2014 State of Georgia Hazard Mitigation Strategy





Georgia Hazard Mitigation Strategy

Standard and Enhanced Plan

Effective April 1, 2014-March 31, 2017

Prepared by the Georgia Emergency Management Agency

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Chapter 1: Introduction to Planning Process

1.1 OVERVIEW AND PURPOSE

The summary of updates and changes is included in the overview section of every chapter as a table that details each section and the changes that have occurred within the section since the last approval in 2011. Table 1.1 describes the updates and changes that have occurred in Chapter 1.

Chapter 1 Section	Updates to Section
1.1 Overview and Purpose	• Changed title from Plan Organization and Overview • Text revised to describe overview and purpose of plan • Text revised to add information on State of Georgia (Section 1.3 in 2011 GHMS)
1.2 State Adoption and Federal Statute Compliance	• Changed title from Adoption by State • Summarized Federal statute compliance and added into new section 1.2.2
1.3 Planning Process	• Changed title from State of Georgia • Added new sections 1.3.1, 1.3.2, 1.3.3, 1.3.4 and updated text to each • Added table that summarizes workshops
1.4 Coordination among Agencies	• Changed name from Plan Goals • Added tables to identify 2014 plan update participants and how they were involved • Described changes in participant coordination
1.5 Program Integration	• Changed title from Documentation of the Planning Process • Added table that identifies other state mitigation programs and how they were incorporated into the 2014 plan update • Added table that identifies FEMA mitigation programs and how they were incorporated into the 2014 plan update

Table 1.1 Summary of Changes to Chapter 1

Hazard Mitigation is sustained action taken to reduce or eliminate long-term risk to people and their property from hazards and their effects. Mitigation focuses on breaking the cycle of disaster damage, reconstruction, and repeated damage. Mitigation efforts provide value to people and society by creating safer communities and reducing loss of life and property.

Hazard mitigation planning is the process State, Tribal, and local governments use to identify risks and vulnerabilities associated with natural disasters, and to develop long-term strategies for protecting people and property from future hazard events.

This document, referred to as the Georgia Hazard Mitigation Strategy (GHMS), is an official update

of the State of Georgia Hazard Mitigation Plan submitted to and approved by the Federal Emergency Management Agency (FEMA) Region IV on March 31, 2011. The Georgia Emergency Management Agency (GEMA) is the state agency responsible for presenting this planning document on behalf of the State of Georgia.

The primary purpose for this plan is to eliminate or reduce risk and vulnerability to natural hazards in the State of Georgia. This is achieved through a comprehensive range of activities including education, outreach and coordination, hazard identification, risk and vulnerability assessment and development of mitigation strategies. The contents of this document provide the framework for hazard mitigation strategies and actions undertaken by local and state governments within the State of Georgia.

The United States Census Bureau estimates that the population of Georgia was 9,919,945 on July 1, 2012, a 2.4% increase since the 2010 United States Census. This was an increase of 104,735 from the previous year, and an increase of 232,292 since 2010. This includes a natural increase since the last census of 438,939 people (that is 849,414 births minus 410,475 deaths) and an increase from net migration of 606,673 people into the state. Georgia is the 8th most populous state in the United States and ranks 18th in population density with 165 people per square mile.

As of 2010, 87.35% (7,666,663) of Georgia residents age 5 and older spoke English at home as a primary language, while 7.42% (651,583) spoke Spanish, 0.51% (44,702) Korean, 0.44% (38,244) Vietnamese, 0.42% (36,679) French, 0.38% (33,009) Chinese (which includes Mandarin,) and 0.29% German. In total, 12.65% (1,109,888) of Georgia's population age 5 and older spoke a mother language other than English.

Georgia's 2010 total gross state product was $403.1 billion and Per Capita personal income for 2011 puts it 39th in the nation at $35,979. There are 15 Fortune 500 companies and 26 Fortune 1000 companies with headquarters in Georgia. Atlanta has a very large effect on the state of Georgia and the Southeastern United States. The city is an ever-growing addition to communications, industry, transportation, tourism, and government.

Widespread farms produce peanuts, corn, and soybeans across middle and South Georgia. The state is the number one producer of pecans in the world, with the region around Albany in southwest Georgia being the center of Georgia's pecan production. Gainesville in northeast Georgia touts itself as the Poultry Capital of the World. Other important agricultural outputs include peaches, cotton, peanuts, rye, cattle, hogs, dairy products, turfgrass, timber, particularly pine trees, tobacco and vegetables.

Industrial output includes textiles and apparel, transportation equipment, food processing, paper products, chemical products, and electric equipment. The Georgia Ports Authority owns and operates four ports in the state: Port of Savannah, Port of Brunswick, Port Bainbridge, and Port Columbus. The Port of Savannah is the fourth largest seaport in the United States, importing and exporting a total of 2.3 million TEUs per year. Other important contributions to Georgia’s economy include tourism, film and military installations.

With a low-lying coastal area, a middle piedmont area, and a mountainous northern area, Georgia’s

exposures to natural hazards range from hurricanes to drought and wildfire to severe winter weather. These exposures coupled with the expanding sprawl of metropolitan Atlanta, increasing coastal and mountainous area development, and increasing impoverishment in agricultural communities throughout the State lead to an increased “hazardousness of place”.

Exposure to the coastal weather patterns from the Atlantic Ocean and Gulf of Mexico and the continental weather patterns driven by the jet stream allows severe weather to originate from any direction and to occur during any season.

Because of the wide exposure to natural hazards and the increasing growth of population, identifying the hazards, risk and vulnerability both locally and statewide becomes critically important in the process of mitigating to protect human life and property.

1.2 STATE ADOPTION AND FEDERAL STATUTE COMPLIANCE

1.2.1 *State Adoption*

As evidence of the State of Georgia’s intent to fully comply with applicable Federal statutes and regulations in effect with respect to the periods in which it receives grant funding, in compliance with 44 CFR 13.11(c), a copy of the formal state adoption resolution and a copy of FEMA’s approval, once received, of Georgia’s Standard and Enhanced Hazard Mitigation Plans will be placed in Appendix F.

The State of Georgia assures that it will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, in compliance with 44 CFR 13.11(c). The GHMS will be amended according to the process and procedures listed and described in the plan maintenance section in Chapter 5, wherever necessary to reflect appropriate changes in State and Federal statues as required in 44 CFR 13.11(c) and 44 CFR 13.11(d) and as described by the State of Georgia.

1.2.2 *Federal Statute Compliance*

The GHMS has met the requirements of the Disaster Mitigation Act of 2000 Public Law 106-390, October 30, 2000, as stipulated in the Interim Final Rule 44 CFR 201.4 Standard State Plan criteria, published on February 26, 2002. Meeting the regulations will allow Georgia to maintain eligibility and qualify to secure all federally declared disaster assistance, including certain types of Public Assistance and hazard mitigation grants available through the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288, as amended).

1.3 PLANNING PROCESS

1.3.1 *Plan Update Narrative*

Chapter 1 of the Georgia Hazard Mitigation Plan was reviewed and updated by GEMA’s Hazard Mitigation Planners. Each section was reviewed by each member of the planning staff individually and

as a group. As a group, the planning staff revised each section as necessary to reflect the current update process utilized for this plan document, including the methodology, timeline and the participating Federal and State agencies.

Since the creation of the 2005 Georgia Hazard Mitigation Strategy, the State of Georgia has maintained a series of quarterly meetings of State agencies, called the State Hazard Mitigation Planning Team (SHMPT). The purpose of these meetings is to establish and maintain relationships between state agencies with a focus on hazard mitigation within the State of Georgia. These quarterly meetings provide a means for the State Hazard Mitigation Staff to update other state agencies, and receive feedback from those agencies, on mitigation activities throughout the State, including the GHMS.

In addition to the quarterly meetings, the SHMPT meets in the aftermath of major disasters. The purpose of these post-disaster meetings are to review and, if necessary, update the plan with any information related to the disaster and for the State Mitigation Staff to be made aware of any disaster or damage information the other agencies may have to determine possibilities for mitigation assistance to the affected agencies. The SHMPT conducted a post-disaster review of the 2011 GHMS in the aftermath of the 2011 major tornado outbreak in Northern and Central Georgia (DR 1973). The details of this post-disaster review meeting are described in Section 1.3.4 below.

Beginning in the Spring of 2012, the GEMA hazard mitigation planning staff began a more active update phase by conducting a summary review of the 2011 plan and update process. Each chapter was examined and the following list of suggested changes and areas to update was compiled:

- Update the risk assessment to reflect new hazard data including maps and occurrences of hazard events since the previous state plan update.
- Update the mitigation strategy to reflect a broader spectrum of mitigation partners and stakeholders, as well as increase connectivity to the risk assessment.
- Streamline the planning document itself by simplifying chapter contents and moving more detailed and technical information to supplemental annexes.
- Increase the number and diversity of participants.

After the summary review, the GEMA Hazard Mitigation planning staff developed a new process that would attempt to accomplish the objectives outlined above. In addition to the quarterly meetings and, if necessary, post disaster review meetings with the SHMPT, one of the substantive changes to the planning process for the 2014 update was the development and implementation of plan update workshops. For these workshops, a wide range of agencies and organizations were invited to participate.

Three workshops were developed: Understanding Risks, Understanding Vulnerabilities and Developing a Mitigation Strategy. The workshops allowed staff to present information from the previous plan such as the risk assessment and goals for comment and review. One of the tools created for these workshops is a risk ranking method that could help reinforce risk information and capture risk perceptions of the participants. This risk ranking method is explained in greater detail in Chapter 2. Breakout sessions, presentations and handouts were utilized in each of the workshops to engage the participants and facilitate discussions and activities. GEMA staff facilitated each of the breakout

Workshop	Date	Information Presented	Results
1: Understanding Risks	December 6, 2012	12 hazards in 2011 GHMS and profiles; Hazard risk ranking methodology	Breakout group discussion on hazards; hazards scored and ranked based on profile
2: Understanding Vulnerability	February 6, 2013	Vulnerability definition; historical and potential impacts of 12 hazards	Breakout group discussion on hazard vulnerabilities; hazards scored and ranked based on vul-
3: Developing Georgia's Mitigation Strategy	April 25, 2013	Risk summary from first 2 workshops; types of mitigation actions	Lists of potential mitigation actions for each hazard with prioritization

Table 1.2 State Plan Update Workshops

sessions and led the presentations and group discussions. The GEMA Hazard Mitigation website was used to publish results from each of the workshops.

The first workshop, Understanding Risks, was held on December 6, 2012 and included almost 70 participants from federal and state agencies, local government, non-government/non-profit organizations and the private sector. The definition of risk as a combination of hazard of vulnerability was presented to the participants. This workshop focused on identifying and profiling the natural hazards Georgia is exposed to. Handouts were developed that listed the twelve hazards identified in 2011 GHMS and included characteristics of these hazards in Georgia such as history, frequency, extent and locations at risk. GEMA staff presented overview of the planning process that includes these three workshops. A presentation was also given providing specifics on each of the twelve hazards. After these presentations, the participants were divided into three breakout groups. The breakouts involved discussion of hazard information and hazard scoring and ranking. After the breakout sessions, each group presented summary of comments from the discussion and hazard rankings.

The second workshop, Understanding Vulnerability, was held on February 6, 2013 and included 44 participants. In this workshop, the participants were given a presentation on the definition of vulnerability and information on impacts from the 12 natural hazards identified in the 2011 GHMS. Handouts were provided which described information on the historical and potential impacts of each hazard including adjusted losses, injuries and deaths, property damage, critical facilities, economic disruption and natural and cultural resources. The participants were divided into breakout groups where they scored and ranked each of the hazards in respect to the vulnerability. Each of the participants were given score sheets to rank the vulnerability of each hazard. Participants also added these scores to the average hazard scores from Workshop 1 to calculate the total risk score and rankings for all 12 hazards. After the breakout sessions, each group presented summary of comments from the discussion and vulnerability and total risk rankings. The results of the hazard scores and ranking are presented in Chapter 2.

The third workshop, Developing Georgia's Mitigation Strategy, was held on April 25, 2013 and included 25 participants. Risk summaries and findings from the previous two workshops were presented to the participants. This included the total risk scores and rankings for all the hazards. The participants were given a presentation on what mitigation means and the four categories of mitigation ac-

tions along with examples. The participants were divided into breakout groups with each assigned a different set of hazards. Each group developed a list of possible mitigation actions for their assigned hazards. These lists were compiled and presented to the entire group. Afterwards, the participants were given opportunity to prioritize these actions by placing sticker dots on the actions they believed are most important to reduce long-term risks. Some of the results from this workshop are presented in Chapter 3.

Another substantial change in the planning process for the 2014 GHMS was for the mitigation planning staff to proactively reach out, individually, to state agencies to discuss hazard mitigation and find out what type activities each agency was doing or had plans to do that have mitigation effects. These identified mitigation activities and priorities were reviewed by GEMA Hazard Mitigation Planning staff for inclusion into the State mitigation strategy.

1.3.2 *State Plan Update Participants*

As noted above, the State of Georgia has historically involved multiple other State and Federal agencies in the development and subsequent updates of the GHMS, primarily through the planning staff and the SHMPT meetings. One of the goals for the 2014 update was to broaden participation by involving more Federal and State agencies and partnering non-governmental organizations.

The 2014 GHMS was developed utilizing three core groups:

1. GEMA Hazard Mitigation Planning staff
2. University of Georgia Information Technology Outreach Services (ITOS)
3. Other agencies and partners

The planning process for the 2014 Update to the GHMS was led by the GEMA Hazard Mitigation Planning staff which consists of four planners and a manager. This team developed the process to the update the plan, facilitated the update implementation and drafted the planning document.

The Office of Information Technology Outreach Services (ITOS), a Division of the Carl Vinson Institute of Government of the University of Georgia, updated and developed data that was integrated into the risk assessment. This includes collection of hazard history from SHELDUS and NCDC, maps used in risk analysis and other hazard information.

Other agencies and partner organizations were invited and contributed to the development of the risk assessment and mitigation strategies. These organizations included federal, state and local representatives, non-government organizations and the private sector. Coordination among these organizations was completed with three mechanisms: the State Hazard Mitigation Planning Team (SHMPT), planning workshops and individual interviews with State agencies. Details on participants and how they participated in the state planning process is provided in section 1.4.

As described above, previous planning process utilized a group called the State Hazard Mitigation Planning Team (SHMPT). The SHMPT has evolved with each plan update and largely includes state agencies that meet quarterly. The quarterly meetings provide an opportunity for participants to receive updates on GEMA Hazard Mitigation activities as well as mitigation-related activities from other

agencies. During the state plan update, the SHMPT is informed of progress and given the opportunity to provide feedback on the planning process and completed sections. For more information on the history to the SHMPT and agencies actively participating, please see Appendix B.

For this plan update, the GEMA Hazard Mitigation Planning staff developed a new mechanism to expand participation to other agencies and organizations to reflect a broader representation of state interests. The result was a series of three workshops that would be designed to inform participants about hazard risks, vulnerabilities and mitigation strategies through the review of information from the 2011 GHMS. GEMA staff coordinated with federal and state agencies, local governments, regional planning organizations, non-government organizations and the private sector to participate.

1.3.3 *Plan Review and Revisions*

Since the adoption of the 2011 GHMS, the document has been available on the GEMA website for public view. During local plan update meetings, communities are informed about the availability of the GHMS as a resource and also encouraged to provide feedback on how the document could be improved to assist their needs. Some of these comments that have been received are that the GHMS is difficult to read and find useful information. Many of the sections are burdensome in length and contain highly technical language. Including more useful figures, tables and maps into the chapters would help communities find the information they need. This feedback was taken into consideration in the process and development of the 2014 update to the GHMS. Relevant maps that support text have been moved from appendices and integrated into the appropriate sections of the plan. Tables were formatted to improve clarity. The GHMS has been streamlined by removing redundant and superfluous information. New figures that support plan text and provide relevant information have been integrated into the chapters.

As described above in Section 1.3.1, the active update process began with a summary review of each section of the plan to note which items needed updating, as well as identifying any necessary changes to the planning process that would be needed in order to accomplish the goals the staff had for the 2014 plan. The review of the planning process, as well as the evaluation, monitoring and updating process to be used in the future, revealed changes that were necessary in order to accomplish the goal of broadening participation and input by other Federal and State agencies and non-governmental organizations. Therefore, the description of the planning process was revised to reflect, not only the quarterly and post disaster review meetings of the SHMPT and the planning work done by the mitigation staff, but also the workshops and agency interviews described in Section 1.3.1. The evaluation, monitoring and updating description was revised to reflect a similar process that was used to create the current update, with notation that the process may be modified as necessary to continually improve the state plan.

The planning staff’s review also revealed much of the information in the discussion on program integration contained much information not related to hazard mitigation. This information was streamlined to focus only on details related to hazard mitigation and how those programs were integrated into hazard mitigation as well as how hazard mitigation is integrated into them.

Upon review of the integration of local plan information into the State plan, the planning staff realized

that the process was only vaguely described. This resulted in additional detail being added to the 2014 plan to describe how the review of local information took place. The 2014 plan now describes whether changes were necessary as a result of the local plan review or whether the state plan adequately addresses the hazards and goals identified in Georgia's 159 local plans.

Information from the 2011 GHMS was used in the workshops to provide interactive opportunity for the participants to review and provide comments. This includes hazard descriptions, history, frequency, location and extent. The information used in the workshops was posted on the GEMA website for review. Participants were also encouraged to review other sections of the GHMS and provide comments. Some of the comments included adding maps into plan chapters, improving clarity of text and removing non-essential information.

The planning staff's summary review and Workshops 1 and 2 described in Section 1.3.1, included review and analysis of the risk assessment from the 2011 plan. This review and analysis revealed the following needs:

- The hazard history needed to be updated. This was done, including the most recent events, Presidential declarations, etc..
- The risk assessment section was highly technical and difficult to read and contained an unnecessary amount of detail not related to the hazards themselves. This was addressed by streamlining the information in the plan text, narrowing it to the actual risk assessment information, replacing paragraphs with tables and maps, and moving detailed technical information to the appendix.
- Some of the hazards did not adequately address the scope of those hazards, as faced by the State of Georgia. This was addressed by broadening hazards identified in the 2011 plan, such as storm surge and sinkholes. "Storm Surge" was re-labeled "Coastal Hazards" and now includes events, such as storm surge, coastal flooding, high surf and abnormal tides. "Sinkholes" was re-labeled "Geologic Hazards" and now includes sinkholes and landslides.
- Some of the map data was out of date. Out of date maps were replaced with maps based on the best and most recent data available.
- Staff review, Workshop 3 and agency interviews were used to review and analyze the mitigation strategy of the 2011 plan. This review revealed opportunities for improvement regarding the mitigation strategy. While the goals remained relevant, the mitigation actions were revised to be more comprehensive and inclusive of more State agencies, as well as to more adequately and concisely reflect what the State of Georgia wishes to accomplish and how (responsible party, potential funding sources, etc.) the State wishes to accomplish it.

The Staff reviewed the information on State assistance to local communities. The review did not result in any changes, other than updating and streamlining the presented information.

As draft sections of the plan were completed, these were posted on the GEMA website for public review and comment. Participants from the SHMPT and workshops were also contacted via e-mail informing them that draft chapters are available on the GEMA website. GEMA staff in other divisions was also given opportunity to review plan drafts and submitted comments that were incorporated in-

to the plan update.

1.3.4 *Post-Disaster Review*

Since the approval of Georgia's Hazard Mitigation Strategy update in 2011, one major hazard event has resulted in disaster a declaration in the State of Georgia. DR 1973 in April 2011 produced severe storms and tornadoes throughout central and northern Georgia.

In conjunction with ITOS, GEMA Hazard Mitigation Division and the Planning Team staff have updated the Standard Plan's hazard, risk, and vulnerability assessment (found in Chapter 2) to include the most recent disaster information and to reflect the new risks associated with the occurrence of the new disaster events.

A Post-Disaster meeting was held following the 2011 disaster, which occurred after the 2011 update. During this meeting, information on disaster impacts to communities and available mitigation funding programs were provided to the attendees. A separate portion of this meeting was held to specifically discuss the damages incurred by state agencies during each disaster, lessons learned, and any changes to local hazard mitigation plans, the state plan and state agency annexes. Two State agencies, the Georgia Department of Transportation and the Department of Juvenile Justice, reported damages to their facilities from the storms.

During the disaster many of the agencies involved with the hazard mitigation program were also involved with the state's response and took active roles in the State Operations Center by participating in ESF's. Support agencies worked on improving their response and coordination with other agencies from the state, the federal government and several private non-profit organizations.

1.4 COORDINATION AMONG AGENCIES

1.4.1 *State and Federal Agency Participation*

As described in the above sections, the State of Georgia used methods to involve Federal and State agencies and other interested organizations. These included the quarterly and post-disaster review meetings of the SHMPT, three plan update workshops held between December, 2012 and April, 2013 and individual agency interviews held between July and September 2013. Tables 1.3 and 1.4 identify and describe the participation of State and Federal Agencies in the 2014 plan update. The 2014 plan update also involved coordination with other organizations such as local communities, non-profit organizations, regional planning organizations and the private sector.

1.4.2 *Changes in Participant Coordination*

As described in Section 1.3, the State of Georgia changed the planning process in two substantial ways. The quarterly and post-disaster meetings that have occurred since the completion of the 2005 plan are continuing as a tool for stakeholder engagement. However, beginning with this update, Georgia added the series of workshops and agency interviews in order to increase participation in

the planning process and to improve coordination of Federal and State agencies into the 2014 State Plan.

State Agency	Participation
Administrative Office of the Courts	Workshops
GA Forestry Commission	Workshops, quarterly meetings, risk analysis, SHMPT
GA Dept of Driver Services	Workshops
GA Dept of Behavioral Health & Dev Dis	Workshops
Soil & Water Conservation Commission	Workshops
DNR	Workshops, quarterly meetings, risk analysis, SHMPT
GA State Patrol	Workshops
GEMA	Workshops
Georgia Lottery	Workshops
GA Dept of Community Affairs	Workshops, quarterly meetings, risk analysis, SHMPT
DOAS Risk Mgmt Services	Workshops
Dept. of Human Resources	Workshops, quarterly meetings, SHMPT
West Central Health District 7	Workshops
BOR-USG	Workshops
Dept. of Revenue	Agency telephone Interviews
Board of Regents	Workshops, Agency telephone Interviews
Georgia Port Authority	Workshops, Agency telephone Interviews
Dept. of Highway Safety	Workshops, quarterly meetings, SHMPT
Dept. of Audits	Workshops
GA Assoc. of Soil & Water Conservation Commission	Workshops
GA Dept. of Veterans Affairs	Workshops
State Property Office	Workshops
Dept. of Administrative Services	Workshops, SHMPT

Table 1.3 State Agency Participation in 2014 GHMS Update

Federal Agency	Participation
FEMA Mitigation Division - Risk Analysis	Workshops
National Weather Service	Workshops

Table 1.4 Federal Agency Participation in 2014 GHMS Update

Other Organization	Participation
GA 4 MW	Workshops
Family Intervention Specialists, Inc.	Workshops
Odyssey Family Counseling Center	Workshops
Cherokee Briggs & Associates	Workshops
Oconee Center - CSB	Workshops
UGA-ITOS	Workshops, risk analysis
Advantage Behavioral Health Systems	Workshops
CBF of Georgia	Workshops
Volunteers of America, SE	Workshops
Noah's Ark	Workshops
Children's Healthcare of Atlanta	Workshops
ACTS Retirement-Life Communities	Workshops
Lynndale, Inc.	Workshops
Hope Animal-Assisted Crisis Response (AACR)	Workshops
GA Community Support & Solutions	Workshops
Pudar Mitigation Consulting, Inc.	Workshops
Devereux	Workshops
Meritan, Inc.	Workshops
River Valley Regional Commission	Workshops
Cross Plains Community Partner	Workshops
Behavioral Health Link	Workshops
Volunteer Organizations Active in Disaster (VOAD)	Workshops
United Way 211	Workshops
Rockdale County	Workshops
Volunteers of America	Workshops
Salvation Army	Workshops
Child & Family Guidance	Workshops
Humane Assoc of GA	Workshops
Georgia Power Company	Workshops

Table 1.5 Other Organizations Participation in the 2014 GHMS Update

1.5 PROGRAM INTEGRATION

1.5.1 *State Planning Programs*

GEMA Hazard Mitigation planning staff has identified fourteen programs and initiatives that are relevant to hazard mitigation. These were reviewed for their effectiveness and incorporated into this plan update where appropriate. All of the programs and initiatives align with the overall goals of Georgia's Hazard Mitigation Strategy: reducing human vulnerability to hazard events; reducing the losses as-

sociated with hazard events; and reducing the people and property of Georgia's overall exposure to hazard events. Specific program and initiatives that are represented in the State mitigation strategy include Safe Dams, Community Wildfire Protection Plans and Risk MAP. GEMA Hazard Mitigation planning staff will continue to review other state programs and initiatives for review and inclusion into the GHMS. Additional information on these programs is provided in Section 3.3.

State Planning Efforts	GHMS Integration
Georgia StormReady	State capability assessment, mitigation strategy
GA Planning Act	State capability assessment, mitigation strategy
Safe Dams	State capability assessment, mitigation strategy
Coastal Management	State capability assessment
Coastal Marshland Protection	State capability assessment
Erosion and Sedimentation Control	State capability assessment
River Corridor Protection	State capability assessment
Shore Protection	State capability assessment
Emergency Watershed Protection	State capability assessment
EMAP Accreditation	State capability assessment
Southern Wildfire Risk Assessment	Data added into wildfire risk assessment and hazard maps, State capability assessment
Community Wildfire Protection Plans	State capability assessment, mitigation strategy
Silver Jackets	State capability assessment, mitigation strategy
Risk MAP	State capability assessment

Table 1.6 Integration of State Programs into the 2014 GHMS

1.5.2 *FEMA Mitigation Programs*

The 2014 GHMS is integrated with FEMA programs such as Hazard Mitigation Assistance (HMA), National Flood Insurance Program (NFIP), Community Rating System (CRS), and Risk Map. The mitigation actions in Chapters 3 and 4 include details on the State's efforts at increasing NFIP and CRS participation, implementation and support of the Risk MAP program and use of the HMA and FMA grant programs. Additional information on these programs is found in Sections 3.3, 3.4 and 4.2.

FEMA Program	GHMS Integration
HMA	Funding sources for Mitigation Grants
NFIP	State risk assessment, mitigation strategy, Local capability assessment
CRS	
FMA	Funding Source for Mitigation Grants
Risk MAP	Activity being conducted in the State of Georgia.

Table 1.7 Integration of FEMA Mitigation Programs into the 2014 GHMS

Chapter 2: Risk Assessment

2.1 OVERVIEW

The Hazard, Risk, and Vulnerability Assessment of the Georgia Hazard Mitigation Strategy provides the scientifically-sound foundation for the goals, objectives, tasks, and actions steps that are proposed in the plan. This chapter of the plan consists of the following sections: Overview, Definition of Terms, Methodology, Overview of Natural Hazards in Georgia, Hazard-Specific Assessments, Vulnerability Assessment, Composite Assessment, and Loss Potential.

The Definition of Terms section includes definitions of the terms *hazard*, *risk*, *risk assessment, vulnerability*, and *mitigation* utilized in this plan.

The Methodology section outlines the processes used in developing the risk assessment, including data manipulation and analyses that led to the presented conclusions.

The All-Hazard Assessment section discusses the hazard event and loss history for the State of Georgia without regard for specific hazard types. This section includes analysis of losses associated with all hazard events and claims associated with Presidential Disaster Declarations (PDDs).

The Hazard Specific Assessments section identifies the specific hazards affecting Georgia by recounting each hazard's event and loss history, Presidential Disaster Declarations history, and notable event history. Also, this section includes hazard-specific occurrence probabilities (risk).

The Vulnerability Assessments section addresses both social and environmental vulnerability to hazard events at a state level. This also includes an analysis of vulnerable state buildings and critical facilities.

The Composite Assessment section attempts to address the concept of "hazardousness of place" by combining the composite of hazards with vulnerability in order to highlight areas of concern.

The last section, which relates to Loss Potential, presents the state assets and locally-defined critical facilities in conjunction with the composite hazard scores in order to determine the areas with the highest potential for loss.

The summary of changes that occurred to the updated mitigation strategy from the 2011 plan is recorded in the following table, Table 2.1.

Chapter 2 of the Georgia Hazard Mitigation Plan was updated with assistance by the Carl Vinson Institute's Information Technology Outreach Service (ITOS) at the University of Georgia. The risk assessment is based on best available risk and vulnerability statistics and data available as of June 30, 2013.

Chapter 2 Section	Updates to Section
2.1 Overview	• Changed dates to reflect new plan • Text changes to describe structure of chapter
2.2 Definition of Terms	• Changed name from Context • Definitions changed and new term added
2.3 Methodology	• New text added to describe risk assessment process • New section 2.3.2 describing risk ranking
2.4 Overview of Natural Hazards in Georgia	• Changed title from All-Hazard Assessment • Reformatted and revised all sections • Added maps and tables into sections • Updated dates to section to reflect the dates as they pertain to the plan update
2.5 Hazard-Specific Assessments	• Tropical cyclone to Hurricane Wind • New geologic hazards section; includes sinkhole and landslide • New coastal hazards section; includes previous storm surge and coastal flooding; adds related hazards • Seismic changed to Earthquake • Added text to each section • Added maps and figures • Updated tables, text, and maps to reflect the current available data for hazards
2.6 Social Vulnerability Assessment	• Updated data, tables and maps • Name changed from Vulnerability Assessment
2.7 Composite Assessment	• Updated tables, text, and maps to reflect the current available data for composite assessment
2.8 Loss Potential	• Updated tables, text, and maps to reflect the current available data for hazard risk

Table 2.1: Overview of Updates to Chapter 2: Hazard, Risk, and Vulnerability Assessment

2.2 DEFINITION OF TERMS

Risk, for the purpose of hazard mitigation planning, is the potential for damage, loss, or other impacts created by the interaction of natural hazards with community assets. Hazards are natural processes, such as tornados and earthquakes. The exposure of people, property, and other community assets to natural hazards can result in disasters depending on the impacts. Impacts are the consequences or effects of the hazard on the community and its assets. The type and severity of impacts are based on the extent of the hazard and the vulnerability of the asset, as well as the community's capabilities to mitigate, prepare for, respond to, and recover from events. The following are FEMA definitions of terms used in risk assessments.

Hazard: A source of potential danger or adverse condition. Natural hazards are created by a meteorological, environmental, or geological event.

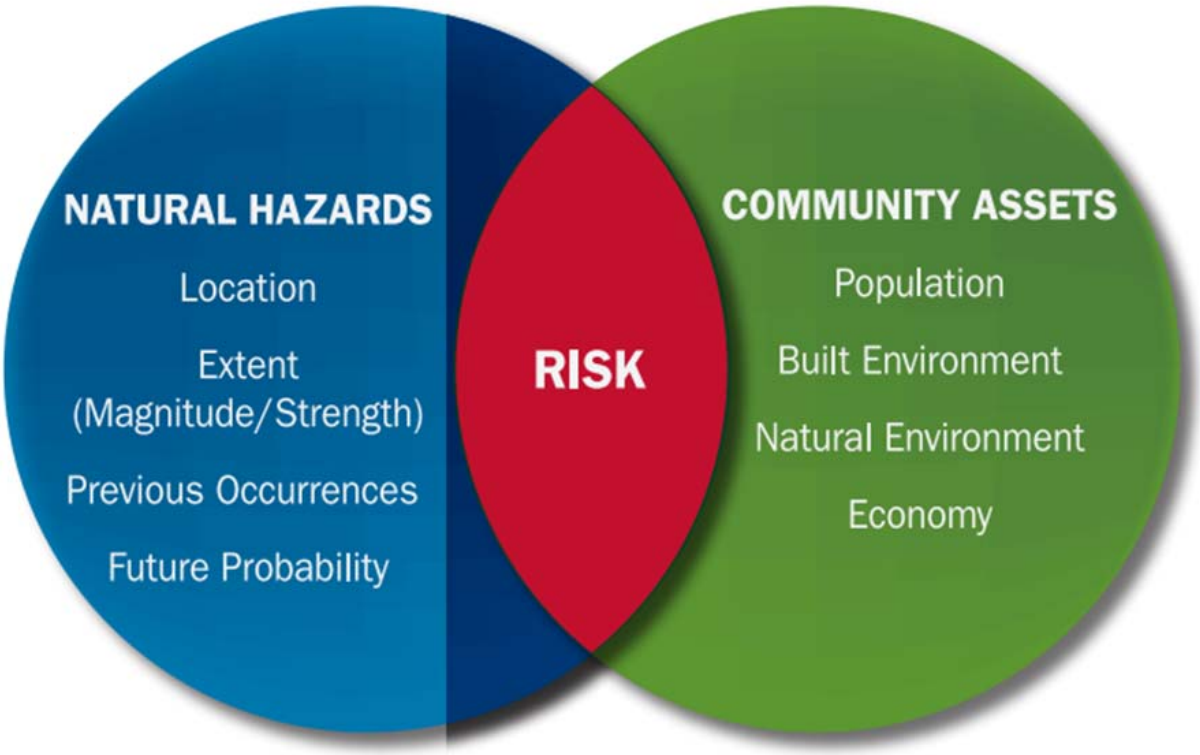
Risk: The estimated impact that a hazard would have on people, services, facilities, and structures in a community; the likelihood of a hazard event resulting in an adverse condition

that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate or low likelihood of sustaining damage above a particular threshold due to a specific type of hazard event. It also can be expressed in terms of potential monetary losses associated with the intensity of the hazard. As Figure 2.1 illustrates, risk exists when natural hazards interact with community assets.

Risk Assessment: The product or process that collects information and assigns values to risks for the purpose of informing priorities, developing or comparing courses of action, and informing decision making.

Vulnerability: Describes how exposed or susceptible to damage an asset is. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power – if an electric substation is flooded, it will affect not only the substation itself, but a number of businesses as well. Often, indirect effects can be much more widespread and damaging than direct ones.

Mitigation: Hazard mitigation is sustained action taken to reduce or eliminate long-term risk to people and their property from hazards.



Note: Modified from U.S. Geological Survey and Oregon Partnership for Disaster Resilience Models.

Figure: 2.1

2.3 METHODOLOGY

The focus of this risk assessment is to identify and describe the hazards and their impacts affecting the State of Georgia. The point of this Methodology section is to outline the steps to analyzing risk to Georgia from natural hazards. Methods pertaining to specific hazard and risk assessments are outlined in the individual hazard's section of the Hazard Specific Assessments.

2.3.1 2014 Risk Assessment

Updating the risk assessment began with a review of the twelve identified natural hazards in the 2011 GHMS. Identifying natural hazards in Georgia is a process involving local plan inputs, comments from state stakeholders and hazard history. GEMA staff started this process by examining local hazard mitigation plans to determine if additional locally identified hazards warrant consideration in this risk assessment. This review did not produce additional hazards for the state plan update.

During the state plan update workshops, participants were given the opportunity to review the 2011 identified hazards. Several comments were given on additional hazards to consider. These include landslides, agricultural pests, wildfire smoke/air quality, pandemic flu and climate change. After the workshops, GEMA staff analyzed each of these hazards to determine if the definition and data were sufficient to meet natural hazard profile requirements.

Landslides were mentioned under seismic hazards in the 2011 plan as a secondary hazard to earthquakes; however, this description was deemed insufficient as landslides have several causes. Additional data and discussion on the landslide hazard was added to the new section 2.5.11 Geologic Hazards. Among other updates to section 2.5.9 Wildfire, the description now includes air quality impacts from smoke. The other suggested hazards were determined to either not meet the definition of natural hazard, or insufficient data is available to objectively document specific risk to life and property.

Historic data from Spatial Hazard Events and Losses Database for the United States (SHELDUS), National Climate Data Center (NCDC) and other records were reviewed to identify any additional hazards. This did not produce any hazards for the risk assessment. More information on SHELDUS and NCDC is provided in section 2.4.2

After the hazard identification process, the assessments for all twelve identified hazards were reviewed to identify new sources of information and updated data. This includes hazard events that have occurred since the 2011 GHMS adoption, hazard maps, potential risk areas and potential vulnerability. All hazard assessments have been updated to reflect best available descriptions and data.

2.3.2 *Hazard Risk Ranking*

To gain a better understanding of risks to hazards, GEMA staff developed a tool that could comparatively assess and prioritize each of the identified hazards in the GHMS. GEMA staff surveyed existing hazard ranking tools that were incorporated into various state and local hazard mitigation plans

around the nation. While many of those ranking tools in other mitigation plans had useful or insightful components or methods, GEMA staff created its own methodology incorporating best practices from other examples.

Among the problems this methodology attempts to resolve includes developing a priority ranking based on total risk, factoring vulnerability into risk and potential for events not recorded in data sources. An example of the latter is hurricanes. While some major hurricanes have made impact in the past, none have in over a century therefore data event and impact sources such as SHELDUS and NCDC do not have information on this hazard since those records begin in the 1950's.

The basic definition that GEMA staff operated from to create this methodology is that Risk = Hazard + Vulnerability. Specific categories were identified based on common definitions of hazard and vulnerability. Where possible, objective data was utilized such as events per year and annualized losses. Only data was from 1992-2012 was incorporated since older records are often incomplete. This methodology is not intended to be a scientific process, but rather an additional tool for understanding natural hazards in Georgia. The results are presented in Tables 2.2, 2.3 and 2.4.

Hazard:

Historical Frequency	Duration	Area Impacted

Vulnerability:

Annualized Losses	Injuries and Deaths Per Year	Human Loss	Property Damage & Effect	Critical Facilities Impacted	Economy Disruption	Natural and Cultural Resources (Environment)

Blue: Historical Impact (SHELDUS data)
Green: Potential Hazard
Red: Potential Vulnerability

Hazard Ranking

	Hazard	Score	Threat
1	Severe Weather	12	VH
2	Drought	10	H
3	Winter Weather	9	H
4	Inland Flooding	8	M
5	Wind	8	M
6	Tornado	7	M
7	Trop. Cyclone	6	M
8	Wildfire	6	M
9	Storm Surge	5	L
10	Seismic	4	L
11	Dam Failure	4	L
12	Sinkhole	3	L

Threat Levels
Very High= 12-15
High= 9-11
Medium= 6-8
Low= 3-5

Table 2.2 Workshop 1 Hazard Ranking

Vulnerability Ranking

	Hazard	Score	Impact
1	Tornado	25	VH
2	Inland Flooding	17	H
3	Severe Weather	17	H
4	Trop. Cyclone	15	M
5	Wind	13	M
6	Drought	12	M
7	Winter Weather	12	M
8	Storm Surge	12	M
9	Wildfire	12	M
10	Dam Failure	11	M
11	Seismic Hazards	7	L
12	Sinkhole	4	L

Impact Level
Very High= 24-30
High= 16-23
Medium= 8-15
Low= 1-7

Table 2.3 Workshop 2 Vulnerability Ranking

Total Risk Ranking

	Hazard	Score	Risk
1	Tornado	32	H
2	Severe Weather	30	H
3	Inland Flooding	26	H
4	Drought	22	M
5	Wind	22	M
6	Winter Weather	21	M
7	Trop. Cyclone	21	M
8	Wildfire	18	M
9	Storm Surge	18	M
10	Dam Failure	15	L
11	Seismic Hazards	11	L
12	Sinkhole	7	L

Risk Levels
Very High= 36-45
High= 26-35
Medium= 16-25
Low= up to 15

Table 2.4 Workshop 2 Total Risk Ranking

This ranking methodology was presented in the state plan update workshops and participants were given the opportunity to present their perspectives of these hazards based on their understanding of the hazards and the scoring criteria presented. Worksheets used in this ranking are included in Appendix C. The hazard specific assessments in section 2.5 include the hazard, vulnerability and risk levels as well as the total rank out of the 12 hazards.

2.4 OVERVIEW OF NATURAL HAZARDS IN GEORGIA

2.4.1 *Introduction*

The 2014 GHMS retains twelve natural hazards although some of these have been modified after the risk assessment process was completed. Tropical Cyclonic Events was changed to Hurricane Wind to reflect the data used in the analysis. Storm Surge was changed to Coastal hazards to also include Coastal Flooding related events that are not associated with tropical cyclones. The Seismic Hazards section was changed to Earthquake to more specifically identify the hazard and data described in that section. Sinkhole was added to the Geologic Hazards along with Landslide. The table below shows the hazards identified in the 2011 and 2014 GHMS. Sub-hazards included under each hazard are also listed. This summary of changes is depicted in Table 2.5.

2011 Hazards	2014 Hazards	2014 Sub-hazards
Tropical Cyclonic Events	Hurricane Wind	
Storm Surge	Coastal Hazards	Storm Surge, Coastal Flooding
Wind	Wind	
Severe Weather	Severe Weather	Thunderstorms, lightning, hail
Tornadoes	Tornadoes	
Inland Flooding	Inland Flooding	
Severe Winter Weather	Severe Winter Weather	
Drought	Drought	
Wildfire	Wildfire	
Seismic Hazards	Earthquake	
Sinkholes	Geologic Hazards	Sinkhole, landslides and debris flows
Dam Failures	Dam Failures	

Table 2.5 Changes in Hazards from 2011 to 2014 State Plan

Table 2.6 was created based upon the results of reviewing all 159 local hazard mitigation plans. GEMA staff extracted information about hazards that the locals included in each risk assessment. The table includes hazard type and percentages of local plans that identify that hazard. There is a significant increase in the percentage of local plans that are identifying Wind, Hurricane Wind and Severe Weather hazards.

2.4.2 *Hazard Profiling and Characteristics*

The primary characteristics used in profiling hazards include event history, extent (magnitude), probability and location. History involves describing previous events and impacts to the affected areas. Extent or magnitude is the greatest severity likely to occur. Probability is the likelihood that an event will occur in the future. Location is the areas that are susceptible to being impacted by the event.

The primary source for historical events and impacts is the Spatial Hazard Event and Loss Database for the United States (SHELDUS) produced by the Hazards & Vulnerability Research Institute of the University of South Carolina. This searchable database contains hazard-specific data with each

Hazard Type	% of Counties Identifying in 2010	% of Counties Identifying in 2013
Inland Flooding	97%	98%
Tornadoes	97%	98%
Drought	91%	90%
Severe Winter Storms	81%	81%
Wind	72%	80%
Wildfire	78%	79%
Tropical Cyclonic Events (Hurricane Wind)	52%	60%
Severe Weather	52%	68%
Hailstorm (Severe Weather)	50%	64%
Lightning (Severe Weather)	45%	63%
Dam Failure	32%	32%
Heat	22%	22%
Earthquake	26%	21%
Coastal Flooding	5%	6%
Sinkhole	3%	3%
Landslide	1%	1%

Table 2.6 Hazards in Local Plans

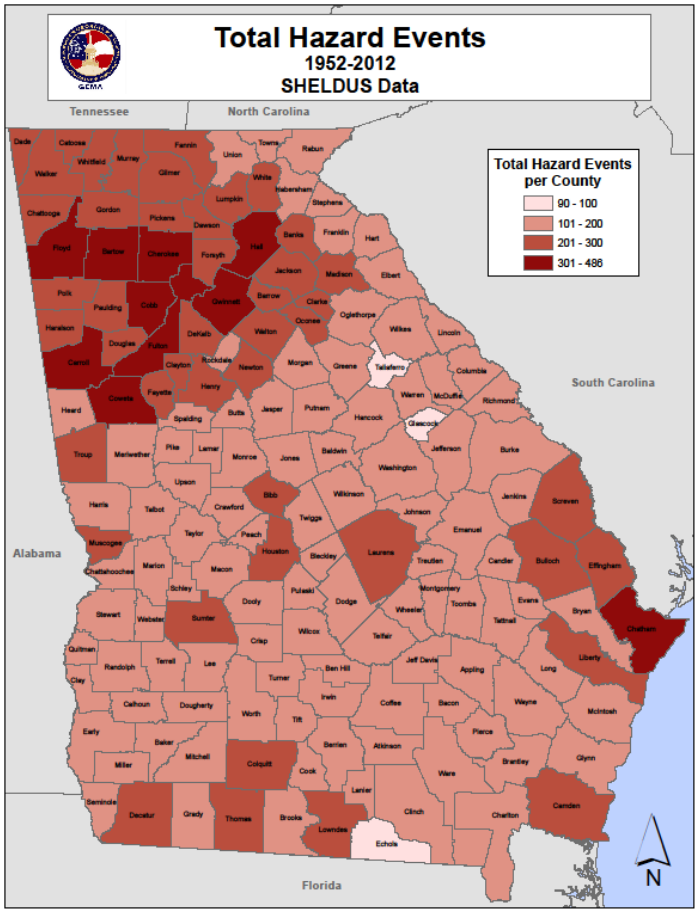


Figure 2.2 Total Hazard Events by County

event having the location (county), beginning date, property losses, crop losses, injuries, and fatalities. This database is derived from many national data sources including the National Climatic Data Center (NCDC) and the National Geophysical Data Center (NGDC). The data covers hazard events and losses from 1952 to 2012 for tornado events and 1960 to 2012 for all other events, with updates for additional years forthcoming. The version of SHELDUS used for this plan update is 10.1, released in August of 2013. This version includes a greater number of events than previous versions. In older versions, a hazard event was utilized only if exceeding a $50,000 loss or 1 fatality. In SHELDUS 10.1, every loss-causing event between 1960 and 1989 and from 1995 to December 31, 2012 was included. Events occurring between 1990 and 1995 were still subject to the loss threshold of 1 fatality or $50,000 in damages. Therefore this version of SHELDUS still undercounts some events but overall has improved in its tabulation

of Hazard events with the dropping of loss thresholds for the majority of years covered. Other sources of hazards events and loss are presented as best available data in instances where SHELDUS and NCDC were incomplete. This includes coastal flooding and wildfire.

The data gathered from SHELDUS is visually represented in maps located in the Hazard Specific Assessments. Figure 2.2 illustrates the total of hazard events that have occurred within the State from 1952-2012. Areas around Metro Atlanta and Savannah experienced the greatest number of total hazard events during this timeframe.

Figure 2.3 illustrates the total losses from all hazard events by county from 1952 - 2012. These totals take into account inflation; therefore, all amounts are in 2012 dollars. Counties in the Metro Atlanta area experienced the greatest total losses during this timeframe.

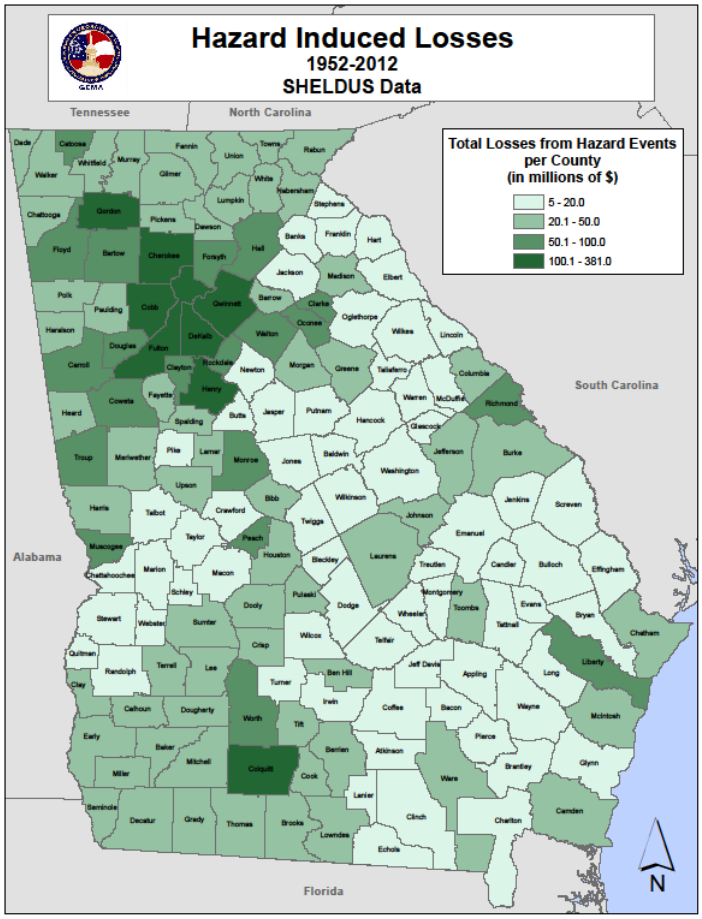


Figure 2.3 Total Hazard Losses by County

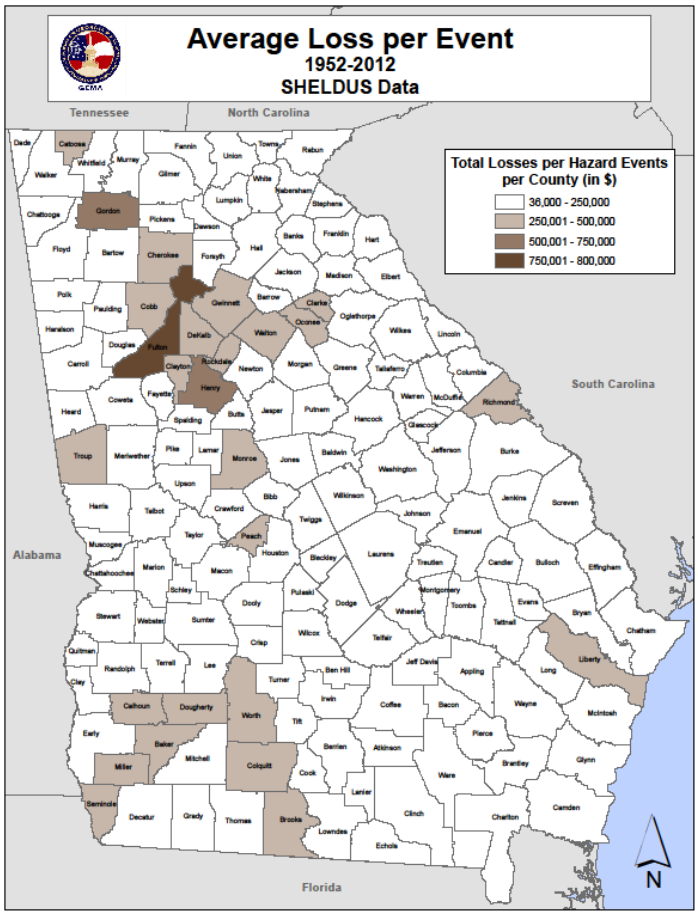


Figure 2.4 Average Loss per Event by County

Figure 2.4 depicts the average loss per hazard event for each county. Fulton County represents the highest loss per event category with totals between $750,000 and one million dollars per hazard event.

Extent or magnitude of a hazard event is defined by a scientific scale or objective data that describes how severe the event could be. Examples include the Enhanced Fujita Tornado Scale or Saffir-Simpson Hurricane scale. A review of historical events that have occurred can indicate a reasonable expectation of the potential extent to a future event. With tornadoes, the greatest severity experienced in Georgia is an EF4; therefore, the potential extent of a future tornado event in Georgia is an EF4. Each of the hazard specific assessments describes potential extent.

The best source of information for determining

future probability is to review the historic occurrence or frequency of a hazard event. This is limited depending on the quality of historical records and availability of data. For example, no major hurricane has made landfall since 1898; however, between 1854 and 1898 there were three. There is not enough scientific data to determine the exact probability of a future event.

Location of the areas susceptible to the hazard event also takes into consideration previous occurrences. However, just as the case with other profile characteristics location depends on the availability and quality of data. Maps are included in the hazard specific assessments to help indicate susceptible locations either by historical events or other data sources such as floodplain maps and wildfire risk.

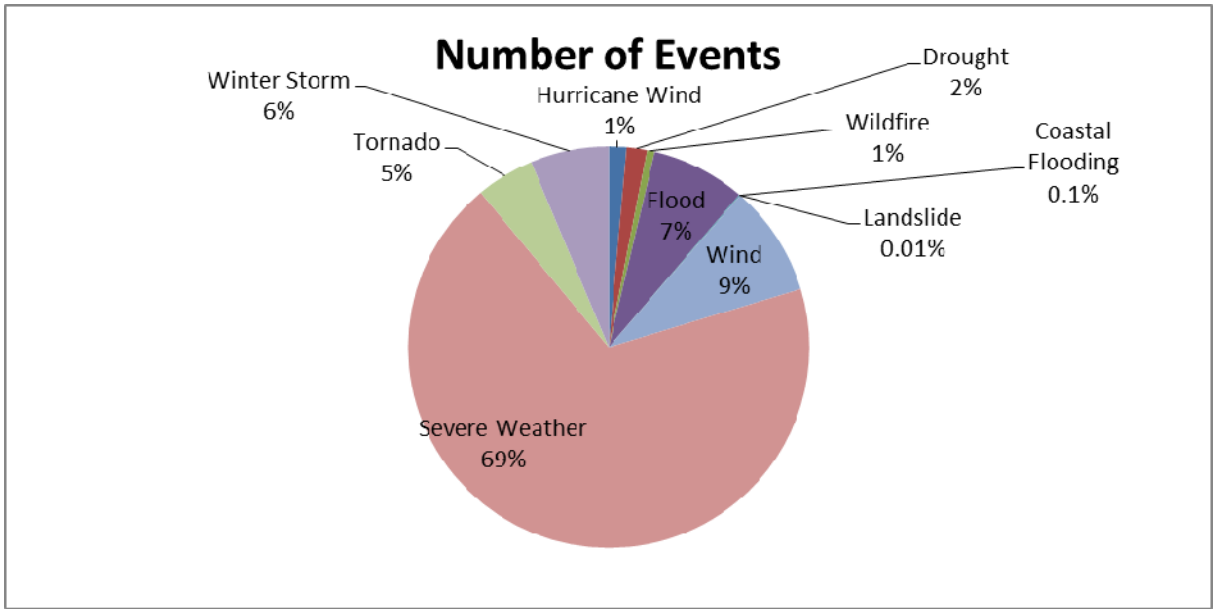


Figure 2.5 SHELDUS Hazard Events Percentage 1992-2012

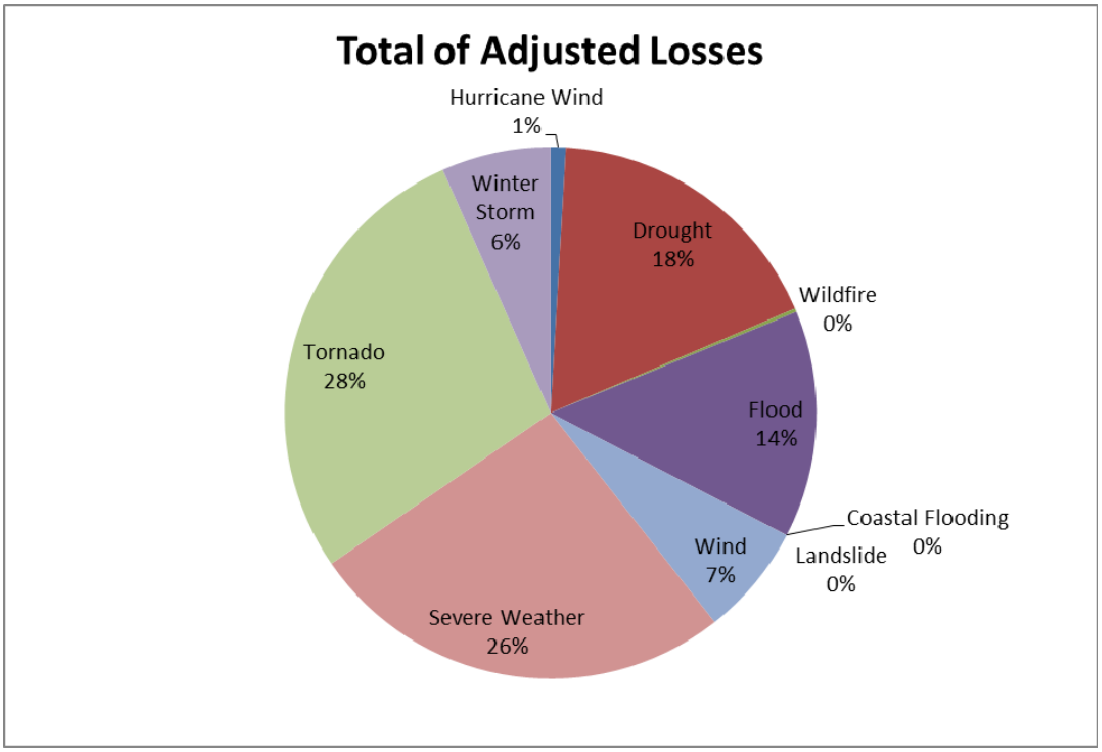


Figure 2.6 SHELDUS Adjusted Loss Percentage by Hazard 1992-2012

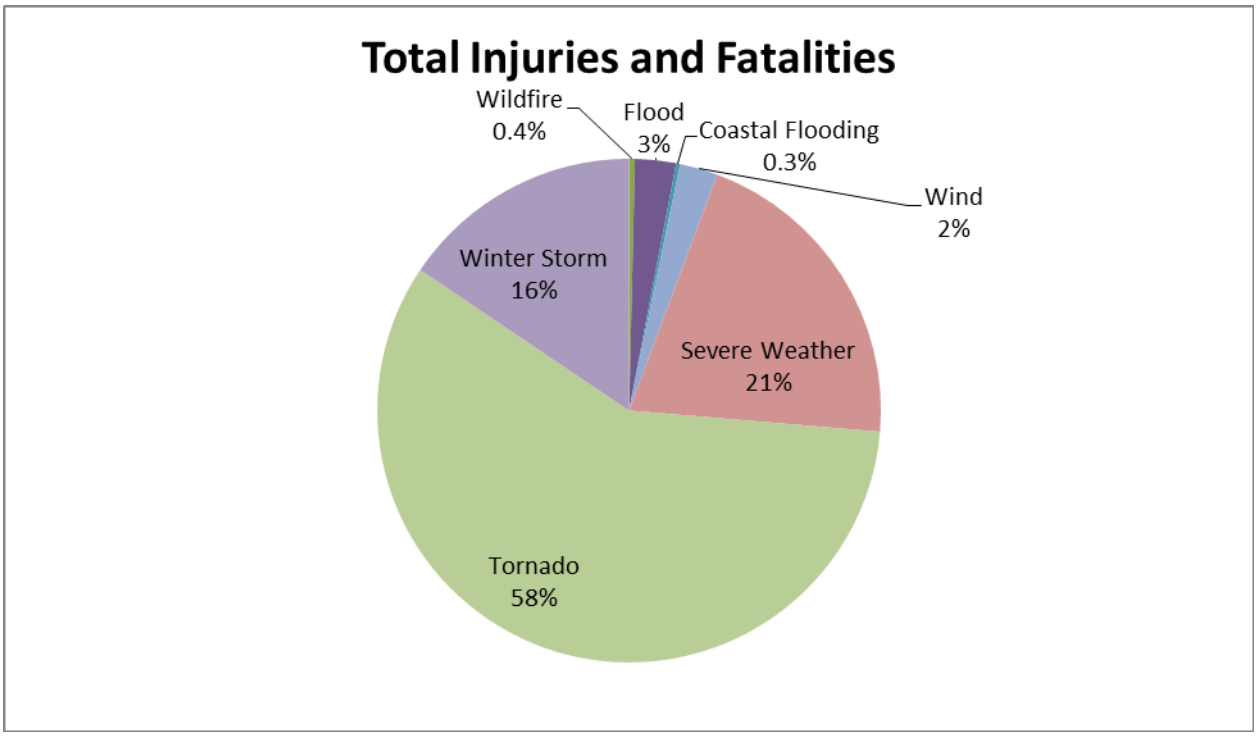


Figure 2.7 SHELDUS Total Injuries and Fatalities Percentage by Hazard.

Figure 2.5 illustrates the distributions of number of events of each hazard according to data from SHELDUS between 1992 and 2012. By far, Severe Weather (Thunderstorm, Lightning, Hail) is the most frequent hazard event that occurs in Georgia. Figure 2.6 illustrates the distributed of Total Losses by hazard. Tornado and Severe Weather create the highest dollar amount loss in Georgia. Figure 2.7 illustrates the distribution of Total Injuries and Fatalities from each hazard. SHELDUS data did not have any recorded injuries or fatalities from Hurricane Wind, Drought or Landslide, therefore these hazards were not included in this diagram. Tornado events produce more injuries and fatalities than all the other hazards combined.

2.4.3 *Presidential Declared Disasters*

Only one Presidential Declared Disaster (PDD) has occurred since the 2011 GHMS was adopted. This was DR1973 in April 2011 after severe thunderstorm outbreak produced tornadoes, straight-line winds and associated flooding. The following Table 2.7 lists the declared counties in this disaster. Twenty-three counties were declared under Individual Assistance (IA) and Public Assistance (PA), two counties declared only under Individual Assistance and one county declared only under Public Assistance. Information on previous PDDs can be found in Appendix D. Notable hazard events that were also PDDs are identified in the hazard specific assessments in section 2.5.

Bartow	Catoosa	Cherokee	Coweta	Dade	Floyd
Gordon	Greene	Habersham	Harris	Heard	Jasper
Lamar	Lumpkin	Meriwether	Monroe	Morgan	Newton
Pickens	Polk	Rabun	Spalding	Troup	Upson
Walker	White				

IA & PA IA Only PA Only

Table 2.7 Declared Counties in PDD DR1973

2.5 HAZARD SPECIFIC ASSESSMENTS

The hazard-specific assessments contained within this section follow the subsequent order:

2.5.1 Hurricane Wind
2.5.2 Coastal Hazards (includes storm surge and coastal flooding)
2.5.3 Wind
2.5.4 Severe Weather (includes lightning and hail)
2.5.5 Tornado
2.5.6 Inland Flooding
2.5.7 Severe Winter Weather
2.5.8 Drought
2.5.9 Wildfire
2.5.10 Earthquake
2.5.11 Geologic Hazards (includes sinkhole and landslide)
2.5.12 Dam Failure

Within each hazard's assessment will be a description of the event and a hazard profile. The description defines what the hazard is and general information on characteristics. The hazard profile describes the history of the hazard in Georgia, locations susceptible to the hazard, probability of occurrence and extent. Hazard history includes SHELDUS data where this information is available. Maps, tables and other related figures are also included to describe and profile each hazard.

2.5.1 Hurricane Wind

Associated Hazards:

Tropical cyclones, hurricanes, tropical storms, tropical depressions, coastal storms

Hazard	Vulnerability	Total	Rank
Medium	Medium	Medium	7

Hazard Description:

Tropical cyclones are referred to in a multitude of ways across the globe from Hurricanes in the Atlantic Ocean, Typhoons in the Pacific Ocean, and more generically Tropical Cyclones in the southwest Indian Ocean. According to the Atlantic Oceanographic and Meteorological Laboratory (AOML) a tropical cyclone "…is the generic term for a non-frontal synoptic scale low-pressure system over tropical or sub-tropical waters with organized convection (i.e. thunderstorm activity) and definite cyclonic surface wind circulation." The National Oceanic and Atmospheric Administration's (NOAA) National Hurricane Center (NHC) categorizes tropical cyclones in the Atlantic Basin (Atlantic Ocean, Caribbean Sea, and Gulf of Mexico) into four types based on intensity.

> **Tropical Disturbance**: A discrete tropical weather system of apparently organized thunderstorms - generally 100 to 300 nautical miles in diameter - originating in the tropics or subtropics, and maintaining its identity for 24 hours or more.
>
> **Tropical Depression:** An organized system of clouds and thunderstorms with a defined circulation and maximum sustained winds of 38 mph (33 knots) or less.
>
> **Tropical Storm:** An organized system of strong thunderstorms with a defined circulation and maximum sustained winds of 39 mph to 73 mph (34-63 knots).
>
> **Hurricane:** An intense tropical weather system with a well-defined circulation, producing maximum sustained winds of 74 mph (64 knots) or greater. Hurricane intensity is classified into five categories using the Saffir-Simpson Hurricane Scale (presented in Attachment 2: Saffir-Simpson Hurricane Scale). Winds in a hurricane range from 74 – 95 mph for a category 1 hurricane to greater than 156 mph for a category 5 hurricane. Hurricane Camille (1969) and Hurricane Allen (1980) epitomize the destructive potential of hurricanes as both had sustained winds of 190 mph and gusts well over 200 mph.

Hurricanes can cause catastrophic damage to coastlines and areas several hundred miles inland. Hurricane can produce winds exceeding 155 miles per hour as well as tornadoes and mircrobursts. Additionally, hurricanes can create storm surges along the coast and cause extensive damage from heavy rainfall. Floods and flying debris from the excessive winds are often the deadly and destructive results of these weather events. Slow moving hurricanes traveling into mountainous regions tend to produce especially heavy rain. Excessive rain can trigger landslides or mud slides. Flash flooding can occur due to intense rainfall. (Source: http://www.ready.gov/hurricanes)

Each of these hazards present unique characteristics and challenges; therefore, the following have been separated and analyzed as individual hazards: Hurricane Wind, Storm Surge, Tornado, Flooding (inland and coastal), Wind and Severe Weather. This section will focus on the hurricane wind hazard.

Hazard Profile

Throughout history, tropical cyclones have plagued Georgia. The NHC has accumulated records of all of the tropical cyclones that have affected the state since 1851. The National Weather Service (NWS) and NOAA's Atlantic Oceanic and Meteorological Laboratory (AOML) have records of tropical cyclone activity affecting the Georgia Coast since 1565. Table 2.8 presents the total number of hurricanes by intensity that have affected any portion of Georgia from 1851 through 2011. Table 2.9 presents all of the tropical cyclones that have made landfall on the Georgia coast during the period of 1800 through the present.

Hurricane Intensity	Number of Hurricanes
Category 1	15
Category 2	5
Category 3	2
Category 4	1
Category 5	0

Table 2.8 Total Number of Hurricanes that have Tracked Over Georgia, 1851 to Present

Tropical Cyclone Intensity	Number of Named Storms	Recurrence Interval (years per storm)
Tropical Storm & Category 1 – 2	25	8
Major Hurricane: Category 3 – 5	6	35

Table 2.9 Tropical Cyclones that have made Landfall on the Georgia Coast, 1800 to Present

Year	Name (if applicable)	Area Affected	Remarks
1804		Savannah Area	Hutchison Island inundated; 3 deaths
1813		Coastal Georgia	28 deaths
1881		Savannah Area	$1.5 million in damages; 335 deaths
1893		Savannah Area	$10 million in damages; 1000 deaths
1898		Coastal Georgia	120 deaths
1911		Coastal Georgia	18" of rain in 24 hours
1916		Southwest Georgia	$2.5 million in damages
1928		Savannah Area	11" of rain
1940		Coastal Georgia	> $1 million in damages
1947		Savannah Area	> $2 million in damages
1959	Gracie	Coastal Georgia	$5 million in damages
1964*	Dora	Coastal Georgia	DR177; $8 million in damages
1979	David	Coastal Georgia	2 deaths
1990*	Klaus/Marco	Central Georgia	FEMA DR880; *$6 million in damages
1994*	Alberto	Statewide	FEMA DR1033; Extreme flooding on Flint and Ocmulgee Rivers; > $400 million in damages
1995*	Opal	Western Georgia	FEMA DR1071; Widespread wind damages
2004*	Frances, Ivan, and Jeanne	Statewide	FEMA DR1554 and DR1560; Wind / rain damage in 107 counties
2005	Dennis	Statewide	Wind / rain damage; Flooding

Table 2.10, Notable and Historic Tropical Cyclonic Events Affecting Georgia
***Presidential Declared Disasters**

Between 1800 and 1850, three major hurricanes made landfall on the Georgia coast in 1804, 1813, and 1824, causing a combined total of over 600 fatalities. Between 1851 and 1899, 14 named storms and three major hurricanes (in 1854, 1893, and 1898) made landfall on the Georgia coast, with the number of fatalities nearing 2700. From 1900 to 1949, four named storms (1911, 1928, 1940, and 1947) made landfall on the Georgia coast. From 1950 to the present, only one hurricane (Category 2 Hurricane David, 1979) has impacted the Georgia coast.

Table 2.10, details the more notable events in Georgia's tropical cyclone history. These events are not representative of all events affecting the State, but are selected on the basis of having a great impact. Damage values are given in historic dollars.

Although all of Georgia's counties can be affected by tropical cyclonic activity, two regions stand apart when analyzed using SHELDUS data. Figure 2.8, which illustrates the tropical cyclonic events per county from 1960 to 2012 highlights the two regions in Southwest Georgia and Coastal Georgia. Based on SHELDUS, the counties in Southwest Georgia are most affected by tropical cyclones (that enter from the Gulf of Mexico) while the counties are less affected by tropical cyclones (that enter from the Atlantic Ocean).

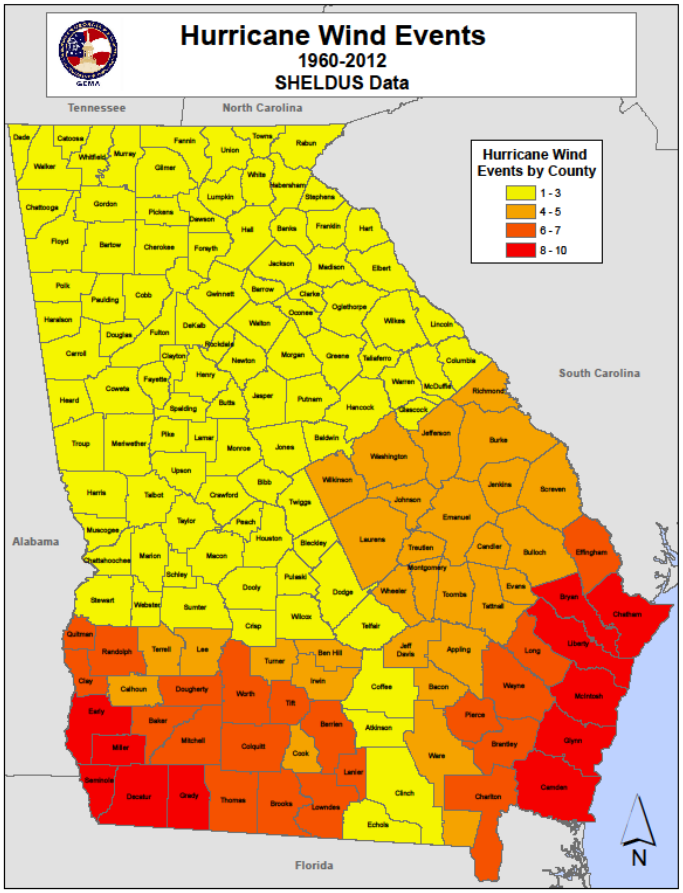


Figure 2.8

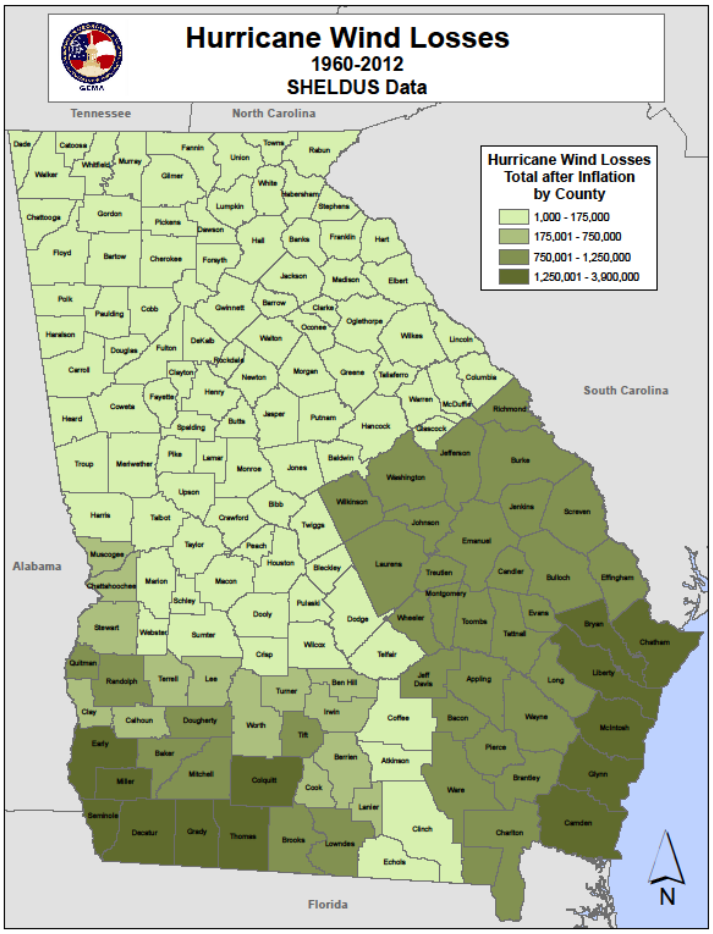


Figure 2.9

The risk analysis of all hazard events takes into account the recurrence interval of the hazard. Because the historical record of tropical cyclonic events is limited and subject to seasonality, a true recurrence interval is unknown and changes yearly (as demonstrated by the NWS forecasting). However, using the various sources for Georgia's tropical cyclone history (NOAA, SHELDUS), one can estimate over a 200 year period around 36 tropical cyclones affected the State (not necessarily a direct hit). This trans-

lates to about an 18% chance of a tropical cyclone affecting the State per year or approximately one storm every 5.5 years.

Figure 2.9 illustrates the cumulative estimated losses from hurricane wind events. Losses from associated hurricane hazards such as flooding, storm surge and tornados are not included in these figures.

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph 64-82 kt 119-153 km/h	**Very dangerous winds will produce some damage:** Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph 83-95 kt 154-177 km/h	**Extremely dangerous winds will cause extensive damage:** Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129 mph 96-112 kt 178-208 km/h	**Devastating damage will occur:** Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156 mph 113-136 kt 209-251 km/h	**Catastrophic damage will occur:** Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157 mph or higher 137 kt or higher 252 km/h or higher	**Catastrophic damage will occur:** A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

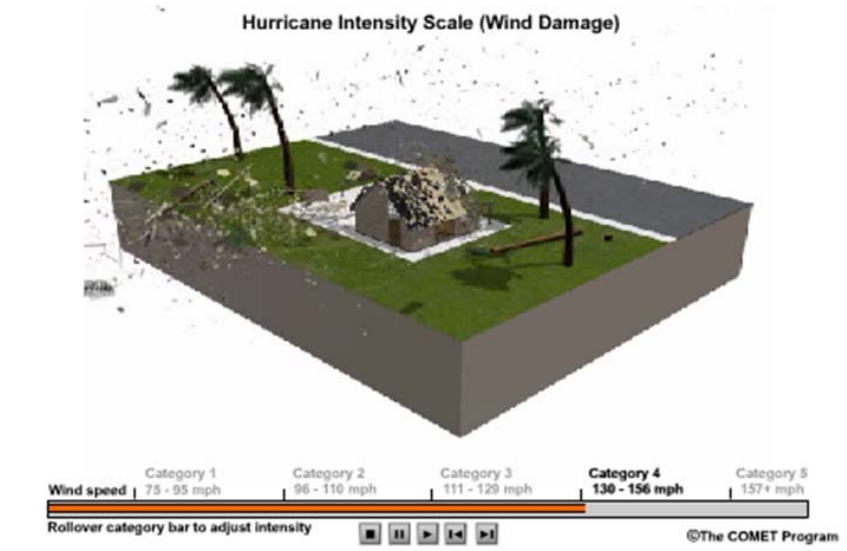
Source: NOAA National Hurricane Center http://www.nhc.noaa.gov/aboutsshws.php

Figure 2.10 Hurricane Wind Intensity Scale

Extent

The best available method for determining potential extent or magnitude of a future hurricane wind event is to review historical records. Based on hazard history for Georgia, the potential extent for a future hurricane wind event in Georgia is a Category 4 Hurricane producing maximum sustained winds of up to 156 miles per hour.

The graphic in Figure 2.11 provides a simulation of damages to a wood-frame structure from winds that are



Conceptual animation illustrates the wind damage associated with increasing hurricane intensity - courtesy of The COMET Program

Figure 2.11 http://www.nhc.noaa.gov/pdf/sshws_table.pdf.

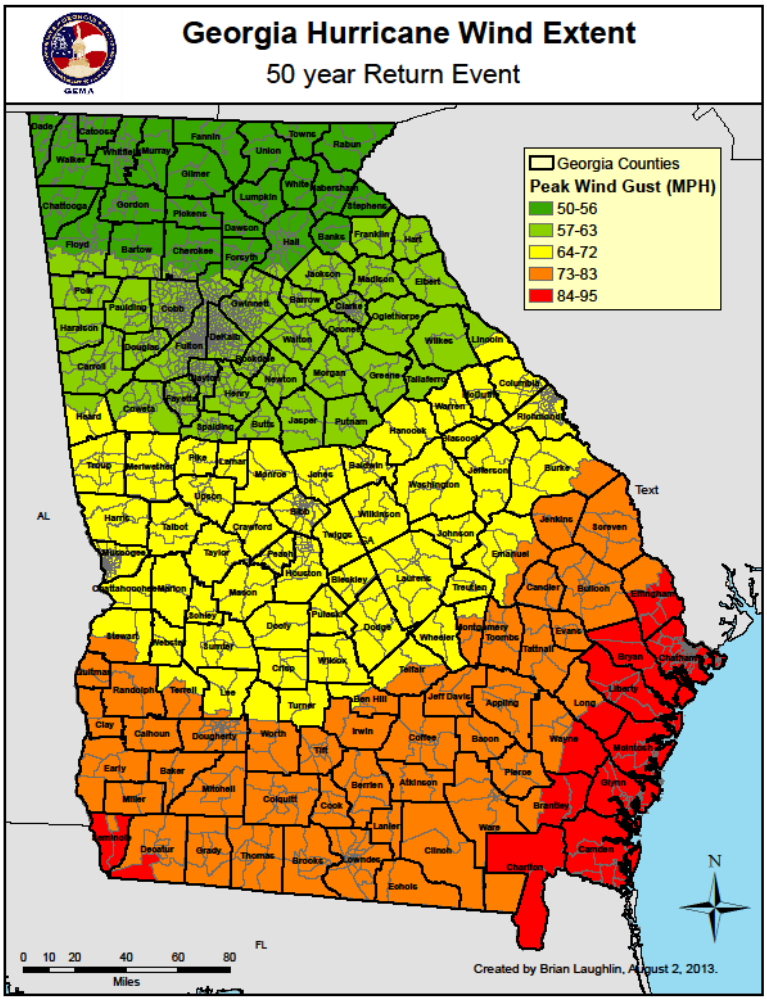


Figure 2.12

approximately 130 miles per hour (Category 4 Hurricane). The animated graphic and additional information on the Hurricane Intensity Wind Scale can be viewed at: http://www.nhc.noaa.gov/pdf/sshws_table.pdf.

The map in Figure 2.12 is based on data available from HAZUS-MH. It provides estimates of Peak Wind Gust for a 2% annual chance hurricane or 50-year return interval. Peak wind gusts are hurricane winds that maintain its velocity for 3-seconds. HAZUS uses peak wind gust in its loss estimation since these higher velocity winds can produce the greatest amount of damage. There is no direct correlation between maximum sustained winds (which determines Category) and peak wind gusts.

2.5.2 Coastal Hazards

Associated Hazards:

Tropical cyclones, hurricanes, tropical storms, tropical depressions, coastal storms, coastal winter storms, storm surge, coastal flooding.

Hazard	Vulnerability	Total	Rank
Low	Medium	Medium	9

This section was previously called Storm Surge and after review of hazard data, was expanded to include broader discussion of coastal hazards. These include storm surge, coastal flooding, high surf and abnormal tides.

Hazard Description

The NHC defines storm surge as "…an abnormal rise in sea level accompanying a hurricane or other intense storm, and whose height is the difference between the observed sea surface and the level that would have occurred in the absence of the cyclone." Storm surge that is produced by a tropical cyclone is a function of both tropical cyclone and geographic characteristics. Tropical cyclone characteristics affecting storm surge values include the intensity of the hurricane (strength of the winds and central pressure), angle of approach, and forward speed. Geographic characteristics that affect the extent of storm surge include bathymetry (underwater terrain), slope of the continental shelf, roughness of the continental shelf, shape of the coastal region, and existence of natural or manmade barriers.

The overall observed height of water that will impact a region from a tropical cyclone is referred to as the storm tide. Storm tide is the actual level of the sea water resulting from the astronomical tide combined with the storm surge. The value of storm tide includes the storm surge created by the tropical cyclone and the tidal variations that exist in a region. Along the Georgia coast, the tidal variation or total height difference between low tide and high tide can be as much as ten feet (five feet above sea level during high tide, and four and one half feet below sea level during low tide) during spring tides. Compounding the destructive potential of a storm tide is the occurrence of wind driven waves. Hurricane force winds blowing over the ocean creates large waves known as wind driven waves. These waves can reach heights of 10 feet and exists on top of the rising waters.

Hurricanes primarily occur during hurricane season which spans June 1 through November 30, although hurricanes have been known to form outside of the official hurricane season. The official hurricane season accounts for 95% of observed activity; therefore, on average, only 5% of hurricanes form outside of hurricane season.

The rate of onset of a storm surge has a smaller range than the storm itself. While the storm may show signs of approach up to days before the storm peaks, the storm surge will often appear somewhat suddenly. However, the surge can reach inland for miles along a vast span of coastline (depends on the size and strength of the storm). This rapid rate of onset is the major contributor to the many deaths associated with storm surge. The duration of the surge event depends on the depth

of the surge and other environmental factors such as drainage capability. The waters from the surge may remain for days in certain areas. The frequency of storm surges of a certain magnitude greatly depends on the frequency of tropical cyclones with the ability to produce the surge. The measure of magnitude of storm surge is largely based upon height above mean water level.

It should be noted that tropical cyclones are not the only type of storms that can cause destructive storm surge. Albeit less common in Georgia, nor'easters and strong winter storms can result in elevated water levels, which while not as high at their peak, may be more destructive over a sustained period of time.

Coastal flooding is defined as flooding of coastal areas not associated with tropical cyclone events. Coastal flooding is caused by strong, persistent onshore wind, high astronomical tide, and/or low atmospheric pressure and results in damage, erosion, flooding, fatalities, or injuries. Coastal areas are defined as those portions of coastal land zones adjacent to the waters and bays of the oceans.

High surf is defined as large waves breaking on or near shore, resulting from swell spawned by a distant storm or from strong onshore winds, causing a fatality, injury or damage. In addition, if accompanied by anomalous astronomical high tides, high surf may produce beach erosion and possible damage to beachfront structures. High surf conditions are usually accompanied by rip currents and near-shore breaks.

Date	Event	Description of Impact on Georgia
September 7-8, 1804	"Great Gale of 1804"	St. Simons Island was flooded with water 7' above normal. The tide rose 10' above MSL on the Savannah waterfront. Severely flooded Pablo Creek (currently the intracoastal waterway). More than 500 persons drowned.
September 16-17, 1813	Category 3-4 Hurricane	Storm surge of at least 19 feet above Mean Low Water (MLW)
September 14-15, 1824	Major Hurricane	Exceeded 1804 storm in flooding and damage. St. Simons Island completely overflowed.
September 8, 1854	Category 3 Hurricane	Fort Pulaski- storm tide elevation 10.50 feet above normal.
August 27, 1881	Hurricane	Fort Pulaski- storm tide level 11.57 feet above normal. Isle of Hope- 11.82 feet above normal
August 27, 1893	Category 3 Hurricane	Fort Pulaski- storm tide elevation between 12-13 feet above normal. Heavy storm surge of approximately 16 feet in other areas.
October 2, 1898	Category 4 Hurricane	Hutchinsons Island, opposite Savannah, was completely inundated to a depth of 4 to 8 feet. Campbell Island, near Darien, GA, was inundated, while Darien reported a tidal wave about 13 feet above mean high water mark and Sapelo Island, GA, reported about 18 feet. This hurricane caused 179 deaths and damage was estimated at around $2.5 million. 16 foot storm surge in downtown Brunswick.
October 14, 1947	Hurricane	High tides along the Georgia and South Carolina coasts ranged from 12 feet above mean low tide at Savannah Beach, GA, and 9.6 feet at St. Simons Island near Brunswick, GA.
September 4, 1979	Hurricane David	Storm surge of 3-5 feet and heavy surf

Table 2.11 Notable Storm Surge Events in Georgia from Tropical Cyclones

Profile

No major hurricanes have made landfall along the Georgia coast since 1898; therefore there is a limitation on historical data that can be used for comprehensive risk analysis to storm surge. Table 2.11 describes more notable storm surge events that have affected Georgia. This list only includes hurricanes where there were recorded storm tide elevations. It is possible that other hurricanes that produced storm surge or coastal flooding may have occurred during this time; however, no records on storm tides are available. The greatest extent of storm surge was associated with a Category 4 hurricane. According to Table 2.9 in section 2.5.1, the recurrence interval for a major hurricane making landfall in Georgia is approximately once every 35 years.

SHELDUS and NCDC data include information on some coastal flooding events. Four counties had one coastal flooding occurrence, while one (Chatham County) reported twelve occurrences

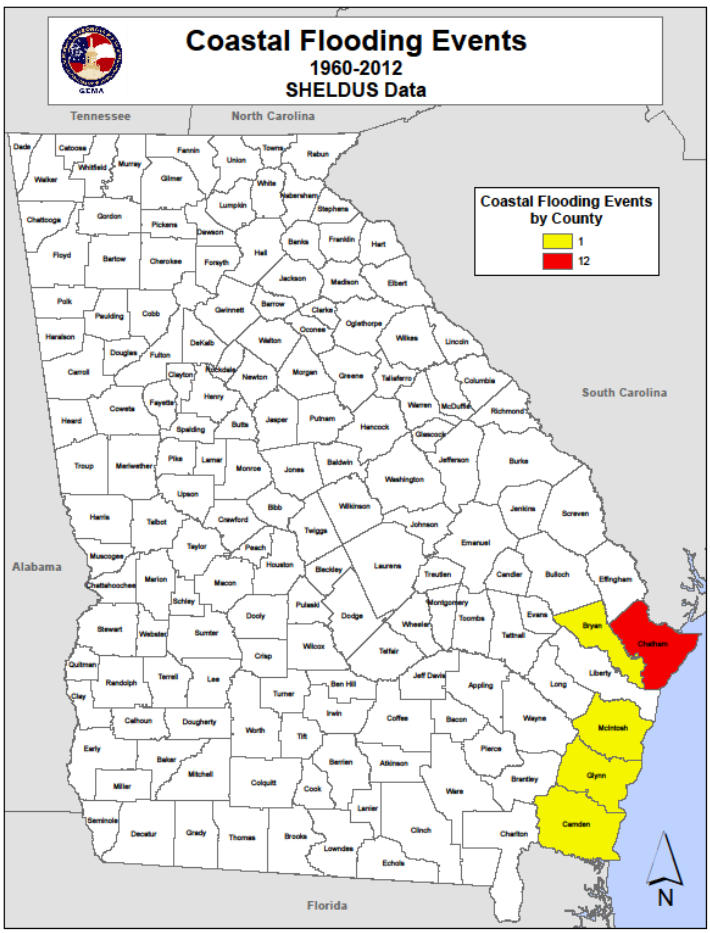


Figure 2.13

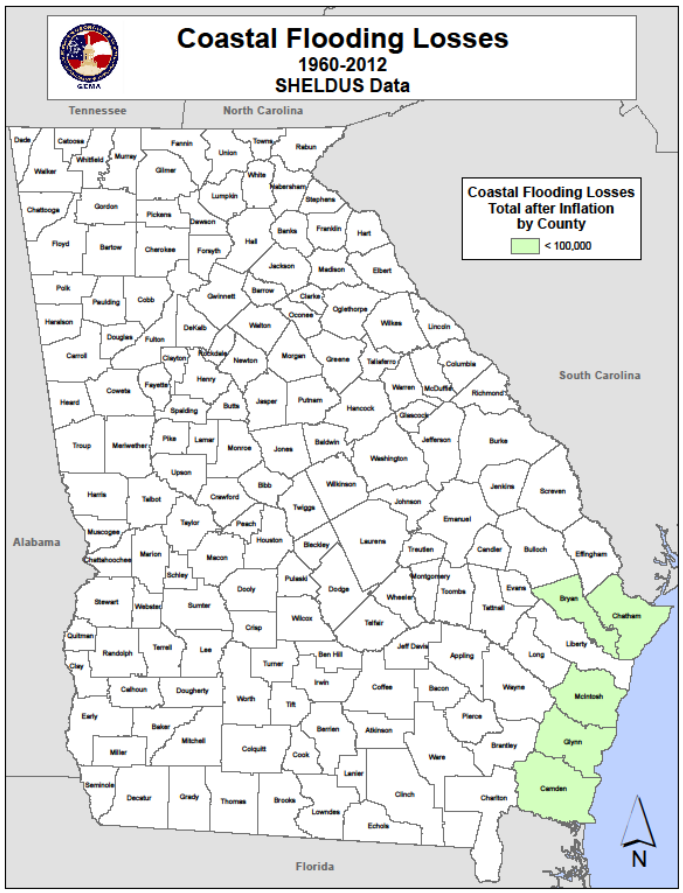


Figure 2.14

between 1960 and 2012. The NCDC narratives describe these events as not associated with storms but rather attributes to unusual tidal events. Coastal flooding was minor and beach erosion was the most substantial impact. Figures 2.13 and 2.14 show the location and losses of these coastal flooding events.

The Sea, Lake and Overland Surges from Hurricanes (SLOSH) is a deterministic model based on historical, hypothetical, or predicted hurricane data (pressure, size, forward speed, track, and wind speed) that estimates storm surge heights at particular locations when impacted by a certain magnitude storm. The surge levels are defined by the corresponding category of hurricane on the Saffir-Simpson scale. The areas inundated by a Category 4 or 5 are combined to reflect their decreased probability of occurrence. The exact heights of the surge are not noted because hori-

zontal positional accuracy is unknown due to no prior collection of reliable surge data in Georgia. Figure 2.15 shows approximate SLOSH inundation areas for Category 1-5 Hurricanes and tropical storms.

Although the SLOSH-based hazard scores stop at the inland borders of the six coastal counties, strong hurricanes have the ability to drive storm surge farther into the other non-coastal counties. This is not represented on the maps because the underlying data does not account for counties beyond the coast. Also, the SLOSH model does not account for any barriers to the storm surge such as Interstate 95's acting as a berm. It is, however, provided as the best available information.

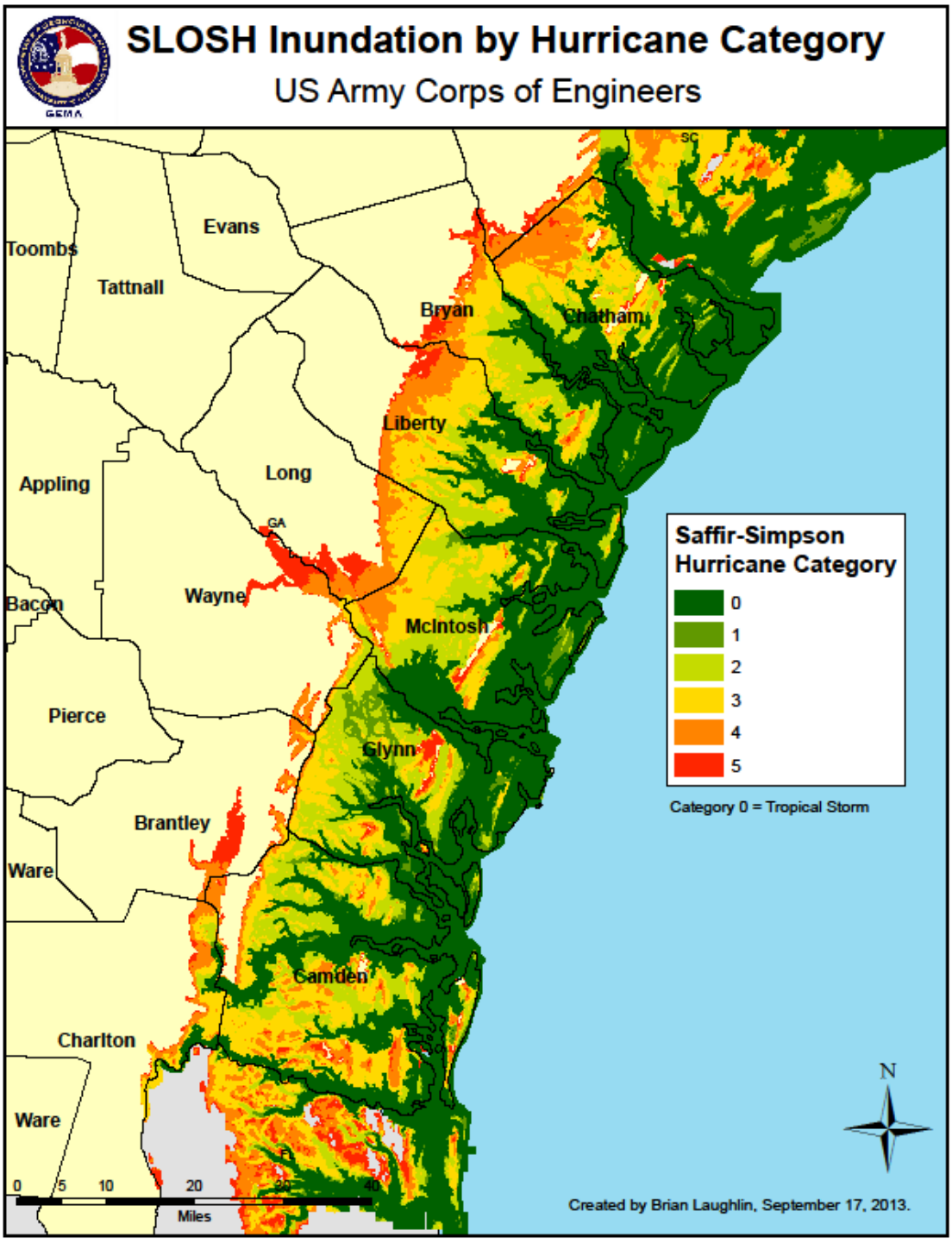


Figure 2.15 Model of Potential Storm Surge Inundation by Hurricane Category

2.5.3 Wind

Associated Hazards:

Thunderstorms, downbursts, gustnadoes.

Hazard	Vulnerability	Total	Rank
Medium	**Medium**	**Medium**	5

Hazard Description

The National Data Climate Center (NCDC) divides wind events into several types including High Wind, Strong Wind, Thunderstorm Wind, Tornado and Tropical Cyclone. For the purpose of this risk assessment, the Wind hazard will include data from High Wind, Strong Wind and Thunderstorm Wind. Tropical cyclone wind is covered under the Hurricane Wind section. The wind related hazards Tornado and Winter Storms are addressed as individual hazards in this risk assessment. The following definitions come from the NCDC Storm Data Preparation document.

> High Wind- Sustained non-convective winds of 35 knots (40 mph) or greater lasting for 1 hour or longer or winds (sustained or gusts) of 50 knots (58 mph) for any duration (or otherwise locally/regionally defined), on a widespread or localized basis.
>
> Strong Wind- Non-convective winds gusting less than 50 knots (58 mph), or sustained winds less than 35 knots (40 mph), resulting in a fatality, injury, or damage.
>
> Thunderstorm Wind- Winds, arising from convection (occurring within 30 minutes of lightning being observed or detected), with speeds of at least 50 knots (58 mph), or winds of any speed (non-severe thunderstorm winds below 50 knots) producing a fatality, injury, or damage.

Downbursts, including dry, or wet, microbursts or macrobursts, will be classified as Thunderstorm Wind events. In some cases, the downburst may travel several miles away from the parent thunderstorm, or the parent thunderstorm may have dissipated.

A gustnado is a small and usually weak whirlwind which forms as an eddy in thunderstorm outflows. They do not connect with any cloud-base rotation and are not tornadoes. Since their origin is associated with cumuliform clouds, gustnadoes will be classified as Thunderstorm Wind events.

Profile

The first map of historical wind events in Figure 2.16 shows the majority of events in the northern portion of the State as reported in the SHELDUS data. The historical losses map based on SHELDUS data in Figure 2.17 illustrates that the majority of losses are found within the area cited as having the most wind events.

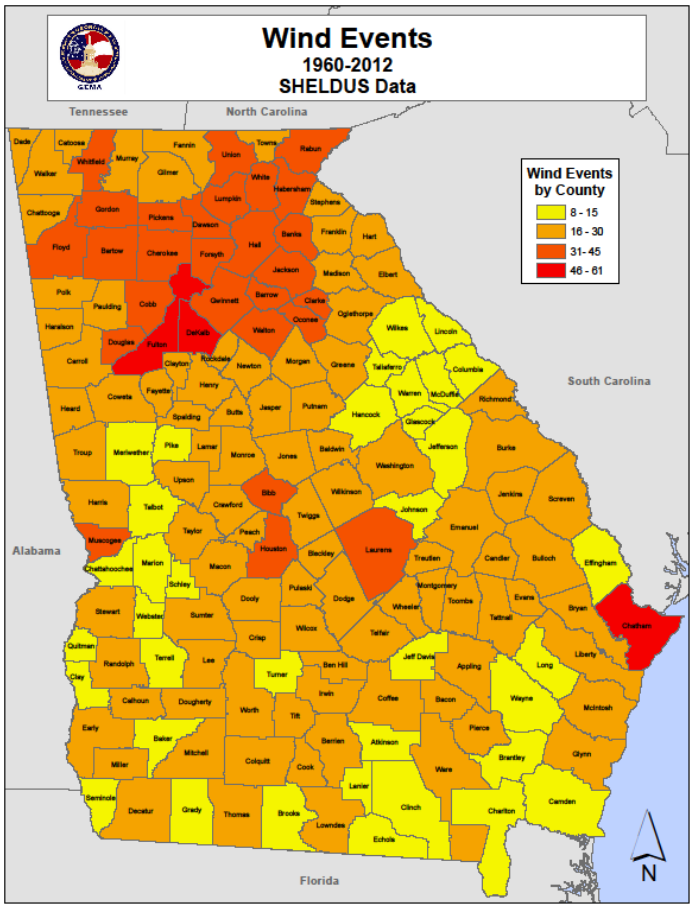


Figure 2.16

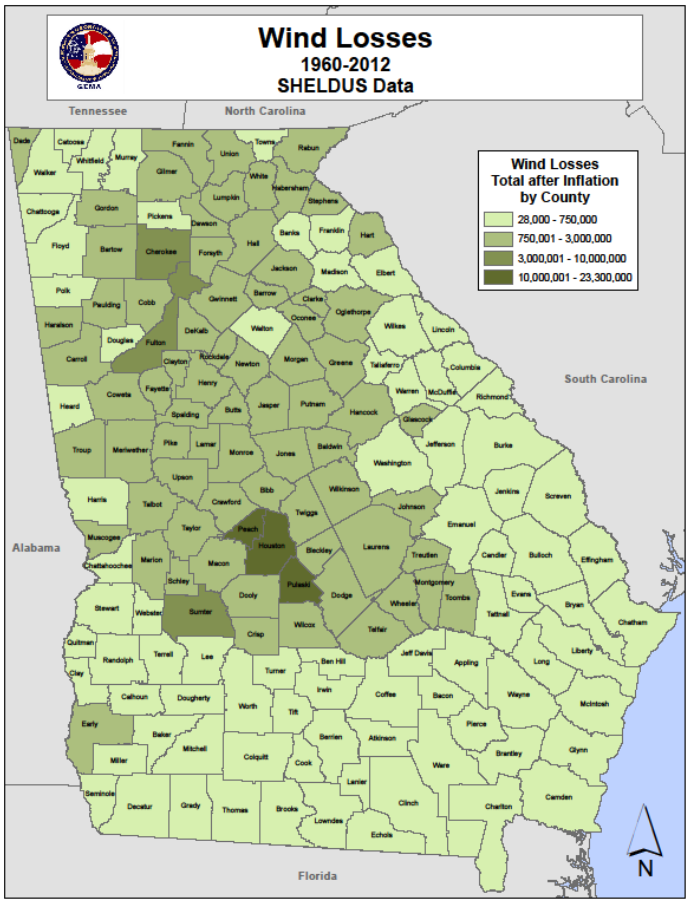


Figure 2.17

Figure 2.18 shows the average hazard score by county for wind risk. These wind speeds correspond with the assigned hazard scores with values ranging from 1 to 5 shown in Table 2.12. The highest risk areas are located along the Atlantic coast and the Southern portion of the state.

The wind risk map, Figure 2.19, illustrates the wind gust speeds that have a return interval of 50 years for the counties in Georgia.

Hazard Score	Wind Speeds
1	<90 mph gust
2	91 – 100 mph gust
3	101 – 110 mph gust
4	111 – 120 mph gust
5	>120 mph gust

Table 2.12

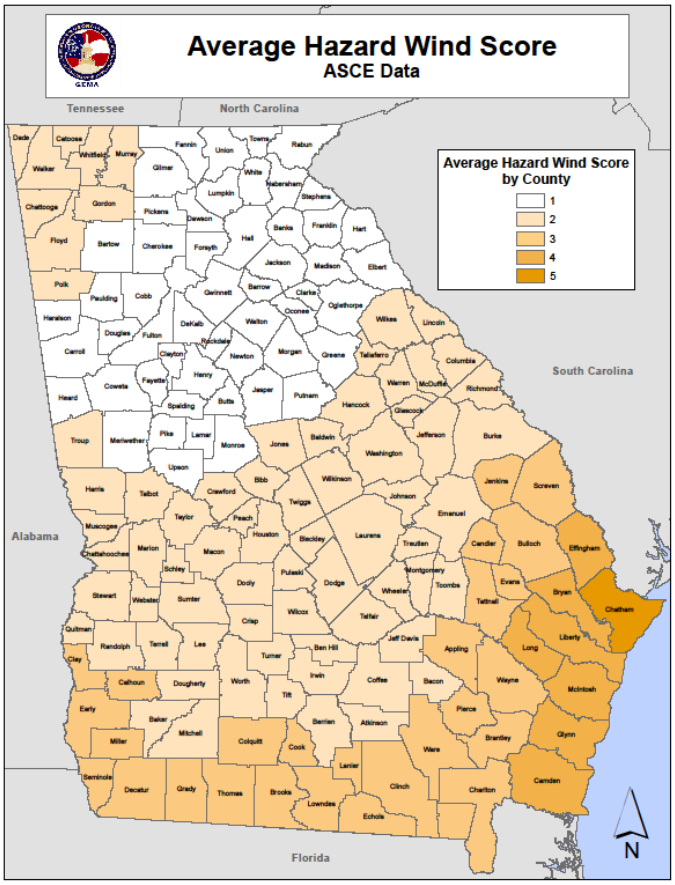


Figure 2.18

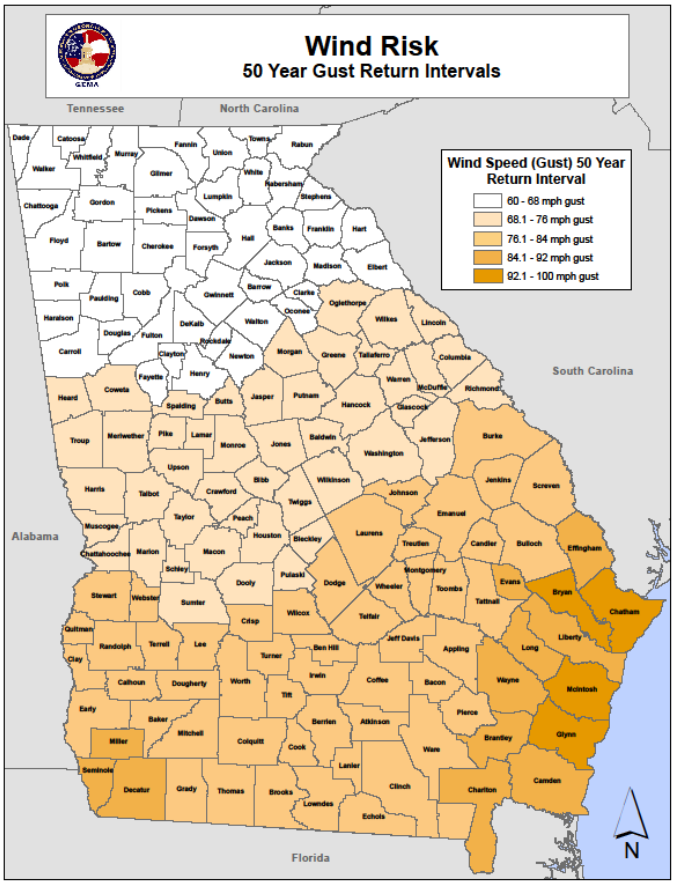


Figure 2.19

2.5.4 Severe Weather

Associated Hazards:

Thunderstorms, hail, lightning.

Hazard	Vulnerability	Total	Rank
Very High	High	High	2

Hazard Description

This section provides general and historical information about severe weather's main elements of thunderstorms, lightning, and hail. Other elements of severe weather such as tornadoes and wind are addressed in other sections of this chapter.

Thunderstorms are formed when moist air near the earth's surface is forced upward through some catalyst (convection or frontal system). As the moist air rises, the air condenses to form clouds. Because condensation is a warming process, the cloud continues to expand upward. When the initial updraft is halted by the upper troposphere, both the anvil shape and a downdraft form. This system of up-drafting and down-drafting air columns is termed a "cell".

As the process of updrafts and downdrafts feeds the cell, the interior particulates of the cloud collide and combine to form rain and hail which falls when the formations are heavy enough to push through the updraft. The collision of the water and ice particles within the cloud creates a large electrical field that must discharge to reduce charge separation. This discharge is the lightning that occurs from cloud to ground or cloud to cloud in the thunderstorm cell. In the final stage of development, the updraft weakens as the downdraft-driven precipitation continues until the cell dies.

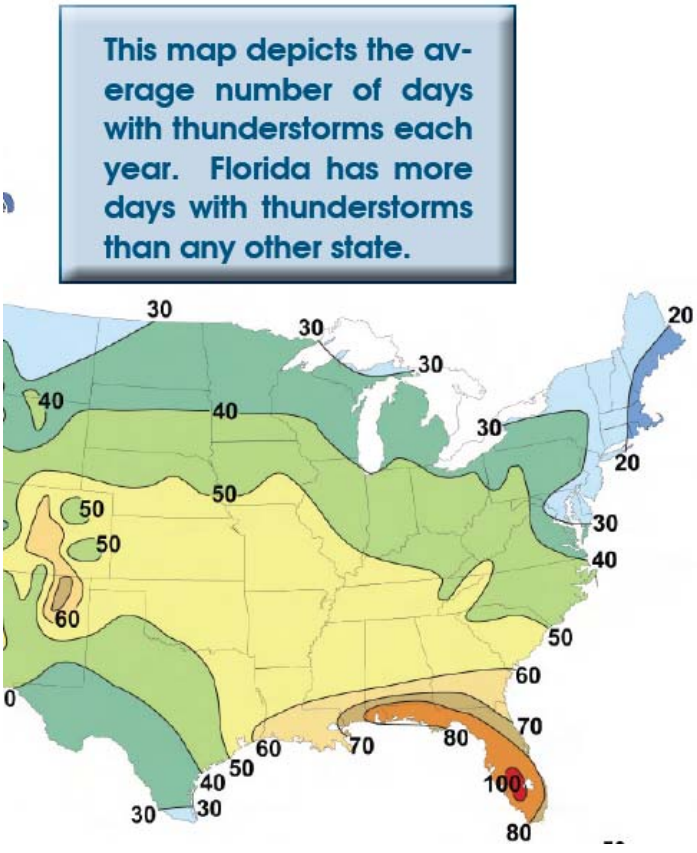


Figure 2.20 Source: NOAA

Each thunderstorm cell has the ability to extend several miles across its base and to reach 40,000 feet in altitude. Thunderstorm cells may compound and move abreast to form a squall line of cells, extending farther than any individual cell's potential.

In terms of temporal characteristics, thunderstorms exhibit no true seasonality in that occurrences happen throughout the year. Convectively driven systems dominated in the summer while frontal driven systems dominate during the other seasons. The rate of onset is rapid in that a single cell endures only 20 minutes. However, various cells in different stages of development may form a thunderstorm that lasts up to a few hours as it

moves across the surface. Georgia experiences thunderstorms an average of 50 to 80 days per year.

In terms of magnitude, the NWS defines thunderstorms in terms of severity as a severe thunderstorm that produces winds greater than 57 miles per hour and/or hail greater than 1 inch in diameter and/or a tornado. The NWS chose these measures of severity as parameters more capable of producing considerable damage. Therefore, these are measures of magnitude that may project intensity.

Lightning occurs when the difference between the positive and negative charges of the upper layers of the cloud and the earth's surface becomes great enough to overcome the resistance of the insulating air. The current flows along the forced conductive path to the surface (in cloud to ground lightning) and reaches up to 100 million volts of electrical potential. In Georgia, lightning strikes peak in July with June and August being second highest in occurrence.

Hail is a form of precipitation that forms during the updraft and downdraft-driven turbulence within the cloud. The hailstones are formed by layers of accumulated ice (with more layers creating larger hailstones) that can range from the size of a pea to the size of a grapefruit. Hailstones span a variety of shapes but usually take a spherical form. Hail storms mostly endanger crops but have been known to damage automobiles, aircraft, and structures.

Profile

The hazard event and loss history for severe weather (thunderstorms, lightning, and hail) from SHELDUS data are shown in Figures 2.21 and 2.22 . The map illustrating the total events from 1960 – 2012, highlights the area around metropolitan Atlanta as having the most events. This may be a result of urban areas' having more valuables to damage and, thus, having SHELDUS recognize the occurrence as an event. The losses from severe weather map illustrate the fact that severe weather hazard events may also affect rural, farm communities to the same extent as urban areas in terms of losses.

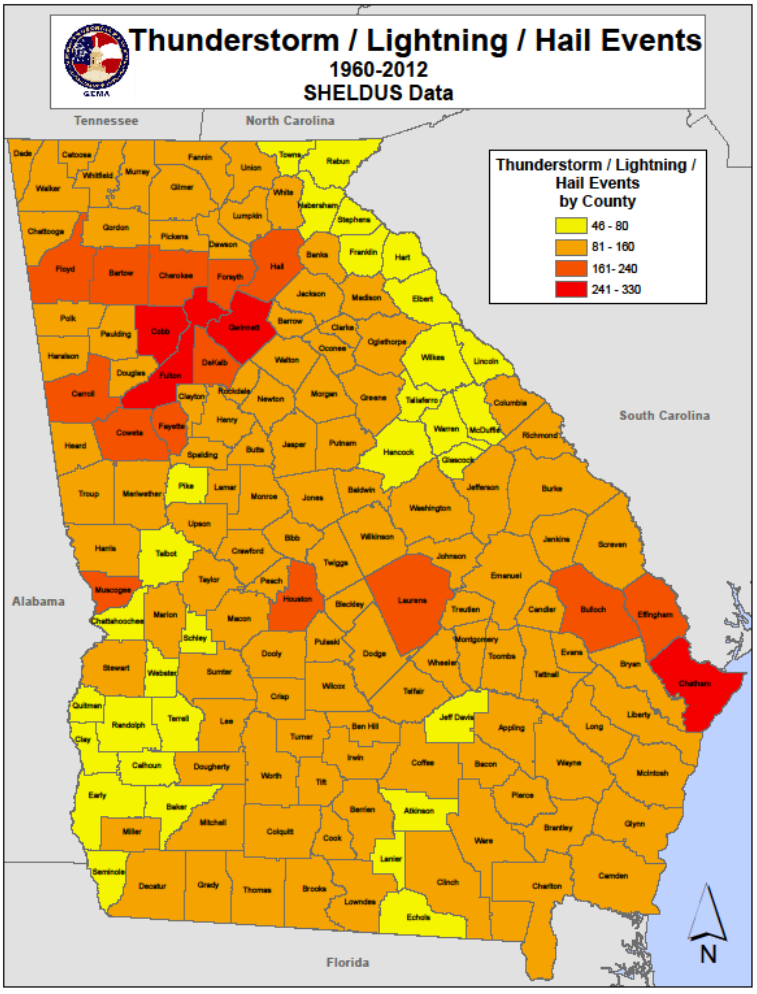


Figure 2.21

While most events related to severe weather are limited in terms of their impact, duration, and spatial extent, the hazard remains one of the most common in the State of Georgia. According to SHELDUS data, an average of 296 severe weather events have occurred from 1960-2012. These events in total have

caused 990 injuries, 168 fatalities and over $1.2 billion in damages. Over the period from 1992-2012, the historic occurrence jumps to 442 severe weather events per year.

According to the Vaisala US National Lightning Detection Network, from 1997 to 2011 Georgia averaged approximately 811, 240 cloud to ground lightning flashes per year. While lightning frequently occurs, only 18 deaths have been reported from 2002-2011 as a result of lightning, although this is the 5th highest total in the United States (source: http://www.vaisala.com/nldn30/).

In terms of magnitude, the NWS defines thunderstorms in terms of severity. A severe thunderstorm produces winds greater than 57 miles per hour and/or hail greater than 1 inch in diameter and/or a tornado. The NWS chose these measures of severity as parameters more capable of producing considerable damage. Hail stones can vary in diameter and in Georgia there have been records of hail of up to 2.75 inches.

Severe weather is not as spatially defined to any particular location in Georgia; therefore, the entire state is equally at risk to severe weather.

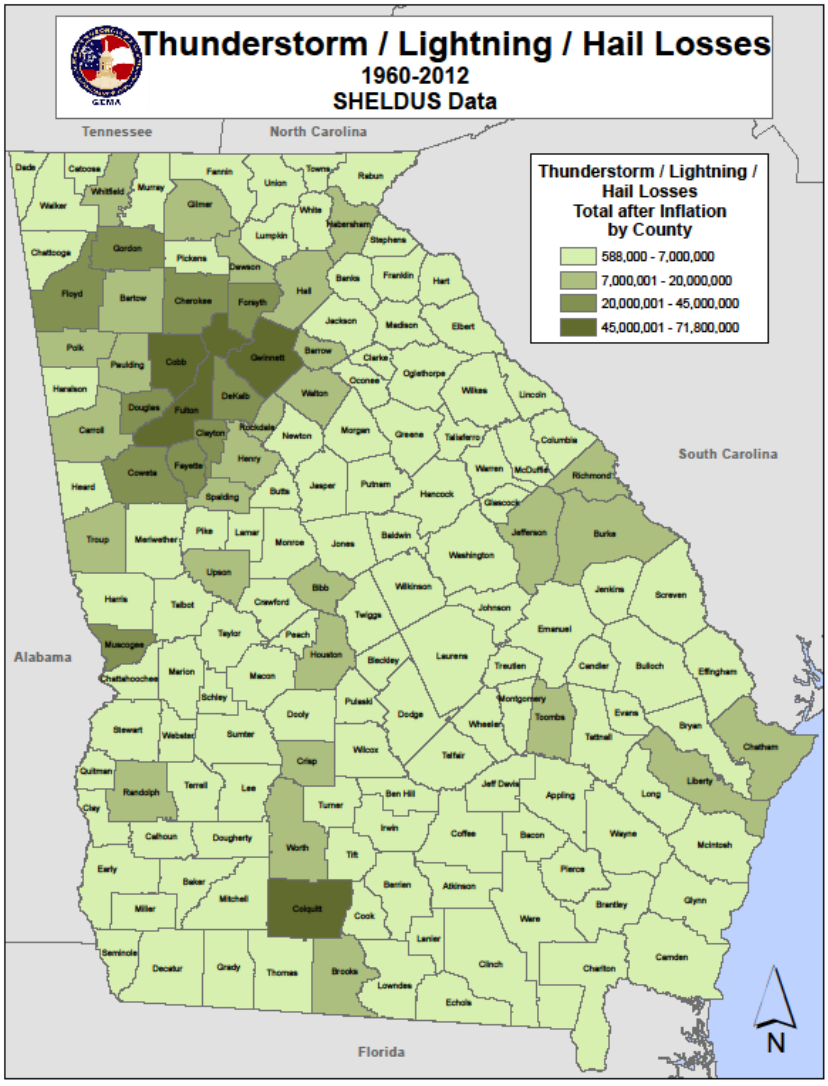


Figure 2.22

2.5.5 Tornado

Associated Hazards:

Thunderstorms, tropical cyclones.

Hazard	Vulnerability	Total	Rank
Medium	Very High	High	1

Hazard Description

A tornado is a violently rotating column of air (seen only when containing condensation, dust, or debris) in contact with the surface of the ground. Exceptionally large tornadoes may not exhibit the classic "funnel" shape but may appear as a large, turbulent cloud near the ground or a large rain shaft. Destructive because of strong winds and windborne debris, tornadoes can topple buildings, roll mobile homes, uproot vegetation and launch objects hundreds of yards.

Most significant tornadoes (excluding some weak tornadoes and coastal waterspouts) stem from the right, rear quadrant of large thunderstorm systems where the circulation develops between 15,000 and 30,000 feet. As circulation develops, a funnel cloud (rotating air column aloft) or tornado descends to the surface. These tornadoes are typically stronger and longer-lived. The weaker, shorter-lived tornadoes can develop along the leading edge of a singular thunderstorm.

Chuck Doswell III

Weak Tornadoes

- 88% of all tornadoes
- Less than 5% of tornado deaths
- Lifetime 1 – 10+ minutes
- Winds less than 110 mph
- Produces EF0 or EF1 damage

Wikimedia/Justin Hobson

Strong Tornadoes

- 11% of all tornadoes
- Nearly 30% of all tornado deaths
- May last 20 minutes or longer
- Winds 111-165 mph
- Produces EF2 or EF3 damage

Wikimedia/Joshua Jans

Violent Tornadoes

- Less than 1% of all tornadoes
- 70% of all tornado deaths
- Can exceed 1 hour
- Winds greater than 166 mph
- Produces EF4 or EF5 damage

Figure 2.23 Tornado Characteristics by Strength. Source: NOAA National Weather Service

EF Number	3 Second Gust (mph)	Damage
0	65-85	**Light damage.** Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
1	86-110	**Moderate damage.** Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
2	111-135	**Considerable damage.** Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
3	136-165	**Severe damage.** Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
4	166-200	**Devastating damage**. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
5	Over 200	**Incredible damage.** Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yd); high-rise buildings have significant structural deformation; incredible phenomena will occur.

Table 2.13. Enhanced Fujita Scale Source: NOAA

Although tornadoes can occur in most locations, most of the tornado activity in the United States exists in the Mid-West and Southeast. Within the State of Georgia, tornadoes can occur anywhere. In terms of the continuum of area of impact for hazard events, tornadoes are fairly isolated. Typically ranging from a few hundred feet to one or two miles across, tornadoes affect far less area than larger meteorological events such as hurricanes, winter storms, and severe weather.

An exact season does not exist for tornadoes; however, most occur within the time period of early spring to middle summer (February – June). The rate of onset of tornado events is rapid. Typically, the appearance of the first signs of

Year	Area Affected	Description
1903	Gainesville Area	200 deaths; 400 injuries; 1500 homeless
1936	Gainesville Area	203 deaths; >1000 injuries; 800 homes destroyed
1944	Hall and Franklin Counties	18 deaths
1974	Dawsonville Area	4 deaths
1992*	Lumpkin County	FEMA DR969; F4 tornado; 6 deaths; 170 injuries; >1000 homes damage; $2 million in damages
1993*	Hall County	FEMA DR980; 44 homes damaged; $2.5 million in damages
1994*	Northwestern Georgia	FEMA DR1020; 19 deaths; >200 injuries; $67.5 million in damages
1994*	Camden County	FEMA DR1042; F2 intensity
1995*	Albany Area	FEMA DR1076; 36 injured; 250 buildings damaged
1998*	Hall County & Metropolitan Atlanta	FEMA DR1209; tornadoes causing extensive damage to homes and critical facilities
1999*	Dooly and Candler Counties	FEMA DR1271; tornadoes causing damage to homes, especially in Vienna
2000*	Southwest Georgia	FEMA DR1315; 18 deaths; >100 injured; $5 million in damages
2007*	Southwest Georgia	FEMA DR1686; 2 deaths; numerous injuries; hospital destroyed in Sumter County
2008*	Atlanta Metro Area, including downtown	FEMA DR1750; 3 deaths; 39 injuries; $38 million in damages
2008*	Macon and surrounding areas and Southeast Georgia	FEMA DR1761; 2 deaths; 25 injuries; $71.2 million in damages
2011*	North and Central Georgia Tornadoes	FEMA DR-1973; 15 tornadoes including 1 EF4 and 4 EF3; 15 deaths; 143 injuries; $167 million damages

Table 2.14 Notable Tornado Events in Georgia
***Presidential Declared Disaster**

the tornado is the descending funnel cloud. This sign may be only minutes from the peak of the event, giving those in danger minimal sheltering time. However, meteorological warning systems attempt to afford those in danger more time to shelter. The frequency of specific tornado intensities is undetermined because no pattern seems to exist in occurrence. Finally, the duration of tornado events range from the few minutes of impact on a certain location to the actual tornado lasting up to a few hours.

Tornadoes are measured after the occurrence using the subjective intensity measures. The Enhanced Fujita scale (Fujia-Pearson Tornado Classification) describes the damage and then gives estimates of magnitude of peak 3-second gusts in miles per hour. Table 2.13 lists the rankings on the Enhanced Fujita scale and the corresponding magnitude and intensity measures.

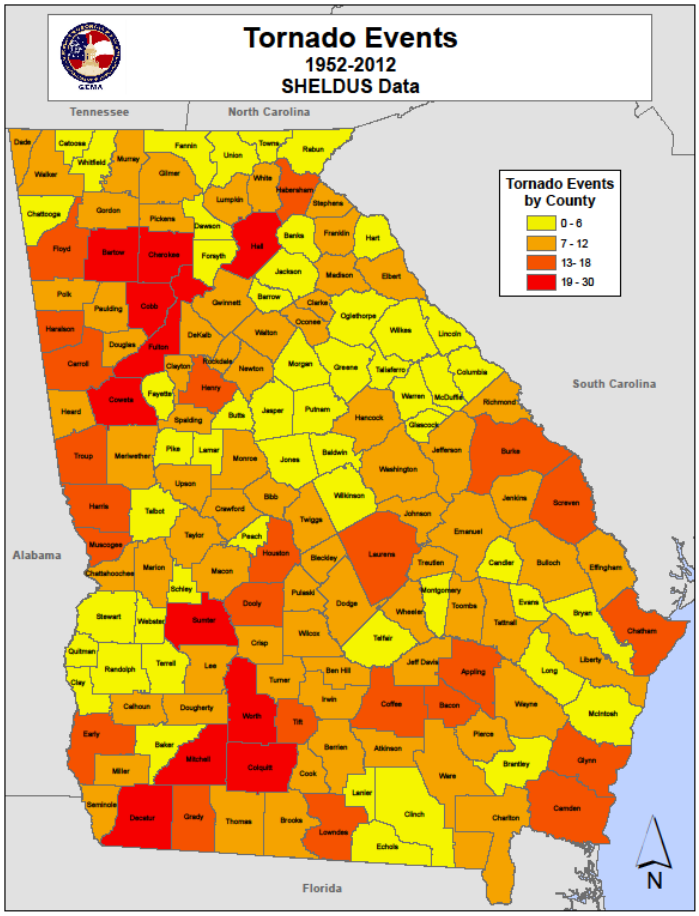


Figure 2.24

Figure 2.24 illustrates the tornado events per county from 1952 to 2012. Based on this map, counties in Northwest and Southeast Georgia have experienced a higher number of tornado events. However, tornadoes can occur anywhere within the state. In terms of losses associated with these events, Figure 2.25 illustrates that the areas with the most losses from tornadoes exist in around the city of Atlanta. This phenomenon is most likely due the fact that urban areas have more potential for loss in terms of property (not necessarily including crop damage).

Table 2.14 details the more notable tornado events that have affected the State of Georgia. The data spans from the early 1900s to the present and includes storms that appear in the historical record with numerous fatalities or vast damage. These events listed in the table are not a complete history of tornado activity in Georgia

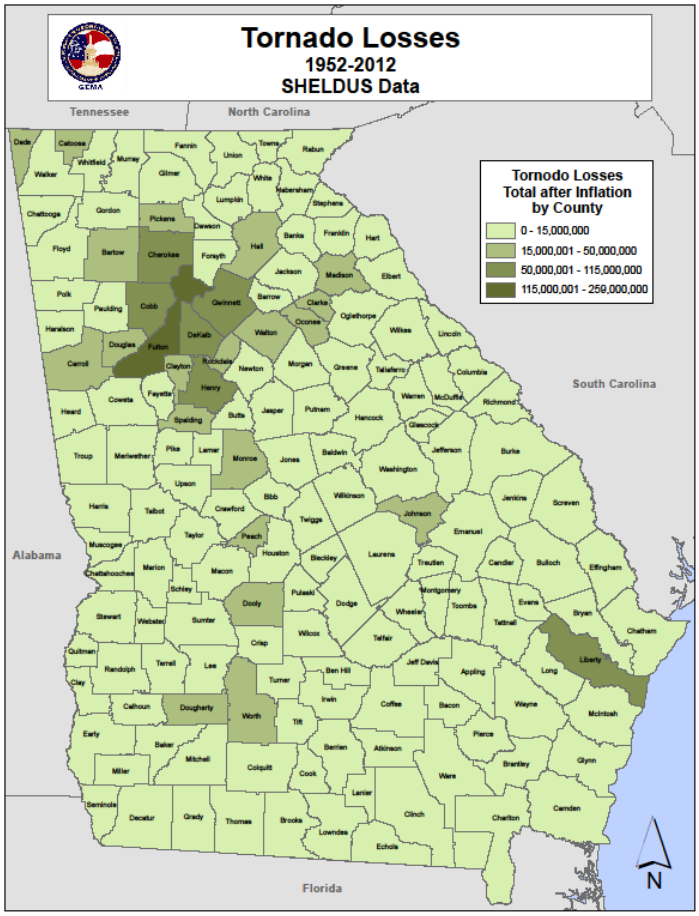


Figure 2.25

but are a sample meant to demonstrate the ability of tornadoes to impact the State.

The best available information to determine future probability of a tornado event is to review historic frequency. In total, 1438 tornado events have occurred from 1952-2012 in Georgia according to SHELDUS data. This equates to approximately 24 events per year historic average. These events in total have caused 2,940 injuries, 153 fatalities and over $1.7 billion in damages.

NOAA's SVRGIS data contains several spatial datasets for tornado events covering the years 1950-2011. Figure 2.26 shows tornado tracks from SVRGIS data. These tracks show that tornados seem to predominantly travel in a northeasterly direction in the state. This data indicates that the highest recorded magnitude tornado event in Georgia is an EF4.

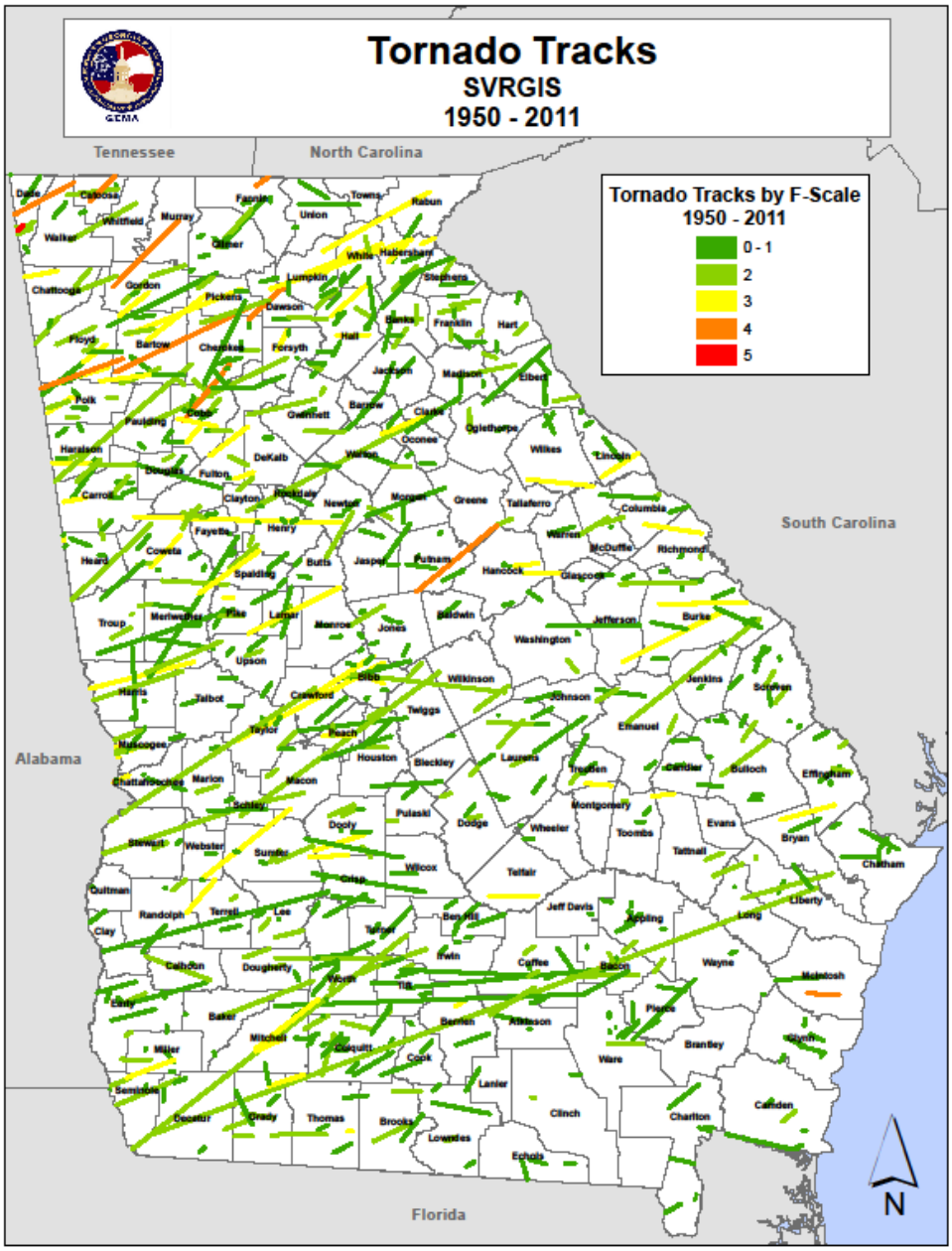


Figure 2.26

2.5.6 Inland Flooding

Associated Hazards:

Thunderstorms, tropical cyclones, dam failure

Hazard	Vulnerability	Total	Rank
Medium	High	High	3

Hazard Description

Flooding is a temporary overflow of water on normally dry lands adjacent to the source of water (river, stream, or lake). The causes of flooding include mass sources of precipitation such as tropical cyclonic systems, frontal systems, and isolated thunderstorms combined with other environmental variables such as changes to physical environment, topography, ground saturation, soil types, basin size, drainage patterns, and vegetative cover. Adverse impacts may include structural damages, temporary backwater effects in sewers and drainage systems, death of livestock, agricultural crop loss, loss of egress and access to critical facilities due to roads being washed-out or over-topped and unsanitary conditions by deposition of materials during recession.

Floods are loosely classified as either coastal or riverine. Coastal flooding is addressed in the Coastal Hazards section of this chapter. Riverine flooding occurs from inland water bodies such as streams and rivers. Riverine flooding is often classified based on rate of onset. The first is slow to build, peak, and recede often allowing sufficient time for evacuations. The other type of riverine flood is referred to as a “flash” flood which rapidly peak and recedes and gives insufficient time for evacuations. The more dangerous flash floods are common to the mountainous, impermeable surfaces of northern Georgia. Urban flash flooding can also present dangerous conditions, especially with roads washing out.

On a broad scale, flooding can occur around any body of water or low-lying surface given enough precipitation or snow melt. The spatial extent of the flooding event depends on the amount of water overflow but can usually be mapped because of existing floodplains (areas already prone to flooding).

In the State of Georgia, flooding is highly dependent of precipitation amounts and is highly variable within the State. Georgia’s climate is primarily affected by latitude, proximity to the Atlantic Ocean and Gulf of Mexico, and topography. Certain seasons are more prone to flooding due to their proneness to excessive precipitation. Typically, the wet seasons are during the winter, early spring and midsummer while the drier seasons are in the fall and late spring. However, this varies across the State with the northern portion receiving maximum precipitation amounts during the winter as a result of frontal systems while central and coastal Georgia receive maximums in the mid to late summer as a result of tropical cyclones and convective thunderstorm activity.

Profile

The rate of onset and duration of flooding events depends on the type of flooding (typical flood or

flash flood). The frequency measure of flooding events typically refers to the 100 year flood. In other words, this particular flood magnitude has the probability of occurring in one out of 100 years (1% chance per year). This magnitude of flood is often mapped as 100 year floodplains, which often delineate those with substantial risk to some severe flooding. Higher number of events in the Atlanta area is likely a result of the growth and development within floodplains in the region prior to floodplain mapping efforts that began in the 1970s. As a result, land and structures in this region are more likely to experience flood events.

Figures 2.27 and 2.28 illustrate flooding hazard events' history and losses in the State of Georgia from 1960 – 2012. Although the event totals pale compared to more frequent events such as severe weather, the total losses speak to the impact of flooding on Georgia. The regions with major losses from flooding include the Atlanta

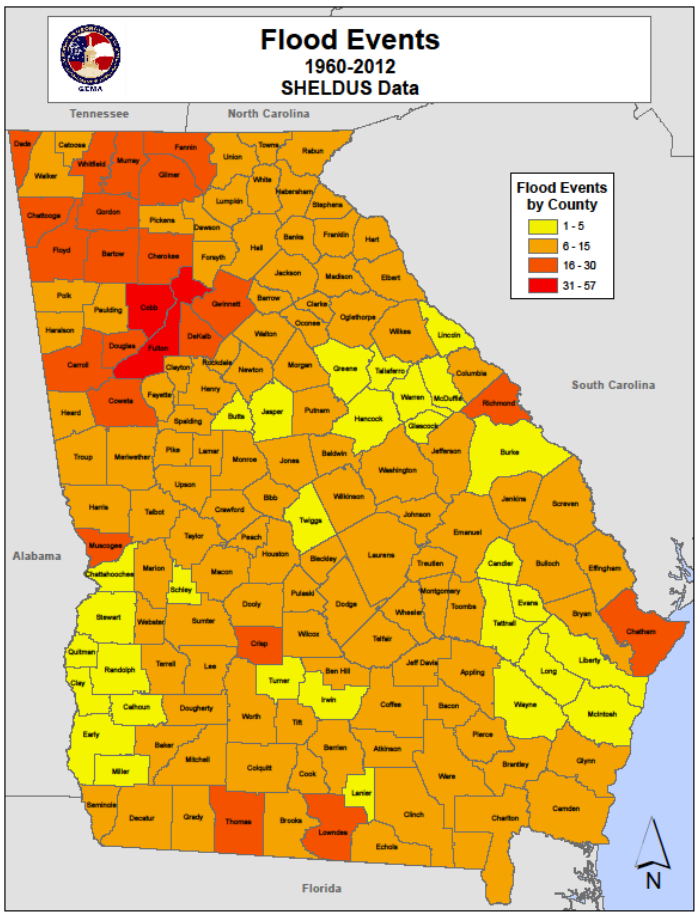


Figure 2.27

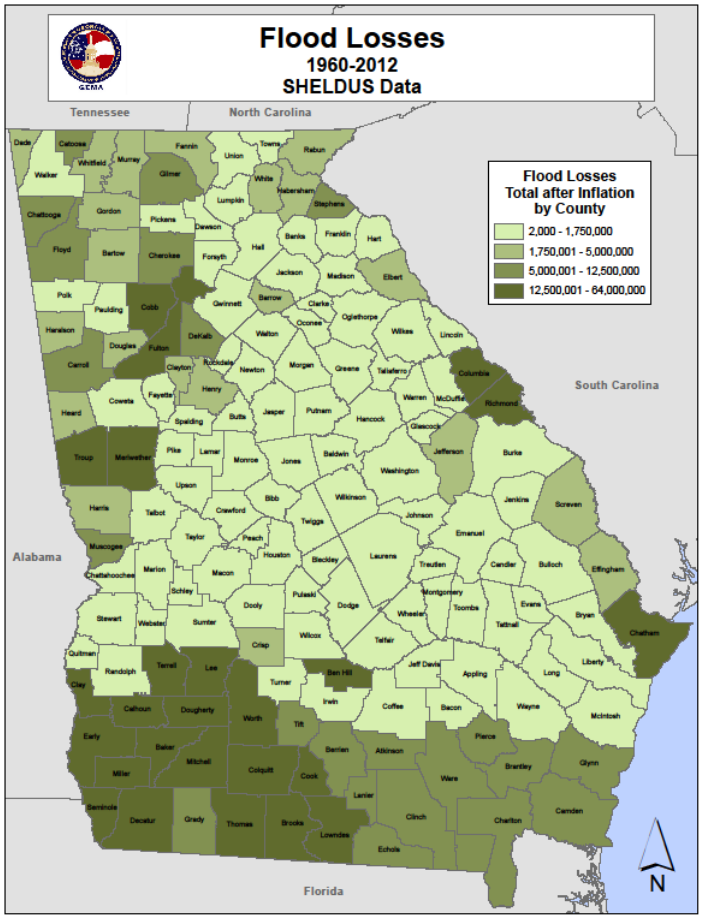


Figure 2.28

area, the Augusta area, and southwestern Georgia. However, the entire State of Georgia has experienced loss from flooding.

In total, 1,601 inland flooding events have occurred from 1960-2012 in Georgia according to SHELDUS data. This equates to approximately 26 events per year historic average. These storms in total have caused 51 injuries, 69 fatalities and over $854 million in damages.

Table 2.15 lists notable flooding events in Georgia since the late 1800s along with an estimate of magnitude of the flood (recurrence interval). Although the majority of floods will be minor in their impact, the risk analysis demonstrates the susceptibility of Georgia to experience significant flooding events. It should be noted that the 1994 Tropical Storm Alberto and 2009 Metro Atlanta flood events were extreme events with damages almost ten times the amount of any

Year	Area Affected	Recurrence Interval	Remarks
1881	Savannah Area	>100 years	335 deaths; $1.5 million in damages
1893	Savannah Area	>100 years	2,500 deaths; $10 million in damages
1916	Chattahoochee, Coosa, and Flint Rivers	25 to >100 years	8-21 inches of rain; $2.3 million in damages
1925	Central / South Georgia	25 to >100 years	8-11 inches of rain; 2 deaths
1929	Savannah, Ogeechee, and Altamaha Rivers	25 to >100 years	6-10 inches of rain; $3 million in damages
1940	Ogeechee and Savannah Rivers	10 to 75 years	25 deaths; $850,000 in damages; hurricane
1977*	Toccoa Creek	Unknown	DR541; Dam failure; 39 deaths; $2.8 million in damages
1990*	Conasauga, Chattooga, Toccoa and Oconee Rivers	50 to >100 years	FEMA DR857; 9 deaths; $13.9 million in damages
1990*	Savannah, Ogeechee and Ohoopee Rivers	>100 years	FEMA DR880; $7.6 million in damages, tropical storm
1991*	Altahama, Apalachicola, Ochlockonee, Ogeechee, Satilla, and Savannah Rivers	25 to 50 years	FEMA DR897; $3.4 million in damages
1994*	Flint, Chattahoochee, and Altamaha Rivers	>100 years	FEMA DR1033; 31 deaths; >20 inches of rain; $400 million in damages; Tropical Storm Alberto
1994*	Savannah area	25 to >100 years	FEMA DR1042; 15 inches of rain; $10.5 million in damages
1995*	Western Georgia	25 to 50 years	FEMA DR1209; 5-9 inches of rain; $20 million in damages; hurricane
2004*	Middle and South Georgia	10 to 50 years	FEMA DR1560; 4-9 inches of rain; $20 million in damages; hurricane
2004*	Northern and Southwestern Georgia	10 to 50 years	FEMA DR1554; 4-9 inches of rain; $30 million in damages; hurricane
2009*	Southwestern Georgia	10 to >500 years	FEMA DR1833; 5-10 inches of rain; $36.5 million in damages
2009*	Northwest Georgia, Atlanta Area	> 500 years (Epic)	FEMA DR1858; 9-12 inches of rain; $225 million in damages

Table 2.15 Notable Flood Events in Georgia

*Presidential Declared Disasters

other recorded flood event.

The worst flooding event in Georgia since records were kept is the flooding from a decaying tropical system, previously known as Tropical Storm Alberto, that produced torrential rainfall which resulted in some of the worst flooding ever observed across portions of the States of Georgia, Alabama, and Florida during July 1994. By far, the worst flooding occurred along Georgia's Flint and Ocmulgee Rivers and their tributaries. Some of the hardest hit cities along these rivers include Albany, Macon, and Montezuma. Across the entire three-state area impacted by the flooding, 17 NWS river forecast locations set new record flood stages, some breaking the old record by 5-7 feet. In all, 47 NWS river forecast locations exceeded flood stage. Crests of 5-15 feet above flood stage were common, while portions of some rivers observed crests that exceeded flood stage by more than 20 feet.

The flooding from Tropical Storm Alberto took a significant toll on human life, as a total of 33 persons perished. Of that total, 31 deaths occurred in Georgia, while the other 2 occurred in Alabama. Many of the fatalities, as is typical with flood events, occurred as a result of flash flooding; and most occurred in vehicles. In addition, approximately 50,000 people were forced from their homes due to the

flooding. More than 18,000 dwellings were damaged or destroyed by the floods, and nearly 12,000 people applied for emergency housing. In Macon, Georgia, the fresh water supply to nearly 160,000 people was disrupted when the water treatment plant, located along the banks of the Ocmulgee River, was flooded. Some residences were without fresh water for as long as 19 days. In addition, thousands of people and pieces of equipment were engaged in various flood-fighting efforts throughout the three-state area impacted by the flooding. Dozens of Federal, state, and local government agencies, private organizations, as well as various volunteer groups, were heavily involved in the massive mobilization of resources.

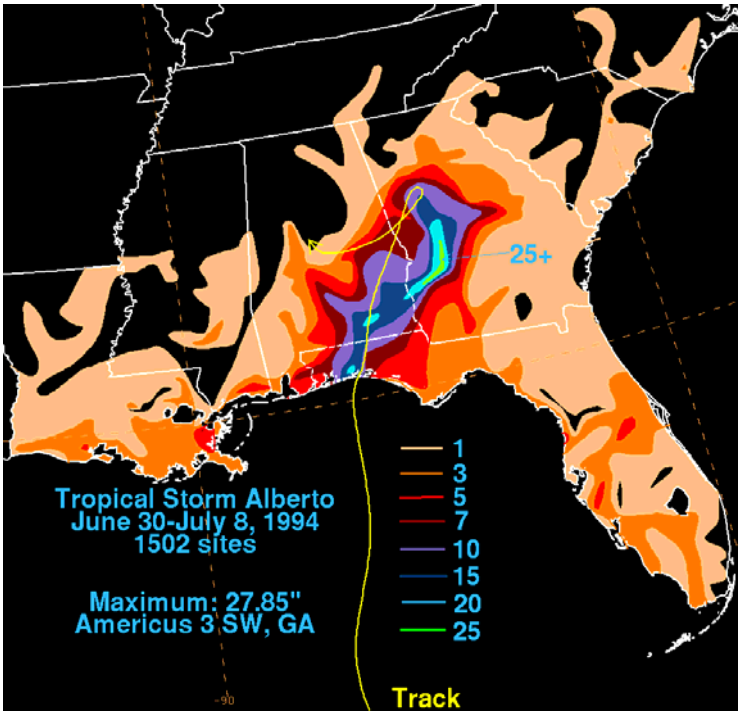


Figure 2.29 Tropical Storm Alberto Rainfall Totals (inches)

With respect to property damages from Tropical Storm Alberto, the estimates are nearly $750 million across the States of Georgia, Alabama, and Florida as a result of this flood event. In addition to the more than 18,000 dwellings damaged or destroyed, hundreds of bridges and well over 1,000 roads sustained damages. Also, 218 dams (most of them small dams located in Georgia) were damaged by the flooding, many of which failed altogether. Agricultural losses accounted for approximately $100 million. In the States of Georgia, Alabama, and Florida combined, more than 900,000 acres of crops were affected by the flooding. Georgia and Alabama suffered the greatest crop losses with more than 400,000 acres in each state impacted. In all three states, peanuts and cotton were the commodities most severely affected. Livestock losses were also significant, especially to poultry, with as many as 250,000 chickens reportedly lost to the flooding.

Similar to storm surge models, flood models are statistically based on historical flooding events and estimate the impact areas of certain magnitudes of floods (typically the 100 year flood). Figure 2.30 maps the 1% (100 year) and 0.2% (500-year) floodplains for the State of Georgia based on the FEMA DFIRM floodplain layer. This is the result of map modernization efforts that ended in 2010. As of this plan update, all counties in Georgia have available DFIRM data. During the map updates, not all 500 year floodplains were mapped. For many counties, only 100 year floodplains were mapped.

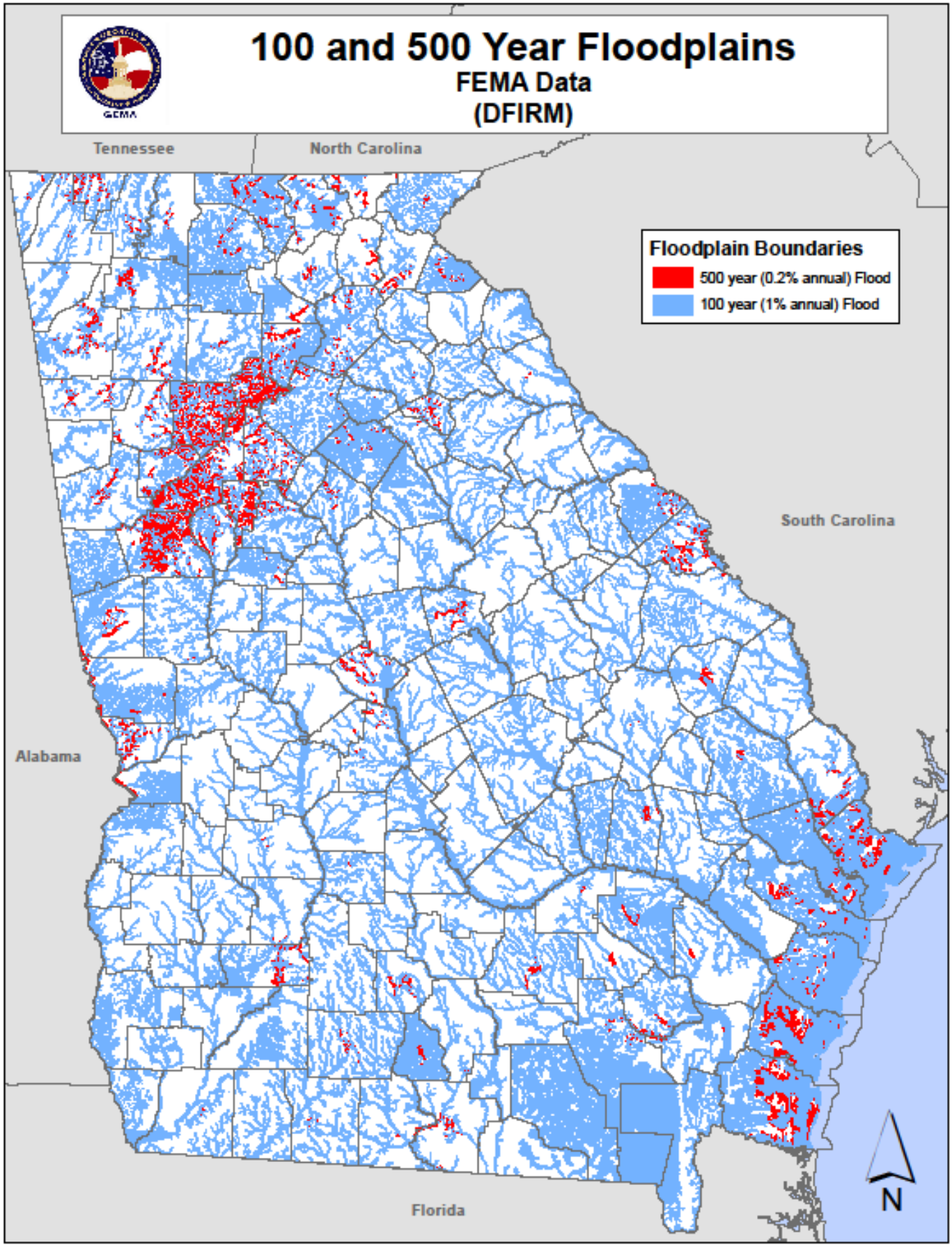

100 and 500 Year Floodplains
FEMA Data
(DFIRM)
Tennessee
North Carolina
South Carolina
Alabama
Florida
Floodplain Boundaries
500 year (0.2% annual) Flood
100 year (1% annual) Flood
N

Figure 2.30

2.5.7 Severe Winter Weather

Associated Hazards:

Snowfall, ice, high winds, extreme cold temperatures, winter coastal storms

Hazard	Vulnerability	Total	Rank
High	Medium	Medium	6

Hazard Description

Severe winter storms bring the threat of ice. Freezing rain consists of super cooled falling liquid precipitation freezing on contact with the surface when temperatures are below freezing. This results in an ice glazing on exposed surfaces including buildings, roads, and power lines. Sleet is easily discernable from freezing rain in that the precipitation freezes before hitting the surface. Often this sleet bounces when hitting a surface and does not adhere. However, sleet can compound into sufficient depths to pose some threat to motorists and pedestrians.

A heavy accumulation of ice, which is often accompanied by high winds, has the ability to devastate infrastructure and vegetation. Destructiveness in the southern states is often amplified due the lack of preparedness and response measures. Also, the infrastructure was not designed to withstand certain severe weather conditions such as weight build-up from snow and ice. Often, sidewalks and streets become extremely dangerous to pedestrians and motorists. Primary industries such as farming and fishing suffer losses through winter seasons that produce extreme temperatures and precipitation.

Within Georgia, the impacts of winter storms are often contained in the northern part of the State. However, events like the 1993 “storm of the century” illustrated the vast impacts that one storm can have on the entire State. The greatest impacts to Georgia come from winter storms that are the result of coastal storms coming up from the Gulf of Mexico, including the winter storms in 1973 and 1993. The 1973 storm produced snowfalls of up to 19 inches in parts of Central Georgia including the City of Thomaston in Upson County.

Severe winter weather exhibits seasonal qualities in that most occur within the months of January to March, with the highest probability of occurrence in February. The rate of onset and duration varies among storms, depending on the weather system driving the storm. Severe winter weather rarely frequents the State of Georgia; however, the impacts of the storms substantiate severe winter weather’s inclusion in risk assessments for most southern states.

Profile

The best measures for describing the magnitude and intensity of severe winter weather include average amounts of precipitation (snow fall), inches of accumulated ice, low and high temperatures, and wind gust speeds.

NOAA's National Climatic Data Center is now producing the Regional Snowfall Index (RSI) for significant snowstorms that impact the eastern two thirds of the U.S. The RSI ranks snowstorm impacts on a scale from 1 to 5, similar to the Fujita scale for tornadoes or the Saffir-Simpson scale for hurricanes.

The RSI differs from these other indices because it includes population. RSI is based on the spatial extent of the storm, the amount of snowfall, and the juxtaposition of these elements with population. Including population information ties the index to societal impacts. Currently, the index uses population based on the 2000 Census.

Category	RSI Value	Description
1	1–3	Notable
2	3–6	Significant
3	6–10	Major
4	10–18	Crippling
5	18.0+	Extreme

Table 2.16 NOAA RSI Categories for Southeast

The RSI is an evolution of the Northeast Snowfall Impact Scale (NESIS) which NCDC began producing operationally in 2005. While NESIS was developed for storms that had a major impact in the Northeast, it includes the impact of snow on other regions as well. It can be thought of as a quasi-national index that is calibrated to Northeast snowstorms. By contrast, the RSI is a regional index; a separate index is produced for each of the six NCDC climate regions in the eastern two-thirds of the nation. Georgia is in the Southeast climate region.

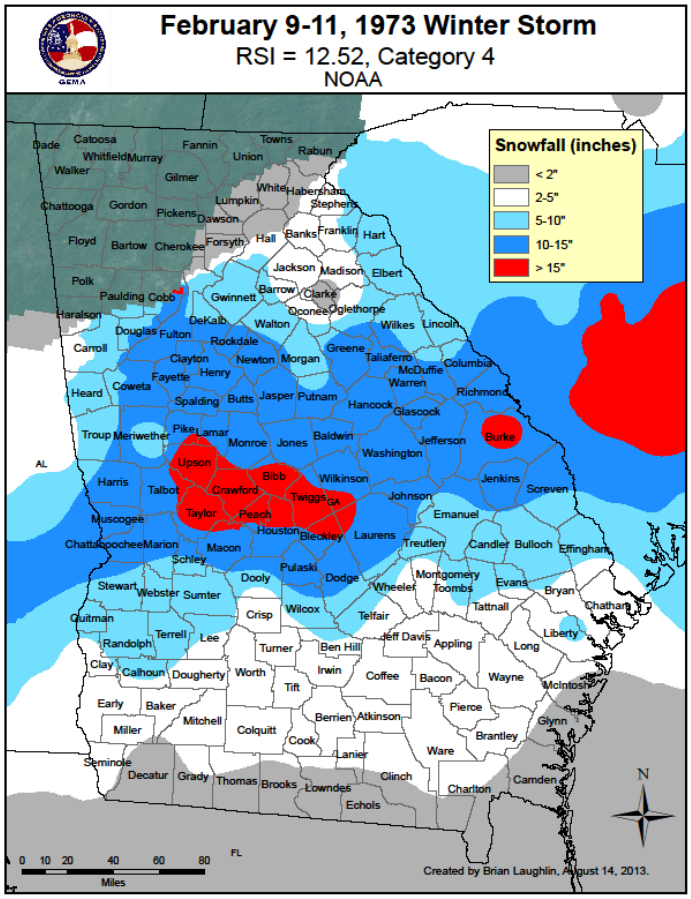


Figure 2.31

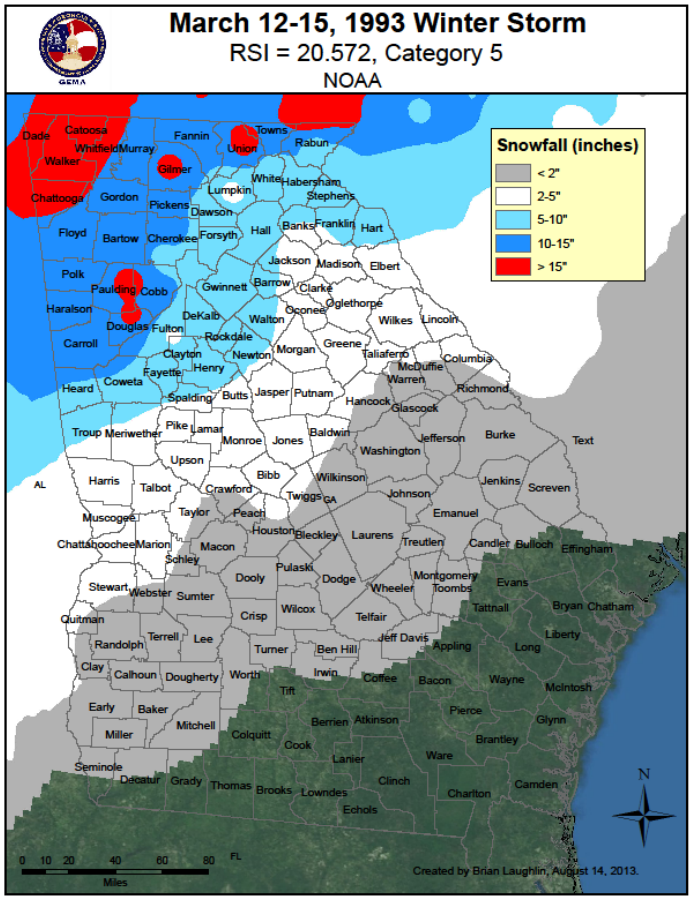


Figure 2.32

Date	Areas Affected	Description
1/21-24/1940	North and Central GA	Up to 14.5 inches of snow in North GA; Central GA reported up to 10 inches
2/9-11/1973	Central and South GA	More than 15 inches reported in Upson, Taylor, Bibb, Twiggs, Wilkinson and Burke counties;
2/17-20/1979	North GA	10 inches in Toccoa, GA
1/21-24/1987	North and Central GA	11.5 inches in Dallas and Helen
3/12-15/1993	North and Central GA	Several locations in North GA and Metro Atlanta area reporting 13-21 inches
1/22-2/1/2000*	North and Central GA	FEMA DR1311; Severe ice storms, freezing rain, damaging wind, severely cold temperatures; 51 declared counties
1/9-11/2011	North and Central GA	Several locations in North and Central GA reporting 7-13 inches; RSI = 4.158, Category 2

Table 2.17 Notable Winter Storm Events in Georgia. *Presidential Declared Disaster

The RSI is important because of the need to place snowstorms and their societal impacts into a historical perspective on a regional scale. For example in February 1973 (Figure 2.31), a major snowstorm hit the Southeast affecting areas not prone to snow. The storm stretched from the Louisiana and Mississippi Gulf coasts northeastward to the Carolinas. Over 11 million people received more than 5" of snow and three quarters of a million people in Georgia and South Carolina experienced over 15" of snow. This is currently the 10th highest ranked storm for the Southeast region. More information on RSI available at http://www.ncdc.noaa.gov/snow-and-ice/rsi/overview .

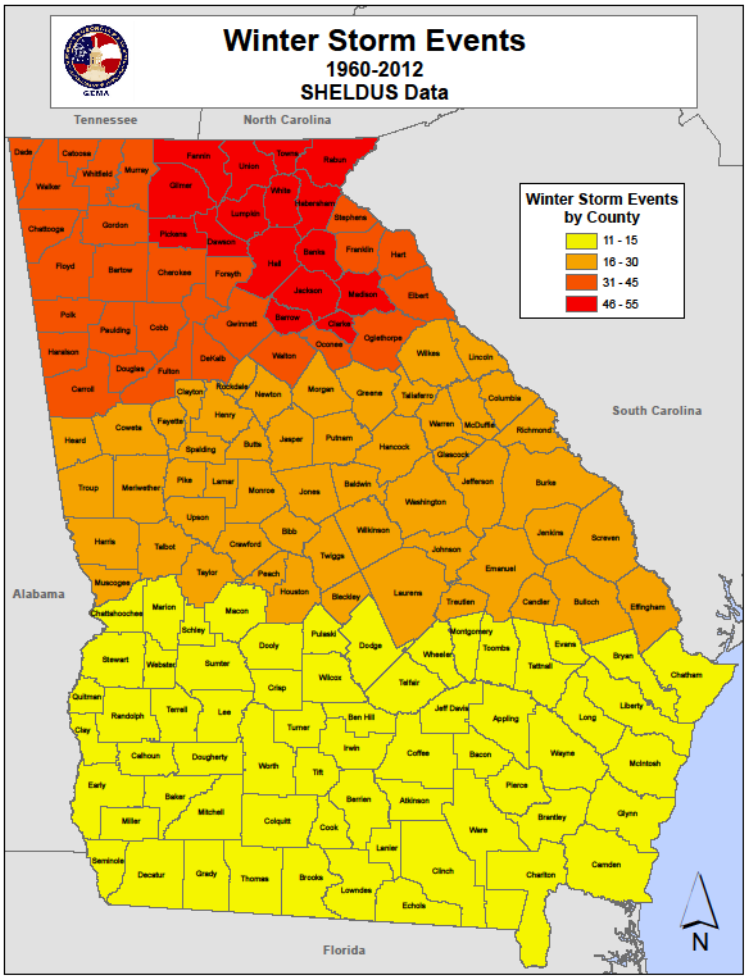


Figure 2.33

The historical events map for severe winter weather, Figure 2.33, illustrates the relationship with latitude. Areas that typically have cooler temperatures are more likely to experience more extreme temperatures. The map roughly corresponds to the southern, piedmont, and mountainous regions of Georgia. The losses incurred from severe winter weather shown in Figure 2.34 do not mirror the event distribution. The areas with the highest losses do not correspond with the areas with the most events; however, all are located in North Georgia. North Georgia counties are not the only ones at risk, however. Figure 2.31 shows snowfall impacts from the winter storm of 1973 that had greater impacts on Central and South Georgia.

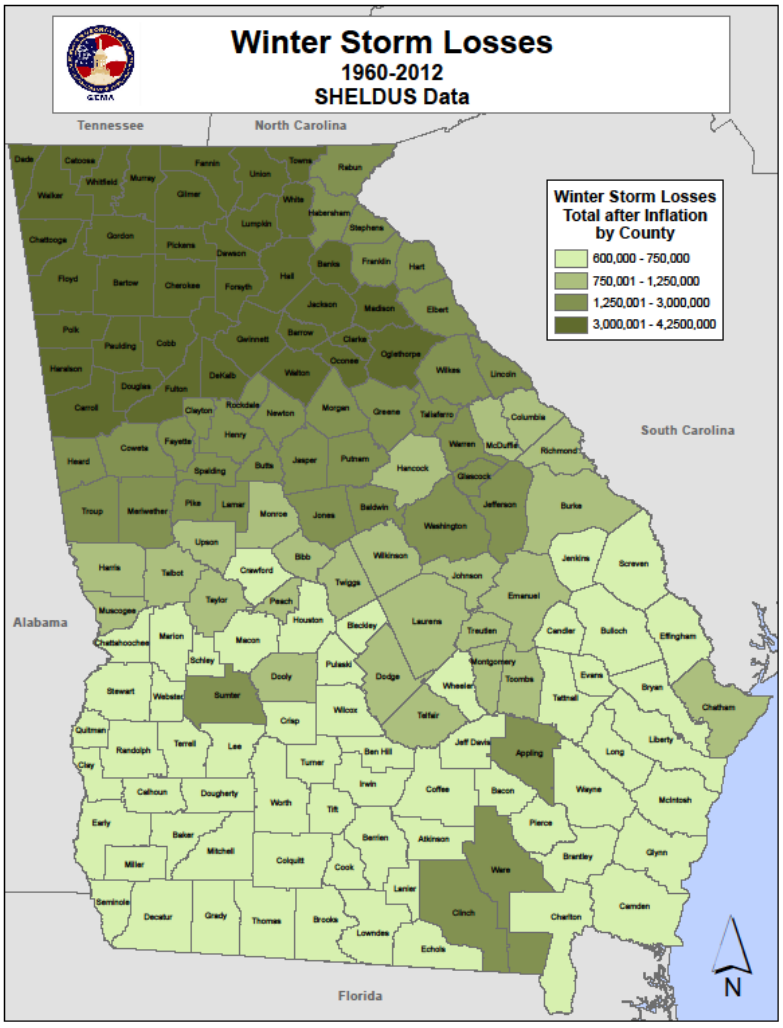


Figure 2.34

Table 2.17 lists major winter storms that have occurred in Georgia. The most notable of these events occurred in March of 1993. In the morning of March 12, 1993, the collision of a low pressure system from the Gulf of Mexico, an arctic high pressure system from the Great Plains, and a steep southward jet stream brought high winds, heavy rain and snow, tornadoes, record low temperatures and blizzard conditions to the State of Georgia. The entire Southeast region, including Georgia, shut down for three days. As a result of the incident, FEMA declared Georgia counties eligible for Federal assistance to cover expenses associated with debris removal and emergency protective measures. This storm also was rated a Category 5 by the NOAA RSI.

In total, 3958 severe winter weather events have occurred from 1960-2012 in Georgia according to SHELDUS data. This equates to approximately 65 events per year historic average. These storms in total have caused 415 injuries, 40 fatalities and over $413 million in damages.

2.5.8 Drought

Hazard	Vulnerability	Total	Rank
High	Medium	Medium	4

Hazard Description

Drought is a normal, recurrent feature of climate consisting of a deficiency of precipitation over an extended period of time (usually a season or more). This deficiency results in a water shortage for some social or environmental sector. Drought should be judged relative to some long-term average condition of balance between precipitation and evapotranspiration in a particular area that is considered "normal". Drought should not be viewed as only a natural hazard because the demand people place on water supply affects perceptions of drought conditions. The impacts of drought are vast, including limited water supplies in urban areas to insufficient water for farmland.

Droughts occur in virtually every climatic zone (on every continent). Because the impacts of drought conditions are largely dependent on the human activity in the area, the spatial extent of droughts can span a few counties to an entire country.

Temporal characteristics of droughts are drastically different from other hazards due to the possibility of extremely lengthy durations as well as a sluggish rate of onset. Drought conditions may endure for years to decades, which implicate droughts as having high potential to cause devastation on a given area. The duration characteristic of droughts is so important that droughts are classified in terms of length of impact. Droughts lasting 1 to 3 months are considered short term, while droughts lasting 4 to 6 months are considered intermediate and droughts lasting longer than 6 months are long term. With the slow rate of onset, most populations have some inkling that drought conditions are increasingly present. However, barring drastic response measures, most only have to adapt to the changing environment.

Seasonality has no general impact on droughts in terms of calendar seasons. However, "wet" and "dry" seasons obviously determine the severity of drought conditions. In other words, areas are less susceptible to drought conditions if the area is experiencing a wet season. The frequency of droughts is undetermined due to the fact that the hazard spans such a long period of time. However, climatologists track periods of high and low moisture content similarly to the tracking of cooling and warming periods.

Measures of drought magnitude and intensity can be found in some of the drought indices. Dr. Michael Hays with the National Drought Mitigation Center (NDMC) lists the drought indices currently being used as the percent of normal, Standardized Precipitation Index, Palmer Drought Severity Index, Crop Moisture Index, Surface Water Supply Index, and Reclamation Drought Index. Basically, all of these indices are comparable and not absolute measures of magnitude or intensity. In other

words, the indices highlight areas that are wetter or drier using statistical calculations based on a limited climatic history.

The historical events and losses maps for drought (Figures 2.35 and 2.36) illustrate areas of drought being in the heart and northern portion of Georgia. This may be a result of South and Coastal Georgia's preexisting proneness to aridity. Because most indicators measure drought in terms of precipitation below average, the indicators may not differentiate between typically moist and arid areas when receiving the same amounts of precipitation. As the loss map illustrates, drought causes a drain totaling more than 5 million dollars in some counties. Most of these losses are probably crop losses since agriculture is often greatly affected by drought.

Because droughts are "creeping" disasters, only large-scale events are considered notable. One

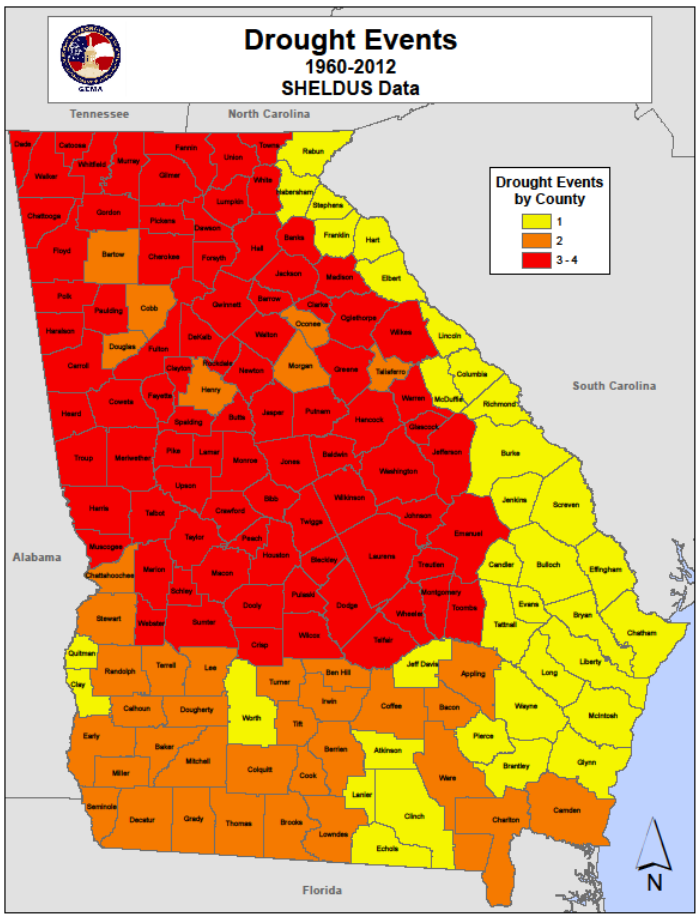


Figure 2.35

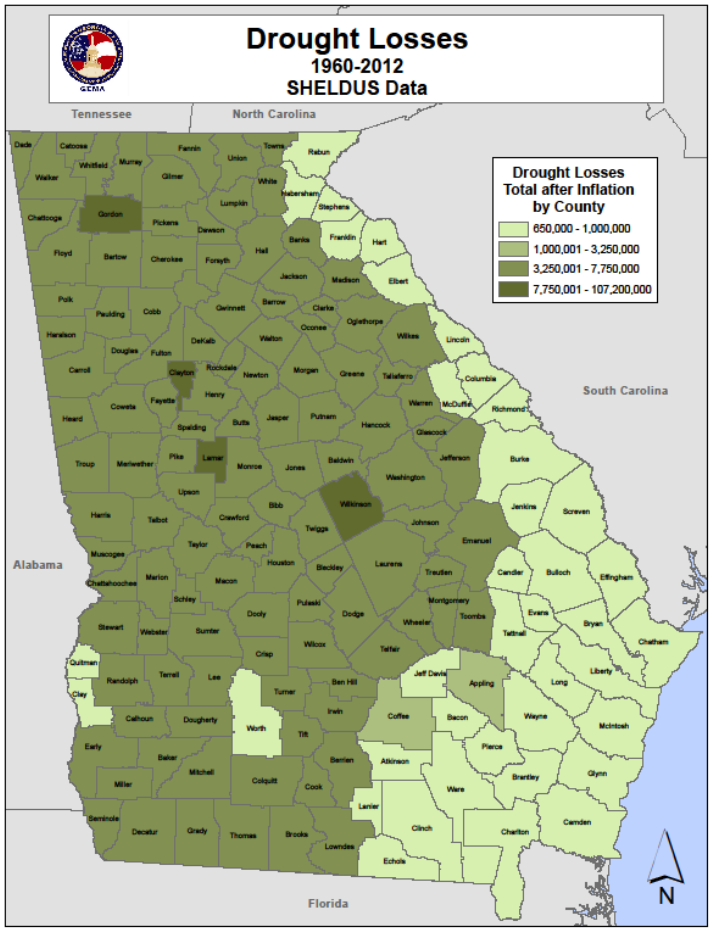


Figure 2.36

of the most severe drought events in Georgia occurred in 1977 and resulted in a Federal disaster declaration. The drought spanned most of the Midwestern and Southeastern United States and doomed many harvests of hay, corn, soybean, cotton, and peanut. The declaration included 130 of Georgia's 159 counties with costs to farmers topping $300 million (inflation rate not included).

Other notable droughts have severely affected municipal and industrial water supplies, streamwater quality, recreation, hydropower generation, navigation, and agricultural production. The following table, Table 2.18, lists the more notable droughts in Georgia's history since the beginning of the 20th century.

Typically, the risk analysis of hazard events takes into account the recurrence interval of the hazard. Droughts are not measured in terms of

Year	Area Affected	Remarks
1903-05	Statewide	Severe
1924-27	North-central Georgia	One of the most severe of the century
1930-35	Mostly statewide	Affected most of US
1938-44	Statewide	Regional drought
1950-57	Statewide	Regional drought
1968-71	Southern and Central Georgia	Variable severity
1977	Statewide	Disaster 3044
1985-90	North and Central Georgia	Regional drought
1999-2009	Statewide	Severe

Table 2.18: Notable Drought Events in Georgia

recurrence intervals. However, drought prediction and indication models utilize historical and current meteorological and geological data in order to determine the current and possible extent of drought conditions. These models, which can be found at the NDMC website, are dynamic and, therefore, are not useful in the composite score. Also, drought does not seem to impact portions of Georgia more than other portions and, therefore, is not a spatially-defined hazard.

The nature of drought events, along with the limited data on previous occurrences, makes estimating a future probability difficult at best. Nevertheless, tables 2.18 shows 9 drought events occurring within 106 years. Looking at the 100 year record from 1903 to 2003, 37 of those 100 years were affected by drought. This yields a probability of a 37% chance of a drought occurring in any given year.

One of the newer indices of drought is the Standardized Precipitation Index (SPI) which is based on the probability of precipitation for any time scale. This index is used by many drought planners because of the versatility of computing for different time scales, the ability to provide early warning of drought and to assess drought severity. The SPI include the impacts of precipitation deficits on groundwater, reservoir storage, soil moisture, snowpack and streamflow. Monthly maps of the SPI are downloadable from the NDMC. Figure 2.37 is an examples of SPI maps for United States. This map shows the extent of drought conditions can reach a SPI score of –2.0 or less, or extremely dry conditions.

Because of the slow rate of onset and long duration of droughts in Georgia, long-term management and mitigation measures are appropriate. The Environmental Protection Division (EPD) of Georgia's Department of Natural Resources (DNR) publishes the Georgia Drought Management Plan, which addresses both pre-drought mitigation strategies and drought response strategies. Refer to the Drought Mitigation Plan for more details on drought assessments for the State of Georgia.

SPI Score	Condition
+2 and above	Extremely wet
+1.5 to +1.99	Very wet
+1.0 to +1.49	Moderately wet
-0.99 to +0.99	Near normal
-1.0 to -1.49	Moderately dry
-1.5 to -1.99	Severely dry
-2.0 and less	Extremely dry

Table 2.19: SPI Scores and Corresponding Conditions

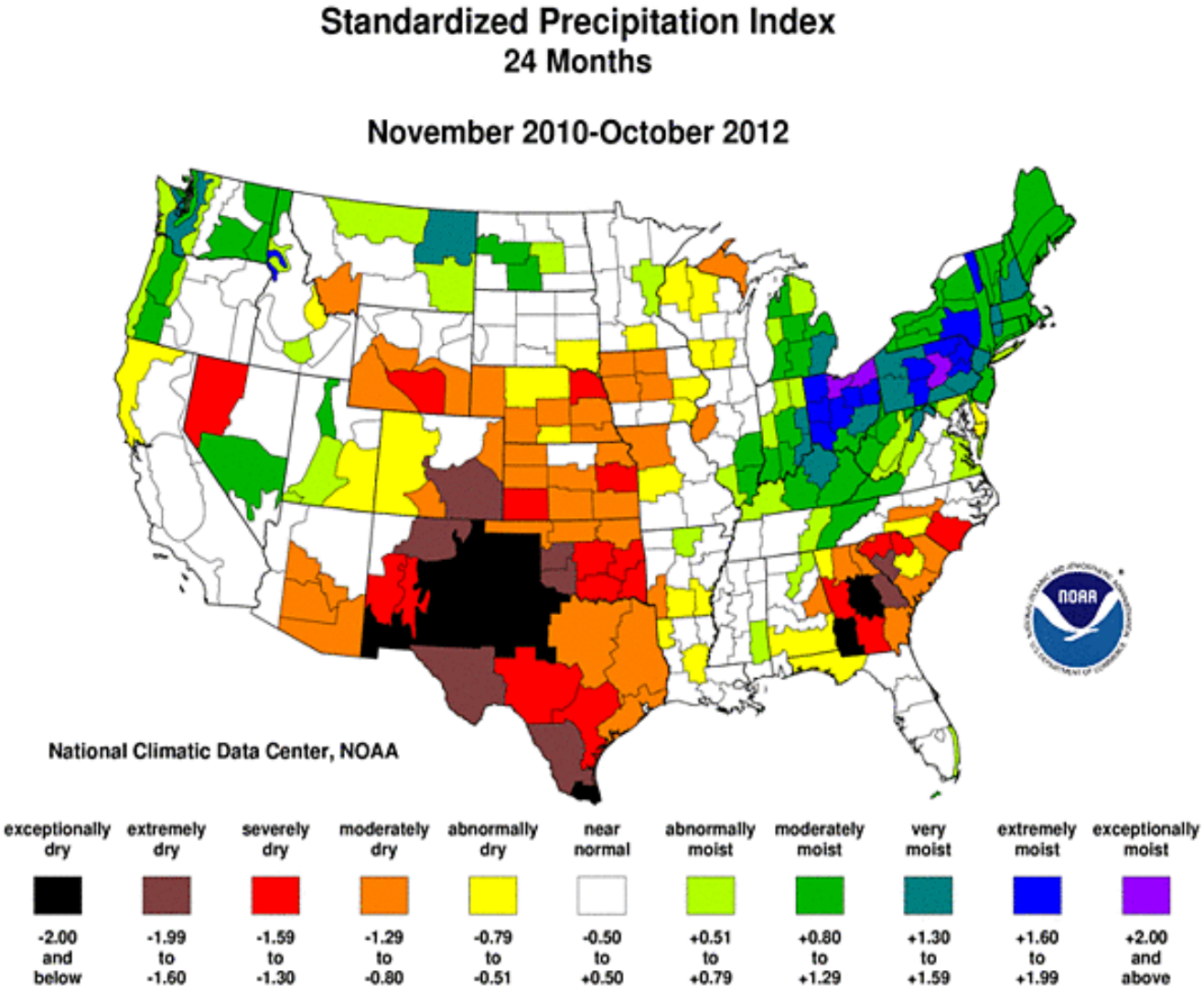

Standardized Precipitation Index
24 Months
November 2010-October 2012
National Climatic Data Center, NOAA
exceptionally dry
-2.00 and below
extremely dry
-1.99 to -1.60
severely dry
-1.59 to -1.30
moderately dry
-1.29 to -0.80
abnormally dry
-0.79 to -0.51
near normal
-0.50 to +0.50
abnormally moist
+0.51 to +0.79
moderately moist
+0.80 to +1.29
very moist
+1.30 to +1.59
extremely moist
+1.60 to +1.99
exceptionally moist
+2.00 and above

Figure 2.37

2.5.9 Wildfire

Hazard	Vulnerability	Total	Rank
Medium	Medium	Medium	6

Hazard Description

A wildfire is an uncontained fire that spreads through the environment. Wildfires have the ability to consume large areas, including infrastructure, property, and resources. When massive fires, or conflagrations, develop near populated areas, evacuations possibly ensue. Not only do the flames impact the environment, but the massive volumes of smoke spread by certain atmospheric conditions also impact the health of nearby populations.

Wildfires result from the interaction of three crucial elements: fuel, ignition (heat), and oxygen. Natural and man-made forces cause the three crucial elements to coincide in a manner that produces wildfire events. Typically, fuel consists of natural vegetation. However, as the urban and suburban footprint expands, wildfires may utilize other means of fuel such as buildings. In terms of ignition or source of heat, the primary natural source is lightning. However, humans are more responsible for wildfires than lightning (causing around 80% of fires). Man-made sources vary from the unintentional (fireworks, campfires, machinery) to the intentional (arson). With these two elements provided, the wildfires may spread as long as oxygen is present.

Weather is the most variable factor affecting wildfire behavior. Strong winds propel wildfires quickly across most landscapes (unless fire breaks are present). Shifting winds create erratic wildfires, complicating fire management. Dry conditions provide faster-burning fuels, either making the area more vulnerable to wildfire or increasing the mobility of preexisting wildfires.

Wildfires are notorious for spawning secondary hazards, such as flash flooding and landslides, long after the original fire is extinguished. Both flash flooding and landslides result from fire consuming the vegetation that provides precipitation interception and infiltration as well as slope stability.

All of Georgia is prone to wildfire due to presence of wildland fuels associated with wildfires. Land cover associated with wildland fuels include coniferous, deciduous, and mixed forest; shrubland; grasslands/herbaceous; transitional; and woody and emergent herbaceous wetlands. The spatial extent of wildfire events greatly depends on both the factors driving the fire as well as efforts of fire management and containment. Within the State of Georgia, the more recent fires of 2007 engulfed over 400,000 acres and even reached into Florida. However, these fires occurred in largely isolated regions with limited exposure to human development. While these fires posed minimal impact to development, air quality and visibility were greatly reduced throughout large areas of southeast Georgia due to smoke.

In terms of seasonality, wildfires can occur during any season of the year. However, drier seasons, which vary within the State of Georgia, are more vulnerable to severe wildfires because of its abundant quick-burning fuels. In terms of rate of onset and duration, wildfires vary depending on the available fuels and weather patterns. Some wildfires can engulf an area in a matter of minutes from the first signs whereas others may be slower burning and moving. The frequency of wildfires is not typically measured because of the high probability of human ignition being statistically unpredictable.

Magnitude and intensity are typically only measured by size of the wildfire and locations of burning. Three classes of fires include understory fires, crown fires, and ground fires. Naturally-induced wildfires burn at relatively low intensities, consuming grasses, woody shrubs, and dead trees. These understory fires often play an important role in plant reproduction and wildlife habitat renewal and self-extinguish by low fuel loads or precipitation. Crown fires, which consist of fires consuming whole living trees, are low probability but high consequence type events due to the creation of embers that can spread by wind. Crown fires typically match perceptions of wildfires. In areas with high concentrations of organic materials in the soil, ground fires may burn, sometimes persisting undetected for long periods until the surface is ignited.

Profile

Data on historical occurrence and extent of wildfires varies depending on the source. Table 2.20 provides the National Interagency Fire Center (NIFC) figures for wildland fire and burn acreage totals from 2002-2012 in Georgia. The data indicates wildland fires in Georgia can vary substantially in size with the vast majority of small size. Higher totals in 2007 coincide with several swamp fires in southeast Georgia that year. Even with the 2007 figures, the average extent of wildland fires is approximately 20 acres. Based on this data, the State can expect to experience approximately 5,800 wildland fires in any given year.

Year	Fires	Acres
2002	7,185	160,041
2003	3,430	9,908
2004	6,257	27,500
2005	5,573	19,263
2006	8,352	40,202
2007	8,726	837,895
2008	5,454	23,081
2009	3,732	13,714
2010	3,489	14,534
2011	8,387	149,222
2012	3,331	19,136
Total	**63,916**	**1,314,496**
Average	**5,811**	**119,500**

Table 2.20 GA Wildfires and Acres (NIFC)

The most notable wildfire events are most likely the most recent 2007 fires that affected the southeast quadrant of Georgia. These massive fires, the largest in Georgia's history, burned more than 400,000 acres and destroyed 18 homes. Initial estimates of Georgia Forestry Commission (GFC)'s expenditures for fire control efforts totaled more than $62 million.

In 2005, the Southern Wildfire Risk Assessment produced reports and data based best available data and models. One of the products is a Levels of Concern index which combines the existing Wildland Fire Susceptibility Index and the Fire Effects Index to define overall wildfire risk. These models take into account surface fuel, canopy closure, historic fire occurrences, topography, weather influence, fire suppression effectiveness, urban interfaces, and infrastructure areas. Figure 2.39 shows the Levels of Concern (LOC) map

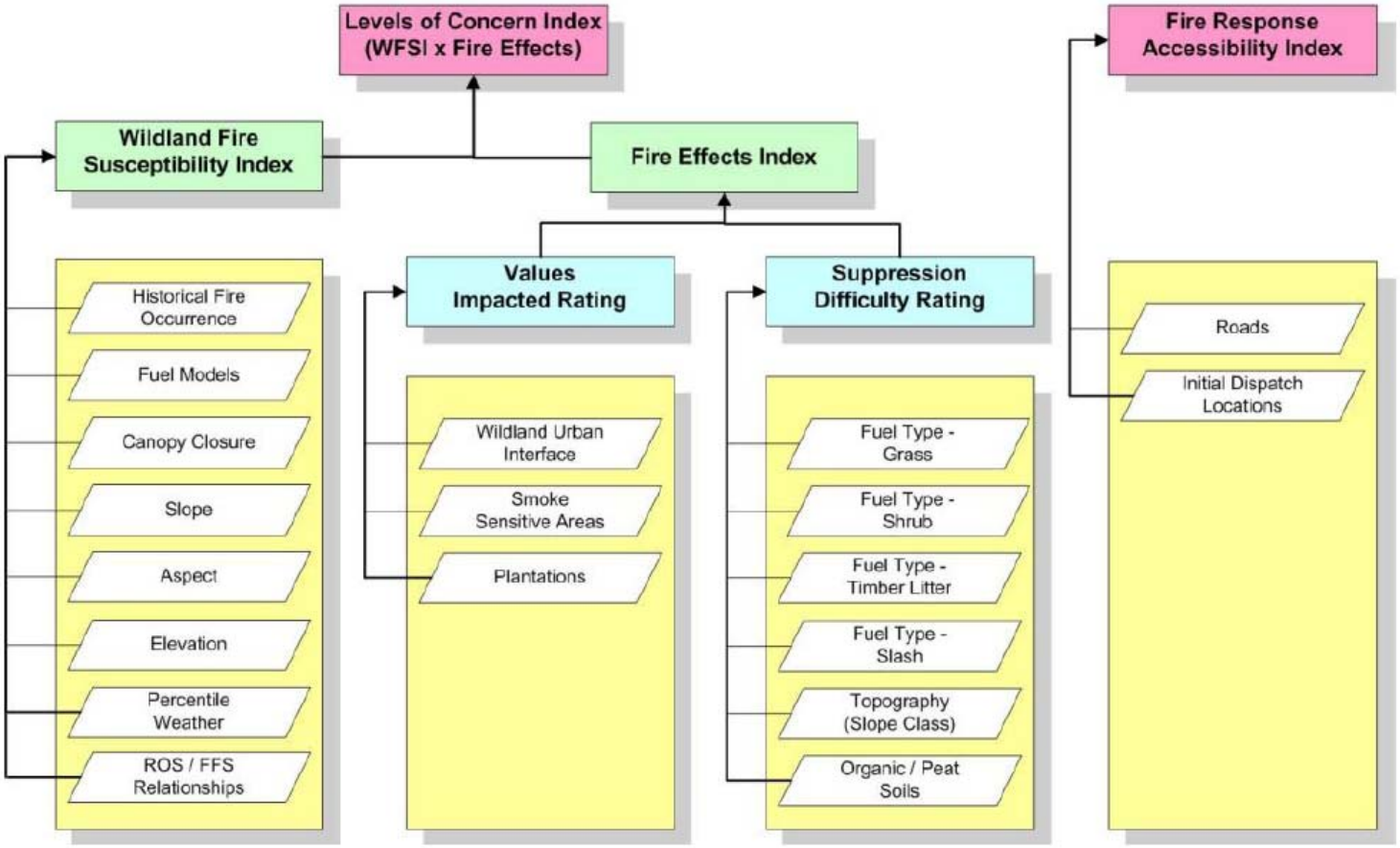


Figure 2.38 Southern Wildfire Risk Assessment Model. Source: SWRA Final Report (2006)

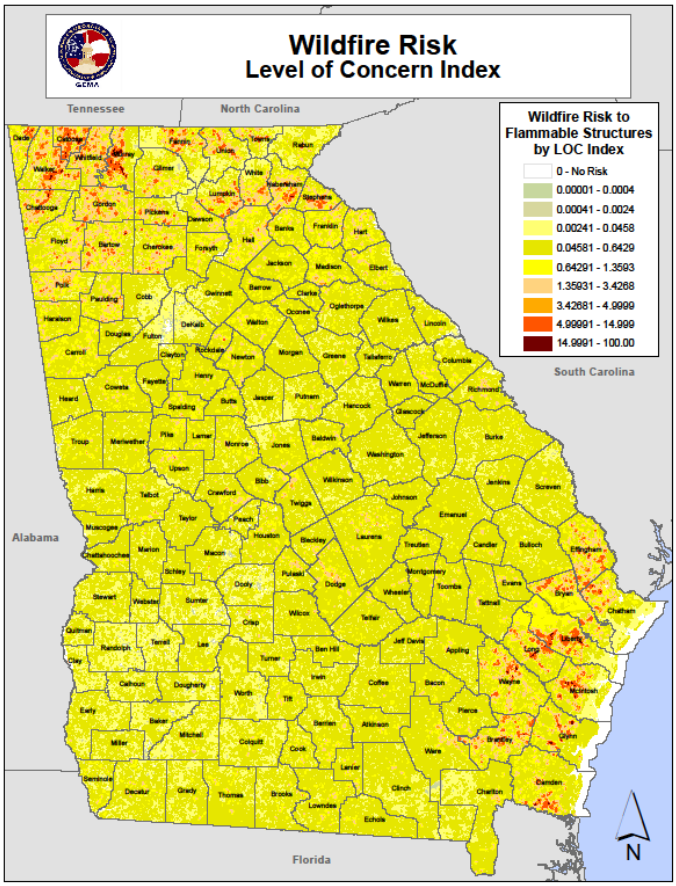


Figure 2.39 Level of Concern Index

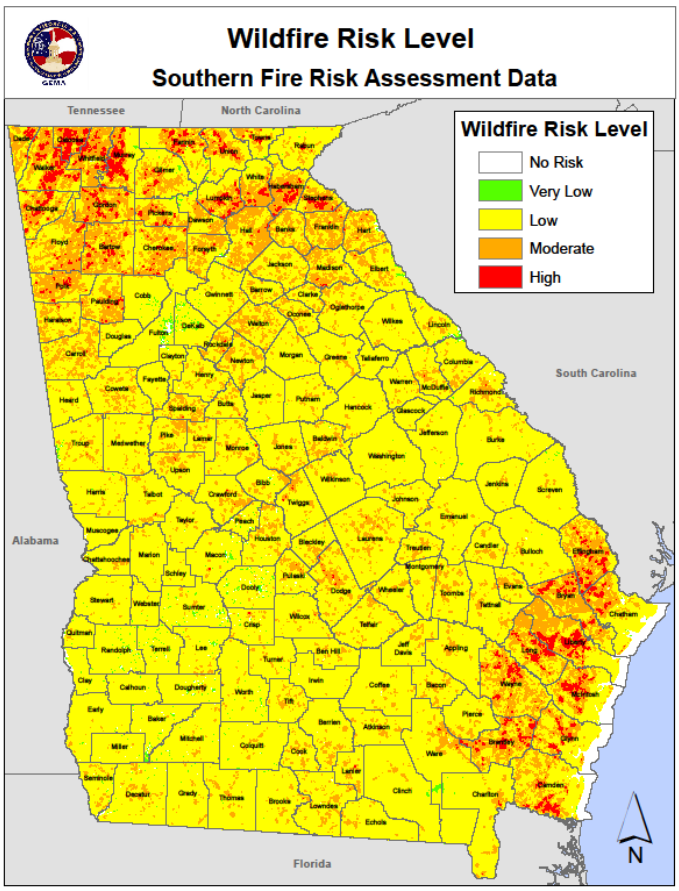


Figure 2.40 Wildfire Risk Level

Hazard Score	Description	Level of Concern Index
0	None	0
1	Very Low	0.00001 - 0.0004
		0.00041 - 0.0024
2	Low	0.00241 - 0.0458
		0.04581 - 0.6429
3	Moderate	0.64291 - 1.3593
		1.35931 - 3.4268
		3.42681 - 4.9999
4	High	4.99991 - 14.999
		14.9991 - 100.00

Table 2.21 Hazard Score Descriptions for Figure 2.39

for Georgia. The Georgia Foresty Commission is in the process of updating indexes that factor into the LOC map.

The nine categories in LOC were divided into four hazard scores to help describe risk for local planning as shown in Figure 2.40. Table 2.21 describes these levels and how they correspond to LOC Index categories.

Figure 2.41 Example of WUI Boundary (GFC)

The wildfires that cause the greatest impact to loss of life and property are those located in the Wildland-Urban Interface. There are many definitions of the Wildland-Urban Interface (WUI), however from a fire management perspective it is commonly defined as an area where structures and other human development meet or intermingles with undeveloped wildland or vegetative fuels. Wildfires are dependent on a certain set of conditions which includes type of vegetation, building construction, accessibility, lot size, topography and other factors such as weather and humidity. When these conditions are present in certain combinations, they make some communities more vulnerable to wildfire damage than others. This “set of conditions” method is perhaps the best way to define wildland-urban interface areas when planning for wildfire prevention, mitigation, and protection activities.

There are three major categories of WUI: Boundary, Intermix and Island. Depending on the set of conditions present, any of these areas may be at risk from wildfire.

1. **“Boundary”** wildland-urban interface is characterized by areas of development where homes, especially new subdivisions, press against public and private wildlands, such as private or commercial forest land or public forests or parks. This is the classic type of wildland-urban interface, with a clearly defined boundary between the suburban fringe and the rural countryside. Due to the higher concentration of development that abuts the wildland areas, Boundary or Interface as it commonly called presents the highest level of risk of the three categories.
2. **“Intermix”** wildland-urban interface areas are places where improved property and/or structures are scattered and interspersed in wildland areas. These may be isolated rural homes or an area that is just beginning to go through the transition from rural to urban land use.
3. **“Island”** wildland-urban interface, also called **occluded interface,** are areas of wildland within predominately urban or suburban areas. As cities or subdivisions grow, islands of un-

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

A more in-depth local wildfire risk assessment can help determine the specific level of risk to a community. A great source for local wildfire risk assessment is the Community Wildfire Protection Plans (CWPP). Copies of completed CWPPs and more information on the program can be found at http://www.gfc.state.ga.us/forest-fire/CWPP/index.cfm.

Year	Total Area (mi²)	Intermix Area	Intermix %	Interface Area	Interface %	WUI Total	WUI %
1990	59,131,458,950	9,668,026,927	16.35%	2,110,058,205	3.57%	11,778,085,132	19.92%
2000	59,131,458,950	11,881,950,792	20.09%	2,487,979,653	4.21%	14,369,930,445	24.30%
2010	59,425,174,404	13,443,969,176	22.62%	2,787,403,529	4.69%	16,231,372,705	27.31%

Table 2.22 Wildland-Urban Interface Areas in Georgia from 1990-2010.

Source: http://silvis.forest.wisc.edu/maps/wui/2010/download

Figure 2.42 illustrates areas within Georgia that most likely fall under Boundary (Interface) or Intermix categories. The WUI areas were created by identifying census blocks that contained both at least 6.17 housing units/km² (or 1 house/40 acres) and substantial amounts of vegetation prone to wildfires (Radeloff et al. 2005). The map indicates that all counties in Georgia contain WUI areas. Table 2.22 provides the size and percentage increase of WUI areas in the State.

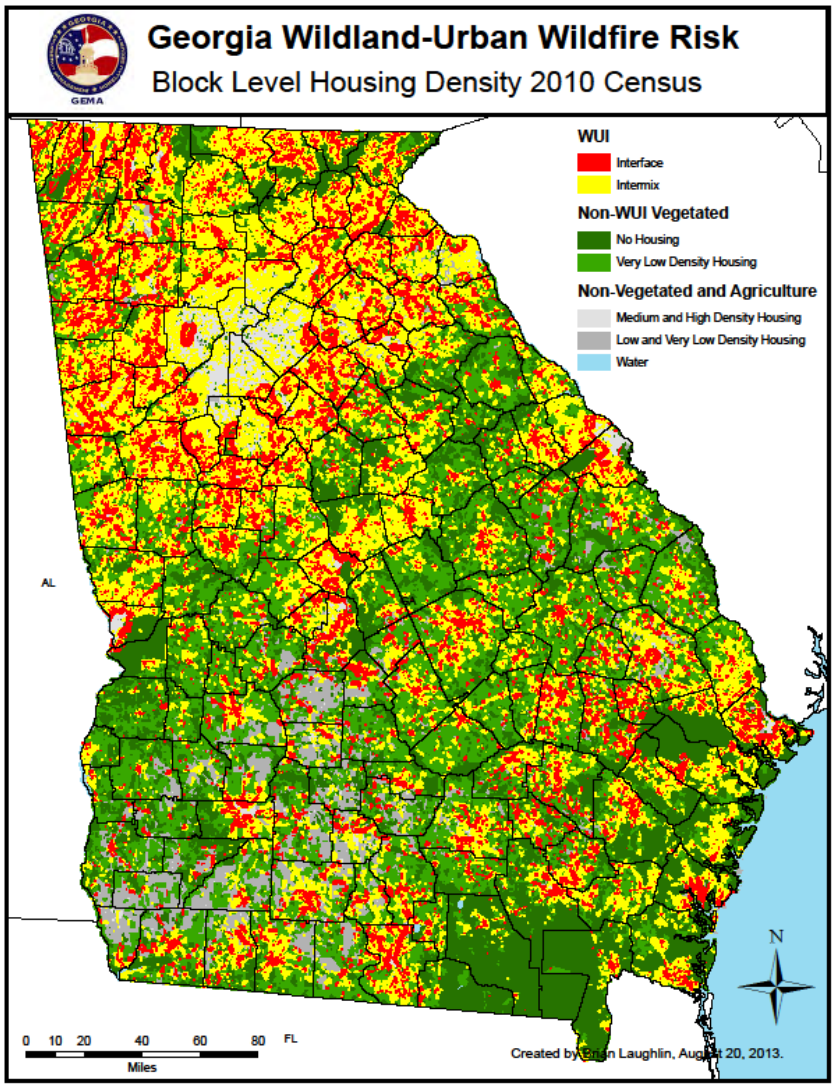


Figure 2.42 Location of WUI areas in Georgia.

Source: http://silvis.forest.wisc.edu/maps/wui/2010/download

2.5.10 Earthquake

Associated Hazards:

Ground-shaking, liquefaction, landslides, tsunamis

Hazard	Vulnerability	Total	Rank
Low	Low	Low	8

Hazard Description

Earthquakes are generally defined as the sudden motion or trembling of the Earth's surface caused by an abrupt release of slowly accumulated strain. This release typically manifests on the surface as ground shaking, surface faulting, tectonic uplifting and subsidence, or ground failures, and tsunamis. In the United States, earthquake activity east of the Rocky Mountains is relatively low compared to the West because it is away from active plate boundaries and the plate interior strain rates are known to be very low.

The physical property of earthquakes that causes the majority of damage within the United States is ground shaking. The vibrations from the seismic waves that propagate outward from the epicenter may cause failure in structures not adequately designed to withstand earthquakes. Because the seismic waves have different frequencies of vibration, the waves disseminate differently through sub-surface materials. For example, high frequency compression and shear waves arrive first whereas lower frequency Rayleigh and love waves arrive later. Not only are speeds varied between seismic waves but also the types of movement. The surface vibration may be horizontal, vertical, or a combination of the two, which causes a wider array of structures to collapse.

Another manifestation of earthquakes is surface faulting. This phenomenon is defined as the offset or tearing of the earth's surface by a differential movement across a fault. Structures built across active faults tend to sustain damage regularly. There are no active faults within or near Georgia. Distinct Inactive faults are known within the state north of the Columbus, Macon, and Augusta fall line and running generally northeast-southwest. One of these is the Brevard Fault line which last moved 185 million years ago and is not associated with ongoing seismic activity in Georgia.

The third earthquake phenomenon that causes damage is tectonic uplift and subsidence. Tectonic uplift can cause shallowing of harbors and waterways while tectonic subsidence can cause permanent or intermittent inundation similar to what happened as a result of the 1964 Alaskan earthquake. Due to the association of tectonic uplift and subsidence with active faults, Georgia is not at risk to this phenomenon.

The fourth earthquake damage-causing phenomena are earthquake-induced ground failures, including liquefaction and landslides. During an earthquake, the areas that are rich in sand and silt and have groundwater within 30 feet of the surface temporarily behave as viscous fluids during strong ground shaking. Structures built on these materials can settle, topple, or collapse as the ground 'liquefies' beneath it. Landslides can also form when earthquake shaking or seismic activity dislodg-

es rock and debris on steep slopes triggering rock falls, avalanches, and slides. Also, unstable, or nearly unstable slopes consisting of clay soils may lose shear strength when disturbed by ground shaking and fail, resulting in a landslide. Georgia is at very low risk of seismic induced liquefaction or landslides.

The last of earthquake-induced phenomena are tsunamis, large gravity-driven waves triggered by the sudden displacement of a large volume of water (by underwater earthquake, landslide, or volcanic eruption). The waves produced travel in all directions from the origin at speeds of up to 600 miles per hour. In deep water tsunamis normally have small wave heights, however, as the waves reach shallower water near land, the wave speed diminishes and the amplitude drastically increases. Upon impact with a shoreline, the waves can inundate land rapidly engulfing everything in its path. Successive wave crests follow, typically arriving minutes to hours later, frequently with later arrivals being more dominant. Frequently, the first tsunami waves are downward, causing dramatic exposure of beach. Because of this, people are often killed trying to collect newly exposed seashells when the positive waves then arrive.

Although large tsunamis are rare in the eastern coast of the US, the possibility of such events occurring anywhere along the Atlantic and Gulf coast exists. For example, a severe earthquake in the Grand Banks of Newfoundland on November 18, 1929 generated tsunami waves that caused considerable damage in coastal Newfoundland and reached as far south as Charleston, South Carolina. Another example occurred in the Caribbean with a large earthquake on November 18, 1867 that caused tsunami waves larger than 20 feet in the Virgin Islands and Puerto Rico.

Profile

Earthquakes of magnitude less than 5.0 are not known to produce significant damage. Georgia's greatest risks for earthquakes of magnitude 5.0 or greater are from three different seismic areas:

New Madrid Fault Zone- centered on the Mississippi River north of Memphis

Eastern Tennessee Seismic Belt- running west of the Appalachians between Knoxville and Northeastern Alabama

Charleston, SC

Modest earthquakes distributed throughout the Georgia Piedmont also occur; however, risk level remains low due to much lower magnitude and intensity associated with these events. The spatial extent of specific earthquakes largely depends on its magnitude (discussed below). For example, the New Madrid earthquakes of 1811 and 1812, centered between St. Louis and Memphis on the Mississippi River, caused damage as far away as Cincinnati and Richmond and were felt as far as Boston.

The temporal characteristics of earthquakes include rate of onset, duration, and the frequency of recurrence. Earthquakes rarely give warning of their impending occurrence, and hence such events are currently considered unpredictable by many in the scientific community. When one occurs ground failure can occur within a few seconds, and strong shaking can last from a few seconds to several minutes depending on the severity of the event, and the distance an individual is from its oc-

Magnitude	Description	Effects
<2	Micro	Not felt; infrequently recorded in the Eastern US
2.0 – 2.9	Minor	Not felt by most; frequently Recorded
3.0 – 3.9	Minor	Often felt; Rarely causes damage
4.0 – 4.9	Light	Noticeable shaking of indoor items; Significant damage unlikely
5.0 – 5.9	Moderate	Damage to poorly constructed buildings near epicenter; Possible slight damage to well-constructed
6.0 – 6.9	Strong	Destructive in area up to 200 miles across
7.0 – 7.9	Major	Serious damage over large area
8.0 – 8.9	Great	Serious damage in areas several hundred miles across
9.0 – 9.9	Great	Devastating in areas several thousand miles across
>10	Great	Never recorded

Table 2.23: Earthquake Magnitudes

currence. Earthquake recurrence is based primarily on historical activity, and since earthquakes are infrequent within the eastern US, future earthquake probability remains low.

The remaining characteristics, magnitude and intensity, are addressed with the Moment Magnitude and the Mercalli scales, respectively. The moment magnitude scale (abbreviated as MMS; denoted as MW or M) is used by seismologists to measure the size of earthquakes in terms of the energy released. The magnitude is based on the seismic moment of the earthquake, which is equal to the rigidity of the Earth multiplied by the average amount of slip on the fault and the size of the area that slipped. The scale was developed in the 1970s to succeed the 1930s-era Richter magnitude scale (ML). Even though the formulae are different, the new scale retains the familiar continuum of magnitude values defined in Table 2.23. The MMS is now the scale used to estimate magnitudes for all modern large earthquakes by the United States Geological Survey .

Mercalli Intensity	Description	Effects
I	Instrumental	Detected only by sensitive instruments
II	Feeble	Felt by few persons (upper floors)
III	Slight	Felt noticeably indoors; Similar to passing truck
IV	Moderate	May awaken sleeping; Household items possibly disturbed
V	Rather Strong	Felt by nearly all; Broken household items
VI	Strong	Felt by all; Chimney damage; Slight other damage
VII	Very Strong	Difficult to stand; Considerable damage in poorly constructed buildings
VIII	Destructive	Considerable damage in average buildings with partial collapse; Chimneys, stacks, columns fall
IX	Ruinous	General panic; Damage to all structures
X	Disastrous	Rails bent; More collapse and damage to all types of structures
XI	Very Disastrous	Few masonry structures standing; Bridges destroyed
XII	Catastrophic	Total damage; Ground moves in waves or ripples; Objects airborne

Table 2.24 Modified Mercalli Scale of Intensity

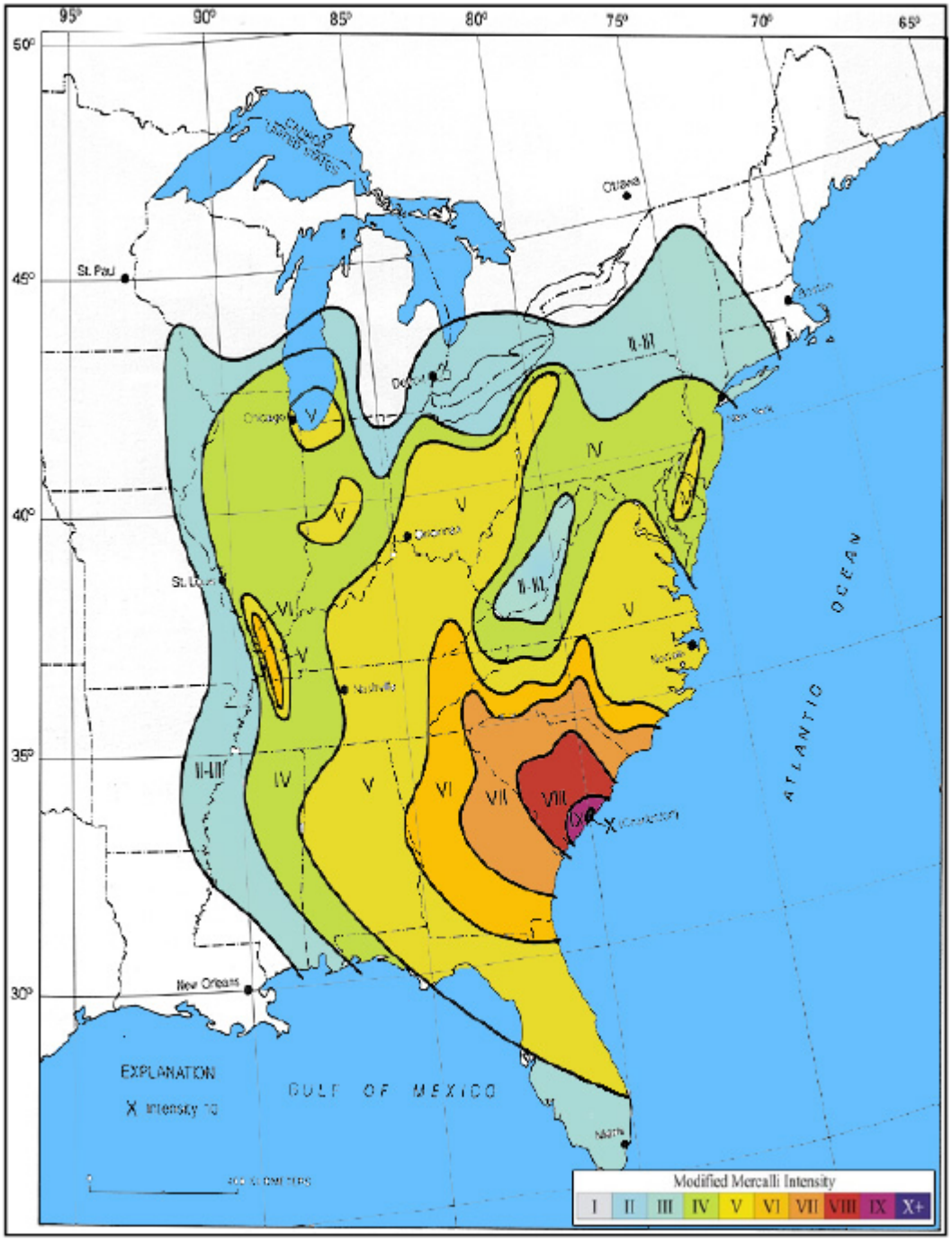


Figure 2.43 Mercalli Earthquake Intensity from 1886 Charleston, SC Earthquake. Source: USGS

Because accounts of earthquakes occurring before the 1960's relied dominantly upon those experiencing the event rather than seismographs, the Modified Mercalli intensity scale is used to evaluate and compare earlier events to modern ones. The Modified Mercalli scale is a qualitative measure of the degree of shaking which an earthquake incurs on people, structures, and the ground at a particular location. Due to this reliance on subjectivity, Mercalli values of intensity vary for each event, and distance from the event (as opposed to the MMS scale). Table 2.24 describes the Modified Mercalli scale of intensity. Figure 2.43 shows an example of historical earthquake intensity from the 1886 Charleston, SC earthquake.

Year	Magnitude	Area Affected	Remarks
1811 – 1812	7.3 – 7.8	New Madrid	XI intensity; Rerouted Miss. River; Damage in Richmond; Felt in Boston
1886	6.9	Charleston, SC	V-VIII intensity
1914	5	North Georgia	Caused little damage
1964	4.5	Lake Sinclair	Tremors every 2-3 years
1972	4.5	Clarks Hill Reservoir	Quakes felt every 20 seconds
1976		Toombs County	Intensity V
1985	3.0-3.5	Columbus	
1996	2.4	DeKalb County	Norris Lake area
2003	4.9	North Georgia / Alabama border	Some power outages; Felled trees; Minor household damage
2010	2.8	Northwestern Georgia	Dalton area
2013	2.5-2.8	Georgia / South Carolina border	Thurmond Lake area

Table 2.25: Notable Earthquake Events Affecting Georgia

SHELDUS reports no earthquake events, meaning that no events occurred in Georgia during 1960 – 2012. However, Georgia has been seismically active throughout that time period, consisting of minor to light earthquakes. No disasters have been declared for the State of Georgia related to earthquake events due to the lack of losses associated with seismic activity during this timeframe.

Georgia's earthquake history, however, demonstrates Georgia's potential for damaging seismic activity, even with events occurring outside of the state line. Table 2.25 lists notable events that have

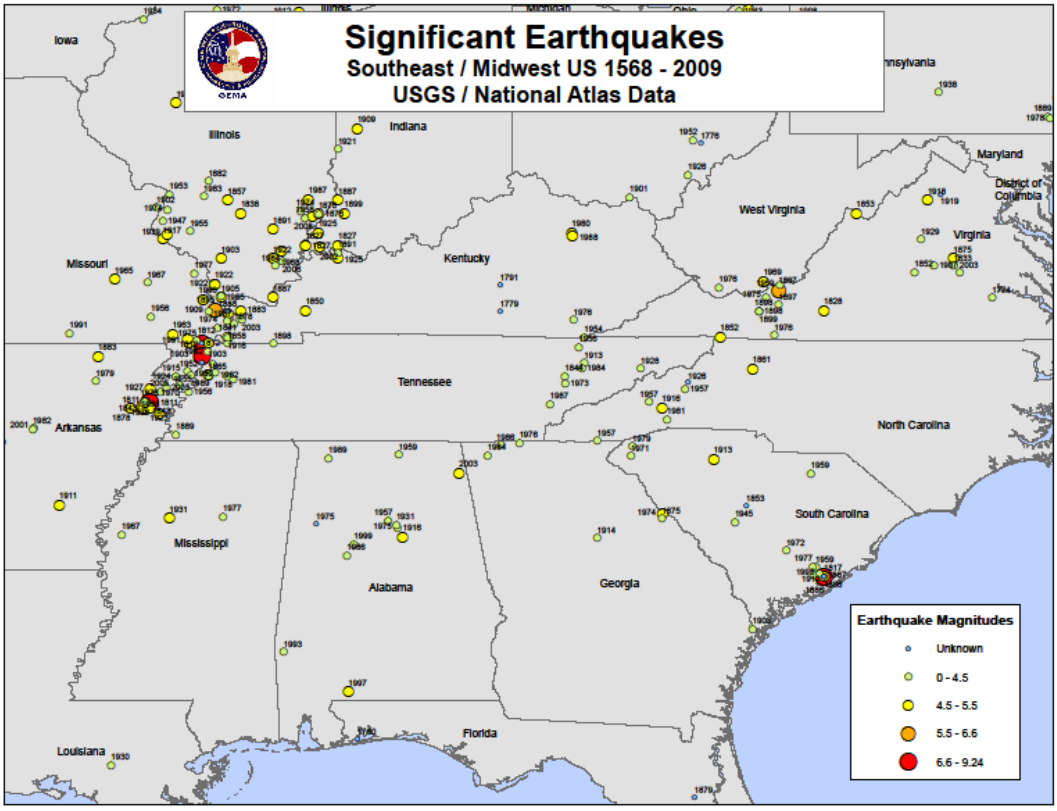


Figure 2.44 Significant Earthquakes

affected Georgia since the late 19th century. Note the magnitude value is estimated based on the historical record or Mercalli scale of intensity rating. These more notable events are included in Figure 2.43, which illustrates notable earthquakes from 1568 through 2009 for parts of the Southeast and Midwest United States (possibly affecting Georgia).

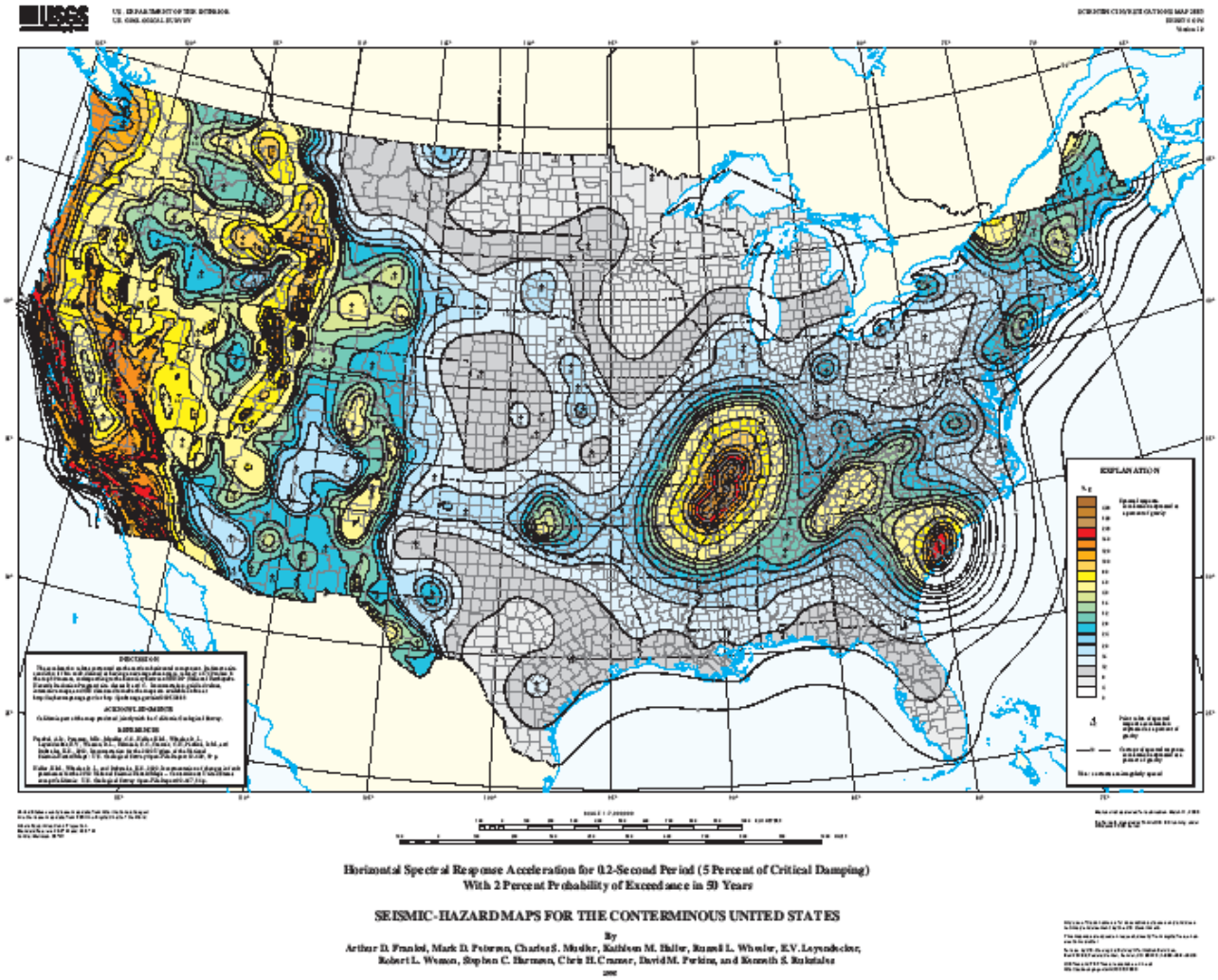


Figure 2.45 Seismic Hazard Map for the Conterminous Unites States

Although frequency, and thus risk, is difficult to determine with earthquakes, estimates are produced about possible return intervals. Recent estimates suggest that an earthquake of 6.0 magnitude or greater is likely to occur every 80 years within the New Madrid Seismic Zone. Though the last such event occurred back in 1895 in New Madrid, this does not mean one is overdue, as earthquake recurrence is highly variable (sometimes with recurrences longer than twice their expected average). Similar earthquake recurrence intervals apply to regions in northwestern Georgia.

Figure 2.45 is a USGS seismic map that portrays the estimated probability of spectral acceleration for a 0.2 second period with the probability of exceedance at 10 percent in 50 years for the conterminous United States. This map illustrates the several regions of potential seismic activity that could affect the State of Georgia: the New Madrid fault, Southern Appalachia, and Charleston, SC.

The Georgia-specific earthquake hazard risk map, Figure 2.46 uses the data presented in the USGS seismic hazard map for the conterminous United States. This map, like the USGS map, presents the 0.2 second spectral acceleration as a percent of gravity. In other words, the seismic contour lines delineate areas of higher risk of exceeding a certain intensity of earthquake. The areas of greater risk include the mountainous counties of northwest Georgia as well as the counties along the Savannah River (because of proximity to Charleston, SC).

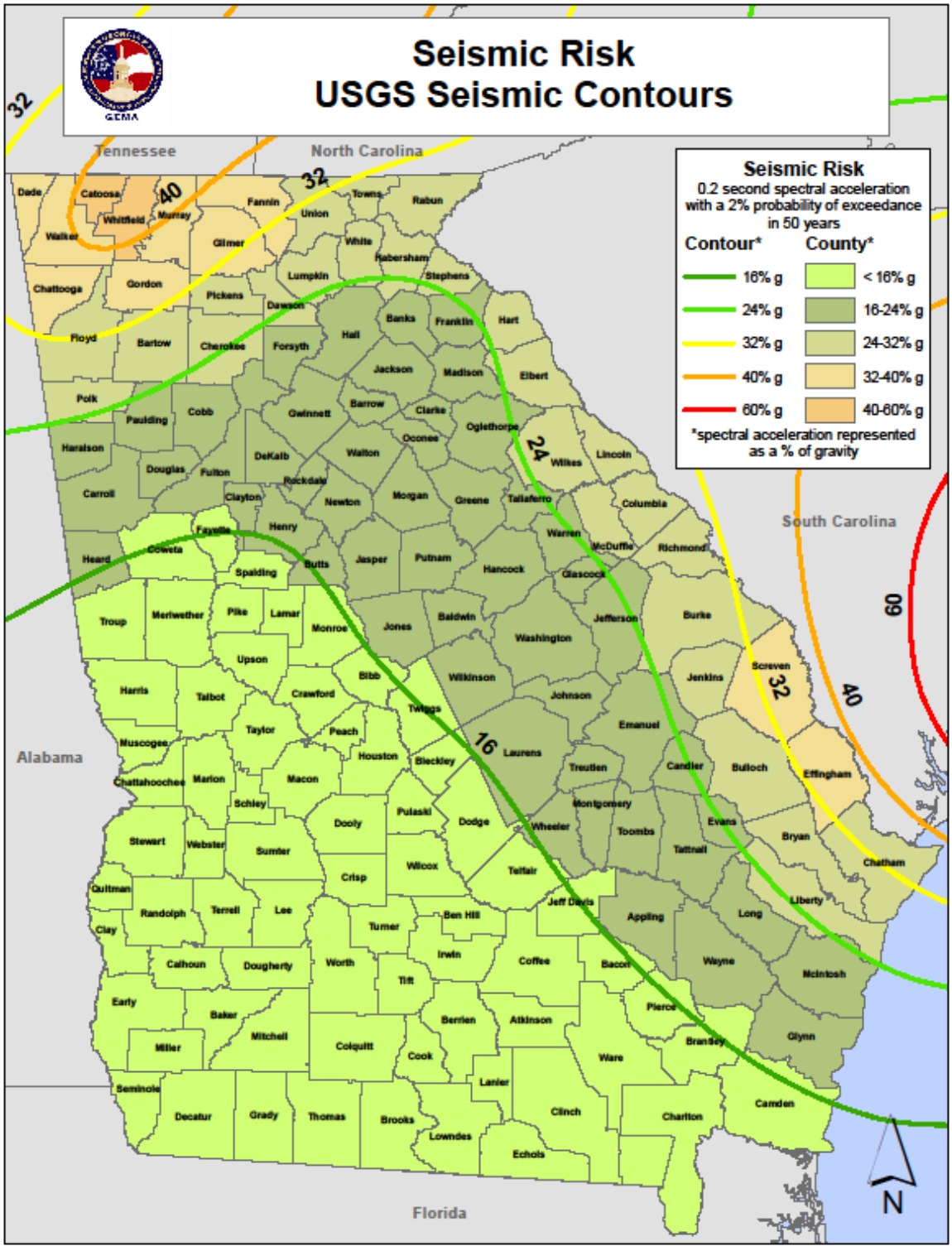


Figure 2.46 Georgia Seismic Risk

2.5.11 Geologic Hazards

Associated Hazards:

Sinkholes, landslides, debris flow, mudslides, flooding, tropical cyclones, wildfire.

Hazard	Vulnerability	Total	Rank
Low	Low	Low	9

Previously called Sinkhole, this section was expanded to include description of another geologic hazard, landslides. Landslides are also associated with and called debris flows. Landslide was not assessed during the risk ranking; therefore the levels of risk and ranking in the boxes above are solely for Sinkhole.

Sinkhole

Sinkholes are generally defined as a natural depression or hole in the surface topography formed by mechanisms such as the gradual removal of soluble bedrock by percolating water, the collapse of cave roofs (due to some seismic activity), or the lowering of the water table. These natural phenomena occur in areas where the subsurface rock consists of evaporites (salt, gypsum, and anhydrite) and carbonates (limestone and dolomite). However, the correlation between sinkholes and land-use practices reveal that sinkholes are often human-induced through over pumping groundwater and through altering natural water drainage patterns.

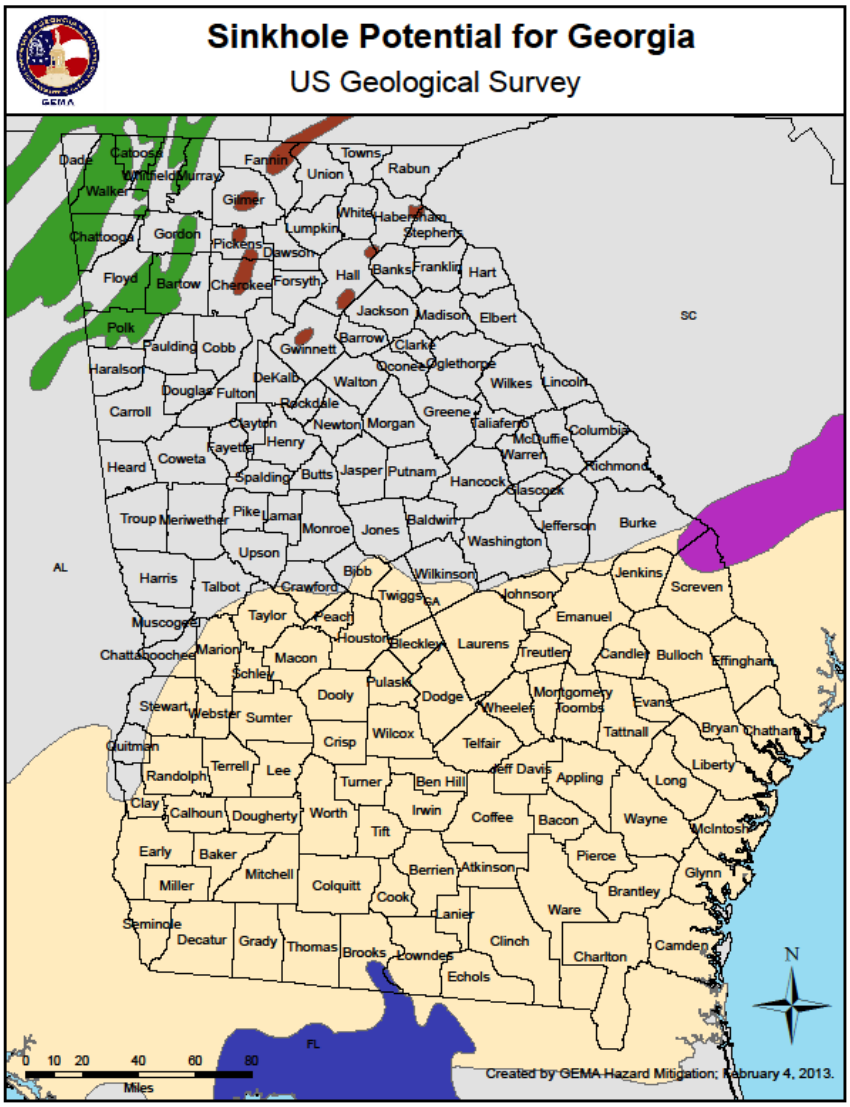
In the State of Georgia, sinkholes occur due to the underlying carbonate rock beneath the area running along the fall line (border between coastal plain and piedmont region of Georgia) and the area of the southern Appalachian Mountains. The spatial dispersion of sinkholes-susceptible soils in Georgia and the United States is found in Figure 2.47. In terms of spatial extent, sinkholes can affect areas from less than one meter to several hundred meters in diameter and depth.

Temporal characteristics greatly depend on the underlying bedrock excluding seasonality. In other words, seasonality has no affect on sinkholes because the hazard is not meteorological. The rate of onset and duration of the event greatly depend on the type of sinkhole forming. Subsidence and solution sinkholes typically form gradually in areas of thin overburden or exposed carbonate rock, respectively. Collapse sinkholes occur rapidly in areas with thick overburden after the confining layer is breached. Therefore, the rate of onset is slow for subsidence and solution sinkholes while rapid for collapse sinkholes; and the duration is longer for subsidence and solution sinkholes and shorter for collapse sinkholes. No frequency estimates exist for sinkholes except that sinkholes are more likely in the areas depicted with soluble bedrocks.

Profile

Official measures and scales of magnitude and intensity do not exist for sinkholes. However, the magnitude may be measured by the areal extent of the sinkhole while intensity may be estimated by the losses involved with the hazard event.

Within the databases utilized for the hazard and risk assessment to account the hazard history in terms of events and losses (SHELDUS, PDD), no sinkhole events exist. This relates to the fact that no sinkholes have caused significant losses in the State of Georgia at least since 1960. However, one notable sinkhole event exists in recent history. During the 1994 flooding of Albany, Georgia in Dougherty County from Tropical Storm Alberto, numerous sinkholes formed under the floodwaters. Notable sinkholes occurred in Riverside and Oakview Cemeteries in downtown Albany, where a combination of flood waters and subsiding terrain released disturbed gravesites. Although disturbed by both floodwaters and sinkholes, the federal and state declarations and subsequently administered grants for Dougherty County for this event only pointed to flooding as the hazard event.



Sinkholes were identified as hazards in 5 local hazard mitigation plans during the first round of plan development. Sinkholes are prevalent primarily in Lowndes County, particularly in the southern part of the county. Historically, some sinkholes in Lowndes County are quite large, measuring hundreds of yards across. Others are small with diameters of 30 to 40 feet. However, it is unknown the degree of threat of potential sinkholes to Lowndes County. Based on limited data, there is a 30 % chance of a sinkhole event in Lowndes County each year. There is, however, no data available at this time to predict when or where a sinkhole might occur in Lowndes County.

In order to provide a risk assessment or probability of future occurrence for sinkhole events, a detailed history of sinkholes through some period of time must be known. Currently, Georgia has no detailed history of sinkhole

Figure 2.47 Geology Associated with Sinkhole Potential (Legend Below)

Geology

Fissures, tubes, and caves over 1,000 ft (300 m) long; 50 ft (15 m) to over 250 ft (75 m) vertical extent

In gently dipping to flat-lying beds of carbonate rock

In moderately to steeply dipping beds of carbonate rock

Fissures, tubes and caves generally less than 1,000 ft (300 m) long; 50 ft (15 m) or less vertical extent

In gently dipping to flat-lying beds of carbonate rock

In gently dipping to flat-lying beds of carbonate rock beneath an overburden of noncarbonate material 10 ft (3 m) to 200 ft (60 m) thick

In metamorphosed limestone, dolostone, and marble

events for the entire state. With no recorded losses from sinkhole events besides those sinkholes compounded by other hazards (such as the Albany floods) the sinkhole hazard threat in the State of Georgia is not significant enough to warrant further analysis or inclusion in the composite assessment at the end of this chapter.

Landslides and Debris Flow

Landslides occur in all U.S. states and territories and can be caused by a variety of factors including earthquakes, storms, volcanic eruptions, fire and by human modification of land. Landslides can occur quickly, often with little notice and the best way to prepare is to stay informed about changes in and around your home that could signal that a landslide is likely to occur.

In a landslide, masses of rock, earth or debris move down a slope. Debris and mud flows are rivers of rock, earth, and other debris saturated with water. They develop when water rapidly accumulates in the ground, during heavy rainfall or rapid snowmelt, changing the earth into a flowing river of mud or “slurry.” They can flow rapidly, striking with little or no warning at avalanche speeds. They also can travel several miles from their source, growing in size as they pick up trees, boulders, cars and other materials.

Landslide problems can be caused by land mismanagement, particularly in mountain, canyon and coastal regions. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides. Land-use zoning, professional inspections, and proper design can minimize many landslide, mudflow, and debris flow problems.

Profile

An exact historical record is difficult to determine as many landslide and debris flow events are minor, do not cause significant damage or go unreported. SHELDUS data from 1952 to 2012 list one event occurring in Rabun County in 2004. Property losses from this event were estimated at $100,000. This event was triggered by excessive rainfalls from Hurricane Ivan as it passed through the state.

In August 2013, heavy rains created a mudslide in Sandy Springs, GA that closed a local road. It is estimated the road will remain closed for up to a year while a retaining wall is constructed at a cost of approximately $1 million. Residents have reported eight other mudslides in the area.
The most vulnerable locations in Georgia are identified in Figure 2.48. Higher risk areas are mostly located in North Georgia where steeper slopes exist in mountain and hill terrain.

Given the variety of events that could cause landslides or debris flows and incomplete records of previous occurrences, it is not currently possible to determine the future probability of an event in Georgia.

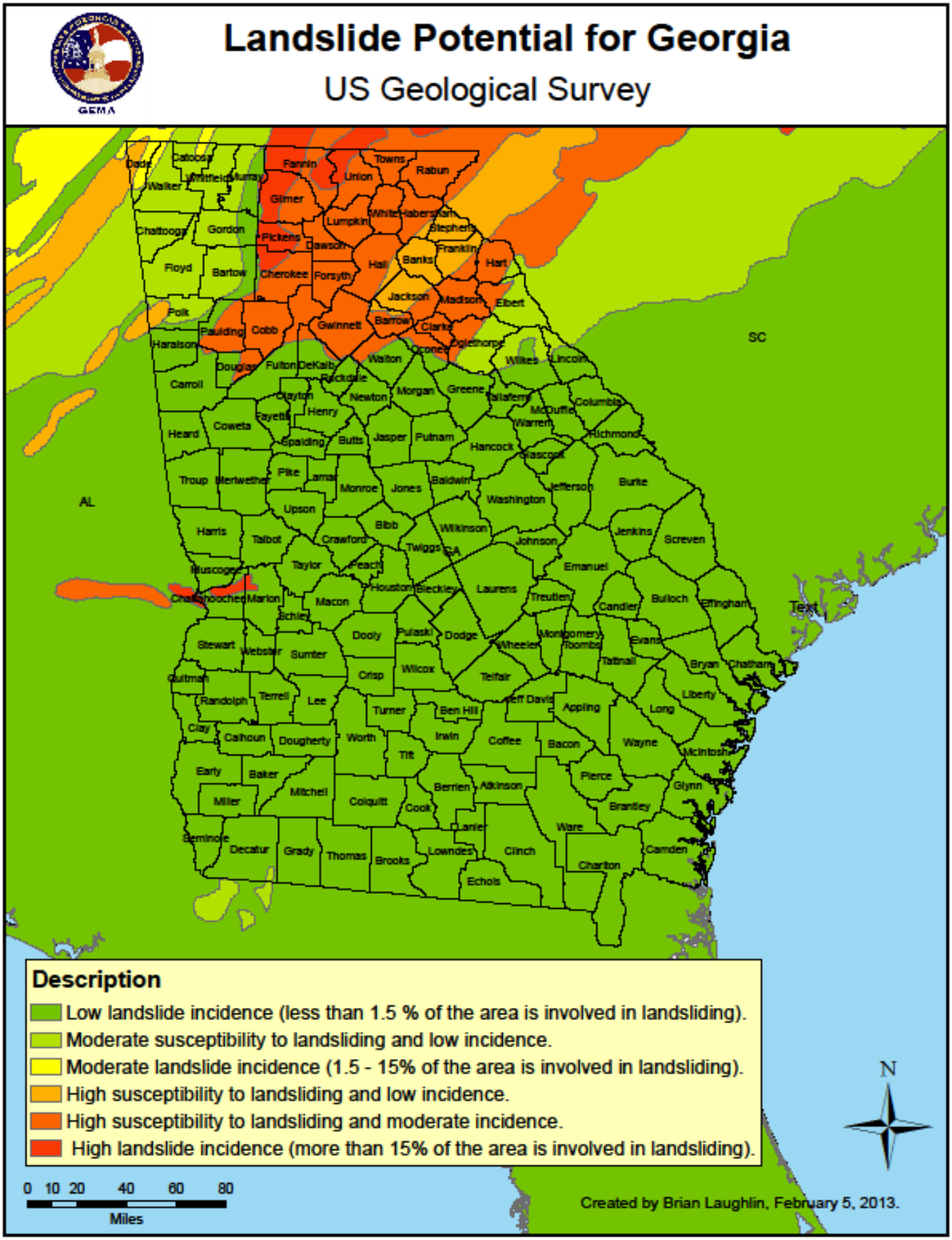


Figure 2.48 Landslide Potential for Georgia

2.5.12 Dam Failure

Associated Hazards:

Flooding, technological (man-made) hazards

Hazard	Vulnerability	Total	Rank
Low	Medium	Low	7

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. The structure's purpose is to 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. The three types of failure sometimes 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.

In the State of Georgia, all of the major rivers are dammed at least once before leaving the boundaries. Also, numerous smaller dams, including agricultural dams, exist throughout the state. Therefore, the possibility of dam failure hazards exists throughout the state. The spatial extent of the dam

failure event highly depends on the amount of water within the dammed reservoir and the downstream topography. 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. 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 2.26 lists the dam categories and potential impact of dam failure.

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

Table 2.26: Dam Classification from NDSP

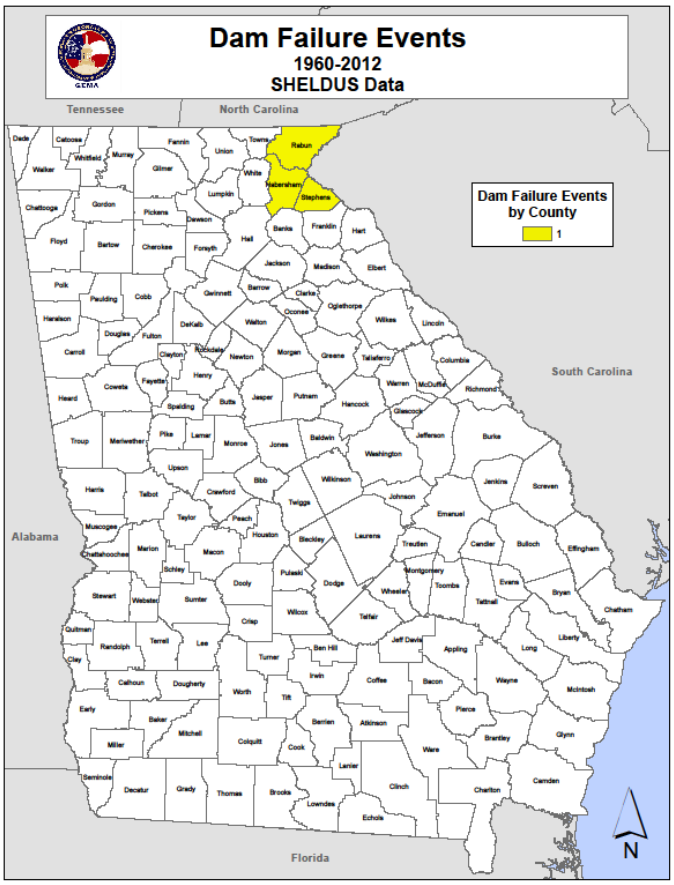


Figure 2.49

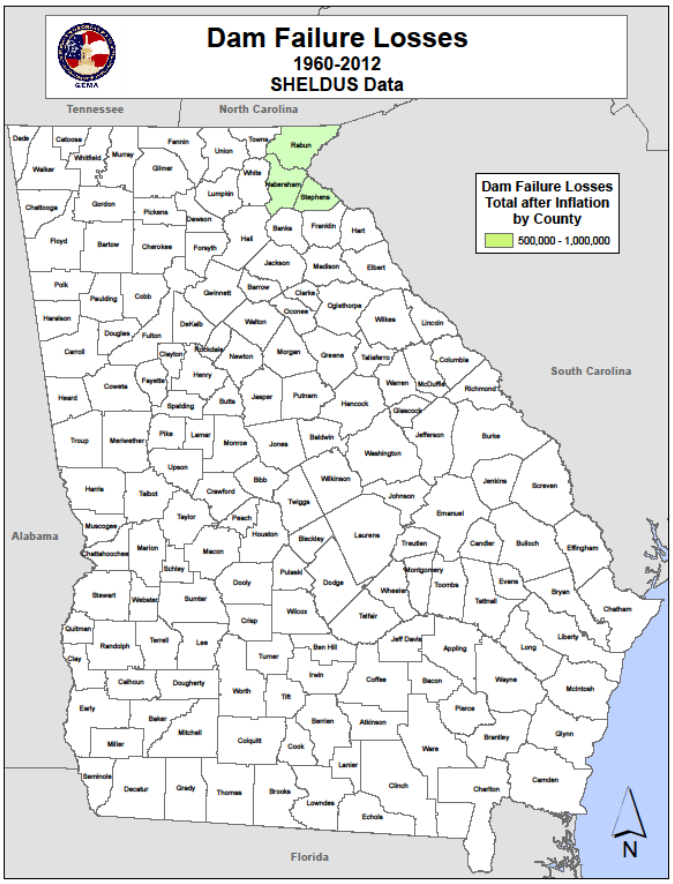


Figure 2.50

The historical events and losses for dam failures for the State of Georgia, Figures 2.49 and 2.50, only show one event from 1960-2012.

Date	Name	Description
11/6/1977*	Kelly Barnes Dam	DR541; Dam Collapse, Flooding

Table 2.27: Dam Failure Notable Events ***Presidential Declared Disaster**

This particular event is the 1977 failure of the Kelly Barnes Dam in Toccoa. The original structure consisted of a rock crib dam built in 1899 in order to create a small reservoir for a hydroelectric plant. The Toccoa Falls Bible Institute built an earthen dam over the original rock crib dam in 1937 in order to develop a more stable electric power source. The dam structure was raised several times, reaching 42 feet above the rock foundation by 1957, when power production was halted and the reservoir was solely utilized for recreation. At around 1:30 am on Sunday, November 6, 1977, the Kelly Barnes Dam failed. This collapse resulted in a flash flood that swept downstream causing 39 fatalities and caused $2.3 million in property damage. The sole cause of the failure is undetermined but the probable causes include a local slide on the steep downstream slope probably associated with piping (form of seepage) and a localized breach in the crest followed by progressive erosion, saturation of the downstream embankment, and the subsequent total collapse of the structure.

Other dam failures have occurred in Georgia with some related to the spring of 1990 flooding and the July of 1994 flooding associated with Tropical Storm Alberto. However, these dam failures were not documented as having a significant contribution to already flooded conditions.

In order to complete a risk assessment for dam failures in the State of Georgia, the location of all the potential sources of the hazard (the dams) must be located and evaluated using some categorization of failure potential (risk). In attempts to meet this criterion, the Georgia Safe Dams Act of 1978 established Georgia's Safe Dams Program. The Environmental Protection Division (EPD) within the Department of Natural Resources (DNR) is responsible for administering the program. The purpose of the program is to *provide for the inspection and permitting of certain dams in order to protect the health, safety, and welfare of all citizens of the state by reducing the risk of failure of such dams*. The program has the two main functions of inventorying and classifying dams and regulating and permitting high hazard dams.

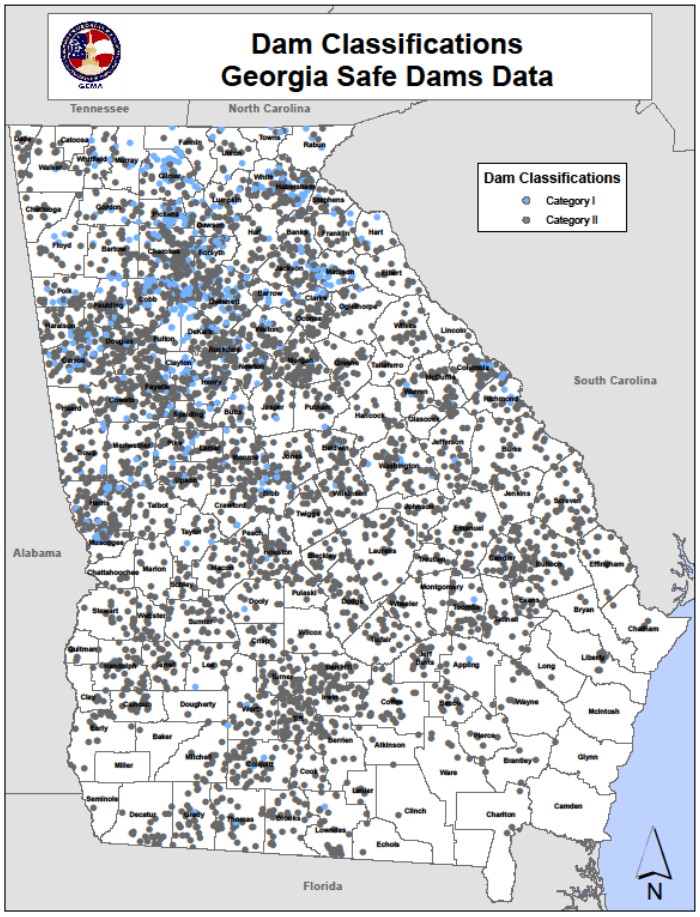


Figure 2.51

For this plan update, Georgia EPD provided safe dams data for Category I and Category II dams. The definitions of these dams are different than the NDSP definitions.

> "Category I" means the classification where improper operation or dam failure would result in probable loss of human life. Situations constituting "probable loss of life" are those situations involving frequently occupied structures or facilities, including, but not limited to, residences, commercial and manufacturing facilities, schools and churches.
>
> "Category II" means the classification where improper operation or dam failure would not expect to result in probable loss of human life. (Georgia Department of Natural Resources – Environmental Protection Division Rules Chapter 391-3-8)

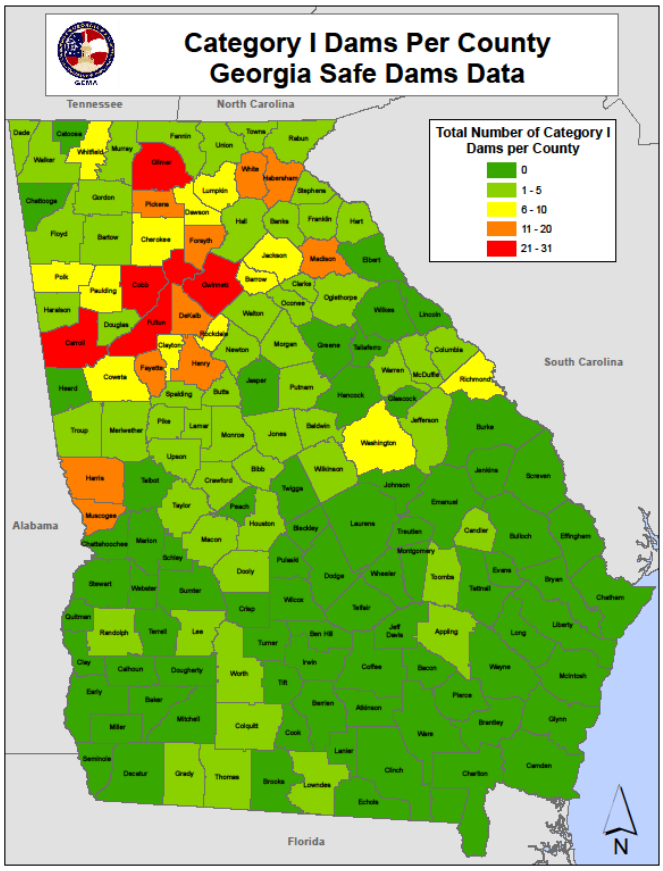


Figure 2.52

The map in Figure 2.51 shows the location of all Category I and Category II dams in the state. Figure 2.52 depicts the total number of Category I dams by county. This data illustrates that the most populous area of the state, the Atlanta Metro region, also has the greatest amount of risk due to dam failure as this area has the highest number of Category I dams.

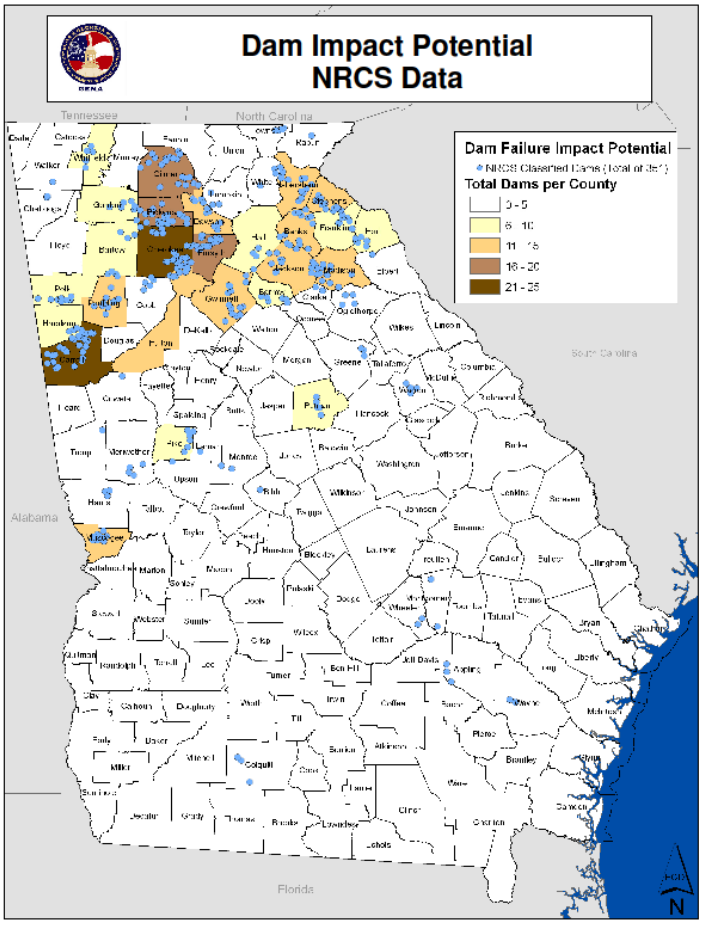


Figure 2.53

The dams presented in Figures 2.53 and 2.54 are considered watershed dams in that they meet Georgia's definition of a dam (any structure 25 feet or more in height or one impounding 100 acre area of water at the top of the dam) that was built with 100% federal money on private land through the coordination of USDA NRCS and local Soil and Water Conservation (SWC) districts. This data, provided by NRCS and representing a small portion of dams that exist within the State of Georgia, allows analysis to determine the counties with the most impact potential (based on mere existence of dams). The dam impact potential map, Figure 2.53, illustrates the

NRCS classified watershed dam locations within Georgia coupled with a summary of total dams per county. The highest concentration of watershed dams are within Georgia counties occurs in Cherokee and Carroll Counties while most of the watershed dams are in the northern portion of the State. The dam failure risk map, Figure 2.54, utilizes a NRCS risk analysis that includes an indicator of failure potential, population at risk, structures at risk, and interstates and secondary roads at risk to calculate an overall risk index for each of the 351 watershed dams shown in Figure 2.53. All of the dams' risk values within each county were combined to calculate each county's overall dam failure risk. The counties with the highest risk include Gwinnett, Cobb, and Muscogee. This map also illustrates the State's higher risk located in the northern portion of Georgia.

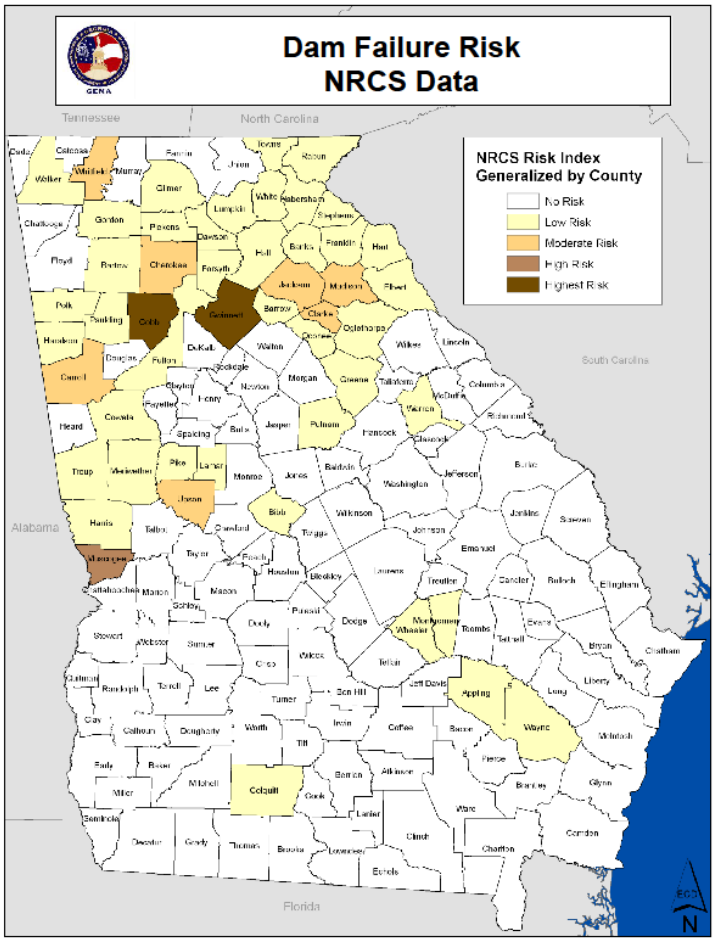


Figure 2.54

2.6 SOCIAL VULNERABILITY ASSESSMENT

While vulnerability may include a range of assets that can be impacted by hazards, the data in this vulnerability assessment is limited to social vulnerability. Social vulnerability is represented as the social, economic, demographic, and housing characteristics that influence a community's ability to respond to, cope with, recover from, and adapt to environmental hazards.

The tool utilized in determine the social vulnerability for each county is the Social Vulnerability Index (SoVI®). SoVI® 2006-10 measures the social vulnerability of U.S. counties to environmental hazards. The index is a comparative metric that facilitates the examination of the differences in social vulnerability among counties and graphically illustrates the geographic variation in social vulnerability. It shows where there is uneven capacity for preparedness and response and where resources might be used most effectively to reduce the pre-existing vulnerability. SoVI® also is useful as an indicator in determining the differential recovery from disasters.

2.6.1 *Methods*

The index synthesizes 31 socioeconomic variables, which the research literature suggests contribute to reduction in a community's ability to prepare for, respond to, and recover from hazards. SoVI® data sources is based solely on the United States Census Bureau. These variables are listed in Table 2.28.

SoVI Variables	SoVI Variables
Hospitals	Female population
Non-Urban population	Unemployed
Median age	Per capita income
Population density	People per household
Service industry employment	Wealthy Population (over 200,000)
Institutionalized population	Poor population (below poverty line)
Social security Households	Median House Value
Extractive industry employment	Rented housing
Native American population	Median Gross Rent
Children Living in Married Couple Families	Female headed households
Population Without Health Insurance	Mobile homes
Black Population	Uneducated population
Asian Population	Female labor force participation
Hispanic Population	Population Speaking English as Second Language with limited Proficiency
Young Population (under 5)	Population Housing with No Car
Old population (Over 65)	

Table 2.28 Variables Included in the SoVI Analysis

The data are compiled and processed by the Hazards and Vulnerability Research Institute at the University of South Carolina. The data are standardized and placed into a principal components analysis to reduce the initial set of variables into a smaller set of statistically optimized components. Adjustments are made to the components' cardinality (positive (+) or negative (-)) to insure that positive component loadings are associated with increased vulnerability, and negative component loadings are associated with decreased vulnerability. Once the cardinalities of the components are determined, the components are added together to determine the numerical social vulnerability score for each county. The SoVI variables listed in Table 2.28 explain 72% of the variance in the data.

2.6.2 *Assessing Social Vulnerability by Jurisdiction*

After completing the SoVI methods, the results are tabulated and mapped in GIS. The following table, Tables 2.29 and 2.30 lists the counties with the highest and lowest SoVI scores for the State of Georgia.

Highest Vulnerability	SoVI Score
Clay County	8.00
Hancock County	6.79
Wilcox County	6.22
Stewart County	5.77
Calhoun County	5.20
Telfair County	4.79
Taliaferro County	4.59
Randolph County	3.68
Wheeler County	3.45
Johnson County	3.04

Table 2.29 Most Vulnerable Counties in Georgia

Lowest Vulnerability	SoVI Score
Forsyth County	-7.68
Fayette County	-7.29
Oconee County	-6.11
Cherokee County	-5.94
Henry County	-5.89
Lee County	-5.65
Paulding County	-5.58
Cobb County	-5.49
Columbia County	-5.45
Gwinnett County	-5.14

Table 2.30 Least Vulnerable Counties in Georgia

The map of relative SoVI scores, Figure 2.55, represents the remaining social vulnerability for the State of Georgia. The number of counties in each score is identified in Table 2.31. The scores are categorized based on standard deviations from the average score for the entire state. The standard deviation for each of the hazard scores is described in Table 2.32.

SoVI Score	Number of Counties
Extremely High	5
High	21
Average	85
Low	33
Extremely Low	15

Table 2.31 Number of Counties by SoVI Score

SoVI Score	Standard Deviation from State Average
Extremely High	-7.68 - -4.55
High	-4.54 - -1.41
Average	-1.40 - 1.73
Low	1.74 - 4.86
Extremely Low	4.87 - 8.00

Table 2.32 Standard Deviation for each SoVI Score

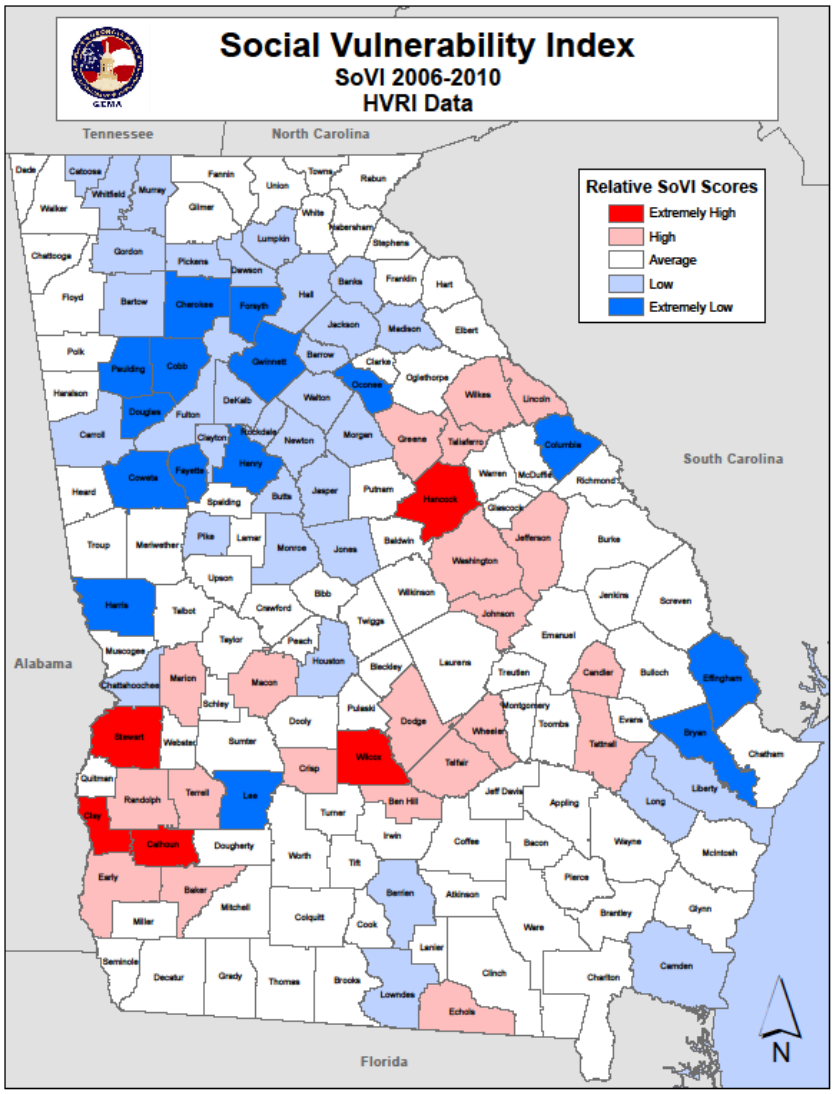


Figure 2.55 SoVI Index by County

2.7 COMPOSITE ASSESSMENT

The composite assessment is a compilation of the social vulnerability scores in Section 2.6 and hazard risk scores for Storm Surge (SLOSH), Wind, Flood, Wildfire and Earthquake. These are the only hazards included in the composite risk as they are the only ones that are spatially constricted or exhibit a strong spatial pattern. The hazard scores are different than those used in the risk ranking in that they only factor location and potential extent. The scores for each of these five hazards are described in the Tables 2.33 to 2.37.

Hazard Score	Description
5	Inundated by a category 1 Hurricane
4	Inundated by a category 2 Hurricane
3	Inundated by a category 3 Hurricane
2	Inundated by a category 4 Hurricane Inundated by a category 5 Hurricane

Table 2.33 SLOSH Hazard Scores

Hazard Score	Wind Speeds
5	>120 mph gust
4	111-120 mph gust
3	101-110 mph gust
2	91-100 mph gust
1	<90 mph gust

Table 2.34 Wind Hazard Scores

Hazard Score	DFIRM Zone	Description
4	Floodway / AE/FW	Floodway (within AE)
4	VE	1% with velocity, BFE
3	A	1% no BFE
3	AE	1% BFE
3	AH	1% Ponding has BFE
3	AO	1% Sheet flow has depths
3	1 PCT FUTURE	1% Future Conditions
2	0.2PCT ANNUAL CHANCE	0.2% Annual Chance of Flood
1	AREA NOT INCLUDED	Area not included in survey
1	D	Undetermined but possible

Table 2.35 Flood Hazard Scores

Hazard Score	Description
4	High Risk
3	Moderate Risk
2	Low Risk
1	Very Low Risk
0	No Houses
	Agriculture
	Bodies of Water
	Dense Urban Development

Table 2.36 Wildfire Hazard Scores

Hazard Score	Description
4	50 – 83% g value
3	33 – 50% g value
2	17 – 33% g value
1	0 – 17% g value

Table 2.37 Earthquake Hazard Scores

Figure 2.56 illustrates the composite of the hazard scores. The values, ranging from 0 to 20, represent the least to the most hazardous areas in the state, respectively. The composite of hazard scores highlights areas of greater hazard potential in the red hues. This map proves useful in sub-county assessments as the scores are somewhat continuous data (not confined by an arbitrary boundary).

Figure 2.57 illustrates the average hazard score by county and include the same hazards listed above. This map identifies the counties that have substantially more risk to hazard events than other counties. For example, the coastal region of Georgia and the mountainous northern portion of Georgia are at more risk than the interior. Because the hazards are not weighted in terms of impact (storm surge being more hazardous than wind, for example), these similarities in risk are caused by different hazards. For example, the

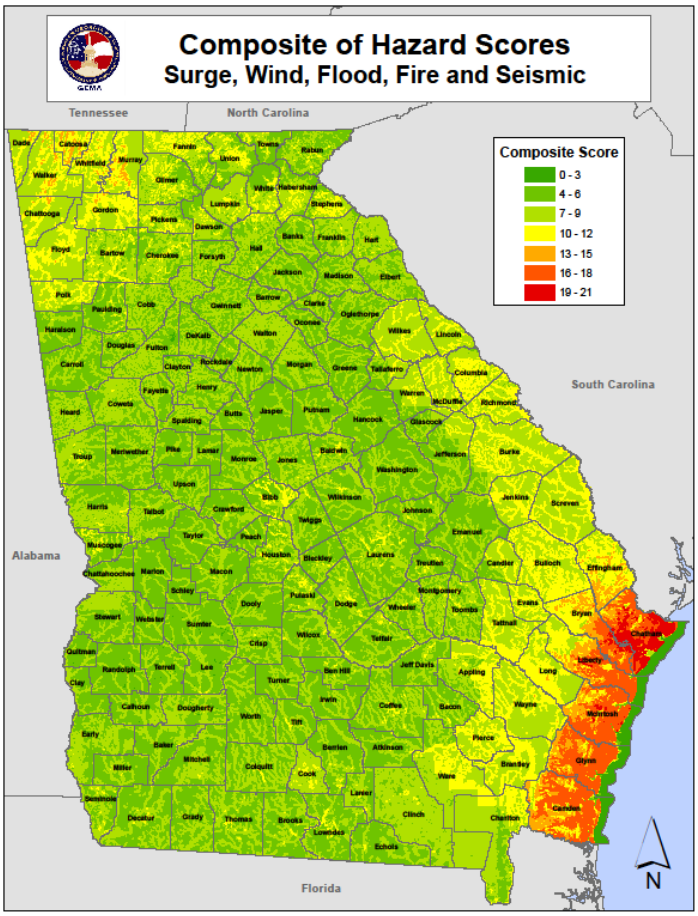


Figure 2.56 Composite Hazard Scores for Georgia

County	Average Hazard Score
Chatham County	13.8
Bryan County	13.3
Liberty County	12.8
Glynn County	12.6
Camden County	12.1
McIntosh County	12.0
Effingham County	11.1
Catoosa County	10.2
Whitfield County	10.0
Walker County	10.0

Table 2.38 Counties with Highest Average Hazard

County	Composite Score (Hazard+SoVI)
Chatham County	15.3
Clay County	13.9
Hancock County	13.5
Wilcox County	12.6
McIntosh County	12.4
Telfair County	11.7
Glynn County	11.4
Stewart County	11.2
Taliaferro County	11.2
Calhoun County	10.9

Table 2.39 Counties with Highest Composite Score

coast is mainly at risk to flooding events (storm surge and inland flooding) while the mountainous north is more at risk to seismic events along with inland flooding. The most at risk counties (based on average) and their respective scores are found in Table 2.38.

When combining the hazard score with social vulnerability scores from section 2.6, an estimate of total risk can be calculated for each county. Figure 2.58 combines the average hazard score with the SoVI score for each county. These scores are categorized by quantiles (equal units in each catego-

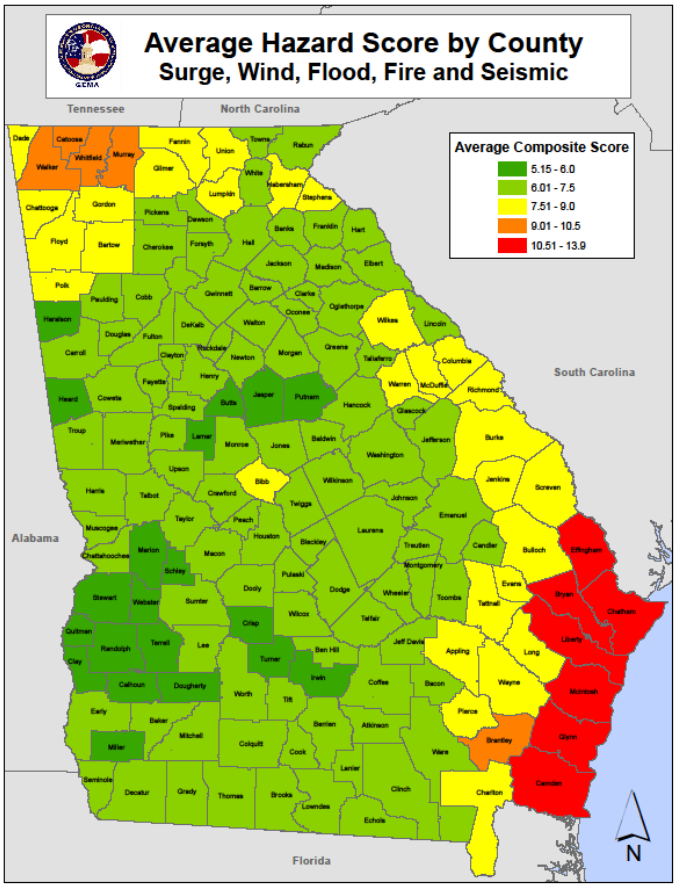


Figure 2.57 Average Hazard Score by County

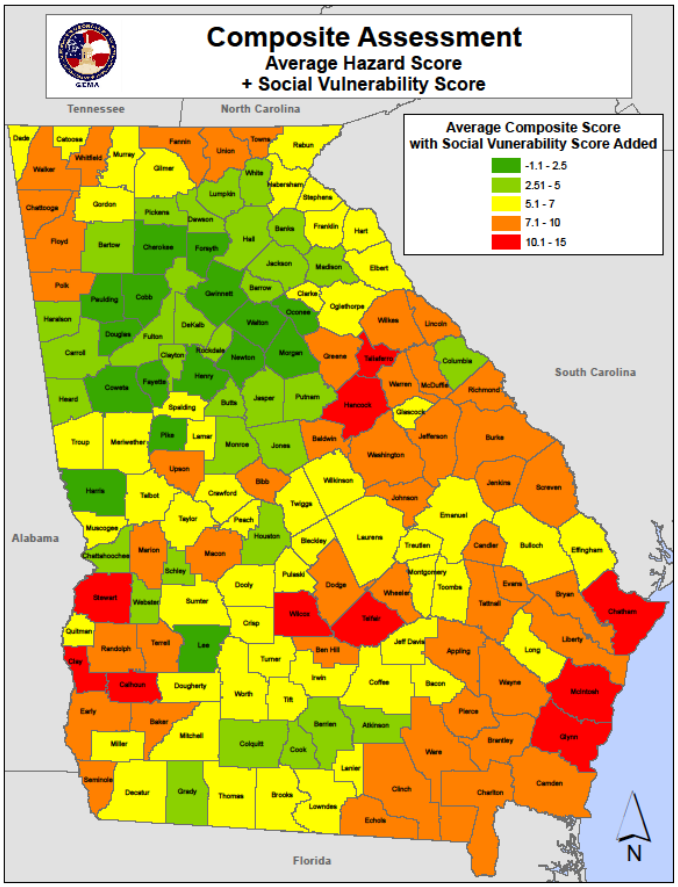


Figure 2.58 Combined Hazard Risk and SoVI

ry) into five groups. The red and orange counties represent the most at risk and vulnerable counties within the State of Georgia while the green counties represent the least at risk and vulnerable. The counties with the highest combined score are listed in Table 2.39.

Adding social vulnerability to the hazard scores changes the risk for several counties and Figure 2.59 illustrates those counties with significant change. Counties with less risk, increased in score because of high SoVI scores. As section 2.6 described, these are the counties where the ability of the population to prepare, respond, and recover comparatively has less capacity than other counties. In contrast, the total risk to some counties was reduced since the population of these counties exhibit greater potential for preparation, response, and recovery.

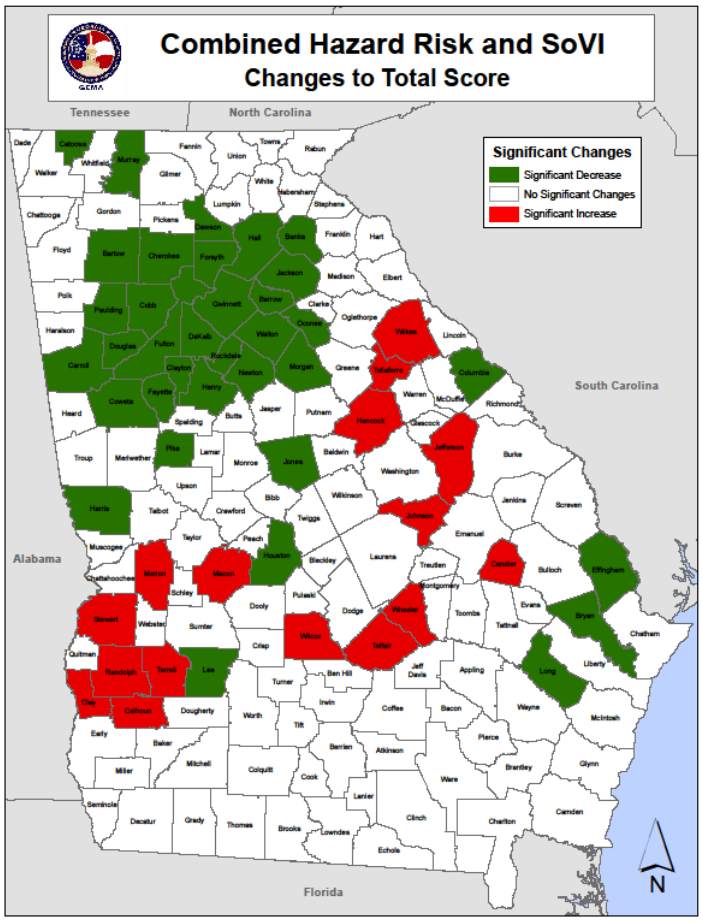


Figure 2.59 Combined Hazard Risk and SoVI

Also of importance is the change in development in jurisdictions that are high or low risk. The data indicates, for example, that growing suburban communities surrounding larger Metropolitan Statistical Areas, have lower SOVI scores, which when added to the composite scores, lowered the overall assessed vulnerability of those communities. Examples of this include Richmond, Harris, Lee an Clayton Counties, which surround Augusta, Columbus, Albany and Atlanta, respectively. This would seem to suggest that population increases due to suburban development tend to lower a community's overall vulnerability. Additional analysis will be necessary to determine the SOVI variables that directly cause this, as well as effects of other population changes on vulnerability over time. If these changes in development continue, the changes may impact future risk and vulnerability assessments. However, because variables related to growth and development are included in SoVI and, therefore, included in the composite assessment, the ranking of the most vulnerable and most at risk has been updated to reflect the most current SoVI scores.

2.8 LOSS POTENTIAL

At present, the best available method to estimate potential losses is in relation to two types of facilities: state-owned or leased facilities and locally-reported critical facilities. The analysis derives critical facility data from the Georgia Mitigation Information System (GMIS). This system allows authorized users to add local critical facility data to an accessible database and to also generate reports against Hazard datasets. Since completion of the last Hazard Mitigation plan, GMIS has continued to be enhanced in order to make the tools and data as useful as possible. Completion of each county's critical facility data is required by GEMA through the local planning process. This section presents

information on critical facility loss potential to local jurisdictions and state facilities. Information on repetitive loss properties is also presented.

The biophysical vulnerability has the potential to increase or decrease because of changes in development. Therefore, as vulnerability changes because of development, the estimates of loss change as well. With increases in development in the higher hazard areas, the estimates of loss will increase accordingly. With the inclusion of the monetary potential for loss for both state facilities and critical facilities in this update, future updates may address the impacts of development on these numbers by calculating the changes in value at risk and standardizing the difference using an indicator of development such as population change. Completed mitigation projects such as acquisitions are a minor change in development that have possibly decreased loss estimates for those areas. Since the 2011 GHMS there have been 87 number acquisition projects completed. GEMA Hazard Mitigation staff are in the process of developing additional methods for tracking development changes as it applies to loss potential.

2.8.1 *Estimating Potential Losses by Jurisdiction*

Critical facility data for this analysis include structures that should continue to function and provide services in some capacity (not necessarily normal purpose) to surrounding populations during and after a hazard event. Typical critical facilities include hospitals, fire stations, police stations, critical record storage, schools, and similar facilities. As of July 1, 2013 the GMIS database includes 18,143 locally-reported critical facilities. There have been a decrease of 140 critical facility records added to the database since the last plan was produced.

The GMIS database is also designed to include numerous attributes to each locally-reported critical facility. As implied, the accuracy of the facility information relies on the participation of local officials using the GMIS. Therefore, as locals continue to add to the database, the data continue to improve. These attributes are identified in Table 2.40. In order for the record to be considered complete in the GMIS system, all of the attributes must have been reported by the local officials. However, these analyses include the incomplete records as well in order to complete the risk assessment for the critical facilities. The information presented in this analysis utilizes the attributes of the estimated value and the occupancy type because these attributes were the most complete within the system.

Facility Name	Valuation Year
Location Coordinates	Building Valuation Type
Jurisdiction	Critical Facility Type
Area square footage	Occupancy
Building Value	

Table 2.40 GMIS Critical Facility Attributes

Including the locally-provided GMIS data in the GIS hazard maps allows the spatial joining of the critical facility data with the composite hazard assessment. Also, the GMIS data are used to summarize percentages of critical facilities located in specific hazard categories (high to low composite hazard scores) as well as summarize the estimated value of the critical facilities at varied risk to hazards. These summaries are found in Tables 2.41 and 2.42.

As the tables illustrate, the majority of total critical facilities and the greatest amount of estimated value of those critical facilities reside in the low hazard zone. All of the facilities are included in the spa-

Hazard Category	Hazard Score Range	Total Facilities	%Total Facilities
High	18-25	59	0.3%
Moderate	9-17	1395	7.7%
Low	0-8	16,681	91.9%

Table 2.41: Local Critical Facilities by Hazard Category

Hazard Category	Hazard Score Range	Estimated Value at Risk	% Total Value
High	18-25	$16,725,605	0.02%
Moderate	9-17	$16,469,725,013	19.9%
Low	0-8	$66,171,116,486	80.1%

Table 2.42: Local Critical Facility Value at Risk According to Hazard Categories

tial join with the composite hazard assessment. In terms of the estimated value of critical facilities at risk, 84.6% of the facilities are represented.

Table 2.43 identifies the most commonly found critical facility types that are in GMIS. These percentages reveal the types of critical facilities that counties are reporting into the GMIS. All of these facilities fit the definition of critical facility: structures that should continue to function and provide services in some capacity to surrounding populations during and after a hazard event.

Building Type	% of Total	Building Type	% of Total
Other	26.5	MSWL	0.5
Water System	14.9	State Prison	0.4
Fire Station	9.5	SL	0.4
Public University	9.4	Primary School	0.4
Elementary School	5.6	Landfill	0.4
Wastewater Treatment Plant	4.0	Public Vocational Technical School	0.4
City Hall	3.0	Transfer Station	0.4
Emergency Services	2.7	Hospital, Emergency Entrance	0.3
Police Station	2.4	Middle/High School	0.3
Private School	2.0	City Jail	0.3
Middle School	2.0	C&D	0.2
Library	1.8	County Correctional Institution	0.2
High School	1.4	Adult Edu. Center	0.2
Courthouse	1.3	Alternative School	0.2
High School, Public	1.1	Recycling Center	0.2
Public Four-Year College	1.0	Private Four-Year College	0.2
Hospital, Admissions Entrance	1.0	Psychoeducational	0.1
Other School	0.9	Private University	0.1
Airport	0.8	Private Two-Year College	0.1
Sheriff's Office	0.8	Federal Penitentiary	0.1
Public Two-Year College	0.8	Marshal's Office	0.1
County Jail	0.7	Kindergarten	0.1
Pre-kindergarten	0.7	Alternative Division	0.0

Table 2.43: Critical Facility Types: Percentage of Total Reported

In order to evaluate the monetary potential for loss by jurisdiction, the locally-reported critical facility data was utilized in conjunction with the average composite hazard scores. This evaluation results in the Table 2.44 which ranks the counties based on the highest value per facility, the highest average risk score per facility, and a combination of the two. As the table illustrates, these jurisdictions have potential for higher losses to the self-reported critical facilities due to having a high average value per facility, a high average risk score per facility, and high average standardized score (the average value standardized by the average risk). Table 2.45 lists the jurisdictions with the highest total value in critical facilities, as reported in the GMIS.

Rank	High Avg. Value / Facility	High Avg. Risk / Facility	High Avg. Standardized
1	Habersham County	City of Tybee Island	Habersham County
2	City of Warner Robins	City of Brunswick	City of Marietta
3	Heard County	Chatham County	City of Warner Robins
4	City of Marietta	City of Richmond Hill	Heard County
5	Effingham County	Glynn County	City of Perry
6	Town of Portal	City of Garden City	Cobb County
7	City of Perry	Town of Thunderbolt	City of Austell
8	City of Canton	City of Savannah	Effingham County
9	Cobb County	City of Port Wentworth	Town of Portal
10	Tattnall County	Liberty County	City of Canton

Table 2.44: Rankings of Potential for Loss by Jurisdiction

Rank	High Value/Facility
1	Habersham County
2	City of Marietta
3	City of Savannah
4	Cobb County
5	City of Warner Robins
6	Columbus-Muscogee County
7	Augusta-Richmond County
8	Fulton County
9	City of Rome
10	Heard County

Table 2.45: Rankings of Total Value of Critical Facilities by Jurisdiction

2.8.2 *Assessing Vulnerability of State Facilities*

The BLLIP database provides information on state-owned and leased properties as well as other assets such as radio and fire towers. This data is provided and sponsored by the Georgia Building Authority (GTS), Georgia State Financing and Investment Commission (GSFIC), State Properties Commission (SPC), and Commission for a New Georgia in collaborations with the Information Technology Outreach Services (ITOS) division of the Carl Vinson Institute of Government at the University of Georgia.

Currently, the database includes 19,626 structures with 14,360 being state-owned, 2,367 being state -leased structures, and 2,899 other assets. The location of these state facilities are depicted in Figure 2.60. The greatest liability to the state is from state-owned facilities. The average composite hazard risk for State-owned properties is provided in Figure 2.61 by county they are located in. The state-owned facilities located in coastal counties are at the highest risk to hazard events.

State Asset Type	2007	2010	2013
Owned	13,222	20,574	14,360
Leased	1,665	2,391	2,367
Other	N/A	1,800	2,899
Total	14,887	24,765	19,626

Table 2.46 State Asset Totals According to BLLIP Data by Year of Data

The BLLIP database is designed to include a plethora of information regarding state-owned and leased facilities. The authorities listed above continue to improve the database so that all the attribute data is complete. BLLIP facility attributes are identified in Table 2.47.

Location information	Insured value
Occupying entity	Estimated value
Owning entity	Fire code compliance
Total floors	Historic value
Square footage	Contents value
Percentage occupied	Contact information
Construction year	

Table 2.47 BLLIP Facility Attributes

The state-owned and leased facilities may include some facilities that qualify as critical (such

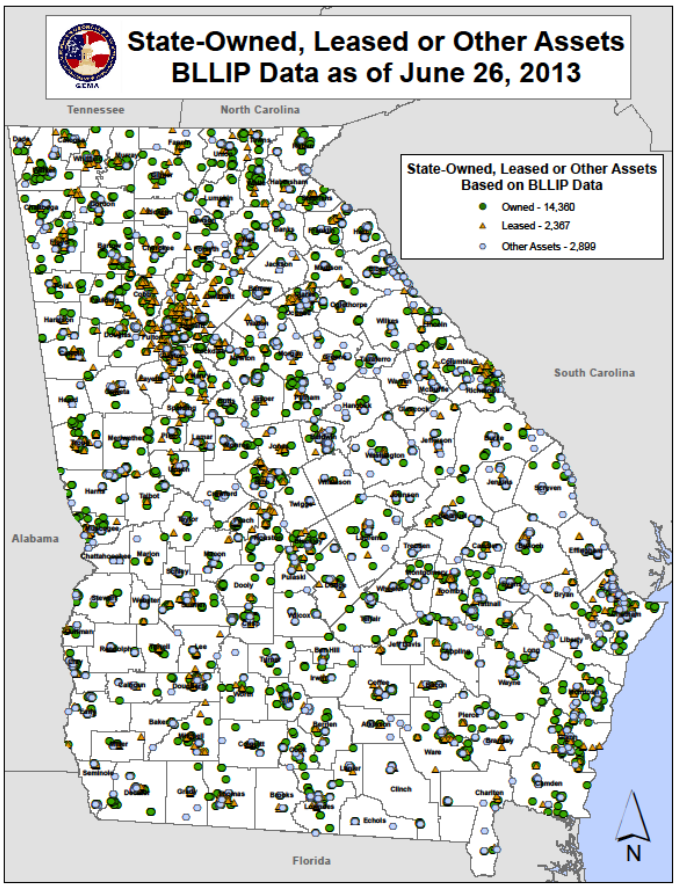


Figure 2.60 Location of State Assets

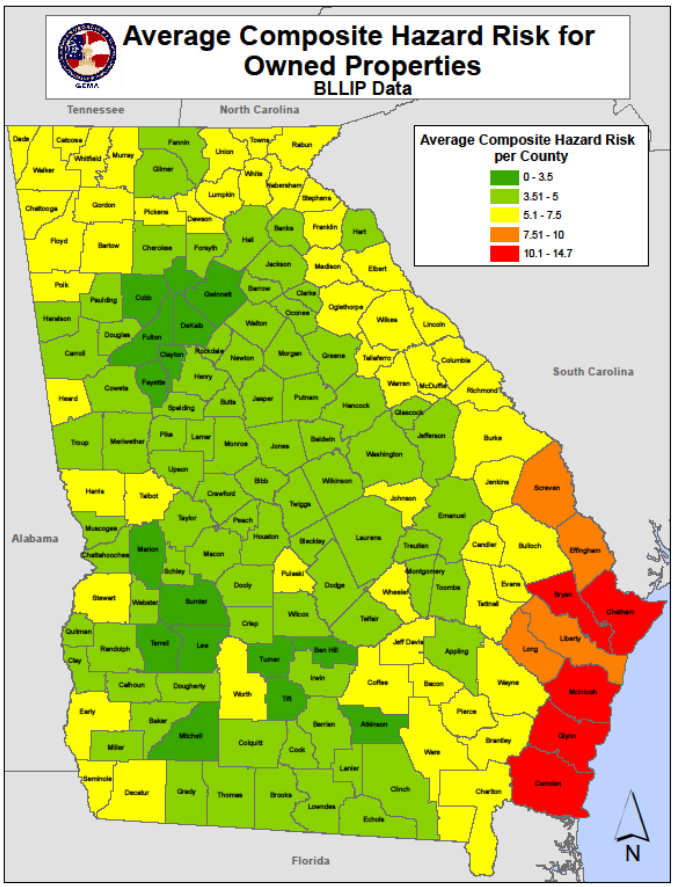


Figure 2.61 Risk to State-Owned Properties

as state hospitals or prisons); however, all state-owned and leased facilities are included in the BLLIP database. The most consistently complete of the attributes was the estimated value. Therefore, this attribute was reported in Tables 2.48 and 2.49 to illustrate the amount at risk in the hazard categories.

Including the BLLIP data in the GMIS allows the spatial joining of the structure data with the composite hazard assessment. In other words, each point spatial feature (BLLIP structure) is assigned the attribute information of the raster cell (composite hazard score) in which point falls. For example, the spatial joining assigns GEMA's Building 5 the hazard score of 6 (on a scale of 25).

In terms of statewide analyses, the BLLIP data are used to summarize percentages of state facilities located in specific hazard categories (high to low composite hazard scores) as well as summarize the estimated value of the structures (state-owned only) at varied risk to hazards. These summaries are found in Tables 2.48 and 2.49.

Hazard Category	Hazard Score Range	% Owned	% Leased	% Total Facilities
High	18-25	0.6%	0.1%	0.5%
Moderate	9-17	6.7%	3.3%	6.2%
Low	0-8	84.0%	57.2%	80.2%
None	Undetermined	8.7%	39.4%	13.1 %

Table 2.48: State Facility Percentages in Hazard Categories

Hazard Category	Hazard Score Range	Estimated Value at Risk	% Total Value
High	18-25	$15,870,561	0.1%
Moderate	9-17	$1,178,706,274	6.1%
Low	0-8	$17,010,654,127	87.8%
None	Undetermined	$1,158,429,485	6.0%

Table 2.49: State Facility Value at Risk According to Hazard Categories

As Table 2.48 illustrates, the majority of total structures reside in the low hazard zone areas. Likewise, the greatest value of state owned properties are in the low hazard areas of the state as shown in Table 2.49. Some records had invalid coordinates which led to the categorization of undetermined for these structures. Most likely, the facilities that are located in the highest hazard areas are located in the counties with the highest average composite risk: the coastal counties in eastern Georgia and the mountainous counties in northern Georgia.

Note that the value totals and facility totals are based on the BLLIP data, which is not completely whole. In terms of the state facility percentages in the various hazard zones, only 8.7% of the state-owned structures and 39.4% of the state-leased structures are represented due to invalid coordinate information. In terms of the estimated value of structures at risk, only 80.9% of the structures are represented due to incomplete value information. Therefore, one may assume that the estimated value at risk in each category is underrepresented substantially.

2.8.3 *Repetitive Loss Properties*

The State of Georgia utilizes several federal hazard mitigation programs to mitigate repetitive and severe repetitive loss properties. These programs include the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA), the Pre-Disaster Mitigation Competitive (PDM-C) program, and the Repetitive Flood Claims (RFC) program. The various federal programs have the ability to provide funds to assist states and communities in reducing flood damages to insured properties that multiple claims to the National Flood Insurance Fund. Eligible mitigation activities include property acquisition (includes either demolition or relocation, where the property is deed restricted for open space in perpetuity), property elevation, dry flood proofing of non-residential structures, and minor localized flood control projects.

In order for this strategy to target repetitive loss properties, including severe repetitive loss properties, those properties must be documented and mapped for further analysis. In 2012, the Federal Register was updated with new definitions for Repetitive Loss (RL) and Severe Repetitive Loss (SRL) properties. For the purposes of comparison to 2011 data, the figures presented in this section are based on the definition used in 2011 assessment.

In order to assess the risk associated with the repetitive loss properties, the point location of every property was aligned with the inland flood hazard score previously discussed from section 2.7. The results are provided in Table 2.50. The numbers include both mitigated and non-mitigated repetitive loss properties. The significant increase of RL properties between 2004 to 2007 and 2007 to 2010 is a result of major flood events during those timeframes. Between 2010 and 2013, there were no major flood events in Georgia; therefore, the change in property totals was negligible. Analyzing location of RL properties in relation to special flood hazard areas did not begin until the 2007 data; therefore, the 2004 data does not have the number of properties located within each flood hazard category.

Flood Hazard Category	2004	2007	2010	2013
Floodway / Velocity	N/A	168	135	157
100 Year Floodplain	N/A	450	668	739
500 Year Floodplain	N/A	82	106	126
Undetermined/Possible	N/A	518	701	604
Total	**811**	**1218**	**1610**	**1626**

Table 2.50: Total Repetitive Loss Properties in Flood Hazard Zones by Year of Data

The first column in this table refers back to Table 2.35 in section 2.7 that details the flood hazard scores. In reference to repetitive loss properties, this table reveals that between 2010 and 2013 there was an increase in RL properties in identified flood hazard areas and a decrease in RL properties where location in relation to a flood hazard area was not known. Reasons for this change include floodplain mapping improvements in the state and updates to the location data in the Repetitive Loss property database. Figure 2.62 shows the general location of mitigated and non-mitigated Repetitive Loss properties.

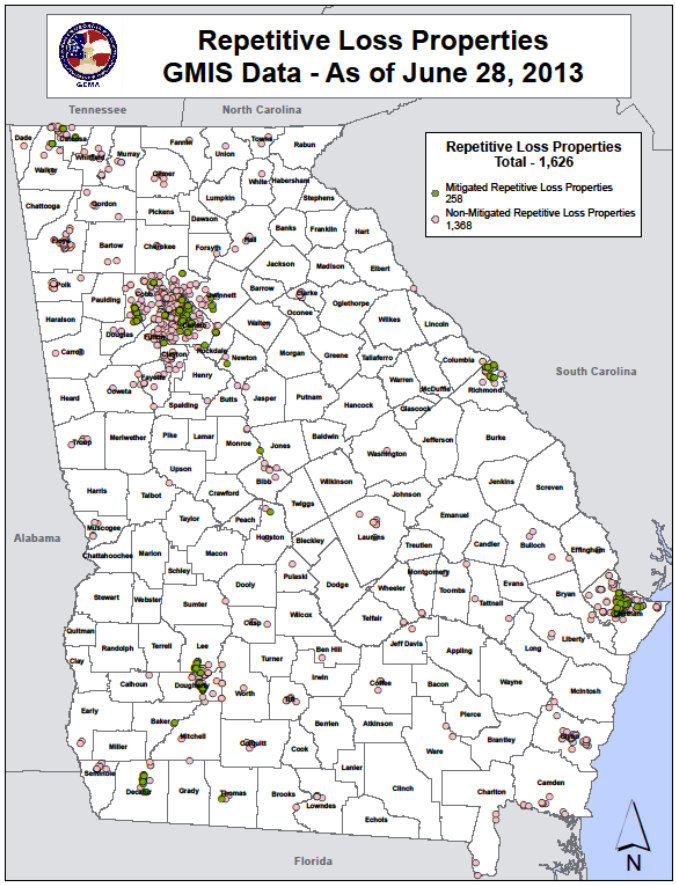


Figure 2.62 Repetitive Loss Properties

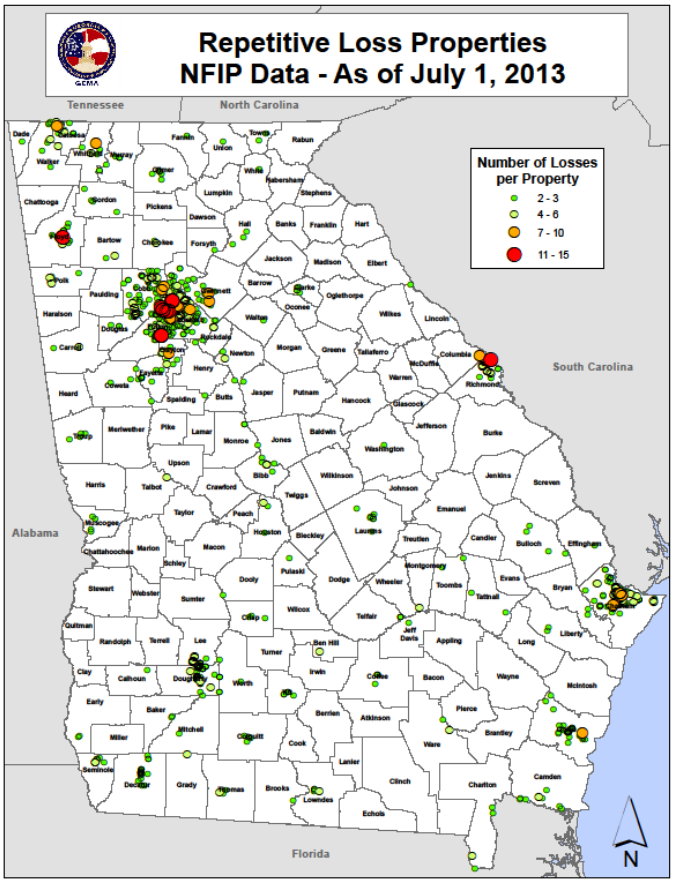


Figure 2.63 Number of Losses Per RL Property

Figures 2.63 through 2.66 illustrate various aspects of the repetitive loss properties in Georgia that are helpful in identifying opportunities to reduce risk. The first map, Figure 2.63 illustrates the total number of losses per property using graduated symbols. As this map indicates, clusters of repetitive loss properties are located in the metropolitan Atlanta, Augusuta-Richmond, Lee and Dougherty Counties and Savannah/Chatham County areas. Those properties with frequent flood claim losses are possible locations for mitigation actions.

The second map, Figure 2.64, illustrates the municipalities with the highest totals of repetitive loss properties. Figure 2.65 illustrates the communities with the highest sums of insurance claim payments to the repetitive loss properties. These communities with high numbers of RL properties or highest total losses from flood claims are ideal targets for outreach to reduce risk and implement mitigation actions. More information on number of RL properties and total losses by community can be found in Chapter 4, section 4.3.3.

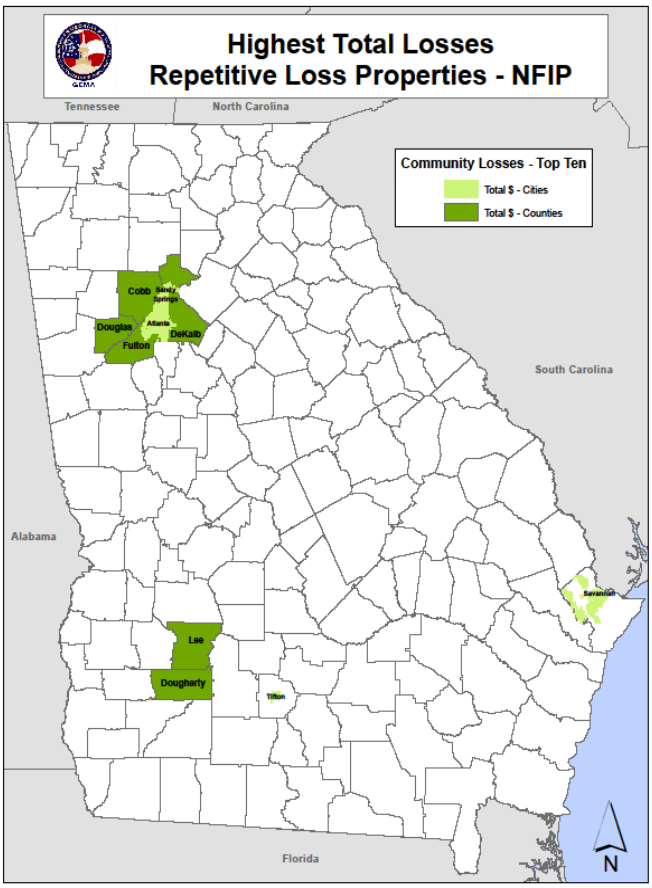


Figure 2.65 Top 10 Communities by Total RLP Losses.

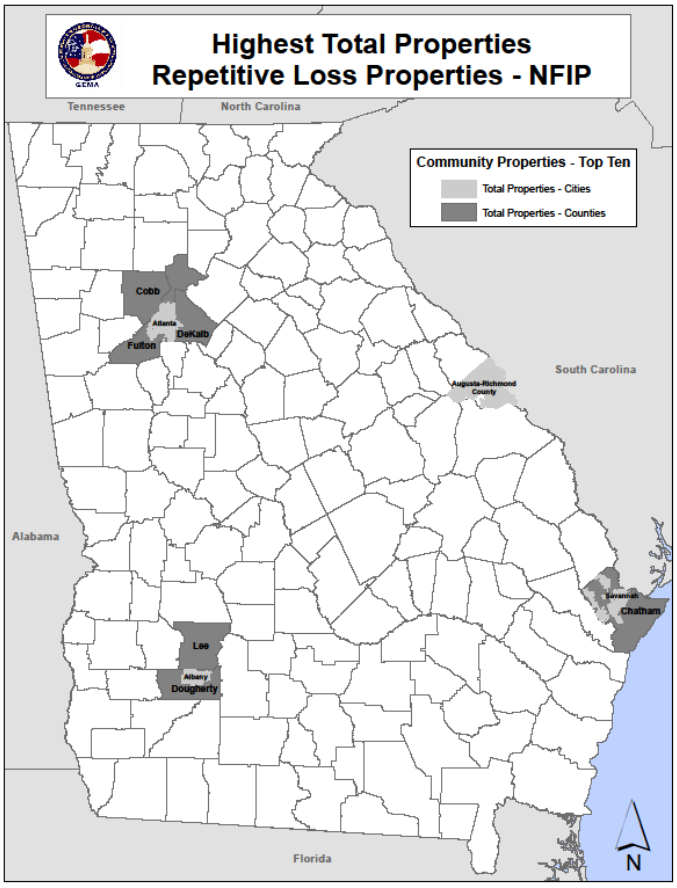


Figure 2.64 Top 10 Communities by Total RL Properties

Table 2.51 identifies the number of validated Severe Repetitive Loss Properties by jurisdiction and is visualized in Figure 2.66. There was a decrease in the number of validated SRL properties from 62 to 51 since 2010. As the number of validated SRL properties changes from month to month, most of this change is likely due to changes in flood insurance on the properties. Additional information on RL and SRL properties by jurisdiction can be found in Chapter 4, Section 4.3.3.

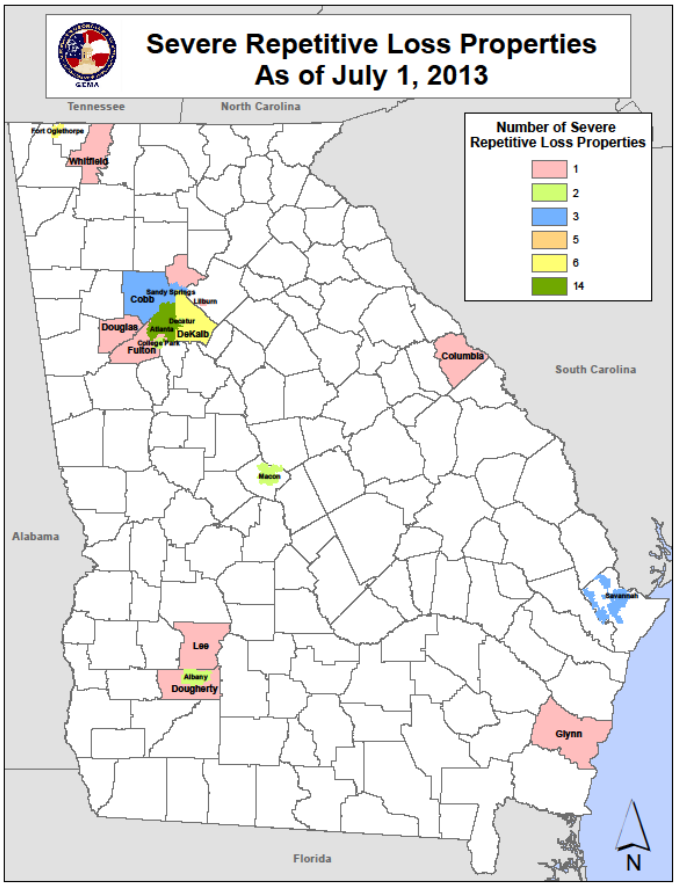


Figure 2.66 Communities with SRL Properties

Jurisdiction	2007	2010	2013
Albany, City of	5	3	2
Atlanta, City of	14	21	14
Austell, City of	2	0	0
Catoosa County	1	1	0
Clayton County	1	0	0
Cobb County	4	5	3
College Park, City of	0	2	2
Columbia County	0	1	1
Dalton, City of	1	0	0
Decatur County	2	0	0
Decatur, City of	3	2	2
Dekalb County	5	5	6
Dougherty County	3	3	1
Douglas County	1	2	1
Fort Oglethorpe, City of	1	2	6
Fulton County	1	0	1
Glynn County	1	1	1
Gwinnett County	1	0	0
Houston County	1	0	0
Lee County	2	2	1
Lilburn, City of	0	1	1
Macon, City of	2	2	2
Powder Springs, City of	0	1	0
Rockdale County	0	1	0
Rome, City of	1	0	0
Sandy Springs, City of	0	2	3
Savannah, City of	6	3	3
Seminole County	0	1	0
Troup County	1	0	0
Whitfield County	0	1	1
Total	**59**	**62**	**51**

Table 2.51 Validated Severe Repetitive Loss (SRL) Properties by Jurisdiction

Chapter 3: State Mitigation Strategy

3.1 OVERVIEW

The summary of changes to Chapter 3 of Georgia's Hazard Mitigation Strategy/Plan since the 2011 approval are listed in the following table, Table 3.1.

Chapter 3 Section	Updates to Section
3.1 Overview	• Updated table of changes. • Updated text
3.2 Georgia Mitigation Strategy	• Revised text to include additional information • Goal text revised, content updated. • Deleted objectives • Organized actions into the 4 categories • Added actions from state appendices into action plan • Updated gaps and obstacles • Describes new action plan table • Revised to include additional analysis on local plan review; Text and data moved from Chapter 4
3.3 State Capability Assessment	• Updated state agency capabilities and consolidated into tables • Moved funding information to 3.5
3.4 Local Capability Assessment	• Updated text and tables • Added maps and tables
3.5 State and Local Funding Sources	• Consolidated into summary of funding sources

Table 3.1 Summary of Changes to Chapter 3

Chapter 3 of the Georgia Hazard Mitigation Plan was reviewed and updated by GEMA's Hazard Mitigation Planners. The planning staff revised each section as necessary to reflect the updated mitigation strategy, based on accomplishments, current activities and the integration of current local multi-jurisdictional hazard mitigation plans and state agency inputs.

This chapter provides the State of Georgia's Strategy toward resilience. Based on the findings of the *Risk Assessment* and the state-level *Capability Assessment*, the goals and actions that follow are intended to guide state agencies, counties, cities, towns and non-governmental organizations toward resilience in regard to the many hazards that plague this region. In order to achieve these aims, this section has been separated into the following components:

- Goals and Actions
- State Capability Assessment

- Local Capability Assessment
- State and Local Funding Sources

This chapter discusses the concept and approaches of mitigation in order to clarify the State's mitigation strategy. Mitigation is a combination of sustained measures and actions that attempt to reduce or eliminate the long-term risk to people and property from hazards. The main methods of mitigation include (1) modifying the hazard event; (2) reducing human vulnerability; and (3) reducing losses.

The State of Georgia's mitigation strategy is an ongoing effort to identify the goals, and actions that will reduce or eliminate losses from natural hazard events.

3.2 GEORGIA MITIGATION STRATEGY

3.2.1 Overview

The Mitigation Strategy serves as the blueprint for how Georgia will reduce vulnerability and risk to the hazards identified in Chapter 2. The mitigation strategy is made up of three main components: mitigation goals, mitigation actions, and an action plan for implementation. These provide the framework to identify, prioritize, and implement actions to reduce risk to hazards. For the purposes of this mitigation strategy, the following FEMA definitions were used.

Mitigation goals are general guidelines that explain what the State wants to achieve with the plan (see Figure 6.1). They are usually broad policy-type statements that are long-term, and they represent visions for reducing or avoiding losses from the identified hazards.

Mitigation actions are specific projects and activities that help achieve the goals.

The *action plan* describes how the mitigation actions will be implemented; including how those actions will be prioritized, administered, and incorporated into the State's existing planning mechanisms, policies and programs.

Mitigation actions fall into four categories, including Planning and Regulation, Structure and Infrastructure Protection, Natural Resources System Protection, and Public Awareness and Education. Table 3.2 provides descriptions and examples of each category.

Figure 3.1 Mitigation Strategy

Mitigation Category	Description	Examples
Local Plans and Regulations	These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.	• Comprehensive plans • Land use ordinances • Subdivision regulations • Development review • Building codes and enforcement • NFIP Community Rating System • Capital improvement programs • Open space preservation • Stormwater management regula-
Structure and Infrastructure Projects	These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards. Many of these types of actions are projects eligible for funding through the FEMA Hazard Mitigation Assistance program. *Task 9 – Create a Safe and Resilient Community* provides more information on these programs.	• Acquisitions and elevations of structures in flood prone areas • Utility undergrounding • Structural retrofits. • Floodwalls and retaining walls • Detention and retention structures • Culverts • Safe rooms
Natural Systems Protection	These are actions that minimize damage and losses and also preserve or restore the functions of natural systems.	• Sediment and erosion control • Stream corridor restoration • Forest management • Conservation easements • Wetland restoration and preservation
Education and Awareness Programs	These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady or Firewise Communities. Although this type of mitigation reduces risk less directly than structural projects or regulation, it is an important foundation. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public is more likely to lead to direct actions.	• Radio or television spots • Websites with maps and information • Real estate disclosure • Presentations to school groups or neighborhood organizations • Mailings to residents in hazard prone areas. • StormReady • Firewise Communities

Table 3.2 Categories of Mitigation Actions. Source: FEMA Local Mitigation Planning Handbook

3.2.2 Review and Assessment of 2011 GHMS Goals

The 2011 GHMS included the following three goals:

1. Reduce human vulnerability to hazard events.
2. Reduce the losses associated with hazard events.
3. Reduce overall exposure to hazard events for Georgia citizens and their property.

The State of Georgia reviewed these to ensure that these goals are consistent with State priorities and remain valid. The State's priorities have not changed since the completion of the 2011 GHMS. The goals were found to be consistent with State priorities and valid and, therefore, remain unchanged.

3.2.3 Updating the Mitigation Action Plan

The State of Georgia used a combination of multiple tools and processes to create the updated mitigation action plan. These include the updated risk assessment, review of the mitigation actions from the 2011 plan, review of mitigation actions from local plans, review of practices from other state plans and input from multiple State and non-governmental agencies throughout the State.

In order for a mitigation plan to be effective, the mitigation goals and actions must address the hazards identified in the risk assessment. Once the State had completed updating the risk assessment, this information was used to ensure the updated goals and actions addressed the updated risks and vulnerabilities posed by the identified hazards. One tool that was used to do this was a workshop held in April, 2013 where various State agencies and non-governmental partnering agencies gathered to review the updated risk assessment and determine the types of projects and actions they would like to see, whether planning and regulations, structure and infrastructure projects, natural resource protection or education and awareness programs. Multiple agencies participated in the workshop, including but not limited to FEMA, the Georgia Technology Authority, Department of Audits, Department of Community Affairs, Lyndale, Inc., Volunteers of America, Family Intervention Specialists and the Oconee Center. For a full list of participants, see Appendix B. One key finding of the workshop was the overwhelming majority (75%) of the chosen actions fall within the 'Planning and Regulation' and 'Education and Awareness' categories. For example, 16% of the chosen actions were related to building and development regulations. For details on the chosen categories, please see Table 3.3.

Mitigation Type	FEMA	State Agencies	Non-Governmental Organizations	GEMA	Totals	%
Planning & Regulations	10	56	50	20	136	**40%**
Structure & Infrastructure	6	29	25	13	73	**21%**
Natural Systems Protection	1	6	7	0	14	**4%**
Education & Awareness Pro-	16	37	54	11	118	**35%**

Table 3.3

While the majority of workshop participants favored the 'planning and regulation' and 'education and awareness,' there are two notable exceptions. Two structural and infrastructure actions that were favored by the workshop participants were burying powerlines and installing mass alert systems. These are notable due to the cost of structure and infrastructure projects. In particular, converting from overhead to buried power lines is a very high cost project and would be difficult to show cost

effectiveness. For full details on the workshop tallies, please see Appendix E

Another tool that was used for updating the mitigation actions is individual interviews with various state agencies conducted by State Mitigation Planning staff. The purpose was to identify specific projects and activities other agencies in the State are planning or conducting. This process identified many new planned actions, as well as many that, while currently in progress, were not included in the 2011 strategy and are, therefore, “new” to the updated mitigation action plan.

During the update process, the State noted the following gaps and obstacles, the first three of which were identified in the 2011 GHMS:

1. The 2011 GHMS noted the state would benefit from incorporating more GIS and other technical information into the hazard mitigation planning process. One major area the State has worked to improve upon is the quality and amount of technical and GIS data that is available and used in, both, local and State Mitigation Planning. The previous strategy included multiple actions to address this issue, including the following:
    a. Actions 1.10 and 4.8 included development of Community Wildfire Protection Plans (CWPP), which provide greater detail than previously available on local risks of wildfire hazards. These CWPPs are now mostly complete. The State now requires local plans to include relevant data and maps from these CWPPs in risk assessments. The GIS data developed from this project is also included in the State risk assessment for wildfires.
    b. Actions 2.4 and 2.5 related to RiskMAP studies the Georgia Department of Natural Resources has initiated in various locations in the State. The pilot phase in the Metropolitan Atlanta area is now approximately 90% complete and the next phase, including counties in the coastal Georgia region has been initiated. This information includes site specific flood studies with GIS and technical data that will be available for inclusion in the next updates of the studied counties’ local mitigation plans.
    c. Action 4.4 related to making improvements to the Georgia Mitigation Information System (GMIS). This system is provided as a basic GIS tool for locals to use in developing their risk assessments, as well as an inventory and reporting tool for their Critical Facilities. It is also used as a reporting and mapping tool for State owned and operated facilities. The State of Georgia is in the process of upgrading the system to make it more user-friendly, as well as open the possibility of including future datasets as they become available.
    d. Action 2.13 related to including and updating data on NFIP repetitive loss properties in the GMIS. This helps local planners in meeting a specific requirement in their local mitigation plans. The State continues to update this data as it becomes available.
    e. Action 4.10 related to updates to the Flood Hazard Maps throughout the State, as well as inclusion of the locations of high hazard dams. The updated maps have been provided to the affected counties and have been included in the GMIS. The updates to the flood maps are now complete. Dam locations, while not included in GMIS have been included in the State Mitigation Strategy as new dams are built, the dam location dataset will be updated.

2. Many state residents did not realize hazard mitigation planning activities were occurring in the area. This part of the process is primarily up to local planners as they update the local mitigation plans. GEMA's Mitigation Planning staff, however, works closely with the local planners and encourages multiple forms of public participation. Encourage FEMA template for news releases; public notices during planning process;

3. Local communities in the state were unaware of the types of assistance available to them for hazard mitigation planning. Action 2.7 in the 2011 GHMS related to two process the GEMA Mitigation staff uses in order to address this. In the aftermath of Presidentially declared disasters, the staff deploys to affected areas and hosts post disaster briefings where the potential for HMGP funding for planning and projects is discussed with declared counties. Also, GEMA hosts specific training for all new Emergency Management Directors. A portion of this training is focused on hazard mitigation, including the programs available and the potential funding for projects and planning. Finally, as described in section 4.4.1, the State Mitigation staff maintains a list of counties prioritized by the expiration dates of their plans and reached out to the prioritized communities, letting them know of the need to update their plans and the potential for funding assistance.

4. The GHMS would benefit from improved methods of incorporating state and local mitigation actions. While this was not noted in the previous strategy, it was a concern identified by the State mitigation planning staff in the initial phases of the current update. The State Mitigation Planning staff did three things in order to address this issue. The workshops described in Chapter 1 were new to Georgia's planning process and provided a way to better capture input from multiple State agencies and partnering non-governmental organizations. Also, the staff specifically reached out to several of the larger State agencies with individual interviews to include the projects those agencies had in process that were related to mitigation. These two processes allowed the mitigation planning staff to incorporate types of mitigation actions the workshop participants perceived as a high priority as well as include projects various State agencies have planned or in progress that have a mitigation effect. Finally, in revising the mitigation action plan, described below, part of the effort was to ensure mitigation actions noted in the local plans were adequately included in the State's action plan.

The State of Georgia also reviewed the 2011 Action Plan, first, to ensure that the goals continued to address the updated risk assessment. The next step was to review the action steps according to the following criteria:

1. Assess their progress.
2. Determine their validity based on the State's capabilities and the current risk assessment.
3. Ensure they contribute to the identified goals.
4. Ensure the actions are cost effective, technically feasible and environmentally sound.
5. Identify actions that could be refined, expanded or deleted.
6. Ensure the updated action plan accurately and completely describes what the State of Georgia, including all agencies, is currently doing or plans to do over the coming years.
7. Ensure the updated Action Plan addresses all relevant needs as identified by State agen-

cies and local mitigation plans.

8. Determine whether the Action Plan is presented in the most effective, concise manner.

The majority of the actions from the 2011 GHMS were listed as ongoing. Upon review, the State found these actions were still ongoing. One key finding of the review was that, while valid, many of the actions in the previous plan were vague. The State, therefore, began to revise the actions, sometimes separating one action into multiple, more specific actions, in order to more clearly define what, exactly, is being done. One method the State used for this was to look at examples from other state plans to see how relevant actions were described by other states. This provided a method for more clearly stating many of the actions in the 2014 update without "reinventing the wheel."

3.2.4 Local Plan Review

GEMA staff reviewed all local hazard mitigation plans to identify mitigation actions communities were proposing in order to reduce their identified risks and vulnerabilities to natural hazards. Results of this analysis are provided in Tables 3.4 and 3.5. This information was considered in the development of the updated 2014 Action Plan. The two tables are color coded such that the mitigation types in Table 3.4 are colored to match the FEMA Mitigation Categories they apply to in Table 3.5. Mitigation types that have no color do not fall within the FEMA mitigation categories and are response and preparedness type actions that have consistently been included in local mitigation plans. Examples of State mitigation actions related to local plans include, but are not limited to the following:

- Continue supporting the use of state of the art warning technology and local warning projects with available initiative funds
- Support local government cost-effective requests through available grant opportunities to mitigate repetitive loss properties with priority given to severe repetitive loss properties and removal of repetitive loss properties from regulatory floodway
- Continue to give priority to projects identified in local mitigation plans that minimize damages to critical facilities

Table 3.4 shows changes in the percentages from the 2011 GHMS. One key observation is the higher changes in 3 of the mitigation action types. The percentage of counties identifying 'planning and zoning' and 'additional analysis' as mitigation actions decreased from 88% and 64% to 76% and 47% respectively. In addition, the percentage of counties identifying 'Emergency Response Operations' type actions increased from 62% to 75%. Further analysis will be necessary to determine whether these trends are indicative of concerns which would require the modification of the Action Plan.

Mitigation Type	% of counties identifying Action		Change from
	2011 GHMS	2014 GHMS	
Public Outreach	93%	94%	1
Warning / Communications	86%	92%	6
Flood Programs (NFIP / CRS)	86%	92%	6
Preparedness Efforts	78%	87%	9
Flood Control	74%	82%	8
Planning / Zoning	88%	76%	-12
Structural Retrofit	82%	75%	-7
Emergency Response Operations	62%	75%	13
Equipment Acquisition	81%	73%	-8
Fire Programs (Firewise, etc.)	64%	62%	-2
Drought Management	62%	61%	-1
Broad Cooperation	61%	60%	-1
Additional Analysis	64%	47%	-17
Property Acquisition	35%	35%	0
Dam Management	25%	30%	5
Property Relocation / Elevation	28%	26%	-2
Wetland Protection	22%	22%	0
Greenspace Preservation	18%	13%	-5

Table 3.4 Local Identification by Mitigation Type

Mitigation Category	% of Counties Identifying Category
Planning and Regulation	98%
Natural Resources Protection	22%
Structure and Infrastructure Projects	100%
Education and Awareness	98%

Table 3.5 Mitigation Categories from Local Plans

3.2.5 Action Plan

As described in the previous sections, the State of Georgia undertook a robust process to update the Action Plan from the 2011 GHMS. The process incorporated input from several State agencies and outside organizations, as well as all 159 Georgia counties through incorporation of data from their local hazard mitigation plans. The current action plan was updated to provide a comprehensive, achievable set of actions for the State of Georgia to pursue over the coming years in order to reduce losses, both human and property, to natural hazards. All actions either directly reduce losses to the identified hazards or obtain better, more current information to better understand the risks and vulnerabilities Georgia faces from all natural hazards.

As noted in Section 3.2.3 above, one key finding in the review of the 2011 Action Plan, was many of the actions were vague and actually included several projects being conducted separately by multi-

ple agencies. One major effort in this update was to separate such actions from the 2011 plan such that each project would be its own action in the updated plan. This allowed for more effective assessment of each individual project's status as well as easier identification of the applicable details, such as the lead and support agencies, funding sources, etc.

Another key aspect of the update process was to make the plan itself more concise and usable for interested parties, including local communities to use. One element of this was to shift the focus of the action plan from being heavily focused on GEMA to it being a more statewide plan with each agency responsible for its own actions. For example, in the 2011 Action Plan, Action 3.10 had GEMA as the lead and support agency in the Georgia Forestry Commission's (GFC) project to install safe rooms on their main campus. In the updated plan, GFC would be the lead agency and GEMA would be the support. In another example, the new outreach methods described above allowed the Mitigation Planning staff to become aware of mitigation activities other agencies were undertaking, that were not using FEMA mitigation funding streams and the mitigation staff was not previously aware of. Another element of this was to revise the format of the Action Plan into a more clean, concise presentation. In doing this, the State made several changes to the format of the Action Plan, including the following:

- Elimination of objectives
- Separating the Action Items into the four categories listed in Table 3.5 above
- Listing the applicable goal as part of the details of each Action Item
- Listing the previous item number from the 2011 GHMS.
- Noting the applicable hazard each action item applies to.

Table 3.6 shows the updated 2014 State of Georgia Action Plan. Each action item includes the following details:

A. Statement naming the action item.
B. The timeline within which the action is proposed to be completed.
C. The current status of the action, whether new, ongoing or deferred. Those activities that have not reached "Complete" status are not fully implemented due to a variety of reasons. The activity may be "Ongoing" in that continued small actions are implemented that leave room for more mitigation activity under that objective or action step. The activity may be "New" in that the planning team recently included the activity in the updated Standard Plan. Deferred actions mean no activity occurred, either due to limited funding or staff resources, but the action was reviewed and continues to be valid. Completed and deleted actions are listed separately in Tables 3.7 and 3.8. Deleted means no action was taken or the action was not completed and the action item was deemed no longer valid.
D. The priority of the action. Part of the prioritization includes a general assessment according to the STAPLEE criteria, which stands for Social, Technical, Administrative, Political, Legal, Economic and Environmental. Also, most items that require grant funding must undergo a full Benefit Cost Analysis, described in Section 4.2.2, to determine that action's actual cost effectiveness prior to funding.
E. The applicable State goal.
F. The specific hazard being addressed, if applicable. Many of the actions are applicable to

all hazards, though some are directly applicable to specific hazards. For example, technical assistance for local mitigation plans is applicable to all hazards, where acquisition of flood prone properties would be applicable to the flood hazard.

G. The Lead Agency. The lead agency is the agency responsible for accomplishing the action.
H. Supporting Agencies. Supporting agencies are those agencies that are not responsible for the completion of the action, but provide assistance in various ways.
I. The applicable resources (staffing, funding, etc.) necessary in order to complete the action. The State of Georgia currently uses several funding sources to implement hazard mitigation activity. Primarily, these funds stem from federal, state, and local sources, which include the programs discussed in Section 3.3's assessment of state mitigation policies, programs, and funding and Section 3.5's description of funding sources. The State of Georgia is interested in continuing to pursue these federal, state, and local funding sources throughout the future implementation of the mitigation strategy as well as in pursuing additional private sources
J. The item number, if applicable, from the 2011 GHMS.
K. The applicable FEMA category described above.

2014 MITIGATION ACTIONS											
Item #	Mitigation Actions	Timeline	Status	Priority	State Goal	Hazard	Lead Agency	Support Agency	Resources	Previous Item #	FEMA Category
1	Identify new funding sources to update local mitigation plans	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	FEMA	HMA	1.1	Planning & Regulation
2	Provide assistance to Georgia counties in obtaining grant funding to update local mitigation plans	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	FEMA,	HMA	1.1	Planning & Regulation
3	Conduct plan kickoff meetings with local mitigation planning committees to provide overview of the mitigation planning process	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	Local Communities	Local Budget	1.3	Planning & Regulation
4	Provide tools, such as fillable charts and templates to assist local planners with data collection for the completion of local mitigation plan documents	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	HMA	1.2	Planning & Regulation
5	Provide updated mapping to local communites through GMIS for the Flood, Wildfire, Landslide, Seismic, SLOSH and Wind hazards	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	HMA	1.1	Planning & Regulation
6	Provide training to local county EMA Directors, planners and state users on entering data into the Georgia Mitigation Information System (GMIS)	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	HMA	2.7	Planning & Regulation
7	Collect, quantify and integrate the local data, such as risk assessment, vulnerability, loss estimates, capability assessment, and mitigation actions, from mitigation plans as they are developed into a standardize matrix for use in the State plan	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	HMA	1.4	Planning & Regulation
8	Review local mitigation plans for compliance with Federal regulations prior to submittal to FEMA	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	FEMA	HMA	New	Planning & Regulation
9	Develop and update Wildfire Protection Plans throughout the State	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GFC	GEMA	Agency Budget	New	Planning & Regulation
10	Georgia will maintain Enhanced State Mitigation Plan status throughout SYF 2017	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	HMA	New	Planning & Regulation
11	Identify potential funding assistance to implement mitigation measures for state agencies and local governments	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GEMA	GEMA	HMA	1.6	Planning & Regulation
12	During disaster operations, deploy staff to ensure continued working relationships with local, state and federal agencies in the implementation of all available hazard mitigation programs	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	FEMA	HMA	1.7	Planning & Regulation
13	Encourage local communities to review related planning processes such as CWPPs and Comprehensive Plans, when updating LHMPs	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GFC & DCA	GEMA	Agency Budget	New	Planning & Regulation
14	Provide training, webinars, workshops on integration of local mitigation plans into local Comprehensive Plans	2014 - 2017	Ongoing	High	1 - 3	All Hazards	DCA	GEMA	Agency Budget	New	Planning & Regulation
15	Provide State Plan risk assessment data on GEMA's Hazard Mitigation Website for local communities to utilize in their local mitigation planning processes	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GEMA	GEMA	HMA	New	Planning & Regulation
16	Georgia will achieve 100% federal approval for the initial update of all 159 local mitigation plans.	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	HMA	New	Planning & Regulation
17	Update GMIS with the most current flood maps available from FEMA	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	DNR & FEMA	HMA	New	Planning & Regulation
18	Add tax parcel data to GMIS	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GEMA	DCA	HMA	New	Planning & Regulation
19	Update GMIS with the most current Wildfire maps available from the Georgia Forestry Commission	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GFC	HMA	New	Planning & Regulation
20	Georgia will contract with 40 % of counties to update their local hazard mitigation plans in the second update cycle by SFY 2017	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	HMA	New	Planning & Regulation

Table 3.6 (a) Mitigation Action Table

2014 MITIGATION ACTIONS											
Item #	Mitigation Actions	Timeline	Status	Priority	State Goal	Hazard	Lead Agency	Support Agency	Resources	Previous Item #	FEMA Category
21	GEMA will support DNR in the development and adoption of a strategy to increase the number of Georgia local governments participating in the National Flood Insurance Program by 5 % in SFY 2017	2014 - 2017	Ongoing	High	1 - 3	All Hazards	DNR	GEMA	Agency Budget	New	Planning & Regulation
22	Develop and conduct Risk MAP meetings in various watersheds throughout Georgia	2014 - 2017	Ongoing	High	1 - 3	All Hazards	DNR	GEMA, FEMA	Agency Budget	New	Planning & Regulation
23	DCA is currently in the process of developing a Business Impact Analysis Survey to be completed by the management of each DCA program. This survey will identify strengths, weaknesses, opportunities, and threats (SWOT). The information from these surveys will be incorporated into the existing DCA Management RecoveryTeam Action Plan.	2014 - 2017	Ongoing	High	1 - 3	All Hazards	DCA	DCA	Agency Budget	New	Planning & Regulation
24	Develop map inundation zones for dam failure	2014 - 2017	Ongoing	Low	1 - 3	Flood & Dam Failure	DNR Safe Dams & USACE	GEMA	HMA	New	Planning & Regulation
25	DCA will continue to pursue its vision that every Georgia community will offer a quality of life where people and businesses can grow and prosper through administration of the programs that mitigate future nautural and man-made disasters.	2014 - 2017	Ongoing	High	1 - 3	All Hazards	DCA	DCA	Agency Budget	New	Planning & Regulation
26	DPS will conduct annual reviews of all their natural disaster plans and participation in disaster exercises	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	DPS	GEMA	Agency Budget	New	Planning & Regulation
27	Develop a hazard mitigation element to local comprehensive plans	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GEMA	DCA	HMA & Agency Budget	New	Planning & Regulation
28	Update Community Wildfire Protection (CWPP) in conjunction with Local Hazard Mitigation Plan (LHMP) update	2014 - 2017	Ongoing	High	1 - 3	Wildfire	GFC	GEMA	Agency Budget	New	Planning & Regulation
29	Provide a link to the GEMA website for hurricane and severe weather emergency preparedness data on the DPS website	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	DPS	GEMA	HUD	New	Planning & Regulation
30	Strengthen and add support to Radio Towers at DPS buildings to prevent wind damage to a critical structure	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	DPS	GEMA	HUD	New	Planning & Regulation
31	Provide lightning suppression protection to all DPS facilities	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	DPS	GEMA	HUD	New	Planning & Regulation
32	Determine effectiveness of mitigation programs through loss avoidance studies	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	HMA & Agency Budget	New	Planning & Regulation
33	Update GMIS database	2014 - 2017	Ongoing	High	1 - 3	All Hazards	ITOS	GEMA	HMA	New	Planning & Regulation
34	Develop statewide flood depth grid database	2014 - 2017	Ongoing	Low	1 - 3	Flood	DNR	GEMA, DCA	HMA & Agency Budget	New	Planning & Regulation
35	Provide watertight document storage for assets in SLOSH and Floodway/Velocity Zones	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	DPS	GEMA	HUD	New	Planning & Regulation
36	Place brochures and documents in DPS facilities for public and employee awareness of mitigation steps they can take for their own and family protection	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	DPS	GEMA	HUD	New	Planning & Regulation
37	Reduce flood loss claims against NFIP through the mitigation of repetitive loss properties	2014 - 2017	Ongoing	High	1 - 3	Flood	GEMA	DNR & FEMA	Agency Budget	3.12	Planning & Regulation

Table 3.6 (b) Mitigation Action Table

2014 MITIGATION ACTIONS											
Item #	Mitigation Actions	Timeline	Status	Priority	State Goal	Hazard	Lead Agency	Support Agency	Resources	Previous Item #	FEMA Category
38	Update repetitive loss data in GMIS and maintain database to track mitigation activities including mitigated properties and repetitive loss structures	2014 - 2017	Ongoing	High	1 - 3	Flood	GEMA	GEMA	HMA & Agency Budget	2.13 & 3.14	Planning & Regulation
39	The Department of Agriculture will conduct an annual review of all it's natural disaster plans and participate in fully functional food emergency exercises annually	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GDAg	GDAg	Ag Grant	New	Planning & Regulation
40	To activate the Agricultural Information Sharing and Analysis Center (AGISAC) to serve as a clearinghouse for information impacting agriculture	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GDAg	GDAg	Ag Grant	New	Planning & Regulation
41	To establish a system of pet friendly shelters in times of disaster	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GDAg	GDAg	Ag Grant	New	Planning & Regulation
42	Conduct post disaster reivew of state and local hazard mitigation plans for evaluation and updating as appropriate	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	HMA & Agency Budget	4.6	Planning & Regulation
43	To continue strengthening the foundation of the All Hazards State Agriculture Response Team	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GDAg	GDAg	Ag Grant	New	Planning & Regulation
44	Collect category one and two data from the Safe Dams Program	2014 - 2017	Ongoing	Low	1 - 3	Flood & Dam Failure	GEMA	DNR	HMA & Agency Budget	New	Planning & Regulation
45	Develop update a map for dams in the risk evaluation portion of the state hazard mitigation plan	2014 - 2017	Ongoing	Low	1 - 3	Flood & Dam Failure	GEMA	DNR	HMA & Agency Budget	4.7	Planning & Regulation
46	Change Georgia definition of categories to include losses other than human	2014 - 2017	Ongoing	Low	1 - 3	Flood & Dam Failure	DNR	DNR	Agency Budget	New	Planning & Regulation
47	Determine non-human loss from dam failures	2014 - 2017	Ongoing	Low	1 - 3	Flood & Dam Failure	GEMA	DNR	HMA & Agency Budget	New	Planning & Regulation
48	Adopt applicable recommendations from the publication Emergency Action Planning for High Hazard Potential Dams: Findings, Recommendations, and Strategies (FEMA 608) into the State Plan	2014 - 2017	Ongoing	Low	1 - 3	Flood & Dam Failure	DNR	GEMA	Agency Budget	4.7	Planning & Regulation
49	Continue developing the hazard, risk, and vulnerability assessments for CWPP and SWRA by utilizing updated technology and improved data	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GFC	GEMA	Agency Budget	4.8	Planning & Regulation
50	To set up an electronic, web-based Reportable Animal Diseases System to incorporate into AGISAC; to train veterinarians and agricultural specialists to be a part of the reporting and response networks, and to plan additional animal and food safety response training exercises	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GDAg	GDAg	Ag Grant	New	Planning & Regulation
51	Develop a plan to provide saferooms for all Department of Human Services offices throughout the state	2014 - 2017	Ongoing	High	1 - 3	All Hazards	DHS	GEMA	Agency Budget	New	Planning & Regulation
52	Develop plan to backup all computer files for the Department of Human Services in the event of a hazard event.	2014 - 2017	Ongoing	High	1 - 3	All Hazards	DHS	GEMA	Agency Budget	New	Planning & Regulation
53	Support prescribed burning in CWPP plans	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GFC	GFC	EMPG	New	Planning & Regulation

Table 3.6 (c) Mitigation Action Table

2014 MITIGATION ACTIONS											
Item #	Mitigation Actions	Timeline	Status	Priority	State Goal	Hazard	Lead Agency	Support Agency	Resources	Previous Item #	FEMA Category
54	Expand the number of Flood Tracking Chart Projects to other river basins, ensuring greater availability of information to the emergency management community and public	2014-2017	Ongoing	Medium	1-3	Inland Flooding	USGS	GEMA, DNR, NOAA	USGS, DNR, Local	1.9	Planning & Regulation
55	Provide technical assistance to local communities in identifying and developing hazard mitigation projects	2014-2017	Ongoing	High	1-3	All	GEMA	GEMA	HMA	3.6	Planning & Regulation
56	Support cost effective mitigation activities that minimize damages to critical facilities, utilities and property	2014-2017	Ongoing	High	1-3	All	GEMA	GEMA	HMA	3.7	Planning & Regulation
57	Support local government cost-effective requests through available grant opportunities to mitigate repetitive loss properties with priority given to severe repetitive loss properties and removal of repetitive loss properties from regulatory floodway	2014 - 2017	Ongoing	Medium	1-3	Inland Flooding	GEMA	Local Communities, DNR	HMA	3.13	Planning & Regulation
58	Utilize and share information on lessons learned from analysis of the mitigated properties database	2014 - 2017	Ongoing	Medium	1-3	All Hazards	GEMA	GEMA	HMA	4.5	Planning & Regulation
59	Develop breach zone studies to mitigate potential loss of life in the event of dam failure	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GSWCC	GSWCC	NRCS	New	Planning & Regulation
60	Improve statewide Digital Elevation Models	2014 - 2017	Ongoing	High	1-3	All Hazards	USGS	DNR	USGS	4.9	Planning & Regulation
61	Invesigate mitigation grant opportunities with Department of Agriculture	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	HMA & Agency Budget	New	Planning & Regulation
62	Develop Local Capability Matrix for next state strategy update	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	HMA & Agency Budget	New	Planning & Regulation
63	Prevention of the installation of structures (i.e. houses) within the breach zone of flood control dams will be dependent on the willingness of local government entities to zone these areas	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GSWCC	GSWCC	NRCS	New	Planning & Regulation
64	The Commission will continue to work closely with the Districts and the NRCS in the preparation of breach zone studies necessary for development of EAPs	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GSWCC	GSWCC	NRCS	New	Planning & Regulation
65	Establish a procedure for District personnel to work with county EMGs in practice drills or preparedness during a dam failure simulation	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GSWCC	GSWCC	NRCS	New	Planning & Regulation
66	Seek funding that will allow the modification of existing NRCS constructed flood control dams in order to comply with state safe dam criteria for high hazard dams	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GSWCC	GSWCC	NRCS	New	Planning & Regulation
67	Plot all financial institution locations on a map to determine the probability and impact of various hazards that they may face	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	DBF	DBF	FDIC	New	Planning & Regulation
68	Explore the possibility of establishing some sort of protocol/credentialing system with GEMA to allow our Commissioner or Senior Deputy Commissioner to be able to quickly get a re-entry pass in the event that the Department or a financial institution needs to get to their data center and/or critical documents	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	DBF	DBF	FDIC	New	Planning & Regulation
69	Review and updating annually the Department of Transportation Hurricane Plans, Snow and Ice Plans and ensuring that emergency response personnel are properly trained to ensure the Department is NIMS compliant	2014 - 2017	Ongoing	High	1 - 3	All Hazards	DOT	DOT	FDOT	New	Planning & Regulation

Table 3.6 (d) Mitigation Action Table

2014 MITIGATION ACTIONS											
Item #	Mitigation Actions	Timeline	Status	Priority	State Goal	Hazard	Lead Agency	Support Agency	Resources	Previous Item #	FEMA Category
70	Schedule and conduct dry run exercises on contra-flow and snow and ice operations annually	2014 - 2017	Ongoing	High	1 - 3	All Hazards	DOT	DOT	FDOT	New	Planning & Regulation
71	Continue to evaluate and update current plans and continues to research any additional resources that may be available to improve DOT's role and response to any hazard that may arise	2014 - 2017	Ongoing	High	1 - 3	All Hazards	DOT	DOT	FDOT	New	Planning & Regulation
72	The Archives will provide training on disaster preparedness to local governments and other not-for-profit cultural organizations in Georgia	2014 - 2017	Ongoing	High	1 - 3	All Hazards	SOS	SOS	IMLS	New	Planning & Regulation
73	The Archives will collect GIS information for all collection holding organizations in Georgia in a database to determine their level of emergency preparedness	2014 - 2017	Ongoing	High	1 - 3	All Hazards	SOS	SOS	IMLS	New	Planning & Regulation
74	Issue and get approval for a statewide contract for document recovery services to ensure that local governments and state agencies contract with the most qualified vendors for document restoration after a disaster	2014 - 2017	Ongoing	High	1 - 3	All Hazards	SOS	SOS	IMLS	New	Planning & Regulation
75	To expand the current Georgia Archives emergency plan to include provisions for business continuity and for water conservation	2014 - 2017	Ongoing	High	1 - 3	All Hazards	SOS	SOS	IMLS	New	Planning & Regulation
76	Integrate hazard mitigation into other state and local processes such as THIRA, Long-Term Recovery Plan, local comprohensive plans, CWPPs, and capital improvement plans	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	DCA, GFC, Local Communities	HMA & Agency Budget	New	Planning & Regulation
77	DCA will conduct training building inspector workshops on the disaster resilient building codes	2014 - 2017	Ongoing	High	1 - 3	All Hazards	DCA	DCA	Agency Budget	2.8	Planning & Regulation
78	Require communities to remain in good standing in the NFIP to be eligible for hazard mitigation funding, as well as continue to give mitigation funding priority to CRS communities	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	HMA & Agency Budget	2.6	Planning and Regulation
79	Chatham and Glynn Counties to team up with GPA and DOAS to develop a maximum loss study in the event of various levels of cyclonic events	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GPA	DOAS	Agency Budget	New	Structure & Infrastructure
80	Update Hurricane Procedure Manual and Preparedness Guide for the Georgia Port Authority	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GPA	GPA	HMA & Agency Budget	New	Structure & Infrastructure
81	The Georgia Port Authority will participate in the development of Coastal County Hazard Mitigation Plan updates	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GPA	GPA	HMA & Agency Budget	New	Planning and Regulation
82	Develop private weather center for the Georgia Port Authority, staffed with a meteorologist	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GPA	GPA	Agency Budget	New	Structure & Infrastructure
83	The Georgia Port Authority has begun the procedure of stacking containers three high and tying the ends together to prevent property damage	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GPA	GPA	Agency Budget	New	Structure & Infrastructure
84	Formulate policy to have saferooms placed in all new university building	2014 - 2017	Ongoing	High	1 - 3	All Hazards	BOR	GBA	Agency Budget	New	Structure & Infrastructure
85	Establish policy to not develop any high profile buildings due to wind hazards	2014 - 2017	Ongoing	High	1 - 3	All Hazards	BOR	BOR	Agency Budget	New	Structure & Infrastructure
86	Develop of a university system wide communications plan	2014 - 2017	Ongoing	High	1 - 3	All Hazards	BOR	TBA	Agency Budget	New	Structure & Infrastructure
87	Develop Emergency Planning Group to plan for all hazards facing the university system	2014 - 2017	Ongoing	High	1 - 3	All Hazards	BOR	BOR	Agency Budget	New	Structure & Infrastructure

Table 3.6 (e) Mitigation Action Table

2014 MITIGATION ACTIONS											
Item #	Mitigation Actions	Timeline	Status	Priority	State Goal	Hazard	Lead Agency	Support Agency	Resources	Previous Item #	FEMA Category
88	Backup all IT systems in multiple locations throughout the state	2014 - 2017	Ongoing	High	1 - 3	All Hazards	BOR	TBA	Agency Budget	New	Structure & Infrastructure
89	Increase hazard vulnerability identification training throughout the university system	2014 - 2017	Ongoing	High	1 - 3	All Hazards	BOR	GEMA	Agency Budget	New	Structure & Infrastructure
90	Complete DRU plans for remaining 12 universities	2014 - 2017	Ongoing	High	1 - 3	All Hazards	BOR	GEMA	Agency Budget	New	Structure & Infrastructure
91	Assist local communities with eligible acquisition/elevation, floodproofing, and storm water projects	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	HMA & Agency Budget	New	Structure & Infrastructure
92	Promote the development of safe areas in public and private schools	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	BOR, DOE & Local Communities	HMA & Agency Budget	3.10	Structure & Infrastructure
93	Expand the use of safe rooms throughout Georgia communities	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA & GFC	HMA & Agency Budget	3.10	Structure & Infrastructure
94	Identify state assets at highest risk and list appropriate mitigation actions to reduce these risk and identify opportunities for structural protections (ie. safe rooms) in buildings	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	HMA & Agency Budget	New	Structure & Infrastructure
95	Coordinate with local emergency management agencies to predesignate safe areas for at-risk population	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	EMPG & Agency Budget	New	Structure & Infrastructure
96	Rebuild Dade County Georgia Forrestry Office in Trenton, GA destroyed by tornados in 2011 to higher building standards to withstand high winds	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GFC	GBA	Agency Budget	New	Structure & Infrastructure
97	Purchase 6 Masficccutters (Brush Cutters) to mitigate underbrush and reduce fuel loads	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GFC	GEMA	Agency Budget	New	Structure & Infrastructure
98	Build future buildings to withstand high winds and other hazards	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GFC	GBA	Agency Budget	New	Structure & Infrastructure
99	Install generator to keep electricity available to the server in the Macon office (Drybranch)	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GFC	GFC	Agency Budget	New	Structure & Infrastructure
100	As a part of DCA's ongoing Disaster Recovery/Business Continuity planning efforts, they plan to set up a Secondary Site in Eastman, GA with back up servers, a back up HVAC system, and a back up generator to prepare for tragic events affecting the City of Atlanta.	2014 - 2017	Ongoing	High	1 - 3	All Hazards	DCA	DCA	Agency Budget	New	Structure & Infrastructure
101	Identify historic sites that may be vulnerable to natural hazards	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GEMA	SHPO	HMA & Agency Budget	New	Natural & Cultural Protection
102	Ensure there are no adverse effects of any proposed mitigative projects on Georgia's natural resources and/or threatened or endangered species	2014 - 2017	Ongoing	Low	1 - 3	All Hazards	GEMA	FEMA, US Fish Wildlife	HMA & Agency Budget	New	Natural & Cultural Protection
103	Educate and promote the prevention of development in places such as flood plains, steep ravines, lands with underground caves, through news letters and workshops	2014 - 2017	Ongoing	Low	1 - 3	All Hazards	GEMA	DCA	HMA & Agency Budget	New	Natural & Cultural Protection
104	Minimize damage to natural resources through the use of and compliance with greenspace, stream buffers, zoning ordinances as actions to protect Georgia communities	2014 - 2017	Ongoing	Low	1 - 3	All Hazards	DNR	GEMA	HMA & Agency Budget	New	Natural & Cultural Protection

Table 3.6 (f) Mitigation Action Table

2014 MITIGATION ACTIONS											
Item #	Mitigation Actions	Timeline	Status	Priority	State Goal	Hazard	Lead Agency	Support Agency	Resources	Previous Item #	FEMA Category
105	Create state wide map layer that identifies important natural and cultural resources	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	DNR	GEMA	Agency Budget	New	Natural & Cultural Protection
106	Develop a list of public and private sector incentives such as CRS & NFIP, that encourage the implementation of hazard mitigation measures for publication on GEMA's website.	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GEMA	GEMA	HMA, Agency Budget	1.5	Public Awareness
107	Support the use of state of the art warning technology and local warning projects with available initiative funds	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GEMA	GEMA	HMA, Agency Budget	3.1 & 3.2	Public Awareness
108	Expand NOAA weather alert system by applying for grants to distribute radios to local communities	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GEMA	Local Communities	HMA, Agency Budget	1.8	Public Awareness
109	Support the StormReady Program in Georgia in partnership with the National Weather Service (NWS)	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GEMA	NWS	Agency Budget	2.2	Public Awareness
110	Determine percentage of population coverage by current alert systems	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GEMA	GEMA	HMA, Agency Budget	New	Public Awareness
111	Promote the increase in the number of StormReady counties from the current number of 77 as of 10/2013	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GEMA	GEMA	HMA, Agency Budget	New	Public Awareness
112	Promote and share Mitigation Ideas Guide (Jan 2013) with local communities and planners	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	FEMA	HMA, Agency Budget	New	Public Awareness
113	Make Georgia hazard data available on GEMA webpage	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	HMA, Agency Budget	New	Public Awareness
114	Develop webinars and workshops for local communitees to increase public awareness of disaster risks and mitigation actions that protect life and decrease property damages	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GEMA	GEMA	HMA, Agency Budget	2.1	Public Awareness
115	Conduct post-disaster workshops for affected local communities	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	NRCS	HMA, Agency Budget	New	Public Awareness
116	Share mitigation project/plan success stories via media such as websites and newsletters	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GEMA	GEMA	HMA, Agency Budget	2.1	Public Awareness
117	Develop flood information outreach resources, such as fact sheets and web pages that summarize flood hydrology for emergency managers and planners	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	DNR	FEMA	Agency Budget	New	Public Awareness
118	Share and promote stream gauge historic crests database to local communities	2014 - 2017	Ongoing	High	1 - 3	Flood	USGS	GEMA & NWS	HMA, Agency Budget	New	Public Awareness
119	Increase the number of stream gauges in Georgia	2014 - 2017	Ongoing	High	1 - 3	Flood	USGS	GEMA	HMA, Agency Budget	New	Public Awareness
120	Develop workshops and webinars to facilitate the update of the state plan risk assessment	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	FEMA	HMA, Agency Budget	New	Public Awareness

Table 3.6 (g) Mitigation Action Table

2014 MITIGATION ACTIONS											
Item #	Mitigation Actions	Timeline	Status	Priority	State Goal	Hazard	Lead Agency	Support Agency	Resources	Previous Item #	FEMA Category
121	Increase local participation in flood hazard mitigation programs such as NFIP and CRS, through workshops and posted information on GEMA and DNR websites	2014 - 2017	Ongoing	High	1 - 3	Flood	GEMA	DNR & FEMA	HMA, Agency Budget	2.5	Public Awareness
122	Increase local participation in hazard mitigation programs such as Storm Ready Communities, through workshops and posted information on GEMA website	2014 - 2017	Ongoing	High	1 - 3	All Hazards	GEMA	FEMA & NWS	HMA, Agency Budget	New	Public Awareness
123	Increase local participation in fire hazard mitigation programs such as FireWise, through workshops and posted information on GEMA and GFC websites	2014 - 2017	Ongoing	High	1 - 3	Wildfire	GFC	GEMA	Agency Budget	New	Public Awareness
124	Distribute information via brochures, websites, webinars and workshops on community and household saferooms to Georgia communities	2014 - 2017	Ongoing	Medium	1 - 3	All Hazards	GEMA	GEMA	Agency Budget	3.10	Public Awareness
125	Meet or exceed 2012 media impressions for Ready Georgia (74 million)	2013 - 2014	Ongoing	High	1 - 3	All Hazards	GEMA PIO	GEMA	Agency Budget	New	Public Awareness
126	Increase Ready profile registrations by 50 percent over 2012 goal	2013 - 2014	Ongoing	High	1 - 3	All Hazards	GEMA PIO	GEMA	Agency Budget	New	Public Awareness
127	Meet or exceed 2012 levels of website traffic Ready Georgia App – 58,000 website visits	2013 - 2014	Ongoing	High	1 - 3	All Hazards	GEMA PIO	GEMA	Agency Budget	New	Public Awareness
128	Meet or exceed 2012 mobile app downloads for Ready Georgia App (14,477)	2013 - 2014	Ongoing	High	1 - 3	All Hazards	GEMA PIO	GEMA	Agency Budget	New	Public Awareness
129	Facebook Fans – Increase total number of fans by 20 percent over 2011 (2,245) – 2,700	2013 - 2014	Ongoing	High	1 - 3	All Hazards	GEMA PIO	GEMA	Agency Budget	New	Public Awareness
130	YouTube – Meet or exceed 2012 views for Ready Georgia App (4,771)	2013 - 2014	Ongoing	High	1 - 3	All Hazards	GEMA PIO	GEMA	Agency Budget	New	Public Awareness
131	Blog/Podcast – Meet or exceed 2012 traffic for Ready Georgia App (10,622 visits)	2013 - 2014	Ongoing	High	1 - 3	All Hazards	GEMA PIO	GEMA	Agency Budget	New	Public Awareness
132	Create new "Southwrap" web-based program to display Southern Wildfire Risk Assessment data electronically	2013 - 2014	Ongoing	High	1 - 3	All Hazards	GFC	GFC	Agency Budget	New	Public Awareness
133	Support the Severe Weather Awareness Week and the Prescribed Fire Awareness Week campaigns in partnership with thw Office of the Governor	2013 - 2014	Ongoing	High	1 - 3	All Hazards	GEMA	GEMA	Agency Budget	New	Public Awareness
134	Provide technical assistance to local governments in order to improve the enforcement of floodplain management requirements	2013 - 2014	Ongoing	High	1 - 3	All Hazards	DNR	GEMA	Agency Budget	New	Public Awareness
135	Increase community awareness of the negative impacts of repetitive loss properties and the benefits of mitigation actions	2013 - 2014	Ongoing	High	1 - 3	All Hazards	GEMA	DNR	HMA, Agency Budget	New	Public Awareness
136	Lead and direct the Georgia Silver Jackets Team to promote flood risk management programs throughout the state.	2014 - 2017	Ongoing	High	1 - 3	Flood	DNR, GEMA	USGS, NWS, USACE, FEMA, EPA, NRCS, FHA, USEDA	HMA, Agency Budgets	New	Planning & Regulation
137	Promote and support mitigation allied programs, such as the Community Rating System (CRS) and Storm Ready by giving application incentive points for communities applying for HMA assistance.	2014 - 2017	Ongoing	Low	1 - 3	All Hazards	GEMA	GEMA	Agency Budget	New	Planning & Regulation

Table 3.6 (h) Mitigation Action Table

2014 MITIGATION ACTIONS											
Item #	Mitigation Actions	Timeline	Status	Priority	State Goal	Hazard	Lead Agency	Support Agency	Resources	Previous Item #	FEMA Category
138	Promote safe room construction at all levels i.e. (individual residents, local governments and local school districts, and private industry).	2014 - 2017	Ongoing	Low	1 - 3	All Hazards	GEMA	GEMA	Agency Budget	New	Planning & Regulation
139	Continue education of local emergency managers on various mitigation activities and funding opportunities	2014 - 2017	Ongoing	Low	1 - 3	All Hazards	GEMA	GEMA	Agency Budget	New	Planning & Regulation
140	Promote mitigation activities on properties that are located in areas vulnerable to hazards	2014 - 2017	Ongoing	Low	1 - 3	All Hazards	GEMA	GEMA	Agency Budget	New	Planning & Regulation
141	Promote structural retrofits for structures that are vulnerable to wind events	2014 - 2017	Ongoing	Low	1 - 3	All Hazards	GEMA	GEMA	Agency Budget	New	Planning & Regulation
142	Develop working relationship with local floodplain managers to educate them on the FEMA's Flood Mitigation Assistance program	2014 - 2017	Ongoing	Low	1 - 3	All Hazards	GEMA	GEMA	Agency Budget	New	Planning & Regulation
143	Identify properties that might be eligible for cost effective mitigation measures and coordinate results with local governments	2014 - 2017	Ongoing	Low	1 - 3	All Hazards	GEMA	GEMA	Agency Budget	New	Planning & Regulation

Table 3.6 (i) Mitigation Action Table

COMBINED OR DELETED MITIGATION ACTIONS											
Item #	Mitigation Actions	Timeline	Status	Priority	State Goal	Hazard	Lead Agency	Support Agency	Resources	Previous Item #	FEMA Category
1	Provide technical assistance to state agencies to incorporate hazard mitigation measures into their own plans	0	Deleted	0	0	0	0	0	0	2.9	Planning & Regulation
2	Support the coordination of hazard mitigation planning and project initiatives with various regional agencies throughout the state of Georgia	0	Deleted	0	0	0	0	0	0	2.11	Planning & Regulation
3	Develop and update plans, prepare for, respond to and recover from disasters, acts of terrorism and special events to enhance the protection of Georgia citizens and visitors	0	Deleted	0	0	0	0	0	0	3.3	Planning & Regulation
4	Streamline the delivery of HMA to eligible recipients	0	Deleted	0	0	0	0	0	0	3.4	Planning & Regulation
5	Work with FEMA on MOA's to shorten HMGP application and approval timelines	0	Deleted	0	0	0	0	0	0	3.5	Planning & Regulation
6	Give prority to projects identified in local mitigation plans that minimize damages to critical facilites	0	Combined	0	0	0	0	0	0	3.8	Planning & Regulation
7	Support cost-effective mitigation activities that minimize damages to state owned or operated assets	0	Combined	0	0	0	0	0	0	3.9	Planning & Regulation
8	Support implementation of mitigation strategies identified in the Georgia Drought Management Plan	0	Deleted	0	0	0	0	0	0	3.11	Planning & Regulation
9	Conduct an annual review of the effectiveness of mitigation programs and recommend courses of action of mitigation programs	0	Deleted	0	0	0	0	0	0	4.1	Planning & Regulation
10	Survey our mitigation customers on an annual basis to determine effectiveness of mitigation programs	0	Deleted	0	0	0	0	0	0	4.2	Planning & Regulation
11	Improve critical facility and hazard history data collection and analysis at local and state levels	0	Deleted	0	0	0	0	0	0	4.3	Planning & Regulation
12	Work with ITOS on data collection tools	0	Deleted	0	0	0	0	0	0	4.4	Planning & Regulation
13	Coordinate with DNR on flood mapping, map modernization and Safe Dam programs to ensure local government mapping and data needs areas properly addressed	0	Deleted	0	0	0	0	0	0	4.1	Planning & Regulation
14	Research new and improved data resources to integrate into the state mitigation strategy and local planning efforts	0	Deleted	0	0	0	0	0	0	4.11	Planning & Regulation
15	Work with NWS, USGS, DNR and other agencies to increase effective warning capabilities	0	Deleted	0	0	0	0	0	0	1.8	Public Awareness

Table 3.7 Combined or Deleted Mitigation Action Table

COMPLETED MITIGATION ACTIONS											
Item #	Mitigation Actions	Timeline	Status	Priority	State Goal	Hazard	Lead Agency	Support Agency	Resources	Previous Item #	FEMA Category
1	Integrate Natural Hazards and Disaster Management into Georgia Comprehensive Plans and Regional Plans	2014 - 2017	Completed	Medium	1 - 3	All Hazards	DCA	GEMA	HMA	New	Planning & Regulation
2	Develop the Georgia HAZUS Pilot Project Prototype Workshops	2014 - 2017	Completed	High	1 - 3	All Hazards	DCA	FEMA, GEMA	Agency Budget	New	Planning & Regulation
3	Develop Disaster Resilience Building Codes to address tornado, flood, and wind hazards	2014 - 2017	Completed	High	1 - 3	All Hazards	DCA	NGO, DNR, GEMA, HUD, GMA, ACCG	Agency Budget	New	Planning & Regulation

Table 3.8 Completed Mitigation Action Table

3.3 STATE CAPABILITY ASSESSMENT

The state capability assessment includes evaluation of Georgia's pre- and post-disaster hazard management including policies, programs, and funding. The first subsection concerns the role of various state agencies in relation to pre- and post-disaster hazard management within Georgia. This includes mitigation-related policies, programs, and funding availability. Following the discussion of state agency roles within Georgia is a discussion of federal agency roles, including policies, programs, and funding opportunities.

Contacts within the Georgia General Assembly initiate legislation that is of direct interest to the agency while also tracking and supporting legislation that is of interest to the public safety, homeland security, and emergency management communities. GEMA also works closely with other agencies and organizations such as the Association County Commissioners of Georgia, the Georgia Municipal Association, the Georgia Fire Chiefs Association, the Georgia Sheriffs' Association, the Georgia Police Chiefs Association, and the Departments of Public Safety and Natural Resources to support legislation of common interest.

The Official Code of Georgia Annotated or OCGA is the compendium of all laws enacted in Georgia. Within the OCGA lie numerous legislative rules supporting mitigation. The following legislation relates to hazard mitigation in the State of Georgia:

- Georgia Coastal Management Act, OCGA 12-5-320
- Georgia Coastal Marshland Protection Act, 12-5-280
- Georgia River Corridor Protection Act 12-2-1
- Georgia Shore Protection Act 2-5-230
- Georgia Safe Dams Act of 1978, OCGA 12-5-370 to 385
- Georgia Planning Act of 1989, OCGA 12-2-8
- Erosion and Sedimentation Act, OCGA 12-7-1
- Georgia Emergency Management Act of 1981, as amended, OCGA 38-3-1
- Soil and Water Conservation Districts Law, OCGA 2-6-20 & 2-6-27
- Georgia Environmental Policy Act, OCGA 12-16-1
- Metropolitan North Georgia Water Planning District Act, OCGA 12-5-70
- Georgia Housing Codes, OCGA 8-2-20
- The Uniform Standards Code for Manufactured Homes Act and Installation of Manufactured and Mobile Homes, OCGA 8-2-130 and 8-2-160
- Georgia Records Act, OCGA 50-18-93
- Georgia Forest Fire Protection Act, OCGA 12-6-80 to 12-6-93
  Georgia Prescribed Burning Act, OCGA 12-6-145

As stated, the legislation listed above relates to hazard mitigation in the State of Georgia. The first seven of the legislative acts listed were previously discussed in Chapter 1's section concerning program integration. Several of the remaining acts are discussed below under the corresponding state or federal agency and under the state capability summary. There has been no legislation or regulations passed by the Georgia General Assembly since the approval of the last Hazard Mitigation Plan

in March of 2011.

Another example of state capability as it relates to the Georgia Emergency Management Agency is the use of the Georgia Mitigation Information System (GMIS). GEMA contracts with the University of Georgia's Information Technology Outreach Services (ITOS) in developing an online data entry and display system for local planning efforts that evolved into the GMIS. The web-based GMIS provides easy access and maintenance without requiring extensive knowledge of GIS applications and software. As an online database, GMIS only allows authorized access to the application through a login process. As an authorized user, one may manipulate critical facility data (based on access level), view maps, and download data and reports for analysis. In order to enter critical facility data, the authorized user utilizes a web-based form that includes drop-down boxes and other methods of validating user-input, which minimizes training and improves data quality. As new data are entered, the database updates to provide the most recent information available. In addition to critical facilities, other layers are available within the GMIS including transportation corridors, political boundaries, hydrology, or hurricane surge zones.

3.3.1 *State Policies and Programs*

Table 3.9, below identifies state programs and policies related to mitigation. Each program was evaluated to determine relevance to mitigation and if it affect Repetitive Loss and Severe Repetitive Loss properties.

State Agencies			
Department	**Program**	**Description**	**Affected Repetitive Flood Loss / SRL**
Georgia Department of Natural Resources	The Georgia Community Greenspace Program	The Georgia Community Greenspace Program establishes a framework in which developed and rapidly developing counties and their municipalities can preserve community greenspace. This bill promotes the adoption of policies and rules that enable the preservation of at least 20% of county or municipal land area as connected and open greenspace usable for informal recreation and natural resource protection.	X
	The Georgia Land Conservation Act	The Georgia Land Conservation Act, initiative to encourage the long-term conservation and protection of the state's natural resources. The legislation establishes the Georgia Land Conservation Trust Fund and the Georgia Land Conservation Revolving Loan Fund that provides up to $100 million in state, federal and private funding to local governments and the Georgia DNR for the purchase of conservation lands. The responsibilities of the Georgia DNR under this legislation include establishing a state land geographic information system database for conservation activities and providing technical support to local governments.	
	The River Basin Management Planning Program	The Environmental Protection Division (EPD) of Georgia DNR implements a river basin management planning approach for the 14 major river basins in Georgia. A written plan is required and updated on a five-year cycle to coincide with National Pollutant Discharge Elimination (NPDES) permitting.	
	The Coastal Resources Division (CRD)	The Coastal Resources Division (CRD) implements provisions of the Coastal Marshlands Protection Act of 1970, the Shore Protection Act, the Revocable Licenses Program, the Coastal Zone Management Act and others. These existing authorities provide protection for critical marshes, water bottoms, beaches, sand dunes, and submerged lands. Members of the CRD staff are also available to assist hazard response and damage assessments. Also available for disaster resilience projects is the Coastal Incentive Grants.	

Table 3.9 (a) Mitigation Related State Programs

State Agencies			
Department	**Program**	**Description**	**Affected Repetitive Flood Loss / SRL**
Georgia Department of Community Affairs	The Federal Community Development Block Grant Program	Georgia's Department of Community Affairs (DCA) has the ability to fund hazard mitigation projects (with appropriate federal waivers and authorizations) using the Federal Community Development Block grant program. DCA administers portions of these grants to repair public facilities, to repair public and private housing, to provide relocation assistance for displaced households, to assist in business loans to support threatened jobs, and to provide engineering and technical assistance to local governments.	X
	Immediate Threat and Danger (ITD) Program	The DCA administers the Immediate Threat and Danger (ITD) program available through the Community Development Block Grant Program of Housing and Urban Development (HUD). These grants (usually limited to $20,000) are available to qualifying local governments with a 50% provision of funding for activities designed to meet community development needs.	
	GA Planning Act	With the passing of the 1989 Georgia Planning Act, DCA created the State Comprehensive and Coordinated Planning Program to encourage effective growth management by local governments throughout the state. This program includes the development and updating of minimum standards for local and regional planning and provides technical assistance to local governments and Regional Commissions to carry out these standards. Many opportunities exist with this program for local government hazard mitigation programs or measures in connection with the state-required preparation and implementation of local comprehensive plans. This comprehensive planning approach is especially applicable to floodplain management and construction standards (mitigation approaches).	
	Uniform Codes Act	The Construction Codes and Industrialized Buildings section of DCA maintains and updates Georgia's state minimum standard codes for construction. These codes are designed to help protect the life, health, and property of all Georgians from faulty design and unsafe construction. The Uniform codes Act is codified in Chapter 2 of Title 8 of The Official Code of Georgia Annotated. O.C.G.A. Section 8-2-20(9)(B) identifies the ten "state minimum standard codes". Each of these separate codes typically consists of a base code and a set of state amendments to the base code. Georgia law further dictates that eight of these codes are mandatory (effective throughout the entire state of Georgia regardless of whether a county or municipality adopts them) or permissive (effective only in those counties and municipalities that choose to adopt the permissive code through local ordinance). DCA periodically reviews, amends, and updates the state minimum standard code.	
	Office of Mapping and Decision Support Systems	Within DCA exists the Office of Mapping and Decision Support Systems that provides support and training to local governments for comprehensive planning activities. They also provide hazard mitigation planning assistance to local governments using FEMA's HAZUS-MH risk assessment software with which they can prepare a detailed parcel-based building-level risk assessment for floods and hurricanes. Contact GIS@dca.ga.gov for free assistance.	
	The Local Development Fund	A state-appropriated grant program that provides matching grants to fund community improvement activities	

Table 3.9 (b) Mitigation Related State Programs

State Agencies			
Department	**Program**	**Description**	**Affected Repetitive Flood Loss / SRL**
Georgia Emergency Management Agency	The Public Assistance Grant Program	Authorizes funding for cost-effective hazard mitigation measures on facilities damaged by disaster events	
	PDM	The PDM program provides funds to states, territories, Indian tribal governments, and communities 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	X
	HMGP	The Hazard Mitigation Grant Program (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.	X
	The Flood Mitigation Assistance Program	Created as part of the National Flood Insurance Reform Act of 1994, 42 U.S.C. 4101, attempts to reduce or eliminate claims under the NFIP by assisting states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to structures insurable by NFIP. Elements of Repetive Flood Claims and Severe Repetitive Loss programs have been integrated into the FMA program.	X
The Georgia Forestry Commission		Supports many mitigation and preparedness activities through the Forest Protection Programs to reduce the number of wildfires and acres burned. These programs include Pre-Suppression Firebreak Plowing, Burning Assistance, and Fire Prevention and Firewise, Rural Fire Defense Program, Volunteer Fire Assistance Grants, and Burn Permit System.	
	Southern Wildfire Risk Assessment (SWRA)	The SWRA is a regional project completed by the 13 southern states included in the USDA-Forest Service Region 8. It is a GIS project, illustrated in an Arc View product that documents and maps forest fuels, historical wildfire occurrence, values at risk from wildfires, communities at risk, wildfire susceptibility index, and levels of concern for damage from wildfires. The program also allows for illustration of mitigation treatments and the corresponding affect on wildfire susceptibility and level of concern. Working with GEMA, GFC is providing SWRA information to be included in county EMA plans statewide.	
	Community Wildfire Protection Plans (CWPP)	A community wildfire protection plan outlines wildfire history and risk (SWRA), lists preparedness resources available for wildfire suppression, provides maps to illustrate the wildfire situation, and makes suggestions on how to prepare for, respond to and mitigate wildfires. The Georgia Forestry Commission will facilitate CWPP's on a county level for each Georgia County. Appropriate state, county, and community leaders will work in teams to provide wildfire planning that has buy in from all. The SWRA will be utilized not only to identify risk for CWPP's but will be used to help set priorities for getting started to insure that high risk counties are priority. GEMA and local fire departments will be important partners in completion of CWPP's for the entire state. Georgia has currently 138 completed CWPPs and will continue to focus on completing each county focusing this year on the metro counties of Atlanta, Savannah, Columbus, Macon, and Augusta. http://www.gfc.state.ga.us/forest-fire/CWPP/index.cfm	

Table 3.9 (c) Mitigation Related State Programs

State Agencies			
Department	**Program**	**Description**	**Affected Repetitive Flood Loss / SRL**
Georgia Forestry Commission	Firewise Communities	The Georgia Forestry Commission embraces the Firewise Communities USA concept and employees one full time position to conduct Firewise workshops and encourage communities to become nationally recognized. There are currently 38 nationally recognized Firewise Communities in Georgia with several nearing recognition. Communities are recognized for developing wildfire mitigation teams, funding Firewise practices, completing mitigation projects, and promoting Firewise practices. National Fire Plan grants are used to fund this program. Communities showing special interest may receive small grants for projects. The Georgia Forestry Commission currently has a special focus project to address Northeast and Southeast Georgia whom have the greatest numbers of wildfires and fast	
	Wildfire Prevention	Wildfire Prevention efforts are an integral part of Georgia Forestry Commission routine efforts. Approximately $250,000 is granted through National Fire Plan to the Georgia Forestry Commission for fire prevention efforts each year. Georgia Forestry Commission has a special project named “50 County Wildfire Prevention” that targets specific wildfire causes in Georgia’s top 50 wildfire occurrence counties. A scientific method for measuring success of this program compares reductions in the number of wildfires in this part of the state to reductions realized in the part of the state that is not served by this special program. Numbers of wildfires have been reduced 5% to 10% where $2,500.00 dollars have been applied to address prevention in individual counties. Georgia has just recently added 4 additional staff to battle current wildfire trends nationwide. These folks will assist the state program manager with outreach and miti-	
	Rural Fire Defense	Since 1975 the Rural Fire Defense program operated by the Georgia Forestry Commission has provided planning advice and firefighting equipment to rural fire departments across the state. Today there are some 1375 fire engines leased or on loan to 143 Georgia counties. The program currently provides about 25 fire apparatus, at cost, per year to fire departments. Signed agreements provide for cooperation between state and local efforts for community protection from wildfires. Recent additions to the program include provision of wildfire personal protective gear and specialized wildfire training allowing fire departments to participate more fully and safely in wildfire suppression.	
	Prescribed Burning	Georgia law, Georgia Prescribed Burning Act 12-6-145, makes provisions to protect prescribed burning as a forest management and wildfire mitigation tool and assigns Georgia Forestry Commission as the agency for promoting prescribed burning and certifying practitioners. Since 1992 nearly 2500 practitioners have received certification through the Georgia Prescribed Fire Manager Certification Program. Georgia law protects those who prescribe burn under this program by requiring that gross negligence be proven against any liability suits resulting from prescribed burning. Georgia’s governor proclaims Prescribed Fire Awareness Week the first full week in February each year. Nearly one million acres of Georgia forestland are treated with prescribed fire each year. In FY13 Georgia	

Table 3.9 (d) Mitigation Related State Programs

State Agencies			
Department	**Program**	**Description**	**Affected Repetitive Flood Loss / SRL**
Georgia Forestry Commission	Burn Authorizations	One of the most effective wilfire mitigation tools is the Georgia Burn Permit System. Enacted in 1988, Georgia code 12-6-90, requires a permit to be obtained from the Georgia Forestry Commission for most outdoor burning. This allows management of outdoor burning for wildfire control and for air quality concerns. Since outdoor burning is the number one cause of wildfires, the system allows for some control over wildfire occurrences, especially on the highest fire danger days. The GFC issues some 400,000 permits per year for leaf burning, brush pile burning, land clearing, and prescribed burning. Wildfire suppression costs are charged to Georgians who have escaped fires when burning illegally, without a permit. Although the GFC law enforcement program is very small, burning without a permit is a misdemeanor, punishable by up to $1,000 fine or 1 year imprisonment.	
	Fire Weather Forecasting	In support of wildfire suppression readiness planning, burn permitting, prescribed burning and other forestry activities, the Georgia Forestry Commission employs a full time meteorologist who produces fire weather forecasts and manages the National Fire Danger Rating System for Georgia. Twice a day forecasts are posted on the Georgia Forestry Commission public internet site. This site includes specialized fire weather information that is not produced at this scale by the National Weather Service. Emergency managers across the state may utilize the fire weather forecast for management of other disasters.	
	Mechanical Fuel Treatment	The Georgia Forestry Commission is offering a new service that efficiently and economically clears understory vegetation. Mechanical fuel treatment machines are now available in GFC districts statewide and are ideal for use in areas that are unsuited for traditional prescribed burning, such as land near gas or power lines, in the wildland urban interface, on rights of way or in other smoke-sensitive areas. The program consists of 6 Type 6 engines and 6 Mechanical Fuel Treatment Machines (Masticators). The specialized vehicles have an 88" wide front mount/triple rotary deck that mulches underbrush and trees up to four inches in diameter. The machines are capable of clearing up to two acres per hour. To find out more about the benefits of mechanical fuel treatment service, visit GaTrees.org	
	Urban Forestry Strike Team	Arborists can provide disaster planning assistance to communities, risk assessment, and FEMA debris identification following storms. Risk assessment helps communities identify trees that are an unacceptable risk, and trees suitable for retention and management during disaster recovery.	
The Georgia Department of Transportation		The Georgia Department of Transportation (DOT) plans, constructs, maintains, and improves the state's road and bridge network; provides planning and financial support for other modes of transportation such as mass transit and airports; provides airport and air safety planning; and provides air travel to state departments. Georgia's DOT also provides administrative support to the State Tollway Authority and the Georgia Rail Passenger Authority. Since Hurricane Floyd in 1999, extensive evacuation planning has been completed by the state in response to the large influx of evacuees on the interstate system. When tropical systems threaten neighboring states, Georgia's DOT is prepared for potential influx of evacuees as well as the potential hazard events associated with the tropical system. Georgia DOT also plans and prepares for contra-flow interstates, including planning crossovers, ramp entrance closings, and regular flow exchanges. Georgia's DOT website provides a host of information concerning preparation for emergency evacuation including evacuation routes, emergency supply lists, emergency shelter locations, and contact information for the Georgia NaviGAtor Transportation Management Center.	

Table 3.9 (e) Mitigation Related State Programs

3.3.2 State Capability Related to Development

The information provided in the previous section details the State of Georgia's mitigation policies, programs, and funding in relation to specific state and federal agencies. These agencies include Georgia's Emergency Management Agency, Department of Natural Resources, Department of Community Affairs, Forestry Commission, and Department of Transportation and Federal Emergency Management Agency, Department of Defense Army Corps of Engineers, Natural Resource Conservation Service, Department of Transportation, Department of Agriculture, Small Business Administration, Housing and Urban Development, U.S. Geological Survey, Department of Commerce National Weather Service and National Oceanic and Atmospheric Administration, and National Park Service. The previous section also outlined hazard mitigation related legislation produced by the Georgia General Assembly that is found in the Official Code of Georgia Annotated.

Of the legislation listed, several policies relate to the development of hazard prone areas. These policies include the Georgia Planning Act of 1989, Coastal Management Act, Coastal Marshland Protection Act, Erosion and Sedimentation Act, River Corridor Protection Act, and Shore Protection Act. The specifics of each policy are described in Chapter 1's Program Integration Section. Table 3.10 lists information specifically regarding development in each policy.

Legislation	Policy Purpose	Methods	Administration
GA Planning Act of 1989	Encourage better growth management and smart growth	Local long-range comprehensive planning	Local governments must maintain designation of "Qualified" in order to remain eligible for assistance programs
GA Coastal Management Act	Encourage sustainable development and protection of coastal resources	GA DNR able to receive and disburse federal grant monies	Coastal Resources Division and GA DNR established as governing bodies for developing a coastal management program
GA Coastal Marshland Protection Act	Protect tidal wetlands	Limit certain activities and structures in marsh areas through permitting	Coastal Resources Division grants permits for activities in protected tidal wetlands.
GA Erosion and Sedimentation Act	Limit land-disturbing activities near state waters	Local adoption of comprehensive ordinances governing land-disturbing activities based on minimum requirements	GA DNR EPD and local governments administer ordinances' requirements for land-disturbing activities near state waters
GA River Corridor Protection Act	Protect river corridors	Major provisions include minimum vegetative buffers and local identification of river corridors in land use planning	GA DNR EPD administers the act's minimum standards to all rivers in GA with at least 400 ft^3/s average annual flow
GA Shore Protection Act	Protect and manage GA's shoreline features (sand-sharing system)	Limits certain activities and structures in sand—sharing system	Coastal Resources Division grants permits for activities and structures consistent with the GA Coastal Management Program

Table 3.10 Georgia Legislation Related to Development

The State of Georgia's policies regarding development in hazard prone areas specifically cover the areas prone to inland and coastal flooding hazards. These policies neglect to cover development in areas prone to other hazards such as wind and seismic hazards. However, the Georgia legislation does include building code standards that regulate the actual structure instead of the development of the area. These policies are discussed in the following section of this chapter that concerns local capabilities. Other Georgia legislation concerns wildfire management, however, the legislation does not address development in wildfire prone areas. Other hazards such as tornadoes, severe weather, winter storms, and drought are not addressed by development-regulating legislation due to the hazards' not being spatially definable. In other words, all areas of the State of Georgia could be considered prone to tornadoes, severe weather, winter storms, and drought; therefore, the general development policy (Georgia Planning Act of 1989) applies statewide. By including the statewide Planning Act of 1989 and additional legislation that addresses development in flooding-prone areas, the State of Georgia's policies related to development in hazard prone areas is effective and increases the state's hazard mitigation capabilities.

3.4 LOCAL CAPABILITY ASSESSMENT

The local capability assessment includes discussion of local policies governing building codes zoning and floodplain management that relate to hazard mitigation. This is followed by a discussion on the history and purpose of local mitigation planning, which increases local capability. Details of the current progress of local planning as well as the specific status of each Georgia County are further discussed in Chapter 4 of this document.

3.4.1 Local Mitigation Policies: Building Codes, Zoning, Floodplain Development Regulations and Mitigation Planning

Of the state legislation listed in previous sections, several policies relate to the construction standards or building codes enforced at the local level. The State provides guidance to the communities by offering model ordinances and available grant opportunities to communities interested in adopting hazard mitigation actions. These policies include Georgia's state minimum standard codes for construction (the Uniform Codes Act) and the Uniform Standards Code for Manufactured Homes and Installation of Manufactured and Mobile Homes Act. The State encourages local communities to formally adopt the latest Georgia State Minimum Codes to be uniformly applied and consistently enforced in the community. DCA updates these model codes whenever the latest International Codes are released to stay current with best practices.

Georgia's state minimum standard codes for construction are designed to help protect the life and property of citizens from faulty design and construction; unsafe, unsound, and unhealthy structures and conditions; and the financial hardship resulting from rebuilding after a hazard event. In other words, these codes require a minimum standard of construction which minimally mitigates certain hazards (i.e. high winds, severe thunderstorms, etc.). The Uniform Codes Act identifies the ten "state minimum standard codes" with each code typically consisting of a base code and a set of state amendments. Georgia law dictates that eight of the 10 codes are mandatory (applicable to all construction regardless of local enforcement) and two are permissive (only applicable if the local gov-

ernment chooses to adopt and enforce). The codes are as follows:

Mandatory Codes:

- Georgia State Minimum Standard Building Code (International Building Code with Georgia Amendments)
- Georgia State Minimum Standard One and Two Family Dwelling Code (International Residential Code for One and Two Family Dwellings with Georgia Amendments)
- Georgia State Minimum Standard Fire Code (International Fire Code with Georgia Amendments)
- Georgia State Minimum Standard Plumbing Code (International Plumbing Code with Georgia Amendments)
- Georgia State Minimum Standard Mechanical Code (International Mechanical Code with Georgia Amendments)
- Georgia State Minimum Standard Gas Code (International Fuel Gas Code with Georgia Amendments)
- Georgia State Minimum Standard Electrical Code (National Electrical Code with Georgia Amendments)
- Georgia State Minimum Standard Energy Code (International Energy Conservation Code with Georgia Supplements and Amendments)

Permissive Codes:

- International Property Maintenance Code
- International Existing Building Code

As previously noted, the building, one and two family dwelling, fire, plumbing, mechanical, gas, electrical and energy codes are mandatory codes. Essentially, Georgia law dictates that any structure built in the state must comply with the applicable mandatory codes regardless of the local government's decision to locally enforce. Though local governments do not adopt the mandatory codes, the local government must adopt administrative procedures in order to enforce the codes. However, the local government has the ability to choose which mandatory codes are enforced. The remaining codes, known as permissive codes, must be adopted by either ordinance or resolution by the local jurisdiction in order for the local government to enforce.

In order to properly administer and enforce the state minimum standard codes, local governments must adopt reasonable administrative provisions which should include procedural requirements for code enforcement, provisions for hearings and appeals, and other procedures necessary for the proper local administration and enforcement of the state minimum standard codes. The power to adopt these administrative procedures is set forth in OCGA Section 8-2-26(a)(1) and includes powers such as:

- Building and structure inspection ensuring code compliance;
- Inspector and personnel employment ensuring proper code enforcement;
- Permit issuance and related charges; and
- Contracting with other local governments for code enforcement.

Georgia's Department of Community Affairs (DCA) periodically reviews, amends, and updates the state minimum standard codes. If a local government chooses to enforce any of the codes, the latest edition and the amendments adopted by DCA must be used.

The Uniform Codes Act provides that local governments may adopt local amendments to the state minimum standard codes under certain conditions. In order to enforce the local amendment, DCA must review the proposal. Several requirements exist for local code amendment, which are as follows:

- The proposed local amendment requirement cannot be less stringent that the requirement in the state minimum standard code;
- The local requirement must be based on local climatic, geologic, topographic, or public safety factors;
- The legislative findings of the local governing body must identify the need for the more stringent requirement; and
- The local government must submit the proposed amendment to DCA at least 60 days prior to the proposed adoption of the amendment.

After the submittal of the proposed local amendment, DCA has 60 days in which to forward its recommendations to the local government. The recommendations are in favor of adoption, against adoption, or neutral with no comment. Following adoption by the local governing authority, copies of local amendments must be filed with DCA.

Figure 3.2 is a map produced by DCA that details Georgia communities' enforcement of construction codes as of 2010. As the map illustrates, 112 of Georgia's 159 counties issue permits and enforce the state minimum construction codes.

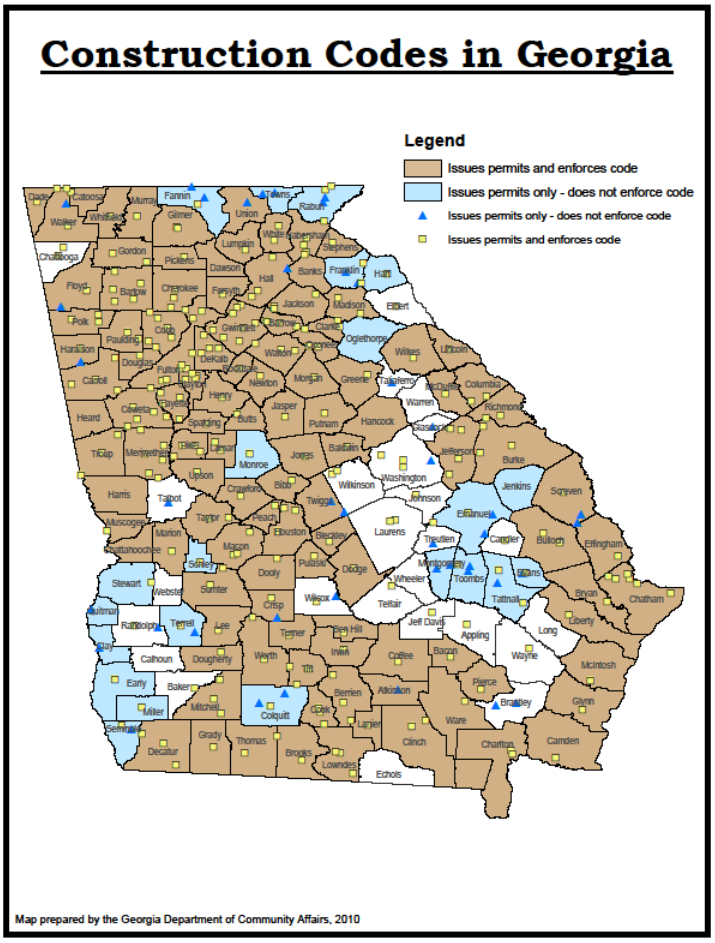


Figure 3.2

Theoretically, the primary purpose of zoning is to segregate incompatible land uses. Practically, zoning consists of locally-produced laws and ordinances that regulate development by dividing a community into zones that are regulated by development criteria. For example, zoning may regulate which activities are acceptable in a certain zone such as open space, residential, agricultural, commercial, or industrial. Zoning has the potential to inhibit inappropriate development in hazard-prone areas as well as designate certain areas for conservation, open space, and public use. Zoning laws vary immensely by jurisdiction and, in the State of Georgia, have no standard basis like the construction codes. En-

forcement of zoning ordinances can, at times and depending on the particular situation, be highly political. With that, a true statewide analysis of the effectiveness of zoning ordinances is impractical. Nevertheless, the potential is there for zoning ordinances to help protect the community from development in hazard prone areas.

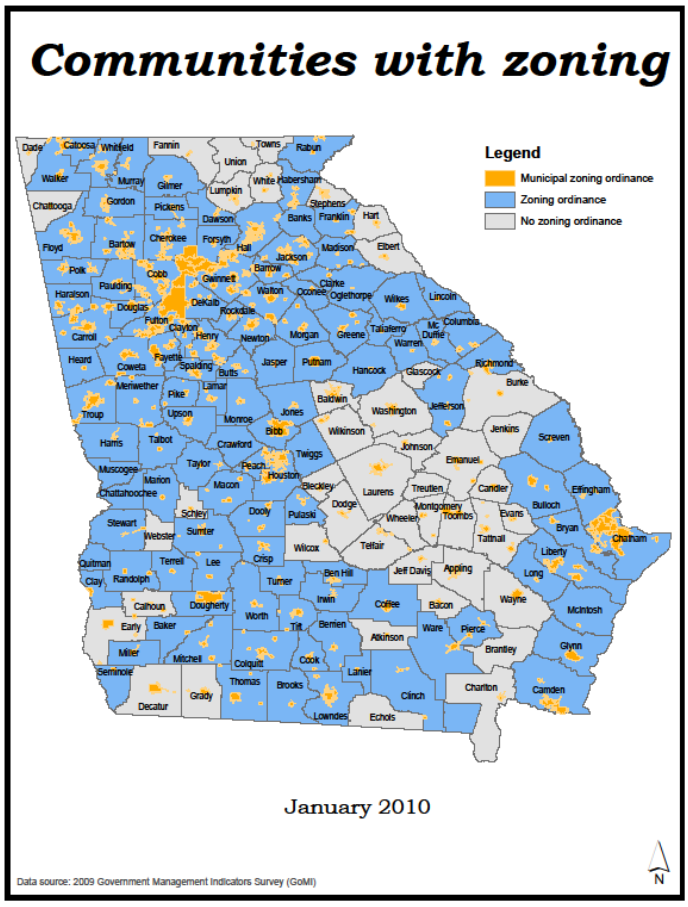


Figure 3.3

The DCA monitors the communities in Georgia that produce zoning ordinances. The status of Georgia communities in regards to zoning ordinances is shown in Figure 3.3. As the map illustrates, 111 of Georgia's 159 counties enact zoning ordinances at the local level.

A third type of code that is prevalent throughout the State is floodplain development regulation. As of July, 2013, 152 of Georgia's 159 counties and 351 of Georgia's 530 cities and towns participate in the National Flood Insurance Program (NFIP). As a pre-requisite for participation in the NFIP, the community must adopt and enforce a floodplain development ordinance that meets certain minimum standards, such as minimum finished floor elevations for buildings built in floodplains. These regulations are designed so that, while they do allow development in the floodplains, any such development must be done so that there is no or minimal negative flood impact on any other properties and any buildings must be constructed so that floodwaters from a 100 year/1% chance per year flood will flow freely and should not enter and cause damage to the enclosed livable or workable spaces of a structure.

Currently, at least 152, or 96%, of Georgia's 159 counties and 351, or 66%, of Georgia's 530 municipalities have adopted and enforce floodplain development regulations that meet the minimum NFIP standards. It is possible, though not very likely, that some communities, unbeknownst to GEMA, have adopted floodplain regulations, but, for one reason or another, do not participate in the NFIP. It is likely, however, that some communities, though probably not very many, have adopted more stringent floodplain development regulations than the minimum NFIP standards require. That being said, the majority of Georgia appears to be fairly well protected from improper development within the floodplain areas.

Between January 2002 and June 2013, all 159 of Georgia's counties, along with the participating municipalities, completed local multi-jurisdictional hazard mitigation plans. As of June 2013, 70 counties have completed first update to their LHMP. The quality and effectiveness of the plans has improved over time and continues to do so. For a more detailed description of the local planning process, including historical, current and future activities, as well as GEMA's assistance and coordina-

tion of the local process, please see Chapter 4.

3.4.2 *Community Rating System*

The Community Rating System is a voluntary program through which National Flood Insurance Program (NFIP) communities are rewarded for beneficial floodplain management that exceed minimum NFIP requirements. Under the CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the three goals of CRS: reducing flood losses; facilitating accurate insurance ratings; and promoting the awareness of flood insurance. The CRS classifies communities based on a point system with the first class (Class 1) receiving the largest premium reduction and the last class (Class 10) receiving no reduction. CRS recognizes 18 credible flood mitigation activities that fall under four broad categories: public information, mapping and regulations, flood damage reduction, and flood preparedness.

		Premium Reduction	
Credit Points	**Class**	**SFHA***	**Non-SFHA****
4,500 +	1	45%	10%
4,000 – 4,499	2	40%	10%
3,500 – 3,999	3	35%	10%
3,000 – 3,499	4	30%	10%
2,500 – 2,999	5	25%	10%
2,000 – 2,499	6	20%	10%
1,500 – 1,999	7	15%	5%
1,000 – 1,499	8	10%	5%
500 - 999	9	5%	5%
0 - 499	10	0	0

Table 3.11 Community Rating System and Associated Flood Insurance Reductions

*** Special Flood Hazard Area**

**** Preferred Risk Policies are available only in B, C, and X Zones for properties that are shown to have a minimal risk of flood damage. The Preferred Risk Policy does not receive premium rate credits under the CRS because it already has a lower premium than other policies. The CRS credit for AR and A99 Zones are based on non-Special Flood Hazard Areas (non-SFHAs) (B, C, and X Zones). Credits are: classes 1-6, 10% and classes 7-9, 5%. Premium reductions are subject to change.**

Table 3.12, lists the total CRS communities in Georgia as of May 1, 2013. The table also provides the CRS class for each community for previous selected years. If no class is provided, that community had not yet joined the CRS program. The number of CRS communities in Georgia has steadily increased with many improving on their CRS class.

Participating in the CRS program benefits communities by providing enhanced public safety, reducing damage to public and private property, avoiding economic losses and disruption, and protecting the local environment. The program also allows the evaluation of local programs in comparison to a nationally recognized benchmark.

	CRS Class by Year of Data			
COMMUNITY NAME	**2004**	**2007**	**2010**	**2013**
Albany, City of	9	9	8	8
Austell, City of				8
Brunswick, City of	9	9	9	9
Camden County				8
Cartersville, City of		9	9	9
Catoosa County				8
Chatham County	7	7	6	6
Cherokee County		8	8	8
Cobb County	8	8	8	8
College Park, City of	6	6	6	6
Columbia County	8	8	7	7
Columbus, City of	8	8	8	8
Covington, City of	9	9	9	9
Coweta County				8
Crisp County		9	9	9
Decatur, City of	8	7	6	6
Dekalb County	8	8	7	7
Dougherty County	7	7	6	6
Douglas, City of				9
Douglas County	8	8	8	8
Duluth, City of	9	9	8	8
Effingham County				7
Fayette County	7	7	6	6
Fayetteville, City of		8	8	7
Forest Park, City of				9
Fulton County	9	9	9	8
Glynn County	8	8	8	7
Griffin, City of			6	5
Gwinnett County	8	8	8	8
Henry County				8
Hinesville, City of				7
Jekyll Island, State Park Authority	7	6	6	6
Lake City, City of				9
Morrow, City of				9
Paulding County	10	10	10	10
Peachtree City, City of	7	7	7	7
Pooler, Town of	8	8	8	7
Roswell, City of	7	7	7	7
Savannah, City of	8	8	8	6
Tifton, City of			8	8
Tybee Island, City of	8	8	7	7
Waynesboro, City of	10	10	10	10
Worth County	9	9	9	9
Total Participating	**26**	**30**	**32**	**43**

Table 3.12 Georgia CRS Communities and Rankings

3.5 STATE AND LOCAL FUNDING SOURCES

The State of Georgia currently uses several funding sources to implement hazard mitigation activity. Primarily, these funds stem from federal, state, and local sources. The State of Georgia is interested in continuing to pursue these federal, state, and local funding sources throughout the future implementation of the mitigation strategy as well as in pursuing additional private sources.

The State of Georgia currently uses several funding sources to implement its hazard mitigation actions. These funds primarily come from Federal and State sources, and the State is interested in pursuing additional private sources. Current and potential sources are listed in the following tables.

Program	Source	Description	Estimated Annual Funding	How it is used
Hazard Mitigation Grant Program (HMGP)	FEMA	The provides funds to States, Territories, Indian Tribal governments, local governments, and eligible private non-profits (PNPs) following a Presidential major disaster declaration.	Only available after disaster declaration and varies depending on size and scope of disaster	State and local planning, state and local projects
CDBG (Community Development Block Grant)	HUD, DCA	Provides communities with resources to address a wide range of unique community development needs.	In Georgia (millions): 2008 $40.1 2009 $39.9 2010 $43.6 2011 $36.6. 2012 $34.5	Housing, economic development, disaster recovery
Assistance to Firefighters Grant	FEMA	Meet the firefighting and emergency response needs of fire departments and nonaffiliated emergency medical service organizations	Prescribed by Congress; $320 million in FY2013	Funding Community Wildfire Protection Planning (CWPP) for GA

Table 3.13 Current Funding Sources

Program	Source	Description	Estimated Annual Funding	Potential Uses
PDM	FEMA	Annual, nationally competitive grant program for hazard mitigation	Prescribed by Congress each year	State and local planning, state and local mitigation projects
Assistance to Firefighters Grant	FEMA	Meet the firefighting and emergency response needs of fire departments and nonaffiliated emergency medical service organizations	Prescribed by Congress; $320 million in FY2013	Fire mitigation projects, community wildfire protection planning
CDBG	HUD, DCA	Provides communities with resources to address a wide range of unique community development needs.	Between 2008-2013, GA has received $33-40 million each year	Housing, economic development, disaster recovery
FMA	FEMA	Provides funds on an annual basis so that measures can be taken to reduce or eliminate risk of flood damage to buildings insured under the National Flood Insurance Program (NFIP).	Prescribed by Congress; $120 million allocated in FY2013	Flood mitigation projects, flood mitigation planning

Table 3.14 Potential Funding Sources

Chapter 4: Coordination of Local Mitigation Planning

As previously discussed in Chapter 3, the local mitigation planning requirements are an attempt to accumulate greater knowledge of local hazard exposure, available critical facilities (especially those with high hazard exposure), and potential mitigation policies, programs, and projects. The following sections detail the approval and update process of local mitigation planning. Following these sections is a discussion concerning the state's prioritization of local assistance.

Chapter 4 Section	Updates to Section
4.1 Local Technical Assistance	• Revised to reflect new plan content. • Moved Local Funding to 4.2 • Revised to include figures and tables • Revised to add details on local plan review process
4.2 Local Funding	• New section, moved from 4.1
4.3 Local Plan Integration	• Updated text • Results of local plan review analysis table moved to Ch.3
4.4 Prioritizing Local Assistance	• Updated text • Updated tables

Table 4.1: Summary of Changes to Chapter 4

Each section of Chapter 4 of the Georgia Hazard Mitigation Strategy (GHMS) was reviewed and updated by GEMA Hazard Mitigation staff. Each section was revised as necessary to reflect previous, current and future planned activities to assist Georgia's 159 counties, their municipalities, University System campuses and authorities in the completion and updating of their local hazard mitigation plans and projects.

4.1 LOCAL TECHNICAL ASSISTANCE

GEMA Hazard Mitigation staff proactively works on meeting the requirements of the Disaster Mitigation Act of 2000 for local hazard mitigation planning activities. The following sections describe the process for how staff assist local plan development and grant management.

4.1.1 Plan Development Process

The development process is captured in Figure 4.1. This flow chart details the process by which the State of Georgia and local jurisdictions typically follow during the funding of planning projects. Imbedded in this flowchart is the timeline associated with the mitigation plan development process. As the chart illustrates, the first section is the application period that lasts 6 - 9 months. For HMGP grants, this timeframe can be longer, depending on the time necessary to get the overall amount

available for grants locked in. This lock-in time often overlaps with when the State begins to reach out to affected communities to discuss needs and possibilities for mitigation grants. The application period includes outreach, calls for applications, GEMA assistance with application development, submittal to FEMA and FEMA's review and response that ultimately ends in the project's receiving or not receiving funding. The second period, the grant development process, lasts from 3 - 6 months and includes the development and signing of grantee-subgrantee agreements and the distribution of guidance packages, usually accomplished at the local kickoff meeting. The third period, the plan development phase, lasts around 18 - 30 months and includes GEMA's provision of technical assistance with plan development as needed, receipt and processing of quarterly reports and payment requests, and plan draft copies. The third period also includes GEMA and FEMA review, plan adoption, FEMA approval, and the notifications of approval. Overall, the third period lasts between 2 ½

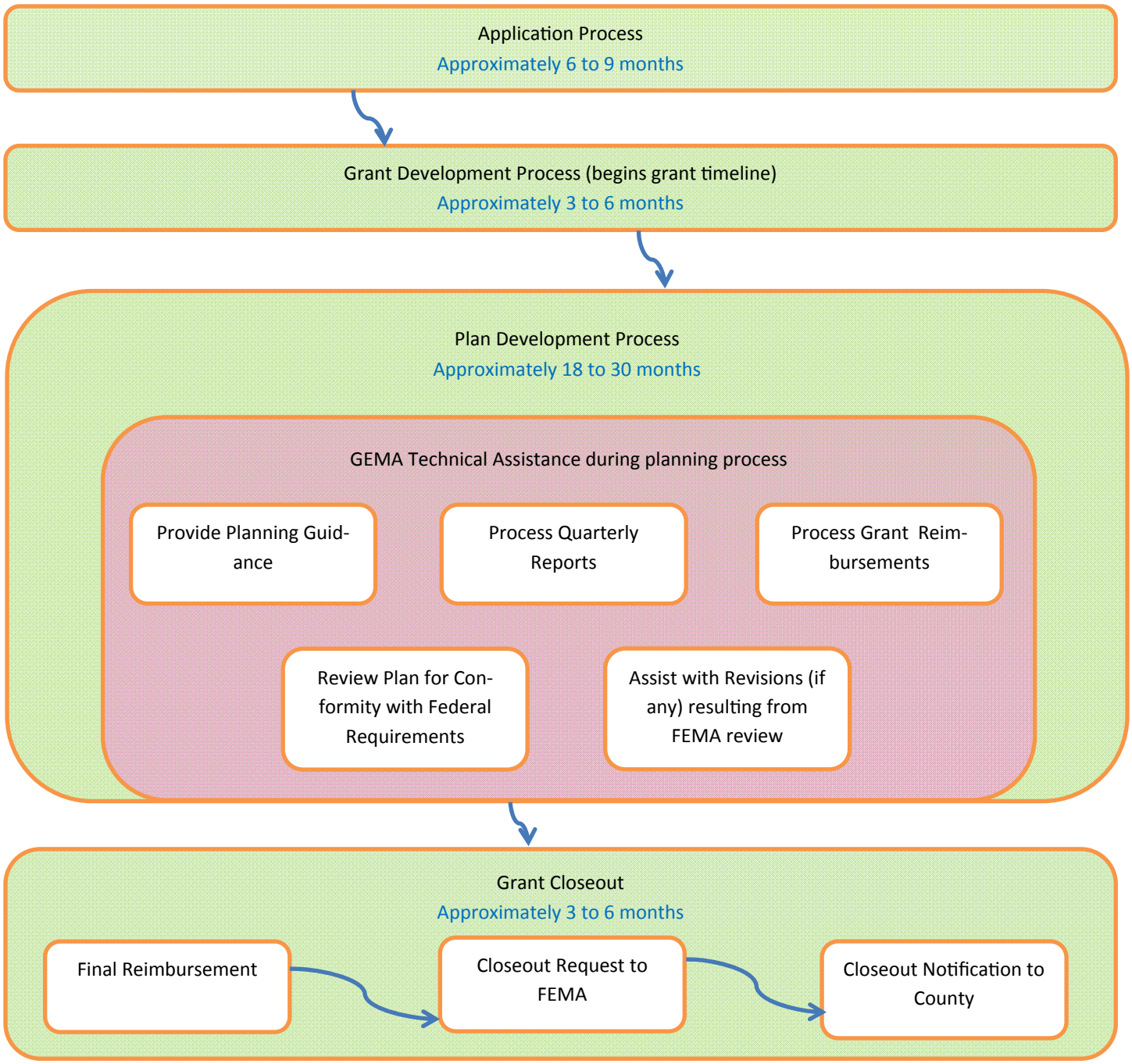


Figure 4.1 Grant Process Flow Chart

and 3 years, though extensions are available if needed. The fourth and final period lasts from 3 – 6 months and includes all final payments to the county and closing out the grant. Following the completion of the local mitigation plan, each county continues to monitor their plan annually as described in the maintenance section of each plan.

GEMA's Mitigation Planners conduct local kickoff meetings with each county and their invited mitigation planning teams. This will include the leadership of all municipalities, emergency management agencies, private businesses and interested citizens. The purpose of these kickoff meetings is to give the entire planning team an overview of the program and some basic guidance to help them get started with the mitigation planning process.

During the plan development, review and approval stages, every county follows the same basic process where the planning committee meets on a regular basis to discuss findings of research and related activity conducted outside of the meetings. Most counties have utilized contractors, such as their Regional Commission or a private consultant, to coordinate their planning process, while others have used existing emergency management or Planning Staff. GEMA planners avail themselves to the counties through phone calls, emails, site visits and/or attendance at planning committee meetings as necessary. When new planning tools are developed or new consultants or planners are brought into the process, the GEMA mitigation planners conduct training and workshops with the necessary parties to teach them how to use the tools available to them and to help them know what is expected for local mitigation plans.

The final phase of the plan development process begins when a draft plan is submitted to GEMA for review. Once the plan has been drafted, the County sends the plan to their assigned GEMA Hazard Mitigation planner for review. GEMA currently has four planners that cover four geographic areas in the State as shown in Figure 4.2. Two planners are located in the Atlanta office and work with counties in the northern half of Georgia, one planner is located in Cordele to assist counties in Southwest Georgia and one planner is located in Statesboro to assist counties in Southeast Georgia. Each planner works with counties to help ensure that plans are updated and reviewed prior to the plan expiration date.

GEMA utilizes the Local Plan Review Tool to review local plans for compliance with FEMA requirements (44 CFR 201.6). In addition to the FEMA requirements, GEMA has developed additional state requirements that must be met for approval. These are included in Element F as shown in Figure 4.4.

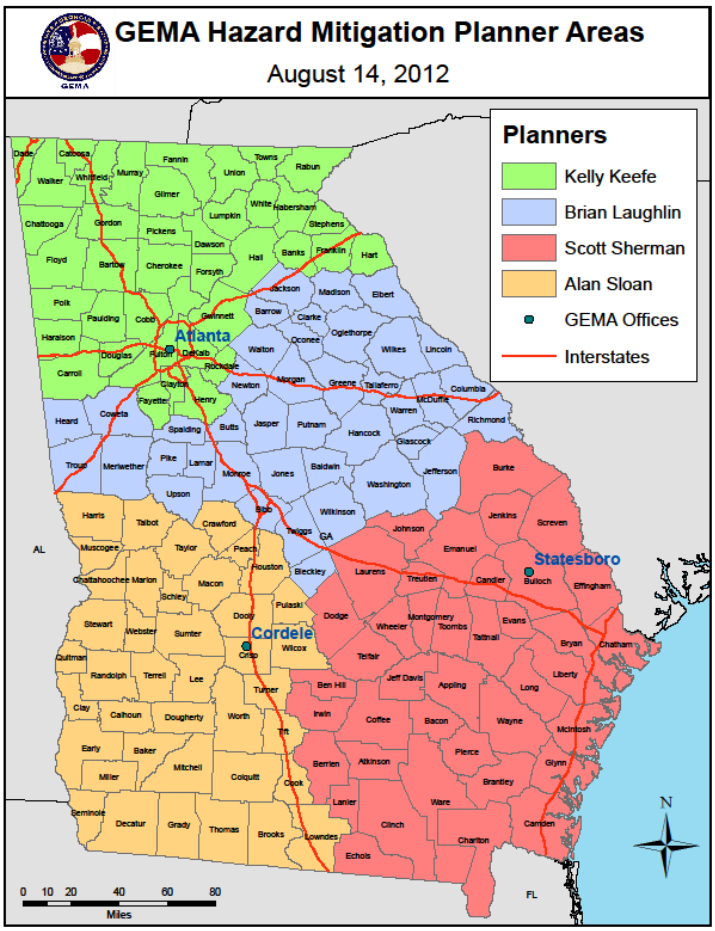


Figure 4.2 GEMA Mitigation Planner Areas

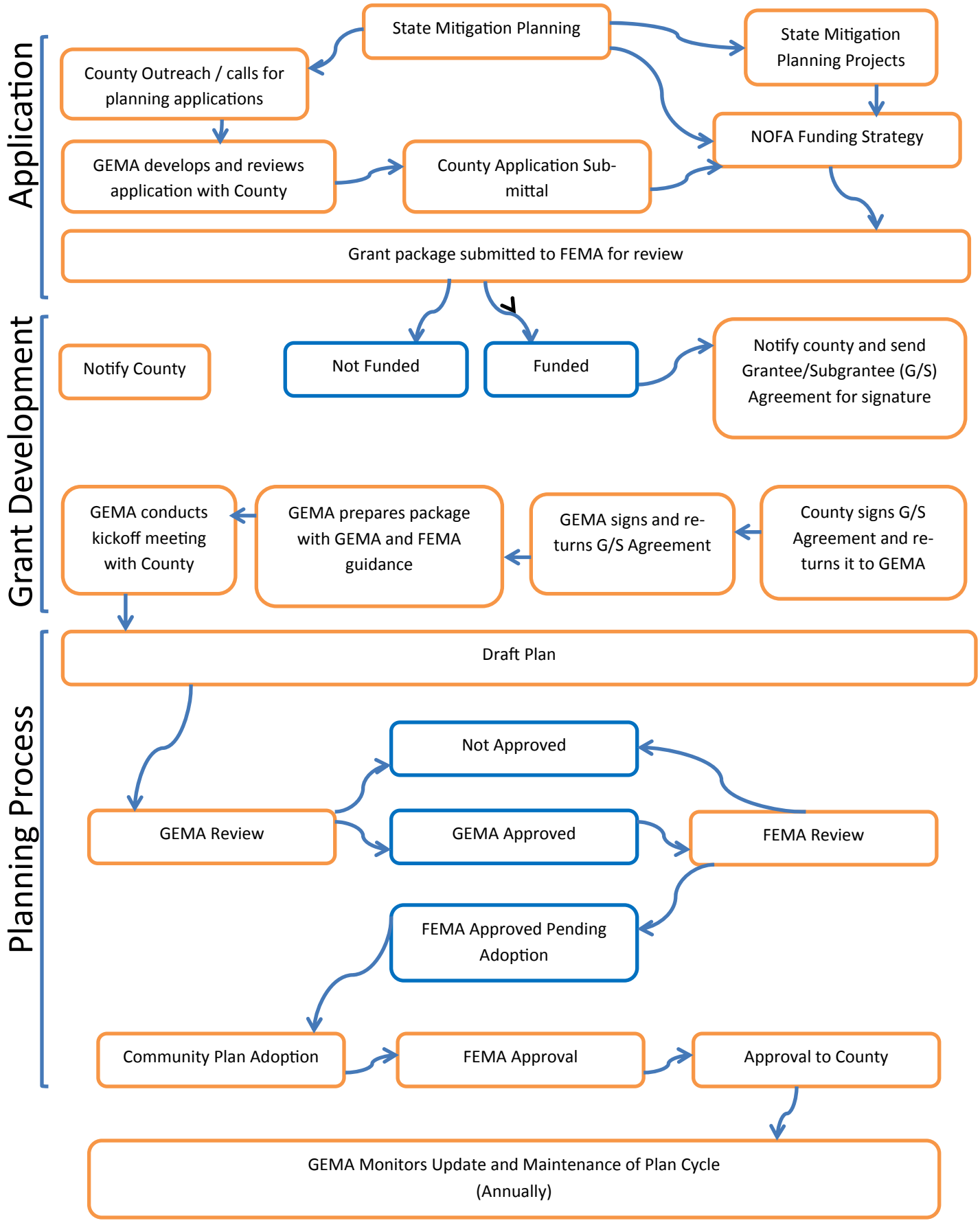


Figure 4.3 Local Hazard Mitigation Planning Process Flow Chart

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT F. ADDITIONAL STATE REQUIREMENTS			
F1. Does the plan document opportunities for participation by neighboring communities, businesses and other interested parties? (Invitation letters, sign in sheets, etc.)			
F2. Does the plan document opportunities for public input and participation? (copies of meeting notices, sign in sheets, or other applicable documentation)			
F3. Does the plan discuss the review of the following planning mechanisms, at a minimum, for incorporation as applicable? • Comprehensive Plan • Flood Mitigation Assistance Plan (if one exists) • Flood Insurance Study (If one exists) • Community Wildfire Protection Plan • Local Emergency Operations Plan • State Hazard Mitigation Strategy			
F4. Has the Critical Facilities Inventory been completed online?			
F5. Have the GMIS Critical Facilities reports and maps, or maps from a superior system, been provided?			
ELEMENT F: REQUIRED REVISIONS			

Figure 4.4 Local Plan Review Tool Element F: State Requirements

Once GEMA's mitigation planners determine that the plan meets the federal mitigation planning requirements, except for final public comment and adoption, the local governments prepare a final draft and and send it to the GEMA Hazard Mitigation Division for submittal to FEMA Region IV for Federal review. Once FEMA determines the plan meets all requirements, except for final public comment and adoption, FEMA will issue an approval pending adoption for the plan. The local governments then conduct their final public comment process, adopt the plan and forward this documentation, along with a final copy of the plan to GEMA, who then forwards this to FEMA. During the state and federal review processes, if revisions become necessary as a result of the reviews, GEMA's mitigation planners will suggest and assist with revisions to the plan in order to meet the requirements. Once FEMA has determined that the plan meets the local mitigation planning requirements, all the necessary notifications of plan approval are made and the county then implements and monitors the plan over the next 5 years.

4.1.2 Local Planning Tools

GEMA Hazard Mitigation staff continues to provide an array of tools to assist local communities with local hazard mitigation planning activities. This includes participating in local plan kickoff meetings, disseminating planning guides and documents via CDs and email, sharing information on available training and hosting planning workshops.

Since the 2011 GHMS, the GEMA Hazard Mitigation website has been updated to provide information and resources on local hazard mitigation planning. Information found on the website include the current State Hazard Mitigation Strategy; FEMA planning guides, including but not limited to the How-to Guides, Disaster Mitigation Act of 2000, FEMA Mitigation Ideas and the Local Mitigation Planning Guidance with GEMA highlights (recently replaced by the Local Mitigation Planning Handbook); GEMA planning documents and links to other useful resources. This website can be located from the GEMA webpage at http://www.gema.state.ga.us/ .

Training is a vital resource to ensure that GEMA staff possesses the most effective capabilities to guide local communities in their planning efforts. Staying current on regulations, FEMA programs and best practices with appropriate FEMA mitigation training allows GEMA staff to advise local communities on maintaining regulatory compliance, maximize funding opportunities and improving local hazard mitigation planning.

4.2 LOCAL FUNDING

Since the inception of the Federal local mitigation planning requirements, GEMA has assisted Georgia communities in locating and obtaining funding for plan development and updates. The planning team continues to use a grant application which addresses and provides examples of responses for both pre and post disaster grants. Upon completion of all parts of the grant application, the applicant should have an acceptable application that will have sufficient information for both of FEMA's NEMIS and eGrants system, and to be found acceptable by FEMA. A copy of the application can be found in Appendix F. Each planning team member works very closely with the counties in their territory when developing these applications. The applications approved by FEMA are made part of the agreement between county, state and federal agencies; therefore they are prepared in great detail and forethought.

In the eleven years Georgia has been involved in mitigation planning, the state has made use of two categories of mitigation grant sources, both of which have been provided by FEMA. These are Disaster Related Mitigation Programs and Non-Disaster Related Mitigation Programs. The primary difference between the two categories is when and where they are available. Non-disaster related is available nationwide on a regular basis, regardless of the occurrence of disasters. Disaster related mitigation is only available in the aftermath of a declared disaster and is only available to the affected state.

4.2.1 Disaster Related Mitigation Programs

Due to a series of natural disasters which have affected the state in various forms and locations, funding for local plan development since 2009, has come solely in the form of the Hazard Mitigation Grant Program(HMGP grants), awarded by the President, provided by FEMA and administered by GEMA. One disaster, DR1973, has occurred since the 2011 approval. This disaster, in conjunction with previously declared disasters, provides sufficient funding for 155 of the 159 counties to update their plans over the course of the last several years and going into the next three.

Disaster #	Month/Year	Total Project Costs	# Applications	Federal Share Approved
1686	3/2007	643,765	28	482,819
1750	3/2008	109,213	1	81,909
1761	6/2008	186,740	9	140,055
1833	5/2009	461,442	23	346,081
1858	9/2009	1,869,803	74	1,402,357
1973	4/2011	478,000	20	358,500
Total		**3,748,963**	**155**	**2,811,721**

Table 4.2 Plan Updates Included in Recent Disasters (Current through September 30, 2013)

For counties involved in a disaster, Governor Deal has authorized payment of 40% of the local match requirement by the State or 10% of the total grant amount, leaving the local government responsible for only 60% of the remaining match or 15% of the total grant amount. In many cases this takes a large burden off the counties struck by disaster and whose assets have been depleted in their recovery.

4.2.2 Non-Disaster Related Mitigation Programs

Historically, Georgia has used two non-disaster related mitigation programs to help local communities develop and update their mitigation plans. These are the Pre-Disaster Mitigation (PDM) grant program and the Flood Mitigation Assistance (FMA) grant program. The primary difference is FMA is specifically for flood mitigation planning and, prior to October 2008, the FMA planning requirements were much more stringent. Due to a large number of disasters that have occurred in Georgia since 2007, it has not been necessary to utilize PDM since the 2008 grant cycle to fund mitigation plans.

In 2008, Georgia used FMA funds for a limited number of FMA stand-alone plans. One of these (Glynn County) was only recently completed in 2012. Prior to October 2008, FMA planning requirements were more stringent than local multi-hazard planning requirements. However, in 2008, FMA planning requirements were incorporated into the local multi-hazard planning requirements. Therefore, FEMA will no longer fund a stand-alone plan using FMA funds.
If the State of Georgia finds itself in the fortunate position of not incurring any disasters over the next five years, the local applications will require financial assistance from the Pre-Disaster Mitigation or other available grant programs.

4.2.3 Other Mitigation Funding Programs

In addition to the multi-jurisdictional hazard mitigation plans discussed in Sections 4.2.1 and 4.2.2 above, GEMA has worked with various agencies on two other mitigation planning programs. The first was the Disaster Resistant University (DRU) program for college and university campuses. The other was the Flood Mitigation Assistance (FMA) planning program for local governments.

The Board of Regents of the University System of Georgia (USG), through a federal Pre-Disaster Mitigation (PDM) grant and GEMA, initialized the Disaster Resistant University (DRU) program for fiscal year 2003 (FY03). The PDM grant allowed all 35 public institutions within the USG to develop a hazard mitigation plan to meet the federal requirements of the Disaster Mitigation Act of 2000 and of the FEMA planning criteria promulgated in Title 44 of the Code of Federal (CFR) Regulations, 201.6 on Federal Register, 2-26-2002. Though the grant is no longer in effect, GEMA has continued to work with various campuses, as requested, in developing and updating their plans.

As of December 2010, twenty-five of the thirty-six universities successfully completed hazard mitigation plans. Each of the universities has been instructed to submit their plans to the counties they are located. They are also recommended to participate in the update of that county's local hazard mitigation plan during their next update. The inclusion of the university's plan in the approved local plan makes them eligible for federal funds in the event they are affected by a presidentially approved hazardous event.

All universities are headed up by the Board of Regents, which is a state agency, and are covered by the State Hazard Mitigation Plan. Therefore, state universities can apply for federal aid as a state entity in the event they are affected by a presidentially declared hazard event. Universities that participate in the update of a local hazard mitigation plan and have their plans included in that approved local plan, can apply for federal funding if they are subject to a presidentially declared event.

Each DRU hazard mitigation plan includes a hazard, risk, and vulnerability assessment based on refined data and hazard maps provided by GEMA. The institutional level risk-based, data-driven mitigation plans were created with clearly identified future mitigation goals and objectives that will ultimately lead to mitigation projects. This process and the provided data allow accurate risk and loss estimates which lead to more cost effective mitigation actions. The DRU program is an integral part of bridging non-traditional local and state partnerships within the context of emergency management.

4.3 LOCAL PLAN INTEGRATION

Chapters 2 and 3 described the review of local plans to ascertain which hazards and mitigation actions are identified in within those plans. The results of this review is utilized by GEMA Hazard Mitigation staff in the assessment on how local plans are reviewed, coordinated and integrated into the state plan.

With an increase in the percentage of counties identifying Wind, Hurricane Wind and Severe weather hazards in the local plans, the risk assessment and mitigation strategy of the state plan has been updated to include additional risk information and strategies to reflect this increase in local priority.

More significant changes were observed in the types of mitigation actions identified in local plans. The most notable is the decrease in Planning/Zoning actions identified from 88% in 2010 to 76% in 2013. Given that these types of actions have proven to have great value in reducing long-term risk, the mitigation strategy in the state plan was updated to include actions that support local planning and zoning efforts. In addition, GEMA Hazard Mitigation planners changed how they review local plans by creating the state requirement in the Plan Review Tool that asks if the plan references specific planning mechanisms. An increase in non-mitigation actions such as preparedness and response indicates GEMA Hazard Mitigation staff should provide more effective education and training to local officials on hazard mitigation planning. Actions related to this have been integrated in the state mitigation strategy.

4.4 PRIORITIZING LOCAL ASSISTANCE

The State of Georgia must utilize analytical methods for prioritizing the distribution of available funding to communities and local jurisdictions. The first subsection discusses the methods the State uses for prioritizing the funding for local mitigation planning. The following section discusses the prioritization of mitigation grant program funding based on repetitive losses.

4.4.1 Prioritization of Local Plan Updates

In the summer of 2008, GEMA's mitigation Planning Team developed list of counties that at that time had received plan approval. Using this list, the Staff divided the counties into 12 levels of priority based on six month timeframes and according to each county's plan expiration date and the date that plan updates would be due with priority 1 being the highest priority and priority 10 being the lowest. This list is updated every six months. For example, counties whose plans expire between July 1, 2015 and December 31, 2015 received priority 1 status. Those that expired between January 1, 2016 and June 30, 2016 received priority 2 status and so forth.

Since that time, GEMA has continued to maintain and update the priority list as local updates are completed. In that time, GEMA has assisted 84 counties in obtaining funding assistance through HMGP to update their mitigation plans. As of August, 2013, 70 of those counties have completed their updated plan. GEMA anticipates the remainder to be completed by the end of 2014.

In addition, as of August, 2013, GEMA is pursuing funding assistance for the next 29 counties in the priority list. It's notable that, for some of these counties, this would be the second update to their plans. GEMA anticipates receiving approval and holding kickoff meetings to initiate the planning processes for these counties in the Winter and Spring of 2014.

GEMA will continue to adhere to this priority system of updating local hazard mitigation plans when distributing funding and assistance for the planning process. Table 4.3 illustrates the priority of the various counties' in terms of plan updates by 6 month period beginning in January of 2010. In each 5 year update cycle the driving factor on priority will be the county's plan expiration date.

County	Plan Expiration	Priority
Pulaski	7/14/2015	1
Houston	8/2/2015	1
Gwinnett	8/19/2015	1
Jones	8/19/2015	1
Fayette	9/2/2015	1
Monroe	10/14/2015	1
Lamar	11/4/2015	1
Camden	11/9/2015	1
Chatham	11/9/2015	1
Upson	11/10/2015	1
Crisp	1/3/2016	2
Lee	2/4/2016	2
White	2/4/2016	2
Bibb	3/22/2016	2
Dougherty	3/29/2016	2
DeKalb	3/31/2016	2
Floyd	4/19/2016	2
Douglas	5/5/2016	2
Hall	5/9/2016	2
Chattooga	6/17/2016	2
Union	7/12/2016	3
Miller	7/26/2016	3
Carroll	8/18/2016	3
Baker	8/22/2016	3
Cobb	9/16/2016	3
Laurens	9/22/2016	3
Fulton	9/23/2016	3
Lumpkin	10/21/2016	3
Liberty	11/15/2016	3
Worth	1/5/2017	4
Bartow	1/10/2017	4
Clayton	1/18/2017	4
Mitchell	1/26/2017	4
Lowndes	2/10/2017	4
Cherokee	2/17/2017	4
Calhoun	2/22/2017	4
Quitman	3/19/2017	4
Glynn	4/4/2017	4
Paulding	4/13/2017	4

County	Plan Expiration	Priority
McDuffie	4/27/2017	4
Decatur	5/2/2017	4
Baldwin	6/15/2017	4
Gordon	6/15/2017	4
Putnam	6/21/2017	4
Richmond	6/28/2017	4
Catoosa	7/5/2017	5
Elbert	7/6/2017	5
Walker	7/10/2017	5
Long	8/30/2017	5
Forsyth	9/5/2017	5
Heard	9/6/2017	5
Muscogee	9/6/2017	5
Morgan	9/14/2017	5
Whitfield	9/18/2017	5
Tift	9/21/2017	5
Fannin	10/12/2017	5
Wayne	10/12/2017	5
Spalding	10/19/2017	5
Columbia	10/192017	5
Early	10/24/2017	5
Polk	11/14/2017	5
Murray	1/16/2018	6
Seminole	2/5/2018	6
Clarke	3/26/2018	6
Gilmer	4/1/2018	6
Clay	5/23/2018	6

Table 4.3 Local Plan Priority Update Schedule by Expiration Date

4.4.2 Prioritization of Local Plan Funding

Georgia has been working in local hazard mitigation planning since 2002. Since then, all of Georgia's 159 counties have completed and adopted their initial mitigation plans. One stipulation to local plans is they are only effective for 5 years and must be updated in order to maintain the community's approved status. With that, Georgia has developed an ever evolving tracking spreadsheet which tracks local plans. Georgia uses this spreadsheet to prioritize local plan funding according to the expiration dates of each county's local plan. The focus is on maintaining eligibility for each community to pursue mitigation grant funding as the need and opportunity arises. The goal is to fund the local plan updates in time to be completed prior to the expiration of the each county's current local plan. The current priority list for the upcoming 3 years is shown in Table 4.3.

4.4.3 Prioritization of Project Funding

In order to maximize the amount of federal and state funding available, GEMA employs an application prioritization system. GEMA reviews, scores and ranks submitted pre- applications and applications using criteria on GEMA's Hazard Mitigation Assistance Score Sheet. The criteria includes: natural hazard exposure, history of damages, type of mitigation, potential impact on the community, impact on environment, community commitment to mitigation, and benefits of mitigation. Generally pre-applications and applications for acquisition and demolition projects receive the highest ranking. See Appendix F for a copy of the GEMA's Hazard Mitigation Assistance Score Sheet.

When a Hazard Mitigation assistance application cycle is opened, GEMA uses a two tiered review process. Initially, communities are directed to submit pre-applications that allow GEMA staff to determine if a proposed mitigation project meets FEMA funding criteria. Completed pre-applications received by the publicly stated deadline are scored using criteria on GEMA's Hazard Mitigation Assistance Score Sheet. In addition to the above criteria, for post-disaster grants (HMGP), pre-applications are prioritized under two categories- within the declared area and outside of the declared area. Projects that mitigate the impacts of the specific declaration event such a flood versus tornado in the declared areas have the highest priority for the State of Georgia.

Applicants whose pre-applications receive the highest score and meet minimum project criteria will be invited to complete and submit a full grant application. Risk Reduction Specialists and Hazard Mitigation Planners will assist applicants in completing their applications and will conduct an initial review in accordance with the GEMA's Hazard Mitigation Assistance Score Sheet. The State Hazard Mitigation Division Director will review the results of the staff scoring and prioritization of applications. The recommendations are presented to the GEMA Agency Director for final determination.

Benefit Cost Analyses (BCA) incorporate various data to determine the cost effectiveness of a project or activity. Essentially, the BCA determines whether the current cost of investing in a project will result in sufficiently reduced damages in the future. Only projects with a benefit-cost ratio (BCR) exceeding 1.0 are ranked for further review and forwarded to FEMA for funding consideration. GEMA Hazard Mitigation staff work closely with project applicants to determine each project's cost effectiveness. The basic information the state obtains to conduct accurate BCAs includes, but is not limited to the following:

- Flood Insurance Study data or historical flood data (flood frequency, discharge, and elevation);
- Past damages to the project site or in the project area;
- Well-documented cost-estimates for the project;
- Useful life of the project;
- Square footage of the building with replacement and content values;
- Facility function;
- Associated future maintenance costs;
- Displacement costs;
- Temporary relocation costs;
- Loss of use; and
- Elevation Certificates or land surveyor certification of finished floor elevation.

All of the projects completed to meet the state's mitigation goals (listed in Table 3.12) must have met the minimum BCR of 1.0 in order to garner funding (where applicable). Georgia's success in all funding rounds to date of the Hazard Mitigation Asistance (HMA) grants which include the Pre-Disaster Mitigation Competitive Program, Flood Mitigation Assistance Program and Repetitive Flood Claims Program demonstrates GEMA's Hazard Mitigation staff's ability to complete accurate BCAs. The State of Georgia has submitted a total of 80 projects since 2003 that have been reviewed at the national level in the competitive grant program. A total of 66 projects applications have been selected and awarded. Of the non-awarded projects, ten were deemed eligible but not selected due to funding constraints.

Finally, not only do projects have to meet standards of cost-effectiveness and technical feasibility, but also environmental soundness. The State of Georgia relies on the staff at FEMA Region IV to conduct environmental reviews and prepare the environmental documentation on all submitted mitigation applications. As part of the application process, the state requires documentation from the sub-applicant to comply with all applicable federal, state, and local codes and standards, including the National Environmental Policy Act (NEPA), PL 91-190, as amended. Georgia provides information to each applicant on the necessary environmental coordination that must be completed as part of the application process. The state reviews each applicant's environmental documentation prior to forwarding it to FEMA. The State of Georgia has successfully worked with each applicant on obtaining the required environmental documentation to comply with the NEPA process.

4.4.4 Repetitive Loss Properties

Repetitive loss properties (RLPs) generally consist of older, less-safe properties that were "grandfathered" into the National Flood Insurance Program (NFIP) during its creation. The RLPs have been repaired multiple times to pre-flood conditions with subsidized flood insurance claim payments. According to FEMA, a relatively small number of RLPs account for a relatively large share of paid flood claims. Therefore, identifying RLPs and Severe Repetitive Loss Properties (SRLPs) and mitigating the specified properties leads to the reduction of actual flood insurance claims, which will diminish the pressure to raise flood insurance rates and stabilize the condition of the NFIP.

The following table, Table 4.4, lists the total losses, total RLPs, total SRLPs, total mitigated RLPs, and total mitigated SRLPs by NFIP community in the State of Georgia as of June 30, 2013. The City of Augusta and Augusta-Richmond County figures have been combined as Augusta-Richmond County is a consolidated government and mitigated actions are compiled at this government level. The repetitive loss information was obtained from DataXchange while the mitigated property information was obtained from GEMA's mitigated properties database. To be considered a RLP by FEMA, the property must have two or more losses (at least $1,000 per loss) paid within a 10 year time period. To be considered a SRLP by FEMA, the property must have four or more losses (at least $5,000 per loss) paid or have two or more losses where the payments exceed the property value. As of June 30, 2013, Georgia has 1,645 RLPs totaling over $135 million in paid claims. Also, Georgia has 51 validated residential SRLPs totaling over $15 million in paid claims.

Table 4.4 illustrates that the City of Savannah accounts for approximately 20% of the RLPs and SRLPs in the State of Georgia. However, Savannah also accounts for approximately 43% of the completed mitigated activities on repetitive loss properties in the State of Georgia. The City of Atlanta also accounts for approximately 27% of the Severe Repetitive Loss properties. This is driven largely in part to the losses from Hurricane Ivan in 2004 and record breaking flooding in Metro Atlanta region in September of 2009.

Community	Losses ($)	# RLPs	# SRLPs	# Mit. RLPs	# Mit. SRLPs
Albany, City Of	1,795,563.35	42	2	1	
Alpharetta, City Of	86,788.47	2		1	
Aragon,City Of	11,701.50	1			
Athens-Clarke County	41,006.19	4			
Atlanta, City Of	33,608,701.54	209	14	2	2
Augusta-Richmond County, City	2,017,773.70	53		15	
Austell, City Of	1,019,922.63	8			
Baconton,City Of	280,663.37	2			
Bainbridge, City Of	117,238.54	2			
Baker County	85,825.77	2			
Bartow County	3,603.75	1			
Bloomingdale, City Of	5,943.87	1			
Brooklet, Town Of	52,988.53	1			
Brooks County	177,413.68	2			
Brunswick,City Of	181,772.79	6			
Bulloch County	52,256.61	2			
Butts County	29,664.41	1			
Calhoun, City Of	185,475.93	2			

Table 4.4 (a) Repetitive and Severe Repetitive Loss Properties by NFIP Community

Community	Losses ($)	# RLPs	# SRLPs	# Mit. RLPs	# Mit. SRLPs
Camden County	140,626.18	3			
Canton, City Of	609,960.12	2			
Carroll County	13,616.50	1			
Carrollton, City Of	30,400.80	1			
Cartersville, City Of	80,411.90	1			
Catoosa County	523,711.67	12		3	
Cedartown, City Of	22,456.23	3			
Chamblee, City Of	124,033.30	3			
Charlton County	142,456.18	3			
Chatham County	1,171,823.48	42		2	
Chatsworth,City Of	164,999.59	4			
Chattooga County	149,600.15	3			
Chickamauga, City Of	147,115.73	4		3	
Clayton County	554,682.47	16			
Cobb County	19,917,179.44	127	3	18	
Coffee County	275,185.48	4			
College Park, City Of	1,123,930.55	6	2	2	
Columbia County	67,263.70	2	1		
Columbus, City Of	296,268.18	4			
Coweta County	53,623.20	1			
Crisp County	29,554.99	3			
Dalton, City Of	147,571.90	2			
Decatur County	1,970,305.95	20		8	
Decatur, City Of	602,052.11	9	2		
Dekalb County	9,010,595.59	135	6	39	
Donalsonville, City Of	127,916.81	4			
Dooly County	48,781.04	1			
Doraville, City Of	126,522.60	1			
Dougherty County	3,683,644.33	41	1	7	
Douglas County	2,024,887.04	21	1	15	
Douglas, City Of	9,044.75	1			
Douglasville, City Of	241,129.90	2			
Dublin, City Of	523,297.04	6			
Duluth, City Of	9,703.64	1			
Early County	106,776.35	2			
East Dublin, Town Of	233,078.82	2			
East Ellijay, City Of	673,237.05	3			

Table 4.4 (b) Repetitive and Severe Repetitive Loss Properties by NFIP Community

Community	Losses ($)	# RLPs	# SRLPs	# Mit. RLPs	# Mit. SRLPs
East Point, City Of	266,741.09	10			
Effingham County	3,643.64	1			
Elberton, City Of	13,683.32	1			
Ellijay, City Of	14,946.50	1			
Fannin County	3,556.52	1			
Fayette County	13,645.45	1			
Fayetteville, City Of	20,683.94	2			
Fitzgerald, City Of	37,009.65	1			
Floyd County	180,593.97	7			
Folkston, City Of	162,466.79	1			
Forsyth County	142,463.78	2			
Fort Oglethorpe, City Of	1,976,557.15	18	6		
Fulton County	2,789,517.29	41	1		
Gainesville, City Of	3,650.92	1			
Garden City, City Of	197,317.86	2			
Gilmer County	255,417.97	3			
Glennville, City Of	33,491.83	1			
Glynn County	1,290,250.82	29	1		
Gordon County	71,222.03	3			
Grady County	17,556.55	1			
Gwinnett County	1,315,624.35	14		3	
Hall County	36,779.47	2			
Helen, City Of	16,419.49	1			
Henry County	114,326.01	2			
Hinesville,City Of	18,525.57	2			
Houston County	161,465.63	3			
Jasper County	27,818.04	1			
Kennesaw, City Of	49,936.92	1			
Kingsland, City Of	166,922.35	4			
Lafayette, City Of	256,842.12	1			
Lagrange, City Of	270,608.74	3			
Lee County	6,849,769.21	96	1	20	
Lilburn, City Of	140,238.48	2	1		
Lowndes County	285,302.80	2			
Lumber City, City Of	71,002.51	2			
Macon, City Of	607,257.06	6	2		
Marietta, City Of	55,293.79	2			

Table 4.4 (c) Repetitive and Severe Repetitive Loss Properties by NFIP Community

Community	Losses ($)	# RLPs	# SRLPs	# Mit. RLPs	# Mit. SRLPs
Millen, City Of	8,962.99	1			
Mitchell County	165,520.87	2			
Monroe County	245,219.73	3		1	
Montgomery County	68,636.58	2			
Moultrie, City Of	511,677.99	4			
Newnan, City Of	66,816.34	2			
Newton County	101,556.32	2		1	
Newton, City Of	51,398.67	1		1	
Peachtree City, City Of	206,299.33	6			
Pine Lake, City Of	100,218.51	1			
Polk County	179,121.17	9			
Pooler, City Of	184,445.61	5			
Port Wentworth, City Of	245,679.79	7			
Powder Springs, City Of	1,167,830.13	11			
Pulaski County	35,347.00	1			
Richmond Hill, City Of	7,933.68	2			
Ringgold, City Of	119,717.12	4		2	
Riverdale, City Of	79,130.80	3			
Rockdale County	391,526.85	5		1	
Rome, City Of	1,034,956.93	32			
Rossville, City Of	70,615.65	4			
Roswell, City Of	113,173.13	4			
Sandersville, City Of	6,154.40	1			
Sandy Springs, City Of	3,124,342.04	23	3		
Savannah, City Of	17,974,660.53	327	3	111	
Seminole County	689,439.01	7			
Smyrna, City Of	46,488.19	2			
St. Marys, City Of	144,565.64	2			
Statesboro, City Of	18,165.14	1			
Stone Mountain, City Of	291,633.75	3			
Sylvester, City Of	53,032.03	1			
Tattnall County	99,496.83	2			
Thomasville, City Of	833,338.02	4		1	
Thunderbolt, Town Of	13,110.29	2			
Tift County	114,336.24	1			
Tifton, City Of	1,978,394.36	4			
Towns County	9,927.00	2			

Table 4.4 (d) Repetitive and Severe Repetitive Loss Properties by NFIP Community

Community	Losses ($)	# RLPs	# SRLPs	# Mit. RLPs	# Mit. SRLPs
Trenton, City Of	86,071.78	1			
Troup County	76,643.40	1			
Tybee Island, City Of	207,914.94	13			
Tyrone, Town Of	137,577.52	1			
Union County	9,033.99	1			
Upson County	30,697.26	1			
Uvalda, City Of	15,505.00	1			
Valdosta, City Of	580,175.84	6			
Vidalia, City Of	134,970.56	1			
Walker County	196,224.63	4			
Walton County	21,145.06	1			
Ware County	11,369.38	1			
Warner Robins, City Of	35,566.46	1		1	
Waycross, City Of	10,553.19	1			
Wheeler County	16,981.97	1			
Whitfield County	175,174.57	6	1		
Woodbine, City Of	3,459.20	1			
Worth County	97,445.33	2			
Total	**135,269,677.74**	**1,645**	**51**	**258**	**2**

Table 4.4 (e) Repetitive and Severe Repetitive Loss Properties by NFIP Community

4.4.5 Coordination with Repetitive Loss Jurisdictions

In previous chapters, the Repetitive Flood Claims (RFC) grant program and the Severe Repetitive Loss (SRL) grant program are discussed as programs to provide funds to assist in reducing flood damages to NFIP insured properties. However, GEMA has utilized other available programs to mitigate repetitive loss properties. For HMA13, these programs have been incorporated into the Flood Mitigation Assistance program. The following table, Table 4.5, lists the program years for the Flood Mitigation Assistance (FMA) program and the Pre-Disaster Mitigation-Competitive (PDM-C) program as well as the disaster numbers for the Hazard Mitigation Grant Program (HMGP) along with the corresponding mitigation activities enacted upon repetitive loss properties. For the program years or disasters that have yet to been closed out, the State of Georgia and GEMA will continue to utilize available programs to mitigate repetitive loss and severe repetitive loss properties.

Upon review and analysis of Georgia's RLP and SRLP data, GEMA formed a mitigation strategy to reduce or eliminate the negative impacts of repetitive losses on the NFIP as well as Georgia's citizens and economy. This strategy aligns with the existing goals and objectives discussed in Chapter 3 of this mitigation strategy. The specific tasks and action steps related to repetitive losses are included in Chapter 3 of this document. The State of Georgia continues to prioritize the mitigation of RLPs and SRLPs through all available mitigation grant programs.

Program	Year/Disaster	Acquisitions	Elevations	Relocations	Drainage
FMA	1997	4	0	0	0
FMA	2001	1	2	0	0
FMA	2002	2	0	0	0
FMA	2003	2	0	0	0
FMA	2004	1	0	0	0
FMA	2005	1	0	0	0
FMA	2006	13	0	0	1
FMA	2007	9	0	0	0
FMA	2008	1	0	0	0
FMA	2009	1	0	0	0
HMGP	1020	0	1	0	0
HMGP	1033	80	2	0	0
HMGP	1042	18	0	0	0
HMGP	1071	9	5	1	0
HMGP	1209	12	0	0	1
HMGP	1271	5	0	0	0
HMGP	1311	36	0	0	0
HMGP	1554	4	0	0	0
HMGP	1560	1	0	0	0
HMGP	1686	1	0	0	0
HMGP	1833	4	0	0	0
HMGP	1858	14	0	0	0
PDM-C	2003	4	0	0	0
PDM-C	2005	8	0	0	7
PDM-C	2006	1	0	0	0
PDM-C	2007	2	0	0	0
RFC	2007	3	0	0	0
DRI	1998	1	0	0	0
Totals		**238**	**10**	**1**	**9**

Table 4.5 Mitigation Repetitive Loss Properties by Program Year or Disaster From GMIS

Chapter 5: Plan Maintenance

The purpose of Chapter 5 is to identify and evaluate the process used to monitor, evaluate and update the 2011 Georgia Hazard Mitigation Strategy over the previous 3 years, as well as to outline the mechanism for updating the 2014 strategy over the next three years. This chapter establishes both the method and schedule for monitoring, evaluating, and updating the plan. The following table, Table 5.1, documents the changes to Chapter 5 that have occurred since the 2008 approval.

Chapter 5 Section	Updates to Section
5.1 Monitoring, Evaluating, and Updating Methods	• Includes table of changes. • Revised to include new schedule for future updates.
5.2 Mitigation Activity Monitoring	• Updated tables • Updated Text

Table 5.1 Changes to Chapter 5

The review of Chapter 5 of the Georgia Hazard Mitigation Strategy (GHMS) was coordinated by GEMA Hazard Mitigation division. Each section was reviewed by the staff and revised as necessary to reflect the monitoring, evaluation and update process used over the previous 3 years. In addition, state planning stakeholders were presented opportunities to review each section in the plan as described in Chapter 1. This includes placing draft sections of the plan on the GEMA website for public review and comment.

The planning team followed the process outlined in Chapter 1 in order to update the GHMS. The planning team will continue to use this process over the next three years for the next plan update. The next plan update is anticipated to begin in spring of 2014 and to be completed and approved in 2017.

5.1 MONITORING, EVALUATING, AND UPDATING THE PLAN

The State of Georgia has and will continue to review and update the GHMS to submit for gubernatorial and federal approval at a minimum of once every three years. The state may update the plan more frequently under the following conditions: a state declaration without federal assistance; a presidential disaster declaration; changes in state policy; significant updates to the hazard, risk, and vulnerability assessment based on new data; or a need deemed by the governor or state hazard mitigation planning group.

Within the state, the Hazard Mitigation Division of GEMA is responsible for coordinating the monitoring, evaluation, and update of the GHMS. Within this division, the Planning Program Manager is responsible for the oversight of this process, including the coordination of local, state, and federal agencies. Participants in this process are listed in Chapter 1 and include state government agencies participating in mitigation programs and federal government agency representatives with general interest or legislative authority on items presented in the mitigation strategy.

The GEMA Hazard Mitigation staff performed an analysis of the 2011 GHMS method and schedule for monitoring, evaluating, and updating and concluded these items were adequate in meeting the planning requirements. However, the planning staff determined adding a series of workshops would go farther in meeting the intent of including a wide variety of stakeholders in the planning process. This effort was successful. Therefore, GEMA will continue to use the described update process. The update process includes a scheduled annual review, a post-disaster review, and the three year plan review and update. The planning staff anticipates using the workshops, or a similar process, again in 2015 and 2016.

State Plan Approval	March 2011
Presidential Disaster Declaration Tornado Outbreaks	April 27-29, 2011
Post Disaster Review	July 2011
Annual Review	January 2012
Begin State Plan Update	Summer 2012
Workshop 1	December 2012
Workshop 2	February 2013
Workshop 3	April 2013
Plan Review and Update	Fall 2012-September 2013
Plan Submission to FEMA	September 2013
State Plan expires	March 2014

Table 5.2 2014 Plan Review and Update Schedule

The scheduled annual review occurs at the beginning of each calendar year. This process includes an analysis of the goals, objectives and actions identified in the state mitigation strategy for current applicability by the SHMPT. In addition to monitoring and evaluating plan implementation reflecting the progress and success of mitigation actions, the annual review also identifies, whether any updates are necessary with special regard to updating the hazard, risk, and vulnerability assessment to reflect the best available data.

The post-disaster review occurs on the occasion of each state of emergency, state disaster declaration, or federal disaster declaration within the State of Georgia in order to determine any necessary updates to accommodate the impacts of the disaster and the potential new data. Following disaster events; GEMA staff will coordinate with local officials to document how mitigation measures instituted in the affected areas may have reduced the amount of damages or loss of life that may have resulted from those events. GEMA will continue to identify and develop opportunities to analyze successes. GEMA staff accompanied by state stakeholders reviews the disaster-related strategies within the hazard mitigation plan to determine if any adjustments are necessary. This post-disaster review may replace an annual review depending on the severity of the disaster event.

The comprehensive three year plan review and update of the state plan occurs prior to federal submission for approval. This review process begins more than 18 months prior to the federal approval deadline (March 2017) and the first submission occurs 6 months prior (September 2016) to the federal approval deadline in order to allocate sufficient review time. The review and any necessary revisions are guided by GEMA's Hazard Mitigation Division and the SHMPT.

The 2011 plan included a monitoring and evaluation strategy using a process of annual review meetings and post-disaster review meetings as applicable. Since the approval of the 2011 GHMS, the SHMPT has used the process described in Table 5.2. The plan was approved in March 2011.

The state received a presidential disaster declaration for tornado outbreaks on April 27-28, 2011. After this event, the SHMPT conducted post-disaster reviews of the 2011 plan. In addition, 2012 included a scheduled annual review. The annual review for 2013 was not scheduled because the plan update process had already begun. Beginning in June 2011, the mitigation planning staff began the process of reviewing the 2011 plan for the purpose of starting the 3-year update process. The next mandatory three year update is currently scheduled for final approval in March 2017. A schedule of each task leading up to final approval of the 2017 update is found in Table 5.3. The process is scheduled to begin more than 18 months prior to the approval deadline. Therefore, the notice to proceed and interagency planning group's initial meeting will occur in Summer of 2015. GEMA intends the next updated plan to incorporate the newest data and methods into the hazard, vulnerability, and risk assessment as well as updated data from all approved local hazard mitigation plans.

State Plan Approval	March 2014
Annual Review	January 2015
Begin State Plan Update	Summer 2015
Plan Review and Update	Fall 2015-September 2016
Plan Submission to FEMA	September 2016
State Plan expires	March 2017

Table 5.3 2017 Plan Review and Update Schedule

5.2 MONITORING PROGRESS OF MITIGATION ACTIVITIES

The Hazard Mitigation Division within GEMA is responsible for monitoring implementation of projects and activities identified in the state mitigation strategy. The Mitigation Division Director oversees this function. Consistent with the annual and post-disaster plan review processes, progress to these projects and activities are reviewed and updated at least once per year. The review and status of the activities (or "action steps") is located within Section 3.2.5 of this plan under the heading of "Action Plan". Actions and projects listed in Chapter 3 contribute to achieving State goals.

GEMA Mitigation Staff hosts quarterly meetings with the SHMPT to provide a forum to share information on hazard mitigation news and activities in the state. During these meetings, state stakeholders are given opportunities to present updates on mitigation projects and activities within their organizations.

GEMA is currently using a software program specifically developed to manage all grant projects called the Grants Management System (GMS). The Hazard Mitigation Division uses the GMS to manage all aspects of project grants, including monitoring mitigation measures and closeouts. The system is also used to prepare and email blank quarterly reports to be completed and returned by the local grant recipients, as well as to submit its quarterly reports to FEMA. The system was in the

process of being phased in when the 2011 plan was approved. The system is now in full use and will continue to be used for the foreseeable future.

In addition, the state uses the Georgia Mitigation Information System (GMIS) to track the status of mitigated properties and avoided losses to completed mitigation projects. This information is shared with local officials as well as FEMA for utilization as a vehicle to track the effectiveness and success of mitigation efforts. GEMA is in the process of upgrading this system in order to improve the system's capability of tracking and evaluating .

Chapter 6: Enhanced Plan

Chapter 6 Section	Updates to Section
6.1 Integration With Other Panning Initiatives	• Updated the other State and regional planning initiatives the State plan is integrated with and the description of how the State Plan is and will be integrated into those initiatives. • Updated all Tables
6.2 Project Implementation Capability	• Updated the description and history showing the State's capability for successful project implementation. • Updated all Tables.
6.3 Program Management Capability	• Updated the description and history showing the State's capability to manage the Hazard Mitigation Program. • Restructured the Section • Updated all Tables and added Tables and Figures to support text.
6.4 Assessment of Mitigation Actions	• Updated the description of the State's methods for assessment of completed mitigation actions. • Record of actual cost avoidance updated for new events.
6.5 Effective Use of Available Mitigation Funding	• Updated the description and history of the State's effective use of available mitigation funding. • Restructured the Section • Updated all Tables and added new Tables on Program effectiveness
6.6 Commitment to a Comprehensive Mitigation Program	• Updated the description of the State's commitment to a comprehensive mitigation program. • Restructured the Section • Updated all Tables

Table 6.1 Changes to Chapter 6

6.1 INTEGRATION WITH OTHER PLANNING INITIATIVES

44 CFR 201.5(b)(1) states that a state's Enhanced Plan must demonstrate that the plan is integrated to the extent practicable with other State and/or regional planning initiatives (comprehensive, growth management, economic development, capital improvement, land development, and/or emergency management plans) and Federal Emergency Management Agency (FEMA) mitigation programs and initiatives that provide guidance to State and regional agencies. In the following sections we will demonstrate how Georgia has continued to meet this requirement.

6.1.1 Integration with Other Planning Initiatives

Georgia Emergency Management Agency's (GEMA) Hazard Mitigation Division has taken the lead for the integration and incorporation of the State mitigation planning process with other ongoing fed-

eral, state and regional planning efforts. A discussion on the integration with other state and regional planning initiatives is introduced in Chapter 1 and Chapter 3.

This section of the plan specifically details the steps Georgia has taken to integrate the GHMS into other state, regional, and FEMA initiatives. As noted in Chapter 1, the State Hazard Mitigation Plan-

Agency	Initiative	Description of GHMS Integration into Initiative
GFC	Community Wildfire Protection Plans (CWPPs)	- CWPPS to be updated during local hazard mitigation plan (LHMP) updates - CWPPs to include information to meet FEMA hazard profile requirements - CWPPs integrated with LHMPs
DCA	Disaster Resilient Building Codes (DRBC)	The State Mitigation Officer and Floodplain Coordinator served on the DRBC Task Force to establish and implement the DRBC appendices to the IBC and IRC. DCA developed and conducted a comprehensive training program for code enforcement officials on the importance, implementation and enforcement of DRBC appendices.
DCA	Comparative analysis of Comprehensive Plans, Regional Plans, and Local Hazard Mitigation Plans	Members of the Hazard Mitigation staff provided input into the initiative to compare comprehensive plans, regional plans, and local hazard mitigation plans to determine commonalities and parts of each type of plan that would benefit the other.
DCA	HAZUS-MH Pilot	DCA in coordination with the Polis Center at IUPUI developed data layers to enhance HAZUS-MH models in Georgia. This includes a workflow to translate local government Computer Aided Mass Appraisal (CAMA) information into a parcel-based building inventory map for HAZUS-MH analysis producing detailed exposure and loss estimates for the modeled disaster scenarios. For four counties a risk assessment using HAZUS-MH models incorporated data from GMIS. GEMA staff participated in the presentation of materials to counties.
GEMA	GMIS	GMIS supports the documentation and implementation of mitigation activities through mapping and reporting of Critical Facilities, Mitigated Properties, and National Flood Insurance Program (NFIP) Properties.
GEMA	Disaster Recovery Program Workshops	GEMA mitigation staff provided training to local government officials on HMA programs.
DNR	Risk MAP	GEMA mitigation staff provided data to support discovery maps and presented mitigation information at the Risk-MAP Discovery & Resilience Workshops.
Georgia Department of Juvenile Justice (DJJ)	Safety and Security Plan	DJJ created an Emergency Operations Unit to handle mitigation activities with a focus on safety and security of the facilities and staff.
Board of Regents (BOR)	Mitigation Plans	BOR encourages each campus to have a hazard mitigation plan and that they work with the counties in the update of their local hazard mitigation plans.

Table 6.2 GHMS Integration into Other State Initiatives

ning Team involves numerous state and Federal agencies that meet together on a regular basis throughout the planning period. The purpose of these meetings is twofold. First, they allow for the input of these various agencies into the planning process. Second, they allow for the dissemination of mitigation related information; including current activities, available programs and plan related information to the participating agencies.

Information provided by each agency has been collectively reviewed to accomplish the following objectives:

1) Incorporate mitigation data or resources into emergency management plans and activities;
2) Link program and planning initiatives to support specific hazard mitigation strategies;
3) Check for planning initiatives that promote mitigation as part of authorities and responsibilities; and
4) Coordinate with other state and regional agencies to incorporate hazard mitigation into their own programs, regulations, and activities.

The above mentioned meetings allow for the input of various agencies into the planning process. In addition, they also provide the opportunity for interaction between the participating agencies and the encouragement to take the information from the meetings and the plan document back to their respective agencies for incorporation, as applicable, into their various short and long term plans and programs.

This section includes information from the state agencies and their programs in the effort to accomplish mitigation goals. Throughout the planning process, GEMA utilized information provided by the agencies. State agencies were also valuable contributors to the review and update of the goals and actions provided in Chapter 3. Many of these agencies provided GEMA with information on how they planned to achieve the goals and actions that are specific to their program area.

Table 6.2 has been updated to provide examples of how the Georgia Hazard Mitigation Strategy (GHMS) is integrated and incorporated into other agency activities and their programs.

6.1.2 Integration with Regional Planning Initiatives

GEMA has been working very closely with numerous state agencies and non-governmental organizations over the past three years to pass along the benefits and concepts of hazard mitigation and how to incorporate these ideas into their own programs, regulations, and activities. In Georgia, we have the fortunate situation of a positive relationship among all state agencies and non-governmental organizations. Each organization and their individual representatives have been proactive in their ideas and efforts to work together to help the citizens of this state. The following are lists of opportunities we took advantage of to integrate hazard mitigation into other organization's programs.

Georgia Department of Community Affairs HUD Disaster Recovery Enhancement Fund Grant
Following the presidentially declared disasters in 2008 (DR1750 and DR1761), which included severe weather and tornados affecting over 20 counties in north and central Georgia, DCA received funding from HUD to increase disaster mitigation education and review consistency among various

required planning documents throughout the state. GEMA and DCA staff met numerous times with the consultant (AMEC) to develop a system that compares local comprehensive, regional and mitigation plans for commonality and identification of areas that could benefit each and help communities look ahead at their direction of growth and possible affects by natural hazards.

The review process identified several areas that could benefit local community plans by incorporating separate section of each plan. For example comprehensive and regional plans could benefit from the hazard analysis contained in the hazard mitigation plan so that communities keep hazards in mind when making plans to expand. The local mitigation plans can benefit from the comprehensive plans by incorporating future growth patterns, not just looking at current building stock. This shared information makes all three plans more valuable to the counties and their citizens.

DCA and GEMA conducted three workshops throughout the areas affected of DR1750 and DR1761, and met with county and city officials to discuss the benefits of combining data sources. The ideas and suggestions were well received and this information was passed on to other regions that develop these plans.

Georgia's Coastal Zone Management Program

GEMA has been working closely with DNR Coastal Resource Division over the past few years to determine the effects of sea level rise on our coastal areas and their natural assets. A number of federal and state funded studies are underway. Sea level rise is not an immediate natural hazard, however, over the next 100 years, its effects to Georgia's coastline and natural habitats could be detrimental. Increased sea level can affect the amount of tidal surge during hazard events such as a hurricane or tropical wind event.

Georgia's coast has experienced some effects of rising sea levels and changing inland waterways. To what level is still being determined. Current studies estimate that Georgia's sea level has risen approximately 3mm/year over the past 70 years. Also, during that time, rates of residential and infrastructure development along coastal Georgia's waterways have increased significantly, resulting in more persons and property at risk. Scientists predict that the rate of global mean sea level rise during the 21st century will exceed the rate observed from 1971 thru 2010. If these predictions materialize we will need to develop plans and actions to counter the effects.

Post Disaster Redevelopment Plans

Georgia's coast has not been hit directly by a major storm in over 100 years. It is important that the state and local communities not become complacent and diligently create disaster resilient plans and incorporate long-term planning for natural disasters into both their state and local management processes. It is important that preparations be initiated to reduce our vulnerabilities to probable coastal related natural disasters and potential changes from sea-level rise. GEMA in conjunction with DCA and DNR are in the process of developing a plan to guide coastal communities in their redevelopment after a major natural disaster. The plan will revise state policies on the post-disaster repair and rebuilding of homes, businesses, permitted piers, docks, marinas, etc. Upon completion, this model plan will be used as a guidance document to prepare post-disaster redevelopment plans for coastal and inland communities throughout the state.

Regional Commissions (RC)

A Regional Commission (RC) is a multi-county planning and development organization that partners with local governments in their planning and development efforts and can also serve as a service delivery organization. RCs often constitute the local and regional layers of Georgia's "bottom-up" planning philosophy. RCs are owned and operated by the local governments that they serve. The RCs help counties plan and secure funding for development with projects such as construction, repair or upgrade of roads, repair or upgrade of bridges and water and sewer lines, industrial park development as well as projects related to community services, education and workforce development.

The Department of Community Affairs contracts with the RCs to provide a variety of services mandated in the Georgia Planning Act. These services include assisting local governments with comprehensive planning, regional transportation plans, and specific plan implementation activities such as developing new zoning ordinances or putting a GIS system in place.

A comprehensive plan outlines a framework for the development of an area, recognizing the physical, economic, social, political, aesthetic and related factors of a community. A comprehensive plan typically results from lengthy and intensive analysis, includes a long-range scope (usually 20 years or more) and provides the overall guiding principles for growth and development of a community.

Regional Transportation Plans (RTP) are integral parts of the Statewide Transportation Improvement Plan - Georgia's four-year transportation and capital improvements program. The RTP examines regional and county transportation needs over the next 20+ years and provides a framework to address anticipated growth through systems and policies. It contains both short- and long-term transportation strategies to improve mobility and investments to improve the region's transportation system.

A significant number of counties contracted with the RCs in the development of their multi-jurisdictional Hazard Mitigation plans. While there is no formal programmatic working relationship where GEMA has any agreement directly with the RCs, by default of many of Georgia's counties contracting with RCs to develop and update their local mitigation plans, GEMA mitigation staff has worked very closely with most of the State's 12 RCs on this planning effort over the previous years.

In addition to assisting local communities with their local planning efforts, RCs also conduct regional planning initiatives to help guide local planning efforts and to encourage cooperation between counties where such cooperation would be beneficial to the region. The regional planning efforts include, but are not limited to, items such as economic development, natural and cultural resources, land use, transportation, etc. On cursory review, hazard mitigation is included, even if mostly indirectly, in regional planning efforts. A stated part of natural resources protection is maintaining a river or stream's capacity to handle increased water levels, which otherwise, would result in flooded areas. Another part of natural resources protection is protecting these areas from incompatible development. In the case of rivers and streams, it includes protecting the banks and floodplains.

In addition, local governments are required to remain consistent with their RC's Regional Plan in order to maintain their Qualified Local Government status with the State of Georgia. Some regional plans include updating and adopting a Hazard Mitigation Plan as part of the minimum requirements

for a local government to remain consistent. This is consistent with the State Plan's strategy of maintaining approved status for all 159 counties and their municipalities.

The State will continue to work with DCA and the RCs to develop GIS capabilities which can provide communities with a better understanding of hazards that possibly affect economic development. The GEMA mitigation staff and the RCs will continue to work closely to keep the counties informed of mitigation initiatives in their region. GEMA plans to keep a close working relationship with the RCs in developing local plan updates as they become due.

HAZUS-MH Training

During 2012 - 2013 the Georgia Department of Community Affairs was the recipient of a special competitive grant from the US Department of Housing and Urban Development. The HUD Disaster Recovery Enhancement Fund was a one-time supplement to the Community Development Block Grant Program for states with presidentially declared disasters during 2008. DCA used part of their award to partner with the Federal Emergency Management Agency, the Georgia Emergency and the Georgia Regional Commissions to educate a cadre of Georgia students in the use of FEMA's HAZUS-MH risk assessment software.

DCA in partnership with the POLIS Center at Indiana University Purdue University, and FEMA's Emergency Management Institute provided a basic series of HAZUS□MH training courses to GEMA Hazard Mitigation planners, regional Commission personnel, county planners, and others in order to learn how to use and benefit from this software program. There were about 20□30 students in each class, spread over three locations (Atlanta, Savannah, and Macon). FEMA provided teleconferencing from Atlanta to classrooms in Macon and Savannah, as well as subject matter experts in all three classrooms. 22 students completed the courses to receive FEMA certification as HAZUS Trained Professionals and the more advanced HAZUS Practitioner Certificate.

They also developed a workflow to translate local government Computer Aided Mass Appraisal (CAMA) information into a parcel-based building inventory map for HAZUS analysis producing detailed exposure and loss estimates for the modeled disaster scenarios. Augusta-Richmond County was selected as one of the four pilot counties for the development of their pre disaster mitigation plan processing procedures. This process can now be readily applied to all of the other 141 Georgia counties that use similar WinGAP CAMA systems.

HAZUS-MH is a nationally applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. Government planners, GIS specialists, and emergency managers use HAZUS-MH to determine losses and the most beneficial mitigation approaches to take to minimize them.

Some of the benefits of these courses were: the updated 2010 demographics in HAZUS inventory which can be used to estimate losses; embedded GEMA Georgia Mitigation Information System (GMIS) Essential Facilities (Fire, Police, Schools, Hospitals) into HAZUS inventory; used to estimate losses; custom tools to import Georgia parcel maps and WinGAP assessor data to create county-wide building inventory maps and to update the general building stock maps used to estimate loss-

es; custom tools and documented workflow to produce multi-hazard risk assessments and reports; and better coordinated inter-agency, inter-governmental hazard mitigation planning partnership.

Georgia Association of Floodplain Management

The Georgia Association of Floodplain Management (GAFM) promotes advances in floodplain management. As a chapter of the national organization, the Association of State Floodplain Managers (ASFPM), opportunities exist to link to a nationwide network with similar aims. GAFM seeks to find and make possibilities for the presence, thoughts and actions of its members to affect and integrate within public policy the best known management practices expressing collective intent and experience, thereby initiating within the general populace the recognition towards, and resonance with sound floodplain, stormwater, wetlands, river corridor, and coastline management as an imperative duty of environmental stewardship, described by the actions, examples and contributions of its members.

The GAFM provides educational opportunities allowing dissemination of general and technical information, in order to keep its members abreast with the advancement of floodplain and stormwater management knowledge. GAFM encourages the exchange of information, ideas and experiences among the practitioners and advocates of floodplain, stormwater, wetlands, river corridor, and coastline management.

Due to its role as the State Floodplain Coordinator, the Floodplain Management Unit of the Georgia Department of Natural Resources, Environmental Protection Division (DNR-EPD/FM) has a strong working relationship with GAFM and GEMA. The State will continue to work with DNR-EPD/FM on the implementation of mitigation plans and projects. GEMA staff has supported each of GAFM's annual workshops and a few of the regional workshops to provide mitigation information to its members. GEMA mitigation staff will continue to coordinate with DNR-EPD/FM and GAFM to inform them of mitigation initiatives in their region.

Metropolitan North Georgia Water Planning District (MNGWPD)

The Metropolitan North Georgia Water Planning District (District) was created by the Georgia General Assembly in 2001 (O.C.G.A. 12-5-570) and is currently comprised of 15 counties, 92 cities and 7 water authorities in the Metropolitan Atlanta area. Per this legislation, the District developed three water management plans and five model ordinances, including the Model Floodplain Management / Flood Damage Prevention Ordinance. Each year the District surveys the jurisdictions to report activities and achievements.

The purpose of the Flood Damage Prevention Ordinance is to protect, maintain and enhance the public health, safety, environment and general welfare and to minimize public and private losses due to flood conditions in flood hazard areas. Furthermore, the intent of the ordinance is to protect the beneficial uses of floodplain areas for water quality protection, stream bank and stream corridor protection, wetlands preservation, as well as ecological and environmental protection. The model ordinance requires local governments to adhere to a 3 foot freeboard requirement which will significantly reduce future flood damages and flood insurance premiums on new and substantially improved structures.

All of the jurisdictions surveyed in 2012 except for two have adopted the Model Floodplain Management / Flood Damage Prevention Ordinance or equivalent regulations. This ordinance is intended to minimize future flooding impacts and integrate floodplain management with stormwater management during the land development process by promoting the No Adverse Impact approach. Eighty-seven of these jurisdictions have incorporated the new floodplain management provisions into their local development review process.

As part of the adoption of the model floodplain ordinance, local jurisdictions are required to delineate the future-conditions hydrology 100-year floodplain within their jurisdictions. The ordinance also requires the local government to regulate floodplains on all streams with a drainage area of 100 acres and greater. Future-conditions flood studies are based on the best estimates of future land use conditions within a watershed. Local governments are responsible, at a minimum, for delineating future-conditions floodplains for all streams with a drainage area of one-square mile or greater. Forty-seven communities have responded by providing completed mapping of future-conditions floodplains within their jurisdictions, while another 25 have partially completed mapping in their city or county. Eight jurisdictions currently have a RFP or contract in place for the mapping of future-conditions floodplain, and/or they have completed some preliminary technical work.

6.1.3 Integration with Federal Programs and Planning Initiatives

This section of the plan includes federal programs that GEMA and the State of Georgia utilize, which includes regulations that provide local communities with guidance for state and regional agencies. The State integrates several FEMA programs to accomplish our mitigation goals. Table 6.3 summarizes the Federal Program or Planning Initiative and how GHMS is integrated into them.

National Flood Insurance Program (NFIP)
The Georgia Department of Natural Resources (DNR), Environmental Protection Division (EPD) is a cooperating technical partner (CTP) with FEMA in the administration of the NFIP. GEMA works closely with the DNR floodplain management staff on NFIP issues as project eligibility requirements for mitigation grants depends on NFIP participation. Flood insurance, floodplain management, and flood hazard mapping are the three main components of the NFIP. Federally backed flood insurance is available to homeowners, renters, and business owners in communities who voluntarily participate in the NFIP. Increasing participation in the NFIP and encouraging property owners to purchase flood insurance significantly reduces disaster losses. There are 643 counties and cities in Georgia, of which 84% participate in the NFIP. The number of participating communities has increased by 14% since the last plan update.

- Coastal model flood ordinance (coastal communities only)
- Riverine model flood ordinance (non-coastal communities)
- Metropolitan North Georgia Water Planning District (for the fifteen counties currently comprising the Water Planning District as established in 2001 by Senate Bill 130 and subsequently modified)

Federal Program or Planning Initiative	GHMS Integration into Initiative
NFIP	Potential applicants must be good standing in NFIP to be eligible for any mitigation project funding.
CRS	Prioritization of mitigation funds for CRS communities. 43 communities have incorporated CRS principles and practices into their local mitigation strategies.
RISK MAP	Mitigation information incorporated into discovery and resilience workshops.
FMA	Projects must be identified in local mitigation plans. More than $9.9 million for planning and projects designed to reduce or eliminate flood hazard caused damages throughout the State.
HMGP	Projects must be identified in local mitigation plans. More than $142.9 million for planning and projects designed to reduce or eliminate hazard caused damages throughout the State.
PDM	Projects must be identified in local mitigation plans. More than $38 million for planning and projects designed to reduce or eliminate hazard caused damages throughout the State.
EMPG	EMPG funds utilized to improve warning and communication throughout the State.
HAZUS-MH	Level two data developed for 4 pilot communities which will be utilized for local plan updates and workflow developed to incorporate parcel level data for 141 of Georgia's 159 counties.
EMAP	Integration of EMAP standards including hazard vulnerability and risk assessments, state and local mitigation plans, grant administration and public education and outreach.
PA	Mitigation information provided to potential applicants at DRP and applicant briefing workshops. State staff supports Section 406 mitigation and State match assistance provided to implement Section 406 mitigation projects.
Silver Jackets	State lead team activities support GHMS and integration of mitigation into recovery actions.
NRCS	State match assistance provided to local sponsors to implement EWP projects for the restoration of impaired watersheds.
NWS	Support of Georgia Storm Ready Program and prioritization of warning grants for Storm Ready communities.

Table 6.3 GHMS Integration with Federal Programs and Initiatives

Other Floodplain Management Information

- Floodplain Management Quick Guide: a reference manual for local officials, floodplain administrators, and persons newly involved in floodplain determinations, enforcement and reviews.
- (http://www.gaepd.org/Files_PDF/techguide/wpb/GAQG2009_ScreenView.pdf/)
- Flood Insurance Rate Maps, Flood Hazard Boundary Maps, and Flood Insurance Studies: Contact the Georgia Floodplain Management Office.
- GA DNR's Outreach Planning Guidebook for Local Governments
- Offsite Links
    - ◊ FEMA On-line Library
    - ◊ Georgia Flood MAP (http://www.georgiadfirm.com/)
    - ◊ GAFM (http://www.gafloods.org/)
    - ◊ ASFPM (http://www.floods.org/)

In an effort to increase the number of NFIP participating communities, the State requires NFIP participation to be eligible for mitigation funding. Since the inception of the HMGP, several communities

have joined the NFIP in order to get HMGP funds. The majority of these new NFIP entrants can be attributed to this requirement due to the popularity of the warning grants and other statewide mitigation initiatives.

Community Rating System (CRS)
Information about the CRS program is detailed in Chapter 3. In partnership with DNR, GEMA mitigation staff promotes the CRS program at mitigation workshops. In an effort to increase the number of CRS participating communities and improved classification, the State incorporates CRS information into the overall ranking of mitigation projects. As shown in Chapter 3, the number of CRS communities has increased by 34% in the last three years.

Georgia Community Rating System (CRS) User's Group Activity
The Georgia CRS users group held their first meeting in May, 2012. Six communities participated along with one private firm in an informal, round table discussion around what neighboring communities are doing in the CRS Program and the challenges they face. Suggestions were made from other communities who have dealt with similar issues and how they had met those challenges.

The CRS User's Group continues to grow and other Georgia communities are encouraged to join. It has been reported that communities have improved their CRS rating a full class just by better understanding the ways they can improve their local program using knowledge gained at these meetings.

Discussions have taken place at the State's quarterly Silver Jackets meetings to see how this group might provide support to increase the efficiency of the CRS users group and increase participation in the CRS.

Georgia Flood Mapping, Assessing, and Planning (MAP) Program
As part of a Cooperating Technical Partner (CTP) Agreement with FEMA, the Georgia Environmental Protection Division (EPD) under the Department of Natural Resources (DNR) accepted delegation and responsibility of the Map Modernization program for the State of Georgia. Georgia's Flood Map Modernization program concluded in July 2012, which provided updated, easily accessible Digital Flood Insurance Rate Maps for 159 counties and over 530 municipalities.

Building on the strengths of the Map Modernization program, FEMA has a new effort in helping communities nationwide to assess their risk associated with flooding, and minimize, or avoid altogether, damage they experience in the face of future flooding disasters. This program, called Risk MAP (Mapping, Assessment and Planning) combines quality engineering with updated flood hazard data to help communities plan for and reduce losses due to flooding using the best possible, most current information.

Figure 6.1 RiskMAP Diagram

Continuing as a CTP with FEMA, the EPD is facilitating the implementation of FEMA's Risk MAP Program through its Georgia Flood MAP (Mapping, Assessment & Planning) program.

This will provide direct management and support of all regulatory, engineering, and mapping activities within the State of Georgia. EPD is committed to developing a fully integrated floodplain management program that incorporates:

- Mapping needs assessments;
- Project scoping;
- Hydrologic and hydraulic modeling;
- Floodplain delineation;
- An internal quality control process for all aspects of the program;
- Digital Flood Insurance Rate Map (DFIRM) revisions;
- Post preliminary DFIRM processing; and
- Risk Assessment & Communication.

Benefits to Georgia communities and citizens include:

- The updated study data will provide more accurate information for Georgia communities to help with design decisions when rebuilding after flood disasters, building new structures and infrastructure, and when retrofitting existing structures.
- DFIRMs will more accurately depict flood risk information.
- Users will be able to make more precise flood risk determinations.
- Builders and developers can use the updated map data to determine where and how to build structures more safely and how high to build to reduce the risk of flood damage.
- Real estate agents will be better able to inform clients of the risk factors that may affect the property they are buying or selling as well as any flood insurance requirements.
- Insurance agents will know their clients' current flood risk and can provide more informed recommendations regarding flood insurance coverage options.
- Residents and business owners will understand their current flood risk and be able to make better decisions about insuring and protecting their property against floods.
- Community officials will be able to develop more comprehensive approach to disaster mitigation planning, economic development and emergency response, resulting in a safer Georgia in which to live and work.
- The Non-Regulatory products will provide substantially more and detailed information to communities to enable them to identify mitigation activities and for local plan updates. These products can further identify where flooding may take place within a community. Developing the additional locations could be used to help prioritize potential mitigation actions within the community. These products include changes since last firm, depth and probability grids, HAZUS-MH loss estimates, and areas of mitigation interest.

RISK MAP Activities

Upper Chattahoochee River Basin (UCRB) Project

In April 2010, the Georgia Department of Natural Resources – Floodplain Management (GA DNR) launched the UCRB RiskMAP project that will assess and re-map flood risks along a 107-mile stretch of the Chattahoochee River Basin, including Cobb, Coweta, DeKalb, Douglas, Forsyth, Fulton and Gwinnett Counties. The new study will replace outdated detailed studies within the basin that date back as far as 1977. The updated maps will incorporate studies using new technology that

results in more accurate measurement and modeling. The models will also incorporate data collected from recent flooding, such as the widespread floods of September 2009 to ensure that the new flood maps reflect the effects of actual flooding events that have occurred in the region.

Scoping meetings were held with each county and extensive surveying performed. Preliminary flood maps were completed and made available for public review in September- November 2011 and became effective in the March-April of 2012. Over 50 meetings were held within the project area following the issuance of the Preliminary Maps. Letters of final determination were completed in the August-November 2012 and the new maps went effective February-May 2013. DNR in partnership with GEMA and FEMA hosted Disaster Resilience workshops for each of the communities when the new maps and products were completed. With the new maps and associated studies, government agencies, residents, and businesses throughout the upper Chattahoochee River region will have more up-to-date information about their flood risks and the data will be easily available online.

In addition, the non-regulatory products produced will further support the identification of mitigation projects and local mitigation plan updates.

Georgia Coastal Mapping Project

GA DNR launched its second Georgia Flood MAP project in the fall of 2010. The Georgia Coastal Mapping Project will involve two different studies (riverine and coastal) in nine coastal counties (Bryan, Camden, Charlton, Chatham, Effingham, Glynn, Liberty, Long, and McIntosh). The coastal study will provide the most detailed analysis of the flood risk along the coastline ever performed. New elevation and updated storm data will be used along with the latest computer models and high-capacity systems to generate Georgia's most accurate coastal study, flood maps and improved understanding of the coastal flood risk. While this is occurring, a second study will be ongoing that will map in more detail select watersheds in the nine coastal counties. Again, new elevation and storm data will be used to more accurately model and map the current flood risk. The preliminary FIRMs for the coastal phase are expected to be issued in the Spring of 2015.

Initial Discovery Meetings for Three Watersheds

In the spring of 2012, in partnership with GEMA and FEMA, the GA DNR conducted the Discovery Process for communities within the Middle Chattahoochee, Upper Ocmulgee, Middle Savannah and Upper Savannah Watersheds. This process began with online surveys to obtain basic needs documentation from communities followed by one-on-one telephone interviews to determine the detailed mapping needs of the community as well as mitigation efforts in place. After information was obtained from communities, as well as GA DNR, FEMA and GEMA, watershed-wide Discovery Meetings were held to further explain this new initiative to stakeholders while encouraging intercommunity dialogue and mitigation planning. Communities shared information with one another about capital improvement projects within the watershed as well as major mitigation projects (both ongoing and planned) in addition to major flooding and mapping issues. Community participants included emergency managers, planners, engineers, zoning administrators, permitting officials, among other technical staff.

In January 2013, a new flood hazard mapping project commenced that will assess and re-map the flood risks within the Middle Chattahoochee – Lake Harding and Upper Ocmulgee River Basin watersheds. Project kick-off meeting were held throughout each watershed to introduce the project scope to all impacted communities. GA DNR and its contractors have engaged county and community officials as well as industry stakeholders from the involved counties to share information as well as receive updated information related to local flooding as well as any new detailed studies that may have been locally performed.

DNR has published newsletters that provide much more detail on the RISK MAP activities. These newsletters can be accessed on the GeorgiaDFIRM website. As part of the transition to Georgia Flood MAP Program, the GeorgiaDFIRM.com website has been updated to more effectively distribute comprehensive information about the program to floodplain management officials, property owners, and other community stakeholders. The website contains background information, status reports, technical data, outreach materials, and valuable links to other pertinent information.

GEMA works closely with State floodplain management staff to advance the Map Modernization and Risk MAP initiatives. Mitigation staff supported all of the discovery meetings with data and presentation of information. In addition, staff supported all of the Disaster Resilience Workshops. These improved flood maps and non-regulatory products will lead to a much more refined risk assessment in our ongoing efforts to reduce Georgia's flood vulnerability. GEMA has worked with some of the communities in the RISK MAP study area to utilize the non-regulatory products to select future flood mitigation projects.

Flood Mitigation Assistance (FMA)

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. Georgia has utilized planning, project, and technical assistance grants through the FMA program. As noted in Section 6.5, FMA funds are utilized to develop flood mitigation plans and implement projects that reduce or eliminate claims against the NFIP primarily through property acquisition. With the recent update to the FMA program to incorporate Severe Repetitive Loss (SRL) and Repetitive Flood Claims programs, the State has focused its efforts for the HMA13 application cycle to address SRL properties.

Hazard Mitigation Grant Program (HMGP)

The Hazard Mitigation Grant Program (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.

The Disaster Mitigation Act of 2000 (DMA2K) placed a much greater emphasis on risk-based data driven mitigation plans. Georgia utilized primarily PDM funds to meet the initial development of state and local mitigation planning requirements of DMA2K. For the initial plan development, 20 of the state's 159 counties received HMGP planning assistance with the remainder receiving assistance through the PDM program. Through the Enhanced Plan, the State has received a 33% increase in

mitigation funds in the aftermath of a disaster for DR1833, DR1858, and DR1973. This has made additional funds available to meet the plan update funding needs in Georgia. HMGP grants are a major component of funding Georgia will utilize to not only update plans but to implement state and local projects identified in these plans. With the increase in HMGP funds due to the 6 presidential disaster declarations since 2007, the majority of the local plan updates are being funded through the HMGP 7% allocation. HMGP funds have been utilized to fund the completion of the first local plan update cycle and the third State Mitigation Plan update.

Pre-Disaster Mitigation Program (PDM)

The PDM program provides funds to states, territories, Indian tribal governments, and communities 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.

The 44CFR Part 201, Hazard Mitigation Planning, established criteria for State and local hazard mitigation planning authorized by Section 322 of the Stafford Act, as amended by Section 104 of the Disaster Mitigation Act of 2000. State and local mitigation plans meeting these criteria must be approved in order to receive PDM funds for State and local mitigation projects. Therefore, the development and update of State and local mitigation plans is essential to maintain eligibility for future PDM funding.

The State has utilized the PDM program to fund the initial development of multi-jurisdictional planning grants for 136 counties and plan updates in 3 counties. The State is pursuing PDM funds through the FY13 application cycle to start the second local plan update cycle for 28 counties. Section 6.5 includes a further discussion on the utilization of the PDM program since its inception in 2002. GEMA mitigation staff works closely with local governments to develop and submit projects and plans for funding consideration. Mitigation staff has also served on the national review panel and GEMA will continue to support the development of plans and projects for future PDM funding.

HAZUS-MH

HAZUS-MH is a nationally applicable standardized methodology and software program that contains models for estimating potential losses from earthquakes, floods, and hurricane winds. HAZUS-MH was developed by the Federal Emergency Management Agency (FEMA) under contract with the National Institute of Building Sciences (NIBS). Loss estimates produced by HAZUS-MH are based on current scientific and engineering knowledge of the effects of hurricane winds, floods, and earthquakes. Estimating losses is essential to decision-making at all levels of government, providing a basis for developing mitigation plans and policies, emergency preparedness, and response and recovery planning.

HAZUS-MH uses ArcGIS software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure. It also allows users to estimate the impacts of hurricane winds, floods, and earthquakes on built environment and populations. HAZUS-MH is

fast-running to facilitate use in real time to support response and recovery following a natural disaster.

HAZUS User Groups (HUGs) have been in existence since 1997. These public-private partnerships between public, private, and academic organizations use HAZUS-MH software and technology to build enhanced disaster-resistant communities and save lives, time, and dollars. Georgia has its own chapter which is very active.

In addition, as described in Section 6.1.2 above, The Georgia Department of Community Affairs, with the support of the Georgia Emergency Management Agency, conducted HAZUS-MH training in three locations throughout the state for local communities and interested Regional Commissions. This training will allow more local communities to make use of the program for their planning needs.

Emergency Management Performance Grants (EMPG)

Concerning the enhanced plan element of plan integration, one of the examples of demonstrated integration with FEMA programs and initiatives include how the enhanced plan guides activities funded by EMPG.

One activity funded through the EMPG was the Emergency Management Accreditation Program (EMAP) certification. EMAP is a standard-based voluntary assessment and accreditation process for state and local government programs responsible for coordinating prevention, mitigation, preparedness, response, and recovery activities for natural and human-caused disasters. Accreditation is based on compliance with collaboratively developed national standards, the EMAP Standard. (The EMAP Standard is based on the NFPA 1600 Standard on Disaster/Emergency Management and Business Continuity Programs, 2004).

Georgia went through the EMAP reaccreditation in March 2013. Georgia received full reaccreditation on the 64 standards in May 2013. The Georgia programs continue to meet national standards for disaster preparedness and response. The Georgia Mitigation Information System was noted as a best practice in our exit interview.

Starting in Fiscal Year 2008, GEMA established criteria for local EMAs to be eligible for additional funds above the baseline EMPG allocation. These response and recovery project competitive award criteria demonstrate enhanced plan integration. In order to be eligible for these enhancement grants, local governments must have an approved local hazard mitigation plan or be in the process of updating their plan to meet the five year recertification. In addition, the local government must be in good standing in the NFIP. Since the time of the last update, an additional $1.02 million has been awarded to 33 local governments for warning and communication enhancements. As a result of this initiative, almost $1.5 million has been awarded to 59 local governments to implement projects to improve warning and communication.

Public Assistance Program

The objective of the Federal Emergency Management Agency's (FEMA) Public Assistance (PA) Grant Program is to provide assistance to State, Tribal and local governments, and certain types of Private Nonprofit organizations so that communities can quickly respond to and recover from major

disasters or emergencies declared by the President. Through the PA Program, FEMA provides Federal disaster grant assistance for debris removal, emergency protective measures, and the repair, replacement, or restoration of disaster-damaged, publicly owned facilities and the facilities of certain Private Non-Profit (PNP) organizations. The PA Program also encourages protection of these damaged facilities from future events by providing assistance for hazard mitigation measures during the recovery process, which is commonly referred to as Section 406 mitigation.

Georgia utilized Section 403to assist with the implementation of the HMGP for DR 1858. Both programs (HMGP and PA) were packaged to local governments in an effort to maximize the number of substantially damaged (SD) properties that could be mitigated through property acquisition and demolition. The PA program was utilized to cover the expenses associated with the demolition of HMGP funded SD acquisitions. As a result of this initiative, more than $2 million in demolition expenses were covered by the PA program, which freed up these funds to acquire approximately 20-30 more SD properties.

Local governments are encouraged to pursue Section 406 mitigation. Public Assistance Mitigation Profile reports for DR 1833, DR 1858 and DR1973, which were pulled from FEMA's EMMI System, can be viewed in Appendix H. These reports show a significant amount of Section 406 mitigation completed for DR1833 and DR1858.

Silver Jackets

Effective and continuous collaboration between state and Federal agencies is critical to successfully reducing the risk of flooding and other natural disasters in the United States and enhancing response and recovery efforts when such events do occur. No single agency has all the answers, but often multiple programs can be leveraged to provide a cohesive solution. The Silver Jackets is an innovative program that provides an opportunity to consistently bring together multiple Federal, State and sometimes local agencies to learn from one another and apply that knowledge to reduce risk. The Silver Jackets program provides a formal and consistent strategy for an interagency approach to planning and implementing measures to reduce the risks associated with flooding and other natural hazards.

The program is a partnership of the U.S. Army Corps of Engineers, the Federal Emergency Management Agency (FEMA) and other federal and state agencies. Silver Jacket programs are developed at the state level with support from the Corps, FEMA and other Federal agencies. The program's primary goals are to:

- Create or supplement a mechanism to collaboratively address risk management issues, prioritize those issues, and implement solutions;
- Increase and improve risk communication through a unified interagency effort;
- Leverage information and resources, including providing access to such national programs as FEMA's Map Modernization program and RiskMAP programs and USACE's Levee Inventory and Assessment Initiative;
- Provide focused, coordinated hazard mitigation assistance in implementing high-priority actions such as those identified by state mitigation plans; and

- Identify gaps among the various agency programs and/or barriers to implementation, such as conflicting agency policies or authorities, and provide recommendations for addressing these issues.

The program's desired outcomes are:

- Reduced flood risk;
- Agencies better understand and leverage each other's programs;
- Collaboration between various agencies, coordinated programs, cohesive solutions;
- Multi-agency technical resource for state and local agencies; and
- Mechanism for establishing relationships to facilitate integrated solutions post-disaster

Georgia has developed a Silver Jackets team with a signed charter. The team meets on a quarterly basis or as needed to address flood risk reduction strategies. A copy of the charter along with GEMA's adoption can be found in Appendix H.

Team activities over the past three years have resulted in the development of Flood Forecast Inundation Maps (FFIM) similar to what was completed in Albany, Georgia. FFIMS have been completed for Suwanee Creek at Suwanee, Sweetwater Creek at Austell, Chattahoochee River at SR280 near Atlanta, and Peachtree Creek at Atlanta. FFIMs are under development for the Ocmulgee River at Macon.

The FFIMs assist federal, state, and local officials as well as property owners to be able to take action long before a flood actually happens to save lives and reduce property damages. This online tool helps identify where the potential threat of floodwaters is greatest, enabling federal, state, and local officials to better plan for flood response, resource recovery, and assess evacuation routes at various flood levels before the rain falls.

Pilot funds have been awarded for the Macon Levee Safety Project. This project will examine the high-risk problems of the reduced level of protection and under seepage and opportunities that could alleviate these problems, reduce the risk of loss of life and damages to property and support accreditation.

Pilot funds have been awarded to assist Augusta-Richmond County with the identification of cost-effective mitigation strategies for the Hyde Park area. The purpose of this project is for the Georgia Silver Jackets Team to assist the state and Augusta-Richmond County in eliminating the risk of loss of life and damages to 189 properties in Hyde Park.

Funding has been committed on each presidentially declared disaster to provide or assist with the non-federal match for locally sponsored projects under this program. Since 1994, almost $25 million has been approved on EWP measures and the State has provided $5.7 million as match for this program. Since the last plan update, GEMA and NRCS established a Memorandum of Understanding for DR1973 which authorized the State to provide 40% of the non-federal match requirement on all Emergency Watershed Protection projects approved by NRCS.

National Weather Service (NWS)
GEMA has continued its partnership with NWS on the StormReady program. This NWS program recognizes counties that have reached a high level of severe weather preparedness. StormReady counties have increased by 12 since July of 2010, presently reaching 79 total counties. In addition, GEMA supports the Atlanta Integrated Warning Team. This team is made up of staff from the National Weather Service, emergency management, the media, the private sector and social scientists to look for ways to improve the warning system and reduce weather related fatalities and injuries.

6.2 PROJECT IMPLEMENTATION CAPABILITY

The 44 CFR 201.5(b)(2) (i) and (ii) states the Enhanced Plan must document the State's project implementation capability, identifying and demonstrating the ability to implement the plan, including:

- Established eligibility criteria for multi-hazard mitigation measures; and
- A system to determine the cost effectiveness of mitigation measures, consistent with OMB Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, and to rank the measures according to the State's eligibility criteria.

Georgia Emergency Management Agency's Hazard Mitigation Division staff has overall responsibility for implementation of the Hazard Mitigation Assistance programs. These programs include the Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA) program, and Pre-Disaster Mitigation (PDM) program. The Biggert-Waters Flood Insurance Reform Act of 2012 incorporated elements of the Repetitive Flood Claims and Severe Repetitive Loss programs into the FMA program so the implementation of these two programs have been incorporated into the FMA program. State criteria have been developed for determining eligibility for all types of proposed multi-hazard mitigation measures for these programs.

The State utilizes the procedures outlined in the HMGP administrative plan for the administration of all of the programs mentioned above. The State submitted its last update to the HMGP administrative plan in May 2011 for the DR1973 disaster. The HMGP administrative plan was approved by FEMA in July 2011. See Appendix H for the HMGP Administrative Plan.

6.2.1 *Eligibility Criteria*

Applications that are received by the Hazard Mitigation Division for funding consideration through the HMGP, FMA, and PDM programs are reviewed for the following eligibility criteria:

- Conformance with the goals and actions of the State Hazard Mitigation Plan;
- Meets applicant eligibility requirements;
- Meets project type requirements which include but are not limited to:
    - ◊ Voluntary acquisition or relocation of hazard-prone structures for conversion to open space in perpetuity;
    - ◊ Retrofitting of existing buildings and facilities for wildfire, seismic, wind or flood hazards (i.e., elevation, storm shutters, hurricane clips), including designs and feasibility studies when included as part of the proposed project;

- ◊ Construction of “safe rooms”(i.e., tornado and severe wind shelters) that meet the FEMA construction criteria in FEMA 320 “Taking Shelter from the Storm” and FEMA 361 “Design and Construction Guidance for Community Shelters”;
- ◊ Minor structural hazard control or protection projects that may include vegetation management, stormwater management (e.g., culverts, floodgates, retention basins), or shoreline/landslide stabilization;
- ◊ Localized flood control projects that are designed specifically to protect critical facilities (defined as Hazardous Materials Facilities, Emergency Operation Centers, Power Facilities, Water Facilities, Sewer and Wastewater Treatment Facilities, Communications Facilities, Emergency Medical Care Facilities, Fire Protection, and Emergency Facilities) and that do not constitute a section of a larger flood control system;
- ◊ Development of State or local plans that meet DMA2K requirements; and
- ◊ Projects that improve the warning and communication capabilities of local governments for severe weather or emergency events (HMGP Only).

- Have a beneficial impact upon the project area;
- Be in conformance with 44 CFR Part 9, Floodplain Management and Protection of Wetlands and 44 CFR Part 10, Environmental Considerations;
- Solve a problem independently or constitute a functional portion of a solution where there is assurance that the project as a whole will be completed (Projects that merely identify or analyze hazards or problems without a funded, scheduled implementation program is not eligible.);
- Addresses a problem that has been repetitive, or a problem that poses a significant risk if left unsolved;
- Be cost-effective. Demonstrate that the project will not cost more than the anticipated value of the reduction in both direct damages (property) and subsequent negative impacts (loss of function, deaths, injuries) to the area if future disasters were to occur. Both costs and benefits will be computed on a net present value basis (i.e. obtaining expected damage estimates as a function of hazard intensity);
- Has been determined to be the most practical, effective, and environmentally sound alternative after consideration of a range of options, including the “no action” alternative; and
- Contributes, to the extent practicable, to a long term solution to the problem it is intended to address;
- Considers long-term changes to the areas and entities it protects, and has manageable future maintenance and modification requirements; and
- Have a federally approved hazard mitigation plan.

In addition, GEMA also considers the following criteria in evaluating proposed mitigation projects:

- Conformance with the goals and objectives of the Local Hazard Mitigation Plan. For each of the HMA programs, projects must be listed in plan;
- Mitigation activities that if not taken will have a severe detrimental impact on the community such as the loss of life, loss of essential services, damage to critical facilities, or economic hardship;
- Mitigation activities that have the greatest potential for reducing future disaster losses;

- Mitigation activities that are designed to accomplish multiple objectives, including damage reduction, environmental enhancement, historical preservation, recreational opportunities, and economic recovery;
- The community's level of interest and demonstrated degree of commitment to mitigation programs and activities;
- Communities participation in and compliance with the National Flood Insurance Program (NFIP); GEMA coordinates with the Georgia Department of Natural Resources in determining a community's compliance with the NFIP.
- The proposed project does not encourage development in a Special Flood Hazard Area;
- Applicant has the ability to provide for the non-federal cost share; and
- Applicant and/or local government that are receiving the mitigation benefit must be in good standing in the National Flood Insurance Program (exception for planning grants)

The eligibility requirements were reviewed during the update process. No changes were necessary.

6.2.2 *Cost Effectiveness Determination*

As stated in the above criteria, projects have to be cost-effective. Only projects with a benefit-cost ratio of at least 1 to 1 are forwarded to FEMA for funding consideration. The State utilizes a system to determine the cost-effectiveness of all mitigation measures consistent with OMB Circular A-94 for each project application submitted to FEMA for funding with the exception of Planning, TA/ Management, and Initiative projects. Prior to mitigation grant applications being scored for competitive ranking, GEMA Hazard Mitigation Staff works closely with each applicant to get sufficient documentation to determine if the proposed applications are cost-effective. Only projects with a benefit-cost ratio exceeding 1.0 are ranked for further funding consideration. Each analysis conducted by GEMA staff utilizes the most recent Benefit Cost Analysis (BCA) tools (current version is BCA Version 4.8.0) approved and provided by FEMA. State Mitigation staff work very closely with the sub-applicants on proposed grants to ensure they meet the minimum benefit cost requirements.

Although the state mitigation staff completes the benefit-cost analysis, they depend on information in the application provided by the community. To help communities develop mitigation projects that are as cost-effective as possible, and that have a benefit of one dollar for each dollar of cost, the mitigation staff developed the Pre-application and application specific worksheets for each type of project and are used for all of the mitigation programs. The information requested on the worksheets provides staff with the data necessary for an accurate and complete benefit-cost analysis. Sub-applicants submit the worksheets (pre-applications) for benefit-cost review, prior to moving forward with the completion of the full application. The worksheets are updated annually and utilized with every HMA application process.

The State has extensive experience in utilizing the FEMA developed benefit-cost modules. Since October 1, 1995, the State has utilized FEMA developed software to complete benefit-cost (BC) reviews for each mitigation project submitted for federal funding. Due to the high number of flood mitigation projects, the state has gained the most experience in utilizing the FEMA flood BC models (both Full Data and Limited Data).

Table 6.4 provides information on the total number of approved HMA projects that had a BCA submitted with the application. The table also shows the approved projects that had a BCA submitted with the application during this plan update cycle. The table does not show the other 506 approved HMA projects that are exempt from BC review. The exempt projects consist of planning, management cost, acquisition of substantially damaged properties, and initiative projects.

Project Type	Approved Projects with BCAs	Approved Projects with BCAs Since Last Plan Update
Acquisition w/ (Demolition or Relocation)	116	11
Acquisition and Elevation	3	0
Acquisition and Drainage Improvements	2	0
Elevation	7	0
Retrofit (Wind, Flood, Lightning)	15	0
Drainage Improvement	58	1
Safe Room	10	3
Totals	**211**	**15**

Table 6.4 HMA Projects with BCA

Our track record for submitting eligible projects for mitigation funding is exceptional, as the overwhelming majority of all projects submitted for funding consideration have received FEMA approval.

As part of populating the mitigated properties database, the State Mitigation staff is currently reviewing the BC information on all closed projects and ensuring that we have an updated BC analysis for all mitigated properties. This information is critical in documenting future successes of our completed mitigation activities.

Based on our review of all approved HMGP mitigation projects that had a property acquisition or elevation component, the State has completed an analysis using either the Full Data or Limited Data FEMA approved modules on more than 1,850 properties. This number only includes approved grants and does not include the hundreds of analysis completed on proposed grants that did not meet the minimum benefit cost requirements, as this data was not tracked in any of our historical databases. The State does not submit projects to FEMA for funding consideration where minimum federal project criteria are not met.

Based on the review of all approved HMGP mitigation projects that had a wind retrofit or building retrofit component, the State has completed an analysis using either the Hurricane or Tornado FEMA approved BC modules on 46 properties.

The approval rate of projects submitted in the Pre Disaster Mitigation – Competitive (PDM-C) program since its inception in 2003 is directly related to the technical accuracy, supporting documentation completeness, and credibility of the data in demonstrating the projects submitted for funding are cost-effective. FEMA Head Quarters staff recognized the State's efforts in this area by requesting Georgia share their experience with the rest of the States at the National Hazard Mitigation Assistance (HMA) summit in 2008.

All GEMA Risk Reduction Hazard Mitigation Division staff receive benefit-cost training from FEMA Region IV or at EMI to fully understand how to utilize the FEMA benefit-cost modules for completing the benefit-cost analysis. Each new employee as part of their training is required to attend the next available FEMA offered BC training courses.

The State has implemented hazard mitigation eligibility criteria reviews in 21 presidential declared disasters on 600 projects since 1990. In addition, similar types of reviews are done for the Flood Mitigation Assistance and PDM-C programs. The projects submitted have been diverse in nature and include drainage improvements, acquisition, elevation, wind retrofit, tornado safe room construction, planning, and many warning initiative projects.

The State's system for determining cost-effectiveness for Hazard Mitigation Assistance grants has been reviewed. The State continues to use the most recent FEMA BCA tools in determining cost-effectiveness for mitigation grants and the process is updated to incorporate these tools.

6.2.3 System to Rank Projects

GEMA Hazard Mitigation Division staff review all proposed mitigation pre-applications and applications to ensure that the proposed projects are eligible and meet minimum criteria as outlined above. In evaluating proposed projects, GEMA reviews, ranks and scores proposed projects. The State review criteria include a scoring sheet to determine potential for funding and overall priority within the application process. There are two basic types of projects: Regular Program Projects and Initiative Projects. Each has its own score sheet. The main categories utilized in ranking the Regular Program project submissions include natural hazard, history of damages, type of mitigation, potential impact on community, estimated environmental impact, community commitment to mitigation, and benefits. The ranking categories in the Initiative Project score sheet include History of Tornado Hazard in County, Potential Benefit to Community, Cost Effectiveness and Intangible Factors.

Each category within either score sheet is given a maximum range of points. Point amounts were developed over several years by the Hazard Mitigation staff and are based primarily upon HMGP guidelines. Maximum point possibilities per category range from 5 to 25 points and are listed below. The maximum amount of points any one project could accumulate would be 100. The Regular Program score sheet has a possible 10 bonus points which can be used in a tie breaker situation.

Categories included in the Regular Program score sheet are described here:

Natural Hazard Score – The natural hazard score is dependent upon the type of disaster, its location in regard to the coast and if a tornado is involved. A maximum of 25 points is possible in this section, depending upon the following criteria: the total amount of damage, the amount of flooding, proximity to the coast line and historic record of tornados in that area. In a post-disaster environment, priorities are established by the disaster type(s). In the event of multiple disasters scoring will be calculated for each event and combined to give an overall score. (In some situations with multiple disasters the score could exceed 25)

History of Damage in Project Area – Historical records of events in a county/project area and the likelihood of the event happening again will determine the total amount of points issued in this category. Five points are given for every event documented, up to a maximum of five events. The highest amount available in this category is 25 points.

Type of Mitigation – In this category the reviewer must determine if the mitigative action is Non-Structural or Structural. Examples of Non-Structural projects are flood proofing, retrofitting, elevation, acquisition and the implementation of stricter building codes. Structural projects would entail flood walls and storm water drainage improvements. The most effective type of mitigative action can garner 5 points.

Potential Impact on Community – Projects are prioritized by their ability to eliminate or reduce the effects upon the community by a disaster event. The failure to implement a project can have either a severe, moderate or no potential impact on a community. Depending upon the amount of perceived future impact avoidance, a project can accumulate up to 15 points.

Estimated Environmental Impact – Environmental impact is broken into three categories; Major, Moderate and Insignificant. A maximum of 5 points is awarded to the project according to its ability to reduce the impact of a disaster to the environment.

Intangible Factors – These factors include whether or not a community is storm ready, its CRS rating, amount of local cost share paid by the community and the community's experience in successfully completing mitigation projects.

Benefits – One point is awarded per $500,000 in hazard avoidance benefits to a community with a maximum of 15 points.

Bonus Point Section – (Tie Breaker) The State utilizes the quality of the data in the application as a tie-breaker if needed. A maximum of 10 points can be given to an application depending upon the quality of the data in the application, the amount of hazard data, damage history, cost data and environmental impact analysis. It is in this section that two applications with very similar scores are compared and a tie breaker is issued.

Initiative projects are non-competitive; however, they are competitive between each other for the funds available. Categories included in the most recently used Initiative Program score sheet are described here:

History of Tornado Hazard in County – The more likely a tornado event will occur determines the amount of points awarded a project. The likelihood is calculated based on the history of tornados in that area. The higher the likelihood the higher the points to a maximum of 25.

Potential Benefit to Community – One quarter of a point is awarded per 1,000 population warned per device. Maximum award possible 25 points.

Cost Effectiveness ($/per capita warned) – Cost effectiveness is broken down into 6 categories. Points are awarded based on the overall cost per capita warned. Maximum award is 25 points.

Intangible Factors – These factors include whether or not a community is storm ready and the communities experience in successfully completing mitigation projects. A maximum of 25 points can be awarded in this category.

Based on State priorities, non-structural projects such as acquisition, demolition, and relocation generally receive the highest ranking and the greatest consideration for funding. Planning projects are given priority over structural and non-structural projects due to the fact that a FEMA approved hazard mitigation plan is a requirement for a community to be eligible for a federal grant. Therefore, planning projects always receives a higher ranking than a structural or non-structural application. Counties involved in a Presidential Declaration are given priority over non-declared counties.

Appendix F provides the HMA score sheet used for the FMA grant for FY 2013. This score sheet is used to rank all of the HMA project grants that meet BC and other project eligibility criteria.

For the Flood Mitigation Assistance Program, additional criteria include the proposed project must address mitigating an NFIP insured property with repetitive loss and severe repetitive loss properties receiving priority.

6.3 PROGRAM MANAGEMENT CAPABILITY

The 44 CFR 201.5(b)(2) (iii A-D) states the Enhanced Plan must document that the State has the capability to effectively manage the HMGP as well as other mitigation grant programs, and provide a record of the following:

- Meeting HMGP and other mitigation grant application timeframes and submitting complete, technically feasible, and eligible project applications with appropriate supporting documentation;
- Preparing and submitting accurate environmental reviews and benefit-cost analyses;
- Submitting complete and accurate quarterly progress and financial reports on time; and
- Completing HMGP and other mitigation grant projects within established performance periods, including financial reconciliation.

This section of the plan demonstrates the State's capabilities to effectively manage the Hazard Mitigation Grant Program (HMGP) and other mitigation grant programs.

GEMA's Hazard Mitigation Division has primary responsibility for program management. The Division consists of a Planning Section and a Risk Reduction Section, with staff dedicated to providing technical assistance to state agencies and local governments on the development and implementation of mitigation plans and projects. Each section is supervised by a Program Manager who reports to the Division Director. The respective program managers review all activities of their program staff for compliance. The number of program staff can vary based on disaster activity. Since the last plan update, the Division has added one additional planner to support state and local plan updates. The

HMGP Administrative Plan details how the Hazard Mitigation Division administers the mitigation programs.

Program management is significantly enhanced by the vast experience of the Hazard Mitigation management team and staff. The management team averages more than 13 years of experience in the administration of the FEMA mitigation programs and program staff averages more than 5 years of experience.

Table 6.5 summarizes the Program Management Activities for each of the open allocations for this grant update cycle for the period October 1, 2010 through September 30, 2013. (NA = No activity during this timeframe) Timelines vary among the different types of grant programs. For example, the PDM Program is designed to assist States, Territories, Indian Tribal governments, and local communities to implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters. These grants are offered annually with the application period typically starting in June or July and ending in December. Awards for this type of grant typically are announced in January of the following year. PDM grants are now limited to two years including the period from the application close date. The total amounts of PDM grants are determined by Congress.

Program	Meet HMA Application Timeframe	Projects Submitted	Projects with Environmental	Projects w/ BCA	Quarterly and Financial Reports	Projects Completed Within POP
DR1560	NA	NA	NA	NA	Yes	1
DR1686	NA	NA	NA	NA	Yes	44
DR1750	NA	NA	NA	NA	Yes	6
DR1761	NA	NA	NA	NA	Yes	13
DR1833	18 months	9	5	3	Yes	31
DR1858	18 months	54	5	0	Yes	19
DR1973	18 months	49	19	7	Yes	3
PDMC07	NA	NA	NA	NA	Yes	5
PDMC08	NA	NA	NA	NA	Yes	2
PDMC09	NA	NA	NA	NA	Yes	2
PDMC10	NA	NA	NA	NA	Yes	1
PDMC11	6 months	4	3	3	Yes	0
PDMC12	6 months	4	3	3	Yes	0
LPDM08	NA	NA	NA	NA	Yes	6
LPDM09	NA	NA	NA	NA	Yes	3
LPDM10	11 months	2	1	NA	Yes	0
FMA07	NA	NA	NA	NA	Yes	1
FMA08	NA	NA	NA	NA	Yes	2
FMA09	NA	NA	NA	NA	Yes	2
Totals		**122**	**36**	**16**		**141**

Table 6.5 Program Management Project Summary since October 1, 2010

The Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. Post disaster grants are only awarded after presidentially declared disasters and are subject to FEMA's determination of loss. These grants are typically structured for three years and a designated application period is established by FEMA. Timelines for the various grants vary by program.

Sections 6.3.1 through 6.3.4 provide additional detail to document each of the program management capability requirements shown in Table 6.3.

6.3.1 Meet HMA Application Timeframe and Submission of Eligible Project Applications

The State has an excellent track record of submitting eligible project applications within the applicable grant application timeframe. For this plan update cycle, the State completed the grant submission for the HMGP for DR1833, DR1858, and DR1973. All 112 HMGP applications submitted to FEMA were complete, technically feasible, and eligible project applications and subsequently approved by FEMA.

Also in this update cycle, the State completed the grant submission for the Non-Disaster grant programs for 2011 PDMC, 2012 PDMC, and 2010 LPDM programs. All ten of the Non-Disaster applications submitted to FEMA were complete, technically feasible, and eligible project applications, of which eight were approved.

Figure 6.3.1 shows the steps the State takes in working with potential applicants on the development and submittal of eligible project applications. The application process starts with either a disaster declaration for HMGP or a Notice of Funding Availability for the non-disasters programs (FMA and PDM). Supplemental information is provided on each of the steps.

Outreach: Application information is developed and posted on the GEMA website and distributed through the Association of County Commissioners of Georgia (ACCG), the Georgia Municipal Association (GMA), EMA directors, and through press releases. Appendix H provides information on the DR1973 HMGP and the HMA 13 application process. For HMPG, applicant briefings are conducted in the declared counties.

Pre-Applications: Pre-applications are reviewed for funding potential and pre-screened for HMA eligibility. An initial BCA is completed on all project submittals. Only eligible applications are recommended for full application development. Ineligible applications are removed from further consideration.

Technical Assistance: State mitigation staff work closely with potential applicants and provide technical assistance to assist applicants in completing full applications. GEMA uses the FEMA application completeness template to ensure that adequate information has been provided to document HMA minimum requirements.

Applications: The BCA is finalized based on data in the full application. Completed applications that meet the minimum program requirements will be scored and ranked as described in Section 6.2.3 prior to submission to FEMA. The Hazard Mitigation Division Director will make a recommendation to

the GEMA Director who will make the final decision regarding the selection of projects to forward to FEMA for consideration.

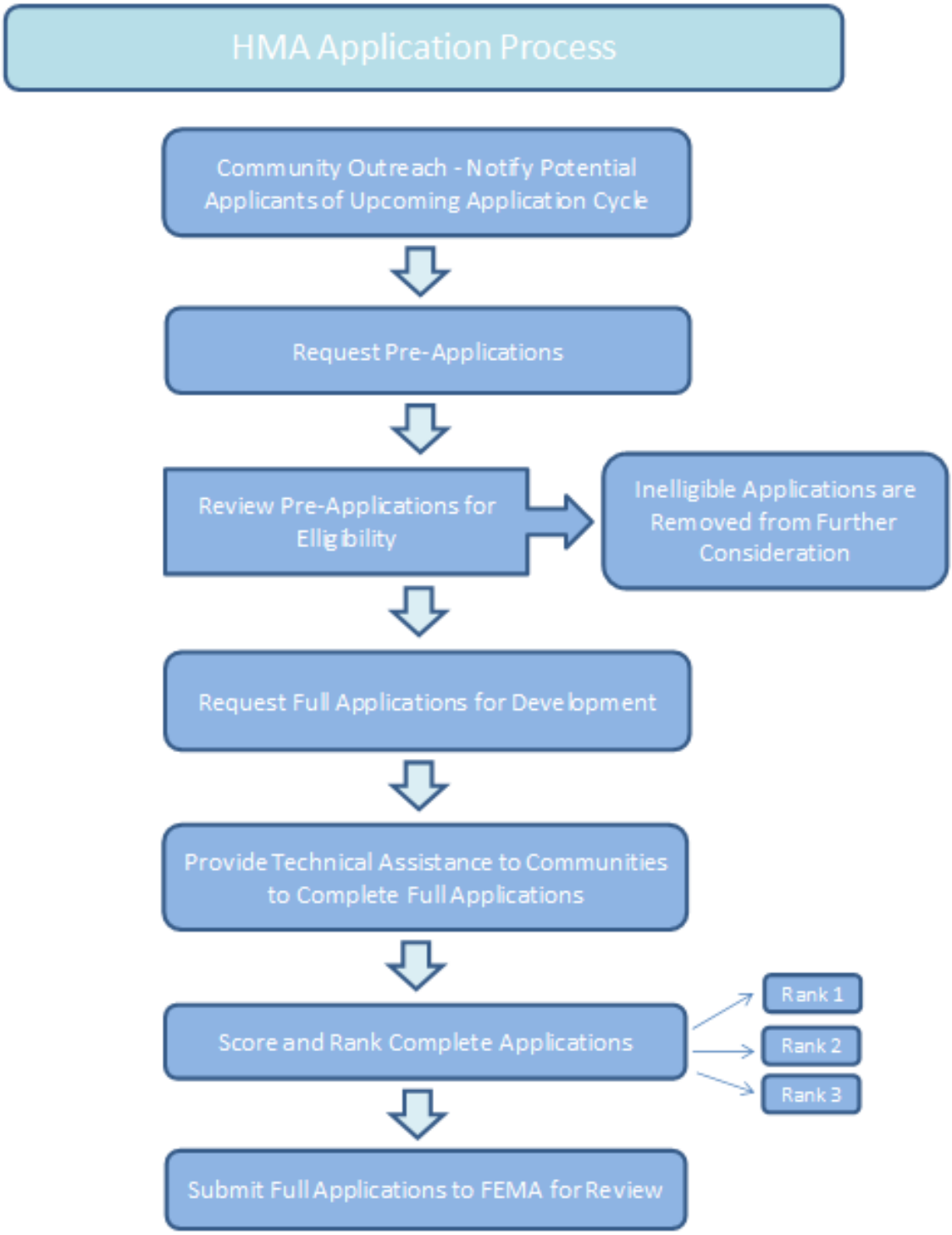


Figure 6.2 HMA Application Process

GEMA's simplified application process allows the state to react to any grant funding opportunity quickly. In the event of a major disaster declaration, GEMA can provide the needed outreach and technical assistance to its communities. Also, by using the GMIS database, we can also target communities that are eligible for a particular program such as the PDM13 program which targets SRL and RL properties.

HMGP Performance

Within the past three years (since October 1, 2010) the State has implemented the HMGP for one new presidential disaster declaration and continued to manage the HMGP for seven other disasters.

For the disaster designated DR1973, the state requested additional time beyond the 12 months to submit applications. All of the grant applications for this disaster were submitted within the FEMA deadline. The applications submitted were sufficient to expend the allocation. All forty-nine project applications submitted to FEMA were determined to be technically feasible and eligible project applications with appropriate supporting documentation.

For DR1858, the State completed the grant application process. Based on the 12 month program estimate, a sufficient number of projects were identified through the pre-application process, and the State has completed its work with local governments on their submission of fully developed project applications In addition, work was completed on grant amendments to take care of the large number of alternate properties identified with the original project submissions for Cobb County and the City of Austell.

Table 6.6 provides a snapshot as of September 30, 2013, for each presidential disaster declaration of the number of HMGP projects approved and managed by the State during this plan update cycle. The State had previously closed out the HMGP for 13 disasters declared prior to 2004. This table provides a good indication of the numbers of grants and amount of federal funding the State has effectively managed or currently managing in the HMGP programs since October 1, 2010. A * after the disaster number denotes the disaster is closed. Disasters 1554 and 1560 have been closed during this update cycle. Disaster 1750 is projected to close in the next federal fiscal year and all work has been completed in this disaster. The federal funds expended column includes grantee and subgrantee administrative funds. Since the last update, the State has received approval on 120 additional projects, closed 117 projects and processed expenditures of almost $33 million.

Disaster	Approved Projects		Open Projects	Closed Projects		Federal Funds Expended	
	Last 3 Years	Total	Total	Last 3 Years	Total	Last 3 Years	Total
1554*	0	6	0	0	6	$2	$892,147
1560*	0	6	0	1	6	$2,537	$1,135,905
1686	0	58	6	44	52	$5,921,176	$8,116,518
1750	0	7	1	6	6	$457,518	$932,979
1761	0	17	4	13	13	$1,639,171	$1,743,932
1833	14	46	15	31	31	$4,922,088	$5,045,021
1858	57	95	76	19	19	$18,825,035	$19,034,598
1973	49	49	46	3	3	$1,020,727	$1,020,727
Sub-total	**120**	**284**	**148**	**117**	**136**	**$32,788,254**	**$37,921,827**

Table 6.6 Hazard Mitigation Grant Project Summary

Non-Disaster Programs Performance

Within the past three years (since October 1, 2010) the State has taken advantage of the non-disaster programs within the Hazard Mitigation Assistance (HMA) Program. The application intake is managed through FEMA's eGrants system, and only those projects submitted by the State's dead-

line are eligible for consideration. The State has submitted a successful grant application(s) for each fiscal year allocation of HMA. Each of the project applications submitted to FEMA had sub-applications that were reviewed and approved by FEMA Regional/HQ staff.

Tables 6.7 and 6.8 provide a snapshot as of September 30, 2013, for each of the non-disaster programs of the number of projects approved and managed by the State during this plan update cycle. The State had previously closed out the FMA program for all 11 allocations prior to 2008, closed out the PDM program for all 5 allocations prior to 2007, and closed out the RFC program for both allocations. These tables provides a good indication of the numbers of grants and amount of federal funding the State has effectively managed or currently managing in the various mitigation programs. A * after the program year denotes the allocation is closed. The mitigation staff's program management ability is effectively demonstrated by their success in each year of the HMA Program for both the Pre-Disaster Mitigation Competitive Program (including Legislative component) and Flood Mitigation Assistance Program funding cycles.

FMA Project Summary

Over the past 3 years, all work has been completed for the FMA08 and FMA09 programs. All projects have been completed and these allocations are closed out. Due to the increased disaster activity in 2009 and 2011, most of the local government projects submitted during this timeframe were handled with HMGP funds. The other projects submitted through the HMA application cycle were submitted through the PDM program. All of the submitted applications for the FMA program have been considered eligible for funding consideration.

Program Year	Approved Projects		Open Projects	Closed Projects		Federal Funds Expended	
	Last 3 Years	Total	Total	Last 3 Years	Total	Last 3 Years	Total
FMA08*	0	3	0	2	3	$35,283	$320,993
FMA09*	0	2	0	2	2	($26,893)	$156,907
Sub-total	**0**	**5**	**0**	**4**	**5**	**$8,390**	**$477,900**

Table 6.7 Flood Hazard Mitigation Assistance Project Summary

PDM Project Summary

Over the past 3 years, all work has been completed for the PDMC07 thru PDMC09 programs. All projects have been completed and these allocations closed out or going through closeout. The other open program allocations are progressing on schedule. Since the last update, the State has received approval on 11 additional projects, closed 18 projects and processed expenditures of more than $3.6 million.

The State has submitted a total of 64 competitive applications in the Pre-Disaster Program since its inception in 2002 thru the 2012 program year. Fifty (78%) of these projects have been selected and awarded federal funds. The Pre-Disaster Mitigation Program Summary table also includes information on the legislative directed projects through this program. The state has successfully worked with each of the legislative directed communities to develop projects to meet this directive. Where possible, the State has worked diligently to assist local governments to develop these projects consistent with the goals of the competitive nature of the program.

Program Year	Approved Projects		Open Projects	Closed Projects		Federal Funds Expended	
	Last 3 Years	Total	Total	Last 3 Years	Total	Last 3 Years	Total
PDMC07*	0	7	0	5	7	$2,081,607	$6,617,197
PDMC08*	0	2	0	2	2	$80,654	$116,192
PDMC09	0	2	1	1	1	$661,755	$661,755
PDMC10	3	3	2	1	1	$139,738	$139,738
PDMC11	4	4	4	0	0	$222,204	$222,204
PDMC12	2	2	2	0	0	$0	$0
LPDM08	0	8	2	6	6	$402,949	$922,242
LPDM09*	0	3	0	3	3	$7,135	$122,149
LPDM10	2	2	2	0	0	$9,084	$9,084
Sub-total	**11**	**33**	**13**	**18**	**20**	**$3,605,126**	**$8,810,561**

Table 6.8 Pre-Disaster Mitigation Program Summary

In summary, the State has been very successful in applying for and receiving approvals for projects submitted through the competitive HMA program. To date, almost 83% of the competitive projects submitted to FEMA have been approved.

6.3.2 *Preparing and Submitting Accurate Environmental Reviews and Benefit-Cost Analysis*

Preparing and Submitting Accurate Environmental Reviews

The State of Georgia relies on the staff of the Federal Emergency Management Agency Region IV to conduct environmental reviews and prepare the environmental document on all submitted mitigation applications.

Preparing and Submitting Accurate Benefit Cost Analysis (BCA)

As discussed in Section 6.2.2 on project implementation capability, the State has a track record of submitting accurate benefit-cost analysis that meets FEMA criteria for hazard mitigation projects. For this update cycle, the State completed BCA reviews on 10 HMGP projects and 6 PDMC projects.

Basic information the State obtains and utilizes to conduct accurate BCAs includes, but is not limited to:

- Flood Insurance Study (FIS) data or historical flood data. This includes flood frequency, discharge and elevation;
- Past damages at the project site or in the project area;
- Well documented cost-estimate for the project;
- Useful life of the project;
- Structure Type;
- Square footage of the building/s and replacement values along with contents value;
- Function of the facility;
- Associated future maintenance costs;
- Displacement costs;
- Temporary relocation costs;
- Loss of Use; and

- Elevation Certificates or certification from land surveyor of finished floor elevation.

GEMA mitigation staff utilizes their experience to assist in determining the appropriate FEMA approved BC module to use for each project. Based on the type of project and information provided in the pre-application and application, GEMA staff will determine which benefit cost analysis module will be used to determine the project's cost effectiveness.

The BCA determines whether the cost of investing in a project today, will result in sufficiently reduced damages in the future to justify spending the money on the project. If the benefit is greater than the cost, then the project is cost-effective. Cost effectiveness is determined by comparing the project cost to the value of damages prevented after the mitigation measure. If the dollar-value of the benefits exceeds the cost of funding the project, the project is cost-effective. To arrive at a ratio, the benefits are divided by the costs, resulting in a benefit-cost ratio (BCR). The BCR simply states whether the benefits exceed the project costs, and by how much. To arrive at a BCR, divide the benefits by the cost. If the result is 1.0 or greater, then the project is cost-effective. If it is less than 1.0, it is not cost-effective.

A narrative analysis is used when the benefits of a project cannot be easily quantified into specific categories and do not conform to any of the other modules or formats. This analysis allows for a subjective, broad-based approach to quantify the benefits of a project so that all benefits of the project can be recorded and the project objectively assessed. This type of analysis is used normally in the HMGP 5% State Initiative projects.

If the project is cost-effective, it is considered by GEMA for funding consideration and full application development. If the project is not cost-effective, mitigation staff would attempt to obtain additional information from the applicant to arrive at a positive BCA. If there is no additional credible data available or all available data has been utilized, and the project is still not cost-effective, the project is not considered for full application development.

The mitigation staff's ability to complete accurate BCAs was demonstrated by their success in all funding rounds to date of the HMA programs. In addition, the State has completed Data Documentation Templates for all applications submitted from 2005 through 2012. This form is utilized to document each piece of data and the values that are input into the various FEMA benefit-cost models. This form documents the accuracy of the BCA. Due to changes within the BCA tool version 4.8, the State will discontinue this form as it is incorporated into the BCA tool to document the information utilized in completing the BCA.

6.3.3 *Quarterly Reports*

The State of Georgia provides timely, complete, and accurate quarterly progress and financial reports on all funded HMA grants. Separate financial reports are submitted quarterly from the Office of Planning and Budget for each of the open disasters or allocations. For this update cycle, the State submitted all quarterly reports within 30 days of the end of the calendar quarter. Subsequent meetings were held with FEMA staff on each quarterly report submission to discuss any findings or questions. All questions and findings were satisfactorily addressed.

The State provides an enhanced quarterly and financial report on all open mitigation projects. This report includes detail on work completed, work remaining, project delays (if any), and all associated financial information. This reporting format has been shared at Regional meetings with other Region IV states as a model format for other states to follow. The quarterly report submissions also include budget-comparison reports on each of the State's open management grants.

GEMA uses an agency wide computer program to manage all federal grants called the Grants Management System (GMS). Some of the major features included in the system are:

- Ability to view key dates, funding amounts, status, expenditures, itemization of subgrants and current balances for all federal grant allocations;
- Ability to add/view/track key dates, funding amounts, applications data, status, expenditure history, adjustment history, progress report history, closeout details, correspondence, and current balances on all plans, applications and subgrants;
- Automated subgrantee Progress Report generation and creation of FEMA Quarterly Progress Report from the subgrantee reports;
- Ability to generate and track correspondence (paper and email) tailored by subgrants; and
- Ability to generate dozens of standard reports and user-created ad hoc reports.

One of the significant enhancements of this system is the ability to create quarterly reports to FEMA that includes additional information on activities completed in the quarter with all activities tied back to the milestones for the project. This new report format was developed and has been utilized for all quarterly report submissions for this plan update cycle.

Upon project approval notification from FEMA, a State/Local Grantee/Subgrantee Agreement is prepared by GEMA and sent to the subgrantee for signature. Upon receipt of the signed agreement, the GEMA Director signs the agreement and a fully executed agreement is sent to the subgrantee with instructions to start the project. The signed agreement requires the subgrantee to submit quarterly status reports within 15 days of the end of the quarter. Due dates are January 15, April 15, July 15 and October 15. As noted above, GEMA uses GMS to generate the subgrantee quarterly report which is emailed to the project point of contact. The reports include financial information current as of the end of the quarter, as well as grant status information current as of the end of the previous quarter. The counties update the status and return the reports to their assigned planner or specialist who then inputs the updated information into the GMS system. As an incentive to receiving timely quarterly reports from each subgrantee, the State requires all reports to be current in order to process progress payments.

The quarterly report consists of a letter with narrative information regarding each open grant program as well as information on other activities that the mitigation staff has been involved in for the quarter. In addition, a project summary spreadsheet is completed for each program detailing the status of each funded program listing both closed and open projects. The GMS printout and budget comparison reports complete the quarterly report package.

In addition to the quarterly report submitted for each of the open projects, the Office of Planning and Budget submits the FF 20-10 financial reports and the PMS 272 Federal Cash Transaction Report for each of the open disasters. The submitted reports are consistent with SMARTLINK and based on

the approved supplements received from FEMA. When GEMA's internal financial tracking system, based on supplements received, is not in balance with SMARTLINK, the State notifies FEMA program staff to get the missing supplements so the reports will balance at the end of each quarter.

6.3.4 *Grant Completion and Closeout*

For this update cycle, the State closed 117 HMGP projects in seven disasters, and 22 projects in eight non-disaster programs. Two disaster and five non-disaster programs were successfully closed.

The following summarizes the process that the mitigation staff follows in monitoring approved grants and completing project and declaration closeouts within established performance periods including financial reconciliation.

The State/Local Grantee/subgrantee Agreement that is signed by both GEMA and the subgrantee requires the subgrantee to complete the project based on milestones established in the grant application (not to exceed three years from project obligation date). In addition, for project grants, they are required to submit supporting documentation identified at final inspection within 30 days.

If the subgrantee cannot complete the project within the identified performance period per the grant agreement, a request for a time extension must be submitted to GEMA 90 days prior to the end of the performance period. Requests for time extensions needs to explain why the completion date cannot be met, how much of the project work remains, and an estimated date for completion. If an extension request for any project means that the activity period will go beyond the State's performance period (or closeout date for disasters), GEMA will request up to a one-year time performance extension. This request will be submitted to FEMA 60 days prior to the end of the performance period.

All mitigation projects that receive federal funding go through the same financial reconciliation as part of the closeout process. State Mitigation staff utilizes the signed grantee-subgrantee agreement with each applicant to monitor progress of their project and ensure the project is on track. Site visits are scheduled as necessary. Upon written notification of project completion, GEMA Hazard Mitigation staff conducts a final inspection to ensure the project is completed per the terms of the agreement and verifies the GPS coordinates and takes photographs of each mitigated property. For planning grants, GEMA Hazard Mitigation staff conducts a desk audit to verify the approved scope of work has been completed. As part of the final inspection, all financial documents are reviewed to ensure only allowable costs are reimbursed consistent with Office of Management and Budget circulars. Project closeout requests are made to FEMA upon completion of final inspection and financial reconciliation on a project-by-project basis. In the project closeout request, GEMA certifies to FEMA that costs incurred in the performance of eligible work are allowable, that the approved work was completed, and that the mitigation measure is in compliance with the Federal-State Agreement (for the HMGP) or Agreement Articles (for non-disaster programs) and the State/Local Assistance Agreement. GEMA mitigation staff will prepare a project closeout worksheet which is submitted to FEMA Region IV along with a request to close the grant. The financial reconciliation and project closeout requests are completed within 90 days of the final inspection. Upon receipt of final claim amounts from FEMA, any remaining funds are liquidated and closeout notice sent to the subgrantee.

When all projects are completed and closed out for the disaster declaration, GEMA prepares the Declaration Closeout Letter and final financial status report, SF425, for the HMGP and forwards it to FEMA.

The subgrantee and grantee closeout reports are valuable for not only historical purposes and in monitoring projects for adherence to certain grant agreements such as open space deed restrictions, but they are also valuable in documenting disaster avoidance and developing success stories. The closeout reports including those properties that have been acquired have been shared with the Department of Natural Resources Floodplain Management staff. This information is useful by floodplain management staff during community assistance contacts and visits. In addition, during these visits floodplain management staff can monitor the acquired sites to ensure that the subgrantees have adhered to the required deed restrictions. This information is also utilized to support Risk MAP Discovery and Resilience workshops.

6.4 ASSESSMENT OF MITIGATION ACTIONS

The 44 CFR 201.5(b)(2)(iv) states the Enhanced Plan must document the system and strategy by which the State will conduct an assessment of the completed mitigation actions and include a record of the effectiveness (actual cost avoidance) of each mitigation action.

6.4.1 *System to Track the Assessment of Mitigation Actions*

The information collected on each site that has had a mitigation action completed includes:

- Funding Source;
- Project Number;
- Applicant;
- Property Address;
- Parcel Number;
- GIS Coordinates;
- Mitigation Action;
- Structure Size;
- Replacement Value of property mitigated (Structure and Contents);
- Damage Source;
- Hazard Data;
- Elevation Data;
- Cost;
- Benefits;
- Repetitive Loss Number ;
- Avoided Losses;
- Last Inspection Date; and
- Project Closeout Date.

The State Hazard Mitigation Division is currently populating the database for all completed and closed projects within the HMGP and PDM programs. The database is greater than 99% completed

with 1,891 records in the system as of September 30, 2013. The State continues to populate the database with information from older disaster allocations. The database is updated by State Hazard Mitigation Division staff on completed mitigation projects as part of the closeout process.

Repetitive Loss Property Tracking

When a property acquisition project is completed, a record is added to GMIS for each of the acquired and deed restricted properties and the last inspection date is entered into the database. GEMA Hazard Mitigation staff utilizes the GMIS to pull a list of acquired properties needing certification. This list is sent to the subgrantee along with a request to verify the properties are being maintained according to the deed restrictions. Upon receipt of the certification, GEMA Hazard Mitigation staff updates GMIS to reflect the most recent inspection date.

The GMIS is undergoing a complete update to a new platform with enhancements to be completed by June 2014. Specific details on the updated system will be reported in the next State Plan Update cycle.

6.4.2 *Strategy to Assess Mitigation Actions*

The following action steps will be taken to effectively assess completed mitigation actions in Georgia:

- Finish the process of populating the Mitigated Properties Database on all completed mitigation projects that are administered by GEMA.
- Incorporate mitigation activities completed by other agencies into the Mitigated Properties database.
- Review Hazard Event information submitted to GEMA to determine the potential for loss reduction as a result of all completed mitigated actions documented in the Mitigated Properties system.
- Upon determination that the completed mitigation action resulted in a reduction of damages, data will be entered into the Mitigated Properties database and a computation of damages avoided for each structure mitigated.

Local governments will be able to access the data in the GMIS for their community and pull reports for their counties and municipalities on completed mitigation actions and any avoided losses as a result of hazard events documented in the project area after the projects are completed.

Record of Actual Cost Avoidance

A critical component to estimate the actual avoided losses is having accurate information on the hazard event and information about the exposure of the property to damages. Scenario losses are computed based on established hazard damage relationships such as depth damage curves for wind and flood events provided by FEMA in benefit-cost modules. For flood events, avoided losses can be computed by knowing how much flooding would have occurred at the site by comparing the finished floor elevation data with the water surface elevation of the hazard event. Applying the depth damage curves and additional information collected allows one to compute scenario losses at the site that would have occurred if the structure had not been mitigated.

Studies were completed by FEMA and the State on the effectiveness of completed mitigation actions (acquisitions) in the cities of Newton and Albany and Dougherty County at the time of the 1998 flood event. Additional successes were documented in Douglas and DeKalb Counties after the Hurricane Ivan event in 2004. In the previous updates of the Enhanced Plan, the data from the previous studies was added to the Loss Avoidance Section of each mitigated property. For the events for which we had high water marks, a depth of flooding was computed and the scenario losses from the BCA analysis for the depth of flooding were input into each record.

In the aftermath of the September 2009 flood event, the State worked with FEMA on a Loss Avoidance Study in the declared counties which had completed mitigated properties. FEMA completed the final study and provided the results to the State in November 2010. The State has populated the Avoided Losses section for each mitigated property record in the GMIS. In addition, the State has utilized the methodology that is documented in the 2009 Loss Avoidance Study to compute additional losses for all other projects in the counties declared for DR1833 and DR1858. As high water marks were not available in all projects, the State utilized gauge data from the USGS to compute the water surface elevation for the declared flood events. The water surface elevation was compared to the Base Flood elevation. This information was transferred where practicable to each of the project sites impacted by DR1833 so depth of flooding could be computed for properties that had both a finished floor elevation and base flood elevation. Damages have been computed for each of the projects along the main stem of the Flint River for DR1833 declared counties. This information has been incorporated into the Mitigated Properties section of GMIS.

Applicant	Buildings in Analysis	Project Investment	Total Loss Avoided	Return on Investment
Augusta-Richmond County	1	177,948	59,011	33%
Baker County	3	62,431	218,010	349%
City of Albany	62	925,582	3,170,028	342%
City of Chickamauga	49	2,140,887	3,279,171	153%
City of Newton	25	340,880	864,221	254%
City of Savannah	1	118,971	89,306	75%
Cobb County	59	7,315,380	9,495,265	130%
Decatur County	8	774,276	1,278,799	165%
DeKalb County	80	26,808,903	12,137,155	45%
Dougherty County	19	2,827,481	1,317,732	47%
Douglas County	13	704,332	3,396,316	482%
Douglas County Water and Sewer Authority	4	535,829	429,704	80%
Gwinnett County	2	261,481	1,677,448	642%
Lee County	7	398,095	231,890	58%
Mitchell County	2	109,718	115,310	105%
Tift County *	7	996,830	338,765	34%
Town of Trion	1	4,465,893	2,138,183	48%
Totals	**343**	**48,964,917**	**40,236,314**	**82%**

Table 6.9 Actual Losses Avoided Summary * New losses avoided since last plan update

Since the last State Plan Update, the State has not received any presidential disaster declarations for flooding. The State had several areas impacted by flooding, but the only location that impacted a mitigation project area was in Tift County. A localized flood event impacted an area in Tift County where property acquisition had just been completed. Applying the methodology described above, seven properties which had just been acquired would have received flood damages estimated at $338,765.

Currently there are 483 records in the database totaling $40.2 million in losses avoided. Table 6.9 provides a record of the actual losses avoided for all HMA applicants. The return on investment (ROI) was calculated for each individual building for each event that was analyzed. The ROI reflects only the damage and project costs related to the buildings in the analysis or just those buildings were actual losses avoided were computed.

It is interesting to note that with less than 20 years of history in evaluating projects where mitigation has been completed, there are several areas where the ROI exceeds 100%. This suggests that mitigation activities have been completed in areas where hazard events continue to occur.

The GMIS database will be an ongoing tool to capture success stories on future disaster events. By capturing information at the property level, the State can at any time create a report on the effectiveness of any completed mitigation project.

6.5 EFFECTIVE USE OF AVAILABLE MITIGATION FUNDING

The 44 CFR 201.5(b)(3) states the Enhanced Plan must demonstrate that the State effectively uses existing mitigation programs to achieve its mitigation goals.

The State of Georgia continues to effectively implement hazard mitigation programs towards achieving its goals to:

1. Reduce human vulnerability to hazard events;
2. Reduce the losses associated with hazard events; and
3. Reduce overall exposure to hazard events for Georgia citizens and their property.

The mitigation programs utilized in implementing mitigation measures throughout the state are primarily federally funded and state administered. These include the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance Program (FMA), the Pre-Disaster Mitigation Program (PDM), and the Emergency Management Performance Grants. The Repetitive Flood Claims Program (RFC) data has been incorporated into the FMA program. The projects that have been approved and funded through these programs support the State's hazard mitigation goals and specific program eligibility criteria.

Project effectiveness can be defined as the ability of a mitigation project to reduce or eliminate the possibility of future damage or human suffering. There are three levels of project effectiveness. High effectiveness would be given to projects that create the most effective type of mitigation such as property acquisition or relocation where no damage would occur in the event of a future disaster. Medium effectiveness would entail projects that reduce the likelihood of future damage, however, in

the event of an uncommonly severe disaster event, property damage and human vulnerability may still occur. Low effectiveness would entail projects that provide relatively low and short term limited hazard prevention levels or those projects where benefits are difficult to quantify. Table 6.10 lists potential mitigation projects and their effectiveness.

Project Type	Level of Effectiveness	Rationale
Acquisition	High	Removes structure and inhabitants from hazard area
Elevation	Medium	Reduces damages but structure and inhabitants have residual risk
Acquisition/Relocation	High	Removes structure and inhabitants from hazard area
Acquisition/Elevation	Medium/High	Combination of effectiveness as noted in each project type
Acquisition/Drainage	Medium/High	Combination of effectiveness as noted in each project type
Retrofit (Wind, Flood, Safe Rooms Lightning)	Medium	Reduces damages but structure and inhabitants have residual risk
Drainage Improvement	Medium	Reduces damages but structure and inhabitants have residual risk
Warning/Initiative	Low/Medium	Projects are short term and inhabitants have residual risk
Planning	High	Guide for developing and implementing mitigation measures
Safe Room	High	Protects inhabitants from tornadoes
Management	High	Technical support for developing and implementing mitigation measures

Table 6.10 Effectiveness of Potential Mitigation Projects

Program effectiveness can be defined as the ability of a mitigation program to fund the most projects to reduce or eliminate the possibility of future damage or human suffering. There are three levels of program effectiveness. A rating of High would be given to programs that fund the most projects (>50% of total funds allocated). Medium effectiveness would entail to programs that fund fewer projects that reduce the likelihood of future damage (between 20% and 50% of total funds allocated). A low effectiveness rating would entail to programs that fund the fewest number of projects (<20% of total funds allocated).

Program	Number of Projects	Funding (Millions)	% of total funds allocated to GA	Effectiveness	Applicable Goals
HMGP	600	142.9	74%	High	1-3
FMA	50	9.9	5%	Low	1-3
PDM	67	38	20%	Medium	1-3
EMPG	59	1.5	1%	Low	1
Total		192.3	100%		

Table 6.11 FEMA Funding Programs used for Mitigation Projects

Table 6.11 provides a summary of FEMA Funding Programs used for Mitigation Projects. The list ties each program with the associated State mitigation goal, along with a corresponding level of program effectiveness. RFC program information has been included with the FMA and LPDM has been included with the PDM information. In addition, the amount of funds utilized in accomplishing mitigation goals has also been incorporated into the table.

Hazard Mitigation Grant Program (HMGP)

Table 6.12 lists information about the HMGP and the funds approved for each federally declared disaster from 1990 through September 30, 2013.The table has been updated to combine information about disasters where all work was completed prior to this plan update which includes 15 disasters from DR857 through DR1560. Since 2004, Georgia has provided and made available 10% of all match funds for counties involved in disasters. The State of Georgia will continue to contribute a percentage of the non-federal cost share for all counties included in a Presidential Declaration. GEMA's Hazard Mitigation Division will continue to provide technical assistance to all counties, their municipalities and state agencies.

Any unused mitigation program funding was a result of unavailable non-federal match by counties, uninterested property owners, and/or insufficient program funds to implement prioritized mitigation actions.

Disaster	Federal Allocation (NEMIS)	Federal Share Expended	State Share Expended	Local Share Expended	Approved Projects	Percentage of Funds Used
DR857–1560	$87,748,097	$83,383,944	$4,421,111	$31,618,372	328	95.0%
DR1686	$12,699,596	10,164,570	664,025	2,724,163	58	80.0%
DR1750	$1,258,542	932,979	38,476	272,518	7	74.1%
DR1761	$2,821,243	2,445,520	103,365	711,810	17	86.7%
DR1833	$5,756,746	5,704,463	804,882	1,204,073	46	99.1%
DR1858	$35,438,896	35,104,735	4,956,491	6,744,748	95	99.1%
DR1973	5,380,886	5,365,349	523,041	1,265,373	49	99.7%
DR1686-DR1973	$63,355,909	$59,717,616	$$7,090,280	$12,922,685	272	94.3%
Total	**$151,104,816**	**$143,101,560**	**$11,511,391**	**$44,541,057**	**600**	**94.7%**

Table 6.12 HMGP Funding by Disaster

Program Highlights

Through the HMGP, local governments have permanently mitigated losses through the acquisition of 1317 flood prone properties. Another 89 flood prone properties have been elevated and 36 retrofits predominantly wind related have been completed, and two safe rooms constructed. Rounding out the activities, 433 outdoor warning sirens have been installed and 35 drainage improvement projects completed. The program also funded the initial development of 20 local mitigation plans, 155 local plan updates, and the initial development and 2 updates of the State Mitigation Plan. Table 6.13 summarizes the number of projects and project types funded through the HMGP and their associated State Mitigation Goal.

Program	Project Type	Number of Projects	Goal
HMGP	Acquisition	86	2
	Elevation	4	2
	Acquisition/Relocation	4	2
	Acquisition/Elevation	3	2
	Acquisition/Drainage	2	2
	Retrofit (Wind, Flood, Safe Rooms Lightning)	15	1,2
	Drainage Improvement	49	2
	Warning/Initiative	238	1
	Planning	168	1,3
	Safe Room	25	1,2
	Management	6	1,2,3

Table 6.13 Projects Funded with HMGP

Since the last plan update, the State has effectively utilized initiative funding from the HMGP to improve the warning and communication capabilities. For disaster DR1973, the state prioritized the utilization of the HMGP funds for projects in the declared counties that reduce or eliminate damages to life and property resulting from high winds and tornadoes. The State utilized the full 5% initiative and 5% tornado initiative to improve the warning and communication capabilities of local governments in the declared counties and also gave preference to those projects that help local government maintain or achieve storm ready status. In addition to the outdoor warning siren type projects, there was an increased interest in mass alert systems and weather radio projects.

For DR1973, the enhanced plan status provided an additional $1.3 million to the State of Georgia for HMGP projects. These additional funds were also made available to the declared counties to address warning and communication enhancements and Safe Room type projects. The State was also able to meet the unmet needs from DR1858 with these funds.

Flood Mitigation Assistance (FMA) Program

The State has facilitated the use of FMA funds by local governments for the development of flood hazard mitigation plans and projects since the program was initiated in 1997. Planning grants were targeted to the communities that had the largest number of repetitive loss properties identified by FEMA. All communities with 10 or more repetitive loss properties have received funding to develop an FMA plan. Project grants have been targeted to the communities with the largest number of repetitive loss properties who meet the planning requirements. Availability of local match has hindered many local governments in pursuing project grants. Table 6.5.e lists information through September 30, 2013, about the FMA funds approved since the program has been in existence. The table has been updated to combine information about allocations where all work was completed prior to this plan update which includes 11 allocations from 1997 through 2007.

Program Highlights

Through the FMA project grants, local governments have permanently mitigated losses through the acquisition of 35 NFIP insured properties. Another 2 NFIP insured properties have been elevated and another 8 properties protected through a drainage improvement. The program also funded the development of 11 FMA plans and the initial development of 3 local mitigation plans. Table 6.14 summarizes the number of projects and project types funded through the FMA and their associated State Mitigation Goal.

Since the last update, all work has been completed for the FMA08 and FMA09 programs.

Fiscal Year	Total Approved	Federal Share	State Share	Local Share	Approved Projects
FMA97-07	$8,158,886	$5,934,569	$117,033	$2,107,284	41
FMA08	$427,991	$320,993	$13,239	$93,759	3
FMA09	$210,725	$156,907	$7,921	$45,898	2
FMA08– 09	$638,716	$477,900	$21,159	$139,657	5
Total	**$8,797,602**	**$6,412,469**	**$138,192**	**$2,246,941**	**46**

Table 6.14

Program	Project Type	Number of Projects	Applicable Goal
FMA	Acquisition	18	2
	Elevation	2	2
	Planning	13	1,3
	Drainage Improvement	2	2
	Management	11	1,2,3

Table 6.15

Repetitive Flood Claims (RFC) Program

The State has facilitated the use of RFC funds by local governments for the development of acquisition projects to permanently mitigate flood damages to NFIP insured structures. Table 6.16 lists information about the RFC funding received through September 30, 2013. The table has been updated to combine information about allocations where all work was completed prior to this plan update which includes 2 allocations.

Fiscal Year	Total Approved	Federal Share	State Share	Local Share	Approved Projects
RFC06 - RFC07	3,243,615	3,243,615	0	0	4

Table 6.16

Program	Project Type	Number of Projects	Goal
RFC	Acquisition	2	2
	Management	2	1,2,3

Table 6.17

Program Highlights

Through the RFC project grants, local governments have permanently mitigated losses through the acquisition of 9 NFIP insured properties. Table 6.17 summarizes the number of projects and project types funded through the RFC and their associated State Mitigation Goal. The Biggert-Waters Flood Insurance Reform Act of 2012 eliminated the Repetitive Flood Claims program and future funding to mitigate RFC properties will be accomplished with the other Hazard Mitigation Assistance (HMA) programs.

Severe Repetitive Loss (SRL) Program

Georgia has not made an application for SRL grants since the program's inception in 2008. In the initial roll out of the SRL program, Georgia had fewer than forty validated SRL properties and did not qualify for an allocation. An analysis of these properties showed that 50% of the properties previous-

ly had mitigation activities pursued by local governments with the majority determined to be not cost-effective. Based on all of the subsequent alternative determination of benefits provided by FEMA for the validated SRL properties based on greatest savings to the fund, the State identified potential SRL properties that may meet cost-effectiveness as the savings to the fund exceeds the projected acquisition cost based on current tax value. Our outreach to local governments on these SRL properties has not resulted in any new SRL applications. However, several SRL properties were included in HMGP grant program applications as a result of the September 2009 flooding in the Metro-Atlanta area. As these SRL properties were substantially damaged, the cost-effective requirement was satisfied by the BCA waiver for HMGP substantially damaged properties in the special flood hazard area.

GEMA continues to give prioritization to the mitigation of SRL properties. Issues related to cost-effectiveness have hindered our ability to mitigate SRL properties. The State will continue to work with local governments that have SRL properties to implement cost-effective hazard mitigation measures. The Biggert-Waters Flood Insurance Reform Act of 2012 eliminated the Severe Repetitive Loss program and future funding to mitigate SRL properties will be accomplished with the other HMA programs.

Pre-Disaster Mitigation Competitive (PDMC) Program

The State has facilitated the use of PDM competitive funds by local governments for the development of DMA2K compliant hazard mitigation plans and the implementation of projects which have been identified or support goals and actions identified in the local mitigation plans. The State provides technical assistance to local governments in the development of fundable PDM applications. Since the program's inception in 2002, the State has been successful in getting federal approval on more than 82% of PDM sub-grant applications. Table 6.18 lists information through September 30, 2013, about the PDM funds approved since the program has been in existence. The table has been updated to combine information about allocations where all work was completed prior to this plan update which includes 5 allocations from 2002 through 2006. In addition, the table has been updated to show Legislative directed projects.

Fiscal Year	Total Approved	Federal Share	State Share	Local Share	Approved Projects
PDMC 02-06	$28,850,110	$19,341,033	$480,233	$10,028,843	34
PDMC07	8,891,405	6,617,197	56,639	2,217,570	7
PDMC08	166,814	116,192	15,489	35,132	2
PDMC09	1,708,909	1,281,681	54,206	373,022	2
PDMC10	3,125,117	2,343,838	40,648	740,631	3
PDMC11	5,008,172	3,756,115	103,761	1,148,295	4
PDMC12	4,133,876	3,100,407	81,169	952,300	2
LPDM08	1,384,638	1,038,476	26,905	319,256	8
LPDM09	162,869	122,149	3,244	37,475	3
LPDM10	403,333	302,500	9,167	91,667	2
PDMC07-12	$24,985,133	$18,678,555	$391,228	$5,915,348	33
Total	**$54,835,243**	**$38,019,588**	**$871,461**	**$15,944,191**	**67**

Table 6.18

Program Highlights

Through the PDMC and LPDM, local governments have permanently mitigated losses through the acquisition of 126 flood prone properties. Another 116 flood prone properties have been mitigated through drainage improvements and 5 safe rooms constructed. The program also funded the initial development of 136 local mitigation plans and 3 local plan updates. Table 6.19 summarizes the number of projects and project types funded through the PDMC and their associated State Mitigation Goal.

Program	Project Type	Number of Projects	Goal
PDMC	Planning	9	1,3
	Acquisition	26	2
	Drainage Improvement	7	2
	Elevation	1	2
	Safe Room	1	1,2
	Management	10	1,2,3
LPDM	Acquisition	1	2
	Warning/Initiative	5	1
	Management	3	1,2,3
	Safe Room	3	1,2
	Drainage Improvement	1	2

Table 6.19

Conclusion

The mitigation staff has administered 717 hazard mitigation projects since 1990. These activities as well as those described above and throughout the plan demonstrate that Georgia effectively uses existing mitigation programs to achieve its mitigation goals.

The State endeavors to continue to pursue these mitigation programs along with additional programs and funding streams in the future to take advantage of every possible opportunity to accomplish our goals. Table 6.20 summarizes the information for all four of the FEMA mitigation grants programs and funding received in Georgia through September 30, 2013.

Total Approved	Federal Share	State Share	Local Share	Approved Projects
266,030,467	190,777,233	12,521,043	62,640,525	717

Table 6.20

The State has given priority to the funding of non-structural mitigation projects to eliminate the damages occurring to flood prone structures, both insured and uninsured. Through September 30, 2013, 1,487 flood prone structures have been permanently mitigated through the implementation of acquisition projects through the HMA programs.

The State's mitigated properties database is almost 100% completed. Based on information reported to date, 258 properties on FEMA's repetitive loss list have been mitigated primarily through property acquisition. Over 75% of the State's available mitigation funding has been directed to mitigating repetitively damaged structures through acquisition, elevation or relocation. The State will continue to target these types of properties in future mitigation projects. In addition, GEMA has provided support

to local governments in the development of all hazard mitigation plans and projects through the issuance of guidance, education through workshops and grants.

6.6 COMMITMENT TO A COMPREHENSIVE MITIGATION PROGRAM

The 44 CFR 201.5(b)(4)(i-vi) states the Enhanced Plan must demonstrate that each state is committed to a comprehensive state mitigation program. Georgia has a long-standing commitment to support a comprehensive mitigation program. This commitment has been demonstrated through continued support for local mitigation planning, legislation enacted that supports mitigation, commitment to mitigation through state funding for mitigation projects, commitment to assist state and local jurisdictions in reducing vulnerability to critical facilities and the continued practice of integrating mitigation into post-disaster recovery. This section provides a discussion of each aspect of the State of Georgia's commitment, how each aspect has been implemented and the State's plan to continue implementation.

6.6.1 *Local Mitigation Planning Support*

Georgia is committed to support local mitigation planning by providing workshops, training, tools, and technical assistance to meet the planning requirements of the Disaster Mitigation Act of 2000. The Hazard Mitigation Planning Staff supports the development of local mitigation plans with dedicated resources, which includes on-site technical assistance and in-county service through the use of field stationed planners. Additional details on local plan support are provided in Chapter 4. GEMA has acquired funding for local governments to complete the first local plan update cycle and is in the process of acquiring funding to begin the second cycle of local plan updates.

6.6.2 *Statewide Program of Hazard Mitigation*

GEMA and the Hazard Mitigation Division support the development, of legislation and executive actions, as well as, the formation of public/private partnerships that promote hazard mitigation. GEMA tracks and supports legislation of interest to the public safety, homeland security and emergency management communities, including bills relevant to hazard mitigation. GEMA also works closely in partnership with other agencies and organizations to leverage support for legislation of common interest. Those entities include the Association County Commissioners of Georgia, the Georgia Municipal Association, the Georgia Fire Chiefs Association, the Georgia Sheriffs' Association, the Georgia Police Chiefs Association, the Departments of Public Safety and Natural Resources, and others.

Legislation Supporting Mitigation

The Official Code of Georgia Annotated or O.C.G.A is the compendium of all laws in Georgia. Georgia has numerous legislative rules that support the mitigation process in the State. Below is a list of this legislation and O.C.G.A, which is more thoroughly discussed in Chapter 3 and Appendix J.

Georgia Emergency Management Act of 1981, as amended, O.C.G.A § 38-3-1
Soil and Water Conservation Districts Law, O.C.G.A §§ 2-6-20 to 23 & § 2-6-27
Coastal Marshlands Protection, O.C.G.A. § 12-5-280
Georgia Safe Dams Act of 1978, O.C.G.A §§ 12-5-370 to 385
Erosion and Sedimentation Act, O.C.G.A § 12-7-1

Georgia Environmental Policy Act, O.C.G.A § 12-16-1
Metropolitan North Georgia Water Planning District Act, O.C.G.A § 12-5-570
Uniform Codes Act, O.C.G.A § 8-2-20
The Uniform Standards Code for Manufactured Homes Act and Installation of Manufactured and Mobile Homes, O.C.G.A § 8-2-130 and § 8-2-160
Georgia Planning Act of 1989, O.C.G.A §12-2-8
Georgia Forest Fire Protection Act, O.C.G.A §12-6-80 to §12-6-93
Georgia Prescribed Burning Act, O.C.G.A §12-6-145
Georgia Geospatial Advisory Council, O.C.G.A §12-5-9

Mitigation Councils

Georgia State Inter-Agency Hazard Mitigation Planning Team
In July 2006, the State Hazard Mitigation Task Force, now called the State Hazard Mitigation Planning Team (SHMPT) was convened by letter from GEMA Director Charley English. The team was made up of a number of state agencies and was instrumental in updating the State Mitigation Plan. The SHMPT was introduced in Chapter 1 and meeting details are included in Appendix B.

Other Partnerships

Association of County Commissioners of Georgia (ACCG) and Georgia Municipal Association (GMA)
The State of Georgia places considerable value on partnerships the State utilizes ACCG and GMA to publicize the availability of mitigation program grant funds for local and county governments. In addition, GEMA provides information to ACCG and GMS at their annual meetings.

Geographical Information Systems Coordinating Committee (GISCC)
The Georgia GISCC's vision is that all levels of government become highly effective and efficient through the coordination and use of geospatially-related data, standards and technologies. The GISCC's mission is to be a valued advisor on sustainable geospatial governance, investments, policies and data-driven decisions influencing Georgia.

The GISCC, formed by the Information Technology Policy Council (ITPC) in July of 1998, is the officially recognized statewide advisory and coordinating body for geospatially-related activities, pending legislative approval. The GISCC provides an efficient and effective framework for the collaboration, communication, planning, budgeting, acquisition, utilization and archiving of all state, regional and local geospatial resources.

The GISCC leads and encourages continued development and use of the Georgia Spatial Data Infrastructure (GaSDI) which feeds the National Spatial Data Infrastructure (NSDI), defined as the "technology, policies, and people necessary to promote geospatial data sharing throughout all levels of government, the private and non-profit sectors, and academia." The term "infrastructure" is defined as the "underlying base or the basic facilities, equipment, services, and installations needed for the growth and functioning of a community or organization." In the same manner that roads are vital-

ly important to the State's infrastructure, the data, systems, people, and institutional arrangements that comprise the GaSDI provide public and private organizations with the foundation for progress.

GISCC members include representatives from all levels of government, private industry, educational institutions, non-profit and private groups. The GISCC leadership positions include Chair; Vice Chair, Outgoing Chair (new in 2008) and Chairs of the following three standing subcommittees: Strategic Plans and Policy, Education and Outreach, and Framework Management.

Georgia Geospatial Advisory Council (GGAC)

The 2009 floods which affected the metro-Atlanta and North Georgia areas validated the need for accurate maps and data depicting the risk of flooding. In 2010, the Georgia General Assembly passed HB 169 (O.C.G.A § 12-5-9 (b)(3), creating the Georgia Geospatial Advisory Council (GGAC). The GGAC is charged with auditing Georgia's geospatial capabilities at county, regional, and state levels.

The two primary tasks of the GGAC are:

1) Use geospatial capabilities in meeting Federal Emergency Management Agency (FEMA) floodplain notification requirements; and

2) Formulate GGAC recommendations for advancing governmental data interoperability and enhancing service delivery to the citizens of Georgia through geospatial technologies.

The GGAC is overseen by the EPD Director and is comprised of 43 representatives from state departments and agencies, local governments, private sector, universities, regional commissions and others. Findings from the statewide geospatial audit have been compiled and presented to the General Assembly. The GGAC achieved consensus on the following recommendations:

1. Formalize a geospatial advisory council to the General Assembly or state governmental entity with rules making authority;
2. Establish Georgia Geospatial Information Office;
3. Execute statewide master agreement(s) for geospatial software/services/resources;
4. Develop a digital, statewide parcel GIS database (i.e., "property" database); and
5. Develop a current (2009 and newer), high-resolution, statewide elevation GIS database.

These recommendations represent what the GGAC finds to be the most viable approach to advancing the use of geospatial technology and assets for the purpose of notification as recommended by FEMA, and which will produce, for a very modest sum, a significant return on investment.

6.6.3 *State Match Assistance for Mitigation Programs*

The State provides 40% of the non-federal match for HMGP projects funded in the counties declared for Individual and or Public Assistance. The State also provides the same level of match for mitigation projects funded through the Public Assistance Program and the Emergency Watershed Protection program. Table 6.21 lists for each of the open presidentially declared disasters in this plan update cycle the amount of federal, state, and local assistance that has been expended or approved in support of HMGP projects through September 30, 2013.

Disaster	Total Approved	Federal Share	State Share	Local Share
DR1560	1,493,304	1,096,129	45,672	351,503
DR1686	13,552,758	10,164,570	664,025	2,724,163
DR1750	1,243,973	932,979	38,476	272,518
DR1761	3,260,695	2,445,520	103,365	711,810
DR1833	7,713,418	5,704,463	804,882	1,204,073
DR1858	46,805,974	35,104,735	4,956,491	6,744,748
DR1973	7,153,763	5,365,349	523,041	1,265,373
Total	**81,223,885**	**60,813,745**	**7,135,952**	**13,274,188**
Percent		**74.9%**	**8.8%**	**16.3%**

Table 6.21

6.6.4 *Construction Standards for Mitigation*

DCA's Construction Codes and Industrialized Buildings Program establish minimum building construction standards for all new structures. Local governments that adopt building codes under one of these programs must utilize these minimum standards. Chapter 3.4.1 provides a list of building construction codes in the State of Georgia. These include eight mandatory and two permissive codes.

Disaster Resilient Building Codes (DRBC) Appendices

The Georgia Department of Community Affairs (DCA) was awarded a grant through the U.S. Department of Housing and Urban Development (HUD) to develop new disaster resilient building code (DRBC) Appendices for the International Building Code (IBC) and the International Residential Building Code (IRC). A task force of 19 stakeholders was appointed to look for opportunities to improve any provisions relating to hurricane, flood, and tornado disasters. In addition to improving existing provisions in the codes, the task force developed new provisions that address these issues. See Appendix I for the Georgia State International Building Code and Georgia State International Residential Code in regards to Disaster Resilient Construction. The optional appendices contain increased construction requirements (code plus) for disaster resilience that may be adopted in whole or part and are available for adoption by local jurisdictions in the State of Georgia as of January 1, 2013.

DRBC Workshops/Training

The state has developed and conducted a comprehensive training program for building officials on the importance, implementation and enforcement of the disaster resilient construction appendices. The training focused on the provisions within the appendices and aide in helping a community to determine which options may apply to provide increased requirements beyond what may be currently enforced.

6.6.5 *Mitigating Risks to Critical and Essential Facilities*

Critical facilities is used to describe all manmade structures or other improvements that, because of their function, size, service area, or uniqueness, have the poten-tial to cause serious bodily harm, extensive property damage, or disruption of vital socioeconomic activities if they are destroyed, damaged, or if their functionality is impaired. Critical facilities commonly include all public and private facili-ties that a community considers essential for the delivery of vital services and for the protection of the community. They usually include emergency response facilities (fire stations, police sta-tions,

rescue squads, and emergency operation centers [EOCs]), custodial facilities (jails and other detention centers, long-term care facilities, hospitals, and other health care facilities), schools, emergency shelters, utilities (water supply, wastewater treatment facilities, and power), communications facilities, and any other as-sets determined by the community to be of critical importance for the protection of the health and safety of the population.

Essential facilities are a subset of critical facilities and include hospitals, fire and police stations, rescue and other emergency service facilities, power stations, water supply facilities, aviation facilities, and other buildings critical for post disaster response and recovery operations.

Chapter 2 of the Standard Plan addresses both state-owned and operated facilities as well as critical facilities in order to focus on loss potential within the state. Assessing state-owned and operated facilities allows GEMA to prioritize mitigation efforts directed towards other state agencies with more efficiency as well as to aid in protecting the state's assets. Because critical facilities include any facility or structure that should continue to function and provide necessary services in some capacity (not necessarily normal purpose) to surrounding populations during and after a hazard event, GEMA aims mitigation efforts in this area as well.

As discussed in Section 2.8 of the Standard Plan, an assessment to identify the state-owned and leased facilities has been completed in all 159 Georgia counties. The state has utilized this information to update the hazard, risk, and vulnerability assessment.

Subsequently, future hazard, risk, and vulnerability assessments will include analyses of all spatially defined hazards identified in Chapter 2 of the Standard Plan that have the potential to affect state-owned and operated facilities that are stored in the Building, Land & Lease Inventory of Property (BLLIP) system as well as critical facilities stored in the GMIS system. Efforts are currently underway to develop processes for state agencies to identify critical facilities in the BLLIP system and also to have the GMIS site consume the relevant BLLIP information. Once the risk assessments have been completed for all spatially defined hazards, a formal, comprehensive, multi-year plan to mitigate the risks posed to the identified facilities will be developed.

In addition, through community education and outreach, GEMA has encouraged local jurisdictions to include mitigation activities that would reduce or eliminate the vulnerability to local jurisdictional critical facilities. Section 2.4.2 of the Standard Plan provides a table containing a list of hazards identified by local hazard mitigation plans and Section 3.2.4 of the Standard Plan provides a table containing a list of mitigation activities addressed in each of the approved or submitted local hazard mitigation plans.

6.6.6 *Integrating Mitigation to Post Disaster Recovery Operations*

Hazard Mitigation is an integral part of Georgia's post-disaster recovery operations. Staff from the Mitigation Division support FEMA staff at the Joint Field Office (JFO). State and FEMA staff work together to identify mitigation opportunities through both the Human Services, Public Assistance, Small Business Administration and Floodplain Management programs. Public Assistances' staff is very proactive in pursuing mitigation activities in the immediate post disaster recovery effort for re-

pair and restoration projects. GEMA's Mitigation staff supports the Public Assistance staff at their applicant briefings. GEMA's Mitigation staff conducts applicant briefings in the declared counties and provides technical assistance to all potential grant applicants on project development.

For DR1973, GEMA Hazard Mitigation staff worked very closely with FEMA Mitigation staff at the JFO to develop a Joint Mitigation Implementation plan for the disaster. The Joint Mitigation Implementation Plan detailed actions taken at the JFO to address the mitigation priorities identified by GEMA and FEMA in response to damage from severe storms/tornadoes associated with FEMA DR1973. The priorities were compiled by the State in cooperation with the JFO Mitigation staff to support the State Mitigation Plan for Georgia. Mitigation staff also worked very closely with FEMA's Hazards and Performance Analysis staff on benefit cost analysis of individual Safe Room type projects. This work resulted in higher benefits for Georgia Counties bordering the State of Alabama than the FEMA developed standard benefits identified in the Expedited Residential Safe Room application. Safe Room workshops were conducted at four colleges and at GEMA providing information to more than 100 people on guidelines for determining areas of Safe Refuge within buildings.