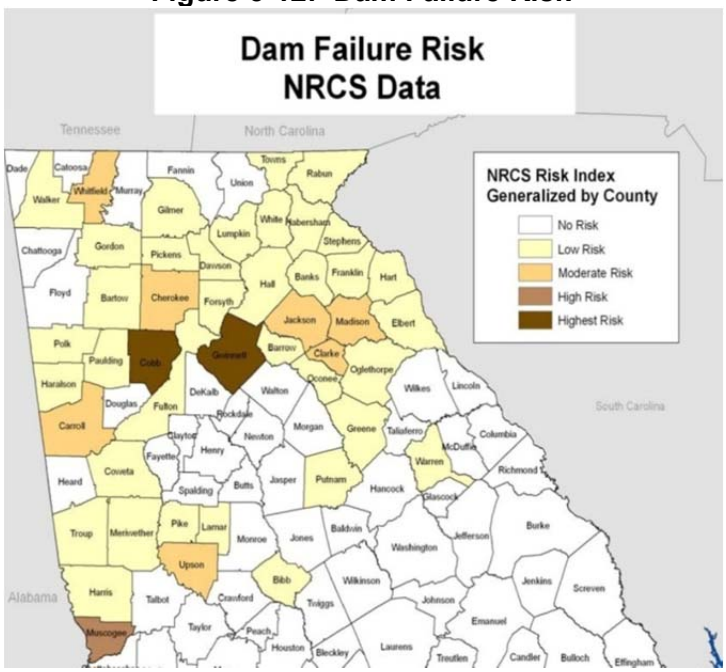
Using the Social Vulnerability Index (SoVI) methodology which uses 42 socioeconomic and built environment variables to measure social vulnerability to environmental hazards, Fulton County as a

whole is ranked average on the SoVI.[16] However, jurisdictions in northern Fulton County, as well as the City of Atlanta, are at greater risk for more extensive damage as a result of dam failures.

Probability and Range of Magnitude of Future Dam Failure Events

Although there are no historical occurrences of dam failures in Fulton County, most of the jurisdiction with dams report that numerous dams in their jurisdictions are privately owned and are not being adequately maintained. Combined with the effects of other natural hazards such as heavy rainfall associated with severe weather or tropical systems, the added stress on dam systems indicate there is some probability of dam failure. GEMA determined in their 2008 Hazard Mitigation Strategy the total dam failure risk as calculated by NRCS was low (see Figure 5-12.) This was calculated by totaling the individual dam risk failure scores.

Figure 5-12: Dam Failure Risk



Source: GEMA 2008 Hazard Mitigation Plan

On a scale of 1 to 4, with 1 being unlikely and 4 being highly likely, and magnitude ranging from negligible to catastrophic, the Hazard Mitigation Planning Committee rated the probability and magnitude of dam failure occurrences as follows:

- Level IV – Negligible: Possible (2.33)
- Level III – Marginal: Unlikely to Possible (1.50)
- Level II – Critical: Unlikely (1.25)
- Level I – Catastrophic: Unlikely (1.17)

5.4.11 Winter Storm

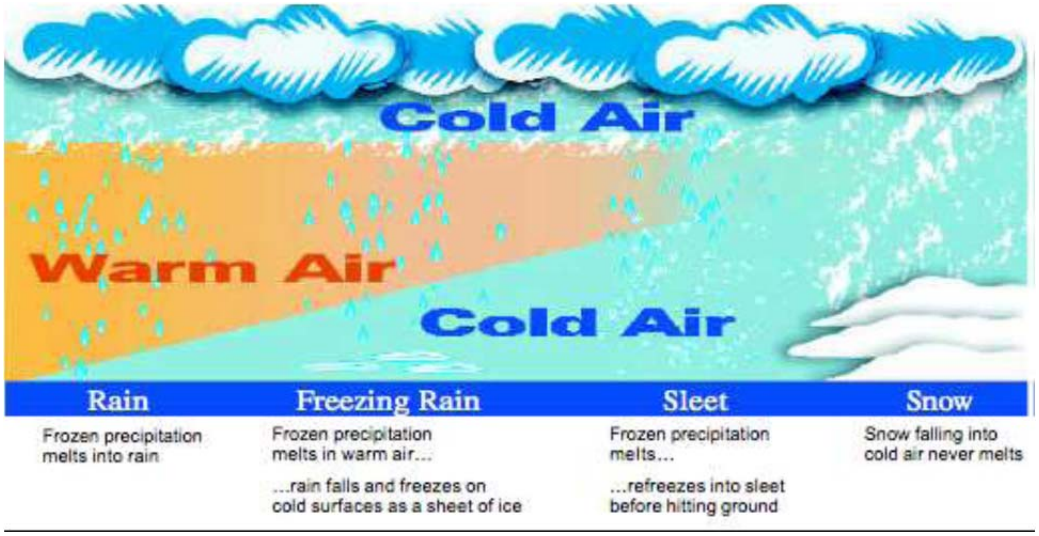
5.4.11.1 Hazard Description

Winter storms and blizzards originate as mid-latitude depressions or cyclonic weather systems, sometimes following the meandering path of the jet stream. A blizzard combines heavy snowfall, high winds, extreme cold, and ice storms. The origins of the weather patterns that cause severe winter storms are primarily from four sources in the continental United States. Winter storms in the

[16] 2008 GEMA Hazard Mitigation Plan, p. 237.

southeast region of the United States are usually a result of Canadian and Arctic cold fronts from the north and mid-western states combining with tropical cyclonic weather systems in the Gulf of Mexico. Typical winter storms in the Southeast include ice storms, crop-killing freezes and occasional snow.

Figure 5-13: How a Winter Storm is Formed



Source: National Weather Service, Winter Storms, The Deceptive Killers at http://www.weather.gov/os/winter/resources/winterstorm.pdf

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

5.4.11.2 Hazard Profile

Although winter storms in Georgia are not as common as in more northern regions of the U.S., portions of the state in which Fulton County is located are at risk for severe winter weather. Occurrences of winter weather conditions can involve an occasional dusting of snow or short freezing rain falls. On rare occasions snowfalls may exceed two inches or freezes disrupt road travel for long periods. On average, the county receives 2.1 inches of snowfall annually.[17] When the occasional snow storm or severe freeze does occur, however, major transportation disruptions and power outages may be experienced. This is largely due to local inexperience in coping with such infrequent occurrences. Consequently, the risks associated with this type of weather are largely a direct correlation to the community's ability to handle the storm. These risks include loss of life due to cold, loss of electricity for extended periods of time, agricultural damage, and road hazards. Fallen trees and limbs and heavy snow loads can cause roof collapses and downed power and communications lines. Heavy snowfalls over two inches and long-lasting freezes are more infrequent but create higher risks. Disruptions can last for several days following these extreme winter storm conditions.

[17] The Southeast Regional Climate Center. http://www.sercc.com/climateinfo/historical/avgsnowfall.html

Winter temperatures in Fulton County are generally moderate, with average temperature of 43.8° F and average minimums at 33.0° F. Extreme cold temperatures are infrequent but do occur. These rare temperature lows could result in burst plumbing in homes and occasional deaths due to lack of sufficient heating or exposure. The lowest recorded temperature of −10 ° in 1985 in Marietta.

Past Occurrences of Winter Storms

In January 2011, Fulton County experienced one of the most significant winter storms to affect north and central Georgia in years. The event began the evening of January 9th and continued throughout much of the following week. Snowfall of four to seven inches was common across most of north Georgia north of Interstate-20. From Interstate-20 southward to about 50 miles, snow and sleet accumulations were mostly in the one to two inch range, but mostly freezing rain and some sleet southward for the remainder of central Georgia. North Georgia, north of interstate 20, and especially areas north and northwest of Atlanta, extensive snow and ice lingered throughout the work week. The snow and sleet accumulations were compounded by an extended period of light freezing drizzle into the 11th and nearly a week long period of temperatures remaining at or below freezing. The extensive snow and ice accumulations resulted in significant disruptions to travel and daily activities in the area. Fulton County experienced an average of 3 to 4.5 inches of snowfall South and North Fulton, respectively. Major interstates, roads, and highways were a quagmire for two to three days as cars and trucks were unable to navigate hilly sections of the roads covered with a solid sheet of ice covered snow pack. Most schools and many businesses in north Georgia counties were closed throughout the week. Significant disruptions to travel at Hartsfield-Jackson International Airport were observed, compounded by simultaneous major winter storms in the northeast U.S. The area was simply unable and unequipped to handle such a major and long lasting winter weather event. Although the majority of winter precipitation fell during the first 12 hours of the event, the duration of below freezing temperatures resulted in an unprecedented impact on the area. Other past occurrences are detailed in Appendix B.

Location of Potential Winter Storms Failures

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

Extent and Intensity of Winter Storms

On average, Fulton County experiences annual disruptions and some damages due to severe winter storms/freezes. The average snowfall is 2.1 inches yearly, but some events have produced major disruptions and damages, such as the one occurring in January 2011. Winter temperatures on average are above freezing, but occasional freezes do occur.

Probability and Range of Magnitude of Future Winter Storms

Winter storms/freezes should continue to affect Fulton County on an annual basis to some extent. More severe events with heavy snowfalls exceeding two inches, long lasting freezes, and extreme lows should be more infrequent at a rate of one per three to five years. Certainly, however, the historical records cannot determine future outcomes; frequency of these events is totally unpredictable. The risks associated with the average annual hazard are slight, but the more infrequent but severe winter storms/freezes have potentially severe risks. These severe winter events can cause major transportation disruptions, lengthy power outages, substantial property damages, and some loss of life.

The Hazard Mitigation Planning Committee rated the probability of future occurrences of negligible to marginal extent as possible to likely (3.75 to 2.67, respectively) and critical to catastrophic (1.67 to 1.17 respectively) as generally unlikely, on a scale of 1 – 4, with 1 being unlikely and 4 being highly likely.

5.5 Summary of Hazards and Community Impacts

Each participating jurisdiction completed a Risk Assessment Matrix that was derived from the NFPA 1600 methodology (see Appendix C – Meeting Documentation for a sample matrix that was used at jurisdiction-level meetings). This methodology measured level of magnitude or severity as:

- Level I – Catastrophic
  - Personnel: Death or fatal injury.
  - Public: Death or fatality or fatalities due to direct exposure.
  - Environment: A major hazardous chemical spill that is uncontained. Regional or total species/subspecies loss.
  - Economic Impact: Total loss of financial base, incapacitating the City. Funding not available within one week to initiate urgent recovery procedures.
  - Facilities: Complete shutdown of facilities and critical services for more than a month.
  - Property: More than 50 percent of the property located in the proximity of the City is severely damaged.
- Level II – Critical
  - Personnel: Permanent disability, severe injury or illness.
  - Public: Permanent disability, severe injury or illness.
  - Environment: A minor hazardous chemical spill that is uncontained. Local or species/subspecies damage.
  - Economic Impact: Partial loss of financial base, temporarily incapacitating the City. Funding not available within four days to initiate recovery procedures.
  - Facilities: Complete shutdown of facilities and critical services for more than two weeks.
  - Property: More than 25 percent of the property located in the proximity of the City is severely damaged.
- Level III – Marginal
  - Personnel: Injury or illnesses not resulting in disability, major quality of life loss, or perceived illness.
  - Public: Injury or illnesses not resulting in disability, major quality of life loss, or perceived illness.
  - Environmental: A major hazardous chemical spill that is contained. Portion of local organisms negatively impacted.
  - Economic Impact: Minor loss of financial base, temporarily incapacitating the City. Funding not available within 24 hours to initiate recovery procedures.
  - Facilities: Complete shutdown of facilities and critical services for more than a week.
  - Property: More than 10 percent of the property located in the proximity of the City is severely damaged.
- Level IV: Negligible
  - Personnel: Treatable first aid injury.
  - Public: Minor quality of life loss.
  - Environment: A minor hazardous chemical spill that is contained. No measurable impact to environs.
  - Economic Impact: Minor loss of financial base, which does not incapacitate the City. Funding not available within 12 hours to initiate recovery procedures.
  - Facilities: Complete shutdown of facilities and critical services for more than 24 hours.

- Property: No more than 1 percent of property located in the proximity of the City is severely damaged.

and probability or likelihood as:

- Highly Likely – A hazard whose potential impact is very probable (100%) within the next year.
- Likely – A hazard whose potential impact is probable (10% - 100%) within the next year, or one whose impact has a chance of occurring within the next ten years.
- Possible – A hazard whose potential impact is possible (1% - 10%) or has one chance of occurrence in a hundred years.
- Unlikely – A hazard whose potential impact is likely to occur less than once in a hundred years. (<1%) This category can be compared to the 100-year flood exposures used in design.

for each natural hazard identified a potential threat. A meeting was conducted with each participating jurisdiction to complete the assessment exercise. Appendix C – Meeting Documentation contains a sample of the assessment instrument that was used including descriptions for the levels of measurement. After an assessment was completed for each participating jurisdiction, the respective scores were combined to determine an overall county risk assessment. The individual jurisdiction risk assessments are on the following pages followed by the overall county risk assessment matrix.

These assessments also served to assist the jurisdictions in determining which threats posed the highest or greatest threat. Once this was determined, these assessments were used to guide the development of hazard mitigation actions that were in the best interest of protecting their community from the most likely and/or the most severe hazards facing their jurisdiction.

Table 5-7: Atlanta Risk Assessment Matrix

Hazard Type	Level I Catastrophic	Level II Critical	Level III Marginal	Level IV Negligible	Score
Drought	L	L	L	H	13
Flood	L	L	L	H	13
Tornadoes	P	L	L	H	12
Heat Wave	U	L	L	H	11
Severe Weather	U	P	L	H	10
Winter Storm	U	P	P	H	9
Dam Failure	P	P	P	P	8
Tropical System	U	U	P	L	7
Wildfire/Urban Interface	U	U	U	H	7
Sinkhole	U	U	U	H	7
Earthquake	U	U	U	P	5
Average Risk by Level	1.5	1.92	2.08	3.42	

H = Highly Likely (4 points)
L = Likely (3 points)
P = Possible (2 points)
U = Unlikely (1 point)

Table 5-8: Chattahoochee Hills Risk Assessment Matrix

Hazard Type	Level I Catastrophic	Level II Critical	Level III Marginal	Level IV Negligible	Score
Drought	U	L	L	L	10
Flood	U	P	L	H	10
Severe Weather	U	P	L	H	10
Winter Storm	U	U	L	H	9
Wildfire/Urban Interface	U	U	L	H	9
Tropical System	U	P	P	L	8
Tornadoes	U	P	P	L	8
Dam Failure	U	P	P	P	7
Heat Wave	U	U	P	P	6
Earthquake	U	U	U	P	5
Sinkhole	U	U	U	P	5
Average Risk by Level	1.00	1.58	2.25	2.92	

H = Highly Likely (4 points)
L = Likely (3 points)
P = Possible (2 points)
U = Unlikely (1 point)

Table 5-9: College Park Risk Assessment Matrix

Hazard Type	Level I Catastrophic	Level II Critical	Level III Marginal	Level IV Negligible	Score
Tornadoes	U	P	H	H	11
Severe Weather	U	U	H	H	10
Flood	U	U	P	H	8
Winter Storm	U	U	P	H	8
Wildfire/Urban Interface	U	U	P	H	8
Retention Ponds	U	U	P	H	8
Drought	U	U	U	H	7
Heat Wave	U	U	U	H	7
Tropical System	U	U	P	L	7
Sinkhole	U	U	U	L	6
Dam Failure	U	U	U	U	4
Earthquake	U	U	U	U	4
Average Risk by Level	1	1.08	1.85	3.15	

H = Highly Likely (4 points)
L = Likely (3 points)
P = Possible (2 points)
U = Unlikely (1 point)

Table 5-10: East Point Risk Assessment Matrix

Hazard Type	Level I Catastrophic	Level II Critical	Level III Marginal	Level IV Negligible	Score
Drought	P	P	P	H	10
Flood	U	P	L	H	10
Tropical System	U	U	L	H	9
Severe Weather	U	U	L	H	9
Tornadoes	U	U	L	H	9
Winter Storm	U	U	L	H	9
Wildfire/Urban Interface	U	U	L	L	8
Sinkhole	U	U	U	H	7
Heat Wave	U	U	U	L	6
Earthquake	U	U	U	P	5
Dam Failure	U	U	U	U	4
Average Risk by Level	1.08	1.17	2.17	3.25	

H = Highly Likely (4 points)
L = Likely (3 points)
P = Possible (2 points)
U = Unlikely (1 point)

Table 5-11: Fairburn Risk Assessment Matrix					
Hazard Type	Level I Catastrophic	Level II Critical	Level III Marginal	Level IV Negligible	Score
Severe Weather	U	P	L	H	10
Tornadoes	U	P	P	H	9
Winter Storm	U	P	P	L	8
Tropical System	U	U	P	L	7
Dam Failure	U	U	U	H	7
Heat Wave	U	U	U	L	6
Wildfire/Urban Interface	U	U	U	P	5
Drought	U	U	U	P	5
Earthquake	U	U	U	P	5
Flood	U	U	U	P	5
Sinkhole	U	U	U	P	5
Average Risk by Level	1.00	1.25	1.42	2.75	

H = Highly Likely (4 points)
L = Likely (3 points)
P = Possible (2 points)
U = Unlikely (1 point)

Table 5-12: Hapeville Risk Assessment Matrix					
Hazard Type	Level I Catastrophic	Level II Critical	Level III Marginal	Level IV Negligible	Score
Tornadoes	P	P	L	H	11
Severe Weather	U	P	L	H	10
Winter Storm	U	P	L	H	10
Heat Wave	U	U	P	H	8
Drought	U	U	P	H	8
Tropical System	U	P	P	L	8
Flood	U	U	U	L	6
Sinkhole	U	U	U	P	5
Wildfire/Urban Interface	U	U	U	U	4
Dam Failure	U	U	U	U	4
Earthquake	U	U	U	U	4
Average Risk by Level	1.08	1.33	1.75	2.67	

H = Highly Likely (4 points)
L = Likely (3 points)
P = Possible (2 points)
U = Unlikely (1 point)

Table 5-13: Milton Risk Assessment Matrix					
Hazard Type	Level I Catastrophic	Level II Critical	Level III Marginal	Level IV Negligible	Score
Severe Weather	U	L	H	H	12
Wildfire/Urban Interface	P	P	L	H	11
Winter Storm	U	P	H	H	11
Flood	U	P	H	H	11
Dam Failure	U	P	L	H	10
Tornadoes	U	P	P	H	9
Drought	U	U	P	L	7
Heat Wave	U	U	P	L	7
Tropical System	U	U	P	P	6
Earthquake	U	U	U	P	5
Sinkhole	U	U	U	U	4
Average Risk by Level	1.08	1.58	2.42	3	

H = Highly Likely (4 points)
L = Likely (3 points)
P = Possible (2 points)
U = Unlikely (1 point)

Table 5-14: Mountain Park Risk Assessment Matrix					
Hazard Type	Level I Catastrophic	Level II Critical	Level III Marginal	Level IV Negligible	Score
Flood	P	P	L	H	11
Severe Weather	P	P	L	H	11
Winter Storm	P	P	L	H	11
Heat Wave	U	P	L	H	10
Tornadoes	P	P	P	L	7
Wildfire/Urban Interface	U	U	U	L	6
Dam Failure	U	U	U	P	5
Drought	U	U	U	P	5
Earthquake	U	U	U	U	4
Sinkhole	U	U	U	U	4
Tropical System	U	U	U	U	4
Average Risk by Level	1.33	1.33	1.67	2.58	

H = Highly Likely (4 points)
L = Likely (3 points)
P = Possible (2 points)
U = Unlikely (1 point)

Table 5-15: Palmetto Risk Assessment Matrix					
Hazard Type	Level I Catastrophic	Level II Critical	Level III Marginal	Level IV Negligible	Score
Tornadoes	P	L	L	L	11
Drought	P	P	L	L	10
Heat Wave	P	P	L	L	10
Severe Weather	P	P	L	L	10
Winter Storm	P	P	L	L	10
Dam Failure	P	P	P	P	8
Tropical System	P	P	P	P	8
Wildfire/Urban Interface	U	U	P	H	8
Flood	U	U	U	P	5
Earthquake	U	U	U	U	4
Sinkhole	U	U	U	U	4
Average risk by Level	1.58	1.67	2.08	2.33	

H = Highly Likely (4 points)
L = Likely (3 points)
P = Possible (2 points)
U = Unlikely (1 point)

Table 5-16: Roswell Risk Assessment Matrix					
Hazard Type	Level I Catastrophic	Level II Critical	Level III Marginal	Level IV Negligible	Score
Tornadoes	L	L	L	H	13
Severe Weather	P	P	L	H	11
Flood	U	P	L	H	10
Winter Storm	U	P	L	H	10
Tropical System	U	U	L	L	8
Heat Wave	U	U	P	H	8
Dam Failure	U	U	P	P	6
Drought	U	U	U	L	6
Wildfire/Urban Interface	U	U	U	L	6
Earthquake	U	U	U	P	5
Sinkhole	U	U	U	P	5
Average Risk by Level	1.25	1.42	2	3.08	

H = Highly Likely (4 points)
L = Likely (3 points)
P = Possible (2 points)
U = Unlikely (1 point)

Table 5-17: Sandy Springs Risk Assessment Matrix					
Hazard Type	Level I Catastrophic	Level II Critical	Level III Marginal	Level IV Negligible	Score
Tornadoes	U	P	H	H	11
Severe Weather	U	P	L	H	10
Flood	U	P	L	H	10
Winter Storm	U	P	L	H	10
Wildfire/Urban Interface	U	U	L	H	9
Heat Wave	U	U	L	H	9
Dam Failure	U	U	P	H	8
Drought	U	U	P	H	8
Tropical System	U	U	P	H	8
Earthquake	U	P	P	P	7
Sinkhole	U	U	U	L	6
Average Risk by Level	1	1.42	2.5	3.67	

H = Highly Likely (4 points)
L = Likely (3 points)
P = Possible (2 points)
U = Unlikely (1 point)

Table 5-18: Union City Risk Assessment Matrix					
Hazard Type	Level I Catastrophic	Level II Critical	Level III Marginal	Level IV Negligible	Score
Flood	U	L	H	H	12
Tornadoes	P	P	L	H	11
Severe Weather	U	P	L	H	10
Winter Storm	U	P	L	H	10
Wildfire/Urban Interface	U	P	L	L	9
Drought	U	U	U	H	7
Heat Wave	U	U	U	H	7
Tropical System	U	U	U	L	6
Sinkhole	U	U	U	P	5
Dam Failure	U	U	U	P	5
Earthquake	U	U	U	P	5
Average Risk by Level	1.08	1.5	1.92	3.08	

H = Highly Likely (4 points)
L = Likely (3 points)
P = Possible (2 points)
U = Unlikely (1 point)

Table 5-19: Unincorporated Fulton County Risk Assessment Matrix					
Hazard Type	Level I Catastrophic	Level II Critical	Level III Marginal	Level IV Negligible	Score
Severe Weather	P	P	H	H	12
Tornadoes	P	P	H	H	12
Flood	U	P	L	H	10
Tropical System	U	U	L	H	9
Heat Wave	U	P	P	L	8
Winter Storm	U	U	P	H	8
Drought	U	U	P	L	7
Wildfire/Urban Interface	U	U	U	P	5
Dam Failure	U	U	U	P	5
Sinkhole	U	U	U	P	5
Earthquake	U	U	U	P	5
Average Risk by Level	1.17	1.33	2.08	2.92	

H = Highly Likely (4 points)
L = Likely (3 points)
P = Possible (2 points)
U = Unlikely (1 point)

Table 5-20: Overall County Combined Jurisdiction Likelihood of Occurrence Averages					
Hazard Type	**Level I Catastrophic**	**Level II Critical**	**Level III Marginal**	**Level IV Negligible**	**Score**
Tornadoes	1.67	2.17	3.00	3.75	10.58
Severe Weather	1.33	1.83	3.17	3.92	10.25
Winter Storm	1.17	1.67	2.67	3.75	9.25
Flood	1.25	1.83	2.50	3.58	9.17
Heat Wave	1.08	1.42	2.00	3.50	8.00
Drought	1.33	1.50	1.83	3.33	8.00
Tropical System	1.08	1.25	2.08	3.00	7.42
Wildfire/Urban Interface	1.00	1.08	1.83	3.17	7.08
Dam Failure	1.17	1.25	1.50	2.33	6.25
Sinkhole	1.00	1.00	1.00	2.33	5.33
Earthquake	1.00	1.08	1.08	1.67	4.83
Average by Risk	**1.17**	**1.42**	**1.99**	**3.00**	

H = Highly Likely (4 points)
L = Likely (3 points)
P = Possible (2 points)
U = Unlikely (1 point)

5.6 Vulnerability of Structures and Dollar Estimate of Losses

This section provides data on the vulnerability of existing and future buildings, critical facilities, and infrastructure located within identified hazard areas and jurisdiction. For the purposes of this risk assessment, vulnerability refers to the exposure of buildings, critical facilities, infrastructure and property to a particular hazard and their susceptibility to the resultant damages that could be incurred by such hazard exposure. The property inventory in this section provides the basis for the loss estimates presented in Summary of Exposure Tables by jurisdiction. The information in these tables are prioritized based on the respective jurisdiction's risk assessment matrix found in Section 5.5 – Summary of Hazards and Community Impacts. Analysis was based on the 2009 tax records obtained from the Fulton County Tax Assessors office.

Most of the identified Fulton County hazards are countywide, where exposure is generally uniform among all jurisdictions. Countywide hazards include tornadoes, severe weather, tropical systems, winter storms, droughts, heat waves, and earthquakes. Location-specific hazards, where exposure may vary among jurisdictions include flooding, dam failure, landslides, and sinkholes.

5.6.1 Vulnerability of Structures

Table 5-21: Countywide Property Inventory by Property Class

Occupancy	Count	Percentage
Agriculture	6	.002%
Commercial	20,217	5.882%
Education	993	.287%
Public Property	5,713	1.662%
Industrial	3,133	.912%
Religious	1,922	.559%
Hospitals/Medical	94	.027%
Charitable	613	.178%
Historic	365	.106%
Conservation & Environmental	517	.150%
Utilities	870	.253%
Single Family Residence	308,961	89.905%
Other	249	.072%
Total Property	**343,653**	**100.00%**

Table 5-22: Countywide Property Values by Property Class

Occupancy	Value	Percentage
Agriculture	$11,235,120	.008%
Commercial	$47,273,285,632	32.70%
Education	$2,466,779,000	1.71%
Public Property	$8,165,125,200	5.65%
Industrial	$4,230,265,829	2.92%
Religious	$1,768,829,300	1.22%
Hospitals/Medical	$1,050,616,600	.727%
Charitable	$1,050,523,800	.727%

Table 5-22: Countywide Property Values by Property Class		
Occupancy	**Value**	**Percentage**
Historic	$165,309,900	.114%
Conservation & Environmental	$253,069,172	.175%
Utilities	$241,891,000	.167%
Single Family Residence	$76,899,533,652	53.20%
Other	$980,285,500	.678%
Total Property	**$144,556,749,705**	**100.00%**

Table 5-23: Summary of Exposure by Jurisdiction Jurisdiction-wide Hazards†					
Jurisdiction	**Population‡**	**Number of Property***		**Value of Property***	
		Residential	**Non-Residential**	**Residential**	**Non-Residential**
Alpharetta	67,575	16,960	2,166	$5,129,366,231	$6,105,778,810
Atlanta	445,709	130,001	18,231	$31,656,624,557	$38,525,329,664
Chattahoochee Hills	3,000§	1,661	237	$355,013,340	$132,651,020
College Park	15,527	2,477	1,517	$334,003,920	$1,325,277,152
East Point	37,465	2,535	1,666	$1,341,678,140	$1,291,064,804
Fairburn	5,464‡‡	5,655	479	$626,321,699	$395,179,461
Hapeville	6,180‡‡	2,069	479	$237,563,658	$542,460,400
Johns Creek	70,050±	24,194	718	$8,223,527,193	$2,154,321,610
Milton	30,180¥	11,695	521	$4,410,128,607	$1,106,974,072
Mountain Park	506‡‡	764	93	$52,688,200	$2,559,800
Palmetto	3,400‡‡	1,712	242	$168,338,646	$178,221,710
Roswell	103,711	27,165	2,487	$8,018,867,289	$3,764,533,514
Sandy Springs	98,941	25,997	1,626	$10,245,416,584	$7,559,094,574
Union City	11,621‡‡	6,993	638	$660,106,590	$694,069,765
Unincorporated Fulton County	245,180	40,331	2,288	$5,793,882,938	$3,811,589,997
Totals	**1,144,509**	300,209	33,388	$77,253,527,592	$67,589,106,353

† *Includes Severe Weather, Tornadoes, Tropical Systems, Heat Wave, Drought, and Earthquakes*
* *Includes both property with and without physical structures*
‡ *2006-2008 US Census American Community Survey estimates, unless otherwise indicated*
‡‡ *2000 US Census*
± *http://www.johnscreekga.gov/about/demographics.asp*
¥ *http://www.cityofmiltonga.us/index.asp?Type=B_LIST&SEC={328767DC-FDC7-4184-A65E-C372B73538EE}#{7A96E367-8C29-472B-8701-22632A828D6A}*
§ *http://www.chatthillcountry.org/*

Table 5-24: Summary of Exposure by Hazard Atlanta				
Hazard	Number of Properties		Value of Property	
	Residential	Non-Residential	Residential	Non-Residential
Drought	130,001	18,231	$31,656,624,557	$38,525,329,664
Flood	3,549	1,292	$1,820,426,576	$3,144,808,041
Tornadoes	130,001	18,231	$31,656,624,557	$38,525,329,664
Heat Wave	130,001	18,231	$31,656,624,557	$38,525,329,664
Severe Weather	130,001	18,231	$31,656,624,557	$38,525,329,664
Winter Storm	130,001	18,231	$31,656,624,557	$38,525,329,664
Dam Failure	Not reported	Not reported	Not reported	Not reported
Tropical System	130,001	18,231	$31,656,624,557	$38,525,329,664
Wildfire/Urban Interface	Not reported	Not reported	Not reported	Not reported
Sinkhole	Not reported	Not reported	Not reported	Not reported
Earthquake	130,001	18,231	$31,656,624,557	$38,525,329,664

Table 5-25: Summary of Exposure by Hazard Alpharetta				
Hazard*	Number of Properties		Value of Property	
	Residential	Non-Residential	Residential	Non-Residential
Drought	16,960	2,166	$5,129,366,231	$6,105,778,810
Flood	Not reported	Not reported	Not reported	Not reported
Tornadoes	16,960	2,166	$5,129,366,231	$6,105,778,810
Heat Wave	16,960	2,166	$5,129,366,231	$6,105,778,810
Severe Weather	16,960	2,166	$5,129,366,231	$6,105,778,810
Winter Storm	16,960	2,166	$5,129,366,231	$6,105,778,810
Dam Failure	Not reported	Not reported	Not reported	Not reported
Tropical System	16,960	2,166	$5,129,366,231	$6,105,778,810
Wildfire/Urban Interface	Not reported	Not reported	Not reported	Not reported
Sinkhole	Not reported	Not reported	Not reported	Not reported
Earthquake	16,960	2,166	$5,129,366,231	$6,105,778,810

**Not listed in order of threat priority; jurisdiction did not complete a risk assessment matrix*

Table 5-26: Summary of Exposure by Hazard Chattahoochee Hills				
Hazard	Number of Properties		Value of Property	
	Residential	Non-Residential	Residential	Non-Residential
Drought	1,661	237	$355,013,340	$132,651,020
Flood	185	75	$76,995,094	$66,329,320
Severe Weather	1,661	237	$355,013,340	$132,651,020
Winter Storm	1,661	237	$355,013,340	$132,651,020
Wildfire/Urban Interface	338	17	$76,647,500	$6,602,200
Tropical System	1,661	237	$355,013,340	$132,651,020
Tornadoes	1,661	237	$355,013,340	$132,651,020
Dam Failure	Not reported	Not reported	Not reported	Not reported
Heat Wave	1,661	237	$355,013,340	$132,651,020
Earthquake	1,661	237	$355,013,340	$132,651,020
Sinkhole	Not reported	Not reported	Not reported	Not reported

Tabl5-27: Summary of Exposure by Hazard College Park				
Hazard	Number of Properties		Value of Property	
	Residential	Non-Residential	Residential	Non-Residential
Tornadoes	2,477	1,517	$334,003,920	$1,325,277,152
Severe Weather	2,477	1,517	$334,003,920	$1,325,277,152
Flood	248	166	$32,498,500	$353,726,630
Winter Storm	2,477	1,517	$334,003,920	$1,325,277,152
Wildfire/Urban Interface	Not reported	Not reported	Not reported	Not reported
Drought	2,477	1,517	$334,003,920	$1,325,277,152
Heat Wave	2,477	1,517	$334,003,920	$1,325,277,152
Tropical System	2,477	1,517	$334,003,920	$1,325,277,152
Sinkhole	Not reported	Not reported	Not reported	Not reported
Dam Failure	Not reported	Not reported	Not reported	Not reported
Earthquake	2,477	1,517	$334,003,920	$1,325,277,152

Table 5-28: Summary of Exposure by Hazard East Point				
Hazard	Number of Properties		Value of Property	
	Residential	Non-Residential	Residential	Non-Residential
Drought	2,535	1,666	$1,341,678,140	$1,291,064,804
Flood	28	11	$3,779,700	$16,427,300
Tropical System	2,535	1,666	$1,341,678,140	$1,291,064,804
Severe Weather	2,535	1,666	$1,341,678,140	$1,291,064,804
Tornadoes	2,535	1,666	$1,341,678,140	$1,291,064,804
Winter Storm	2,535	1,666	$1,341,678,140	$1,291,064,804
Wildfire/Urban Interface	Not reported	Not reported	Not reported	Not reported
Sinkhole	Not reported	Not reported	Not reported	Not reported
Heat Wave	2,535	1,666	$1,341,678,140	$1,291,064,804
Earthquake	2,535	1,666	$1,341,678,140	$1,291,064,804
Dam Failure	Not reported	Not reported	Not reported	Not reported

Table 5-29: Summary of Exposure by Hazard Fairburn				
Hazard	Number of Properties		Value of Property	
	Residential	Non-Residential	Residential	Non-Residential
Severe Weather	5,655	479	$626,321,699	$395,179,461
Tornadoes	5,655	479	$626,321,699	$395,179,461
Winter Storm	5,655	479	$626,321,699	$395,179,461
Tropical System	5,655	479	$626,321,699	$395,179,461
Dam Failure	15	8	$1,837,300	$19,642,700
Heat Wave	5,655	479	$626,321,699	$395,179,461
Wildfire/Urban Interface	Not reported	Not reported	Not Reported	Not reported
Drought	5,655	479	$626,321,699	$395,179,461
Earthquake	5,655	479	$626,321,699	$395,179,461
Flood	124	23	$17,055,900	$143,312,000
Sinkhole	Not reported	Not reported	Not Reported	Not reported

Table 5-30: Summary of Exposure by Hazard Hapeville				
Hazard	Number of Properties		Value of Property	
	Residential	Non-Residential	Residential	Non-Residential
Tornadoes	2,069	479	$237,563,658	$542,460,400
Severe Weather	2,069	479	$237,563,658	$542,460,400
Winter Storm	2,069	479	$237,563,658	$542,460,400
Heat Wave	2,069	479	$237,563,658	$542,460,400
Drought	2,069	479	$237,563,658	$542,460,400
Tropical System	2,069	479	$237,563,658	$542,460,400
Flood	333	144	$34,654,100	$65,988,600
Sinkhole	Not reported	Not reported	Not reported	Not reported
Wildfire/Urban Interface	Not reported	Not reported	Not reported	Not reported
Dam Failure	Not reported	Not reported	Not reported	Not reported
Earthquake	2,069	479	$237,563,658	$542,460,400

Table 5-31: Summary of Exposure by Hazard John's Creek				
Hazard*	Number of Properties		Value of Property	
	Residential	Non-Residential	Residential	Non-Residential
Severe Weather	24,194	718	$8,223,527,193	$2,154,321,610
Wildfire/Urban Interface	Not reported	Not reported	Not reported	Not reported
Winter Storm	24,194	718	$8,223,527,193	$2,154,321,610
Flood	270	9	$128,895,400	$35,156,800
Dam Failure	Not reported	Not reported	Not reported	Not reported
Tornadoes	24,194	718	$8,223,527,193	$2,154,321,610
Drought	24,194	718	$8,223,527,193	$2,154,321,610
Heat Wave	24,194	718	$8,223,527,193	$2,154,321,610
Tropical System	24,194	718	$8,223,527,193	$2,154,321,610
Earthquake	Not reported	Not reported	Not reported	Not reported
Sinkhole	Not reported	Not reported	Not reported	Not reported

**Not listed in order of threat priority; jurisdiction did not complete a risk assessment matrix*

Table 5-32 Summary of Exposure by Hazard Milton				
Hazard	Number of Properties		Value of Property	
	Residential	Non-Residential	Residential	Non-Residential
Severe Weather	11,695	521	$4,410,128,607	$1,106,974,072
Wildfire/Urban Interface	Not reported	Not reported	Not reported	Not reported
Winter Storm	11,695	521	$4,410,128,607	$1,106,974,072
Flood	1,073	115	$510,798,124	$495,570,800
Dam Failure	Not reported	Not reported	Not reported	Not reported
Tornadoes	11,695	521	$4,410,128,607	$1,106,974,072
Drought	11,695	521	$4,410,128,607	$1,106,974,072
Heat Wave	11,695	521	$4,410,128,607	$1,106,974,072
Tropical System	11,695	521	$4,410,128,607	$1,106,974,072
Earthquake	11,695	521	$4,410,128,607	$1,106,974,072
Sinkhole	Not reported	Not reported	Not reported	Not reported

Table 5-33: Summary of Exposure by Hazard Mountain Park				
Hazard	Number of Properties		Value of Property	
	Residential	Non-Residential	Residential	Non-Residential
Flood	47	101	$8,863,300	$1,881,480
Severe Weather	1,035	101	$54,338,800	$2,662,192
Winter Storm	1,035	101	$54,338,800	$2,662,192
Heat Wave	1,035	101	$54,338,800	$2,662,192
Tornadoes	1,035	101	$54,338,800	$2,662,192
Wildfire/Urban Interface	Not reported	Not reported	Not reported	Not reported
Dam Failure	17	10	$3,456,100	$207,100
Drought	1,035	101	$54,338,800	$2,662,192
Earthquake	1,035	101	$54,338,800	$2,662,192
Sinkhole	Not reported	Not reported	Not reported	Not reported
Tropical System	1,035	101	$54,338,800	$2,662,192

Table 5-34: Summary of Exposure by Hazard Palmetto				
Hazard	Number of Properties		Value of Property	
	Residential	Non-Residential	Residential	Non-Residential
Tornadoes	1,712	242	$168,338,646	$178,221,710
Drought	1,712	242	$168,338,646	$178,221,710
Heat Wave	1,712	242	$168,338,646	$178,221,710
Severe Weather	1,712	242	$168,338,646	$178,221,710
Winter Storm	1,712	242	$168,338,646	$178,221,710
Dam Failure	Not reported	Not reported	Not reported	Not reported
Tropical System	1,712	242	$168,338,646	$178,221,710
Wildfire/Urban Interface	Not reported	Not reported	Not reported	Not reported
Flood	Not reported	Not reported	Not reported	Not reported
Earthquake	1,712	242	$168,338,646	$178,221,710
Sinkhole	Not reported	Not reported	Not reported	Not reported

Table 5-35: Summary of Exposure by Hazard Roswell				
Hazard	Number of Properties		Value of Property	
	Residential	Non-Residential	Residential	Non-Residential
Tornadoes	27,165	2,487	$8,018,867,289	$3,764,533,514
Severe Weather	27,165	2,487	$8,018,867,289	$3,764,533,514
Flood	475	50	$275,000,000	$36,500,000
Winter Storm	27,165	2,487	$8,018,867,289	$3,764,533,514
Tropical System	27,165	2,487	$8,018,867,289	$3,764,533,514
Heat Wave	27,165	2,487	$8,018,867,289	$3,764,533,514
Dam Failure	355	2	120,000,000	$14,000,000
Drought	27,165	2,487	$8,018,867,289	$3,764,533,514
Wildfire/Urban Interface	Not reported	Not reported	Not reported	Not reported
Earthquake	27,165	2,487	$8,018,867,289	$3,764,533,514
Sinkhole	Not reported	Not reported	Not reported	Not reported

Table 5-36a: Summary of Exposure by Hazard Sandy Springs				
Hazard	Number of Properties		Value of Property	
	Residential	Non-Residential	Residential	Non-Residential
Tornadoes	25,997	1,626	$10,245,416,584	$7,559,094,574
Severe Weather	25,997	1,626	$10,245,416,584	$7,559,094,574
Flood	2,529	115	$1,014,553,036	$937,980,329
Winter Storm	25,997	1,626	$10,245,416,584	$7,559,094,574
Wildfire/Urban Interface	9	34	$4,666,700	$31,621,000
Heat Wave	25,997	1,626	$10,245,416,584	$7,559,094,574
Dam Failure	184	20	$162,935,700	$60,310,000
Drought	25,997	1,626	$10,245,416,584	$7,559,094,574
Tropical System	25,997	1,626	$10,245,416,584	$7,559,094,574
Earthquake	25,997	1,626	$10,245,416,584	$7,559,094,574
Sinkhole	Not reported	Not reported	Not reported	Not reported

No critical facilities are located within the flood plain or dam failure inundation pathway. Critical facilities which are at risk for jurisdiction-wide hazards are as follows:

Table 5-36b: Sandy Springs Critical Facilities	
Facility	**Value**
Police	$5,584,900
Fire	$9,302,600
Public Schools	$54,895,500
Hospitals	$141,334,700
Total:	$211,117,700

Table 5-37: Summary of Exposure by Hazard Union City				
Hazard	Number of Properties		Value of Property	
	Residential	Non-Residential	Residential	Non-Residential
Flood	Not reported	Not reported	Not reported	Not reported
Tornadoes	6,993	638	$660,106,590	$694,069,765
Severe Weather	6,993	638	$660,106,590	$694,069,765
Winter Storm	6,993	638	$660,106,590	$694,069,765
Wildfire/Urban Interface	Not reported	Not reported	Not reported	Not reported
Drought	6,993	638	$660,106,590	$694,069,765
Heat Wave	6,993	638	$660,106,590	$694,069,765
Tropical System	6,993	638	$660,106,590	$694,069,765
Sinkhole	Not reported	Not reported	Not reported	Not reported
Dam Failure	Not reported	Not reported	Not reported	Not reported
Earthquake	6,993	638	$660,106,590	$694,069,765

Table 5-38: Summary of Exposure by Hazard Unincorporated Fulton County				
Hazard	Number of Properties		Value of Property	
	Residential	Non-Residential	Residential	Non-Residential
Severe Weather	40,331	2,288	$5,793,882,938	$3,811,589,997
Tornadoes	40,331	2,288	$5,793,882,938	$3,811,589,997
Flood	Not reported	Not reported	Not reported	Not reported
Tropical System	40,331	2,288	$5,793,882,938	$3,811,589,997
Heat Wave	40,331	2,288	$5,793,882,938	$3,811,589,997
Winter Storm	40,331	2,288	$5,793,882,938	$3,811,589,997
Drought	40,331	2,288	$5,793,882,938	$3,811,589,997
Wildfire/Urban Interface	Not reported	Not reported	Not reported	Not reported
Dam Failure	Not reported	Not reported	Not reported	Not reported
Sinkhole	Not reported	Not reported	Not reported	Not reported
Earthquake	40,331	2,288	$5,793,882,938	$3,811,589,997

5.7 General Description of Population and Development Trends

5.7.1 Population Trends

Fulton County's Department of Environment and Community Development (E&CD) uses a building permit model to estimate population. The forecasts are based on a gradual reduction in permits as the remaining vacant buildable land diminishes. This model was calibrated to the 1990 to 2000 US Census, but is different than the Census Bureau's Estimates and Atlanta Regional Commission's (ARC) County Forecasts to 2030.

Fulton County has an estimated 2005 population of 904,796 and the 10 county Atlanta Region has a population of 3,923,462. The 28 county Atlanta Metropolitan Statistical Area (MSA) contains 4.9 million people, which is more than half of Georgia's population of 9.1 million people. Almost all of the population growth in the MSA from 1980 to 2005 has been in the Atlanta suburbs. The population of the Atlanta Region has been increasing as a percentage of the State of Georgia; from approximately 12% in 1900 to almost 42% in 2000. The suburban portion of the Atlanta Region grew by nearly 2 million people between 1980 and 2000. The population in counties to the north and east seemed to be generally higher than those in the south and west. This suggests a new center of population for the region some twelve miles to the north east of downtown Atlanta (approximately in the vicinity of Peachtree-DeKalb airport). The growth edge appears to be in a wide band about fifteen miles from this center.

Fulton County is the 52nd largest county in the nation based on the 2000 Census Bureau population estimates and the most populous county in Georgia. It contained 14% of the state's population in 1960. Since 1980, Fulton County has had 10% of the state's population. It will continue to be close to 10% over the next 20 years. Fulton County is currently growing at a rate of 2.08% with the region growing at a current annual rate of 2.14% per year. Both are growing at a faster rate than the state's current growth rate of 1.68% and the United States growth rate of 0.92%.

Table 5-39: Fulton County, Georgia, Annual Demographic Counts, Estimates and Forecasts, 1990 to 2020[18]

Year	Fulton County Population	Annual Fulton County Growth Rate	Fulton County Share of GA
2005	904,796	3.14%	10.14%
2006	911,334	0.72%	10.06%
2007	927,504	1.77%	10.09%
2008	943,116	1.68%	10.12%
2009	958,169	1.60%	10.13%
2010	972,678	1.51%	10.14%
2015	1,061,057	1.63%	10.37%
2020	1,140,576	1.35%	10.52%

[18] Focus Fulton 2025 Comprehensive Plan

Table 5-39: Fulton County, Georgia, Annual Demographic Counts, Estimates and Forecasts, 1990 to 2020[18]			
Year	Fulton County Population	Annual Fulton County Growth Rate	Fulton County Share of GA
2025	1,221,054	1.29%	10.67%
2030	1,294,612	1.11%	10.77%

Population in Cities: According to the 2000 Census, approximately 73% of Fulton County's population is in its then 10 cities. The City of Atlanta grew in the 1990s and 2000s, after a declining population in the 1970s and 1980s. The City of Atlanta, the state's largest city, has a 2005 population of 455,624 of which 424,873 is in Fulton County. Mountain Park, the smallest city in Fulton County, has a population of 562 of which 551 is in Fulton County Except for the City of Atlanta, some of the growth in the cities has resulted from annexation of unincorporated areas. In 2004, two-thirds of the building permits were issued in the cities. Due to the this level of permitting activity, the cities are forecasted to continue to grow.

Fulton County Planning Areas: Fulton County Environment and Community Development Department has created planning areas to recognize parts of the County which have very different characteristics. The planning areas are: North Fulton, an area of 79.5 square miles and located north of the Chattahoochee River, Sandy Springs, an area of 38.7 square miles north of the City of Atlanta and south of the Chattahoochee River, Southwest Fulton, the area west of the City of Atlanta and east of the Chattahoochee River with 25.6 square miles, and South Fulton, an area of 158 square miles south of the City of Atlanta.

According to the 2000 US Census, the unincorporated portion of Fulton County had a population of 229,916 persons. Population in the unincorporated areas has grown from 17% in 1980 to 27% in 2005 as a percentage of the Fulton County population. Between 1980 and 2005, unincorporated Fulton County experienced dramatic growth, growing by 144%. North Fulton, the fastest growing planning area, grew by 638% between 1980 and 2005. Unincorporated Fulton County is forecasted to grow by almost 44% between 2005 and 2025. South Fulton, projected to be the fastest growing planning area between 2005 and 2025, is expected to grow by 101% and is expected to be more populous than North Fulton by 2035.

Table 5-40: 1980-2025 Population and Forecasts in Fulton County Cities and Unincorporated Areas						
Area	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**
Cities: (Only the Fulton County portions are shown)						
Alpharetta	34,854	37,132	42,120	44,027	45,509	47,194
Atlanta	386,699	447,245	462,908	505,054	542,985	582,678
Chatt Hills	N/A	N/A				
College Park	18,810	18,968	20,797	21,937	22,871	23,622
East Point	39,595	38,653	44,704	47,579	50,021	52763
Fairburn	5,464	8,561	9,075	11,038	12,926	14,831

Table 5-40: 1980-2025 Population and Forecasts in Fulton County Cities and Unincorporated Areas						
Area	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**
Cities: (Only the Fulton County portions are shown)						
Hapeville	6,180	6,175	6,849	7,441	7,970	8,490
Johns Creek	N/A	N/A				
Milton	N/A	N/A				
Mountain Park	496	500	606	642	672	687
Palmetto	3,073	4,225	4,492	5,661	6,529	7,396
Roswell	79,334	82,912	90,587	94,911	98,325	101,274
Sandy Springs	85,835	86,698	92,529	97,546	101,678	105,861
Union City	11,621	15,250	15,264	17,008	18,620	20,003
City Total	586,126	659,621	696,643	755,367	807,366	859,997
Unincorporated Planning Areas:						
North Fulton	91,400	93,192	100,300	106,553	111,850	117,211
SW Fulton	11,300	12,851	15,152	17,368	19,446	21,541
South Fulton	41,345	52,439	66,639	80,611	94,000	107,489
Unincorporated Fulton Total	229,880	245,180	274,620	302,078	326,975	352,103
Fulton County Total	**816,006**	**904,796**	**972,678**	**1,061,057**	**1,140,576**	**1,221,054**

5.7.2 Land Use and Development Trends

Growth and development in unincorporated Fulton County are generally in accordance with the 2015 Land Use Map, the Fulton County Zoning Resolution (adopted in 1955) and other development regulations. Single family residential development has been the largest factor in shaping the development patterns of Fulton County. Mixed use zonings have increased over the past 15 years.

Areas of rapid growth in Fulton County are tracked by monitoring water demand, sewer flows, the increase in number of new accounts added to the system, zonings, increases in population and households as well as population and household forecasts. The Georgia 400 corridor in North Fulton, located in the Big Creek Basin, and the Palmetto-Fairburn corridor in South Fulton County have been identified as two high growth areas.

There has also been an increase in redevelopment and transitional areas of older commercial and industrial properties from the 1960's, 1970's and 1980's. Sandy Springs along Roswell Road and GA 400, Fulton Industrial Boulevard, Roosevelt Highway, and Old National Highway are all locations where redevelopment of residential, commercial, and industrial uses have been taking place and are being encouraged to continue.

Major environmental problems associated with rapid land development has included the loss of trees and other vegetation, loss of wildlife habitat, reduced water quality, poor air quality, and creation of severe micro-climates such as urban heat islands. Trees Atlanta estimates that 60% of Atlanta's natural tree cover has been removed over the last 20 years. In addition, conversion of undeveloped land to impervious surfaces has increased storm water runoff, which directly impacts

the quality and flow of Fulton County's streams. In fact, nonpoint source pollution (runoff from parking lots, city streets, roofs, and lawns) is now responsible for 75% of the pollution in 3,400 stream miles in Georgia that do not meet water quality standards.[19]

North Fulton Planning Area

The North Fulton Planning Area consists of 79 square miles and as of 2005 has approximately 94,995 residents. North Fulton is composed of Northeast (NE) Fulton, which is the unincorporated area of Fulton County east of GA 400 and the cities of Alpharetta, Mountain Park and Roswell, and Northwest (NW) Fulton, which is the portion of unincorporated Fulton County north of the Cities of Roswell and Alpharetta. Smaller unincorporated communities are located in NE and NW Fulton. Map 6-1 shows the communities in Sandy Springs and in North Fulton.

The Northwest portion of North Fulton is an emerging area of development. Once an area with primarily rural agricultural land, it is now a mix of rural/agricultural uses, residential subdivisions, golf courses and small commercial nodes. Regional employment corridors have formed along Georgia 400 and State Route 9. The northeast portion of North Fulton is characterized by medium density residential areas in the east and central part and by retail/office corridors. Portions of the western part of the area, in the Shakerag Community, retain some of their rural character. Johns Creek Technology Park, a regional employment center, is located along Medlock Bridge Road and McGinnis Ferry Road.

Residential North Fulton is forecasted to grow by 24,019 residents and 11,416 households between 2005 and 2025. If North Fulton develops in the same pattern as it has to date, the additional households and population would require between 4,766 and 5,783 acres. This is equal to about a third of the land identified as forest and agricultural in the existing land use inventory. Based on the employment forest, the number of jobs will increase by 31,106 between 2005 and 2025. Based on current development patterns, the forecasted employment may require almost 1,432 acres. Currently approximately 1,217 acres are used for institutional uses. An additional 313 acres may be needed for institutional uses. The 100 year floodplains are protected by current stream buffer ordinances.

Table 5-41 summarizes the existing land uses for North Fulton. This table provides the acres for the categories stated above as well as more detailed sub-categories.

[19] 2025 Fulton County Comprehensive Plan, Land Use Element, p. 6-26.

Table 5-41: Existing Land Use North Fulton Planning Area		
Land Use Classification	**Area in Acres**	**Percent of Total**
Low-Density Residential (less than 2 units per acre)	9,469	19.0%
Medium-Density Residential (2 to 5 units per acre)	7,818	15.7%
High-Density Residential (more than 5 units per acre)	1,207	2.4%
Office	467	0.9%
Retail	742	1.5%
Industrial	83	0.20%
Government	381	0.8%
Other Institutional	326	0.7%
School	429	1.01%
Communications/Utility/Transportation	4,748	9.5%
Private Recreation	1,805	3.6%
Public Recreation	303	0.6%
Forest	12,747	25.6%
Agricultural/Vacant	4,674	9.4%
Water bodies & Flood Plain	4,549	9.1%
Total	**49,779**	**100%**

Sandy Springs Planning Area

Sandy Springs is expected to grow from an estimated population of 86,698 in 2005 to 105,861 in 2025. This represents an additional 19,163 people and a growth rate of 22.1%. The number of households is forecasted to increase by 10,871 from 42,683 to 53,554. If Sandy Springs develops in the same pattern as it has to date, the additional households would require between 2,707 and 3,119 acres. This is more than the land currently designated as Forest in the existing land use inventory. The County plans to accommodate for this growth through a variety of options such as turnover in existing neighborhoods, infill and redevelopment of existing areas, and use of non-residential lands that are under-utilized and have suffered from disinvestment.

Population and business growth is anticipated primarily along the Roswell Road and GA 400 corridors. Fulton County forecasts that the four census tracts along these corridors will have a 57.5% increase in population between 2000 and 2030. The remaining 11 census tracts in Sandy Springs are expected to each have less than 10% increase in population.

The 100 year floodplains for stream bodies are protected by current stream buffer ordinances of 50 feet. There are steep slopes which need protection and a steep slope ordinance is under development. The Land Use Plan Map shows almost 16% of the land uses designated as private recreational space, stream and water bodies, and 100 year floodplain as open space. It is the intent of the Comprehensive Plan policies to maintain the integrity of undisturbed buffers and water courses in Sandy Springs. The Plan also encourages the reclamation of stream banks and

piped streams to a more natural state. These efforts are needed to improve water quality and provide habitat for animals.

Table 5-42 summarizes the existing land uses for Sandy Springs.

Table 5-42: Summary of Existing Land Use Sandy Springs Planning Area		
Land Use Classification	**Area in Acres**	**Percent of Total**
Low-Density Residential	7,048	28.4%
Medium-Density Residential	4,201	16.9%
High-Density Residential	999	4.0%
Office	1,173	4.7%
Retail	715	2.9%
Industrial	17	0.1%
Government	57	0.2%
Other Institutional	292	1.2%
School	263	1.1%
Transportation, Communications & Utilities	3,797	15.3%
Private Recreational	401	1.6%
Public Recreational	678	2.7%
Forest	2,519	10.1%
Water Resources & Flood plain	2,071	8.3%
Vacant	585	2.4%
Total	**24,822**	**100%**

Southwest Fulton Planning Area

Southwest Fulton will have a population increase of 8,690 persons by 2025. Corresponding to population growth, the area is expected to add 5,255 more households. The area is also expected to add 4,442 jobs by 2025. If populations grows in a similar pattern, between 3,219 and 5,517 acres will be needed to accommodate the forecasted population growth.

Many areas adjacent to major transportation corridors are located within the 100-year floodplain. Land uses were changed to reflect protection and a limit to development in these natural hazard areas. The 2025 land use plan designates 16% of land uses as one of the open space categories.

Table 5-43 summarizes the existing land uses for Southwest Fulton. Southwest Fulton can be categorized as a suburban community. However, the Fulton Industrial District comprises a large portion of the area.

Table 5-43: Summary of Existing Land Use Southwest Fulton Planning Area		
Land Use Class	**Area in Acres**	**Percent of Total**
Low-Density Residential	606	3.7%
Medium-Density Residential	2,291	14%
High-Density Residential	19	0.1%
Office	47	0.3%
Retail	673	4.1%
Industrial	2,657	16.2%
Government	274	1.7%
Other Institutional	117	0.97%
School	34	0.2%
Utility	2,318	14.1%
Private Recreational	430	2.6%
Public Recreational	219	1.3%
Forest	2,922	17.8%
Agricultural/Vacant	1,589	9.7%
Water & Flood Plain	2,196	13.4%
Total	**16,403**	**100%**

South Fulton Planning Area

South Fulton has the greatest amount of undeveloped land in the heart of the Atlanta Region. In the last ten (10) years South Fulton has experienced unprecedented growth and development. In 2004, Fulton County led the Atlanta Metropolitan Statistical Area in residential building permits by issuing a sum of 16,921 permits. Sixty percent (60%) of the building permits were issued in South Fulton. The development boom occurring in South Fulton mirrors the development explosion that occurred in North Fulton twenty (20) years ago. Population projections for the next 25 years suggest an increase of 20,000 people or more in South Fulton.

South Fulton is expected to grow from an estimated population of 52,439 in 2005 to 107,489 residents in 2025. The number of households is forecasted to increase by 17,395. If South Fulton develops in the same pattern as it has to date, the additional households would require between 16,622 and 17,008 acres. This is equals to about a 28% of the land currently designated as forest and agricultural in the existing land use survey.

Based on the employment forecast, the workforce will increase by 16,282. Based on current development patterns, the forecasted workforce may require almost 2,861 acres. Currently approximately 1,601 acres are used for institutional uses, equal to 0.03 acres per person. An additional 1,682 acres may be needed for institutional uses by 2025.

Table 5-44 summarizes the existing land uses for South Fulton.

Table 5-44: Summary of Existing Land Use South Fulton Planning Area		
Land Use Class	**Area in Acres**	**Percent of Total**
Low-Density Residential	11,194	11.1%
Medium-Density Residential	4,869	4.8%
High-Density Residential	139	0.1%
Office	80	0.1%
Retail	818	0.8%
Industrial	1,181	1.2%
Government	314	0.3%
Other Institutional	710	0.7%
School	579	0.6%
Utility	8,368	8.3%
Private Recreational	74	0.1%
Public Recreational	1,253	1.2%
Forest	47,454	47.1%
Agricultural/Vacant	12,190	15.72%
Water and Flood Plain	11,273	11.2%
Total	**100,695**	**100%**

5.8 NFIP Insured Structures

Since 1978, Fulton County has experienced a total of 463 NFIP losses totaling an approximate payout of $7 million.[20] Losses by jurisdiction are presented in Table 5-45.

Table 5-45: NFIP Losses		
Jurisdiction	**Total Losses**	**Total Payments**
Alpharetta	13	$210,070.10
Atlanta	1552	$55,604,567.61
College Park	132	$1,656,742.14
East Point	90	$516,759.98
Fairburn	2	$0.00
Hapeville	5	$35,580.33
Mountain Park	2	$18,487.01
Roswell	72	$1,257,749.13
Fulton County	463	$7,009,550.31
Total	**2331**	**$66,309,506.61**

[20] NFIP Statistics Report, http://bsa.nfipstat.com/reports/reports.htm

As shown in Table 5-46, there are a total of 4,209 NFIP policies in effect within Fulton County, totaling $960,387,500.

Table 5-46: NFIP Policies as of 3/10/10			
Jurisdiction	**Policies in Force**	**Insurance in Force**	**Written Premiums in Force**
Alpharetta	84	$21,799,600	$35,754
Atlanta	2,071	$429,214,200	$1,561,103
College Park	98	$17,816,500	$79,414
East Point	112	$22,205,700	$89,729
Fairburn	24	$6,112,200	$10,007
Hapeville	53	$9,447,400	$66,831
Mountain Park	12	$2,447,800	$10,060
Palmetto	4	$720,700	$1,869
Roswell	380	$84,765,300	$148,398
Union City	10	$1,212,900	$2,320
Fulton County	1,361	$364,645,200	$693,560
Total	**4,209**	**$960,387,500**	**$2,699,045**

According to data obtained from the FEMA Region IV Floodplain Management and Insurance Branch, Fulton County has 38 repetitive loss structures (residential) as of July 2010 which are summarized in Table 5-47.

Table 5-47: NFIP Repetitive Loss Structures and Values		
Jurisdiction	**Number of Residential Properties**	**Value**
Sandy Springs	31	$9,862,900
Atlanta	3	$988,700
Johns Creek	1	$387,400
Roswell	1	$528,600
Unincorporated Fulton Co.	2	$278,200
Totals	**38**	**$12,045,800**

5.9 NFIP Participation

All jurisdictions within Fulton County are currently participating in the NFIP as detailed in Table 5-48 below.

Table 5-48: NFIP Community Status Report[21]

CID	Community Name	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Regular Emergency Program Date	Tribal
130048	Alpharetta	06/14/74	02/15/78	06/18/10	02/15/78	No
135157	Atlanta		10/14/71	06/18/10	10/14/71	No
135174	Chattahoochee Hills[22]		05/07/01	05/07/01	07/30/08	No
130086	College Park	05/31/74	09/15/78	06/18/10	09/15/78	No
130087	East Point	06/28/74	03/15/77	06/18/10	03/15/77	No
130314	Fairburn	08/19/77	09/28/79	06/18/10	09/28/79	No
135160	Fulton County		11/20/70	06/18/10	10/29/71	No
130502	Hapeville		08/24/93	06/18/10	07/02/96	No
130678	Johns Creek[23]		06/18/10	06/18/10	08/18/09	No
130673	Milton		05/07/01	05/07/01	08/10/07	No
130315	Mountain Park	01/13/78	02/16/83	06/18/10	04/07/83	No
130239	Palmetto	06/14/74	11/01/79	06/18/10	11/01/79	No
130088	Roswell	06/07/74	12/15/77	06/18/10	12/15/77	No
130669	Sandy Springs[24]		05/07/01	06/18/10	05/10/07	No
130316	Union City	04/04/75	09/28/79	06/18/10	09/28/79	No

[21] As of June 2, 2011

[22] The City's SFHA is identified on the Fulton County, GA, FIRM panels (13121C0295 E, 0315, 0405, 0409, 0410, 0415, 0416, 0417, 0418, 0419, 0428, 0429, 0430, 0433, 0436, 0437, 0438, 0439, .441, 0443 E) dated May 7, 2001

[23] City of Johns Creek has adopted Fulton County's FIS and accompanying FIRM panels dated 05/07/01.

[24] The City of Sandy Springs has adopted the Fulton County FIS and FIRM dated 05/07/01. The FIRM panels for Sandy Springs are 13121C 0044E, 0063E, 0064E, 0132E, 0134E, 0139E, 0140E, 0141E, 0142E, 0143E, 0144E, 0151E, 0152E, 0153E, 0154E, 0160E, 0161E.

Chapter 6: Mitigation Strategy

Chapter Overview

6.1 Federal Requirement for the Mitigation Strategy
6.2 Summary of Plan Updates
6.3 Goals and Objectives
6.4 Identification and Analysis of Mitigation Actions and Projects
6.5 Analysis and Implementation of Mitigation Projects
6.6 County and Jurisdiction Mitigation Actions

6.1 Federal Requirements for the Mitigation Strategy

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

> "201.6 (c)(3) A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools. This section shall include:
>
> (i) A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards
> (ii) A section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.
> (iii) An action plan describing how the actions identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.
> (iv) For multi-jurisdictional plans there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan."

6.2 Summary of Plan Updates

Table 6-1 summarizes changes made to the 2004 plan as a result of the 2010 plan update, as follows:

Table 6-1: Summary of plan changes

Section		Changes
6.3	Goals and Objectives	Revised existing goals & objectives; development of new goals & objectives
6.4	Identification and Analysis of Mitigation Actions and Projects	Revised process & provides greater detail of how mitigation projects were identified and analyzed
6.5	Analysis and Implementation of Mitigation Projects	Defines methodology for analyzing and prioritizing mitigation actions and projects

Table 6-1: Summary of plan changes		
Section		**Changes**
6.6	County and Jurisdiction Mitigation Actions	Adds matrix of mitigation projects;

6.3 Goals and Objectives

The first step in developing a hazard mitigation strategy is to establish goals and objectives that aim to reduce or eliminate Fulton County's long-term vulnerability to natural hazard events. Mitigation goals are general guidelines explaining what Fulton County wants to achieve in terms of hazard and loss prevention. Objectives are specific, measurable strategies or implementation steps used to achieve the identified goals. Developing clear goals and objectives help reinforce Fulton County's overall purpose and mission for undertaking a mitigation planning process.

The Planning Team developed hazard mitigation goals and objectives based on the findings of the individual jurisdictional Risk Assessment Matrices and the Georgia Hazard Mitigation Plan. The goals and objectives set forth below provide the necessary framework to develop a mitigation strategy. Fulton County will re-evaluate its hazard mitigation goals and objectives each plan maintenance cycle to ensure they continue to represent Fulton County's hazard mitigation priorities.

Table 6-2: Hazard Mitigation Plan Goals and Objectives	
Goal 1: Protect Public Health and Safety	
Objective 1.1	Improve systems that provide early warning and emergency communications and ensure interoperability of all systems
Objective 1.2	Reduce the impacts of hazards on vulnerable populations
Objective 1.3	Strengthen local building code enforcement
Objective 1.4	Ensure protection of people from dangerous high winds caused by tornadoes and severe storms through special regulatory standards for safe room and shelter construction
Objective 1.5	Encourage all municipalities to develop and maintain an all-hazard Emergency Operations Plan and other supporting plans and procedures that are consistent with the county's plan, National Response Framework, the National Incident Management Plan, and FEMA's Comprehensive Planning Guidance (CPG) 101
Objective 1.6	Develop and/or enhance interlocal agreements for better resource sharing such as buildings for backup EOCs
Objective 1.7	Support interjurisdictional planning safety efforts that enhance evacuation, communication, sheltering, shelter-in-place, and response efforts
Objective 1.8	Enhance the interoperability of all communications systems that support public safety operations through plans, policies, procedures, facilities, and equipment
Goal 2: Protect Property	
Objective 2.1	Consider known hazards, and the potential for likelihood, when identifying sites for new facilities and systems
Objective 2.2	Create redundant supply and interconnectivity for critical networks

Table 6-2: Hazard Mitigation Plan Goals and Objectives	
	such as water, sewer, digital data, power, and communications
Objective 2.3	Integrate new hazard and risk information into building codes and land use planning mechanisms
Objective 2.4	Educate public officials, developers, realtors, contractors building owners, and the public about hazard risk and building requirements
Objective 2.5	Incorporate effective mitigation strategies into county and municipal capital improvement projects, in support of continued NFIP compliance.
Objective 2.6	Promote post-disaster mitigation as part of restoration and recovery
Objective 2.7	Eliminate recurring flood and other natural hazard damages to existing buildings through property acquisition program, including, but not limited to, the demolition of vulnerable buildings and the establishment of permanent open space, in support of continued NFIP compliance.
Objective 2.8	Reduce exposure of existing buildings to flood damage by raising the finish floor elevations above the 100-year flood elevations to prevent interior water damage, in support of continued NFIP compliance.
Objective 2.9	Flood proof existing non-residential and residential buildings to safeguard against possible damages from natural hazards, in support of continued NFIP compliance.
Objective 2.10	Protect critical facilities from potential damages and occupants from harm in the event of natural hazards through retrofits or relocations of existing facilities located in high risk zones or construction of new facilities for maximum protection from all hazards
Objective 2.11	Maintain electric power in the event of loss during severe storms and other natural hazards to ensure uninterrupted operations of critical facilities and prevent major disruptions and consequential damages
Goal 3: Promote a sustainable economy	
Objective 3.1	Form partnerships to leverage and share resources.
Objective 3.2	Partner with private sector to promote structural and non-structural hazard mitigation as part of standard business practice
Objective 3.3	Educate businesses about contingency planning, targeting small businesses and those businesses located in high risk areas
Objective 3.4	Partner with private sector to promote employee/employer education about disaster preparedness while at work and home
Objective 3.5	Partner with private sector to support public safety, preparedness and response operations including warning, notification, evacuations, sheltering, shelter-in-place, and transportation
Objective 3.6	Partner with the Atlanta Regional Commission, Hartsfield-Jackson International Airport, Chambers of Commerce, and the larger business community to integrate regional economic development planning and regional economic mitigation opportunities
Goal 4: Manage development to minimize risks of loss	
Objective 4.1	Implement comprehensive planning programs that promote the principles of sustainable community development
Objective 4.2	Ensure capital improvement planning includes capital projects recommended this hazard mitigation plan
Objective 4.3	Establish or review subdivision standards that sufficiently prevent

Table 6-2: Hazard Mitigation Plan Goals and Objectives	
	damages to property from natural hazards, in support of continued NFIP compliance.
Objective 4.4	Review local codes for effectiveness of standards to protect buildings and infrastructure from hazard damages, in support of continued NFIP compliance.
Objective 4.5	Continue to implement floodplain management programs which meet or exceeds the minimum standards of the National Flood Insurance Program (NFIP)
Objective 4.6	Encourage participation in the Community Rating System (CRS) program
Objective 4.7	Encourage participation in the NFPA's Firewise Communities program to reduces risk of life and property losses due to wildfire and/or urban interface fires
Objective 4.8	Manage the impacts of land development to local drainage systems and waterways through comprehensive regulations designed to control the rate of post-development storm water discharge and adverse erosion and sedimentation impacts, in support of continued NFIP compliance.
Objective 4.9	Improve storm water management impacts through interjurisdictional coordination and collaboration
Objective 4.10	Continue to implement a comprehensive dam safety inspection and monitoring program to ensure proper maintenance, in support of continued NFIP compliance.
Objective 4.11	Enforce maintenance of dam faces, storm water control facilities, and water conveyance infrastructure, including privately owned structures, in support of continued NFIP compliance.
Objective 4.12	Enforce regulations to prevent dumping and littering in the public Right of Way and share maintenance responsibilities with adjoining property owners
Objective 4.13	Perform assessment of critical facilities (hospitals, schools, fire and police stations, emergency operations centers, special needs housing, and others) to address building and site vulnerabilities to hazards. Identify damage control and retrofit measures to reduce vulnerability to damage and disruption of operations during severe weather and disaster events
Objective 4.14	Complete and/or maintain a comprehensive GIS database of hazard locations, socioeconomic data, infrastructure, and critical facilities inventory
Objective 4.15	Incorporate mitigation strategies into community redevelopment or revitalization plans
Objective 4.16	Incorporate mitigation strategies and actions into post disaster redevelopment plans, in support of continued NFIP compliance.
Objective 4.17	Support engagement of all communities to participate in the hazard mitigation grant process and its programs
Goal 5: Natural Resources Protection	
Objective 5.1	Mitigate the long-term effects on the environment by promoting climate change adaptation strategies
Objective 5.2	Protect wetlands by preventing adverse development impacts and

Table 6-2: Hazard Mitigation Plan Goals and Objectives	
	preserve their capabilities to store flood waters, reduce downstream flows and filter water
Objective 5.3	Acquire easements and fee-simple ownership of environmentally beneficial lands, such as hillsides, flood plains, and wetlands to assure permanent protection of these natural resources
Objective 5.4	Restore and protect river and stream corridors to assure their natural and beneficial functions to manage floods and filter runoff
Objective 5.5	Maintain a healthy forest that can help mitigate the damaging impacts of wildfires, flooding, erosion, and landslides such as through selective cutting and other measures
Objective 5.6	Protect water quantity and quality through water conservation programs that can mitigate the effects of drought and help ensure uninterrupted water supplies
Objective 5.7	Convert Class 1 high hazard dams into multiple Class 2 low hazard dams
Goal 6: Apply engineered structural modifications to reduce impacts of hazards	
Objective 6.1	Control flooding through reservoirs and other cost effective, feasible structural improvements such as levees/floodwalls, diversions, channel modifications, dredging, draining modifications, and storm sewers
Objective 6.2	Perform regular maintenance of streams and drainage ways to ensure adequate conveyance of flood waters and storm water runoff
Objective 6.3	Ensure restraining structures, such as retaining walls, are adequately engineered to prevent damage from the effects of erosion
Objective 6.4	Reduce the potential for damage to structures from high winds by ensuring sufficient wind loading capabilities of structures
Objective 6.5	Upgrade flow capacity of dams due to downstream development and locate funding sources for these activities, in support of continued NFIP compliance.
Objective 6.6	Enforce maintenance of dam faces and stormwater control facilities and conveyance infrastructure including privately owned structures, in support of continued NFIP compliance.
Objective 6.7	Reduce the damaging effects of lightening to critical facilities and systems through the use of adequate surge protection
Objective 6.8	Collaborate with state agencies, such as DOT, to identify, inventory, and develop specific strategies reduce damage to critical transportation infrastructure (including bridges, culverts) and critical traffic control systems caused by severe weather events
Goal 7: Public Education and Awareness	
Objective 7.1	Distribute and educate the hazard mitigation plan to elected officials, businesses, and residents using all available means of publication and distribution
Objective 7.2	Provide public access to Flood Insurance Rate Map (FIRM) information
Objective 7.3	Conduct ongoing outreach projects to increase public awareness of hazard risks and provide information regarding steps to protect themselves and their properties
Objective 7.4	Utilize local library resources to educate the public on hazard risks

Table 6-2: Hazard Mitigation Plan Goals and Objectives	
	and mitigation alternatives
Objective 7.5	Ensure availability of qualified local government staff to provide technical assistance to advise property owners of various hazard risks and mitigation alternatives
Objective 7.6	Use school and other community education resources to conduct programs on topics related to hazard risks and mitigation measures
Objective 7.7	Utilize all available mass media (i.e. newspapers, radio, TV, cable access, internet, etc.) to increase public awareness and distribute public information on hazard mitigation topics
Objective 7.8	Promote the use of weather radios in critical facilities, institutions, businesses, and homes as a means of advance warning
Objective 7.9	Promote signage regarding hazards to motorists pertaining to flooded or iced roadways and bridges

6.4 Identification and Analysis of Mitigation Actions and Projects

The strategic planning approach for identifying and analyzing mitigation actions and projects followed five overarching categories. These categories are:

- **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 that reduce hazard losses. Examples include building and construction code revisions; zoning regulation changes; and computer hazard modeling.
- **Property Protection**: Actions that involve the modifications of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples include roadway elevations, improving wind and impact resistance, and flood proofing.
- **Public Education and Awareness**: Action to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Examples include programs that target repetitive loss properties and vulnerable populations.
- **Natural Resources Protection**: Actions that, in addition to minimizing hazard losses, also preserve or restore the function of natural systems. Examples include projects to create open space, green space, and stream restoration.
- **Structural Projects**: Actions that involve the construction of structures to reduce the impact of a hazard. Examples include projects that control floodwater, reconstruction of dams, and construction of regional retention areas.
- **Emergency Services**: Actions that protect people and property during and immediately after a disaster event or hazard event. Examples include enhancements that provide advanced warning and redundant communications.

These categories were developed by FEMA for managing a successful mitigation programs and were utilized for guiding jurisdictions in identifying the mitigation measures. A sample of the guidance packet that was used for each jurisdiction's meeting is included in Appendix C – Meeting Documentation.

6.5 Analysis and Implementation of Mitigation Projects

The STAPLEE process is the methodology by which the Hazard Mitigation Committee and local jurisdictions analyzed and prioritized potent mitigation projects. STAPLEE examines social, technical, administrative, political, legal, environmental, and economic considerations. Hazard Mitigation Committee members from each jurisdiction participated in the evaluation and selection of mitigation measures. Using this method, each jurisdiction assigned a priority to selected measures, estimated costs, and where possible identified potential funding sources, including potential eligibility for FEMA Hazard Mitigation Assistance Programs.

The STAPLEE method guided the evaluation of the range of measures considered by the Hazard Mitigation Planning Committee and its recommended action programs for each participating jurisdiction. The STAPLEE method addressed the following areas of concern and responded to many of the questions presented here:

Social Considerations

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

Technical Considerations

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

Administrative Considerations

- *Staffing*. Does the jurisdiction have adequate staff resources and expertise to implement the measure? Will additional staff, training, or consultants be necessary? Can local funds support staffing demands? Will the measure overburden existing staff loads?
- *Maintenance*. Does the jurisdiction have the capabilities to maintain the proposed project once it is completed? Are staff, funds, and facilities available for long-term project maintenance?
- *Timing*. Can the measure be implemented in a timely manner? Are the timeframes for implementation reasonable?

Political Considerations

- *Political support*. Does the local governing body support the proposed measure? Does the public support the measure? Do stakeholders support the measure? What advocates might facilitate implementation of the proposal?

Legal Considerations

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

Economic Considerations

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

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

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

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

All of the above considerations and prioritization methods resulted in the final Mitigation Actions presented in Section 6.7 below.

6.6 County and Jurisdiction Mitigation Actions

Fulton County and its jurisdictions have been actively engaging and implementing hazards mitigation actions to reduce current and future risk to its residents and businesses.

Participating jurisdictions have identified mitigation measures for their respective jurisdictions and are presented in Table 6-3. Jurisdictions are responsible for establishing their respective action projects and programs as they relate to the items included in the table. Appendix E – Studies, Reports and Supplementary Documents contains supplementary information that provides greater detailed about the proposed mitigation action and is referenced where appropriate. The proposed measures are within the authority of the jurisdiction or are part of a joint effort among multiple jurisdictions covered by this plan. Each jurisdiction participated in the development of its action program through its representative(s) on the Hazard Mitigation Committee, who identified and analyzed a comprehensive range of mitigation actions and projects that address each identified hazard. All actions included in these projects and programs are achievable and within the capabilities of each jurisdictions. Projects numbers denoted by the symbol "†" indicate an action that supports NFIP participation or compliance.

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
25.0001	Improve drainage at the bridge at Rivertown Rd and Malone by adding drain to tie into the storm water drainage system	Fairburn	Flooding	6.1	Structural Project	Cost estimate not provided by jurisdiction	HMA, FMA, Local	2 years from receipt of grant funds	16
	Comments: Debris backs up under the bridge at Malone. Need to add a drain to tie into the system.								
25.0002	Acquire the upstream property (currently privately owned) on Rivertown Rd. to provide city access to clean and prevent debris in stream	Fairburn	Flooding	5.3 6.2	Property Protection	Cost estimate not provided by jurisdiction	HMA, FMA, Local	1 – 2 years from receipt of grant funds	16
25.0003	Acquire privately owned agriculture land to prevent further development that is consistent with current land use policies	Fairburn	All hazards	5.3	Property Protection	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from receipt of grant funds	19
	Comments: Acquisition would be used to promote less dense land usage and expand nature preserve which is consistent with the natural conservation projects already being implemented in the area.								
40.0001	Acquire generator for emergency power for Fire Department Headquarters Building	Palmetto	Severe Weather; Winter Storm; Tropical System; Tornadoes;	2.11	Emergency Services	$25,000	HMA, EOC, SCG, Local	1 year from date of funds availability	8
40.0002	Retrofit glass old window glass at the Fire Department Headquarters building for increased impact resistance	Palmetto	Severe Weather; Tornado; Winter Storm; Tropical System	2.10 6.4	Property Protection	$10,000	HMA, SCG, EOC, Local	1 year from date of funds availability	8

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
40.0003	Acquire generator for emergency power for Fire Station	Palmetto	Severe Weather; Tornado; Winter Storm; Tropical System	2.11	Emergency Services	$25,000	HMA, SCG, Local	1 year from date of funds availability	8
40.0004	Retrofit bay doors of Fire Station	Palmetto	Severe Weather; Tornado; Winter Storm; Tropical System	2.10 6.4	Property Protection	$15,000	HMA, SCG, Local	1 year from date of funds availability	8
	Comments: Bay doors are over 40 years old and of residential grade quality. They are of insufficient wind loading capacity and impact resistance.								
40.0005	Retrofit current flat roof of city hall for improved wind loading capacity	Palmetto	Severe Weather; Tornado; Winter storm; Tropical System	2.10 6.4	Property Protection	$55,000	HMA, Local	1 year from date of funds availability	8
40.0006	Acquire generator for emergency power for Police Station	Palmetto	Severe Weather; Tornado; Winter Storm; Tropical System	2.11	Emergency Services	$25,000	HMA, DHS, Local	1 year from date of funds availability	8

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
40.0007	Retrofit Police Station for improved wind loading capacity	Palmetto	Severe Weather; Tornado; Winter Storm; Tropical System	2.10 6.4	Property Protection	$15,000	HMA, DHS, Local	1 year from date of funds availability	8
40.0008	Harden Community Center which functions as a first responder shelter. Reinforce roof for wind loading capacity as well replace windows for wind resistance	Palmetto	All hazards	2.10 6.4	Property Protection	$110,000	HMA, Local,	2 years from date of funds availability	8
40.0009†	Acquire stream in Palmetto Oaks to preserved as green space and improve flood plain management	Palmetto	Flooding	2.7 5.2 5.3 5.4	Natural Resource Protection	$300,000	HMA, FMA, Local	2 – 3 years from date of funds availability	7
40.0010	Acquire land on Mixon Ave to prevent further dense development as part of their green space expansion program	Palmetto	Wildfire/Urban Interface; Tornado; Severe Weather	4.3 5.3 5.5	Natural Resource Protection	$150,000	HMA, Local	2 – 3 years from date of funds availability	7
56.0001	Retrofit Fire Station #42 to be more wind, impact resistant, surge resistant; improve emergency power generator	Milton	Severe Weather; Winter Storm; Tornadoes; Tropical Storms	2.10 2.11 6.4	Property Protection	$1.5M	HMA, SCG, Local	1 year from date of funds availability	11
	Comments: Built in 1976, this station does not meet current life safety codes. Generator is underpowered for current needs. Metal roof is rusted and patched in several places. Glass is older, residential quality and is not impact resistant. Building was originally designed and built as a volunteer fire house for the county.								

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
56.0002	Implement roadway right of way maintenance program for Birmingham, Freemanville, Hopewell, Bethany, and Providence Roads	Milton	Flooding; Severe Weather; Tropical Systems	4.4	Protect Property; Structural Project	$256,000	HMA, Local	1 year from date of funds availability	5
	Comments: Road shoulders do not allow for adequate water runoff allowing water to collect on roadway causing public safety hazard.								
56.0003	Replace wooden wing walls on bridges with concrete wing walls; perform bank restoration and stabilization	Milton	Flooding	6.8	Structural Project	5 Structures at $75,000 ea. for $375,000	HMA, FMA, Local	2 years from date of funds availability	14
	Comments: When the creek swells the water seeps in through wooden wing wall cracks which then flows behind the wall and erodes the embankment. Four bridges were significantly damaged in Sept. 2009 and received PDM funds to replace, but can only replace with wooden wing walls, so the problem will re-occur.								
56.0004	Continue development of GIS web mapping project to allow for real time information of road and other hazard areas to be avoided	Milton	All Hazards	1.2	Public Education and Awareness	In house staff and time; $20,000	HMA, DHS, Local	Ongoing from date of funds availability	11
56.0005	Develop campaign strategy to increase participation in Nixel notification program	Milton	All Hazards	1.2	Public Education and Awareness	In house staff and time	HMA Local	1 year from funds availability	11
45.0001	Reroute Azalea Dr from current location to a more elevated location on hilltop	Roswell	Flooding	1.2 2.7	Structural Project	Cost estimate not provided by jurisdiction	HMA, FMA, Local	3 – 5 years from funds availability	3
	Comments: Although the houses are not in the floodplain, the road is and floods when the Chattahoochee River overflows. This prevents ingress and egress of not only the residents but also of first responders who need to access the area. Causes damage to the roadway. Affects approximately 150 condo units.								
45.0002†	Elevate Willeo Rd which becomes submerged during heavy rains and floods	Roswell	Flooding; Severe Weather; Tropical Systems	1.2 2.7	Structural Project	Cost estimate not provided by jurisdiction	HMA, Local	3 – 5 years from funds availability	4

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
	Comments: The road is in the flood plain and floods when the Chattahoochee River overflows. This prevents ingress and egress of not only the residents but also of first responders who need to access the area. Causes damage to the roadway.								
99.0001†	Rehabilitate the flood plain on Oakhaven Dr. through acquisition of 10 structures in the flood plain; improve drainage in the area	Roswell and Mountain Park	Flooding; Severe Weather; Tropical Systems	5.2 5.3 5.4 6.1	Property Protection	Cost estimate not provided by jurisdiction	HMA, FMA, Local	5 – 10 years from funds availability	10
	Comment: Area is in flood plain. There is repeated flooding that affects homes and roadway. Have had to had numerous rescues due to low lying area. Too much water comes into area that cannot be dispersed.								
45.0003	Improve culvert capacity in the Roswell Area Park to reduce flooding to allow residents and first responders ingress and egress from the area	Roswell	Flooding; Severe Weather; Tropical Systems	1.2 2.7 6.1	Structural Project	Cost estimate not provided by jurisdiction	HMA, Local	2 – 3 years from funds availability	8
	Comments: Access to the area is prevented when it floods. Culvert capacity is currently insufficient. Have had to perform rescues to get stranded people out of the area.								
35.0001	Convert open storm water drainage ditches to underground piping system in areas were the ditching system passes the roadway	Mountain Park	Flooding; Severe Weather; Tropical Systems	2.7 6.1	Structural Project	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	15
	Comments: City has open ditch drainage system which causes problems in heavy rain events due to debris in the ditches. When the ditches get clogged, the water overflows onto the road and drivers cannot see where edge of road it and ditch is.								
35.0002	Improve storm water drainage ditches in areas that do not cross roadways to increase drainage system capacity	Mountain Park	Flooding; Severe Weather; Tropical Systems	2.7 6.1 6.2	Structural Project	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	15
35.0003	Acquire generator for EOC/Fire Station building	Mountain Park	Severe Weather; Tropical Systems;	2.11	Emergency Services	Cost estimate not provided by jurisdiction	HMA, EOC, SCG, Local	1 year from funds availability	12

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
35.0004	Install surge protection equipment and measures for the EOC/Fire Station	Mountain Park	Severe Weather	2.7 2.11 6.5	Property Protection; Emergency Services	Cost estimate not provided by jurisdiction	HMA, EOC, Local	1 year from funds availability	12
45.0004	Install surge protection at the city fuel island	Roswell	Severe Weather	2.7 2.11 6.5	Property Protection; Emergency Services	Cost estimate not provided by jurisdiction	Local	1 year from funds availability	5
45.0005	Improve basin structure to the inland areas of Oxbo Rd to protect against turbulent water flows such as with regional detention areas and bank stabilization and restoration below the intake	Roswell	Flooding; Severe Weather; Tropical Systems	5.2 5.4 5.6	Property Protection; Natural Resource Protection	Cost estimate not provided by jurisdiction	HMA, Local	5 – 10 years from funds availability	5
	Comment: Big Creek runs along the road which captures water for their water system. Heavy rains in combination with impervious surfaces causes creek to overflow onto the roadway. When creek reaches certain height, city cannot operate their water system. Flooding on Oxbo also prevents access to water plant facility and fuel, island, and city equipment in the Park and Recreation maintenance area.								
35.0005†	Flood proof Fire Station including, raising generators and other mechanicals, installing drainage pumps, waterproof foundation and seal foundation walls	Mountain Park	Flooding; Severe Weather; Tropical Systems	2.7 2.9 2.10	Emergency Services; Property Protection	Cost estimate not provided by jurisdiction	HMA, EOC, FMA, SCG, Local	1 – 2 years from funds availability	12
	Acquire property to relocate flood-prone Fire Station	Mountain Park	Flooding; Severe Weather; Tropical Systems	2.7 2.9 2.10	Property Protection	Cost estimate not provided by jurisdiction	HMA, FMA, SCG, Local	2 – 3 years from funds availability	8
	Comment: This is a multi-purpose building that also functions at the City's EOC and designated special needs shelter.								
35.0006	Improve roadbed across lower dam to provide secondary access into the city	Mountain Park	Flooding	1.2	Structural Project	Cost estimate not provided by jurisdiction	Local	1 – 2 years from funds availability	8

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
	Comment: Currently there is an area of the city with only one way in and out which is across a bridge between two lakes. If bridge becomes impassable due to flood, there is a section of the city that becomes isolated. Improvement of roadbed would allow for emergency responders to access that part of the city.								
45.0006	Retrofit roof of the 911 Center which is susceptible to damage from high winds and water leakage. Retrofit glass with more impact resistant glass	Roswell	Severe Weather; Winter Storm; Tornadoes; Tropical Systems	2.7 2.10 6.4	Emergency Services; Property Protection	Cost estimate not provided by jurisdiction	HMA, EOC, Local	1 – 2 years from funds availability	5
35.0007	Enhance physical protection of City Hall for increased high wind resistance	Mountain Park	Severe Weather; Tornadoes; Tropical Systems	2.7 6.4	Property Protection	Cost estimate not provided by jurisdiction	HMA, Local	2 – 3 years from funds availability	12
35.0008	Acquire property at the corner of Cardinal Rd & Mountain Park Rd to relocate the City Works building	Mountain Park	Flooding; Winter Storms; Severe Weather; Wildfire/Urban Interface	2.7	Emergency Services; Property Protection	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	8
	Comments: Acquisition of this property would allow for increased storage capacity to store more salt that could benefit additional jurisdictions such as the City of Roswell and Cherokee County								
45.0007	Perform stream stabilization and repair erosion along stream corridors	Roswell	Flooding; Severe Weather; Winter Storms; Tropical Systems	5.4 6.2 6.3	Natural Resource Protection	Cost estimate not provided by jurisdiction	HMA, Local	3 – 5 years from funds availability	5

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
35.0009	Improve capacity of Lake Garrett by dredging accumulated sedimentation	Mountain Park	Flooding; Severe Weather; Winter Storm; Tropical Systems	6.1	Natural Resource Protection	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	17
35.0010	Improve capacity of Lake Cheerful by dredging accumulated sedimentation	Mountain Park	Flooding; Severe Weather; Winter Storm; Tropical Systems	6.1	Natural Resource Protection	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	17
35.0011†	Harden spillway structure between Lake Cheerful and Lake Garrett to	Mountain Park	Flooding; Tropical Systems; Severe Weather	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, Local	3 – 5 years from fund availability	17
	Comments: Received PDM grant to repair damage from recent flood event. Improvements would lessen risk for future damage.								
59.0001†	Improve infrastructure and capacity at Riverside Dr. and North Harbor	Sandy Springs	Flooding; Severe Weather; Tropical Systems; Winter Storm	6.1	Structural Projects	$300,000	HMA, FMA, Local	2 – 3 years from funds availability	15
	Comments: Area suffers from inadequate infrastructure. This area suffered damage in Sept. 2009 for which they received PDM funds to repair.								

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
59.0002	Purchase approximately 45 flooded homes in the Colewood Creek Basin	Sandy Springs	Flooding; Severe Weather; Tropical Systems	2.7	Property Protection	$1.4M	HMA, FMA, Local	2 – 3 years from funds availability	12
	Comments: Homes are located in the flood plain and are subject to flooding.								
59.0003	Purchase approximately 35 flooded houses in Pine Forest along Nancy Creek Basin	Sandy Springs	Flooding; Severe Weather; Tropical Systems	2.7	Property Protection	$1.1M	HMA, FMA Local	2 – 3 years from funds availability	12
	Comments: Development is built in the floodplain. It is a 40 to 50 year old development which was built pre-FIRM.								
59.0004	Acquire approximately 10 homes in the North Mill area and convert to open space	Sandy Springs	Flooding; Severe Weather; Tropical Systems	2.7	Property Protection	$3M	HMA, FMA, Local	2 – 3 years from funds availability	12
	Comments: There are a total of about 600 homes in the floodplain. City wishes to purchase the most homes that are most at risk.								
59.0005	Reinforce old culverts with slip line	Sandy Springs	Flooding; Severe Weather; Tropical Systems; Sinkholes	6.1	Structural Project	$3.5M	HMA, Local	1 – 2 years from funds availability	17
	Comments: Current infrastructure is aging and rusting. The leaking pipes are causing secondary erosion to the substrate. This technique would reinforce pipes to keep from collapsing which would damage homes that are built on or near the top of the system.								
59.0006	Rehabilitate city-owned detention ponds which have previously breached	Sandy Springs	Flooding	6.1	Structural Project	$5M	HMA, Local	3 – 5 years from funds availability	14
	Comments: Some of the detention ponds are located by creeks. Should the structure fail, it will release mud and debris into the creeks.								

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
59.0007	Build retaining wall on Morgan Falls Rd where erosion is occurring where slope crosses the roadway and has lake below	Sandy Springs	Landslide; Severe Weather	6.3	Structural Project	$1M	HMA, Local	3 – 5 years from funds ability	14
59.0008	Build retaining wall on Lake Forest Rd to reduce debris sliding onto the roadway	Sandy Springs	Landslide; Severe Weather	6.3	Structural Project	$267,000	HMA, Local	2 – 3 years from funds availability	19
	Comment: This is an old settlement road which become a major road. Trees, boulders, and mud block can block the road following severe weather events blocking any access, including first responders, into the area.								
55.0001	Acquisition of homes in the Old National area to implement a regional detention area	Unincorp. Fulton County	Flooding	1.2 2.7 6.1	Property Protection	Cost estimate not provided by jurisdiction	HMA, FMA, Local	2 – 3 years from funds availability	-5
	Comments: There are storm water drainage issues due to overdevelopment causing insufficient capacity.								
55.0002	Enhance pump stations at the older treatment facilities in Bear Creek	Unincorp. Fulton County	Flooding	2.9	Property Protection	Cost estimate not provided by jurisdiction	Local	1 – 2 years from funds availability	2
55.0003	Retrofit Fire Station #7 on Buffington Rd to be more wind and impact resistant	Unincorporated Fulton county	Severe Weather; Tropical Systems; Winter Storms; Tornadoes	6.1	Property Protection	Cost estimate not provided by jurisdiction	HMA, SCG, Local	1 – 2 yeas from funds availability	6
50.0001	Replace drainage pipe on Shannon Parkway with bridge	Union City	Flooding	1.2	Structural Project	$5M	HMA, FMA, Local	1 – 2 years from funds availability	12
	Comments: Currently there is a 72" drainage pipe, but it is still not enough capacity. This pipe has been repaired 4 times which causes the roadway to be completely shut down to complete repairs (the longest being for 4 months approximately 3 years ago). The Fire Station is located close-by and water has reached the back of the station. Since it is a major roadway, when it floods, it impacts emergency response times.								

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
50.0002	Improve aging storm water infrastructure on Lester Rd which is circa 1950 and of insufficient capacity for storm water runoff	Union City	Flooding	6.1	Structural Projects	$3M	HMA, FMA, Local	1 – 2 years from funds availability	10
50.0003	Elevate areas of Lester Rd where creeks cross the roadway	Union City	Flooding	6.8	Structural Projects	$1M	HMA, Local	2 – 3 year from funds availability	10
	Comments: Roads were designed and built in the 1950's and are not elevated to the current specifications to prevent flooding.								
50.0004	Dredge Windham Creek that runs through the city to be wider and deeper to increase volume	Union City	Flooding; Severe Weather; Tropical Systems	6.2	Structural Projects	$2M	HMA, Local	2 – 3 years from funds availability	12
	Comments: Current creek capacity is insufficient. There is an increase volume directed towards it as a result of urbanization. The speed and volume of the flow causes erosion and exposes drainage pipes. NOTE: There are no populations downstream that would be affected by increased volume.								
50.0005†	Remediation of Upper Dixie Lake Dam (see Appendix E – Studies, Reports, and Supplementary Documents for detailed options)	Union City	Flooding; Tropical Systems; Severe Weather	6.1	Structural Projects	$250,000 to $1.3M	HMA, FMA, Local	5 – 10 years from funds availability	12
50.0006	Replace early warning system	Union City	Severe Weather; Tornadoes	1.8	Emergency Services	TBD	HMA, Local	2 – 3 years from funds availability	13
	Comments: City currently employs a siren system which is older and only reaches a small percent of the population. Need a more targeted system such as Code Red or NOAA weather radios. This will be implemented in collaboration with the recommendations of the evaluation as described in this project.								
50.0007	Improve emergency responder communication interoperability by implementing an 800 MHz radio system	Union city	All Hazards	1.1, 1.8	Emergency Services	$1M	Local	3 – 5 years from funds availability	13
	Comments: Union City is the only jurisdiction in Fulton County which does not have an 800 MHz radio system. This results in severe interoperability issues with other jurisdictions and leaves the city with no backup system should the current system become damaged or otherwise inoperable.								

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
50.0008	Emergency backup power for facilities with critical operations: City Hall, Public Services, and IT	Union City	Severe Weather; Winter Storm; Tornadoes; Tropical Systems	2.2, 2.11	Emergency Services	$30,000	HMA, Local	1 – 2 years from funds availability	12
15.0001†	Replace 3 box culvert on Camp Creek Parkway with a more open design	College Park	Flooding; Severe Weather; Tropical Systems	6.1	Structural Projects	$200,000	HMA, FMA, Local	2 – 3 years from funds availability	14
	Comments: Dividing walls of box culverts do not allow for debris to pass through underneath causing debris to back up and preventing water from flowing through and overflow. Happens frequently whenever it rains hard.								
15.0002	Storm sewer improvement project on Cambridge , Walker, Mercer, Lyle, and Vista Avenues	College Park	Flooding	6.1	Structural Projects	$800,000	HMA, Local	1 – 2 years from funds availability	14
15.0003†	Increase flow-through capacity of box culvert on Parkview Lane	College Park	Flooding; Severe Weather; Tropical Systems	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	14
	Comments: During heavy rains, the flow through capacity is insufficient causing debris to accumulate and block water flow.								
15.0004†	Increase flow-through capacity of box culvert the intersection of Harris and Rugby Ave.	College Park	Flooding; Severe Weather; Tropical Systems	6.1	Structural Projects	$100,000	HMA, Local	1 – 2 years from funds availability	14
	Comments: During heavy rains, the flow through capacity is insufficient causing debris to accumulate and block water flow.								

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
15.0005	Increase capacity of city-owned detention ponds	College Park	Flooding; Severe Weather; Tropical Systems	6.1	Structural Project	Cost estimate not provided by jurisdiction	HMA, Local	2 – 3 years from funds availability	14
	Comments: These detention ponds are built up and have walls rather than dug into the ground. These structures were designed for lower capacity when subdivisions were built in the 1950's and the ponds were built at the same time. Increased population has put an increased demand on the capacity they can hold.								
15.0006	Replace traffic lights with more weather resistant mast arms	College Park	Severe Weather; Tornadoes; Tropical Systems	6.8	Structural Projects	Cost estimate not provided by jurisdiction	HMA, DOT, Local	2 – 3 years from funds availability	8
15.0007	Retrofit roof at public works facility on Harvard Rd; install surge protection; install emergency generator	College Park	Severe Weather; Tornados; Winter Storm; Tropical Systems;	6.4 6.5	Property Protection	$35,000 (roof); Estimate unknown for generator and surge protection	HMA, Local	1 – 2 years from funds availability	10
	Comments: This is an older facility with an original roof which is not sufficiently hardened for high winds. Dispatch functions for the City's Public Works operate from this location.								
15.0008	Upgrade culvert on Park Terrace	College Park	Flooding; Severe Weather; Tropical Systems	6.1	Structural Projects	$100,000	HMA, Local	2 – 3 years from funds availability	14
15.0009	Retrofit the roof at the Power Department Building; replace generator	College Park	Severe Weather; Tornadoes; Winter Storm; Tropical Systems	6.4 6.5	Property Protection	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	10

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
	Comments: This building houses the operations for the city-owned power utility as well as the water and sewer department and the warehouse. The current generator is small and underpowered for current needs. The computer system that is housed at this location runs all of their system data.								
15.0010	Clean up and make minor modifications to existing detention structures along Fur Creek in Greenspring Subdivisioin	College Park	Flooding	6.1, 6.2, 6.3	Property Protection	Cost estimate not provided by jurisdiction	HMA Local	2 – 3 years from funds availability	Not scored by jurisdiction
15.0011	Modify Fur Creek structure to regulate but not restrict flow	College Park	Flooding	6.1	Property Protection	Cost estimate not provided by jurisdiction	HMA, Local	2 – 3 years from funds availability	Not scored by jurisdiction
15.0012	Modify and enlarge existing detention pond on Hopewell Road	College Park	Flooding	6.1	Property Protection	Cost estimate not provided by jurisdiction	HMA, Local	2 – 3 years from funds availability	Not scored by jurisdiction
15.0013	Construct new detention pond to regulate southwest branch of Fur Creek	College Park	Flooding	6.3	Property Protection	Cost estimate not provided by jurisdiction	HMA, Local	2 – 3 years from funds availability	Not scored by jurisdiction
15.0014	Improve Edison/Sullivan Road drainage through the addition of new storm water piping	College Park	Flooding	6.1	Property Protection	Cost estimate not provided by jurisdiction	HMA, Local	2 – 3 years from funds availability	Not scored by jurisdiction
15.0015	Improve capacity of Janice Drive storm drain	College Park	Flooding	6.1	Property Protection	Cost estimate not provided by jurisdiction	HMA, Local	2 – 3 years from funds availability	Not scored by jurisdiction
65.0001†	Develop storm water plan	Chatt Hills	Severe Weather; Tropical Systems; Winter Storms	4.8	Prevention	Cost estimate not provided by jurisdiction	HMA, Local	2 years from funds availability	9

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
65.0002	Harden and retrofit City Hall (which also functions as the EOC and shelter) with generator and impact resistant glass	Chatt Hills	Severe Weather; Tropical Systems; Tornadoes; Winter Storms	2.10 6.4	Property Protection	Cost estimate not provided by jurisdiction	HMA, EOC, Local	2 – 3 years from funds availability	9
65.0003	Improve storm water run off on Caps Ferry Rd	Chatt Hills	Severe Weather; Flooding; Tropical Systems	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, Local	2 – 3 years from funds availability	15
	Comment: Due to the proximity to the Chattahoochee River, the creek backs up and floods the road which, in turn, cuts off access to three counties.								
65.0004	Harden Fire Station with impact resistant glass and wind resistant garage doors; equip with upgraded generator (current one is underpowered)	Chatt Hills	Severe Weather; Tropical Systems; Winter Storms; Tornadoes	2.10 6.5	Property Protection	Cost estimate not provided by jurisdiction	HMA, SCG, Local	1 – 2 years from funds availability	9
65.0005	Acquire the abandoned subdivisions Bear Creek and Arbor Reserve to convert to open space, prevent development and create defensible fire buffer	Chatt Hills	Wildfire/Urban Interface	2.7	Property Protection	Cost estimate not provided by jurisdiction	HMA, Local	3 – 5 years from funds availability	4
	Comment: There are no structures that would require demolition.								
20.0001	Coordinate with DOT regarding improved conveyance capacity and drainage on Camp Creek Pkwy between Washington Rd and Desert Dr	East Point	Flooding; Severe Weather; Tropical Systems	6.8	Structural Projects	Cost estimate not provided by jurisdiction	HMA, FMA, DOT, Local	3 – 5 years from funds availability	16

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
	Comment: DOT is preparing to widen Camp Creek and it owns the draining infrastructure; however, there are design impacts that may affect the city that need to be coordinated.								
20.0002	Improve drainage capacity on Norman Berry Rd	East Point	Flooding; Severe Weather; Tropical Systems	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	16
20.0003	Improve drainage capacity in the 800 block of Cleveland Ave	East Point	Flooding; Severe Weather; Tropical Systems	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	16
20.0004	Improve drainage design in the area of Martin St. and Norman Berry due to insufficient infrastructure capacity	East Point	Flooding; Tropical Systems; Severe Weather	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	16
	Comments: This area collects from 3 or 4 different points that drain into one location. Either a larger drain or rerouting of drainage points to multiple locations are needed.								
20.0005	Improve retaining wall at the Fire Station due to slope	East Point	Landslide	6.3	Structural Projects	Cost estimate not provided by jurisdiction	HMA, SCG, Local	1 – 2 years from funds availability	16
	Comment: There is a partial retaining wall that is insufficient that is allowing for erosion behind the Fire Station that is endangering the structure.								
20.0006	Harden City EOC (2727 East Point St) by adding more impact resistant glass	East Point	Severe Weather; Tropical Systems; Tornadoes	6.4	Property Protection	Cost estimate not provided by jurisdiction	HMA, EOC, Local	1 – 2 years from funds availability	16
20.0007	Drainage improvements in the Sun Valley/Camp Creek Watershed area	East Point	Flooding	`6.1	Structural Projects	$1,950,000	HMA, Local	1 – 2 years from funds availability	15

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
20.0008	Drainage improvements at Lester St & Spring Ave. in the Utoy Watershed	East Point	Flooding	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	15
20.0009	Drainage improvements at Randall St & East Forrest Ave	East Point	Flooding	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	15
20.0010	Culvert improvements at 3030 & 3042 Dodson Dr	East Point	Flooding	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	15
20.0011	Drainage Improvements in the Jim's Creek area	East Point	Flooding	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	Not scored by jurisdiction
20.0012	North Martin St. catch basin replacement	East Point	Flooding	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	Not scored by jurisdiction
	Comments: There are yard and street flooding complaints from residents.								
20.0013	North Martin St. regional storage improvement	East Point	Flooding	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, FMA, Local	2 – 3 years from funds availability	Not scored by jurisdiction
	Comments: There is major road flooding; regional improvements for downstream flooding problems.								
20.0014	Calhoun Ave pipe replacement	East Point	Flooding	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, FMA, Local	1 – 2 years from funds availability	Not scored by jurisdiction
	Comments: There is major road flooding at the intersection of Calhoun Ave. and Norman Berry Dr.								
20.0015	South River unnamed tributary 3 improvements	East Point	Flooding	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, FMA, Local	2 – 3 years from funds availability	Not scored by jurisdiction
	Comments: There is secondary road flooding with potential structural flooding.								
20.0016	Pipe replacement on Norman Berry Dr, near Maria Head Terrace	East Point	Flooding	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, FMA Local	1 – 2 years from funds availability	Not scored by jurisdiction
	Comment: There is major roadway flooding.								

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
20.0017	Maria Head Terrace Berm Construction	East Point	Flooding	6.1	Structural Project	Cost estimate not provided by jurisdiction	HMA, FMA, Local	2 – 3 years from funds availability	Not scored by jurisdiction
	Comment: There is a secondary road with potential structural flooding.								
20.0018	Georgia Power Pond	East Point	Flooding	6.1	Structural Project	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	Not scored by jurisdiction
	Comments: There is secondary road flooding; alternate access to residences; coordinate with Meadow Lark improvements.								
20.0019	Meadow Lark Lane Pipe Replacement	East Point	Flooding	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	Not scored by jurisdiction
	Comments: There is secondary road flooding; alternate access to residences.								
20.0020	Grove Ave. pipe replacement	East Point	Flooding	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	Not scored by jurisdiction
	Comments: There is secondary road flowing; alternate access to residences.								
30.0001	Install surge protection for City Hall which houses server databases	Hapeville	Severe Weather		Property Protection	Cost estimate not provided by jurisdiction	HMA, Local	1 year from funds availability	8
30.0002	Install surge protection and emergency generator at the Public Services building	Hapeville	Severe Weather; Tropical Systems; Winter Storm	2.2 2.11	Property Protection	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	8
30.0003	Install surge protection at the Police Station which houses its own database servers	Hapeville	Severe Weather	2.2 2.11	Property Protection	Cost estimate not provided by jurisdiction	HMA, DHS, Local	1 – 2 years from funds availability	8
30.0004	Install surge protection at Fire Station #2	Hapeville	Severe Weather	2.2 2.11	Property Protection	Cost estimate not provided by jurisdiction	HMA, SCG, Local	1 – 2 years from funds availability	8
	Comments: Lightning surges can damage older repeaters which serve as their backup communications system.								

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
30.0005	Install surge protection at the Community Services building	Hapeville	Severe Weather	2.2 2.11	Property Protection	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	8
	Comments: This building which IT Administration; Planning & Zoning; Public Works Administration; Plan Review Data and other data records. All GIS data is located at this building as well which is on a server with no external backup.								
30.0006†	Revise site plan review process to ensure that site plan review is part of the interdepartmental plan review process	Hapeville	All Hazards	2.3, 4.1 4.2 4.4	Prevention	Cost estimate not provided by jurisdiction	Local	1 – 2 years from funds availability	9
	Comments: Currently the site plan review is performed by a position that is a political appointment and the planning commission may not be receiving technical expert reports and studies such as slope and connections to infrastructure. The current process only provides information on setbacks, landscape, etc.								
30.0007	Acquire 7 parcels located south of Woodrow and west of Wheeler (north of the Lake)	Hapeville	Flooding	2.7	Property Protection	Cost estimate not provided by jurisdiction	HMA, FMA, Local	2 – 3 years from funds availability	3
	Comments: The city wants to acquire these parcels which are in the 100 year floodplain to prevent further development and convert to a detention area which will overtax the current stormwater system and prevent flooding of other residents which are downhill from the area.								
30.0008	Perform stream bank stabilization in the stream that flows into the South River	Hapeville	Flooding	5.4	Natural Resources Protection	Cost estimate not provided by jurisdiction	HMA, FMA, Local	3 – 5 years from funds availability	4
	Comments: Stream bank erosion is causing the stream bed to fill up with sediment which impacts the ability to disperse water and damages the sanitary sewer that is located there. This infrastructure was damaged during the 2009 floods.								
30.0009	Improve drainage at Claire and Parkway by increasing the size of the underground storm drain line	Hapeville	Flooding	6.1	Structural Project	Cost estimate not provided by jurisdiction	HMA, Local	2 – 3 years from funds availability	8
	Comment: The current pipe capacity causes flooding in the park and roadway resulting in damage to the road and causing people to be caught in the flood waters.								

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
30.0010	Improve drainage in the area of South Central Avenue by increasing the size of the underground storm drain	Hapeville	Flooding	6.1	Structural Project	Cost estimate not provided by jurisdiction	HMA, FMA, Local	2 – 3 years from funds availability	9
	Comments: Flooding impacts the business district and floods on both sides of the railroad tracks. Businesses are moving out of the area causing economic harm to the city. It also results in flooding at the fire station located at 870 S. Central Ave in which flood waters have flowed through the front garage door and out the back. The city would like to reroute the piping under the railroad, Refer to Hapeville flooding map for location of these choke points.								
30.0011	Perform curb modification on Oakdale Road which currently has header rocks. Installation of curb and gutters will improve storm water drainage	Hapeville	Flooding	6.1	Structural Project	Cost estimate not provided by jurisdiction	HMA, Local	2 – 3 years from funds availability	9
05.0023	Improve storm water drainage capacity and design in the area of Piedmont and Auburn Ave to allow better tie in to the Claire Creek overflow	Atlanta	Flooding; Severe Weather; Tropical Systems	6.1	Structural Projects	Cost estimate not provided by jurisdiction	HMA, Local	2 – 3 years from funds availability	Not scored by jurisdiction
	Comment: This is an area of identified need as part of the Combined Sewer Overflow (CSO) Remediation Plan which can be found at http://www.cleanwateratlanta.org.								
05.0024	Station 21: Harden to improve wind and impact resistance; increase generator capacity	Atlanta	Flooding; Severe Weather; Tropical Systems; Tornadoes; Winter Storms	2.10 2.11 6.4	Property Protection; Emergency Services	Cost estimate not provided by jurisdiction	HMA, SCG, Local	2 – 3 years from funds availability	Not scored by jurisdiction
	Comments: This is a heavy rescue special operations station. Houses rescue boat, collapse rescue equipment, trench rescue equipment, and technical rescue equipment. ALS engine is station at this location. GSAR is housed at this station. Station has large amount of plate glass, including bay doors. Bay doors are older and are not up to current code.								

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
05.0025	Station 8: Harden to improve wind and impact resistance; increase generator capacity	Atlanta	Flooding; Severe Weather; Tropical Systems; Winter Storms; Tornadoes	2.10 2.11 6.4	Property Protection; Emergency Services	Cost estimate not provided by jurisdiction	HMA, SCG, Local	` 1 – 2 years from funds availability	Not scored by jurisdiction
	Comment: This is the Hazardous Materials station and contains HazMat related personnel and equipment.								
05.0026	Station 28: Harden to improve wind and impact resistance; increase generator capacity	Atlanta	Flooding; Severe Weather; Tropical Systems; Winter Storms; Tornadoes	2.10 2.11 6.4	Property Protection; Emergency Services	Cost estimate not provided by jurisdiction	HMA, SCG, Local	1 – 2 years from funds availability	Not scored by jurisdiction
	Comment: This is the Foam Unit Station for the Airport and fuel farm.								
05.0027	Station 1: Harden to improve wind and impact resistance; increase generator capacity	Atlanta	Flooding; Severe Weather; Tropical Systems; Winter Storms; Tornadoes	2.10 2.11 6.4	Property Protection; Emergency Services	Cost estimate not provided by jurisdiction	HMA, SCG, Local	1 – 2 years from funds availability	Not scored by jurisdiction
	Comments: This station is the Decontamination Station and houses decontamination equipment. It also houses CBRNE equipment and serves as the backup station to the HazMat team in Station 8.								

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
05.0028	Stations 9, 20, 22, & 25: Harden to improve wind and impact resistance; increase generator capacity	Atlanta	Flooding; Severe Weather; Tropical Systems; Winter Storms; Tornadoes	2.10 2.11 6.4	Property Protection; Emergency Services	Cost estimate not provided by jurisdiction	HMA, SCG, Local	1 – 2 years from funds availability	Not scored by jurisdiction
05.0029	Improve wind resistance of roof to the Maddox Park building which houses fleet operations. Roof is not wind rated	Atlanta	Flooding; Severe Weather; Tropical Systems; Winter Storms; Tornadoes	2.10	Property Protection	Cost estimate not provided by jurisdiction	HMA, Local	1 – 2 years from funds availability	Not scored by jurisdiction
05.0030	Build retaining structure at the solid waste landfill area to prevent further slope and erosion damage	Atlanta	Flooding; Severe Weather; Tropical Systems	6.3	Structural Projects	Cost estimate not provided by jurisdiction	HMA, Local	2 – 3 years from funds availability	Not scored by jurisdiction
05.0031†	R.M. Clayton Waste Water Treatment Plan: Flood-proof the plant through raising the height of the banks	Atlanta	Flooding; Severe Weather; Tropical Systems	2.10	Property Protection	Cost estimate not provided by jurisdiction	HMA, FMA, Local	3 – 5 years from funds availability	Not scored by jurisdiction
	Comment: This plant flooded from Proctor Creek during the floods of Sept. 2009. It has received some PDM funds for repairs, but further mitigation is needed to improve flood-proofing of this facility. This facility serves East Point, College Park, and Hapeville. The plant cannot treat sewage and is causing environmental problems in West Point Lake. It also affects the communities' ability to draw water.								
05.0032	Piedmont Park natural creek bank restoration and stabilization by reducing slopes and burying tree logs that are natural features	Atlanta	Flooding; Severe Weather; Tropical Systems	5.4	Natural Resources Protection	Cost estimate not provided by jurisdiction	HMA, Local	5 – 8 years from funds availability	Not scored by jurisdiction

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
05.0033	Acquire generator for emergency power for Fire Department Headquarters Building	Atlanta Fire	Severe Weather; Winter Storm; Tropical System; Tornadoes;	2.11	Emergency Services	$1,300,000	HMA, SCG, Local	1 – 2 years from funds availability	13
05.0034	Retrofit glass old window glass at the Fire Department Headquarters building for increased impact resistance	Atlanta Fire	Severe Weather; Tornado; Winter Storm; Tropical System	2.10 6.4	Emergency Services; Property Protection	$1,500,000	HMA, SCG, Local	1 – 2 years from funds availability	11
05.0035	Acquire generator for emergency power for 40 Fire Stations	Atlanta Fire	Severe Weather; Tornado; Winter Storm; Tropical System	2.11	Emergency Services	$4,000,000	HMA, SCG, Local	1 – 2 years from funds availability	13
05.0036	Retrofit bay doors of 40 Fire Stations	Atlanta Fire	Severe Weather; Tornado; Winter Storm; Tropical System	2.10 6.4	Property Protection	$5,000,000	HMA, SCG, Local	1 – 2 years from funds availability	13

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
05.0037	Retrofit All 40 Fire Stations with Lightning Rods	Atlanta Fire	All Hazards	2.10	Emergency Services	$ 800,000	HMA, SCG, Local	1 – 2 years from funds availability	13
05.0038	Place 80 Warning Sirens in Residential Areas	Atlanta Fire	Severe Weather	1.1	Emergency Services	$4,000,000	HMA, Local	2 – 3 years from funds availability	13
05.0039	Acquire generator for emergency power for 15 Police Facilities	Atlanta Police	Severe Weather; Winter Storm; Tropical System; Tornadoes;	2.11	Emergency Services; Property Protection	$1,500,000	HMA, DHS, Local	1 – 2 years from funds availability	7
05.0041†	Relocate SWAT Offices & Storage, Classrooms, Ranger Offices & Storage, Gym, Explosive Bldg, and Equipment Facility at 1500 Key Rd outside of Floodplain	Atlanta Police	Flooding	2.10, 4.11	Property Protection	$2,750,000	DHS, Local	1 – 2 years from funds availability	8
05.0042†	Relocate Firing Range Facility at 1500 Key Rd outside of Floodplain	Atlanta Police	Flooding	2.10, 4.11	Property Protection	$1,125,000	Local	1 – 2 years from funds availability	8

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
05.0043	Site at 1500 Key Road includes SWAT, flooding of the road severely impacts ability to respond. Multiple pieces of critical tactical equipment are located there as well as the Police Firing Range	Atlanta Police	Flooding	4.11, 7.9	Emergency Services; Property Protection	$50,000	Local, HMA	1 – 2 years from funds availability	8
05.0044	Install traffic warning signs on at all road crossing at creeks and streams that are submerged during a 100 & 500 year flood or greater. Approximately 80+ locations at $600 per location	Atlanta Public Works	Flooding	4.11, 7.9	Emergency Services; Property Protection	$50,000	Local	1 – 2 years from funds availability	13
05.0045	Install generators at Public Work Facilities involving 25 sites involving Fueling Operations for the City, Operations, and Vehicle Maintenance	Atlanta Public Works	Severe Weather, Flooding	4.11, 2.11	Emergency Services; Property Protection	$2,500,000	HMA, Local	1 – 2 years from funds availability	11
05.0046	Raise roadway & Structure by 3.3 ft. at Pryor Rd. Culvert at North Fork of South River	Atlanta Public Works	Flooding; Landslide	6.1 6.2	Property Protection	$400,000	HMA, Local	3 – 5 years from funds availability	11
05.0047	Raise roadway and structure by 17 ft. at Thornton St. Culvert at North Fork of South River	Atlanta Public Works	Flooding; Landslide	1.1 6.1 6.2	Property Protection	$1,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0048	Raise roadway and structure by 9.3 ft. at Arthur Langford Jr. Pl. at North Fork of South River	Atlanta Public Works	Flooding; Landslide	1.1 6.1 6.2	Property Protection	$1,000,000	HMA, Local	3 – 5 years from funds availability	11

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
05.0049†	Raise roadway by 2.5ft at Macon Dr at South Fork of South River	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$200,000	HMA, Local	3 – 5 years from funds availability	11
05.0050†	Raise roadway and structure by 5.5ft. at Lakewood Raceway – Southern Leg at Middle Branch of South River	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$400,000	HMA, Local	3 – 5 years from funds availability	11
05.0051†	Raise roadway and structure by 4 ft. at Bohler Rd. at Peachtree Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0052†	Raise roadway and structure by 2 ft. at Northside Drive at Peachtree Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0052†	Raise roadway and structure by 4 ft. at Northwest Dr. at Proctor Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$200,000	HMA, Local	3 – 5 years from funds availability	11
05.0054†	Raise roadway and structure by 3.3 ft. at Sanford Dr. (AKA Kerry Cir.) at Proctor Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$200,000	HMA, Local	3 – 5 years from funds availability	13
05.0055†	Raise roadway and structure by 5 ft. at Gun Club Park Bridge at Proctor Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$400,000	HMA, Local	3 – 5 years from funds availability	11
05.0056†	Raise roadway and structure by 8 ft at Joseph E Boone Blvd (AKA Simpson Road) at Proctor Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0057†	Raise roadway and structure by 6.5ft at Joseph E Boone Blvd (AKA Simpson Road) at Proctor Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0058†	Raise roadway and structure by 5 ft. at Burbank Dr. at Proctor Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,000,000	HMA, Local	3 – 5 years from funds availability	11

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
05.0059†	Raise roadway and structure by 9 ft. at Sharon St at Proctor Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0060†	Raise roadway and structure by 8 ft at Windsor Pkwy. at Nancy Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$250,000	HMA, Local	3 – 5 years from funds availability	11
05.0061†	Raise roadway and structure by 2 ft. at Peachtree Dunwoody Rd at Nancy Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$4,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0062†	Raise roadway and structure by 3.2 ft. at Great Southwest Pkwy at Utoy Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,500,000	HMA, Local	3 – 5 years from funds availability	11
05.0063†	Raise roadway and structure by 4 ft. at Fulton Industrial Blvd – EB at Utoy Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,500,000	HMA, Local	3 – 5 years from funds availability	11
05.0064†	Raise roadway and structure by 4 ft. at Fulton Industrial Blvd – WB at Utoy Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,500,000	HMA, Local	3 – 5 years from funds availability	11
05.0065†	Raise roadway and structure by 4 ft. at Fairburn Rd at North Utoy Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,500,000	HMA, Local	3 – 5 years from funds availability	11
05.0066†	Raise roadway and structure by 3.5 ft. at Benjamin E. Mays Dr. Rd. at North Utoy Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,500,000	HMA, Local	3 – 5 years from funds availability	11
05.0067†	Raise roadway and structure by 2.2 ft. at Brownlee Rd. at North Utoy Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,500,000	HMA, Local	3 – 5 years from funds availability	11
05.0068†	Raise roadway and structure by 11.2ft at Sandy Creek Rd	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$3,500,000	HMA, Local	3 – 5 years from funds availability	11

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
05.0069†	Raise roadway and structure by 6 ft. at South River Industrial Blvd. at Federal Prison Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$3,500,000	HMA, Local	3 – 5 years from funds availability	11
05.0070†	Raise roadway and structure by 11ft at Woodland Ave. at Intrenchment Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$3,500,000	HMA, Local	3 – 5 years from funds availability	11
05.0071†	Raise roadway and structure by 3.2 ft. at Danforth Rd. at Niskey Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0072†	Raise roadway and structure by 6 ft. at Niskey Lake Rd.	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0073†	Raise roadway and structure by 2 ft. at Boulder Park Dr. at Wildwood Lake Tributary	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0074	Raise roadway and structure by 2.2 ft. at Branch Rd. at Wildwood Lake Tributary	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0075†	Raise roadway and structure by 2.2ft at Hasty Place at Mozley Park Tributary	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$500,000	HMA, Local	3 – 5 years from funds availability	11
05.0076†	Raise roadway and structure by 1.5 ft. at Hightower Rd. at Center Hill Tributary	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0077†	Raise roadway and structure by 2 ft. at Donald Lee Hollowell Pkwy (AKA Bankhead Hwy) at Center Hill Tributary	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0078†	Raise roadway and structure by 5 ft. at Bolton Rd. at Whetstone Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,500,000	HMA, Local	3 – 5 years from funds availability	11

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
05.0079†	Raise roadway and structure by 6.5 ft. at Adams Dr at East Whetstone Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0080†	Raise roadway and structure by 2 ft. at Dawn Ln. at East Whetstone Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$1,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0081†	Raise roadway and structure by 6 ft. at Sumter St. at East Whetstone Creek	Atlanta Public Works	Flooding	1.1 6.1 6.2	Property Protection	$2,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0082†	Raise roadway and structure by 2.5 ft. at Connelly Dr at Headland Branch	Atlanta Public Works	Flooding	6.1 6.2	Property Protection	$2,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0083†	Raise roadway and structure by 2 ft. at Headland Dr. at Headland Branch	Atlanta Public Works	Flooding	6.1 6.2	Property Protection	$2,000,000	HMA, Local	3 – 5 years from funds availability	11
05.0084	Build two separate 2,500 tons sand domes for storage of materials during cold and icy weather	Atlanta Public Works	Severe Weather; Winter Storms	2.6	Property Protection	$ 600,000	Local	3 – 5 years from funds availability	13
05.0085	Build retaining structure at the solid waste landfill area to prevent further slope and erosion damage	Atlanta Public Works	Flooding; Severe Weather; Tropical Systems	6.3	Property Protection	$1,000,000	HMA, Local	2 – 3 years from funds availability	13
05.0086†	Raise levee and other work along Chattahoochee River and Peachtree Creek to prevent flood waters from the Chattahoochee River raising into the R.M. Clayton Water Reclamation Center	Atlanta DWM	Flooding	4.11	Property Protection	$5,000,000	HMA, FMA, Local	3 – 5 years from funds availability	16

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
05.0087	Acquire flood prone properties located in the FEMA mapped floodplains throughout the City of Atlanta.	Atlanta DWM	Flooding; Severe Weather; Tropical Systems	2.7	Property Protection	$10,000,000	HMA, FMA, Local	3 – 5 years from funds availability	16
05.0088†	Elevate flood prone properties located in the FEMA mapped floodplains throughout the City of Atlanta	Atlanta DWM	Flooding; Severe Weather; Tropical Systems	2.8	Property Protection	$15,000,000	HMA, FMA, Local	3 – 5 years from funds availability	16
05.0089	Educate the public about the risk of flooding and the importance of obtaining flood insurance	Atlanta DWM	Flooding; Severe Weather; Tropical Systems	2.4	Property Protection	$50,000.00/ Yearly	Local	Ongoing	16
05.0090	Continue program for natural/ vegetative stabilization of stream banks (average 1300 feet per year) to secure infrastructure	Atlanta DWM	Flooding; Severe Weather; Tropical Systems	5.1, 5.2, 5.4, 5.5	Property Protection	$200,000 /year	Local	Ongoing	16
05.0091	Relocate Parks NE and SE District Maintenance Depots	Atlanta Parks, Recreation, & Cultural Affairs	Flooding	2.1, 2.10, 4.11	Emergency Services; Property Protection	$800,000 Land $1,500,000 Design & Construction	Local	2 – 4 years from funds availability	16

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
05.0092	Tree Maintenance Program in Hazard and Urbanized Areas	Atlanta Parks, Recreation, & Cultural Affairs	Heat Wave; Drought	5.1, 5.2, 5.4, 5.5	Property Protection	$300,000 Equipment; $400,000 annually	Local	1 – 2 years from funds availability	16
05.0093	Reconstruct roofs and generators on shelter facilities	Atlanta Parks, Recreation, & Cultural Affairs	All Hazards	2.9	Property Protection	$7,500,000	Local	3 – 5 years from funds availability	16
05.0094	Implement creek netting program to prevent damming of creeks and stream by debris and improve water quality by reducing the effect of pollutants entering the water	Atlanta	Flooding; Severe Weather; Tropical Systems	5.4	Natural Resources Protection	Cost estimate not provided by jurisdiction	HMA, Local	1 – 3 years from funds availability	Not scored by jurisdiction
99.0002	Increase participation in the NFPA Firewise Communities program to educate communities in steps to reduce risk to fires	Countywide[‡]	Wildfire/ Urban Interface	1.2 4.7 7.3	Prevention; Public Education and Awareness	$150,000	HMA, NFPA, Local	Ongoing	18

[‡] Atlanta, Chattahoochee Hills, College Park, East Point, Fairburn, Hapeville, Johns Creek, Milton, Mountain Park, Palmetto, Roswell, Sandy Springs, Union City, Unincorporated Fulton County

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
99.0003†	Increase participation in the NFIP's Community Rating System including interjurisdictional coordination to ensure maximum use of shared credit for eligible activities; may include bi-annual interjurisdictional meeting to review shared credit activities	Countywide‡	Flooding	1.7 7.3	Prevention; Public Education and Awareness	In house staff & time	HMA, FMA, Local	Ongoing	18
99.0004†	Train local flood plain managers through programs offered through the State and FEMA's training center	Countywide‡	Flooding	7.5	Public Education and Awareness	In house staff and time	HMA, FMA, Local	Ongoing	10
99.0005	Participate in the "Turn Around Don't Drown" program by acquiring signs in known flash flood locations	Countywide‡	Flooding	7.9	Public Education and Awareness	TBD	HMA, Local	Education ongoing; 1 – 2 years from funds availability for signs	8
99.0006†	Enact and enforce a storm water management ordinance that maintains pre-development runoff rates for major developments	Countywide‡	Flooding	4.8	Prevention	In house staff and time;	Local	2 – 3 years	19

‡ Atlanta, Chattahoochee Hills, College Park, East Point, Fairburn, Hapeville, Johns Creek, Milton, Mountain Park, Palmetto, Roswell, Sandy Springs, Union City, Unincorporated Fulton County

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
99.0007†	Conduct planning and engineering studies to determine feasibility of regional detention structures or sub-basins in critical flood hazard areas to determine watershed-wide solutions to flooding	Countywide‡	Flooding; Severe Weather; Tropical Systems; Winter Storms	2.7 4.5 4.7 4.8 5.2 5.6	Prevention	TBD	HMA, FMA, Local	2 – 3 years from funds availability	8
99.0008†	Conduct multijurisdictional storm water modeling project. Develop comprehensive watershed-scale storm management plans. Multi-jurisdictional high priority areas should be identified where watershed level solutions projects could be applied	Countywide‡	Flooding; Tropical Storms; Severe Weather; Winter Storm	4.1 4.2 4.7 4.8	Prevention	TBD	HMA, FMA, Local	2 – 3 years from funds availability	8
	Comments: This would help determine regional storm water control issues (both quality and quantity) and provide guidance as to the best locations for regional detention ponds and other similar type structures.								
99.0009†	Evaluate the need for an ordinance to govern inspection and maintenance of private fire hydrants that are maintained within gated communities to prevent hitting non-functioning hydrants	Countywide‡	Wildfire/Urban Interface	1.2 2.1 2.3 2.4 4.2	Prevention	In house staff and time	In house staff and time	1 – 2 years	13

‡ Atlanta, Chattahoochee Hills, College Park, East Point, Fairburn, Hapeville, Johns Creek, Milton, Mountain Park, Palmetto, Roswell, Sandy Springs, Union City, Unincorporated Fulton County

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
99.0010	Standardize older hydrants to the new 5" adapter specification to allow better connectivity to fire engines	Countywide‡	Wildfire/Urban Interface	1.2 2.2 4.13	Emergency Services	TBD	Unk	2 – 4 years from funds availability	6
99.0011†	Update comprehensive plans, short term work program, and capital improvements program (6-20 years) for future growth and development that integrate findings and recommendations of this hazard mitigation plan. Consider the addition of a natural hazards element, which includes risk assessment findings of this plan and carries over the goals, objectives, and mitigation measures	Countywide‡	All Hazards	2.1 2.3 2.5 2.6 4.1 4.2 4.3	Prevention	In house staff and time	In house staff and time; costs for consultants	3 – 10 years – then ongoing (in conjunction with mandated plan update cycles)	19
99.0012†	Ensure that capital improvement plans include capital projects to implement the natural hazards element of the jurisdiction's comprehensive plan or projects identified in the Mitigation Strategy Section of this plan	Countywide‡	All Hazards	4.2	Prevention	In house staff and time	In house staff and time	Within 2 years then ongoing	10

‡ Atlanta, Chattahoochee Hills, College Park, East Point, Fairburn, Hapeville, Johns Creek, Milton, Mountain Park, Palmetto, Roswell, Sandy Springs, Union City, Unincorporated Fulton County

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
99.0013†	Consider updating zoning regulations to require various open space and landscaping standards for land development proposals	Countywide‡	Flooding; Wildfire/Urban Interface	2.7 4.1 5.3	Prevention	In house staff and time	In house staff and time	Within 2 years then ongoing	14
99.0014†	Continue to enforce subdivision construction standards for drainage improvements	Countywide‡	Flooding; Severe Weather; Tropical Systems	4.3	Prevention	In house staff and time	In house staff and time	Ongoing	15
99.0015†	Evaluate building code standards for roof construction to assure protection against wind damage from wind producing events; consider incorporating green roof principles	Countywide‡	Tropical Systems; Winter Storms; Severe Weather	1.3	Prevention	In house staff and time	In house staff and time	Within 2 years then ongoing	8
99.0016	Encourage the relocation of existing utility lines underground, and consider local regulations to require placement of all new utility lines underground, were feasible	Countywide‡	Tornadoes; Severe Storms; Winter Storms; Tropical Systems	2.1	Prevention	TBD	Local	Within 2 years then ongoing	2

‡ Atlanta, Chattahoochee Hills, College Park, East Point, Fairburn, Hapeville, Johns Creek, Milton, Mountain Park, Palmetto, Roswell, Sandy Springs, Union City, Unincorporated Fulton County

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
99.0017	Encourage replacement of traffic signals at major or priority intersections with mast arm design with emergency power; coordinate with State Transportation agencies for state-owned roadways that impact local jurisdictions	Countywide‡	Tornadoes; Severe Storms; Winter Storms; Tropical Systems	6.8	Structural Projects	TBD	Unk	Within 2 years then ongoing	3
99.0018†	Develop local ordinances and enforcement mechanisms to ensure proper maintenance of privately-owned dams that are within local jurisdictions	Countywide‡	Flooding; Dam Failure	4.11	Prevention	In house staff and time	In house staff and time	Within 2 years then ongoing	14
99.0019	Consider enactment of local ordinances to require community storm shelters or safe rooms with sizeable mobile homes parks, subdivisions, and RV parks	Countywide‡	Severe Weather; Tornadoes; Tropical Systems	1.4	Prevention	In house staff and time	In house staff and time	2 to 3 years	11
99.0020†	Maintain risk assessment data in GIS, including flood zones, tornado tracks, sinkhole threat areas, dam inundation areas, disaster events, and comprehensive inventory of critical facilities within all jurisdictions	Countywide‡	All Hazards	4.14	Public Education and Awareness	In house staff and time; software and network infrastructure costs TBD	HMA	Ongoing for staff and time; 1 year for network and infrastructure	9

‡ Atlanta, Chattahoochee Hills, College Park, East Point, Fairburn, Hapeville, Johns Creek, Milton, Mountain Park, Palmetto, Roswell, Sandy Springs, Union City, Unincorporated Fulton County

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
99.0021	Integrate FEMA HAZUS-MH applications for hazard loss estimations within local GIS programs. Maintain up-to-date data within GIS to apply the full loss estimation capabilities of HAZUS	Countywide‡	All Hazards	4.14	Prevention	In house staff and time; associated training costs TBD	HMA	3 – 5 years from funds availability	6
99.0022	Work with DNR, NCRS, and local GIS departments to maintain inundation mapping downstream of dams	Countywide‡	Flooding; Dam Failure	4.14	Prevention	In house staff and time	HMA	3 – 5 years from funds availability	12
99.0023	Evaluate all available notifications systems, including but not limited to, Outdoor Warning Sirens, Reverse 911, Code Red, Nixel, and all other public available systems for Atlanta-Fulton County, including consideration of the unique geographical location, technical requirements, system types, and operational procedures of each local jurisdiction with sirens. With interjurisdictional capability	Countywide‡	All hazards	1.1 1.8 2.2	Emergency Services	In house staff and time	HMA	2 – 4 years from funds availability	11
99.0024	Installation of warning and notification systems	Countywide‡	All hazards		Emergency Services		HMA	4 – 6 years from funds availability	

‡ Atlanta, Chattahoochee Hills, College Park, East Point, Fairburn, Hapeville, Johns Creek, Milton, Mountain Park, Palmetto, Roswell, Sandy Springs, Union City, Unincorporated Fulton County

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
99.0025	Develop a countywide multi-jurisdictionally coordinated notification plan for alert and notification of hazardous (or potentially hazardous) events	Countywide‡	All Hazards	1.1 1.8 2.2	Emergency Services	In house staff and time; or consultant cost TBD	HMA	3 – 5 years from funds availability	10
99.0026	Install automatic icing indicators on critical bridges and overpasses	Countywide‡	Winter Storm	7.9	Emergency Services	TBD	HMA	2 – 3 years from funds availability	3
99.0027†	Implement a voluntary program of flood protection and property acquisition and relocation for high-risk residences and repetitive loss properties. Survey property owners to determine interest and assess cost	Countywide‡	Flooding	2.7	Prevention; Public Education and Awareness	In house staff and time; cost of acquisitions TBD	HMA, FMA, Local	3 – 5 years from funds availability	9
99.0028	Coordinate and provide educational outreach on mitigation strategies the private sector can take to reduce or eliminate the impact of hazards of their services and infrastructure. Opportunities to educate AFCEMA's private sector partners include conferences, AFCEMA website, and presentations	Countywide‡	All hazards	3.1 3.3 3.6	Public Education and Awareness	In house staff and time;	In house staff and time	Ongoing	12

‡ Atlanta, Chattahoochee Hills, College Park, East Point, Fairburn, Hapeville, Johns Creek, Milton, Mountain Park, Palmetto, Roswell, Sandy Springs, Union City, Unincorporated Fulton County

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
99.0029	Support resiliency of the county's private sector through information sharing, partnership building, training and education on mitigation principles and the AFCEMA Hazard Mitigation Plan	Countywide‡	All Hazards	3.1 3.2 3.4	Public Education and Awareness	In house staff and time	In house staff and time	1 – 3 years	11
99.0030	Establish pre-arranged MOUs for facility sharing following disaster, and other equipment sharing. Establish cooperative assistance agreements	Countywide‡	Flooding; Severe Weather; Tornadoes; Tropical Systems	1.6	Emergency Services	In house staff and time	In house staff and time	1 – 3 years	8
99.0031†	Develop and implement plans to prevent flooding of water and waste water facilities	Countywide‡	Flooding	1.5 1.8	Prevention	In house staff and time	In house staff and time	1 – 3 years	8
99.0032	Participation in the National Weather Service's annual Flood Awareness Week	Countywide‡	Flooding	7.4	Public Education and Awareness	In house staff and time	In house staff and time	Annually	11
99.0033	Participation in the National Weather Service's annual Winter Weather Awareness week	Countywide‡	Winter Storms	7.3	Public Education and Awareness	In house staff and time	In house staff and time	Annually	11
99.0034	Continue to participate in the NOAA weather radio program to distribute weather radios to vulnerable populations and high congregate areas	Countywide‡	Tornadoes; Severe Weather; Winter Storms; Flooding	7.8	Emergency Services	TBD	HMA	Ongoing depending upon availability of funds	6

‡ Atlanta, Chattahoochee Hills, College Park, East Point, Fairburn, Hapeville, Johns Creek, Milton, Mountain Park, Palmetto, Roswell, Sandy Springs, Union City, Unincorporated Fulton County

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
99.0035	Sponsor educational programs for seniors to provide instruction for accessing government websites for preparedness information	Countywide‡	All Hazards	7.3	Public Education and Awareness	In house staff and time	In house staff and time	Ongoing	11
99.0036	Continue to make presentations in the school system to educate students regarding natural hazards and preparedness	Countywide‡	All Hazards	7.3	Public Education and Awareness	In house staff and time	In house staff and time	Ongoing	12
99.0037	Highlight and emphasize disaster preparedness and promote Ready.gov on local government cable channels during National Disaster Preparedness Month	Countywide‡	All Hazards	7.3 7.7	Public Education and Awareness	In house staff and time	In house staff and time	1 – 3 years	12
99.0038	Increase jurisdictional participation in annual dissemination of flooding information and awareness to all residents as well as flood plain information to people and businesses in the flood plain	Countywide‡	Flooding	7.2 7.3	Public Education and Awareness	TBD	HMA, FMA, Local	1 – 3 years	13
99.0039	Implement outreach campaign to disseminate maps to the public as the maps are updated over the next 18 months	Countywide‡	Flooding	7.2 7.3	Public Education and Awareness	In house staff and time; costs TBD for supporting materials	HMA, FMA, Local	2 – 4 years from funds availability	11

‡ Atlanta, Chattahoochee Hills, College Park, East Point, Fairburn, Hapeville, Johns Creek, Milton, Mountain Park, Palmetto, Roswell, Sandy Springs, Union City, Unincorporated Fulton County

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
99.0040	Increase participation by jurisdictions in the Storm Ready program to become Storm Ready Partners	Countywide‡	Severe Weather; Tropical Systems; Flooding	7.3	Prevention	In house staff and time	In house staff and time	1 – 3 years	10
99.0041	Continue to build out development of web-based GIS mapping that allows residents to research and view their floodplain status	Countywide‡	Flooding	7.1 7.2	Prevention	In house staff and time; costs for software and network infrastructure TBD	Unk	2 – 4 years from funds availability	7
99.0042†	Increase participation by jurisdictions to develop conservation easement ordinances	Countywide‡	Flooding; Wildfire/Urban Interface	4.1	Prevention	In house staff and time	In house staff and time	2 – 4 years	14
99.0043	Increase participation by jurisdictions to implement water restrictions and promote public education and awareness through rebate/voucher programs for low flow	Countywide‡	Drought	3.1 5.1 5.6	Prevention	In house staff and time	In house staff and time; partnerships with private sector	1 – 3 years	12
99.0044	Continue to implement and enforce dam maintenance ordinances throughout all jurisdictions	Countywide‡	Dam Failure	6.6	Prevention	In house staff and time	In house staff and time	Ongoing	15

‡ Atlanta, Chattahoochee Hills, College Park, East Point, Fairburn, Hapeville, Johns Creek, Milton, Mountain Park, Palmetto, Roswell, Sandy Springs, Union City, Unincorporated Fulton County

Table 6-3: Atlanta-Fulton County Potential Hazard Mitigation Actions

Project Number	Mitigation Action and Description	Jurisdiction	Hazards Addressed	Objective Supported	FEMA Category	Estimated Project Cost	Possible Funding Source(s)	Timeframe For Completion	STAPLEE Score
99.0045	Continue to implement ordinances and/or comprehensive planning policies prohibiting new development in the 100 year floodplain	Countywide‡	Flooding	4.5	Prevention	In house staff and time	In house staff and time	Ongoing	14
99.0046	Enhance and/or expand presentations regarding instructions to residents for weather sirens	Countywide‡	Severe Weather; Tornadoes	1.1 1.8	Prevention	In house staff and time	In house staff and time	1 – 3 years	10

‡ Atlanta, Chattahoochee Hills, College Park, East Point, Fairburn, Hapeville, Johns Creek, Milton, Mountain Park, Palmetto, Roswell, Sandy Springs, Union City, Unincorporated Fulton County

Table 6-5: Status of Previously Identified Mitigation Actions			
Action	**Jurisdiction**	**Status**	**Comments**
Flooding: Dredge Dixie Lake to lessen the impacts of flooding along Dixie Lake	Union City	Deferred	See Project Number 50.0005 in Table 6-3.
Flooding: Increase storm water drainage through addition of new piping in the following areas: Shannon Parkway, Little Drive, Edison Trail, Pinevalley Drive, Kingston Court, Raymond Drive, Oakley Drive, Church Street, Flat Shoals Road, Hilltop Drive, Lakeside Drive, Park Ave, and Jonesboro Road.	Union City	Deferred	See Project Number 50.0001 in Table 6-3
Flooding: Minimize road closures along Oakhaven Drive due to flooding by modifying/acquiring flooding easements as well as studying the feasibility of road elevation.	Roswell	Deferred	See Project Number 99.0001 in Table 6-3
Flooding: Minimize road closures along Azalea Drive due to flooding by applying for a FEMA Letter of Map revision and elevating the road.	Roswell	Deferred	See Project Number 45.0003 in Table 6-3
Improve Stormwater infrastructure near Woodstock Road, Knollwood Terrace and Alpine Drive/Pullman Trail.	Roswell	Completed	
Flooding: Elevate 7 residential partials along Peachtree Creek	Atlanta	Completed	
Flooding: Purchase greenway and stream side properties for conversation purposes to allow space to act as a buffer and filter for Stormwater management.	Atlanta	Completed	The city purchased 160 parcels for $25 million

Table 6-5: Status of Previously Identified Mitigation Actions			
Action	**Jurisdiction**	**Status**	**Comments**
Flooding: Establish on-going system to obtain FIRMs from GEMA and FEMA.	Alpharetta Atlanta Chattahoochee Hills College Park East Point Fairburn Fulton County Hapeville Johns Creek Milton Mountain Park Palmetto Roswell Sandy Springs Union City	Ongoing	FIRMs updated in 2010 (with exception of Chattahoochee Hills which was updated in 2001.
Heat Wave: Assist and empower outreach programs in their efforts to provide for the "at risk" populations	Fulton County	On-going	Included as part of Project Number 99.0035 in Table 6-3; Ongoing programs listed in Table 6-4 of Existing Mitigation Actions,
Flooding: Obtain data for detailed map of flood prone areas in the County	Fulton County	Completed	Jurisdiction participating in the HMP update provided GIS maps which detailed flood prone areas. See Annex D – Maps
Urban Interface: Determine and map the urban/woodland interfaces in Fulton County	Fulton County	Deferred	Included as part of various mapping projects listed in Table 6-3
Severe Weather: Assess all county and municipal facilities for structural protections against lightning strikes; this includes lightning rods and/or proper grounding	Fulton County	Deferred	See Projects 05.0037, 15.0007, 30.0001, 30.0002, 30.0003, 30.0004, 30.0005, 35.0004, 45.0004, and 56.0001 in Table 6-3

Table 6-5: Status of Previously Identified Mitigation Actions			
Action	**Jurisdiction**	**Status**	**Comments**
Severe Weather/Tornadoes: Increase Weather Alert Radio distribution, through a public awareness campaign, especially among those in manufactured homes	Fulton County	Ongoing	See Project 99.0034 in Table 6-3.
Severe Weather/Tornadoes: Research other notification systems for those areas where sirens are not feasible.	Fulton County	Deferred	See Project 99.0023 in Table 6-3
Severe Weather/Tornadoes: Conduct public education campaign regarding safe room and other related construction techniques	Fulton County	Deferred	See Project 99.0019 in Table 6-3
Clean up and make minor modifications to existing detention structures along Fur Creek in the Greenspring Subdivision	College Park	Deferred	See Project 15.0010 in Table 6-3
Modify Fur Creek structure to regulate but not restrict flow	College Park	Deferred	See Project 15.0011 in Table 6-3
Modify and enlarge existing detention pond on Hopewell Road	College Park	Deferred	See Project 15.0012 in Table 6-3
Construct new detention pond to regulate southwest branch of Fur Creek	College Park	Deferred	See Project 15.0013 in Table 6-3
Improve Edison/Sullivan Road drainage through the addition of new storm water piping	College Park	Deferred	See Project 15.0014 in Table 6-3
Improve capacity of Janice Drive storm drain	College Park	Deferred	See Project 15.0010 in Table 6-3

Chapter 7: Plan Maintenance

Chapter Overview

7.1 Federal Requirements for the Mitigation Strategy
7.2 Summary of Plan Updates
7.3 Monitoring, Evaluating, and Updating the Mitigation Plan
7.4 Incorporation of the Mitigation Plan into Other Planning Mechanisms
7.5 Continuing Public Participation in the Plan Maintenance Process

7.1 Federal Requirements for the Mitigation Strategy

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

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

(4) A plan maintenance process that includes:

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

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

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

7.2 Summary of Plan Updates

Table 7-1 summarizes changes made to the 2004 plan as a result of the 2010 plan update, as follows:

Table 7-1: Summary of plan changes

Section		Change
7.3	Monitoring, Evaluation, and Updating the Mitigation Plan	Provides greater process detail for these activities
7.4	Incorporation of the Mitigation Plan into Other Planning Mechanisms	Provides greater process detail for these activities
7.5	Continuing Public Participation in the Plan Maintenance Process	Reaffirms commitment to public participation

7.3 Monitoring, Evaluating, and Updating the Mitigation Plan

7.3.1 Ongoing Monitoring of the Plan

The Hazard Mitigation Planning Committee's (HMPC) ongoing review process throughout the year should continually monitor the current status of the mitigation measures scheduled for implementation. Ongoing status reports of each jurisdiction's progress will be reviewed by the AFCEMA Director and representatives from the HMPC and will include the following information:

- Actions that have been undertaken to implement the scheduled mitigation measure, such as, obtaining funding, permits, approvals or other resources to begin implementation.
- Mitigation measures that have been completed, including public involvement activities.
- Revisions to the priority, timeline, responsibility, or funding source of a measure and cause for such revisions or additional information or analysis that has been developed that would modify the mitigation measure assignment as initially adopted in the plan.
- Measures that a jurisdiction no longer intends to implement and justification for cancellation.
- The ongoing review process may require adjustments to the selection of mitigation measures, priorities, timelines, lead responsibilities, and funding sources scheduled in the Mitigation Action Projects presented in Chapter 6 – Mitigation Strategy. In the event modifications to the plan are warranted as a result of the annual review or other conditions, the HMPC will oversee and approve all amendments to the plan by majority vote of a quorum of HMPC members. Conditions that might warrant amendments to this plan would include, but not be limited to, special opportunities for funding and response to a natural or man-made disaster. A copy of the plan amendments will be submitted by the Atlanta-Fulton County EMA to all jurisdictions in a timely manner and filed with the GEMA.

7.3.2 Evaluating the Plan

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

The HMPC will oversee an annual evaluation of progress towards implementation of the Mitigation Strategy. Any discussions and reports by the HMPC should be documented. When the plan is next revised, the evaluation findings can clearly justify and explain any revisions. In its annual review, the HMPC should discuss the following topics to determine the effectiveness of the implementation actions and the need for revisions to the Mitigation Strategy:

Are there any new potential hazards that have developed and were not addressed in the plan?

- Have any disasters occurred and are not included in plan?
- Are there additional mitigation ideas that need to be incorporated into the plan?
- What projects or other measures have been initiated, completed, deferred or deleted?
- Are there any changes in local capabilities to carry out mitigation measures?

- Have funding levels to support mitigation actions either increased or decreased?

The HMPC may create subcommittees to oversee and evaluate plan implementation. This will be done at the Committee's discretion.

7.3.3 Plan Update Process

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

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

As stated above in Section 7.3.2, the HMPC will convene within 60 days of a significant disaster to discuss the potential need for any amendments to the plan. If there are no significant disasters which trigger an update, the current Federal guidelines require a five-year update.

The Atlanta-Fulton County EMA will release or publish a notice to the public that an update is being initiated and provide information on meeting schedules, how and where to get information on the plan, how to provide comments on the plan, and opportunities for other public involvement activities. The AFCEMA will then convene the HMPC and with the assistance of EMA staff or a consultant, as deemed necessary, carry out the steps necessary to update the plan.

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

Step 1. Review of the most recent FEMA local mitigation planning requirements and guidance.
Step 2. Evaluation of the existing planning process and recommendations for improvements.
Step 3. Examination and revision of the risk assessment, including hazard identification, profiles, vulnerabilities, and impacts on development trends, to ensure accuracy and up to date information.
Step 4. Update of mitigation strategies, goals and action items, in large part based on the annual plan implementation evaluation input.
Step 5. Evaluation of existing plan maintenance procedures and recommendations for improvements.
Step 6. Comply with all applicable Federal regulations and directives.

Six months prior to the plan's expiration, a final draft of the revised plan will be submitted to the GEMA for review and comments and then to FEMA for conditional approval. Once FEMA Region IV has issued a conditional approval, the updated plan will be adopted by all participating jurisdictions.

7.4 Incorporation of the Mitigation Plan into Other Planning Mechanisms

This plan supplements the most recent edition of the Atlanta-Fulton County Emergency Operations Plan, which is administered through the Atlanta-Fulton County Emergency Management Agency. Further, each governmental entity will be responsible for implementation of their individual Jurisdiction Mitigation Action Programs based on priorities, funding availability, capabilities, and other considerations described in Chapter 6 – Mitigation Strategy. Because the 2010 Atlanta-Fulton County Hazard Mitigation Plan is a multi-jurisdictional plan, the mechanism for implementation of the various mitigation measures through existing programs may vary by jurisdiction. Each jurisdiction's unique needs and capacities for implementation are reflected in its respective mitigation action program.

The Hazard Mitigation Planning Committee recognizes the importance of fully integrating hazard mitigation planning and implementation into existing local plans, regulatory tools, and related programs. This plan is intended to influence each jurisdiction's planning decisions concerning land use, development, public facilities, and infrastructure. Any updates, revisions, or amendments to the Atlanta-Fulton County Emergency Operations Plan, local comprehensive plans, capital improvement budgets or plans, zoning ordinances and maps, subdivision regulations, building and technical codes, and related development controls will be consistent with the goals, objectives, and mitigation measures adopted in this plan. Each jurisdiction's commitment to this consistency is reflected in its respective mitigation action program. As part of the subsequent five-year update process, all local planning mechanisms will again be reviewed for effectiveness, and recommendations for new integration opportunities will be carefully considered. This type of evaluation was performed in the 2010 update and will follow in the next update cycle.

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

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

7.5 Continuing Public Participation in the Plan Maintenance Process

A critical part of maintaining an effective and relevant multi-hazard mitigation plan is ongoing public review and comment. Consequently, the Hazard Mitigation Planning Committee is dedicated to direct involvement of its citizens in providing feedback and comments on the plan throughout the five-year implementation cycle and interim reviews.

To this end, copies of this 2010 Atlanta-Fulton County Multi-Hazard Mitigation Plan will be maintained in the offices of the Atlanta-Fulton County EMA and the principal offices of

all of the jurisdictions that participated in the planning process. After adoption, a public information notice will inform the public that the plan may be viewed at these offices. Public comments can be mailed, e-mailed, or phoned in to the Atlanta-Fulton County EMA.

Public meetings will be held when significant modifications to the plan are required or when otherwise deemed necessary by the Hazard Mitigation Planning Committee. The public will be able to express their concerns, ideas, and opinions at the meetings. At a minimum, public hearings will be held during the annual and five-year plan updates and to present the final plan and amendments to the plan to the public before adoption. Public opinion surveys are conducted during the community meeting and public involvement activities required for the five-year update and may be periodically administered by the Atlanta-Fulton County EMA.

Public involvement activities initiated by the 2010 planning process are documented in this plan. These activities will continue throughout the five-year implementation cycle and be evaluated for effectiveness at least annually by the Hazard Mitigation Planning Committee. Moreover, the public outreach goal of this plan and the associated objectives and mitigation measures commit each locality to implement a range of public education and awareness opportunities. The constant monitoring of these programmed mitigation actions assures ongoing public participation throughout the plan maintenance process.

Appendix A

Property Values by Land Use Type

All Jurisdictions
Property Values by Land Use

Land Use Type		Value
Agricultural	$	11,235,120
Commercial	$	40,185,819,452
Home for Aged	$	744,106,600
Public Property	$	7,768,711,000
Churches	$	1,508,855,400
Charities	$	1,018,682,400
Cemetary	$	151,700,100
Hospitals	$	1,071,365,900
Schools	$	2,239,917,600
Historic	$	165,309,900
Industrial	$	4,009,631,989
Residential	$	63,566,063,008
Utility	$	166,444,500
Conservation	$	221,553,672
Environmental	$	101,800
	$	-
Residential	$	63,566,063,008
Non-Residential	$	59,188,498,113
Total	**$**	**122,754,561,121**

Chattahoochee Hill
Property Values

Land Use Type		Value
Agricultural	$	11,235,120.0
Commercial	$	8,055,500.0
Home for Aged	$	-
Public Property	$	12,760,400.0
Churches	$	4,532,400.0
Charities	$	842,400.0
Cemetary	$	190,300.0
Hospitals	$	335,200.0
Schools	$	669,800.0
Historic	$	-
Industrial	$	121,400.0
Residential	$	355,013,340.0
Utility	$	-
Conservation	$	93,908,500.0
Environmental	$	-
Residential	$	355,013,340.0
Non-Residential	$	121,415,900.0
Total	**$**	**476,429,240.0**

College Park
Property Values

Land Use Type		Value
Agricultural	$	-
Commercial	$	655,058,736.0
Home for Aged	$	16,083,200.0
Public Property	$	389,486,300.0
Churches	$	14,953,800.0
Charities	$	6,203,700.0
Cemetary	$	2,334,000.0
Hospitals	$	-
Schools	$	121,561,600.0
Historic	$	-
Industrial	$	118,555,816.0
Residential	$	334,003,920.0
Utility	$	1,040,000.0
Conservation	$	-
Environnmental	$	-
Residential	$	334,003,920.0
Non-Residential	$	1,325,277,152.0
Total	**$**	**1,659,281,072.0**

East Point City
Property Values

Land Use Type		Value
Agricultural	$	-
Commercial	$	854,921,620.0
Home for Aged	$	9,840,900.0
Public Property	$	77,167,300.0
Churches	$	32,611,500.0
Charities	$	5,622,800.0
Cemetary	$	1,742,400.0
Hospitals	$	48,346,400.0
Schools	$	-
Historic	$	131,900.0
Industrial	$	257,469,184.0
Residential	$	1,341,678,140.0
Utility	$	213,600.0
Conservation	$	838,100.0
Environmental	$	
Residential	$	1,341,678,140.0
Non-Residential	$	1,288,905,704.0
Total	**$**	**2,630,583,844.0**

Fairburn
Property Values

Land Use Type		Value
Agricultural	$	-
Commercial	$	249,952,161.0
Home for Aged	$	1,066,200.0
Public Property	$	24,513,200.0
Churches	$	9,799,400.0
Charities	$	864,100.0
Cemetary	$	4,895,800.0
Hospitals	$	290,400.0
Schools	$	30,917,000.0
Historic	$	-
Industrial	$	68,238,200.0
Residential	$	626,321,699.0
Utility	$	897,300.0
Conservation	$	3,102,600.0
Environmental	$	-
Residential	$	626,321,699.0
Non-Residential	$	394,536,361.0
Total	**$**	**1,020,858,060.0**

Milton
Property Values

Land Use Type		Value
Agricultural	$	-
Commercial	$	808,473,572.0
Home for Aged	$	-
Public Property	$	104,606,200.0
Churches	$	40,904,000.0
Charities	$	3,678,200.0
Cemetary	$	635,500.0
Hospitals	$	534,200.0
Schools	$	59,582,500.0
Historic	$	-
Industrial	$	7,150,800.0
Residential	$	4,410,128,607.0
Utility	$	280,000.0
Conservation	$	81,129,100.0
Environmental	$	
Residential	$	4,410,128,607.0
Non-Residential	$	1,043,271,872.0
Total	**$**	**5,453,400,479.0**

Palmetto
Property Values

Land Use Type		Value
Agricultural	$	-
Commercial	$	58,476,510.0
Home for Aged	$	230,500.0
Public Property	$	23,827,100.0
Churches	$	6,213,200.0
Charities	$	33,298,300.0
Cemetary	$	437,700.0
Hospitals	$	-
Schools	$	2,410,800.0
Historic	$	-
Industrial	$	48,871,000.0
Residential	$	168,338,646.0
Utility	$	-
Conservation	$	4,456,600.0
Environmental	$	
Residential	$	168,338,646.0
Non-Residential	$	178,221,710.0
Total	**$**	**346,560,356.0**

Union City
Property Values

Land Use Type		Value
Agricultural	$	-
Commercial	$	547,072,615.0
Home for Aged	$	43,321,300.0
Public Property	$	20,126,600.0
Churches	$	28,460,600.0
Charities	$	13,129,300.0
Cemetary	$	743,800.0
Hospitals	$	94,300.0
Schools	$	6,578,000.0
Historic	$	-
Industrial	$	31,256,100.0
Residential	$	660,106,590.0
Utility	$	658,400.0
Conservation	$	2,628,750.0
Environmental	$	
Residential	$	660,106,590.0
Non-Residential	$	694,069,765.0
Total	**$**	**1,354,176,355.0**

Atlanta
Property Values by Land Use

Land Use Type		Value
Agricultural	$	-
Commercial	$	25,463,560,031
Home for Aged	$	622,315,900
Public Property	$	6,079,825,600
Churches	$	1,002,712,300
Charities	$	892,835,700
Cemetary	$	75,358,400
Hospitals	$	841,144,100
Schools	$	1,454,279,900
Historic	$	163,346,400
Industrial	$	1,711,354,833
Residential	$	31,656,624,557
Utility	$	152,742,700
Conservation	$	6,294,100
Environmental	$	101,800
Residential	$	31,656,624,557
Non-Residential	$	38,465,871,764
Total	**$**	**70,122,496,321**

Hapeville
Property Values by Land Use

Land Use Type		Value
Agricultural	$	-
Commercial	$	396,885,200
Home for Aged	$	-
Public Property	$	102,896,700
Churches	$	5,658,000
Charities	$	414,800
Cemetary	$	35,800
Hospitals	$	-
Schools	$	6,442,900
Historic	$	-
Industrial	$	30,066,500
Residential	$	256,305,158
Utility	$	60,500
Conservation	$	-
Environmental	$	-
Residential	$	256,305,158
Non-Residential	$	542,460,400
Total	**$**	**798,765,558**

Roswell
Property Values by Land Use

Land Use Type		Value
Agricultural	$	-
Commercial	$	2,919,311,646
Home for Aged	$	45,408,800
Public Property	$	209,151,000
Churches	$	140,183,700
Charities	$	20,970,400
Cemetary	$	31,556,000
Hospitals	$	1,576,100
Schools	$	185,247,000
Historic	$	1,831,600
Industrial	$	203,491,546
Residential	$	8,018,867,289
Utility	$	-
Conservation	$	5,805,722
Environmental	$	-
Residential	$	8,018,867,289
Non-Residential	$	3,764,533,514
Total	**$**	**11,783,400,803**

Sandy Springs
Property Values by Land Use

Land Use Type		Value
Agricultural	$	-
Commercial	$	6,664,657,074
Home for Aged	$	5,839,800
Public Property	$	288,860,600
Churches	$	121,982,500
Charities	$	28,902,400
Cemetary	$	29,279,500
Hospitals	$	178,723,800
Schools	$	195,818,100
Historic	$	-
Industrial	$	33,420,400
Residential	$	10,245,416,584
Utility	$	10,111,400
Conservation	$	1,499,000
Environmental	$	-
Residential	$	10,245,416,584
Non-Residential	$	7,559,094,574
Total	**$**	**17,804,511,158**

Unincorporated Fulton County
Property Values by Land Use

Land Use Type		Value
Agricultural	$	-
Commercial	$	1,559,394,787
Home for Aged	$	-
Public Property	$	433,188,200
Churches	$	100,714,900
Charities	$	11,908,200
Cemetary	$	4,490,900
Hospitals	$	321,400
Schools	$	176,305,500
Historic	$	-
Industrial	$	1,499,636,210
Residential	$	5,438,869,598
Utility	$	440,600
Conservation	$	21,891,200
Environmental		
	$	-
Residential	$	5,438,869,598
Non-Residential	$	3,808,291,897
Total	**$**	**9,247,161,495**

Mountain Park
Property Values by Land Use

Land Use Type		Value
Agricultural	$	-
Commercial	$	-
Home for Aged	$	-
Public Property	$	2,301,800
Churches	$	129,100
Charities	$	12,100
Cemetary	$	-
Hospitals	$	-
Schools	$	104,500
Historic	$	-
Industrial	$	-
Residential	$	54,388,880
Utility	$	-
Conservation	$	-
Environmental	$	-
	$	-
Residential	$	54,388,880
Non-Residential	$	2,547,500
Total	**$**	**56,936,380**

Appendix B

Event Data

Appendix B: Hazard Profile Data

This appendix contains the detailed records of previous occurrences of hazard events reported in Section 5 for events reported by the National Weather Service and National Climatic Data Center.

Tornadoes								
Location	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
Fulton	12/5/54	5:30 PM	Tornado	F2	1	40	$25K	0
Fulton	5/20/65	2:15 PM	Tornado	F0	0	3	$3K	0
Fulton	5/18/66	5:00 PM	Tornado	F0	0	0	$3K	0
Fulton	1/10/72	10:25 AM	Tornado	F3	1	9	$250K	0
Fulton	5/27/73	11:30 PM	Tornado	F3	0	0	$250K	0
Fulton	3/13/75	5:00 PM	Tornado	F1	0	0	$250K	0
Fulton	3/13/75	7:30 PM	Tornado	F1	0	1	$250K	0
Fulton	3/24/75	5:28 AM	Tornado	F3	3	152	$250M	0
Fulton	5/14/76	5:00 PM	Tornado	F1	0	0	$25K	0
Fulton	3/17/82	12:05 PM	Tornado	F0	0	0	$25K	0
Fulton	12/3/83	9:00 PM	Tornado	F2	0	0	$2.5M	0
Fulton	5/3/84	1:30 PM	Tornado	F1	0	0	$250K	0
Fulton	4/5/85	7:10 PM	Tornado	F1	0	0	$2.5M	0
Fulton	11/15/89	6:31 PM	Tornado	F2	0	0	$2.5M	0
Fulton	11/15/89	6:49 PM	Tornado	F2	0	7	$2.5M	0
Fulton	2/10/90	5:10 AM	Tornado	F1	0	0	$2.5M	0
Fulton	5/28/90	12:50 PM	Tornado	F0	0	0	$0K	0
Atlanta	9/16/96	8:53 PM	Tornado	F1	0	0	$500K	0
Sandy Springs	4/8/98	11:30 PM	Tornado	F1	0	4	$10M	0
Palmetto	1/2/06	4:45 PM	Tornado	F2	0	0	$250K	0
Mountain Park	4/8/06	3:02 AM	Tornado	F1	0	0	$1.5M	0
Atlanta	3/14/08	8:38 PM	Tornado	F2	1	30	$25M	0

Winter Weather								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
Fulton	2/3/96	1:00 PM	Extreme Cold	N/A	0	0	0	0
Fulton	12/18/96	6:00 PM	Heavy Snow	N/A	0	0	0	0
Fulton	2/4/98	1:00 AM	Snow	N/A	0	0	0	0
Fulton	3/12/98	6:55 AM	Cold	N/A	0	0	0	0
Fulton	2/23/99	11:00 AM	Snow	N/A	0	0	0	0
Fulton	1/22/00	1:00 PM	Ice Storm	N/A	0	1	$48M	0
Fulton	1/28/00	7:00 PM	Ice Storm	N/A	0	0	$2M	0
Fulton	12/17/00	7:30 AM	Winter Storm	N/A	0	0	0	0
Fulton	12/19/00	12:00 AM	Winter Storm	N/A	0	0	0	0
Fulton	1/1/01	7:58 AM	Light Snow	N/A	0	0	0	0
Fulton	1/2/02	6:00 AM	Heavy Snow	N/A	0	0	0	0
Fulton	2/26/02	6:00 PM	Extreme Cold	N/A	0	0	0	0
Fulton	1/23/03	8:00 AM	Extreme Cold	N/A	0	0	0	0
Fulton	1/25/04	5:00 AM	Ice Storm	N/A	0	1	$925K	0
Fulton	2/26/04	12:00 AM	Winter Storm	N/A	0	0	0	0
Fulton	1/28/05	8:00 PM	Winter Storm	N/A	0	0	$9.8M	0
Fulton	4/2/05	10:00 AM	Winter Weather	N/A	0	0	0	0
Fulton	12/16/05	5:00 AM	Freezing Fog	N/A	0	0	0	0
Fulton	2/13/06	12:00 AM	Winter Weather	N/A	0	0	0	0
Fulton	2/1/07	4:00 AM	Heavy Snow	N/A	0	0	0K	0K
Fulton	2/1/07	4:00 AM	Winter Storm	N/A	0	0	0K	0K
Fulton	2/1/07	4:00 AM	Winter Weather	N/A	0	0	0K	0K
Fulton	4/7/07	4:00 AM	Frost/freeze	N/A	0	0	0K	$155M
Fulton	1/16/08	20:00 PM	Heavy Snow	N/A	0	0	0K	0K
Fulton	1/16/08	20:00 PM	Winter Weather	N/A	0	0	0K	0K
Fulton	1/19/08	12:00 PM	Heavy Snow	N/A	0	0	0K	0K
Fulton	1/19/08	12:00 PM	Winter Weather	N/A	0	0	0K	0K
Fulton	3/1/09	11:00 AM	Heavy Snow	N/A	0	0	$3K	0K
Fulton	3/1/09	11:00 AM	Winter Weather	N/A	0	0	0K	0K
Fulton	3/1/09	12:00 PM	Heavy Snow	N/A	0	0	$25K	0K
Fulton	3/1/09	12:00 PM	Winter Weather	N/A	0	0	0K	0K
Fulton	1/7/10	15:00 PM	Winter Weather	N/A	0	0	0K	0K
Fulton	2/12/10	13:30 PM	Heavy Snow	N/A	0	0	0K	0K
Fulton	2/12/10	14:00 PM	Heavy Snow	N/A	0	0	0K	0K
Fulton	2/12/10	14:00 PM	Winter Weather	N/A	0	0	0K	0K
Fulton	3/2/10	5:00 AM	Heavy Snow	N/A	0	0	0K	0K
Fulton	3/2/10	5:00 AM	Winter Weather	N/A	0	0	0K	0K
Fulton	12/15/10	17:00 PM	Winter Weather	N/A	0	0	0K	0K
Fulton	12/25/10	14:00 PM	Heavy Snow	N/A	0	0	0K	0K
Fulton	12/25/10	14:00 PM	Winter Weather	N/A	0	0	0K	0K
Fulton	01/09/11	17:00 PM	Heavy Snow	N/A	0	0	0K	0K
Fulton	01/09/11	17:00 PM	Winter Storm	N/A	0	0	0K	0K
Fulton	01/09/11	19:00 PM	Winter Weather	N/A	0	0	0K	0K
Fulton	02/09/11	20:00 PM	Winter Weather	N/A	0	0	0K	0K
Fulton	02/09/11	21:00 PM	Winter Weather	N/A	0	0	0K	0K

Flooding								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
Fulton	7/5/94	6:30 AM	Flood	N/A	0	0	$5K	$5K
Fulton	10/4/95	10:00 AM	Flash Flood	N/A	0	0	0	0
Fulton	2/27/97	10:00 PM	Flood	N/A	0	0	0	0
Atlanta	7/23/97	7:30 AM	Flash Flood	N/A	0	0	$2K	0
Atlanta	11/21/97	8:35 PM	Flash Flood	N/A	0	0	$45K	0
Fulton	2/4/98	5:00 AM	Flood	N/A	0	0	$2K	0
Fulton	3/8/98	5:00 AM	Flash Flood	N/A	0	0	$10K	0
East Point	9/1/98	5:00 PM	Flash Flood	N/A	0	0	$10K	0
Atlanta	7/6/99	4:30 PM	Flash Flood	N/A	0	0	0	0
Atlanta	8/24/00	6:00 PM	Urban/sml Stream Fld	N/A	0	0	0	0
Atlanta	9/21/00	8:05 AM	Urban/sml Stream Fld	N/A	0	0	0	0
Fulton	3/1/01	12:00 AM	Extremely Wet	N/A	0	0	0	0
Atlanta	6/3/01	4:30 PM	Urban/sml Stream Fld	N/A	0	0	0	0
Alpharetta	7/3/01	2:45 PM	Urban/sml Stream Fld	N/A	0	0	0	0
Atlanta	3/30/02	9:00 PM	Urban/sml Stream Fld	N/A	0	0	0	0
Atlanta	5/3/02	7:14 AM	Urban/sml Stream Fld	N/A	0	0	0	0
Atlanta	5/4/02	9:30 AM	Flash Flood	N/A	0	0	0	0
Atlanta	9/21/02	7:30 PM	Urban/sml Stream Fld	N/A	0	0	0	0
Atlanta	9/21/02	8:30 PM	Flash Flood	N/A	0	0	$1.5M	0
Fulton	10/6/02	11:00 AM	Abnormally Wet	N/A	0	0	0	0
Atlanta	12/24/02	8:30 AM	Flash Flood	N/A	0	0	0	0
Atlanta	5/6/03	1:45 AM	Flash Flood	N/A	0	0	$250K	0
East Point	5/6/03	2:35 PM	Flash Flood	N/A	0	0	$375K	0
North Fulton	5/6/03	2:40 PM	Flash Flood	N/A	0	0	$5K	0
Atlanta	5/6/03	4:19 PM	Flash Flood	N/A	0	0	$5K	0
East Point	5/7/03	8:00 PM	Flash Flood	N/A	0	0	$5K	0
Atlanta	5/16/03	2:05 AM	Flash Flood	N/A	0	0	$300K	0
Atlanta	5/18/03	2:45 AM	Flash Flood	N/A	0	0	0	0
Atlanta	6/13/03	2:50 PM	Flash Flood	N/A	0	0	$5K	0
Sandy Springs	6/16/03	11:30 PM	Flash Flood	N/A	0	0	$500K	0
Sandy Springs	6/28/03	5:57 PM	Heavy Rain	N/A	0	0	0	0
Atlanta	6/30/03	2:50 PM	Flash Flood	N/A	0	0	$5K	0
Atlanta	7/1/03	3:35 PM	Flash Flood	N/A	0	0	$5K	0
Atlanta	7/1/03	5:18 PM	Flash Flood	N/A	0	0	$5K	0
Atlanta	7/10/03	4:30 PM	Flash Flood	N/A	0	0	0	0

Flooding								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
Palmetto	7/10/03	6:12 PM	Heavy Rain	N/A	0	0	0	0
Alpharetta	5/12/04	7:20 PM	Heavy Rain	N/A	0	0	0	0
Atlanta	7/25/04	11:31 PM	Flash Flood	N/A	0	0	0	0
Sandy Springs	8/5/04	3:45 PM	Heavy Rain	N/A	0	0	$50K	0
Fulton	9/16/04	1:20 AM	Flood	N/A	0	0	$5.5M	0
Fulton	9/16/04	4:45 PM	Flash Flood	N/A	0	0	$20M	0
North Fulton	9/27/04	7:00 PM	Flash Flood	N/A	0	0	$2M	0
Fulton	11/24/04	10:00 AM	Flood	N/A	0	0	0	0
Atlanta	3/31/05	10:45 AM	Flash Flood	N/A	0	0	0	0
Fulton	7/6/05	7:00 PM	Flood	N/A	0	0	$25K	0
Atlanta	7/6/05	8:23 PM	Flash Flood	N/A	0	0	$5K	0
Union City	7/10/05	7:05 PM	Flash Flood	N/A	0	0	$1K	0
Fulton	7/10/05	11:00 PM	Flood	N/A	0	0	$665K	0
Central Fulton	7/11/05	1:45 AM	Flash Flood	N/A	0	0	$10K	0
Newtown	1/2/06	8:35 AM	Flash Flood	N/A	0	0	0	0
Newtown	1/23/06	1:08 PM	Flash Flood	N/A	0	0	0	0
Alpharetta	3/21/06	12:09 AM	Flash Flood	N/A	0	0	0	0
Campbellton	7/31/08	20:45 PM	Flood	N/A	0	0	0	0
Rico	7/31/08	21:24 PM	Flash Flood	N/A	0	0	$1K	0
Hapeville	6/4/09	18:45 PM	Flood	N/A	0	0	$20K	0
Atlanta	7/12/09	19:45 PM	Flash Flood	N/A	0	0	$30K	0
Atlanta	8/28/09	8:30 AM	Flash Flood	N/A	0	0	$1K	0
Ocee	8/28/09	10:15 AM	Flash Flood	N/A	0	0	$1K	0
Atlanta	1/24/10	18:26 PM	Flash Flood	N/A	0	0	$3K	0

Drought								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
Fulton	9/1/97	12:00 AM	Drought	N/A	0	0	0	$20M
Fulton	5/1/99	12:00 AM	Drought	N/A	0	0	0	0
Fulton	8/1/99	12:00 AM	Drought	N/A	0	0	0	0
Fulton	2/1/00	12:00 AM	Drought	N/A	0	0	0	0
Fulton	4/1/00	12:00 AM	Drought	N/A	0	0	0	0
Fulton	5/1/00	12:00 AM	Drought	N/A	0	0	0	0
Fulton	6/1/00	12:00 AM	Drought	N/A	0	0	0	$306.7M
Fulton	7/1/00	12:00 AM	Drought	N/A	0	0	0	0
Fulton	10/1/00	12:00 AM	Drought	N/A	0	0	0	0
Fulton	10/1/01	12:00 AM	Very Dry	N/A	0	0	0	0
Fulton	11/1/01	12:00 AM	Drought	N/A	0	0	0	0
Fulton	12/1/01	12:00 AM	Very Dry	N/A	0	0	0	0
Fulton	8/1/02	12:00 AM	Drought	N/A	0	0	0	0
Fulton	1/1/03	12:00 AM	Abnormally Dry	N/A	0	0	0	0
Fulton	3/1/04	12:00 AM	Drought	N/A	0	0	0	0
Fulton	5/1/07	12:00 AM	Drought	N/A	0	0	0	0
Fulton	9/1/07	12:00 AM	Drought	N/A	0	0	0	$344M
Fulton	10/1/07	12:00 AM	Drought	N/A	0	0	0	0
Fulton	11/1/07	12:00 AM	Drought	N/A	0	0	0	0
Fulton	12/1/07	12:00 AM	Drought	N/A	0	0	0	0

Excessive Heat								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
College Park	6/9/95	11:00 AM	Heat	N/A	2	0	0	0
Fulton	7/20/99	8:00 AM	Excessive Heat	N/A	2	0	0	0
Fulton	8/1/99	12:00 AM	Excessive Heat	N/A	0	0	0	0
Fulton	9/3/02	12:00 PM	Very Warm	N/A	0	0	0	0
Fulton	8/1/07	12:00 AM	Excessive Heat	N/A	0	0	0	0

Severe Weather								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
FULTON	3/12/55	1930	Hail	1.50 in.	0	0	0	0
FULTON	4/6/56	1100	Tstm Wind	0 kts.	0	0	0	0
FULTON	4/15/56	1814	Tstm Wind	77 kts.	0	0	0	0
FULTON	8/12/57	1500	Tstm Wind	0 kts.	0	0	0	0
FULTON	11/18/57	1815	Tstm Wind	0 kts.	0	0	0	0
FULTON	1/21/59	1600	Tstm Wind	60 kts.	0	0	0	0
FULTON	3/16/60	300	Hail	0.00 in.	0	0	0	0
FULTON	8/13/62	1500	Tstm Wind	0 kts.	0	0	0	0
FULTON	8/13/62	1527	Tstm Wind	55 kts.	0	0	0	0
FULTON	7/23/63	1645	Hail	1.75 in.	0	0	0	0
FULTON	4/23/64	1900	Tstm Wind	50 kts.	0	0	0	0
FULTON	8/4/64	1900	Tstm Wind	55 kts.	0	0	0	0
FULTON	4/12/65	600	Tstm Wind	0 kts.	0	0	0	0
FULTON	4/12/65	605	Tstm Wind	50 kts.	0	0	0	0
FULTON	6/30/66	1520	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/14/66	1715	Tstm Wind	60 kts.	0	0	0	0
FULTON	7/15/66	1830	Tstm Wind	50 kts.	0	0	0	0
FULTON	3/10/68	900	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/14/68	1200	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/18/68	1800	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/29/68	1700	Tstm Wind	0 kts.	0	0	0	0
FULTON	6/21/70	1920	Hail	1.00 in.	0	0	0	0
FULTON	8/22/70	1613	Tstm Wind	50 kts.	0	0	0	0
FULTON	5/12/71	1517	Tstm Wind	58 kts.	0	0	0	0
FULTON	8/9/71	1545	Hail	0.75 in.	0	0	0	0
FULTON	4/7/72	2130	Hail	0.75 in.	0	0	0	0
FULTON	8/20/72	1525	Tstm Wind	53 kts.	0	0	0	0
FULTON	3/4/73	1615	Tstm Wind	50 kts.	0	0	0	0
FULTON	5/11/73	1658	Tstm Wind	0 kts.	0	0	0	0
FULTON	8/20/73	1600	Tstm Wind	0 kts.	0	0	0	0
FULTON	3/21/74	343	Tstm Wind	61 kts.	0	0	0	0
FULTON	3/30/74	29	Tstm Wind	53 kts.	0	0	0	0
FULTON	5/3/74	1545	Tstm Wind	51 kts.	0	0	0	0
FULTON	12/15/74	1000	Tstm Wind	65 kts.	0	0	0	0
FULTON	1/10/75	1840	Tstm Wind	52 kts.	0	0	0	0
FULTON	3/13/75	1855	Tstm Wind	55 kts.	0	0	0	0
FULTON	8/26/75	1237	Tstm Wind	50 kts.	0	0	0	0
FULTON	2/18/76	1315	Tstm Wind	0 kts.	0	0	0	0
FULTON	2/18/76	1315	Tstm Wind	62 kts.	0	0	0	0
FULTON	7/16/76	1530	Tstm Wind	0 kts.	0	0	0	0
FULTON	12/5/77	1300	Hail	1.00 in.	0	0	0	0
FULTON	4/18/78	2330	Hail	1.75 in.	0	0	0	0
FULTON	4/18/78	2330	Hail	3.25 in.	0	0	0	0
FULTON	7/23/78	1330	Tstm Wind	0 kts.	0	0	0	0
FULTON	4/13/79	930	Tstm Wind	0 kts.	0	0	0	0
FULTON	5/5/80	1630	Hail	0.75 in.	0	0	0	0

Severe Weather								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
FULTON	6/29/80	1230	Tstm Wind	50 kts.	0	0	0	0
FULTON	8/20/80	1830	Tstm Wind	0 kts.	0	0	0	0
FULTON	9/3/80	1958	Tstm Wind	56 kts.	0	0	0	0
FULTON	4/20/81	1045	Tstm Wind	0 kts.	0	0	0	0
FULTON	5/18/81	2114	Tstm Wind	60 kts.	0	0	0	0
FULTON	6/7/81	1550	Tstm Wind	0 kts.	0	0	0	0
FULTON	6/7/81	1555	Hail	1.75 in.	0	0	0	0
FULTON	6/10/81	1900	Tstm Wind	0 kts.	0	0	0	0
FULTON	6/11/81	1240	Tstm Wind	0 kts.	0	0	0	0
FULTON	6/25/81	1825	Hail	1.75 in.	0	0	0	0
FULTON	6/30/82	1652	Tstm Wind	59 kts.	0	0	0	0
FULTON	7/4/82	2200	Tstm Wind	0 kts.	0	0	0	0
FULTON	3/7/83	1800	Hail	0.75 in.	0	0	0	0
FULTON	4/5/83	2040	Tstm Wind	53 kts.	0	0	0	0
FULTON	8/6/83	1440	Tstm Wind	50 kts.	0	0	0	0
FULTON	2/24/84	1800	Tstm Wind	0 kts.	0	0	0	0
FULTON	2/24/84	1810	Hail	1.75 in.	0	0	0	0
FULTON	2/24/84	1815	Tstm Wind	0 kts.	0	0	0	0
FULTON	3/28/84	1352	Hail	1.00 in.	0	0	0	0
FULTON	3/28/84	1430	Tstm Wind	0 kts.	0	0	0	0
FULTON	5/3/84	1315	Tstm Wind	0 kts.	0	1	0	0
FULTON	5/3/84	1330	Tstm Wind	63 kts.	1	5	0	0
FULTON	5/14/84	1256	Tstm Wind	50 kts.	0	0	0	0
FULTON	7/22/84	1527	Hail	1.75 in.	0	0	0	0
FULTON	7/22/84	1527	Hail	1.75 in.	0	0	0	0
FULTON	7/27/84	1222	Tstm Wind	67 kts.	0	0	0	0
FULTON	11/10/84	1715	Tstm Wind	0 kts.	0	0	0	0
FULTON	11/10/84	1730	Tstm Wind	0 kts.	0	0	0	0
FULTON	3/13/85	1400	Hail	1.75 in.	0	0	0	0
FULTON	4/5/85	1855	Tstm Wind	70 kts.	0	0	0	0
FULTON	4/5/85	1915	Tstm Wind	0 kts.	0	0	0	0
FULTON	4/5/85	1915	Tstm Wind	53 kts.	0	0	0	0
FULTON	6/7/85	1450	Hail	0.75 in.	0	0	0	0
FULTON	6/7/85	1615	Hail	0.75 in.	0	0	0	0
FULTON	6/7/85	1615	Tstm Wind	0 kts.	0	0	0	0
FULTON	6/7/85	1645	Tstm Wind	50 kts.	0	0	0	0
FULTON	8/24/85	1400	Hail	1.75 in.	0	0	0	0
FULTON	8/24/85	1400	Tstm Wind	0 kts.	0	0	0	0
FULTON	5/25/86	1540	Tstm Wind	0 kts.	0	0	0	0
FULTON	6/27/86	1545	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/23/86	1700	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/25/86	1945	Tstm Wind	0 kts.	0	0	0	0
FULTON	8/1/86	30	Tstm Wind	0 kts.	0	0	0	0
FULTON	8/16/86	1730	Tstm Wind	0 kts.	0	0	0	0
FULTON	11/20/86	810	Tstm Wind	0 kts.	0	1	0	0
FULTON	7/6/87	1620	Hail	1.75 in.	0	0	0	0
FULTON	7/6/87	1640	Tstm Wind	0 kts.	0	0	0	0

Severe Weather								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
FULTON	7/24/87	1640	Tstm Wind	52 kts.	0	0	0	0
FULTON	7/25/87	1530	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/26/87	1430	Tstm Wind	0 kts.	0	0	0	0
FULTON	8/23/87	1525	Tstm Wind	0 kts.	0	0	0	0
FULTON	1/19/88	2245	Tstm Wind	0 kts.	0	0	0	0
FULTON	4/25/88	1320	Hail	0.75 in.	0	0	0	0
FULTON	4/25/88	1535	Hail	1.25 in.	0	0	0	0
FULTON	6/25/88	1900	Tstm Wind	0 kts.	0	0	0	0
FULTON	8/1/88	1754	Tstm Wind	52 kts.	0	0	0	0
FULTON	8/2/88	1905	Tstm Wind	52 kts.	0	0	0	0
FULTON	4/3/89	640	Hail	1.00 in.	0	0	0	0
FULTON	4/4/89	1254	Tstm Wind	52 kts.	0	0	0	0
FULTON	4/4/89	1350	Tstm Wind	0 kts.	0	0	0	0
FULTON	5/5/89	1345	Tstm Wind	0 kts.	0	0	0	0
FULTON	6/14/89	1624	Tstm Wind	52 kts.	0	0	0	0
FULTON	6/28/89	1330	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/3/89	640	Hail	1.00 in.	0	0	0	0
FULTON	7/16/89	1330	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/19/89	1650	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/25/89	1710	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/26/89	1535	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/26/89	1535	Tstm Wind	0 kts.	0	0	0	0
FULTON	11/15/89	1815	Tstm Wind	0 kts.	0	0	0	0
FULTON	11/15/89	1835	Tstm Wind	65 kts.	0	0	0	0
FULTON	11/15/89	2030	Tstm Wind	0 kts.	0	0	0	0
FULTON	2/10/90	452	Tstm Wind	59 kts.	0	0	0	0
FULTON	2/10/90	510	Tstm Wind	0 kts.	1	1	0	0
FULTON	2/22/90	1015	Tstm Wind	0 kts.	0	0	0	0
FULTON	3/16/90	1700	Tstm Wind	0 kts.	0	0	0	0
FULTON	4/10/90	1613	Hail	1.00 in.	0	0	0	0
FULTON	4/10/90	1620	Tstm Wind	0 kts.	0	0	0	0
FULTON	5/20/90	1320	Tstm Wind	0 kts.	0	0	0	0
FULTON	5/20/90	1335	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/8/90	1700	Tstm Wind	0 kts.	0	0	0	0
FULTON	8/8/90	1445	Tstm Wind	0 kts.	0	0	0	0
FULTON	9/10/90	450	Tstm Wind	0 kts.	0	0	0	0
FULTON	9/10/90	1515	Hail	0.75 in.	0	0	0	0
FULTON	9/10/90	1530	Tstm Wind	0 kts.	0	0	0	0
FULTON	9/10/90	1545	Tstm Wind	0 kts.	0	0	0	0
FULTON	3/29/91	815	Tstm Wind	0 kts.	0	0	0	0
FULTON	3/29/91	815	Tstm Wind	0 kts.	0	0	0	0
FULTON	4/9/91	1800	Tstm Wind	0 kts.	0	0	0	0
FULTON	4/19/91	1440	Hail	0.88 in.	0	0	0	0
FULTON	4/27/91	1645	Tstm Wind	0 kts.	0	0	0	0
FULTON	4/29/91	1313	Hail	0.88 in.	0	0	0	0
FULTON	5/5/91	1530	Tstm Wind	0 kts.	0	0	0	0
FULTON	5/5/91	1530	Tstm Wind	0 kts.	0	0	0	0

Severe Weather								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
FULTON	7/4/91	1300	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/10/91	2025	Tstm Wind	0 kts.	0	0	0	0
FULTON	8/11/91	1240	Tstm Wind	0 kts.	0	0	0	0
FULTON	3/6/92	1555	Hail	1.75 in.	0	0	0	0
FULTON	3/19/92	1128	Hail	1.00 in.	0	0	0	0
FULTON	7/2/92	1445	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/2/92	1535	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/2/92	1700	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/5/92	1515	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/13/92	1655	Tstm Wind	0 kts.	0	0	0	0
FULTON	7/15/92	1400	Tstm Wind	0 kts.	0	0	0	0
FULTON	8/27/92	1745	Tstm Wind	0 kts.	0	0	0	0
FULTON	10/30/92	1615	Tstm Wind	0 kts.	0	0	0	0
FULTON	11/24/92	950	Tstm Wind	0 kts.	0	0	0	0
Atlanta	2/21/93	2145	Hail	1.50 in.	0	0	0	0
Atlanta	5/17/93	630	Hail	1.75 in.	0	0	500K	0
Roswell	10/18/93	1700	Lightning	N/A	0	1	0	0
FULTON	12/11/93	1000	High Winds	0 kts.	1	2	500K	0
Roswell	5/21/94	1645	Thunderstorm Winds	0 kts.	0	0	5K	0
Atlanta	5/21/94	1700	Thunderstorm Winds	0 kts.	0	0	500K	0
Roswell	5/21/94	1720	Thunderstorm Winds	0 kts.	0	0	5K	0
Roswell	6/9/94	1020	Hail	0.75 in.	0	0	0	0
Roswell	6/25/94	1850	Hail	0.88 in.	0	0	0	0
Roswell	6/29/94	920	Thunderstorm Winds	0 kts.	0	0	5K	0
Atlanta	7/8/94	1600	Thunderstorm Wind	0 kts.	0	0	1K	0
Hartfield Airport	1/6/95	1825	Lightning	N/A	0	2	0	0
College Park	1/19/95	1440	Hail	0.75 in.	0	0	0	0
Atlanta	4/19/95	1424	Thunderstorm Winds	0 kts.	0	0	300	0
FULTON	4/22/95	1030	Hail	1.00 in.	0	0	0	0
Atlanta	5/15/95	1611	Thunderstorm Winds	56 kts.	0	0	0	0
Atlanta	5/15/95	1625	Thunderstorm Winds	0 kts.	0	3	70K	0
Atlanta	6/30/95	1840	Thunderstorm Winds	0 kts.	0	0	1K	0
Atlanta	7/17/95	1443	Thunderstorm Winds53	0 kts.	0	0	50K	0
East Point	8/3/95	1700	Thunderstorm Winds	0 kts.	0	0	500	0
Atlanta	8/19/95	1845	Thunderstorm	0 kts.	0	0	10K	0

Severe Weather								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
			Winds					
FULTON	10/5/95	600	Thunderstorm Winds	0 kts.	8	7	75.0M	50.0M
Atlanta	3/6/96	9:17 AM	Tstm Wind	0 kts.	0	0	50K	0
Atlanta	4/20/96	2:45 PM	Tstm Wind	0 kts.	0	0	200K	0
Fulton County Airport	4/29/96	5:05 PM	Tstm Wind	55 kts.	0	0	0	0
Palmetto	4/29/96	5:45 PM	Tstm Wind	0 kts.	0	0	1K	0
Roswell	4/29/96	5:50 PM	Tstm Wind	0 kts.	0	0	1K	0
Birmingham	5/6/96	4:40 PM	Hail	0.75 in.	0	0	0	0
Atlanta	5/6/96	6:35 PM	Hail	0.75 in.	0	0	0	0
Atlanta	5/24/96	9:45 PM	Hail	1.75 in.	0	0	0	0
Atlanta	6/13/96	1:44 PM	Tstm Wind	0 kts.	0	4	5K	0
Fairburn	8/23/96	8:00 PM	Tstm Wind	0 kts.	0	0	2K	0K
Atlanta	8/24/96	5:06 PM	Tstm Wind	0 kts.	0	0	4K	0K
Roswell	1/25/97	12:35 AM	Hail	0.75 in.	0	0	0	0
Atlanta	2/21/97	2:10 PM	Tstm Wind	0 kts.	0	0	5K	0
Sandy Springs	3/5/97	6:30 PM	Tstm Wind	0 kts.	0	0	3K	0K
Alpharetta	4/22/97	1:22 PM	Hail	1.00 in.	0	0	0	0
Alpharetta	4/22/97	2:00 PM	Hail	1.00 in.	0	0	0	0
Mountain Park	4/22/97	2:25 PM	Hail	1.75 in.	0	0	0	0
Atlanta	4/22/97	5:00 PM	Tstm Wind	0 kts.	0	0	2K	0
Atlanta	4/22/97	5:50 PM	Lightning	N/A	0	0	0	0
Adamsville	4/28/97	2:45 PM	Hail	0.75 in.	0	0	0	0
Atlanta	4/28/97	2:48 PM	Hail	2.50 in.	0	0	10K	0
Sandy Springs	4/28/97	4:45 PM	Hail	0.75 in.	0	0	0	0
Roswell	4/28/97	4:55 PM	Hail	1.50 in.	0	0	0	0
Atlanta	5/27/97	8:15 AM	Hail	0.90 in.	0	0	0	0
Atlanta	5/27/97	8:50 AM	Hail	0.75 in.	0	0	0	0
Ft Mc Pherson	6/17/97	2:10 PM	Tstm Wind	0 kts.	0	0	2K	0
Alpharetta	6/20/97	9:00 PM	Hail	0.90 in.	0	0	0	0
Alpharetta	7/16/97	6:25 PM	Tstm Wind	0 kts.	0	0	15K	0
Roswell	9/10/97	5:10 PM	Hail	1.75 in.	0	0	0	0
Alpharetta	9/10/97	5:30 PM	Hail	0.88 in.	0	0	0	0
Fu	2/3/98	10:00 AM	Strong Wind	0 kts.	0	0	100K	0
Union City	2/17/98	7:50 AM	Hail	0.75 in.	0	0	0	0
Alpharetta	2/17/98	8:03 AM	Tstm Wind	76 kts.	0	0	0	0
Atlanta	4/3/98	4:15 PM	Hail	0.75 in.	0	0	0	0
Atlanta	4/3/98	4:25 PM	Hail	0.75 in.	0	0	0	0
Atlanta	4/3/98	6:45 PM	Hail	0.75 in.	0	0	0	0
Hapeville	4/3/98	8:15 PM	Hail	1.00 in.	0	0	0	0
Sandy Springs	4/3/98	10:24 AM	Lightning	N/A	1	0	0	0
Alpharetta	4/8/98	6:15 PM	Hail	0.75 in.	0	0	0	0
East Point	4/8/98	9:07 PM	Hail	1.00 in.	0	0	0	0
Roswell	4/8/98	11:30 PM	Hail	0.75 in.	0	0	0	0

Severe Weather								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
Roswell	4/9/98	12:30 AM	Tstm Wind	0 kts.	0	4	5K	0
Alpharetta	4/21/98	4:45 PM	Hail	0.75 in.	0	0	0	0
Crabapple	5/3/98	4:24 PM	Hail	1.75 in.	0	0	2K	0
Alpharetta	5/3/98	4:35 PM	Hail	1.75 in.	0	0	5K	0
Alpharetta	5/3/98	7:20 PM	Funnel Cloud	N/A	0	0	0	0
Roswell	5/7/98	8:15 PM	Hail	1.50 in.	0	0	1K	0
Roswell	5/7/98	10:35 PM	Hail	1.75 in.	0	0	2K	0
Palmetto	5/8/98	1:00 AM	Hail	1.00 in.	0	0	0	0
Alpharetta	5/8/98	12:15 AM	Tstm Wind	0 kts.	0	0	2K	0
Sandy Springs	5/9/98	11:50 PM	Hail	0.75 in.	0	0	0	0
Sandy Springs	5/10/98	1:43 AM	Hail	0.75 in.	0	0	0	0
Palmetto	5/10/98	12:34 AM	Hail	1.00 in.	0	0	0	0
East Point	5/29/98	4:30 PM	Tstm Wind	0 kts.	0	0	1K	0
Roswell	6/4/98	3:50 PM	Hail	1.75 in.	0	0	0	0
Roswell	6/4/98	3:50 PM	Tstm Wind	0 kts.	0	0	2K	0
Sandy Springs	6/4/98	4:35 PM	Hail	1.00 in.	0	0	0	0
Fairburn	6/4/98	6:48 PM	Hail	0.75 in.	0	0	0	0
Fairburn	6/5/98	7:35 AM	Tstm Wind	0 kts.	0	0	2K	0
East Point	6/15/98	11:45 PM	Hail	1.75 in.	0	0	0	0
East Point	6/15/98	11:45 PM	Tstm Wind	55 kts.	0	0	100K	0
Sandy Springs	6/19/98	10:45 AM	Tstm Wind	0 kts.	0	0	10K	0
Atlanta	6/19/98	10:55 AM	Hail	0.75 in.	0	0	0	0
Roswell	6/19/98	11:40 AM	Lightning	N/A	0	0	20K	0
Fairburn	6/19/98	11:41 AM	Hail	1.00 in.	0	0	0	0
Atlanta	6/19/98	11:42 AM	Tstm Wind	0 kts.	0	0	10K	0
Alpharetta	6/30/98	8:00 PM	Tstm Wind	0 kts.	0	0	1K	0
Hapeville	7/19/98	9:40 PM	Tstm Wind	0 kts.	0	0	1K	0
Sandy Springs	7/20/98	4:15 PM	Hail	1.25 in.	0	0	0	0
Union City	8/18/98	2:55 PM	Hail	0.75 in.	0	0	0	0
Union City	8/18/98	2:55 PM	Tstm Wind	0 kts.	0	0	1K	0
Roswell	8/30/98	3:34 PM	Hail	0.88 in.	0	0	0	0
Alpharetta	9/2/98	4:00 PM	Tstm Wind	0 kts.	0	0	2K	0
Sandy Springs	2/9/99	3:12 PM	Hail	0.75 in.	0	0	0	0
Atlanta	2/27/99	11:08 PM	Tstm Wind	0 kts.	0	0	10K	0
Roswell	3/3/99	4:30 AM	Tstm Wind	0 kts.	0	0	1K	0
Atlanta	5/6/99	7:35 AM	Hail	2.50 in.	0	0	50K	0
Atlanta	5/6/99	8:00 AM	Tstm Wind	50 kts.	0	0	1K	0
Alpharetta	5/7/99	6:30 PM	Hail	1.00 in.	0	0	0	0
Atlanta	5/13/99	2:30 PM	Hail	1.75 in.	0	0	0	0
East Point	5/23/99	5:00 PM	Hail	1.75 in.	0	0	0	0
Roswell	6/2/99	4:35 PM	Hail	1.00 in.	0	0	0	0
Roswell	6/2/99	4:45 PM	Tstm Wind	0 kts.	0	0	1K	0
Roswell	6/2/99	5:00 PM	Tstm Wind	0 kts.	0	0	1K	0
Alpharetta	6/29/99	4:19 PM	Hail	1.00 in.	0	0	0	0
Union City	6/29/99	6:45 PM	Hail	0.75 in.	0	0	0	0
Roswell	6/30/99	2:20 PM	Tstm Wind	0 kts.	0	0	1K	0
Alpharetta	7/6/99	3:25 PM	Hail	1.00 in.	0	0	0	0

Severe Weather								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
Sandy Springs	7/6/99	3:45 PM	Hail	1.25 in.	0	0	0	0
Atlanta	7/6/99	4:00 PM	Tstm Wind	57 kts.	0	0	5K	0
Sandy Springs	7/6/99	4:00 PM	Lightning	N/A	0	0	1.0M	0
Alpharetta	7/10/99	5:00 PM	Tstm Wind	0 kts.	0	0	1K	0
Alpharetta	7/24/99	2:30 PM	Lightning	N/A	0	0	200K	0
Alpharetta	7/24/99	2:33 PM	Hail	0.75 in.	0	0	0	0
Alpharetta	7/24/99	2:46 PM	Tstm Wind	0 kts.	0	0	1K	0
Fairburn	8/20/99	4:10 PM	Hail	0.75 in.	0	0	0	0
Alpharetta	8/23/99	5:00 PM	Tstm Wind	0 kts.	0	0	1K	0
Sandy Springs	9/21/99	1:30 PM	Hail	1.25 in.	0	0	0	0
College Park	9/21/99	2:10 PM	Hail	0.75 in.	0	0	0	0
Fairburn	1/10/00	2:00 AM	Tstm Wind	0 kts.	0	0	2K	0
Fulton	4/8/00	1:45 PM	Strong Wind	0 kts.	0	13	12K	0
Adamsville	5/3/00	5:30 PM	Hail	0.88 in.	0	0	0	0
Atlanta	5/21/00	7:25 PM	Hail	0.75 in.	0	0	0	0
Union City	5/21/00	7:25 PM	Funnel Cloud	N/A	0	0	0	0
Roswell	5/25/00	4:55 PM	Tstm Wind	0 kts.	0	0	0K	0
Alpharetta	5/25/00	5:15 PM	Hail	0.75 in.	0	0	0	0
East Point	6/25/00	1:00 PM	Hail	0.75 in.	0	0	0	0
Sandy Springs	6/25/00	12:10 PM	Hail	0.75 in.	0	0	0	0
Hartfield Airport	6/26/00	5:30 PM	Lightning	N/A	0	5	0	0
College Park	7/20/00	8:15 PM	Tstm Wind	50 kts.	0	0	1K	0
College Park	7/23/00	3:30 PM	Tstm Wind	0 kts.	0	0	8.0M	0
College Park	7/23/00	3:40 PM	Hail	1.75 in.	0	0	0	0
Roswell	7/30/00	7:15 PM	Hail	1.75 in.	0	0	0	0
Alpharetta	8/10/00	11:15 PM	Hail	0.75 in.	0	0	0	0
Sandy Springs	8/24/00	5:57 PM	Tstm Wind	0 kts.	0	0	5K	0
Roswell	8/24/00	6:15 PM	Tstm Wind	0 kts.	0	0	10K	0
Atlanta	8/24/00	10:15 PM	Lightning	N/A	0	0	0	0
Union City	1/19/01	12:10 PM	Tstm Wind	0 kts.	0	0	500K	0
Adamsville	2/16/01	6:22 PM	Tstm Wind	0 kts.	0	0	5K	0
Fairburn	4/3/01	8:00 AM	Lightning	N/A	0	0	2K	0
Fairburn	4/3/01	8:00 AM	Lightning	N/A	0	0	2K	0
Sandy Springs	5/19/01	3:09 PM	Lightning	N/A	0	0	250K	0
Roswell	5/19/01	3:43 PM	Lightning	N/A	0	0	0	0
Alpharetta	5/19/01	11:27 AM	Hail	1.75 in.	0	0	0	0
Alpharetta	5/28/01	9:04 PM	Hail	0.75 in.	0	0	0	0
Alpharetta	6/3/01	2:40 PM	Hail	0.75 in.	0	0	0	0
Atlanta	6/3/01	3:21 PM	Hail	0.88 in.	0	0	1K	0
Atlanta	6/3/01	3:58 PM	Hail	0.75 in.	0	0	0	0
Atlanta	6/14/01	1:35 PM	Hail	0.75 in.	0	0	0	0
Union City	6/14/01	6:55 PM	Hail	0.88 in.	0	0	0	0
Union City	6/22/01	12:45 PM	Tstm Wind	0 kts.	0	0	2K	0
Atlanta	6/25/01	6:45 PM	Tstm Wind	0 kts.	0	0	5K	0
Alpharetta	7/3/01	2:45 PM	Hail	0.75 in.	0	0	0	0
Alpharetta	7/3/01	2:45 PM	Tstm Wind	0 kts.	0	0	1K	0

Severe Weather								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
Atlanta	7/5/01	4:39 PM	Tstm Wind	56 kts.	0	0	10K	0
Fulton	1/29/02	3:00AM	Fog	N/A	0	0	0	0
Fulton	1/30/02	12:00 AM	Fog	N/A	0	0	0	0
East Point	3/31/02	2:03 PM	Hail	0.75 in.	0	0	0	0
Lakewood Heights	3/31/02	2:16 PM	Tstm Wind	0 kts.	0	0	1K	0
Roswell	4/28/02	8:23 PM	Hail	1.75 in.	0	0	0	0
Roswell	4/28/02	8:30 PM	Funnel Cloud	N/A	0	0	0	0
Roswell	4/28/02	8:30 PM	Tstm Wind	0 kts.	0	0	7K	0
Atlanta	5/3/02	7:10 AM	Hail	0.75 in.	0	0	0	0
Fairburn	5/13/02	2:30 PM	Tstm Wind	0 kts.	0	0	1K	0
Crabapple	5/13/02	2:40 PM	Hail	0.88 in.	0	0	0	0
Roswell	6/4/02	7:07 PM	Tstm Wind	0 kts.	0	0	1K	0
Roswell	6/4/02	7:10 PM	Hail	0.75 in.	0	0	0	0
Crabapple	7/2/02	3:42 PM	Hail	0.88 in.	0	0	0	0
Atlanta	7/2/02	4:45 PM	Hail	1.00 in.	0	0	0	0
Atlanta	7/2/02	4:50 PM	Tstm Wind	0 kts.	0	0	1K	0
Atlanta	7/3/02	3:50 PM	Tstm Wind	0 kts.	0	0	1K	0
Alpharetta	7/23/02	4:54 PM	Hail	1.00 in.	0	0	0	0
Warsaw	7/31/02	4:00 PM	Tstm Wind	0 kts.	0	0	1K	0
Roswell	8/16/02	7:30 PM	Tstm Wind/hail	0 kts.	0	0	0	0
Sandy Springs	8/26/02	6:09 PM	Tstm Wind	0 kts.	0	0	2K	0
Fairburn	8/26/02	6:30 PM	Lightning	N/A	0	0	0K	0
Fulton	9/26/02	6:00 PM	Strong Wind	0 kts.	0	0	22K	0
Fulton	9/27/02	3:00 AM	Strong Wind	0 kts.	0	0	32K	0
Alpharetta	11/11/02	3:39 AM	Hail	0.75 in.	0	0	0	0
Atlanta	11/11/02	3:46 AM	Tstm Wind	0 kts.	0	0	30K	0
Campbellton	3/5/03	10:20 PM	Hail	0.75 in.	0	0	0	0
College Park	3/20/03	12:25 AM	Tstm Wind	50 kts.	0	0	2K	0
Atlanta	4/25/03	6:15 PM	Tstm Wind	45 kts.	0	0	5K	0
Bolton	4/25/03	6:17 PM	Hail	1.75 in.	0	0	0	0
Alpharetta	5/2/03	4:35 PM	Hail	1.00 in.	0	0	0	0
Lakewood Heights	5/2/03	5:16 PM	Hail	0.75 in.	0	0	0	0
Lakewood Heights	5/2/03	5:20 PM	Tstm Wind	50 kts.	0	0	1K	0
Union City	5/2/03	6:50 PM	Hail	0.75 in.	0	0	0	0
Union City	5/2/03	7:20 PM	Tstm Wind	60 kts.	0	1	150K	0
East Point	5/7/03	6:00 PM	Tstm Wind	50 kts.	0	0	2K	0
Fairburn	5/7/03	6:05 PM	Hail	0.75 in.	0	0	0	0
Fairburn	5/7/03	6:05 PM	Tstm Wind	56 kts.	0	0	0	0
Birmingham	5/17/03	4:12 PM	Hail	0.75 in.	0	0	0	0
Sandy Springs	6/28/03	5:57 PM	Heavy Rain	N/A	0	0	0	0
Roswell	7/4/03	2:00 PM	Tstm Wind	45 kts.	0	0	0K	0
Atlanta	7/10/03	4:15 PM	Tstm Wind	53 kts.	3	0	35K	0
Palmetto	7/10/03	6:12 PM	Heavy Rain	N/A	0	0	0	0

Severe Weather								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
Alpharetta	7/22/03	1:14 PM	Hail	0.75 in.	0	0	0	0
Alpharetta	7/22/03	1:15 PM	Lightning	N/A	0	0	5K	0
Birmingham	7/22/03	12:12 PM	Tstm Wind	52 kts.	0	0	100K	0
Fulton	2/25/04	9:30 PM	Strong Wind	39 kts.	0	0	170K	0
Atlanta	4/12/04	11:45 PM	Tstm Wind	35 kts.	0	0	1K	0
Alpharetta	5/12/04	7:20 PM	Heavy Rain	N/A	0	0	0	0
East Point	5/16/04	4:55 PM	Hail	0.75 in.	0	0	0	0
Atlanta	6/23/04	4:30 PM	Tstm Wind	50 kts.	0	0	5K	0
Atlanta	6/27/04	6:07 PM	Tstm Wind	50 kts.	0	0	7K	0
Moutain Park	7/6/04	5:05 PM	Hail	0.75 in.	0	0	0	0
Alpharetta	7/14/04	6:33 PM	Hail	0.75 in.	0	0	0	0
Sandy Springs	8/5/04	3:45 PM	Heavy Rain	N/A	0	0	50K	0
Fulton	9/27/04	5:30 AM	Strong Wind	30 kts.	0	0	758K	0
Campbellton	11/24/04	9:52 AM	Tstm Wind	50 kts.	0	0	1K	0
Sandy Springs	11/24/04	10:25 AM	Tstm Wind	50 kts.	0	0	5K	0
Atlanta	12/9/04	9:15 PM	Hail	1.00 in.	0	0	0	0
Atlanta	12/10/04	3:55 PM	Tstm Wind	50 kts.	0	0	5K	0
Atlanta	12/10/04	4:00 PM	Hail	1.00 in.	0	0	0	0
Fulton	1/22/05	7:00 PM	Strong Wind	33 kts.	0	0	148K	0
Alpharetta	2/21/05	6:50 PM	Hail	1.00 in.	0	0	0	0
Sandy Springs	2/21/05	7:35 PM	Hail	1.00 in.	0	0	0	0
Atlanta	2/21/05	8:46 PM	Hail	0.75 in.	0	0	0	0
Alpharetta	3/27/05	2:40 PM	Hail	1.00 in.	0	0	0	0
Fulton	4/2/05	6:00 AM	Strong Wind	36 kts.	0	2	271K	0
Crabapple	4/12/05	5:42 PM	Hail	0.75 in.	0	0	0	0
Sandy Springs	4/22/05	9:2PM	Hail	1.00 in.	0	0	0	0
Palmetto	4/22/05	12:25 PM	Hail	1.00 in.	0	0	0	0
Palmetto	6/6/05	3:40 PM	Hail	1.00 in.	0	0	0	0
Atlanta	7/3/05	12:40 PM	Lightning	N/A	0	0	5K	0
Atlanta	7/3/05	12:50 PM	Tstm Wind	50 kts.	0	0	250K	0
Atlanta	7/3/05	12:57 PM	Hail	0.75 in.	0	0	0	0
Fairburn	7/6/05	7:55 PM	Tstm Wind	50 kts.	0	0	5K	0
Fulton	7/10/05	3:00 PM	Strong Wind	34 kts.	1	0	246K	0
Roswell	7/15/05	3:49 PM	Lightning	N/A	0	2	0	0
East Point	8/4/05	10:22 PM	Tstm Wind	50 kts.	0	0	3K	0
Warsaw	8/5/05	3:10 PM	Tstm Wind	35 kts.	0	0	1K	0
Alpharetta	8/16/05	3:00 PM	Lightning	N/A	0	0	500K	0
Warsaw	8/29/05	6:48 PM	Tstm Wind	50 kts.	0	0	3K	0
Fulton	8/30/05	3:00 AM	Strong Wind	32 kts.	0	0	19K	0
Fulton	11/21/05	7:00 PM	Strong Wind	31 kts.	0	0	39K	0
Alpharetta	12/4/05	3:47 PM	Hail	1.00 in.	0	0	0	0
Palmetto	1/2/06	4:30 PM	Hail	2.00 in.	0	0	250K	0
College Park	1/2/06	5:02 PM	Tstm Wind	50 kts.	0	0	2K	0
Alpharetta	1/2/06	5:12 PM	Hail	0.75 in.	0	0	0	0
Adamsville	4/3/06	6:15 AM	Hail	1.25 in.	0	0	0	0
Union City	4/26/06	8:35 PM	Tstm Wind	35 kts.	0	0	1K	0
Roswell	5/25/06	6:10 PM	Hail	0.75 in.	0	0	0	0

Severe Weather								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
Roswell	6/23/06	5:15 PM	Hail	0.75 in.	0	0	0	0
Sandy Springs	8/2/06	6:13 PM	Tstm Wind	35 kts.	0	0	1K	0
Sandy Springs	8/5/06	5:20 PM	Tstm Wind	50 kts.	0	0	2K	0
Atlanta	8/31/06	2:00 PM	Lightning	N/A	0	0	0	0
Alpharetta	9/28/06	2:10 PM	Hail	0.75 in.	0	0	0	0
Atlanta	9/28/06	4:15 PM	Hail	0.88 in.	0	0	0	0
Atlanta	1/5/07	11:20 AM	Thunderstorm Wind	50 kts.	0	0	3K	0K
Sandy Springs	4/3/07	18:05 PM	Hail	1.00 in.	0	0	0K	0K
Crabapple	4/4/07	1:07 AM	Thunderstorm Wind	50 kts.	0	0	7K	0K
Fulton	4/16/07	15:00 PM	Strong Wind	37 kts.	0	0	200K	0K
Alpharetta	6/5/07	14:04 PM	Hail	0.75 in.	0	0	0K	0K
Sandy Springs	6/5/07	15:17 PM	Thunderstorm Wind	39 kts.	0	0	3K	0K
Alpharetta	6/12/07	18:50 PM	Thunderstorm Wind	50 kts.	0	0	10K	0K
College Park	6/12/07	18:50 PM	Hail	1.25 in.	0	0	0K	0K
Alpharetta	6/12/07	18:57 PM	Hail	0.75 in.	0	0	0K	0K
Alpharetta	6/12/07	19:05	Lightning	N/A	0	0	10K	0K
College Park	6/12/07	19:56 PM	Thunderstorm Wind	36 kts.	0	0	2K	0K
Atlanta	6/19/07	15:15 PM	Thunderstorm Wind	50 kts.	0	1	25K	0K
Sandy Springs	7/19/07	14:00 PM	Lightning	N/A	0	1	0K	0K
Roswell	8/17/07	16:30 PM	Thunderstorm Wind	50 kts.	0	0	5K	0K
College Park	8/23/07	18:46 PM	Lightning	N/A	0	0	50K	0K
Sandy Springs	8/24/07	17:25 PM	Thunderstorm Wind	51 kts.	0	0	10K	0K
Alpharetta	8/26/07	14:00 PM	Lightning	N/A	1	0	0K	0K
Alpharetta	8/26/07	14:20 PM	Lightning	N/A	0	0	100K	0K
Atlanta	8/26/07	14:20 PM	Thunderstorm Wind	46 kts.	0	0	50K	0K
Fairburn	9/13/07	13:50 PM	Lightning	N/A	0	0	1K	0K
Fulton	1/30/08	12:30 AM	Strong Wind	43 kts.	0	0	2K	0K
Palmetto	2/17/08	16:30 PM	Thunderstorm Wind	50 kts.	0	0	3K	0K
Roswell	2/26/08	6:30 AM	Thunderstorm Wind	78 kts.	0	2	2.0M	0K
East Point	3/14/08	21:54 PM	Hail	0.88 in.	0	0	0K	0K
Palmetto	3/15/08	4:45 AM	Hail	0.75 in.	0	0	0K	0K
Adamsville	3/15/08	14:45 PM	Hail	2.75 in.	0	0	5.0M	0K
Atlanta	3/15/08	15:15 PM	Hail	0.75 in.	0	0	0K	0K
Hapeville	3/15/08	15:37 PM	Hail	1.75 in.	0	0	1.5M	0K
Union City	3/15/08	15:51 PM	Hail	1.00 in.	0	0	0K	0K
Fairburn	5/11/08	1:05 AM	Hail	1.75 in.	0	0	2.0M	0K

Severe Weather								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
Fairburn	5/11/08	3:41 AM	Thunderstorm Wind	52 kts.	0	0	150K	0K
Moutain Park	5/20/08	17:40 PM	Thunderstorm Wind	52 kts.	0	0	15K	0K
Alpharetta	5/20/08	17:43 PM	Lightning	N/A	0	0	50K	0K
Roswell	5/20/08	18:38 PM	Hail	1.00 in.	0	0	0K	0K
Palmetto	6/11/08	16:00 PM	Thunderstorm Wind	56 kts.	0	0	20K	0K
Sandy Springs	6/11/08	16:15 PM	Thunderstorm Wind	37 kts.	0	0	2K	0K
East Point	7/22/08	17:30 PM	Thunderstorm Wind	50 kts.	0	0	3K	0K
Union City	7/31/08	18:40 PM	Lightning	N/A	0	0	1K	0K
Sandy Springs	8/2/08	18:19 PM	Hail	0.88 in.	0	0	0K	0K
Atlanta	8/2/08	18:20 PM	Thunderstorm Wind	62 kts.	0	0	0K	0K
Atlanta	8/7/08	14:05 PM	Thunderstorm Wind	50 kts.	0	0	50K	0K
Ben Hill	8/26/08	7:13 AM	Thunderstorm Wind	50 kts.	0	0	2K	0K
Fulton	1/7/09	10:50 AM	Strong Wind	33 kts.	0	0	2K	0K
Ocee	2/18/09	17:07 PM	Thunderstorm Wind	50 kts.	0	0	2K	0K
Fairburn	2/18/09	17:12 PM	Thunderstorm Wind	39 kts.	0	0	2K	0K
Palmetto	2/18/09	17:50 PM	Hail	1.75 in.	0	0	700K	0K
Crabapple	4/10/09	18:15 PM	Thunderstorm Wind	52 kts.	0	0	30K	0K
Roswell	4/10/09	18:19 PM	Hail	1.75 in.	0	0	600K	0K
Sandy Springs	4/10/09	19:10 PM	Hail	0.75 in.	0	0	0K	0K
Atlanta	4/10/09	19:42 PM	Hail	0.88 in.	0	0	0K	0K
Atlanta	4/10/09	19:56 PM	Hail	0.75 in.	0	0	0K	0K
Atlanta	4/23/09	18:18 PM	Hail	1.00 in.	0	0	0K	0K
Fairburn	4/23/09	18:24 PM	Hail	1.00 in.	0	0	0K	0K
Hartfield Airport	4/23/09	19:00 PM	Lightning	N/A	0	0	5K	0K
Roswell	4/23/09	19:23 PM	Hail	1.00 in.	0	0	0K	0K
Atlanta	4/23/09	20:10 PM	Hail	1.75 in.	0	0	2.0M	0K
Atlanta	5/2/09	15:06 PM	Thunderstorm Wind	35 kts.	0	0	35K	0K
Palmetto	5/3/09	17:22 PM	Thunderstorm Wind	50 kts.	0	0	250K	0K
Atlanta	5/6/09	13:38 PM	Thunderstorm Wind	50 kts.	0	0	100K	0K
Atlanta	6/11/09	14:40 PM	Hail	0.88 in.	0	0	0K	0K
Atlanta	6/12/09	14:40 PM	Thunderstorm Wind	50 kts.	0	0	25K	0K

Severe Weather								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
Warsaw	7/7/09	12:36 PM	Lightning	N/A	0	0	5K	0K
Lakewood Heights	7/17/09	15:00 PM	Thunderstorm Wind	30 kts.	0	0	15K	0K
College Park	8/26/09	20:43 PM	Thunderstorm Wind	35 kts.	0	0	1K	0K
Warsaw	8/28/09	8:00 AM	Lightning	N/A	0	0	25K	0K
Ocee	2/22/10	3:49 AM	Lightning	N/A	0	0	50K	0K

Tropical System								
Location or County	Date	Time	Type	Magnitude	Deaths	Injury	Property Damage	Crop Damage
Inclusive of Fulton	9/14/2002	11:00 AM	Tropical Storm	N/A	0	0	0	0
Inclusive of Fulton	7/1/2003	12:00 AM	Tropical Depression	N/A	0	0	0	0
Inclusive of Fulton	9/6/2004	12:00 PM	Tropical Storm	N/A	0	0	0	0
Inclusive of Fulton	9/16/2004	12:00 AM	Tropical Storm	N/A	0	0	0	0
Inclusive of Fulton	9/26/2004	12:00 AM	Tropical Storm	N/A	0	0	0	0
Inclusive of Fulton	6/12/2005	12:00 AM	Tropical Storm	N/A	0	0	0	0
Inclusive of Fulton	7/6/2005	3:00 PM	Tropical Storm	N/A	0	0	0	0
Inclusive of Fulton	7/10/2005	10:00 AM	Hurricane	N/A	0	0	0	0
Inclusive of Fulton	8/29/2005	11:00 AM	Hurricane	N/A	0	0	0	0
Inclusive of Fulton	10/5/2005	4:00 AM	Tropical Storm	N/A	0	0	0	0
Inclusive of Fulton	9/14/2007	12:00 AM	Hurricane	N/A	0	0	0K	0K
Inclusive of Fulton	8/21/2008	12:00 PM	Tropical Storm	N/A	0	0	1.9M	0K

Appendix C

Meeting Documentation

ATLANTA-FULTON COUNTY EMERGENCY MANAGEMENT AGENCY

130 Peachtree Street SW | Suite G-157 | Atlanta, Georgia 30303

Office (404) 730-5600 Fax (404) 730-5625

M E M O R A N D U M

Date: November 30, 2010

To: Fulton County Multijurisdictional Hazardous Mitigation Plan Participants

From: Darnell Fullum, Interim Director

Subject: Open Public Meeting

Dear Participants:

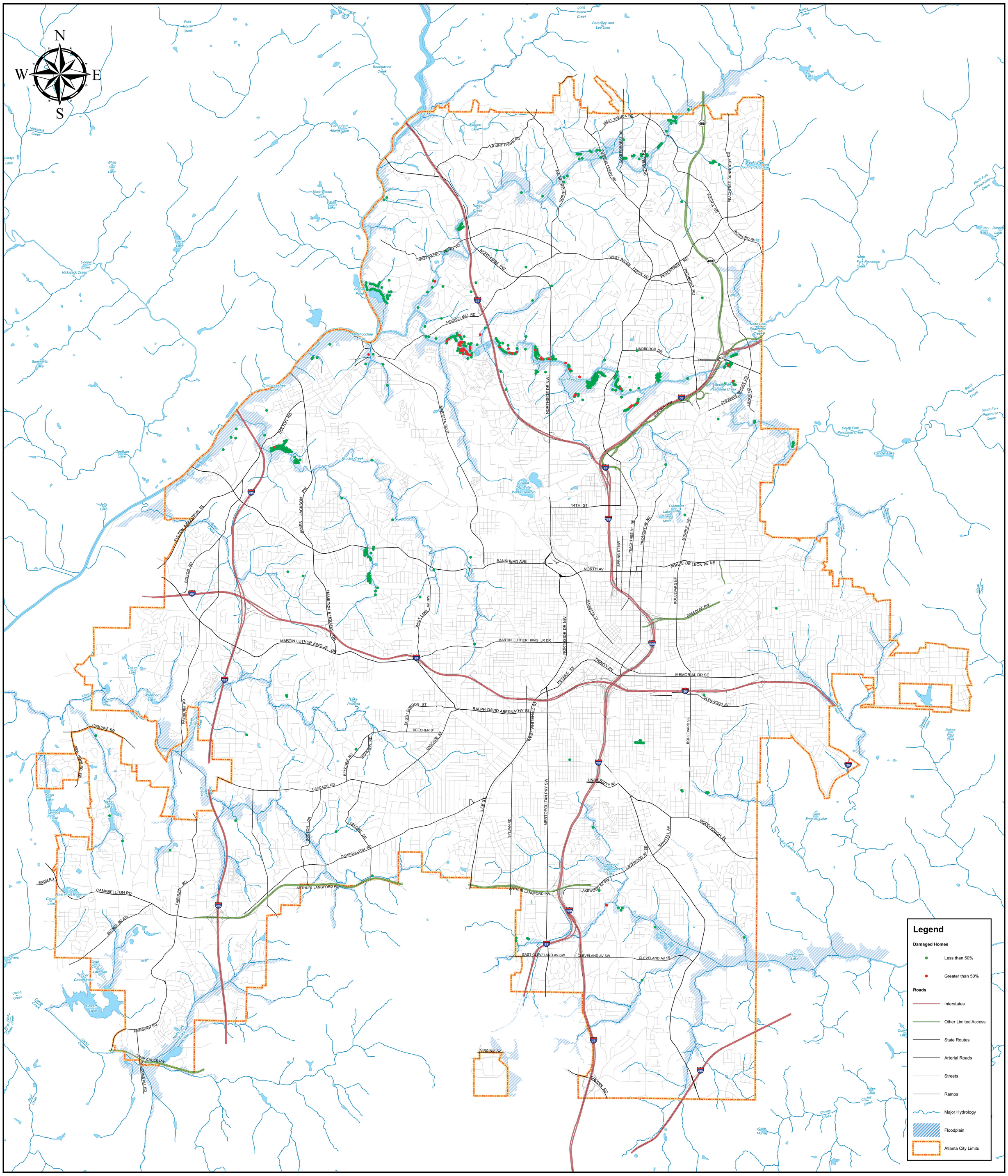
You are invited to attend the Multijurisdictional Hazard Mitigation Plan (Draft) public involvement open forum and to take part in discussions from residents, the business community, and other interested parties.

Wednesday, December 8, 2010
10:00- 12:00
Atlanta-Fulton County Emergency Management Operations Center
130 Peachtree St SW Suite G-157
Atlanta GA 30303
404-730-5600

To review a public copy of the Multijurisdictional Hazard Mitigation Plan (Draft), please contact sergio.rondon@fultoncountyga.gov **or 404-730-5600 and a public draft copy of the plan will be email to you.**

Appendix D

Maps



Known Flooded Properties in September 2009 Flood

CITY OF ATLANTA

DEPARTMENT OF WATERSHED MANAGEMENT

THIS MAP IS PROVIDED AS A PUBLIC SERVICE

The City of Atlanta has made known that this Data contains known errors and inconsistencies. The city of Atlanta in no way ensures, represents or warrants the accuracy and/or reliability of the Data and/or map products being developed. The user of the Data and or map products assumes all risks and liabilities which may arise from the information produced by Maps or Data furnished to User by the City of Atlanta.

COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST	
MAP UNITS: U.S. SURVEY FEET	
SCALE: 1:31,680	MAP SHEET #: 1 of 1
DATE: 06/04/2010	MAP REQUEST #: 13284

WATERSHED GIS
gis.atlantawatershed.org

General Legend

Roads

By Classification

- Rural Local Road
- Rural Major Collector
- Rural Minor Collector
- Rural Principal Arterial
- Fulton County
- Chattahoochee Hills City Limit
- Parcels 2008
- FEMA 100 Yr Flood Plain
- Chattahoochee River
- Lakes
- Streams

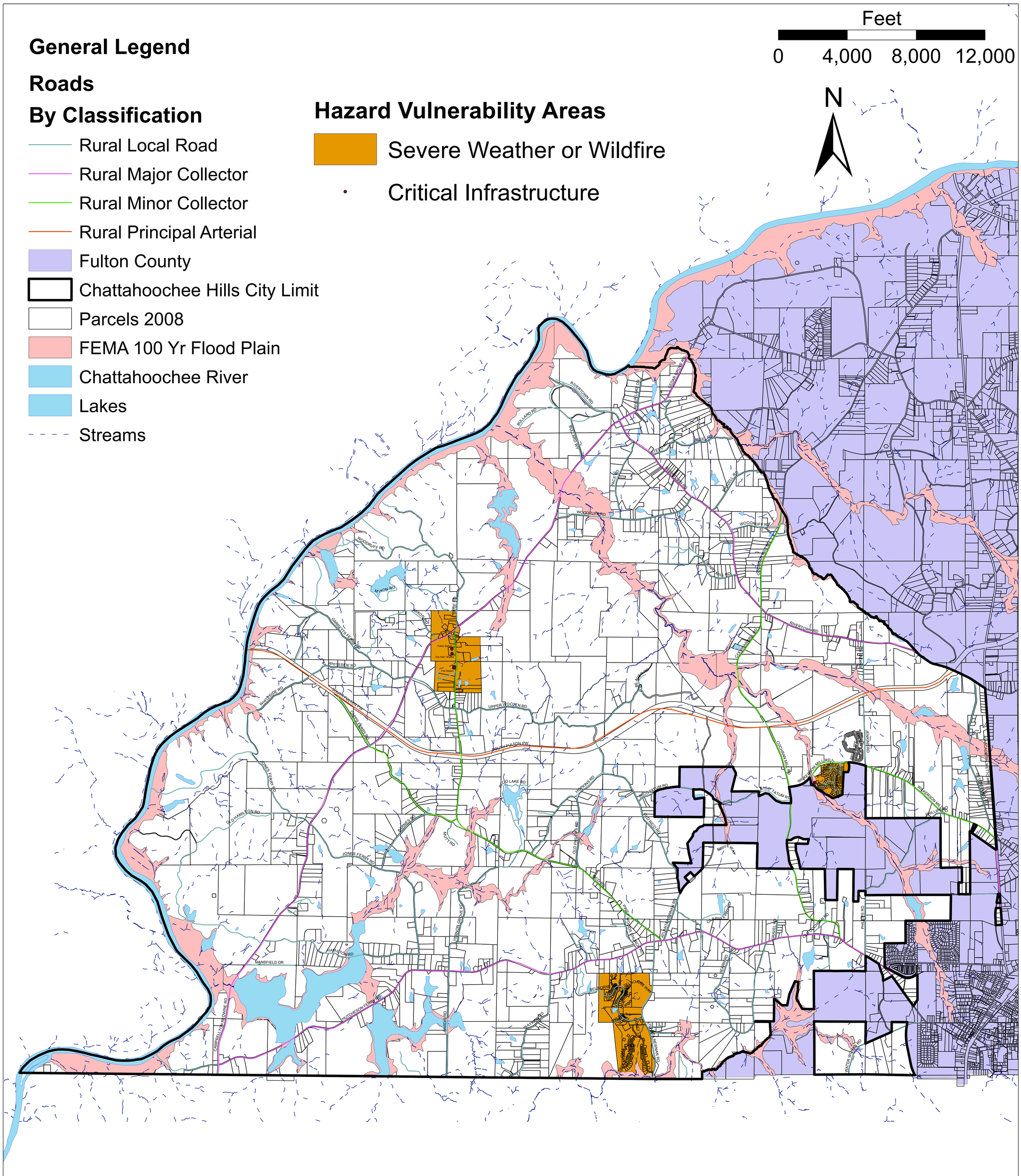
Hazard Vulnerability Areas

- Severe Weather or Wildfire
- Critical Infrastructure

Feet

0 4,000 8,000 12,000

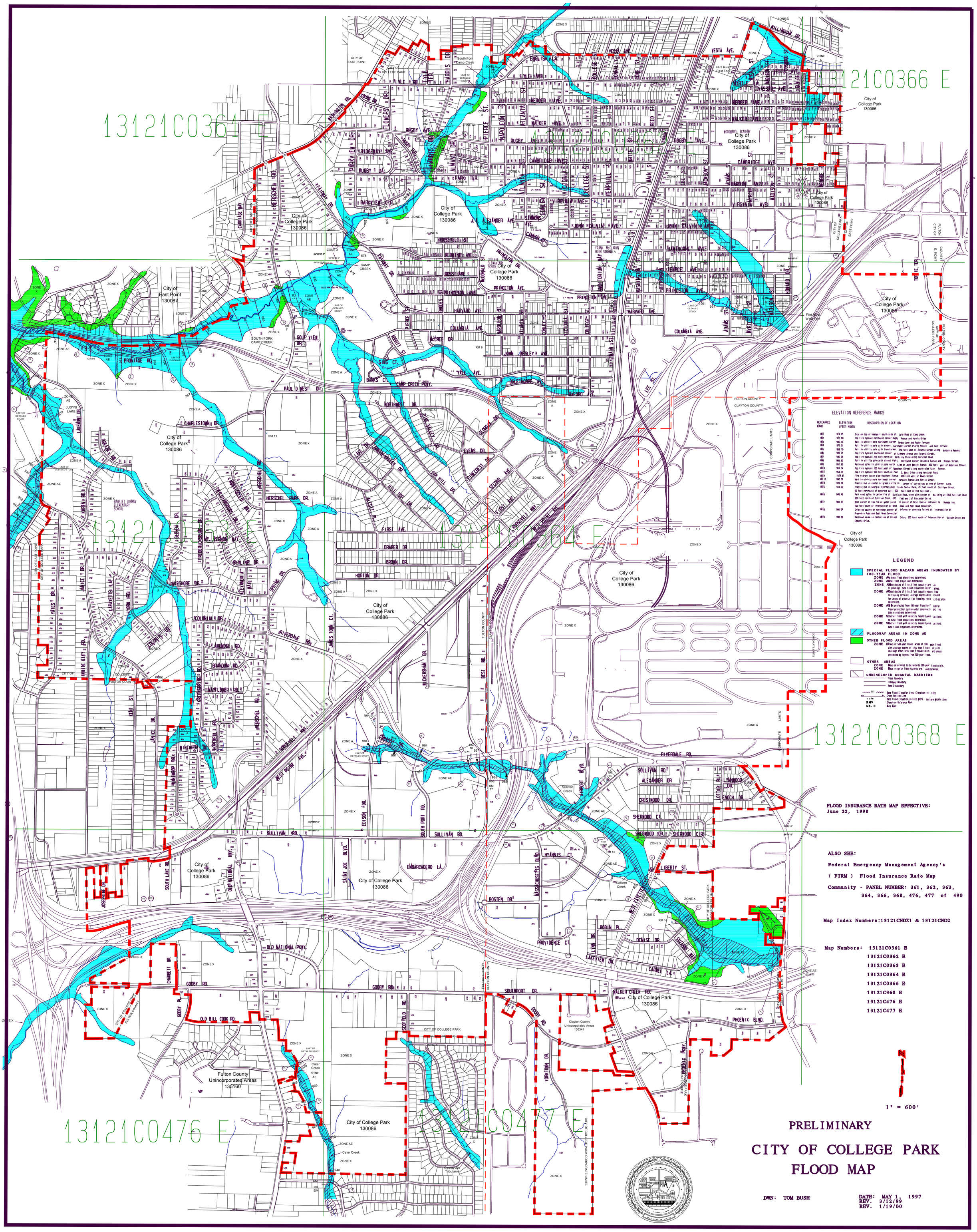
N



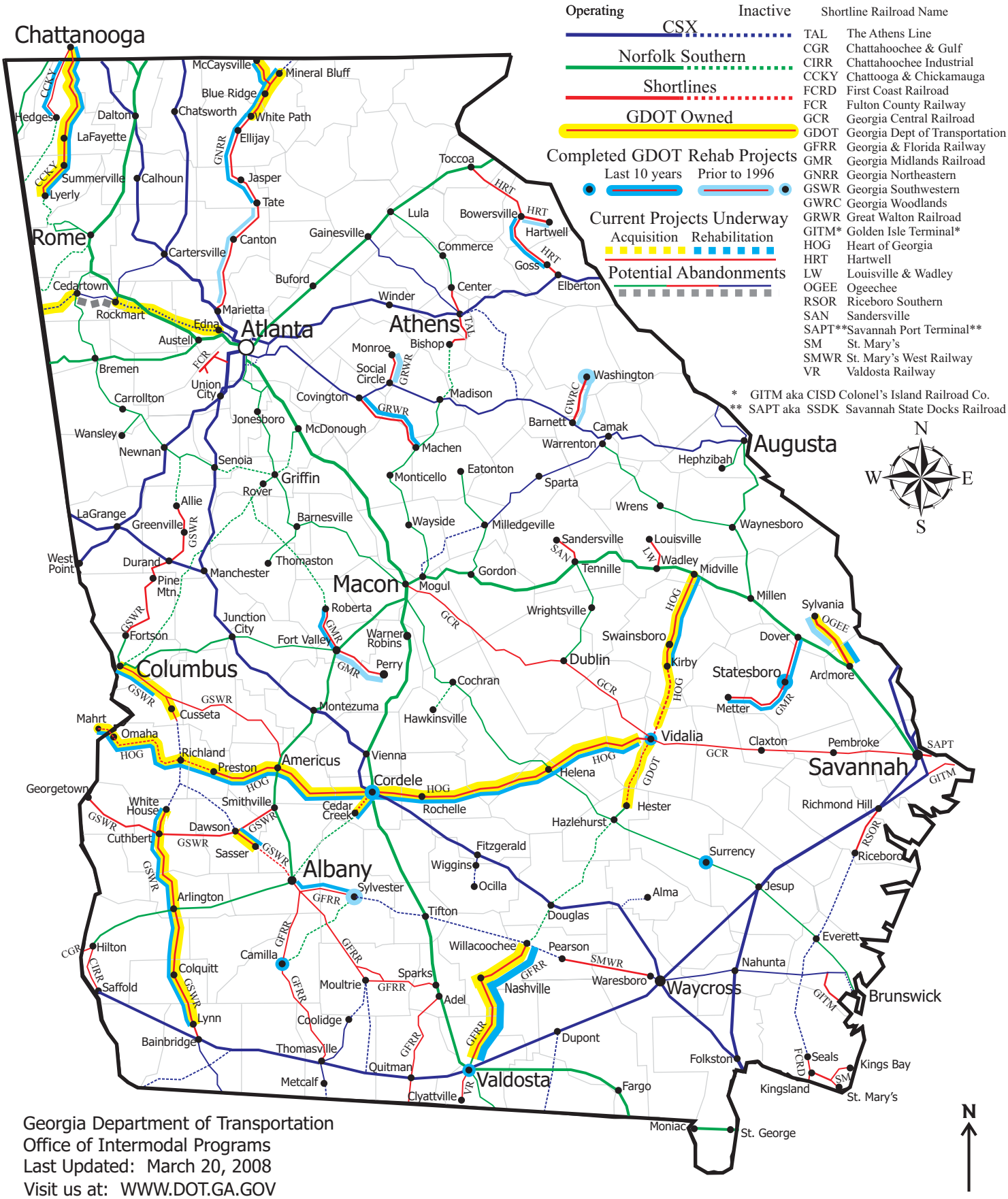
Chattahoochee Hills

Keck & Wood, Inc.

Engineers, Surveyors, Planners, & GIS Specialists

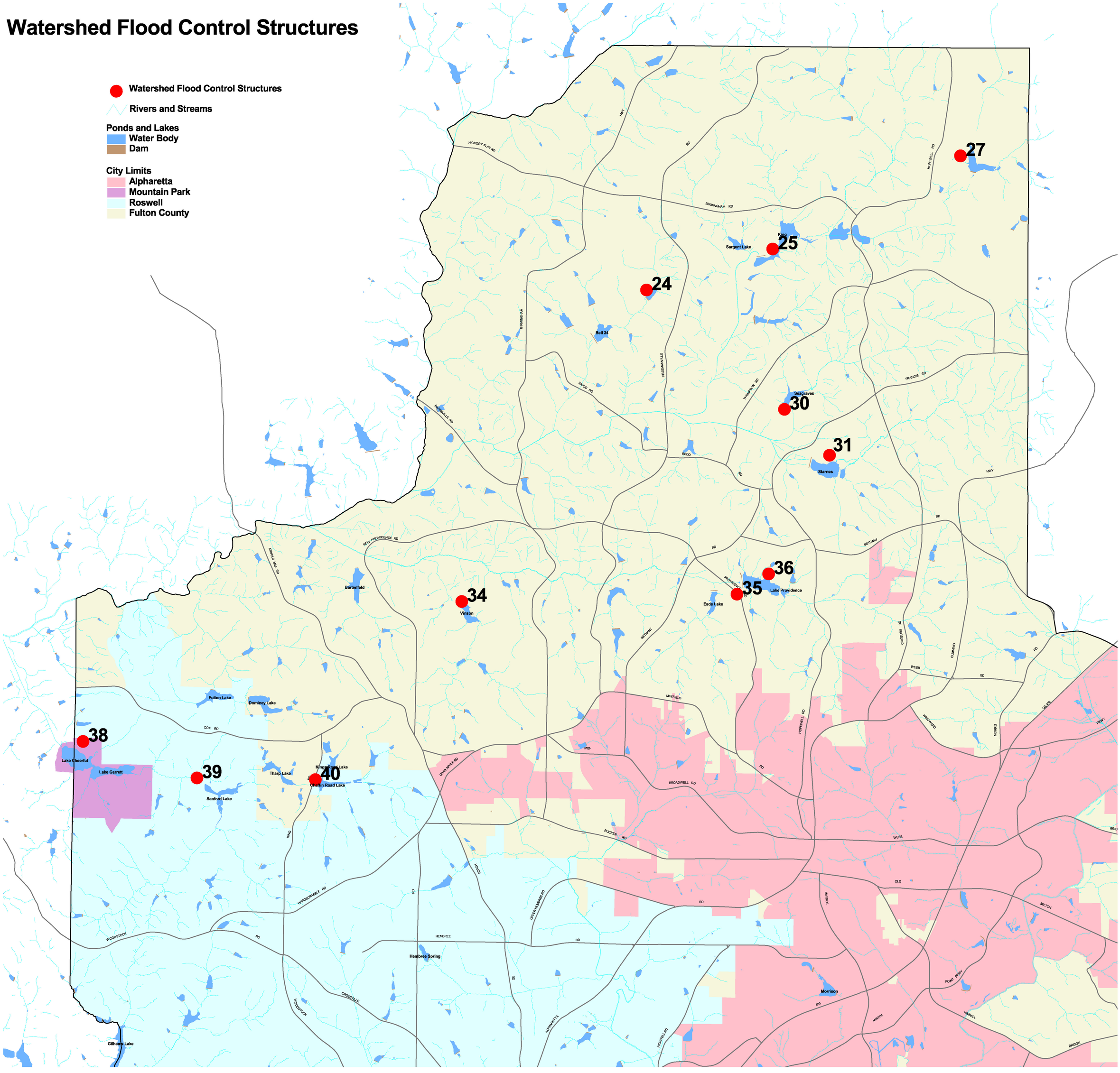

13121C0361 E
13121C0362 E
13121C0363 E
13121C0364 E
13121C0366 E
13121C0368 E
13121C0476 E
13121C0477 E
City of College Park 130086
City of East Point 130087
Fulton County Unincorporated Areas 135160
Clayton County Unincorporated Areas 130341
ELEVATION REFERENCE MARKS
LEGEND
SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD
FLOODWAY AREAS IN ZONE AE
OTHER FLOOD AREAS
OTHER AREAS
UNDEVELOPED COASTAL BARRIERS
FLOOD INSURANCE RATE MAP EFFECTIVE:
June 22, 1998
ALSO SEE:
Federal Emergency Management Agency's
(FIRM) Flood Insurance Rate Map
Community - PANEL NUMBER: 361, 362, 363, 364, 366, 368, 476, 477 of 490
Map Index Numbers:13121CNDX1 & 13121CND2
Map Numbers: 13121C0361 E
13121C0362 E
13121C0363 E
13121C0364 E
13121C0366 E
13121C0368 E
13121C0476 E
13121C0477 E
1" = 600'
PRELIMINARY
CITY OF COLLEGE PARK
FLOOD MAP
DWN: TOM BUSH
DATE: MAY 1, 1997
REV. 3/12/99
REV. 1/19/00

Georgia Rail System

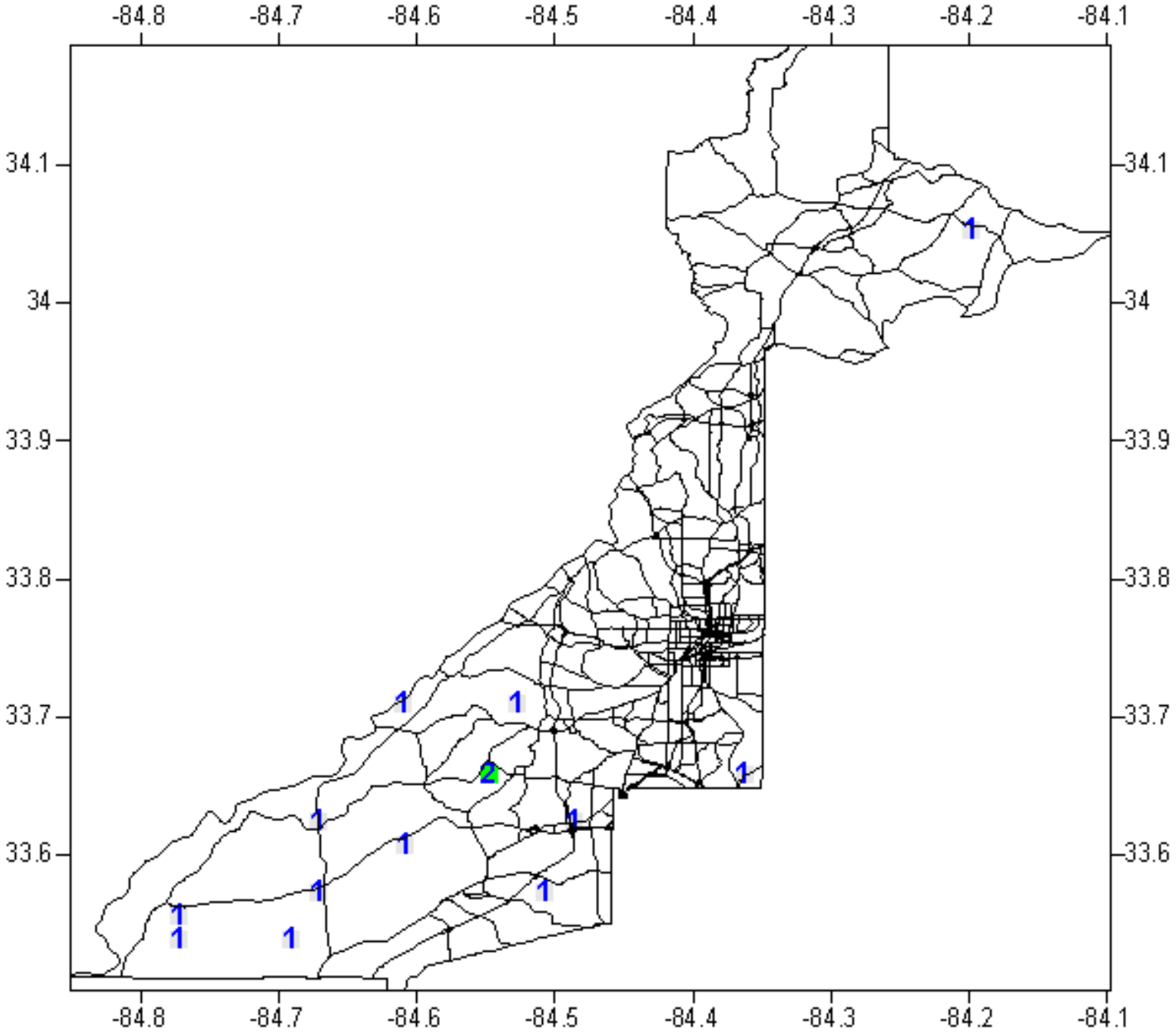


Georgia Department of Transportation
Office of Intermodal Programs
Last Updated: March 20, 2008
Visit us at: WWW.DOT.GA.GOV
Or Search for us online, enter: "GDOT RAIL"

Watershed Flood Control Structures

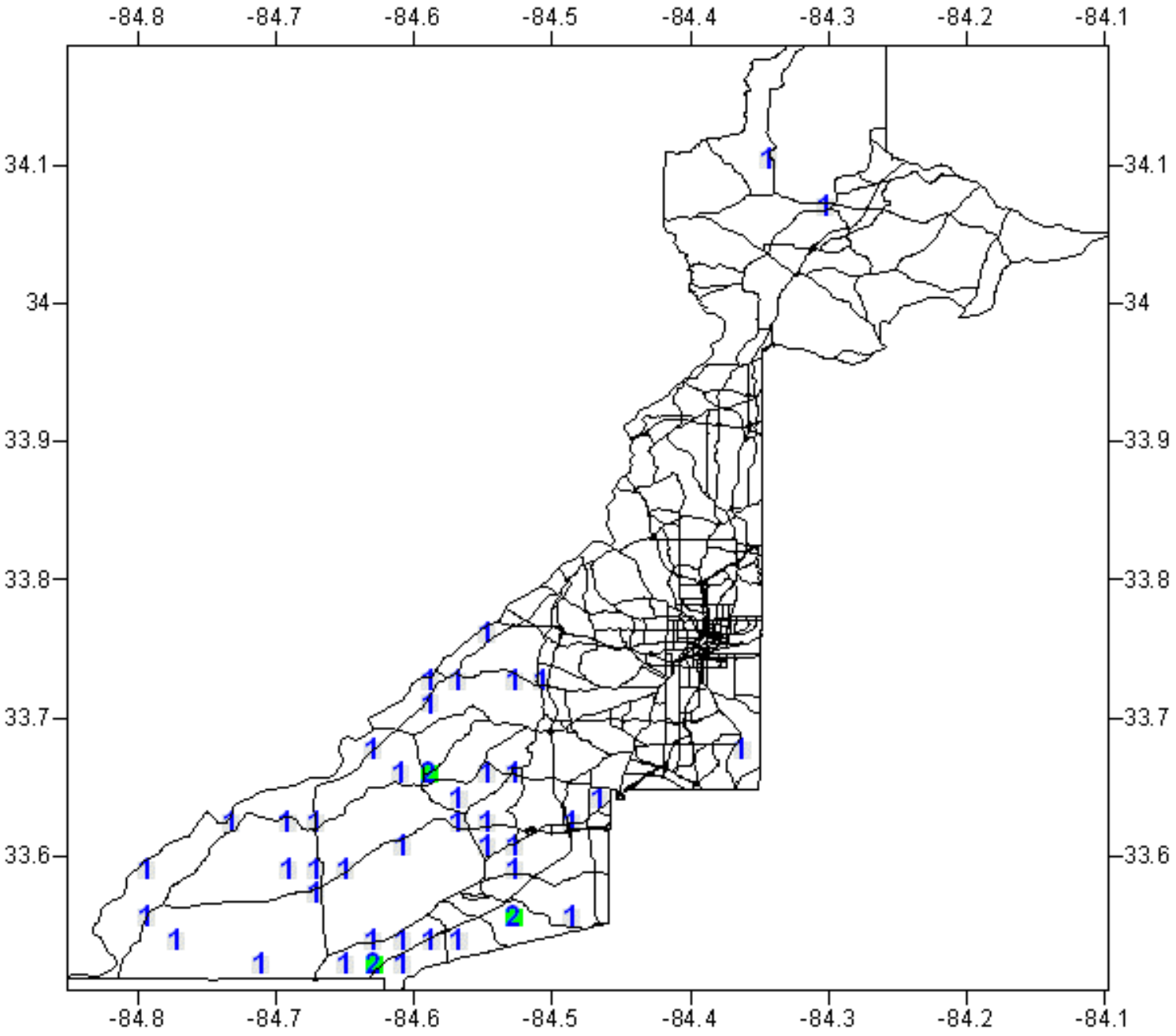


Fire Occurrence Map for Fulton County for Fiscal Year 2000-2004



- 1 to 2
- 2 to 4
- 4 to 8
- 8 to 15
- 15 to 50

Fire Occurrence Map for Fulton County for Fiscal Year 2005-2009

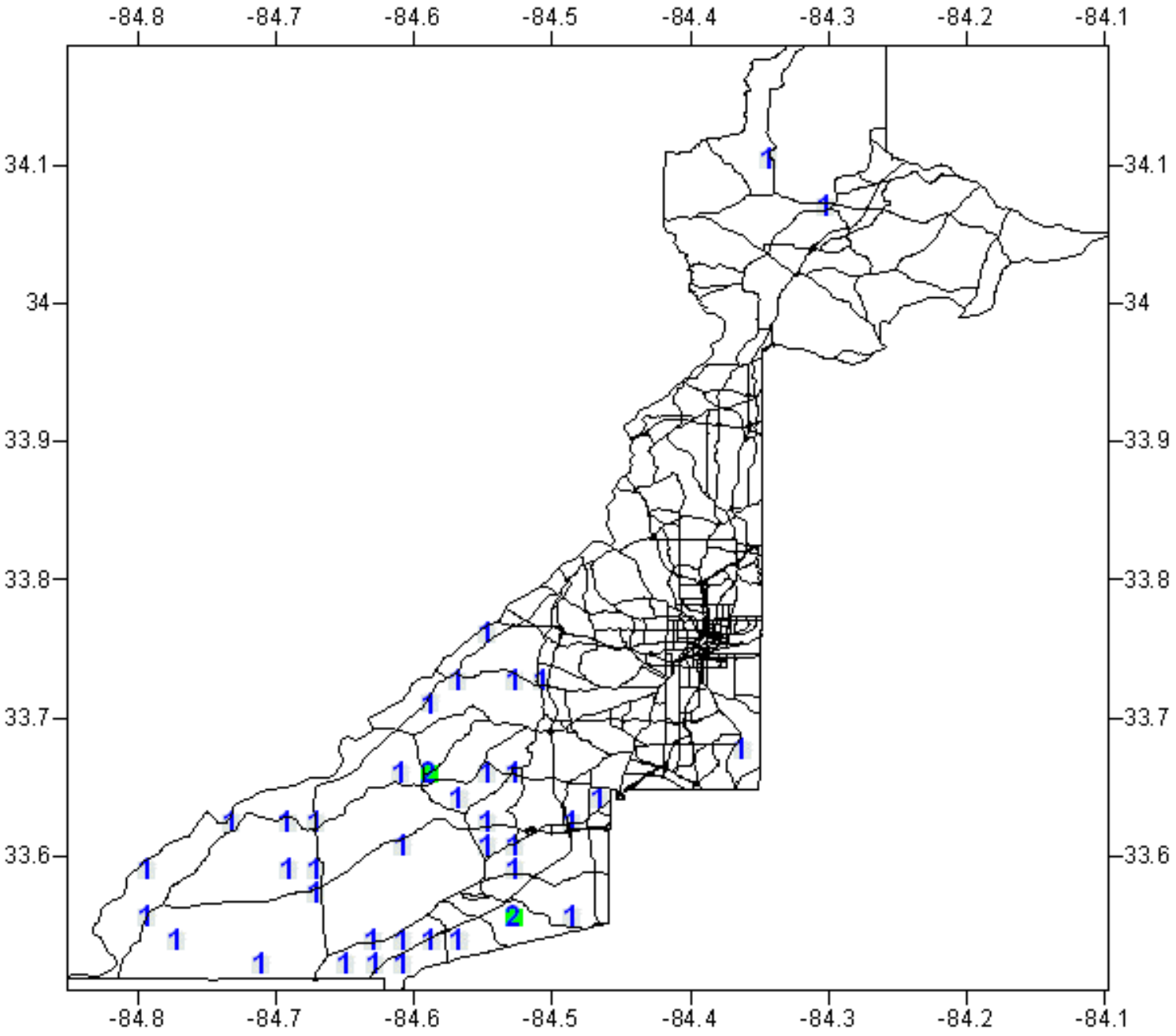


GEORGIA FORESTRY COMMISSION

1 to 2
2 to 4
4 to 8
8 to 15
15 to 50

GEORGIA FORESTRY COMMISSION

Fire Occurrence Map for Fulton County for Fiscal Year 2006-2010



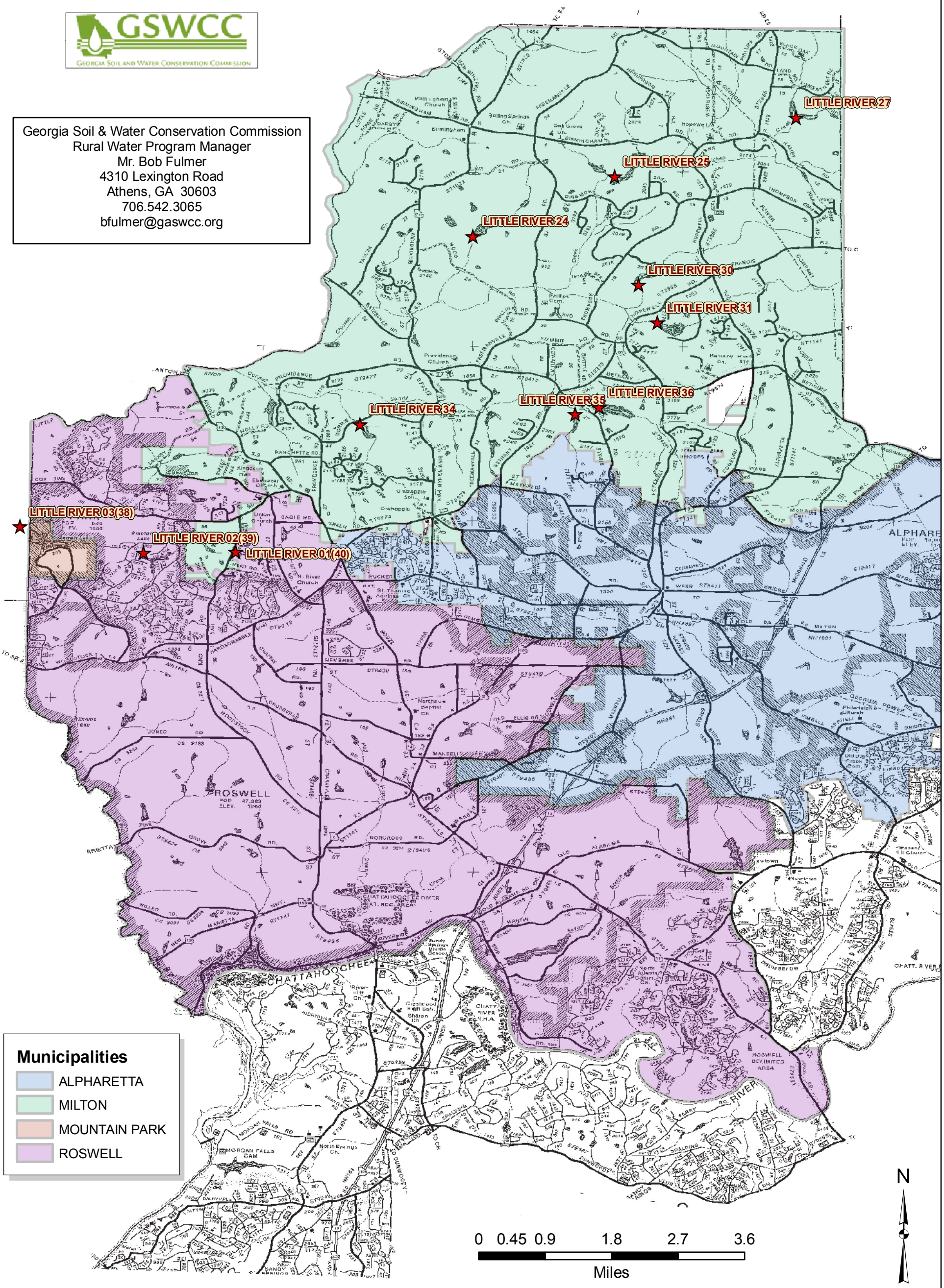
GEORGIA FORESTRY COMMISSION

1 to 2
2 to 4
4 to 8
8 to 15
15 to 50

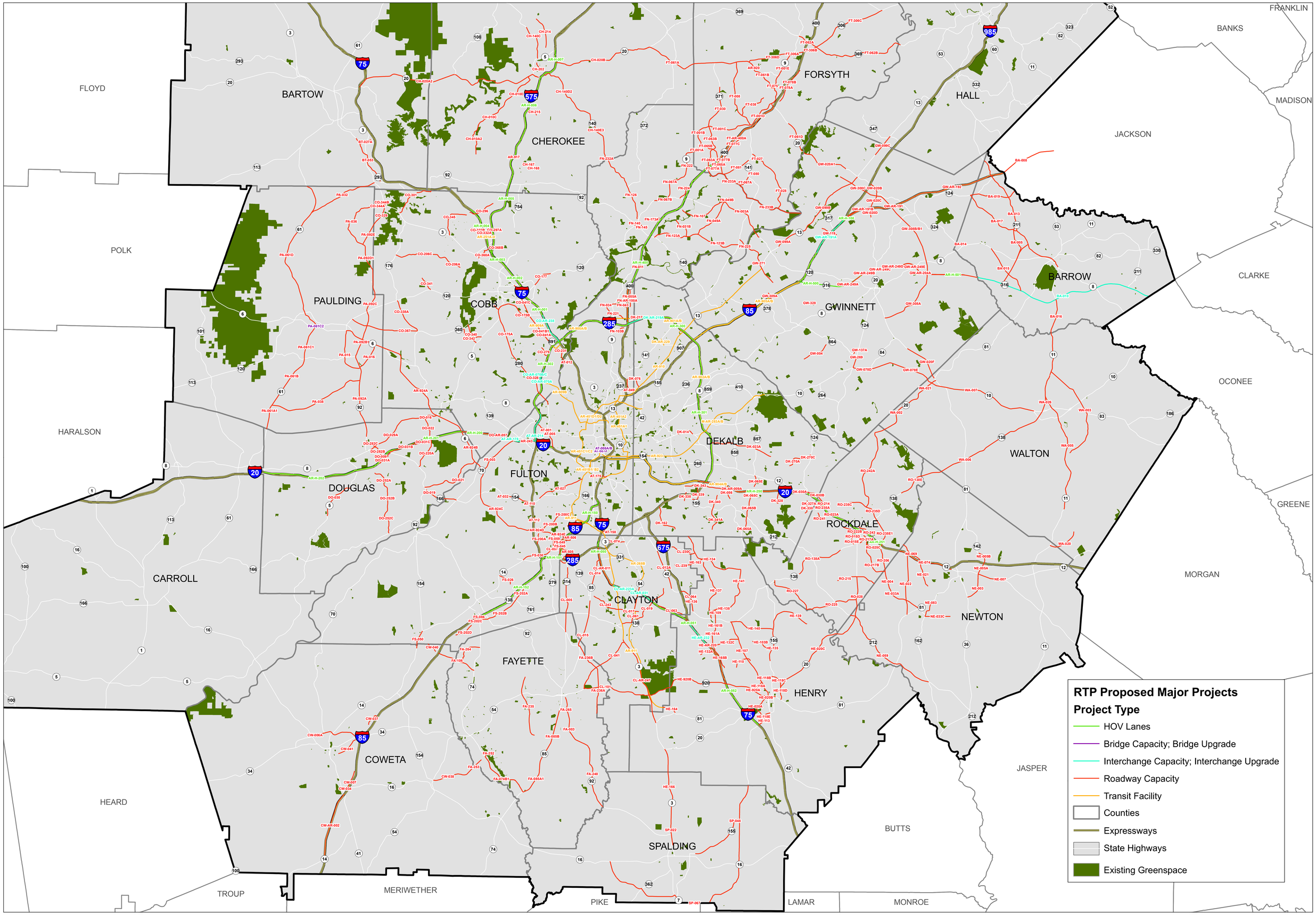
GEORGIA FORESTRY COMMISSION

Watershed Structures

Georgia Soil & Water Conservation Commission
Rural Water Program Manager
Mr. Bob Fulmer
4310 Lexington Road
Athens, GA 30603
706.542.3065
bfulmer@gaswcc.org



Existing Greenspace Overlay on Proposed RTP Major Projects

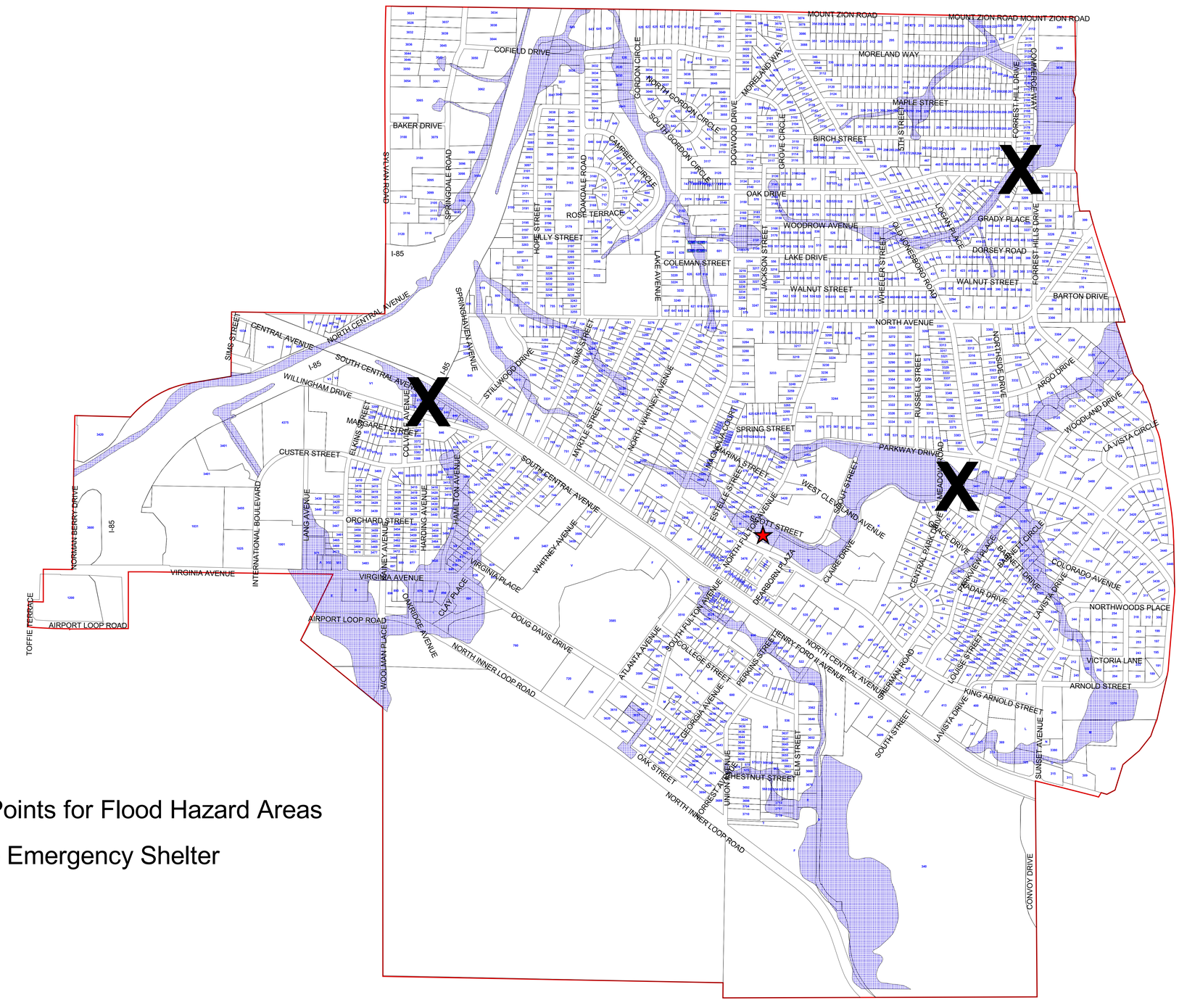


Atlanta Regional Commission
40 Courtland St.
Atlanta, GA 30303
404.463.3100
www.atlantaregional.com

3/21/07

City of Hapeville Hazzard Mitigation Map

October 21, 2008: as amended from July 10, September 28, 2010



X = Choke Points for Flood Hazard Areas

★ = Citywide Emergency Shelter

N

JCM 101508

Atlanta Region 2003 "Less Developed" Census Tracts

Regional Inset Map

Cobb Co
Smyrna
Atlanta
DeKalb Co
Decatur
Avondale Estates
East Point
Hapeville
College Park
Fulton Co
Forest Park
Lake City
Union City
Fairburn
Riverdale
Morrow
Clayton Co

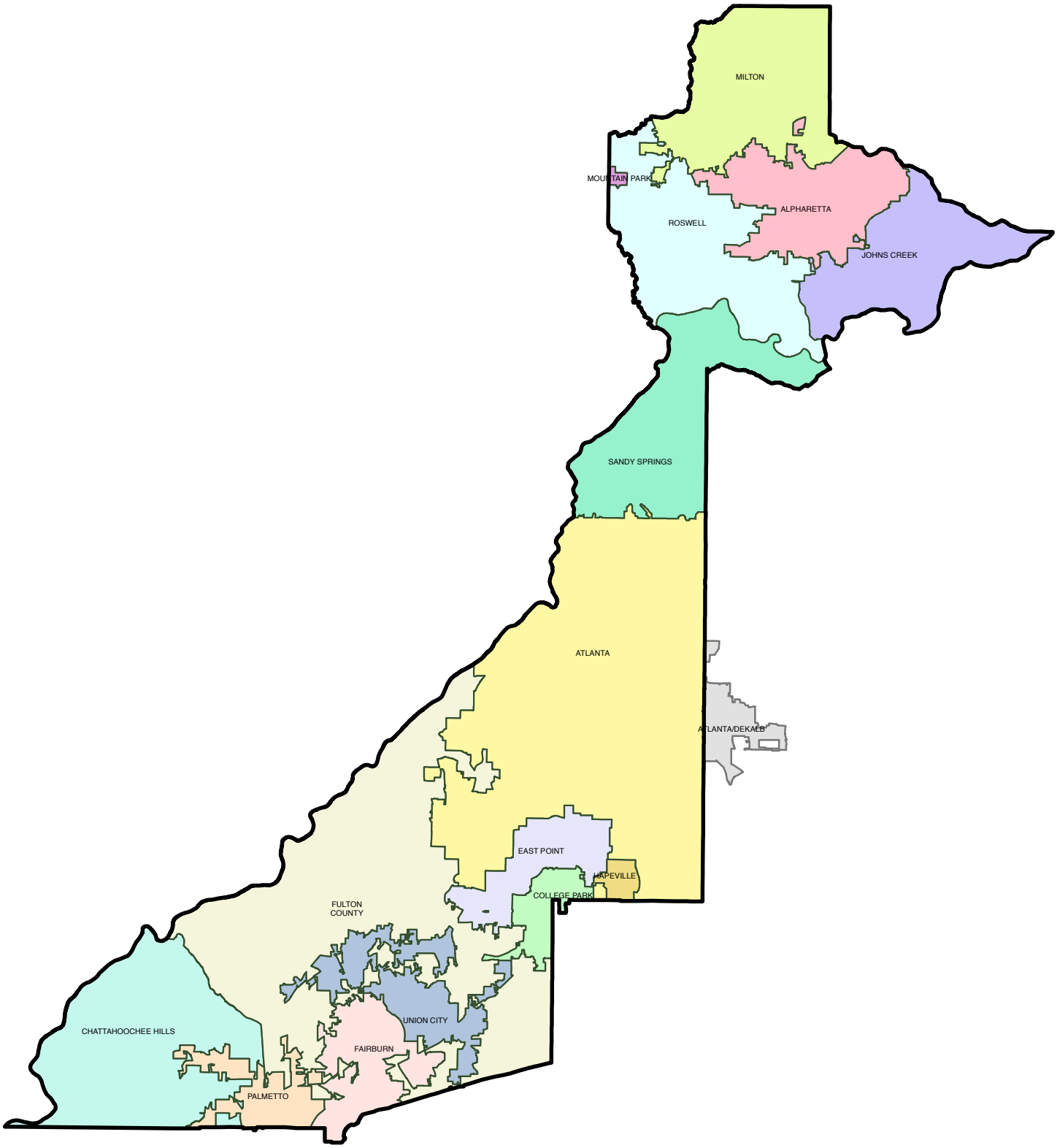
0 0.5 1 2 Miles

Legend

- 2003 Less Developed Census Tracts
- Municipal Boundaries
- County Boundaries
- Expressways
- Atlanta Region Streets
- Major Roads

Note to Users: This map was created for the Atlanta Chamber of Commerce by the Geographic Information Systems (GIS) Division of the Atlanta Regional Commission (ARC). The census tracts indicated on this map represent "Less Developed" tracts as defined by the Georgia Department of Community Affairs (DCA) and as such, are eligible for job tax credit for any business or headquarters of any such business engaged in manufacturing, warehousing and distribution, processing, telecommunications, tourism, or research and development industries, excluding retail. These Less Developed census tracts are DCA's current (2003) designations and the tract boundaries themselves are the U.S. Census Bureau's current (2000) geography. The streets, major roads and interstates shown on this map are derived from the Atlanta Region Streets (ARstreets) database which is a 10-county subset of the Georgia Department of Transportation's (GDOT) DLG -F street centerline file. For additional information about this map and GIS data at AR C, please contact Art Kalinski, GIS Manager at 404-463-3150. For additional information about the State's Less Developed census tracts, please refer to DCA's website at www.dca.state.ga.us

Atlanta Regional Commission • 40 Courtland St. NE • Atlanta, Georgia 30303 • 404-463-3100 • www.atlantaregional.com • 7/2004



Fulton County

Alpharetta
Atlanta
Atlanta/DeKalb
Chattahoochee Hills
College Park
East Point
Fairburn
Fulton County
Hapeville
Johns Creek
Milton
Mountain Park
Palmetto
Roswell
Sandy Springs
Union City

0 2 4 6 8 Miles

Prepared by the Fulton County Department of Environment & Community Development Geographical Information System Support Services Division

Created: 01/07/2010 AK
J:/.../fcgis_maps/base_maps/fc_cities_ap_v1.mxd

January 2010

Areas & Roads Susceptible to Flooding
Hazard Mitigation
City of Milton

October 2010

- Bridges
- Streets Likely To Flood
- Street Centerlines
- Rivers & Streams
- Parcels
- Lakes & Ponds
- 100yr Floodplain
- 500yr Floodplain
- Milton City Limits
- Fulton County Boundary

N

0 0.5 1 2 3 Miles

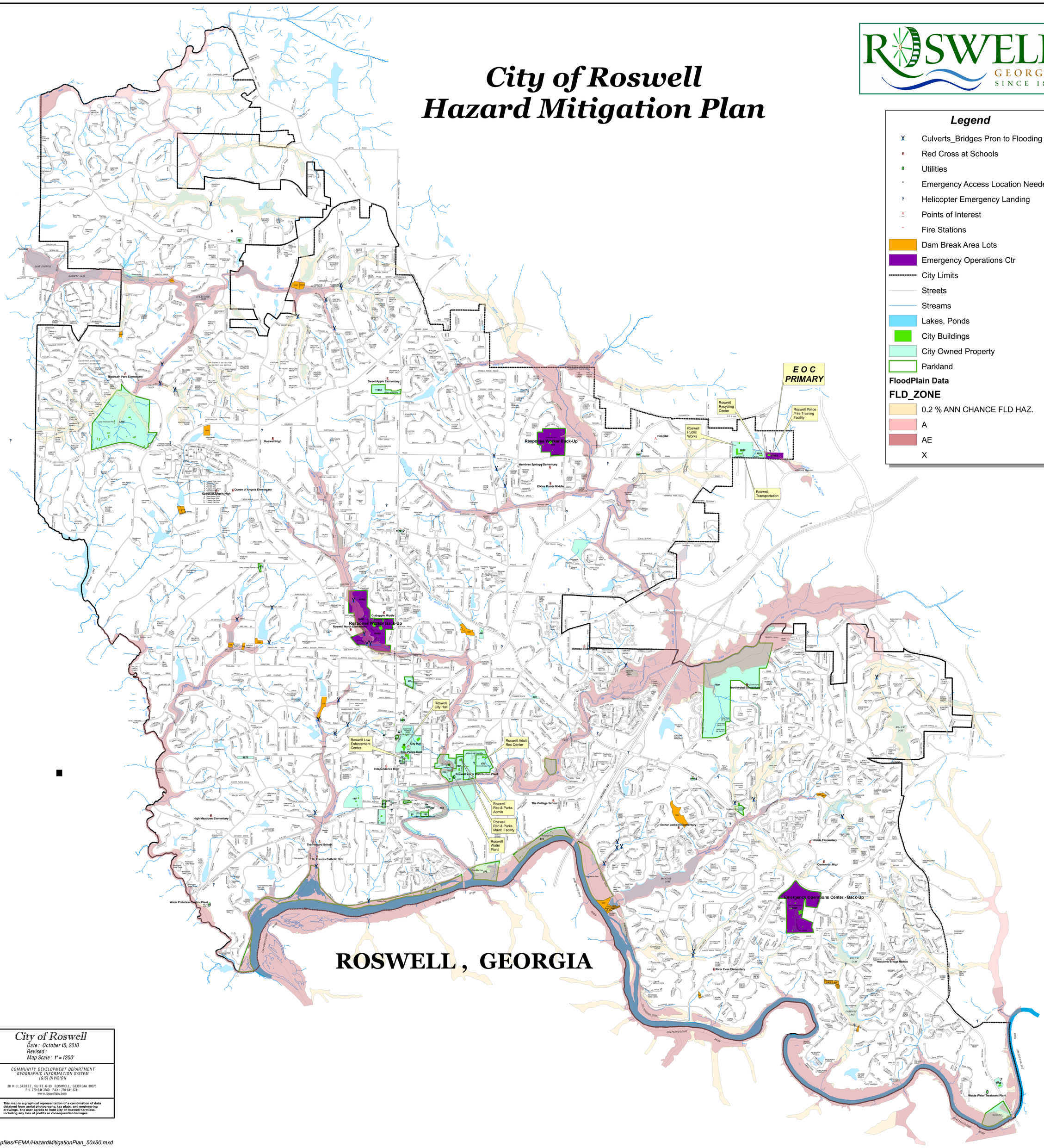
City of Milton
Department of IT - GIS Division
Date Created: 10/04/2010

G:\Miscellaneous\HazardMitigationFloodedAreas_bl_v1.mxd

Mountain Park
Flood Prone Areas

City of Roswell
Hazard Mitigation Plan

ROSWELL GEORGIA SINCE 1854



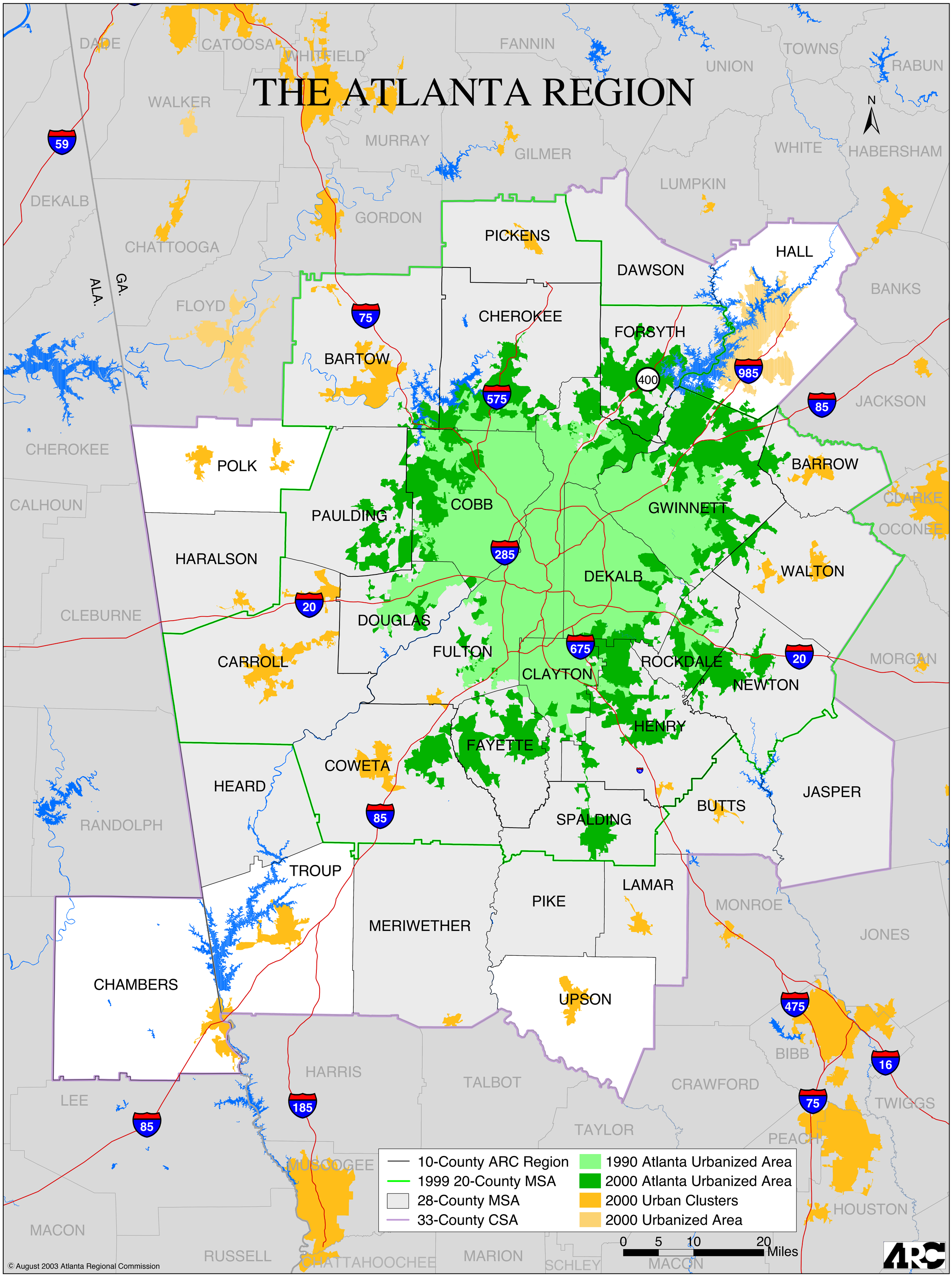
City of Roswell
Date : October 15, 2010
Revised :
Map Scale : 1" = 1200'

COMMUNITY DEVELOPMENT DEPARTMENT
GEOGRAPHIC INFORMATION SYSTEM
(GIS) DIVISION

38 HILL STREET, SUITE G-30 ROSWELL, GEORGIA 30075
PH. 770-641-3780 FAX : 770-641-3741
www.roswellgov.com

This map is a graphical representation of a combination of data obtained from aerial photography, tax plats, and engineering drawings. The user agrees to hold City of Roswell harmless, including any loss of profits or consequential damages.

Mapfiles/FEMA/HazardMitigationPlan_50x50.mxd


THE ATLANTA REGION
N
DADE
CATOOSA
WHITFIELD
FANNIN
UNION
TOWNS
RABUN
WALKER
MURRAY
GILMER
WHITE
HABERSHAM
LUMPKIN
DEKALB
GORDON
PICKENS
CHATTOOGA
HALL
DAWSON
BANKS
ALA.
GA.
FLOYD
CHEROKEE
FORSYTH
BARTOW
JACKSON
CHEROKEE
POLK
BARROW
CALHOUN
COBB
GWINNETT
CLARKE
PAULDING
OCONEE
HARALSON
WALTON
DEKALB
CLEBURNE
DOUGLAS
FULTON
CARROLL
ROCKDALE
MORGAN
CLAYTON
NEWTON
HENRY
FAYETTE
COWETA
HEARD
JASPER
BUTTS
RANDOLPH
SPALDING
TROUP
LAMAR
PIKE
MERIWETHER
MONROE
JONES
CHAMBERS
UPSON
BIBB
HARRIS
TALBOT
CRAWFORD
LEE
TWIGGS
TAYLOR
PEACH
MUSCOGEE
HOUSTON
MACON
RUSSELL
CHATTAHOOCHEE
MARION
SCHLEY
MACON
59
75
575
985
400
85
285
20
675
20
85
185
85
475
16
75
10-County ARC Region
1999 20-County MSA
28-County MSA
33-County CSA
1990 Atlanta Urbanized Area
2000 Atlanta Urbanized Area
2000 Urban Clusters
2000 Urbanized Area
0 5 10 20 Miles
ARC
© August 2003 Atlanta Regional Commission