

Appendix A
Adoption and Approval Letters



STATE OF GEORGIA
OFFICE OF THE GOVERNOR
ATLANTA 30334-0090

Brian P. Kemp
GOVERNOR

March 12, 2019

Ms. Gracia Szczech
Regional Administrator
Federal Emergency Management Agency Region IV
3003 Chamblee-Tucker Road
Atlanta, Georgia 30341

Dear Ms. Szczech:

I am pleased to submit for your approval the Georgia Enhanced State Hazard Mitigation Plan Update, herein referred to as the Georgia Hazard Mitigation Strategy (GHMS). This has been prepared in response to the Standard and Enhanced State Hazard Mitigation Plan update requirements in accordance with the Disaster Mitigation Act of 2000 and 44 CFR §201.4 and §201.5. This letter represents my formal adoption of this plan on behalf of the State of Georgia as the blueprint for our future actions to reduce the devastating impacts of natural and manmade disasters on our businesses, property owners and citizens. All State agencies shall support the implementation of the plan as the plan continues to evolve, reflecting lessons learned from actual experiences in disasters and ongoing state planning efforts.

The GHMS provides a comprehensive framework for statewide disaster mitigation. The GHMS identifies the risks and vulnerabilities of the state to multiple hazards and identifies goals and actions to address those risks and vulnerabilities. The actions included in the plan update reflect the most current major natural hazards that Georgia faces, including riverine and coastal flooding, high winds from tornadoes and hurricanes, and wildfires, along with several others. Recommended actions in the plan range from working with local governments and communities to improve their capabilities for planning and identification of meaningful and valuable hazard mitigation projects, to seeking ways to incorporate better hazard mitigation practices within our own agencies as we carry out the work of State government.

In addition, I certify that the State 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 State will amend the plan whenever necessary to reflect changes in state or Federal laws and statutes as required in 44 CFR 13.11(d).

If you or any of your staff have any comments, please contact GEMA/Homeland Security Director Homer Bryson at (404) 635-7001. Again, thank you for your continued cooperation and support as Georgia advances its mitigation planning efforts.

Sincerely,

Brian P. Kemp



FEMA

January 7, 2019

Mr. Homer Bryson, Director
Georgia Emergency Management Agency/Homeland Security
P.O. Box 18055
Atlanta, Georgia 30316-0055

Attention: Mr. Terry Lunn, Hazard Mitigation Manager

Reference: Georgia Enhanced State Hazard Mitigation Plan Update 2019

Dear Mr. Bryson:

This is to confirm that FEMA has completed a review of the Georgia Enhanced State Hazard Mitigation Plan Update 2019 for compliance with the Federal mitigation planning requirements resulting from the Disaster Mitigation Act of 2000, as contained in 44 CFR 201.4.

We have determined that the Georgia Enhanced State Hazard Mitigation Plan Update 2019 is now compliant with Federal requirements, subject to formal adoption by the State. Upon submittal of the adoption documentation to our office, we will issue formal approval of the Georgia Enhanced State Hazard Mitigation Plan. When you submit your adoption documentation, please also include a complete final copy of the Georgia State Plan on CD.

For any assistance, please contact Stephen Juszcyk, of the Hazard Mitigation Assistance Branch, at (229) 225-4636 or Lillian Huffman, of my staff, at (770) 220-5322.

Sincerely,

A handwritten signature in black ink that reads "Kristen M. Martinenza".

Kristen M. Martinenza, P.E., CFM
Branch Chief
Risk Analysis
FEMA Region IV



FEMA

March 18, 2019

Mr. Homer Bryson, Director
Georgia Emergency Management Agency/Homeland Security
P.O. Box 18055
Atlanta, Georgia 30316-0055

Attention: Mr. Terry Lunn, Hazard Mitigation Manager

Reference: Georgia Enhanced State Hazard Mitigation Plan Update 2019

Dear Mr. Bryson:

The Georgia Enhanced State Hazard Mitigation Plan Update 2019 effective March 18, 2019 through March 17, 2024 is hereby approved as meeting the planning requirements of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, the National Flood Insurance Act of 1968, as amended, and Title 44 Code of Federal Regulations (CFR) Part 201.

We commend Georgia for developing a solid, workable plan that demonstrates commitment to reduce risks from natural hazards and that will guide mitigation activities over the coming years. We acknowledge and support the State's intention to review and update the plan annually and after each presidential disaster declaration, as needed. We look forward to receiving the 2024 Enhanced State Hazard Mitigation Plan update for review, which will capture the experiences gained over the previous five years.

A FEMA-approved State hazard mitigation plan is a condition of receiving certain non-emergency Stafford Act assistance and FEMA mitigation grants from the following programs:

- Public Assistance Categories C-G (PA C-G)
- Fire Management Assistance Grants (FMAG)
- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)

State hazard mitigation plans must be updated and resubmitted to FEMA Region IV Mitigation Division, Risk Analysis Branch for approval. If the plan is not updated by March 17, 2024, the plan is considered lapsed and FEMA will not obligate funds until the hazard mitigation plan is approved by FEMA.

If at any time over the plan approval period, FEMA determines that the State is not complying with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives funding or is unable to fulfill mitigation commitments, FEMA may take action to correct the noncompliance (44 CFR §§201.3(b)(5) and 201.4(c)(7)).

FEMA has determined the State hazard mitigation plan includes a Repetitive Loss Strategy that meets the requirements set forth in 44 CFR §201.4(c)(3)(v) and qualifies the State to request an increased Federal share for repetitive loss properties under the FMA program.

FEMA recognizes the state for the additional effort and commitment to hazard mitigation, authorizing the state to receive additional HMGP funds of up to 20 percent of the total estimated eligible Stafford Act disaster assistance. The “Enhanced” designation is recognition for states that are leaders in implementing a comprehensive statewide hazard mitigation program that results in safer, more sustainable communities.

As required by 44 C.F.R. § 201.5(b)(2)(iii), FEMA’s approval of your Enhanced State Hazard Mitigation Plan is based on our review of your mitigation program management performance over the last five years ending on the last day of the month immediately prior to submission of the plan to FEMA. Please note that when you submit your next updated plan for FEMA approval, the review of your mitigation program management performance will cover the full period of time between this approval and the next submission of your plan.

In addition, FEMA will remind the State, at a minimum, 12 months prior to the plan expiration date, of the consequences of not having a FEMA-approved hazard mitigation plan with respect to eligibility for the FEMA assistance programs that require FEMA-approved mitigation plan as a condition of eligibility.

The State is responsible for communicating with local and tribal officials, as applicable, interested in applying through the State for FEMA assistance. FEMA encourages the State to communicate with the appropriate officials regarding hazard mitigation plan status and eligibility requirements. The State is responsible for reviewing and submitting approvable hazard mitigation plans to FEMA. If the State is not submitting approvable hazard mitigation plans, FEMA will provide feedback as well as technical assistance or training, as needed.

To maintain eligibility for PA C-G, FMAG, HMGP, PDM, and FMA, the State must submit a draft of the next plan update prior to the end of the approval period, and allow sufficient time for the review and approval process, including any revisions, if needed, and for formal adoption by the State following determination by FEMA that the plan has achieved a status of “Approvable Pending Adoption.”

We look forward to continuing a productive relationship between FEMA Region IV and Georgia Emergency Management Agency/Homeland Security. If we can be of assistance, please contact Mr. Jesse F. Munoz, Mitigation Division Director, at 770 220-5212.

Sincerely,



Gracia B. Szozech
Regional Administrator

Attachments:

1. State Mitigation Plan Review Tool

Appendix B
Planning Process Documentation

Appendix B-I
State Hazard Mitigation Planning
Team Members and Meeting
Documentation

State Hazard Mitigation Planning Team (SHMPT)

In 2005 GEMA established a working task force of private, state and federal agency representatives, universities and other interested parties to make up the SHMPT. The SHMPT is currently still in existence and is made up of many of the initial organizations involved. GEMA has no formalized group set up by charter to develop or review the GHMS; however, there is a core group within the HMD and several state agencies that assist in this task.

All members of SHMPT are continually invited to participate in the planning process and are provided with copies of meeting notes via email for those unable to attend. GEMA also holds individual meetings with state and federal agencies. Members of SHMPT are provided information on GEMA's website of HMD activities. GEMA continues to maintain working relationships with all SHMPT members in regard to planning and mitigation. These efforts take place in the form of annual interagency meetings in addition to any post disaster meetings. The role of these meetings in the update process is to allow all state agencies and other members to participate in the update of the State Hazard Mitigation Strategy. Essentially, at every meeting, GEMA staff present progress on the update process as well as seek input from members regarding each section of the plan. The input from the members consists of review and analysis of the 2008 approved strategy as well as suggestions and recommendations for the update.

Also, in an attempt to include as many agencies as possible at every meeting, a call-in option is made available during the update planning process. Therefore, agencies without the means to physically attend the meetings can stay apprised during the planning process by reviewing meeting notes as well as calling into the annual meetings via conference call.

The annual interagency meetings bring together all the agencies that want to assist in the planning process. Prior to each meeting minutes of the previous meeting are sent to all members via email. At the beginning of each meeting all members present and via conference call-in are asked if they have any questions or comments on the previous meeting notes. This way all members are kept abreast of SHMPT proceedings. SHMPT had initially met monthly, however, since the updated plan had been approved in March 2008 the group decided to meet on an annual basis. Each meeting is recorded in minutes which are provided to all SHMPT members via email after each meeting. A sign-in sheet is provided at each meeting to determine which members attended in person and a roll-call is taken of the members calling in via conference call.

One of the benefits of having the annual meetings is to have the ability to brief each of the state agency representatives on any new federal requirements. Another of the primary functions of these meetings is to reestablish working relations between federal, state and local agencies and to focus on hazard identification and assess each agency's overall ability and data inventory.

While the meetings are now referred to as “State Inter-Agency Meetings”, these meetings sometimes include other interested parties such as non-profit organizations and private sector participants. These participants have included the American Red Cross, BellSouth, and AT&T, the Stone Mountain Memorial Association and the Business Executives for National Security Business Force. All agencies that participate in the state plan development and update process are given ample time and opportunities to review, analyze, and update information uncovered during the interagency meetings.

SHMPT is currently made up of the following agencies and organizations:

State Hazard Mitigation Planning Team

Board of Regents of the University System of Georgia
Emergency Managers Association of Georgia
Federal Emergency Management Agency
Georgia Department of Audits and Accounts
Georgia Department of Economic Development
Georgia Building Authority
Georgia Department of Administrative Services
Georgia Department of Agriculture
Georgia Department of Community Affairs
Georgia Department of Defense
Georgia Department of Driver Services
Georgia Department of Education
Georgia Department of Human Services
Georgia Department of Natural Resources - Floodplain Management
Georgia Department of Natural Resources - Safe Dams Program
Georgia Department of Natural Resources Coastal Resources
Georgia Department of Public Health
Georgia Department of Revenue
Georgia Department of Transportation
Georgia Emergency Management Agency/ Homeland Security
Georgia Environmental Finance Authority
Georgia Forestry Commission
Georgia Municipal Association
Georgia Office of Planning and Budget
Georgia Office of the Courts
Georgia Ports Authority
Georgia Soil and Water Conservation Commission
Georgia State Patrol
Georgia Technology Authority
Georgia World Congress Center
Jekyll Island Authority
Office of State Administrative Hearings
Subsequent Injury Trust Fund
Technical College System of Georgia
United States Department of Agriculture
US Army Corps of Engineers

Georgia State Hazard Mitigation Planning Team Meeting - Minutes

May 22, 2014

Present

Alan Fox, Governor's Office
Christopher Luncheon, DOR
Brad Cline, DOR
Randy Clayton, GOHS-SHSP
Bryan Haines, DOT
Tom Shillock, DNR
Eric Mosley, GFC
Terry Lunn, GEMA
Natalie Jones, GEMA
Dee Langley, GEMA
Brian Laughlin, GEMA

Via Conference Call-In:

Angela Wheeler, ITOS
Anita Russo, ITOS
Allen Fox, OPB
Chris Anderson, GEFA
Jeffrey Morris, USACE
Lisa Beck, TCSG
Venessa Sims, AGR
Raymond Noel, DCA
Alan Sloan, GEMA
Scott Sherman, GEMA

Welcome and Introductions

Dee Langley, Planning Program Manager, opened the meeting with greetings to all attendees and agencies joining the meeting and thanked them for their time and participation. Each participant in the room and on the phone introduced themselves. This meeting is being held as a Post Disaster review of the State Hazard Mitigation Strategy. In this review we plan to identify the damages, casualties, and loss of productivity due to the recent Severe Snow Storms in regard to the state, the counties and their communities. We will also develop new action steps to help eliminate or reduce our losses in future winter storm events.

Review & Approval of July 11, 2013 Meeting Notes

The meeting minutes for the July 11, 2013, meeting were approved and adopted.

State Hazard Mitigation Plan Update

a. Standard & Enhanced Plan Approvals by FEMA

A copy of the FEMA approval letter for the 2014 Georgia Standard and Enhanced Hazard Mitigation Strategy was passed around to all in attendance.

b. New Timeline (Update cycle extended from 3 to 5 Years)

FEMA recently approved the extension of state plan approval period from three to five years. A copy of the FEMA letter dated May 15, 2014, was passed around to all in attendance. Per the letter, the recently approved Enhance Hazard Mitigation Plan for the State of Georgia is now good through March 30, 2019. A copy of the plan can be seen on the GEMA website under the Mitigation tab and Planning section. The plan was significantly reduced in size after the Planning Team reviewed and eliminated much of the repeated information from the previous plan.

c. Plan at Publisher – UGA

A copy of the 2014 Georgia Hazard Mitigation Strategy was forwarded to the editorial section of UGA for review and development of a printable version of the plan to be prepared for distribution and placement on the new webpage.

Presidential Declaration 4165

a. Review Ice Storm Event

Georgia experienced two severe winter weather events in early 2014. One was in January and another in February of this year. Over one million residencies were without power, and up to $\frac{3}{4}$ of an inch of ice fell in some areas. There were six weather related deaths due to these storms. The first storm seemed to catch Georgia by surprise, however, with lessons learned, the second storm was less eventful, but very destructive. Due to the ice and snow many power lines were downed and many citizens and businesses did not have power for days.

Below is a map showing which counties were included in the disaster declaration.

FEMA-4165-DR, Georgia Disaster Declaration as of 04/24/2014



HAZARD MITIGATION GRANT PROGRAM

Building Resilient Communities

Georgia Emergency Management Agency/Homeland Security

Hazard Mitigation Division

Atlanta, GA 30316

Overview:

Mitigation is the cornerstone of emergency management. Hazard Mitigation is sustained action to reduce or eliminate risks to life and property from natural or man-made hazard events. Through mitigation actions such as sound land-use planning; adoption and enforcement of building codes; removing structures from hazardous areas; and retrofitting of existing buildings and facilities; and storm water management projects; we can protect facilities to assure functionality following an event, reduce exposure to liabilities and minimize disruptions to the community.

Introduction:

Section 404 of the Robert T. Stafford Disaster and Emergency Assistance Act of 1988 established the Hazard Mitigation Grant Program (HMGP). The purpose of the program is to provide funds to State agencies and local governments in the aftermath of a disaster for projects that reduce or eliminate the long-term risk to human life and property from the effects of natural hazards. For this disaster, the Federal Emergency Management Agency (FEMA) will contribute 20% of the amount it will spend for disaster assistance programs to fund the HMGP. Federal law requires States and local jurisdictions to have a mitigation plan prior to receipt of HMGP project funds. The plan identifies hazards, assesses community needs, and describes a community-wide strategy for reducing risks associated with natural disasters.

Project Funding:

The federal share of HMGP funding cannot exceed 75% of the total eligible project cost. The non-federal share may be met with cash, contributions, certain other grants such as Community Development Block Grants, or with in-kind services. Grants will be made available to eligible applicants on a competitive basis with priority given to the federally declared counties. The state may contribute a percentage of the non-federal cost share based on severity of damage for the counties included in the presidential disaster declaration for Public Assistance.

An estimated \$6-8 million in federal funds will be available for the Hazard Mitigation Grant Program (HMGP) as a result of the Presidential Disaster Declaration received on March 6, 2014. Through this grant program, the Federal Emergency Management Agency (FEMA) provides funds to States and local governments to implement hazard mitigation measures in the aftermath of a disaster to reduce losses of life and property damage. The Georgia Emergency Management Agency (GEMA) administers this federal grant program.

HMGP Application Process:

The HMGP is administered by the Georgia Emergency Management Agency (GEMA). GEMA Hazard Mitigation staff offer technical assistance to local governments for project identification and application preparation. GEMA also is responsible for the review, prioritization and funding recommendation of eligible projects to FEMA. FEMA is responsible for making all final funding decisions on projects submitted by the state.

Following a presidential disaster declaration, GEMA announces the HMGP grant application information, usually within 30-60 days of the disaster declaration date. Pre-applications are required based on project type. Upon favorable review of pre-applications, applicants will be invited to submit full applications. Completed applications are required within six to eight months of the declaration date. Applications are evaluated and projects are recommended to FEMA for approval and funding based on prioritization and available funds. All applications must be submitted to FEMA within twelve (12) months of the disaster declaration date.

Public agencies, including State and local governments are eligible to apply for HMGP funds. In addition, certain private nonprofit organizations or institutions that provide essential services to the general public are eligible to apply for HMGP funds.

The State's top priority for the HMGP is to fund projects in the PA declared counties that reduce or eliminate damages to life and property resulting from Severe Winter Storms.

To be eligible for the full range of HMGP projects, applicants must participate and be in good standing in the National Flood Insurance Program (NFIP). In addition, local governments **must** have a FEMA approved hazard mitigation plan and all proposed projects must be identified in the plan.

TYPES OF HMGP PROJECTS THAT COULD BE ELIGIBLE:

- Initiative Projects such as the development or improvement of warning systems with mitigation as an essential component;
- Construction of safe rooms (tornado and severe wind shelters) for public and private structures that meet the FEMA construction criteria in FEMA 320, "Taking Shelter from the Storm" and FEMA 361, "Design and Construction Guidance for Community Shelters";
- Retrofits such as elevations, structure relocation, structural reinforcement (wind and seismic), strapping of utilities, installation of storm shutters, tie downs, etc.;
- Acquisition of property and/or relocation of homes, businesses and public facilities from hazard prone areas;
- Wildfire mitigation such as creating defensible space, application of ignition-resistant construction and hazardous fuel reduction;
- Soil stabilization projects that provide protection from erosion and landslides;
- Generators that protect a critical facility and meets all other HMGP eligibility criteria. Critical facilities may include Emergency Operation Centers, police and fire stations, hospitals, and water and sewer treatment facilities;
- Structural hazard control or protection measures such as floodwalls, detention basins and other storm drainage upgrades; and
- Development of a Local Hazard Mitigation Plan.

Generally, a project should:

- Substantially reduce the risk of future damage, hardship, loss or suffering from a major disaster;
- Conform with federal floodplain, wetland and environmental regulations;
- Solve a problem independently, or part of a problem when there is assurance that the whole project will be completed;

- Be **cost-effective** in that it addresses a problem that is repetitive or that poses a significant risk if left unsolved;
- Contribute substantially to the problem's long-term solution;
- Have manageable future maintenance requirements;
- Be determined to be the most practical, effective and environmentally sound alternative among the possible options;
- Conform to the goals and objectives of Local and State Hazard Mitigation Plans; and
- Have the documented support of the local community.

Some of the reasons that projects / applications are determined to be ineligible:

- Project is for operation and maintenance versus disaster-related mitigation;
- Project is the responsibility of another federal agency, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service;
- Project is the result of deferred maintenance rather than related to a natural hazard;
- Project has an inadequate benefit/cost ratio (not cost-effective);
- No federally approved local Hazard Mitigation Plan; and
- Non-participation in the National Flood Insurance Program.

For further information, write us at the address below or call the State Hazard Mitigation Program Office at (404) 635-7522.

Georgia Emergency Management Agency
Hazard Mitigation Division
Post Office Box 18055
Atlanta, Georgia 30316-0055

Below is a picture of some of the damage due to ice accumulations.



b. Review of Winter Weather Section of the State Plan & Mitigation Actions Review

The Planning Team in Hazard Mitigation will review the state plan to determine what updates need to be made and data included in the corresponding charts. The Team will also review the current mitigation actions that had to do with severe winter weather and make recommendations for updates and submit them to the SHMPT for evaluation and approval at their next meeting.

c. Damages to State Facilities?

There were no severe damages to state facilities reported other than all state offices on capitol-hill and in northeastern Georgia having to close down for several days due to slippery roads and lack of power.

d. Business Interruption to State Agencies?

As stated earlier, all state offices on capitol-hill and in the eastern portion of the state were closed for three days. The Augusta area seemed to incur the most significant ice accumulations and damages to utilities. With the weight of the snow and ice, a large amount of debris was accumulated and had to be removed. This was a very costly endeavor. Estimated cleanup costs totaled approximately \$60 million dollars.

e. Application Cycle, Timeline & Priorities

Terry Lunn gave a presentation on the application timeline.

An Application Information document was provided to all parties in attendance and made available on the GEMA website. Here are some of the pertinent dates:

Hazard Mitigation Grant Program - DR-4165 Timeline

Deadline to submit Pre-Application to GEMA: August 11, 2014

State will review Pre-Applications

GEMA will notify Applicants to submit full HMGP Application by: September 15, 2014

Full Applications due to GEMA by: November 17, 2014

Full Applications submitted to FEMA no later than: March 5, 2015

FEMA Approval – Timeline unknown

Project implementation – Up to three years

PDMC 2013 & 2014

Per Terry Lunn, we had 24 PDM 2013 grant applications approved this year for counties to update their hazard mitigation plans and we are working on getting their Grantee/Subgrantee agreements to them to begin the local plan update process. The applications are selected according to GEMAs plan update priority schedule. Terry also mentioned that we will be preparing 21 grant applications for the PDM 2014 cycle. In relation to the HMGP 4165 disaster grant program, we will be preparing applications for a large number of generators, 10 county plans, and the state plan update.

Geological Technical Working Committee

Brian Laughlin informed the group that he is developing a Geological Technical Working Committee to bring together geology experts to discuss the geological hazards in Georgia. During our most recent update to the State Hazard Mitigation Strategy, our research into geological hazards such as landslides and sinkholes resulted in limited or scarce information for Georgia. In order to better inform the state and local communities, we invite those interested in assisting us in developing a more comprehensive risk assessment to geological hazards. The risk assessment is the foundation to the state hazard mitigation strategy and also serves as a resource to local communities in the development of their local hazard mitigation plans.

ITOS – GMIS New Platform

Lawton Brantley and Angela Wheeler were on the conference call and they described the progress they have made with the development of the new GMIS platform.

GMIS Upgrade activities:

Migration Scripts

Many updates to support one button push to migrate "All data" to new model based on specifications. Still in progress.

User Management

View User Information

Edit User Information (partial)

Search/Filter based on input

Forgot Password

Migrations and models to support county/role access and NFIP view permissions

User Interface/widgets

Updated Main Menu styling

UI overhaul to fix issues related to javascript libraries

Wider search input

Minimized scrolling on add/edit forms

Expansion of adding/editing Mitigated Properties of all Mitigation Action Types in addition to Tornado Initiative

Search

Facility: expanded from 2 to 13 attributes

Mitigated Properties: expanded from 7 to 19 attributes

General

ArcGIS JSapi upgraded to 3.9 from 3.4

- Fixed issue with saving of multiple choices for facility types.
- Updated search results to show map results as highlighted with an updated extent.
- Added forgot password option to GEMA GMIS landing page (description for testing below)
- Updated Add and Edit form screens to minimize or eliminate scrolling.
- Updated the Account “Manage” form.
- Fixed style issue with search results not using screen space effectively.

Also worked on the following:

- Implementing Mitigated Property for all acquisition types.
- Visualizations and searches based on hazard and other geography types.
- Response time.
- Move location tools
- Location widget that populates latitude/longitude based on address input on the Add forms.
- County/role access
- Filters for jurisdiction in add form based on county.
- Add the search input to search forms for the Facility Details/Mitigated Property Details Searches.
- Highlight selected features that are shown in search results.
- Exception email and custom error handling
- Custom security/roles authorize based on GEMA GMIS user/role definitions and updates to the UI to hide functions based on user role
- Reports through Sql server reporting services
- Fixes for the Kendo grid refresh on multiple searches w/o dismissing search results
- Change/reset password
- Edit icon added to search results next to zoom to icon
- location widget that will allow the geocode/update of lat/long based on address input
- Fixes related to lat/lon not required for all entity types and allowing review of non geographic entity types (mass alert and weather radios)
- Fixes related to zip code implementation
- Fixes to UI so zoom tools do not obliterate the map tools icons.
- ongoing evaluations of iterative imports of production data into new model (risk categories and tiered critical facility type categories and occupancy)
- Updated data context searches based on attribute queries (checkboxes for id and name expanded to include cascading attribute selections)

Next Meeting

The next meeting will be determined at a later date. We will notify everyone by email.

Comments and Questions

Having no further comments or questions, the meeting was adjourned.

Georgia State Hazard Mitigation Planning Team Meeting - Minutes

March 19, 2015

Present

Philip Dalenberg, GDOT
Jeff Rolsten, DOAS
Venessa Sims, GDA
Danny Thompson, GPA
Brad Cline, DOR
Randy Clayton, GOHS-SHSP
Haydn Blaize, DNR
Tom Shillock, DNR
Alan Giles, DNR
Brad Allen, JC-AOC
Charlisa Bell, GDPH
Amy Rammo-Kuns, DNR/EPD
Darlene Booker, FEMA
Edwardine Marrone, FEMA
Terry Lunn, GEMA
Kelly Reeves, GEMA
Dee Langley, GEMA
Laura Radford, GEMA
Kelly Brokenburr, GEMA
 Via Conference Call-In:
Anita Russo, ITOS
Robin Berzins, FEMA
Bruce Holmes, USG
Ernay Robinson, DOT
Lisa Beck, TCSG
Crystal Swain-Bates, GTA
Jennifer Kline, GADNR
Mark Wiles, GFC
Raymond Noel, DCA
Scott Sherman, GEMA

Welcome and Introductions

Dee Langley welcomed everyone to the 1st annual update meeting for the 2014 SHMS. We greatly appreciated everyone's time and participation. The meeting was run on WebEx, so those who could not make the meeting can participate and see the screens we are looking at. Dee reminded those calling in and joining the meeting by WebEx to please remember to use Internet Explorer as your web browser. Roll call was taken.

Review & Approval of May 22, 2014 Meeting Notes

Dee began the meeting by asking if anyone had any comments or recommended changes to the minutes of our 5/22/2014 Post Disaster meeting? We corrected the spelling of Venessa Sims name and added Governor's Office of Highway Safety to Mr. Clayton. With no further changes the minutes were approved.

New GEMA Website

a. **Web Address:** <http://gema.ga.gov/Mitigation/Pages/Planning.aspx>

b. **Planning Resources**

Dee asked if any agency had mitigation related websites they think would be of value to local communities or other state agencies to send them to him.

2014 Georgia Hazard Mitigation Strategy Update

a. **New Timeline (3 to 5 Years)**

FEMA recently approved the extension of state plan approval period from three to five years. A copy of the FEMA letter dated May 15, 2014, was displayed. Per the letter, the recently approved Enhance Hazard Mitigation Plan for the State of Georgia is now good through March 30, 2019. A copy of the plan can be seen on the GEMA website under the Mitigation tab, in the Planning section. The plan was significantly reduced in size after the Planning Team reviewed and eliminated much of the repeated information from the previous plan. This coincides with the 5 year term for local plans.

b. **Proposed Updates to the Strategy**

We provided several documents on our ShareFile for the Team members to download and review and prepare comments or suggestions. The Hazard Mitigation Planning Team here at GEMA reviewed the information from the 5/22/2014 Post Disaster meeting, along with each chapter in the SHMS. From this review we came up with the following proposed changes and copies are attached:

- Chapter 2, Table 2.17, added winter storm information
- Chapter 2, Table 2.25, added notable earthquake information
- Chapter 2.5.7 Winter Weather, SHMP team reviewed and updated event information:

- i. Comment from Alan Giles (DNR): “Change from “Snowmagedden” to “Snowmageddon””, “Change “motorist” to “motorists””
 - ii. Comment from Jeff Rolsten (DOAS): “You need to mention control of commercial vehicle traffic through the city during events.”
- 2014 SHMP Strategies Compiled (2014-12-11)
 - i. Added generators
 - ii. Comment from Sarah Fox (FEMA) “PDM generators have to be part of a larger project.”
 - iii. Question from Venessa Sims (Ag): “Is the funding/need for MitActions 41 and 51 still relevant for the Agricultural Sharing and Analysis Center?”
- SHMS Chapter 5 Updates
 - Added changes in State Plan expiration date from 3 to 5 years

c. Other Hazard Events in 2014

Other Events will be addressed in local plans; we wanted to show you that other hazards have had an impact on the state and its communities in 2014.

Local Plan Update Status

a. Plan Status Map (Attached)

b. Status of HMGP 4165, PDMC 2013, 2014, & 2015

We went over status figures for PDMC 2013& 2014, along with DR 4165. The Planning Team at GEMA is working on a list of counties to apply for in the PDMC 2015 application period coming soon. We plan to finish the 1st cycle of updates this year or early next year. We are providing a great deal of technical assistance to the counties.

c. State of Georgia Risk Analysis Outreach

- i. Question from Venessa Sims (Ag): “Are you going to share this data with other state agencies?”
 - 1. Response from Terry Lunn: “You can use GMIS for a general idea, but not sure about actually sharing. It will probably depend on what the county wants to do.”
- ii. Question from Amy Rammo-Kuhs (EPD): “What about waste water plants- EPA warns about security issues?”
 - 1. Response from Terry Lunn: “GMIS is password protected.”

- iii. Question from Venessa Sims (Ag): “Is there any way to get information on how much commerce (closed roads and airports) was affected by the winter weather events?”
- iv. Question from Charlisa Bell (DPH): “Does information put into GODAWGS automatically go into GMIS?”
 1. Response from Terry Lunn: “No, but we can talk to Leanora.”

The Polis Center, Terry Jackson, and various Regional Commission offices will be developing a risk assessment model and reports focused on defining wind, hurricane, tornado, and flood risks for each of the counties in Georgia. The contractors, using exported Win GAP information, parcel maps from the county, and updated essential facility data from GEMA, will run this information through a translator which will create a building inventory stock which is then inputted into the flood and wind models in Hazus MH to develop reports in a Hazus Level 2 format.

The assessment will use HPR, Hazus-MH and GIS analyses to generate hazard profiles. Where available, the risk assessment process will also apply updated Hazus-MH inventory data derived from available essential facility and building inventory stock data (assessor's data), digital Flood Insurance Rate Maps (dFIRM), best available DEM, and other sources as appropriate.

FEMA and HMA Activities

a. New State Plan Guidance – Released March 2015

The Hazard Mitigation Planning Team at GEMA will be reviewing the new State Plan Guidance to see what changes have been included

b. 2015 Partners in Mitigation Workshop at Georgia Tech

More than 100 state and federal agency staff converged on the Georgia Tech Research Institute Conference Center this week for Partners in Mitigation: Teamwork in Action, a five-day workshop focusing on water resources engineering and federal policy implementation.

Sponsored by Region IV of the Federal Emergency Management Agency (FEMA) and hosted by the School of Civil and Environmental Engineering, the workshop will also bring together civil engineers from academia and the private sector to review several areas of practical importance to emergency management, including:

- New federal regulations and policies for flood hazard mapping and insurance
- Resources for updated hazards analyses and education for general public
- Updates on floodplain management, flood Insurance and federal mitigation grant program

The workshop runs from Jan. 28 through Feb. 1

c. 2015 HMA Guidance (Fact Sheet Attached)

d. HMGP 4165 Activities

Terry Lunn updated everyone on the status of generator and initiative applications that have been received for DR 4165. \$9 million is the sixth month estimate. We are waiting on the 12 month figure. We received 47 local government applications for 120 generators. June 4th is the deadline to finalize and submit applications.

Question from Amy Rammo-Kuhs (EPD): “Are these generators given to people or are they a resource they have to call upon? Do they apply to receive these? Can I get a list of all the wastewater systems that get generators?”

Response from Terry Lunn: “No, these are kept onsite and yes you do have to apply. Yes, you can get a list of the wastewater plants that receive generators.”

ITOS – GMIS New Platform

Anita Russo was on the conference call and she described the progress ITOS has made on the new GMIS platform.

First Generation (legacy) Application in Final Stages of Decommissioning

Application Go-Live official date: Friday, December 19, 2014

To Do: Mitigated Property Attach Documents/ Avoided Loss

Schedule Lessons Learned

New site:

<https://apps.itos.uga.edu/gema.gmis>

Project Planning/Requirements meetings

Design and Architecture planning

Iterative development cycles (738 code revisions 39 release deployments)

Phase 1 - Internal Alpha Releases

Phase 2 - GEMA notifications/Reviews

Phase 3 - Alpha/Beta/Release Deployments

Phase 4 - New site promotion and legacy site decommissioning

Build New Models

Continuous data migration script development

Continuous UI development and Map Service optimization

Final migration testing and deployment

Up to 6 developers contributing and merging code

Map search by address, county, city

Alternate among base maps

Imagery choices <1 Meter resolution in some areas

Legend widget independent of table of contents

Integrated external services and layers

Cross Browser support

Classification of Facility Types

Facility Criticality Designation

Specified (Expanded) Mitigated Property Data Capture

Standard Import Process

Triggered automated communication

Standard template storage/upload location

Decoupled Design of Concerns

Location/Valuation/Occupancy - Use/Risk

Reports feature/support Ad-hoc sorting grouping

Multi-tiered Security Model

County Access

Role Access

Layer Access

National Flood Insurance Program Properties

Validation

Allowed County location

Construction/Value Year

A question from the phone: "Do you need a new password to get onto site?" Response from Anita Russo: "Yes, click forgot password to set up new account information."

Agency Updates – Report Out

Dee introduced several agencies that had mitigation related activities:

- a. Mark Wiles with the Georgia Forestry Commission explained the Large Wildfires in Georgia Data submitted by Eric Mosely at a DCA IWIUC code meeting. He also gave a report on South Wrap and Southern Wildfire.
 - a. Developed a *State of Georgia's Large Wildfire* map for last 5 years
 - b. Working on finishing all the update CWPPs- only a few left
 - c. Working with cities to become Firewise
 - d. SouthWRAP
 - e. Southern Group of State Forestry
 - i. Designed to provide data to areas as large as the whole state or as small as your neighborhood
 - ii. Based on fuel types
- b. Tom Shillock with the Department of Natural Resources spoke about the upcoming ASFPM Conference in Atlanta May 30th thru June 5th of 2015, with the theme “Mitigation on My Mind.” He also spoke about the RiskMAP meetings later this year.
 - a. Working on:
 - i. GA Coastal Map
 - ii. Storm Surge
 - iii. Ocmulgee
 - iv. Chattahoochee
 - v. Etowah Watershed
 - vi. Middle Savannah Watershed
 - b. Community Assistance Plan
 - i. Provided local communities with new guidebooks
 - ii. Macon-Bibb considering joining CRS
- c. Other agencies were asked if they had any mitigation related activities. There were no responses.

Next Meeting

The next meeting date will be determined at a later date. It will be held sometime in the first quarter of 2016. We will notify everyone by email.

Comments and Questions

Having no further comments or questions, the meeting was adjourned.

DR 4215
(Feb 2015 Severe Winter Storm Event)
Post Disaster State Hazard Mitigation
Planning Team Meeting

AGENDA

Tuesday – June 30, 2015

10:30am to 11:30am

WebEX Meeting Online

Toll Free: 1-855-282-6330

Access Code: 648 222 677

- 1) Welcome and Introductions
- 2) Presidential Declaration 4215
 - a. Review Ice Storm Event
 - b. Review of Winter Weather Section & Mitigation Actions
 - c. Damages to State Facilities?
 - d. Business Interruption to State Agencies?
 - e. Application Cycle, Timeline, & Priorities
- 3) Next meeting – Late January 2016
- 4) Comments and Questions
- 5) Adjournment

Georgia State Hazard Mitigation Planning Team Meeting - Minutes

May 19, 2016

Present

Dee Langley, GEMHSA
Alan Giles, DNR
Tom Shillock, DNR
Philip Dalenberg, GDOT
Laura Radford, GEMHSA
Michael Keene, GDOT
Vanessa Sims, GDA
Amy Rammo Kuhs, DNR EPD
Shaurice Mullins, GEMHSA
Will Lanxton, GEMHSA
Terry Lunn, GEMHSA
 Via conference Call-in:
Jennifer Kline, DNR
Alan Sloan, GEMHSA
Scott Sherman, GEMHSA
Linda Byers, FEMA

Welcome and Introductions

Dee Langley welcomed everyone to the combined DR 4259 post disaster review meeting / 2016 Annual Update meeting for the 2014 SHMS. We greatly appreciated everyone's time and participation. The meeting was run on WebEx, so those who could not make the meeting can participate and see the screens we are looking at. Dee noted the recent change in the agency name from GEMA/HS to GEMHSA. Roll call was taken.

Review and Approval of the March 19, 2015 meeting minutes

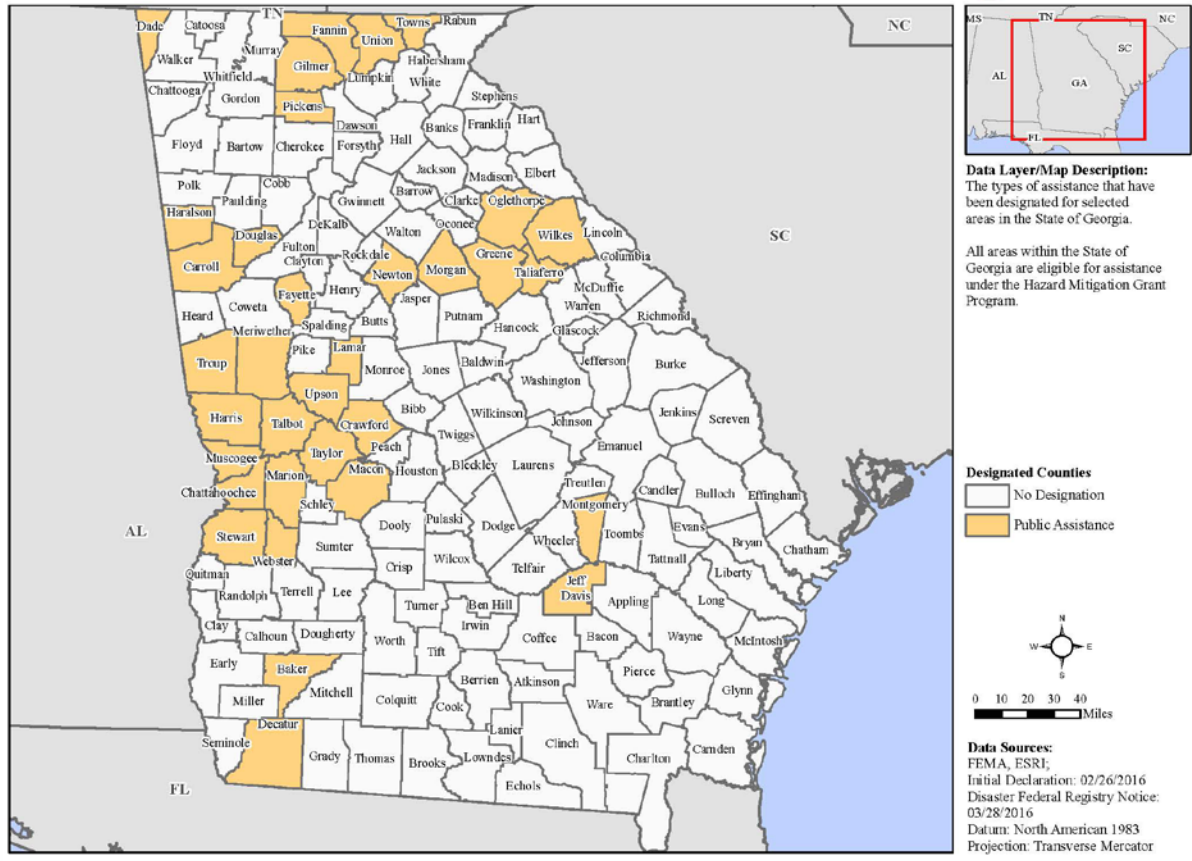
Dee began the meeting by asking if anyone had any comments or recommended changes to the minutes of our 6/30/2015 Post Disaster meeting? With no changes the minutes were approved.

DR 4259 Post Disaster Review Meeting

a. Presidential Declaration:

Below is a map showing the counties included in the DR4284 Disaster declaration:

FEMA-4259-DR, Georgia Disaster Declaration as of 03/28/2016



b. Review Severe Storm and Flooding Event

Between December 22, 2015 and January 13, 2016, between 3” and 16” fell across Northern, Central and Southwest Georgia significantly impacting the Oconee, Ocmulgee, Altamaha, Flint and Chattahoochee Rivers. A map of the rainfall totals is below:

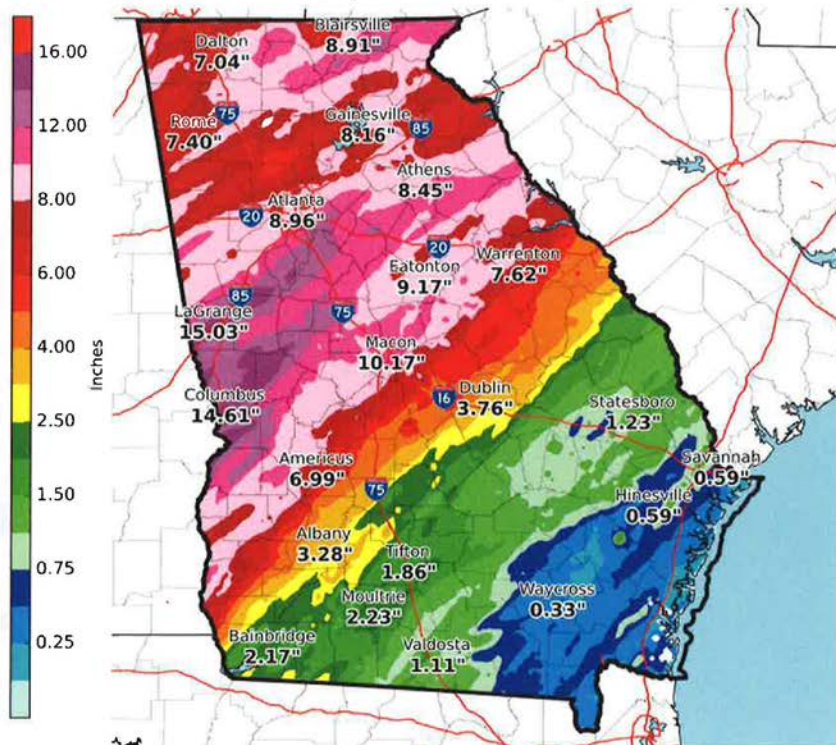
December 2015 / January 2016 Heavy Rain & Flooding in Georgia

December 22, 2015 – January 13, 2016

Rainfall Amount Graphics

Storm Total Rainfall (Observed)

Valid: Mon 12/21/15 7:00 AM - Thu 12/31/15 7:00 AM EST



National Weather Service
Peachtree City, GA
12/31/2015 09:42 AM EST

Follow Us:   
weather.gov/atlanta

c. Damage to State Facilities

It was reported there was damage to a wastewater treatment plant (Name/location?).

d. Business Interruptions to State Agencies

e. HMGP Application Timeline and Priorities

Terry Lunn gave a presentation on the application timeline. An application information packet was provided to all parties in attendance and emailed to all parties, shown on the presentation and emailed to all attendees, including those participating online. The following timeline was described:

February 26, 2016 – Disaster Declaration (HMGP Statewide)
March 29-March 31, 2016 – Applicant Briefings
June 30, 2016 – Pre-Application due to GEMHSA
July 30, 2016 – GEMHSA completes review of Pre-Applications
October 30, 2016 – Full Application due to GEMHSA
February 26, 2017 – All Applications submitted to FEMA
FEMA Application Review Process (up to 12 months)

f. Public Assistance Mitigation

Terry Lunn (GEMA/HS) gave a brief overview of PA mitigation.

Agency Updates – Report Out

a. Sea Level Rise and Coastal Projects – Jennifer Kline

Jennifer Kline, Ga DNR Coastal Resources Division, gave an overview of the ongoing Sea Level Rise study and coastal projects. She noted marsh model data was given to 6 coastal counties. They've projected a 1 meter rise in sea level over the next 100 years. They've studied shoreline change rates from 1935 forward.

Jennifer also noted they are running HAZUS models on a regional basis for the 11 coastal counties. The models include climate change perspectives. The models will include Category 2, 4 and 5 hurricanes both with and without sea level rise and will be complete within the next year.

Jennifer described the completion of recovery and redevelopment plans in Chatham and Brantley Counties. She noted Camden and Glynn Counties are including sea level rise in their base plans.

Jennifer informed the team of an upcoming November conference on Jekyll Island.

b. Climatological Impacts on Georgia – Will Lanxton

Will Lanxton (GEMHSA Meteorologist) gave a description of the El Nino Southern Oscillation (ENSO), climate change and their impacts on the Southeastern United States. Typical effects of El Nino and La Nina are as follows:

El Nino	La Nina
Summer Impacts	
Slight increase in Tornado/Hail frequency in South Georgia and Florida	Slight decrease in tornado/hail frequency in Georgia and Florida.
Fewer hurricanes due to stronger vertical wind shear and trade winds and greater atmospheric stability.	More hurricanes due to weaker vertical wind shear and trade winds and less atmospheric stability.
Winter Impacts	
Above average precipitation = flooding more likely.	Below average precipitation
Below average temperatures.	Above average temperatures
Slight decrease in severe weather.	Slight increase in severe weather

Will noted climate change could intensify effects of ENSO events, however, this is still a grey area for scientists. Recent research has suggested the effects of ENSO will worsen with climate change, however, the question is not settled.

Will explained climate change will likely produce slightly stronger (approximately 3%), slightly less (approximately 25%) hurricanes with slightly more rainfall (approximately 10%) and more surge (approximately 3%) due to sea level rise.

Climate change will likely cause hurricanes to form further east in the Atlantic and tracks will likely steer further away from the US, reducing the potential for landfall. However, this is cancelled out by the fact that damages and risks will continue to rise due to the recent increase in population along the coast with 53% of the US population now living within 50 miles of the US coast.

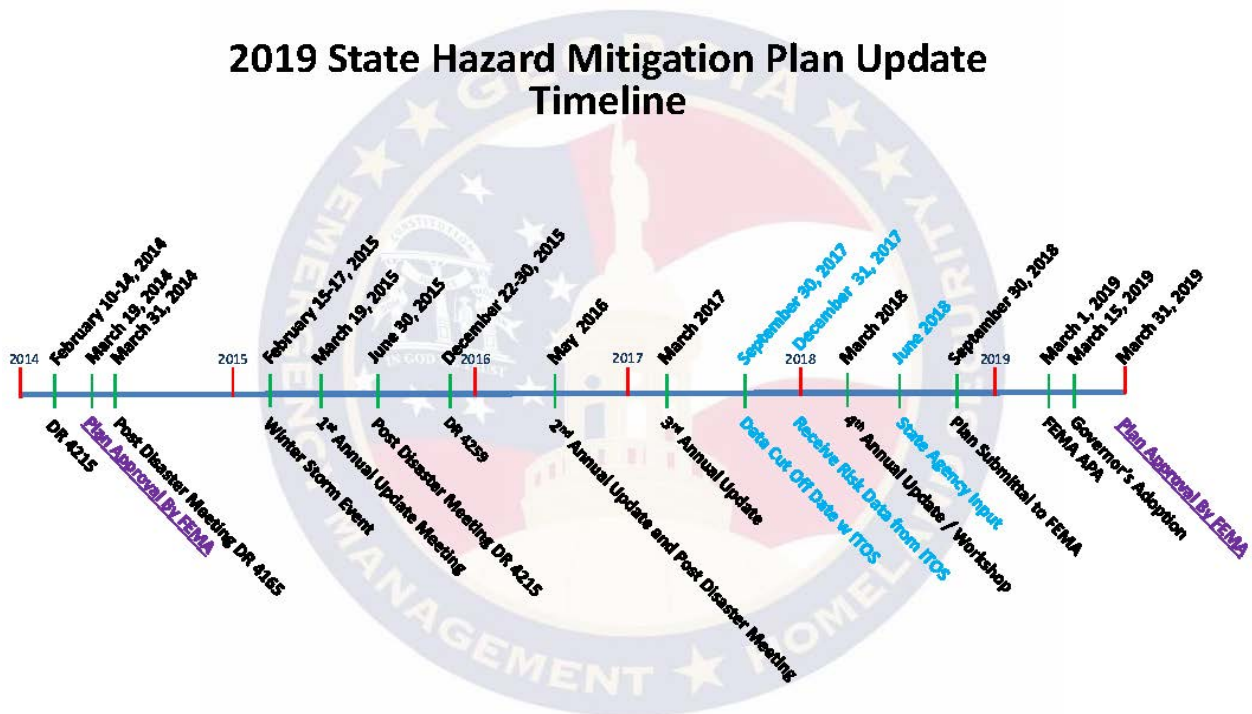
c. **RiskMap Activities for 2016 –**

Tom Shillock, GA DNR, gave an overview of ongoing RiskMap activities and plans for 2016. Currently they are planning Discovery meetings in the Upper Oconee and Withlacoochee watersheds. Tom also described current progress on the Upper Savannah watershed.

State of Georgia Enhanced Mitigation Strategy Update

a. **Revised Timeline**

Dee described the proposed timeline, shown below, for the 2019 SHMS update process.



b. **Review of Inland Flooding Table Updates**

Dee described the following updates to the risk assessment related to the recent flood disaster:

Number	Declared	Description
4259	02/26/2016	Severe Storms and Flooding
1858	09/24/2009	Severe Storms and Flooding
1833	04/23/2009	Severe Storms, Flooding, Tornadoes, and Straight-line Winds
1761	05/23/2008	Severe Storms
1560	9/24/2004	Tropical Storm Frances
1554	9/18/2004	Hurricane Ivan
1209	03/20/1998	Severe Storms, Tornadoes and Flooding
1042	10/19/1994	Heavy Rains, Tornadoes, Flooding, High Winds
1033	07/07/1994	Tornadoes, Flooding, Heavy Rain, Tropical Storm Alberto
1020	03/30/1994	Severe Storms, Tornadoes and Flooding
897	03/15/1991	Flooding, Severe Storm
880	10/19/1990	Flooding, Severe Storm
857	02/23/1990	Flooding, Severe Storm, Tornado
541	11/07/1977	Dam Collapse, Flooding
507	06/11/1976	Severe Storms, Flooding
370	04/04/1973	Tornadoes, Flooding
214	03/14/1966	Flooding
180	11/04/1964	Flooding
150	03/26/1963	Severe Storms, Flooding
110	03/02/1961	Floods

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	Dam failure; 39 deaths; \$2.8 million in damages
1990	Conasauga, Chattooga, Toccoa and Oconee Rivers	50 to >100 years	9 deaths; \$13.9 million in damages
1990	Savannah, Ogeechee and Ochopee Rivers	>100 years	FEMA 880; \$7.6 million in damages, tropical storm
1991	Altamaha, Apalachicola, Ochlockonee, Ogeechee, Satilla, and Savannah Rivers	25 to 50 years	FEMA 897; \$3.4 million in damages

1994	Flint, Chattahoochee, and Altamaha Rivers	>100 years	FEMA 1033; 31 deaths; >20 inches of rain; \$400 million in damages; tropical storm
1994	Savannah area	25 to >100 years	FEMA 1042; 15 inches of rain; \$10.5 million in damages
1995	Western Georgia	25 to 50 years	FEMA 1209; 5-9 inches of rain; \$20 million in damages; hurricane
2004	Middle and South Georgia	10 to 50 years	FEMA 1560; 4-9 inches of rain; \$20 million in damages; hurricane
2004	Northern and Southwestern Georgia	10 to 50 years	FEMA 1554; 4-9 inches of rain; \$30 million in damages; hurricane
2009	Southwestern Georgia	10 to >500 years	FEMA 1833; 5-10 inches of rain; \$36.5 million in damages
2009	Northwest Georgia, Atlanta Area	> 500 years (Epic)	FEMA 1858; 9-12 inches of rain; \$225 million in damages
2015	Northern and Southwestern GA	10 to 50 years	FEMA 4259; 7-15 inches of rain; \$30 million in damages

c. Proposed Updates to the Strategy

Dee described the addition of a mitigation action to provide and encourage the use of the best available historic, risk and vulnerability data and resources to counties for use in local mitigation plans.

b. Status of Local Plan Update Cycles 1 & 2

Dee gave a general description of the current status of local plan updates from cycles 1& 2.

c. HAZUS Level II Analysis and Reports

Dee updated the team on the status of the HAZUS Level II analysis and reports, including the status on obtaining the necessary data as well as completing the reports.

FEMA Activities

a. State of Georgia Plan Consultation with FEMA Region IV

Dee discussed the State Plan consultation with FEMA Region IV. Georgia was the first state in Region IV to participate in the consultation process. The approval letter from FEMA is shown below:

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



FEMA

December 16, 2015

RECEIVED
12/22/15

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

Reference: Georgia State Consultation and 2015 Enhanced State Plan Review Acknowledgement

Dear Mr. Lunn:

This letter serves as an acknowledgement of the results of the Georgia State Consultation process completed on November 12, 2015 and the Georgia Enhanced Plan Interim Review completed on November 18, 2015.

The FEMA State Plan Guidance, released March 2015 and effective March 2016, contains specific instructions for updating State Standard and Enhanced Plans, including the introduction of the State Consultation process (State Mitigation Plan Review Guide, 2.1.2, p. 6) and an annual review and validation of "Enhanced" mitigation programs (State Mitigation Plan Review Guide, A.6, p. 40). As stated in A.6, the "Enhanced" mitigation program review validates that the State is maintaining a comprehensive mitigation program, effectively using available mitigation funding, and remaining capable of managing the increased HMGP funding. FEMA will not require a state mitigation plan update as a result of the annual validation.

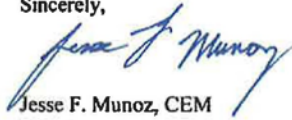
This letter *acknowledges* the completion of all elements for the two processes. Because the Georgia State Enhanced Plan does not expire until March 2019, a Regional review was completed for your grants management performance. An interim courtesy review was also completed for the Planning program elements as well. Both reviews were evaluated as having met all of the FEMA requirements, and FEMA has determined that the state is on track and continues to meet grants management performance requirements. The next annual review will occur in November 2016 and each year at that time until the next Enhanced Plan update is submitted for formal review in 2019.

The Final Rule amending the Mitigation Planning regulations (44 Code of Federal Regulations (C.F.R.) Part 201), specifically 44 C.F.R. §§ 201.3(b)(5), 201.3(c)(2), 201.3(c)(3), 201.3(e)(3), 201.4(d), 201.5(a), 201.5(c)(1), and 201.5(c)(2), was published in the Federal Register (80 FR 22873) on April 25, 2014. The Rule reduced the frequency of Standard State and Enhanced State Mitigation Plan updates by extending the update requirement from 3 to 5 years. The change was effective May 27, 2014. Therefore, the State of Georgia's Enhanced State Mitigation Plan, previously approved on March 31, 2014 is now approved through March 31, 2019. All other terms detailed in your original approval letter, dated March 18, 2014, will continue without change. The State should continue to implement the plan and follow maintenance requirements to ensure that the plan remains relevant to guide the implementation of measures to reduce risk from future events.

www.fema.gov

Finally, we look forward to working with you to discuss the status of the state's mitigation program each year over the approval period. If we can be of assistance, please contact Linda L. Byers, RIV Senior Lead Planning Specialist, at (770) 220-5498 or Jeffery Brewer, HMA Program Specialist at 770-220-5661.

Sincerely,



Jesse F. Munoz, CEM
Director
Mitigation Division

Attachments:

1. State Mitigation Plan Review Tool
2. Mitigation Consultation Summary
3. HMA Review Document

Cc:

Dee Langley
Susan Wilson
Jacky Bell
Rob Lowe
Tom Shillock

b. New State Plan Guidance – Effective March 2016 & Review Tool

Alan Sloan discussed the recent changes in the State Plan requirements. We submitted the current State Plan in October, 2013. It was approved and made effective March 2014. FEMA published new guidance in March 2013 and made it optional for the first year. We were neck deep into the update by then, so we chose to use the previous guidance, which was released in 2008. March, 2015, FEMA published a second new State Plan guide. The primary differences were as follows:

- The new guidance streamlined the order of some of the requirements. *This may cause us to re-organize the document itself to match the new review tool.*
- There are some different requirements:

- 2008 guidance listed several items that the plan “should” do. *We met most of these anyway.*
- 2015 guidance has moved several of the “should do” items to “must do” items. *We met most of these anyway in the 2014 plan under the 2008 guidance. We will continue to do so. Any that we didn’t do were not listed in the plan review crosswalk. At most, these should only require minor changes in the plan document.*
- Some of the 2008 requirements have been removed and not listed in the 2015 guidance. *However, it may make sense to continue doing these for continuity sake – particularly where the old guidance required the plan to describe how some sections were reviewed.*
- 2015 guidance does have some brand new requirements. *We did some of these anyway because it made sense at the time and there was no conceivable reason not to do it. We will have to make sure we know exactly what FEMA is looking for and make sure it is specifically addressed in the planning process as well as in the plan itself.*

c. Upcoming Meeting and Workshops

I. Program Management National Conference (August 1-4)

Dee noted this conference for information.

II. Annual HM Stakeholders Meeting in Emmitsburg, MD

Dee noted this workshop for information.

d. HMA Activities with PDM 2015 and 2016

Dee updated the team on activities related to PDM 2015 and PDM 2016, including the approval of the PDM 2015 grant applications and the completion of their agreements and the ongoing application process for PDM 2016 with the goal of submitting the applications by June 30, 2016.

Next Meeting

The next meeting date will be determined at a later date. It will be held during the first quarter of 2017. We will notify everyone by email.

Comments and Questions

Having no further comments or questions, the meeting was adjourned.

Georgia State Hazard Mitigation Planning Team Meeting - Minutes

January 10, 2017

Present

John Fleisch, OPB
Frederick Trotter, DOAS
Matthew Klaiber, Georgia Courts
Kelly Nadeau, DPH
Terry Lunn, GEMA
Shelby Meyers, GEMA
Alan Sloan, GEMA
Laura Gustavson, GEMA
Kelly Brokenburr, GEMA
Kelsey Goodman, GEMA
DeAngelo Bryant, GEMA
Shaurice Mullins, GEMA

Via Conference Call-In:

Anita Russo, ITOS
Jennifer Kline, GADNR
Danny Thompson, GPA
Vanessa Sims, GDA
Charlissa Ussery, DPH
Bill Wright, GDOT
Lisa Beck, TCSG
Betty Jandovitz
Scott Sherman, GEMA
Tomi King, GEMA

Welcome and Introductions

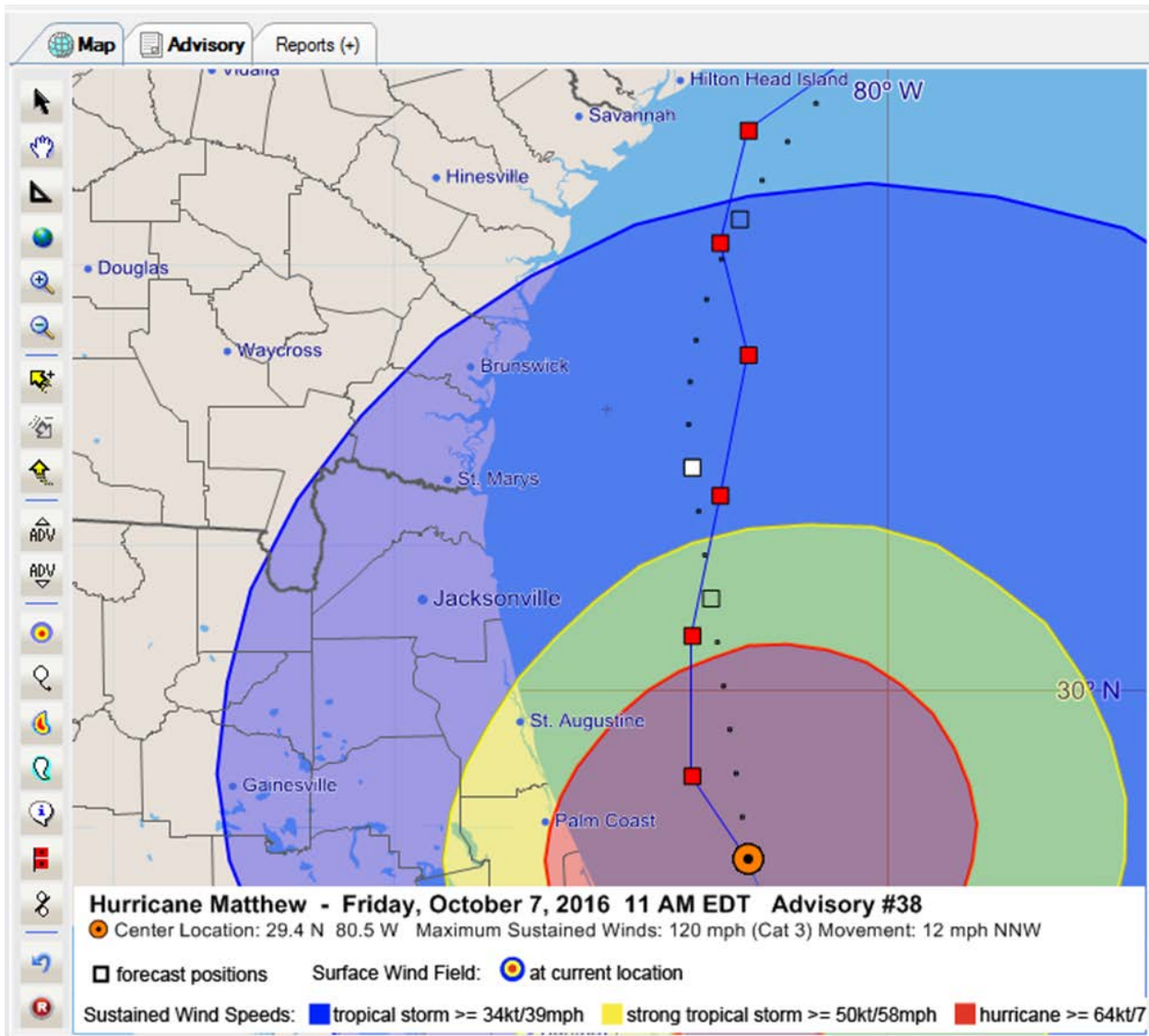
Alan Sloan welcomed everyone to the DR 4284 post disaster review meeting for the 2014 SHMS. We greatly appreciated everyone's time and participation. The meeting was run on WebEx, so those who could not make the meeting can participate and see the screens we are looking at. Alan noted the recent change in the agency name from GEMHSA to GEMA/HS. Roll call was taken.

DR 4284 Post Disaster Review Meeting

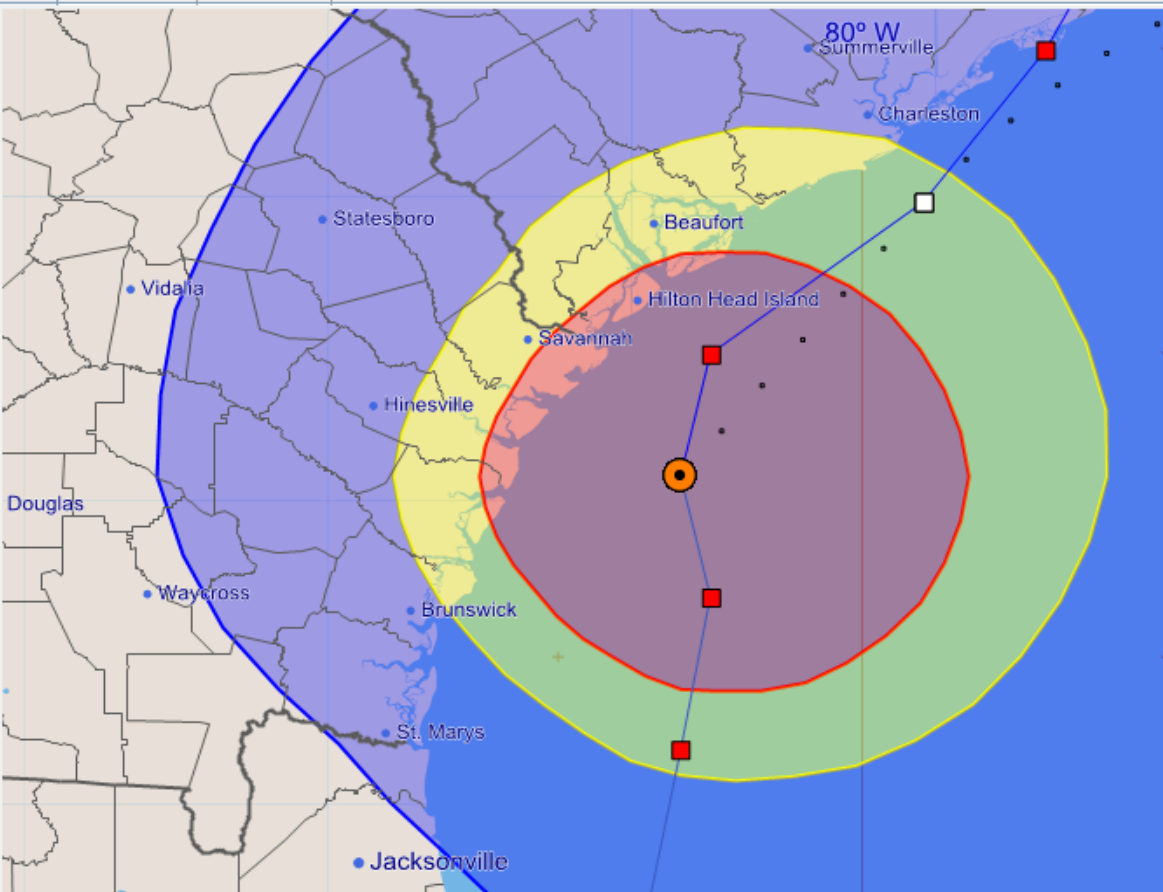
a. Review Hurricane Matthew Event

In Fall, 2016, Hurricane Matthew formed in the Atlantic Ocean, eventually reaching the Caribbean Sea in early October then travelling just off the coasts of Florida, Georgia and South Carolina. On October 4th????, The State of Georgia ordered the first full evacuation of its coast since Hurricane Floyd, nearly 20 years prior. By the morning of October 7th, the City of Saint Marys began experiencing tropical storm force winds. By the morning of October 8th, Saint Marys continued to

experience tropical storm force winds while the winds in Savannah had reached hurricane speeds. The hurricane caused 3 fatalities, more than 250,000 people to lose power, and an estimated \$175,000,000 in losses including \$85,000,000 in uninsured losses.



Map Advisory Reports (+)

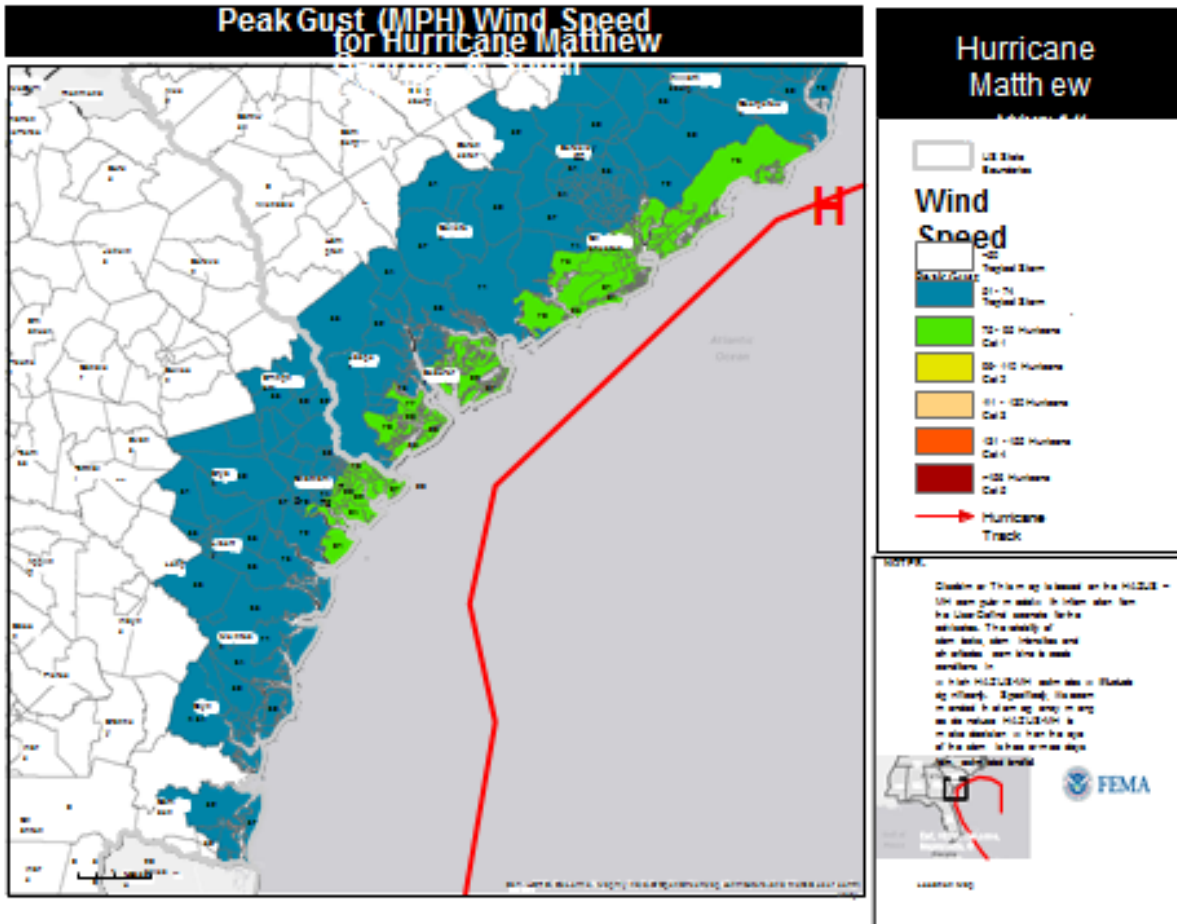


Hurricane Matthew - Saturday, October 8, 2016 2 AM EDT Advisory #40A

Center Location: 31.6 N 80.6 W Maximum Sustained Winds: 105 mph (Cat 2) Movement: 12 mph N

□ forecast positions Surface Wind Field: ● at current location

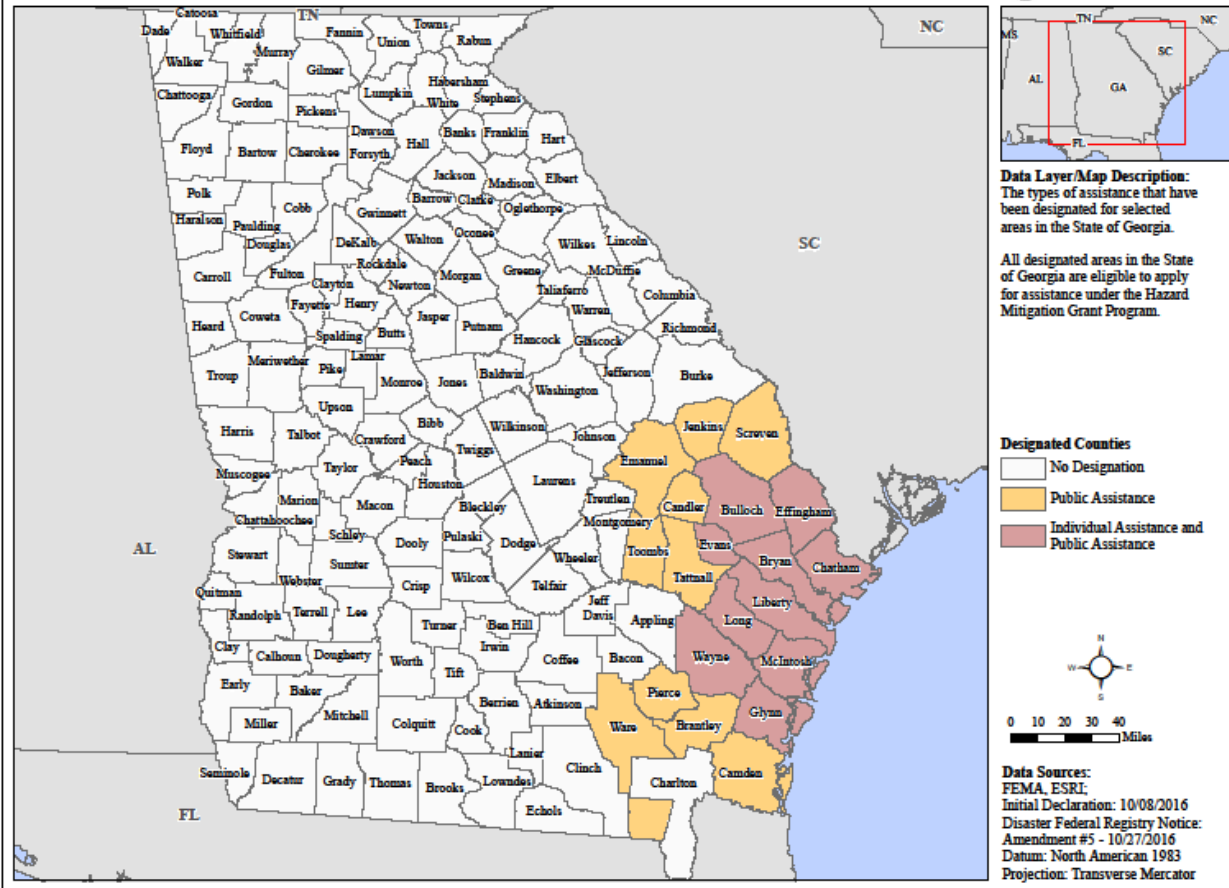
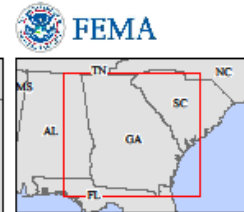
Sustained Wind Speeds: ■ tropical storm >= 34kt/39mph ■ strong tropical storm >= 50kt/58mph ■ hurricane >= 64kt/72mph



b. Presidential Declaration

Below is a map showing the counties included in the DR4284 Disaster declaration:

FEMA-4284-DR, Georgia Disaster Declaration as of 10/28/2016



c. Damage to State Facilities

Vanessa Sims (Ag) noted there was water damage to savannah state farmers market, including limbs down on fencing and water damage to roofing.

Kelly Nadeau (Health) noted damage to state mental health facilities. It was noted that nursing homes and hospice can also apply on their own for projects like generators.

Danny Thompson (GPS) noted extensive damage to GA ports

Frederick Trotter (DOAS) explained state agencies need to provide estimates of damage to DOAS for insurance coverage. Some of the damages they incurred might be covered by them. FEMA covers uninsured aspects of damage and FEMA checks with Insurance companies to see what is covered as well.

Jennifer Kline (DNR) noted possible damage to state properties, aka state parks, boat ramps, marsh lands, 11 sunken boats (they were uninsured shrimp boats). She explained when boats are sunk in areas outside of international or intercoastal waterways, it is the State's responsibility to clean up.

d. Business Interruptions to State Agencies

It was noted GEMA looking to put generators in areas known for outages

A question was asked about reimbursement for business interruptions. The question is a Public Assistance question and needs to be directed to Charles Dawson.

e. HMGP Application Timeline and Priorities

Terry Lunn gave a presentation on the application timeline. An application information packet was provided to all parties in attendance and emailed to all parties, shown on the presentation and emailed to all attendees, including those participating online. The following timeline was described:

- October 8, 2016 – Disaster Declaration (HMGP Statewide)**
- November 29-December 1, 2016 – Applicant Briefings**
- March 10, 2017 – Pre-Application due to GEMHSA**
- April 30, 2017 – GEMHSA Notification to Applicant for Full Application**
- July 31, 2017 – Full Application due to GEMHSA**
- October 7, 2017 – All Applications submitted to FEMA**
- FEMA Application Review Process (up to 12 months)**

Information on the HMGP program is below:



HAZARD MITIGATION GRANT PROGRAM *Building Resilient Communities*

Georgia Emergency Management and Homeland Security Agency

Hazard Mitigation Division

Atlanta, GA 30316

Article I. Overview:

Mitigation is the cornerstone of emergency management. Hazard Mitigation is sustained action to reduce or eliminate risks to life and property from natural or man-made hazard events. Through mitigation actions such as sound land-use planning; adoption and enforcement of building codes; removing structures from hazardous areas; and retrofitting of existing buildings and facilities; and storm water management projects; we can protect facilities to assure functionality following an event, reduce exposure to liabilities and minimize disruptions to the community.

Article II. Introduction:

Section 404 of the Robert T. Stafford Disaster and Emergency Assistance Act of 1988 established the Hazard Mitigation Grant Program (HMGP). The purpose of the program is to provide funds to State agencies and local governments in the aftermath of a disaster for projects that reduce or eliminate the

long-term risk to human life and property from the effects of natural hazards. For this disaster, the Federal Emergency Management Agency (FEMA) will contribute 20% of the amount it will spend for disaster assistance programs to fund the HMGP. Federal law requires States and local jurisdictions to have a mitigation plan prior to receipt of HMGP project funds. The plan identifies hazards, assesses community needs, and describes a community-wide strategy for reducing risks associated with natural disasters.

Article III. Project Funding:

The federal share of HMGP funding cannot exceed 75% of the total eligible project cost. The non-federal share may be met with cash, contributions, certain other grants such as Community Development Block Grants, or with in-kind services. Grants will be made available to eligible applicants on a competitive basis with priority given to the federally declared counties. The state may contribute a percentage of the non-federal cost share based on severity of damage for the counties included in the presidential disaster declaration for Public Assistance.

Article IV. HMGP Application Process:

The HMGP is administered by the Georgia Emergency Management and Homeland Security Agency (GEMHSA). GEMHSA Hazard Mitigation staff offer technical assistance to local governments for project identification and application preparation. GEMHSA also is responsible for the review, prioritization and funding recommendation of eligible projects to FEMA. FEMA is responsible for making all final funding decisions on projects submitted by the state.

Following a presidential disaster declaration, GEMHSA announces the HMGP grant application information, usually within 30-60 days of the disaster declaration date. Pre-applications are required based on project type. Upon favorable review of pre-applications, applicants will be invited to submit full applications. Completed applications are required within six to eight months of the declaration date. Applications are evaluated and projects are recommended to FEMA for approval and funding based on prioritization and available funds. All applications must be submitted to FEMA within twelve (12) months of the disaster declaration date.

Article V. TYPES OF HMGP PROJECTS THAT COULD BE ELIGIBLE:

- Initiative Projects such as the development or improvement of warning systems with mitigation as an essential component;
- Construction of safe rooms (tornado and severe wind shelters) for public and private structures that meet the FEMA construction criteria in FEMA 320, “Taking Shelter from the Storm” and FEMA 361, “Design and Construction Guidance for Community Shelters”;
- Retrofits such as elevations, structure relocation, structural reinforcement (wind and seismic), strapping of utilities, installation of storm shutters, tie downs, etc.;
- Acquisition of property and/or relocation of homes, businesses and public facilities from hazard prone areas;
- Wildfire mitigation such as creating defensible space, application of ignition-resistant construction and hazardous fuel reduction;
- Soil stabilization projects that provide protection from erosion and landslides;
- Generators that protect a critical facility and meets all other HMGP eligibility criteria. Critical facilities may include Emergency Operation Centers, police and fire stations, hospitals, and water and sewer treatment facilities;
- Structural hazard control or protection measures such as floodwalls, detention basins and

- other storm drainage upgrades; and
- Development of a Local Hazard Mitigation Plan.

Generally, a project should:

- Substantially reduce the risk of future damage, hardship, loss or suffering from a major disaster;
- Conform with federal floodplain, wetland and environmental regulations;
- Solve a problem independently, or part of a problem when there is assurance that the whole project will be completed;
- Be **cost-effective** in that it addresses a problem that is repetitive or that poses a significant risk if left unsolved;
- Contribute substantially to the problem's long-term solution;
- Have manageable future maintenance requirements;
- Be determined to be the most practical, effective and environmentally sound alternative among the possible options;
- Conform to the goals and objectives of Local and State Hazard Mitigation Plans; and
- Have the documented support of the local community.

Some of the reasons that projects / applications are determined to be ineligible:

- Project is for operation and maintenance versus disaster-related mitigation;
- Project is the responsibility of another federal agency, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service;
- Project is the result of deferred maintenance rather than related to a natural hazard;
- Project has an inadequate benefit/cost ratio (not cost-effective);
- No federally approved local Hazard Mitigation Plan; and
- Non-participation in the National Flood Insurance Program.

Article VI. For further information, write us at the address below or call the State Hazard Mitigation Program Office at (404) 635-7522.

Georgia Emergency Management and Homeland Security Agency
Hazard Mitigation Division
Post Office Box 18055
Atlanta, Georgia
30316-0055

f. Public Assistance Mitigation

Terry Lunn (GEMA/HS) gave a brief overview of PA mitigation. ????

Next Meeting

The next meeting date will be determined at a later date. It will be held sometime in April or May of 2017. We will notify everyone by email.

Comments and Questions

A HAZUS analysis was run for economic losses by University of Wisconsin (**verify this**) for various scenarios regarding Hurricane Matthew prior to impact and including what actually occurred.

Having no further comments or questions, the meeting was adjourned.

Georgia State Hazard Mitigation Planning Team Meeting - Minutes

May 3, 2017

Present

Tianlin Song, DNR
Haydn Blaize, DNR
Thomas Tkacs, DNR
Brian Shoun, DNR
Alan Sloan, GEMA/HS
Shaurice Mullins, GEMA/HS
DeAngelo Bryant, GEMA/HS
Terry Lunn, GEMA/HS
Angela Wheeler, ITOS
Lawton Brantley, ITOS
Charlisa Bell, ITOS
Amy Rammo Kuhs, GDPH
Edwardine Marrone, FEMA
Marlene Dawkins, FEMA
Laura Gustavson, GEMA/HS
Breanna Rogers, GEMA/HS
Kelly Nadeau, DPH
 Via conference Call-in:
Lisa Beck, TCSG
Andy Doyle, GDOT
Brian Sho, Corps of Engineers
Matthew Kloiber, Georgia Courts
Jeff Hodges, DOE
Tomi King, GEMA/HS
Shelby Meyers, GEMA/HS
Jennifer Kline, DNR
Alan Giles, DNR
Anita Russo, ITOS
Lillian Huffman, FEMA
Kelly Reeves, FEMA

Welcome and Introductions

Alan Sloan welcomed everyone to the combined DR 4294 / 4297 post disaster review meeting / 2017 Annual Update meeting for the 2014 SHMS. We greatly appreciated everyone's time and participation. The meeting was run on WebEx, so those who could not make the meeting can participate and see the screens we are looking at. Roll call was taken.

Review and Approval of the May 19, 2016 and January 10, 2017 meeting minutes

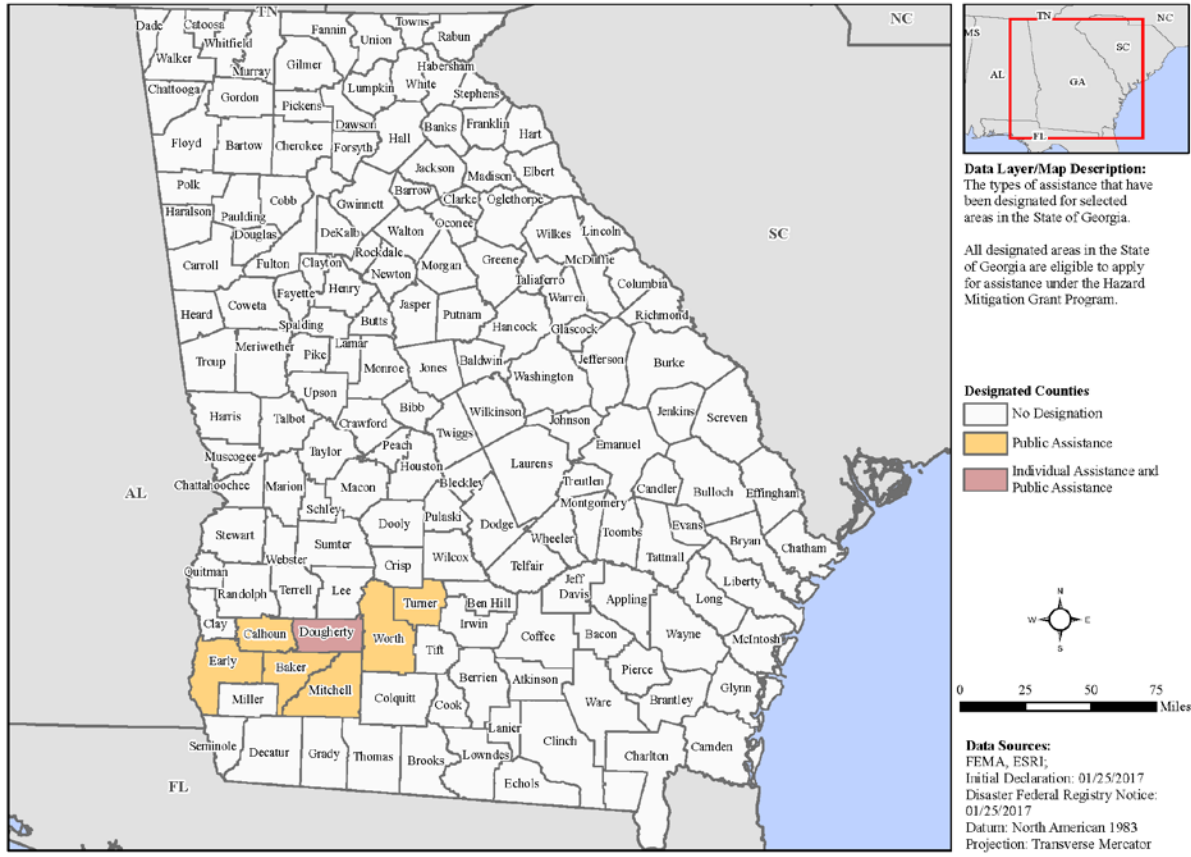
Alan began the meeting by asking if anyone had any comments or recommended changes to the minutes of our 5/19/2016 Annual Update meeting or our January 10, 2017 Post Disaster meeting? With no changes the minutes were approved.

DR 4294/4297 Post Disaster Review Meeting

a. Presidential Declaration:

Below are maps showing the counties included in the DR4294 and 4297 Disaster declarations:

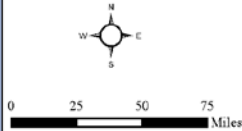
FEMA-4294-DR, Georgia Disaster Declaration as of 01/25/2017



Data Layer/Map Description:
The types of assistance that have been designated for selected areas in the State of Georgia.

All designated areas in the State of Georgia are eligible to apply for assistance under the Hazard Mitigation Grant Program.

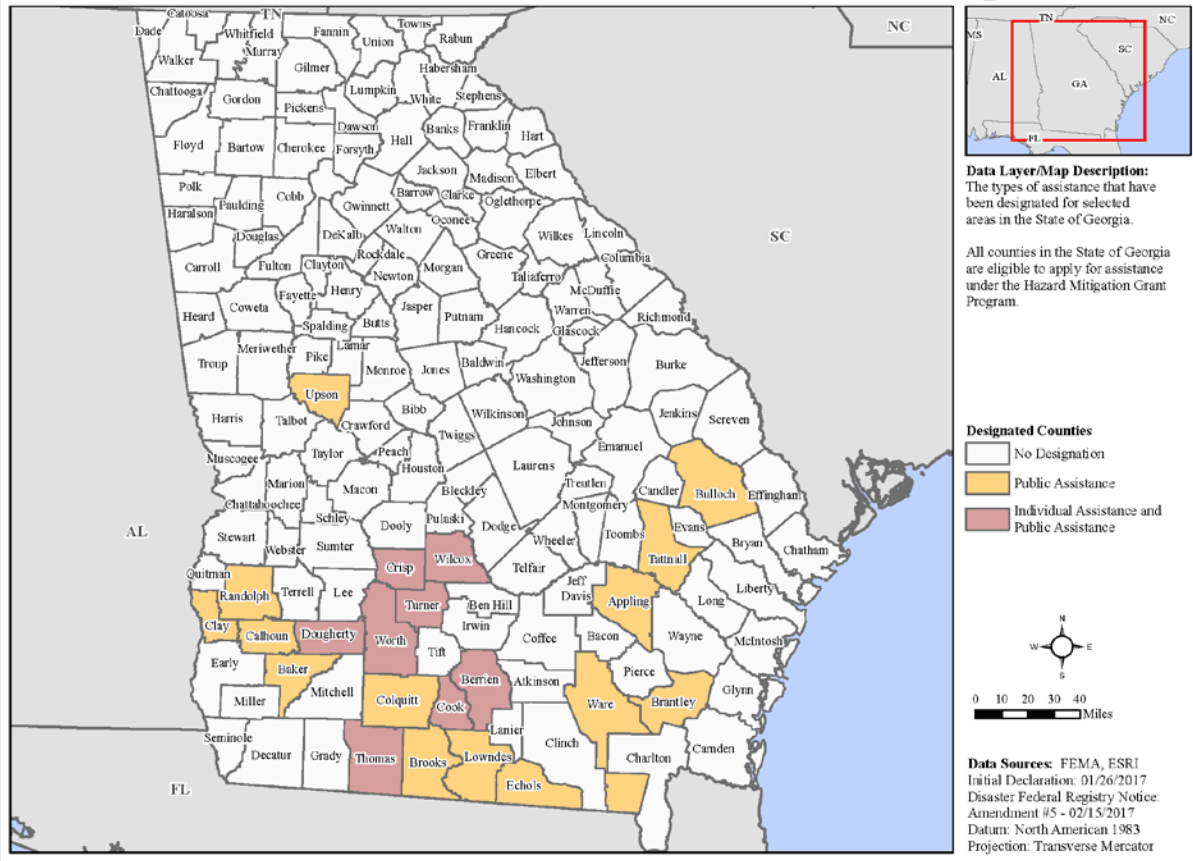
- Designated Counties**
- No Designation
 - Public Assistance
 - Individual Assistance and Public Assistance



Data Sources:
FEMA, ESRI,
Initial Declaration: 01/25/2017
Disaster Federal Registry Notice: 01/25/2017
Datum: North American 1983
Projection: Transverse Mercator

MapID 8a7a922e9b70125171824hqrod

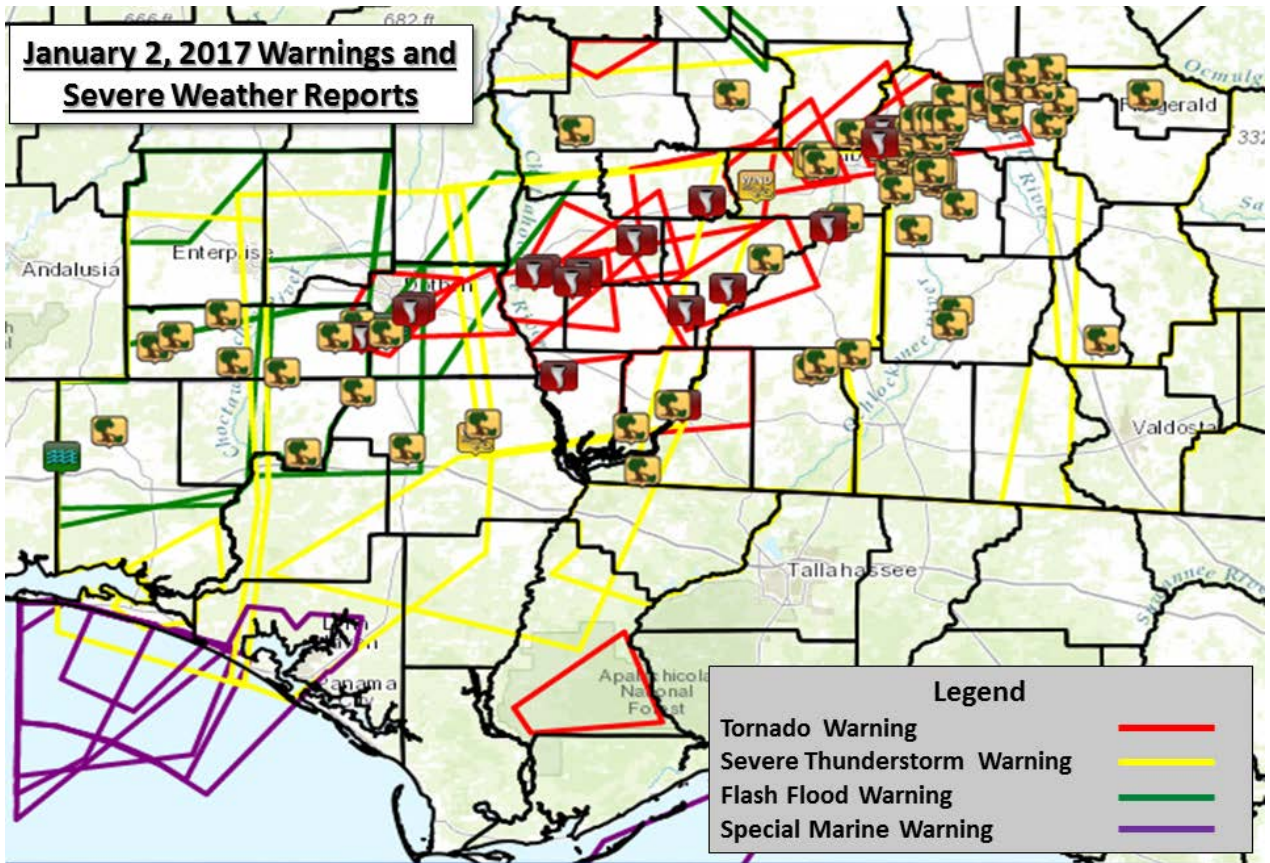
FEMA-4297-DR, Georgia Disaster Declaration as of 02/16/2017



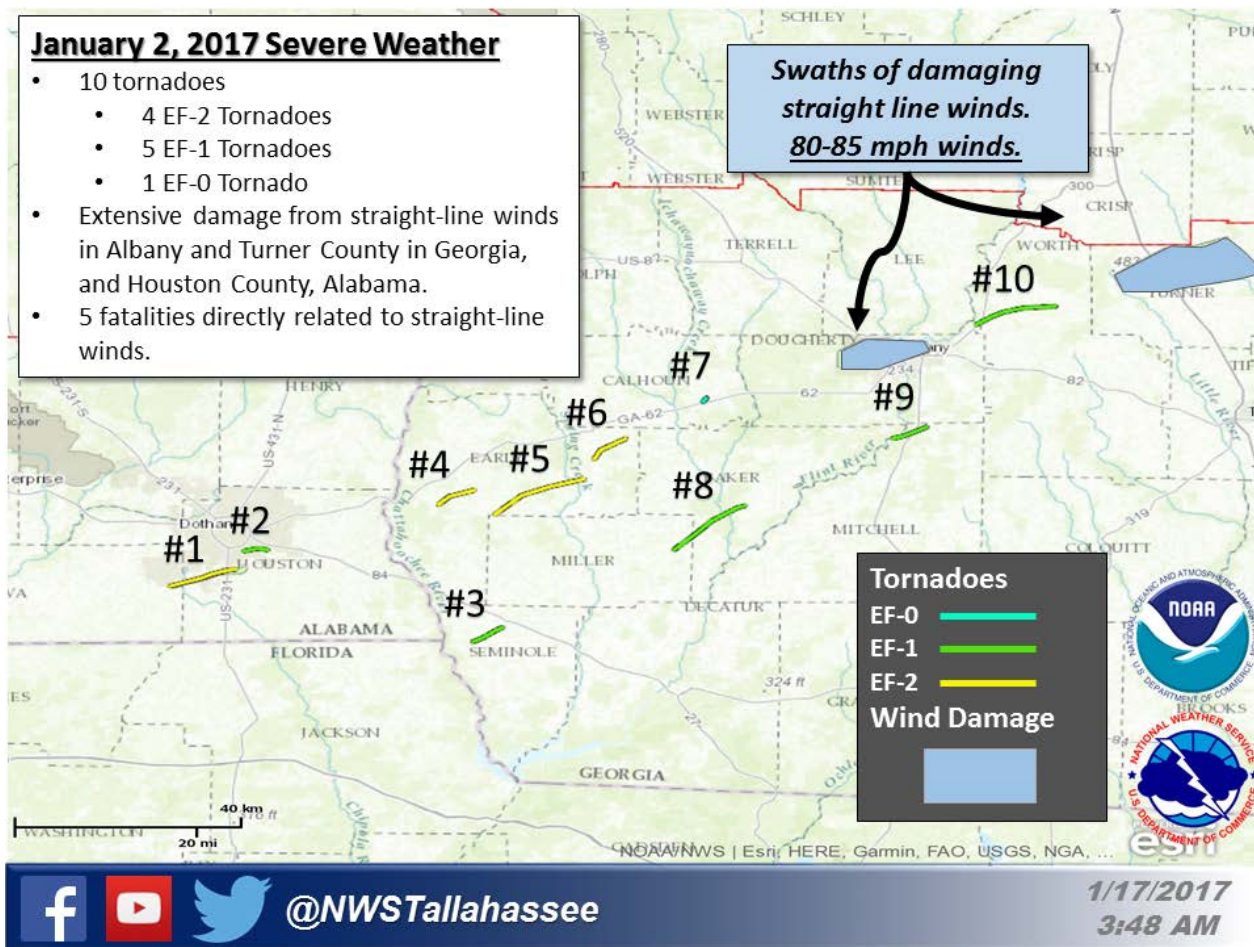
b. Review Severe Weather and Tornado Events

On January 2nd, a series of warnings for severe weather were issued for Southwest Georgia. A total of 10 confirmed tornadoes and two areas of straight line winds occurred throughout the area. Maps showing the warnings issued and the confirmed tracks are below.

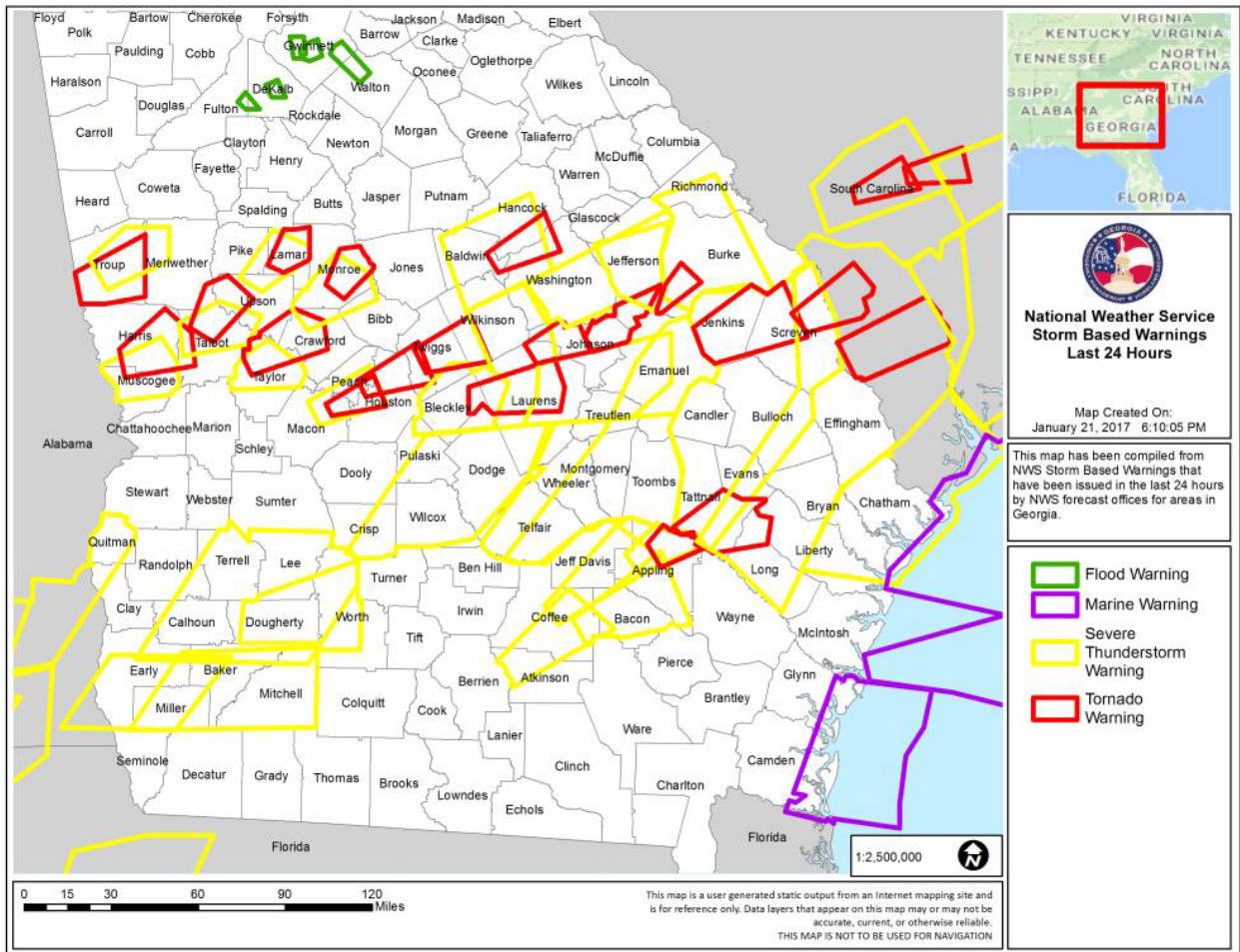
January 2, 2017 Warnings and Severe Weather Reports

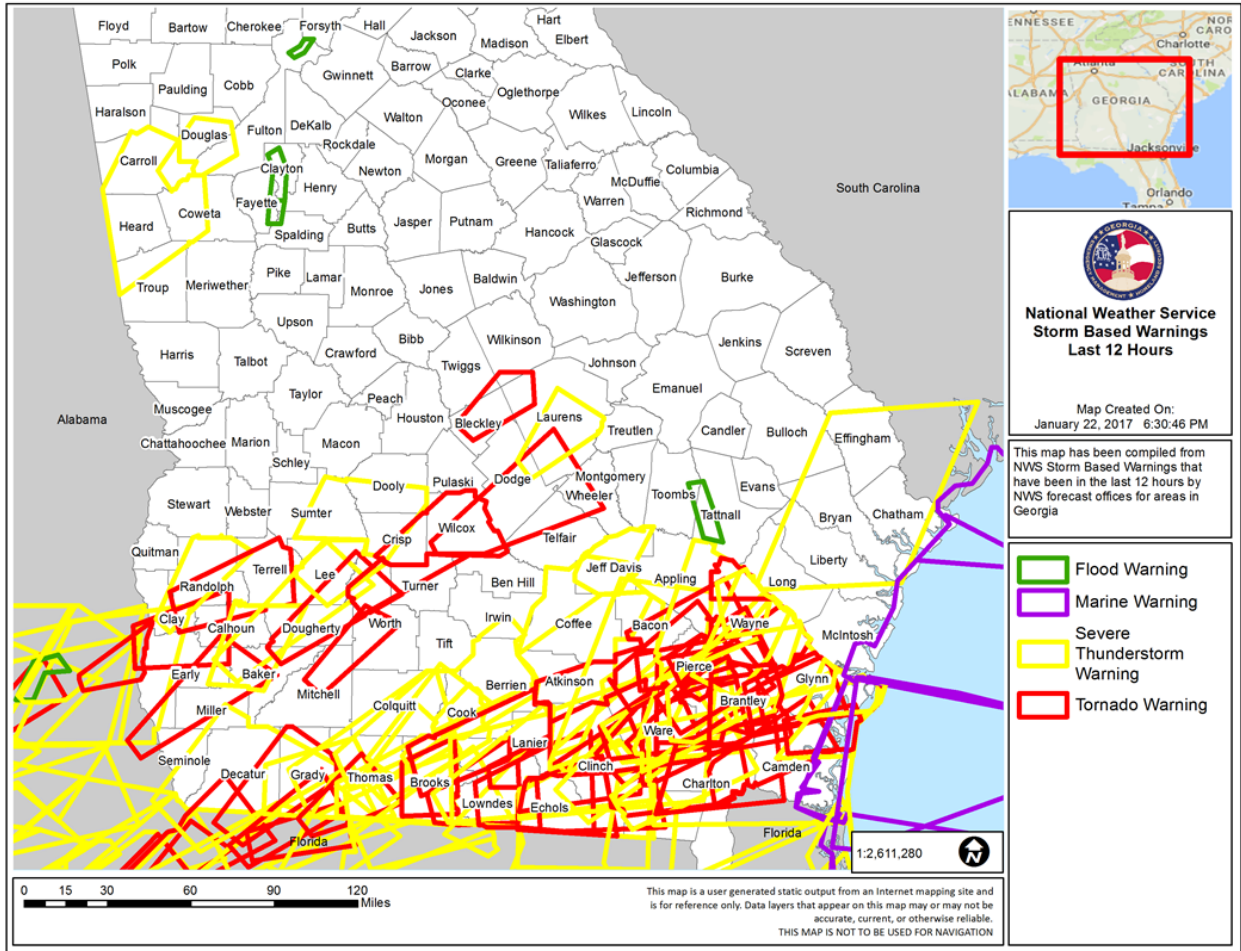


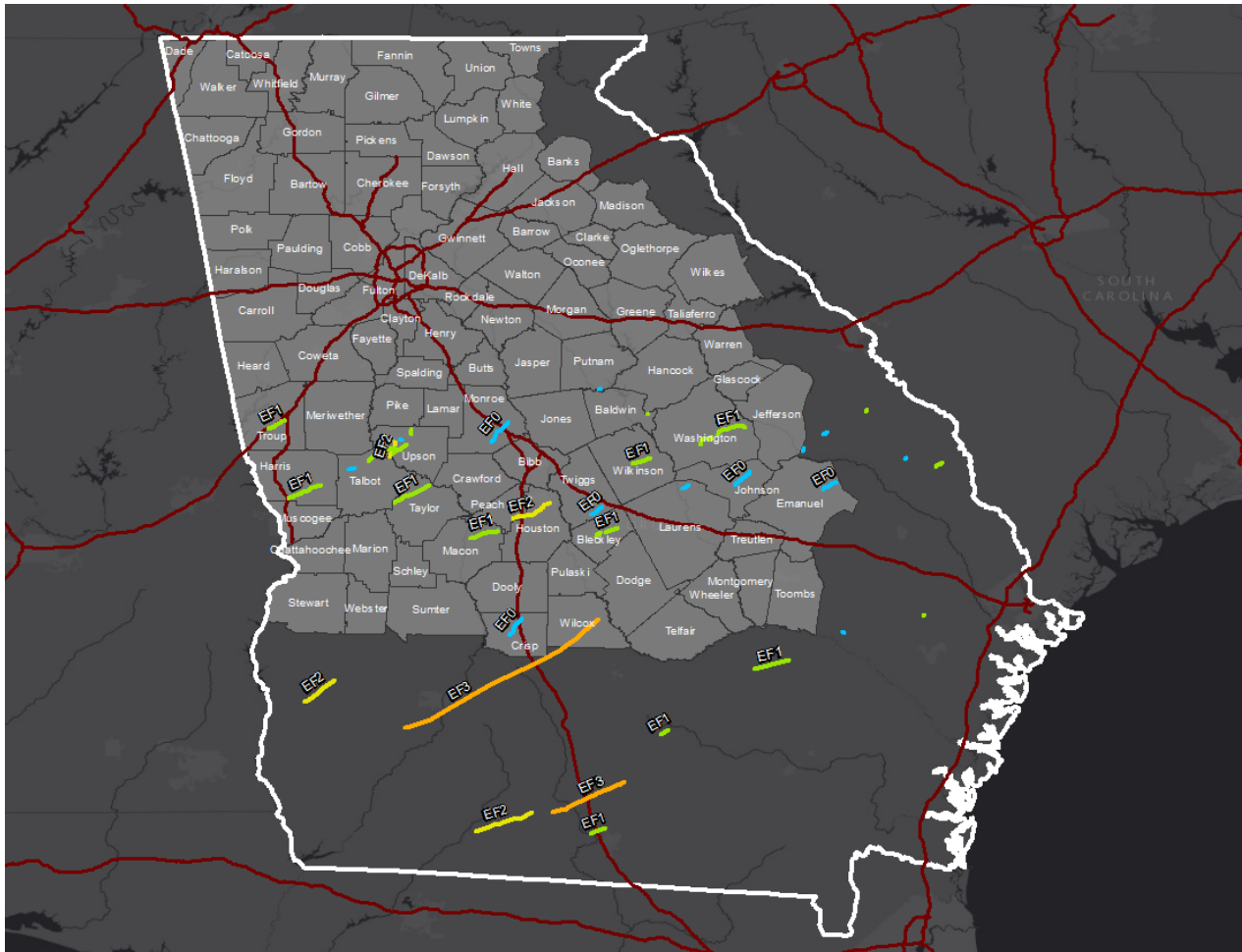
Facebook icon | YouTube icon | Twitter icon | [@NWSTallahassee](https://twitter.com/NWSTallahassee) | NOAA logo | National Weather Service logo



Two weeks later, January 21st and 22nd, another, group of stronger severe weather systems enter the State from the west. Over the course of 2 days, 3 separate systems caused a confirmed 41 tornadoes to touch down, the strongest and most long lived two of which were in the southern part of the State. Maps of the warnings issued and the confirmed tornadoes are below.







c. Damage to State Facilities

It was noted the Department of Public Health may have sustained some damages, but the speaker wasn't sure of the location.

d. Business Interruptions to State Agencies

No significant business interruptions were noted.

e. HMGP Application Timeline and Priorities

Terry Lunn gave a presentation on the application timeline. An application information packet was provided to all parties in attendance and emailed to all parties, shown on the presentation and emailed to all attendees, including those participating online. The following timeline was described:

January 25, 2017 – DR 4294 Disaster Declaration (HMGP Statewide)

January 26, 2017 – DR 4297 Disaster Declaration (HMGP Statewide)

March 15 & 16, 2017 – Applicant Briefings
June 9, 2017 – Pre-Application due to GEMA/HS
July 6, 2017 – GEMA/HS completes review of Pre-Applications
September 29, 2017 – Full Application due to GEMA/HS
January 24, 2018 – All 4294 Applications submitted to FEMA
January 25, 2018 – All 4297 Applications submitted to FEMA
FEMA Application Review Process (up to 12 months)

f. Public Assistance Mitigation

Terry Lunn (GEMA/HS) gave a brief overview of PA mitigation.

Agency Updates – Report Out

a. Sea Level Rise and Coastal Projects – Jennifer Kline

Jennifer Kline, Ga DNR Coastal Resources Division, gave an update of the ongoing Sea Level Rise study and coastal projects. The project is funded by the NOAA Coastal Zone Management Act. The purpose is to look at sea level rise and the changes to the coast line.

They contracted with the University of Wisconsin and Indiana University to run HAZUS MH 3.2 on the 11 county area, including all 6 coastal counties and 5 immediately adjacent inland counties. The study area is 5,735 square miles and includes 630,681 people and 240,000 buildings. The model was run for flooding and hurricane winds. They modeled a 20 year hurricane scenario including no sea level rise and an estimated rise in sea levels based on 1 meter over 100 years. They also modeled a worst case scenario wind and storm surge for a category 4 hurricane glancing the coast, again with and without sea level rise. It was noted there were not much difference in damages with sea level rise with Category 4 due to the severity of a Cat 4 storm.

Jennifer noted they will also run the model for riverine flooding with and without sea level rise. She also noted they are incorporating the results into local recovery and mitigation plans as they are created and updated.

Jennifer also noted a climate adaptation and resilience report being developed by Hagerty Consulting using an EPA tool called “Create.” This is for the Glynn County and Brunswick Water and Sewer Commission.

Jennifer then noted DNR CRD will be partnering with the State Chamber of Commerce and the Georgia Department of Economic Development to develop a

private sector Disaster Recovery and Redevelopment plan as a pilot project. They will be using Hagerty Consulting for this project as well.

b. RiskMap Activities for 2017 –

Haydn Blaize gave an overview of the ongoing projects by DNR's EPD. Notably, DNR is a Cooperating Technical Partner with FEMA where they develop and update the Flood Insurance Rate Maps (FIRMs) throughout the State. He described the ongoing process of updating the floodmaps to reflect the current 1% annual chance flood, as well as developing products to help communicate the flood risk to the community. It was noted there have been reductions in flood hazard areas in some places and increases in others.

Haydn described the process of notifying property owners when the identified risk to their property is changed as part of the study. He noted the toolkits, resources and guidebooks DNR makes available to the community to communicate risk and educate the community on what to do before and after the flood.

Haydn noted DNR is in the process of collecting updated LIDAR mapping. They currently have over 70% of the state completed or in the process of being collected. He noted two of the enhanced risk products being developed, including areas where roads are likely to be overtopped as well as a product estimating the freeboard needed to protect a structure from anticipated flooding. He described the status of current efforts in updating both regulatory and non-regulatory flood risk products and study areas and outlined the plan for the next 5 years.

c. Others

Kelly Nadeau, Department of Public Health, noted an ongoing \$16-17 million project to provide backup power for nursing homes. She asked about potential funding assistance or sources. It was noted Hazard Mitigation has funded generators in the past and that the staff would be happy to meet with her individually to discuss it.

State of Georgia Enhanced Mitigation Strategy Update

a. Review of Hurricane and Storm Surge Table Updates

Alan noted the updates to the Hurricane and Storm Surge Tables resulting from Hurricane Matthew:

TABLE 2.10 NOTABLE AND HISTORIC TROPICAL CYCLONIC EVENTS AFFECTING GEORGIA

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; 1,000 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
2016*	Matthew	Coastal Georgia	FEMA 4284; Wind/rain/coastal flooding in 20 Southeast GA counties; \$175 million in damages

*Presidential Declared Disasters

TABLE 2.11 NOTABLE STORM SURGE EVENTS IN GEORGIA FROM TROPICAL CYCLONES

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
October 8-9, 2016	Hurricane Matthew	DR 4284; Storm surge of 2-8 feet along the entire Georgia coast, including surge of 7.5 feet at Fort Pulaski.

b. Review of Severe Weather Table Updates

Alan noted the updates to the Severe Weather Tables resulting from January South Georgia Events:

TABLE 2.14 NOTABLE TORNADO EVENTS IN GEORGIA

Year	Area Affected	Description
1903	Gainesville Area	200 deaths; 400 injuries; 1,500 homeless
1936	Gainesville Area	203 deaths; >1,000 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; >1,000 homes damaged; \$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 injuries; 250 buildings damaged
1998*	Hall County & Metro 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 injuries; \$5 million in damages
2007*	Southwest Georgia	FEMA DR1686; 2 deaths; numerous injuries; hospital destroyed in Sumter County
2008*	Metro Atlanta 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	FEMA DR1973; 15 tornadoes including one EF4 and four EF3; 15 deaths; 143 injuries; \$167 million in damages
2017*	Southwest Georgia	FEMA DR 4294; Straight line winds/10 tornadoes in SW Georgia; 5 deaths; estimated \$15 million in uninsured losses
2017*	Central and South Georgia	FEMA DR 4297; >30 tornadoes; 16 deaths; estimated \$30 million in uninsured losses

*Presidential declared disaster

c. Review of Upcoming Plan Updates

Alan described the updated table showing future plan updates based on progress made since the 2014 plan was adopted.

Table 4.3 Local Plan Priority Update Schedule by Expiration Date

County	Plan Expiration	Priority	County	Plan Expiration	Priority
Haralson	6/7/2018	6	Bryan	4/28/2019	8
Banks	6/19/2018	6	Peach	5/1/2019	8
Johnson	6/26/2018	6	Coffee	5/6/2019	8
Crawford	7/25/2018	7	Oconee	5/6/2019	8
Dawson	7/30/2018	7	Stephens	5/6/2019	8
Coweta	8/20/2018	7	Pickens	5/12/2019	8
Thomas	8/26/2018	7	Madison	5/26/2019	8
Rabun	8/29/2018	7	Twiggs	6/5/2019	8
Brantley	9/24/2018	7	Appling	6/10/2019	8
Taylor	9/30/2018	7	Berrien	6/10/2019	8
McIntosh	10/1/2018	7	Ben Hill	6/16/2019	8
Charlton	10/7/2018	7	Wilkinson	7/1/2019	9
Effingham	10/30/2018	7	Telfair	7/24/2019	9
Turner	11/4/2018	7	Grady	8/6/2019	9
Warren	11/6/2018	7	Toombs	8/6/2019	9
Wilkes	11/25/2018	7	Dodge	8/11/2019	9
Terrell	12/2/2018	7	Troup	8/19/2019	9
Macon	12/3/2018	7	Randolph	8/22/2019	9
Ware	12/10/2018	7	Stewart	9/3/2019	9
Bacon	12/11/2018	7	Habersham	9/8/2019	9
Pierce	12/11/2018	7	Oglethorpe	10/28/2019	9
Glascock	12/15/2018	7	Wheeler	11/3/2019	9
Washington	12/17/2018	7	Jeff Davis	11/18/2019	9
Henry	1/23/2019	8	Candler	12/8/2019	9
Cook	2/18/2019	8	Jefferson	12/29/2019	9
Rockdale	2/20/2019	8	Burke	1/4/2020	10
Greene	2/27/2019	8	Jenkins	1/7/2020	10
Jackson	2/27/2019	8	Butts	3/9/2020	10
Bleckley	3/11/2019	8	Hancock	4/6/2020	10
Echols	3/18/2019	8	Clinch	4/7/2020	10
Brooks	3/19/2019	8	Dade	4/10/2020	10
Lanier	3/19/2019	8	Wilcox	4/15/2020	10
Franklin	3/20/2019	8	Sumter	4/20/2020	10

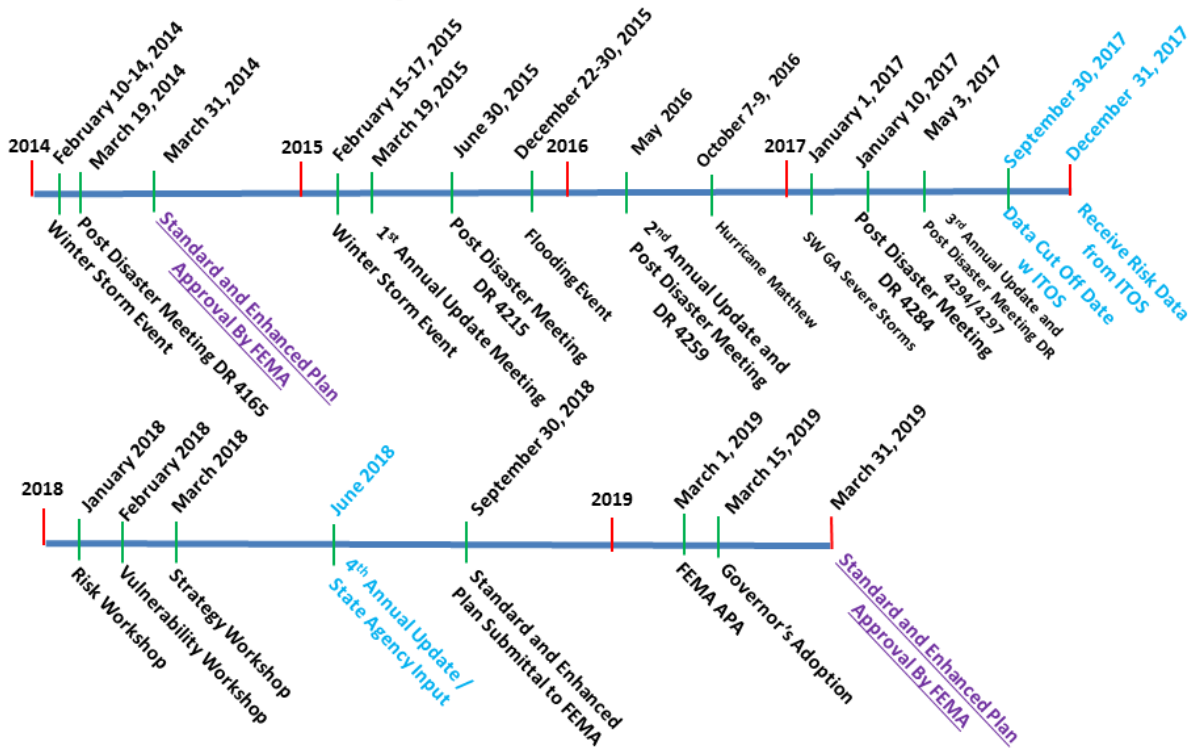
Towns	3/25/2019	8
Atkinson	4/16/2019	8
Irwin	4/17/2019	8
Taliaferro	6/7/2020	10
Screven	6/8/2020	10
Tattnall	6/14/2020	10
Marion	6/18/2020	10
Lincoln	7/13/2020	11
Newton	7/14/2020	11
Bulloch	7/19/2020	11
Meriwether	7/27/2020	11
Gwinnett	8/18/2020	11
Baker	8/22/2020	11
Dooly	8/26/2020	11
Montgomery	8/26/2020	11
Fayette	9/2/2020	11
Webster	9/7/2020	11
Barrow	9/9/2020	11
Evans	10/14/2020	11
Emanuel	10/19/2020	11
Treutlen	12/14/2020	11
Lamar	1/5/2021	12
Harris	1/7/2021	12
Houston	1/10/2021	12
Pulaski	1/11/2021	12
Lee	2/3/2021	12
Chatham	2/16/2021	12
Crisp	2/22/2021	12
Jones	2/23/2021	12
Dougherty	3/2/2021	12
Walton	5/9/2021	12
Talbot	6/8/2021	12
Douglas	6/12/2021	12
Union	7/12/2021	13
Hart	7/21/2021	13

Pike	5/6/2020	10
Jasper	5/25/2020	10
Colquitt	6/7/2020	10
White	7/21/2021	13
Miller	7/25/2021	13
Carroll	7/31/2021	13
Baker	8/22/2021	13
Bibb	8/30/2021	13
Upson	9/6/2021	13
Laurens	9/21/2021	13
Schley	10/16/2021	13
Camden	11/9/2021	13
Lumpkin	11/16/2021	13
Columbia	11/10/2021	13
Liberty	11/14/2021	13
Cobb	12/11/2021	13
Worth	1/3/2022	14
Floyd	1/4/2022	14
Bartow	1/9/2022	14
Mitchell	1/26/2022	14
Lowndes	2/8/2022	14
Chattooga	2/13/2022	14
Cherokee	2/15/2022	14
Calhoun	2/21/2022	14
Spalding	2/22/2022	14
DeKalb	2/28/2022	14
Fulton	2/28/2022	14
Decatur	5/1/2022	14
Elbert	7/5/2022	15
Monroe	8/9/2022	15
Long	8/29/2022	15
Forsyth	9/4/2022	15
Morgan	9/13/2022	15
Tift	9/23/2022	15

d. Revised Timeline

Alan noted the revised timeline for the State Plan Update. He asked members to pay particularly close attention to the workshops planned for January – March, 2018.

2019 State Hazard Mitigation Plan Update Timeline



Local Plan Update Status

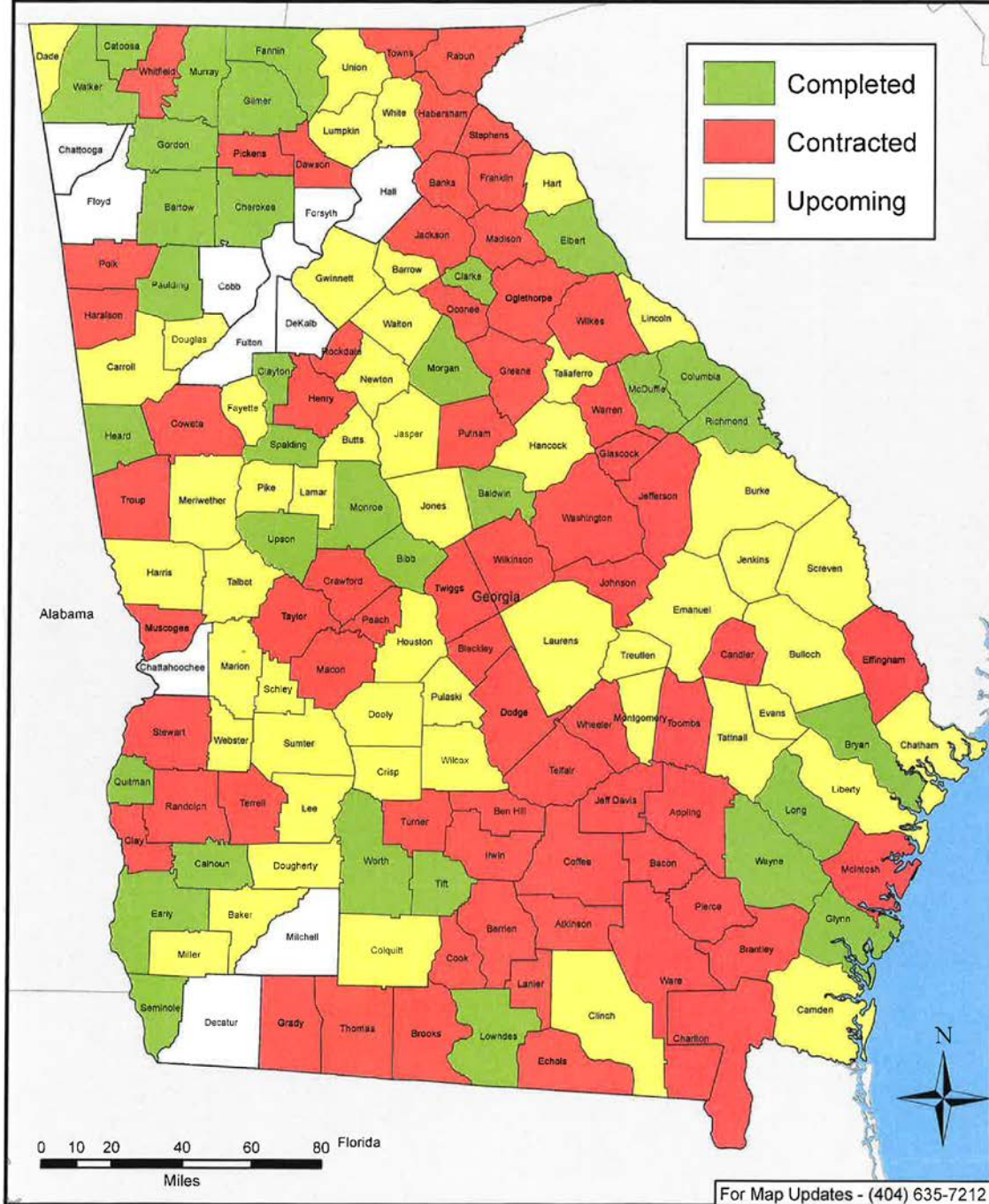
a. Plan Status Map

Alan showed the current status of local mitigation plans according to FEMA. The FEMA map is shown below:



Hazus Report Status Map

May 1, 2017



FEMA Activities

a. State of Georgia Plan Consultation with FEMA Region IV

Alan noted the State Plan Consultation with FEMA was currently being scheduled.

b. Upcoming Meeting and Workshops

I. Annual HM Stakeholders Meeting in Emmitsburg, MD

Alan noted this conference for information.

II. Areas of Safe Refuge Training (June)

Terry noted we are holding training on finding areas of safe refuge in June. The training will be held at 6 USG campuses. Team members are encouraged to register.

c. HMA Activities with PDM 2015 and 2016

No activities to discuss.

Next Meeting

The next meeting date will be determined at a later date. It will be held during the second quarter of 2018. We will notify everyone by email. Alan reminded the team about the workshops to be held during the first quarter of 2018.

Comments and Questions

Having no further comments or questions, the meeting was adjourned.

Georgia State Hazard Mitigation Planning Team Meeting - Minutes

December 7, 2017

Present

Charlisa Bell, DPH
Shelby Meyers, GEMA
Gus Elliot, OPB
Kimberly Angel, GEMA
Tomi King, GEMA
Olivia Duke, OPB
Stephen Clark, GEMA
Breanna Rogers, GEMA
Terry Lunn, GEMA
Dee Langley, GEMA
Kutheria McKnight, DPH
Amy Rammo-Kuhs, EPD
 Via Conference Call-In:
Lisa Beck, TCSG
Anita Russo, ITOS
Angie Wheeler, ITOS
Bruce Holmes, BOR
Robin Berzins, FEMA
Lacey Kondracki, BOR
Kelsey Goodman, GEMA
Jessica Mimbs, GASWCC
Edwardine Marrone, FEMA
Noel Jensen, Jekyll Island Authority
Sonny Emmert, DNR Coastal Resources

Welcome and Introductions

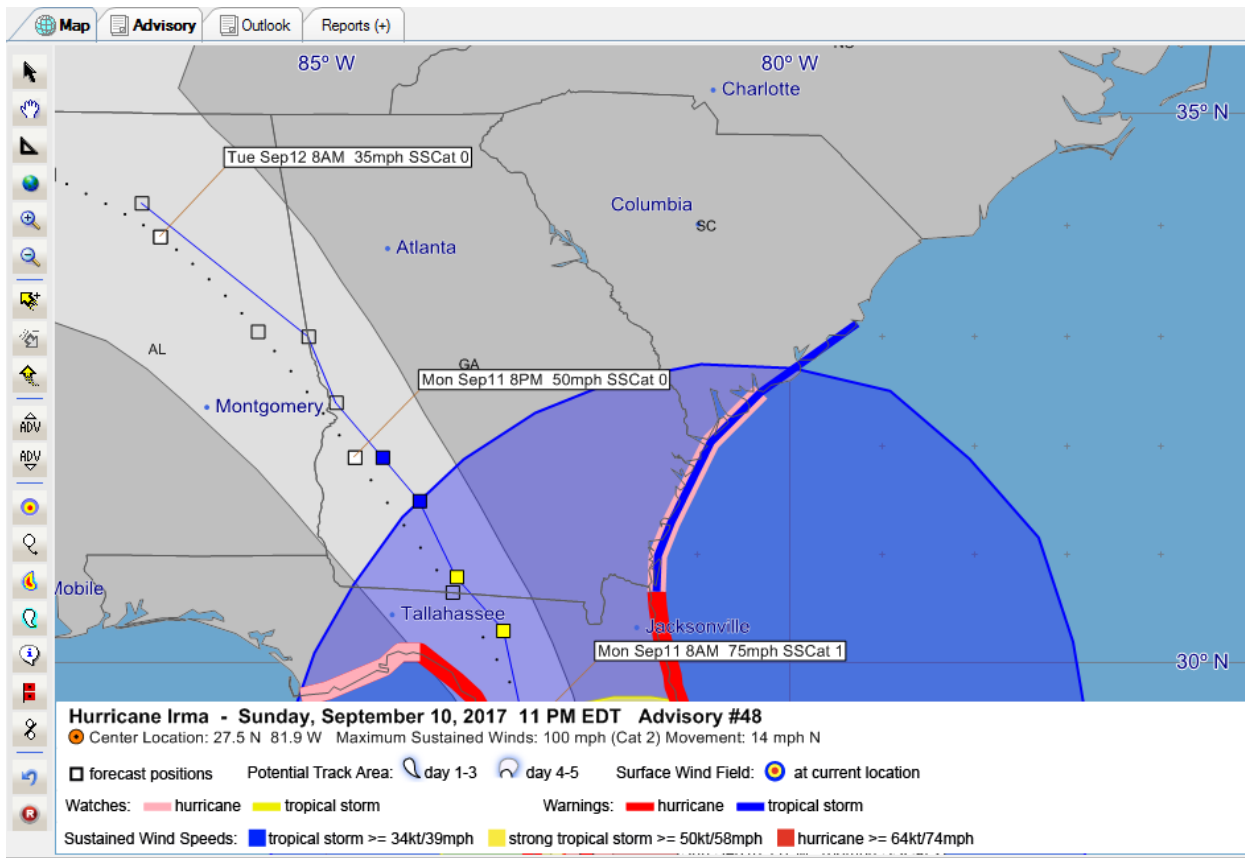
Alan Sloan welcomed everyone to the DR 4338 post disaster review meeting for the 2014 SHMS. We greatly appreciated everyone's time and participation. The meeting was run on WebEx, so those who could not make the meeting can participate and see the screens we are looking at. Roll call was taken.

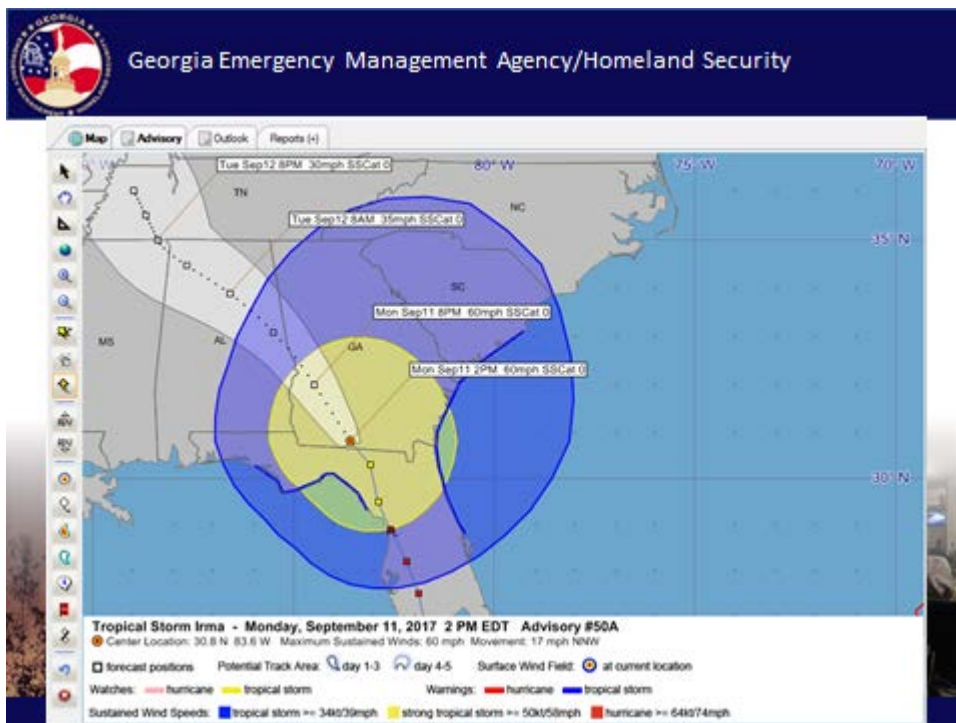
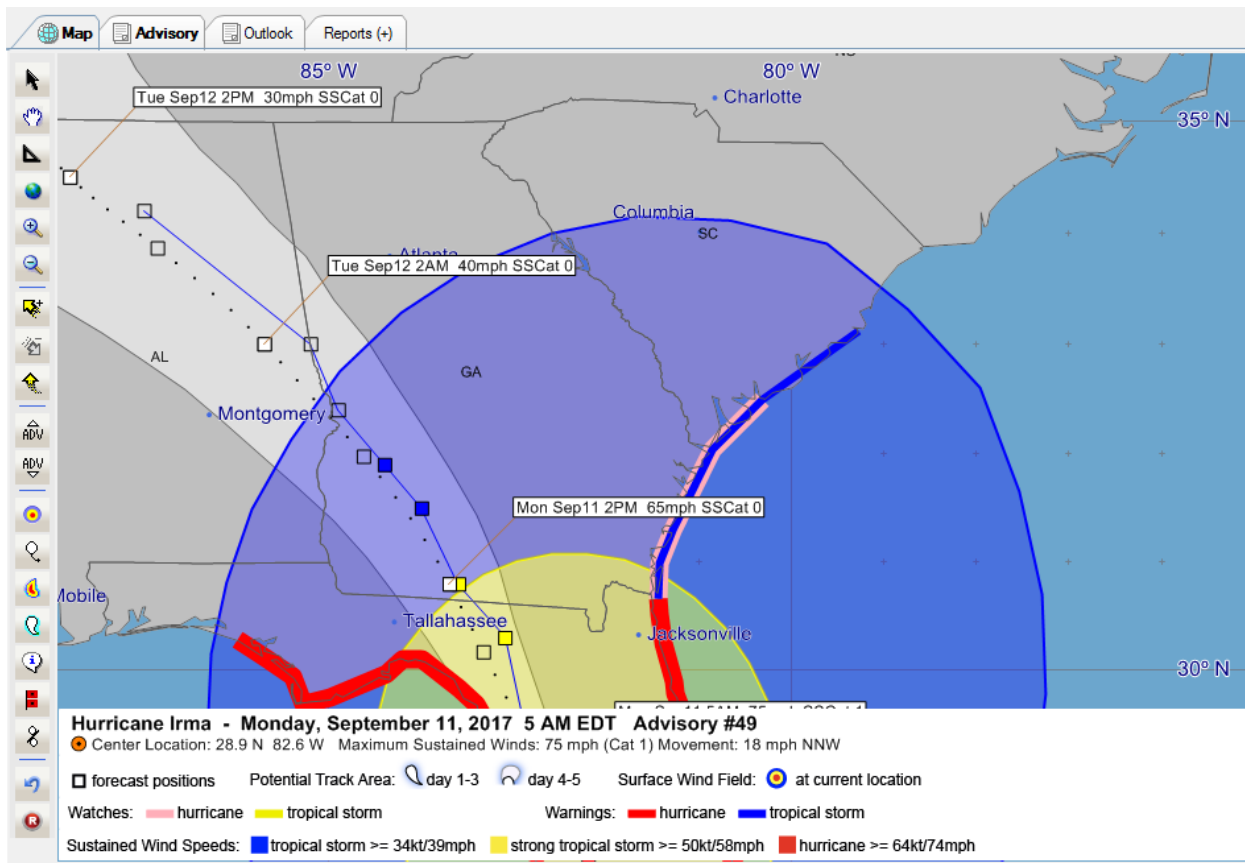
DR 4338 Post Disaster Review Meeting

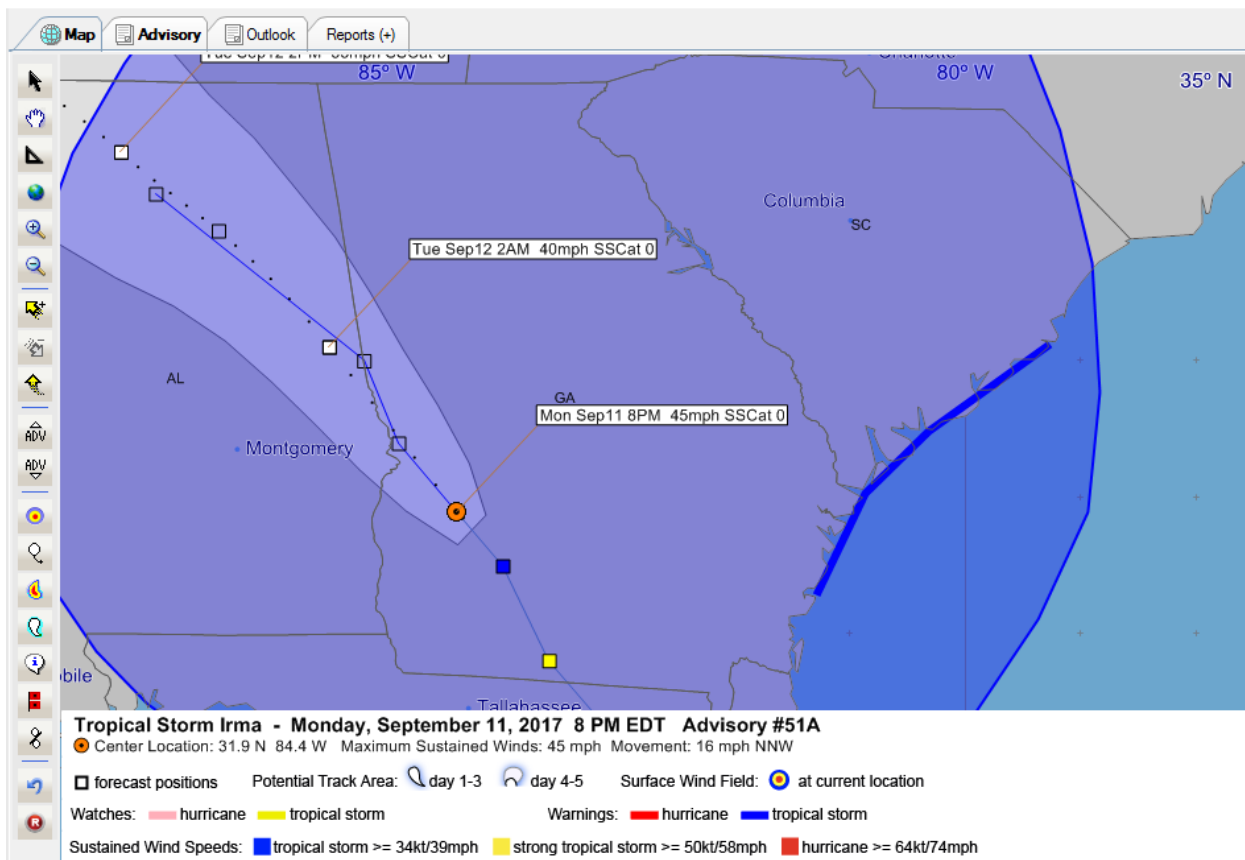
a. Review Hurricane Irma Event

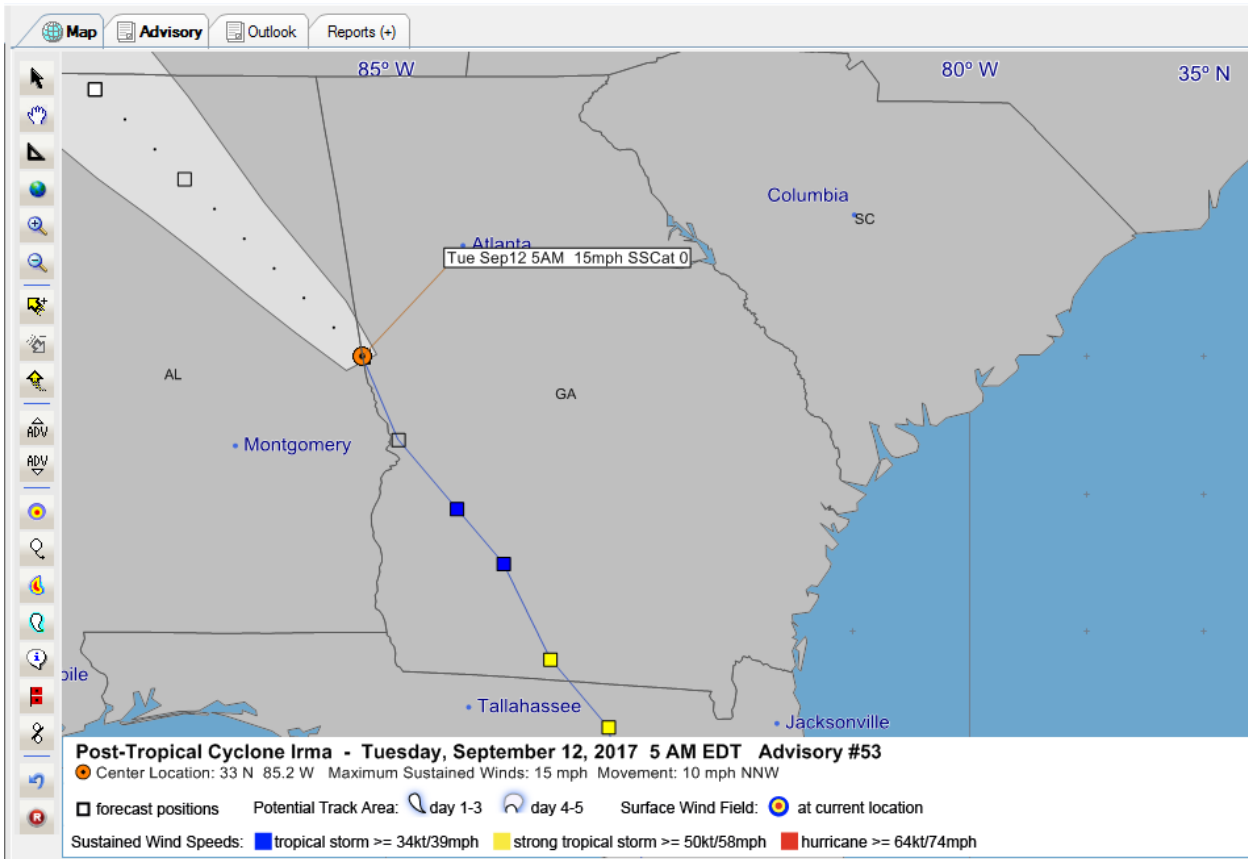
In Fall, 2017, Hurricane Irma formed in the Atlantic Ocean, eventually reaching the Caribbean Sea in early September then entering the Gulf of Mexico and traveling up the western coast of Florida, making landfall approximately half way up the Florida

peninsula. By Sunday afternoon, September 10th, 2017, the majority of South Georgia, from just north of Savannah to Bainbridge, had begun experiencing sustained tropical storm force winds. Monday morning, strong tropical storm winds entered South Georgia. The eye of the storm entered Georgia Monday afternoon and strong tropical storm winds stretched from just off the Atlantic coast to Southeast Alabama and from near Ocala, Florida to Macon, Georgia. By Monday evening, the eye had passed over Albany, which notably had experienced two strong severe weather disasters in January. By Tuesday morning, September 12th, the eye of the remnants of the storm exited Georgia over Lagrange. This event led to the second evacuation of the Georgia coast in less than a year and only the 3 such evacuation in since Hurricane Floyd nearly 20 years prior. Notably, even though the eye of the storm traveled over Southwest Georgia, coastal Georgia experience worse flooding than from Hurricane Matthew, which traveled up the coast in October, 2016. Impacts from the storm include 5 fatalities, as well as an estimated \$150 million in uninsured losses and >1,900 NIFP flood claims with \$8 million in advanced payments. The storm also caused more than 1.5 million people throughout lose power, some for more than a week. Notably, this is the first disaster to result in the entire State receiving a Federal Declaration.







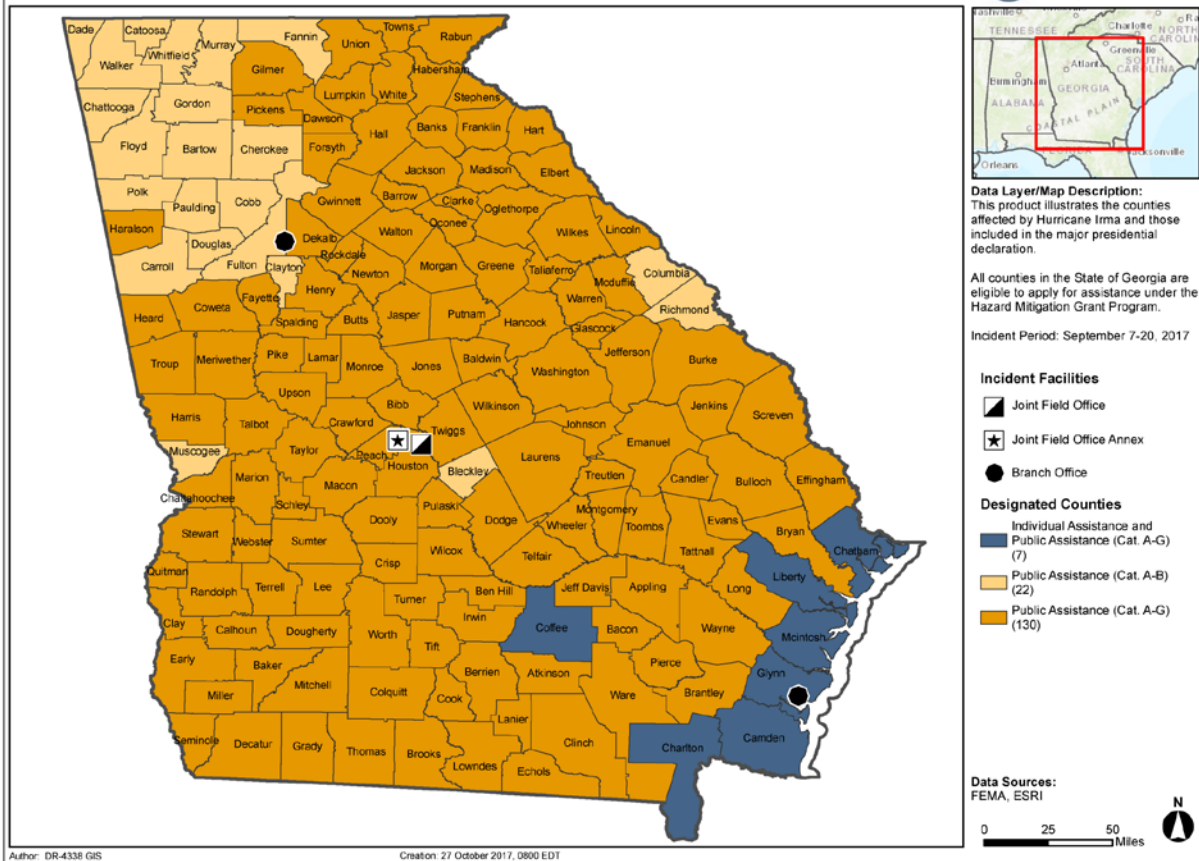


b. Presidential Declaration

Below is a map showing the counties included in the DR4338 Disaster declaration:

Major Disaster Declaration – State of Georgia

FEMA-4338-DR-GA - Hurricane Irma - Declared September 15, 2017 / Amended October 26, 2017



c. Damage to State Facilities

None noted.

d. Business Interruptions to State Agencies

It was noted GEMA looking to put generators in areas known for outages

e. HMGP Application Timeline and Priorities

Terry Lunn gave a presentation on the application timeline. An application information packet was provided to all parties in attendance and emailed to all parties, shown on the presentation and emailed to all attendees, including those participating online. The following timeline was described:

September 15, 2017 – Disaster Declaration (HMGP Statewide)

October 24-November 15, 2017 – Applicant Briefings

February 1, 2018 – Pre-Application due to GEMA/HS
March 1, 2018 – GEMA/HS Notification to Applicant for Full Application
May 1, 2018 – Full Application due to GEMA/HS
September 15, 2018 – All Applications submitted to FEMA
FEMA Application Review Process (up to 12 months)

Information on the HMGP program is below:



HAZARD MITIGATION GRANT PROGRAM

Building Resilient Communities

Georgia Emergency Management Agency / Homeland Security

Hazard Mitigation

Atlanta, GA 30316

Overview:

Mitigation is the cornerstone of emergency management. Hazard Mitigation is sustained action to reduce or eliminate risks to life and property from natural or man-made hazard events. Through mitigation actions such as sound land-use planning; adoption and enforcement of building codes; removing structures from hazardous areas; and retrofitting of existing buildings and facilities; and storm water management projects; we can protect facilities to assure functionality following an event, reduce exposure to liabilities and minimize disruptions to the community.

Introduction:

Section 404 of the Robert T. Stafford Disaster and Emergency Assistance Act of 1988 established the Hazard Mitigation Grant Program (HMGP). The purpose of the program is to provide funds to State agencies and local governments in the aftermath of a disaster for projects that reduce or eliminate the long-term risk to human life and property from the effects of natural hazards. For this disaster, the Federal Emergency Management Agency (FEMA) will contribute 20% of the amount it will spend for disaster assistance programs to fund the HMGP. Federal law requires States and local jurisdictions to have a mitigation plan prior to receipt of HMGP project funds. The plan identifies hazards, assesses community needs, and describes a community-wide strategy for reducing risks associated with natural disasters.

Project Funding:

The federal share of HMGP funding cannot exceed 75% of the total eligible project cost. The non-federal share may be met with cash, contributions, certain other grants such as Community Development Block Grants, or with in-kind services. Grants will be made available to eligible applicants on a competitive basis with priority given to the federally declared counties. The state may contribute a percentage of the non-federal cost share based on severity of damage for the counties included in the presidential disaster declaration for Public Assistance.

HMGP Application Process:

The HMGP is administered by the Georgia Emergency Management and Homeland Security Agency (GEMA/HS). GEMA/HS Hazard Mitigation staff offer technical assistance to local governments for project identification and application preparation. GEMA/HS also is responsible for the review, prioritization and funding recommendation of eligible projects to FEMA. FEMA is responsible for making all final funding decisions on projects submitted by the state.

Following a presidential disaster declaration, GEMA/HS announces the HMGP grant application information, usually within 30-60 days of the disaster declaration date. Pre-applications are required based on project type. Upon favorable review of pre-applications, applicants will be invited to submit full applications. Completed applications are required within six to eight months of the declaration date. Applications are evaluated and projects are recommended to FEMA for approval and funding based on prioritization and available funds. All applications must be submitted to FEMA within twelve (12) months of the disaster declaration date.

TYPES OF HMGP PROJECTS THAT COULD BE ELIGIBLE:

- Initiative Projects such as the development or improvement of warning systems with mitigation as an essential component;
- Construction of safe rooms (tornado and severe wind shelters) for public and private structures that meet the FEMA construction criteria in FEMA 320, "Taking Shelter from the Storm" and FEMA 361, "Design and Construction Guidance for Community Shelters";
- Retrofits such as elevations, structure relocation, structural reinforcement (wind and seismic), strapping of utilities, installation of storm shutters, tie downs, etc.;
- Acquisition of property and/or relocation of homes, businesses and public facilities from hazard prone areas;
- Wildfire mitigation such as creating defensible space, application of ignition-resistant construction and hazardous fuel reduction;
- Soil stabilization projects that provide protection from erosion and landslides;
- Generators that protect a critical facility and meets all other HMGP eligibility criteria. Critical facilities may include Emergency Operation Centers, police and fire stations, hospitals, and water and sewer treatment facilities;
- Structural hazard control or protection measures such as floodwalls, detention basins and other storm drainage upgrades; and
- Development of a Local Hazard Mitigation Plan.

Generally, a project should:

- Substantially reduce the risk of future damage, hardship, loss or suffering from a major disaster;
- Conform with federal floodplain, wetland and environmental regulations;
- Solve a problem independently, or part of a problem when there is assurance that the whole project will be completed;
- Be **cost-effective** in that it addresses a problem that is repetitive or that poses a significant risk if left unsolved;
- Contribute substantially to the problem's long-term solution;
- Have manageable future maintenance requirements;
- Be determined to be the most practical, effective and environmentally sound alternative among the possible options;
- Conform to the goals and objectives of Local and State Hazard Mitigation Plans; and
- Have the documented support of the local community.

Some of the reasons that projects / applications are determined to be ineligible:

- Project is for operation and maintenance versus disaster-related mitigation;
- Project is the responsibility of another federal agency, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service;
- Project is the result of deferred maintenance rather than related to a natural hazard;
- Project has an inadequate benefit/cost ratio (not cost-effective);
- No federally approved local Hazard Mitigation Plan; and
- Non-participation in the National Flood Insurance Program.

For further information, write us at the address below or call the State Hazard Mitigation Program Office at (404) 635-7522.

Georgia Emergency Management and Homeland Security Agency
Hazard Mitigation
Post Office Box 18055
Atlanta, Georgia 30316-0055

Hazard Mitigation Grant Program – Fact Sheet
FEMA-4338-DR-GA

Amy Rammo-Kuhs asked about obtaining generators for local public water systems. Charlissa Bell asked about the application process for local public health facilities. Terry Lunn explained that generator applications have to be tied to a specific location in order to document outage data and determine a benefit for the project. He also explained that local and State agencies and Private Non-Profit agencies are eligible to apply. He also described the application processes for generators and transfer switches.

State Plan Update

Alan Sloan explained the staff has begun the process of updating the 2014 State Hazard Mitigation Strategy, which is required to be submitted to FEMA by September 30, 2018 and to be approved and adopted by March 31, 2019. He explained the cutoff date for all data was September 30, 2017 and ITOS was compiling the data and updated maps to be submitted to GEMA by December 30. Alan noted staff is currently working on Chapters 4, 5 and 6. He noted Chapter 6 is the enhanced portion of the plan and that Georgia is one of 12 states nationwide to have an enhanced plan. He noted this status nets Georgia an additional 33% in post disaster HMGP funding, or an additional \$.05 for every \$1 of damages resulting from a federally declared disaster. Alan noted the team's current goal is to complete the draft by the end of August in order to allow time for packaging the plan for submittal to FEMA by the end of September.

Alan informed the group the staff was in the process of scheduling a series of workshops, anticipated for January, February and March. The workshops will be onsite only due to the interactive nature of the events, with the goal of getting input from participating agencies regarding the hazards that impact the state and the strategy for mitigating against those hazards.

Next Meeting

The next meeting date will be determined at a later date. It will likely be held sometime in the Spring in order to update the group on the status of the plan update. We will notify everyone by email.

Comments and Questions

Having no further comments or questions, the meeting was adjourned.

Georgia State Hazard Mitigation Planning Team Meeting - Minutes

June 28, 2018

Present

Alan Sloan, GEMA/HS
Dee Langley, GEMA/HS
Lawton Brantley, ITOS
Angela Wheeler, ITOS
Terry Lunn, GEMA/HS
Taiza Troutman, GEMA/HS
Kimberly Angel, GEMA/HS
Breanna Rogers, GEMA/HS
Kari Giles, GDPH
Scott Minarcine, GDPH
Ken Parker, GFC
Stephen Adams, GA DNR
Amy Henderson, Georgia Municipal Association
Jack Krolikowski, GA DNR floodplain unit
Brian Shoun, GA DNR Floodplain unit
Amy Rammo Kuhs, GA DNR EPD
David Griffin, GA DNR EPD
Kelly Brokenburr, GEMA/HS
Via conference Call-in:
Shelby Meyers, GEMA/HS
Kristofer Anderson, GEFA
Anita Russo, ITOS
Matthew Kloiber, Judicial Council – Administrative Office of Courts
Tomi King, GEMA/HS – signed in online

Welcome and Introductions

Alan Sloan welcomed everyone to the 2018 Annual Update meeting for the 2014 SHMS. We greatly appreciated everyone's time and participation. The meeting was run on WebEx, so those who could not make the meeting can participate and see the screens we are looking at. Roll call was taken.

Review and Approval of the May 19, 2016 and January 10, 2017 meeting minutes

Alan began the meeting by asking if anyone had any comments or recommended changes to the minutes of our 5/3/2017 Annual Update meeting or our December 7, 2017 Post Disaster meeting? With no changes the minutes were approved.

State of Georgia Enhanced Mitigation Strategy Update

a. Results from Workshops

Alan noted the completion of the workshops from January, March and April. He noted we looked at the top hazards affecting the State, and noted the addition of the Extreme Heat hazard, based on the workshop results and analysis of local hazard mitigation plans. He states staff is continuing to analyze the results of the mitigation strategy workshop (#3), comparing the new items from the workshop to the current mitigation strategy. Alan explained the ranking criteria and displayed the updated ranking of hazards.

34	Tornado	High
32	Inland Flooding	High
29	Hurricane Wind	High
28	Severe Weather	High
26	Drought	Medium
25	Severe Winter Weather	Medium
25	Coastal Hazards	Medium
24	Wildfire	Medium
17	Wind	Medium
17	Extreme Heat	Medium
17	Dam Failure	Medium
8	Seismic Hazards	Low
6	Geologic Hazards	Low

b. Major changes to plan requirements

Alan noted there are some changes in the requirements for State mitigation plans. He noted FEMA now requires the plan include a discussion about climate change. Staff has gotten general information about impact of climate change on each of the 13 hazards. He also noted the Sea level rise study done by DNR's Coastal Resources Division, which will be incorporated into the risk analysis.

Alan then noted the review tool, which was published after the 2014 plan, which includes a few changes in how things are expected to be covered in the 2019 plan.

c. Review Progress on update of State Plan document

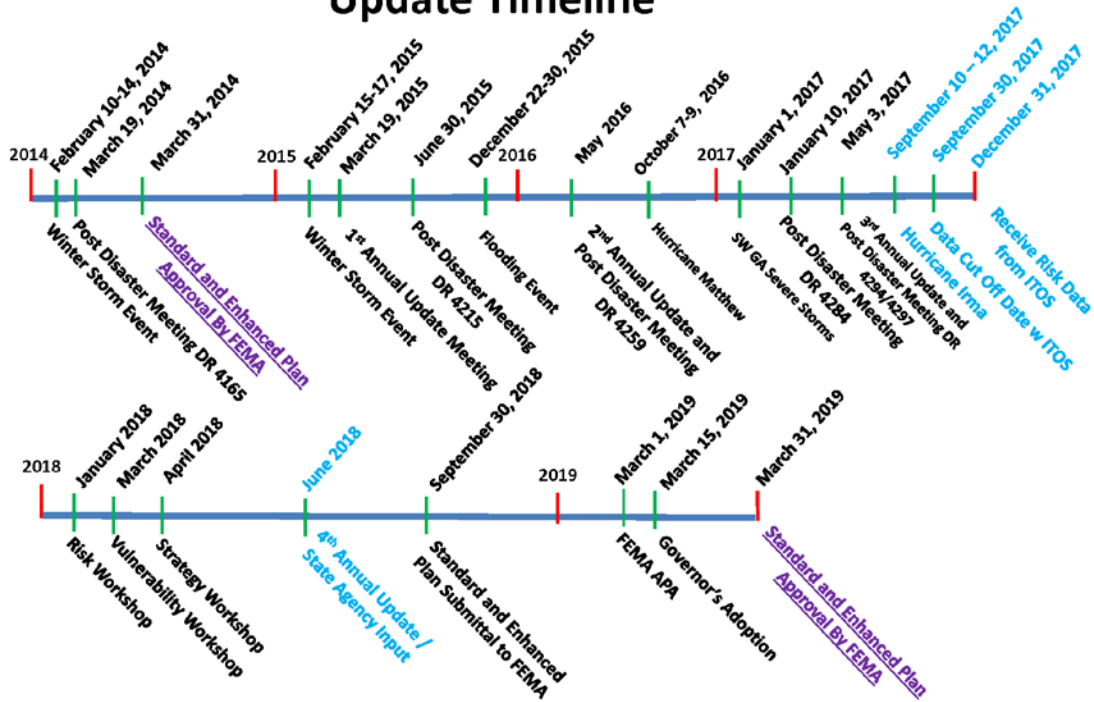
Alan described the progress staff has made in updating the State Plan document. He noted progress on some chapters, including Chapters 3 and 4 being almost complete. He then said the staff's current focus is on completing Chapter 2, the risk assessment, including the addition of the Extreme Heat hazard and incorporating climate change information. He noted the next focus will be the mitigation strategy section. Finally, he noted Terry Lunn has been working with the Enhanced Plan section. Alan noted the progress on some of the appendix items.

Alan reminded the team that the plan will be submitted to FEMA by September 30, 2018 in order to have the plan approved and adopted by the required March 30, 2019 update timeframe.

d. Timeline

Alan noted the updated timeline for the State Plan Update. He noted the changes to the timeline include Hurricane Irma and the December 4338 post disaster review meeting. He also noted staff intends to submit the Enhanced Plan section at the same time as the standard plan section, which is a change from previous years where the State would submit the Standard Plan in September, then submit the Enhanced Plan around December.

2019 State Hazard Mitigation Plan Update Timeline

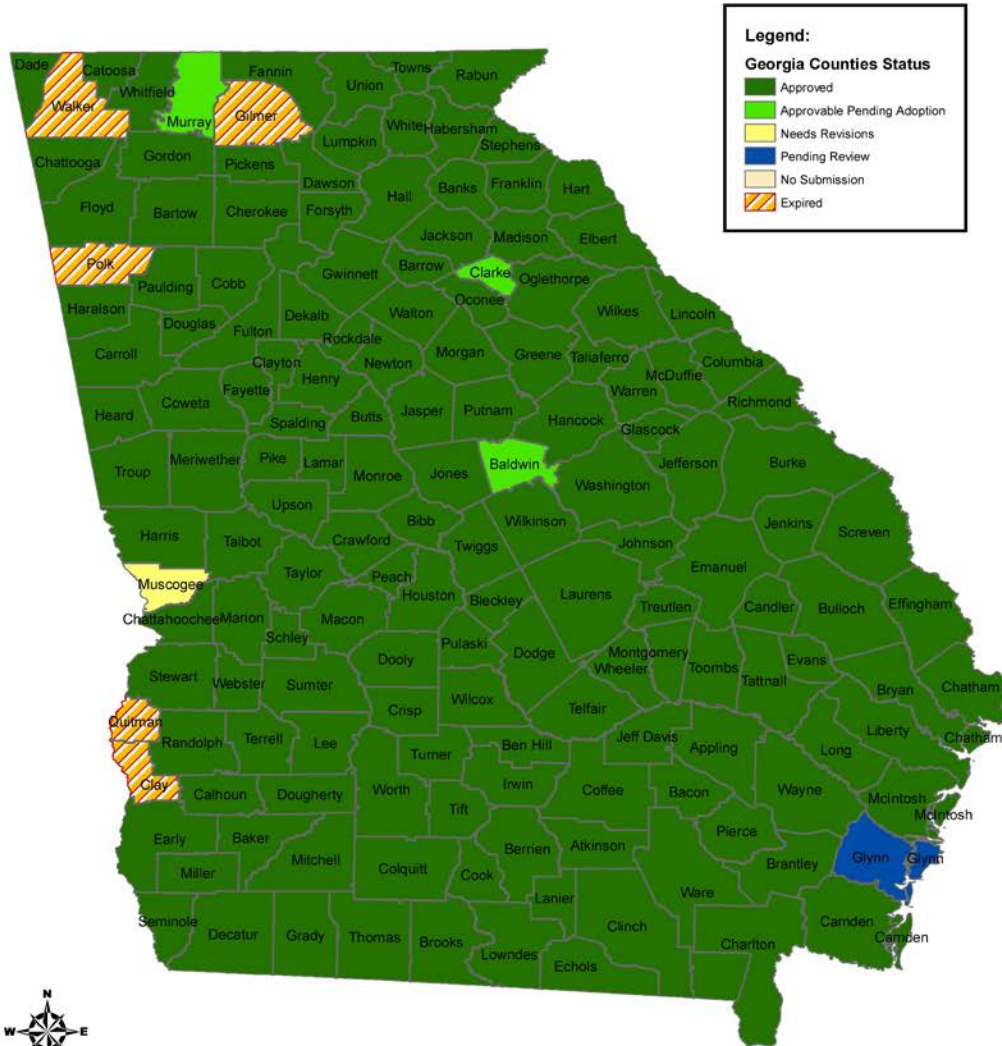


Local Plan Update Status

a. Plan Status Map

Alan showed the current status of local mitigation plans according to FEMA. The FEMA map is shown below:

Georgia Hazard Mitigation Plan Status



May 31, 2018
I:\PLANNING TEAM DATA\Planning Inventories\Georgia\Georgia Plan Status.mxd

b. HMGP 4259, 4284 and 4294 applications

Alan noted the ongoing application cycles:

4284 (Hurricane Matthew):

42 New applications approved by FEMA, 2 additional pending FEMA approval.

4294 (South Georgia January Tornadoes):

2 Applications pending submittal to FEMA

Alan also noted the planners have as many as 20 plans in house for state review, in addition to the State Plan update.

c. HAZUS Level II Analysis and Reports

Alan updated the team on the status of the HAZUS Level II analysis and reports and gave a general description of the benefits of the Hazus reports being better, more specific data for each county.

Total Contracted	104
Percent Contracted	65%
Total Completed	70
Percent Completed	44%

FEMA Activities

a. State of Georgia Plan Consultation with FEMA Region IV

Alan described the State Plan Consultation meetings with FEMA and noted the next one is scheduled for August 9th, 2018.

b. Upcoming Meeting and Workshops

Alan noted there were none others at this time. Brian Shoun noted there are some RiskMap resilience meetings coming up to be scheduled in Bartow and Cobb Counties, as well as Chatham, Liberty, Bryan and McIntosh Counties, however, no dates were set at the time.

c. HMA Activities with PDM 2015 and 2016

Terry Lunn noted we also will be amending the contract to add the 4284 local plan updates to have Hazus analyses run for those counties. He then noted the 4284 project applications submitted to FEMA, including generators and wind retrofit projects.

Terry noted the application period for the SW Ga tornado disaster applications, including some warning systems, acquisitions of substantially damaged flood prone structures, and generators. The applications are due to FEMA by the 3rd week in July.

Terry noted the prioritization process for some generator projects for Hurricane Matthew.

He then noted the availability of HMGP funds for two fire disasters, one in 2016 and one in 2017 and the work being done to identify potential projects in the declared counties – Clinch, Ware, Charlton and Dade Counties. He noted new types of projects FEMA has identified that would be fundable through the program. Terry then noted additional outreach to identify potential projects in non-declared counties as well. We are expecting approximately \$1.5 million total funds with a Federal share of approximately \$1.1 million. Terry noted some of the impacted rural areas may have problems with the match so staff would be working with interested communities to determine how to meet that.

Terry then noted the anticipated notification of funding available for FY 18 non-disaster programs, including PDM and FMA, to come in August with an application period of October, 2018 – January, 2019.

Next Meeting

The next meeting date will be determined at a later date. It will be held during the second quarter of 2019. We will notify everyone by email.

Dee Langley noted the ongoing EMAP process and the work he has been doing to incorporate Hazard Mitigation related items in to the process. The agency has been accredited twice and is in the process of submitting for re-accreditation sometime in August.

Terry reminded everyone to please review the information about various state agencies within the State Plan and please get comments back to Alan for incorporation into the updated 2019 plan. He noted benefits of the state plan in terms of disaster assistance. He noted having the enhanced plan allows the State to receive approximately an additional \$140,000 each in HMGP funds for the two previously mentioned wildfire disasters, which is available to local communities, as well as state agencies.

Comments and Questions

Having no further comments or questions, the meeting was adjourned.

Appendix B-II
Workshop Documentation

State Hazard Mitigation Planning Team	
Name	Agency
Alan Giles	DNR
Amy Rammo-Kuhs	DNR
Angela Wheeler	ITOS
Anita Russo	ITOS
Bob Bray	Georgia Courts
Breanna Rogers	GEMA
Brian Shoun	DNR
Bruce Holmes	Board of Regents
Charles Lawrence	Department of Administrative Services
Charlisa Bell	Department of Public Health
Charlissa Ussery	Department of Public Health
Christopher Luncheon	Georgia Department of Revenue
Cran Upshaw	USDA
Crystal Swain-Bates	Georgia Technology Authority
David Vandewater	FEMA
DeAngelo Bryant	GEMA
Debra Myers	Georgia Building Auth
Eddie Henderson	DNR
Edwardine Marrone	FEMA
Elizabeth Smith	Department of Community Affairs
Ernay Robinson	Department of Transportation
Frank Billard	Department of Human Services
Frederick Trotter	Department of Administrative Services
Garry McGibony	Department of Education
Gary Kelley	Department of Agriculture
Greg Mercier	Georgia State Patrol
Gus Elliot	OPB
Haydn Blaize	DNR
James Winn	Department of Revenue
Jason Richardson	Jekyll Island Authority
Jeffrey Hodges	Department of Education
Jeffrey Morris	US Army Corps of Engineers
Jennifer Kline	DNR Coastal Resources
Jessica Mimbs	Georgia Soil and Water Conservation Commission
John Lowe	Department of Defense
JR Campbell	DNR
Judd Smith	DNR
Karen Hampton	Ga Dept of Econ Development
Kelly Brokenburr	GEMA
Kelly Nadeau	Department of Public Health
Kelly Towe	Georgia Forestry Commission
Kelsey Goodman	GEMA
Ken Parker	Georgia Forestry Commission

Kimberly Angel	GEMA
Kristophor Anderson	Georgia Environmental Finance Authority
Kvonne Bryant	GEMA
Lacey Kondracki	Board of Regents
Lawton Brantley	ITOS
Lisa Beck	Technical College System of Georgia
Mark Millirons	Georgia Forestry Commission
Mark Wiles	Georgia Forestry Commission
Marlene Dawkins	FEMA
Noel Jensen	Jekyll Island Authority
Paul Melvin	Georgia Building Auth
Robin Berzins	FEMA
Shelby Meyers	GEMA
Sonja Allen-Smith	OPB
Stephen Adams	DNR
Stephen Clark	GEMA
Terry Lunn	GEMA
Tom Woosley	DNR
Tomi King	GEMA
Venessa Sims-Green	Department of Agriculture
	EMAG
	Ga Dept of Audits and Accounts
	Office of State Administrative Hearings
	Department of Driver Services
	Department of Banking and Finance
	Georgia World Congress Center
Michael Lankford	Department of Transportation
	Subsequent Injury Trust Fund
	Department of Driver Services
	Georgia Ports Authority
	Georgia State Patrol
	Department of Human Services

Alan Sloan

Subject: Georgia State Hazard Mitigation Strategy Risk Assessment Workshop
Location: State Operations Center, 935 East Confederate Avenue, Building 2; Atlanta, GA

Start: Thu 1/25/2018 8:30 AM
End: Thu 1/25/2018 12:00 PM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Alan Sloan
Required Attendees: Stephen Adams; Debra Myers; 'GMckinney@georgia.org'; Kelsey Goodman; 'Blewisgmag@plantationcable.net'; Amy Rammo-Kuhs; 'lbeck@tcsge.edu'; Stephen Clark; 'David Vandewater'; 'Cran.upshaw@ga.usda.gov'; 'schwinne@audits.ga.gov'; 'mwiles@gfc.state.ga.us'; 'brenda.stirrup@fema.dhs.gov'; Kelly Towe; 'charles.lawrence@doas.ga.gov'; 'dlangsto@osah.ga.gov'; Kelly Nadeau; Deangelo Bryant; Shelby Meyers; 'james.winn@dor.ga.gov'; 'Christopher.luncheon@gmail.com'; 'eddie_henderson@dnr.state.ga.us'; 'mrawls@dds.ga.gov'; 'arusso@itos.uga.edu'; 'awheeler@itos.uga.edu'; 'Sonja.allen@opb.georgia.gov'; tom_woosley@dnr.state.ga.us; 'webbc@dbf.state.ga.us'; 'jfootman@gwcc.com'; Kristofor Anderson; 'christopher.luncheon@dor.ga.gov'; Kelly Brokenburr; 'Frederick.trotter@doas.ga.gov'; 'edwardine.marrone@fema.dhs.gov'; 'Jeffrey.S.Morris@usace.army.mil'; 'crystal.swain-bates@gta.ga.gov'; Charlissa Ussery; 'mlankford@dot.ga.gov'; Gary Kelley; 'adixon@sitf.ga.gov'; 'jrichardson@jekyllisland.com'; Terry Lunn; 'dprosser@dds.ga.gov'; 'Robin.Berzins@fema.dhs.gov'; 'Jennifer.Kline@dnr.state.ga.us'; 'dthompson@gaports.com'; 'bruce.holmes@usg.edu'; JR Campbell; Mark Millirons; Paul Melvin; Frank Billard; 'lsmith@gsp.net'; 'alan_giles@dnr.state.ga.us'; Greg Mercier; Venessa Sims Green; Tomi King; Ernay Robinson; 'seminarcine@dhr.state.ga.us'; Kvonne Bryant; 'john.g.lowe.mil@mail.mil'; 'Elizabeth.smith@dca.ga.gov'; 'gmcgiboney@doe.k12.ga.us'; Kimberly Angel; 'Morris, Jeffrey S CIV USARMY CESAS (US)'; 'Allen-Smith, Sonja'; 'Jeffrey Hodges'; Lisa Beck; 'Trotter, Frederick'; 'Noel Jensen'; 'Marrone, Edwardine'; 'Smith, Lt Judd'; 'Anita Russo'; 'Elliott, Gus'; 'Berzins, Robin'; Venessa Sims; Bell, Charlisa; Breanna Rogers; lbrantley@itos.uga.edu; Bob.Bray@georgiacourts.gov; Ken Parker; lsmith@gsp.net; mlankford@dot.ga.gov; lacey.kondracki@usg.edu; jessica.mimbs@gaswcc.ga.gov

Good morning, State Hazard Mitigation Planning Team!

The Hazard Mitigation Division is preparing to hold a series of three workshops to update the Enhanced State Hazard Mitigation Strategy. The approval of this update by FEMA is essential in assuring the State's eligibility for federal disaster funding in the event of a natural disaster.

The first workshop will be January 25th, beginning at 8:30am, in the State Operations Center, located on the 2nd floor of Building 2 at GEMA Headquarters. We would like to ask that you please plan on attending this workshop as we would like to hear from you about the hazards that impact your agency. If you are unable to attend, we ask that you please send someone to attend in your place to represent you and your organization. The information gathered at the workshops will help in the development of mitigation actions

to reduce losses, and provide effective action steps to protect your assets, most notably your organizations' employees.

I want to thank you in advance for your support and participation in these workshops which will help make our state more resilient to disasters, and able to protect its employees, facilities, and other assets, in times of disaster.

We will put together an agenda and send it, along with a map to the facility, in the next few days. However, we ask that you please mark your calendars and plan to attend. Please also let us know how many from your organization will be attending, so we can prepare accordingly. Please let me know if you have any questions or require any assistance. You can reach us at (404) 635-7522 or 1 (800) TRY-GEMA or you may contact me directly at (229) 276-2773. We look forward to hearing from you in this important process.

Sincerely!



R. Alan Sloan, MPA
Hazard Mitigation Planning Supervisor
GEMA/HS
210 South 7th Street, Room 210
Cordele, GA 31015
Office: 229-276-2773
Cell: 404-693-5507
Fax: 229-239-0861



Invited Stakeholders

Name	Title	Agency
Bannister, Mark		Georgia Department of Veterans Services
Bell, Gary	Operations Manager - Facility Operations	Georgia Department of Corrections
Bonilla-Chacon, Elenilzon "Chacon"	Xpress Operations Specialist	Georgia Regional Transportation Authority
David, Jeannette	Disaster Mental Health Services Coordinator	Georgia Department of Behavioral Health & Development Disabilities
Flynn, Patrick	Chief of Staff - Incident Response Team	Atlanta Gas Light
Ford, Aisha	Program Director	Georgia Criminal Justice Coordinating Council
Fortner, Amy	Director of Special Operations	Georgia Department of Juvenile Justice
Garner, Debbie	Special Agent in Charge	Georgia Bureau of Investigation
Godfrey, Philip A.	Storm Center Manager	Georgia Power
Hall, Randy		Georgia Transmission Corporation
Harben, Tim		Georgia Transmission Corporation
Henderson, Amy	Director of Communications	Georgia Municipal Association
Henderson, Gordon	Executive Director	Georgia Firefighter Standards and Training Council
Higgins, James	Director	Georgia Museum of Agriculture and Historic Village - Agrirama
Hightower, Tony	Deputy Director	Georgia Public Safety Training Center
Hiott, Perry	Research and Information Manager	Georgia Municipal Association
Holcomb, Tom	District Emergency Coordinator	American Radio Relay League, Inc.
Holsey, Patrick	Assistant Director	Georgia State Board of Pardons and Paroles
Kirkland, Thomas	Emergency Management Coordinator	Georgia Department of Labor
Martin, Kristina	Program Director	Georgia Criminal Justice Coordinating Council
McCorry, Shawn	Senior Disaster Program Manager	American Red Cross
Mohr, Monty	Director of Criminal Investigation	Georgia Governor's Office of Consumer Affairs
Norman, Kim	Curator	Georgia Archives
Oni, Jo Anne	Assistant Director Consumer Services Division	Georgia Office of the Commissioner of Insurance and Fire Safety
Padgett, Anthony	Chief Operating Officer	Georgia Public Broadcasting
Pope, Diana	Director	Georgia State Financing and Investment Commission
Poznanski, Alex	Transit Program Analyst	Georgia Regional Transportation Authority
Romans, Lloyd	Disaster Recovery Director	Georgia Department of Labor
Shimp, Stephen	Public Safety Director	Georgia National Fairgrounds and Agricenter
Sparks, Sharon		Georgia Department of Labor
Stancil, Steve	State Properties Officer	Georgia State Properties Commission
Sumner, Audrey	Disaster Mental Health Services Coordinator	Georgia Department of Behavioral Health & Development Disabilities
Vaughan, Robert	Assistant Director, Utilities Division	Georgia Public Service Commission
Wills, Dave	Government Relations Manager	Association County Commissioners of Georgia
Wood, Paul	CEO	Georgia Electric Membership Corporation
Yarbrough, NeeNah	Budget Administrator	Georgia Peace Officer Standards and Training Council
York, Heather		Georgia State Properties Commission
Williams, Brent		Association County Commissioners of Georgia
Bergman, James	Field Operations Deputy Director	Department of Community Supervision
Kent Young		Department of Community Supervision
Johnston, Brian		Georgia Bureau of Investigation
Sharon Sparks		Georgia Department of Labor
Branscomb, Nathan		Georgia Criminal Justice Coordinating Council
Slappey, Elbert		Georgia National Fairgrounds and Agricenter
Boone, Garrett	Director	Georgia Museum of Agriculture and Historic Village - Agrirama

Alan Sloan

From: Alan Sloan
Sent: Monday, January 08, 2018 3:05 PM
To: 'timothy.harben@gatrans.com'
Subject: Georgia State Hazard Mitigation Strategy Risk Assessment Workshop

Good afternoon, Mr. Harben:

The Hazard Mitigation Division of GEMA is preparing to hold a series of three workshops to update the State Enhanced Hazard Mitigation Plan. The approval of this update by FEMA is essential in assuring the State's eligibility for federal disaster funding in the event of a natural disaster.

The first workshop will be January 25th, beginning at 8:30am, in the State Operations Center, located on the 2nd floor of Building 2 at GEMA Headquarters. I would like to ask that you and/or another person from your organization please attend these workshops and help determine the amount of risk your agency faces from various types of natural hazards. The information gathered at the workshops will help in the development of mitigation actions to reduce losses, and provide effective action steps to protect your assets, most notably your employees.

We will put together an agenda and send it, along with a map to the facility, in the next few days. However, we ask that you please mark your calendars and plan to attend. Please also let us know how many from your organization will be attending so we can plan accordingly.

I want to thank you in advance for your support and participation in these workshops which will help make our state more resilient to disasters, and able to protect our public, as well as the state's employees, facilities, and other assets, in times of disaster.

Please let me or a member of our Hazard Mitigation Division know if you have any questions or require any assistance. You can reach us at (404) 635-7522 or 1 (800) TRY-GEMA. We look forward to hearing from you in this important process.




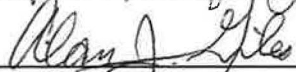

Sincerely,



R. Alan Sloan, MPA
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Cell: 404-693-5507
Fax: 229-239-0861



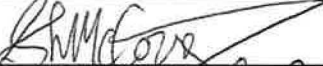

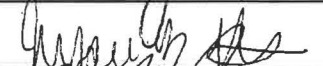

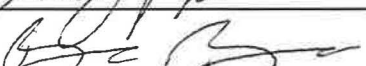
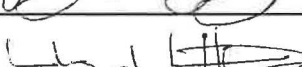
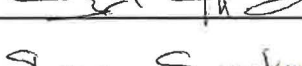


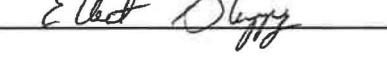


Understanding Georgia's Risk to Natural Disasters - Workshop 1/25/2018
Sign in Sheet

Name	Organization	Signature	email	Phone
Allen-Smith, Sonja	OPB		sonja.allen-smith@opb.georgia.gov	
Angel, Kimberly	GEMA		kimberly.angel@gema.ga.gov	
Berzins, Robin	FEMA		robin.berzins@fema.dhs.gov	
Blaize, Haydn	DNR		haydn.blaize@dnr.state.ga.us	
Branscomb, Nathan	Georgia Criminal Justice Coordinating Council		nathan.branscome@cjcc.ga.gov	
Brantely, Lawton	ITOS		lbrantley@itos.uga.edu	706-542-5609
Bray, Bob	Georgia Courts		bob.bray@georgiacourts.gov	
Brokenburr, Kelly	GEMA		kelly.brokenburr@gema.ga.gov	404-635-7511
Bryant, DeAngelo	GEMA		deangelo.bryant@gema.ga.gov	
Bryant, Kvonne	GEMA		kvonne.bryant@gema.ga.gov	
Campbell, JR	DNR		jerry.campbell@dnr.state.ga.us	
Flynn, Patrick	Atlanta Gas Light		pflynn@aglresources.com	404-576-3300
Giles, Alan	DNR		alan.giles@dnr.state.ga.us	(404) 651-8495
Hampton, Karen	Ga Dept of Econ Development		khampton@georgia.org	
Hodges, Jeffrey	Department of Education		jhodges@doe.k12.ga.us	404-463-7891
Jensen, Noel	Jekyll Island Authority		njensen@jekyllisland.com	


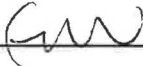
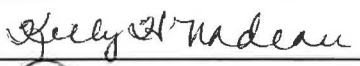
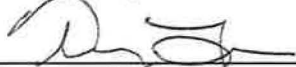

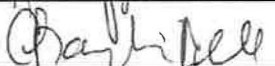


scheduled
to retire
3/5/18

Understanding Georgia's Risk to Natural Disasters - Workshop 1/25/2018
Sign in Sheet

Name	Organization	Signature	email	Phone
Johnston, Brian	Georgia Bureau of Investigation		brian.johnson@gbi.ga.gov	678-859-3633
Kelley, Gary	Department of Agriculture		gary.kelley@agr.georgia.gov	
Kent Young	Department of Community Supervision		rodnev.young@dcs.ga.gov	
Marrone, Edwardine	FEMA		edwardine.marrone@fema.dhs.gov	770 220-5582
McCorry, Shawn	American Red Cross		shawn.mccorry@redcross.org	706-587-9208
Meyers, Shelby	GEMA		shelby.meyers@gema.ga.gov	404-276-2494
Mimbs, Jessica	Georgia Soil and Water Conservation Commission		jessica.mimbs@gaswcc.ga.gov	706-286-2858
Rammo-Kuhs, Amy	DNR		amy.rammo_kuhs@dnr.state.ga.us	404-861-9566
Rogers, Breanna	GEMA		breanna.rogers@gema.ga.gov	404 635 7245
Romans, Lloyd	Georgia Department of Labor		lloyd.romans@dol.state.ga.us	404 232 3415
Sharon Sparks	Georgia Department of Labor		sharon_sparks@dol.ga.gov	404-232-3433
Shoun, Brian	DNR		brian.shoun@dnr.state.ga.us	404-651-8504
Slappey, Elbert	Georgia National Fairgrounds and Agricenter		eslapey@gnfa.com	478-808-0364
Sparks, Sharon	Georgia Department of Labor			
Trotter, Fredrick	Department of Administrative Services		frederick.trotter@doas.ga.gov	404 463 2143
Williams, Brent	Association County Commissioners of Georgia		bwilliams@accg.org	

Understanding Georgia's Risk to Natural Disasters - Workshop 1/25/2018

Sign in Sheet

Name	Organization	Signature	email	Phone
Angela Wheeler	ITOS		awheeler@itos.uga.edu	706-542-2076
Greg Walker	ASWCC		greg.walker@aswcc.ga.gov	
Bruce Holmes	BOR-USG		BRUCE.HOLMES@USG.EDU	
Lucy Kondracki	BDR-USG		LUCY.KONDRACKI@USG.EDU	
Kelly Nadeau	DPH		Kelly.Nadeau@dph.ga.gov	678 618 4906
Terry Lunn	GEMA		terry.lunn@gema.ga.gov	404 635 2014
Ashley Lauria-Golden	GEMA		ashley.lauria-golden@gema.ga.gov	(770) 403-7771
Charlisa Bell	DPH		charlisa.bell@dph.ga.gov	678-322-6057
Dee Langley	GEMA		dee.langley@gema.ga.gov	770-881-4831
King Tom	SEMA		TomKing@gema.ga.gov	

Alan Sloan

Subject: Georgia State Hazard Mitigation Strategy Vulnerability Workshop
Location: State Operations Center, 935 East Confederate Avenue, Building 2; Atlanta, GA

Start: Thu 3/15/2018 8:30 AM
End: Thu 3/15/2018 12:00 PM
Show Time As: Tentative

Recurrence: (none)

Organizer: Alan Sloan

Good afternoon, State Hazard Mitigation Planning Team!

As you know, the Hazard Mitigation Division is in the process of holding a series of three workshops to update the Enhanced State Hazard Mitigation Strategy. The approval of this update by FEMA is essential in assuring the State's eligibility for federal disaster funding in the event of a natural disaster.

The first workshop was January 25th, where we discussed potential hazards that could impact the State of Georgia. Since that time, the Hazard Mitigation Division has been analyzing the findings from the workshop and combining those findings with historical data. The next step in ranking our hazards is looking at the State's vulnerability to those hazards. The second workshop will do just that. The workshop will be held on Thursday, March 15th, beginning at 8:30am, in the State Operations Center, located on the 2nd floor of Building 2 at GEMA Headquarters. We would like to ask that you please plan on attending this workshop as we would like to hear from you about how these hazards that impact your agency. If you are unable to attend, we ask that you please send someone to attend in your place to represent you and your organization. The information gathered at the workshops will help in the development of mitigation actions to reduce losses, and provide effective action steps to protect your assets, most notably your organizations' employees.

I want to thank you in advance for your support and participation in these workshops which will help make our state more resilient to disasters, and able to protect its employees, facilities, and other assets, in times of disaster.

We will put together an agenda and send it, along with a map to the facility, in the next few days. However, we ask that you please mark your calendars and plan to attend. Please also let us know how many from your organization will be attending, so we can prepare accordingly. Please let me know if you have any questions or require any assistance. You can reach us at (404) 635-7522 or 1 (800) TRY-GEMA or you may contact me directly at (229) 276-2773. We look forward to hearing from you in this important process.

Sincerely,

Alan

R. Alan Sloan, MPA

Hazard Mitigation Planning Supervisor

GEMA/HS

210 South 7th Street, Room 210

Cordele, GA 31015

Office: 229-276-2773

Cell: 404-693-5507

Fax: 229-239-0861

Alan Sloan

Subject: Georgia State Hazard Mitigation Strategy Vulnerability Workshop
Location: State Operations Center, 935 East Confederate Avenue, Building 2; Atlanta, GA

Start: Thu 3/15/2018 8:30 AM
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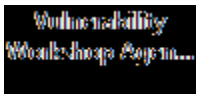
Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Alan Sloan
Required Attendees: Amy Rammo-Kuhs; Shelby Meyers; 'Christopher Luncheon'; Stephen Adams; 'seminarcine@dhr.state.ga.us'; Stephen Clark; 'mwiles@gfc.state.ga.us'; 'Jessica Mimbs'; 'Danny Thompson'; Kelly Towe; 'Edwardine Marrone'; Kimberly Angel; Jim Winn; 'Crystal Swain-Bates'; 'schwinne@audits.ga.gov'; 'Alan Giles'; Kelly Brokenburr; Ernay Robinson; Debra Myers; 'Charles Lawrence'; Kristofor Anderson; 'Angela Wheeler'; 'Jennifer Kline'; 'christopher.luncheon@gmail.com'; Breanna Rogers; Judd Smith; tom_woosley@dnr.state.ga.us; Ken Parker; 'Bob Bray'; Venessa Sims Green; 'Anita Russo'; 'lsmith@gsp.net'; 'John Lowe'; 'Frederick Trotter'; Paul Melvin; 'Charlisa Bell'; 'dprosser@dds.ga.gov'; Tomi King; 'Robin Berzins'; Kvonne Bryant; James Richardson; Garry McGiboney; 'webbc@dbf.state.ga.us'; Charliisa Ussery; Stephen Juszczuk; 'Brian Shoun'; 'Elizabeth Smith'; Greg Mercier; Terry Lunn; 'Sonja Allen-Smith'; Deangelo Bryant; 'Cran Upshaw'; Lisa Beck; Kelly Nadeau; JR Campbell; 'Jeffrey Hodges'; Mark Millirons; 'Lacey Kondracki'; 'mrawls@dds.ga.gov'; 'jfootman@gwcc.com'; 'Blewisgmag@plantationcable.net'; 'Eddie Henderson'; Lawton Brantley; Karen Hampton; 'Jeffrey Morris'; 'David Vandewater'; 'Noel Jensen'; Kelsey Goodman; 'adixon@sitf.ga.gov'; 'Haydn Blaize'; Bruce Holmes; 'dlangsto@osah.ga.gov'; 'mlankford@dot.ga.gov'; Frank Billard; 'Gus Elliot'; Shoun, Brian (brian.shoun@dnr.ga.gov)

Optional Attendees: 'Griffin, David'; Charles Petty; 'Rammo Kuhs, Amy'; Venessa Sims; Gary Kelley; 'Kline, Jennifer'; 'Smith, Lt Judd'; Adams, Stephen; Wes Lanier; Beck, Lisa Anne; Jamie McCurry

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Good afternoon, State Hazard Mitigation Planning Team!

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Sincerely,



R. Alan Sloan, MPA
Hazard Mitigation Planning Supervisor
GEMA/HS
210 South 7th Street, Room 210
Cordele, GA 31015
Office: 229-276-2773
Cell: 404-693-5507
Fax: 229-239-0861



Alan Sloan

Subject: Georgia State Hazard Mitigation Strategy Vulnerability Workshop
Location: State Operations Center, 935 East Confederate Avenue, Building 2; Atlanta, GA

Start: Thu 3/15/2018 8:30 AM
End: Thu 3/15/2018 12:00 PM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

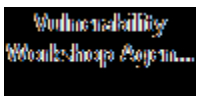
Organizer: Alan Sloan

Required Attendees: Amy Rammo-Kuhs; Shelby Meyers; 'Christopher Luncheon'; Stephen Adams; 'seminarcine@dhr.state.ga.us'; Stephen Clark; 'mwiles@gfc.state.ga.us'; 'Jessica Mimbs'; 'Danny Thompson'; Kelly Towe; 'Edwardine Marrone'; Kimberly Angel; Jim Winn; 'Crystal Swain-Bates'; 'schwinne@audits.ga.gov'; 'Alan Giles'; Kelly Brokenburr; Ernay Robinson; Debra Myers; 'Charles Lawrence'; Kristofor Anderson; 'Angela Wheeler'; 'Jennifer Kline'; 'christopher.luncheon@gmail.com'; Breanna Rogers; Judd Smith; tom_woosley@dnr.state.ga.us; Ken Parker; 'Bob Bray'; Venessa Sims Green; 'Anita Russo'; 'lsmith@gsp.net'; 'John Lowe'; 'Frederick Trotter'; Paul Melvin; 'Charlisa Bell'; 'dprosser@dds.ga.gov'; Tomi King; 'Robin Berzins'; Kvonne Bryant; James Richardson; Garry McGiboney; 'webbc@dbf.state.ga.us'; Charliisa Ussery; Stephen Juszczuk; 'Brian Shoun'; 'Elizabeth Smith'; Greg Mercier; Terry Lunn; 'Sonja Allen-Smith'; Deangelo Bryant; 'Cran Upshaw'; Lisa Beck; Kelly Nadeau; JR Campbell; 'Jeffrey Hodges'; Mark Millirons; 'Lacey Kondracki'; 'mrawls@dds.ga.gov'; 'jfootman@gwcc.com'; 'Blewismag@plantationcable.net'; 'Eddie Henderson'; Lawton Brantley; Karen Hampton; 'Jeffrey Morris'; 'David Vandewater'; 'Noel Jensen'; Kelsey Goodman; 'adixon@sitf.ga.gov'; 'Haydn Blaize'; Bruce Holmes; 'dlangsto@osah.ga.gov'; 'mlankford@dot.ga.gov'; Frank Billard; 'Gus Elliot'; Shoun, Brian (brian.shoun@dnr.ga.gov)

Optional Attendees: 'Griffin, David'; Charles Petty; 'Rammo Kuhs, Amy'; Venessa Sims; Gary Kelley; 'Kline, Jennifer'; 'Smith, Lt Judd'; Adams, Stephen; Wes Lanier; Beck, Lisa Anne; Jamie McCurry; Carol Webb

Good morning!

I apologize. Someone noted an error in the agenda. To be clear, the meeting is this Thursday, March 15 at 8:30. I've attached the corrected agenda. We're looking forward to seeing everyone.



Good afternoon, Planning Team! I have attached the agenda for Thursday's workshop. We are looking forward to another successful workshop and look forward to seeing you there. As always, if you have any questions, please don't hesitate to give me a call!

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Sincerely,



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GEMA/HS
210 South 7th Street, Room 210
Cordele, GA 31015
Office: 229-276-2773
Cell: 404-693-5507
Fax: 229-239-0861



State Hazard Mitigation Planning Team	
Name	Agency
Adams, Stephen	DNR
Allen-Smith, Sonja	OPB
Anderson, Kristopher	Georgia Environmental Finance Authority
Angel, Kimberly	GEMA
Beck, Lisa	Technical College System of Georgia
Bell, Charlisa	Department of Public Health
Berzins, Robin	FEMA
Billard, Frank	Department of Human Services
Blaize, Haydn	DNR
Brantley, Lawton	ITOS
Bray, Bob	Georgia Courts
Brokenburr, Kelly	GEMA
Bryant, DeAngelo	GEMA
Bryant, Kvonne	GEMA
Campbell, JR	DNR
Clark, Stephen	GEMA
Dawkins, Marlene	FEMA
Elliot, Gus	OPB
Giles, Alan	DNR
Goodman, Kelsey	GEMA
Griffin, David	EPD Safe Dams
Hampton, Karen	Ga Dept of Econ Development
Hart, Amy	Georgia Ports Authority
Henderson, Amy	Georgia Municipal Association
Henderson, Eddie	DNR
Hodges, Jeffrey	Department of Education
Holmes, Bruce	Board of Regents
Jenson, Noel	Jekyll Island Authority
Juszczuk, Stephen	FEMA
Kelly, Gary	Department of Agriculture
King, Tomi	GEMA
Kline, Jennifer	DNR Coastal Resources
Kondracki, Lacey	Board of Regents
Lanier, Wes	Georgia Ports Authority
Lankford, Michael	Department of Transportation
Lawrence, Charles	Department of Administrative Services
Lowe, John	Department of Defense
Luncheon, Christopher	Georgia Department of Revenue
Lunn, Terry	GEMA
Marrone, Edwardine	FEMA
McGibony, Garry	Department of Education
Melvin, Paul	Georgia Building Auth
Mercier, Greg	Georgia State Patrol

Meyers, Shelby	GEMA
Millirons, Mark	Georgia Forestry Commission
Mimbs, Jessica	Georgia Soil and Water Conservation Commission
Morris, Jeffrey	US Army Corps of Engineers
Myers, Debra	Georgia Building Auth
Nadeau, Kelly	Department of Public Health
Parker, Ken	Georgia Forestry Commission
Petty, Charles	Georgia Building Auth
Rammo-Kuhs, Amy	DNR
Richardson, Jason	Jekyll Island Authority
Robinson, Ernay	Department of Transportation
Rogers, Breanna	GEMA
Russo, Anita	ITOS
Shoun, Brian	DNR
Sims-Green, Venessa	Department of Agriculture
Smith, Elizabeth	Department of Community Affairs
Smith, Judd	DNR
Swain-Bates, Crystal	Georgia Technology Authority
Towe, Kelly	Georgia Forestry Commission
Trotter, Frederick	Department of Administrative Services
Upshaw, Cran	USDA
Ussery, Charlissa	Department of Public Health
Vandewater, David	FEMA
Wheeler, Angela	ITOS
Wiles, Mark	Georgia Forestry Commission
Winn, James	Department of Revenue
Woosley, Tom	DNR
	EMAG
	Ga Dept of Audits and Accounts
	Office of State Administrative Hearings
	Department of Driver Services
	Department of Banking and Finance
	Georgia World Congress Center
	Subsequent Injury Trust Fund
	Department of Driver Services
	Georgia State Patrol
	Department of Human Services

Alan Sloan

From: Alan Sloan
Sent: Monday, February 26, 2018 2:20 PM
To: 'brian.johnson@gbi.ga.gov'
Subject: Georgia State Hazard Mitigation Strategy Vulnerability Workshop

Good afternoon, Mr. Johnston!

The Hazard Mitigation Division is in the process of holding a series of three workshops to update the Enhanced State Hazard Mitigation Strategy. The approval of this update by FEMA is essential in assuring the State's eligibility for federal disaster funding in the event of a natural disaster.

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Sincerely,



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GEMA/HS
210 South 7th Street, Room 210
Cordele, GA 31015
Office: 229-276-2773
Cell: 404-693-5507
Fax: 229-239-0861



Alan Sloan

From: Alan Sloan
Sent: Friday, March 09, 2018 3:48 PM
To: 'kbennett@gmanet.com'
Subject: Georgia State Hazard Mitigation Strategy Vulnerability Workshop Reminder
Attachments: Directions to SOC 3 15 2018.pdf; Vulnerability Workshop Agenda.pdf

Good afternoon!

This is just a brief reminder of our the Georgia State Hazard Mitigation Strategy Vulnerability Assessment Workshop, scheduled for Thursday, March 15th. I've attached the agenda and directions to the workshop. If you've already let us know whether you are coming, thank you. If you haven't, please let us know as soon as possible, so we can plan accordingly. If you have any questions, please don't hesitate to contact me at your earliest convenience.

Sincerely,

Alan

R. Alan Sloan, MPA
Hazard Mitigation Planning Supervisor
GEMA/HS
210 South 7th Street, Room 210
Cordele, GA 31015
Office: 229-276-2773
Cell: 404-693-5507
Fax: 229-239-0861



Alan Sloan

From: Alan Sloan
Sent: Monday, March 12, 2018 8:37 AM
To: 'acsumner@dbhdd.ga.gov'
Subject: RE: Georgia State Hazard Mitigation Strategy Vulnerability Workshop Reminder
Attachments: Vulnerability Workshop Agenda - Corrected.pdf; Directions to SOC 3 15 2018.pdf

Good morning!

Let me first apologize for the multiple emails. One of our invitees noticed an error in the agenda I emailed Friday. I've attached a corrected agenda. To be clear, the meeting is this Thursday, March 15 at 8:30am. If you have any questions, please don't hesitate to give me a call.

Thanks!

Alan

R. Alan Sloan, MPA
Hazard Mitigation Planning Supervisor
GEMA/HS
210 South 7th Street, Room 210
Cordele, GA 31015
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Fax: 229-239-0861



From: Alan Sloan
Sent: Friday, March 09, 2018 3:46 PM
To: 'acsumner@dbhdd.ga.gov'
Subject: Georgia State Hazard Mitigation Strategy Vulnerability Workshop Reminder

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Alan




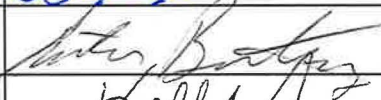
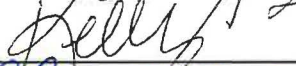


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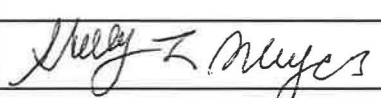


Invited Stakeholders		
Name	Title	Agency
Bannister, Mark		Georgia Department of Veterans Services
Bell, Gary	Operations Manager - Facility Operations	Georgia Department of Corrections
Bennett, Kelli		Georgia Municipal Association
Bergman, James	Field Operations Deputy Director	Department of Community Supervision
Bonilla-Chacon, Elenilson "Chacon"	Xpress Operations Specialist	Georgia Regional Transportation Authority
Boone, Garrett	Director	Georgia Museum of Agriculture and Historic Village - Agrirama
Branscome, Nathan		Georgia Criminal Justice Coordinating Council
Brownsmith, James		Georgia State Financing and Investment Commission
David, Jeannette	Disaster Mental Health Services Coordinator	Georgia Department of Behavioral Health & Development Disabilities
Flynn, Patrick	Chief of Staff - Incident Response Team	Atlanta Gas Light
Ford, Aisha	Program Director	Georgia Criminal Justice Coordinating Council
Fortner, Amy	Director of Special Operations	Georgia Department of Juvenile Justice
Garner, Debbie	Special Agent in Charge	Georgia Bureau of Investigation
Godfrey, Philip A.	Storm Center Manager	Georgia Power
Hamilton, Mac		Georgia Transmission Corporation
Henderson, Gordon	Executive Director	Georgia Firefighter Standards and Training Council
Hightower, Tony	Deputy Director	Georgia Public Safety Training Center
Hiott, Perry	Research and Information Manager	Georgia Municipal Association
Holcomb, Tom	District Emergency Coordinator	American Radio Relay League, Inc.
Johnston, Brian		Georgia Bureau of Investigation
Kirkland, Thomas	Emergency Management Coordinator	Georgia Department of Labor
Martin, Kristina	Program Director	Georgia Criminal Justice Coordinating Council
McCorry, Shawn	Senior Disaster Program Manager	American Red Cross
Mohr, Monty	Director of Criminal Investigation	Georgia Governor's Office of Consumer Affairs
Oni, Jo Anne	Assistant Director Consumer Services Division	Georgia Office of the Commissioner of Insurance and Fire Safety
Padgett, Anthony	Chief Operating Officer	Georgia Public Broadcasting
Passley, Gifton	Assistant Director of Construction Services	Georgia State Financing and Investment Commission
Pope, Diana	Director	Georgia State Financing and Investment Commission
Poznanski, Alex	Transit Program Analyst	Georgia Regional Transportation Authority
Romans, Lloyd	Disaster Recovery Director	Georgia Department of Labor
Shimp, Stephen	Public Safety Director	Georgia National Fairgrounds and Agricenter
Slappey, Elbert		Georgia National Fairgrounds and Agricenter
Sparks, Sharon		Georgia Department of Labor
Stancil, Steve	State Properties Officer	Georgia State Properties Commission
Sumner, Audrey	Disaster Mental Health Services Coordinator	Georgia Department of Behavioral Health & Development Disabilities
Vaughan, Robert	Assistant Director, Utilities Division	Georgia Public Service Commission
Williams, Brent		Association County Commissioners of Georgia

Wills, Dave	Government Relations Manager	Association County Commissioners of Georgia
Wood, Paul	CEO	Georgia Electric Membership Corporation
Yarbrough, NeeNah	Budget Administrator	Georgia Peace Officer Standards and Training Council
York, Heather		Georgia State Properties Commission
Young, Kent		Department of Community Supervision

Understanding Georgia's Vulnerability to Natural Disasters - Workshop 3/15/2018
Sign in Sheet


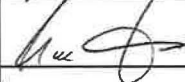



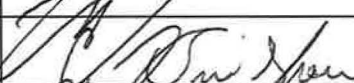
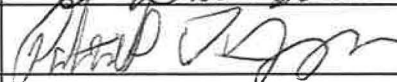
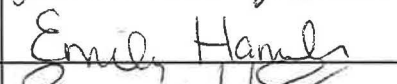
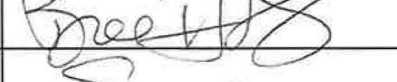



Name	Organization	Signature	email	Phone
Adams, Stephen	DNR		stephen.adams@dnr.state.ga.us	
Allen-Smith, Sonja	OPB		sonia.allen-smith@opb.georgia.gov	
Angel, Kimberly	GEMA		kimberly.angel@gema.ga.gov	
Beck, Lisa	Technical College System of Georgia		lbeck@tcsge.edu	770-617-8824
Bell, Charlisa	Department of Public Health		charlisa.bell@dph.ga.gov	
Bell, Gary	Georgia Department of Corrections		gary.bell@gdc.ga.gov	404-309-7622
Bennett, Kelli	Georgia Municipal Association		kbennett@gmanet.com	
Branscome, Nathan	Georgia Criminal Justice Coordinating Council		nathan.branscome@cjcc.ga.gov	4) 657-1997
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Brokenburr, Kelly	GEMA		kelly.brokenburr@gema.ga.gov	
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Clark, Stephen	GEMA		stephen.clark@gema.ga.gov	
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Hampton, Karen	Ga Dept of Econ Development		khampton@georgia.org	

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Name	Organization	Signature	email	Phone
Henderson, Amy	Georgia Municipal Association		ahenderson@gmanet.com	
Hodges, Jeffrey	Department of Education		jhodges@doe.k12.ga.us	404-463 7891
Jenson, Noel	Jekyll Island Authority		njensen@jekyllisland.com	
Juszczuk, Stephen	FEMA		stephen.juszczuk@fema.dhs.gov	229-221-8506
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Lowe, John	Department of Defense		john.g.lowe.mil@mail.mil	
Meyers, Shelby	GEMA		shelby.meyers@gema.ga.gov	912-478-7939
Mimbs, Jessica	Georgia Soil and Water Conservation Commission		jessica.mimbs@gaswcc.ga.gov	
Morris, Jeffrey	US Army Corps of Engineers		jeffrey.s.morris@usace.army.mil	
Passley, Gifton	Georgia State Financing and Investment Commission		gifton.passley@gsfic.ga.gov	404-463-5772
Petty, Charles	Georgia Building Auth		charles.petty@gba.ga.gov	
Rammo-Kuhs, Amy	DNR		amy.rammo_kuhs@dnr.state.ga.us	404-463-8011
Rogers, Breanna	GEMA		breanna.rogers@gema.ga.gov	404 639 7245
Sims-Green, Venessa	Department of Agriculture		venessa.sims-g@agr.georgia.gov	404-463-1088
Wheeler, Angela	ITOS		awheeler@itos.uga.edu	706-542-2076
Williams, Brent	Association County Commissioners of Georgia	Brent Williams	bwilliams@accg.org	404.522.5022

Understanding Georgia's Vulnerability to Natural Disasters - Workshop 3/15/2018

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Name	Organization	Signature	email	Phone
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MAC HAMILTON	GTE GA Transmission Corp.		mac.hamilton@gatrans.com	404-293-3719
Lloyd Romans	GDOL		Lloyd.Romans@GDOLGA-Cor.	404 232-3415
Sharon Sparks	GDOL		ssparks@gdol.ga.gov	404-232-3433
Kristofor Andersen	GEFA		Kristofor@gef.ga.gov	404-584-1071
Jimmie Musdy	GBA		jimmie.musdy@gba.ga.gov	404-708-2114
BRIAN SHOWN	GA Floodplain		brinshown@dnr.ga.gov	404-651-9504
Patrick Pridemore	GA S		ppridemore@state.ga.us	678-70-3000
Emily Hamilton	GFC		ehamilton@gfc.state.ga.us	478-986-8421
Bill Hatherley	Am Red Cross		BILL.HATHERLEY@redcross.org	770-375-6885
Tianlin Song	GA DNR		tianlin.song@dnr.ga.gov	

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Name	Organization	Signature	email	Phone
Dee Langley	GEMA Haz Mit		dee.langley@gema.ga.gov	770-581-4831
Greg Walker	GSWCC		greg.walker@gswwc.ga.gov	706-844-7704
Jessica Nimbs	ASWCC		jessica.nimbs@gswwc.ga.gov	706-286-2858
Amy Herbers	GA Municipal Assoc		aherbers@gamet.com	4387-0624

Alan Sloan

Subject: FW: Georgia State Hazard Mitigation Strategy Mitigation Goals and Actions Workshop
Location: State Operations Center, 935 East Confederate Avenue, Building 2; Atlanta, GA

Start: Thu 4/26/2018 8:30 AM
End: Thu 4/26/2018 12:00 PM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Alan Sloan

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From: Alan Sloan

Sent: Thursday, April 12, 2018 3:53 PM

To: Alan Sloan; 'Stephen Adams'; 'Debra Myers'; 'Karen Hampton'; Kelsey Goodman; 'Blewisgmag@plantationcable.net'; 'Amy Rammo-Kuhs'; 'Lisa Beck'; Stephen Clark; 'David Vandewater'; 'Cran Upshaw'; 'schwinne@audits.ga.gov'; 'mwiles@gfc.state.ga.us'; 'Kelly Towe'; 'Charles Lawrence'; 'dlangsto@osah.ga.gov'; 'Kelly Nadeau'; Deangelo Bryant; Shelby Meyers; 'James Winn'; 'Eddie Henderson'; 'mrawls@dds.ga.gov'; 'Anita Russo'; 'Angela Wheeler'; 'Sonja Allen-Smith'; tom_woosley@dnr.state.ga.us; 'webbc@dbf.state.ga.us'; 'jfootman@gwcc.com'; 'Kristofor Anderson'; 'Christopher Luncheon'; 'christopher.luncheon@gmail.com'; Kelly Brokenburr; 'Frederick Trotter'; 'Jeffrey Morris'; 'Crystal Swain-Bates'; Charliisa Ussery; 'Gary Kelley'; 'adixon@sif.ga.gov'; Terry Lunn; 'dprosser@dds.ga.gov'; 'Jennifer Kline'; 'Amy Hart'; 'Bruce Holmes'; 'JR Campbell'; Mark Millirons; Paul Melvin; Frank Billard; 'Alan Giles'; 'Greg Mercier'; Venessa Sims Green; Tomi King; Ernay Robinson; 'seminarcine@dnr.state.ga.us'; Kvonne Bryant; 'John Lowe'; 'Elizabeth Smith'; 'Garry McGibony'; Kimberly Angel; 'Jeffrey Hodges'; 'Noel Jensen'; 'Edwardine Marrone'; 'Gus Elliot'; 'Robin Berzins'; 'Charlisa Bell'; Breanna Rogers; 'Lawton Brantley'; 'Judd Smith'; 'Bob Bray'; 'Ken Parker'; 'lsmith@gsp.net'; 'mlankford@dot.ga.gov'; 'Lacey Kondracki'; 'Jessica Mimbs'; 'Haydn Blaize'; 'Brian Shoun'; 'Stephen Juszczuk'; 'Amy Henderson'; Ashley Lauria-Golden; Julia Regeski; Marlene Dawkins; Jessica Gibson; Lillian Huffman - FEMA (lillian.huffman@fema.dhs.gov); Giles, Alan; 'Stephen Adams'; 'Debra Myers'; 'Karen Hampton'; 'Blewisgmag@plantationcable.net'; 'Amy Rammo-Kuhs'; 'Lisa Beck'; 'David Vandewater'; 'Cran Upshaw'; 'schwinne@audits.ga.gov'; 'mwiles@gfc.state.ga.us'; 'Kelly Towe'; 'Charles Lawrence'; 'dlangsto@osah.ga.gov'; 'Kelly Nadeau'; 'James Winn'; 'Eddie Henderson'; 'mrawls@dds.ga.gov'; 'Anita Russo'; 'Angela Wheeler'; 'Sonja Allen-Smith'; 'webbc@dbf.state.ga.us'; 'jfootman@gwcc.com'; 'Kristofor Anderson'; 'Christopher Luncheon'; 'christopher.luncheon@gmail.com'; 'Frederick Trotter'; 'Jeffrey Morris'; 'Crystal Swain-Bates'; 'Gary Kelley'; 'adixon@sif.ga.gov'; 'dprosser@dds.ga.gov'; 'Jennifer Kline'; 'Amy Hart'; 'Bruce Holmes'; 'Alan Giles'; 'Greg Mercier'; 'seminarcine@dnr.state.ga.us'; 'John Lowe'; 'Elizabeth Smith'; 'Garry McGibony'; 'Jeffrey Hodges'; 'Noel Jensen'; 'Edwardine Marrone'; 'Gus Elliot'; 'Robin Berzins'; 'Charlisa Bell'; 'Lawton Brantley'; 'Judd Smith'; 'Bob Bray'; 'Ken Parker'; 'lsmith@gsp.net'; 'mlankford@dot.ga.gov'; 'Lacey Kondracki'; 'Jessica Mimbs'; 'Haydn Blaize'; 'Brian Shoun'; 'Stephen Juszczuk'; 'Amy Henderson'; Marlene Dawkins; Jessica Gibson; Lillian Huffman - FEMA (lillian.huffman@fema.dhs.gov); Giles, Alan; 'Griffin, David' (David.Griffin@dnr.ga.gov)
Cc: 'Kline, Jennifer'; 'Griffin, David' (David.Griffin@dnr.ga.gov); 'Kline, Jennifer'
Subject: Georgia State Hazard Mitigation Strategy Mitigation Goals and Actions Workshop
When: Thursday, April 26, 2018 8:30 AM-12:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: State Operations Center, 935 East Confederate Avenue, Building 2; Atlanta, GA

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I want to thank you in advance for your support and participation in these workshops which will help make our state more resilient to disasters, and able to protect its employees, facilities, and other assets, in times of disaster.

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Alan

R. Alan Sloan, MPA
Hazard Mitigation Planning Supervisor
GEMA/HS
210 South 7th Street, Room 210
Cordele, GA 31015
Office: 229-276-2773
Cell: 404-693-5507
Fax: 229-239-0861



Alan Sloan

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From: Alan Sloan

Sent: Thursday, April 12, 2018 3:53 PM

To: Alan Sloan; Stephen Adams; Debra Myers; Karen Hampton; Kelsey Goodman; 'Blewisgmag@plantationcable.net'; Amy Rammo-Kuhs; Lisa Beck; Stephen Clark; David Vandewater; Cran Upshaw; 'schwinne@audits.ga.gov'; 'mwiles@gfc.state.ga.us'; Kelly Towe; Charles Lawrence; 'dlangsto@osah.ga.gov'; Kelly Nadeau; Deangelo Bryant; Shelby Meyers; James Winn; Eddie Henderson; 'mrawls@dds.ga.gov'; Anita Russo; Angela Wheeler; Sonja Allen-Smith; tom_woosley@dnr.state.ga.us; 'webbc@dbf.state.ga.us'; 'jfootman@gwcc.com'; Kristofer Anderson; Christopher Luncheon; christopher.luncheon@gmail.com; Kelly Brokenburr; Frederick Trotter; Jeffrey Morris; Crystal Swain-Bates; Charliisa Ussery; Gary Kelley; 'adixon@sitf.ga.gov'; Terry Lunn; 'dprosser@dds.ga.gov'; Jennifer Kline; Amy Hart; Bruce Holmes; JR Campbell; Mark Millirons; Paul Melvin; Frank Billard; Alan Giles; Greg Mercier; Venessa Sims Green; Tomi King; Ernay Robinson; 'seminarcine@dhr.state.ga.us'; Kvonne Bryant; John Lowe; Elizabeth Smith; Garry McGibony; Kimberly Angel; Jeffrey Hodges; Noel Jensen; Edwardine Marrone; Gus Elliot; Robin Berzins; Charliisa Bell; Breanna Rogers; Lawton Brantley; Judd Smith; Bob Bray; Ken Parker; ismith@gsp.net; mlankford@dot.ga.gov; Lacey Kondracki; Jessica Mimbs; Haydn Blaize; Brian Shoun; Stephen Juszczuk; Amy Henderson; Ashley Lauria-Golden; Julia Regeski

Cc: Kline, Jennifer

Subject: Georgia State Hazard Mitigation Strategy Mitigation Goals and Actions Workshop

When: Thursday, April 26, 2018 8:30 AM-12:00 PM (UTC-05:00) Eastern Time (US & Canada).

Where: State Operations Center, 935 East Confederate Avenue, Building 2; Atlanta, GA

Good afternoon, State Hazard Mitigation Planning Team!

As you know, the Hazard Mitigation Division is in the process of holding a series of three workshops to update the Enhanced State Hazard Mitigation Strategy. The approval of this update by FEMA is essential in assuring the State's eligibility for federal disaster funding in the event of a natural disaster.

The first two workshops were held in January and March, where we discussed potential hazards that could impact the State of Georgia. Since that time, the Hazard Mitigation Division has been analyzing the findings from the workshops, combining those findings with historical data in order to rank the hazards in terms of their potential impacts on the State of Georgia. After identifying and ranking the hazards, the next step is to identify ways to reduce the potential impact of those hazards when they do occur. The third workshop will help us do just that. The workshop will be held on Thursday, April 26th, beginning at 8:30am, in the State Operations Center, located on the 2nd floor of Building 2 at GEMA Headquarters. We would like to ask that you please plan on attending this workshop as we would like to hear from you about how best to reduce the impacts of the hazards we have identified in the previous two

workshops. If you are unable to attend, we ask that you please send someone to attend in your place to represent you and your organization. The information gathered at the workshops will help in the development of mitigation actions to reduce losses, and provide effective action steps to protect your assets, most notably your organizations' employees.

I want to thank you in advance for your support and participation in these workshops which will help make our state more resilient to disasters, and able to protect its employees, facilities, and other assets, in times of disaster.

We will put together an agenda and send it, along some additional information to help you prepare for the workshop, in the next few days. However, we ask that you please mark your calendars and plan to attend. Please also let us know how many from your organization will be attending, so we can prepare accordingly. Please let me know if you have any questions or require any assistance. You can reach us at (404) 635-7522 or 1 (800) TRY-GEMA or you may contact me directly at (229) 276-2773. We look forward to hearing from you in this important process.

Alan

R. Alan Sloan, MPA
Hazard Mitigation Planning Supervisor
GEMA/HS
210 South 7th Street, Room 210
Cordele, GA 31015
Office: 229-276-2773
Cell: 404-693-5507
Fax: 229-239-0861



Alan Sloan

Subject: Georgia State Hazard Mitigation Strategy Mitigation Goals and Actions Workshop
Location: State Operations Center, 935 East Confederate Avenue, Building 2; Atlanta, GA

Start: Thu 4/26/2018 8:30 AM
End: Thu 4/26/2018 12:00 PM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Alan Sloan
Required Attendees: Stephen Adams; Debra Myers; Karen Hampton; Kelsey Goodman; 'Blewisgmag@plantationcable.net'; Amy Rammo-Kuhs; Lisa Beck; Stephen Clark; David Vandewater; Cran Upshaw; 'schwinne@audits.ga.gov'; 'mwiles@gfc.state.ga.us'; Kelly Towe; Charles Lawrence; 'dlangsto@osah.ga.gov'; Kelly Nadeau; Deangelo Bryant; Shelby Meyers; James Winn; Eddie Henderson; 'mrawls@dds.ga.gov'; Anita Russo; Angela Wheeler; Sonja Allen-Smith; tom_woosley@dnr.state.ga.us; 'webbc@dbf.state.ga.us'; 'jfootman@gwcc.com'; Kristofor Anderson; Christopher Luncheon; christopher.luncheon@gmail.com; Kelly Brokenburr; Frederick Trotter; Jeffrey Morris; Crystal Swain-Bates; Charlissa Usery; Gary Kelley; 'adixon@sitf.ga.gov'; Terry Lunn; 'dprosser@dds.ga.gov'; Jennifer Kline; Amy Hart; Bruce Holmes; JR Campbell; Mark Millirons; Paul Melvin; Frank Billard; Alan Giles; Greg Mercier; Venessa Sims Green; Tomi King; Ernay Robinson; 'seminarcine@dhr.state.ga.us'; Kvonne Bryant; John Lowe; Elizabeth Smith; Garry McGibony; Kimberly Angel; Jeffrey Hodges; Noel Jensen; Edwardine Marrone; Gus Elliot; Robin Berzins; Charlisa Bell; Breanna Rogers; Lawton Brantley; Judd Smith; Bob Bray; Ken Parker; lsmith@gsp.net; mlankford@dot.ga.gov; Lacey Kondracki; Jessica Mimbs; Haydn Blaize; Brian Shoun; Stephen Juszczuk; Amy Henderson; Ashley Lauria-Golden; Julia Regeski

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Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

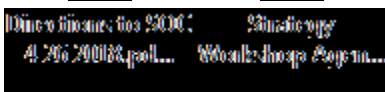
Organizer: Alan Sloan

Required Attendees: 'Stephen Adams'; 'Debra Myers'; 'Karen Hampton'; 'Kelsey Goodman'; 'Blewismag@plantationcable.net'; 'Amy Rammo-Kuhs'; 'Lisa Beck'; 'Stephen Clark'; 'David Vandewater'; 'Cran Upshaw'; 'schwinne@audits.ga.gov'; 'mwiles@gfc.state.ga.us'; 'Kelly Towe'; 'Charles Lawrence'; 'dlangsto@osah.ga.gov'; 'Kelly Nadeau'; 'Deangelo Bryant'; 'Shelby Meyers'; 'James Winn'; 'Eddie Henderson'; 'mrawls@dds.ga.gov'; 'Anita Russo'; 'Angela Wheeler'; 'Sonja Allen-Smith'; 'tom_woosley@dnr.state.ga.us'; 'webbc@dbf.state.ga.us'; 'jfootman@gwcc.com'; 'Kristofor Anderson'; 'Christopher Luncheon'; 'christopher.luncheon@gmail.com'; 'Kelly Brokenburr'; 'Frederick Trotter'; 'Jeffrey Morris'; 'Crystal Swain-Bates'; 'Charlissa Ussery'; 'Gary Kelley'; 'adixon@sitf.ga.gov'; 'Terry Lunn'; 'dprosser@dds.ga.gov'; 'Jennifer Kline'; 'Amy Hart'; 'Bruce Holmes'; 'JR Campbell'; 'Mark Millirons'; 'Paul Melvin'; 'Frank Billard'; 'Alan Giles'; 'Greg Mercier'; 'Venessa Sims Green'; 'Tomi King'; 'Ernay Robinson'; 'seminarcine@dhr.state.ga.us'; 'Kvonne Bryant'; 'John Lowe'; 'Elizabeth Smith'; 'Garry McGibony'; 'Kimberly Angel'; 'Jeffrey Hodges'; 'Noel Jensen'; 'Edwardine Marrone'; 'Gus Elliot'; 'Robin Berzins'; 'Charlisa Bell'; 'Breanna Rogers'; 'Lawton Brantley'; 'Judd Smith'; 'Bob Bray'; 'Ken Parker'; 'ismith@gsp.net'; 'mlankford@dot.ga.gov'; 'Lacey Kondracki'; 'Jessica Mimbs'; 'Haydn Blaize'; 'Brian Shoun'; 'Stephen Juszczuk'; 'Amy Henderson'; 'Ashley Lauria-Golden'; 'Julia Regeski'; 'Marlene Dawkins'; 'Jessica Gibson'; 'Lillian Huffman - FEMA (lillian.huffman@fema.dhs.gov)'; 'Giles, Alan'

Optional Attendees: 'Kline, Jennifer'; 'Griffin, David' (David.Griffin@dnr.ga.gov); 'D Langley'; 'tianlin.song@dnr.ga.gov'; 'Blaize, Haydn'; 'Rammo Kuhs, Amy'; 'Holger Loewendorf'; 'Carol Webb'; 'Walker, Greg'

Good morning, Planning Team!

I have attached the agenda for the upcoming workshop, as well as directions to the SOC. We are looking forward to another successful workshop. This will be the culmination of what has been a tremendously successful round of workshops, where we have gathered a great deal of vital information for the 2019 update of our State Hazard Mitigation Strategy. We look forward to seeing you there. If you have any questions, please don't hesitate to give us a call.



Good afternoon, State Hazard Mitigation Planning Team!

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Alan

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Cell: 404-693-5507
Fax: 229-239-0861



State Hazard Mitigation Planning Team	
Name	Agency
Adams, Stephen	DNR
Allen-Smith, Sonja	OPB
Anderson, Kristopher	Georgia Environmental Finance Authority
Angel, Kimberly	GEMA
Beck, Lisa	Technical College System of Georgia
Bell, Charlisa	Department of Public Health
Berzins, Robin	FEMA
Billard, Frank	Department of Human Services
Blaize, Haydn	DNR
Brantley, Lawton	ITOS
Bray, Bob	Georgia Courts
Brokenburr, Kelly	GEMA
Bryant, DeAngelo	GEMA
Bryant, Kvonne	GEMA
Campbell, JR	DNR
Clark, Stephen	GEMA
Damron, Wade	Department of Administrative Services
Dawkins, Marlene	FEMA
Elliot, Gus	OPB
Gibson, Jessica	FEMA
Giles, Alan	DNR
Goodman, Kelsey	GEMA
Griffin, David	EPD Safe Dams
Hampton, Karen	Ga Dept of Econ Development
Hart, Amy	Georgia Ports Authority
Henderson, Amy	Georgia Municipal Association
Henderson, Eddie	DNR
Hodges, Jeffrey	Department of Education
Holmes, Bruce	Board of Regents
Huffman, Lillian	FEMA
Jenson, Noel	Jekyll Island Authority
Juszczyk, Stephen	FEMA
Kelly, Gary	Department of Agriculture
King, Tomi	GEMA
Kline, Jennifer	DNR Coastal Resources
Kondracki, Lacey	Board of Regents
Lanier, Wes	Georgia Ports Authority
Lankford, Michael	Department of Transportation
Lauria-Golden, Ashley	GEMA
Lawrence, Charles	Department of Administrative Services
Lowe, John	Department of Defense
Luncheon, Christopher	Georgia Department of Revenue
Lunn, Terry	GEMA
Marrone, Edwardine	FEMA

McGibony, Garry	Department of Education
Melvin, Paul	Georgia Building Auth
Mercier, Greg	Georgia State Patrol
Meyers, Shelby	GEMA
Millirons, Mark	Georgia Forestry Commission
Mimbs, Jessica	Georgia Soil and Water Conservation Commission
Morris, Jeffrey	US Army Corps of Engineers
Myers, Debra	Georgia Building Auth
Nadeau, Kelly	Department of Public Health
Parker, Ken	Georgia Forestry Commission
Petty, Charles	Georgia Building Auth
Rammo-Kuhs, Amy	DNR
Regeski, Julia	GEMA
Gailey, Dennis	Jekyll Island Authority
Robinson, Ernay	Department of Transportation
Rogers, Breanna	GEMA
Russo, Anita	ITOS
Shoun, Brian	DNR
Sims-Green, Venessa	Department of Agriculture
Smith, Elizabeth	Department of Community Affairs
Smith, Judd	DNR
Song, Tianlin	DNR
Swain-Bates, Crystal	Georgia Technology Authority
Towe, Kelly	Georgia Forestry Commission
Upshaw, Cran	USDA
Ussery, Charlissa	Department of Public Health
Vandewater, David	FEMA
Wheeler, Angela	ITOS
Wiles, Mark	Georgia Forestry Commission
Winn, James	Department of Revenue
Woosley, Tom	DNR
	EMAG
	Ga Dept of Audits and Accounts
	Office of State Administrative Hearings
	Department of Driver Services
	Georgia World Congress Center
	Subsequent Injury Trust Fund
	Department of Driver Services
	Georgia State Patrol
	Department of Human Services
Additional / Alternates	
Dickens, Korey	Georgia Municipal Association
Walker, Greg	Georgia Soil and Water Conservation Commission
Pleger, Steve	Department of Banking and Finance
Clanton, Cynthia	Administrative Office of the Courts
Hines, Stephanie	Administrative Office of the Courts
Pace, Meisa	Administrative Office of the Courts

Alan Sloan

From: Alan Sloan
Sent: Thursday, April 19, 2018 11:11 AM
To: 'ahart@gaports.com'
Subject: Georgia State Hazard Mitigation Strategy update – Request for Information
Attachments: 2014 SHMP Strategies Ongoing by Agency.xlsx

Good morning, Amy!

As you are aware, we are in the process of updating the 2014 State Hazard Mitigation Strategy, due to be completed and approved by March, 2019. As part of that update process, we have been holding a series of workshops, the first two of which helped us identify and prioritize the top 13 hazards that impact the State of Georgia. This list includes the following:

- Tornado
- Inland Flooding
- Severe Weather
- Hurricane Wind
- Severe Winter Weather
- Drought
- Coastal Hazards
- Wildfire
- Wind
- Extreme Heat
- Dam Failure
- Seismic Hazards
- Geologic Hazards

The next workshop, to be held April 26 in our State Operations Center, will help us to update our strategy to reduce the impacts of future hazard events. In that light, as a State agency, even if you are unable to make the workshop, there is still a way you can help provide vital information. I've attached the list of mitigation actions from our current 2014 State Hazard Mitigation Strategy, broken down by assigned agency. This list was developed based on information we received from your agency at the time we last updated the state strategy in 2014. We ask that you please look at the attached spreadsheet, find the tab for your agency and review the list of mitigation actions for your agency. If your agency is not listed, but you have programs or projects that you feel would be relevant, there is a blank form where we ask you to please tell us about those as well. We ask that you please let us know the following:

- Is this list still current?
- Have you completed any of the actions on the list? If so, which ones?
- Are there any actions that you are no longer doing, whether you completed them or not?
- Are there any actions that have not been started, but you wish to continue to pursue them? If so, please tell us.
- Are there any similar projects or programs that your agency has going on that are not listed, whether new or otherwise?

We ask that you either email the updated spreadsheet to me, or if you are coming to the April workshop, you can bring it with you. Again, this is vital information, and whether you've been able to make the workshops or not, this is an opportunity for you to tell us what your agency is doing, or is interested in doing, to reduce the impact of future

hazard events on your agency and employees, as well as the citizens of our State. If you have any questions, please do not hesitate to contact me, either by email at alan.sloan@gema.ga.gov, or phone at (229) 276-2773.

Sincerely,

Alan

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Jenson, Noel	Jekyll Island Authority
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Millirons, Mark	Georgia Forestry Commission
Mimbs, Jessica	Georgia Soil and Water Conservation Commission
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Petty, Charles	Georgia Building Auth
Rammo-Kuhs, Amy	DNR
Regeski, Julia	GEMA
Gailey, Dennis	Jekyll Island Authority
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Sims-Green, Venessa	Department of Agriculture
Smith, Elizabeth	Department of Community Affairs
Smith, Judd	DNR
Swain-Bates, Crystal	Georgia Technology Authority

Towe, Kelly	Georgia Forestry Commission
Ussery, Charlissa	Department of Public Health
Wiles, Mark	Georgia Forestry Commission
Winn, James	Department of Revenue
Woosley, Tom	DNR
	EMAG
	Ga Dept of Audits and Accounts
	Office of State Administrative Hearings
	Department of Driver Services
	Georgia World Congress Center
	Subsequent Injury Trust Fund
	Department of Driver Services
	Georgia State Patrol
	Department of Human Services
Additional / Alternates	

Alan Sloan

From: Alan Sloan
Sent: Thursday, April 12, 2018 5:04 PM
To: 'acsumner@dbhdd.ga.gov'
Subject: Georgia State Hazard Mitigation Strategy Mitigation Goals and Actions Workshop

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Alan Sloan

From: Alan Sloan
Sent: Thursday, April 19, 2018 2:15 PM
To: 'apadgett@gpb.org'
Subject: RE: Georgia State Hazard Mitigation Strategy Mitigation Goals and Actions Workshop
Attachments: Directions to SOC 4 26 2018.pdf; Strategy Workshop Agenda 4-26-2018.pdf

Good afternoon, Anthony!

This is just a reminder of our Mitigation Goals and Actions workshop coming up next Thursday, April 26th. This workshop is very important as it is a first step in identifying ways to reduce the impact of future natural disasters in Georgia. It is also an opportunity for you to tell us what you see from your agency's perspective. I've attached the workshop agenda and directions to our State Operations Center, where the workshop will be held. We hope to see you at there. If you have any questions, please don't hesitate to contact me by email at alan.sloan@gema.ga.gov, or by phone at (229) 276-2773.

Sincerely,



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Sent: Thursday, April 12, 2018 5:04 PM
To: 'apadgett@gpb.org'
Subject: Georgia State Hazard Mitigation Strategy Mitigation Goals and Actions Workshop

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Alan Sloan

From: Alan Sloan
Sent: Thursday, April 19, 2018 2:01 PM
To: 'aisha.ford@cjcc.ga.gov'
Subject: Georgia State Hazard Mitigation Strategy Goals and Actions Workshop – Agenda and Request for Information
Attachments: 2014 SHMP Strategies Ongoing by Agency.xlsx; Directions to SOC 4 26 2018.pdf; Strategy Workshop Agenda 4-26-2018.pdf

Good afternoon, Aisha!

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- Geologic Hazards

The next workshop is scheduled for April 26 in our State Operations Center and will help us to update our strategy to reduce the impacts of future hazard events. As promised earlier, I've attached the agenda for the workshop, as well as directions to our State Operations Center.

However, as a State agency, there is also another way you can help provide vital information. I've attached the list of mitigation actions from our current 2014 State Hazard Mitigation Strategy, broken down by assigned agency. This list was developed based on information we received from your agency at the time we last updated the state strategy in 2014. We ask that you please look at the attached spreadsheet, find the tab for your agency and review the list of mitigation actions for your agency. If your agency is not listed, but you have programs or projects that you feel would be relevant, there is a blank form where we ask you to please tell us about those as well. We ask that you please let us know the following:

- Is this list still current?
- Have you completed any of the actions on the list? If so, which ones?
- Are there any actions that you are no longer doing, whether you completed them or not?
- Are there any actions that have not been started, but you wish to continue to pursue them? If so, please tell us.
- Are there any similar projects or programs that your agency has going on that are not listed, whether new or otherwise?

We ask that you either email the updated spreadsheet to me, or if you are coming to the April workshop, you can bring it with you. Again, this is vital information, and whether you've been able to make the workshops or not, this is an opportunity for you to tell us what your agency is doing, or is interested in doing, to reduce the impact of future hazard events on your agency and employees, as well as the citizens of our State. If you have any questions, please do not hesitate to contact me, either by email at alan.sloan@gema.ga.gov, or phone at (229) 276-2773.

Sincerely,

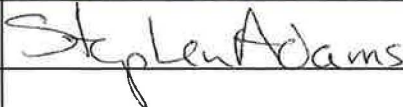





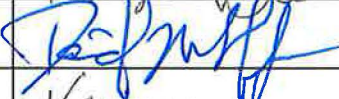
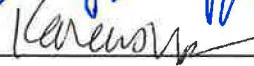


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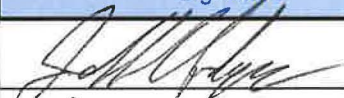
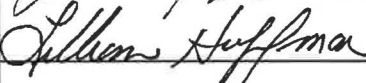
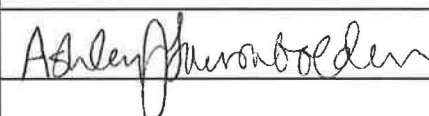
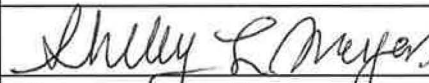

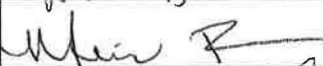
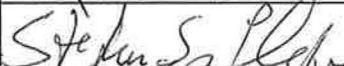
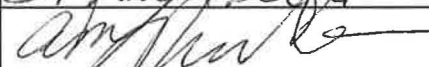


Invited Stakeholders		
Name	Title	Agency
Bannister, Mark		Georgia Department of Veterans Services
Bell, Gary	Operations Manager - Facility Operations	Georgia Department of Corrections
Bennett, Kelli		Georgia Municipal Association
Bergman, James	Field Operations Deputy Director	Department of Community Supervision
Bonilla-Chacon, Elenilson "Chacon"	Xpress Operations Specialist	Georgia Regional Transportation Authority
Boone, Garrett	Director	Georgia Museum of Agriculture and Historic Village - Agrirama
Branscome, Nathan		Georgia Criminal Justice Coordinating Council
Brownsmith, James		Georgia State Financing and Investment Commission
David, Jeannette	Disaster Mental Health Services Coordinator	Georgia Department of Behavioral Health & Development Disabilities
Flynn, Patrick	Chief of Staff - Incident Response Team	Atlanta Gas Light
Ford, Aisha	Program Director	Georgia Criminal Justice Coordinating Council
Fortner, Amy	Director of Special Operations	Georgia Department of Juvenile Justice
Garner, Debbie	Special Agent in Charge	Georgia Bureau of Investigation
Godfrey, Philip A.	Storm Center Manager	Georgia Power
Hamilton, Emily		Georgia Forestry Commission
Hamilton, Mac		Georgia Transmission Corporation
Hatherly, Bill		American Red Cross
Henderson, Gordon	Executive Director	Georgia Firefighter Standards and Training Council
Hightower, Tony	Deputy Director	Georgia Public Safety Training Center
Hiott, Perry	Research and Information Manager	Georgia Municipal Association
Holcomb, Tom	District Emergency Coordinator	American Radio Relay League, Inc.
Johnston, Brian		Georgia Bureau of Investigation
Kirkland, Thomas	Emergency Management Coordinator	Georgia Department of Labor
Martin, Kristina	Program Director	Georgia Criminal Justice Coordinating Council
McCorry, Shawn	Senior Disaster Program Manager	American Red Cross
Mohr, Monty	Director of Criminal Investigation	Georgia Governor's Office of Consumer Affairs
Musely, Jimmy		Georgia Building Authority
Oni, Jo Anne	Assistant Director Consumer Services Division	Georgia Office of the Commissioner of Insurance and Fire Safety
Padgett, Anthony	Chief Operating Officer	Georgia Public Broadcasting
Passley, Gifton	Assistant Director of Construction Services	Georgia State Financing and Investment Commission
Pope, Diana	Director	Georgia State Financing and Investment Commission
Poznanski, Alex	Transit Program Analyst	Georgia Regional Transportation Authority
Romans, Lloyd	Disaster Recovery Director	Georgia Department of Labor
Shimp, Stephen	Public Safety Director	Georgia National Fairgrounds and Agricenter
Slappey, Elbert		Georgia National Fairgrounds and Agricenter
Sparks, Sharon		Georgia Department of Labor
Stancil, Steve	State Properties Officer	Georgia State Properties Commission
Sumner, Audrey	Disaster Mental Health Services Coordinator	Georgia Department of Behavioral Health & Development Disabilities
Vaughan, Robert	Assistant Director, Utilities Division	Georgia Public Service Commission
Williams, Brent		Association County Commissioners of Georgia
Wills, Dave	Government Relations Manager	Association County Commissioners of Georgia
Wood, Paul	CEO	Georgia Electric Membership Corporation
Yarbrough, NeeNah	Budget Administrator	Georgia Peace Officer Standards and Training Council
York, Heather		Georgia State Properties Commission
Young, Kent		Department of Community Supervision
Additional / Alternates		




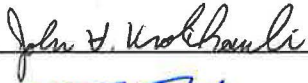

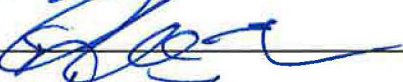

Developing Georgia's Mitigation Strategy - Workshop 4/26/2018
Sign in Sheet

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Developing Georgia's Mitigation Strategy - Workshop 4/26/2018
Sign in Sheet







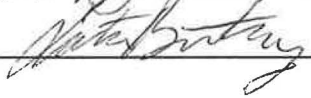
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Developing Georgia's Mitigation Strategy - Workshop 4/26/2018
Sign in Sheet

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Krotlikowski, Jack	DNR		Jack.Krotlikowski@dnr.ga.gov	
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Terry Lunn	GEMA/HS		terry.lunn@gema.ga.gov	

Developing Georgia's Mitigation Strategy - Workshop 4/26/2018

Sign in Sheet

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MAC HAMILTON	GEORGIA TRANSMISSION CORP.		mac.hamilton@gatrans.com	
Lawton Brantley	TIOS		lbrantley@ios.usg.edu	

Workshop Attendees List

Participant's Name	Title	Organization / Agency
Adams, Stephen	Conservation Major	Department of Natural Resources
Anderson, Kristopher	Business Operations	Georgia Environmental Finance Authority
Angel, Kimberly	Mitigation Planning Specialist	GEMA
Beck, Lisa	Emergency Manager	Technical College System of Georgia
Bell, Charlisa	Deputy Director of Planning and Engineering	Department of Public Health
Bell, Gary	Operations Manager	Georgia Department of Corrections
Blaize, Haydn	Floodplain Unit Manager	Department of Natural Resources
Branscomb, Nathan	Director of Administration	Georgia Criminal Justice Coordinating Council
Brantely, Lawton	GIS Production Coordinator	UGA Internet Technology Outreach Service
Brokenburr, Kelly	Risk Reduction Specialist	GEMA
Brownsmith, James	Project Executive	Georgia State Financing and Investment Commission
Bryant, DeAngelo	Risk Reduction Specialist	GEMA
Clark, Stephen	Hazard Mitigation Deputy Manager	GEMA
Dickens, Korey	Content Development Manager	Georgia Municipal Association
Flynn, Patrick	Chief of Staff, Incident Response Team	Atlanta Gas Light
Giles, Alan	Geologist	Department of Natural Resources
Goodman, Kelsey	Risk Reduction Specialist	GEMA
Griffin, David	Environmental Engineer	EPD Safe Dams
Hamilton, Emily	Business Operations Manager	Georgia Forestry Commission
Hamilton, Mac	Real Estate Specialist	Georgia Transmission Corporation
Hampton, Karen	Human Resources Director	Ga Dept of Econ Development
Hatherly, Bill	Lead Planning Volunteer	American Red Cross
Henderson, Amy	Director of Communications and Marketing	Georgia Municipal Association
Hodges, Jeffrey	Education Program Specialist	Department of Education
Holmes, Bruce	Public Safety Director	Board of Regents
Huffman, Lillian	Mitigation Planner	FEMA
Johnston, Brian	Assistant Special Agent in Charge	Georgia Bureau of Investigation
Juszczyk, Stephen	Emergency Management Specialist, Mitigation	FEMA
Kondracki, Lacey	Manager	Board of Regents
Lauria-Golden, Ashley	Risk Reduction Specialist	GEMA
Marrone, Edwardine	Region IV Lead Planner	FEMA
McCorry, Shawn	Sr. Disaster Program Manager	American Red Cross
Meyers, Shelby	Mitigation Planning Specialist	GEMA
Mimbs, Jessica	Environmental Compliance Specialist	Georgia Soil and Water Conservation Commission
Musely, Jimmy		Georgia Building Authority
Nadeau, Kelly	Business Operations Director	Department of Public Health
Pace, Meisa	Grant and Contract Coordinator	Administrative Office of the Courts
Passley, Gifton	Assistant Director of Construction Services	Georgia State Financing and Investment Commission
Pleger, Steve	Deputy Commissioner	Department of Banking and Finance
Polk, Jennifer	Purchasing and Procurement Agent	Department of Public Health
Rammo-Kuhs, Amy	Environmental Specialist	Department of Natural Resources
Regeski, Julia	Communications Strategist	GEMA
Rogers, Breanna	Mitigation Planning Specialist	GEMA
Romans, Lloyd	Project Consultant	Georgia Department of Labor
Russo, Anita	Application Analyst Principal	UGA Internet Technology Outreach Service
Shoun, Brian	Environmental Engineer	Department of Natural Resources
Sims-Green, Venessa	Director of Emergency Management	Department of Agriculture
Slappey, Elbert		Georgia National Fairgrounds and Agricenter
Song, Tianlin	Environmental Engineer	Department of Natural Resources
Sparks, Sharon		Georgia Department of Labor
Starks, Demaurio	Sr. Project Manager	Georgia State Financing and Investment Commission
Trotter, Fredrick	Sr. Manager for Insurance Investigations	Department of Administrative Services
Walker, Greg	Environmental Compliance Specialist	Georgia Soil and Water Conservation Commission
Wheeler, Angela	IT Professional	UGA Internet Technology Outreach Service
Wiles, Mark	Natural Resources Program Worker	Georgia Forestry Commission
Williams, Brent	Customer Relations Director	Association County Commissioners of Georgia

Appendix B-III
Outreach for Review and Comment

Alan Sloan

From: GEMA SOC
Sent: Tuesday, December 11, 2018 3:59 PM
To: GEMA SOC
Cc: Alan Sloan
Subject: State of Georgia Hazard Mitigation Strategy Update
Attachments: 2019 DRAFT GHMS Chapters 1-6.pdf

This message is being send to all local EMA Directors and all ESF Leads

The Georgia Emergency Management and Homeland Security Agency (GEMA/HS) has completed a draft update to Georgia's standard and enhanced Hazard Mitigation Strategy. This has been done in accordance with the Federal Emergency Management Agency's (FEMA) requirement to update the plan every five years in order to maintain eligibility for federal mitigation funds. This update has been prepared by GEMA/HS in partnership with multiple State and Federal agencies, and other emergency management partners.

Georgia's update is due to be adopted by the State and approved by FEMA no later than March 30, 2019. We would like for you to review the attached plan and provide any feedback you may have. Please send your feedback directly to Alan Sloan by January 7, 2019. He can be reached at (229) 276-2773 or via email at alan.sloan@gema.ga.gov.

Thank you,
Georgia Emergency Management and
Homeland Security Agency



Alan Sloan

From: Alan Sloan
Sent: Tuesday, December 11, 2018 11:26 AM
To: 'Stephen Adams'; 'Debra Myers'; 'Karen Hampton'; 'Kelsey Goodman'; 'Blewismag@plantationcable.net'; 'Amy Rammo-Kuhs'; 'Lisa Beck'; 'Stephen Clark'; 'David Vandewater'; 'Cran Upshaw'; 'schwinne@audits.ga.gov'; 'Mark Wiles'; 'Kelly Towe'; 'Charles Lawrence'; 'dlangsto@osah.ga.gov'; 'Kelly Nadeau'; 'Deangelo Bryant'; 'Shelby Meyers'; 'James Winn'; 'Eddie Henderson'; 'mrawls@dds.ga.gov'; 'Anita Russo'; 'Angela Wheeler'; 'Sonja Allen-Smith'; 'tom_woosley@dnr.state.ga.us'; 'jfootman@gwcc.com'; 'Kristofor Anderson'; 'Christopher Luncheon'; 'christopher.luncheon@gmail.com'; 'Wade Damron'; 'Jeffrey Morris'; 'Crystal Swain-Bates'; 'Charlissa Ussery'; 'Gary Kelley'; 'adixon@sitf.ga.gov'; 'Terry Lunn'; 'dprosser@dds.ga.gov'; 'Jennifer Kline'; 'Amy Hart'; 'Bruce Holmes'; 'JR Campbell'; 'Mark Millirons'; 'Paul Melvin'; 'Frank Billard'; 'Alan Giles'; 'Greg Mercier'; 'Venessa Sims Green'; 'Tomi King'; 'Ernay Robinson'; 'seminarcine@dhr.state.ga.us'; 'John Lowe'; 'Elizabeth Smith'; 'Garry McGibony'; 'Kimberly Angel'; 'Jeffrey Hodges'; 'Noel Jensen'; 'Gus Elliot'; 'Charlisa Bell'; 'Breanna Rogers'; 'Lawton Brantley'; 'Judd Smith'; 'Stephanie Hines'; 'Ken Parker'; 'lsmith@gsp.net'; 'Michael Lankford'; 'Jessica Mimbs'; 'Haydn Blaize'; 'Brian Shoun'; 'Stephen Juszczuk'; 'Amy Henderson'; 'Ashley Lauria-Golden'; 'Marlene Dawkins'; 'Jessica Gibson'; 'Lillian Huffman'; 'Julia Regeski'; 'Charles Petty'; 'David Griffin'; 'Dennis Gailey'; 'Cynthia Clanton'; 'Steve Pleger'; 'Stephanie Hines'; 'Valery Lancaster'; 'Ann Thompson'; 'Terrell Jacobs'; 'Barbara Stitt'; 'Veronica Crow'
Subject: RE: Georgia State Hazard Mitigation Plan Draft

Good morning, again!

I apologize for the multiple emails. I've already gotten a couple of emails returned due to the size of the attachment exceeding email limits. Therefore, I've placed the file on sharefile where you can download it at your convenience, if needed, using the link below.

<https://gema.sharefile.com/d-s2d7f060ec0e43d09>

Thanks!



R. Alan Sloan, MPA
Hazard Mitigation Planning Supervisor
GEMA/HS
210 South 7th Street, Room 210
Cordele, GA 31015
Office: 229-276-2773
Cell: 404-693-5507
Fax: 229-239-0861



From: Alan Sloan

Sent: Tuesday, December 11, 2018 11:16 AM

To: 'Stephen Adams'; 'Debra Myers'; 'Karen Hampton'; Kelsey Goodman; 'Blewisgmag@plantationcable.net'; 'Amy Rammo-Kuhs'; 'Lisa Beck'; Stephen Clark; 'David Vandewater'; 'Cran Upshaw'; 'schwinne@audits.ga.gov'; 'Mark Wiles'; 'Kelly Towe'; 'Charles Lawrence'; 'dlangsto@osah.ga.gov'; 'Kelly Nadeau'; Deangelo Bryant; Shelby Meyers; 'James Winn'; 'Eddie Henderson'; 'mrawls@dds.ga.gov'; 'Anita Russo'; 'Angela Wheeler'; 'Sonja Allen-Smith';

tom_woosley@dnr.state.ga.us; 'jfootman@gwcc.com'; 'Kristofor Anderson'; 'Christopher Luncheon';

'christopher.luncheon@gmail.com'; 'Wade Damron'; 'Jeffrey Morris'; 'Crystal Swain-Bates'; Charlissa Ussery; 'Gary Kelley'; 'adixon@sitf.ga.gov'; Terry Lunn; 'dprosser@dds.ga.gov'; 'Jennifer Kline'; 'Amy Hart'; 'Bruce Holmes'; JR Campbell; Mark Millirons; Paul Melvin; Frank Billard; 'Alan Giles'; 'Greg Mercier'; 'Venessa Sims Green'; Tomi King; Ernay Robinson;

'seminarcine@dhr.state.ga.us'; 'John Lowe'; 'Elizabeth Smith'; 'Garry McGibony'; Kimberly Angel; 'Jeffrey Hodges'; 'Noel Jensen'; 'Gus Elliot'; Charlisa Bell; Breanna Rogers; 'Lawton Brantley'; 'Judd Smith'; 'Stephanie Hines'; 'Ken Parker';

'ismith@gsp.net'; 'Michael Lankford'; 'Jessica Mimbs'; 'Haydn Blaize'; 'Brian Shoun'; 'Stephen Juszczuk'; 'Amy Henderson'; Ashley Lauria-Golden; 'Marlene Dawkins'; 'Jessica Gibson'; 'Lillian Huffman'; Julia Regeski; 'Charles Petty'; 'David Griffin';

'Dennis Gailey'; 'Cynthia Clanton'; 'Steve Pleger'; 'Stephanie Hines'; Valery Lancaster; 'Ann Thompson'; 'Terrell Jacobs'; 'Barbara Stitt'; 'Veronica Crow'

Subject: Georgia State Hazard Mitigation Plan Draft

Good morning, State Hazard Mitigation Planning Team members!

I'm still working on the agenda for next week's meeting and will have that out shortly. However, we are distributing the draft State Hazard Mitigation Plan to all of our ESF partners, local EMAs and our Silver Jackets partners for review and comment. I've attached the draft of Chapters 1-6 to this email and ask that you please take some time and look over it and let me know of any feedback you may have by January 7th. This will give us time to consider and incorporate any feedback prior to adoption. If you have any questions, please don't hesitate to give me a call or email me.

Thanks!

Alan

R. Alan Sloan, MPA
Hazard Mitigation Planning Supervisor
GEMA/HS
210 South 7th Street, Room 210
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Alan Sloan

From: Alan Sloan
Sent: Tuesday, December 11, 2018 11:39 AM
To: 'Simon-Dodd, Monica S CIV USARMY CESAS (US)'; Terry Lunn; Stephen Clark; jennifer.kline@dnr.ga.gov; brian.shoun@dnr.ga.gov; Tom.Woosley@dnr.ga.gov; joseph.martinenza@dnr.ga.gov; tianlin.song@dnr.ga.gov; jack.krolikowski@dnr.ga.gov; emily.wingo@dnr.ga.gov; Mary.Rountree@fema.dhs.gov; Susan.Wilson@dhs.gov; Kristen.Martinenza@fema.dhs.gov; Mark.Vieira@fema.dhs.gov; Janice.Mitchell@fema.dhs.gov; jwmusser@usgs.gov; bemccall@usgs.gov; agotvald@usgs.gov; ewstrom@usgs.gov; wbhughes@usgs.gov; jkjoiner@usgs.gov; smithca@usgs.gov; john.schmidt@noaa.gov; Victor.Hom@noaa.gov; Todd.Hamill@noaa.gov; Leonard.Vaughn@noaa.gov; Laura.Belanger@noaa.gov; blair.holloway@noaa.gov; Joshua.Palmer@noaa.gov; ehudson@fs.fed.us; keller.anne@epa.gov; Cynthia.nurmi@dot.gov; Jcorso@eda.doc.gov; cran.upshaw@ga.usda.gov; Cardenas, Joaquin A CIV USARMY CESAD (US); David Peterson; tturner@augustaga.gov; mblakely@chathamcounty.org; tmcdonald@savannahga.gov; jstanley@cityofgriffin.com; diane.guthrie@ga.usda.gov; Williams, Laura E (Beth) CIV USARMY CESAS (USA); Robinson, Bryan J CIV USARMY CESAS (US); Newberry, Lucia A CIV USARMY CESAS (US); Kelsey Goodman; Haydn Blaize (haydn.blaize@dnr.ga.gov); Morris, Jeffrey S CIV USARMY CESAS (US); 'Simon-Dodd, Monica S CIV USARMY CESAS (US)'
Subject: Georgia State Hazard Mitigation Strategy draft

Good morning!

As we mentioned yesterday, we are distributing a draft of the Georgia State Hazard Mitigation Strategy for review and comment to all of our ESF partners and local EMAs. Per our discussion yesterday, we also want to give each of you an opportunity to review the document and provide any feedback you may have. We ask that you please take some time and review the draft and let us know any comments you may have by January 7th so that we can incorporate your feedback as applicable prior to adoption. Please use the link below to download Chapters 1-6 from our Sharefile site. If you have any questions, please don't hesitate to give me a call.

<https://gema.sharefile.com/d-s2d7f060ec0e43d09>

Sincerely,



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Appendix C

Risk Ranking Process

Risk/Vulnerability Scores Definitions

Historical Impact

Annualized losses

The annualized losses are based on historical data. The date range of 1997-2016 was used because of the unreliability in older records. Annualized losses are determined by the total reported loss divided by the number of the years in the date range. These scores are pre-filled on the ranking table.

Rating	Adjusted Losses Per Year
1	Up to \$100k
2	100-1 million
3	1-5
4	6-15
5	16-25
6	26-35
7	36-45
8	More than 45

Injuries and Deaths per year

The injuries and deaths are based on historical data. The date range of 1997-2016 was used because of the unreliability in older records. Annualized injuries and deaths are determined by the total reported divided by the number of the years in the date range. These scores are pre-filled on the ranking table.

Rating	Average Per Year
0	None
1	Less than 10
2	10-25
3	26-50
4	More than 50

Historical Occurrence of Events

The number of recorded incidents.

Rating	Frequency Per Year
1	Less than 25 events
2	25-50
3	More than 50

Potential Hazard

Duration

Determined at 1st Workshop

Rating	Number of Days
1	Less than 1 day
2	1-3 days
3	3-7 days
4	More than 1 week

Area Impacted per Event

Determined at 1st Workshop

Rating	Number of Counties
1	1-5
2	6-10
3	11-25
4	More than 25

Potential Vulnerability

Since historical records often do not contain the most severe event that could impact Georgia, it is important to factor in estimates of what could happen based on what is currently known about the hazards.

Human Loss

Based on what is the most severe event that could impact Georgia, estimate the potential loss of life and injuries that could occur from a single event.

Rating	Description
0	No impact
1	Few injuries and no deaths
2	Multiple injuries and few deaths
3	Multiple deaths and injuries

Property Damage

Based on the most severe event that could impact Georgia, estimate the potential damages to properties and structures.

Rating	Description
0	No impact
1	Some properties with minimal, non-structural damage, no residents displaced, no need for long-term housing
2	Some properties with non-structural damage, residents only displaced short-term, temporary shelters needed, no need for long-term housing
3	Moderate amount of homes substantially damaged or destroyed, some residents displaced long-term, need for some long-term housing assistance
4	Large number of homes destroyed or substantially damaged, many residents displaced, need for comprehensive long-term housing planning and assistance

Critical Facilities Impacted

How long they will be offline; prevents government from being able to provide all essential services.

Rating	Description
0	No impact
1	Brief interruption of essential facilities/services 7 days or less
2	1-4 weeks
3	1-6 months
4	More than 6 months

Economic Disruption

How long will businesses and economic sectors be disrupted?

Rating	Description
0	No impact
1	Minimal impact, Brief interruption of some business services up to one week
2	Moderate impact: Some businesses and economic sectors interrupted up to one month, some short term outside assistance may be needed.
3	Major Impact: Multiple locals and some state economic sectors disrupted for 1 month to a year; Long term state and federal assistance required; some local economies permanently changed (people move away and businesses close or relocate)
4	Catastrophic impact to state and multiple locals; more than 1 year to recover; disruption requires substantial long-term recovery and redevelopment planning and assistance; some communities do not recover

Natural and Cultural Resources (Environment)

Rating	Potential degree of impact
0	No impact to important natural and cultural resources
1	Minimal or minor
2	Moderate
3	Substantial

Workshop 1 Hazard Ranking Tables

Table 2
Potential Hazard

Hazard	Duration	Area Impacted	Total Hazard Score (H+P)
Dam Failure	2	1	3
Drought	4	4	8
Inland Flooding	2	4	6
Seismic Hazards	1	2	3
Severe Weather	2	4	6
Severe Winter Weather	2	4	6
Geologic Hazards	1	1	2
Coastal Hazards	2	2	4
Tornadoes	2	2	4
Hurricane Wind	2	4	6
Wildfire	4	3	7
Wind	2	2	4
Extreme Heat	4	4	8

Table 3
Potential Hazard

Hazard	Duration	Area Impacted	Total Hazard Score (H+P)
Dam Failure	2	2	4
Drought	4	4	8
Inland Flooding	4	3	7
Seismic Hazards	2	3	5
Severe Weather	2	4	6
Severe Winter Weather	4	4	8
Geologic Hazards	2	1	3
Coastal Hazards	3	3	6
Tornadoes	2	4	6
Hurricane Wind	4	3	7
Wildfire	3	3	6
Wind	2	3	5
Extreme Heat	4	4	8

Table 4
Potential Hazard

Hazard	Duration	Area Impacted	Total Hazard Score (H+P)
Dam Failure	2	2	4
Drought	4	4	8
Inland Flooding	3	3	6
Seismic Hazards	1	2	3
Severe Weather	2	4	6
Severe Winter Weather	2	4	6
Geologic Hazards	2	2	4
Coastal Hazards	2	2	4
Tornadoes	1	2	3
Hurricane Wind	2	3	5
Wildfire	4	1	5
Wind	2	2	4
Extreme Heat			

Table 5
Potential Hazard

Hazard	Duration	Area Impacted	Total Hazard Score (H+P)
Dam Failure	No score	No score	2
Drought	No score	No score	8
Inland Flooding	No score	No score	4
Seismic Hazards	No score	No score	5
Severe Weather	No score	No score	6
Severe Winter Weather	No score	No score	6
Geologic Hazards	No score	No score	2
Coastal Hazards	No score	No score	4
Tornadoes	No score	No score	2
Hurricane Wind	No score	No score	6
Wildfire	No score	No score	6
Wind	No score	No score	4
Extreme Heat	No score	No score	

Workshop 1 Hazard Ranking Results

Hazard	Table 2	Table 3	Table 4	Table 5	Average Table Ranking
Dam Failure	3	4	4	2	3
Drought	8	8	8	8	8
Inland Flooding	6	7	6	4	6
Seismic Hazards	3	5	3	5	4
Severe Weather	6	6	6	6	6
Severe Winter Weather	6	8	6	6	7
Geologic Hazards	2	3	4	2	3
Coastal Hazards	4	6	4	4	5
Tornadoes	4	6	3	2	4
Hurricane Wind	6	7	5	6	6
Wildfire	7	6	5	6	6
Wind	4	5	4	4	4
Extreme Heat	8	8			8

Table 1 not used this workshop

Workshop 2 Vulnerability Tables

Table 2

Hazard	Potential Hazard					Total Hazard Score (H+P)
	Human	Property	Critical Facilities	Economy	Environment	
Dam Failure	3	4	3	3	3	16
Drought	0	1	0	3	2	6
Inland Flooding	2	4	4	3	3	16
Seismic Hazards	0	1	0	0	0	1
Severe Weather	2	2	1	2	0	7
Severe Winter Weather	2	2	1	1	0	6
Geologic Hazards	0	1	1	1	0	3
Coastal Hazards	3	4	3	4	3	17
Tornadoes	3	4	3	3	2	15
Hurricane Wind	3	4	3	4	3	17
Wildfire	1	3	1	3	3	11
Wind	2	2	1	1	0	6
Extreme Heat	2	0	0	1	0	3

Table 4

Hazard	Potential Hazard					Total Hazard Score (H+P)
	Human	Property	Critical Facilities	Economy	Environment	
Dam Failure	3	4	3	4	3	17
Drought	0	1	1	3	3	8
Inland Flooding	2	4	3	4	3	16
Seismic Hazards	1	1	0	0	0	2
Severe Weather	3	3	2	3	1	12
Severe Winter Weather	2	2	1	2	1	8
Geologic Hazards	1	1	1	1	1	5
Coastal Hazards	3	4	4	4	3	18
Tornadoes	3	4	4	4	3	18
Hurricane Wind	3	4	4	3	2	16
Wildfire	2	3	3	3	3	14
Wind	1	1	1	1	1	5
Extreme Heat	2	1	0	2	1	6

Table 3

Hazard	Potential Hazard					Total Hazard Score
	Human	Property	Critical Facilities	Economy	Environment	
Dam Failure	1	2	1	1	1	6
Drought	0	0	1	2	3	7
Inland Flooding	2	4	2	3	3	13
Seismic Hazards	1	2	1	1	1	6
Severe Weather	2	2	1	1	1	7
Severe Winter Weather	2	2	1	1	1	6
Geologic Hazards	1	1	1	0	0	4
Coastal Hazards	2	3	3	3	2	14
Tornadoes	3	3	2	3	2	12
Hurricane Wind	2	4	2	3	2	14
Wildfire	1	3	1	1	2	8
Wind	1	1	1	1	0	4
Extreme Heat	1	0	0	1	1	3

Table 5

Hazard	Potential Hazard					Total Hazard Score (H+P)
	Human	Property	Critical Facilities	Economy	Environment	
Dam Failure	3	4	3	3	3	16
Drought	0	0	2	4	2	8
Inland Flooding	2	4	3	3	2	14
Seismic Hazards	1	2	1	1	1	6
Severe Weather	2	3	1	1	2	9
Severe Winter Weather	2	2	1	2	1	8
Geologic Hazards	0	1	1	0	0	2
Coastal Hazards	2	4	3	3	3	15
Tornadoes	3	4	3	3	2	15
Hurricane Wind	3	4	4	4	3	18
Wildfire	2	3	2	2	3	12
Wind	2	3	1	1	1	8
Extreme Heat	2	0	0	3	2	7

Table 1 not used this workshop

Human

Hazard	Potential Hazard				Average Score
	Table 2	Table 3	Table 4	Table 5	
Dam Failure	3	1	3	3	3
Drought	0	0	0	0	0
Inland Flooding	2	2	2	2	2
Seismic Hazards	0	1	1	1	1
Severe Weather	2	2	3	2	2
Severe Winter Weather	2	2	2	2	2
Geologic Hazards	0	1	1	0	0
Coastal Hazards	3	2	3	2	3
Tornadoes	3	3	3	3	3
Hurricane Wind	3	2	3	3	3
Wildfire	1	1	2	2	1
Wind	2	1	1	2	1
Extreme Heat	2	1	2	2	2

Property

Hazard	Potential Hazard				Average Score
	Table 2	Table 3	Table 4	Table 5	
Dam Failure	4	2	4	4	4
Drought	1	0	1	0	1
Inland Flooding	4	4	4	4	4
Seismic Hazards	1	2	1	2	2
Severe Weather	2	2	3	3	3
Severe Winter Weather	2	2	2	2	2
Geologic Hazards	1	1	1	1	1
Coastal Hazards	4	3	4	4	4
Tornadoes	4	3	4	4	4
Hurricane Wind	4	4	4	4	4
Wildfire	3	3	3	3	3
Wind	2	1	1	3	2
Extreme Heat	0	0	1	0	0

Critical Facilities

Hazard	Potential Hazard				Average Score
	Table 2	Table 3	Table 4	Table 5	
Dam Failure	3	1	3	3	2
Drought	0	1	1	2	1
Inland Flooding	4	2	3	3	3
Seismic Hazards	0	1	0	1	1
Severe Weather	1	1	2	1	1
Severe Winter Weather	1	1	1	1	1
Geologic Hazards	1	1	1	1	1
Coastal Hazards	3	3	4	3	3
Tornadoes	3	2	4	3	3
Hurricane Wind	3	2	4	4	3
Wildfire	1	1	3	2	2
Wind	1	1	1	1	1
Extreme Heat	0	0	0	0	0

Economy

Hazard	Potential Hazard				Average Score
	Table 2	Table 3	Table 4	Table 5	
Dam Failure	3	1	4	3	3
Drought	3	2	3	4	3
Inland Flooding	3	3	4	3	3
Seismic Hazards	0	1	0	1	1
Severe Weather	2	1	3	1	2
Severe Winter Weather	1	1	2	2	2
Geologic Hazards	1	0	1	0	1
Coastal Hazards	4	3	4	3	4
Tornadoes	3	3	4	3	3
Hurricane Wind	4	3	3	4	4
Wildfire	3	1	3	2	2
Wind	1	1	1	3	1
Extreme Heat	1	1	2	3	2

Environment

Hazard	Potential Hazard				Average Score
	Table 2	Table 3	Table 4	Table 5	
Dam Failure	3	1	3	3	2
Drought	2	3	3	2	2
Inland Flooding	3	3	3	2	3
Seismic Hazards	0	1	0	1	1
Severe Weather	0	1	1	2	1
Severe Winter Weather	0	1	1	1	1
Geologic Hazards	0	0	1	0	0
Coastal Hazards	3	2	3	3	3
Tornadoes	2	2	3	2	2
Hurricane Wind	3	2	2	3	3
Wildfire	3	2	3	3	3
Wind	0	0	1	1	1
Extreme Heat	0	1	1	2	1

Workshop 2 Vulnerability Ranking Results

Hazard	Human	Property	Critical Facilities	Economy	Environment	Total Hazard Score (H+P)
Dam Failure	3	4	2	3	2	14
Drought	0	1	1	3	2	7
Inland Flooding	2	4	3	3	3	15
Seismic Hazards	1	2	1	1	1	6
Severe Weather	2	3	1	2	1	9
Severe Winter Weather	2	2	1	2	1	8
Geologic Hazards	0	1	1	1	0	3
Coastal Hazards	3	4	3	4	3	17
Tornadoes	3	4	3	3	2	15
Hurricane Wind	3	4	3	4	3	17
Wildfire	1	3	2	2	3	11
Wind	1	2	1	1	1	6
Extreme Heat	2	0	0	2	1	5

Table 1 not used this workshop

Final Ranking Results

Hazard	Historical Impact				Potential Hazard		Potential Vulnerability Impact					Total Risk Score	
	Annualized Losses	Injuries and Deaths	Historical Frequency	Historical Score	Duration and Area Impacted Table Rankings	Total Hazard Score (H+P)	Human	Property	Critical Facilities	Economy	Environment		Impact Score
Dam Failure	0	0	0	0	3	3	3	4	2	3	2	14	17
Drought	8	0	3	11	8	19	0	1	1	3	2	7	26
Inland Flooding	7	1	3	11	6	17	2	4	3	3	3	15	32
Seismic Hazards	0	0	0	0	4	4	1	2	1	1	1	6	10
Severe Weather	7	3	3	13	6	19	2	3	1	2	1	9	28
Severe Winter Weather	7	1	3	11	7	18	2	2	1	2	1	8	26
Geologic Hazards	0	0	0	0	3	3	0	1	1	1	0	3	6
Coastal Hazards	1	1	3	5	5	10	3	4	3	4	3	17	27
Tornadoes	8	4	3	15	4	19	3	4	3	3	2	15	34
Hurricane Wind	3	1	3	7	6	13	3	4	3	4	3	17	30
Wildfire	3	1	3	7	6	13	1	3	2	2	3	11	24
Wind	3	1	3	7	4	11	1	2	1	1	1	6	17
Extreme Heat	0	1	3	4	8	12	2	0	0	2	1	5	17

Ranking Score	Hazard	Priority
34	Tornado	High
32	Inland Flooding	High
30	Hurricane Wind	High
28	Severe Weather	High
27	Coastal Hazards	High
26	Drought	Medium
26	Severe Winter Weather	Medium
24	Wildfire	Medium
17	Wind	Medium
17	Extreme Heat	Medium
17	Dam Failure	Medium
10	Seismic Hazards	Low
6	Geologic Hazards	Low

High= >25
 Medium= 16-25
 Low= <16

Notes:
 Historical Impact data based on SHELUDS on 20 year period 1997-2016.
 Potential Hazard and Vulnerability are Subjective variables.

Appendix D
Other Risk Information

Appendix D-I
DNR Coastal Resources Sea Level
Rise Study

Georgia Coastal Region NOAA CZM Project of Special Merit Final Report

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Acknowledgments

This report was prepared by The Polis Center at Indiana University Purdue University Indianapolis and the under grant award #NA15NOS4190212 to the Georgia Department of Natural Resources from the Office for Coastal Management, National Oceanic and Atmospheric Administration. The statement, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of DNR, OCM or NOAA.

Acronyms

FEMA – Federal Emergency Management Agency

GBS – General Building Stock

UDF – User Defined Facilities

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Executive Summary

The potential for complacency exists among coastal Georgia residents, policy makers, business owners and other stakeholders due to the fact that the coast has not been hit by a major storm in many decades and just recently avoided a hurricane landfall once again. However, the Georgia Coastal Management Program GCMP is well aware of the importance of creating disaster resilient communities and the need to incorporate long-term planning for natural disasters into state and local management processes.

This project not only provides a regional assessment for probable storm-scenarios for coastal communities but it has also generated innovative simulations of the potential predicted effects of a warming climate, such as sea-level rise and more intense coastal storms. A warming atmosphere can produce major changes in temperatures, land cover, precipitation (drought, fire, and floods), wildlife risks, rising seas (increased erosion, salt marsh loss), stronger storms producing increased storm damage, and economic losses among other effects that occur over several decades or longer. With these changes to the atmosphere, the intensity, power, destructive energy (i.e., a combination of intensity and duration) and frequency of hurricanes is likely to increase (Emmanuel, 2005; CCSP, 2008; Karl et al 2009). Also, with a predicted sea level rise of at least one meter by 2100, the Southeast will likely see an increase in storm surge, which could easily be the most costly consequence of long-term hazards (Karl et al., 2009). Hurricane intensity is also projected to increase, which will likely increase storm surge (Knutson and Tulyea 2004).

To capture high and low frequency hurricane events in coastal Georgia, three hurricane scenarios and their associated storm surge were analyzed. The first was a high frequency event, a Category 1 hurricane. Wind risk data within Hazus-MH estimates that Category 1 hurricanes have a 5% annual chance (20 year return period) to strike coastal Georgia. The most extreme hurricanes to impact Georgia were in 1893 (strong CAT 3) and 1898 (CAT 4). To simulate an extreme, high-impact, low frequency hurricane event, a Category 4 hurricane that skirts the Georgia coastline was simulated with current sea levels. This orientation to the coastline maximizes the hurricane's wind and storm surge impacts along the coastline. A Category 5 hurricane has never made landfall in Georgia and has an annual likelihood of occurrence that is minimal (< 0.1% annual chance). However, with changes to sea surface temperatures, the potential for stronger hurricanes in the Atlantic Ocean are possible. Therefore, in the final scenario, a Category 5 hurricane with a direct landfall along the Georgia coastline was simulated to capture the potential impacts from a stronger storm under future sea surface temperatures. Each scenario was then simulated using a 1-meter rise in sea level. The scenario

outputs between baseline and future conditions were compared to demonstrate the increased risk due to increasing sea surface temperatures and rising sea levels.

The intense thunderstorms within hurricanes also produce heavy rains. To capture the impacts of rainfall from hurricanes the 1% annual chance flooding areas along the streams and rivers in coastal Georgia were computed. The scenario was completed twice, first under current sea-level conditions and second with a 1 meter increase to sea levels. These two scenarios along with the wind and storm surge simulations capture the impacts from hurricanes landfalling in Georgia under current and future climates.

Perhaps the greatest benefit of this project will be the increased awareness and understanding of coastal Georgia's vulnerability to long-term hazards by the local decision makers and coastal stakeholders. Their appreciation for the risks and vulnerabilities will be critical for the successful long-term implementation of future planning.

Finally, this project ultimately benefits the general public who live in coastal Georgia. Informed preparation for the inevitable risks and changes will lessen negative impacts to the public in terms of economics, health and culture. Given Georgia's vast expanse of coastal estuaries and rivers, preservation of healthy ecosystems through appropriate planning tremendously benefits Georgia's general public by preserving opportunities for livelihood and recreation. As a result of local leadership's education through this project, the general public too will develop increased resiliency.

Section

1

Introduction

The geography studied for this project encompasses an eleven county area covering 5,735 square miles along the Georgia coastline. It contains over 240,000 buildings with a building replacement value in excess of 48 billion dollars. Counties included in the study are Effingham, Chatham, Bryan, Liberty, Long, McIntosh, Wayne, Glynn, Brantley, Camden and Charlton. According to the U.S. Census the 2010 population of this area was 630,681.



Figure 1: Project Study Area

Section**2**

Inventory Development

2.1 Overview

While there exist a growing number of data sources that describe the built environment, most of these currently suffer from one or more characteristics that make their use for a study of this type less than ideal. These may include being out of date, incomplete, or even fee-based. Beginning in 2011, a number of entities within the State of Georgia embarked on an initiative to develop tools and data about the built environment that could support better informed modeling of the impacts of natural hazards. This effort was a collaboration between the Georgia Emergency Management Agency, the Georgia Department of Natural Resources and the Coastal Regional Commission of Georgia.

Building exposure data, hereinafter referred to in this report as ‘building inventory,’ developed as part of this initiative were derived from county parcel maps and computer-aided-mass appraisal (CAMA) files in selected Georgia counties. These included the 11 coastal counties chosen for this study. The inventory was formatted to be consistent with the requirements of Hazus-MH Release 3.2, the modeling platform selected for this project. Hazus-MH is a GIS-based tool developed by the U.S. Federal Emergency Management Agency that is an extension of Esri’s ArcGIS Desktop release 10.4. It enables the estimation of social and economic impacts from floods, earthquake and hurricanes. To estimate these impacts requires three key inputs. These include a description of what is exposed to the hazard, the building inventory; a description of the hazard itself; and a methodology for assessing losses. This part of the report focuses on the building inventory. Aspects of the Hazus-MH hazard and loss estimation methodology of relevance to the study will be discussed later in the report.

Hazus-MH comes with a building inventory for the entire United States, which means that any community can produce an assessment of risk with minimal effort. While the ‘out-of-the-box’ inventory provides a reasonable depiction of exposure for assessing regional impacts, it tends to offer limited utility for localized estimations. For this reason, it was decided for this project that the Hazus-MH provided inventory should be updated with the refined inventory produced for Georgia. Building inventory in Hazus-MH can be represented in two different ways, points for individual buildings – referred to in Hazus-MH as User Defined Facilities– and in an aggregated format referred to in Hazus-MH as the General Building Stock. Both representations were used for this project due to the type of outputs available from each.

User Defined Facilities were located at the centroids of parcels. This decision was based on the availability of data to support the inventory development. Figure 2 shows an example of User Defined Facility inventory in Glynn County.



Figure 2: Example of User Defined Facility Inventory

The General Building Stock Inventory was aggregated to geographic boundaries supported by Hazus-MH for modeling losses from hurricanes and floods. For hurricane loss estimations, aggregation occurs at the level of 2010 census tracts. For flood loss estimations, aggregation occurs at the level of 2010 census blocks. It is assumed in Hazus-MH that building stock is evenly distributed across census boundaries. This assumption can lead to over or underestimations of hazard impact in some cases. For this reason, in Hazus-MH 3.2, census blocks are clipped to remove areas without population such as vacant land, forested areas and water bodies. Figure 3 shows an example of the General Building Stock inventory for the flood model in Glynn County. Labels represent building counts in each census block.



Figure 3: Example of General Building Stock Inventory.

Both the User Defined Facility inventory and the General Building Stock inventory were attributed with information gathered from the CAMA data necessary to support the calculation of losses. For the User Defined Facility Inventory examples of these attributes include a description of how each structure is used (e.g. residential, commercial, industrial, etc.); the material from which each structure is built (e.g. wood, concrete, steel, etc.) the size of the

structure; costs of replacement for the structure, its contents and any inventory; the foundation type and first floor elevation; and so forth.

In addition to the General Building Stock inventory and the User Defined Inventory described above, Hazus-MH also includes a type of inventory referred to as Essential Facilities. These types of structures include police stations; fire stations; care facilities such as hospitals and clinics; and emergency operation centers. Given the not-for-profit purpose of these facilities, they are usually not accounted for in CAMA data which is collected for tax assessment purposes. For this reason we also integrated updates of the Hazus-MH Essential Facility data completed by the Coastal Regional Commission of Georgia as part of this project.

2.2 General Building Stock and User Defined Facility Updates

CAMA data is information about properties typically used for taxation purposes. It includes content about the ownership of each property, structural characteristics of any buildings on the property, their use and a variety of other information.

In the past, property assessment information was stored in paper form. However, most county assessors have now transitioned to digital representations of the type of information stored and managed by CAMA software. There are a multitude of different CAMA software options available – in the State of Georgia there were 10 different CAMA software applications in use. While there are some commonalities across CAMA software, such as the fact that they all store information about properties, the data structure and options vary widely between software. In addition, even in cases where two counties may use the same CAMA software they often elect to populate fields with different codes or other values customized to their needs. While this offers a great deal of flexibility for taxation purposes, it can make use of this type of data for hazard modeling and other purposes somewhat challenging.

In order to address this challenge, the development of inventory for this project required the creation of tools that could convert the CAMA data from its native format to a Hazus-MH compliant format that is consistent across all counties. These tools were developed with Esri's Data Interoperability extension by The Polis Center at Indiana University Purdue University Indianapolis. The tools, along with detailed workflows, were delivered to the state so that they can maintain consistently updated versions of their building data into the future. Where information was not available from the CAMA data, assumptions were put in place based on other sources of information or expert opinion. These were incorporated within the tool and the associated workflow documentation. For example, content cost, a representation of the cost to replace furnishings and other non-structural components of a building, are not reported in CAMA files. For content replacement cost, values were estimated as a percentage of the replacement cost of the structure. For example, for a RES1 (single family residential) building,

the content values was assumed to be 50% of the building replacement cost. The complete list of occupancy type to content replacement value conversions can be found in Table 14.6 of the Hazus-MH Flood Technical Manual.¹

Figure 4 offers an example of one of the tools in which occupancy codes used in a CAMA system are translated to Hazus-MH compliant values. For instance, a value of '0004' is translated to 'RES1' which, in Hazus-MH, refers to a single family dwelling.

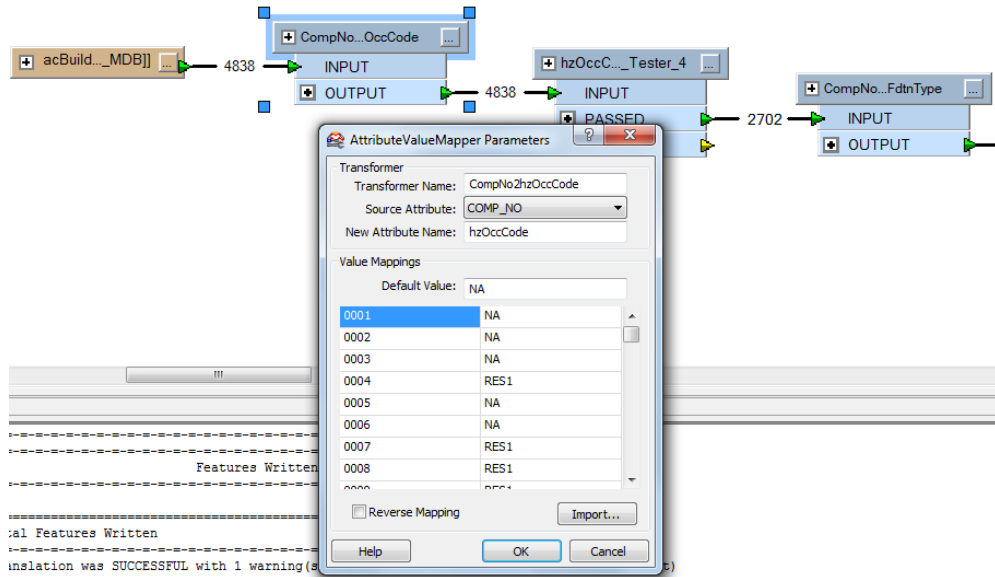


Figure 4: Example of Data Conversion Tool Interface

The following tables provide match rates between parcel data and CAMA data for each of the counties in the study. They also provide default as well as updated Hazus-MH building counts and building replacement costs. With the exception of Glynn County, the match rate was exceptional. For Glynn County it was determined that the mismatch between the parcel records and assessor records could be due to several condominiums belonging to one parcel, but each having a unique PIN which was not used in the join between the parcel and CAMA records and therefore was deemed acceptable.

It should be noted that, while the data collected from the counties for this project yielded what is believe to be useful information about the built environment against which to model potential impacts of flooding, these data were not intended to be perfect in nature. There were, for example, a number of assumptions made about building characteristics that would impact the specifics of the model output. For example, given the lack of information in the CAMA data about first floor elevations, the default first floor elevation values applied in Hazus for riverine pre-FIRM structures were universally applied to all buildings in the dataset. This

¹ Hazus-MH 2.1 Flood Technical Manual page 453, Table 14.6.

would have the result in some cases of overestimating impacts of flooding where first floor elevations were actually higher than modeled. However, given the predicted depth of water along the coastline in the modeled scenarios we believe this impact would be limited in nature. Future analysis could seek to refine the estimates by refining this and other assumptions should funding and time be available to support such an effort.

After update, there are a total of 241,987 buildings in the 11-county region with a combined building replacement cost value of slightly over \$48 billion. Replacement costs values are calculated using Hazus-MH provided 2014 RS Means costs for materials and labor per square foot by occupancy and then regionally adjusted.

Brantley County

Percentage Match Rate: 98.6%

Occupancy	Building Count – Default Hazus 3.1	Building Count Updated Hazus 3.1	Replacement Cost Default Hazus 3.1 (X \$1,000)	Replacement Cost Updated Hazus 3.1 (X \$1,000)
Commercial	134	224	\$58,275	\$90,652
Industrial	43	98	\$14,043	\$37,864
Residential	7,950	8,401	\$929,136	\$690,100
Agricultural	9	0	\$4,008	0
Religious	18	40	\$14,767	\$25,558
Government	11	3	\$5,107	\$744
Educational	8	4	\$10,850	\$2,163

Table 1: Brantley County General Building Stock Inventory Update Statistics

Bryan County

Percentage Match Rate: 97.1%

Occupancy	Building Count – Default Hazus 3.1	Building Count Updated Hazus 3.1	Replacement Cost Default Hazus 3.1 (X \$1,000)	Replacement Cost Updated Hazus 3.1 (X \$1,000)
Commercial	491	401	\$254,144	\$120,049
Industrial	125	156	\$55,089	\$84,783
Residential	11,027	13,426	\$2,882,790	\$2,090,537
Agricultural	28	0	\$7,957	0
Religious	57	106	\$32,639	\$26,461
Government	17	44	\$13,657	\$18,981
Educational	22	28	\$32,041	\$34,908

Table 2: Bryan County General Building Stock Inventory Update Statistics

Camden County

Percentage Match Rate: 99.7%

Occupancy	Building Count – Default Hazus 3.1	Building Count Updated Hazus 3.1	Replacement Cost Default Hazus 3.1 (X \$1,000)	Replacement Cost Updated Hazus 3.1 (X \$1,000)
Commercial	817	1,069	\$463,170	\$833,846
Industrial	168	19	\$58,586	\$53,514
Residential	18,670	18,966	\$4,263,335	\$3,016,919
Agricultural	20	7	\$4,764	\$10,674
Religious	117	154	\$77,177	\$134,505
Government	69	50	\$61,940	\$60,080
Educational	36	27	\$28,480	\$359,306

Table 3: Camden County General Building Stock Inventory Update Statistics

Charlton County

Percentage Match Rate: 97%

Occupancy	Building Count – Default Hazus 3.1	Building Count Updated Hazus 3.1	Replacement Cost Default Hazus 3.1 (X \$1,000)	Replacement Cost Updated Hazus 3.1 (X \$1,000)
Commercial	151	192	\$87,395	\$84,279
Industrial	43	87	\$22,600	\$76,695
Residential	4,336	4,145	\$591,524	\$394,789
Agricultural	9	0	\$2,279	0
Religious	25	9	\$15,063	\$4,986
Government	5	12	\$2,627	\$60,097
Educational	6	2	\$9,223	\$2,109

Table 4: Charlton County General Building Stock Inventory Update Statistics

Chatham County

Percentage Match Rate: 98.83

Occupancy	Building Count – Default Hazus 3.1	Building Count Updated Hazus 3.1	Replacement Cost Default Hazus 3.1 (X \$1,000)	Replacement Cost Updated Hazus 3.1 (X \$1,000)
Commercial	5,914	5,259	\$4,670,204	\$5,139,157
Industrial	1,362	455	\$907,791	\$1,392,019
Residential	93,115	89,804	\$23,911,712	\$16,340,181
Agricultural	180	14	\$44,461	\$2,412
Religious	802	260	\$684,358	\$254,669
Government	164	35	\$137,772	\$143,296
Educational	197	52	\$390,447	\$159,859

Table 5: Chatham County General Building Stock Inventory Update Statistics

Effingham County

Percentage Match Rate: 99.8%

Occupancy	Building Count – Default Hazus 3.1	Building Count Updated Hazus 3.1	Replacement Cost Default Hazus 3.1 (X \$1,000)	Replacement Cost Updated Hazus 3.1 (X \$1,000)
Commercial	654	486	\$310,281	\$282,922
Industrial	249	137	\$104,906	\$226,312
Residential	18,867	22,679	\$3,861,472	\$3,215,340
Agricultural	50	7	\$10,380	\$16,064
Religious	120	25	\$73,165	\$60,675
Government	19	14	\$16,283	\$7,837
Educational	19	6	\$31,270	\$20,807

Table 6: Effingham County General Building Stock Inventory Update Statistics

Glynn County

Percentage Match Rate: 80.4%

Occupancy	Building Count – Default Hazus 3.1	Building Count Updated Hazus 3.1	Replacement Cost Default Hazus 3.1 (X \$1,000)	Replacement Cost Updated Hazus 3.1 (X \$1,000)
Commercial	2,057	972	\$1,357,850	\$293,458
Industrial	510	110	\$252,333	\$61,629
Residential	34,208	28,024	\$8,405,595	\$5,002,803
Agricultural	83	129	\$15,944	\$3,629
Religious	266	182	\$205,834	\$72,433
Government	74	8	\$63,421	\$3,434
Educational	71	25	\$111,854	\$86,558

Table 7: Glynn County General Building Stock Inventory Update Statistics

Liberty County

Percentage Match Rate: 96.9%

Occupancy	Building Count – Default Hazus 3.1	Building Count Updated Hazus 3.1	Replacement Cost Default Hazus 3.1 (X \$1,000)	Replacement Cost Updated Hazus 3.1 (X \$1,000)
Commercial	786	1,022	\$442,597	\$999,579
Industrial	157	49	\$105,243	\$131,054
Residential	22,303	21,286	\$4,502,396	\$2,795,998
Agricultural	28	6	\$6,197	\$2,060
Religious	101	154	\$61,452	\$116,353
Government	62	32	\$36,887	\$38,628
Educational	51	30	\$41,587	\$242,513

Table 8: Liberty County General Building Stock Inventory Update Statistics

Long County

Percentage Match Rate: 88.5%

Occupancy	Building Count – Default Hazus 3.1	Building Count Updated Hazus 3.1	Replacement Cost Default Hazus 3.1 (X \$1,000)	Replacement Cost Updated Hazus 3.1 (X \$1,000)
Commercial	43	118	\$22,496	\$41,343
Industrial	23	19	\$5,729	\$8,115
Residential	5,942	4,376	\$633,397	\$501,604
Agricultural	3	0	\$867	0
Religious	9	11	\$8,090	\$14,592
Government	4	2	\$1,982	\$709
Educational	2	0	\$1,312	0

Table 9: Long County General Building Stock Inventory Update Statistics

McIntosh County

Percentage Match Rate: 98.3%

Occupancy	Building Count – Default Hazus 3.1	Building Count Updated Hazus 3.1	Replacement Cost Default Hazus 3.1 (X \$1,000)	Replacement Cost Updated Hazus 3.1 (X \$1,000)
Commercial	143	226	\$104,671	\$146,066
Industrial	32	115	\$10,653	\$71,647
Residential	8,989	7,005	\$1,239,599	\$875,943
Agricultural	8	0	\$1,423	0
Religious	22	35	\$16,356	\$27,926
Government	18	8	\$14,322	\$2,454
Educational	7	6	\$7,247	\$42,223

Table 10: McIntosh County General Building Stock Inventory Update Statistics

Wayne County

Percentage Match Rate: 91.2%

Occupancy	Building Count – Default Hazus 3.1	Building Count Updated Hazus 3.1	Replacement Cost Default Hazus 3.1 (X \$1,000)	Replacement Cost Updated Hazus 3.1 (X \$1,000)
Commercial	646	604	\$311,464	\$330,092
Industrial	190	23	\$109,172	\$65,428
Residential	11,603	10,367	\$1,770,746	\$1,285,206
Agricultural	51	3	\$10,335	\$1,391
Religious	108	0	\$68,566	0
Government	27	1	\$22,491	\$196
Educational	20	136	\$20,823	\$97,929

Table 11: Wayne County General Building Stock Inventory Update Statistics

2.3 Essential Facility Updates

Updates of the Hazus-MH Essential Facilities were completed by the Coastal Regional Commission of Georgia. The update process included verification of the existence and location of each facility. Aerial imagery was used to verify the location. County websites, along with local knowledge, were used to verify the name, address, replacement cost and other information about each facility where possible.

The following table provides information about the default and updated county for each facility type by county.

Facility Type	Default Hazus-MH Building Count	Updated Building Count
Brantley County		
Fire Stations	1	34
Police Stations	2	6
Emergency Operation Centers	1	1
Medical Care Facilities	0	4
Schools	6	20
Bryan County		
Fire Stations	5	9
Police Stations	2	2
Emergency Operation Centers	0	1
Medical Care Facilities	0	2
Schools	14	8
Camden County		
Fire Stations	4	18
Police Stations	5	5
Emergency Operation Centers	1	1
Medical Care Facilities	1	1
Schools	15	15
Charlton County		
Fire Stations	1	10
Police Stations	2	9
Emergency Operation Centers	0	1
Medical Care Facilities	1	7
Schools	6	9
Chatham County		
Fire Stations	20	40
Police Stations	15	20
Emergency Operation Centers	0	1
Medical Care Facilities	5	4
Schools	87	159
Effingham County		
Fire Stations	4	18
Police Stations	3	5
Emergency Operation Centers	0	1
Medical Care Facilities	1	3
Schools	14	16
Glynn County		
Fire Stations	3	14

Facility Type	Default Hazus-MH Building Count	Updated Building Count
Police Stations	8	11
Emergency Operation Centers	0	1
Medical Care Facilities	2	12
Schools	30	32
Liberty County		
Fire Stations	8	14
Police Stations	6	6
Emergency Operation Centers	0	1
Medical Care Facilities	2	1
Schools	22	21
Long County		
Fire Stations	0	6
Police Stations	2	3
Emergency Operation Centers	0	1
Medical Care Facilities	0	5
Schools	4	6
McIntosh County		
Fire Stations	1	11
Police Stations	2	6
Emergency Operation Centers	0	1
Medical Care Facilities	0	2
Schools	6	7
Wayne County		
Fire Stations	6	11
Police Stations	1	2
Emergency Operation Centers	0	1
Medical Care Facilities	1	4
Schools	10	9

Table 12: Essential Facility Inventory Update Statistics

Section**3**

Hazard Development and Analysis

Methodology

3.1 Hazard Development Methodology

Hazus-MH provides a wide range of options for defining a hazard. Some of these options rely on Hazus-MH to generate the hazard while others allow for expert input. For this study we applied a combination of these. A total of eight hazard scenarios were developed. The purpose of each scenario, the methodology used to develop it, and any limitations that should be considered when assessing the estimated loss impacts are described in the following pages.

3.1.1 High Frequency – Category 1 Hurricane Scenario

The team developed three scenarios related to a Category 1 (5% annual chance / 20-year return period) hurricane as described by its maximum sustained wind speeds. The modeled hurricane was assumed to have similar characteristics to the 1898 storm that impacted the Georgia coastline. In all three scenarios, the modeled hurricane has a forward speed of 10 mph with hurricane force winds extending outward at a distance of 20 miles from the center of the storm (Figure 5). The hurricane winds and storm surge were calculated using Hazus-MH's wind and surge models.

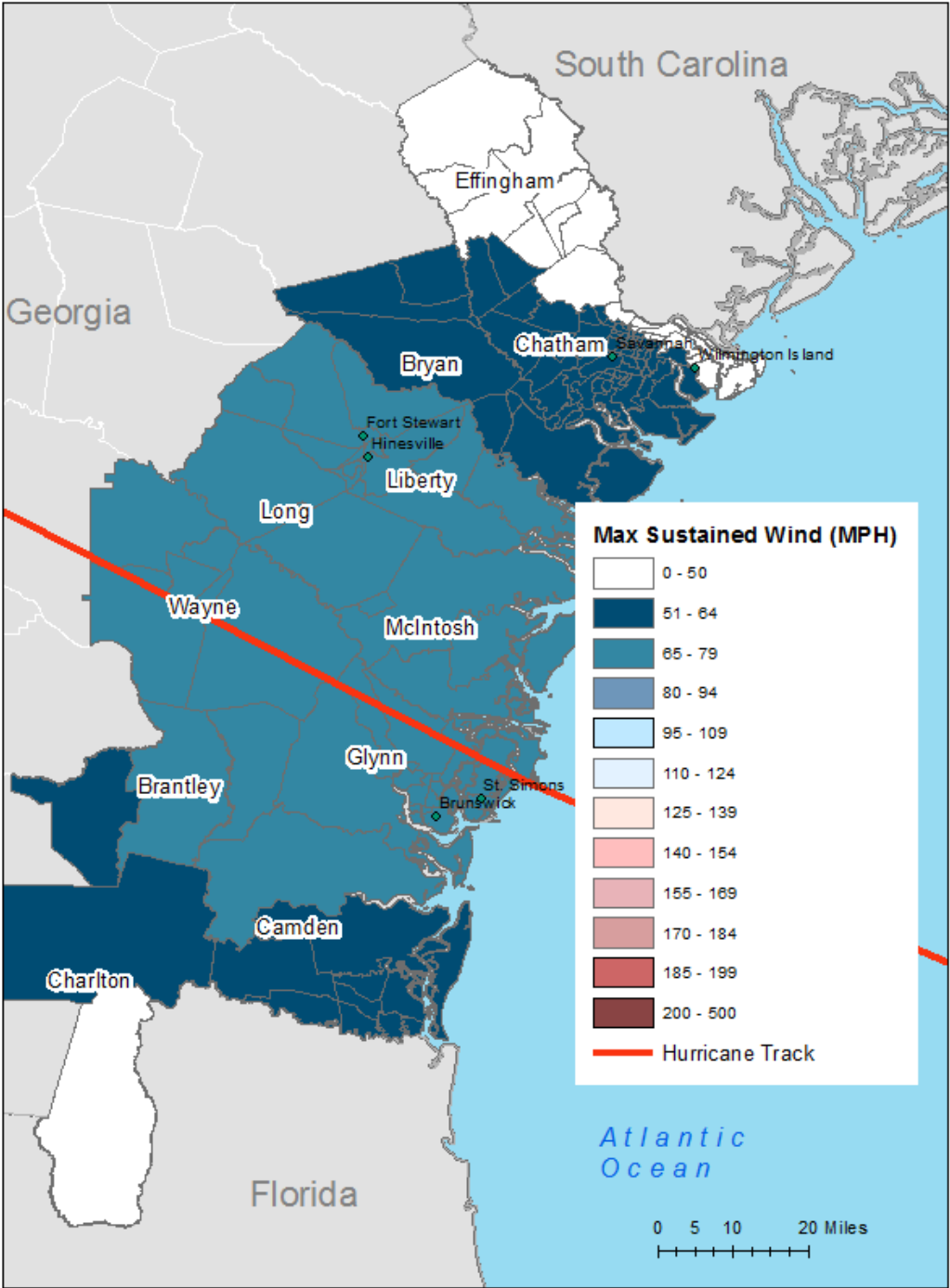


Figure 5: Maximum Sustained Winds for a Category 1 Hurricane

The three scenarios have varying changes to the storm surge. The first modeled scenario represents storm surge conditions that should be expected from a Category 1 hurricane without the consideration of future sea level rise. In this scenario, a Lidar derived DEM from Georgia Southern University was used to estimate storm surge with current sea levels. The second scenario represents the potential future conditions that could be expected from flooding with sea level rise during a Category 1 hurricane. In this simulation the storm surge reflects the 'typical' rise expected based upon the Category 1 windspeeds that were modeled. The relationship between hurricane windspeeds and storm surge can vary based-upon the wind history of an approaching hurricane. The third scenario simulates the impacts of sea-level rise from a Category 1 hurricane, but assumes a worst case storm surge event. Both sea level rise scenarios are based-upon a 1 meter sea level rise DEM calculated using the Sea Level Affecting Marshes Model (SLAMM) by Georgia Southern University. A comparison of the extent of flooding from a Category 1 hurricane with and without potential sea level rise (typical surge conditions) is represented in Figure 6. Figure 7 includes the same Category 1 hurricane without sea level rise as in Figure 6, but is compared against a worst case storm surge under future sea level rise conditions.



Figure 6: Category 1 hurricane with present ocean conditions compared with a 'typical' storm surge under potential future sea level rise conditions.

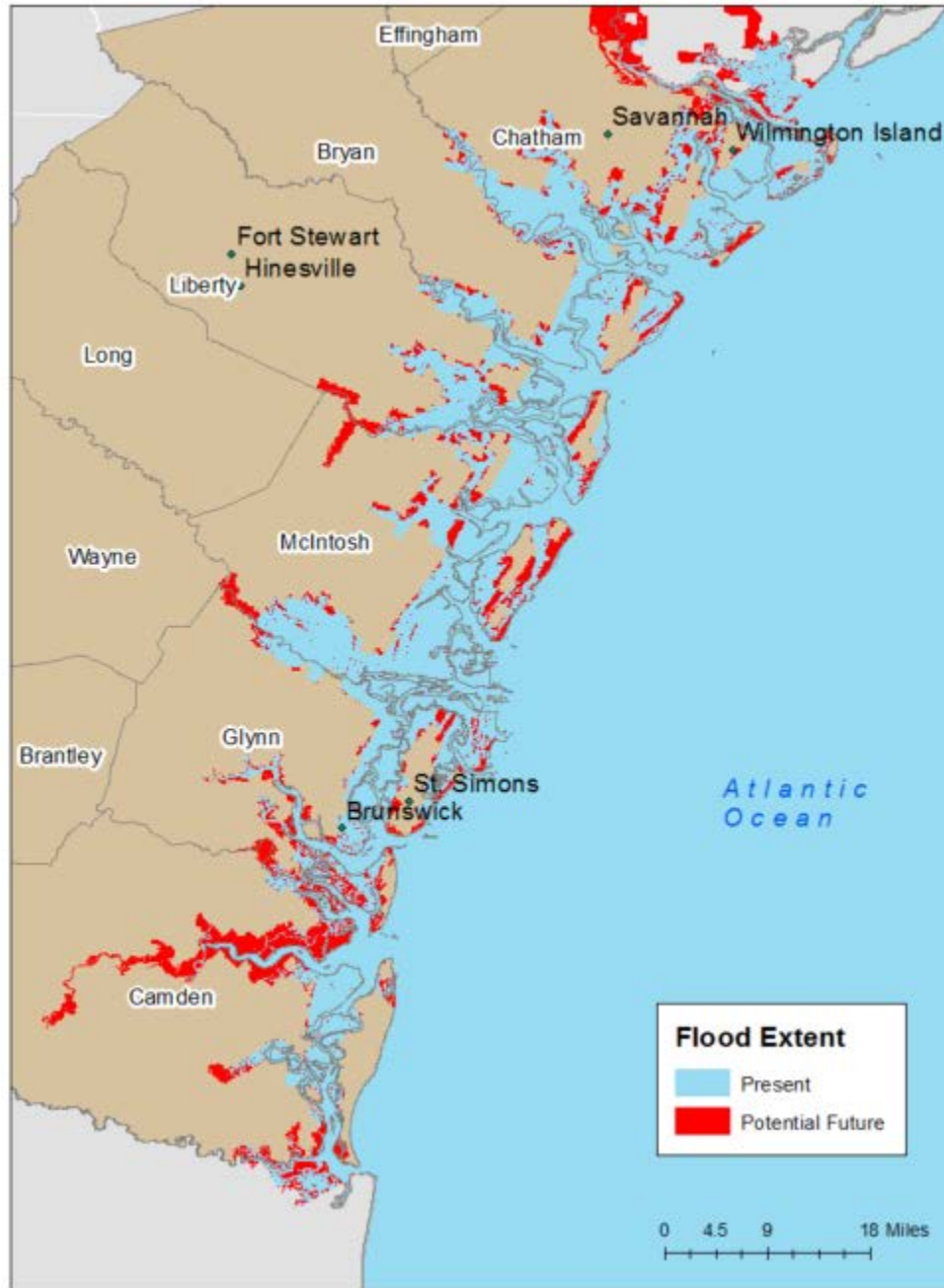


Figure 7: Category 1 hurricane with present ocean conditions compared with a worst case storm surge under potential future sea level rise conditions.

3.1.2 Worst Case Wind and Storm Surge Scenarios

Two scenarios were developed to represent a worst case wind damage and storm surge scenario with a category 4 hurricane glancing the coastline of Georgia and impacting all coastal communities that falls in line with the dominant path that is supported by hurricane climatology from this region.

This scenario reflects the physical characteristics of Hurricane Floyd (1999) and the 1893 Sea Island hurricanes. The modeled storm moves at 6 mph and has hurricane force winds extending out 40 miles from the center. This storm tracks parallel to the Georgia coastline as it makes a turn to the north (Figure 8). The hurricane winds and storm surge are calculated using Hazus-MH's wind and surge models.

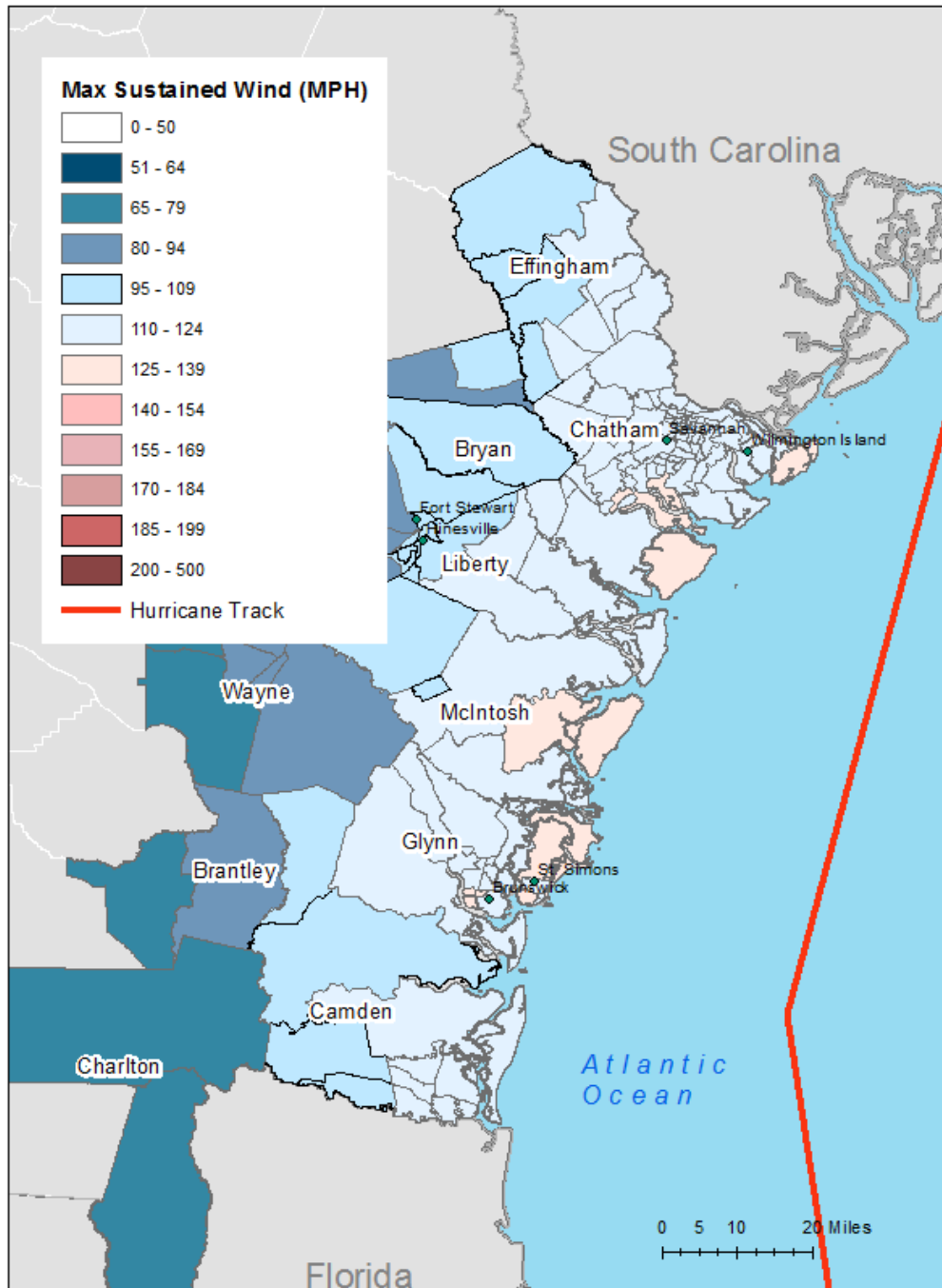


Figure 7: Maximum Sustained Winds for the Modeled Category 4 Storm

Two surge scenarios were performed. For the first scenario, a Lidar derived DEM from Georgia Southern University was used to estimate storm surge with current sea levels. In the second scenario, a DEM was used that represents a 1 meter potential future sea level rise calculated using the Sea Level Affecting Marshes Model (SLAMM) by Georgia Southern University was used. Figure 9 shows the comparison between these events.

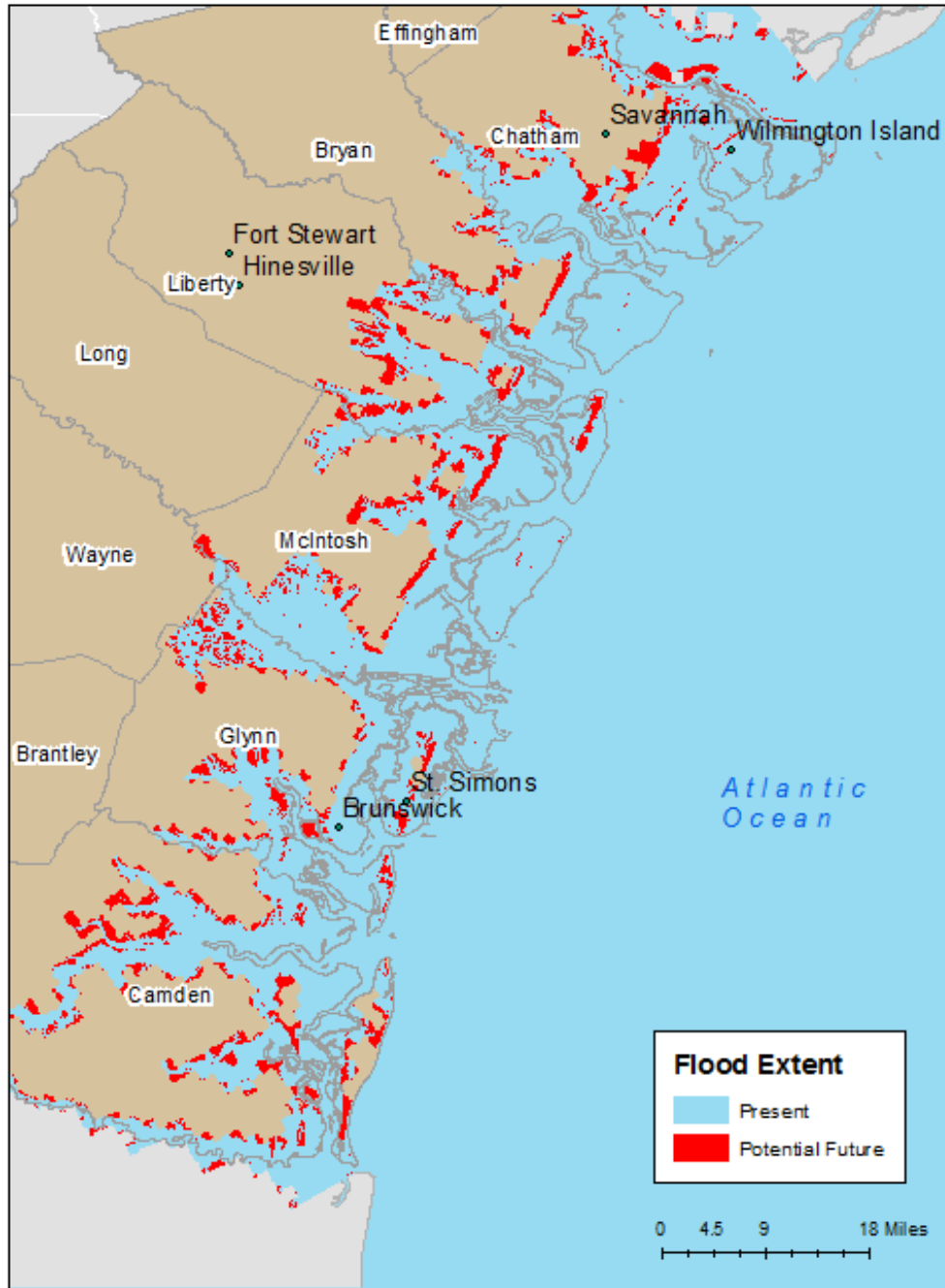


Figure 8: Present and Potential Future Worst Case Category 4 Storm Surge

3.1.3 Worst Case Maximum Impacts Wind and Storm Surge Scenarios

Two scenarios were developed that represented worst case maximum impacts of wind and storm surge with a Category 5 directly impacting the coastline.

For this scenario the simulated hurricane winds and trajectory reflects the characteristics of Hurricane Andrew (1992) that impacted south Florida in 1992. The storm has a forward motion of 18 mph with hurricane force winds extending 30 miles from the center. The fast motion of the hurricane produces lower than usual amounts of rainfall for a category 5 hurricane. The modeled hurricane makes landfall south of Savannah near Sapelo Island (Figure 10). The hurricane winds and storm surge are calculated using Hazus-MH's wind and surge models.

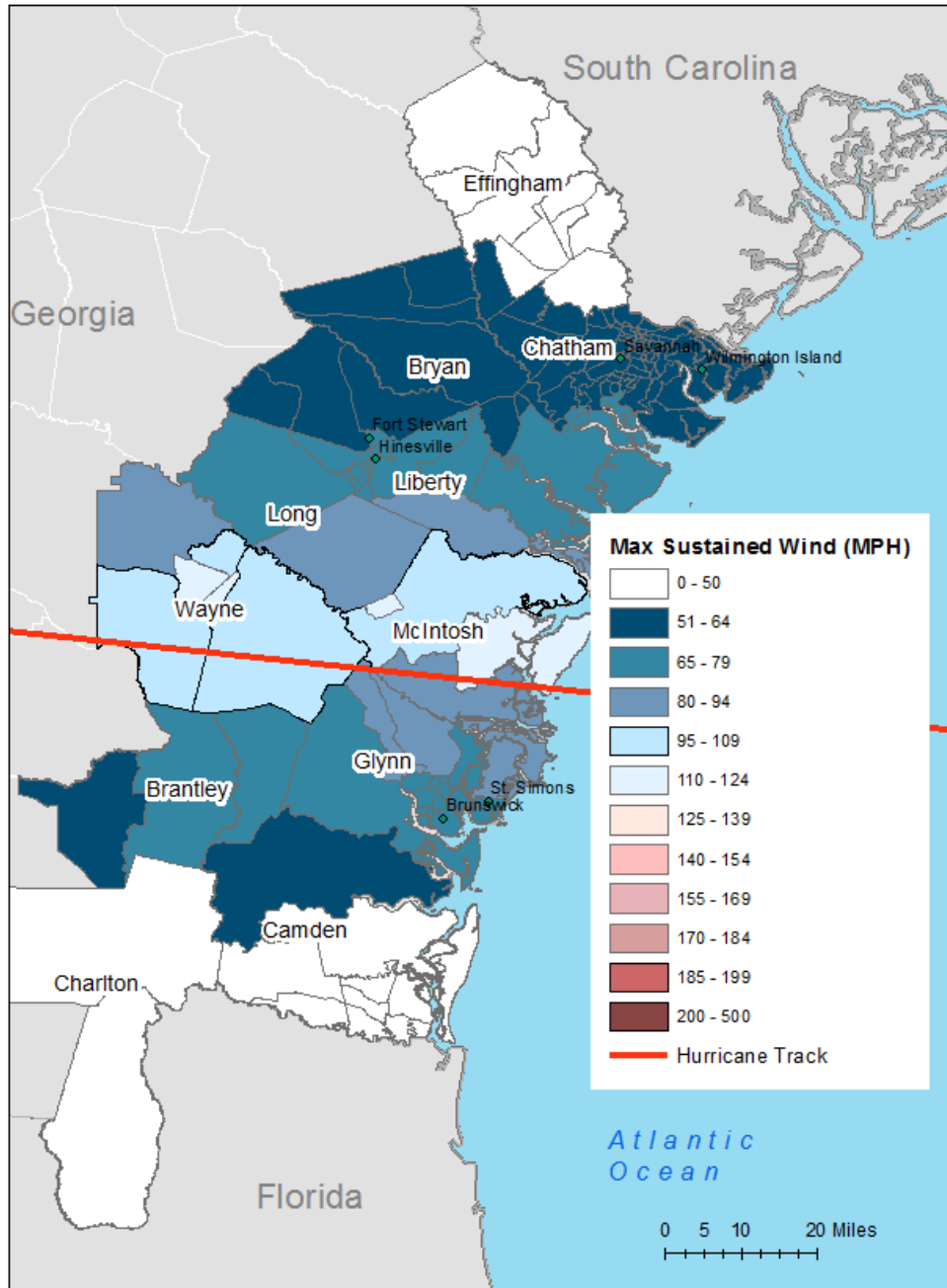


Figure 9: Maximum Sustained Winds for the Modeled Category 5 Hurricane.

Two storm surge scenarios were generated. For the first scenario a Lidar derived DEM from Georgia Southern University was used to estimate storm surge with current sea levels. In the second scenario a DEM representing predictions of future potential sea level rise are included by using a 1 meter sea level rise simulation created using the Sea Level Affecting Marshes Model (SLAMM) by Georgia Southern University. A comparison of the extent of each flood event is offered in Figure 11.

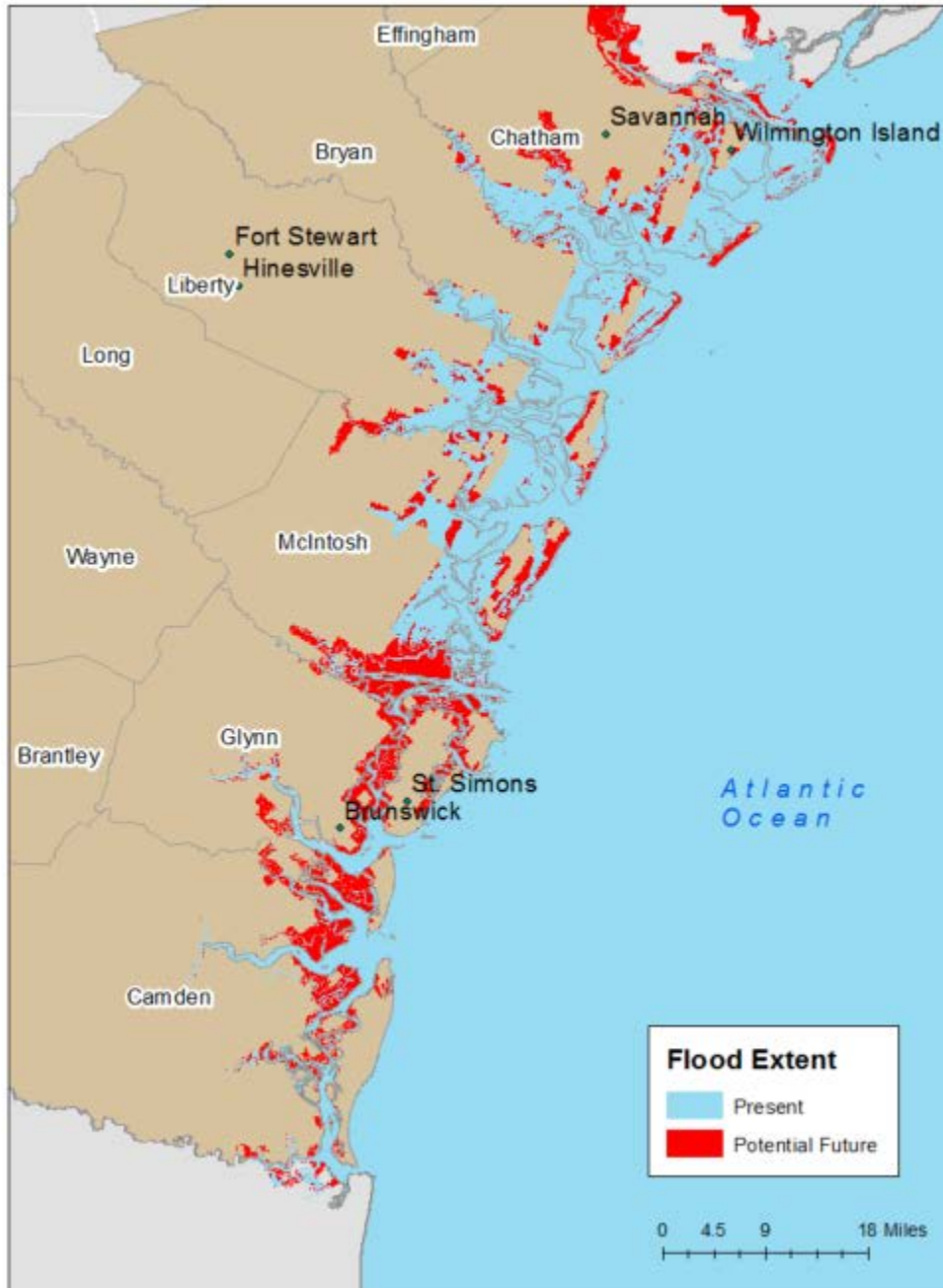


Figure 10: Present and Potential Future Category 5 Storm Surge

3.1.4 Riverine Flood Scenarios

Two scenarios were developed simulating the impacts for current and future impacts of riverine flooding. The 1% annual chance flood for all streams and rivers with a drainage area of 10 square miles or greater were modeled in all 11 coastal Georgia counties using Hazus-MH. In the first scenario a Lidar derived DEM from Georgia Southern University was used to estimate riverine flooding with current sea levels. To simulate the impacts of sea-level rise, the predictions of flooding were made based-upon a DEM representing a 1 meter sea level rise

calculated using the Sea Level Affecting Marshes Model (SLAMM) by Georgia Southern University. Figure 12 depicts flood extent with and without anticipated potential future sea level rise conditions.

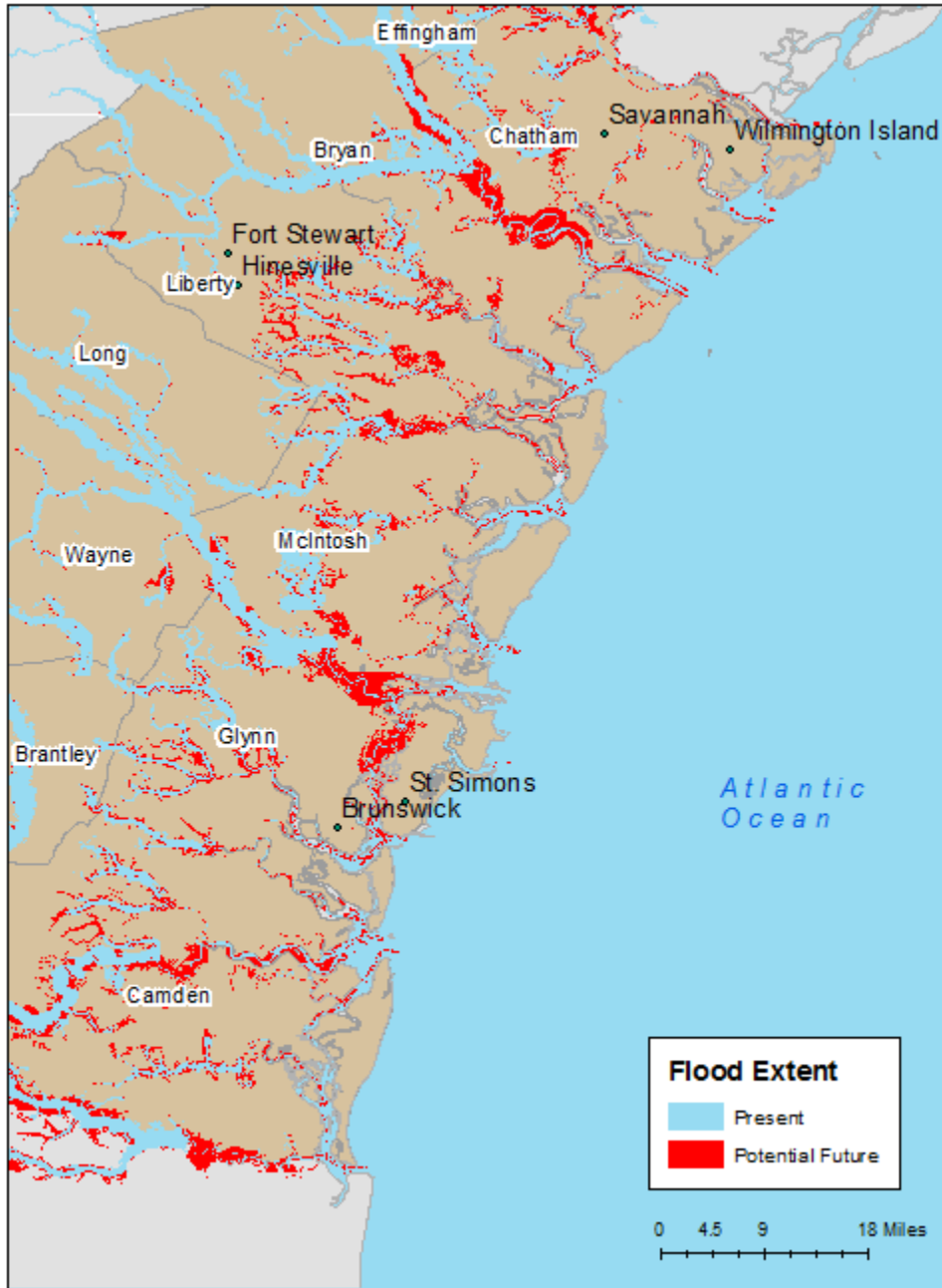


Figure 11: Present and Future Potential Flooding for the 1% Return Period

3.2 Analysis Methodology

The following material provides an overview of the key aspects of the analysis methodology employed in Hazus-MH. For additional information on this methodology the reader is encouraged to consult the Hazus-MH technical and user manuals available from FEMA's Map Service Center².

3.2.1 Flood Building Damage Analysis

In the Hazus-MH flood model, General Building Stock is reported by 2010 census block geographies. As described previously, a key assumption associated with the General Building Stock is that all structures are evenly distributed. Clearly, this is not always the case. Figure 13 illustrates an example in which the actual location of two of the four structures are in areas of three feet of water while the other two structures are entirely outside of the flooded area. Hazus-MH would assume, however, that three of the four structures are impacted and that only one is in three feet of water while the others are in relatively shallow water and potentially unscathed.

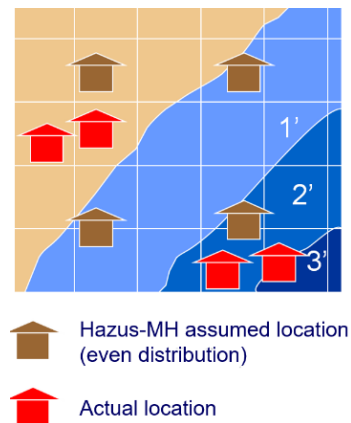


Figure 12: Hazus-MH Interpretation of Locations of Structures within the General Building Stock Inventory

As mentioned in Section Two, the assumption of even distribution of structures is partially mitigated by the use of clipped census block polygons from which unpopulated areas such as forests, vacant land and water have been removed. However, there is still considerable potential for error to be introduced in loss estimations due to the even distribution assumption. In order to mitigate this issue, we elected to take advantage of the Hazus-MH User Defined Facility inventory where possible to refine the building loss estimations for this study.

User Defined Facilities outputs used for this study included the number of damaged buildings based on their occupancy. It also included for each building the losses to the building itself, its

² Hazus-MH technical and user manuals can be obtained from FEMA's Map Service Center at <https://www.fema.gov/hazus-mh-user-technical-manuals>.

contents and, where applicable, its inventory due to flooding. As is the case for the General Building Stock, the User Defined Facility inventory categorizes buildings based on seven General Occupancies (residential, commercial, industrial, agricultural, government, religion and education) and 33 specific occupancies (e.g. single family residential, multifamily residential, etc.). It further defines buildings by the type of material from which they are constructed. In the Hazus-MH flood model materials include wood, concrete, steel, masonry and manufactured homes. Additionally, critical attributes for user defined facilities include first floor elevation and the number of stories of each structure.

Damages to individual user defined facilities are assessed using depth damage curves. Figure 14 provides an example of damage curves associated with single family residential homes with one story and no basement. The sample curves reflect estimated damage percentages for the building itself as well as the contents of the building.

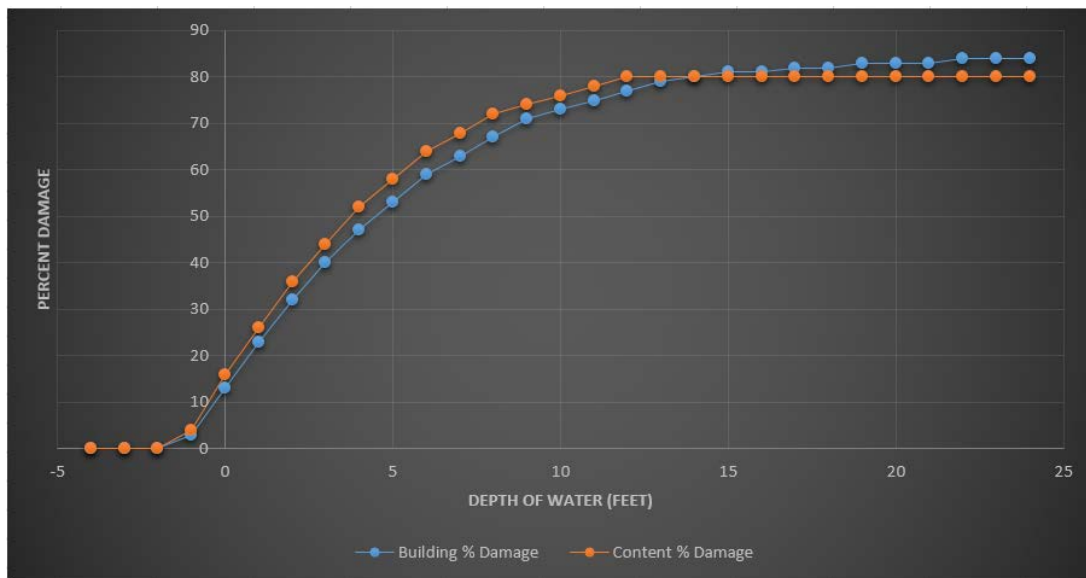


Figure 13: Building Damage and Content Damage Curves for Single Family Residential Home with 1-Story and No Basement

3.2.2 Hurricane Wind Building Damage Analysis

All hurricane wind related impacts associated with this study were based on exposure defined in the Hazus-MH General Building Stock inventory. The only exception to this is estimated damage related to Hazus-MH Essential Facilities. As noted earlier, the Hazus-MH General Building Stock inventory contains information that describes characteristics of buildings aggregated to 2010 census boundaries. In the Hurricane model aggregation is determined by the 2010 census tracts. Factors considered by Hazus-MH for estimating wind impacts include wind pressures, wind-borne debris, tree blow-down, rainfall, and storm duration. The model explicitly accounts for the impacts of wind on various structure components including roof cover, roof deck, whole roof failures, window and door failures and wall damage.

Hazus-MH includes over 300,000 hurricane wind damage functions that are applied to the building inventory to assess impacts. Figure 15 provides an example of the probability of various damage states to a single family home one story in height and constructed of wood. This outcome reflects a hip shaped roof, the presence of secondary water resistance measures, toe-nail roof-wall connections, and open terrain. It also assumes the presence of hurricane shutters. Note, for example, that at a 140 MPH peak gust wind speed the probability of destruction would be less than 0.1 (or a 10% chance).

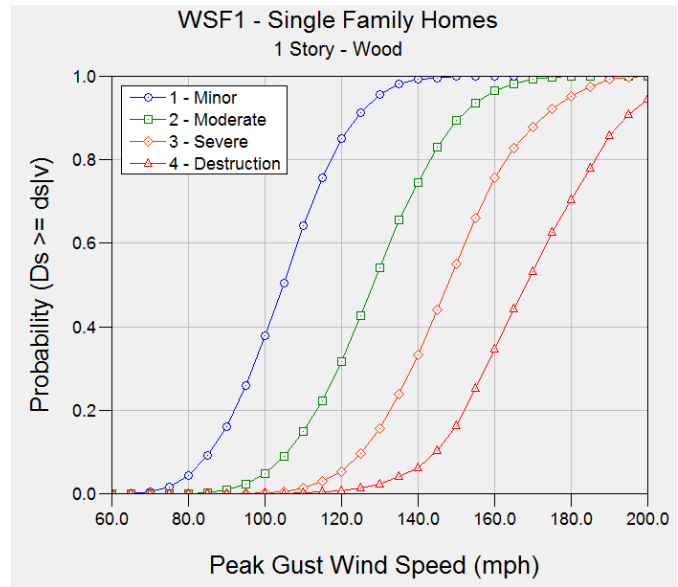


Figure 14: Hurricane Wind Damage Curves for Single Family Home with Hurricane Shutters.

Figure 16 reflects the same conditions, but adjusted to assume that no hurricane shutters are present. In this situation, the same peak gust wind speed would yield a probability of destruction that exceeds 0.5 (or a 50% chance).

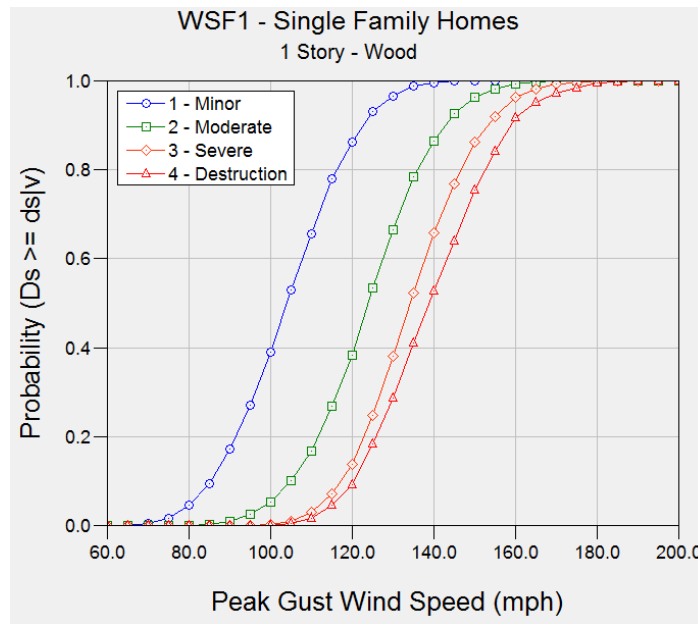


Figure 15: Hurricane Wind Damage Curves for Single Family Home without Hurricane Shutters.

3.2.3 Hurricane and Flood Displaced Population Analysis

Displaced population estimates in the hurricane wind model are based primarily on building loss ratios within each census tract. Considered in the model are the number of uninhabitable units due to damage, the number of uninhabitable housing units due to loss of water or power, and the number of households to include both single and multi-family dwelling units.

Determination of displaced population in the flood model is heavily influenced by physical access into the area where population is located. This is a function of the depth of water and the ability to travel into the area on foot or by vehicle. It should be noted that displaced population estimates may be underrepresented in this report due to factors not considered in this study. For example, water and sewer utilities may be damaged within the inundation area that impact residences outside of that area.

3.2.4 Hurricane and Flood Debris Analysis

The hurricane wind debris model is based on the damage states for structural and non-structural components of several model building types. For each damaged component, the debris generated in each building type category (wood, masonry, metal and other) is calculated based on the component's damage state and weight statistics. Then, by adding up the debris produced by all the damaged components, the total debris weight for each model building type can be estimated. The debris volume is simply estimated by dividing the debris weight by its

density. Specific assumptions about each modeled building type as they related to debris generation are provided in the Hazus-MH documentation.³

In addition to building related damage, the Hazus-MH Hurricane Wind model provides an estimation of tree debris that is reported in this study for each hurricane wind scenario. This estimate considers the density of trees as well as their height. It also considers the type of trees grouped by deciduous, coniferous and mixed based on root systems and resistance to wind. The tree database that comes with Hazus-MH was not modified for this study. From its analysis Hazus-MH provides an estimate of total tree debris as well as debris eligible for removal at the public's expense as a result of being located on roadways for instance.

The Hazus-MH flood model reports building debris in terms of estimated tons of building finishes, structural components and foundation materials. It is important to note that this is not an all-inclusive representation of flood related debris. For examples, it does not consider debris from vegetation, sediment or building contents. Flood debris estimations are evaluated based upon a combination of building occupancies and foundation types. Default assumptions about building foundation type weights are pre-populated in Hazus-MH and were not modified for this study.

3.2.5 Hurricane and Flood Essential Facility Analysis

Essential facilities consist of police stations, fire stations, schools, hospitals and emergency operation centers. Of these, fire stations, schools and hospitals have been explicitly modeled in the Hazus-MH hurricane wind model methodology. Fire stations and schools are often low-rise structures and are modeled in Hazus-MH as such, while hospitals can be low-rise or high-rise in nature. In the Hazus-MH methodology essential facility damage is limited to entry doors and windows, overhead doors (fire station only), and metal roof systems. All essential facilities were modeled assuming that whole wall failure and roof framing member failure would not occur. Detailed information on the assumptions associated with various damage states for each essential facility type is provided in the Hazus-MH documentation.⁴

As is the case for most damage estimations in the Hazus-MH flood model, Essential Facility loss estimates are based on the use of depth damage functions. Input required to estimate losses includes the building height, presence/absence of a basement and first floor elevation. The methodology applied to assess Essential Facility impacts is similar to that of the General Building Stock except that Essential Facilities are assessed at the location of the facility – a point with latitude and longitude coordinates.

³ See Hazus-MH 2.1 Hurricane Technical Manual Chapter 11: Debris Generated from Damaged Buildings.

⁴ Hazus-MH 2.1 Hurricane Technical Manual page 6-140 to 6-158.

3.2.6 Combined Wind and Storm Surge Loss Analysis

Sections 3.2.1 through 3.2.5 described losses from wind and flood. Within the areas impacted by both wind and storm surge there is potential within Hazus-MH for some double counting of damages to building components if separately calculated hurricane wind losses are added to separately calculated storm surge related flood losses. FEMA developed a methodology to address this issue that has been used in this study. Unfortunately, the combined loss methodology has a few limitations. It is entirely based upon the General Building Stock and it only provides estimates for combined wind and storm surge economic losses. It does not provide estimations for debris, displaced population, or many of the other outputs only available by modeling separate wind and flood losses. For this reason we chose to also provide the analysis output described in sections 3.2.1 through 3.2.5 given the importance of considering displaced population, debris estimations, and a refined estimation of flood impacts only available by incorporating point level building inventory (user defined facilities) into the study.

A combined loss estimation effectively ‘deconstructs’ buildings into those components more likely to be damaged by wind vs flooding. The combined loss model defines seven major building sub-assemblies:

1. Foundation: Includes site work, footings, and walls, slabs, piers or piles.
2. Below First Floor: Items other than the foundation that are located below the first floor of the structure such as mechanical equipment, stairways, parking pads, break away flood walls, etc.
3. Structure Framing: Includes all of the main load carrying structural members of the building below the roof framing and above the foundation.
4. Roof Covering: Includes the roof membrane material and flashing
5. Roof Framing: Includes trusses, rafters, and sheathing¹
6. Exterior Walls: Includes wall covering, windows, exterior doors, and insulation
7. Interiors: Includes interior wall and floor framing, drywall, paint, interior trim, floor coverings, cabinets, counters, mechanical, and electrical

These groupings allow for roof covering, for example, to contribute more on average to wind-only loss than to flood-only loss. Additional details about the Hazus-MH combined wind and storm surge loss methodology can be found in the Hazus-MH documentation.⁵

⁵ Hazus-MH 2.2 Hurricane Technical Manual pages 13-1 to 13-58.

Section

4

Scenario Results

As indicated previously, a total of eight scenarios were modeled for this study.

These include

- Scenario 1: Wind and flooding conditions that should be expected from a Category 1 hurricane without consideration of future sea level rise
- Scenario 2: Wind and flooding conditions that should be expected from a Category 1 hurricane that includes 'typical' storm surge conditions with the consideration of future sea level rise
- Scenario 3: Wind and flooding conditions that should be expected from a Category 1 hurricane that includes 'worst case' storm surge conditions with the consideration of future sea level rise
- Scenario 4: Worst case damage wind and storm surge scenario with a category 4 hurricane glancing the coastline of Georgia and impacting all coastal communities that falls in line with the dominant path that is supported by hurricane climatology from this region. No sea level rise included.
- Scenario 5: Worst case damage wind and storm surge scenario with a category 4 hurricane glancing the coastline of Georgia and impacting all coastal communities that falls in line with the dominant path that is supported by hurricane climatology from this region. Sea level rise included.
- Scenario 6: Worst case maximum impacts of wind and storm surge with a slow moving Category 5 hurricane skirting the coastline. No sea level rise included.
- Scenario 7: Worst case maximum impacts of wind and storm surge with a slow moving Category 5 hurricane skirting the coastline. Sea level rise included.
- Scenario 8: Riverine flooding based on present day 1% annual flood risk
- Scenario 9: Riverine flooding based on 1% annual flood risk with sea level rise

While seven different flood hazards were studied to reflect impact differences with and without sea level rise, only three wind hazards were considered since the same wind hazards were assumed to apply to both the pre and post sea level rise flooding conditions.

The following pages describe the total potential impacts that each scenario could potentially produce on the 11 counties included in this study.

Sections 4.1 to 4.3 describe potential hurricane wind and flood related economic impacts to buildings, their contents and their inventory. Note that the losses reported in these sections do not account for all potential economic impacts such as business interruption.

4.1 Wind Related Building Damages

Table 13 provides a summary of the expected hurricane wind only building, content and inventory losses for each of the modeled scenarios. The number of buildings damaged column reflects the total of all buildings that have experienced any amount of damage from minor to total destruction.

	Number of Buildings Damaged	Building Loss	Content Loss	Inventory Loss
Scenarios 1, 2 and 3: Category 1 hurricane	6,253	\$149,011,000	\$54,332,000	\$36,000
Scenarios 4 and 5: Worst case Category 4 storm	202,716	\$18,034,083,000	\$8,816,381,000	\$128,315,000
Scenarios 6 and 7: CAT 5 impact	21,038	\$731,913,000	\$326,710,000	\$3,660,000

Table 13: Wind Related Building Damages

4.2 Storm Surge Related Building Damages

Table 14 provides a summary of the expected damages from storm surge for each of the modeled scenarios. Total Buildings Damaged reflects the total number of buildings in any state of damage from minor damage to destruction. Building loss refers to damage to the structure only. Content loss is an estimate of loss to furniture, equipment that is not integral with the structure, computers and other supplies. Contents do not include inventory or nonstructural components such as lighting, ceilings, mechanical and electrical equipment and other fixtures. Inventory losses are things within a structure that can be sold. Thus, they do not apply to many occupancies. Note that the numbers in the following table do not account for potential impacts such as business interruption.

Occupancy Classification	Total Buildings Damaged	Building Loss	Content Loss	Inventory Loss
Scenario 1: Category 1: no sea level rise – typical storm surge				
Residential	833	\$103,556,570	\$53,526,254	\$0
Commercial	21	\$6,024,609	\$8,397,919	\$1,540,494
Industrial	6	\$931,324	\$1,956,087	\$1,360,870
Agricultural	0	\$0	\$0	\$0
Religious	3	\$780,758	\$1,138,039	\$0
Government	1	\$545,385	\$774,056	\$0
Education	0	\$0	\$0	\$0
Total	864	\$111,838,646	\$65,792,355	\$2,901,364
Scenario 2: Category 1: with sea level rise – typical storm surge				
Residential	897	\$112,652,761	\$58,311,433	\$0
Commercial	24	\$7,460,365	\$10,590,231	\$1,217,504
Industrial	5	\$567,683	\$1,204,559	\$840,890
Agricultural	0	\$0	\$0	\$0
Religious	3	\$762,774	\$1,138,039	\$0
Government	1	\$602,965	\$774,056	\$0
Education	0	\$0	\$0	\$0
Total	930	\$122,046,549	\$72,018,318	\$2,058,394
Scenario 3: Category 1: – with sea level rise – worst case storm surge				
Residential	13,229	\$1,371,109,780	\$795,470,941	\$0
Commercial	207	\$55,633,846	\$145,297,259	\$64,672,135
Industrial	66	\$18,105,287	\$47,502,734	\$36,222,239
Agricultural	4	\$68,456	\$127,609	\$188,597
Religious	11	\$724,313	\$4,746,879	\$0
Government	7	\$750,324	\$4,375,836	\$0
Education	4	\$736,688	\$3,947,222	\$0
Total	13,528	\$1,447,128,694	\$1,001,468,481	\$101,082,972
Scenario 4: Worst case Cat 4 – no sea level rise				
Residential	34,788	\$5,198,594,335	\$2,597,713,127	\$0
Commercial	845	\$323,305,587	\$395,886,284	\$184,953,146
Industrial	126	\$58,879,895	\$114,322,088	\$81,555,531
Agricultural	20	\$1,237,870	\$1,056,652	\$1,334,707
Religious	87	\$52,850,234	\$63,661,170	\$0
Government	20	\$13,888,202	\$18,319,263	\$0
Education	14	\$64,798,880	\$77,093,803	\$0
Total	35,900	\$5,713,555,002	\$3,268,052,388	\$267,843,384
Scenario 5: Worst case Cat 4 – with sea level rise				
Residential	61,243	\$8,369,375,182	\$4,319,081,572	\$0
Commercial	1,879	\$923,392,109	\$1,278,973,829	\$695,656,759
Industrial	223	\$280,098,311	\$588,204,934	\$415,077,351
Agricultural	34	\$2,065,484	\$2,076,351	\$2,676,772
Religious	228	\$103,431,319	\$157,952,130	\$0
Government	59	\$48,480,573	\$76,847,209	\$0
Education	35	\$77,895,258	\$134,994,087	\$0

Occupancy Classification	Total Buildings Damaged	Building Loss	Content Loss	Inventory Loss
Total	63,701	\$9,804,738,236	\$6,558,130,113	\$1,113,410,882
Scenario 6: Category 5: no sea level rise				
Residential	681	\$79,418,793	\$41,194,887	\$0
Commercial	17	\$6,001,494	\$8,186,675	\$1,658,085
Industrial	2	\$67,681	\$142,134	\$98,618
Agricultural	0	\$0	\$0	\$0
Religious	3	\$805,663	\$1,138,039	\$0
Government	0	\$0	\$0	\$0
Education	0	\$0	\$0	\$0
Total	703	\$86,293,630	\$50,661,734	\$1,756,703
Scenario 7: Category 5: with sea level rise				
Residential	12,119	\$1,209,231,574	\$705,533,728	\$0
Commercial	221	\$43,581,195	\$121,874,135	\$58,430,486
Industrial	47	\$8,682,478	\$21,915,482	\$17,144,312
Agricultural	1	\$54,854	\$106,374	\$159,006
Religious	11	\$1,035,131	\$6,844,053	\$0
Government	3	\$383,259	\$2,272,929	\$0
Education	1	\$139,130	\$674,420	\$0
Total	12,403	\$1,263,107,621	\$859,221,121	\$75,733,803

Table 14: Storm Surge Related Building Damages

4.3 Riverine Flood Related Building Damages

Table 15 provides a summary of the expected damages from riverine flooding for each of the modeled scenarios. Note that the numbers in the following table do not account for potential impacts such as business interruption.

Occupancy Classification	Total Buildings Damaged	Building Loss	Content Loss	Inventory Loss
Scenario 8: Riverine flooding based on present day 1% annual flood risk				
Residential	2,605	\$39,108,405	\$21,541,540	\$0
Commercial	62	\$2,205,176	\$8,591,221	\$4,910,938
Industrial	19	\$2,340,913	\$4,833,707	\$4,700,863
Agricultural	2	\$0	\$1,091	\$0
Religious	4	\$299,774	\$1,646,610	\$0
Government	4	\$285,751	\$1,069,704	\$0
Education	2	\$94,032	\$527,284	\$0
Total	2,698	\$44,334,051	\$38,211,157	\$9,611,802
Scenario 9: Riverine flooding based on 1% annual flood risk with sea level rise				
Residential	6,183	\$63,517,493	\$34,634,144	\$0
Commercial	188	\$4,706,776	\$19,222,774	\$14,385,782
Industrial	30	\$4,269,474	\$7,167,847	\$7,045,146
Agricultural	6	\$361	\$10,290	\$1,505

Occupancy Classification	Total Buildings Damaged	Building Loss	Content Loss	Inventory Loss
Religious	18	\$597,871	\$3,960,494	\$0
Government	18	\$1,125,146	\$6,008,707	\$0
Education	8	\$96,468	\$545,766	\$0
Total	6,451	\$74,313,589	\$71,550,022	\$21,432,433

Table 15: Riverine Flood Related Building Damages

Sections 4.4 to 4.6 address modeled wind and flood impacts to essential facilities.

4.4 Wind Related Essential Facility Impacts

Table 16 provides a summary of the expected wind related damages to the 620 Essential Facilities in the region for each of the modeled scenarios.

	Facilities Moderately Damaged (>50%)	Facilities Completely Damaged (>50%)	Facilities with expected loss of use (<1 day)
Scenarios 1, 2 and 3: Category 1 hurricane	0	0	620
Scenarios 4 and 5: Worst case Category 4	475	20	233
Scenarios 6 and 7: Category 5 hurricane	41	0	575

Table 16: Wind Related Essential Facility Impacts

4.5 Storm Surge Related Essential Facility Impacts

Table 17 provides a summary of the expected storm surge related damages to the 620 Essential Facilities in the region for each of the modeled scenarios. In this table as well as in Table 18 moderate damage is considered 11-50% damage. Substantial damage is where the damage to the building and contents exceeds 50% of the buildings total replacement cost and the building is generally considered a total loss. Note that this is different from structural failure. In general, it is expected that the major structural components of a building will survive a flood, but that the structural finishes and the contents / inventory may be severely damaged due to inundation. Loss of use refers to the normal functioning of a building.

	Facilities at least Moderately Damaged	Facilities at Least Substantially Damaged	Facilities with expected loss of use (<1 day)
Scenario 1: Category 1 – no sea level rise – typical surge	0	0	0
Scenario 2: Category 1 – with sea level rise – typical surge	0	0	0

	Facilities at least Moderately Damaged	Facilities at Least Substantially Damaged	Facilities with expected loss of use (<1 day)
Scenario 3: Category 1 – with sea level rise – typical surge	16	2	21
Scenario 4 Worst case Cat 4 – no sea level rise	1	57	60
Scenario 5 Worst case Cat 4 – with sea level rise	5	109	146
Scenario 6: Category 5– no sea level rise	0	0	0
Scenario 7: Category 5 – with sea level rise	7	3	18

Table 17: Storm Surge Related Essential Facility Impacts

4.6 Riverine Flood Related Essential Facility Impacts

Table 18 provides a summary of the expected riverine flood damages to the 620 Essential Facilities in the region for each of the modeled scenarios.

	Facilities Moderately Damaged (>50%)	Facilities Completely Damaged (>50%)	Facilities with expected loss of use (<1 day)
Scenario 8: Riverine flooding based on present day 1% annual flood risk	3	0	3
Scenario 9: Riverine flooding based 1% annual flood risk with sea level rise	0	0	4

Table 18: Riverine Flood Related Essential Facility Impacts

Sections 4.7 to 4.9 provide the estimated number of displaced people as a result of the modeled scenarios.

4.7 Wind Related Displaced People

Table 19 provides an estimated number of displaced households based on wind related damages for each of the modeled scenarios.

	Total Displaced People
Scenarios 1, 2 and 3: Category 1 hurricane	Less than 50
Scenario 4 and 5: Worst case category 4	Approximately 197,500
Scenarios 6 and 7: Category 5 hurricane	Approximately 4,000

Table 19: Wind Related Displaced Households (rounded to the nearest 500)

4.8 Storm Surge Related Displaced People

Table 20 provides an estimated number of displaced people based on storm surge related damages for each of the modeled scenarios.

	Total Displaced People
Scenario 1: Category 1 – no sea level rise – typical surge	Approximately 2,000
Scenario 2: Category 1 – with sea level rise – typical surge	Approximately 2,000
Scenario 3: Category 1 – with sea level rise – typical surge	Approximately 25,500
Scenario 4: Worst case Cat 4 – no sea level rise	Approximately 78,500
Scenario 5: Worst case Cat 4 – with sea level rise	Approximately 148,000
Scenario 6: Category 5– no sea level rise	Approximately 1,500
Scenario 7: Category 5 – with sea level rise	Approximately 21,500

Table 20: Storm Surge Related Displaced Households (rounded to the nearest 500)

4.9 Riverine Flood Related Displaced People

Table 21 provides an estimated number of displaced households based on riverine flood related damages for each of the modeled scenarios.

	Total Displaced People
Scenario 8: Riverine flooding based on present day 1% annual flood risk	Approximately 5,000
Scenario 9: Riverine flooding based on 1% annual flood risk with sea level rise	Approximately 14,000

Table 21: Riverine Flood Related Displaced Households (rounded to nearest 500)

Sections 4.10 to 4.12 address the potential debris impacts from the modeled scenarios.

4.10 – Wind Related Building and Tree Debris Impacts

Table 22 provides an estimate of building and tree related debris based on wind related damages for each of the modeled scenarios.

	Brick, Wood and Other (Tons)	Reinforced Concrete Steel (Tons)	Tree Debris Eligible for Removal with Public Funds	Other Tree Debris	Total
Scenarios 1, 2 and 3: Category 1 hurricane	Approximately 16,000	Less than 10	Approximately 96,500	Approximately 1,365,000	Approximately 1,477,500
Scenario 4 and 5: Worst case category 4	Approximately 3,110,000	Approximately 79,000	Approximately 1,122,000	Approximately 12,621,000	Approximately 16,932,500

Scenarios 6 and 7: Category 5 hurricane	Approximately 122,500	Approximately 5,000	Approximately 215,000	Approximately 3,462,500	Approximately 3,805,000
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Table 22: Wind Related Building and Tree Debris Impacts (all numbers rounded to the nearest 500)

4.11 – Storm Surge Related Debris Impacts

Table 23 provides an estimate of building debris based on storm surge related damages for each of the modeled scenarios.

	Finishes (Tons)	Structures (Tons)	Foundations (Tons)	Total (Tons)
Scenario 1: Category 1 – no sea level rise – typical surge	Approximately 10,000	Approximately 22,000	Approximately 19,000	Approximately 51,000
Scenario 2: Category 1 – with sea level rise – typical surge	Approximately 9,000	Approximately 19,500	Approximately 18,000	Approximately 47,000
Scenario 3: Category 1 – with sea level rise – typical surge	Approximately 98,000	Approximately 72,000	Approximately 52,000	Approximately 222,000
Scenario 4 Worst case Cat 4 – no sea level rise	Approximately 364,500	Approximately 597,000	Approximately 687,000	Approximately 1,649,000
Scenario 5 Worst case Cat 4 – with sea level rise	Approximately 501,500	Approximately 1,028,500	Approximately 1,055,000	Approximately 2,585,000
Scenario 6: Category 5– no sea level rise	Approximately 11,000	Approximately 24,000	Approximately 20,000	Approximately 55,500
Scenario 7: Category 5 – with sea level rise	Approximately 88,500	Approximately 69,000	Approximately 48,000	Approximately 205,000

Table 23: Storm Surge Related Debris Impacts (all numbers rounded to the nearest 500)

4.12 – Riverine Flood Related Debris Impacts

Table 24 provides an estimate of building debris based on riverine flood related damages for each of the modeled scenarios.

	Finishes (Tons)	Structures (Tons)	Foundations (Tons)	Total (Tons)
Scenario 8: Riverine flooding based on present day 1% annual flood risk	Approximately 2,500	Approximately 1,000	Approximately 2,000	Approximately 5,500
Scenario 9: Riverine flooding based on 1%	Approximately 4,000	Approximately 1,500	Approximately 3,000	Approximately 8,500

	Finishes (Tons)	Structures (Tons)	Foundations (Tons)	Total (Tons)
annual flood risk with sea level rise				

Table 24: Riverine Flood Related Debris Impacts (all numbers rounded to the nearest 500)

4.13 – Combined Wind and Storm Surge Economic Impacts

Table 25 provides a combined wind and storm surge related economic loss estimate for each of the modeled scenarios. It should be noted that these values do not include damages from riverine flooding. In addition, they do not account for losses related to business interruption or other types of economic impact.

	Building Loss	Content Loss	Inventory Loss	Total Loss
Scenario 1: Category 1– no sea level rise – typical surge	\$299,662,000	\$149,372,000	\$445,000	\$449,479,000
Scenario 2: Category 1 – with sea level rise – typical surge	\$2,073,733,000	\$1,353,473,000	\$9,376,000	\$3,436,582,000
Scenario 4: Worst case Category 4 – no sea level rise	\$20,522,737,000	\$10,771,808,000	\$151,524,000	\$31,446,070,000
Scenario 5: Worst case Category 4 – with sea level rise	\$22,930,984,000	\$13,076,474,000	\$213,430,000	\$36,220,888,000
Scenario 6 Worst case maximum impact – no sea level rise	\$854,855,000	\$405,460,000	\$3,986,000	\$1,264,301,000
Scenario 7 Worst case maximum impact – with sea level rise	\$2,319,754,000	\$1,373,358,000	\$8,848,000	\$3,701,960,000

Table 25: Combined Wind and Storm Surge Economic Impacts

Note: No combined losses were calculated for the Category 1 hurricane that included worst case storm surge under future sea level rise (Scenario 3).

Section

5

How to Use this Information

This study was designed to assess the potential impacts of hurricane related wind and flooding on Georgia coastal communities, both under current conditions and based upon the predictions of the scientific community related to climate change.

The report is not designed to predict with precision what will happen in the future. Its findings are based on a variety of assumptions related to the hazards modeled as well as the description of the built environment. Altering the modeled scenarios by simply shifting the track of a hurricane by a few miles would yield significant differences in both economic and social impacts. This, however, does not diminish the value of the report because its primary goal is to highlight the potential magnitude of increased impact that could be realized without the application of effective mitigation practices.

Readers of this report will note that the predicted increases in social and economic impacts are significant. Yet, it is important to note that this study did not attempt to comprehensively evaluate the full range of impacts that would almost certainly be realized should the modeled events take place. For example, we did not consider the potentially significant economic impacts related to business interruption, impacts to the utility or transportation infrastructure, or the possibility of casualties. This is important to consider given that, as significant as the losses reported for this study are, they would likely be much more profound if these events were to occur.

We hope that this study serves as a call to action for the homeowners, businesses, governmental organizations and other stakeholders who have interests in the Georgia coastal communities. The information in this report should not be a reflection of what will happen, but rather what could occur if current conditions are not mitigated.

For next steps we recommend the following:

- Use the findings in this report to inform stakeholders of the magnitude of impact that could be realized from hurricanes of the present and future. Explore and implement the many regulatory as well as economic incentivizes that can encourage these individuals and organizations to take action to mitigate these impacts through more effective land use planning, hazard resistance construction practices, and educational outreach.

- Consider more detailed studies especially in areas that would be prone to the most significant impacts. These studies could incorporate refined estimations of hazard predictions as well as improvements to the exposure data used to characterize impacts and associated losses.

Appendix D-II

UGA ITOS State Coastal Facility Hazus Assessment with Sea Level Rise

To assess the threat of Sea Level Rise along Georgia's coastline GEMA is reviewing a report published by Georgia's Department of Natural Resources. This report uses Hazus to analyze the effects of tropical storms and hurricanes on buildings in coastal counties using current sea levels and comparing those results with 1-meter sea level rise.

In addition to the report, analysis of just State assets was run using HAZUS-MH to assess the potential monetary impact of a 100yr flooding event with and without sea level rise. There are 832 state owned or leased properties included in the analysis that are located in the six coastal counties (Bryan, Camden, Chatham, Glynn, Liberty, and McIntosh). Of those 832 Hazus-MH estimates that 331 could potentially be at risk of flooding. The total exposure amount (\$653.6M) of the 331 properties remains the same whether using the current depth grid or the depth grid adjusted for 1 meter of sea level rise. However, there is an estimated increase of \$2.3 million in building damages and \$3.9 million in combined building and content losses. The results of the analysis shows that a 1-meter sea level rise could have a costly monetary impact in the event of flooding during a 100yr storm.

The following is a list of maps and what they are representing.

Figure A: This map shows the total number of BLLIP buildings that were mapped in the county and the total monetary exposure for the buildings by county.

Figure B: This map shows the number of buildings that HAZUS-MH estimates could be at risk and the exposure for those buildings. This analysis was run with current Sea Levels.

Figure C: This map shows the number of buildings that HAZUS-MH estimates could be at risk and the exposure for those buildings. This analysis was run with a 1-meter Sea Level Rise.

Figure D: This map shows the number of buildings that HAZUS-MH estimates could be damaged and the losses those buildings might suffer. This analysis was run with current Sea Levels.

Figure E: This map shows the number of buildings that HAZUS-MH estimates could be damaged and the losses those buildings might suffer. This analysis was run with a 1-meter Sea Level Rise.

Study Name	BLLIP Buildings	Exposure	BLLIP Buildings at Risk	Exposure at Risk
Bryan - No Sea Level Rise	75	\$15,121,000	45	\$12,745,000
Bryan - Sea Level Rise	75	\$15,121,000	45	\$12,745,000
Camden - No Sea Level Rise	74	\$11,955,000	11	\$7,918,000
Camden - Sea Level Rise	74	\$11,955,000	11	\$7,918,000
Chatham - No Sea Level Rise	362	\$764,580,000	119	\$431,163,000
Chatham - Sea Level Rise	362	\$764,580,000	118	\$431,163,000
Glynn - No Sea Level Rise	122	\$219,327,000	55	\$155,230,000
Glynn - Sea Level Rise	122	\$219,327,000	54	\$155,230,000
Liberty - No Sea Level Rise	24	\$17,645,000	4	\$1,759,000
Liberty - Sea Level Rise	24	\$17,645,000	4	\$1,759,000
McIntosh - No Sea Level Rise	175	\$44,818,000	97	\$44,818,000
McIntosh - Sea Level Rise	175	\$44,818,000	94	\$44,818,000

Buildings Damages	Building Losses	Combined Building and Content Losses	Building Loss Ratio
43	\$818,000	\$3,084,000	6.4
42	\$840,000	\$3,127,000	6.6
10	\$281,000	\$811,000	3.5
10	\$266,000	\$804,000	3.4
99	\$21,134,000	\$27,552,000	4.9
98	\$22,327,000	\$29,090,000	5.2
44	\$9,478,000	\$22,866,000	6.1
44	\$10,460,000	\$25,011,000	6.7
4	\$109,000	\$250,000	6.2
4	\$117,000	\$264,000	6.7
57	\$2,024,000	\$3,962,000	4.5
54	\$2,129,000	\$4,151,000	4.8

Total Building Losses - No Sea Level Rise	\$33,844,000
Total Building Losses - Sea Level Rise	\$36,139,000
Difference	\$2,295,000

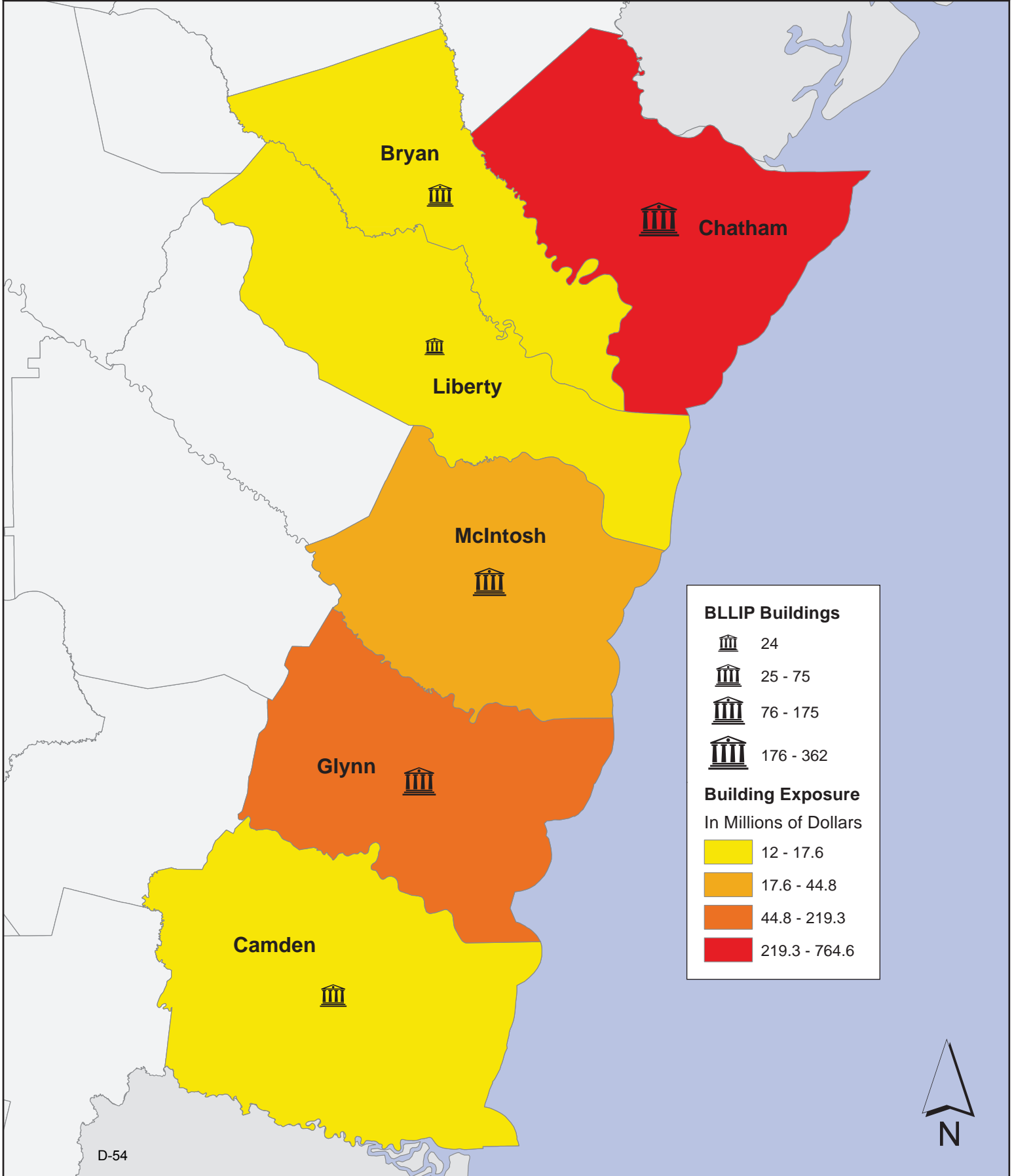
Total Combined Losses - No Sea Level Rise	\$58,525,000
Total Combined Losses - Sea Level Rise	\$62,447,000
Difference	\$3,922,000

		Exposure Amounts
BLLIP Total Buildings	832	\$1,073,446,000
BLLIP Total Buildings at Potential Risk	331	\$653,633,000



BLLIP Sea Level Rise Analysis

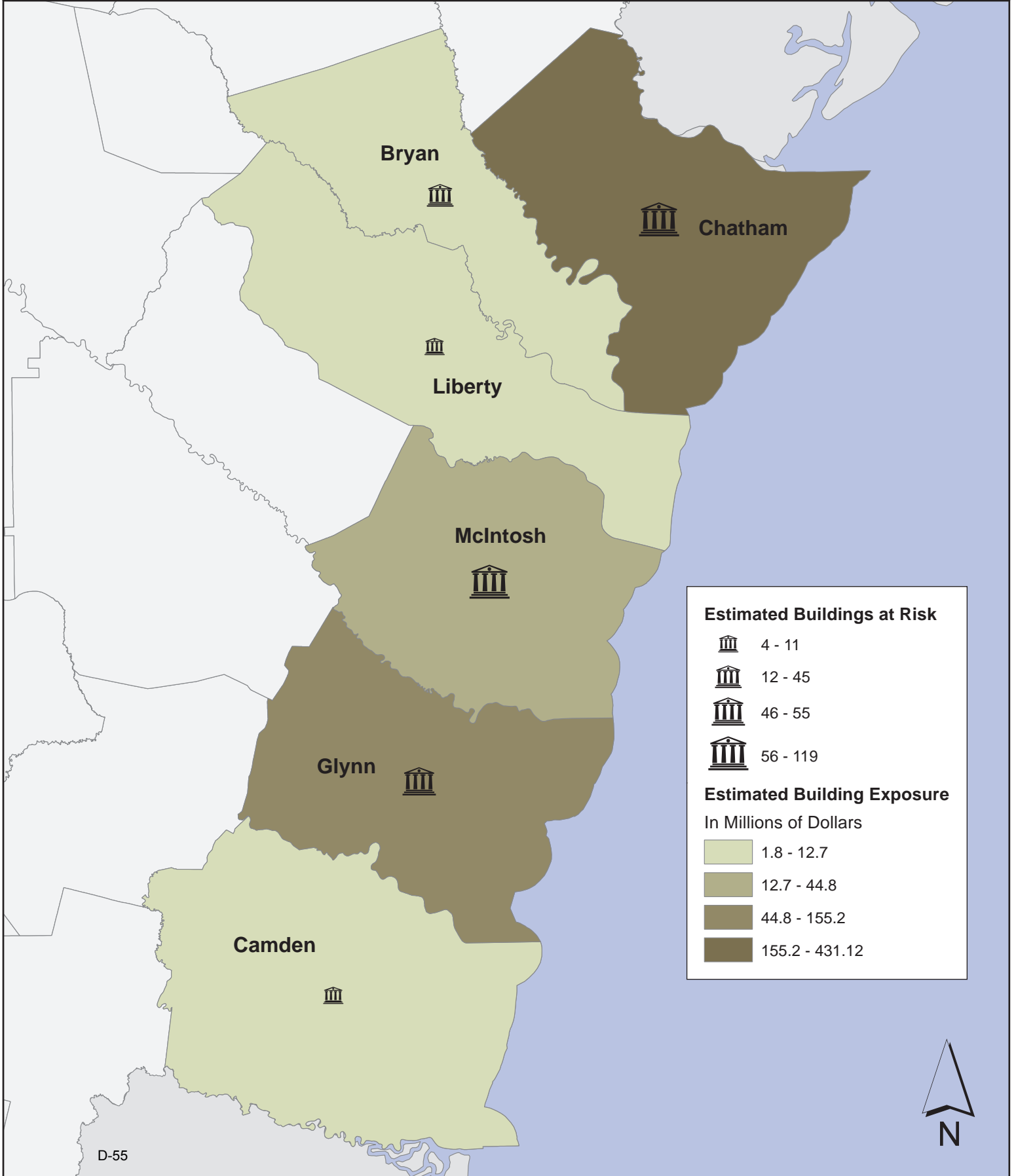
BLLIP Buildings





BLLIP Sea Level Rise Analysis

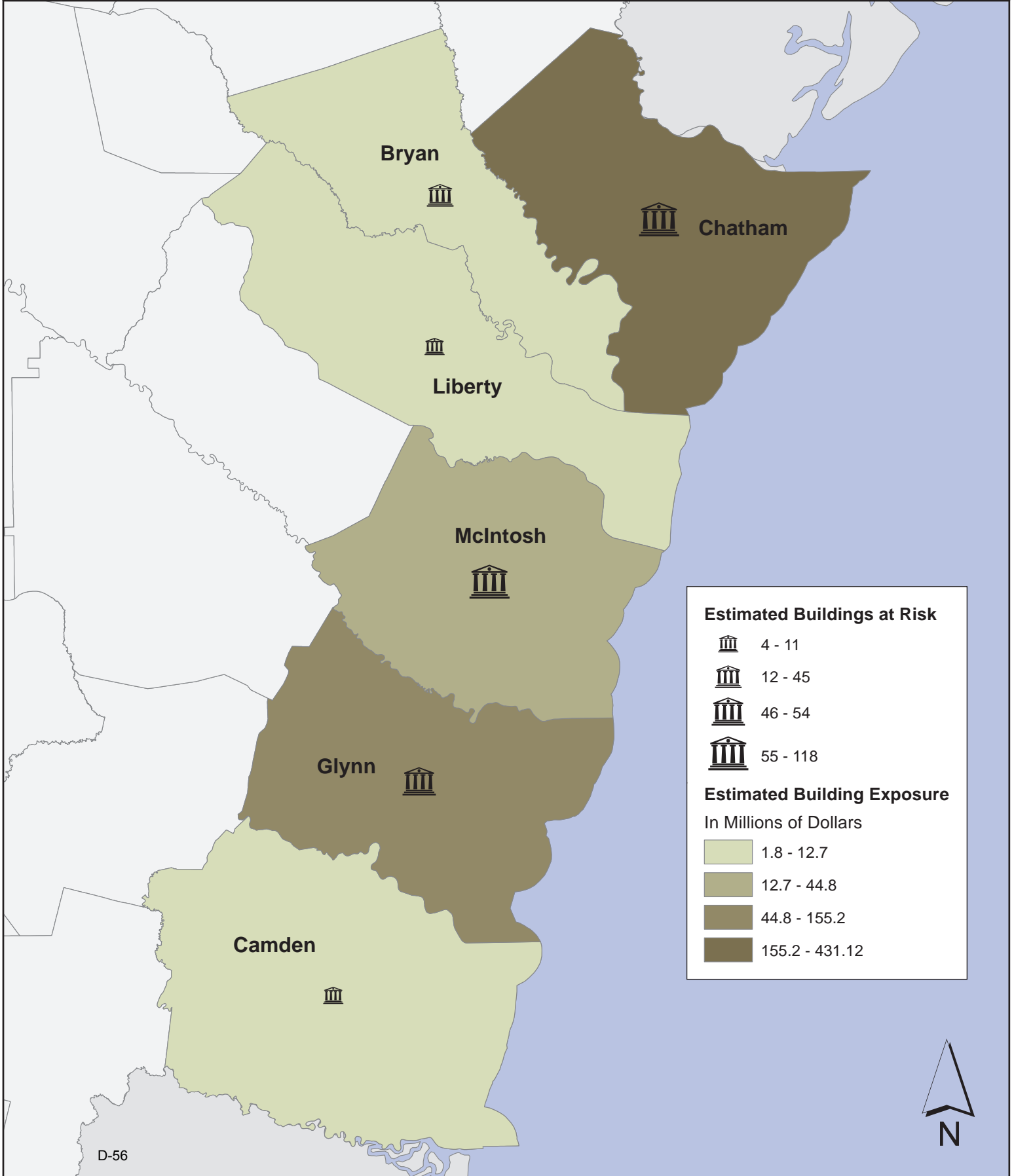
Buildings at Risk and Exposure Amounts with No Sea Level Rise





BLLIP Sea Level Rise Analysis

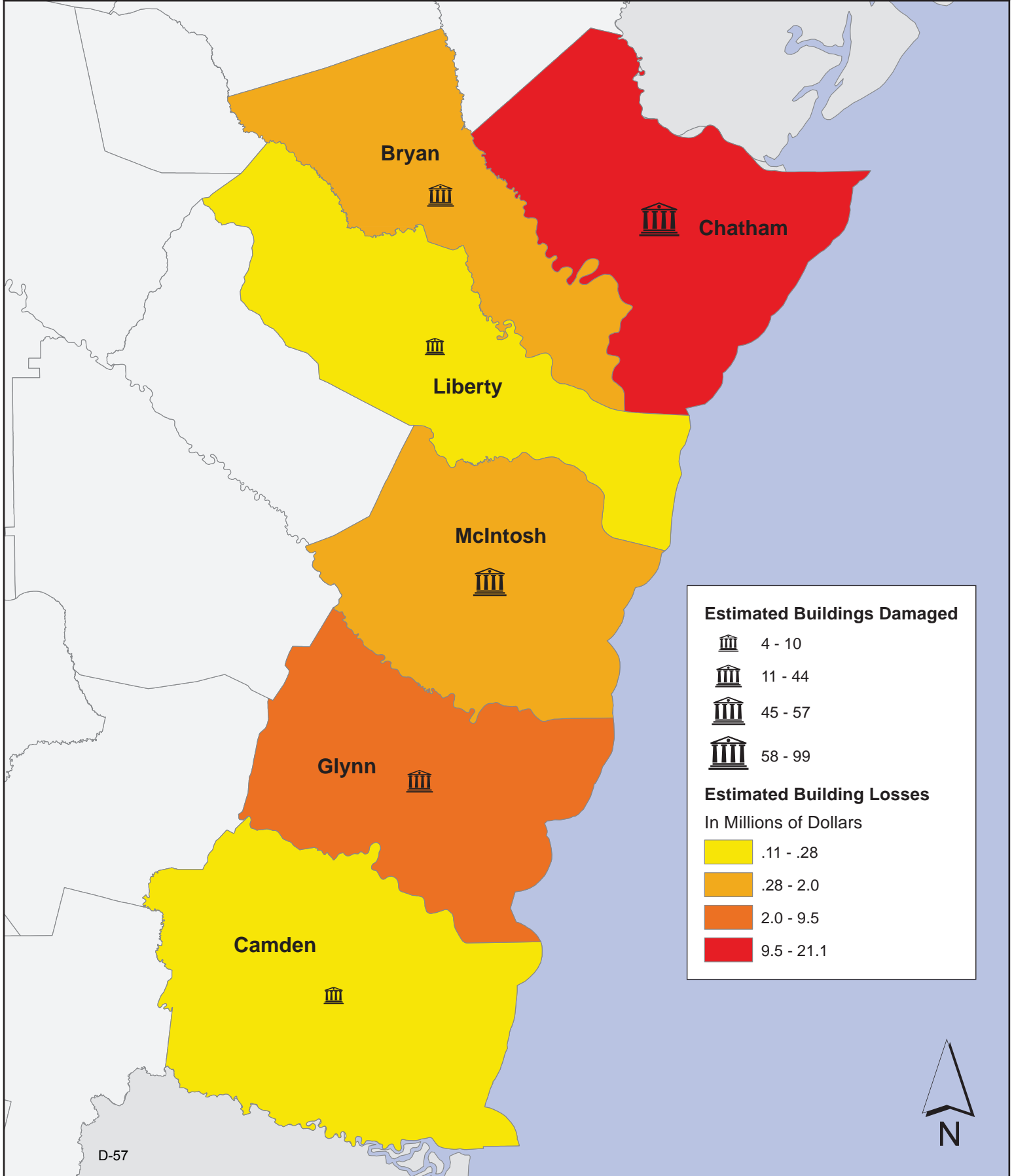
Buildings at Risk and Exposure Amounts with Sea Level Rise





BLLIP Sea Level Rise Analysis

Buildings Damaged and Loss Amounts with No Sea Level Rise



Estimated Buildings Damaged

- 4 - 10
- 11 - 44
- 45 - 57
- 58 - 99

Estimated Building Losses
In Millions of Dollars

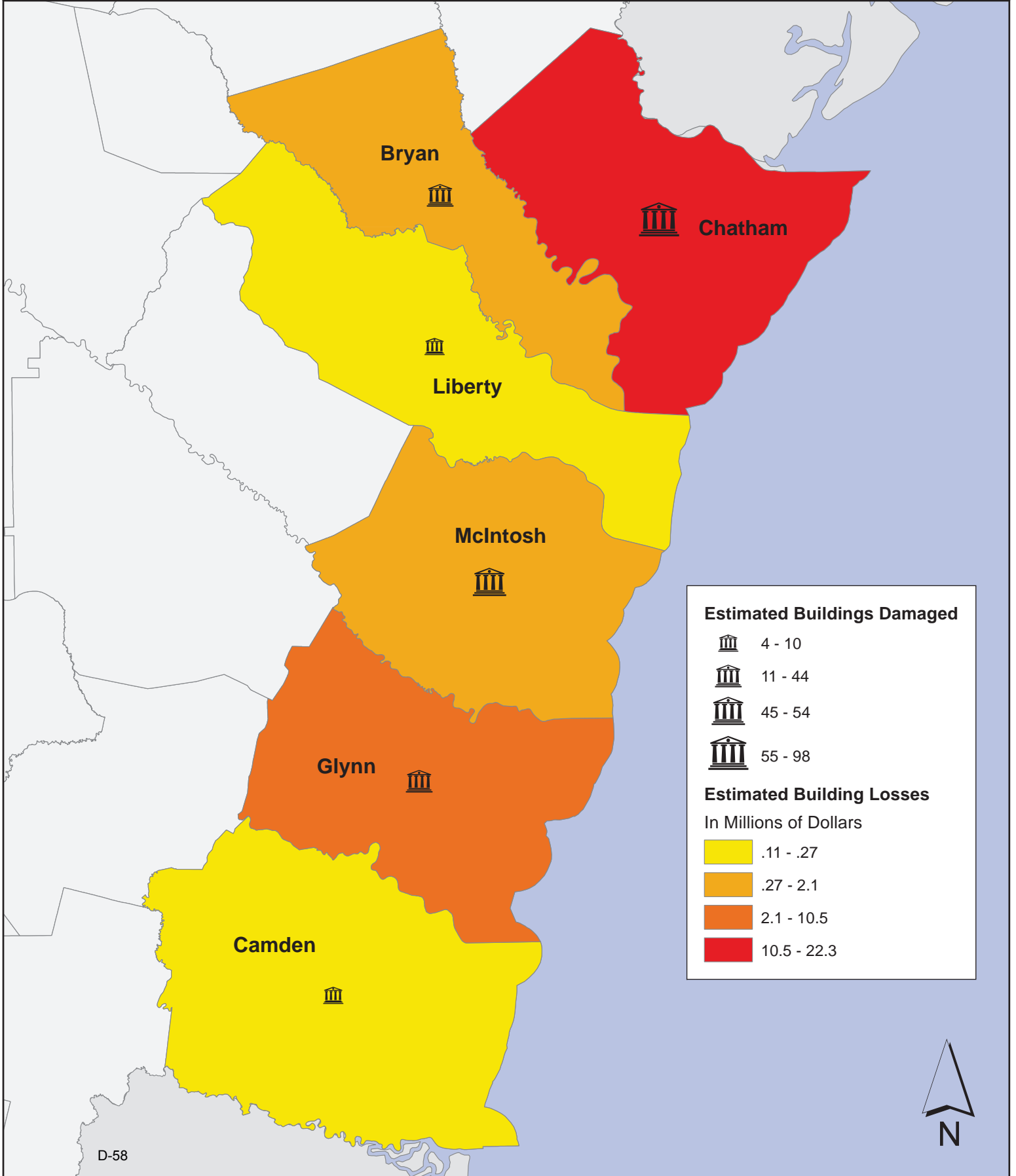
- .11 - .28
- .28 - 2.0
- 2.0 - 9.5
- 9.5 - 21.1





BLLIP Sea Level Rise Analysis

Buildings Damaged and Loss Amounts with Sea Level Rise

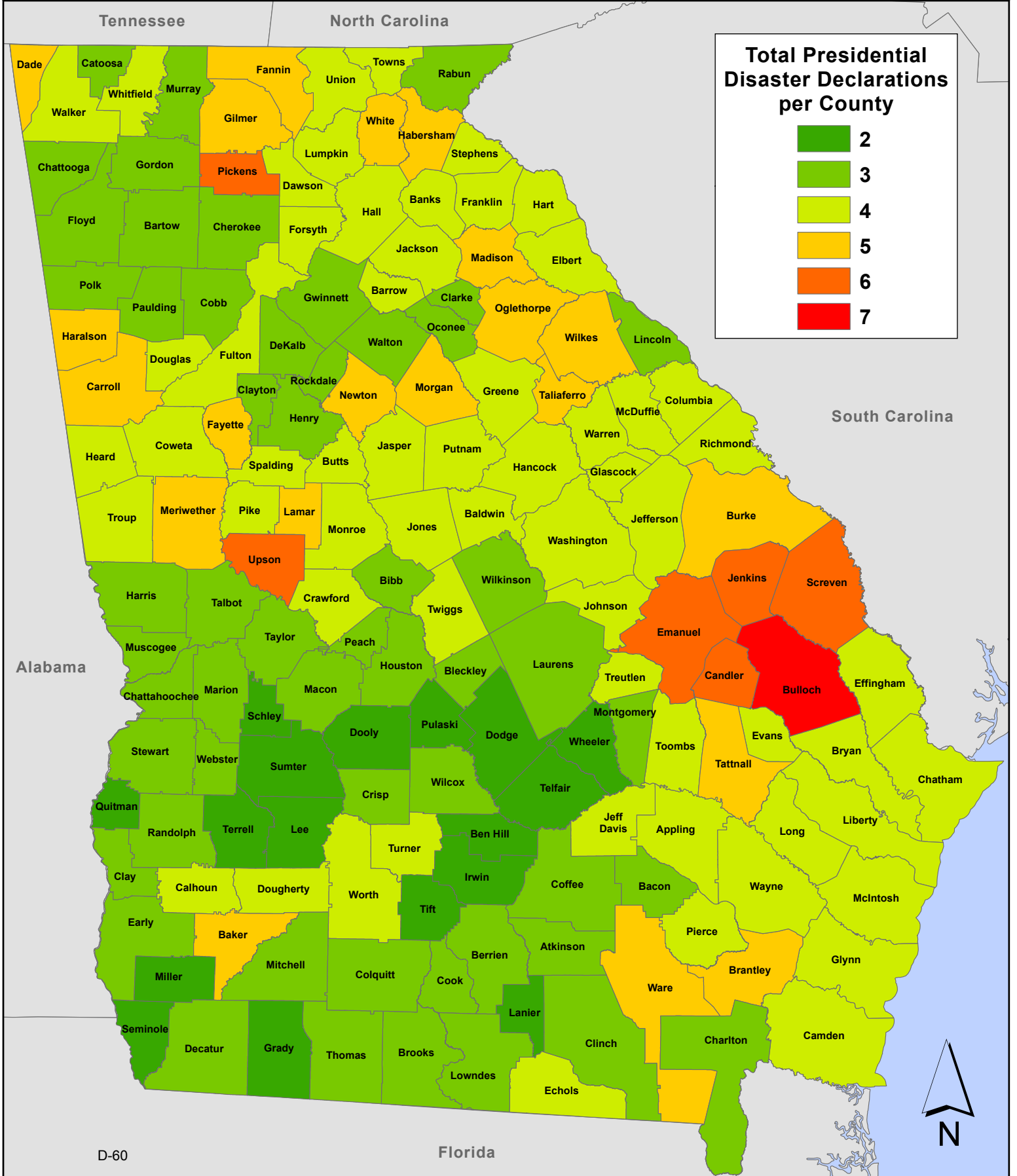


Appendix D-III
Georgia Declaration History

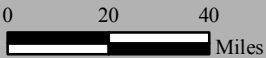
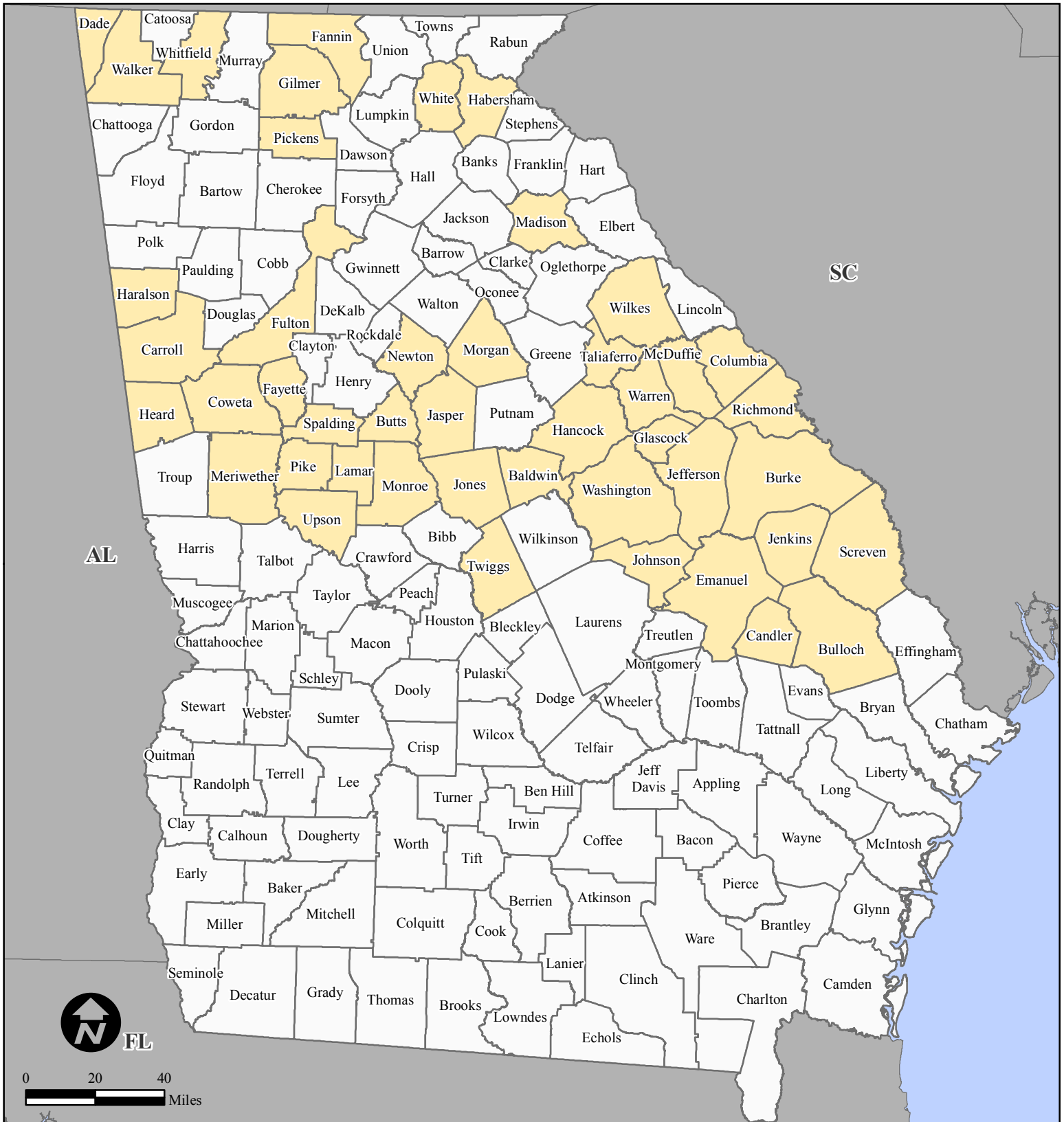


Presidential Disaster Declarations

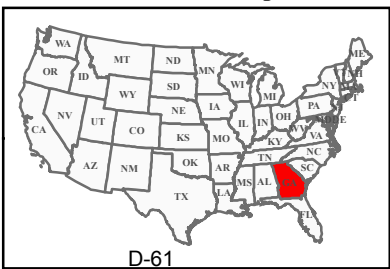
2013-2017
FEMA Data



FEMA-4165-DR, Georgia Disaster Declaration as of 04/24/2014



Location Map



D-61

Designated Counties

- No Designation
- Public Assistance

All counties in the State of Georgia are eligible to apply for assistance under the Hazard Mitigation Grant Program



FEMA

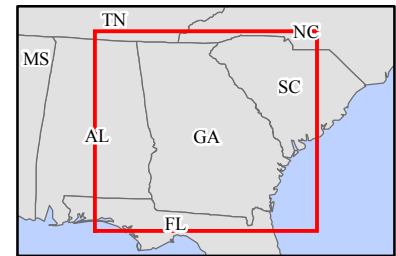
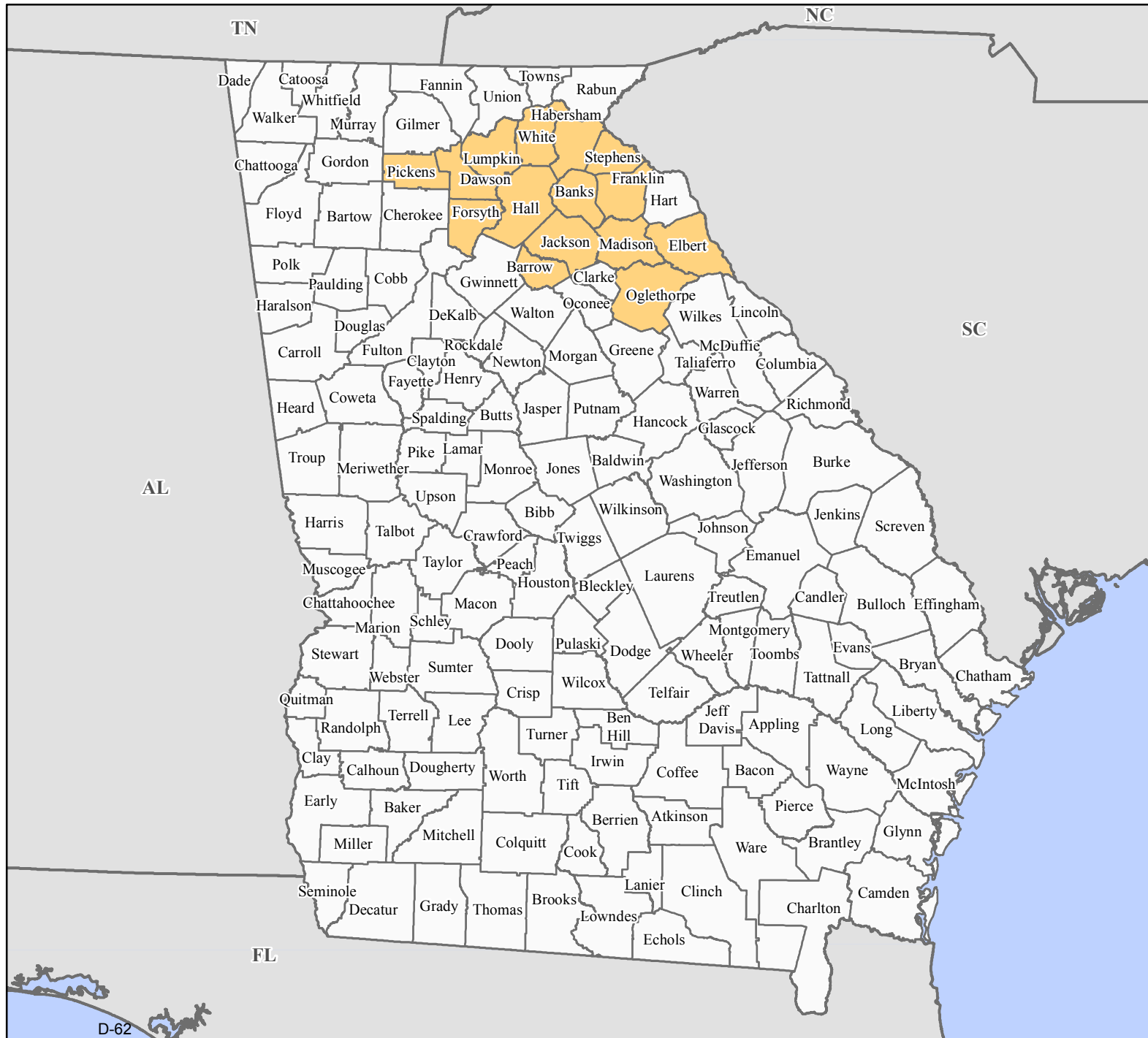
MSB-OCIO-AEES
Enterprise Geospatial Information Services (EGIS)
04/24/14 -- 3:23 PM EST

Source: Disaster Federal Registry Notice Amendment No. 3: 04/24/2014

FEMA-4215-DR, Georgia Disaster Declaration as of 04/20/2015



FEMA

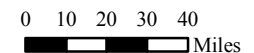
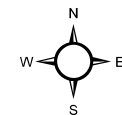


Data Layer/Map Description:
The types of assistance that have been designated for selected areas in the State of Georgia.

All areas in the State of Georgia are eligible for assistance under the Hazard Mitigation Grant Program.

Designated Counties

- No Designation
- Public Assistance



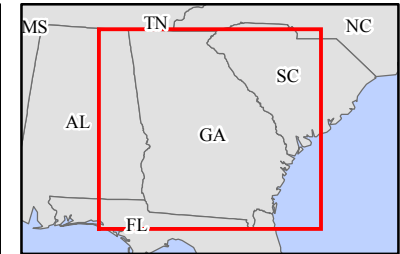
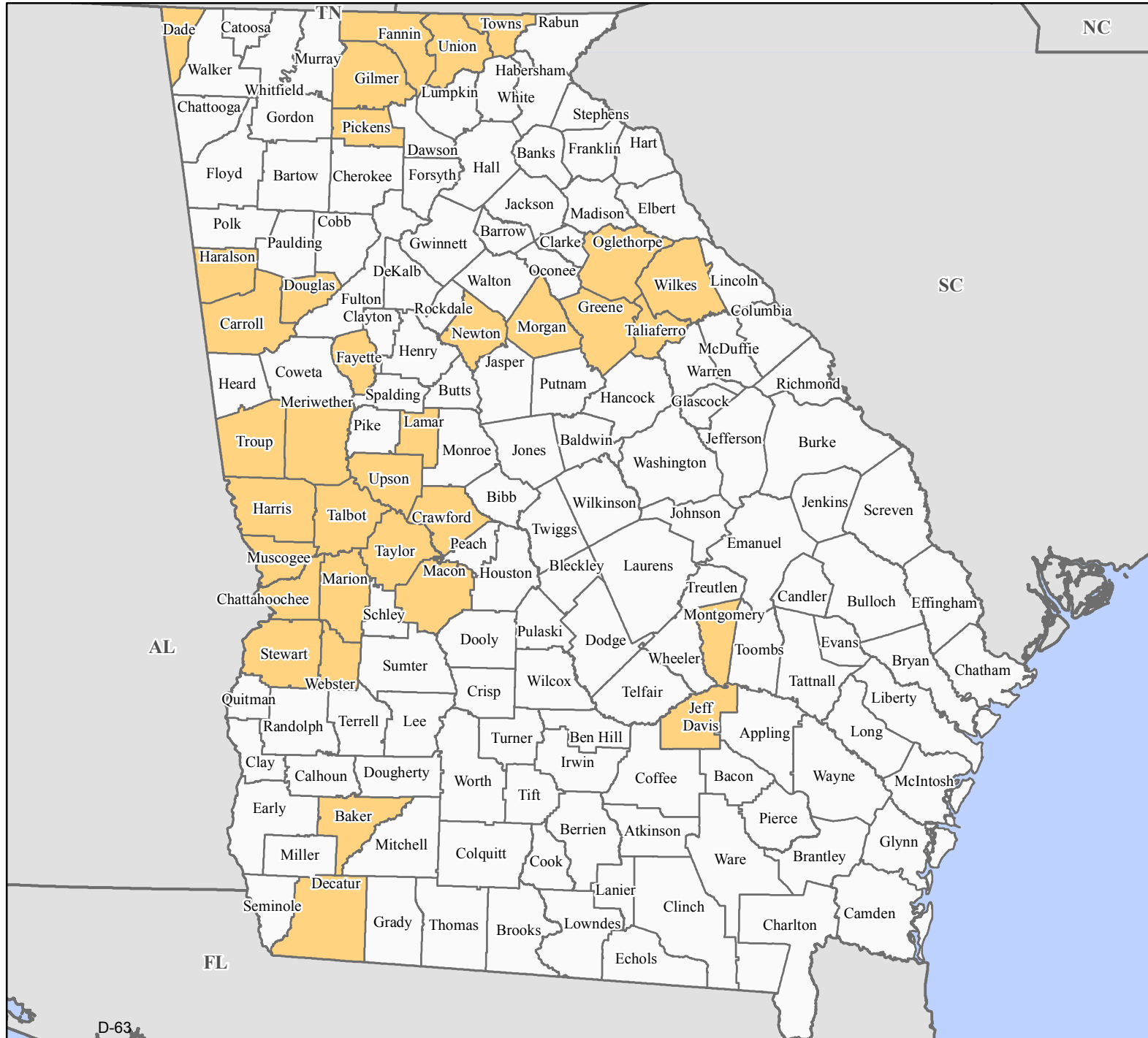
Data Sources:

FEMA, ESRI;
Initial Declaration: 04/20/2015
Disaster Federal Registry Notice: 04/20/2015
Datum: North American 1983
Projection: Transverse Mercator

FEMA-4259-DR, Georgia Disaster Declaration as of 03/28/2016



FEMA

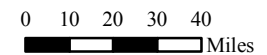
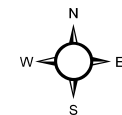


Data Layer/Map Description:
The types of assistance that have been designated for selected areas in the State of Georgia.

All areas within the State of Georgia are eligible for assistance under the Hazard Mitigation Grant Program.

Designated Counties

- No Designation
- Public Assistance

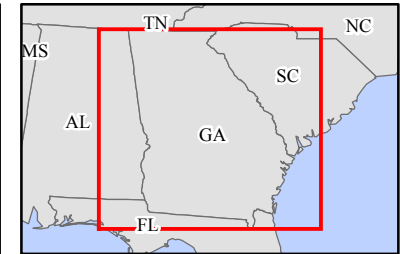
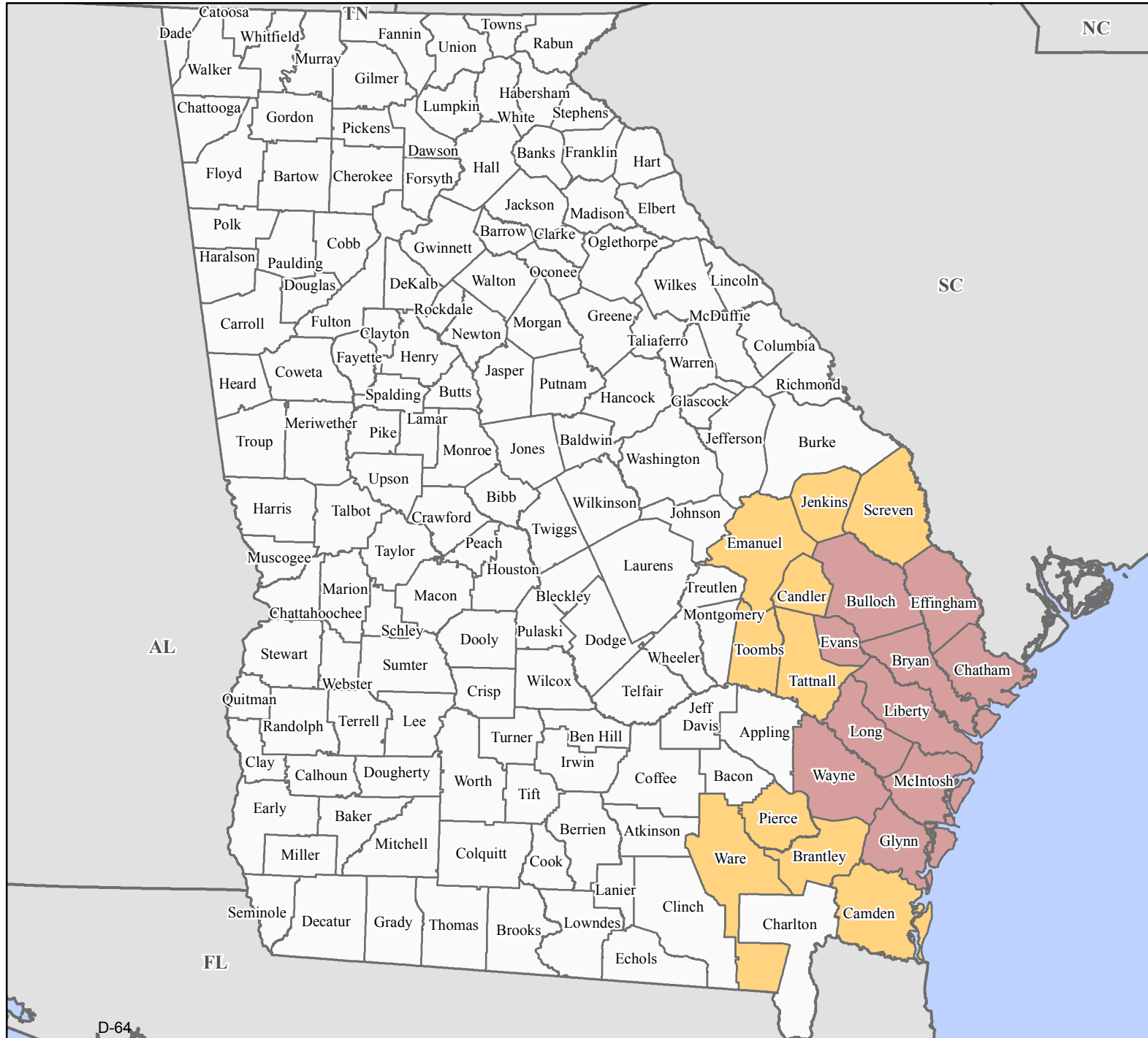


Data Sources:
FEMA, ESRI;
Initial Declaration: 02/26/2016
Disaster Federal Registry Notice: 03/28/2016
Datum: North American 1983
Projection: Transverse Mercator

FEMA-4284-DR, Georgia Disaster Declaration as of 10/28/2016



FEMA

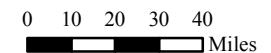
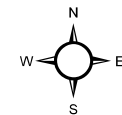


Data Layer/Map Description:
The types of assistance that have been designated for selected areas in the State of Georgia.

All designated areas in the State of Georgia are eligible to apply for assistance under the Hazard Mitigation Grant Program.

Designated Counties

- No Designation
- Public Assistance
- Individual Assistance and Public Assistance

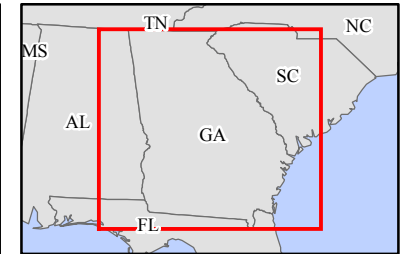
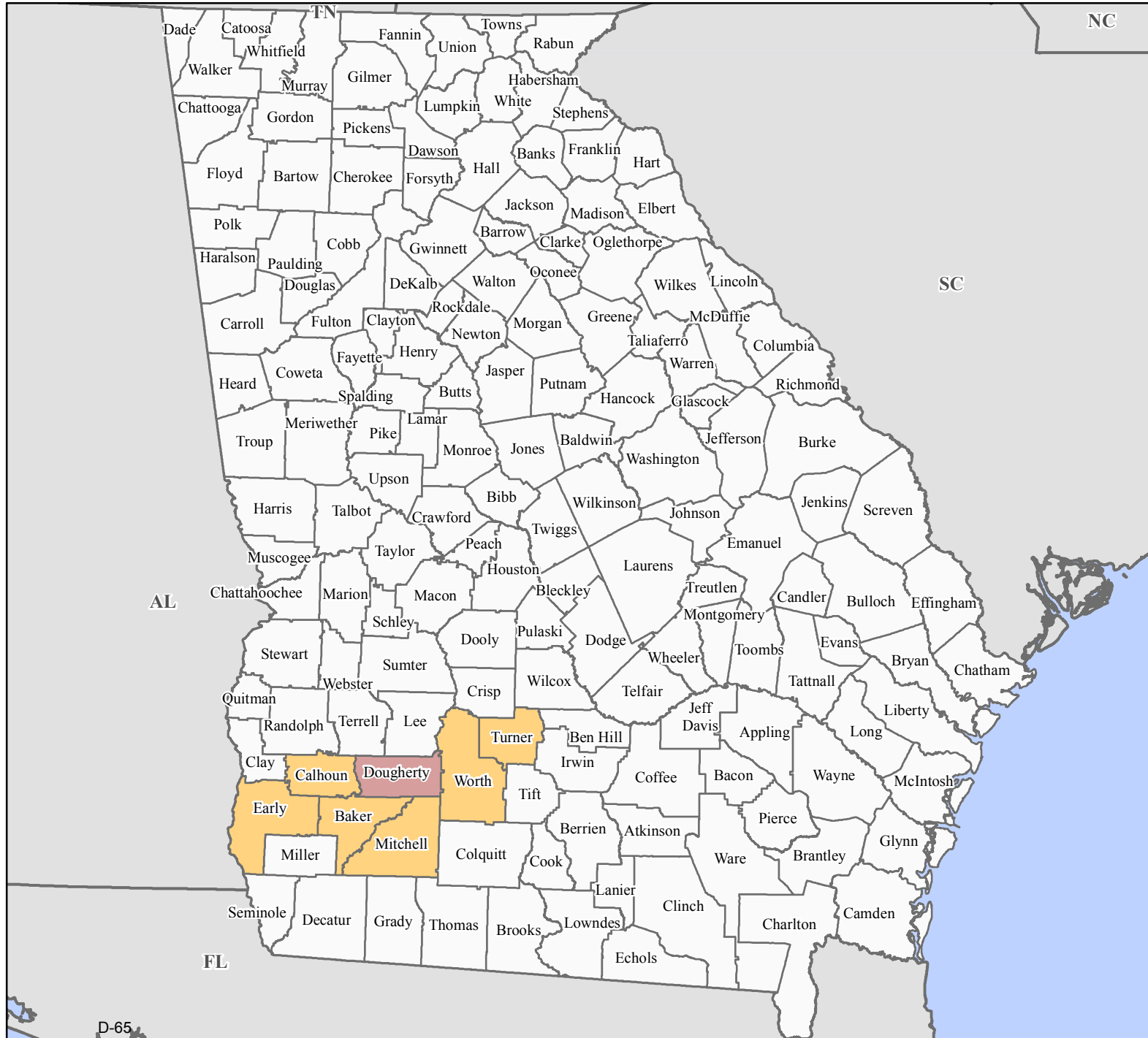


Data Sources:
FEMA, ESRI;
Initial Declaration: 10/08/2016
Disaster Federal Registry Notice:
Amendment #5 - 10/27/2016
Datum: North American 1983
Projection: Transverse Mercator

FEMA-4294-DR, Georgia Disaster Declaration as of 01/25/2017



FEMA

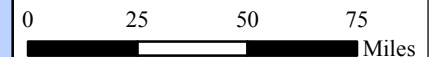
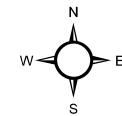


Data Layer/Map Description:
The types of assistance that have been designated for selected areas in the State of Georgia.

All designated areas in the State of Georgia are eligible to apply for assistance under the Hazard Mitigation Grant Program.

Designated Counties

- No Designation
- Public Assistance
- Individual Assistance and Public Assistance

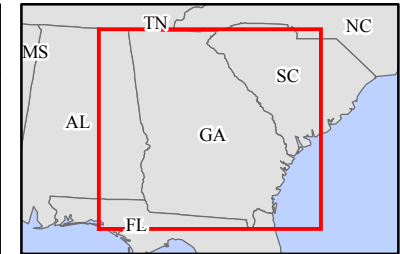
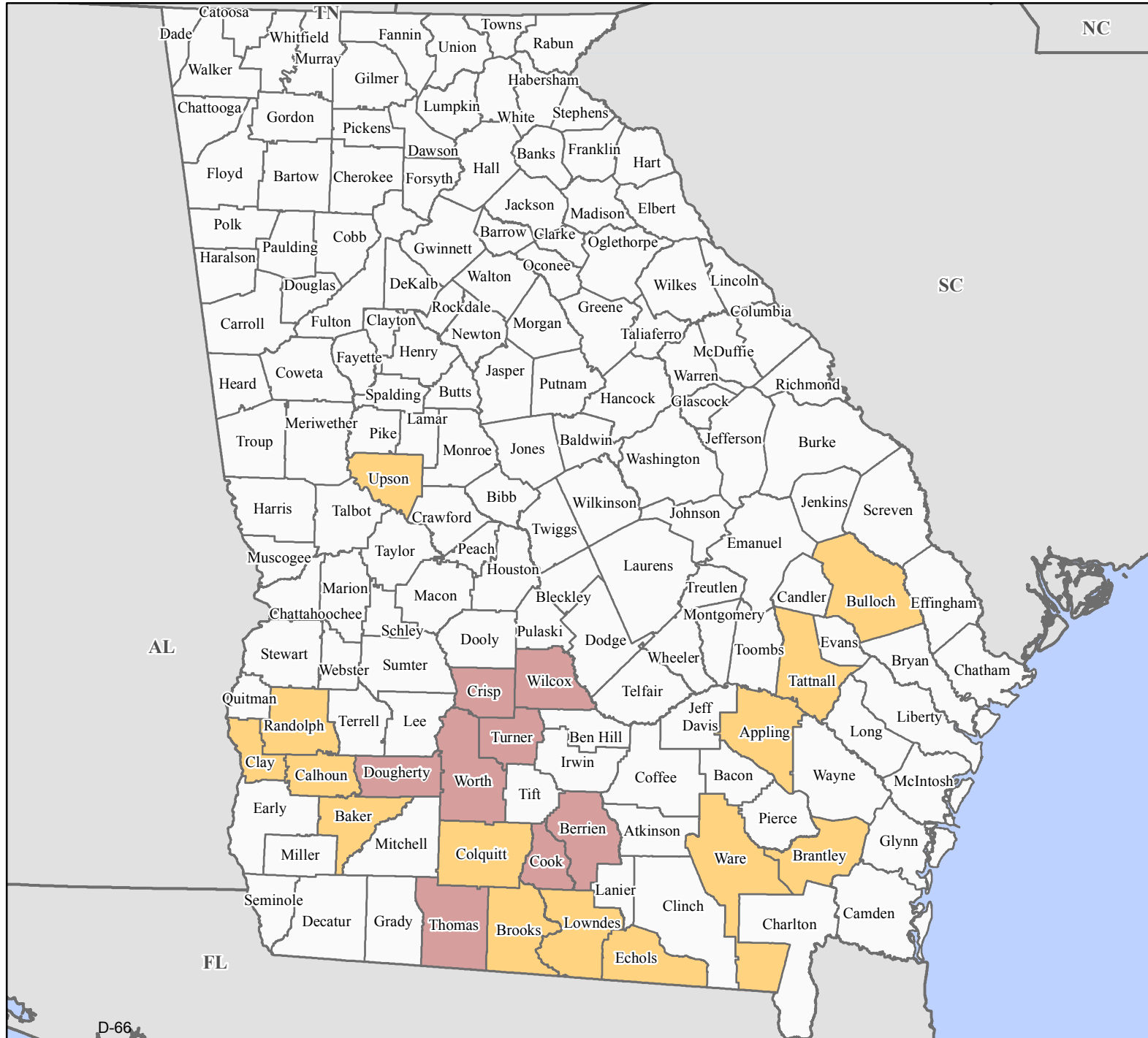


Data Sources:
FEMA, ESRI;
Initial Declaration: 01/25/2017
Disaster Federal Registry Notice: 01/25/2017
Datum: North American 1983
Projection: Transverse Mercator

FEMA-4297-DR, Georgia Disaster Declaration as of 02/16/2017



FEMA

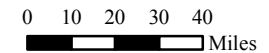
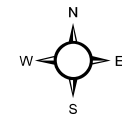


Data Layer/Map Description:
The types of assistance that have been designated for selected areas in the State of Georgia.

All counties in the State of Georgia are eligible to apply for assistance under the Hazard Mitigation Grant Program.

Designated Counties

- No Designation
- Public Assistance
- Individual Assistance and Public Assistance



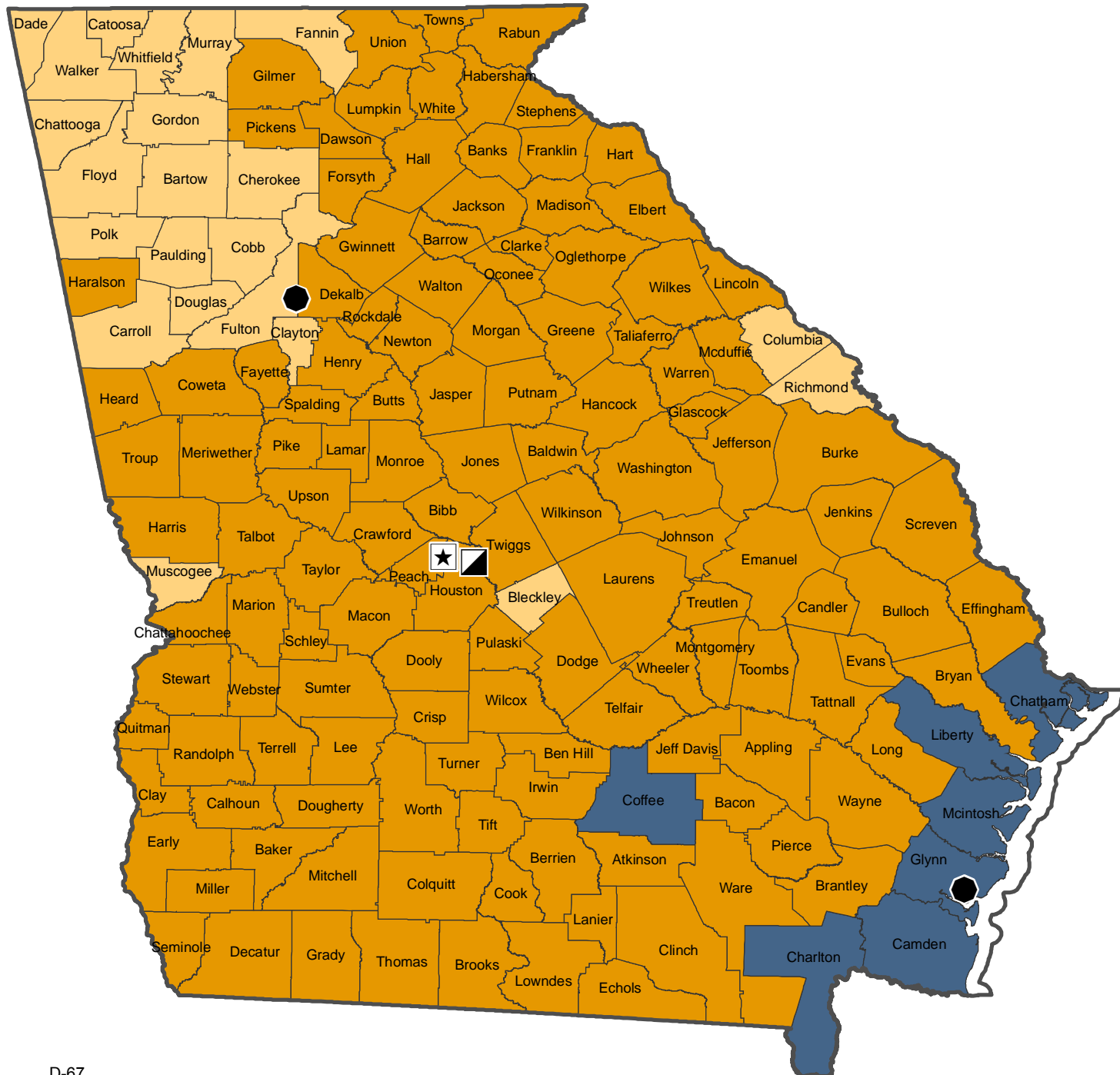
Data Sources: FEMA, ESRI
Initial Declaration: 01/26/2017
Disaster Federal Registry Notice:
Amendment #5 - 02/15/2017
Datum: North American 1983
Projection: Transverse Mercator

Major Disaster Declaration – State of Georgia

FEMA-4338-DR-GA - Hurricane Irma - Declared September 15, 2017 / Amended October 26, 2017



FEMA



Data Layer/Map Description:
This product illustrates the counties affected by Hurricane Irma and those included in the major presidential declaration.

All counties in the State of Georgia are eligible to apply for assistance under the Hazard Mitigation Grant Program.

Incident Period: September 7-20, 2017

Incident Facilities

- Joint Field Office
- Joint Field Office Annex
- Branch Office

Designated Counties

- Individual Assistance and Public Assistance (Cat. A-G) (7)
- Public Assistance (Cat. A-B) (22)
- Public Assistance (Cat. A-G) (130)

Data Sources:
FEMA, ESRI

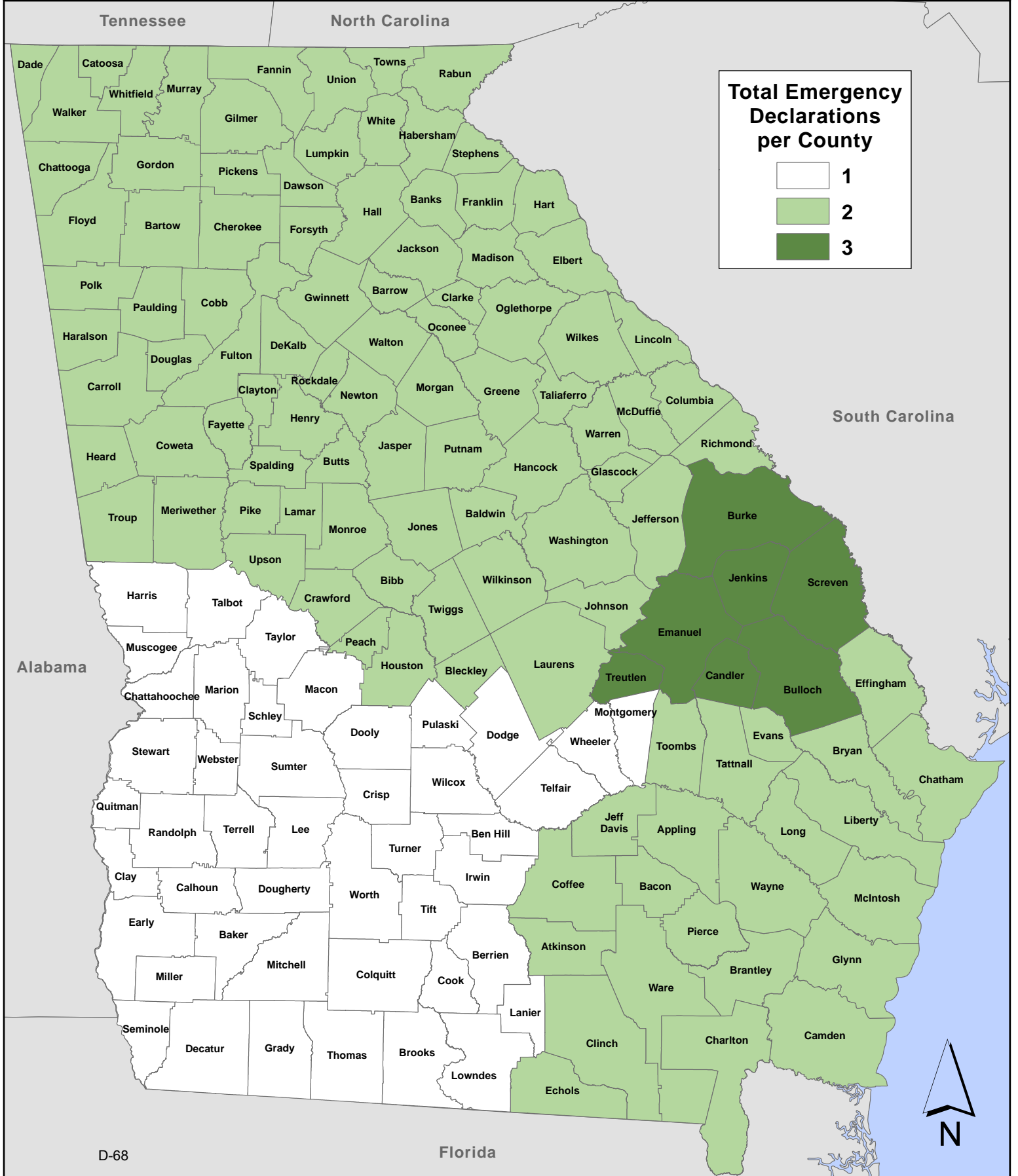
0 25 50 Miles





Emergency Declarations

2013-2017
FEMA Data

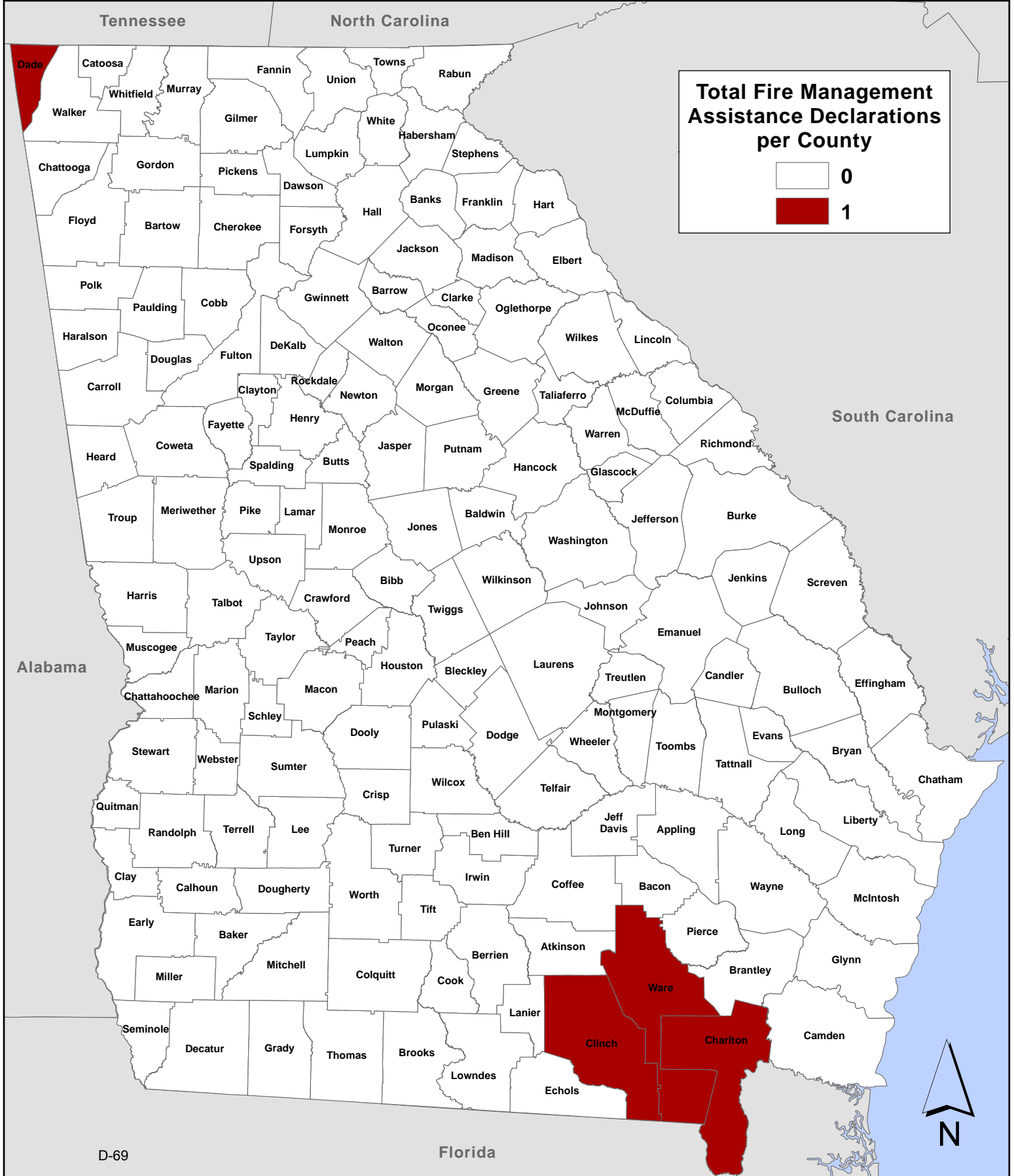




Fire Management Assistance Declarations

2013-2017

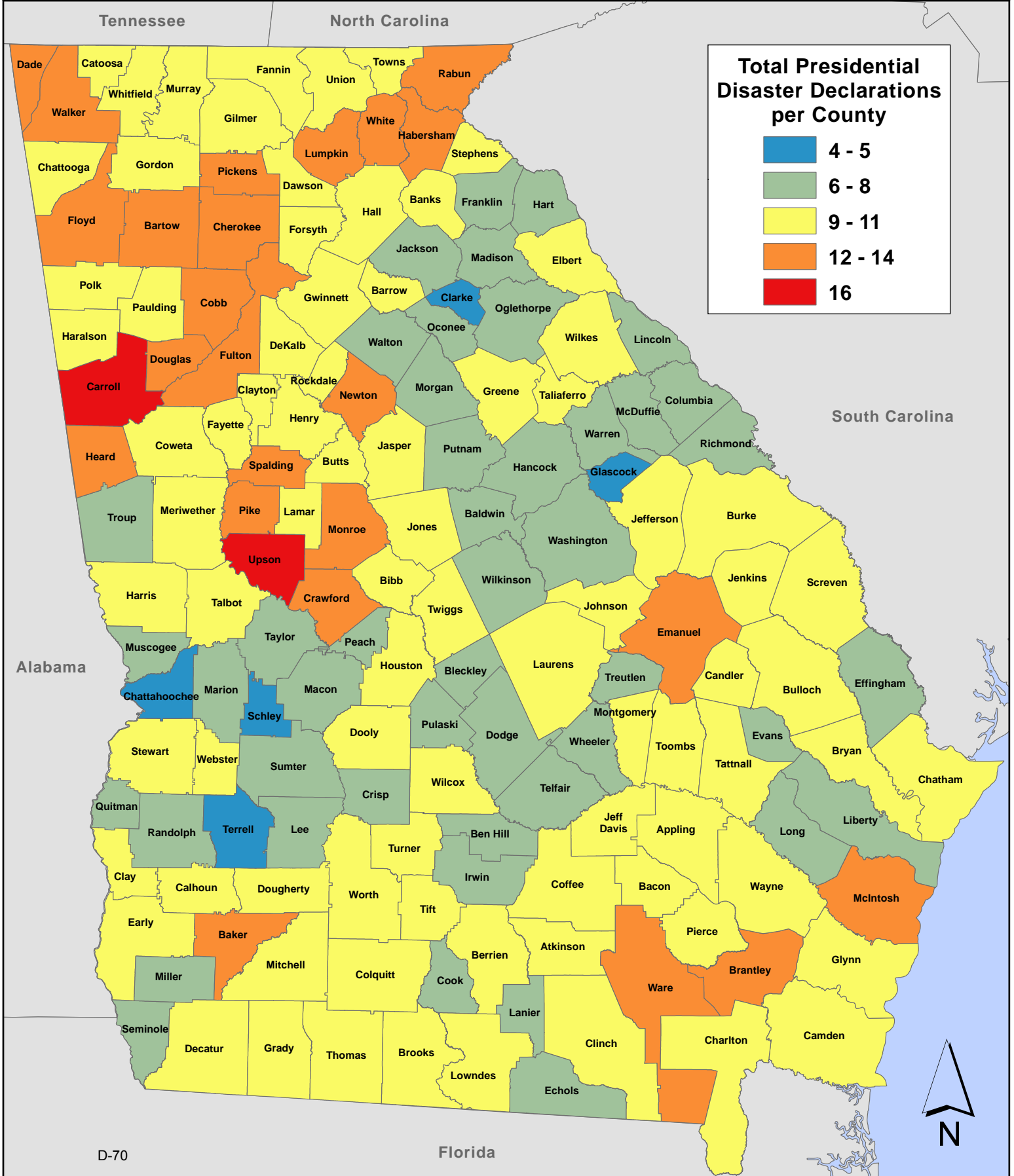
FEMA Data





Presidential Disaster Declarations

1990-2017
FEMA Data

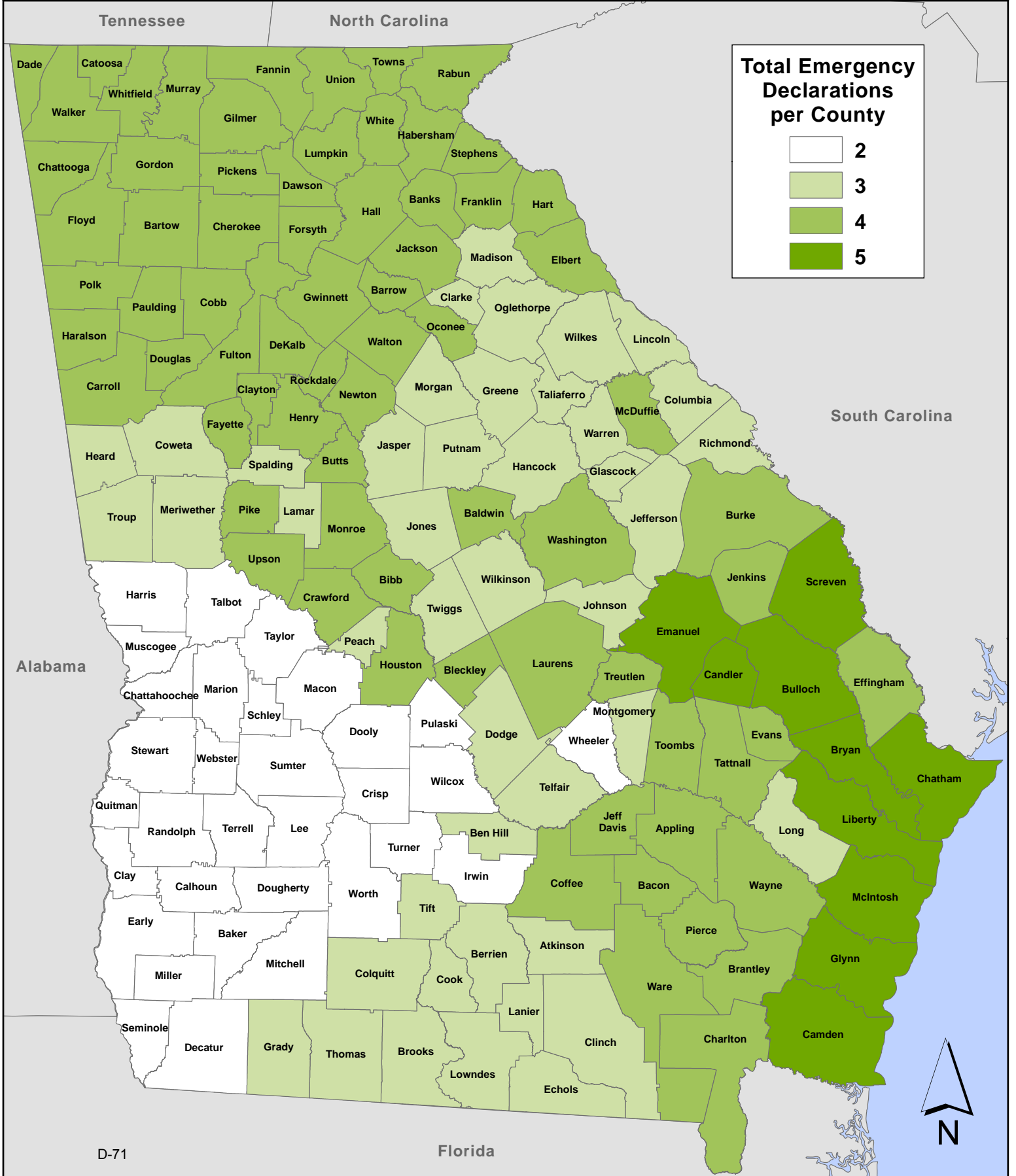




Emergency Declarations

1990-2017

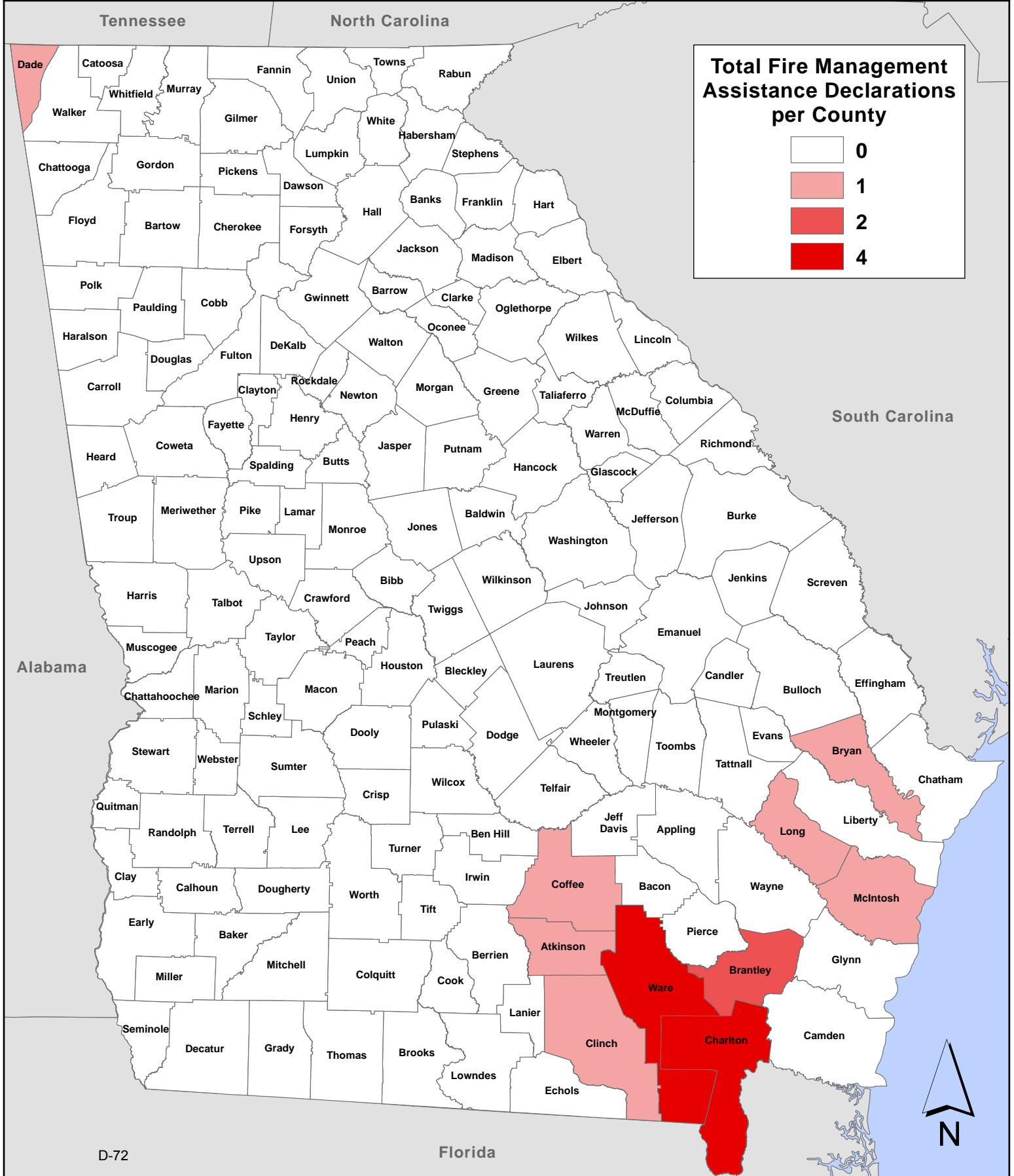
FEMA Data





Fire Management Assistance Declarations

1990-2017
FEMA Data



Presidential Major Disaster Declarations 2014 - Present									
County	4165	4215	4259	4284	4294	4297	4338		Total
Appling						1	1		2
Atkinson							1		1
Bacon							1		1
Baker			1		1	1	1		4
Baldwin	1						1		2
Banks		1					1		2
Barrow		1					1		2
Bartow							1		1
Ben Hill							1		1
Berrien						1	1		2
Bibb							1		1
Bleckley							1		1
Brantley				1		1	1		3
Brooks						1	1		2
Bryan				1			1		2
Bulloch	1			1		1	1		4
Burke	1						1		2
Butts	1						1		2
Calhoun					1	1	1		3
Camden				1			1		2
Candler	1			1			1		3
Carroll	1		1				1		3
Catoosa							1		1
Charlton							1		1
Chatham				1			1		2
Chattahoochee			1				1		2
Chattooga							1		1
Cherokee							1		1
Clarke							1		1
Clay						1	1		2
Clayton							1		1
Clinch							1		1
Cobb							1		1
Coffee							1		1
Colquitt						1	1		2
Columbia	1						1		2
Cook						1	1		2
Coweta	1						1		2
Crawford			1				1		2
Crisp						1	1		2
Dade	1		1				1		3
Dawson		1					1		2
Decatur			1				1		2
DeKalb							1		1
Dodge							1		1

Presidential Major Disaster Declarations 2014 - Present

County	4165	4215	4259	4284	4294	4297	4338	Total
Dooly							1	1
Dougherty					1	1	1	3
Douglas			1				1	2
Early					1		1	2
Echols						1	1	2
Effingham				1			1	2
Elbert		1					1	2
Emanuel	1			1			1	3
Evans				1			1	2
Fannin	1		1				1	3
Fayette	1		1				1	3
Floyd							1	1
Forsyth		1					1	2
Franklin		1					1	2
Fulton	1						1	2
Gilmer	1		1				1	3
GlascocK	1						1	2
Glynn				1			1	2
Gordon							1	1
Grady							1	1
Greene			1				1	2
Gwinnett							1	1
Habersham	1	1					1	3
Hall		1					1	2
Hancock	1						1	2
Haralson	1		1				1	3
Harris			1				1	2
Hart							1	1
Heard	1						1	2
Henry							1	1
Houston							1	1
Irwin							1	1
Jackson		1					1	2
Jasper	1						1	2
Jeff Davis			1				1	2
Jefferson	1						1	2
Jenkins	1			1			1	3
Johnson	1						1	2
Jones	1						1	2
Lamar	1		1				1	3
Lanier							1	1
Laurens							1	1
Lee							1	1
Liberty				1			1	2
Lincoln							1	1

Presidential Major Disaster Declarations 2014 - Present								
County	4165	4215	4259	4284	4294	4297	4338	Total
Long				1			1	2
Lowndes						1	1	2
Lumpkin		1					1	2
Macon			1				1	2
Madison	1	1					1	3
Marion			1				1	2
McDuffie	1						1	2
McIntosh				1			1	2
Meriwether	1		1				1	3
Miller							1	1
Mitchell					1		1	2
Monroe	1						1	2
Montgomery			1				1	2
Morgan	1		1				1	3
Murray							1	1
Muscogee			1				1	2
Newton	1		1				1	3
Oconee							1	1
Oglethorpe		1	1				1	3
Paulding							1	1
Peach							1	1
Pickens	1	1	1				1	4
Pierce				1			1	2
Pike	1						1	2
Polk							1	1
Pulaski							1	1
Putnam							1	1
Quitman							1	1
Rabun							1	1
Randolph						1	1	2
Richmond	1						1	2
Rockdale							1	1
Schley							1	1
Screven	1			1			1	3
Seminole							1	1
Spalding	1						1	2
Stephens		1					1	2
Stewart			1				1	2
Sumter							1	1
Talbot			1				1	2
Taliaferro	1		1				1	3
Tattnall				1		1	1	3
Taylor			1				1	2
Telfair							1	1
Terrell							1	1

Presidential Major Disaster Declarations 2014 - Present									
County	4165	4215	4259	4284	4294	4297	4338		Total
Thomas						1	1		2
Tift							1		1
Toombs				1			1		2
Towns			1				1		2
Treutlen							1		1
Troup			1				1		2
Turner					1	1	1		3
Twiggs	1						1		2
Union			1				1		2
Upson	1		1			1	1		4
Walker	1						1		2
Walton							1		1
Ware				1		1	1		3
Warren	1						1		2
Washington	1						1		2
Wayne				1			1		2
Webster			1				1		2
Wheeler							1		1
White	1	1					1		3
Whitfield	1						1		2
Wilcox						1	1		2
Wilkes	1		1				1		3
Wilkinson							1		1
Worth					1	1	1		3
TOTAL	45	15	34	20	7	22	159	0	

Emergency Declarations 2014 - Present					
County	3368	3379	3387		Total
Appling		1	1		2
Atkinson		1	1		2
Bacon		1	1		2
Baker			1		1
Baldwin	1		1		2
Banks	1		1		2
Barrow	1		1		2
Bartow	1		1		2
Ben Hill			1		1
Berrien			1		1
Bibb	1		1		2
Bleckley	1		1		2
Brantley		1	1		2
Brooks			1		1
Bryan		1	1		2
Bulloch	1	1	1		3
Burke	1	1	1		3
Butts	1		1		2
Calhoun			1		1
Camden		1	1		2
Candler	1	1	1		3
Carroll	1		1		2
Catoosa	1		1		2
Charlton		1	1		2
Chatham		1	1		2
Chattahoochee			1		1
Chattooga	1		1		2
Cherokee	1		1		2
Clarke	1		1		2
Clay			1		1
Clayton	1		1		2
Clinch		1	1		2
Cobb	1		1		2
Coffee		1	1		2
Colquitt			1		1
Columbia	1		1		2
Cook			1		1
Coweta	1		1		2
Crawford	1		1		2
Crisp			1		1
Dade	1		1		2
Dawson	1		1		2
Decatur			1		1
DeKalb	1		1		2
Dodge			1		1

Emergency Declarations 2014 - Present					
County	3368	3379	3387		Total
Dooly			1		1
Dougherty			1		1
Douglas	1		1		2
Early			1		1
Echols		1	1		2
Effingham		1	1		2
Elbert	1		1		2
Emanuel	1	1	1		3
Evans		1	1		2
Fannin	1		1		2
Fayette	1		1		2
Floyd	1		1		2
Forsyth	1		1		2
Franklin	1		1		2
Fulton	1		1		2
Gilmer	1		1		2
Glascocock	1		1		2
Glynn		1	1		2
Gordon	1		1		2
Grady			1		1
Greene	1		1		2
Gwinnett	1		1		2
Habersham	1		1		2
Hall	1		1		2
Hancock	1		1		2
Haralson	1		1		2
Harris			1		1
Hart	1		1		2
Heard	1		1		2
Henry	1		1		2
Houston	1		1		2
Irwin			1		1
Jackson	1		1		2
Jasper	1		1		2
Jeff Davis		1	1		2
Jefferson	1		1		2
Jenkins	1	1	1		3
Johnson	1		1		2
Jones	1		1		2
Lamar	1		1		2
Lanier			1		1
Laurens	1		1		2
Lee			1		1
Liberty		1	1		2
Lincoln	1		1		2

Emergency Declarations 2014 - Present					
County	3368	3379	3387		Total
Long		1	1		2
Lowndes			1		1
Lumpkin	1		1		2
Macon			1		1
Madison	1		1		2
Marion			1		1
McDuffie	1		1		2
McIntosh		1	1		2
Meriwether	1		1		2
Miller			1		1
Mitchell			1		1
Monroe	1		1		2
Montgomery			1		1
Morgan	1		1		2
Murray	1		1		2
Muscogee			1		1
Newton	1		1		2
Oconee	1		1		2
Oglethorpe	1		1		2
Paulding	1		1		2
Peach	1		1		2
Pickens	1		1		2
Pierce		1	1		2
Pike	1		1		2
Polk	1		1		2
Pulaski			1		1
Putnam	1		1		2
Quitman			1		1
Rabun	1		1		2
Randolph			1		1
Richmond	1		1		2
Rockdale	1		1		2
Schley			1		1
Screven	1	1	1		3
Seminole			1		1
Spalding	1		1		2
Stephens	1		1		2
Stewart			1		1
Sumter			1		1
Talbot			1		1
Taliaferro	1		1		2
Tattnall		1	1		2
Taylor			1		1
Telfair			1		1
Terrell			1		1

Emergency Declarations 2014 - Present					
County	3368	3379	3387		Total
Thomas			1		1
Tift			1		1
Toombs		1	1		2
Towns	1		1		2
Treutlen	1	1	1		3
Troup	1		1		2
Turner			1		1
Twiggs	1		1		2
Union	1		1		2
Upson	1		1		2
Walker	1		1		2
Walton	1		1		2
Ware		1	1		2
Warren	1		1		2
Washington	1		1		2
Wayne		1	1		2
Webster			1		1
Wheeler			1		1
White	1		1		2
Whitfield	1		1		2
Wilcox			1		1
Wilkes	1		1		2
Wilkinson	1		1		2
Worth			1		1
Total	91	30	159	0	

Fire Management Assistance Declarations 2014 to Present (None to date)

County	5181*	5163*								Total
Charlton		1								1
Clinch		1								1
Dade	1									1
Ware		1								1
TOTAL	1	3	0	0	0	0	0	0	0	0

Only counties included in declarations are shown.

*No designated counties for these declarations.

Presidential Major Disaster Declarations 2000 - 2013											
County	1973	1858	1833	1761	1750	1686	1560	1554	1315	1311	Total
Appling			1				1				2
Atkinson			1				1				2
Bacon			1				1				2
Baker			1			1	1				3
Banks								1		1	2
Barrow										1	1
Bartow	1	1			1					1	4
Ben Hill			1				1				2
Berrien			1				1				2
Bibb				1			1				2
Bleckley							1				1
Brantley			1				1				2
Brooks			1				1				2
Burke					1						1
Butts							1			1	2
Calhoun			1				1				2
Camden			1				1				2
Candler							1				1
Carroll		1		1				1		1	4
Catoosa	1	1								1	3
Charlton							1				1
Chattooga		1								1	2
Cherokee	1	1						1		1	4
Clarke										1	1
Clay						1		1			2
Clayton								1			1
Clinch			1				1				2
Cobb		1						1		1	3
Coffee			1				1				2
Colquitt			1				1		1		3
Cook			1				1				2
Coweta	1	1									2
Crawford		1		1		1	1				4
Crisp			1				1				2
Dade	1							1			2
Dawson		1						1		1	3
Decatur			1				1		1		3
DeKalb		1			1			1		1	4
Dodge			1				1				2
Dooly		1					1				2
Dougherty			1			1	1				3
Douglas		1		1						1	3
Early			1					1			2
Echols			1				1				2
Elbert							1	1		1	3

Presidential Major Disaster Declarations 2000 - 2013											
County	1973	1858	1833	1761	1750	1686	1560	1554	1315	1311	Total
Emanuel				1			1				2
Evans							1				1
Fannin								1		1	2
Floyd	1				1					1	3
Forsyth								1		1	2
Franklin								1		1	2
Fulton		1			1			1		1	4
Gilmer								1		1	2
Glynn				1			1				2
Gordon	1									1	2
Grady			1				1		1		3
Greene	1						1			1	3
Gwinnett		1								1	2
Habersham	1							1		1	3
Hall										1	1
Hancock						1	1				2
Haralson										1	1
Harris	1						1	1			3
Hart							1			1	2
Heard	1	1						1			3
Henry										1	1
Houston		1					1				2
Irwin			1				1				2
Jackson										1	1
Jasper							1			1	2
Jeff Davis			1				1				2
Jefferson				1	1						2
Jenkins				1							1
Johnson				1			1				2
Jones							1			1	2
Lamar	1						1			1	3
Lanier			1				1				2
Laurens				1			1				2
Lee			1								1
Long							1				1
Lowndes			1				1				2
Lumpkin	1							1		1	3
Macon							1				1
Madison								1			1
McDuffie						1					1
McIntosh			1	1			1				3
Meriwether	1										1
Miller			1					1			2
Mitchell			1			1			1		3
Monroe	1		1				1			1	4

Presidential Major Disaster Declarations 2000 - 2013											
County	1973	1858	1833	1761	1750	1686	1560	1554	1315	1311	Total
Montgomery			1				1				2
Morgan	1										1
Muscogee						1					1
Newton	1	1								1	3
Oconee										1	1
Oglethorpe										1	1
Paulding		1								1	2
Peach		1					1				2
Pickens	1							1		1	3
Pierce			1				1				2
Pike							1	1		1	3
Polk	1				1						2
Pulaski			1				1				2
Putnam							1				1
Rabun	1						1	1		1	4
Rockdale		1								1	2
Schley							1				1
Seminole			1								1
Spalding	1						1			1	3
Stephens		1						1		1	3
Stewart						1					1
Sumter						1	1				2
Talbot							1				1
Taliaferro							1			1	2
Tattnall			1				1				2
Taylor		1				1	1				3
Telfair			1				1				2
Thomas			1				1				2
Tift			1				1		1		3
Toombs			1				1				2
Towns								1			1
Treutlen				1			1				2
Troup	1										1
Turner			1				1		1		3
Twiggs				1			1				2
Union								1		1	2
Upson	1		1				1	1		1	5
Walker	1	1								1	3
Walton										1	1
Ware			1				1				2
Warren						1					1
Washington							1				1
Wayne			1				1				2
Webster						1	1				2
Wheeler			1				1				2

Presidential Major Disaster Declarations 2000 - 2013											
County	1973	1858	1833	1761	1750	1686	1560	1554	1315	1311	Total
White	1							1		1	3
Wilcox			1				1				2
Wilkes							1	1		1	3
Wilkinson				1		1	1				3
Worth			1			1	1				3
TOTAL	25	23	46	14	7	15	80	31	6	51	

Presidential Major Disaster Declarations 1990 - 1999

County	1271	1209	1076	1071	1042	1033	1020	980	969	897	880	857	Total
Appling		1								1			2
Atkinson		1								1			2
Bacon		1								1			2
Baker		1				1						1	3
Baldwin		1											1
Banks				1									1
Barrow		1		1									2
Bartow		1		1			1	1					4
Ben Hill		1											1
Berrien		1								1			2
Bibb		1				1						1	3
Bleckley		1											1
Brantley		1											1
Brooks		1			1					1			3
Bryan		1			1								2
Bulloch		1			1								2
Burke		1									1		2
Butts		1				1						1	3
Calhoun		1				1							2
Camden					1								1
Candler	1	1											2
Carroll		1		1		1			1			1	5
Catoosa				1			1					1	3
Charlton		1											1
Chatham		1			1								2
Chattahoochee													0
Chattooga				1								1	2
Cherokee		1		1			1		1				4
Clarke													0
Clay		1		1		1							3
Clayton		1		1		1							3
Clinch		1			1					1			3
Cobb		1		1				1	1			1	5
Coffee		1								1			2
Colquitt		1			1								2
Columbia		1									1		2
Cook		1											1
Coweta				1		1							2
Crawford		1				1							2
Crisp		1				1							2
Dade		1		1					1			1	4
Dawson		1		1									2
Decatur		1			1	1							3
DeKalb		1		1									2
Dodge		1				1							2

Presidential Major Disaster Declarations 1990 - 1999

County	1271	1209	1076	1071	1042	1033	1020	980	969	897	880	857	Total
Dooly	1	1				1						1	4
Dougherty		1	1			1							3
Douglas		1		1								1	3
Early		1				1						1	3
Echols		1											1
Effingham		1			1								2
Elbert													0
Emanuel		1									1		2
Evans		1											1
Fannin				1								1	2
Fayette				1		1							2
Floyd		1		1			1					1	4
Forsyth		1		1									2
Franklin													0
Fulton		1		1		1						1	4
Gilmer				1								1	2
Glascock													0
Glynn		1											1
Gordon		1		1								1	3
Grady		1			1								2
Greene									1				1
Gwinnett		1		1									2
Habersham		1		1			1						3
Hall		1		1				1					3
Hancock													0
Haralson		1		1									2
Harris				1								1	2
Hart													0
Heard		1		1				1				1	4
Henry		1				1						1	3
Houston		1				1							2
Irwin		1											1
Jackson													0
Jasper						1							1
Jeff Davis		1								1			2
Jefferson		1									1		2
Jenkins		1									1		2
Johnson		1								1	1		3
Jones		1				1			1				3
Lamar		1				1							2
Lanier		1								1			2
Laurens		1								1			2
Lee		1				1						1	3
Liberty		1											1
Lincoln		1							1				2

Presidential Major Disaster Declarations 1990 - 1999

County	1271	1209	1076	1071	1042	1033	1020	980	969	897	880	857	Total
Long		1											1
Lowndes		1								1			2
Lumpkin		1		1			1		1				4
Macon		1				1						1	3
Madison													0
Marion						1						1	2
McDuffie											1		1
McIntosh		1											1
Meriwether				1		1		1				1	4
Miller		1				1							2
Mitchell		1				1							2
Monroe		1				1			1			1	4
Montgomery		1				1							2
Morgan													0
Murray		1		1			1					1	4
Muscogee		1		1								1	3
Newton		1				1						1	3
Oconee													0
Oglethorpe						1							1
Paulding		1		1									2
Peach		1				1							2
Pickens		1		1			1						3
Pierce										1			1
Pike		1		1		1		1				1	5
Polk				1				1				1	3
Pulaski		1				1						1	3
Putnam									1				1
Quitman		1		1		1							3
Rabun		1		1			1						3
Randolph		1		1		1							3
Richmond		1									1		2
Rockdale		1		1		1							3
Schley						1							1
Screven		1									1		2
Seminole		1				1							2
Spalding		1		1		1			1				4
Stephens													0
Stewart		1		1		1						1	4
Sumter		1				1							2
Talbot		1		1		1			1			1	5
Taliaferro									1				1
Tattall		1											1
Taylor						1							1
Telfair		1				1							2
Terrell		1				1							2

Presidential Major Disaster Declarations 1990 - 1999													
County	1271	1209	1076	1071	1042	1033	1020	980	969	897	880	857	Total
Thomas		1			1					1			3
Tift		1			1								2
Toombs		1				1							2
Towns		1		1									2
Treutlen		1											1
Troup				1		1							2
Turner		1											1
Twiggs		1				1							2
Union		1		1								1	3
Upson				1		1						1	3
Walker		1		1			1					1	4
Walton								1					1
Ware		1								1			2
Warren													0
Washington													0
Wayne		1											1
Webster		1				1						1	3
Wheeler		1				1							2
White		1		1			1						3
Whitfield				1			1					1	3
Wilcox		1				1						1	3
Wilkes									1				1
Wilkinson		1											1
Worth		1			1	1							3
TOTAL	2	119	1	50	13	55	12	8	14	15	9	38	

Emergency Declarations 1990 - 2013				
County	3218	3144	3097	Total
Appling	1		1	2
Atkinson	1			1
Bacon	1		1	2
Baker	1			1
Baldwin	1		1	2
Banks	1		1	2
Barrow	1		1	2
Bartow	1		1	2
Ben Hill	1		1	2
Berrien	1		1	2
Bibb	1		1	2
Bleckley	1		1	2
Brantley	1		1	2
Brooks	1		1	2
Bryan	1	1	1	3
Bulloch	1		1	2
Burke	1			1
Butts	1		1	2
Calhoun	1			1
Camden	1	1	1	3
Candler	1		1	2
Carroll	1		1	2
Catoosa	1		1	2
Charlton	1		1	2
Chatham	1	1	1	3
Chattahoochee	1			1
Chattooga	1		1	2
Cherokee	1		1	2
Clarke	1			1
Clay	1			1
Clayton	1		1	2
Clinch	1			1
Cobb	1		1	2
Coffee	1		1	2
Colquitt	1		1	2
Columbia	1			1
Cook	1		1	2
Coweta	1			1
Crawford	1		1	2
Crisp	1			1
Dade	1		1	2
Dawson	1		1	2
Decatur	1			1
DeKalb	1		1	2
Dodge	1		1	2

Emergency Declarations 1990 - 2013				
County	3218	3144	3097	Total
Dooly	1			1
Dougherty	1			1
Douglas	1		1	2
Early	1			1
Echols	1			1
Effingham	1		1	2
Elbert	1		1	2
Emanuel	1		1	2
Evans	1		1	2
Fannin	1		1	2
Fayette	1		1	2
Floyd	1		1	2
Forsyth	1		1	2
Franklin	1		1	2
Fulton	1		1	2
Gilmer	1		1	2
Glascock	1			1
Glynn	1	1	1	3
Gordon	1		1	2
Grady	1		1	2
Greene	1			1
Gwinnett	1		1	2
Habersham	1		1	2
Hall	1		1	2
Hancock	1			1
Haralson	1		1	2
Harris	1			1
Hart	1		1	2
Heard	1			1
Henry	1		1	2
Houston	1		1	2
Irwin	1			1
Jackson	1		1	2
Jasper	1			1
Jeff Davis	1		1	2
Jefferson	1			1
Jenkins	1			1
Johnson	1			1
Jones	1			1
Lamar	1			1
Lanier	1		1	2
Laurens	1		1	2
Lee	1			1
Liberty	1	1	1	3
Lincoln	1			1

Emergency Declarations 1990 - 2013				
County	3218	3144	3097	Total
Long	1			1
Lowndes	1		1	2
Lumpkin	1		1	2
Macon	1			1
Madison	1			1
Marion	1			1
McDuffie	1		1	2
McIntosh	1	1	1	3
Meriwether	1			1
Miller	1			1
Mitchell	1			1
Monroe	1		1	2
Montgomery	1		1	2
Morgan	1			1
Murray	1		1	2
Muscogee	1			1
Newton	1		1	2
Oconee	1		1	2
Oglethorpe	1			1
Paulding	1		1	2
Peach	1			1
Pickens	1		1	2
Pierce	1		1	2
Pike	1		1	2
Polk	1		1	2
Pulaski	1			1
Putnam	1			1
Quitman	1			1
Rabun	1		1	2
Randolph	1			1
Richmond	1			1
Rockdale	1		1	2
Schley	1			1
Screven	1		1	2
Seminole	1			1
Spalding	1			1
Stephens	1		1	2
Stewart	1			1
Sumter	1			1
Talbot	1			1
Taliaferro	1			1
Tattnall	1		1	2
Taylor	1			1
Telfair	1		1	2
Terrell	1			1

Emergency Declarations 1990 - 2013				
County	3218	3144	3097	Total
Thomas	1		1	2
Tift	1		1	2
Toombs	1		1	2
Towns	1		1	2
Treutlen	1			1
Troup	1			1
Turner	1			1
Twiggs	1			1
Union	1		1	2
Upson	1		1	2
Walker	1		1	2
Walton	1		1	2
Ware	1		1	2
Warren	1			1
Washington	1		1	2
Wayne	1		1	2
Webster	1			1
Wheeler	1			1
White	1		1	2
Whitfield	1		1	2
Wilcox	1			1
Wilkes	1			1
Wilkinson	1			1
Worth	1			1
TOTAL	159	6	93	

Fire Management Assistance Declarations 1990 - 2013											
County	2921	2920	2876	2875	2697	2693	2688	2686	2685	2362	Total
Atkinson							1				1
Brantley		1						1			2
Bryan					1						1
Charlton		1				1			1		3
Coffee			1								1
Long				1							1
McIntosh										1	1
Ware	1	1							1		3
TOTAL	1	3	1	1	1	1	1	1	2	1	

Only counties included in declarations are shown.

Presidential Major Disaster Declarations Prior to 1990

County	541	536*	507	460	425	391	370	214	180*	177*	150*	110*	16*	1*	Total
Baker								1							1
Banks			1												1
Bartow					1										1
Berrien					1										1
Bleckley								1							1
Bryan								1							1
Catoosa							1								1
Chattooga							1								1
Clarke						1	1								2
Clayton							1								1
Cobb								1							1
Coffee					1										1
Crawford								1							1
Dade							1								1
Dawson					1										1
Decatur								1							1
DeKalb							1								1
Dougherty								1							1
Fannin					1										1
Floyd								1							1
Forsyth					1										1
Franklin			1												1
Fulton				1											1
Gilmer					1										1
Gordon					1		1								2
Habersham			1												1
Hall			1		1			1							3
Haralson					1										1
Henry							1								1
Houston								1							1
Jackson			1												1
Jefferson								1							1
Laurens								1							1
Lee								1							1
Long								1							1
Lumpkin			1		1										2
Madison								1							1
Mitchell					1										1
Montgomery								1							1
Murray					1										1
Oconee							1								1
Paulding					1			1							2
Peach								1							1
Pickens					1										1
Polk					1										1

Presidential Major Disaster Declarations Prior to 1990															
County	541	536*	507	460	425	391	370	214	180*	177*	150*	110*	16*	1*	Total
Rabun			1		1										2
Rockdale							1								1
Stephens	1		1												2
Tattnall								1							1
Taylor								1							1
Tift					1										1
Toombs								1							1
Treutlen								1							1
Walker								1							1
Walton								1							1
Washington								1							1
Wheeler								1							1
Whitfield					1		1								2
Worth					1										1
TOTAL	1	0	8	1	20	1	14	23	0	0	0	0	0	0	

* Location records are not available for these declarations
Only counties included in declarations are shown.

Emergency Declarations Prior to 1990					
County	3089*	3072*	3044	3008*	Total
Appling			1		1
Atkinson			1		1
Bacon			1		1
Baker			1		1
Baldwin			1		1
Banks			1		1
Barrow			1		1
Bartow			1		1
Ben Hill			1		1
Berrien			1		1
Bibb			1		1
Bleckley			1		1
Brantley			1		1
Brooks			1		1
Bryan			1		1
Bulloch			1		1
Burke			1		1
Butts			1		1
Camden			1		1
Candler			1		1
Carroll			1		1
Catoosa			1		1
Charlton			1		1
Chatham			1		1
Chattahoochee			1		1
Chattooga			1		1
Cherokee			1		1
Clarke			1		1
Clayton			1		1
Clinch			1		1
Cobb			1		1
Coffee			1		1
Colquitt			1		1
Columbia			1		1
Cook			1		1
Coweta			1		1
Crawford			1		1
Crisp			1		1
Dade			1		1
Dawson			1		1
Decatur			1		1
DeKalb			1		1
Dodge			1		1
Dooly			1		1
Douglas			1		1

Emergency Declarations Prior to 1990					
County	3089*	3072*	3044	3008*	Total
Early			1		1
Echols			1		1
Effingham			1		1
Elbert			1		1
Emanuel			1		1
Fayette			1		1
Floyd			1		1
Forsyth			1		1
Franklin			1		1
Fulton			1		1
Glascokk			1		1
Glynn			1		1
Gordon			1		1
Grady			1		1
Greene			1		1
Gwinnett			1		1
Habersham			1		1
Hall			1		1
Hancock			1		1
Haralson			1		1
Harris			1		1
Hart			1		1
Heard			1		1
Henry			1		1
Houston			1		1
Irwin			1		1
Jackson			1		1
Jasper			1		1
Jeff Davis			1		1
Jefferson			1		1
Jenkins			1		1
Johnson			1		1
Jones			1		1
Lamar			1		1
Lanier			1		1
Laurens			1		1
Lee			1		1
Liberty			1		1
Lincoln			1		1
Long			1		1
Lowndes			1		1
Lumpkin			1		1
Macon			1		1
Madison			1		1
Marion			1		1

Emergency Declarations Prior to 1990					
County	3089*	3072*	3044	3008*	Total
McDuffie			1		1
McIntosh			1		1
Meriwether			1		1
Miller			1		1
Mitchell			1		1
Monroe			1		1
Montgomery			1		1
Morgan			1		1
Murray			1		1
Newton			1		1
Oconee			1		1
Oglethorpe			1		1
Paulding			1		1
Peach			1		1
Pickens			1		1
Pierce			1		1
Pike			1		1
Polk			1		1
Pulaski			1		1
Putnam			1		1
Richmond			1		1
Rockdale			1		1
Schley			1		1
Screven			1		1
Seminole			1		1
Spalding			1		1
Stephens			1		1
Stewart			1		1
Sumter			1		1
Talbot			1		1
Taliaferro			1		1
Tattnall			1		1
Taylor			1		1
Telfair			1		1
Thomas			1		1
Tift			1		1
Toombs			1		1
Treutlen			1		1
Troup			1		1
Twiggs			1		1
Upson			1		1
Walker			1		1
Walton			1		1
Ware			1		1
Warren			1		1

Emergency Declarations Prior to 1990					
County	3089*	3072*	3044	3008*	Total
Washington			1		1
Wayne			1		1
Webster			1		1
Wheeler			1		1
White			1		1
Whitfield			1		1
Wilcox			1		1
Wilkes			1		1
Wilkinson			1		1
TOTAL	0	0	144	0	

* Location records are not available for these declarations
Only counties included in declarations are shown.

Appendix D-IV
Georgia Forest and Wildfire
Information



Georgia Forest Facts

Georgia's forests have the capacity to meet increased demands for goods and services now and in the future. But the correct mix of stewardship, market opportunities and commitment to public policy must come together to support forest landowners, organizations and communities that hold these forests in trust for future generations.

Forest Land

Of Georgia's 37 million acres of land area, 24.8 million acres is forest land. Of this 24.8 million acres, 24.4 million acres is timberland available for commercial use - more than any other state in the nation. The state's forest lands provide a myriad of benefits to citizens, including clean air and clean water. **With two out of every three raindrops falling in Georgia landing on forest lands, our forests are one of the most significant factors affecting our water quality and quantity.**

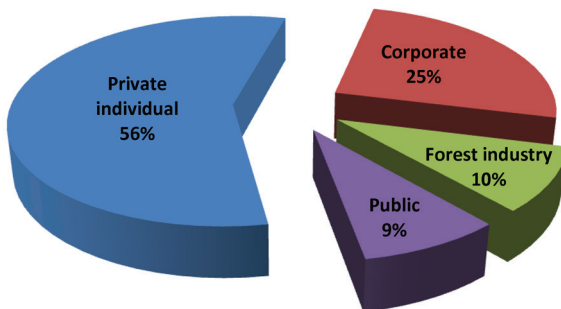
Forest Inventory and Analysis, US Forest Service 2011

- The forest industry provides an average of **\$448 million in state tax revenues** each year.
- There are 151 wood processing mills in Georgia, including 12 pulp mills, 85 sawmills and 54 other mills.
- An estimated 47 Georgia counties are ranked as critically dependent, very dependent or moderately dependent on the forest products industry in terms of employment.

*Economic Benefits of the Forestry Industry in Georgia
Georgia Institute of Technology - 2010 Report*

Ownership

The majority of Georgia's timberland is owned by private non-industrial landowners.



Forest Inventory and Analysis, US Forest Service 2010

Contribution to the Economy

Georgia's forest industry is the second largest industry in the state in terms of employment and wages and salaries.

- Forest-related industries inject **\$23.6 billion and 108,112 jobs** into the state's economy, making it Georgia's second largest manufacturing employer.
- Compensation for forest industry employees and supporting businesses exceeds \$5.4 billion per year, and forest management and supply to mills by landowners and forest managers generate \$900 million in output (mill gate value).

Value to Georgia Citizens

Georgia's forest lands provide immense value to citizens throughout the state in the form of essential ecosystem services - clean water, carbon storage, wildlife habitat and aesthetics. A report by the University of Georgia found that these **ecosystem services are worth an estimated \$37 billion annually**. This is in addition to the value of timber, forest products and recreation.

Emerging Opportunities

Georgia's forest resources are capable of providing a variety of additional opportunities for the state. One of the most profound opportunities lies with the emerging bioenergy industry, of which Georgia is considered a leader.

- *Forbes* magazine ranked Georgia third in the nation for potential biomass energy as measured by the amount of biomass available in the state.
- Bioenergy projects in Georgia have the potential to add **thousands of additional jobs** within the new facilities and forestry operations to support them.
- The marketing of Georgia's traditional forest products and developing new bioenergy products will increase the value of forests and encourage reforestation and good management practices.

Sustainability

Trees are a renewable resource providing clean air, clean water and abundant products. Georgia's forests are being sustainably managed to meet the growing needs of citizens. With the wise use of knowledge and resources, Georgians can keep our forests sustainable for present and future generations.

- Georgia's commercial timberlands grow 19 million tons more wood each year than is harvested, resulting in **growth exceeding removals by 38 percent.**
- Georgia's timberland coverage has remained stable since the 1950s. Forest losses in metro areas have been offset by converting old farm lands back to forest lands in other parts of the state.
- Because the net growth of our forests has consistently exceeded net removals, **the volume of timber in Georgia is greater now than it was in the 1930s!**

Forest Threats

Forest issues ranked most critical by the public and identified in the Statewide Assessment of Forest Resources include a number of threats which present significant challenges to forest managers, landowners and policy makers. They are interrelated and often complex:

- *Water quality and quantity*
- *Urbanization*
- *Forest health*
- *Biodiversity*
- *Air quality*
- *Fire management*
- *Fragmentation and parcelization*
- *Economics and changing markets*

Mitigating risks associated with these threats to Georgia's forests is a priority for GFC. For more information on these threats, download the Statewide Assessment of Forest Resources at www.GaTrees.org.

The Georgia Forestry Commission (GFC) is a dynamic state agency responsible for providing leadership, service and education in the protection and conservation of Georgia's forest resources.

An Equal Opportunity Employer and Service Provider

www.cnpp.usda.gov/NondiscriminationStatement.htm



Georgia Wildfires of 2007 Summary of Facts and Costs for Recovery

Overview of The Fires of 2007

The Georgia Forestry Commission led the battle to control Georgia's largest wildfire in recorded history. The Georgia Bay Complex burned 441,705 acres in Georgia and destroyed 9 homes.

An additional 21,000 acres burned in the 21-County Governor Declared Emergency area.

More than 3,300 people from 44 states worked to control the wildfires.

Over \$8 million is needed to reforest non-industrial private land; \$2.2 million in cost-share assistance has been procured to date.

Funds are needed to rehabilitate over 352 miles of firebreaks surrounding the Okefenokee National Wildlife Refuge.

During fiscal year 2007, over 9,500 fires burned more than 504,000 acres. The largest ever recorded annual GFC expenditures for fire control efforts totaled over \$62,000,000.



Jen Kolb

Now that The Fires have been controlled, we all have the opportunity to leave a lasting legacy by the way we manage Georgia's recovery.

The GFC is working to refine assessments of damage and recovery beyond preliminary figures presented in this document.

7/20/2007

The Bottom Line: Damage, Destruction & Cost of The South Georgia Fires of 2007

Fire Location	Ownership of Burned Land	Acres of Land Burned	Number of Landowners	Value of Lost Timber	Acres to Reforest	Estimated Cost To Reforest
Georgia Bay Complex*	<i>Georgia only</i>	441,705				
	Corporate Lands	70,529	11	\$34,971,981	45,844	\$18,337,540
	Non-Industrial Private Farms	19,129	123	\$ 9,485,162	12,434	\$ 4,973,540
	DOI Easements	6,344		\$ 3,145,688	4,124	\$ 1,649,440
	State Forests	19,187		\$ 6,605,600	4,539	\$ 1,268,000
		115,189	134	\$54,208,431	66,941	\$26,228,520
21 County Emergency Declaration Area	Corporate Lands	9,256	23	\$ 4,589,611	6,016	\$ 2,406,560
	Non-Industrial Private Farms	11,792	164	\$ 5,847,093	7,665	\$ 3,065,920
		21,048	187	\$ 10,436,704	13,681	\$ 5,472,480
Totals of All Non-Industrial Private Farms		30,921	287	\$15,332,255	20,099	\$ 8,039,460
Totals of All Private Lands		117,050	321	\$58,039,535	76,083	\$30,433,000

*Georgia Bay Complex – Total acres burned in both Georgia and Florida: 564,450

Appendix D-V
Social Vulnerability Index Variables

US County-Level 2010-14 Social Vulnerability Component Summary

<i>Component</i>	<i>Cardinality</i>	<i>Name</i>	<i>% Variance Explained</i>	<i>Dominant Variables</i>	<i>Component Loading</i>
1	-	Wealth	15.833	MHSEVAL	0.873906183
				QRICH200K	0.871619111
				MDGRENT	0.846370212
				PERCAP	0.817764954
				QASIAN	0.68335643
2	+	Race (Black) and Social Status	15.689	QBLACK	0.838618138
				QFHH	0.820467943
				QPOVTY	0.708101777
				QCVLUN	0.65510152
				QED12LES	0.589244914
				QNOAUTO	0.587784173
				QFAM	-0.792544127
3	+	Age (Elderly)	12.483	MEDAGE	0.840840732
				QSSBEN	0.791627081
				QAGEDEP	0.772990516
				QUNOCCHU	0.757050843
				QRENTER	-0.707241114
4	+	Ethnicity (Hispanic) and Lack of Health Insurance	10.094	QHISP	0.918217941
				QESL	0.89318902
				QNOHLTH	0.53952391
5	+	Special Needs Populations	7.769	QNRRES	0.722009603
				QHOSPTPC	0.65255876
				PPUNIT	-0.518618239
6	+	Service Sector Employment	5.724	QSERV	0.77226767
				QFEMLBR	0.590202961
				QEXTRCT	-0.553394535
7	+	Race (Native American)	5.554	QNATAM	0.921862441
8	+	Gender (Female)	4.955	QFEMALE	0.943608309

Total Variance Explained 78.101



29 Total Variables, populations < 1 excluded, housing units < 1 excluded

Notes:

Component scores and composite SoVI scores in the accompanying geodatabase are relative and comparable across all US counties only.

Component cardinalities in the accompanying feature class have been adjusted as indicated above. The SoVI composite score is obtained by summing all adjusted component scores.

Input data are derived from the 2010 U.S. Census Five-Year American Community Survey, 2010-14.

Appendix E
Mitigation Strategy Workshop
Results

COASTAL HAZARDS

Planning / Regs

- Evacuation zones
- Building codes
- CRS
- advanced notice / @
- centralized communication (1 message)
- Coordinate debris removal issues w/ agencies

Coastal Natural Systems

Structure / Infrastructure drainage design / improvements

Coastal Hazards

Education & Awareness

- "ZONE" Education - Knowing Where You Live and When to Evacuate.
- Insurance / FEMA # Education Sessions
- Centralized Communication - ONE WEBSITE
 - Return Procedures
 - Shelters - # of Openings / Categories
 - POWER vs. No Power
- ↳ Media Broadcast ONE WEBSITE
- Debris Removal "What To Do With It"
- Reverse 911 & Geogig (GEM) Ready App

*Planning 200

Coastal Natural Systems

- Wetlands Protection
 - Wildland
 - Wetland
 - Marsh lands

Structure / Infrastructure

- drainage design / improvements

Education & Awareness Programs:

- Insurance Incentives for ↑ Building Codes
- Property Owner/Builder Outreach

DAM FAILURE

Planning & Regs:

- Inspections & Reporting
- Ordinances & Code Enforcements

Structure & Infrastructure Projects:

- EAP updates &
- Improvements & Renovation & Maintenance

Natural System Protection:

- Dam Removal & Ecosystem Value

Education & Awareness:

- EAP & Ordinance
- GIS Data & Sharing w/ interested Partners
- Dam Removal Outreach & Impact

DROUGHT

Planning and Regulations

- Investigate new strategies through modeling
- Inventory of water resources
- Drought resistant crops
- Water restriction planning
- Identify vulnerable areas that would need additional water

Structure and Infrastructure

- Reservoirs available
- Sustainable development with water conservation
- Improve efficiency in water irrigation systems

Drought

Natural Systems Protection

- Drills in Schools: tornado drills

EXTREME HEAT

Planning / Regs

- Plan for cooling station coordination/planning
- Public/private partnerships
- Transport vulnerable population

Structure / Infrastructure

- Power needs/equip/cooling stations

EXTREME HEAT

Education & Awareness

- Locations of Cooling Stations

Improve efficiency in water irrigation systems

Drought

Natural Systems Protection

- Wetland conservation
- Salt water intrusion
- Stream buffers
- Monitoring streams and rivers
- Testing programs for wells during times of drought

Education and Awareness

- Public outreach to encourage water conservation
- PSA's + signage for drought times to raise awareness of burn bans
- Educate public and officials about the benefits of additional water resources
- Rain collection systems

Structure / Infrastructure

- Power needs/equip/cooling stations

EXTREME HEAT

Education & Awareness

- Locations of Cooling Stations
- "HEAT" Awareness Campaigns for Targeted Pops.
 - Schools
 - Elderly
 - Farmers
- Reverse 911 / "BEMA Ready" App to Broadcast Messages.

GEOLOGIC HAZARDS

Planning and Regs

- Regulations requiring ground cover
- Reg. scheduling of updating maps
- Impact studies

Structure and Infrastructure

- Require new construction to have geological studies.
- Netting along mountain roadsides
- Barrier walls

Geologic

- Barrier walls

Geologic

Natural Systems Prot.

- Barrier walls
- Vegetative coverings in areas prone to landslides.
- Build up problem areas

Education and Awareness Prog.

- School programs
- Signage in landslide prone areas

HURRICANE WIND

Planning & Regulation

- Disaster resilient bldg codes
- Planning for generator needs
- Zoning
- tree trimming - power lines, structures
- underground utilities (power, water, etc.)
- generators for facilities

Natural

- Wind resistant trees
- Prot. Barrier Islands

HURRICANE WIND EDUCATION & AWARENESS

(power, water, etc.)

generators for facilities

Natural

- Wind resistant trees
- Prot. Barrier Islands

HURRICANE WIND EDUCATION & AWARENESS

- "Best Practices"
 - Mitigation Construction
- Debris Mitigation
 - Tree Trimming
 - Gutter Cleaning
 - Drain Cleaning

INLAND FLOODING

Planning + Regulations

- Water Management in Rural regions
 - conserving dirt roads
- City Canopy Study: determine necessary open green spaces

Structure + Infrastructure

- Incentive Program
- Retention Ponds / Runoff Areas in Urban regions
 - encouraging more tree plantings in heavily constructed areas

Education + Awareness

- Dam Safety Awareness
 - Don't build structures in spillway
 - No habitable structures in breach zone
- Provide Variety of education outlets: social media, tv, courses

Natural Systems Protection

③ Forecast - wind advisory
 - Note the risks to life + property
 ① Now to - b
 to protect
 ② Shelter / safe

SEISMIC HAZARDS

Planning/Regs ① building codes

Structure/Infrastructure ① building codes (critical infrastructure)

Natural Resource Protection

Public Awareness/Education ① what to do to protect yourself (get under a stable structure or outside)

Ready Georgia

SEVERE WEATHER

Planning & Regs:

- Building Codes & Ordinances ↑ Requirements

Structure & Infrastructure Projects:

- Retrofitting Property / Manufactured Homes Tie-down
- Safe Rooms
- Generators

Natural Systems Protection:

- Wetland Restoration

Education & Awareness Programs:

- Insurance Incentives for ↑ Building Codes (Certified / Fortified)
- Property Owner/Builder Outreach

TORNADO

Planning + Regulations

- Street Tree Assessment: Removals
 - determining healthy/unhealthy trees that could block roadways; contractors lined up to assist when needed
- Tree City Program

Structure + Infrastructure

- School system design safety
 - safe rooms / shelter-in-place / generators

Education + Awareness

- Drills in Schools: tornado drills

EXTREME HEAT

WILDFIRE

Planning & Reqs:

- Building Codes: Buffers, Controlled Burns
- Community Wildfire Protection Plans

Structure & Infrastructure Project:

- Wildfire Projects: Defensible Space / Hazardous Waste Removal
- Remove Fire Hazards from Critical facilities

Natural System Protection:

- Forest Floor Burns / Controlled Burns
- Native Vegetation Trimming / Burn levels

Wild Education & Awareness:

- Public Outreach / E&D Interstate signage
- Drought MAPS & Indicator Flyers Posted in Community

WIND

Planning/Reqs

- 1 building codes (emergency responders) (roofing) - retro-fit critical infrastructure of transportation & power
- 2 tax breaks/credits

Structure/Infrastructure

- 1 emergency responder capabilities to contain operations
- 2 critical infrastructure planning (transportation, power)
- 3 shut Hurricane proof window protection
- 4 Health care facilities (power)

Natural Resource Protection

- 1 tree grooming

Public Awareness/Education

- 1 how to - best practice to protect yourself
- 2 Forecast - wind advisory - Note the risks to life + property
- 2 shelter/safe room

WINTER WEATHER

Planning

- Pre-positioning of mitigation resources (sand/salt trucks)

Public Awareness - multi-channel

- Closure communications early/pre (reduce traffic)

Structure/Infrastructure

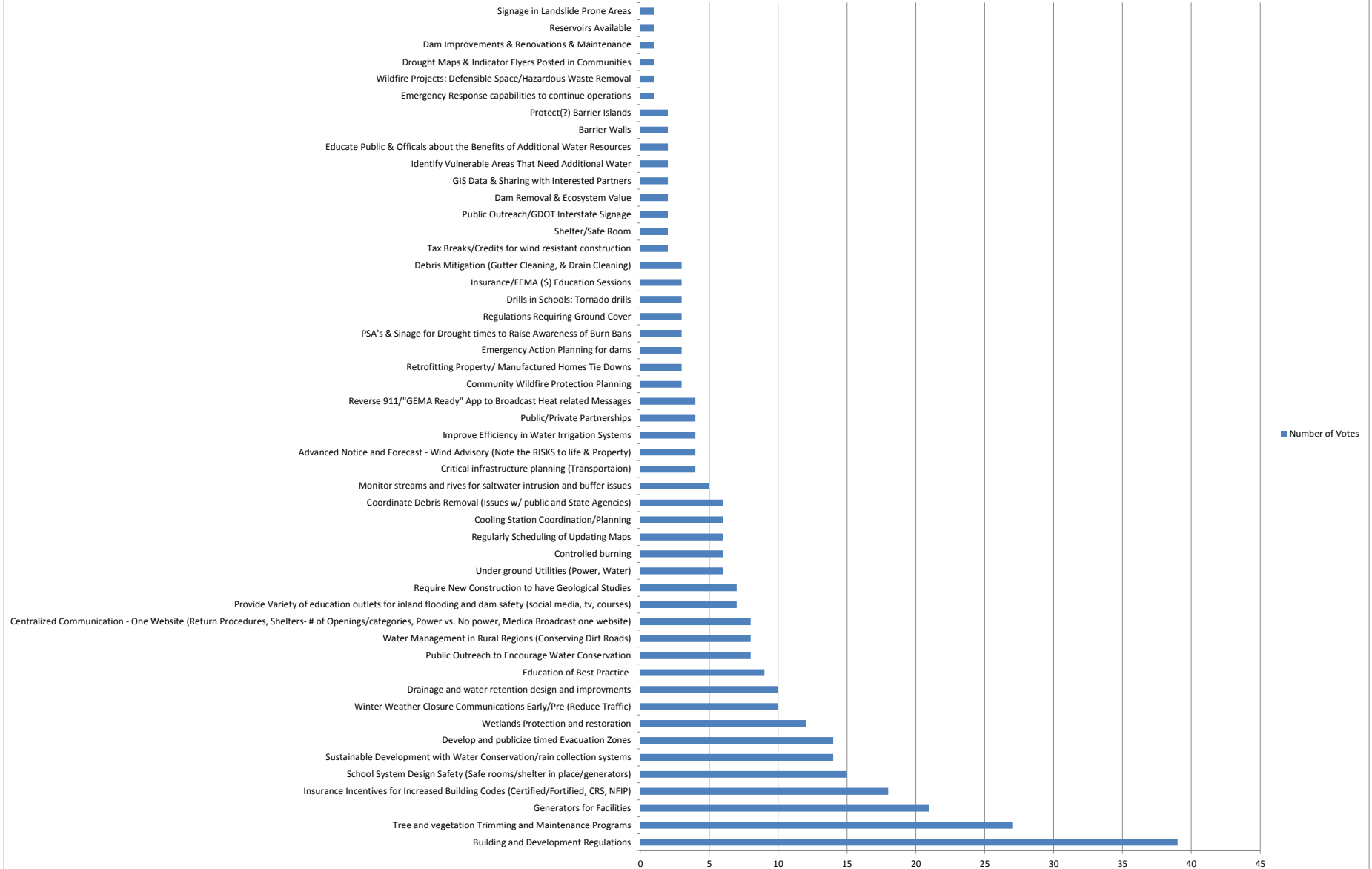
- Secondary power sources (emergency responders)

Public Awareness multi-channel

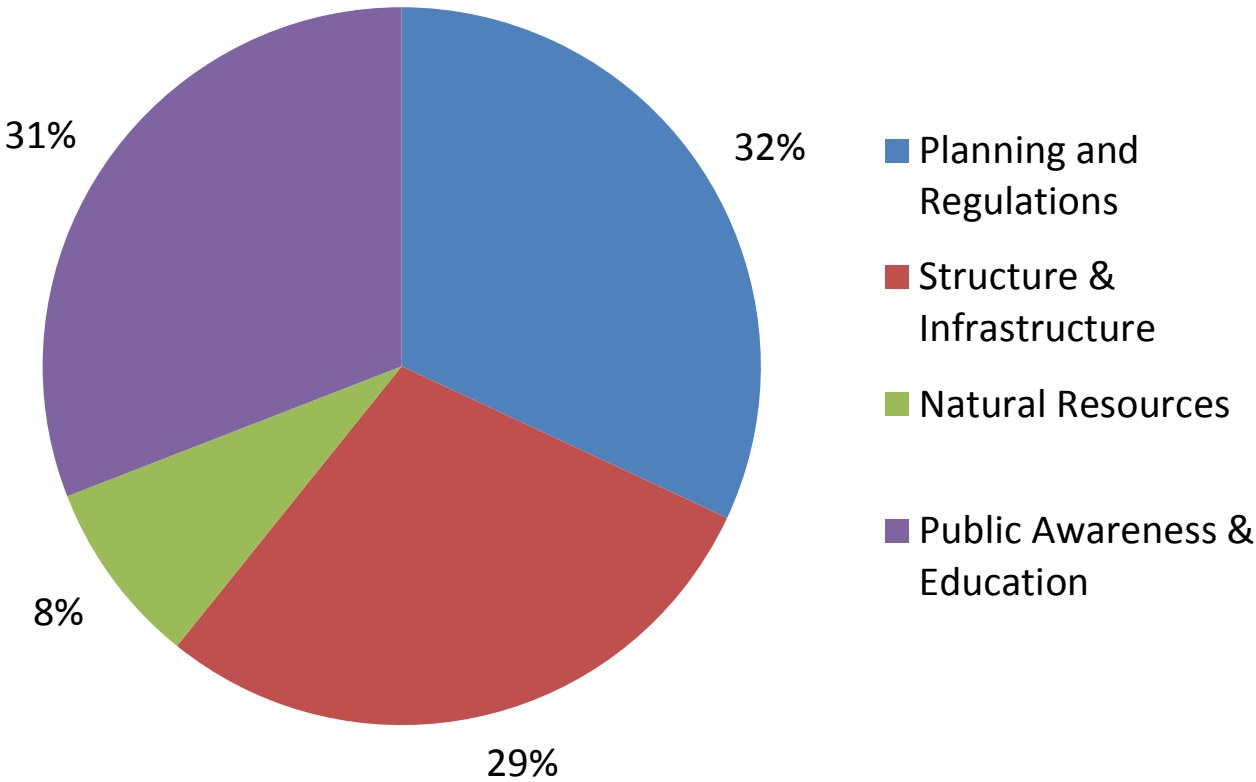
- Education of best practice (don't use generator in enclosed space w/o ventilation (keep water and blanket in car))

SEISMIC HAZARDS

Number of Votes



Mitigation Categories



Appendix F

Coordination of Local Mitigation Funding

THIS SECTION FOR STATE USE ONLY

FEMA-_____-DR-_____

Application Complete

In Declared Area

Statewide

HMGP Planning

Eligible Applicant

State or Local Government

Private Non-Profit (Tax ID Received)

Community NFIP Status:

Participating Community ID #: _____

State Application ID _____

In Good Standing Non-Participating CRS

Date Application Received _____

State Reviewer _____

Signed _____ Date _____

FEMA Application Hardcopy Submittal Date: _____

FEMA Application Completed NEMIS Entry Date: _____

**** Please submit one signed and one Microsoft Word copy of the application ****

This application is for the Hazard Mitigation Grant Program (HMGP) for a plan update proposal administered by the Georgia Emergency Management Agency (GEMA). Please complete all sections and provide all information as requested. **Incomplete applications will not be forwarded to FEMA for their review.** If you require assistance with this application, contact **Planner Name**, Planner at (111) 222-3333.

Applicant Information

1. **Project Title: HAZARD MITIGATION PLAN UPDATE**

2. **Applicant (Organization) *XYZ* County**

3. **Applicant Type**

State or Local Government

Recognized Indian Tribe

Private Non-Profit

State Legislative District(s) _____ Congressional District(s) _____

Federal Tax I.D. Number ____ - _____ DUNS Number ____ - ____ - _____

FIPS Code: 99###

4. **National Flood Insurance Program CID #: _____**

5. **NFIP Community Rating System Class Number _____**

6. **Point of Contact** (Individual responsible for the grant)

Ms. Mr. Mrs. Dr. First Name _____ Last Name _____

Title _____ Telephone _____ Fax _____

Street Address _____

City _____ State GA Zip Code _____

E-mail address _____

7. **Application prepared by** (if different from Point of Contact):

Name _____ Telephone _____ E-mail address _____

8. **Authorized Applicant Agent** (An individual authorized to sign financial and legal documents on behalf on the local government (e.g., the Chairperson, Board of County Commissioners or the County Manager, etc.)

Ms. Mr. Mrs. Dr. First Name _____ Last Name _____

Title _____ Telephone _____ Fax _____

Street Address _____

City _____ State GA Zip Code _____

E-mail address _____

Signature: _____ Date: _____

I. Project Description – Narrative Statement

A. Mitigation Activity

1. Please describe the strategy for completing this planning activity, including the review process, adoption and FEMA's approval.

XYZ County will form a planning committee comprised of representatives of various county departments, as well as other interested parties, such as outside state and regional agencies, local businesses, residents, the City of 123, public etc. The committee will be lead by the EMA Director and will meet on a regular basis in order to accomplish the items set forth in the Scope of Work below, including addressing any recommended revisions from the original plan's review crosswalk (attached). The EMA Director will coordinate the planning process including the meetings, write the plan based on committee findings and work through the State and Federal review and approval process. The EMA Director will coordinate the process of meeting the objectives outlined in the Scope of Work below with the assistance and input of the appropriate committee members and local staff resources as necessary. Outside interested parties will be invited to participate by direct invitation and by public postings and meeting notices. A minimum of two public hearings will be held in order to provide the public an opportunity to comment during the drafting phase and prior to final adoption.

2. Please describe how the applicant will manage the costs and schedule and how successful performance will be ensured.

A budget will be set according to the budget figures in this application to allow for labor on the part of committee members and other staff members and the purchase of necessary materials. Expenses will be incurred according to the budget items and will not exceed the total grant award. This will be tracked by the county as well as the State's grants management system which tracks expenses to date and remaining grant figures. Also, the county will track each budget allocation as expenses are incurred under those allocations to ensure that expenses remain within the allowed budget.

3. Please describe the staff and resources needed to implement this mitigation activity and the applicant's ability to provide these resources.

This planning process involves a variety of staff and expertise, which will be used as necessary. Specifically, expertise will be needed from the Fire Department, Tax Assessor, Building Inspections, Public Health, etc. XYZ County is able to provide the staff resources to meet these needs.

4. Please explain how this mitigation activity will leverage involvement of partners to enhance its outcome.

The planning process will involve the opportunity for outside agencies and public to be a part. This will be done by a combination of direct invitation, public notice and individual meetings with the various agencies as necessary.

5. Please describe the outreach activities that are planned relative to this mitigation activity (signs, press releases, success stories, etc) and/or how this mitigation activity will serve as a model for other communities.

At the outset of the process, the EMA Director will invite various outside State agencies, local businesses, The City of 123 and others to be a part of the process. In addition, the public will be notified and invited to attend through public notices and a minimum of two public meetings with opportunity for public comment.

6. Please describe how this planning activity will benefit the applicant's constituents.

This activity will benefit the local citizens of XYZ County by providing a current and up to date hazard mitigation plan for XYZ County and the City of 123, thereby ensuring the County and City's/Cities' eligibility to participate in future mitigation grants.

7. Does your County plan to update your Hazard Mitigation Plan In-House or with the assistance of an outside contractor?

In-House Contractor

(If outside contractor selected please describe the duties they will perform to meet the Scope of Work below)

XYZ County intends to contract with a consultant to act as the facilitator of the planning process as well as to develop and write the plan update. The consultant and the County will attend GEMA Hazard Mitigation planning workshops as they are offered.

The contracted consultant will meet with the EMA Director and GEMA as necessary to discuss the plan development process and construct an invitation list for the larger planning committee.

The contracted consultant and County EMA Director will pull together existing data, plans, and EMA capabilities together in a draft report to be discussed by both the Task Force and the larger stakeholder group. This will include the base HRV analysis provided by GEMA and added to by local data and the contracted consultant efforts.

The contracted consultant will review all hazards to address any newly identified hazards that pose a more significant threat than was apparent when the previously approved plan was prepared and discuss new occurrences of hazard events and update the probability of future occurrences.

The contracted consultant will work with the Task Force to update the current inventory of existing and proposed buildings, infrastructure, and critical facilities in hazard areas.

The contracted consultant will update the loss estimate to reflect any changes to the hazard profile and/or the inventory of structures.

The contracted consultant will analyze, update, and continue development of Goals, Objectives, and Action Steps with the assistance of the task force and stakeholders.

The contracted consultant will update the Plan Maintenance and Implementation to include an analysis of whether the previously approved plan's method and schedule for monitoring, evaluating, and updating the plan worked, and what elements or processes, if any, were changed; and discuss the method and schedule to be used over the next five years.

The contracted consultant will describe how the community was kept involved during the plan maintenance process over the previous five years, within the planning process section of the plan update and how they will continue public involvement during the planning period.

The contracted consultant will work with the planning committee and GEMA staff throughout the State and Federal plan review process to ensure that, in the end, XYZ County has a federally approved updated hazard mitigation plan.

B. Scope of Work

XYZ County will update its existing Multi-jurisdictional Pre-disaster Mitigation Plan according to the requirements of the Disaster Mitigation Act of 2000. This Scope of Work was designed in conformance to FEMA Plan Guidance requirements.

XYZ County agrees to have representatives attend and participate in all GEMA and local level mitigation planning meetings and workshops. The county will coordinate as needed with the GEMA representative to utilize the tools necessary and to ensure that the plan meets the most current Federal regulations. Each county will be required to complete the following: Critical Facility Inventory and basic mapping will be established in the Georgia Mitigation Information System, including running reports by jurisdiction for each identified hazard; GEMA Worksheets 3A for each participating jurisdiction for each identified hazard; high level detail for all mitigation action steps as required by FEMA and GEMA; insure all “recommended revisions” from their previous FEMA Plan review are addressed in the plan update.

Additionally, **XYZ** County will insure the plan update is consistent with the most current requirements from FEMA, including:

- **Identify all changes to the plan within each section**
- **Update the Planning Process**
 - List jurisdictions participating in the plan that seek approval.
 - Describe process used to review and analyze each section of plan, as well as process used to determine if a section warranted an update.
- **Improve the risk assessment**
 - Address any newly identified hazards that pose a more significant threat than was apparent when previously approved plan was prepared.
 - Discuss new occurrences of hazard events and update the probability of future occurrences.
 - Incorporate new information where data deficiencies were identified in the original plan, or if the data deficiencies remain unresolved, explain why they remain unresolved and include a schedule to resolve the issue.
 - Include current inventory of existing and proposed buildings, infrastructure, and critical facilities in hazard areas, including existing NFIP repetitive loss structures. The community will determine how far into the future they wish to go in considering proposed buildings and Critical Facilities based on and timed with data gathering phase of their comprehensive plan or land use plan update.
 - The loss estimate should be updated to reflect any changes to the hazard profile and/or the inventory of structures. Any changes to analysis methodologies must be noted. Any previously noted data deficiencies should be updated or explained.
 - Should include a general overview of land uses and types of development occurring within community and highlight any new and/or relevant information.
 - If there are changes in the risk assessment or the vulnerability of the community to the hazards, the information must be attributed to the appropriate jurisdiction(s) or to the whole planning area, whichever applies.
- **Analyze, update, and continue development of Goals, Objectives, and Action Steps**
 - Use this update as an opportunity for jurisdictions to reconsider the goals and objectives. For goals and actions that remain, the plan must document that they were re-evaluated and deemed valid and effective.
 - Goals and objectives shall include the community’s strategy for new or continued NFIP participation. Continue to use the “STAPLEE Criteria” (Social, Technical, Administrative, Political, Legal, Economic, and Environmental), or incorporate the STAPLEE Criteria if not previously used to assess the value of and develop an understanding of the cost effectiveness of mitigation action steps. If actions remain unchanged, the updated plan must indicate why changes are not necessary.
 - Shall include evaluation and prioritization for any new mitigation action steps.
- **Update the Plan Maintenance and Implementation**
 - Must include an analysis of whether previously approved plan’s method and schedule for monitoring, evaluating, and updating plan worked, and what elements or processes, if any, were changed; and discuss method and schedule to be used over next five years.
 - Describe other planning mechanisms or ordinances that this plan will be incorporated into, such as Comprehensive Plans.
- **Information Dissemination**
 - Describe how community was kept involved during plan maintenance process over previous five years, within planning process section of plan update.
 - Plan maintenance section shall describe how community will involve public during plan maintenance process over next five years.
- **Adoption and Review**
 - The plan will be submitted for State review and recommendation prior to adoption.
 - Upon recommendation from GEMA, the county and participating municipalities will adopt the plan.
 - The adopted plan will be submitted for FEMA review and approval.

B. Evaluation Information

1. Current **XYZ** County Hazard Mitigation Plan Approval Date: _____
2. Current **XYZ** County Hazard Mitigation Plan Expiration Date: _____
3. Does **XYZ** County participate in the Community Rating System (CRS)? Yes No If yes, what is your CRS rating? 1 2 3 4 5 6 7 8 9 10
4. Is **XYZ** County a Cooperating Technical Partner (CTP)? Yes No
5. Has **XYZ** County adopted building codes consistent with the International Codes? Yes No
6. Have **XYZ** County's building codes been assessed on the Building Code Effectiveness Grading Schedule (BCEGS)? Yes No If yes, BCEGS rating? 1 2 3 4 5 6 7 8 9 10
7. Is **XYZ** County a Firewise Community? Yes No If yes, Firewise Community number? _____
8. Has **XYZ** County adopted the National Fire Protection Association (NFPA) 5000 code? Yes No

C. Project Milestones

List the major milestones in this project:

Milestone	Number of Days to Complete
Issuance of Subgrantee/Grantee Agreement	90 days
Hire Planning Consultant	60 days
Establish and Form Planning Committee	60 days
Gather Critical Facilities Data	90 days
Hazard Identification and Risk Assessment Update	120 days
Analyze, update, and continue development of Goals, Objectives, and Action Steps	90 days
Mitigation Strategy Update	90 days
Update Plan Maintenance and Implementation	60 days
Update the Planning Process	60 days
Submit Plan for GEMA Review and Approval	30 days
Submit Plan for FEMA Review and Approval	60 days
Plan Adoption and implementation	60 days
Financial Reconciliation and Closeout	<u>90 days</u>
Total	960 days

D. Location

Please provide a county map and give a brief description of the county and list the municipalities that will be covered by this plan update along with a description of each. (Example: Date founded, population, major industries, special events, etc.)

E. History of Hazards

Please provide an assessment of the frequency and severity of each of the following hazards that have affected **Xyz** County in the past.

Coastal Storms:

Frequency: Not Applicable Very Low Low Moderate High

Severity: Minor Serious Extensive Catastrophic

Earthquake:

Frequency: Not Applicable Very Low Low Moderate High

Severity: Minor Serious Extensive Catastrophic

Windstorms:

Frequency: Not Applicable Very Low Low Moderate High

Severity: Minor Serious Extensive Catastrophic

Fire:

Frequency: Not Applicable Very Low Low Moderate High

Severity: Minor Serious Extensive Catastrophic

Flood:

Frequency: Not Applicable Very Low Low Moderate High

Severity: Minor Serious Extensive Catastrophic

Freezing:

Frequency: Not Applicable Very Low Low Moderate High

Severity: Minor Serious Extensive Catastrophic

Hurricane:

Frequency: Not Applicable Very Low Low Moderate High

Severity: Minor Serious Extensive Catastrophic

Mud/Landslide:

Frequency: Not Applicable Very Low Low Moderate High

Severity: Minor Serious Extensive Catastrophic

Severe Ice Storms:

Frequency: Not Applicable Very Low Low Moderate High

Severity: Minor Serious Extensive Catastrophic

Severe Storms:

Frequency: Not Applicable Very Low Low Moderate High

Severity: Minor Serious Extensive Catastrophic

Snow:

Frequency: Not Applicable Very Low Low Moderate High

Severity: Minor Serious Extensive Catastrophic

Tornado:

Frequency: Not Applicable Very Low Low Moderate High

Severity: Minor Serious Extensive Catastrophic

Tsunami:

Frequency: Not Applicable Very Low Low Moderate High

Severity: Minor Serious Extensive Catastrophic

Typhoon:

Frequency: Not Applicable Very Low Low Moderate High

Severity: Minor Serious Extensive Catastrophic

Volcano:

Frequency: Not Applicable Very Low Low Moderate High

Severity: Minor Serious Extensive Catastrophic

II. Budget

In this section, with regard to the Scope of Work [Section I(B) above], please provide details of all costs in relation to this project. Reasonable cost estimates are essential. **Do not** include contingency costs in the budget. (See example below)

A. Labor

Description	Hours	Rate	Cost	Source
County Staff	XXX	\$25.00/hr	XXX,XXX	County Budget

The budget includes \$X,XXX for county staff to be utilized as part of the non-Federal share. The cost for the county staff was determined based upon an average salary for the staff anticipated to participate in the planning process multiplied by the estimated hours to oversee the process, research hazard histories, inventory building and infrastructure assets, identify goals and objectives and get the updated plan adopted and approved.

B. Fees Paid Include any other costs associated with the project, engineering, permits, inspections, etc.

Description of Task	Hours	Rate	Cost	Source
Contractor Fee	XXX	\$30.00/hr.	XXXXXX	Grant

C. Hazus Level 2 Analysis Include any other costs associated with the project, engineering, permits, inspections, etc.

Description of Task	Cost	Source
Hazus Level 2 Analysis	\$6,000.00	Grant

Total Estimated Project Cost \$ XXXXX

D. Funding Sources (round figures to the nearest dollar) The maximum FEMA share for HMGP projects is 75%. The other 25% can be made up of State and Local funds as well as in-kind services. HMGP funds may be packaged with other Federal funds, but other Federal funds (except for Federal funds which lose their Federal identity at the State level – such as CDBG, ARS, HOME) may not be used for the State or Local match.

<i>Estimated FEMA Share</i>	\$ <u>XXXXX</u>	<u>75</u> % of Total
<i>Non-Federal Share</i>		
Estimated Local Share	\$ <u>XXXX</u>	<u>25</u> % of Total (Cash)
Estimated State Share	\$ _____	_____ % of Total (Cash)
Total Project Costs	\$ <u>XXXXX</u>	<u>100</u> % of Total

ASSURANCES - NON-CONSTRUCTION PROGRAMS

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0040), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.

2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.

3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.

4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.

5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).

6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681- 1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee-3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.

7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.

8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.

10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.

11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State

management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).

12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.

13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).

14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.

15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.

16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.

17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."

18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.

SIGNATURE OF AUTHORIZED APPLICANT AGENT	TITLE
APPLICANT ORGANIZATION	DATE SUBMITTED

Example: Letter of Availability of Matching Funds

(Please prepare the following letter on county letterhead and after securing the proper signatures, attach the letter to the hardcopy of this application)

Xyz County Letterhead

County Official with signatory authority

January 25, 2008

Mr. Terry K. Lunn, Director
Hazard Mitigation Division
Georgia Emergency Management Agency
P. O. Box 18055
Atlanta, GA 30316

RE: **Xyz** County Five Year Hazard Mitigation Plan Update Grant Pre-Application for FEMA Grant Funding

Dear Mr. Lunn:

I have been well informed of the County staff's preparation of the Hazard Mitigation Planning Grant (HMGP) Application Worksheet. If accepted, we understand that the county may be eligible for federal grant funding to assist with the update of our Hazard Mitigation Plan.

I am writing to assure you that **Xyz** County has funding to meet the required **25%** Local Match for this project. We appreciate your assistance and the assistance of your staff in the preparation of this application.

Sincerely,

County Official with signatory authority
Official Title

Example: Municipal Letter of Intent to Participate

(Please distribute the following letter to your municipalities and, after securing the proper signatures, attach the letter(s) to the hardcopy of this application)

June 17, 2009

Name

Emergency Management Director
Xyz County Emergency Management Agency

Address

City, Georgia Zip

Dear Mr. Name:

It is our understanding that Xyz County has applied for a grant from the Federal Emergency Management Agency through the Georgia Emergency Management Agency to fund the cost of updating the county's Multi-Jurisdictional Hazard Mitigation Plan. We recognize that participation in this plan update process and adoption of this multi-jurisdictional plan is important, not only to the Xyz County, but to the City of 123 as well, in order to be eligible to future Federal money for mitigation related projects. We also understand that there is a local match requirement which can be met in part by participation of our staff in the plan update process.

With that said, it is our intention to participate fully with the county in this process, providing input into the plan update, providing available staff resources to assist with the local match requirement and adopting the plan in order for the City of 123 to remain eligible for mitigation funding. We look forward to hearing from you on this process soon. If you have any questions, please contact Name at (223) 456-7890.

Sincerely,

Name Here
Title of Local Official Here

XYZ County Letterhead

Date

Mr. Gona Bea Planner
Our streets
The town, GA 12345

Dear Mr. Planner

Protecting the health, safety and welfare of residents in our community is a critical task for public officials. Natural disasters cost billions of dollars annually throughout the United States. The loss of life, injury, and damage to homes and businesses causes incalculable hardships and emotional suffering. One way we can help our community become more disaster-resistant is by planning for disasters before they occur. A proven, successful tool to help in that effort is through Pre-Disaster Mitigation (PDM) Planning. Hazard Mitigation Planning is the process of determining how to reduce or eliminate risk of loss of life and property damage resulting from natural or human-caused hazards in advance of the event. Our community can become a safer place to live, work, and do business.

We now have an opportunity to participate in the Hazard Mitigation Planning Program to update our old PDM Plan. This opportunity is funded by the Federal Emergency Management Agency. The Program will begin with a local kick-off meeting to be held on (insert the date, time and location of the meeting). By our participation in this planning process and update of our Hazard Mitigation Plan, we will continue to meet Federal guidelines for future disaster funding. An approved Hazard Mitigation Plan will also allow our community to compete favorably for other funding opportunities.

The kick-off meeting will provide participants with an overview of the Hazard Mitigation Planning Program and will begin the process of updating our plan. This invitation is in accordance with FEMA requirements and we need you or someone you designate to represent your organization to participate in the planning process. Expected time commitment will be one meeting per month for five months and a review of the draft plan. Important to the process will be the attendance of the same appointed member to most meetings.

I look forward to seeing you on (?).

Sincerely,

We Fixa Problems, Director
Xyz County Emergency Management Agency

Hazard Mitigation Assistance (HMA) Score Sheet

Overall Score _____

Applicant: _____

Project Title/ID #: _____

Overall Priority _____

Natural Hazard Exposure (Average for all Properties) 25

Flood	Wind (Miles from Coast)	Tornado (History)	_____
Floodway (25)	0-10 Miles (25)	1.09/tornado	
AE (20)	10-25 Miles (20)		
A (15)	25-50 Miles (15)		
B,X (shaded) (10)	50-100 Miles (10)		
C, X (unshaded) (0)	>100 Miles (0)		

History of Damage in Project Area (Average for all Properties) 25

5 points per event of documented history (up to 5 events) _____

or BC Module Predicts an Average of

<5 year Hazard Return Interval	25	
>5 and <10 Hazard Return Interval	20	
>10 and <25 Hazard Return Interval	15	
>25 and <50 Hazard Return Interval	10	
>50 and <100 Hazard Return Interval	5	
>100 Hazard Return Interval	0	_____

Type of Mitigation 5

Non-structural (e.g., floodproofing, retrofitting, elevation, acquisition, development/implementation of codes and standards, etc.) 5

Structural (e.g., flood wall, storm water drainage improvements) 0 _____

Potential Impact on Community 15

Severe (failure to implement project results in loss of life or essential services) 15

Moderate (failure to implement project results

in economic hardship)	7.5	
None (project has minimal or no impact)	0	—
Estimated Environmental Impacts	5	
Insignificant (CATEX)	5	
Moderate (EA required)	2.5	
Major (EIS required)	0	—
Intangible Factors	10	
(Community Commitment to mitigation)		
Storm Ready	1	
CRS Rating (6-10) 1 point for each class	5	
Cost Share arrangements (>25%)	2	
History of mitigation projects	2	
		—
Benefits	15	
1 point per \$500,000 (cap at 15 points)		—
		—
TOTAL POINTS	100	—
Bonus Point Section (for top 5 scoring apps)	10	
Quality of data in the application	10	
Hazard Data (Zone)	2.5	
Damage History	2.5	
Cost Data	2.5	
Environmental (Completeness)	2.5	
(Confidence in source data to validate application information)		—

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Appendix H
Enhanced Plan Information

Appendix H-I
HMGP Administrative Plan



GEMA

PROJECT ADMINISTRATION

THE STATE OF GEORGIA

Georgia Emergency Management and Homeland Security
Agency (GEMA/HS)

Administrative Plan

THE STATE OF GEORGIA

Administrative Plan for the Hazard Mitigation Assistance Program

October 2017

Georgia Emergency Management and Homeland Security Agency
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Introduction

Purpose

This plan provides the administrative policies and procedures which will be used by the State of Georgia to develop, request, obtain and administer awards for hazard mitigation measures under the provisions of the Hazard Mitigation Assistance Programs, Section 203 and Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, referred to as the Stafford Act, the Sandy Recovery Improvement Act (SRIA) of 2013 and 44 Code of Federal Regulation. This document outlines the basic administrative procedures for all Hazard Mitigation Assistance programs managed by the Georgia Emergency Management and Homeland Security Agency.

General

Section 404 of the Stafford Act establishes an independent Hazard Mitigation Grant Program that provides a source of funding for mitigation projects that are cost-effective and are identified in the community's hazard mitigation plan. The program is aimed at mitigating hazards that have repeatedly caused damage in the past. Eligible projects include, but are not limited to:

- Initiative Projects such as the development or improvement of warning systems with mitigation as an essential component;
- Construction of safe rooms (tornado and severe wind shelters) for public and private structures that meet the FEMA construction criteria in FEMA 320, "Taking Shelter from the Storm" and FEMA 361, "Design and Construction Guidance for Community Shelters".
- Retrofits such as elevation in place, structure relocation, structural reinforcement (wind and seismic), strapping of utilities, installation of storm shutters, tie downs, etc.;
- Acquisition of property and/or relocation of homes, businesses and public facilities from hazard prone areas;
- Wildfire mitigation such as creating defensible space, application of ignition-resistant construction and hazardous fuel reduction;
- Soil stabilization projects that provide protection from erosion and landslides;
- Generators that protect a critical facility and meet all other Hazard Mitigation Grant Project (HMGP) eligibility criteria. Critical facilities may include police and fire stations, hospitals, and water and sewer treatment facilities.
- Structural hazard control or protection measures such as floodwalls, detention basins and other storm drainage upgrades; and
- Development of a Local Hazard Mitigation Plan.

The total amount of federal funding for the Section 404 Hazard Mitigation Grant Program is limited. Approved projects are funded on a cost-sharing basis.

Section 203 of the Stafford Act establishes an independent Pre-Disaster Mitigation program that provides a source of funding for mitigation projects that are cost-effective and are identified in the community's hazard mitigation plan. The program is aimed at mitigating hazards that align with the priorities set by FEMA and have repeatedly caused damage in the past.

The National Flood Insurance Act of 1968 and Biggert-Waters Flood Insurance Reform Act of 2012, establishes an independent Flood Mitigation Assistance program that provides a source of funding for mitigation of repetitive loss properties and severe repetitive loss properties. The program is aimed at mitigating hazards that align with the priorities set by FEMA and have repeatedly caused damage in the past.

Authorities and References

The authorities and references for this administrative plan are found in the following citations:

Federal Laws

- Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288)
- Sandy Recovery Improvement Act of 2013 (P.L. 113-2)
- Single Audit Act of 1984 (PL 98-502)
- 2 CFR, Part 200: "Super Circular" Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards
- 44 CFR, Part 9: Floodplain Management and Protection of Wetlands
- 44 CFR, Part 10: Environmental Considerations
- 44 CFR, Part 78: Flood Mitigation Assistance
- 44 CFR, Part 79: Flood Mitigation Grants
- 44 CFR, Part 80, Property Acquisition and Relocation
- 44 CFR, Part 201: Mitigation Planning
- 44 CFR, Part 206, Subpart N Hazard Mitigation Grant Program
- 44 CFR, Part 207: Management Costs

Office of Management and Budget (OMB) Circulars

- OMB Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs

Executive Orders

- President's Executive Order 11988 on Floodplain Management
- President's Executive Order 11990 on Protection of Wetlands
- President's Executive Order 12699 on Seismic Safety

- President's Executive Order 12898 on Economic Justice
- President's Executive Order 13690 on Federal Flood Risk Management Standard

State Laws

- Georgia Emergency Management Act of 1981, as amended (OCGA 33-3)

State Regulation

- Georgia Emergency Operations Plan, 2013, as amended.

Development and Maintenance

The State Administrative Plan covers all Hazard Mitigation Assistance programs (the "administrative plan"): Hazard Mitigation Grant Program, Pre-Disaster Mitigation, and Flood Mitigation Assistance. This administrative plan is a support plan to the Georgia Emergency Operations Plan. This administrative plan is maintained by the Hazard Mitigation Division, Georgia Emergency Management and Homeland Security Agency (GEMA/HS) and reflects current state and federal statutes or regulations.

The Hazard Mitigation Grant Program was authorized by The Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (the Stafford Act), Title 42, U.S. Code (U.S.C.) 5170c and administered through the Federal Emergency Management Agency (FEMA).

The Governor's request for a disaster declaration will include a submission for Hazard Mitigation Program assistance. Following each major disaster, the plan will be reviewed by GEMA/HS Hazard Mitigation Staff. If no revisions are necessary, FEMA will be notified within 30 days of the declaration. Plan revisions will be forwarded to the FEMA Regional Director for approval within 45 days of the declaration. This administrative plan covers all disasters through the date of submission.

The Hazard Mitigation Manager is the individual responsible for the day to day management of the Hazard Mitigation Assistance Programs.

Definitions

"Administrative Assistant" is the person responsible for providing administrative and clerical support to the staff of the Hazard Mitigation Division.

"Advance Assistance" under the Sandy Recovery and Improvement Act of 2013 FEMA has the authority to provide up to 25 percent of the amount of estimated Hazard Mitigation Grant Program (HMGP) costs to States to develop mitigation strategies and obtain data to prioritize, select and develop complete HMGP applications in a timely manner.

"Application" is the formal request for Hazard Mitigation Grant Program funding.

"Applicant" is a state agency, local government or eligible private non-profit organization submitting a request to the Recipient for assistance under the Hazard Mitigation Grant Program.

"Authorized Applicant's Agent" is the person authorized by the entity's governing body to act on behalf of the entity to dedicate matching funds and execute the contract for the purpose of obtaining federal financial assistance.

"Benefit-cost Analysis" means a quantitative procedure that assesses the desirability of a hazard mitigation measure by taking a long-term view of avoided future damages as compared to the cost of a project. The outcome of the analysis is a *benefit-cost ratio*, which demonstrates whether the net present value of benefits exceeds the net present value of costs.

"Award" is monetary funds of financial assistance.

"Enhanced State Mitigation Plan" is the hazard mitigation plan approved under 44 CFR part 201 as a condition of receiving increased funding under the HMGP. An Enhanced State Mitigation Plan must include all elements of the Standard State Mitigation Plan identified in 44 CFR 201.4 as well as those identified in 44 CFR 201.5.

"Environmental Assessment" is the document prepared when a project does not qualify as a categorical exclusion and serves to determine whether an Environmental Impact Statement is needed.

"Environmental Impact Statement" is the document prepared for all actions significantly affecting the environment.

"Federal Hazard Mitigation Officer" (FHMO) is the FEMA employee responsible for representing the agency in carrying out the overall responsibilities for post-disaster hazard mitigation.

"Flood Mitigation Assistance" is the program authorized under Biggert-Waters Flood Insurance Reform Act of 2012, to mitigate repetitive loss properties and severe repetitive loss properties.

"Flood Mitigation Technical Assistance Grant" funding that allows GEMA/HS to staff develop, promote and perform technical assistance activities for Flood Mitigation Assistance program to local governments.

"Governor's Authorized Representative" (GAR) is the person empowered by the Governor to execute, on behalf of the State, all necessary documents for disaster assistance.

"Grants Management System," is a program that allows for the tracking of all aspects of HMGP projects and is used as an internal agency grants management tool.

"Hazard Mitigation Assistance" awards include the current complement of FEMA Mitigation awards. They include HMGP which is the disaster recovery award and two non-disaster grants: Flood Mitigation Assistance (FMA) and Pre-Disaster Mitigation (PDM).

“Hazard Mitigation Grant Program” is the Program authorized under section 404 of the Stafford Act, 42 and implemented at 44 CFR Part 206, Subpart N, which authorizes funding for certain mitigation measures identified through the evaluation of natural hazards conducted under section 322 of the Stafford Act.

"Hazard Mitigation Grant Program Projects" are projects proposed under Section 404 of the Stafford Act by eligible applicants to the Hazard Mitigation Division for funding following a Presidential major disaster declaration.

“Hazard Mitigation Plan” is the documentation of a State or local government’s evaluation of natural hazards and the strategy to mitigate such hazards. States and local governments are required by Section 322 of the Stafford Act to undergo the mitigation planning process as a condition of receiving Federal disaster assistance.

“Hazard Mitigation Planning Specialist” is the individual responsible for the management of Hazard Mitigation Planning Projects, Flood Mitigation Assistance Planning Projects, and Pre-Disaster Mitigation Planning Projects.

“Hazard Mitigation Planning Supervisor” is the person who serves as the supervisor of the Hazard Mitigation Planning Specialists.

“Hazard Mitigation Risk Reduction Supervisor” is the person who serves as the supervisor of the Risk Reduction Specialists.

“Increased Cost of Compliance (ICC)” coverage benefits under the National Flood Insurance Program may be used for elevation and/or acquisition relocation costs.

“Local Hazard Mitigation Plan” is the hazard mitigation plan required of a local or Indian tribal government acting as a Subrecipient as a condition of receiving project funds under the HMGP as outlined in 44 CFR 201.6.

“Management Costs” are any indirect costs, administrative expenses, and any other expenses not directly chargeable to a specific project that are reasonably incurred by a Recipient or Subrecipient in administering and managing an award.

"Measure" is any mitigation project, treatment or action proposed to reduce the risk of damage, hardship, loss of life or suffering from a future disaster event. The term measure is used interchangeably with the term “project” in this program.

“National Flood Insurance Program” provides the availability of flood insurance in exchange for the adoption of a minimum local floodplain management ordinance that regulates new and substantially improved development in identified flood hazard areas.

“Non-Federal Funds” are the financial resources provided by sources other than the Federal Government. The term does not include funds provided to a State or local government through a Federal grant unless the authorizing statute for that grant explicitly allows the funds to be used as cost share for other Federal grants.

"Pre-Application" is the initial request for consideration that indicates interest and assists in evaluating eligibility for Hazard Mitigation Grant Program funding.

"Pre-Award Costs" are costs incurred after the HMA application period has opened, but prior to the date of the grant award or final approval. For HMGP, the opening of the application period is the date when HMGP is authorized, which is generally the date of declaration. The opening of the application period for the PDM and FMA programs are established annually by FEMA. These costs may include gathering EHP data for preparing design specifications or for attending application workshops or meetings related to development and submission of HMGP applications.

"Project Administration" is the oversight of an approved project from the award phase to the completion of the approved scope of work.

"Pass-through Entity" is a government or other legal entity that provides a subaward to a subrecipient who is accountable for carrying out part of a federal program. For this program, the state is the pass-through entity.

"Recipient" is the government to which an award is given directly and which is accountable for use of the funds provided. The recipient is the entire legal entity even if only a particular component of the entity is designated in the award document. For the Hazard Mitigation Assistance programs, the state is the recipient.

"Recipient- Subrecipient Agreement" agreement between the state and the subrecipient at local level detailing the award guidelines for the administration, procurement, management, closeout and records retention for an approved project, in accordance with the 2 CFR 200.

"Risk Reduction Specialist" is the individual responsible for the management of Hazard Mitigation Grant Projects, Flood Mitigation Assistance Projects, and Pre-Disaster Mitigation Projects

"State Administrative Plan for the Hazard Mitigation Assistance programs" is the document developed by the State to describe the procedures for administration of the HMGP, PDM and FMA.

"Hazard Mitigation Manager" is the individual responsible for all matters related to the Hazard Mitigation Grant Program, the Flood Mitigation Assistance Program, and the Pre-Disaster Mitigation Programs.

"Hazard Mitigation Deputy Manager" is the individual responsible for the providing management support of Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, and Pre-Disaster Mitigation Program, as directed by the Hazard Mitigation Manager.

"State Hazard Mitigation Program" is an ongoing program involving a coordinated effort of state agencies and local governments with the main focus to ensure that critical mitigation measures are taken to reduce the risk of loss of life and property from future disasters.

"Standard Form 424" is the Application for Federal Assistance to be included as part of the State's overall and local Hazard Mitigation Applications.

“Standard State Mitigation Plan,” referred to the Standard Plan, is the hazard mitigation plan approved under 44 CFR Part 201, as a condition of receiving Stafford Act assistance as outlined in 44 CFR, Part 201.4.

"Subaward" is an award of financial assistance under an award provided to an eligible subrecipient by a pass-through entity. It does not include payments to a contractor or payments to an individual that is a beneficiary of a federal program. A subaward is initiated through an agreement that the pass-through entity considers a contract.

"Subrecipient" is the government or other legal entity to which a subaward is awarded from a pass-through entity and is accountable to the pass-through entity for the use of the funds provided. Subrecipient may be a state agency, local government or eligible private non-profit organizations.

"Substantial Damage Structures" are structures located in the Special Flood Hazard Area (i.e., the 100 year floodplain) and are determined by the community to be substantially damaged and can be acquired through the HMGP without benefit-cost analysis.

“TeamWorks Accounting System” offers Accounts Payable, Accounts Receivable, and Asset Management for GEMA/HS. Procurement, routine reconciliations, inventory tracking and records maintenance utilize this system which is administered and governed by the regulations set forth by the Georgia Department of Administrative Services and the State Accounting Office with the coordination of the Office of Planning and Budget. The regulations include 2 CFR 200.302-318.

Responsibilities

State Government

Federal regulation 2 CFR 200.300 (b) and 2 CFR 200.301 requires the State to ensure that Subrecipients know of the requirements imposed on them by Federal awards. GEMA/HS's Hazard Mitigation Division, on behalf of the State, has primary responsibility for project management and accountability of funds. The Hazard Mitigation Division is responsible for ensuring that Subrecipients adhere to all program requirements. The Division is divided into two sections: the Planning Section and the Risk Reduction Section. Each section is headed by a supervisor. The respective supervisor reviews all activities of their staff for program compliance.

Governor's Authorized Representative (GAR) (Director, GEMA/HS)

- Administers and supervises overall state responsibilities in hazard mitigation planning and assistance.
- Designates an Assistant State Coordinating Officer/Alternate GAR to provide oversight of the State's Hazard Mitigation Program.
- Designates a permanent, full-time State Hazard Mitigation Officer responsible for hazard mitigation activities under the Stafford Act. The Hazard Mitigation Manager has the duties of this position and serves as Alternate GAR for hazard mitigation activities.

Hazard Mitigation Manager

- Serves as the State's primary point of contact with FEMA, other Federal Agencies, and local governments in mitigation planning and implementation of mitigation programs and activities required under the Stafford Act.
- Signs and submits general correspondence for mitigation planning and projects and activities required under the Stafford Act.
- Submits to FEMA the State Mitigation Plan following the criteria established for the "Standard Plan" and/or the "Enhanced Plan" in 44 CFR Parts 201.4 and 201.5 respectively.
- Submits to FEMA the State Administrative Plan for implementing the HMGP.
- Ensures that all project applications submitted to FEMA are complete and meet all program eligibility requirements. Ensures that all approved projects are administered in compliance with federal and state regulations.

Hazard Mitigation Deputy Manager

- Serves as the State's alternate point of contact with FEMA, other Federal Agencies, and local governments in mitigation planning and implementation of mitigation programs and activities required under the Stafford Act.
- Provides additional management support to the Hazard Mitigation Manager and staff in all areas of the HMGP, FMA, and PDM to ensure programmatic compliance for plans and projects.
- Supervises the Hazard Mitigation Risk Reduction Supervisor and the Hazard Mitigation Planning Supervisor.

Hazard Mitigation Risk Reduction Supervisor

- Responsible for project management of the Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, and Pre-Disaster Mitigation Program.
- Responsible for the preparation of the State Administrative Plan.
- Supervises Risk Reduction Specialists.
- Reports to the Hazard Mitigation Deputy Manager.
- Serves as lead risk reduction specialist in the development of critical, urgent or high-level projects.
- Prepares HMA program materials for distribution at briefings and training sessions.
- Participates on mitigation team, brief local officials on mitigation; work with County Points-of-Contact, as related to HMGP.
- Ensures that all required reports and correspondence are prepared and distributed.
- Ensures project development and technical assistance is provided to interested communities.
- Ensures proper award management of HMGP projects approved by FEMA.

Hazard Mitigation Risk Reduction Specialists

- Supports local governments and other applicants in application development and completes project eligibility reviews of submitted applications.
- Supports subrecipients with their responsibilities in project management and administration of approved Hazard Mitigation Grant Program award, Flood Mitigation Assistance Program award, and Pre-Disaster Mitigation Program award.

Hazard Mitigation Planning Supervisor

- Responsible for project management of planning projects under Hazard Mitigation Program, Flood Mitigation Assistance Program and Pre-Disaster Mitigation Programs.
- Prepares the State Mitigation Plan following the criteria established for the “Standard Plan” and/or the “Enhanced Plan” in 44 CFR Parts 201.4 and 201.5 respectively.
- Supervises Hazard Mitigation Planning Specialists.
- Serves as the lead Hazard Mitigation Planning Specialist in the development and maintenance of the State Mitigation Plan.
- Supports the development and maintenance of Local Mitigation Planning efforts.
- Reports to the Hazard Mitigation Deputy Manager.

Hazard Mitigation Planning Specialists

- Supports local governments and other qualified applicants in application development and completes project eligibility reviews of submitted planning applications.

- Supports subrecipients in awards management and project administration of approved Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, and Pre-Disaster Mitigation Program awards.
- Supports the development and maintenance of Local Mitigation Planning efforts.

Administrative Assistant

- Responsible for providing support to the Hazard Mitigation Division.
- Assists in the general operation and management of the Division.
- Reports to the Hazard Mitigation Deputy Manager.

Local Government/Private Non-Profits

Each applicant will designate Point of Contact and Authorized Agent in the pre-application and application that will be the primary contacts on all matters relating to the project application and award management.

Applicants are responsible for submitting complete, accurate project applications to the State. An applicant becomes a subrecipient if the proposed measure is selected as an approved project by FEMA. The subrecipient is responsible for:

- Managing the implementation of the approved project.
- Complying with HMGP requirements and award management procedures stated in the recipient-subrecipient agreement, and other applicable Federal, State, and local laws and standards. Specific regulations outlined in the recipient-subrecipient agreement, include: Certification Regarding Lobbying, Certification Regarding Drug Free Workplace Requirements, Certification Regarding Debarment and Suspension, and Assurances for Construction and Non-Construction Practices and Procurement Standards.
- Accounting for the appropriate use of award funds to the pass-through entity and recipient.

Funding

Amounts of Assistance

The amount of HMGP funding available to the Applicant is based upon the estimated total of federal assistance, subject to the sliding scale formula outlined in 44 CFR Section 206.432(b) that FEMA provides for disaster recovery under the Presidential major disaster declaration. The formula provides for up to 15 percent of the first \$2 billion of estimated aggregate amounts of disaster assistance, up to 10 percent for amounts between \$2 billion and \$10 billion, and up to 7.5 percent for amounts between \$10 billion and \$35.333 billion. For States with enhanced plans, the eligible assistance is up to 20 percent for estimated aggregate amounts of disaster assistance not to exceed \$35.333 billion.

The amount of funding for the Flood Mitigation Assistance (FMA) program and Pre-Disaster Mitigation (PDM) program varies from year to year. FEMA will post Notices of Funding Opportunities for these Hazard Mitigation Assistance programs.

The amount of funding for FMA Technical Assistance grant is set at \$50,000. The State will request this Technical Assistance Grant from FEMA, in the Fiscal Year following an FMA award of \$1 Million or more, as specified in the HMA Guidance.

Cost-Sharing

The maximum Federal funding for projects is 75 percent of the approved project costs under the Hazard Mitigation Grant Program. The remaining 25 percent share is the local cost share and may come from a combination of other non-federal sources and Community Development Block Grant (CDBG) funds. For communities within the declared counties, the Governor has determined that the state will contribute 10 percent of the overall project match which equates to 40 percent of the local cost share.

Pre-Disaster Mitigation and Flood Mitigation Assistance funds may be used to pay up to 75 percent of the eligible activity costs. The remaining 25 percent of eligible activity costs are derived from non-Federal sources. FEMA may contribute up to 100 percent Federal cost share for severe repetitive loss properties and up to 90 percent Federal cost share for other repetitive loss properties.

Five Percent Set-Aside

For each Presidential Disaster Declaration, GEMA/HS shall set-aside up to 5 percent of its total HMGP funds available at its discretion for hazard mitigation projects. Projects eligible under this program are those that are often difficult to evaluate against traditional program cost effectiveness and eligibility criteria.

To be eligible, the set-aside project must be identified in the State Hazard Mitigation Plan as a priority and meet the HMGP goal of reducing, or preventing, future damage to property, and to reduce or prevent the loss of life or injury. In lieu of the benefit/cost analysis, the State must include in the application a narrative that identifies the hazard mitigation benefits

and indicate that there is a reasonable expectation that future damage or loss of life or injury shall be prevented. These projects are reviewed for National Environmental Policy Act and other applicable federal environmental law compliance. The Five Percent Set-Aside program is designed to provide the State discretion along with the responsibility to provide the rationale for cost effectiveness.

Additional Five Percent Set-Aside

For each Presidential Disaster Declaration, GEMA/HS may choose to set-aside an additional 5 percent of its total HMGP funds available to address all hazards and to promote resilience through the use of disaster-resistant building codes. To qualify for this funding, the recipient or subrecipient must agree to adopt and promote disaster-resistant codes or improve their BCEGS rating during the period of performance of the award.

The additional funds can be used for the following activities:

- Adopting and enforcing the latest International Building Code/International Residential Code;
- Improving a BCEGS score;
- Upgrading existing code to incorporate disaster-resistant code provisions; and
- Integrating flood-resistant elements of the building code into local floodplain management ordinances.

General

Obligation of project funds will occur when project approval and funds have been received from FEMA. Project funds will go into a non-interest bearing account, operated by the Office of Planning and Budgeting for the State of Georgia, to be distributed according to the terms in the Recipient-Subrecipient Agreement. Project funds will go into a non-interest bearing account, operated by the Office of Planning and Budgeting for the State of Georgia, to be distributed according to the terms in the Recipient-Subrecipient Agreement. A Recipient-Subrecipient Agreement must be executed prior to the commencement of the approved scope of work activities. This agreement will be amended for any award modifications.

GEMA/HS conducts systems' reconciliations between programs and finance at minimum on a quarterly bases through the TeamWorks Accounting System.

Applicant Eligibility

Eligible Applicants

State and local governments.

Private non-profit organizations and institutions that own or operate a private nonprofit facility as defined in 44 CFR Part 206.221(e).

Indian tribes or authorized tribal organizations, although Georgia has no federally recognized tribal organizations.

Note

Eligible applicants must be in good standing in the National Flood Insurance Program (NFIP) to be considered for funding. In addition, the project location must be within an NFIP participating community. An exception to this requirement is allowed for planning awards.

Eligible applicants must have an approved hazard mitigation plan at the time of application and award.

Identification and Notification of Potential Applicants

Information on the Hazard Mitigation Grant Program is widely disseminated through multiple sources such as by phone, e-mail, internet and press releases.

Potential applicants will be directed to the GEMA/HS website at www.gema.ga.gov for information on available Hazard Mitigation Assistance programs and pre-application and application deadlines.

The GEMA/HS Field Coordinators, who are the local points of contact for emergency management activities will also disseminate information on the program. Local EMAs (Directors) will be emailed the details on the program briefings and application announcements.

Risk Reduction Specialists and Hazard Mitigation Planning Specialists attend GEMA/HS area meetings to discuss hazard mitigation issues and new opportunities for funding. In addition, coordination with the Association of County Commissioners of Georgia and the Georgia Municipal Association will serve to notify county and city personnel on the availability of mitigation funds.

HMGP applicant workshops are held within the disaster declaration areas to identify and notify potential applicants within 90 days of the declaration date by State Hazard Mitigation Staff.

FMA Technical Assistance grant will enable Hazard Mitigation personnel, to conduct one-on-one interest meetings and application development meetings with county and city personnel, prior to Notice of Funding Opportunity.

Eligible Projects

Projects under HMGP may be of any nature that will result in protection to public or private property. Specific types of eligible projects include, but are not limited to:

- Initiative Projects such as the development or improvement of warning systems with mitigation as an essential component;
- Construction of safe rooms (tornado and severe wind shelters) for public and private structures that meet the FEMA construction criteria in FEMA 320, “Taking Shelter from the Storm” and FEMA 361, “Design and Construction Guidance for Community Shelters”;
- Retrofits such as elevation in place, structure relocation, structural reinforcement (wind and seismic), strapping of utilities, installation of storm shutters, tie downs, etc.;
- Acquisition of property and/or relocation of homes, businesses and public facilities from hazard prone areas;
- Wildfire mitigation such as creating defensible space, application of ignition-resistant construction and hazardous fuel reduction;
- Generators that protect a critical facility and meet all other HMGP eligibility criteria. Critical facilities may include police and fire stations, hospitals, and water and sewer treatment facilities;
- Soil stabilization projects that provide protection from erosion and landslides;
- Structural hazard control or protection measures such as floodwalls, detention basins and other storm drainage upgrades; and
- Development of a Local Hazard Mitigation Plan.

Identification of Projects

Within 60 days of the declaration under HMGP, GEMA/HS will submit a request for Advance Assistance award to FEMA. The award will cover the costs to:

- Determine appropriate mitigation actions in response to the declaration event;
- Collect data for benefit cost analyses, environmental compliance and other program requirements;
- Scope and prioritize hazard mitigation projects;
- Provide technical assistance to local communities to develop hazard mitigation projects;
- Conduct meetings, outreach and coordination with potential sub-applicants; and
- Submit eligible and complete applications to FEMA.

Projects identified in Local Hazard Mitigation plans will be the initial source for identifying potential projects. All mitigation projects must be identified or support goals and objectives in federally approved local mitigation plans. Hazard Mitigation Planning Specialists will review all FEMA approved plans to identify mitigation projects.

Information acquired during the Preliminary Damage Assessment (PDA) in response to a disaster event is another source for identification of mitigation issues and potential projects. PDA teams will be briefed as to the availability and requirements of the Hazard Mitigation Grant Program so potential projects can be identified for follow-up by the State Hazard Mitigation Staff.

FMA Technical Assistance grant will allow Hazard Mitigation personnel to work throughout the fiscal year to identify and work directly with potential applicants who have repetitive loss properties and severe repetitive loss properties.

Submission of Pre-Applications/Applications

Pre-applications will be disseminated within 90 days of the disaster declaration. The deadline for applicants' submission of completed pre-applications will be set by the Hazard Mitigation Manager. The pre-application will address, at a minimum, the following:

- Name of applicant
- Description of Project, location and the hazard that will be mitigated
- Identify coordination with local Multi-Jurisdictional Plan
- Estimated Project Costs
- Discuss the history/frequency of hazard occurrence in the hazard area

The deadline for applicants' submission of completed applications will be set by the Hazard Mitigation Manager. All HMGP applications will be submitted within the regulatory time frame of 12 months following the disaster date. Under extenuating circumstances, the state may request up to a six month extension to this deadline.

The Hazard Mitigation Risk Reduction Supervisor and Hazard Mitigation Planning Supervisor will ensure that potential applicants are aware of assistance available, provide technical assistance to all eligible applicants, and make timely submission of those documents necessary for the application. Technical assistance will be provided in the development of the HMGP pre-applications and applications by Risk Reduction Specialists and Hazard Mitigation Planning Specialists. FMA Technical Assistance grant will allow Hazard Mitigation personnel to work with applicants to develop quality applications prior to Notice of Funding Opportunity.

Review, Priorities, and Ranking of Pre-Applications/ Applications

Risk Reduction Specialists and Hazard Mitigation Planning Specialists will complete an initial review of their respective pre-applications and score the projects. Each respective Manager will present the review to the Hazard Mitigation Manager who will make recommendations to the GAR.

Completed pre-applications received by the deadline will be scored using the Project Selection Scoring Sheet. Pre-applications will be prioritized under two categories- within the declared area and outside of the declared area. Projects in the declared areas are 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 application. Risk Reduction Specialists and Hazard Mitigation Planning Specialists will assist applicants in completing their applications and will conduct an initial review in accordance with the "General Review Criteria," and score the applications when received. The Hazard Mitigation Manager will review the results of the staff review and scoring of the projects, prioritize the projects, and make recommendations to the GAR.

Following the HMGP program compliance review, applications will be submitted to FEMA within 90 days following receipt of the completed application.

General Review Criteria

Applications for funding under the Hazard Mitigation Grant Program received by the State Hazard Mitigation Division will be reviewed for the following criteria (from 44 CFR 206.434)

- Be in conformance with the State Mitigation Plan and Local Mitigation Plan approved under 44 CFR part 201;
- Have a beneficial impact upon the designated disaster area, whether or not located in the designated 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 are not eligible;
- Be cost-effective and substantially reduce the risk of future damage, hardship, loss, or suffering resulting from a major disaster. The subrecipient must demonstrate this by documenting that the project:
 - Addresses a problem that has been repetitive, or a problem that poses a significant risk to public health and safety if left unsolved,
 - Will not cost more than the anticipated value of the reduction in both direct damages and subsequent negative impacts to the area if future disasters were to occur.
- Has been determined to be the most practical, effective, and environmentally sound alternative after consideration of a range of options,
- 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.

Special Consideration

FEMA award program funds cannot be used as a substitute or replacement to fund projects or programs for which funding is available under other federal authorities.

Hazard Mitigation Grant Program funds may be packaged or used in combination with other federal, state, local or private funding sources, when appropriate, to develop a comprehensive mitigation solution; however, they may not be used as a match for other federal funds.

Submission of Selected Projects to FEMA

The GAR serves as the Grant Administrator for all funds provided by the Hazard Mitigation Grant Program. Within 12 months of the disaster declaration or a mutually agreeable date of up to 18 months, all Hazard Mitigation applications will be submitted that will identify one or more hazard mitigation measures for which funding is requested. The application will include a Standard Form 424, Application for Federal Assistance; Standard Form 424B, Assurance - Non-Construction or Standard Form 424D, Assurances - Construction; and a narrative statement which will identify the specific mitigation measures for which funding is requested. The following information will be included for each hazard mitigation measure:

- Name of Applicant;
- State or local contact for the measure;
- Location of Project (including decimal latitude and longitude coordinates);
- Maps of Site Location(Street, Plat, flood, topographic) with site clearly marked;
- Narrative Description of the mitigation measure (describe how the measure solves the problem);
- Cost estimate of the measure;
- Analysis of the measure's cost effectiveness and substantial risk reduction;
- Work schedule (milestones, start/completion dates and any other limitations);
- Justification for selection;
- Alternatives considered;
- Environmental information consistent with 44 CFR Part 9, Floodplain Management and Protection of Wetlands, and 44 CFR Part 10, Environmental Considerations; and
- Pictures and building construction date if applicable.

A Benefit-Cost Analysis (BCA) is run on each project submitted except for Planning and Initiative Projects and certain acquisition and/or elevation projects that are exempt from BCA per FEMA policy. The State will utilize FEMA approved benefit–cost modules for all analysis or utilize greatest savings to the fund data, or pre-calculated benefits for Safe Rooms, acquisitions and elevations in special flood hazard areas, and for residential hurricane wind retrofit measures. The State will use FEMA’s National Emergency Management Information System (NEMIS) to submit HMGP applications to FEMA. For non-disaster applications the state will submit its applications using FEMA’s mitigation electronic grants system (Egrants).

Notification of Project Approval

Within two weeks of FEMA’s award letter, the Hazard Mitigation Risk Reduction Specialist or Hazard Mitigation Planning Specialist will prepare and send to the applicant an approval package, consisting of an approval letter and two copies of their recipient-subrecipient agreement. The subrecipient is instructed to sign and return both copies to GEMA/HS for signature by GAR. Upon receipt of the signed agreements, the Hazard Mitigation Manager will obtain the GAR’s signature on both copies. The Hazard Mitigation Risk Reduction Specialist or Hazard Mitigation Planning Specialist will retain one copy for the project file and

mail the other signed and executed copy to the subrecipient with instructions to start the project.

The Hazard Mitigation Risk Reduction Supervisor or Hazard Mitigation Planning Supervisor will assist the Public Information Officer in the preparation of a news release to include the following information: Project Description including site location, population affected by the project and total amount of project award. This news release will also be posted on the GEMA/HS web site.

Notification of Project Denial

Within two weeks of FEMA's denial letter, the Risk Reduction Specialist or Hazard Mitigation Planning Specialist will prepare a transmittal for the GAR's signature to advise the applicant of award disapproval. The letter will advise the applicant of its right to appeal and include guidance on the appeal process.

Appeals

A subrecipient or Recipient may appeal any FEMA determination regarding applications submitted for funding. FEMA will only consider written appeals that justify the request for reconsideration. The appeal should specify the monetary figure in dispute and the provisions in Federal law, regulation, or policy with which the appellant believes the initial action was inconsistent.

Whether the appeal originated with the Recipient or subrecipient, the appeal must be submitted in writing to the Regional Administrator by the Recipient. The Regional Administrator is the decision-maker on first appeals. An appeal of the Regional Administrator's decision on any first appeal (the second appeal) is decided by the Deputy Associate Administrator for Mitigation.

To begin the appeal process (including second appeals), appellants must submit documentation within 60 days after receiving the initial notice of the action on the first appeal. The Recipient will forward all appeals from a subrecipient with a written recommendation to the Regional Administrator within 60 days of receipt. The Region will forward second appeals with a recommendation and associated documentation to FEMA Headquarters. Within 90 days following the receipt of an appeal, FEMA will notify the recipient in writing of the disposition of the appeal or of the need for additional information.

If additional information is needed, FEMA will determine a date by which the information must be provided. Within 90 days following the receipt of the requested additional information (or 90 days after the information was due), FEMA will notify the Recipient in writing of the disposition of the appeal.

FEMA will provide its decision to the Recipient in writing. If the decision is to grant the appeal, the Regional Administrator will take the appropriate action.

Within 15 days following the receipt of FEMA's decision, the Recipient will notify the subrecipient in writing of FEMA's decision concerning their appeal.

Program Management

Data Management System

A Hazard Mitigation Grant Program file, Pre-Disaster Mitigation file and Flood Mitigation Assistance file will be established for each approved project that will include the following sections: Project Application, FEMA Correspondence, GEMA/HS Correspondence, Applicant Correspondence, Quarterly Reports, Payments, Environmental Correspondence and Financial Documentation. Also, project information will be tracked in GEMA/HS's Grant Management System.

Each Project file will contain the following information:

- Recipient-Subrecipient Agreement
- Trip Reports
- Correspondence between State, Local and FEMA
- Memorandums and Notes to file
- Progress Payments
- Press Releases
- Application and Submittal Information
- Application review and recommendations
- Financial records
- Reimbursement Documentation
- Electronic file records, including proper documentation in the Grants Management System

Reports

Quarterly progress reports will be submitted by the subrecipient to the Risk Reduction Specialist or Hazard Mitigation Planning Specialist assigned to the project beginning with the first full quarter after receipt of funding. This report should verify that the scope of work is either on schedule or provide a reason that the project will not meet the projected schedule date.

In the report, the subrecipient should indicate work accomplished and remaining, funds expended, and whether there are any issues with the project such as cost overruns or scope changes that were not apparent at the beginning of the award process. Reports are due from the subrecipient within 15 days of the calendar quarter. Once the reports are received by the Risk Reduction Specialist or Hazard Mitigation Planning Specialist, the information is then entered into the GMS system which is used to track all approved HMGP, PDM and FMA projects. The Hazard Mitigation Planning Supervisor reviews and approves the quarterly reports for all of the open planning projects and the Hazard Mitigation Risk Reduction Supervisor reviews and approves the quarterly reports for all of the open projects.

The Hazard Mitigation Manager utilizes the GMS to generate the FEMA quarterly report for all approved open projects.

The Hazard Mitigation Manager will submit a quarterly progress report for all approved HMGP projects to the FEMA RA beginning the first full quarter of funding. Quarterly reports will be submitted within 30 days of the calendar quarter. Due to the State's fiscal year closeout on June 30th of each year, financial reports may not be available on some projects at the time of the quarterly report submission. This will be noted in the quarterly report submission.

NEMIS Progress Reporting

FEMA will provide the State with a spreadsheet exported from NEMIS on the projects needing a quarterly report submission in NEMIS. The State will utilize this spreadsheet to update the required fields and submit updated spreadsheet. The required fields updated in the spreadsheet include subrecipient expenditures to date, total recipient drawdown, federal funds disbursed, date final payment made to subrecipient, approved completion date, time extension, percentage of work completed, actual completion date, comments for acquisition projects, and a list of all properties acquired in the quarter.

The State will also submit an excel spreadsheet listing specific information about acquired properties in the quarter for all HMA programs. The required fields updated in the spreadsheet include project number, property address, latitude, longitude, CRS rating, flood zone, finished floor elevation, base flood elevation, mitigation date, repetitive loss and severe repetitive loss information.

Staffing Requirements

The organization structure of the Hazard Mitigation Division will be flexible and capable of expansion and contraction as the need dictates. The Hazard Mitigation Division Staff consists of the Hazard Mitigation Manager, Hazard Mitigation Deputy Manager, Hazard Mitigation Risk Reduction Supervisor, Hazard Mitigation Planning Supervisor, Hazard Mitigation Risk Reduction Specialists, Hazard Mitigation Planning Specialists, and Administrative Assistant. GEMA/HS's Director of Finance will provide necessary administrative support elements for the HMGP. In addition, the Finance Division will provide finance administration support for the financial management of the awards. This support includes Smartlink management, financial reconciliation, payment processing, and financial closeout of awards.

In an effort to assure that adequate staffing and resources are available following a disaster, the Hazard Mitigation Risk Reduction Supervisor and Hazard Mitigation Planning Supervisor will identify the minimum number of personnel and positions needed to implement and manage the HMGP. These staffing costs will be incorporated into the Advance Assistance and/or Management Cost applications.

Based on the volume of applications for HMGP, key positions may be expanded to support the implementation of mitigation activities, to include conducting BCA's and environmental planning. The mitigation team will be augmented, as necessary, to include staff from other State agencies, or temporary staff, or contractors hired to administer HMGP effectively.

Cost of State personnel (regular time salaries only) for continuing management of the Hazard Mitigation awards may be eligible when approved in advance by Regional Administrator. The State shall submit a plan for such staffing in advanced of the requirement process.

Responsibilities

Subrecipients

- Ensure that projects begin within 90 days of approval and are completed within the approved timeframe or three years from the end of the application period or three years from the funding selection date.
- Implement monitoring procedures and submit quarterly reports to the Risk Reduction Specialist assigned to the project as directed at the time of the award.
- Maintain the financial records and receipts necessary to document all expenditures connected with the project.
- Ensure that construction is in accordance with all applicable federal and state laws and regulations with applicable building and utility codes, and construction standards.
- Maintain a project file that includes copies of the Recipient-Subrecipient Agreement, Meeting Notes, Correspondence, Memorandums and Notes to file, Public Notices, Application and Submittal Information, Financial records, Reimbursement Documentation, and any other important information related to the project.

GAR

- Responsible for overall awards management.
- Provides technical assistance to subrecipients as necessary.
- Notifies subrecipients of actions taken in response to applications.
- Certifies that all claims and costs are eligible and in compliance with provisions of the FEMA-State Agreement and submits claims to FEMA RD for payment.

Hazard Mitigation Manager

- Submits reports to FEMA as required.
- Reviews requests for funds and recommends approval or denial to the GAR
- Coordinates hazard mitigation project actions with the GAR and FEMA, as necessary, and provides assistance as required in administering the program.
- Reviews final claims, certification of cost, cost overruns, audits and appeals
- Responsible for reviewing and transmitting all required information to FEMA in order to complete their application determination.

Hazard Mitigation Deputy Manager

- Serves as the State's alternate point of contact with FEMA, other Federal Agencies, and local governments in mitigation planning and implementation of mitigation programs and activities required under the Stafford Act.
- Provides additional management support to the Hazard Mitigation Manager and staff in all areas of the HMGP to ensure programmatic compliance for plans and projects.
- Assists in preparing financial and other reports.

Hazard Mitigation Planning Supervisor

- Supervises team of Hazard Mitigation Planning Specialists.
- Serves as lead Hazard Mitigation Planning Specialist in the development of critical, urgent or high-level planning projects.
- Reviews all correspondence, activities and meetings conducted to implement HMGP planning functions.
- Conducts meetings to inform local and state officials about the Hazard Mitigation Planning Programs.

Hazard Mitigation Risk Reduction Supervisor

- Supervises team of Risk Reduction Specialists.
- Serves as lead Risk Reduction Specialist in the development of critical, urgent or high-level projects.
- Reviews all correspondence, activities and meetings conducted to implement HMGP project functions.
- Conducts meetings to inform local and state officials about the Hazard Mitigation Project Programs.

Risk Reduction Specialists and Hazard Mitigation Planning Specialists

- Reviews applicants' quarterly progress reports, monitors and evaluates project accomplishment and adherence to work schedule for their respective awards.
- Serves as liaison and primary support for local Emergency Management Agency representatives in designated areas.
- Monitors the progress of their respective hazard mitigation award projects, inspects completed projects, and verifies and recommends award payments.
- Maintains necessary financial documentation to support funds distributed to Subrecipient(s).
- Monitors Project Status by quarterly reports, daily phone contact and conducting on-site visits for their respective awards.

Financial Management

General

GEMA/HS is the recipient and pass-through entity for project financial management in accordance with 2 CFR Part 200. Subrecipients will be accountable to the recipient for funds that are awarded.

Payments of Claims

All payments under Hazard Mitigation Assistance Programs (HMGP, FMA, and PDM) are subject to cost sharing. All processing of HMGP payments is compiled and recorded in GMS. The Risk Reduction Specialist or Hazard Mitigation Planning Specialist reviews documentation submitted by the subrecipient and inspections are made to determine eligible costs under federal guidelines. Payment will be based on eligible expenditures that are properly documented. Subrecipients will be reimbursed for the federal share of the total eligible cost for their project. For planning awards, the final ten percent will be withheld until a final desk review has been completed by the Hazard Mitigation Planning Specialist.

The Risk Reduction Specialist or Hazard Mitigation Planning Specialist prepares the progress payment request form and gives to their respective supervisor for review. The supervisor will forward the payment recommendation to the Hazard Mitigation Deputy Manager for review. Upon review and approval, the Hazard Mitigation Deputy Manager and/or Hazard Mitigation Manager will send the payment forward for processing by the Finance Division.

The Administrative Assistant receives and logs all checks and distributes them to the assigned Risk Reduction Specialist or Hazard Mitigation Planning Specialist. The check and copies of the check and progress payment will be given to the Risk Reduction Specialist or Hazard Mitigation Planning Specialist to be placed in the subrecipient project file. The Risk Reduction Specialist or Hazard Mitigation Planning Specialist is responsible for preparing the payment letter and updating the payment information in the GMS. They will ensure the payment is sent to the applicant via certified mail within 5 business days of receipt. In certain instances, checks may be delivered in lieu of mailing.

Special Consideration for Contract Work

If the State performs a contractual agreement in which the State is the subrecipient, the following payment procedures will be followed:

Invoices for payment are received by GEMA/HS through the Finance Division and transmitted to the Risk Reduction Specialist or Hazard Mitigation Planning Specialist to verify and track the expenditures for the award. Payments are handled directly through the Office of Planning and Budget (OPB).

Allowable Costs

General policies for determining allowable costs are established in 2 CFR 200. For declarations after November 13, 2007, it has been determined by the State not to pass-through any HMGP management costs to the subrecipient for administering awards. The State believes that the management costs not directly chargeable to a specific project are minor. The HMGP management costs that are not directly chargeable expenses include completing the required Quarterly Report, completing requests for payment of funds to the State and completing closeout documentation to the State. The State believes that its contribution to the non-federal share of the total project costs more than makes up for the costs of these un-reimbursable expenses. Project administration expenses incurred by the subrecipient in administering the grant scope of work are chargeable to the award and the subrecipient can request funds to cover these costs.

Management costs are any indirect costs and administrative expenses that are reasonably incurred in administering a subrecipient award. Eligible management cost activities may include:

- Solicitation, review, and processing of subapplications and subrecipient awards;
- Managing awards (e.g., quarterly reporting, closeout);
- Purchase of equipment, per diem and travel expenses, and professional development that is directly related to the implementation of HMA programs; and
- Staff salary costs directly related to performing the activities listed above.

Subrecipient management costs are only awarded in conjunction with Flood Mitigation Assistance and Pre-Disaster Mitigation project or planning awards. Subrecipients may apply for a maximum of 5 percent of the total funds requested in their award application budget (Federal and non-Federal share) for management costs to support the project and planning as part of their award application.

The following categories of Pre-Award Costs are allowed: application development activities; first floor elevation surveys; substantial damage determination surveys; technical assistance; benefit-cost analysis development. If these costs are requested as pre-award, they should be clearly identified by a pre-award line item in each community's application for FEMA award funding. It is understood that pre-award costs may be paid to a community only if the respective FEMA award is granted.

Project Administration costs are the oversight of any FEMA HMA approved project from the award phase to the completion of the approved scope of work. The administration cost must be direct expenses that are actually incurred by the subrecipient and it must be reasonable.

Documentation Requirements

Hazard Mitigation Grant Program awards are reimbursements for approved measures, even when advance funds are received. Each subrecipient must maintain full documentation in

order to be paid. Projects that receive advance funds are not relieved of this requirement. Required documentation consists of copies of:

- Summaries of documentation,
- Activity reports for labor, equipment and materials,
- Proof of payment such as copies of checks or vouchers (for materials purchased and for contract work),
- Contracts awarded,
- Invoices or other billing documents,
- Bid advertisements,
- List of bidders and amounts (for each project),
- Statement of why the low bid was not accepted (if appropriate),
- Progress reports,
- Labor/Equipment Costs

Advance of Funds

A subrecipient may request an advance of funds under certain conditions. The subrecipient must submit a written request for an advance of funds and provide supporting documentation. For acquisition projects, the settlement statement(s), copies of checks relative to each property, and a copy of the Deed with Restrictive Covenant for each property must be submitted prior to receiving the next advance payment. Advances will not exceed 90 percent of the total project cost except for acquisition projects.

The Risk Reduction Specialist or Hazard Mitigation Planning Specialist will verify that the approved scope of work has been followed and with all supporting documentation provided. The Risk Reduction Specialist or Hazard Mitigation Planning Specialist prepares the advance payment request form and gives the request to their respective supervisor for review and recommendation to the Hazard Mitigation Deputy Manager.

The Hazard Mitigation Deputy Manager will review and recommend approval or denial of the advance to the Hazard Mitigation Manager for final approval and denial.

If the request is denied, the Hazard Mitigation Division will inform the applicant in writing that additional documentation is required to support the request. If the request is approved, the Hazard Mitigation Manager authorizes payment by the Administrative Services Division.

Subrecipient Performance

If documentation, inspections or other reviews reveal problems in performance of work or documentation, the GAR will direct the applicant's agent to correct the deficiencies. If the Subrecipient violates any of the conditions of disaster relief assistance under the Act, this Agreement, or applicable federal and state regulations; the State shall notify the subrecipient that additional financial assistance for the project in which the violation occurred will be withheld until such violation has been corrected to the satisfaction of the State.

In addition, the State may also withhold all or any portion of financial assistance which has been or is to be made available to the Subrecipient for other disaster relief projects under the Act, this or other agreements, and applicable federal and state regulations until adequate corrective action is taken. Quarterly reports must be current in order to process progress payment requests.

Award Modifications

Subrecipients are required to request prior approval for award modifications.

Award Modifications include:

- Any revision which would result in the need for additional funding.
- Transfers between budget categories that exceed 10 percent of the award.
- Any revision of the scope or objectives of the project (regardless of whether there is an associated budget revision requiring prior approval).
- Need to extend the period of availability of funds. The **maximum** amount of time the State can give to subrecipients to complete projects is three years per FEMA policy guidance.
- Changes in key persons in cases where specified in an application or award. In research projects, a change in the project director or principal investigator shall always require approval.
- Under non-construction projects, contracting out, sub awarding (if authorized by law) or otherwise obtaining the services of a third party to perform activities which are central to the purposes of the award. This does not apply to the procurement of equipment, supplies, and general support services.

Cost Overruns

The State will no longer reserve any of the initial disaster allocation to cover cost overruns for HMGP awards. If applicants experience cost overruns, they will be met by un-obligated disaster funds not requested within the application period or cost under-runs on other approved awards as a result of project withdrawal or award modifications or project closeouts where projects were completed under budget and funds were de-obligated.

Actual cost of approved work may exceed approved cost estimates. In such cases, the applicant may request approval of additional costs which result in the need for additional federal funds. To do so, the applicant must submit a request in writing for additional federal funding and include supporting documentation. The GAR evaluates each cost overrun and, when justified, submits a request and a recommendation to the FEMA RD for a final determination.

Audit Requirements

- Audits will be conducted in accordance with 2 CFR 200 Subpart F.
- Recipient and subrecipients will fully cooperate and participate in audits as required.
- The Hazard Mitigation Manager with support from the Director of Finance reviews audits completed for the recipient and subrecipients for the Hazard Mitigation Grant Program. If adverse findings are reported, the GAR must take appropriate action and report that action to FEMA.
- FEMA may elect to conduct a federal audit of any of the awards or subawards.

Closeout Procedures

Project Closeout

When a project has been completed the subrecipient must submit a request for closure in writing to the GAR stating that all work is complete and verify the final project cost. Before final payment or reimbursement can be made to the subrecipient, the Risk Reduction Specialist or Hazard Mitigation Planning Specialist must be in possession of a written request for reimbursement, a copy of the settlement statement for each property (where applicable), copies of all proof of payments relative to project costs, and a copy of the Deed with Restrictive Covenant for each property (where applicable), and for drainage improvements as built drawings (where applicable).

After a subrecipient has informed the State that a project is ready for a final inspection, the Risk Reduction Specialist will schedule a meeting to review all of the subrecipient's documentation and perform a site visit to verify the approved scope of work has been completed. The state will collect GPS coordinates and site photographs for each mitigated property. In regard to plan development or update, the Hazard Mitigation Planning Specialist will conduct a desk review to verify the approved scope of work has been completed.

Once the final inspection/desk review is completed and all documentation is satisfactory, the Risk Reduction Specialist or Hazard Mitigation Planning Specialist will process the final payment to the subrecipient for project costs.

When all eligible project funds have been disbursed, the Hazard Mitigation Division will request in writing from FEMA an initial closeout of the project, indicating in the request any overrun or underrun of eligible costs. The request should specify whether the project meets the eligible scope of work. Equipment purchased with award funding totaling \$5,000.00 or more, will be documented at closeout, stored in the TeamWorks Accounting System and reported using the Standard Form-428-B, Tangible Personal Property Report.

FEMA will make a determination of any overrun or underrun amounts and obligate or deobligate funds as necessary. FEMA will notify GEMA/HS of the final eligible amount, including subrecipient administrative allowances. Upon the State's concurrence with FEMA's final claim figures, GEMA/HS will disburse any remaining funds to the subrecipient with a closure letter that specifies that records must be maintained by the subrecipient for a period of three years from the date of project closeout.

Using a mitigated properties database from GMIS, GEMA/HS will keep an up-to-date listing of all properties that have been mitigated in the state. As property acquisition projects are completed, the properties that have been mitigated are listed in detail under this database.

Project files will be documented to reflect that project closeout has been accomplished and no further disbursements will be made. Project file information will be retained for a minimum of three (3) years after the closeout of the disaster. Closed project acquisition type mitigation projects, will be monitored for continued compliance every three (3) years.

Award Program Closeout

When all projects have been completed and all disbursements made, documentation completed and audits performed, the Hazard Mitigation Division will request, through the alternate GAR that the grant program be closed out. The alternate GAR will conduct necessary reviews of project accomplishment and submit necessary documentation to FEMA to support the request for closeout.

APPENDIX A

Sample Recipient-Subrecipient Agreement

HAZARD MITIGATION GRANT PROGRAM Recipient-Subrecipient Agreement

On September 15, 2017, the President declared that a major disaster exists in the State of Georgia. This declaration was based on damage resulting from Hurricane Irma. This document is the Recipient-Subrecipient Hazard Mitigation Assistance Agreement for the major disaster, designated FEMA-4338-DR, under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288 as amended by Public Law 100-707, 42 USC 5121 et seq. ("The Act"), in accordance with 44 CFR 206 Subpart N, Hazard Mitigation Grant Program. Under this Agreement, the interests and responsibilities of the Recipient, herein after referred to as the State, will be executed by the Georgia Emergency Management and Homeland Security Agency (GEMA/HS). The individual designated to represent the State is the GEMA/HS Director, Governor's Authorized Representative. The Subrecipient to this Agreement is XYZ. The interests and responsibilities of the Subrecipient will be executed by XYZ agent, the Subrecipient Authorized Representative.

1. The following Exhibits are attached and made a part of this agreement:

- Exhibit "A": Application for Federal Assistance, GEMA Form 150
- Exhibit "B": Assurances- Construction Programs, Standard Form 424-D
- Exhibit "C": Project Administration Guidelines: Financial Assistance, Hazard Mitigation Grant Program
- Exhibit "D": Certification regarding Drug-Free Workplace Requirements
- Exhibit "E": Certification regarding Lobbying
- Exhibit "F": Scope of Work
- Exhibit "G": Progress Payment Request Form
- Exhibit "H": Federal Funding Accountability and Transparency Act Certification

2. Pursuant to Section 404 of the Act, funds are hereby awarded to the Subrecipient on a 75 percent federal cost share and 10 percent state cost share basis for the hazard mitigation project(s) described in Exhibits "A" and "F". The Subrecipient shall be responsible for the remaining 15 percent share of any costs incurred under Section 404 of the Act and this Agreement. Allowable costs will be governed by 2 CFR Part 200.
3. If the Subrecipient violates any of the conditions of disaster relief assistance under the Act, this Agreement, or applicable federal and state regulations; the State shall notify the Subrecipient that additional financial assistance for the project in which the violation occurred will be withheld until such violation has been corrected to the satisfaction of the State. In addition, the State may also withhold all or any portion of financial assistance which has been or is to be made available to the Subrecipient for other disaster relief projects under the Act, this or other agreements, and applicable federal and state regulations until adequate corrective action is taken.

4. The Subrecipient agrees that federal or state officials and auditors, or their duly authorized representatives may conduct required audits and examinations. The Subrecipient further agrees that they shall have access to any books, documents, papers and records of any recipients of federal disaster assistance and of any persons or entities which perform any activity which is reimbursed to any extent with federal or state disaster assistance funds distributed under the authority of the Act and this Agreement.
5. The Subrecipient will establish and maintain an active program of nondiscrimination in disaster assistance as outlined in implementing regulations. This program will encompass all Subrecipient actions pursuant to this Agreement.
6. The Subrecipient agrees that the mitigation project contained in this agreement will be completed by XYZ on or before MONTH-DAY-YEAR. Completion dates may be extended upon justification by the Subrecipient and approval by FEMA and the Governor's Authorized Representative.
7. The certifications signed by the Subrecipient in the application relating to maintenance of a Drug-Free workplace (44 CFR Part 17) and New Restrictions on Lobbying (44CFR Part 18) apply to this Award Agreement and are incorporated by reference.
8. The written assurances provided by XYZ pertaining to FEMA's post award approval conditions apply to this Award Agreement and are incorporated by reference.
9. The Subrecipient shall follow Uniform Administrative Requirements for awards found in 2 CFR Part 200 and FEMA HMA (Hazard Mitigation Assistance) program guidance to implement this award.
10. There shall be no changes to this Agreement unless mutually agreed upon, in writing, by both parties to the Agreement.

Governor's Authorized
Representative

Subrecipient's Authorized
Representative

Date

Date

EXHIBIT "A"
APPLICATION FOR FEDERAL ASSISTANCE

1. Type of Submission: <input checked="" type="checkbox"/> Construction <input type="checkbox"/> Non-Construction	2. Date Submitted: 00/00/00 3. Date Received by State:00/00/00 4. Date Received by Federal: 00/00/00	Applicant Identifier: HHM000000 State Application Identifier: <u>HHM000000</u> Federal Identifier: HMGP-4338
5. APPLICANT INFORMATION		
Legal Name: <u>XYZ</u>	Organizational Unit: <u>XYZ</u>	
Address (city, state and zip): _____	Name and telephone number of the person to be contacted on matters involving this application (include area code): _____	
6. Employer Identification Number (EIN): _____	8. Type of Applicant (enter appropriate letter in box): <input type="checkbox"/>	
7. DUNS Number: _____	A. State B. County C. Municipal D. Special District E. Independent School District F. State Institution of Higher Learning G. Private University H. Other (List):	
9. Type of Application: <input type="checkbox"/> New <input type="checkbox"/> Continuation <input type="checkbox"/> Revision If revision, enter appropriate letter(s) in box(es): <input type="checkbox"/> A. Increase Award B. Decrease Award C. Increase Duration D. Decrease Duration Other (list):	10.- Name of Federal Agency: FEDERAL EMERGENCY MANAGEMENT AGENCY	
11. Catalog of Federal Domestic Assistance Number: 97.039 Title: Hazard Mitigation Grant Program (HMGP)	12. Descriptive Title of Applicant's Project: _____	
13. Estimated Funding:	Remarks:	
Federal: _____ \$		
Applicant: _____ \$		
State: _____ \$		
Local: _____		
Other: _____		
Total: _____ \$		
14. TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL DATA IN THIS APPLICATION ARE TRUE AND CORRECT, THE DOCUMENT HAS BEEN DULY AUTHORIZED BY THE GOVERNING BODY OF THE APPLICANT AND THE APPLICANT WILL COMPLY WITH THE ATTACHED ASSURANCES IF THE ASSISTANCE IS AWARDED.		
Typed Name of Authorized Representative: _____	Title: _____	Telephone Number: _____
Signature of Authorized Representative:		Date Signed:
Signature of Approving Authority:	Title: Director, Georgia Emergency Management and Homeland Security Agency	Date Signed:

EXHIBIT "B"O.M.B NO. 4040-0009
Expiration Date: 01/31/2019**ASSURANCES - CONSTRUCTION PROGRAMS**

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0042), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the Awarding Agency. Further, certain federal assistance awarding agencies may require applicants to certify additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance, and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project costs) to ensure proper planning, management and completion of project described in this application.
2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, the right to examine all records, books, papers, or documents related to the assistance; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will not dispose of, modify the use of, or change the terms of the real property title or other interest in the site and facilities without permission and instructions from the awarding agency. Will record the Federal awarding agency directives and will include a covenant in the title of real property acquired in whole or in part with Federal assistance funds to assure nondiscrimination during the useful life of the project.
4. Will comply with the requirements of the assistance awarding agency with regard to the drafting, review and approval of construction plans and specifications.
5. Will provide and maintain competent and adequate engineering supervision at the construction site to ensure that the complete work conforms to the approved plans and specifications and will furnish progressive reports and such other information as may be required by the assistance awarding agency or State.
6. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
7. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
8. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards of merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
9. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.
10. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681 1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.
11. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal and federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.
12. Will comply with the provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

13. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333) regarding labor standards for federally-assisted construction subagreements.

14. Will comply with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase Flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.

15. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91- 190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).

16. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components

or potential components of the national wild and scenic rivers system.

17. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq).

18. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."

19. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.

20. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL	TITLE _____
APPLICANT ORGANIZATION _____	DATE SUBMITTED

EXHIBIT "C"
**GEORGIA EMERGENCY MANAGEMENT AGENCY/
OFFICE OF HOMELAND SECURITY
Hazard Mitigation Grant Program
Project Administration Guidelines: Financial Assistance**

This fact sheet provides a synopsis of information contained in the Recipient-Subrecipient Agreement and other applicable documents. Its purpose is to provide general guidelines for efficient and timely Hazard Mitigation Grant Program project administration.

1. **Project Identification.** The Federal Emergency Management Agency (FEMA) has assigned project number HMGP 4338-0000 to this project. Please reference this number in all correspondence, as doing so will greatly assist us in processing any actions for this project.
2. **Documentation.** You must keep full documentation to get maximum payment for project related expenditures. Documentation will be required as part of the approved Hazard Mitigation Grant Program project file. Documentation consists of:
 - A. Recipient-Subrecipient Agreement.
 - B. Copies of checks, vouchers or ledger statements.
 - C. Contracts awarded.
 - D. Invoices or other billing documents.
 - E. Progress reports.
 - F. Record of advance or progress payments (where applicable).
3. **Funding.** Cost sharing has been established at 75% federal, 10% state, and 15% applicant.
4. **Debarred and Suspended Parties.** You must not make any award or permit any award (subaward or contract) at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in Federal assistance programs under Executive Order 12549, "Debarment and Suspension".
5. **Procurement Standards.** You may use your own procurement procedures, which reflect applicable State and local laws and regulations, provided that the procurements conform to applicable Federal laws and standards. Below is a summary of key procurement standards that a Subrecipient should incorporate as discussed in 2 CFR Sections 200.318 to 200.326.
 - A. **Conflict of Interest Policy.** The Subrecipient must maintain written standards of conduct covering conflicts of interest and governing the performance of its employees engaged in the selection, award, and administration of contracts as required in 2CFR Section 200.318.

- B. Procurement. Perform procurement transactions in a manner providing full and open completion. Contracts and Procurements must be of reasonable cost, generally must be competitively bid, and must comply with Federal, State, and local procurement standards. FEMA finds five methods of procurement acceptable:
- a) Micro-purchase procedures: an informal method for securing services or supplies that do not cost more than \$3,000. Micro-purchases may be awarded without soliciting competitive quotes if the Subrecipient considers the price to be reasonable.
 - b) Small purchase procedures: an informal method for securing services or supplies that do not cost more than \$100,000 by obtaining several price quotes from different sources
 - c) Sealed bids: a formal method where bids are publicly advertised and solicited, and the contract is awarded to the responsive bidder whose proposal is the lowest in price
 - d) Competitive proposals: a method similar to sealed bid procurement in which contracts are awarded on the basis of contractor qualifications instead of on price
 - e) Non-competitive proposals: a method whereby a proposal is received from only one source, because the item is available only from a single source; there is an emergency requirement that will not permit delay;
- C. Maintain sufficient records to detail the significant history of procurement. These records will include, but are not necessarily limited to, the following: rationale for the method of procurement, selection of contract type, and contractor selection or rejection.
- D. Take affirmative steps to assure the use of small and minority firms, women's business enterprises, and labor surplus area firms when possible.
- E. Include specific provisions in Subrecipient's contracts to allow changes, remedies, changed conditions, access and records retention, suspension of work and other clauses approved by the Office of Federal Procurement Policy.

6. Payments

A. Progress Payments

- (1) When progress payments are desired, you must submit a written request (on provided form at Exhibit "G") and provide supporting documentation, such as an invoice and copies of check.
- (2) The Risk Reduction Specialist reviews the request and supporting documentation. The Hazard Mitigation Manager reviews and approves or denies the request.

- (3) If the request is denied, the Hazard Mitigation Manager will inform you in writing that additional documentation is required to support the request.
 - (4) If the request is approved, the Hazard Mitigation Manager will authorize payment of the requested amount.
 - (5) Quarterly report submissions must be current in order to receive progress payments.
 - B. Advance Payments - Advance payments will be made on an exception basis only.
7. Subrecipient Performance - The scope of work (see Exhibit F) must be initiated within 90 days of this award notification.
- A. If documentation, inspections or other reviews reveal problems in performance of the scope of work, the Hazard Mitigation Manager will inform you in writing of the deficiencies.
 - B. In addition, the State may also withhold all or any portion of financial assistance which has been made available under this agreement until adequate corrective action is taken.
8. Award Expiration Date
- A. The award expiration date runs through MONTH-DAY-YEAR and has been established based on project milestones established by the applicant in their application. The award expiration date is the time during which the Subrecipient is expected to complete the scope of work. You may not expend FEMA or state funds beyond this date. All costs must be submitted for reimbursement within 60 days of the end of the award expiration date.
 - B. Requests for time extensions to the Award Expiration Date will be considered but will not be granted automatically. A written request must be submitted to the Hazard Mitigation Manager with an explanation of the reason or reasons for the delay. Without justification, extension requests will not be processed. Extensions will not be granted if the Subrecipient has any overdue quarterly progress reports. If an extension is requested, it must be received 90 days prior to the award expiration date. When fully justified, the Hazard Mitigation Manager may extend the award expiration date.
9. Project Termination
- A. The Recipient, Subrecipient, or FEMA may terminate award agreements upon giving written notice to the other party at least seven (7) calendar days prior to the effective date of the termination. All notices are to be transmitted via registered or certified mail.

- B. The Subrecipient's authority to incur new costs will be terminated upon the date of receipt of the notice or the date set forth in the notice. Any costs incurred prior to the date of the receipt of the notice or the date of termination set forth in the notice will be negotiated for final payment. Close out of the award will commence and be processed as prescribed under final inspection procedures described in this Recipient-Subrecipient Agreement.

10. Environmental and Historic Preservation Conditions

- A. The following Environmental Project Conditions must be followed to ensure the project remains in compliance through implementation:

Any change to the approved scope of work will require re-evaluation for compliance with NEPA and other Laws and Executive Orders. This review did not address all federal, state, and local requirements. Acceptance of federal funding requires Recipients to comply with all federal, state, and local laws. Failure to obtain all appropriate federal, state, and local environmental permits and clearances may jeopardize federal funding.

If ground-disturbing activities occur during construction or demolition, Subrecipient will monitor ground disturbance and if any potential archeological resources are discovered, will immediately cease construction in that area and notify the State and FEMA.

11. Equipment/Supplies

- A. The Subrecipient must comply with the regulations listed in 2 CFR 200.313 Equipment, 200.314 Supplies, and must be in compliance with state laws and procedures.

12. Award Modifications

- A. Any award modifications, including deviation from the approved scope of work or budget, must be submitted in writing for approval prior to implementation. Award Modifications include:
 1. Any revision which would result in the need for additional funding.
 2. Transfers between budget categories.
- B. The Subrecipient shall follow prior approval requirements for budget revisions found in 2 CFR 200.308. Transfer of funds between total direct cost categories in the approved budget shall receive the prior approval of FEMA when such cumulative transfers among those direct cost categories exceed ten percent of the total budget.

13. Appeals - You may submit an appeal on any item related to award assistance. Appeals must be submitted to the Hazard Mitigation Manager within 90 days of the action which is being appealed.
14. Progress Reports
 - A. Quarterly progress reports are required. The report will be supplied to you by GEMA/HS on a quarterly basis for your completion.
 - B. The initial progress report will cover the period through MONTH-DAY-YEAR. It must be submitted no later than MONTH-DAY-YEAR.
 - C. Subsequent reports must be filed by you within fifteen days after the end of each calendar quarter (March 31, June 30, September 30, and December 31).
15. Interim Inspections

Interim inspections may be conducted by GEMA/HS staff and/or FEMA staff.
16. Project Closeout
 - A. When all work has been completed, you must notify your Risk Reduction Specialist in writing to request project closeout.
 - B. A desk review will be conducted by your Risk Reduction Specialist.
17. Audits
 - A. If you receive \$750,000 or more in federal assistance from all federal sources, not just this award, during your fiscal year, you are responsible for having an audit conducted as prescribed by the Single Audit Act and sending a copy to the Georgia Department of Audits and Accounts. Mail reports to:

Department of Audits and Accounts
Non-Profit and Local Government Audits
270 Washington Street, SW, Room 1-156
Atlanta, Georgia 30334-8400

If you need additional information or assistance, contact the Hazard Mitigation Division at (404) 635-7522 or 1-800-TRY-GEMA.

EXHIBIT “D”

Certification Regarding Drug Free Workplace Requirements

This certification is required by the regulations implementing the Drug-Free Workplace Act of 1988, 29 CFR Part 3001. The regulations require certification by Subrecipients, prior to award, that they will maintain a drug-free workplace. The certification set out below is a material representation of fact upon which reliance will be placed when the agency determines to grant the award. False certification or violation of the certification shall be grounds for suspension of payments,

- A. The Subrecipient certifies that it will or will continue to provide a drug-free workplace by:
- (a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the Recipient and Subrecipient’s workplace and specifying the actions that will be taken against employees for violation of such prohibition;
 - (b) Establishing an ongoing drug-free awareness program to inform employees about--
 - (1) The dangers of drug abuse in the workplace;
 - (2) The Recipient’s policy of maintaining a drug-free workplace;
 - (3) Any available drug counseling, rehabilitation, and employee assistance programs; and
 - (4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;
 - (c) Making it a requirement that each employee to be engaged in the performance of the award be given a copy of the statement required by paragraph (a);
 - (d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the award, the employee will--
 - (1) Abide by the terms of the statement; and
 - (2) Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the workplace no later than five calendar days after such conviction;
 - (e) Notifying the agency in writing within ten calendar days after receiving notice under subparagraph (d)(2) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice, including position and title, to every award officer or other designee on whose award activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notice shall include the identification number(s) of each affected award;
 - (f) Taking one of the following actions, within 30 calendar days of receiving notice under subparagraph (d)(2), with respect to any employee who is so convicted—
 - (1) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, 29 U.S.C. § 701 et seq.; or
 - (2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency;
 - (g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a), (b), (c), (d), (e) and (f).

EXHIBIT "E"**CERTIFICATION REGARDING LOBBYING**
Certification For Contracts, Awards, Loans, and Cooperative Agreements

This certification is required by the regulations implementing the New Restrictions on Lobbying, 44 CFR Part 18. The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal award, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, award, loan, or cooperative agreement.
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, award, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, sub awards, and contracts under awards, loans, and cooperative agreements) and that all Subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. § 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

EXHIBIT “F”

SCOPE OF WORK

Shown below is the funding level and scope of work for the Hazard Mitigation Grant Program project for XYZ. Any changes to this spreadsheet **MUST RECEIVE PRIOR APPROVAL FROM GEMA/HS** and will be maintained by GEMA/HS and shall supersede all previous versions.

Location	Shipping and Installation	Generator	Concrete Pad for Generator	Facility Transfer Switch and connections	Fuel for Initial Testing	Generator Study (Pre-Award)	Total Project Costs
Totals							

EXHIBIT "G"

Date: _____

HMGP Progress Payment Request

Instructions: All requests for progress payments must be supported by documentation supporting actual expenditures. Itemize each expenditure below to the fullest detail possible, including a reference to specific sites or elements of work. Attach documentation that supports this progress payment request, such as copies of bills of sale, invoices, receipts, and checks evidencing payment. Do not send originals. Attach a continuation sheet if necessary.

Agreement Number: HMGP-4338

FEMA Project Number: HMGP-4338

Subrecipient Name: XYZ **GMS ID. Number:** HHM000000

<u>Site Reference or Element of Work</u>	<u>Approved Amount</u>	<u>Previous Payment</u>	<u>Current Request</u>	<u>Description of Documentation Attached in Support of this Payment Request</u>
(from continuation sheet attached) SUBTOTAL				
TOTAL				
Less Subrecipients Share (15%)				
NET AMOUNT REQUESTED				

Under penalty of perjury, I certify that to the best of my knowledge the data above is correct and that all outlays were made in accordance with the award conditions, comply with procurement regulations contained within the 2 CFR, Part 200, and that payment is due and has not been previously requested. I am familiar with Section 317 of Public Law 93-288, as amended by the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

Signature of Subrecipient's Authorized Representative (and printed name)

EXHIBIT "H"
Federal Funding Accountability and Transparency Act Certification

In order to remain in compliance with The Federal Funding Accountability and Transparency Act of 2006 (FFATA) reporting, complete Items 1-7 and Items 8-10 if necessary, and certify by an authorized agent.

Sub-award Number: HHM000000

Federal Agency Name: **Federal Emergency Management Agency**

CFDA Program Number and Program Title: **97.039 Hazard Mitigation Grant Program (HMGP)**

Sub-award Project Description: **XYZ**

1. Sub-awardee DUNS Number _____
2. Sub-awardee Name _____
3. Sub-awardee DBA Name _____
4. Sub-awardee Address _____
5. If DBA, Sub-awardee Parent DUNS Number _____
6. Sub-award Principle Place of Project Performance _____
7. In the preceding fiscal year, did the sub-awardee receive 80% of its annual gross revenues from the Federal government?
Yes _____ No _____
If **Yes**, continue to question 8. If **No**, questionnaire is complete.
8. In the preceding fiscal year, were the sub-awardee's annual gross revenues from the Federal government more than \$25 million annual? Yes _____ No _____
If **Yes**, continue to question 9. If **No**, questionnaire is complete.
9. Does the public have access to the names and total compensation of the sub-awardee's five most highly compensated officers through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. §§ 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986?
Yes _____ No _____
If **No**, continue to question 10. If **Yes**, questionnaire is complete.

10. Please list the names and compensation of the sub-awardee's five most highly compensated officers.

- 1. _____ \$ _____
- 2. _____ \$ _____
- 3. _____ \$ _____
- 4. _____ \$ _____
- 5. _____ \$ _____

I certify that to the best of my knowledge all of the information on this form is complete and accurate.

Authorized Signature: _____ Date: _____

This section is for use by the Georgia Emergency Management and Homeland Security Agency Only.

Sub-award Obligation/Agency Name: _____

In accordance with The Federal Funding Accountability and Transparency Act of 2006 (FFATA), this document has been processed in the FFATA Sub-award Reporting System (FSRS) by the undersigned:

Signature _____ Date: _____

Sub-award Obligation/Action Date: _____

Appendix H-II
HMGP Disaster Briefing
Documentation



HAZARD MITIGATION GRANT PROGRAM

Building a Stronger and Safer Georgia

Georgia Emergency Management and Homeland Security Agency

Hazard Mitigation Division

Atlanta, GA 30316

Hazard Mitigation Grant Program DR-4338 Timeline

HMGP Workshops Schedule

- ❖ Area 1 – Banks County Recreation Department – November 3, 2017
- ❖ Area 2 – Albany Civic Center – November 9, 2017
- ❖ Area 3 – Fall Line Technical College – October 30, 2017
- ❖ Area 4 – Thomaston-Upson EMA – November 2, 2017
- ❖ Area 5 – Liberty County Performing Arts Center – October 24, 2017
- ❖ Area 6 – Cartersville Public Library – November 6, 2017
- ❖ Area 7 – Gwinnett Environmental and Heritage Center – November 1, 2017
- ❖ Area 8 – C.E. Weir Senior Citizens Center – October 25, 2017

- ❖ **Deadline to submit Pre-Application to GEMA/HS:
February 1, 2018**

- ❖ **GEMA/HS will review Pre-Applications and notify Applicants to submit full HMGP Application:
March 1, 2018**

- ❖ **Full Applications due to GEMA/HS by:
May 1, 2018**

Note: GEMA/HS will work with community to develop an HMGP application that meets FEMA programmatic requirements prior to formal submittal to FEMA.

- ❖ **Full Applications submitted to FEMA no later than:
September 15, 2018***

- ❖ **FEMA Approval – Timeline unknown**
- ❖ **Project implementation – Up to three years**



HAZARD MITIGATION GRANT PROGRAM

Building Resilient Communities

Georgia Emergency Management Agency / Homeland Security

Hazard Mitigation

Atlanta, GA 30316

Overview:

Mitigation is the cornerstone of emergency management. Hazard Mitigation is sustained action to reduce or eliminate risks to life and property from natural or man-made hazard events. Through mitigation actions such as sound land-use planning; adoption and enforcement of building codes; removing structures from hazardous areas; and retrofitting of existing buildings and facilities; and storm water management projects; we can protect facilities to assure functionality following an event, reduce exposure to liabilities and minimize disruptions to the community.

Introduction:

Section 404 of the Robert T. Stafford Disaster and Emergency Assistance Act of 1988 established the Hazard Mitigation Grant Program (HMGP). The purpose of the program is to provide funds to State agencies and local governments in the aftermath of a disaster for projects that reduce or eliminate the long-term risk to human life and property from the effects of natural hazards. For this disaster, the Federal Emergency Management Agency (FEMA) will contribute 20% of the amount it will spend for disaster assistance programs to fund the HMGP. Federal law requires States and local jurisdictions to have a mitigation plan prior to receipt of HMGP project funds. The plan identifies hazards, assesses community needs, and describes a community-wide strategy for reducing risks associated with natural disasters.

Project Funding:

The federal share of HMGP funding cannot exceed 75% of the total eligible project cost. The non-federal share may be met with cash, contributions, certain other grants such as Community Development Block Grants, or with in-kind services. Grants will be made available to eligible applicants on a competitive basis with priority given to the federally declared counties. The state may contribute a percentage of the non-federal cost share based on severity of damage for the counties included in the presidential disaster declaration for Public Assistance.

HMGP Application Process:

The HMGP is administered by the Georgia Emergency Management and Homeland Security Agency (GEMA/HS). GEMA/HS Hazard Mitigation staff offer technical assistance to local governments for project identification and application preparation. GEMA/HS also is responsible for the review, prioritization and funding recommendation of eligible projects to FEMA. FEMA is responsible for making all final funding decisions on projects submitted by the state.

Following a presidential disaster declaration, GEMA/HS announces the HMGP grant application information, usually within 30-60 days of the disaster declaration date. Pre-applications are required based on project type. Upon favorable review of pre-applications, applicants will be invited to submit full applications. Completed applications are required within six to eight months of the declaration date. Applications are evaluated and projects are recommended to FEMA for approval and funding based on prioritization and available funds. All applications must be submitted to FEMA within twelve (12) months of the disaster declaration date.

TYPES OF HMGP PROJECTS THAT COULD BE ELIGIBLE:

- Initiative Projects such as the development or improvement of warning systems with mitigation as an essential component;
- Construction of safe rooms (tornado and severe wind shelters) for public and private structures that meet the FEMA construction criteria in FEMA 320, "Taking Shelter from the Storm" and FEMA 361, "Design and Construction Guidance for Community Shelters";
- Retrofits such as elevations, structure relocation, structural reinforcement (wind and seismic), strapping of utilities, installation of storm shutters, tie downs, etc.;
- Acquisition of property and/or relocation of homes, businesses and public facilities from hazard prone areas;
- Wildfire mitigation such as creating defensible space, application of ignition-resistant construction and hazardous fuel reduction;
- Soil stabilization projects that provide protection from erosion and landslides;
- Generators that protect a critical facility and meets all other HMGP eligibility criteria. Critical facilities may include Emergency Operation Centers, police and fire stations, hospitals, and water and sewer treatment facilities;
- Structural hazard control or protection measures such as floodwalls, detention basins and other storm drainage upgrades; and
- Development of a Local Hazard Mitigation Plan.

Generally, a project should:

- Substantially reduce the risk of future damage, hardship, loss or suffering from a major disaster;
- Conform with federal floodplain, wetland and environmental regulations;
- Solve a problem independently, or part of a problem when there is assurance that the whole project will be completed;
- Be **cost-effective** in that it addresses a problem that is repetitive or that poses a significant risk if left unsolved;
- Contribute substantially to the problem's long-term solution;
- Have manageable future maintenance requirements;
- Be determined to be the most practical, effective and environmentally sound alternative among the possible options;
- Conform to the goals and objectives of Local and State Hazard Mitigation Plans; and
- Have the documented support of the local community.

Some of the reasons that projects / applications are determined to be ineligible:

- Project is for operation and maintenance versus disaster-related mitigation;
- Project is the responsibility of another federal agency, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service;
- Project is the result of deferred maintenance rather than related to a natural hazard;
- Project has an inadequate benefit/cost ratio (not cost-effective);
- No federally approved local Hazard Mitigation Plan; and
- Non-participation in the National Flood Insurance Program.

For further information, write us at the address below or call the State Hazard Mitigation Program Office at (404) 635-7522.

Georgia Emergency Management and Homeland Security Agency
Hazard Mitigation
Post Office Box 18055
Atlanta, Georgia 30316-0055

Hazard Mitigation Grant Program – Fact Sheet
FEMA-4338-DR-GA

Hazard Mitigation Assistance (HMA) Score Sheet

Overall Score _____

Applicant: _____

Project Title/ID #: _____

Overall Priority _____

Natural Hazard Exposure (Average for all Properties) 25

Flood	Wind (Miles from Coast)	Tornado (History)	_____
Floodway (25)	0-10 Miles (25)	1.09/tornado	
AE (20)	10-25 Miles (20)		
A (15)	25-50 Miles (15)		
B,X (shaded) (10)	50-100 Miles (10)		
C, X (unshaded) (0)	>100 Miles (0)		

History of Damage in Project Area (Average for all Properties) 25

5 points per event of documented history (up to 5 events) _____

or BC Module Predicts an Average of

<5 year Hazard Return Interval	25	
>5 and <10 Hazard Return Interval	20	
>10 and <25 Hazard Return Interval	15	
>25 and <50 Hazard Return Interval	10	
>50 and <100 Hazard Return Interval	5	
>100 Hazard Return Interval	0	_____

Type of Mitigation 5

Non-structural (e.g., floodproofing, retrofitting, elevation, acquisition, development/implementation of codes and standards, etc.) 5

Structural (e.g., flood wall, storm water drainage improvements) 0 _____

Potential Impact on Community 15

Severe (failure to implement project results in loss of life or essential services) 15

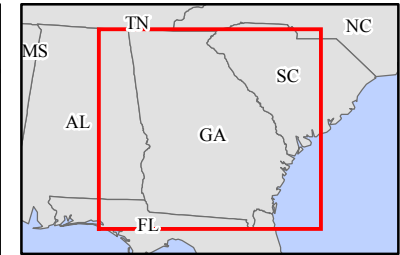
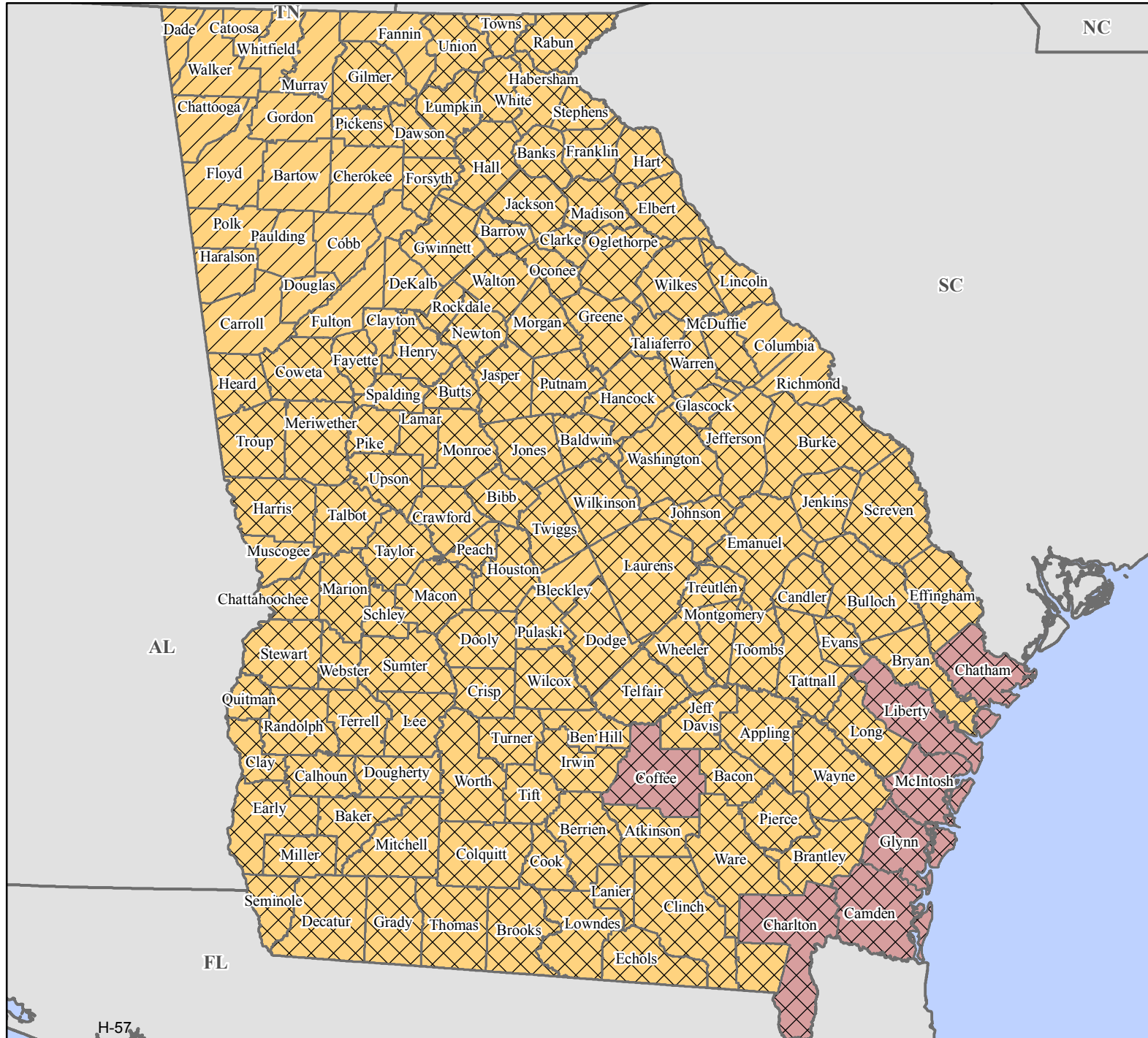
Moderate (failure to implement project results

in economic hardship)	7.5	
None (project has minimal or no impact)	0	—
Estimated Environmental Impacts	5	
Insignificant (CATEX)	5	
Moderate (EA required)	2.5	
Major (EIS required)	0	—
Intangible Factors	10	
(Community Commitment to mitigation)		
Storm Ready	1	
CRS Rating (6-10) 1 point for each class	5	
Cost Share arrangements (>25%)	2	
History of mitigation projects	2	
		—
Benefits	15	
1 point per \$500,000 (cap at 15 points)		—
		—
TOTAL POINTS	100	—
Bonus Point Section (for top 5 scoring apps)	10	
Quality of data in the application	10	
Hazard Data (Zone)	2.5	
Damage History	2.5	
Cost Data	2.5	
Environmental (Completeness)	2.5	
(Confidence in source data to validate application information)		—

FEMA-4338-DR, Georgia Disaster Declaration as of 10/18/2017






FEMA

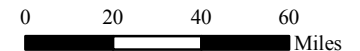
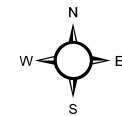


Data Layer/Map Description:
The types of assistance that have been designated for selected areas in the State of Georgia.

All designated areas in the State of Georgia are eligible to apply for assistance under the Hazard Mitigation Grant Program.

Designated Counties

-  Public Assistance (Categories A and B)
-  Individual Assistance and Public Assistance (Categories A - G)
-  Public Assistance (Categories A - G)



Data Sources:

FEMA, ESRI;
Initial Declaration: 09/15/2017
Disaster Federal Registry Notice:
Amendment #6 - 10/11/2017
Datum: North American 1983
Projection: Transverse Mercator



**Georgia Emergency Management Agency /
Homeland Security (GEMA/HS)**

**Hazard Mitigation Grant Program
(HMGP)
Applicant's Briefing
DR-4338-GA**



GEMA/HS Mission

To facilitate the protection of life and property against man-made and natural disasters by directing the state's efforts in the areas of prevention, preparedness, mitigation, response and recovery.





Workshop Agenda

- **Introduction of Staff and Attendees**
- **HMGP Application Information**
 - **Program Overview**
 - **Available Funds**
 - **Priority**
 - **Application Process and Schedule**



Let's Get Started

- **Introductions**
- **Please Include**
 - **Name**
 - **Community**
 - **Agency**
 - **Project Interest**
- **Sign In Sheet**
- **Handouts**



DR-4338 Statewide Impact



Impacts of Hurricane Irma

- Damages primarily to Roads, Buildings, EMCs
- >1.5 million without power
- 5 Fatalities
- \$150 million is estimated in uninsured losses
- >1,900 NFIP claims and \$8 million in advance payments



Hazard Mitigation Grant Program

- **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 HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.**
- **Since 1990, the HMGP has provided funds to Georgia to invest in long-term actions that reduce damages from future natural hazards.**





Objectives of the HMGP

- **Significantly reduce or eliminate future risk to lives and property from severe natural hazards**
- **Provide funds to implement projects identified in State or local hazard mitigation plans**
- **Enable mitigation measures to be implemented during the immediate recovery from a disaster**





404 Hazard Mitigation Funds

- **404 Hazard Mitigation funds are utilized for reducing future damages**
- **406 Public Assistance funds are utilized for repairing damages caused by declared disaster**
- **Any government owned properties or structures damaged during Hurricane Irma cannot be awarded under Hazard Mitigation and should apply for Public Assistance funds.**





How Much Money is Available for DR4338?

HMGP funds based on federal funds spent on Public and Individual Assistance programs (less administrative expenses)

- **Georgia receives 20% of the total estimated Stafford Act Disaster Assistance**
 - **State of Georgia Enhanced Mitigation Plan provides for 20% HMGP funding (33% increase)**
- **Cost Share is 75% federal/25% non-federal**
 - **State will provide 10% of eligible costs**
- **Will use up to 7% of allocation for planning, up to 5% for initiative, and remainder for projects.**
- **Initial Estimate at \$20 million Federal Share**
 - **Initiative - \$1 million**
 - **Planning - \$1.4 million**
 - **Projects - \$17.6 million**





DR-4338 Funding Priorities

- **Utilize 5% initiative to support warning and communication improvements and state wide generator initiative**
 - **Equipment and systems for the purpose of warning residents of impending severe weather and hazard events**
 - **Priority given to mass alert systems**
 - **Transfer switches to support statewide portable generator initiative**
 - **Priority given to water/wastewater/medical facilities**
- **Utilize planning funds (up to 7% of allocation) to update mitigation plans**
- **Utilize project funds (up to 88% of allocation) for mitigation activities that reduce or eliminate damages from high winds and flooding.**



DR-4338 Funding Priorities

Counties with approved Hazard Mitigation Plans

- 1. Declared for both IA and PA (7 counties)**
- 2. Declared for PA (All categories - 130 counties)**
- 3. Declared for PA (A&B - 22 counties)**

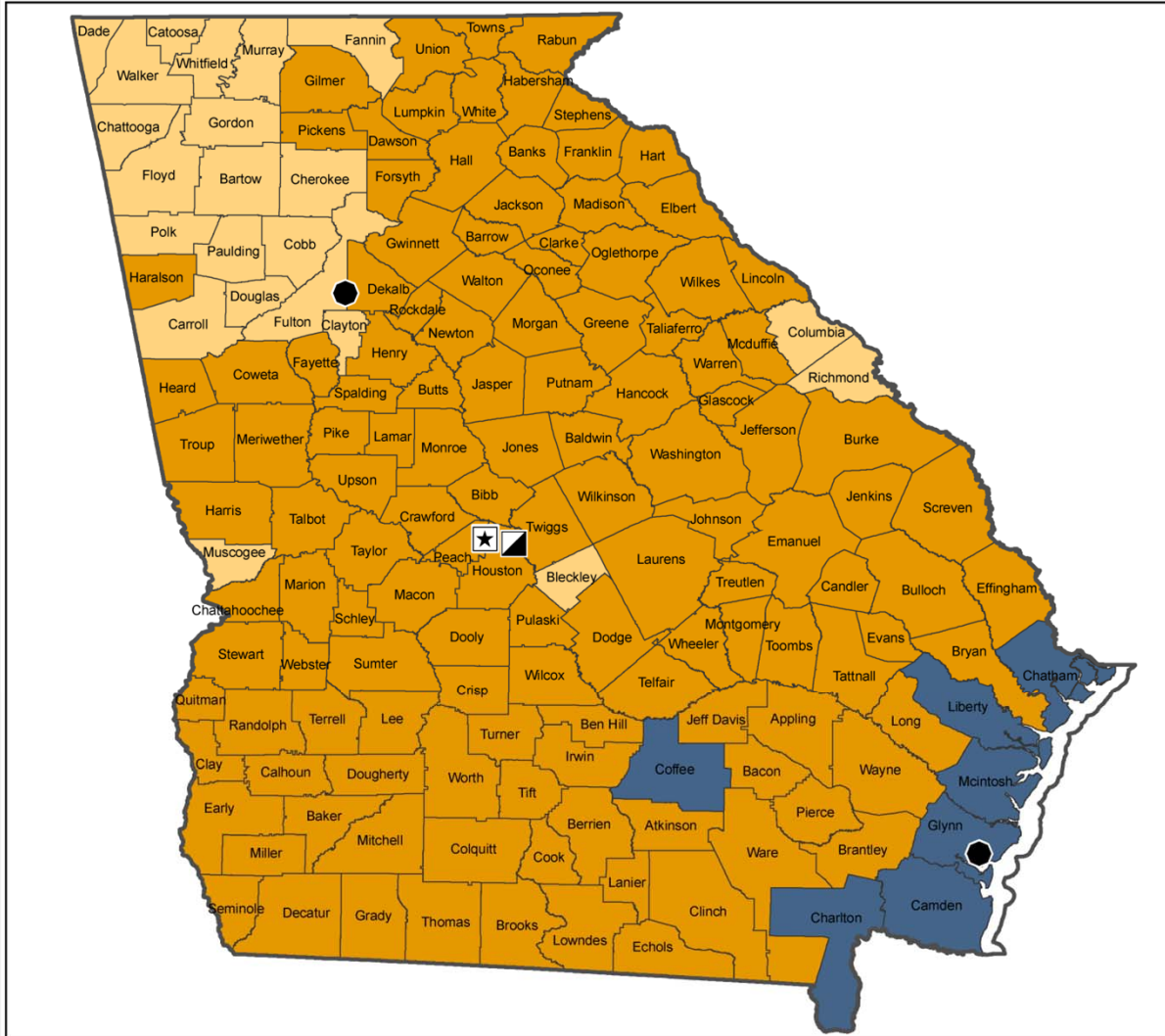
Prioritization for Project Grants

- 1. Generators for essential facilities who lost power during storm event (Water and Wastewater systems and medical facilities have priority)**
- 2. Flood mitigation activities to address damaged structures (Substantially damaged structures have priority)**



Declared Counties

Major Disaster Declaration – State of Georgia
FEMA-4338-DR-GA - Hurricane Irma - Declared September 15, 2017 / Amended October 26, 2017



Data Layer/Map Description:
This product illustrates the counties affected by Hurricane Irma and those included in the major presidential declaration.

All counties in the State of Georgia are eligible to apply for assistance under the Hazard Mitigation Grant Program.

Incident Period: September 7-20, 2017

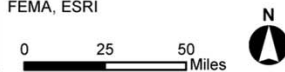
Incident Facilities

- Joint Field Office
- Joint Field Office Annex
- Branch Office

Designated Counties

- Individual Assistance and Public Assistance (Cat. A-G) (7)
- Public Assistance (Cat. A-B) (22)
- Public Assistance (Cat. A-G) (130)

Data Sources:
FEMA, ESRI



Author: DR-4338 GIS

Creation: 27 October 2017, 0800 EDT



What Type of Projects Can be Funded?

- **Eligible Project Types**

- **Voluntary property acquisition and structure demolition or relocation***
- **Structure Elevation***
- **Mitigation Reconstruction**
- **Dry Floodproofing (Historic/Non-Residential)**
- **Generators for Critical Facilities***
- **Flood Risk Reduction Projects**
- **Structural and non-structural retrofitting of existing buildings and facilities**
- **Safe room construction**
- **Infrastructure Retrofit**
- **Soil Stabilization**
- **Wildfire Mitigation**
- **Initiative Projects***
- **State and Local plan updates***

**Indicates projects that are prioritized for DR4338*





Applicant's Role (Subrecipient)

Pre-Award:

- **Develops, adopts and updates local mitigation plan**
- **Submits HMGP Pre-Application/Application to GEMA/HS**

Post-Award:

- **Implements project and maintains records and accounting information on awarded projects for three (3) years**
- **Ensures all project costs are reasonable and in compliance with all applicable federal, state, and local requirements governing the use of federal funds**
- **Complies with all Local, State and Federal Procurement Procedures**
 - **2CFR Part 200 (Code of Federal Regulations)**
- **Complies with all award requirements**
- **Complies with three (3) year post Acquisition requirements**
 - **Open Space Monitoring and Audits**



GEMA/HS's Role (Recipient/Pass-Through)

Manages overall program within Georgia

- **Update the State Mitigation Plan**
- **Establish mitigation priorities for the disaster**
- **Solicit Program Interest**
- **Provide technical assistance to applicants to complete applications**
- **Review, submit and manage applications to FEMA**
- **Keep Subrecipients updated on status of all applications to FEMA**
- **Ensure subrecipients adhere to all program and administrative requirements**
- **Receive and disburse funds and monitor progress of awarded projects**
- **Evaluate the effectiveness of approved projects**



FEMA's Role (Federal Awarding Agency)

- **Provide programmatic oversight of the HMGP**
- **Keep Georgia appraised of available funding**
- **Provide technical assistance to GEMA/HS in support of developing eligible HMGP projects**
- **Conduct final eligibility review and approve applications for funding**
 - **Can take up to 12 months to complete review process**





Who is Eligible to Apply?

- **Government Entities**
 - **State and local**
- **Private Non-Profit Organizations**
 - **Must have IRS Tax Exemption under sections 501(c), (d), or (e)**
- **Individuals and business may not apply directly, but eligible local governments or private non-profit organizations may apply on their behalf**





Project Eligibility Criteria

- **Localities must have current FEMA approved Local Hazard Mitigation Plan prior to HMGP funds being awarded**
- **Consistent with state and local mitigation plans**
- **Project(s) must be identified in local mitigation plan**
- **Project must comply with all FEMA program regulations**
- **Conforms with environmental, historical, and economic justice issues**
- **Provides a long-term solution for the community**
- **Applicant must participate in NFIP and be in good standing**
- **Demonstrates cost-effectiveness**
 - **GEMA/HS staff assists with cost-effectiveness**



DR-4338 Application Timeframe

- **September 15, 2017 – Disaster Declaration (HMGP Statewide)**
- **October 24 - November 9, 2017 – Applicant Briefings (One in each Area)**
- **February 1, 2018 – Pre-Application due to GEMA/HS**
- **February 1, 2018 – Applications for substantial damaged structures (elevation or acquisition)**
- **March 1, 2018 – GEMA/HS Notification to Applicant for Full Application**
- **May 1, 2018 – Full Application due to GEMA/HS**
- **September 15, 2018 – All Applications submitted to FEMA**
- **FEMA Application Review Process (up to 12 months)**



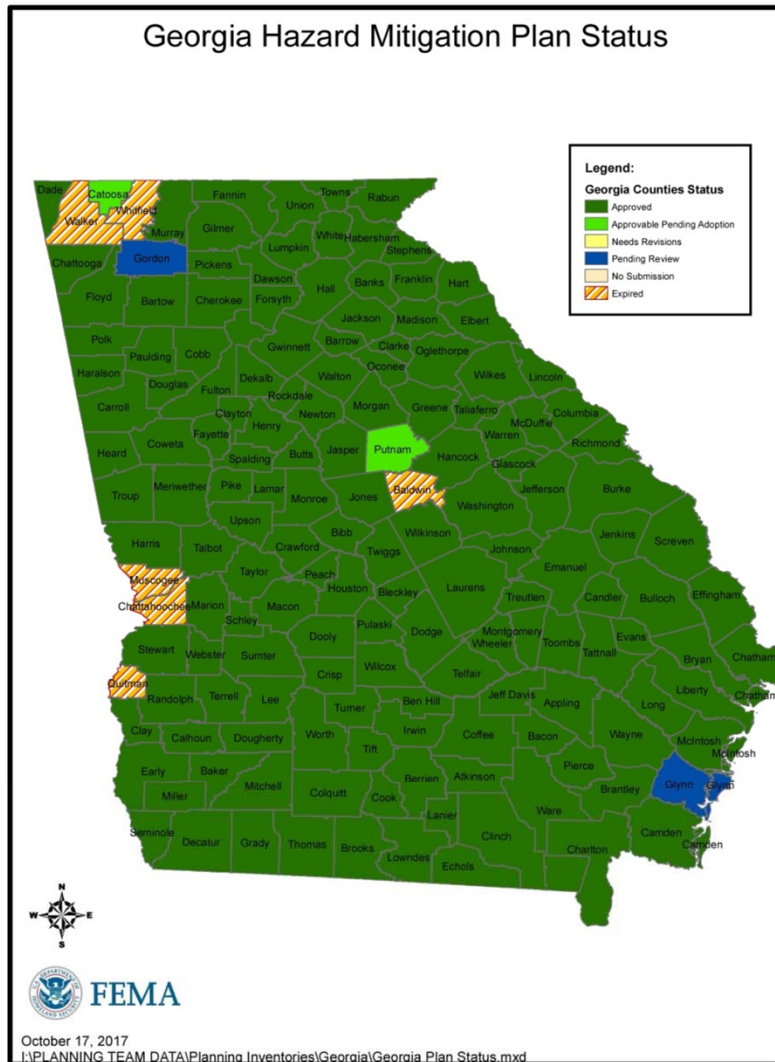
HMGP Plan Update Grant Process

- **Any county requiring a plan update in 2021 or earlier has already received an application from their Mitigation Planning Specialist.**





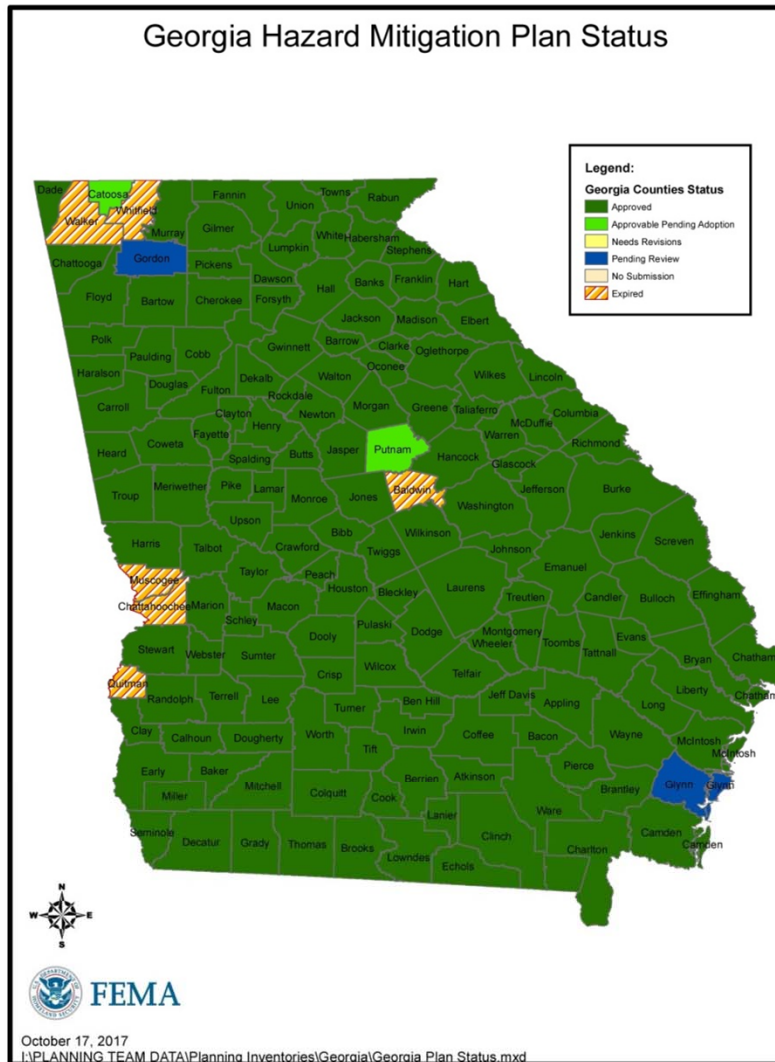
Area 5 Counties HM Plan Status



County	HazMit Plan Expiration Date
Brantley	09/24/2018
Bryan	04/28/2019
Camden	11/9/2021
Charlton	10/7/2018
Chatham	2/4/2021
Effingham	10/30/2018
Glynn	4/13/2017
Liberty	11/14/2021
Long	8/29/2022
McIntosh	10/1/2018
Pierce	12/11/2018
Wayne	10/11/2022



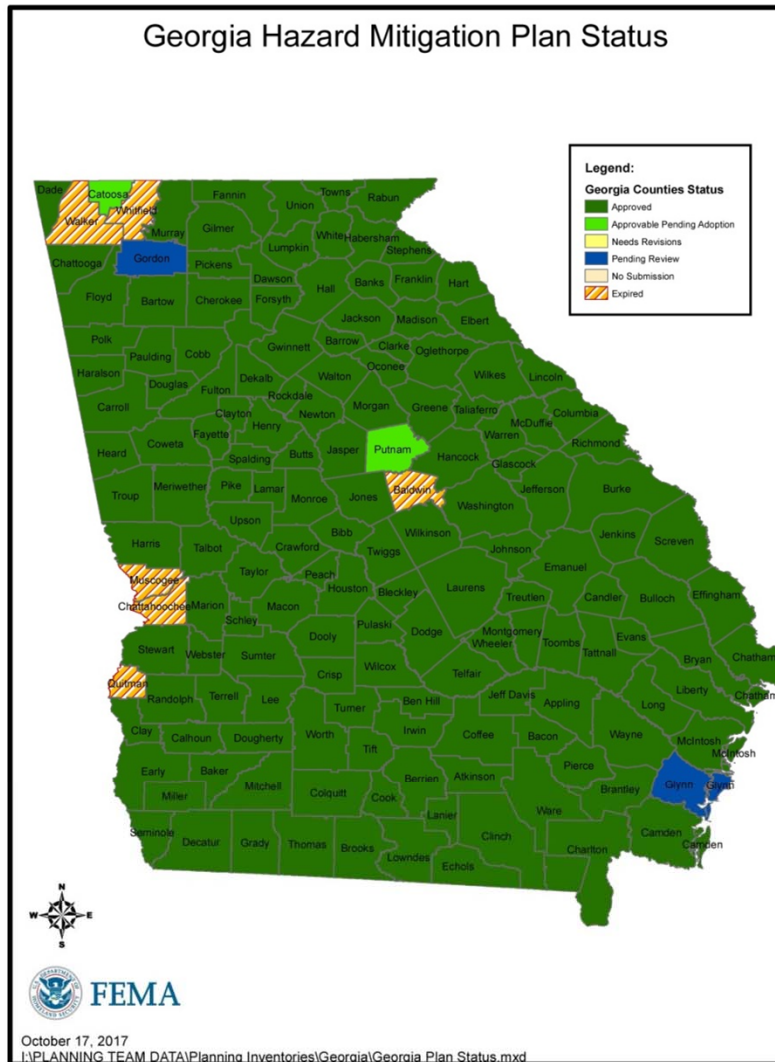
Area 8 Counties HM Plan Status



County	HazMit Plan Expiration Date
Appling	6/10/2019
Atkinson	4/16/2019
Bacon	12/11/2018
Ben Hill	6/16/2019
Berrien	6/10/2019
Bleckley	3/11/2019
Clinch	4/7/2020
Coffee	5/6/2019
Dodge	8/11/2019
Echols	3/18/2019
Irwin	4/17/2019
Jeff Davis	11/18/2019
Lanier	3/19/2019
Montgomery	8/26/2020
Pulaski	1/11/2021
Tattnall	6/14/2020
Telfair	7/24/2019
Toombs	8/6/2019
Ware	12/10/2018
Wheeler	11/3/2019
Wilcox	4/15/2020



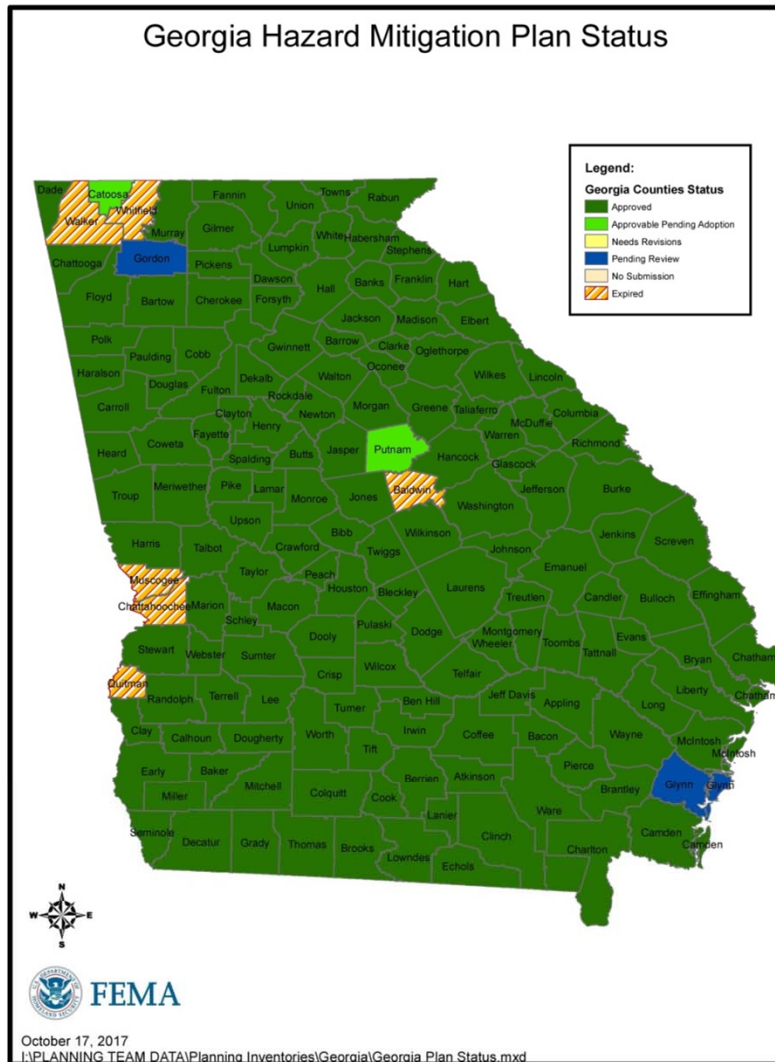
Area 3 Counties HM Plan Status



County	HazMit Plan Expiration Date
Baldwin	6/15/2017
Bulloch	7/19/2020
Burke	1/4/2020
Candler	12/8/2019
Columbia	11/10/2021
Emanuel	10/19/2020
Evans	10/14/2020
Glascok	12/15/2018
Hancock	4/6/2020
Jasper	5/25/2020
Jefferson	12/29/2019
Jenkins	1/7/2020
Johnson	6/26/2018
Laurens	9/21/2021
McDuffie	10/10/2022
Putnam	6/21/2017
Richmond	10/10/2022
Screven	6/8/2020
Taliaferro	6/7/2020
Treutlen	12/14/2020
Twiggs	6/5/2019
Warren	11/6/2018
Washington	12/17/2018
Wilkinson	7/1/2019



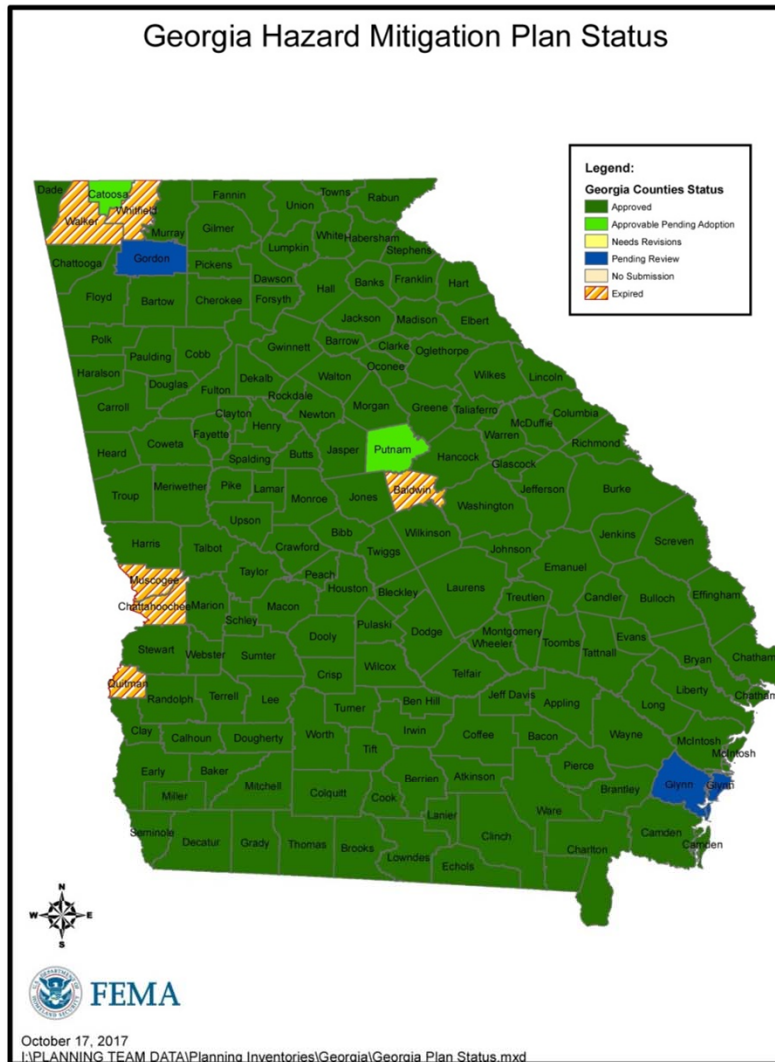
Area 7 Counties HM Plan Status



County	HazMit Plan Expiration Date
Clayton	8/2/2022
Cobb	12/11/2021
DeKalb	2/28/2022
Douglas	6/12/2021
Fayette	9/2/2020
Fulton	2/28/2022
Gwinnett	8/18/2020
Henry	1/23/2019
Rockdale	2/20/2019



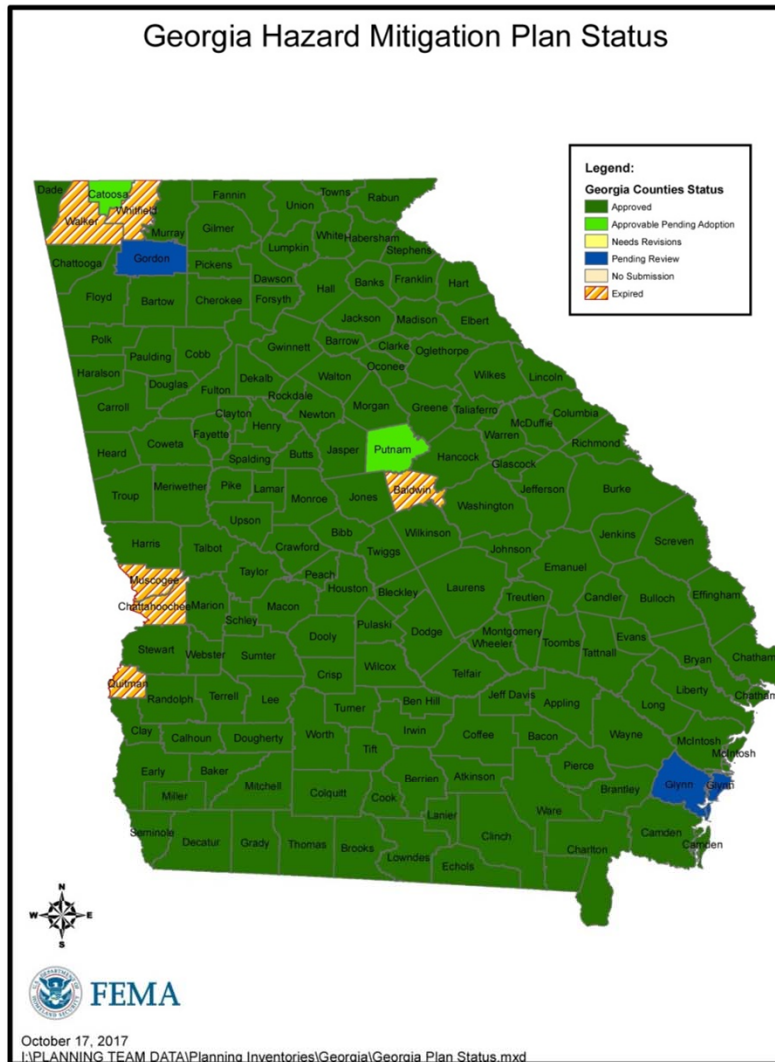
Area 4 Counties HM Plan Status



County	HazMit Plan Expiration Date
Bibb	8/30/2021
Butts	3/9/2020
Chattahoochee	11/3/2014
Crawford	7/25/2018
Dooly	8/26/2020
Harris	1/7/2021
Houston	1/11/2021
Jones	2/23/2021
Lamar	1/6/2021
Macon	12/3/2018
Marion	6/18/2020
Meriwether	7/27/2020
Monroe	8/9/2022
Muscogee	9/6/2017
Peach	5/1/2019
Pike	5/6/2020
Schley	10/16/2021
Spalding	2/22/2022
Stewart	9/3/2019
Sumter	4/20/2020
Talbot	6/8/2021
Taylor	9/30/2018
Troup	8/19/2019
Upton	9/6/2021
Webster	9/7/2020



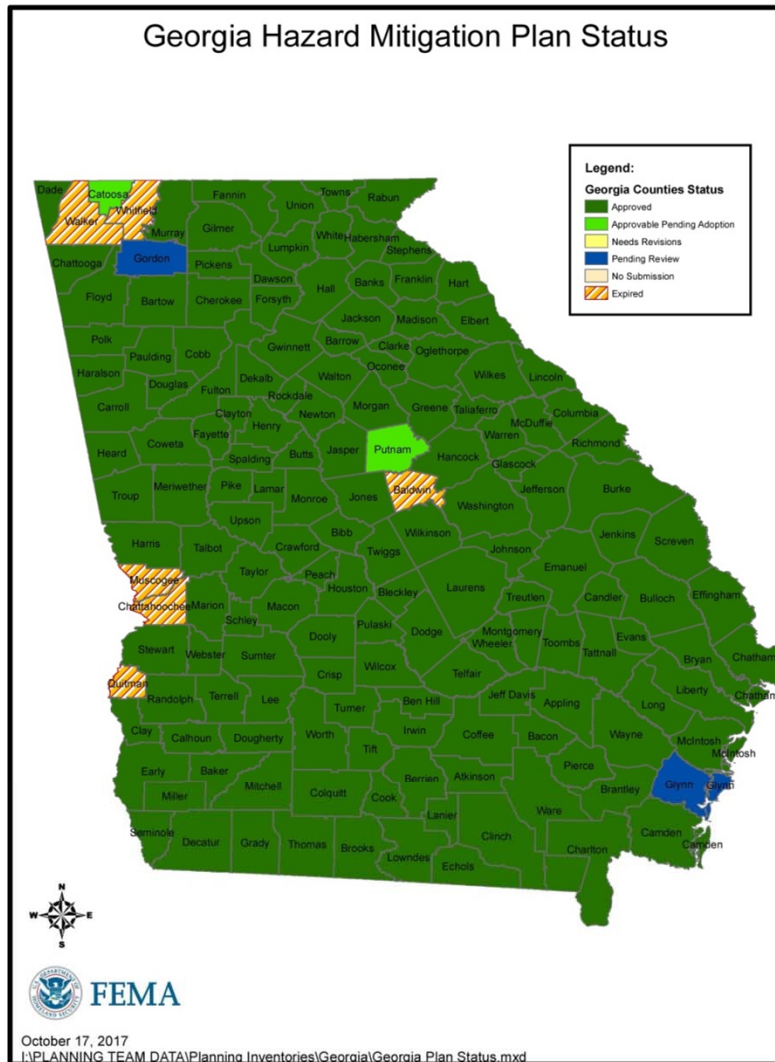
Area 1 Counties HM Plan Status



County	HazMit Plan Expiration Date
Banks	6/19/2018
Barrow	9/9/2020
Clarke	3/26/2018
Elbert	7/6/2022
Franklin	3/20/2019
Greene	2/27/2019
Habersham	9/8/2019
Hall	8/24/2022
Hart	7/21/2021
Jackson	2/27/2019
Lincoln	7/13/2020
Lumpkin	11/16/2021
Madison	5/26/2019
Morgan	9/13/2022
Newton	7/14/2020
Oconee	5/6/2019
Oglethorpe	10/28/2019
Rabun	8/28/2018
Stephens	5/6/2019
Towns	3/24/2019
Union	7/12/2021
Walton	5/9/2021
White	7/21/2021
Wilkes	11/25/2018



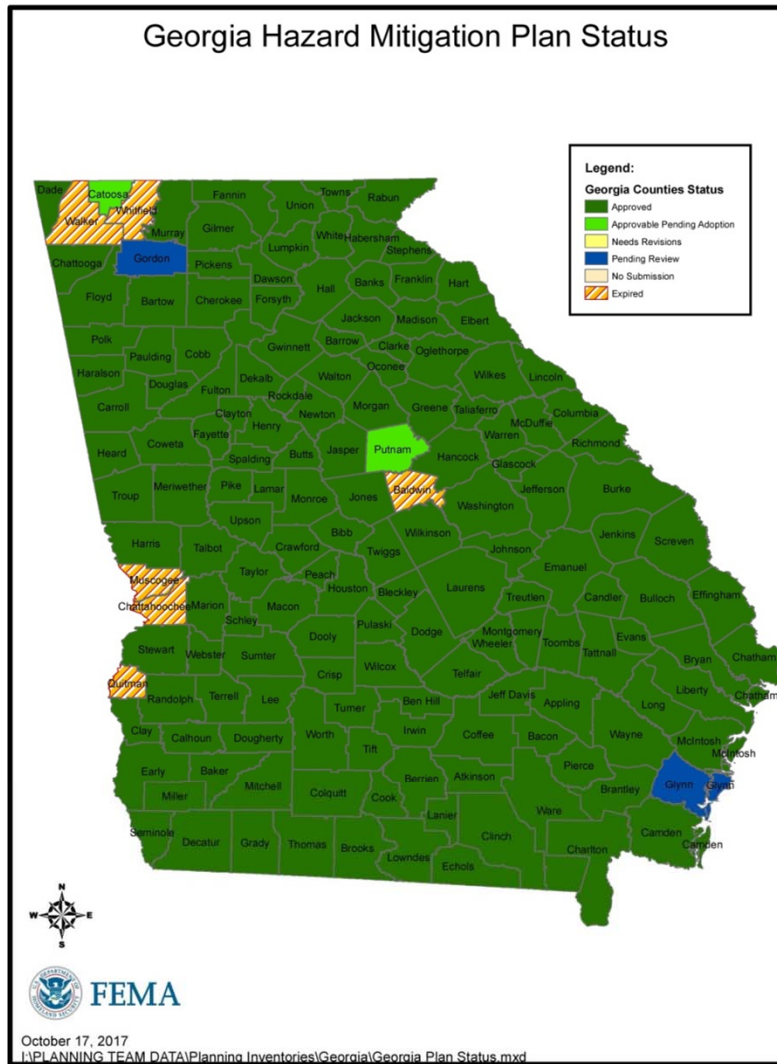
Area 6 Counties HM Plan Status



County	HazMit Plan Expiration Date
Bartow	1/9/2022
Carroll	7/31/2021
Catoosa	10/17/2022
Chattooga	2/13/2022
Cherokee	2/15/2022
Coweta	8/20/2018
Dade	4/10/2020
Dawson	7/30/2018
Fannin	12/19/2022
Floyd	1/4/2022
Forsyth	9/4/2022
Gilmer	4/1/2018
Gordon	6/15/2017
Haralson	6/7/2018
Heard	9/5/2022
Murray	1/16/2018
Paulding	5/1/2022
Pickens	5/12/2019
Polk	11/14/2017
Walker	7/10/2017
Whitfield	9/18/2017



Area 2 Counties HM Plan Status



County	HazMit Plan Expiration Date
Baker	8/22/2021
Brooks	3/19/2019
Calhoun	2/21/2022
Clay	5/23/2018
Colquitt	6/7/2020
Cook	2/18/2019
Crisp	2/22/2021
Decatur	5/1/2022
Dougherty	3/28/2021
Early	6/14/2022
Grady	8/6/2019
Lee	2/4/2021
Lowndes	2/8/2022
Miller	7/25/2021
Mitchell	1/26/2022
Quitman	3/19/2017
Randolph	8/22/2019
Seminole	2/5/2018
Terrell	12/2/2018
Thomas	8/26/2018
Tift	9/23/2022
Turner	11/4/2018
Worth	1/3/2022



HMGP Projects Pre-Application Process

From Applicant (Subrecipient):

- **Determine preferred project type(s)**
 - **Project identified in your Local Hazard Mitigation Plan?**
- **Complete Pre-Application Template**
 - **Contact Risk Reduction Specialist or visit GEMA/HS Website**
- **Submit COMPLETED Pre-Application to GEMA/HS by February 1, 2018**
- **Submit COMPLETED Application for substantial damaged (SD) structures to GEMA/HS by February 1, 2018**

From GEMA/HS (Recipient & Pass Through):

- **Conduct Benefit Cost Analysis**
 - **Initiative, planning, and SD projects are exempt from BCA**
 - **If BCA greater than 1.0, full application development may be recommended**



What You Need to Know

Generators/Transfer Switches

- **For Critical Facilities**
 - **Police Stations, Fire Stations, Water/Wastewater Treatment Facilities, Hospital, Electrical Facility, Emergency Operations Center (EOC), etc.**
- **Location to determine if in Special Flood Hazard Area (SFHA)**
 - **Flood Insurance Rate Map (FIRM)**
 - **Must comply with EO 11988**
 - **If in SFHA, generator/transfer switch must be elevated to 500 year flood elevation**
- **Power Outage History**
 - **Must have minimum of three years weather related outage data**
- **Generator Data Sheet to be filled out by Certified Electrician**
- **EHP Coordination with State and Federal Environmental Agencies**
- **BCA > 1.0 for Cost Effectiveness**



What You Need to Know

Property Acquisition/Elevation:

- **Flood History of Property with all Flood Insurance Claims**
- **Substantial damage determination (if applicable)**
- **Location to determine if in the Special Flood Hazard Area (SFHA)**
 - **Flood Insurance Rate Map (FIRM)**
- **Interest of Voluntary Participation Form signed by Homeowner**
- **EHP Coordination with State and Federal Environmental Agencies**
- **Structure Specific Information**
 - **Building Foundation Type, Use of Building, Square Footage, Building Replacement Value, First Flood Elevation (FFE)**

Initiative

- **Includes Warning Sirens, Mass Alert Systems, Weather Radios and Transfer Switches**
- **Warning and Communication for the Public, Internal Communication not allowable**
- **Storm History of desired project area**
- **Location to determine if in Special Flood Hazard Area (Warning Sirens and Transfer Switches only)**
 - **Flood Insurance Rate Map (FIRM)**
- **EHP Coordination with State and Federal Environmental Agencies**



What You Need to Know

Community Safe Room:

- **Must comply with FEMA P-361 Community Safe Room Guidance**
- **Location to determine if in the Special Flood Hazard Area (SFHA)**
 - **Flood Insurance Rate Map (FIRM)**
- **Population that will utilize Safe Room**
 - **Must be sized for population within 1/2 mile of Safe Room**
 - **5 sf/occupant**
 - **Predominant structure types within 1/2 mile of Safe Room**
- **EHP Coordination with State and Federal Environmental Agencies**



Next Steps

- **Determine Eligible Projects for your Community**
- **Work with EMA Director and Local Officials**
- **Consult your Risk Reduction Specialist or Planning Specialist**
- **Review Project Checklist**
- **Submit Pre-Application by February 1, 2018**
- **Submit SD application by February 1, 2018**





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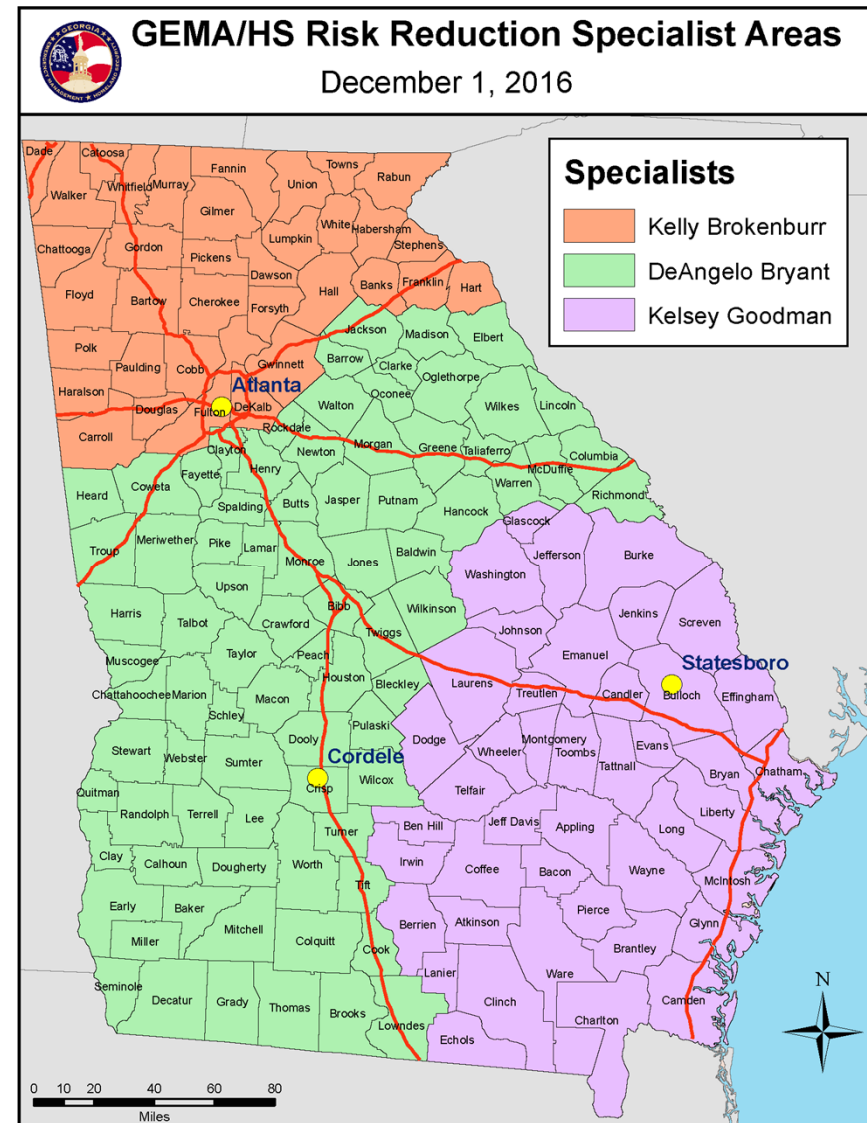


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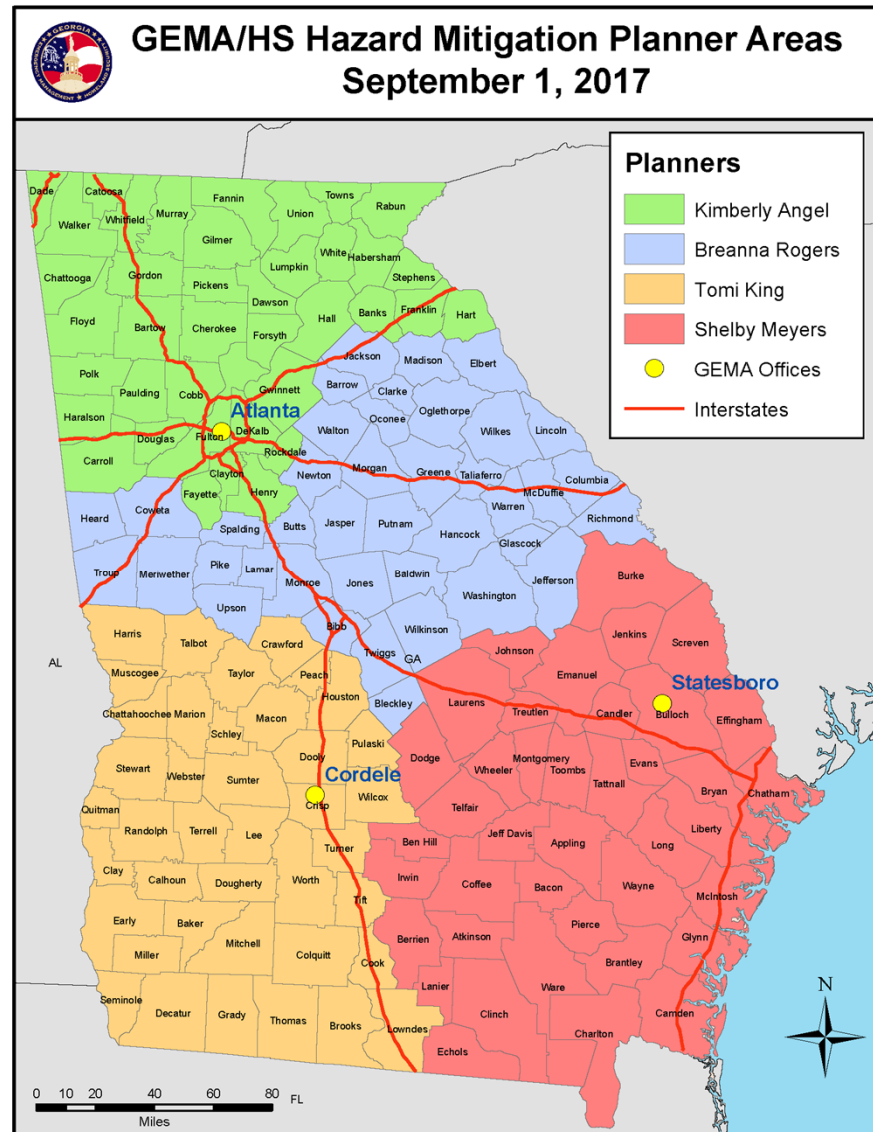
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Federal Insurance and Mitigation Administration

FY 2017 Flood Mitigation Assistance (FMA) Grant Program

As appropriated by the Consolidated Appropriations Act, 2017 (Public Law 114-113); the Fiscal Year (FY) 2017 Flood Mitigation Assistance (FMA) Grant Program provides resources to assist states, tribal governments, territories and local communities in their efforts to reduce or eliminate the risk of repetitive flood damage to buildings and structures insurable under the National Flood Insurance Program (NFIP) as authorized by the National Flood Insurance Act of 1968, as amended.

In Fiscal Year 2017, \$160,000,000 in Flood Mitigation Assistance (FMA), is available to assist States, Tribal, Territorial and local governments in reducing or eliminating claims under the National Flood Insurance Program (NFIP).

The FMA Grant Program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 with the goal of reducing or eliminating claims under the NFIP. Consistent with Biggert-Waters Flood Insurance Reform Act of 2012 (Public Law 112-141), the FMA Grant Program is focused on mitigating repetitive loss (RL) properties and severe repetitive loss (SRL) properties.

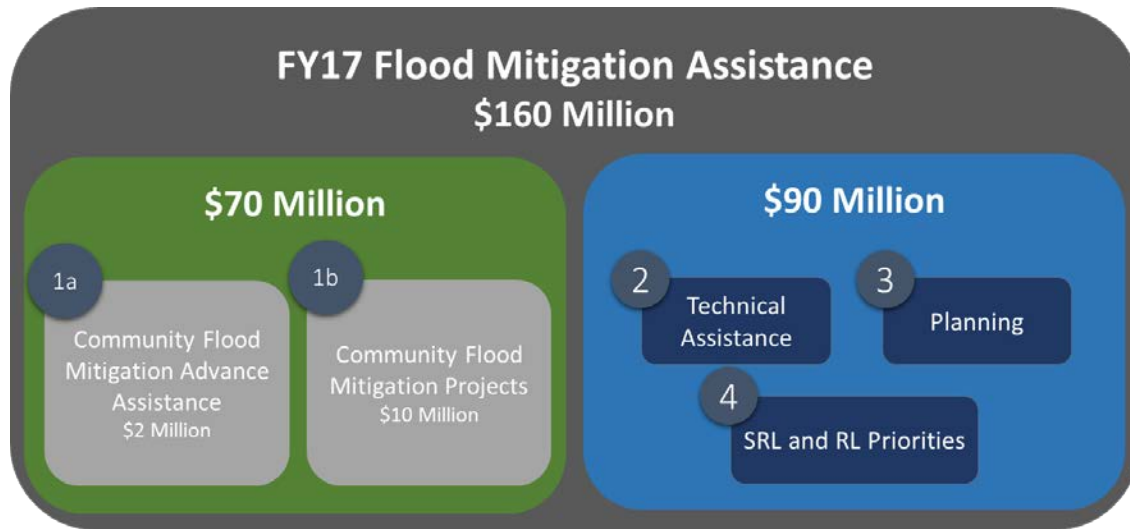
The FY17 FMA application cycle will be implemented as it has been in recent application cycles, but will prioritize \$70 million of the \$160 million available under FMA for community flood mitigation projects as priority 1. Due to the demand for funding by communities with high numbers of SRL and RL properties, projects addressing flooding on a community level have not been selected for funding. FEMA's grant recipients and subrecipients have repeatedly asked for community level flood mitigation funding.

- Advance Assistance - Funding will be provided to develop mitigation strategies and obtain data to prioritize, select, and develop viable community flood mitigation projects. This design work will facilitate viable projects for future grant applications.
- Community Flood Mitigation Projects - The remaining set aside will fund projects for proven techniques that integrate cost effective natural floodplain restoration solutions and improvements to NFIP-insured properties that benefits communities with high participation and favorable standing in the NFIP.

The Hazard Mitigation Assistance (HMA) Guidance applies to the FY 2017 FMA application cycle and applicants are encouraged to review the Notice of Funding Opportunity announcement and the HMA Guidance for detailed information regarding eligibility and to contact their FEMA Regional Office for additional information.

Funding

In FY 2017, the total amount of funds distributed under the FY 2017 FMA will be \$160,000,000. Of this, a total \$70,000,000 has been prioritized for community flood mitigation proposals leaving an estimated \$90,000,000 available for available for FMA if all funding is used. FEMA will select remaining eligible applications once all above priorities are met based on benefits to the NFIP.



Eligibility

All 50 States, the District of Columbia, Federally-recognized Native American Tribal governments, American Samoa, Guam, Northern Mariana Islands, Puerto Rico and the U.S. Virgin Islands are eligible to apply for the FY 2017 FMA Grant Program. Local governments are considered sub-applicants and must apply to their applicant state/territory.

Either the state Emergency Management Agency (EMA) or the office that has primary floodplain management responsibility is eligible to apply directly to FEMA for FMA Grant Program funds as an applicant; however, only one application will be accepted from each state, tribe or territory.

Applicants and Subapplicants must have a FEMA approved mitigation plan as of the application deadline in order to apply for mitigation projects in accordance with Title 44 CFR Part 201.

Funding Guidelines

In FY 2017, the total amount of funds distributed under the FY17 FMA Grant Program will be \$160,000,000 which includes both the traditional FMA Grant Program.

The maximum federal share for FMA planning sub-applications is as follows:

- \$100,000 for community flood mitigation advance assistance
- \$10,000,000 for community flood mitigation projects
- \$50,000 for Technical Assistance for states/territories who were awarded FMA Grant Program funds totaling at least \$1,000,000 in FY16.
- \$100,000 per Applicant for mitigation planning with a maximum of \$50,000 for state plans and \$25,000 for local plans.

A maximum of 10 percent of grant funds awarded can be used by the recipient for management costs, and a maximum of 5 percent of grant funds awarded can be used by the subrecipient for management costs, per HMA Guidance.

Federal funding is available for up to 75 percent of the eligible activity costs.

FEMA may contribute up to 100 percent Federal cost share for SRL properties defined below as:

- a) Is covered under a contract for flood insurance made available under the NFIP; and
- b) Has incurred flood related damage
 - i. For which four or more separate claims payments (includes building and contents) have been made under flood insurance coverage with the amount of each such claim exceeding \$5,000, and with the cumulative amount of such claims payments exceeding \$20,000, or
 - ii. For which at least two separate claims payments (includes only building) have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.

FEMA may contribute up to 90 percent Federal cost share for RL properties. An RL property is a structure covered by a contract for flood insurance made available under the NFIP that:

- a. Has incurred flood-related damage on two occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and
- a) At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.

The period of performance for the FMA Grant Program begins with the opening of the application period and ends no later than 36 months from the date that FEMA announces selected sub-applications.

Evaluation Criteria

FEMA will select eligible project sub-applications on a competitive basis in order of the agency's priorities for FY 2017 FMA Grant Program.

1. Community Flood Mitigation Activities – up to \$70,000,000 available
 - a. Advance Assistance – Applicants are eligible to receive up to \$100,000 federal share to develop mitigation strategies and obtain data to prioritize, select, and develop viable community flood mitigation projects.
 - b. Community Flood Mitigation Projects – FEMA will select the highest ranked eligible community flood mitigation subapplication from each Applicant up to \$10,000,000 federal share based on final priority scoring criteria (see table below) and that benefit communities with high participation and favorable standing in the NFIP.

Eligible project activities include:

- | | |
|--------------------------------------|--|
| ○ Infrastructure protective measures | ○ Localized flood control to protect critical facility |
| ○ Floodwater storage and diversion | ○ Floodplain and stream restoration |
| ○ Utility protective measures | ○ Water and sanitary sewer system protective measures |
| ○ Stormwater management | |
| ○ Wetland restoration/creation | |
| ○ Aquifer storage and recovery | |

Federal Emergency Management Agency

FY 2017 Flood Mitigation Assistance (FMA) Grant Program

FEMA will select proposal types based on the below weighted priorities.

Priority	Description	Total Points
Private Partnership Cost Share	Cost share taken on by private organizations/businesses emphasizing community participation, collaboration, and investment. Points will be assigned based on percentage of private cost share invested.	150
Building Code Effectiveness Grading Schedule (BCEGS) rating	Assesses effectiveness of enforcement and adequacy of building codes with emphasis on mitigation. Classes weighted based on national class grouping ratings. Highest weight will be assigned to class 1 and descending through lower classes.	100
Community Rating System (CRS) Participation	The Community Rating System (CRS) recognizes and encourages community floodplain management activities that exceed the minimum NFIP standards. Depending upon the level of participation, flood insurance premium rates for policyholders can be reduced up to 45%. Highest weight will be assigned to class 1 and descending through lower classes.	100
Cooperating Technical Partners Program (CTP) Participation	Qualified partnership program where communities commit to collaborate in maintaining up-to-date flood hazard maps and other flood hazard information. Points are provided to CTP participating communities.	100
International Building Codes (IBC) Adopted	IBC adoption epitomizes community commitment to responsible building regulations. Points are provided to IBC participating communities.	50
	Total Points Available	500*

* *In the event of a tie between two or more community flood mitigation applications:*

- *FEMA will use the highest Benefit Cost Ratio (BCR) as a tiebreaker for projects; and.*
- *FEMA will use the total number of active policies in the local jurisdiction as a tie breaker for Advance Assistance.*

After meeting the \$70,000,000 available for community flood mitigation or when all eligible community flood mitigation project subapplications have been selected, FEMA will select eligible subapplications for the remaining funds in the following order:

2. Technical Assistance.

FEMA will select eligible technical assistance subapplications up to \$50,000 Federal share for Applicants who received FMA awards totaling at least \$1,000,000 Federal share in FY 2016.

3. Flood Mitigation Planning.

FEMA will select eligible planning subapplications up to \$100,000 Federal share per Applicant with a maximum of \$50,000 Federal share for State mitigation plan updates and \$25,000 Federal share for local mitigation plans. FEMA may reduce the Federal share of any planning subapplication that exceeds the regulatory maximums.

4. Competitive funding for property flood mitigation projects.

FEMA will select eligible flood mitigation project subapplications on a competitive basis as follows:

- a. Projects that will mitigate flood damage to at least 50 percent of structures included in the subapplication that meet definition 42 U.S.C. 4104c(h)(3)(B)(ii) of a Severe Repetitive Loss (SRL) property: At least two separate NFIP claim payments have been made with the cumulative amount of such claims exceeding the market value of the insured structure.

- b. Projects that will mitigate flood damage to at least 50 percent of structures included in the subapplication that meet the definition of a Repetitive Loss (RL) property: Have incurred flood-related damage on two occasions, in which the cost of the repair, on the average, equaled or exceeded 25% of the market value of the structure at the time of each such flood event
- c. Projects that will mitigate flood damage to at least 50 percent of structures included in the subapplication that meet definition 42 U.S.C. 4104c(h)(3)(B)(i) of a SRL property: four or more separate NFIP claims payments have been made with the amount of each claim exceeding \$5,000, and with the cumulative amount of claims payments exceeding \$20,000

For project subapplications in priority categories 4a through 4c above, FEMA will prioritize projects as follows:

- i. The highest percentage of structures included in the subapplication that meet the definition from 100 to 50 percent;
 - ii. The largest number of structures included in the subapplication that meet the definition; and
 - iii. FEMA-validated Benefit-Cost Ratio (BCR).
5. The balance of FMA Grant Program funding will be distributed on a competitive basis to all eligible applicants for flood hazard mitigation projects.

For Additional Information

Please see the Notice of Funding Opportunity announcement posted on [Grants.gov](https://www.grants.gov) and the HMA Guidance available on the FEMA Internet: <https://www.fema.gov/hazard-mitigation-assistance> for more detailed information regarding eligibility.

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



Georgia Emergency Management Agency Application Information

Hazard Mitigation Assistance (HMA) Programs – Fiscal Year (FY) 2017 Pre-Disaster Mitigation (PDM) and Flood Mitigation Assistance (FMA)

Introduction

For the FY 2017 HMA grant cycle, the Federal Emergency Management Agency (FEMA) is providing \$90 million in PDM and \$160 million in FMA funding. Through these grant programs, the Federal Emergency Management Agency (FEMA) provides funds to States and local governments to implement hazard mitigation measures that reduce losses of life and property damage caused by natural disasters. The Georgia Emergency Management Agency (GEMA) administers these federal grant programs in the State of Georgia. This grant guidance is applicable for the FY17 cycle of the PDM and FMA programs.

Eligible Applicants

Public agencies, including State and local governments are eligible to apply for HMA grants.

Applicants must participate and be in good standing in the National Flood Insurance Program (NFIP) if a special flood hazard area has been mapped. Information about the NFIP is available at <http://www.fema.gov/about/programs/nfip/index.shtm>. To be eligible for the full range of HMA projects, applicants must participate and be in good standing in the National Flood Insurance Program (NFIP).

Planning Criteria

To be considered for HMA project funding, local governments **must** have a FEMA approved mitigation plan or plan update by **November 14, 2017** and at the time of award.

HMA Eligible Project Types by Program

Mitigation Project	PDM	FMA
1. Mitigation Projects		
Property Acquisition and Structure Demolition or Relocation	●	●
Structure Elevation	●	●
Mitigation Reconstruction		●
Dry Floodproofing of Historic Residential Structures	●	●
Dry Floodproofing of Non-residential Structures	●	●
Minor Localized Flood Reduction Projects	●	●
Structural Retrofitting of Existing Buildings	●	
Non-structural Retrofitting of Existing Buildings and Facilities	●	●

Safe Room Construction	●	
Wind Retrofit for One- and Two-Family Residences	●	
Infrastructure Retrofit	●	●
Soil Stabilization	●	●
Wildfire Mitigation	●	
Generators for Critical Facilities	●	
2. Hazard Mitigation Planning		
All Hazard/Flood Mitigation Planning	●	●

Project Funding

HMA grants are awarded on a nationally competitive basis. The Federal share of HMA funding is program and plan dependent and ranges from 75% to 100%. The non-Federal share may be met with cash, contributions, and certain other grants such as Community Development Block Grants, Increased Cost of Compliance (ICC) flood insurance payments, or in-kind services.

Cost Share by Program (Percent of Federal/Non-Federal Share)/Federal Share Project Cap

FMA-Severe Repetitive Loss (SRL) Property (100/0)/ (Must be validated SRL)
 FMA-Repetitive Loss (RL) Property (90/10)/ (Must meet **new** RL definition)
 FMA (75/25)/100K planning
 PDM (75/25)/\$4 million project/\$300K planning

FEMA Priorities for Funding (FY2017 PDM Program)

State’s top ranked application if less than \$575K or within the 1% set aside
 Planning applications from States with <\$400K in Hazard Mitigation Grant Program (HMGP) available
 Multi-state/Tribal mitigation initiatives
 Projects from States with <\$4 million in Hazard Mitigation Grant Program (HMGP) available in the following order:
 Non-flood, drainage, acquisition/elevation/mitigation reconstruction, generators for critical facilities

FEMA Priorities for Funding (FY2017 FMA Program)

\$70 million for community flood mitigation
 Up to \$100K for advance assistance per applicant
 Up to \$10 million for community flood mitigation projects

\$90 million for technical assistance, flood mitigation planning, severe repetitive loss/repetitive loss projects
 Up to \$50K for technical assistance
 Up to \$100K for planning
 SRL/RL Priorities
 Mitigation of SRL properties (claims paid exceed structure value)
 Mitigation of RL properties (average of 2 claims paid >25%)

Mitigation of SRL properties that have 4 or more claims, each exceeding \$5K

Definitions

A **severe repetitive loss property** is a structure that:

- (a) Is covered under a contract for flood insurance made available under the NFIP; and
- (b) Has incurred flood related damage –
 - (i) For which 4 or more separate claims payments have been made under flood insurance coverage with the amount of each such claim exceeding \$5,000, and with the cumulative amount of such claims payments exceeding \$20,000; or
 - (ii) For which at least 2 separate claims payments have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.

A **repetitive loss property** (new definition) is a structure covered by a contract for flood insurance made available under the NFIP that:

- (a) Has incurred flood-related damage on 2 occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and
- (b) At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.

Application Process and Schedule

The submittal of pre-applications consisting of either a property or a project worksheet is required for all project grants due to minimum Benefit-Cost requirements for project eligibility. GEMA staff will assist you with the Benefit Cost Analysis. For pre-applications, please contact the GEMA Hazard Mitigation Division at 1-800-TRY-GEMA or (404) 635-7522. [Completed pre-applications including all supporting documentation must be received by September 15, 2017.](#)

Completed pre-applications should be mailed or emailed to:

Georgia Emergency Management Agency
Post Office Box 18055
Atlanta, Georgia 30316-0855
Attention: Hazard Mitigation Division
GEMA-HazMitPOC@gema.ga.gov

Upon determination that the proposed project meets the minimum federal eligibility criteria for PDM and FMA, GEMA will notify you and activate your eGrants access for application development. Pre-applications that do not demonstrate minimum project federal eligibility will be removed from further consideration.

Applicants must use FEMA's eGrants system to enter their application for PDM and FMA grants. eGrants is an electronic grant system developed by FEMA as part of the Federal Government's eCommerce initiative. Completed applications must be submitted through this system by November 3, 2017 at 3:00 p.m. Eastern Standard Time to be considered for funding. Applications submitted after this deadline will not be considered for this funding cycle.

Technical Assistance

GEMA Hazard Mitigation staff will provide technical assistance to local governments for project application preparation.

Additional information about the HMA program is available at

<http://www.fema.gov/government/grant/hma/index.shtm>.



Federal Insurance and Mitigation Administration

FY 2017 Pre-Disaster Mitigation (PDM) Grant Program

As appropriated by the Consolidated Appropriations Act, 2017 (Public Law 115-31); the Fiscal Year (FY) 2017 Pre-Disaster Mitigation (PDM) Grant Program provides resources to assist states, tribal governments, territories and local communities in their efforts to implement a sustained pre-disaster natural hazard mitigation program, as authorized by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended (42 U.S.C. 5133).

In Fiscal Year 2017, \$90,000,000 is available to assist State, Tribal Territorial and local governments in reducing overall risk to the population and structures from future hazard events, while also reducing reliance on federal funding from future disasters.

The 2015 Hazard Mitigation Assistance (HMA) Unified Guidance applies to the FY 2017 PDM Grant Program application cycle.

Applicants are encouraged to review the Notice of Funding Opportunity announcement and the HMA Guidance for detailed information regarding eligibility and to contact their FEMA Regional Office for additional information.

Funding

The total amount of funds that will be distributed under the FY 2017 PDM Grant Program will be \$90,000,000.

- All 50 States, the District of Columbia, American Samoa, Guam, Northern Mariana Islands, Puerto Rico and the U.S. Virgin Islands are eligible to receive an allocation of 1% of the appropriation, or \$575,000, in accordance with Section 203(f)(1) of the Stafford Act.
- Ten percent of the appropriated PDM funding, or \$10 million, will be set aside for Federally-recognized Native American Tribal applicants to receive an allocation of \$575,000 per tribe.
- The balance of PDM Grant Program funds will be distributed on a competitive basis to all eligible applicants.
- No applicant may receive more than 15 percent, or \$15 million, of the appropriated PDM funding per Section 203(f)(2) of the Stafford Act.

Eligibility

All 50 States, the District of Columbia, Federally-recognized Native American Tribal governments, American Samoa, Guam, Northern Mariana Islands, Puerto Rico and the U.S. Virgin Islands are eligible to apply for the FY 2017 PDM Grant Program as Applicants. Local governments including cities, townships, counties, special district governments, and Native American tribal organizations are considered Sub-applicants and must apply to their state/territory.

Either the state Emergency Management Agency (EMA) or the office that has primary emergency management responsibility is eligible to apply directly to FEMA for PDM Grant Program funds as an Applicant; however, only one PDM grant application will be accepted from each state, tribe or territory.

Applicants and Subapplicants must have a FEMA approved mitigation plan as of the application deadline in order to apply for mitigation projects in accordance with Title 44 CFR Part 201.

Funding Guidelines

The maximum federal share for PDM sub-applications is as follows:

- \$4 million for mitigation projects
- \$400,000 for new mitigation plans
- \$300,000 for state/territory and multi-jurisdictional local/tribal plan updates
- \$150,000 for single jurisdiction local/tribal mitigation plan updates
- 10 percent of the plan and project cost estimate for information dissemination activities including public awareness and education (brochures, workshops, videos, etc.) related to a proposed planning or project activity in accordance with the Stafford Act
- 5 percent of plan and project cost estimate for subapplicant management costs for local government EMA to manage the proposed activity
- 10 percent of grant application budget for applicant management costs for state/territory/tribal EMA to manage the plan and projects activities

Federal funding is available for up to 75 percent of the eligible activity costs. Small, impoverished communities may be eligible for up to a 90 percent Federal cost share in accordance with the Stafford Act. The remaining eligible activity costs must be derived from non-Federal sources.

The period of performance for the PDM Grant Program begins with the opening of the application period and ends no later than 36 months from the date that FEMA announces the status of the FY 2017 sub-applications.

Key FY 2017 PDM Grant Program Changes

- FEMA revised the application limits from FY 2016:
 - There is no limit to the number of planning and project sub-applications that can be submitted towards the state/territorial allocation or the Tribal set aside for a maximum of \$575,000 Federal share per Applicant;
 - There is no limit to the number of competitive planning sub-applications that can be submitted per Applicant;
 - A maximum of 9 competitive project sub-applications can be submitted per Applicant;
 - Any state/tribal EMA willing to serve as the Applicant for a multi-state or multi-tribal project may submit one additional competitive project for a maximum of 10 competitive project sub-applications.

- FEMA revised the competitive priorities for funding: multi-state/tribal mitigation activities; competitive mitigation planning sub-applications from applicants with less than \$400,000 Hazard Mitigation Grant Program (HMGP) planning funds available and competitive project sub-applications from applications with less than \$4 million HMGP project funding available before competitive sub-applications from Applicants with at least those amounts of HMGP planning and project funds available.
- FEMA added an emphasis on public-private partnerships as well as the Applicant's ranking of its competitive sub-applications in the selection of competitive for funding.

Application Submission and Review Process

Applications and sub-applications for the PDM Grant Program must be submitted via the Mitigation eGrants system on the FEMA Grants Portal: <https://portal.fema.gov>. If a Sub-applicant does not use the eGrants system, then the Applicant must enter the paper sub-application(s) into the eGrants system on the Sub-applicant's behalf.

Applicants must rank all of the subapplications included in their PDM grant application in the eGrants system, including their Management Costs subapplication for their proposed applicant management costs. To be eligible for the State/Territory allocation or Tribal set aside, the Applicant's highest ranked planning and/or project subgrant application must not exceed \$575,000 Federal share. If an Applicant's highest ranked planning or project sub-application exceeds \$575,000 Federal share, then the Applicant will not receive the allocation, and FEMA will consider all of the Applicant's sub-applications on a competitive basis only. In addition, if an Applicant submits competitive project sub-applications in excess of the maximum allowed, FEMA will only review the competitive projects up to the maximum allowed in order of the Applicant's ranking.

PDM Grant Program applications will undergo a complete eligibility review within their respective FEMA Region. FEMA will review planning and project sub-applications plus one management sub-application submitted by each applicant through the Mitigation eGrants system to ensure compliance with the HMA Guidance, including eligibility of the applicant and sub-applicant; eligibility of proposed activities and costs; completeness of the sub-application; cost effectiveness and engineering feasibility of projects; and eligibility and availability of non-Federal cost share.

Evaluation Criteria

FEMA will select eligible planning and project sub-applications in order of the agency's priorities for the FY 2017 PDM Grant Program:

1. State/Territory Allocation for mitigation planning and project sub-applications up to \$575,000 Federal share per states/territories/District of Columbia
2. Tribal set aside of \$10 million for mitigation planning and project sub-applications up to \$575,000 Federal share per Federally-recognized Tribal applicant
3. Competitive mitigation activities:
 - a. Multi-State/Tribal mitigation initiatives
 - b. Mitigation planning sub-applications from Applicants that have less than \$400,000 HMGP planning funds available

- c. Projects from Applicants that have less than \$4 million HMGP project funds available in the following order:
 - i. Non-flood hazard (e.g., seismic, wildfire, landslide, wind and drought) mitigation projects
 - ii. Flood mitigation activities except acquisition, elevation, or mitigation reconstruction (e.g., stormwater management and flood control measures)
 - iii. Acquisition, elevation and mitigation reconstruction projects
 - iv. Generators for critical facilities
- d. Planning activities from Applicants that have \$400,000 or more HMGP planning funds available
- e. Projects from Applicants that have \$4 million or more HMGP project funds available in the following order:
 - i. Non-flood hazard mitigation projects
 - ii. Flood mitigation activities except acquisition, elevation, or mitigation reconstruction
 - iii. Acquisition, elevation and mitigation reconstruction projects
 - iv. Generators for critical facilities

FEMA will further prioritize planning and project sub-applications within priorities 2 and 3 above as needed in order as follows:

1. Small, impoverished community status;
2. Indication of public-private partnership (i.e., whether private sector funding is included in the required non-federal cost share);
3. FEMA-validated BCEGS rating from a grade of 1 (exemplary commitment to building code enforcement) to 10;
4. FEMA-validated Benefit Cost Ratio for projects; and
5. Applicant's ranking of competitive sub-applications.

FEMA will continue to ensure the majority of PDM funding is utilized for mitigation projects per the 2017 appropriations language.

For Additional Information

Please see the Notice of Funding Opportunity announcement posted on [Grants.gov](https://www.grants.gov) and the HMA Guidance available on the FEMA Internet: <https://www.fema.gov/hazard-mitigation-assistance> for more detailed information regarding eligibility.

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

Appendix H-III
Loss Avoidance Documentation

*Loss Avoidance Study
Lower Flint River Watershed
Georgia*



FEMA *May 2016*

This study was completed entirely by Richard N. Downer, FEMA HM HPA Technical Specialist, Region I, while deployed to DR-4259-GA.

Data was supplied by the Georgia Emergency Management Agency and Homeland Security, Mitigation Division, Terry Lunn, Hazard Mitigation Division Director and State Hazard Mitigation Officer.

The author had the benefit of several previously published sample Loss Avoidance Studies, two of which were most helpful – *Loss Avoidance Study Riverine Flood Methodology Report (without Appendices) April 2011, Version 2* and *Loss Avoidance Study Southeastern Louisiana Hurricane Isaac, 2012 DR-4080-LA Joint Field Office, Hazard Mitigation Branch, Baton Rouge, LA January 2013.*

John E. Bourdeau, FEMA HPA Specialist, Region VI, was most helpful with technical questions.

This publication presents a methodology for an Acquisition/Demolition Loss Avoidance Study. Finally, the study presents an expansive list of the data needs for such a study in the hope that both FEMA and the States will do a better job of electronically archiving the required data as HMGP projects are closed out.

Cover Photo: Baker County Court House, City of Newton

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Executive Summary:

The severe weather that affected Georgia had a devastating effect on the State and local communities. An upper-level long wave trough began to take form over the Western United States on Sunday, December 20, 2015. This put the Southeastern United States in a Southwest upper-flow on Monday, December 21, allowing vast amounts of moisture from the Gulf of Mexico to move into the area. The longwave upper-level trough pattern persisted over the Western and Midwestern United States through December 31, 2015, producing multiple surface low-pressure systems that formed in the Deep South and traversed northeastward. This allowed for frontal boundaries to remain nearly stationary and draped over the Southeast for over ten days. The upper-level flow caused waves of low-pressure to tap into and transport moisture from the Gulf of Mexico northeastward along the frontal boundaries into the Southeast. As a result, most of North and Central Georgia received between seven and fifteen inches of rainfall in only an eleven day period.

This first flood warning was issued by the NWS on December 22, 2015 and last flood warning expired on January 13, 2016. Over the course of the incident period, the NWS compiled a summary of the river crests in twelve basins. For the gauges monitored in these basins, new records were recorded at twenty-nine (29) sites and twenty-one (21) other sites recorded their second highest crest on record.

On February 10, 2016, Governor Nathan Deal requested a major disaster declaration due to severe storms and flooding during the period of December 22, 2015 to January 13, 2016. The Governor requested a declaration for Public Assistance for 33 counties and Hazard Mitigation state-wide. During the period of January 20 to February 9, 2016, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary. The following link is for the NWS river summary during the incident period: http://www.srh.noaa.gov/ffc/?n=2015_dec_flooding .

In this study, 463 Acquisition/Demolition properties along the Flint River in Leesburg, Albany, Newton, Camilla and Bainbridge were examined to determine if they would have sustained damage during the DR-4259 event. These 463 properties represented all the previously acquired properties in Lee, Dougherty, Baker, Mitchell and Decatur counties as listed in the Georgia Emergency Management and Homeland Security Agency (GEMHSA) database.

The database suffers from incomplete data. Early HMGP applications (1995) were not always completely coded into the database. Building type was not coded. Vacant lots which were acquired to prevent *checker boarding* were eliminated from the study set.

The remaining 435 properties were then examined in detail to determine if they, in fact, would have sustained flood water at or above the FFE. Of the 463 only 40 structures were determined to have sustained damage from flooding. See Appendix G.

Approximately 30 million dollars were spent to purchase the 463 properties; most of the cost being funded by a combination of the FEMA Hazard Mitigation Grant Program (HMGP), the Governor’s Emergency Funds, Community Development Block Grants (CDBG) and the National Flood Insurance Program (NFIP) benefit known as Increased Cost of Compliance (ICC). Because the database does not list the adjacent ground elevation, it was not possible to determine if the various properties were surface flooded. Surface flooding can cause damages related to erosion, debris deposition and access inconvenience.

Approximately 1.8 million dollars or \$46,000 each were spent to purchase the 40 properties. On average these 40 structures sustained 5.2 million dollars in avoided losses or approximately \$130,000 each during the DR-4259 event.

Table ES.1 Lower Flint River Watershed Avoided Losses

City, County	Number of Properties	Total Losses Avoided	Total Cost of Mitigation	Difference (+ or -)	Loss Avoidance Ratio
Newton, Baker	5	\$301,501	\$79,876	\$221,625	3.77
Albany, Dougherty	19	\$2,303,378	\$437,693	\$1,865,685	5.26
Leesburg, Lee	16	\$2,592,203	\$1,317,591	\$1,274,612	1.97
Totals	40	\$5,197,082	\$1,835,160	\$6,079,167	2.83

A Losses Avoided Ratio greater-than-one indicates that the project benefits have exceeded the project costs and that the mitigation activity provided a positive Return on Investment (ROI). The Losses Avoided for this study of 40 properties was determined to be 2.83. This ratio being greater-than-one indicates that the mitigation benefits for the single event, DR-4259, have already exceeded the Acquisition/Demolition project costs.

Acquisition/Demolition projects are projected to have a Useful Life of 100 years. This study represents only one flood event in a 22-year period (1994-2016); therefore, this ratio is expected to increase several fold as future floods test the effectiveness of the acquisitions over their useful life-cycles.

The area around Leesburg experienced the most significant inundations and thus had the highest avoided losses. The DR-4259 storm appears to have stalled over the Kinchafoonee Creek and Muckalee Creek watersheds; resulting in 166-year Recurrence Interval flood depths adjacent to these creeks. Flood depths exceeding 6 feet above the FFE were determined for three previously acquired structures.

Section One:

1.0 Introduction

Hazard mitigation is defined by the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) *as any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards and their effects*. Every year, FEMA provides communities and States with substantial financial assistance for hazard mitigation projects. This assistance is provided through Hazard Mitigation Assistance (HMA) grants under the following three programs: the Hazard Mitigation Grant Program (HMGP), the Pre-Disaster Mitigation (PDM) Program and the Flood Mitigation Assistance (FMA) Program,

In 2005, under FEMA's direction, the Multi-hazard Mitigation Council (MMC) conducted a study to assess the cost-effectiveness of natural hazard mitigation. The study, based on probabilistic hazard events rather than actual events, found that natural hazard mitigation saved an average of \$4 for every \$1 of investment (MMC, 2005).

In 2007, the Congressional Budget Office (CBO) indicated that projects funded under the PDM grant program have been cost effective in general, because the discounted present value of their future reductions in disaster losses tended to exceed their total costs of federal and nonfederal dollars. PDM mitigation projects funded during the 2004 to mid-2007 time period cost nearly \$500 million. For these projects, the CBO estimated a future reduction of losses with a present value of \$1.6 billion. Using these values, the total ratio of reduction in losses to costs was estimated to be 3 to 1.

The ability to assess the economic performance of mitigation activities over a period of time is important to encourage continued funding of mitigation projects. A Loss Avoidance Study (LAS) consists of evaluating the economic performance of a mitigation project over a period of time or based on actual hazard events, determining the value of the losses that were avoided by the mitigation project, and comparing the value of the losses avoided to the cost of the mitigation project. The losses avoided by the mitigation are determined by comparing damage that would likely have been caused by the same event without the project in place (Mitigation Project Absent [MP_A]) with damage that actually occurred with the project in place (Mitigation Project Complete [MP_C]).

FEMA implemented the loss avoidance concept as part of its ongoing effort to determine the performance of mitigation programs over a period of time in economic terms. In order to implement the LAS concept to achieve these objectives, it was necessary to develop quantitative, verifiable, defensible, and reproducible methodologies for obtaining consistent, reliable results. FEMA developed these methodologies through practical applications using flood mitigation projects.

FEMA completed nine LASs for the riverine flood hazard from 2001 to 2009. These studies were used to develop and refine the methodology for the riverine flood hazard (FEMA, 2009e.) FEMA also adapted the loss avoidance methodology to other types of hazards. In 2008, FEMA implemented LAS methods to assess the economic performance of electrical system modifications to mitigate the impact of ice and wind storms in Kansas and Nebraska. FEMA prepared additional methodology documents for tornado wind and wildfire mitigation projects (FEMA, 2009f; 2009g).

Since LASs have not been implemented for these types of hazards to date, these methodologies are theoretical.

Loss Avoidance Ratio (LAR) and Return on Investment (ROI) are often used as interchangeable terms. However, Loss Avoidance Ratio more correctly refers to the ratio of the Total Avoided Costs to the Total Cost of Mitigation for a single event. Whereas, Return on Investment more correctly refers to the ratio of Total Avoided Costs to the Total Cost of Mitigation for more than one event. In other words, ROI implies that the time-value of each event's Total Avoided Costs are considered.

This document uses the Ft's EMA methodology as described in the publication: *Loss Avoidance Study, Riverine Flood Methodology Report (without Appendices), April 2011, Version 2, 123 pages*. Every study presents unique challenges in data collection and site conditions. As FEMA encounters hazard- and site-specific situations, the methodology for a particular hazard or mitigation project type is developed further. As new studies are completed, the methodology will continue to evolve, and the tools to support the studies will become more robust.

1.1 Georgia Mitigation Project Information and History

Natural disasters in Georgia commonly result from flooding. From 1953 to 2016, the President declared 12 disasters for severe storms and flooding events in Georgia. Frequent flooding has jeopardized public health and safety and caused severe damage to property. Every year, damage from flooding costs residents, businesses, and taxpayers millions of dollars in repairs even though not every flood is severe enough to be declared a disaster by the President. As a consequence, Georgia communities, supported by the State of Georgia and the Department of Homeland Security's Federal Emergency Management Agency (FEMA), have sought to reduce the risk of flood damage through mitigation. This effort has included the acquisition/demolition, acquisition/relocation, flood-proofing, and elevation of flood-prone buildings. To evaluate the cost-effectiveness of these mitigation projects, FEMA partnered with the State of Georgia following a December 2015-January 2016 flooding disaster to conduct a Loss Avoidance Study (LAS). The LAS could have compared the losses avoided in all floods since the completion of the mitigation projects. However, only the December 2015- January 2016, DR-4259, event data were used for this study.

Because Georgia is highly susceptible to flooding, the State of Georgia initiated a number of flood mitigation projects to reduce or eliminate the risk of property damage; the threat to life, public health, and safety; and costs for emergency response. Four hundred-sixty three properties were considered for the Lower Flint River Watershed Study. The projects were completed between January 4, 1995 and December 15, 2010. The projects, which were funded by FEMA, other public agencies, and private sources, were dispersed throughout Baker, Decatur, Dougherty, Lee and Mitchell counties.

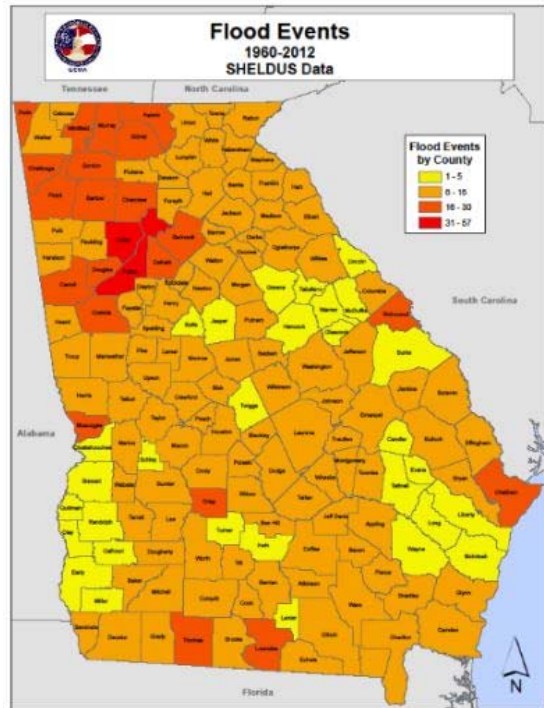
From 1990 to 2000, nearly 75% of the disaster losses in Georgia were the result of flooding (Dobur, 2009). The losses from flooding during this period totaled \$2 billion. From January 1999 to May 2009, there were 804 flood events in Georgia (National Climatic Data Center [NCDC], 2010b).

According to the *2014 State of Georgia Hazard Mitigation Strategy Plan, Effective April 1, 2014 – March 31, 2001*, 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 prone-ness 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.

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

Figure 1.1



Figures 1.1 and 1.2 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 area, the Augusta area, and southwestern Georgia. However, the entire State of Georgia has experienced loss from flooding.

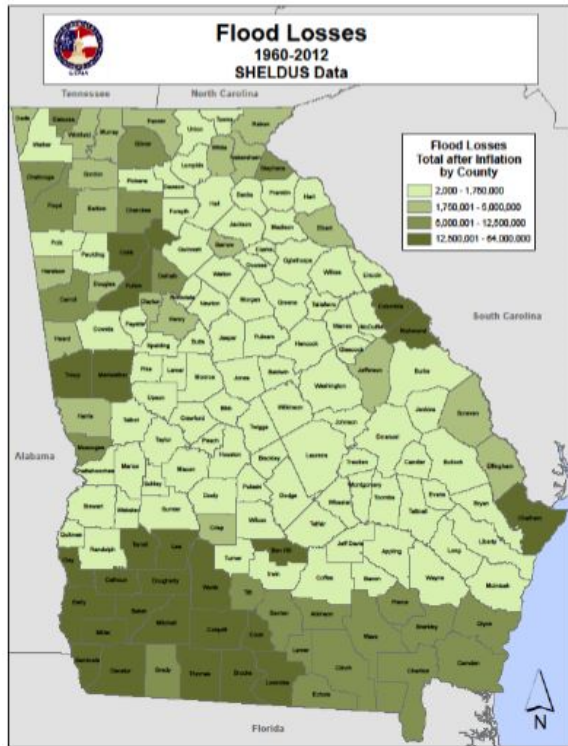


Figure 1.2

flood events were extreme events with damages almost ten times the amount of any other recorded flood event.

In total, 1,601 inland flooding events have occurred from 1960-2012 in Georgia according to SHELUDS 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 1.1 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

Table 1.1 Notable Flood Events in Georgia

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 Ochopee Rivers	>100 years	FEMA DR880; \$7.6 million in damages, tropical storm
1991*	Altamaha, Apalachicola, Ocklockonee, 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

***Presidential Declared Disasters**

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.

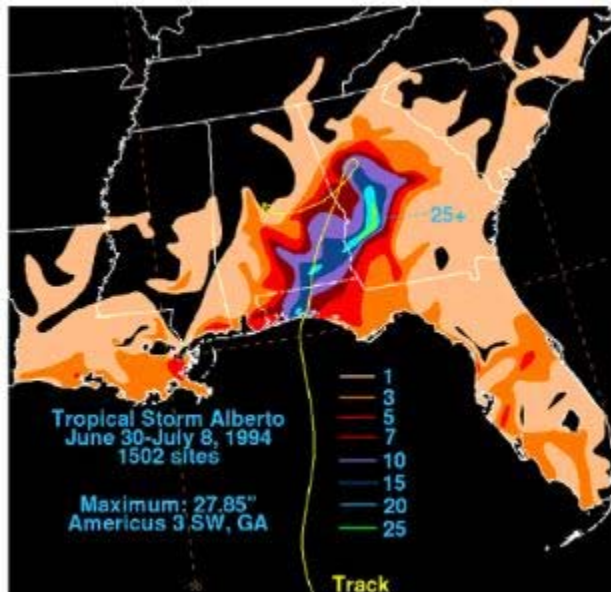
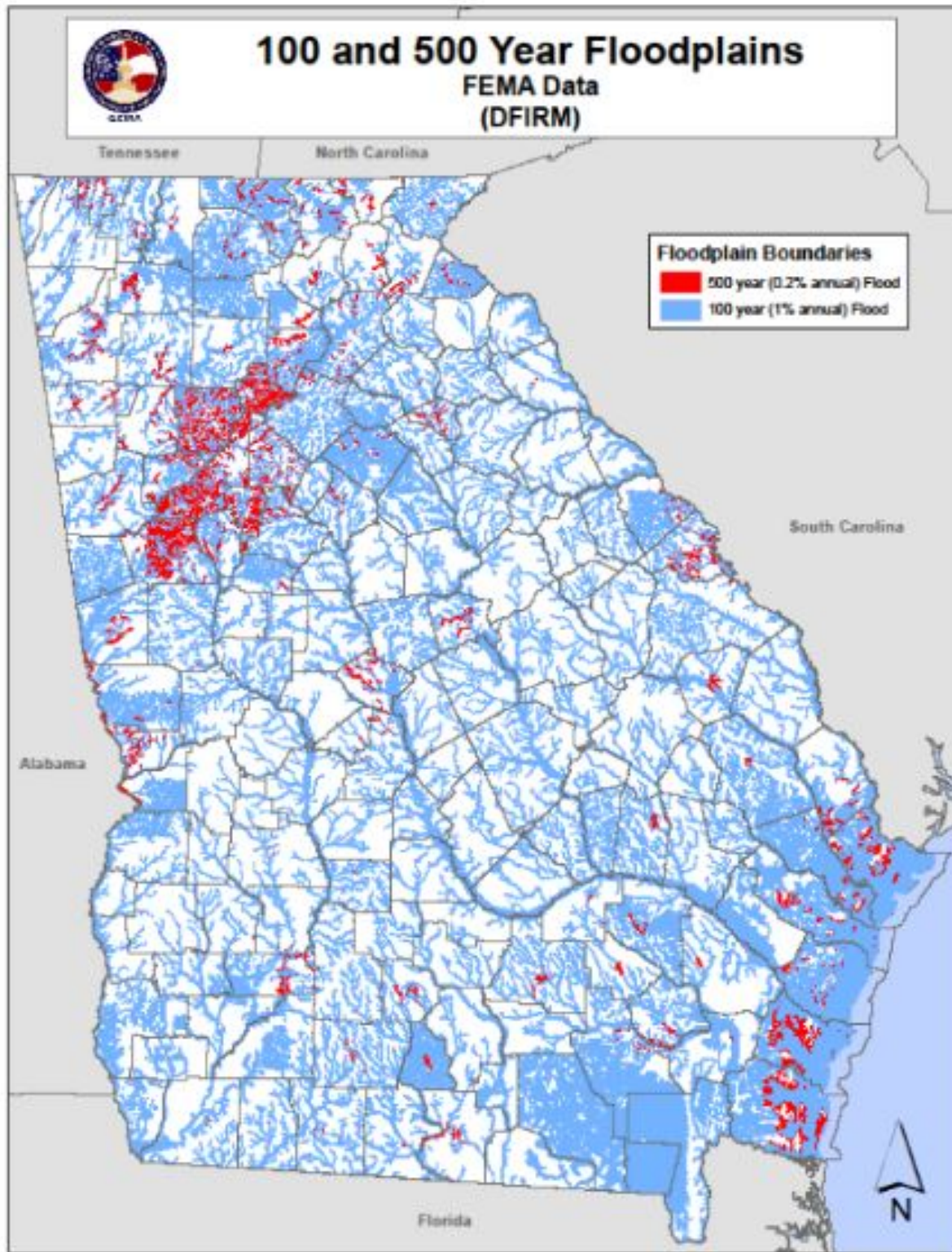


Figure 1.3 Tropical Storm Alberto Rainfall Totals (inches)

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 1.4** 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. Clearly a large portion of Georgia is susceptible to flooding.

Figure 1.4 100 and 500 Year Floodplains in Georgia



In 1994, Tropical Storm Alberto caused heavy storms to sweep over Georgia. Prolonged thunderstorms produced rainfall totals of 12 to 15 inches during a 24-hour period in south-central Georgia. The Flint and Ocmulgee rivers crested up to 20 feet above flood stage and inundated major portions of the state. Floodwaters forced closure of 175 roads in 30 counties. The President declared a major disaster that included 43 counties. Fifteen deaths and dozens of injuries were reported in Georgia (NOAA, 1994). Following the 1994 flooding the State of Georgia initiated a campaign to acquire flood-prone buildings in the Flint River Watershed.

1.2 Georgia Hurricane History

Forecasters often say hurricanes could graze the coastline anywhere from Florida to New England, with North Carolina being the most likely place for a landfall. But if history is any guide, Georgia is generally safe from potential harm.

Why? Georgia's curved coastline makes it harder to attract a direct hit, and the state has fewer miles of coast than neighboring Florida or South Carolina, both of which have endured their share of Atlantic hurricanes.

In fact, Georgia hasn't taken a direct hit from a major hurricane in more than a century, and only four minor storms made landfall here during the 1900s.

Georgia's three worst hurricanes all occurred during the month of August and all made came ashore in the Savannah vicinity in 1881, 1893 and 1898, with the Augusta area's most catastrophic impacts occurring in the 1881 storm in which 700 people died.

1.3 Benefits of a Loss Avoidance Study

The potential benefits of LASs for elected officials, other community officials, project sponsors, and other decision makers are as follows:

- A Loss Ratio (LR) provides a verifiable, quantitative value that clearly demonstrates the economic performance of a project as implemented. Even if the LR is less than one, a project can still be shown to be successful, depending on the age of the project and its expected useful life. For example, the useful life of a minor localized flood reduction project is estimated to be 30 to 50 years (i.e., the project is expected to reduce loss for 30 to 50 years). The LR will increase with each subsequent flood event in which similar losses are avoided.
- Studies that demonstrate the successful economic performance of mitigation projects promote the continuation of funding for HMA programs. The studies provide a tangible reference for policy makers to use to understand the benefits of mitigation and to make an educated decision regarding funding for such projects.
- At the State level, LASs can be used to meet some of the requirements for Enhanced State Mitigation Plans, in accordance with 44 CFR § 201.5. An Enhanced State Mitigation Plan must demonstrate that the State effectively uses existing mitigation programs to achieve its mitigation goals. If the State demonstrates that it has developed a comprehensive mitigation program, and FEMA approves the State's plan, the State may be eligible to receive increased

HMGP funds under the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 following Presidential declarations of major disasters.

- At the local level, an LAS can be used to educate the community about the opportunities for, and benefits of, mitigation. This is particularly important in areas with the potential for repetitive damage. Quantitative demonstrations of improvements to the community through mitigation will increase public support for future projects.
- Following a disaster, an LAS may provide a positive outcome by demonstrating that losses were avoided through proactive planning and investment by the community for existing mitigation projects.

An LAS may provide a way to share successful and innovative mitigation practices. A community can use this information to identify efficient and effective projects when future mitigation measures are considered. An LAS may also be used to prioritize proposed mitigation projects in the community.

1.4 Required Expertise for a Loss Avoidance Study

The types of expertise needed to conduct an LAS depends in part on the type of hazard and project. For many studies, an engineer is needed to collect and analyze technical data related to the hazard event. However, it may be possible for personnel with less technical expertise to collect data and calculate the losses avoided and the Loss Ratio.

Because all LAS's require data related to the specific mitigation projects, representatives of the agencies that administered the mitigation grants, provided non-grant funding, or provided oversight for the construction of the projects should participate in data collection.

For the analysis of riverine flood event data, expertise in gathering and analyzing stream gage or precipitation gage data is required. If a hydrologic and/or hydraulic model is required for the analysis, it will be necessary for an engineer to perform these analyses of the flooding source.

Losses in the MP_C scenario are based on actual observed losses following the event. However, the losses in the MP_A scenario must be estimated because they are theoretical. If it is not possible to use historical losses from similar events, loss calculations may be based on accepted standard methodologies, such as those established by FEMA and the U.S. Army Corps of Engineers (USACE). FEMA's methodologies for loss estimation are described in:

- Benefit-Cost Analysis (BCA) Toolkit, Version 5.2.1, including the BCA Tool and the BCA Reference Guide (FEMA, 2011)¹
- Hazards U.S. – Multi-Hazard (HAZUS-MH) loss estimation model (FEMA, 2009c)²

Personnel familiar with these methodologies may be able to calculate the losses avoided if standard methods and values are provided, but qualified personnel with relevant knowledge and training may be required to estimate the damage to a facility based on analysis of the hazard if no standard methodologies exist.

1 All references to the FEMA BCA Tool in this document are to the FEMA Benefit-Cost Analysis Tool, Version 5.2.1 (FEMA, 2011)

2 All references to HAZUS-MH in this document are to Hazards U.S. - Multi-Hazard MR4 and include the *Flood Model Technical Manual* (FEMA, 2009c; 2009d)

Section Two:

2.0 Hazards and Performance Analysis

Hazards and Performance Analysis (HPA) is a technical group within the FEMA Hazard Mitigation Branch that provides engineering, architectural, economic and scientific assistance to Federal, State and local partners in support of disaster response and recovery.

For this Loss Avoidance Study (LAS) a single HPA Specialist Expert from FEMA Region I undertook the work. This Loss Avoidance Study (LAS) took 45 days from initiation to completion. This LAS is significant in that the project was completed entirely within the FEMA-4259-DR-GA Virtual Joint Field Office, Atlanta, Georgia by FEMA staff without outside support.

2.1 Purpose of a Loss Avoidance Study

A LAS provides the justification for existing and future mitigation projects and measures. The ability to assess the economic performance of mitigation projects over a period of time is important to encourage additional funding and continued support of mitigation activities. A LAS requires the mitigation project be completed prior to the event being analyzed. Losses avoided by the mitigation measure are determined by comparing damage that *would have been caused* by the same event, had the project not been in place.

This study examined properties that were acquired and demolished. Then the extent of damage to the structure on the properties was determined, assuming the properties not have been acquired. A depth- damage calculation was used to determine the dollar value of losses avoided based on depth of inundation in a building had it not been mitigated (acquired/demolished). This dollar value was compared with the actual cost to acquire the property to determine cost-effectiveness of the mitigation measure. Technical aspects of this process are explained in the LAS methodology Section 2.2.

2.2 LAS Methodology

This study is focused on a set of properties in the DR-4259 inundation area, all of which were acquired using Federal, State and local funding. These projects were funded under FEMA's *Hazard Mitigation Grant Program* (HMGP) beginning in 1995. The *Hazard Mitigation Grant Program* is a part of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (The Stafford Act) and provides grants for states and communities to implement hazard mitigation measures after a Presidentially-declared disaster.

Hazard Mitigation is defined as a *sustained action taken to reduce or eliminate long-term risk to people and their property from hazards and their effects.*

FEMA completed nine Loss Avoidance Studies for *riverine* flood hazard from 2001 to 2009. Mitigation projects for river flooding involve acquisition or elevation of flood prone properties. Homes may be purchased and removed from a flood prone area and replaced with buffer areas such as walking trails installed along the rivers' edge.

2.3 *First Floor Elevations*

FFE's are the most important data to collect when building modification projects are analyzed or when buildings are part of a flood reduction project analysis, because damage is calculated based on the depth of flooding inside buildings. The FFE is taken at the top of the lowest finished floor for buildings shown to be in Special Flood Hazard Areas on the FIRM (that is, areas subject to inundation during the 1-percent annual chance flood). Elevation projects require FFE's for both the MPA and MPC scenarios. Actual FFE's, such as surveyed FFE's provided by FEMA elevation certificates, are always preferred.

When elevation certificates are unavailable, several approaches exist for estimating the FFE. However, these approaches should be used as a last resort because they typically result in an increase in the margin of error for the analysis.

2.4 *Screening and Prioritization*

After an initial list of projects is compiled, each building in a building modification project must be evaluated individually to identify those which have the necessary data for an LAS. The list of data required for a riverine flood LAS is provided in Section Four. Initial data collection efforts and general project knowledge should provide sufficient information to determine the potential for a building to advance to Phase 2. If specific data are not available for a building or are difficult to recreate, that building should be removed from the list. Additionally, the building should be eliminated from the study if there are discrepancies in the building data that cannot be resolved through site visits or additional data sources, or the building is outside the project area.

Flood reduction projects should be removed from the study during Phase 1 if specific, necessary data are not available or if the data cannot be easily estimated. Each project on the initial project list should be evaluated for the data requirements of that particular study and for the availability of those data. Unlike building modification projects, which are analyzed on an individual building basis, if sufficient data for the flood reduction project do not exist, the entire project is eliminated.

Section Three:

3.0 Phase I: Initial Project Selection

For this study the State of Georgia Emergency Management and Homeland Security Agency (GEMHSA), Mitigation Division supplied an electronic list of 463 previously acquired properties that, had they not have been acquired and demolished earlier might have been damaged during the incident period: December 22, 2015 to January 13, 2016. For this storm FEMA issued a Major Disaster Declaration; DR-4259-GA on February 26, 2016. **Table 3.1** shows size of the original data set by city, county, flooding source and number.

Table 3.1 Number of Properties Listed by City, County and Flooding Source

City	County	Flooding Sources	Original Number of Properties
Newton, City of	Baker	Cooleewahee	4
		Flint	61
Albany, City of	Dougherty	Flint	219
	Dougherty	Flint	60
Bainbridge, City of	Decatur	Big Slough Tributary	2
		Flint	39
Leesburg, City of	Lee	Kinchafoonee	67
		Muckalee	7
Camilla, City of	Mitchell	Flint	3
Albany, City of	Mitchell	Flint	1
TOTALS			463

The file was quickly parsed to eliminate vacant lots and entries without first floor elevations or square footage values. **Table 3.2** shows the final property count.

Table 3.2 Properties by City, County, Flooding Source after Parsing for Vacant Lots, no FFE and no Square Footage

City	County	Flooding Sources	Original Number of Properties	Vacant Lots	New Total Properties
Newton	Baker	Cooleewahee	4	0	4
		Flint	61	-2	59
Albany	Dougherty	Flint	279	-22	257
Bainbridge	Decatur	Flint	41	-4	37
Leesburg	Lee	Kinchafoonee	67	-0	67
		Muckalee	7	-0	7
Camilla	Mitchell	Flint	3	-0	3
Albany	Mitchell	Flint	1	-0	1
TOTALS			463	-28	435

The data set supplied had most of the following electronic data available:

1. Property ID.
2. Parcel Number.
3. Parcel Size in acres.
4. GEMA Area.
5. Building Replacement Value at time of damage.
6. Contents replacement Value at time of damage.
7. Square footage of the (heat/cool) livable space.
8. Construction year.
9. First Floor Elevation (FFE).
10. Damage Source (river name).
11. Flood Zone.
12. Flood Zone Alpha Name (A, AE, Floodway).
13. FIRM Panel Number.
14. Flood Profile Number.
15. Comments.
16. Disaster Type (Flood, Hurricane, Earthquake, Tornado).
17. Occupancy Type (owner, renter, commercial).
18. Applicant.
19. Project Number.
20. Disaster Number.
21. Date Mitigated (structure removed or elevated).
22. Mitigation Effectiveness (100%, blank, 1%).
23. Post Mitigation Title Holder.
24. People Protected.
25. Expected Annual Benefits at the time of mitigation.
26. Protection Level.
27. Green Space Amount.
28. Mitigation Action (Acquisition, Elevation).
29. Funding Source.
30. Latitude.
31. Longitude.
32. Address1.
33. Address2.
34. City.
35. County.

3.1 Flood Event Analysis

The next step involved determining if the remaining structures would have been damaged by the DR-4259 event. In simplest terms, if the event flood high water elevation was greater than the first floor elevation then the structure suffered some damage.

Thus, it was necessary to determine the event high water elevation for each property.

Very limited Depth-Discharge-Frequency data were available for the DR-4259 event. The USGS recorded depths and discharges at its gaging stations in the study area and the data were available on the USGS Flood-Tracking site. The pertinent gaging stations are listed in **Table 3.3**. However, no frequency data were available from the USGS.

Table 3.3 USGS Gaging Stations and Flood-Tracking Data for DR-4259-GA

Gage Name	Gage Number	Gage Datum, feet	Gage Height, feet	High Water Elevation, feet
Flint River at Newton	02353000	+110.20	32.53	142.73
Flint River at Albany	02352500	+150.03	32.17	182.20
Flint River at Bainbridge	02356000	+58.06	30.20	88.26
Muckalee Creek at State Highway 195 near Leesburg	02351890	+220.00	14.46	234.46
Kinchafonee Creek near Dawson	02350900	+211.74	21.00	232.74

Five different hydrologic techniques were used to estimate the Discharge-Frequency or Depth-Frequency of the DR-4259 event.

1. Newton, Flint River. Frequency data were not published in the FIS. However, Discharge-Frequency data for the USGS gage at Newton were published in a report entitled: Hazard Mitigation at Work: Two Georgia Communities, AIS Draft, 12 November 1998, FEMA T.O.221, page 8:

Table 3.4 Flint River at Newton Depth-Damage-Frequency Data

Frequency (years)	Discharge (cfs)	Elevation (feet above sea level)
10	71,160	141.3
50	104,040	148.5
100	118,920	151.3
500	156,000	157.3

According to the USGS, the peak discharge at the USGS gage on 01/04/2016 equaled 58,900 cfs. Using a hand-drawn Gumbel plot of the data given in the report, the estimated Recurrence Interval is 6 years.

The observed High Water Elevation of 142.73 feet was adopted as the best estimate for the Flint River at Newton.

2. Newton, Cooleewahee Creek. No High Water Elevation data were available for the Cooleewahee Creek at Newton so the same Recurrence Interval and High Water Elevation were assumed as for the Flint River at Newton: RI = 6 years, HWE = 142.73.

- Albany, Flint River. According to the USGS, the peak discharge at the USGS gage on 01/04/2016 equaled 64,700 cfs. The FIS for Albany list the following Discharge-Frequency data:

Table 3.5 Estimated Discharge-Frequency Data for Flint River at Albany

Recurrence Interval, years	Discharge, cfs
10	59,300
50	86,700
100	99,100
500	130,000

Using a hand-drawn Gumbel plot of the data given in the above table, the estimated Recurrence Interval for a discharge of 64,700 cfs is 14 years.

The High Water Elevation for with each property was then determined by creating another hand-drawn Gumbel plot of data extracted from the Flood Profiles at the appropriate location adjacent to the property. This was tedious and time-consuming process.

- Bainbridge, Flint River. According to the USGS, the peak discharge at the USGS gage on 01/04/2016 equaled 69,700 cfs. No frequency data was given in the FIS. Nor, did the FIS contain any Flood Profiles.

Therefore, a Recurrence Interval of 6 years was assumed; the same as for the Flint River at Newton. Using the USGS Flood-Tracking site data a High Water Elevation of 88.34 was assumed.

- Leesburg, Kinchafoonee Creek. Fortunately, the City of Leesburg recently submitted an HMGP application to acquire 19 properties flooded during DR-4259 in December 2015. **Table 2.6** summarizes the data for 4 of these 19 properties. Using the reported FFE's and the flood depths reported in four of the individual property reports it was possible to independently develop high water elevations for DR-4259.

Table 3.6 Lee County Georgia – FY2016 Proposed Floodplain Property Acquisitions with calculated DR-4259 High Water Elevations for Kinchafoonee Creek

Address	City	Flood Zone	BFE, feet	FFE, feet	DR-4259 Depth, feet	DR-4259 HWE, feet	Closest X-section on FIRM
288 Cyprus Point Circle	Leesburg	AE	206.0	202.82	4.5	207.32	K 206
786 Creekside Drive	Leesburg	AE	194.0	194.22	1.00	195.22	D 195
282 Kinchafoonee Creek Drive	Leesburg	AE	195.0	196.91	0.33	197.24	C 195
356 Creekside Drive	Leesburg	AE	198.7	199.95	-0.15	199.8	E 199

Table 3.7 Lee County Georgia – FY2016 Floodplain Property Acquisitions with estimated DR-4259 Recurrence Intervals for Kinchafoonee Creek

Address	City	Flood Zone	BFE, feet	FFE, feet	DR-4259 Depth, feet	DR-4259 HWE, feet	Closest X-section on FIRM	Estimated Recurrence Intervals, years
288 Cyprus Point Circle	Leesburg	AE	206.0	202.82	4.5	207.32	K 206	166
786 Creekside Drive	Leesburg	AE	194.0	194.22	1.00	195.22	B 194	166
356 Creekside Drive	Leesburg	AE	198.7	199.95	-0.15	199.8	E 199.0	270
282 Kinchafoonee Creek Drive	Leesburg	AE	195.0	196.91	0.33	197.24	C 195	333

A critical review of **Table 3.7** suggests that the First Floor Elevation (FFE) for 282 Kinchafoonee Creek Drive may be in error. It is unlikely that the owner of 282 Kinchafoonee Creek Drive made an appreciable error in determining the depth of flooding in his house since he reported a depth of only 4 inches to the insurance inspector. However, if the FFE had been 195.91 instead of 196.91, then the High Water Elevation would have been only 196.24. When 196.4 is plotted on the Gumbel plot the Recurrence Interval is approximately 210 years.

The owner of 356 Creekside Drive reported, “The flood of 2016 lacked 2 inches before being in the house.” The house is located in the AE Zone at the edge of the floodway where flood velocities can influence the apparent flood elevations (stack the water) as water impacts a structure.

Therefore, we have a greater confidence that the DR-4259 Recurrence Interval along Kinchafoonee Creek was closer to 166 years than to 270 or 333 years.

6. Lacking a stream gage on Muckalee Creek, the Recurrence Interval was assumed as the same as for Kinchafoonee Creek; 166 years.

Table 3.8 summarizes the available USGS Depth data available. Using the either Depth-Discharge-Frequency data in the FIS or the Flood Profile Panels data it was possible to construct Gumbel Recurrence Interval plots for the three sub-watersheds; for the Cooleewahee Creek and the Flint River at Newton and Flint River at Bainbridge where the high water elevation surface was assumed to be flat and equal to the gaged elevation.

Table 3.8 Discharges and Estimated Recurrence Intervals

City	County	River or Creek	Discharge, cfs	Estimated Recurrence Intervals, years (Appendix C)	Estimated Water Surface Elevations for DR-4259-GA
Newton	Baker	Cooleewahee	Not known	6 (assumed same as Flint)	No Flood Profile Panels in FIS, assume WSE = 142.73 from Flood-Tracking Chart
		Flint (USGS gage 02353000)	58,900 USGS	6 (Gumbel plot)	
Albany	Dougherty	Flint (USGS gage 02352500)	64,700 USGS	14 (Gumbel plot)	From Flood Profile Panels base on Recurrence Interval. Depth varies with location.
Bainbridge	Decatur	Flint (USGS gage 02356000)	69,700 USGS (no frequency data available)	6 (assumed same as Flint at Newton, no Discharge-Frequency in FIS)	No Flood Profile Panels in FIS, assume WSE = 88.34 from Flood-Tracking Chart
Leesburg	Lee	Kinchafoonee (USGS gage 02350900)	Gage located upstream at a higher elevation. Data not considered useful.	166 (based on HWM's during DR-4259)	From 166-year profile drawn on Flood Profile Panels. Depth base on Recurrence Interval. Depth varies with location.
		Muckalee	Not known	166 (assumed same as Kinchafoonee)	

The discharge-frequency relationships for the Muckalee and Kinchafoonee Creeks as shown in the FIS were determined by USGS regional regression equations. The USGS gage (02350900) Kinchafoonee Creek at Pinewood Road, near Dawson, Georgia is too far upstream from the Special Flood Hazard Area to use the gage height data to determine the water surface elevation.

Although multiple flood events have occurred in the Flint River watershed; 1897, 1912, 1925, 1929, 1942, 1943, 1944, 1948, 1949, 1966, 1971, 1975, 1978, 1985, 1990, 1991, 1994, 1995, 1998; only the 2016 event data.

Section Four:

4.0 Phase II: Project Effectiveness Analysis

To calculate the effectiveness of the properties from the initial data set the following data were collected:

- Base Flood Elevation (BFE).
- Estimated Recurrence Interval (RI) of the DR-4259 event. RI varied with location.
- First Floor Elevation (FFE) before acquisition/demolition.
- DR-4259 Flood Elevation or High Water Elevation (HWE).
- The structure type.
- Total Cost of Mitigation at the time of acquisition.
- Building Replacement Value (BRV) at time of mitigation.
- Date mitigated.
- Living space (heated/cooled) in square feet.

The following data were then determined or calculated:

- Flood depth above the FFE.
- BRV in 2016 dollars.
- Displacement days.
- Displacement Costs.
- % Structural Damages based on USACE Generic Depth-Damage Tables.
- Structural Damages Cost.
- % Contents Damages based on USACE Generic Depth-Damage Tables.
- Contents Damages.
- Total Avoided Losses.
- Total Avoided Costs minus Total Cost of Mitigation at the time of acquisition.
- Losses Avoided Ratio.

4.1 Required Data and Project Screening

The data required for a Hazard Mitigation Assistance (HMA) grant application are similar to the data required for a Loss Avoidance Study (LAS). Therefore, if a building modification project was funded through one of the HMA grant programs, much of the required data can be obtained from the project file.

The required data include the following:

36. Property ID.
37. Parcel Number (Optional).
38. Project Number (Optional).
39. Street Address. **Building Location** – Latitude/longitude data, address, and assessor's parcel number; all available for this study.
40. Community.
41. County.

42. Damage Source.
43. Latitude.
44. Longitude.
45. FIRM Panel Number.
46. Base Flood Elevation (BFE).
47. Flood Zone designation.
48. Estimated Recurrence Interval.
49. Flood Insurance Study (FIS).
50. FIS Flood Profile Panel number.
51. First Floor Elevation (FFE) before mitigation provides the basis for the damage calculations.
52. High Water Elevations for the Study Event, DR-4259.
53. Lot Size in acres. Required if Environmental Benefits are to be included. Environment Benefits were not used in this study.
54. Structure Type. **Building Information** – Type (i.e., residential, commercial, industrial, or municipal), type of construction (e.g., wood frame, manufactured), basement information (finished versus unfinished), year built, livable square footage, foundation type, number of stories, and building replacement value (BRV).
55. Total Cost of Mitigation at the time of mitigation action. **Total Project Cost**, which includes the fair market value of the building paid to the homeowner, demolition costs, relocation costs, construction costs (elevations only), legal fees, and assessor’s costs. Each type of cost can have multiple sources. Data were obtained from the GEMHSA database.
56. Date of Mitigation.
57. Living Space area (heated or cooled).

Calculated data values:

1. Building Replacement Values for the 2016 Event – Building Replacement Values and Content Values were determined using the International Code Council (ICC) methodology. This methodology is regularly used by Georgia Counties Tax Officials and has been accepted by the Georgia Hazard Mitigation Division and FEMA Region IV as an appropriate method for determining BRV for HMGP applications.
2. **Building and Contents Damages** -Flood Damage percentages for the 2016 event for the building and the contents were determined using the latest FEMA Depth-Damage Tables. See Appendix B.
3. **Event Frequencies and Elevations** – Frequencies or Recurrence Intervals were determined or estimated using a variety of methods. Where available, Discharge-Frequency data from the appropriate FIS were plotted on Gumbel paper and used in conjunction with high water marks reported on the USGS Flood-Tracking site to determine the local flood frequency. In the case of Kinchafoonee Creek near Dawson the USGS gages was too far upstream to extract meaningful

water surface elevations, but the discharge-frequency data were adopted for the downstream Special Flood Hazard Area (SFHA).

4. **Water Surface Elevations for the 2016 Event** – For Albany and Leesburg, event water surface elevations were extracted from the FIS Flood Profile Panels base on the Recurrence Interval. Elevations varied based on the location along the flooding source. For Newton and Bainbridge the 2016 event water surface elevations were assumed to be flat since only one elevation was given for each city in the USGS Flood-Tracking site data.
5. **Depths of Flooding in the 2016 Event** – The depth of flooding was determined by subtracting the building first floor elevation from the 2016 event water surface elevation. If the calculated flood depth was less than or equal zero, the property was eliminated from the study data set.
6. **Total Losses Avoided** – The sum of the Displacement Costs, Structural Damage Costs and Contents Damage Costs.
7. **Difference between the Total Losses Avoided and the Total Project Cost** – Shows whether the project has passed the breakeven point. Negative values indicate that the avoided losses have not yet exceeded the total project costs.
8. **Losses Avoided Ratio or Return on Investment** – Ratio of the Total Losses Avoided to the Total Project Costs.

4.2 *Determining Flood Depths at Specific Properties Locations*

At locations with available Flood Profile FIS panels, the High Water Elevation was estimated using the previously estimated frequency and the profiles. At locations where only high water elevations were available (Flood-Tracking sites), the water surface was assumed to be flat. See Appendix G.

4.3 *Depth-Damage Curves*

Established depth-damage relationships are commonly used for determining losses caused by flood hazards. These relationships, which have been developed by FEMA, USACE, and other agencies using observed data from historical events, generally identify the loss that is likely to occur at certain intervals (i.e., flood depths). FEMA and USACE have published depth-damage curves that relate depth of flooding to potential structure damage, which is value based upon a percentage of the BRV. The flood depth-damage relationships are either nationally published estimates, or are estimated from local damage information. Physical damage losses, displacement expense, and disruption time for residents were determined utilizing FEMA and USCE depth-damage relationship curves.

All buildings in this study were Acquisition projects. Depth-damage tables are shown in Appendix B. Disruption Expenses, Debris Removal Expenses and Reduced Insurance Premiums were not considered in this study. Green Space Benefits were calculated based on the FEMA

default value of \$7,853.27 per acre for isolated green space and \$37,492.94 for riparian lots, but these Environmental Benefits were not included in the study.

4.4 Calculating Return on Investment

Calculating the ROI is the final task in determining losses avoided. The results vary depending on the number of events evaluated for each building and the resulting level of damage. In this study the losses from only one event, DR-4259 were included.

An ROI can be calculated for each individual building, for a mitigation project (which could include multiple buildings), by storm event, by community, or for the entire study area (which could include multiple projects). If an ROI is calculated for multiple buildings, taking an average of the ROI for each building is not appropriate. The total losses avoided for all of the buildings should be added and divided by the total construction costs. This is referred to as aggregation.

4.5 Georgia Study: Calculating Return on Investment

In general, the more events that are evaluated in an LAS, the higher the ROI.

An ROI was calculated for each individual building for event DR-4259. This information is reported by city and county. See **Table 6.0**.

A total ROI of 2.83 was calculated for the study as a whole, based on the cumulative losses calculated for all the buildings and the total cost of mitigation for all of the buildings. The ROI calculated for each county and the resulting ROI for the study are shown in **Table 6.0**. The aggregate losses avoided for all buildings was \$3,361,922 and the aggregate project investment was \$1,835,160. The aggregate LAS reflects all the losses avoided and all the costs of mitigation associated with all buildings in the study. The LAR will increase as additional storm events occur.

The LAR of 2.83 for the entire study demonstrates that Georgia's investment in the acquisition/demolition projects have been successful. Building modification projects are expected to reduce losses for 30 years to 100 years after project implementation depending on the type of project. The useful life of residential elevation projects is 30 years, and the useful life of acquisition and relocation projects are approximately 100 years.

The projects in this Georgia study have already demonstrated an LAR of 2.83. The first mitigation activity included in the study was completed in 1996 (approximately 20 years ago), while other buildings were mitigated as recently as 2000. Because many of the buildings included in the study had a fairly recent project completion date, the LAR is not as high would result from a study performed many years after the project completion dates. However, as additional floods occur, further losses will be avoided, and consequently the LAR will increase.

Section Five:

5.0 Phase III: Loss Estimation Analysis

To complete Phase III of the LAS, the following items were calculated:

- Building Repair Costs based on flood depth.
- Content Losses based on flood depth.
- Displacement Costs (food and lodging expenses) based on flood depth.
- Total Losses Avoided.

5.1 Building Repair Costs Based on Flood Depth and 2016 Building Replacement Value

Building repair costs were determined assuming had the property *not been acquired*. This calculation becomes the “losses avoided” in dollars, because this mitigation project was in place at the time of the flood event, DR-4259.

For example: Property # 65 (180 S. Main Street, Newton, Baker County) had a living space area of 2,205 square feet. Having calculated that this *one story residential structure without a basement* would have been flooded 0.33 feet (4 inches) above the finish floor allows one to determine the building repair costs based on the flood depth.

The Building Replacement Value (BRV) is based on a 2016 replacement cost of \$112.65 per square foot. (See *Appendix E, Estimated Building Replacement Costs for DR-4259*). The calculated BRV is \$248,393 (2,205 sf x \$112.65/sf = \$248,393).

The USACE Generic Depth-Damage Tables (See *Appendix B, Structural and Contents Damages plus Displacement Days*) were used to determine the dollar value for any level of flooding in a residence. The calculation takes into account the structural members supporting the property below the finish floor level, as well as the finish flooring, cabinets, appliances, drywall, insulation, electrical outlets and wiring, or any item that is damaged by the inundation. All of the items just mentioned would have been damaged with 0.33 feet of flooding in the home. **Table 5.1** provides the building repair costs for each of the 5 properties in Newton, Baker County. These same values can also be found in the final spreadsheet (**Table 6.0**).

Building Repair Costs are calculated as follows:

1. From Appendix B, **Table B.1**, the interpolated % Damage for 0.33 feet of flooding in a *One Story without Basement* residential structure is 16.7%.
2. The Structural Damage or Structural Repair Cost is \$41,482 (BRV x % Damage/100 = \$248,393 x 16.6%/100 = \$41,482).

Table 5.1 Losses Avoided in City of Newton, Baker County

Property ID	Water Depth Above FFE Pre-Mitigation	Building Repair Costs	Contents Losses	Displacement Costs	Total Losses Avoided
65	0.33	\$41,482	\$24,343	\$10,247	\$76,072
67	0.33	\$20,223	\$11,868	\$10,247	\$42,339
93	0.33	\$16,140	\$24,170	\$10,247	\$50,558
1059	0.33	\$22,710	\$12,572	\$10,247	\$45,529
1060	1.33	\$42,501	\$24,008	\$20,495	\$87,003
Totals		\$143,056	\$96,960	\$61,484	\$301,501

5.2 Content Losses

The cost of contents that are damaged are also calculated; including appliances, electronic equipment, furniture, clothing and other standard residential contents (see Appendix B, **Table B.2**).

Contents Loss Costs are calculated as follows:

1. From Appendix B, **Table B.2**, the interpolated % Damage for 0.33 feet of flooding in a One Story without Basement residential structure is 9.8%.
2. The Structural Damage or Structural Repair Cost is \$24,343 ($BRV \times \% \text{ Damage} / 100 = \$248,393 \times 9.8\% / 100 = \$24,343$).

5.3 Displacement Costs

Along with the property damage calculation, a displacement cost calculation is made that provides a dollar value for the time that the property owners would have been displaced had the property been flooded. This calculation is based on the percentage of damage to the residence which means that the greater the damage (or flood level in the home) the longer the family members would be displaced while repairs are being made. Displacement costs include lodging and the cost of purchasing meals while displaced. The displacement costs are determined in *number of days* before the family members can return to their home. Displacement costs do not include loss of wages or the emotional cost of the loss.

Displacement Costs per structure are based on the average Georgia household size and the Government Services Agency (GSA) per diem rates for the local area. See Appendix B.4 for the complete set of calculations. The USACE Generic Displacement Days tables are also shown in Appendix B, **Table B.3**.

Displacement Costs are calculated as follows:

1. From Appendix B, **Table B.3**, the Displacement Days for 0.33 feet of flooding in a One Story without Basement residential structure is 45 days.

- The Displacement Cost is \$10,247 ($\$227.72/\text{day} \times 45 \text{ days} = \$10,247$).

5.4.1 Losses Avoided in the City of Newton, Baker County

The five (5) properties listed in **Table 5.1** represent approximately three hundred thousand dollars in total losses avoided for the City of Newton, Baker County. These losses include structural damage repairs, replacement of various contents that would have been destroyed or damaged, and displacement costs.

The second column in **Table 5.1**, provides the depth of inundation (in feet) had the home still been at its former pre-mitigation elevation. Property ID # 65 demonstrates that even the smallest amount of flooding, in this case 0.33 of a foot (4 inches) above the finish floor elevation, causes quite a bit of damage – over \$76,000.

The depth of inundation had these properties not been acquired and demolished would have varied between 0.33 feet and 1.33 feet.

The individual losses for the City of Albany, Dougherty County, and the City of Leesburg, Lee County are also shown in the final spreadsheet, **Table 6.0**. **Table 5.2** shows the total losses for all three counties.

Table 5.2 Total Losses Avoided in Newton, Albany and Leesburg

City, County	Number of Properties	Building Repair Costs	Contents Losses	Displacement Costs	Total Losses Avoided
Newton, Baker	5	\$143,056	\$96,960	\$61,484	\$301,501
Albany, Dougherty	19	\$1,117,528	\$611,996	\$573,854	\$2,303,378
Leesburg, Lee	16	\$1,206,374	\$678,758	\$707,071	\$2,592,203
Totals	40	\$2,466,959	\$1,387,714	\$1,342,409	\$5,197,082

5.4.2 Losses Avoided in the City of Albany, Dougherty County

The nineteen (19) properties listed in **Table 5.2** represent approximately 2.3 million dollars in total losses avoided for the City of Albany, Dougherty County. These losses include structural damage repairs, replacement of various contents that were destroyed or damaged, and displacement costs. The depth of inundation had these properties not been acquired/demolished would have varied between 0.50 feet and 4.67 feet.

5.4.3 Losses Avoided in the City of Leesburg, Lee County

The sixteen (16) properties listed in **Table 5.2** represent nearly 2.6 million dollars in total losses avoided for the City of Leesburg, Lee County. These losses include structural damage repairs, replacement of various contents that were destroyed or damaged, and displacement costs. The depth of inundation had these properties not been acquired/demolished would have varied between 0.3 feet and 9.3 feet.

Of the 40 properties studied only three properties in Leesburg have not yet reached the breakeven point; i.e., the point where the losses avoided are greater than the total cost of mitigation. For property #368, had the depth been only 2 inches deeper, it would have passed the threshold. The other two properties will have to experience at least one more flood event.

However, because the Loss Avoidance Ratios for the other 37 properties were well above 1.0, we can say these acquisitions in this study were definitely cost-effective.

Table 5.3 Properties that have not reached the breakeven point

City, County	ID #	Depth of Flooding, feet	Total Losses Avoided	Total Cost of Mitigation	Difference (+ or -)	Loss Avoidance Ratio
Leesburg, Lee	368	0.33	\$133,717	\$141,608	(\$7,891)	0.94
	369	0.33	\$152,798	\$190,731	(\$37,932)	0.80
	419	1.1	\$116,088	\$155,226	(\$39,138)	0.75
Totals			\$402,603	\$487,565	(\$84,961)	0.83

5.5 Total Losses Avoided for the Lower Flint River Watershed

Table 5.4 also summarizes the losses for all 40 properties in the analysis, or approximately 5.2 million dollars in total losses avoided. These losses include structural damage repairs, replacement of various contents that would have been destroyed and displacement costs.

5.6 Losses Avoided Compared with the Total Mitigation Costs

Table 5.4 compares the total losses avoided from **Table 5.1** with the actual cost to acquire and demolish the structures. The difference between these two numbers will be either positive or negative. The total cost of mitigation for each project was derived from Georgia Hazard Mitigation Grant Program (HMGP) data records and represent the total actual mitigation costs.

Note, that with this one event, the Avoided Losses now exceed the Total Cost of Mitigation by \$6.0 million dollars.

Table 5.4 Losses Avoided Compared with the Total Mitigation Costs

City, County	Number of Properties	Total Losses Avoided	Total Cost of Mitigation	Difference (+ or -)	Loss Avoidance Ratio
Newton, Baker	5	\$301,501	\$79,876	\$221,625	3.77
Albany, Dougherty	19	\$2,303,378	\$437,693	\$1,865,685	5.26
Leesburg, Lee	16	\$2,592,203	\$1,317,591	\$1,274,612	1.97
Totals	40	\$5,197,082	\$1,835,160	\$3,361,922	2.83

5.7 Loss Avoidance Ratio for the Lower Flint River Watershed, Georgia

The losses avoided ratio (LR) is calculated by comparing the Losses Avoided (LA) to the net present value of the cost of the project to date. A LR of greater than one indicates that project benefits have exceeded project costs and the mitigation activity is determined to be cost effective and performing successfully. A ratio below one indicates that mitigation benefits have not yet exceeded project costs, however, this study represents only one flood event. An acquisition/demolition project has a useful life of 100 years or more.

The Losses Avoided Ratio (LR) is calculated as follows: $LR = LA \div PC$

Where LA = Losses Avoided in Dollars and PC = Project Costs

Using the totals at the bottom of **Table 5.4**, we derive the following losses avoided ratio:

$$\$5,197,082 \div \$1,835,160 = 2.83 \text{ (Loss Avoided Ratio)}$$

This ratio describes the fact that losses during this one event, DR-4259, would have been 2.83 times larger than the costs to acquire and demolish these 40 homes.

It cost approximately \$1.83 million to acquire and demolish these 40 homes, most of the cost being funded by FEMA Hazard Mitigation Assistance. In contrast, had the homes *not been acquired* prior to DR-4259, all of the homes would have been flooded above the finish floor, many a foot or higher. Had these damages occurred, it would have cost approximately \$5.2 million dollars in repairs – these are the losses avoided and represent 2.83 times of the total cost to acquire these homes.

As described earlier, Leesburg had significant flooding during DR-4259, because the storm appeared to have stalled between the Kinchafoonee and Muckalee Creeks, with Recurrence Intervals for the storm estimated at 166 years.

While three of the 16 properties in Leesburg had Loss Ratios less than 1.00, two of the properties had Loss Ratios greater than 12. Just one more flooding event with flooding depths of 1 foot or less would cause these three properties to become breakeven acquisitions. See the final spreadsheet, **Table 6.0**.

Table 6.0 shows that 37 projects out of 40 that were better than breakeven (Loss Avoidance Ratio = 1.0 or greater) with only 3 projects falling below the breakeven point. This ratio describes the fact that 283% of the costs expended to acquire and demolish these 40 homes were recovered during one just flood event. The data suggests that acquisition projects in the Lower Flint River Watershed are very cost-effective.

5.8 Hazard Mitigation Grant Funding

Many of the hazards of living in a Special Flood Hazard Area (SFHA) can be mitigated using FEMA Hazard Mitigation Assistance (HMA). These funds are administered through the State and information concerning FEMA HMA funding can be obtained by contacting the State Hazard Mitigation Officer (SHMO) or a local Flood Plain Administrator (FPA). There is an excellent FEMA website at: <http://www.fema.gov/hazard-mitigation-assistance>.

Homeowners with flood insurance may also qualify for Increased Cost of Compliance (ICC), a flood policy benefit that assists policy holders bring their home into compliance with local flood plain ordinances, such as elevating a home above the BFE. The ICC benefit can also be used to offset cost share requirements for HMA grant programs – which could effectively fund an elevation project at close to no cost to the homeowner or fund the demolition of their home as part of an acquisition project. Information describing ICC can be found at: <http://www.fema.gov/national-flood-insurance-program-2/increased-cost-compliance-coverage>.

5.9 Summary of Losses Avoided

In summary, this Loss Avoidance Study demonstrates that Federal, State and local funds used to acquire and demolish properties provides a cost-effective long-term mitigation measure that helps reduce or prevent future costs and damages to both life and property that result from a storm event.

Hazard Mitigation provides a community with the ability to minimize losses; recover quickly and be resilient in response to a natural disaster event. This strengthens the economic base and provides the residents with confidence and hope for the future.

Section Six:

6.0 Tables

In this study, 463 Acquisition/Demolition properties along the Flint River in Leesburg, Albany, Newton, Camilla and Bainbridge were examined to determine if they would have sustained damage during the DR-4259 event. These 463 properties represented all the previously acquired properties in Lee, Dougherty, Baker, Mitchell and Decatur counties as listed in the Georgia Emergency Management and Homeland Security (GEMAHS) database. The following table outlines the various tables and their contents.

Table of Tables

Table Number	City	Electronic Name Original GEMHSA Data File	Electronic Name Vacant lots eliminated and flood depths calculated	Electronic Name Final Results
6.0	Newton, Albany, Leesburg			Table 6.0 Final Results 40 Projects.xlsx
6.1	Newton	Table 6.1 Newton Original GEMHSA Data 65.xlsx		
6.1.1	Newton		Table 6.1.1 Newton with Elevations 51.xlsx	Only 5 with flood damage
6.2	Albany	Table 6.2 Albany Original GEMHSA Data 279.xlsx		
6.2.1	Albany		Table 6.2.1 Albany with Elevations 253.xlsx	Only 19 with flood damage
6.3	Leesburg	Table 6.3 Leesburg Original GEMHSA Data 76.xlsx		
6.3.1	Leesburg		Table 6.3.1 Leesburg with Elevations 76.xlsx	Only 16 with flood damage
6.4	Bainbridge	Table 6.4 Bainbridge Original GEMHSA Data 39.xlsx		
6.4.1	Bainbridge		Table 6.4.1 Bainbridge with Elevations 39.xlsx	Zero with flood Damage
6.5	Camilla & Albany in Mitchell County	Table 6.5 Camilla & Albany Original GEMHSA Data 4.xlsx		No FFE data

Table 6.0 Final Results 40 LOWER FLINT RIVER WATERSHED LOSS AVOIDANCE STUDY FOR DR-4259-GA

Project Number	Address:	City	Disaster Number	DR-4259 Flood Elev	Total Cost of Mitigation at Time of Acquisition	Flood Depth, Feet	Living Space, sq.ft	2016 Building Replacement Value	Displacement, Days	Displacement Costs	Structural % Damage	Contents % Damage	Structural Damage Costs	Contents Damage Costs	Data not used in this study. Greenspace Benefit	Total Losses Avoided	Difference (+ or -)	Losses Avoided Ratio
Newton, Baker County, Georgia																		
1	180 S Main St	Newton	1033	142.73	\$21,790	0.33	2,205	\$248,393	45	\$10,247	16.7	9.8	\$41,482	\$24,343	\$55,115	\$76,072	\$54,282	3.49
1	154 S Main St	Newton	1033	142.73	\$18,821	0.33	1,075	\$121,099	45	\$10,247	16.7	9.8	\$20,223	\$11,868	\$37,493	\$42,339	\$23,518	2.25
1	156 S Main St	Newton	1033	142.73	\$4,036	0.33	720	\$81,108	45	\$10,247	19.9	29.8	\$16,140	\$24,170	\$37,493	\$50,558	\$46,522	12.53
13	568 N Main St	Newton	1033	142.73	\$17,614	0.33	1,800	\$202,770	45	\$10,247	11.2	6.2	\$22,710	\$12,572	\$40,867	\$45,529	\$27,915	2.58
13	568 N Main St	Newton	1033	142.73	\$17,614	1.33	1,440	\$162,216	90	\$20,495	26.2	14.8	\$42,501	\$24,008	\$40,867	\$87,003	\$69,389	4.94
Totals for Newton, Baker County					\$79,876			\$815,586		\$61,484			\$143,056	\$96,960	\$211,835	\$301,501	\$221,625	3.77
Albany, Dougherty County, Georgia																		
4	162 (160) Lovers Ln Rd	Albany	1033	187.4	\$63,699	2.4	2,445	\$275,429	135	\$30,742	35.3	19.5	\$97,227	\$53,709	\$14,622	\$181,677	\$117,978	2.85
4	2700 Robinson's Pnt Dr	Albany	1033	187.4	\$72,960	1.5	3,075	\$346,399	90	\$20,495	27.7	15.6	\$95,952	\$54,038	\$0	\$170,485	\$97,525	2.34
4	2418 Cherry Laurel Ln	Albany	1033	174.6	\$7,201	2.1	1,588	\$178,888	135	\$30,742	32.9	13.8	\$58,854	\$24,687	\$0	\$114,283	\$107,082	15.87
22	408 Cherry Ave	Albany	1033	179.5	\$14,079	0.5	1,800	\$202,770	45	\$10,247	18.9	10.7	\$38,324	\$21,696	\$1,335	\$70,267	\$56,188	4.99
22	408 Corn Ave	Albany	1033	179.5	\$10,086	2.49	1,084	\$122,113	135	\$30,742	36	19.9	\$43,961	\$24,300	\$1,335	\$99,003	\$88,917	9.82
22	409 Cherry Ave	Albany	1033	179.5	\$12,400	1.08	1,494	\$168,299	90	\$20,495	24	13.7	\$40,392	\$23,057	\$1,335	\$83,944	\$71,544	6.77
22	411 Cherry Ave	Albany	1033	179.5	\$12,899	1.5	1,494	\$168,299	90	\$20,495	27.7	15.6	\$46,619	\$26,255	\$1,335	\$93,368	\$80,470	7.24
22	412 Cherry Ave	Albany	1033	179.5	\$13,607	1.14	1,868	\$210,430	90	\$20,495	24.5	13.9	\$51,555	\$29,250	\$1,335	\$101,300	\$87,693	7.44
22	413 Cherry St	Albany	1033	179.5	\$6,262	1.08	998	\$112,425	90	\$20,495	24	13.7	\$26,982	\$15,402	\$1,335	\$62,879	\$56,617	10.04
22	414 Cherry Ave	Albany	1033	179.5	\$15,740	2.33	1,195	\$134,617	135	\$30,742	34.7	19.3	\$46,712	\$25,981	\$1,335	\$103,435	\$87,695	6.57
22	414 Corn Ave	Albany	1033	179.5	\$35,769	3.45	1,316	\$148,247	180	\$40,990	43.3	23.7	\$64,191	\$35,135	\$1,335	\$140,315	\$104,546	3.92
22	416 Cherry Ave	Albany	1033	179.5	\$8,192	2.72	1,704	\$191,956	135	\$30,742	37.9	20.9	\$72,751	\$40,119	\$1,335	\$143,612	\$135,420	17.53
22	417 Cherry Ave	Albany	1033	179.5	\$31,431	2.87	1,202	\$135,405	135	\$30,742	39	21.5	\$52,808	\$29,112	\$1,335	\$112,662	\$81,232	3.58
22	420 Corn Ave	Albany	1033	179.5	\$12,293	4.67	1,308	\$147,346	225	\$51,237	51.2	27.8	\$75,441	\$40,962	\$1,335	\$167,640	\$155,347	13.64
22	421 Cherry Ave	Albany	1033	179.5	\$8,891	3.9	1,174	\$132,251	180	\$40,990	46.4	25.3	\$61,365	\$33,460	\$1,335	\$135,814	\$126,923	15.28
22	423 Cherry Ave	Albany	1033	179.5	\$36,666	3.61	1,028	\$115,804	180	\$40,990	44.4	24.3	\$51,417	\$28,140	\$1,335	\$120,547	\$83,881	3.29
22	423 Holloway Ave	Albany	1033	179.5	\$50,273	1.72	2,491	\$280,611	90	\$20,495	29.6	16.6	\$83,061	\$46,581	\$1,335	\$150,137	\$99,864	2.99
22	425 Cherry Ave	Albany	1033	179.5	\$11,370	3.83	1,116	\$125,717	180	\$40,990	45.9	25.1	\$57,704	\$31,555	\$1,335	\$130,249	\$118,879	11.46
22	428 Cherry Ave	Albany	1033	179.5	\$13,874	3.35	1,088	\$122,563	180	\$40,990	42.6	23.3	\$52,212	\$28,557	\$1,335	\$121,759	\$107,885	8.78
Totals for Albany, Dougherty County					\$487,693			\$3,319,570		\$573,854			\$1,117,528	\$611,996	\$35,983	\$2,303,378	\$1,865,685	5.26
Leesburg, Lee County, Georgia																		
1	100 Creekside Pl	Leesburg	1311	200.6	\$89,331	1.84	1,958	\$220,569	90	\$20,495	30.7	17.2	\$67,715	\$37,938	\$18,746	\$126,147	\$36,816	1.41
1	284 Cypress Point Cir	Leesburg	1311	207.3	\$54,570	9.3	1,997	\$224,962	450	\$102,474	53.4	30.8	\$120,130	\$69,288	\$18,746	\$291,892	\$237,322	5.35
1	316 Cypress Point Cir	Leesburg	1311	207.3	\$99,331	5	2,170	\$244,451	225	\$51,237	53.2	28.8	\$130,048	\$70,402	\$25,870	\$251,686	\$152,355	2.53
1	726 Creekside Dr	Leesburg	1311	195.7	\$141,608	0.3	1,649	\$185,760	45	\$10,247	16.4	9.7	\$30,465	\$18,019	\$74,986	\$58,731	(\$82,877)	0.41
1	730 Creekside Dr	Leesburg	1311	195.7	\$190,731	0.3	2,298	\$258,870	45	\$10,247	16.4	9.7	\$42,455	\$25,110	\$74,986	\$77,812	(\$112,918)	0.41
199	540 Creekside Dr	Leesburg	1033	197	\$47,232	4.26	2,142	\$241,296	225	\$51,237	48.7	26.5	\$117,511	\$63,944	\$41,242	\$232,692	\$185,460	4.93
199	618 Creekside Dr	Leesburg	1033	195.9	\$155,226	1.1	2,124	\$239,269	90	\$20,495	14.4	13.8	\$34,455	\$33,019	\$28,120	\$87,969	(\$67,258)	0.57
199	626 Creekside Dr	Leesburg	1033	195.9	\$108,434	3.46	2,160	\$243,324	180	\$40,990	43.3	23.7	\$105,359	\$57,668	\$49,866	\$204,017	\$95,582	1.88
199	710 Creekside Dr	Leesburg	1033	195.7	\$8,275	1.84	2,280	\$256,842	90	\$20,495	30.7	17.2	\$78,850	\$44,177	\$37,493	\$143,522	\$135,247	17.34
199	780 Creekside Dr	Leesburg	1033	195.4	\$115,238	3.58	1,661	\$187,112	180	\$40,990	44.2	24.1	\$82,703	\$45,094	\$37,493	\$168,787	\$53,549	1.46
9	634 Creekside Dr	Leesburg	1033	196.9	\$31,375	2.88	1,103	\$124,253	135	\$30,742	39.4	21.5	\$48,956	\$26,714	\$44,992	\$106,412	\$75,037	3.39
9	754 Northampton Rd	Leesburg	1033	202.1	\$78,550	8.1	1,640	\$184,746	405	\$92,227	67.5	35.9	\$124,704	\$66,324	\$17,247	\$283,254	\$204,704	3.61
9	646 Lovers Lane Rd	Leesburg	1033	193.4	\$37,910	3.4	952	\$107,243	180	\$40,990	42.9	23.5	\$46,007	\$25,202	\$78,735	\$112,199	\$74,289	2.96
9	796 Northampton Rd	Leesburg	1033	202.6	\$71,590	6.6	912	\$102,737	315	\$71,732	61.4	32.9	\$63,080	\$33,800	\$37,493	\$168,613	\$97,023	2.36
9	109 Creekside Place	Leesburg	1033	198.1	\$69,790	0.3	1,327	\$149,487	45	\$10,247	16.4	9.7	\$24,516	\$14,500	\$37,493	\$49,263	(\$20,527)	0.71
9	759 Northampton Rd	Leesburg	1033	202.1	\$18,400	8.1	1,176	\$132,476	405	\$92,227	67.5	35.9	\$89,422	\$47,559	\$46,866	\$229,207	\$210,807	12.46
Totals for Leesburg, Lee County, Georgia					\$1,317,591			\$3,103,395		\$707,071			\$1,206,374	\$678,758	\$670,374	\$2,592,203	\$1,274,612	1.97
Grand Totals for all 40 projects					\$1,835,160			\$7,238,551		\$1,342,409			\$2,466,959	\$1,387,714	\$918,192	\$5,197,082	\$3,361,922	2.83

Appendix A:

Acronyms

<i>BCA</i>	Benefit-Cost Analysis
<i>BRV</i>	Building Replacement Value
<i>CBO</i>	Congressional Budget Office
<i>CDBG</i>	Community Development Block Grants
<i>CFR</i>	Code of Federal Regulations
<i>CFS</i>	Cubic Feet per Second
<i>DFIRM</i>	Digital Flood Insurance Rate Map
<i>DSR</i>	Damage Survey Report
<i>FEMA</i>	Federal Emergency Management Agency
<i>FFE</i>	First Floor Elevation
<i>FIRM</i>	Flood Insurance Rate Map
<i>FIS</i>	Flood Insurance Study
<i>FMA Program</i>	Flood Mitigation Assistance Program
<i>GEMHSA</i>	Georgia Emergency Management and Homeland Security Agency
<i>GIS</i>	Geographic Information System
<i>HAZUS-MH</i>	Hazards U.S. – Multi-Hazard
<i>HMA</i>	Hazard Mitigation Assistance
<i>HMGP</i>	Hazard Mitigation Grant Program
<i>HPA</i>	Hazard and Performance Analysis
<i>HWM</i>	High Water Mark
<i>LAS (or study)</i>	Loss Avoidance Study
<i>MMC</i>	Multi-hazard Mitigation Council
<i>MP_A</i>	Mitigation Project Absent
<i>MP_C</i>	Mitigation Project Complete
<i>NCDC</i>	National Climatic Data Center
<i>NFIP</i>	National Flood Insurance Program
<i>NOAA</i>	National Oceanic and Atmospheric Administration
<i>NWS</i>	National Weather Service
<i>PDM Program</i>	Pre-Disaster Mitigation Program
<i>PA Program</i>	Public Assistance Program
<i>ROI</i>	Return on Investment
<i>SHELDUS</i>	Spatial Hazard Event and Loss Database for the United States (SHELDUS) produced by the Hazards & Vulnerability Research Institute of the University of South Carolina
<i>USACE</i>	U.S. Army Corps of Engineers
<i>USGS</i>	U.S. Geological Survey
<i>WSE</i>	Water Surface Elevation

Appendix B:

Estimating Structural & Contents Damages plus Displacement Days

The most recent U.S. Army Corps of Engineers Generic depth-damage percentage tables and displacement days data are available within the BCA 5.2 program. The tables are reproduced below.

B.1 Residential Building Structural Depth-Damage Function

The residential building depth damage value is a critical calculation for the Loss Avoidance Study. The building structural damage is calculated as a percentage of the building replacement value.

Table B.1 Residential Building Structural Depth Damage Data

Building Type	1 Story without Basement	2 Story Without Basement	Mobile Home Double-Wide on Slab
Flood Depth in Feet	Percent Damage	Percent Damaged	Percent Damaged
-2	0	0	0
-1	2.5	3	0
0	13.4	9.3	8.0
1	23.3	15.2	44.0
2	32.1	20.9	63.0
3	40.1	26.3	73.0
4	47.1	31.4	78.0
5	53.2	36.2	80.0
6	58.6	40.7	81.0
7	63.2	44.9	82.0
8	67.2	48.8	82.0
9	70.5	52.4	82.0
10	73.2	55.7	82.0
11	75.4	58.7	82.0
12	77.2	61.4	82.0
13	78.5	63.8	82.0

Source: USACE Generic and FEMA FIA DDF Tables in BCA 5.1

For example: Property # 65 (180 S. Main Street, City of Newton, Baker County) was a single story, wood frame house with 2,205 square feet of living space and would have experienced a flood depth of 0.33 feet above the finish floor elevation (pre-mitigation) during the DR-4259 event. From Table B.1 the interpolated Percentage Damage for 0.33 feet of flooding is 16.7% $[(23.3 - 13.4) \times 0.33 + 13.4] = 16.7\%$.

The total Building Replacement Value (BRV) of the 2,205 square foot residence is \$112.65 (see Appendix E) multiplied by 2,205 square feet for a BRV of \$248,393 (2,205 sf x \$112.65/sf = \$248,393).

To arrive at the Structural Damage Cost for this property requires multiplying the BRV of the structure by the percent damaged (see Table B.1) which is 17.7% or (248,393 X 0.167 = \$41,482) or \$41,482.

A similar process is required to determine the Residential Building Contents Depth-Damage Value.

B.2 Residential Building Contents Depth-Damage Function

The residential building depth damage function is also a critical calculation for the Loss Avoidance Study. Contents damage is also calculated as a percentage of the Building Replacement Value.

Table B.2 Residential Building Contents Depth Damage Data

Building Type	1 Story without Basement	2 Story Without Basement	Mobile Home Double-Wide on Slab
Flood Depth in Feet	Percent Damage	Percent Damaged	Percent Damaged
-2	0	0	0
-1	2.4	1.0	0
0	8.1	5.0	12.0
1	13.3	8.7	66.0
2	17.9	12.2	90.0
3	22.0	15.5	90.0
4	25.7	18.5	90.0
5	28.8	21.3	90.0
6	31.5	23.9	90.0
7	33.8	26.3	90.0
8	35.7	28.4	90.0
9	37.2	30.3	90.0
10	38.4	32.0	90.0
11	39.2	33.4	90.0
12	39.7	34.7	90.0
13	40.0	35.6	90.0

Source: USACE Generic and FEMA FIA DDF Tables in BCA 5.1

B.3 Average Household Size

The Georgia average household size according to the 2010-2014 U.S. Census Bureau is 2.72 persons. See <https://www.census.gov/quickfacts/table/PST045214/13>

QuickFacts provides statistics for all states and counties, and for cities and towns with a population of 5,000 or more. Scroll to: Families and Living Arrangements, Persons per household, 2010-2014 to find the 2.72 persons per household.

B.4 Displacement Costs

The displacement costs are based on the U. S. Government Services Administration (GSA) *per diem* rates for Georgia. The following link gives both lodging and meal rates: (See <http://www.gsa.gov/portal/category/100120>)

The 2015-16 lodging rates, October through September, for all Georgia counties except for the Atlanta metropolitan area was \$89 per night for all months.

Table B.3 Residential Building Displacement Days Data

Building Type	1 Story without Basement	2 Story Without Basement	Mobile Home Double-Wide on Slab
Flood Depth in Feet	Displacement Days	Displacement Days	Displacement Days
-2	0	0	0
-1	0	0	0
≤ 0	0	0	0
≤ 1	45	45	45
≤ 2	90	90	90
≤ 3	135	135	135
≤ 4	180	180	180
≤ 5	225	225	225
≤ 6	270	270	270
≤ 7	315	315	315
≤ 8	360	360	360
≤ 9	405	405	405
≤ 10	450	450	450
≤ 11	495	495	495
≤ 12	540	540	540
≤ 13	585	585	585

Source: USACE Generic and FEMA FIA DDF Tables in BCA 5.1

The 2015-16 rate for meals was \$51 per day. This rate is then multiplied by the average number of people living in the residence which was determined to be 2.72. The total meal cost per day per household is \$138.72.

The total for daily meals per household (\$138.72) is added to the total daily lodging rate (\$89) for a *Total Daily Displacement Cost of \$227.72 per residence.*

The Number of Days Displaced is based on the flood depth (percent of damage) caused by the flood event.

For example, using an inundation depth above the first floor of 0.33 feet, would have displaced the family for 45 days at an average daily displacement cost of \$227.72 per day ($\227.72×45 days) or a *Total Displacement Cost of \$ 10,247.40.*

Appendix C:

Estimated Frequencies of Peak Discharges for DR-4259-GA

Early USGS Estimates of Recurrence Intervals for DR-4259

Station Number	Station Name	Date of Peak	Peak Gage Height, feet	Peak Discharge, cfs	Annual Exceedance Probability (AEP)	Recurrence Interval
02192000	BROAD RIVER NEAR BELL, GA	12/31/2015	27.56	39400	Q10%-Q4%	10-25 year
02193340	KETTLE CREEK NEAR WASHINGTON, GA	12/22/2015	16.76	3780	Q10%-Q4%	10-25 year
02207185	NO BUSINESS CREEK AT LEE ROAD, BELOW SNELLVILLE, GA	12/24/2015	10.86	1430	Q10%-Q4%	10-25 year
02207385	BIG HAYNES CREEK AT LENORA ROAD, NR SNELLVILLE, GA	12/24/2015	11.9	1750	Q10%-Q4%	10-25 year
02215260	OCMULGEE RIVER AT ABBEVILLE, GA	12/31/2015	18.11	51800	Q10%-Q4%	10-25 year
02215500	OCMULGEE RIVER AT LUMBER CITY, GA	1/3/2016	20.17	55300	Q10%-Q4%	10-25 year
02341800	UPATOI CREEK NEAR COLUMBUS, GA	12/25/2015	21.65	18500	Q2%-Q1%	50-100 year
02350512	FLINT RIVER AT GA 32, NEAR OAKFIELD, GA	12/31/2015	27.79	51400	Q10%-Q4%	10-25 year
02350900	KINCHAFOONEE CREEK AT PINEWOOD ROAD, NR DAWSON, GA	12/25/2015	21	11800	Q10%-Q4%	10-25 year
02352500	FLINT RIVER AT ALBANY, GA	1/2/2016	32.17	64700	Q10%-Q4%	10-25 year
02353000	FLINT RIVER AT NEWTON, GA	1/4/2016	32.53	58900	Q10%-Q4%	10-25 year
02355662	FLINT RIVER AT RIVERVIEW PLANTATION, NR HOPEFUL, GA	1/4/2016	38.68	63000	Q10%-Q4%	10-25 year
02356000	FLINT RIVER AT BAINBRIDGE, GA	1/4/2016	30.28	69700	Q10%-Q4%	10-25 year
02381600	FAUSETT CREEK NEAR TALKING ROCK, GA	12/24/2015	17.84	3110	Q2%-Q1%	50-100 year
02382200	TALKING ROCK CREEK NEAR HINTON, GA	12/24/2015	13.36	13900	Q10%-Q4%	10-25 year
02385800	HOLLY CREEK NEAR CHATSWORTH, GA	12/26/2015	11.86	8590	Q10%-Q4%	10-25 year
02394820	EUHARLEE CREEK AT US 278, AT ROCKMART, GA	12/24/2015	10.75	3300	Q10%-Q4%	10-25 year
02395120	TWO RUN CREEK NEAR KINGSTON, GA	12/24/2015	8.86	4600	Q4%-Q2%	25-50 year
02398000	CHATTOOGA RIVER AT SUMMERVILLE, GA	12/26/2015	20.5	20700	Q4%-Q2%	25-50 year
03550500	NOTTELY RIVER NEAR BLAIRSVILLE, GA	12/24/2015	14.88	6840	Q10%-Q4%	10-25 year

Note that these early Recurrence Intervals are given as ranges.

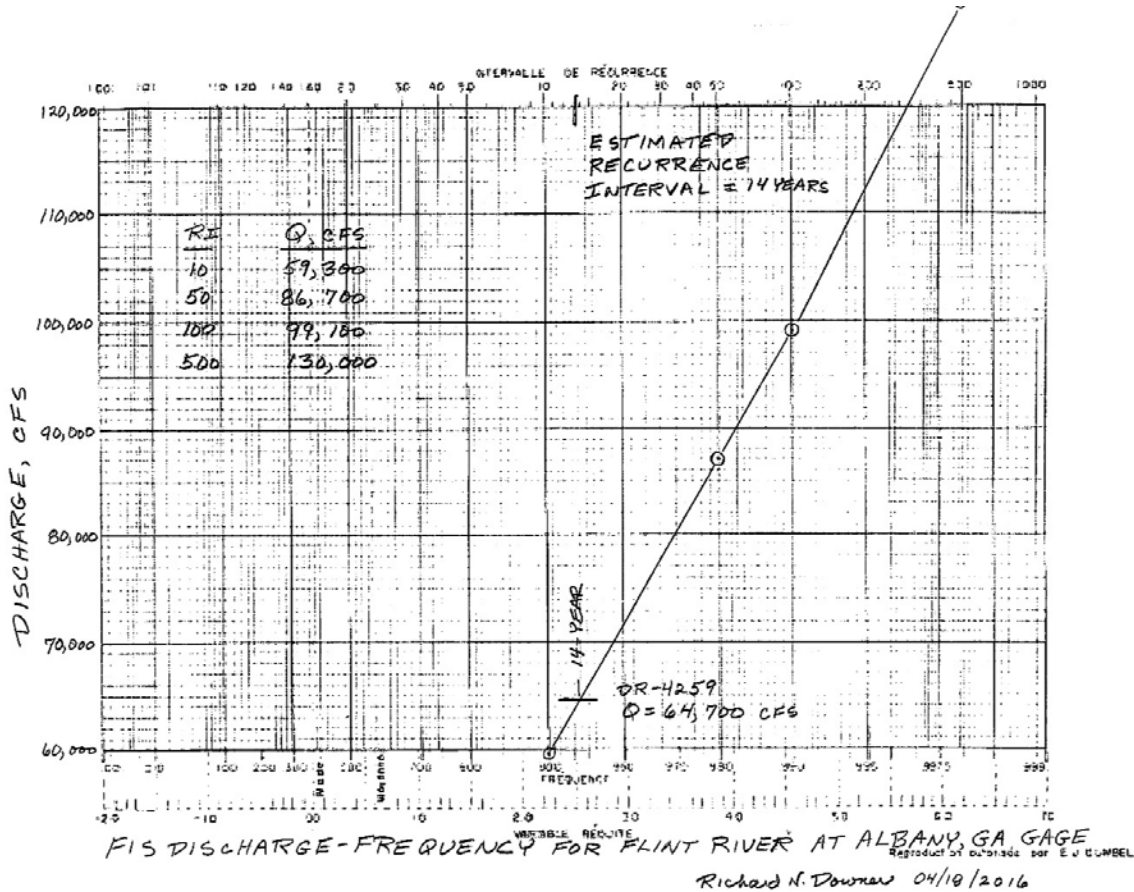
1. Flint River at the Albany, Georgia; USGS gage (02352500).

Flood Insurance Study, ALBANY, GA, REVISED: SEPTEMBER 25, 2009
 FLOOD INSURANCE STUDY NUMBER 13095CV000A

Page 7

TABLE 2 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs)			
		10-percent chance	2-percent chance	1-percent chance	0.2-percent chance
FLINT RIVER At county boundary	4,100.0	59,000	86,400	98,700	129,500
At Albany Gauge	5,300.0	59,300	86,700	99,100	130,000



According to the USGS, the peak discharge at the USGS gage on 01/02/2016 equaled 64,700 cfs. Using a hand-plotted Gumbel plot of the data given in the FIS, the estimated Recurrence Interval = 14 years.

2. Flint River at the Newton, Georgia; USGS gage (02353000).

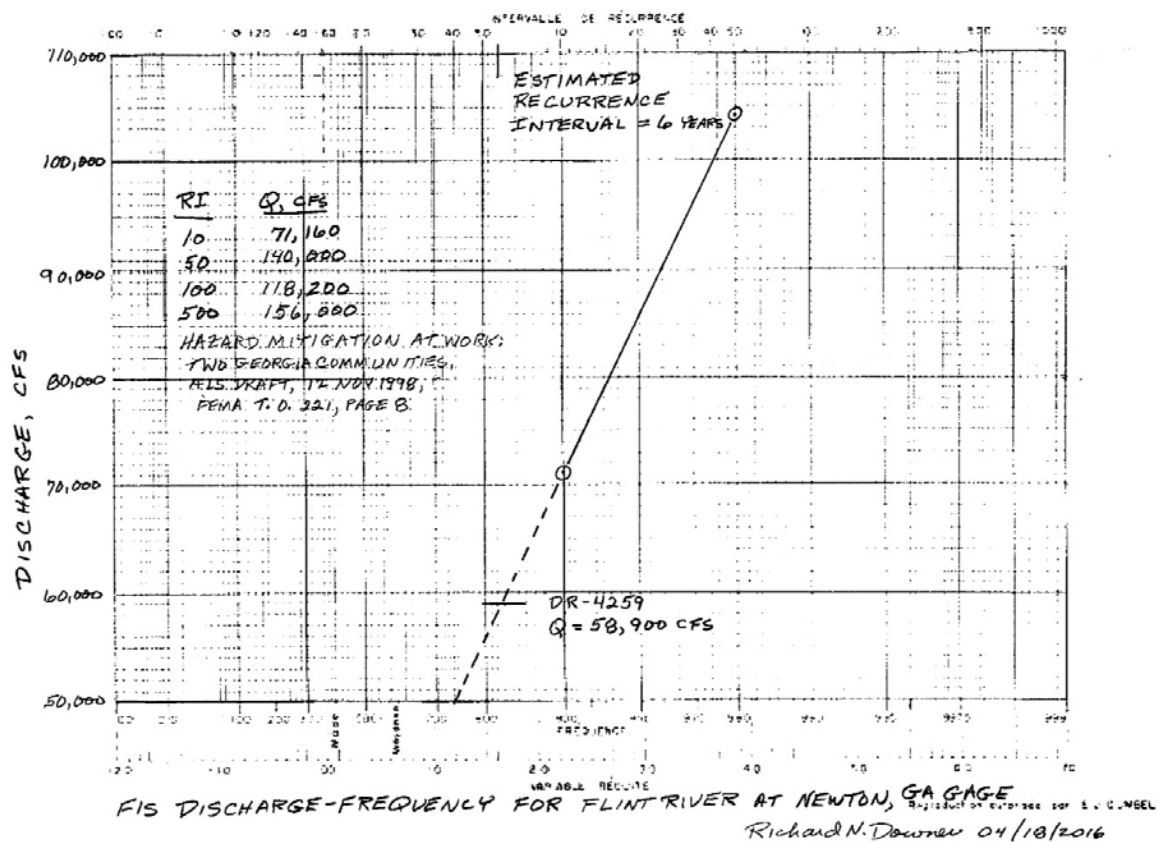
Discharge-Frequency data and Flood Profiles were not published in the BAKER COUNTY Flood Insurance Study for Newton, GA.

August 18, 2009

FLOOD INSURANCE STUDY NUMBER 13007CV000A

However, Discharge-Frequency data for the USGS gage at Newton was published in a report entitled: *Hazard Mitigation at Work: Two Georgia Communities, AIS Draft, 12 November 1998, FEMA T.O.221*, page 8:

Frequency (years)	Discharge (cfs)	Elevation (feet above sea level)
10	71,160	141.3
50	104,040	148.5
100	118,920	151.3
500	156,000	157.3



According to the USGS, the peak discharge at the USGS gage on 01/04/2016 equaled 58,900 cfs. Using a hand-plotted Gumbel plot of the data given in the FIS, the estimated Recurrence Interval = 6 years.

3. *Flint River at the Bainbridge, Georgia; USGS gage (02356000).*

Flood Insurance Study, BAINBRIDGE, EFFECTIVE SEPTEMBER 25, 2009
FLOOD INSURANCE STUDY NUMBER 13087CV000A

No discharge data or no elevation data were available in the FIS. Assume the discharge- frequency relationship is the same as for Newton; 6 years.

USGS Flood-Tracking for the Flint River at Bainbridge (02356000) high water was 32.53 + 58.06 = 88.34 feet.

4. *Kinchafoonee Creeks at Pinewood Road, near Dawson, Georgia; USGS gage (02350900).*

This USGS gage is too far upstream on Kinchafoonee Creek to be representative of water depths within the Leesburg city limits. The watershed area is 527 square miles while the watershed area of Kinchafoonee Creek at Century Road is 591 square miles. The peak high water elevation at the gage on 01/04/2016 was 224.46 feet, which is at least 15 feet above the 500-year flood level at Century Road as shown on Panel 06P.

Flood Insurance Study, LEESBURG, EFFECTIVE: September 2, 2009
FLOOD INSURANCE STUDY NUMBER 13177CV000A

Page 5

TABLE 1 - SUMMARY OF DISCHARGES

<u>FLOODING SOURCE AND LOCATION</u>	<u>DRAINAGE AREA (sq. mi.)</u>	<u>PEAK DISCHARGES (cfs)</u>			
		<u>10% chance</u>	<u>2% chance</u>	<u>1% chance</u>	<u>0.2% chance</u>
KINCHAFOONEE CREEK at U.S. Highway 3 just upstream of Fowntown Creek at Century Road	676.0	10,100	16,560	20,450	29,480
	584.9	9,360	15,340	18,910	27,200
	591.0	9,330	15,280	18,840	27,090
MUCKALEE CREEK at County Boundary just upstream of confluence of Tributary A just upstream of confluence of Tributary B	435.3	7,790	12,720	15,630	22,340
	431.4	7,750	12,650	15,550	22,210
	424.1	7,670	12,520	15,380	21,980

According to the USGS, the peak discharge at the USGS gage on 01/02/2016 equaled 11,800 cfs for a catchment area of 527 square miles

Fortunately, the City of Leesburg recently submitted an HMGP application to acquire 19 properties flooded during DR-4259 in December 2015. Table C.1 summarizes the data for these 19 properties. Using the reported FFE's and the flood depths reported in four of the individual property reports it is possible to independently develop high water elevations for DR-4259 at Leesburg.

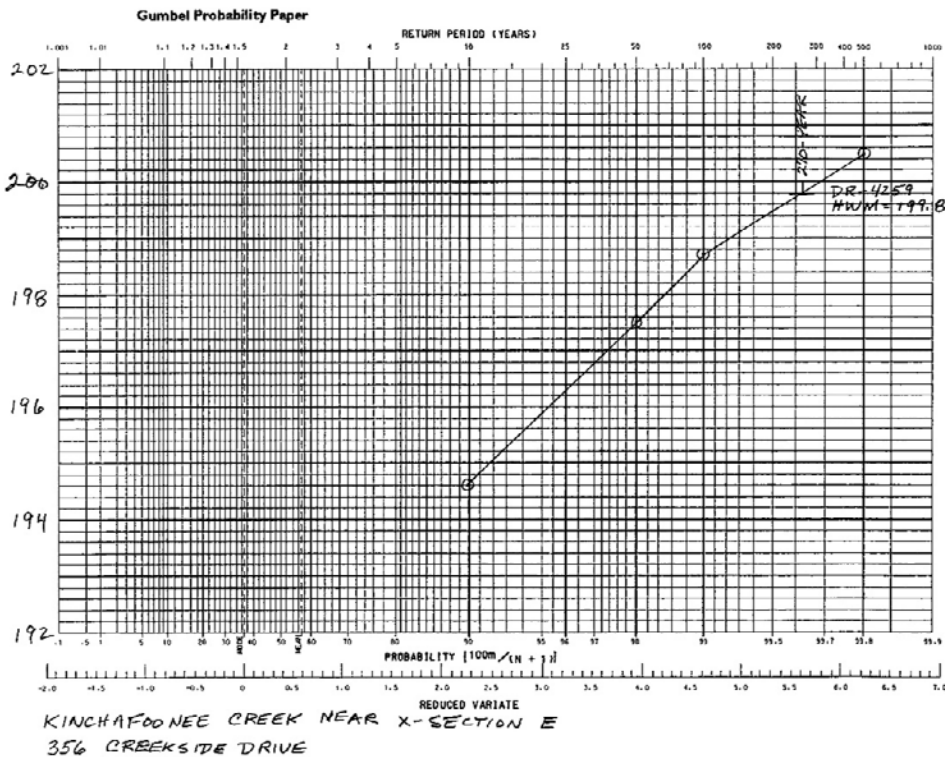
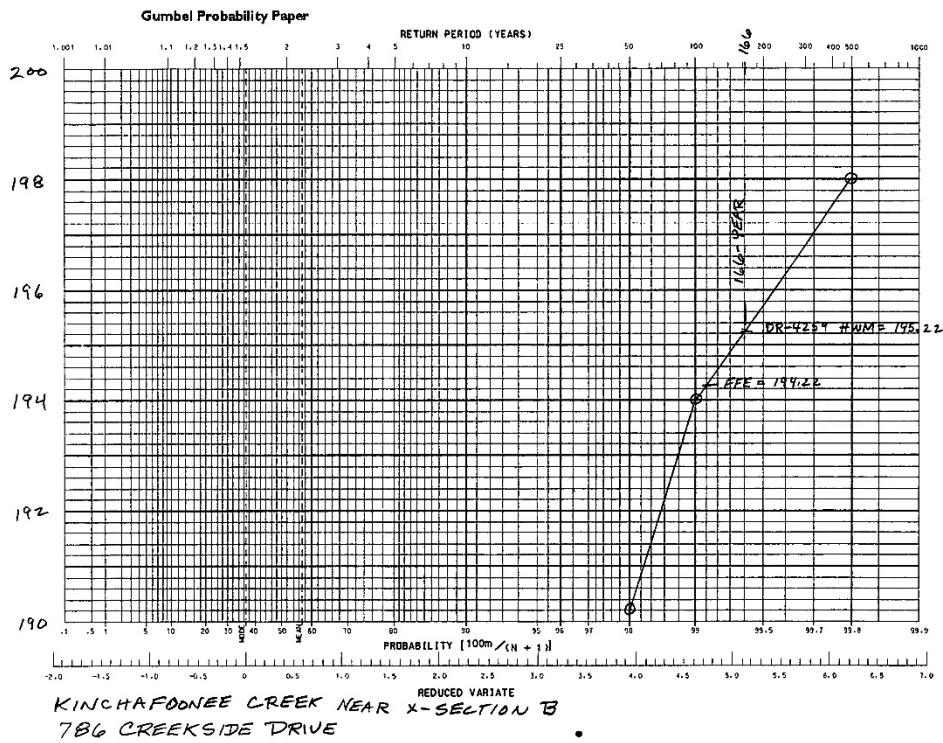
Table C.1 Lee County Georgia – FY2016 Floodplain Property Acquisitions with calculated DR-4259 High Water Elevations for Kinchafoonee Creek

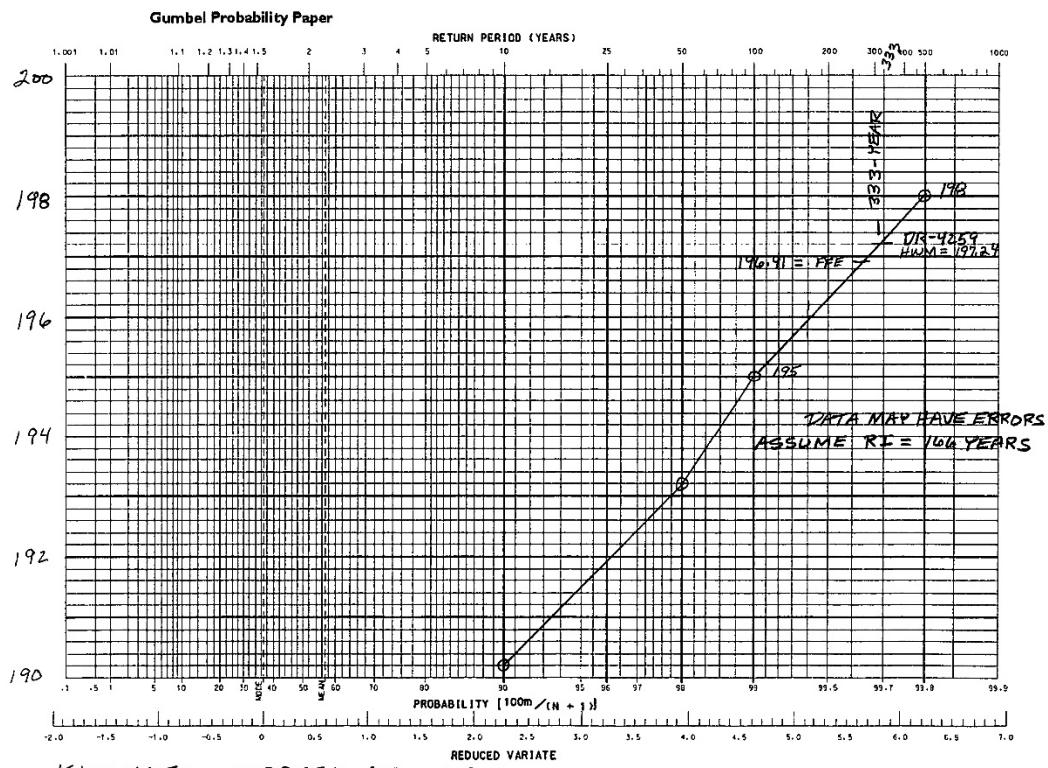
Address	City	Flood Zone	BFE, feet	FFE, feet	DR-4259 Depth, feet	DR-4259 HWE, feet	Closest X-section on FIRM
288 Cyprus Point Circle	Leesburg	AE	206.0	202.82	4.5	207.32	K 206
786 Creekside Drive	Leesburg	AE	194.0	194.22	1.00	195.22	D 195
282 Kinchafoonee Creek Drive	Leesburg	AE	195.0	196.91	0.33	197.24	C 195
356 Creekside Drive	Leesburg	AE	198.7	199.95	-0.15	199.8	E 199

Table C.2 Lee County Georgia – FY2016 Floodplain Property Acquisitions with estimated DR-4259 Recurrence Intervals for Kinchafoonee Creek

Address	City	Flood Zone	BFE, feet	FFE, feet	DR-4259 Depth, feet	DR-4259 HWE, feet	Closest X-section on FIRM	Estimated Recurrence Intervals, years
288 Cyprus Point Circle	Leesburg	AE	206.0	202.82	4.5	207.32	K 206	166
786 Creekside Drive	Leesburg	AE	194.0	194.22	1.00	195.22	B 194	166
356 Creekside Drive	Leesburg	AE	198.7	199.95	-0.15	199.8	E 199.0	270
282 Kinchafoonee Creek Drive	Leesburg	AE	195.0	196.91	0.33	197.24	C 195	333

A critical review of Table C.2 suggests that the First Floor Elevation (FFE) for 282 Kinchafoonee Creek Drive may be in error. It is unlikely that the owner of 282 Kinchafoonee Creek Drive made an appreciable error in determining the depth of flooding in his house since he reported a depth of only 4 inches to the insurance inspector. However, if the FFE had been 195.91 instead of 196.91, then the High Water Elevation would have been only 196.24. When 196.4 is plotted on the Gumbel plot the Recurrence Interval is approximately 210 years. The owner of 356 Creekside Drive reported, “The Flood of 2016 lacked 2 inches before being in the house.” The house is located in the AE Zone at the edge of the floodway where flood velocities can influence the apparent flood elevations as water impacts a structure or flows around an object.





KINCHAFOONEE CREEK AT X-SECTION C
282 KINCHAFOONEE CREEK DRIVE, LEESBURG, GA

4-36

Richard N. Downer 05/02/16

Therefore, we have a greater confidence that the DR-4259 Recurrence Interval along Kinchafoonee Creek was closer to 166 years than to 270 or 333 years.

Table C.3 outlines the available USGS Depth data available. Using the either Depth-Discharge-Frequency data in the FIS or the Flood Profile Panels data it was possible to construct Gumbel Recurrence Interval plots for the three sub-watersheds; for the Coolewahee Creek and the Flint River at Newton and Flint River at Bainbridge where the high water elevation surface was assumed to be flat and equal to the gaged elevation.

Table C.3 Discharges and Estimated Recurrence Intervals

City	County	River or Creek	Discharge, cfs	Estimated Recurrence Intervals, years (Appendix C)	Estimated Water Surface Elevations for DR-4259-GA
Newton	Baker	Cooleewahee	Not known	6 (assumed same as Flint)	No Flood Profile Panels in FIS, assume WSE = 142.73 from Flood-Tracking Chart
		Flint (USGS gage 02353000)	58,900	6 (Gumbel plot)	
Albany	Dougherty	Flint (USGS gage 02352500)	64,700	14 (Gumbel plot)	From Flood Profile Panels base on Recurrence Interval. Depth varies with location.
Bainbridge	Decatur	Flint (USGS gage 02356000)	69,700 (no frequency data available)	6 (assumed same as Flint at Newton, no Discharge-Frequency in FIS)	No Flood Profile Panels in FIS, assume WSE = 88.34 from Flood-Tracking Chart
Leesburg	Lee	Kinchafoonee (USGS gage 02350900)	Gage located upstream at a higher elevation. Data not considered useful.	166 (based on HWM's during DR-4259)	From 166-year profile drawn on Flood Profile Panels. Depth base on Recurrence Interval. Depth varies with location.
		Muckalee	Not known	166 (assumed same as Kinchafoonee)	

High water elevations at specific properties were extracted off the FIS Flood Profile Panels using the previously described Recurrence Intervals.

Table C.4 Lee County Georgia – FY2016 Floodplain Property Acquisitions with estimated DR-4259 Recurrence Intervals for Kinchafoonee Creek

Address	City	Flood Zone	BEF, feet	FFE, feet	DR-4259 Depth, feet	DR-4259 HWE, feet	Closest X-section on FIRM	Estimated Recurrence Intervals, years
288 Cyprus Point Circle	Leesburg	AE	206.0	202.82	4.5	207.32	K 206	166
786 Creekside Drive	Leesburg	AE	194.0	194.22	1.00	195.22	B 194	166
282 Kinchafoonee Creek Drive	Leesburg	AE	195.0	196.91	0.33	197.24	C 195	333

Therefore, we have a greater confidence that the DR-4259 Recurrence Interval along Kinchafoonee Creek was closer to 166 years than 333 years.

5. *Muckalee Creek*

Lacking a stream gage on Muckalae Creek, the Recurrence Interval will be assumed as the same as for Kinchafoonee Creek; 166 years.

Appendix D:

Methodology for Determining the FIRM Panel Number and the Flood Profile Number for each property location

Method 1

1. Google the following key words: Georgia DFIRM Maps.
2. Click on Georgia DFIRM and go to <http://map.georgiadfirm.com/>
3. Click Accept.
4. See the Locate by address or point window.
5. Type in the address or latitude and longitude in format: N 31.329028 W 84.331889.
6. Click Search.
7. See red bulls eye move to location on the DFIRM.
8. Use Zoom Slider at far left to change the magnification. Mouse roller can also be used to fine zoom.
9. Left click and hold to pan the map.
10. Heavy red, horizontal and vertical lines mark the edges of panels. Panel Numbers with their effective dates are shown in red letters.
11. BFE lines and x-section lines are only shown at the Address Zoom Level.

Method 2 for finding FIRM Panels and FIS's

1. Google the following key words: FEMA Flood Map Service Center
2. Click on Search All Products
3. Enter the State, County and Community Names (boxes will appear when a previous box is filled).
4. Click on the blue Search button.
5. See two folders containing Effective Products and Historic Products.
6. Click on the Effective Products icon.
7. See a list of Products.
 - a. FIRM Panels
 - b. FIS Reports
8. Download the required file(s).

Method 3

1. Google the following key words: FEMA Flood Map Service Center
2. Click on MSC Search by Address.
3. Enter an address, place or coordinates in the box. Example:
 - a. 61 Water Street, Newton, GA.
4. Click on the blue Search button.

5. See the FIRM Panel Number with its Effective Date listed in bold.
6. Use the three map buttons to:
 - a. View Map; links to the Map Center Intranetix Viewer.
 - b. Save Map; links to a zip-file which can be Saved or Opened.
 - c. Interactive Map. Links to an Arcgis Map which can be zoomed or panned.
 - i. The Topographic Base Map can be used to find street locations.
 - ii. The Imagery Base Map is useful in locating buildings.

Appendix E:

Estimated Building Replacement Costs for DR-4259-GA

Building Replacement Costs (BRC) for this study were calculated using the International Code Council (ICC) methodology. This methodology is regularly used by Georgia Counties Tax Officials and has been accepted by the Georgia Hazard Mitigation Division and FEMA Region IV as an appropriate method for determining the BRC for HMGP applications.

The ICC method is a national averages method and requires a knowledge of the Building Type, the Construction Type and the building footprint area in square feet. The five steps are:

1. Determine the Building Group (2012 International Building Code):
 - a. R-2, Residential, multifamily.
 - b. R-3, Residential, one- and two-family.
2. Choose the Type of Construction/IBC:
 - a. Types I & II Building Elements are of noncombustible materials.
 - b. Type III Exterior walls are of noncombustible materials and the interior building elements are of any material permitted by the code.
 - c. Type IV H.T. (Heavy Timber) Exterior walls are of noncombustible materials and the interior building elements are of solid or laminated wood without concealed spaces.
 - d. Type V Structural elements, exterior and interior walls are of any materials permitted by code.
 - i. Fire-resistance rated construction.
 - ii. Non fire-resistance rated construction.
3. Look up the Square Foot Cost for the appropriate Building Group and Construction Type.
4. Multiply the Square Foot Cost value by the building area to determine an average Building Replacement Cost.
5. Use Regional Cost Modifiers to adjust the value to reflect any regional differences.

For this study *Building Group R-3, Residential, one- and two-family* and *Construction Type VB* were used. Although the ICC suggests it will update their tables every six months, the latest table available on their web site is dated August 2015.

Lee County provided documentation that the Square Foot Costs given in the table were an accurate representation of the actual replacement cost for homes flooded in December 2015 in Leesville.

Lee County used a Square Foot Cost of \$112.65. See the table below.

At the suggestion of Terry Lunn, Director, Hazard Mitigation Division, Georgia Emergency Management Agency and Homeland Security, the same Square Foot Cost value was adopted for Baker and Dougherty Counties.



LEE COUNTY

Life works well here.

BOARD OF COUNTY COMMISSIONERS

T. PAGE THARP GOVERNMENTAL BUILDING
102 STARKSVILLE AVENUE NORTH, LEESBURG, GEORGIA 31763

**LEE COUNTY BUILDING INSPECTION
BUILDING INSPECTION
BUILDING PERMITS
BUSINESS LICENSE
ALCOHOL LICENSE**

Joey Davenport
Chief Building Official

Lamanda Croft
Administrative Assistant

Matthew Inman
*Engineering and
Planning Director*

Lee County, Georgia
102 Starksville Ave. N.
Leesburg, GA 31763
(229) 759-6000
Fax: (229) 759-2346
Web: www.lee.ga.us

*One of the first
original counties of
Georgia*

*Established
June 9, 1825*

Thursday, April 14, 2016

Mrs. Marcia Studley
Lee County Floodplain Manager
Lee County, Georgia

Dear Marcia,

Per your recent request please allow this letter to serve as confirmation of the square foot replacement cost for construction of a new home in Lee County, Georgia. Per the most recent Building Valuation Data Sheet as published by the International Code Council (attached) the per square foot construction costs are shown as \$112.65. Per recent conversations with local building contractors the per square foot construction costs in Lee County is currently ranging from a low of \$105.00 for starter home type properties to \$120.00 for higher end homes. Based on the above in my opinion the number provided in the B.V.D. from the International Code Council should be an accurate representation of actual replacement costs for these homes based on a per square foot price.

If you have further questions or concerns please feel free to call on me.

Respectfully,

Joey Davenport
Chief Building Official
Lee County, Georgia

Lee County is a thriving vibrant community celebrated for its value of tradition encompassing a safe family oriented community, schools of excellence, and life long opportunities for prosperity without sacrificing the rural agricultural tapestry.

Important Points

- The BVD is not intended to apply to alterations or repairs to existing buildings. Because the scope of alterations or repairs to an existing building varies so greatly, the Square Foot Construction Costs table does not reflect accurate values for that purpose. However, the Square Foot Construction Costs table can be used to determine the cost of an addition that is basically a stand-alone building which happens to be attached to an existing building. In the case of such additions, the only alterations to the existing building would involve the attachment of the addition to the existing building and the openings between the addition and the existing building.
- For purposes of establishing the Permit Fee Multiplier, the estimated total annual construction value for a given time period (1 year) is the sum of each building's value (Gross Area x Square Foot Construction Cost) for that time period (e.g., 1 year).
- The Square Foot Construction Cost does not include the price of the land on which the building is built. The Square Foot Construction Cost takes into account everything from foundation work to the roof structure and coverings but does not include the price of the land. The cost of the land does not affect the cost of related code enforcement activities and is not included in the Square Foot Construction Cost.

Square Foot Construction Costs ^{a, b, c, d}

Group (2012 International Building Code)	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
A-1 Assembly, theaters, with stage	229.03	221.51	216.10	207.06	194.68	189.07	200.10	177.95	171.21
A-1 Assembly, theaters, without stage	209.87	202.35	196.94	187.90	175.62	170.01	180.94	158.89	152.15
A-2 Assembly, nightclubs	177.89	172.85	168.07	161.49	151.98	147.78	155.80	137.68	132.99
A-2 Assembly, restaurants, bars, banquet halls	176.89	171.85	166.07	160.49	149.98	146.78	154.80	135.68	131.99
A-3 Assembly, churches	211.95	204.43	199.02	189.98	177.95	172.34	183.02	161.22	154.48
A-3 Assembly, general, community halls, libraries, museums	176.88	169.36	162.95	154.91	141.73	137.12	147.95	125.00	119.26
A-4 Assembly, arenas	208.87	201.35	194.94	186.90	173.62	169.01	179.94	156.89	151.15
B Business	182.89	176.17	170.32	161.88	147.55	142.00	155.49	129.49	123.76
E Educational	195.85	189.10	183.56	175.25	163.21	154.58	169.21	142.63	137.99
F-1 Factory and industrial, moderate hazard	108.98	103.99	97.83	94.17	84.37	80.56	90.16	69.50	65.44
F-2 Factory and industrial, low hazard	107.98	102.99	97.83	93.17	84.37	79.56	89.16	69.50	64.44
H-1 High Hazard, explosives	102.01	97.02	91.86	87.20	78.60	73.79	83.19	63.73	N.P.
H234 High Hazard	102.01	97.02	91.86	87.20	78.60	73.79	83.19	63.73	58.67
H-5 HPM	182.89	176.17	170.32	161.88	147.55	142.00	155.49	129.49	123.76
I-1 Institutional, supervised environment	180.72	174.14	169.28	161.12	149.06	145.04	161.12	133.69	129.43
I-2 Institutional, hospitals	308.50	301.79	295.93	287.50	272.14	N.P.	281.10	254.09	N.P.
I-2 Institutional, nursing homes	213.56	206.85	200.99	192.56	179.22	N.P.	186.16	161.17	N.P.
I-3 Institutional, restrained	208.37	201.66	195.80	187.37	174.54	167.98	180.97	156.48	148.74
I-4 Institutional, day care facilities	180.72	174.14	169.28	161.12	149.06	145.04	161.12	133.69	129.43
M Mercantile	132.61	127.57	121.79	116.21	106.35	103.15	110.52	92.05	88.36
R-1 Residential, hotels	182.28	175.70	170.83	162.68	150.87	146.84	162.68	135.49	131.23
R-2 Residential, multiple family	152.86	146.27	141.41	133.25	122.04	118.01	133.25	106.66	102.41
R-3 Residential, one- and two-family	143.93	139.97	136.51	132.83	127.95	124.61	130.57	119.73	112.65
R-4 Residential, care/assisted living facilities	180.72	174.14	169.28	161.12	149.06	145.04	161.12	133.69	129.43
S-1 Storage, moderate hazard	101.01	96.02	89.86	86.20	76.60	72.79	82.19	61.73	57.67
S-2 Storage, low hazard	100.01	95.02	89.86	85.20	76.60	71.79	81.19	61.73	56.67
U Utility, miscellaneous	77.10	72.64	68.12	64.64	58.13	54.28	61.62	45.49	43.33

- a. Private Garages use Utility, miscellaneous
- b. Unfinished basements (all use group) = \$15.00 per sq. ft.
- c. For shell only buildings deduct 20 percent
- d. N.P. = not permitted

Appendix F:

Determination of Environmental Benefits

For this study Environmental Benefits were calculated for illustrative purposes, but not used. They ranged from \$1,335 to \$78,735 per property.

Environmental benefits are those that accrue when a parcel's land use is changed by an acquisition mitigation project to one that provides natural environmental benefits or "ecosystem services" benefits.

Ecosystem Services are treated as benefits because they provide measurable, economic dollar values to the economy and because they should be included in a holistic analysis of mitigation project cost-effectiveness. A mitigated parcel may provide several ecosystem services, so the total environmental benefit of the parcel is the total of all the ecosystem services provided for the post-project land use.

For example, green open space or riparian areas adjacent to flood sources provide many beneficial ecosystem services, with some like:

- Erosion Control: preventing erosion and thus reducing silting of the streams and rivers. In turn, this reduces the need for human filtration for drinking water.
 - Water Retention and Flow Regulation: retaining water like a sponge, which helps prevent or reduce flooding, and retaining water during droughts.
 - Climate Regulation and Air Quality: changing developed land to undeveloped land will result in a net gain of natural land that is able to pull carbon and pollutants out of the atmosphere.
 - Aesthetic Value: providing public areas that are more visually attractive and desirable, as seen by a generally higher property value adjacent to these areas.
 - Recreation Value: providing access to recreational activities such as kayaking, fishing, biking, bird watching, and general recreation.
- Because natural systems are largely self-maintaining, and tend to become more economically valuable over time, including ecosystem services as benefits in a benefit cost analysis brings in the natural benefits inherent in the land. Additionally, it yields a more complete picture of the entire suite of benefits – not just losses avoided – from publicly-funded mitigation projects.

The ecosystem services values used in the BCA Tool are based on published, peer-reviewed economic studies of ecosystem services. These values are expressed in terms of dollars per acre per year, and are valued in 2011 dollars since that was the year when the research was

completed. The ecosystem services value is then multiplied by the number of acres of the project area to calculate the total economic value.

Surface flooding can cause damages related to erosion, debris deposition and access inconvenience. Damages should be assessed using a depth-damage curve whose base elevation is the ground elevation adjacent to the structure. It does not seem reasonable to assign a fixed value for Environmental Benefits without knowing the damages associated with an event based on the depth of flooding and velocity of flow over the lot.

The economic value of some ecosystem services is more concrete because they can easily be calculated since we already understand the costs required to replace naturally-occurring services (“green infrastructure”) with human-made infrastructure like a water-filtration plant. Regardless of complexity, all values underwent a rigorous two-step review process.

Currently, the BCA 5.2 program assigns **\$7,853.32 per acre per year for green space benefits** and **\$37,492.94/ per acre per year for riparian benefits** following an acquisition. For this study, riparian benefits were assigned to properties with one or more boundaries on a water body. The proximity of each property to a water body was checked using the web site:

http://qpublic7.qpublic.net/ga_address.php

Searching for property Records and Maps in Georgia

1. Go to the web site: qpublic.net
2. Scroll down and double click on the state.
3. Double click on the blue “Here”to go to the county listing.
4. Click on the first letter of the county name; scroll down to the county name.
5. Double click on the county name.
6. Click on Search Records on top task bar.
7. Click on Yes, I accept the above statement.
8. See the Search by Address window open.
9. Type in the address.

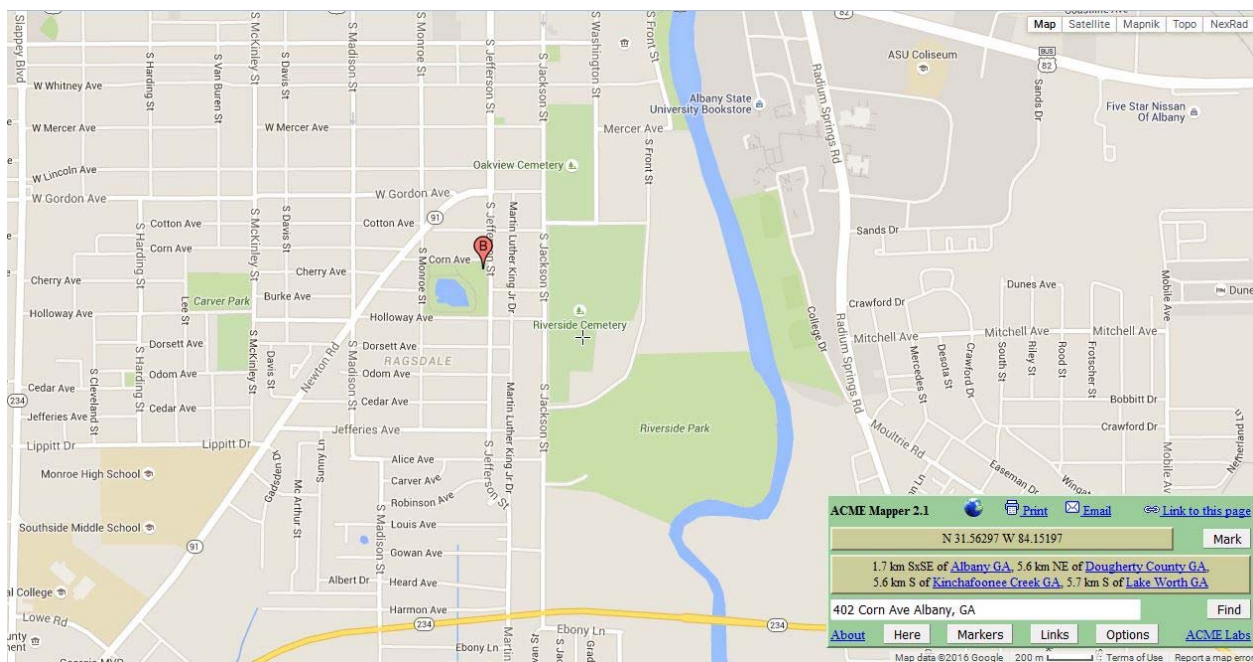
Appendix G:

Estimating Flood Depths for Individual Structures in Albany and Leesburg

For Albany and Leesburg, where Flood Profile Panels are available in the FIS, the following steps were used to estimate the DR-4259 event flood depths for individual properties. 402 Corn Avenue, Albany, GA will be used as an example.

First it necessary to find the general location of the property. Using ACME Mapper 2.1 (<http://mapper.acme.com/>) one can determine that the property, 402 Corn Avenue, Albany, GA, is located on the southwest corner of Corn Avenue and S. Jackson Streets.

Figure G.1 ACME Mapper



Secondly, by studying either the FEMA Map Center DFIRM or the Georgia DFIRM (<http://map.georgiadfirm.com/>) one can locate Corn Avenue just south of cross-section Q.

Next, on Flood Profile Panel 12P, one can locate 402 Corn Avenue just south of cross-section Q at a BFE = 184.5.

Figure G.2 DFIRM

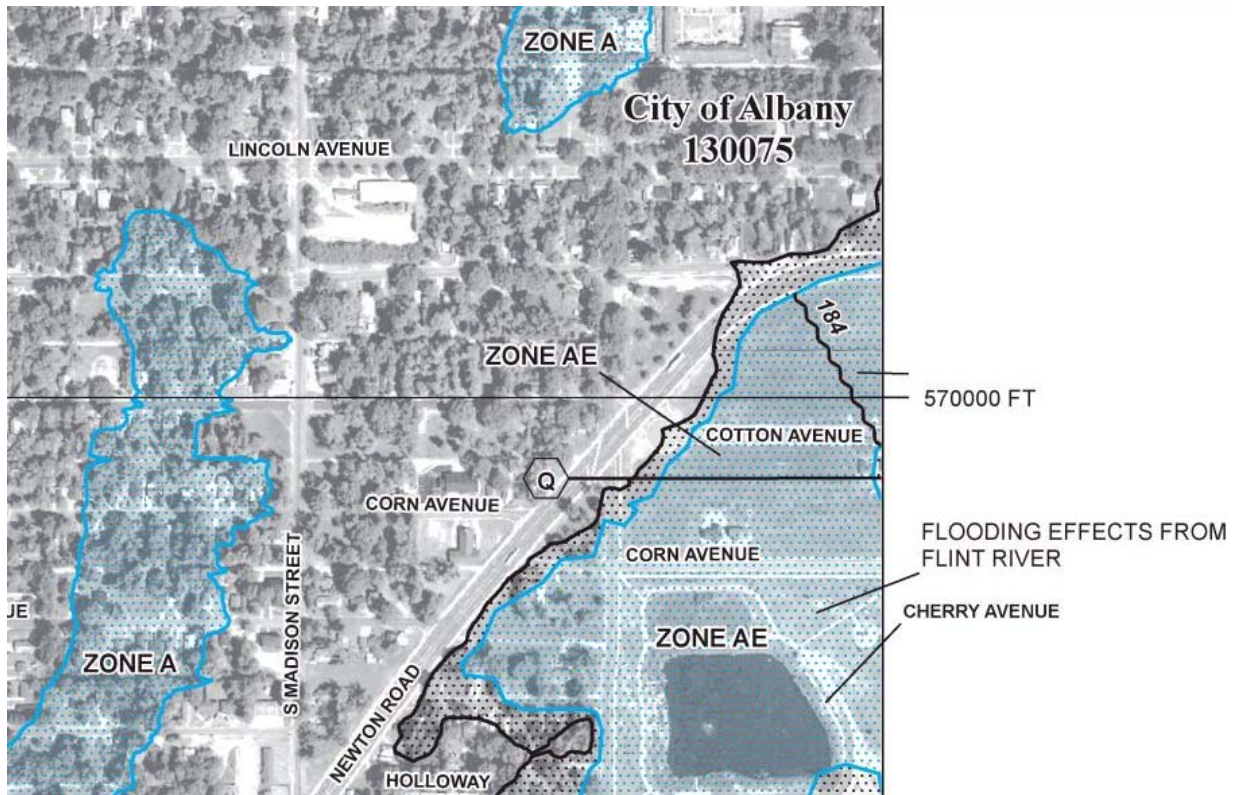
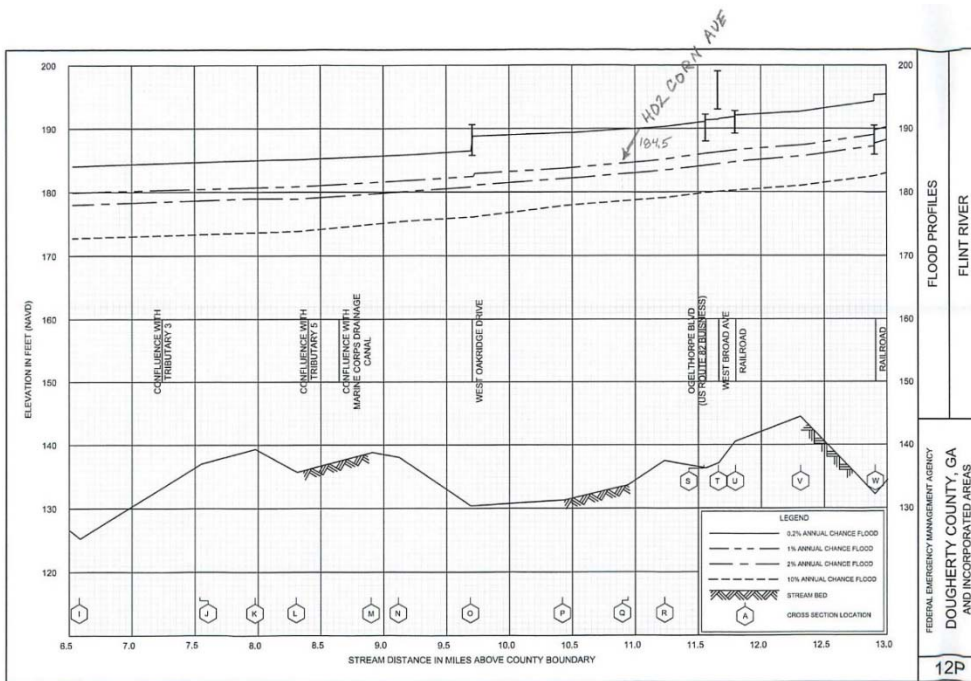


Figure G.3 Flint River Flood Profile, Panel 12P



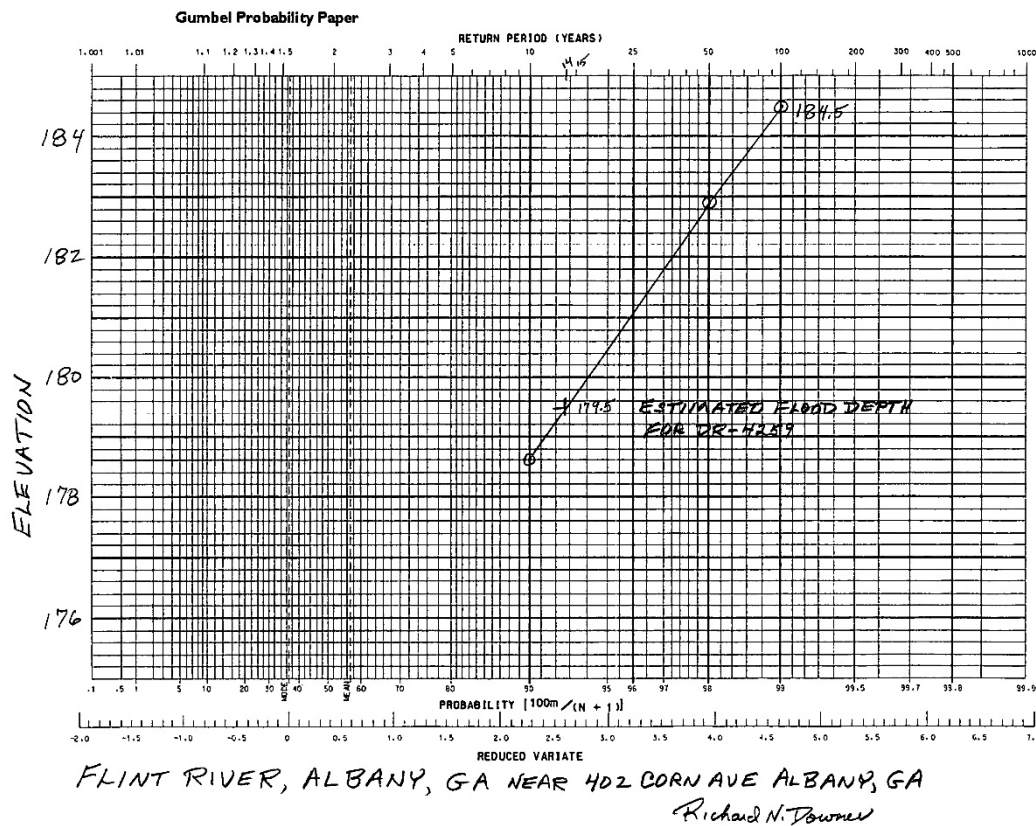
A closer examination of Panel 12P allows one to read off the following flood depths for 402 Corn Avenue:

Table G.1 Depth-Frequency of Flint River at Albany, GA Extracted from Flood profile Panel 12P

Recurrence Interval, years	Flood Depths read from Panel 12P, Flint River, Albany, GA
10	178.6
50	182.9
100	184.5

After plotting these data on Gumbel probability paper it is possible to estimate the Flood Depth for a previously determined 14-year Recurrence Interval event at 402 Corn Avenue.

Figure G.4 Gumbel Depth-Frequency Plot near 402 Corn Ave. Albany, GA



In this case, the DR-4259 Flood Depth for a 14-year Recurrence Interval storm is estimated to be 179.5 feet. This value was then entered on the master spreadsheet as the DR-4259 Flood Depth for 402 Corn Avenue.

Table G.2 FFE and Flood depth at 402 Corn Ave. Albany, GA

FFE Before Mitigation	DR-4259 Flood Depth	Flood Depth, feet	Damage
180.72	179.5	-1.22	No damage

Negative flood depths were listed as having “No damage”. This process was repeated for the 279 properties in Albany and the 76 properties in Leesburg.

Appendix C

Supplement to the FEMA Loss Avoidance Study for the City of Savannah

Total Daily Displacement Cost/Residence*	\$249
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*Assumes 2.53/household from Census Bureau and federal per diem rates used for Chatham

Table 1-0, Depth-Damage Functions

Depth	Mean of Damage, Structure	Mean of Damage, Contents
-2	0	0
-1	2.5	2.4
0	13.4	8.1
1	23.3	13.3
2	32.1	17.9

Table 6-1, Acquisitions in the Carver Heights Neighborhood

Grant type	Year or Declaration	Applicant	Address	City	Latitude	Longitude	Costs	ROI
1 HMGP	1033	City of Savannah	1310 Stokes St	Savannah	32.0752	-81.118418	\$ 41,837	1.28
2 HMGP	1033	City of Savannah	1012 Stokes St	Savannah	32.074719	-81.116685	\$ 40,181	0.14
3 HMGP	1033	City of Savannah	1008 Stokes St	Savannah	32.074412	-81.115639	\$ 58,857	0.11
4 HMGP	1033	City of Savannah	1006 Stokes St	Savannah	32.074454	-81.115822	\$ 37,213	0.15
5 HMGP	1033	City of Savannah	1029 Stokes St	Savannah	32.074542	-81.117256	\$ 53,894	0.11
6 HMGP	1033	City of Savannah	1011 Stokes St	Savannah	32.074299	-81.116268	\$ 36,232	0.91
7 LPDM	2008	City of Savannah	1010 Stokes St	Savannah	32.07451	-81.1116	\$ 21,725	1.30
							\$ 289,938	0.48

Table 6-2, FEMA's IA Housing Inspection Surveys (Matthew)

HWM	HWM Location	Foundation	Address	City	Latitude	Longitude	Ground Elevat	Matthew WSE	Comments
2.08	First Floor Slab		1013 Stokes	SAVANNAH	32.07432	-81.11653	7	9.58	FFE is .5 feet above grade

Table 6-1, Losses Avoided Calculations (Matthew)

Acquisition	FFE	Building SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Matthew WSE	Mental Stress and Productivity Costs	Totals
1	8.7	768	\$ 103	0.88	\$ 79,104	23.3	\$ 18,431	13.3	10,521	11,185	10	13,622	\$ 53,759
2	10.7	1102	\$ 103	-1.12	\$ 113,506	2.5	\$ 2,838	2.4	2,724	-	9.58	-	\$ 5,562
3	10.8	1283	\$ 103	-1.22	\$ 132,149	2.5	\$ 3,304	2.4	3,172	-	9.58	-	\$ 6,475
4	10.3	1100	\$ 103	-0.72	\$ 113,300	2.5	\$ 2,833	2.4	2,719	-	9.58	-	\$ 5,552
5	10.6	1134	\$ 103	-1.02	\$ 116,802	2.5	\$ 2,920	2.4	2,803	-	9.58	-	\$ 5,723
6	9.3	879	\$ 103	0.28	\$ 90,537	13.4	\$ 12,132	8.1	7,333	-	9.58	13,622	\$ 33,087
7	9.8	660	\$ 103	-0.22	\$ 67,980	13.4	\$ 9,109	8.1	5,506	-	9.58	13,622	\$ 28,238
							\$ 51,566		\$ 34,779	\$ 11,185		\$ 40,866	\$ 138,397

Table 7-1, Acquisitions in the Tremont Park Neighborhood

Grant Type	Year or Declaration	Applicant	Address	City	Latitude	Longitude	Costs	ROI
1 HMGP	1033-0196	City of Savannah	1911 Hobson Ave	Savannah	32.059195	-81.136196	7507	7.75

Table 7-2, FEMA's IA Housing Inspection Surveys (Matthew)

HWM Location	Foundation	Address	City	Latitude	Longitude	Ground Elevation	Matthew WSE	Comments
3.42 First Floor Slab		1918 Hobson Ave	SAVANNAH	32.05959	-81.13622	6	10.72	FFE is 1.3 feet above grade

Table 7-1, Losses Avoided Calculations (Matthew)

Acquisition	FFE	Building SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Matthew WSE	Mental Stress and Productivity Costs	Totals
1	9.63	885	\$ 103	1.09	\$ 91,155	23.3	\$ 21,239	13.3	\$ 12,124	\$ 11,185	10.72	\$ 13,622	\$ 58,170
							\$ 21,239		\$ 12,124	\$ 11,185		\$ 13,622	\$ 58,170

Table 8-1, Acquisitions in the West Lake Neighborhood

Grant type	Year or Declaration	Applicant	Address	City	Latitude	Longitude	Costs	ROI		
HMA acquisitions	1	PDM	2005	Chatham County	1907 Blue Jay Ave.	Savannah	32.03449515	-81.1401825	\$ 93,991	0.53
	2	PDM	2005	Chatham County	1909 Blue Jay Ave.	Savannah	32.03442095	-81.14030347	\$ 93,991	0.53
	3	PDM	2005	Chatham County	1915 Blue Jay Ave.	Savannah	32.03446334	-81.14082531	\$ 80,491	0.62
	4	PDM	2005	Chatham County	1918 Blue Jay Ave.	Savannah	32.03499765	-81.14089417	\$ 87,241	0.57
	5	PDM	2005	Chatham County	1920 Blue Jay Ave.	Savannah	32.03506647	-81.1410623	\$ 84,086	0.50
	6	PDM	2005	Chatham County	1921 Blue Jay Ave.	Savannah	32.03477755	-81.14116105	\$ 86,491	0.48
	7	PDM	2005	Chatham County	1922 Blue Jay Ave.	Savannah	32.03514685	-81.1412606	\$ 90,491	0.46
	8	PDM	2005	Chatham County	1923 Blue Jay Ave.	Savannah	32.03484958	-81.14133842	\$ 79,491	0.53
	9	PDM	2005	Chatham County	1923 Westlake Ave.	Savannah	32.0355116	-81.14126274	\$ 83,741	0.60
	10	PDM	2005	Chatham County	1924 Blue Jay Ave.	Savannah	32.03519012	-81.14140745	\$ 91,490	0.46
	11	PDM	2005	Chatham County	1932 Blue Jay Ave.	Savannah	32.0354804	-81.14250743	\$ 81,497	0.08
	12	PDM	2005	Chatham County	1933 Blue Jay Ave.	Savannah	32.03521218	-81.14262105	\$ 83,491	0.51
							\$ 1,036,492		0.49	

Table 8-2, FEMA's IA Housing Inspection Surveys (Matthew)

HWM	Location	Foundation	Address	City	Latitude	Longitude	Ground Elevation	Matthew WSE	Comments
			West Lake Apts	SAVANNAH				16.00	Source: Chatham County Engineering Dept.

Table 8-1, Losses Avoided Calculations (Matthew)

Acquisition	FFE	Building SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Matthew WSE	Mental Stress and Productivity Costs	Totals
1	15.58	1650	\$ 103	0.42	\$ 169,950	13.4	\$ 22,773	8.1	13,766	-	16	\$ 13,622	\$ 50,161
2	15.51	1650	\$ 103	0.49	\$ 169,950	13.4	\$ 22,773	8.1	13,766	-	16	\$ 13,622	\$ 50,161
3	15.61	1650	\$ 103	0.39	\$ 169,950	13.4	\$ 22,773	8.1	13,766	-	16	\$ 13,622	\$ 50,161
4	15.69	1650	\$ 103	0.31	\$ 169,950	13.4	\$ 22,773	8.1	13,766	-	16	\$ 13,622	\$ 50,161
5	15.51	1300	\$ 103	0.49	\$ 133,900	13.4	\$ 17,943	8.1	10,846	-	16	\$ 13,622	\$ 42,411
6	16.07	1278	\$ 103	-0.07	\$ 131,634	13.4	\$ 17,639	8.1	10,662	-	16	\$ 13,622	\$ 41,923
7	15.77	1278	\$ 103	0.23	\$ 131,634	13.4	\$ 17,639	8.1	10,662	-	16	\$ 13,622	\$ 41,923
8	16.32	1300	\$ 103	-0.32	\$ 133,900	13.4	\$ 17,943	8.1	10,846	-	16	\$ 13,622	\$ 42,411
9	16.18	1650	\$ 103	-0.18	\$ 169,950	13.4	\$ 22,773	8.1	13,766	-	16	\$ 13,622	\$ 50,161
10	16.2	1278	\$ 103	-0.2	\$ 131,634	13.4	\$ 17,639	8.1	10,662	-	16	\$ 13,622	\$ 41,923
11	16.63	1300	\$ 103	-0.63	\$ 133,900	2.5	\$ 3,348	2.4	3,214	-	16	\$ -	\$ 6,561
12	16.41	1300	\$ 103	-0.41	\$ 133,900	13.4	\$ 223,959	8.1	10,846	-	16	\$ 13,622	\$ 42,411
										\$ 149,842	\$	510,369	

Table 9-1, Acquisitions in the Liberty City/Summerside/Southover/Richfield Neighborhood

Grant type	Year or Declaration	Applicant	Address	City	Latitude	Longitude	Costs	ROI
1 FMA	2003	City of Savannah	1633 Vassar St	Savannah	32.042088	-81.134183	\$ 102,040	0.77
2 FMA	2003	City of Savannah	1635 Vassar St	Savannah	32.042117	-81.134353	\$ 106,110	0.74
3 HMGP	1761	City of Savannah	4705 Heritage Street	Savannah	32.041733	-81.133711	\$ 139,580	0.59
4 HMGP	1033	City of Savannah	1627 Vassar St	Savannah	32.041988	-81.133615	\$ 91,145	0.80
5 LPDM	2008	City of Savannah	4703 Heritage Street	Savannah	32.043337	-81.13297	\$ 153,566	0.31
							\$ 592,441	0.61

Table 9-2, FEMA's IA Housing Inspection surveys (Matthew)

HWM Location	Foundation	Address	City	Latitude	Longitude	FFE	Matthew WSE	Comments
HWM	0.08 First Floor Slab	1605 Vassar Ave	SAVANNAH			17.97	18.05	FFE from HMGP application

Table 9-1, Losses Avoided Calculations (Matthew)

Acquisition	FFE	Building SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Matthew WSE	Mental Stress and Productivity Costs	Totals
1	17.2	1421	\$ 103	0.85	\$ 146,363	23.3	\$ 34,103	13.3	19,466	11,185	18.05	\$ 13,622	\$ 78,376
2	17.11	1421	\$ 103	0.94	\$ 146,363	23.3	\$ 34,103	13.3	19,466	11,185	18.05	\$ 13,622	\$ 78,376
3	17.1	1519	\$ 103	0.95	\$ 156,457	23.3	\$ 36,454	13.3	20,809	11,185	18.05	\$ 13,622	\$ 82,070
4	17.17	1276	\$ 103	0.88	\$ 131,428	23.3	\$ 30,623	13.3	17,480	11,185	18.05	\$ 13,622	\$ 72,910
5	17.6	1536	\$ 103	0.45	\$ 158,208	13.4	\$ 21,199.87	8.1	12,815	-	18.05	\$ 13,622	\$ 47,637
							156,482		90,036	44,741		68,110	359,369

Table 10-1. Acquisitions in the Cuyler/Brownsville Neighborhood

Grant type	Year or Declaration	Applicant	Address	City	Latitude	Longitude	Costs	ROI
1 FMA	1997	City of Savannah	1247 W 42nd Street	Savannah	32.057308	-81.118076	\$ 36,646	1.62
2 FMA	1997	City of Savannah	2372 Ogeechee Road	Savannah	32.057533	-81.118389	\$ 81,791	0.68
3 FMA	1997	City of Savannah	1245 West 42nd Street	Savannah	32.057267	-81.117905	\$ 31,992	2.79
4 HMGP	1033	City of Savannah	2343 Ogeechee Rd	Savannah	32.057888	-81.118882	\$ 62,458	0.56
5 HMGP	1033	City of Savannah	2345 Ogeechee Rd	Savannah	32.057856	-81.119196	\$ 44,609	0.78
6 HMGP	1033	City of Savannah	1251 W 42nd St	Savannah	32.057348	-81.118226	\$ 35,013	2.36
7 HMGP	1033	City of Savannah	1241 W 42nd St	Savannah	32.057227	-81.117721	\$ 62,356	1.04
8 HMGP	1033	City of Savannah	2380 Ogeechee Rd	Savannah	32.057492	-81.119121	\$ 68,887	0.63
9 HMGP	1033	City of Savannah	2376 Ogeechee Rd	Savannah	32.057533	-81.118547	\$ 65,662	0.63
							\$ 487,414	1.03

Table 10-2. FEMA's IA Housing Inspection Surveys (Matthew)

HWM Location	Foundation	Address	City	Latitude	Longitude	Ground Elevation	Matthew WSE	Comments
0.83	First Floor Crawl Space	1239 W 42nd Ave	SAVANNAH	32.057222	-81.1176	6	8.83	FFE is 2 foot above grade

Table 10-1. Losses Avoided Calculations (Matthew)

Acquisition	FFE	Building SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Matthew WSE	Mental Stress and Productivity Costs	Totals
1	7.7	912	\$ 103	1.13	\$ 93,936	23.3	\$ 21,887.09	13.3	\$ 12,493	\$ 11,185	8.83	\$ 13,622	\$ 59,188
2	7.8	828	\$ 103	1.03	\$ 85,284	23.3	\$ 19,871	13.3	\$ 11,343	\$ 11,185	8.83	\$ 13,622	\$ 56,021
3	6.6	1037	\$ 103	2.23	\$ 106,811	32.1	\$ 34,286	17.9	\$ 19,119	\$ 22,370	8.83	\$ 13,622	\$ 89,998
4	8.9	959	\$ 103	-0.07	\$ 98,777	13.4	\$ 13,236	8.1	\$ 8,001	-	8.83	\$ 13,622	\$ 34,859
5	8.9	959	\$ 103	-0.07	\$ 98,777	13.4	\$ 13,236	8.1	\$ 8,001	-	8.83	\$ 13,622	\$ 34,859
6	7.9	1406	\$ 103	0.93	\$ 144,818	23.3	\$ 33,743	13.3	\$ 19,261	\$ 11,185	8.83	\$ 13,622	\$ 77,811
7	7.6	1063	\$ 103	1.23	\$ 109,489	23.3	\$ 25,511	13.3	\$ 14,562	\$ 11,185	8.83	\$ 13,622	\$ 64,880
8	8.72	1352	\$ 103	0.11	\$ 139,256	13.4	\$ 18,660	8.1	\$ 11,280	-	8.83	\$ 13,622	\$ 43,562
9	9.27	1258	\$ 103	-0.44	\$ 129,574	13.4	\$ 17,963	8.1	\$ 10,495	-	8.83	\$ 13,622	\$ 41,480
							\$ 197,794		\$ 114,555	\$ 67,111		\$ 122,598	\$ 502,058

Table 11-1: Acquisitions in the Wilmington Park Neighborhood

Grant type	Year or Declaration	Applicant	Address	City	Latitude	Longitude	Costs	ROI
1: FMA	2008-002	Chatham County	2 Clarendon Road	Savannah	31.998713	-80.99371	358,832	0.04

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Table 11-2: FEMA's IA Housing Inspection Surveys (Matthew)

HWM Location	Foundation	Address	City	Latitude	Longitude	FFE	Matthew WSE	Comments
0.25 First Floor Slab		112 Winchester Drive	SAVANNAH	31.99760	-80.99298	8	8.25	FFE from HMGP Application

Table 11-1: Losses Avoided Calculations (Matthew)

Acquisition	FFE	Building SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Matthew WSE	Mental Stress and Productivity Costs	Totals
1	9.1	2588	\$ 103	-0.85	\$ 266,564	2.5	\$ 6,664	2.4	6,398	-	8.25	-	\$ 13,062
							6,664		6,398	-		-	13,062

Table 12-1, Acquisitions in the Beach High School Area

Grant type	Year of Declaration	Applicant	Address	City	Latitude	Longitude	Costs	ROI
1	HMGP 1033-0196	City of Savannah	1216 W 51st St	Savannah	32.050865	-81.119534	56,546	0.11
2	HMGP 1042-0002	City of Savannah	1203 W 50TH ST	Savannah	32.051111	-81.118908	24,388	1.24
3	HMGP 1042-0002	City of Savannah	1203 W 51TH ST	Savannah	32.050497	-81.119243	30,407	2.25
4	HMGP 1042-0002	City of Savannah	1214 W 51TH ST	Savannah	32.050826	-81.11936	20,380	0.18
5	HMGP 1042-0002	City of Savannah	1224 W 50TH ST	Savannah	32.051643	-81.119454	27,204	1.50
6	HMGP 1042-0002	City of Savannah	1129 W 49TH ST	Savannah	32.051953	-81.119283	20,287	0.27
7	HMGP 1042-0002	City of Savannah	2803 STANLEY ST	Savannah	32.052385	-81.118225	38,010	0.24
8	HMGP 1042-0002	City of Savannah	2807 STANLEY ST	Savannah	32.0522	-81.118317	40,323	1.36
9	HMGP 1042-0002	City of Savannah	2902 STANLEY ST	Savannah	32.051692	-81.118457	27,114	1.37
10	HMGP 1042-0002	City of Savannah	2906 STANLEY ST	Savannah	32.05151	-81.118525	24,155	1.32
11	HMGP 1042-0002	City of Savannah	3401 STANLEY ST	Savannah	32.05106	-81.118671	49,831	1.69
12	HMGP 1042-0002	City of Savannah	3405 STANLEY ST	Savannah	32.050808	-81.118817	44,385	0.13
13	HMGP 1042-0002	City of Savannah	3407 STANLEY ST	Savannah	32.050686	-81.118872	23,385	1.45
							426,416	0.96

HMA acquisitions

Table 12-2, FEMA's IA Housing Inspection Surveys (Matthew)

IA Housing Inspections	HWM Location	Foundation	Address	City	Latitude	Longitude	Ground Elevation	Matthew WSE	Comments
1.58	First Floor	Crawl Space	1202 W 49th Street	SAVANNAH	32.05207	-81.11847	6	8.58	FFE is 1 foot above grade

Table 12-1, Losses Avoided Calculations (Matthew)

Acquisition	FFE	Building SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Matthew WSE	Mental Stress and Productivity Costs	Totals
1	9.3	1222	\$ 103	-0.72	\$ 125,866	2.5	\$ 3,147	2.4	\$ 3,021	\$ -	\$ 8.58	\$ -	\$ 6,167
2	8.21	750	\$ 103	0.37	\$ 77,250	13.4	\$ 10,352	8.1	\$ 6,257	\$ -	\$ 8.58	\$ 13,622	\$ 30,231
3	7.68	1155	\$ 103	0.90	\$ 118,965	23.3	\$ 27,719	13.3	\$ 15,822	\$ 11,185	\$ 8.58	\$ 13,622	\$ 68,348
4	9.27	720	\$ 103	-0.69	\$ 74,160	2.5	\$ 1,854	2.4	\$ 1,780	\$ -	\$ 8.58	\$ -	\$ 3,634
5	8.87	1224	\$ 103	-0.29	\$ 126,072	13.4	\$ 16,894	8.1	\$ 10,212	\$ -	\$ 8.58	\$ 13,622	\$ 40,727
6	10.07	1083	\$ 103	-1.49	\$ 111,549	2.5	\$ 2,789	2.4	\$ 2,677	\$ -	\$ 8.58	\$ -	\$ 5,466
7	9.83	1840	\$ 103	-1.25	\$ 189,520	2.5	\$ 4,738	2.4	\$ 4,548	\$ -	\$ 8.58	\$ -	\$ 9,286
8	8.6	1860	\$ 103	-0.02	\$ 191,580	13.4	\$ 25,672	8.1	\$ 15,518	\$ -	\$ 8.58	\$ 13,622	\$ 54,812
9	8.4	1060	\$ 103	0.18	\$ 109,180	13.4	\$ 14,630	8.1	\$ 8,844	\$ -	\$ 8.58	\$ 13,622	\$ 37,096
10	8.81	828	\$ 103	-0.23	\$ 85,284	13.4	\$ 11,428	8.1	\$ 6,908	\$ -	\$ 8.58	\$ 13,622	\$ 31,958
11	8	1571	\$ 103	0.58	\$ 161,813	23.3	\$ 37,702	13.3	\$ 21,521	\$ 11,185	\$ 8.58	\$ 13,622	\$ 84,031
12	9.11	1160	\$ 103	-0.53	\$ 119,480	2.5	\$ 2,987	2.4	\$ 2,868	\$ -	\$ 8.58	\$ -	\$ 5,855
13	8.5	912	\$ 103	0.08	\$ 93,936	13.4	\$ 12,587	8.1	\$ 7,609	\$ -	\$ 8.58	\$ 13,622	\$ 33,818
							172,498		107,585	22,370		108,976	411,429

HMA

Table 13-1, Acquisitions in the Magnolia Park/Blueberry Hill Neighborhood

Grant type	Year or Declaration	Applicant	Address	City	Latitude	Longitude	Costs	ROI
1	HMGP 1761-0014	City of Savannah	1513 Woodland Circle	Savannah	32.021721	-81.085663	230,313	0.37
2	HMGP 1033-0194	City of Savannah	1501 Forsyth Road	Savannah	32.019099	-81.087462	114,574	0.72
3	HMGP 1033-0194	City of Savannah	1451 Spalding Road	Savannah	32.020171	-81.087949	132,784	0.40
4	HMGP 1033-0194	City of Savannah	1430 Whitney Road	Savannah	32.021413	-81.0875	156,905	1.02
5	HMGP 1033-0194	City of Savannah	1441 Whitney Road	Savannah	32.021105	-81.087939	142,122	0.03
6	HMGP 1033-0194	City of Savannah	1447 Whitney Road	Savannah	32.021035	-81.087619	172,002	0.06
7	HMGP 1033-0194	City of Savannah	5413 Woodland Dr	Savannah	32.021351	-81.087147	150,816	0.36
8	HMGP 1033-0194	City of Savannah	5513 Woodland Dr	Savannah	32.020031	-81.087539	135,229	0.67
9	HMGP 1033-0194	City of Savannah	5519 Woodland Dr	Savannah	32.019681	-81.087663	118,971	0.78
10	HMGP 1033-0194	City of Savannah	1514 Forsyth Road	Savannah	32.019387	-81.086498	149,835	0.92
11	HMGP 1033-0194	City of Savannah	1513 Forsyth Road	Savannah	32.018959	-81.0869	137,207	0.94
12	HMGP 1033-0194	City of Savannah	1507 Spalding Road	Savannah	32.019854	-81.086767	169,720	0.65
13	HMGP 1033-0194	City of Savannah	1507 Forsyth Road	Savannah	32.01903	-81.08719	175,642	0.63
14	HMGP 1271-0004	City of Savannah	1508 Forsyth Road	Savannah	32.019442	-81.086896	130,534	0.66
15	HMGP 1271-0004	City of Savannah	1502 Forsyth Road	Savannah	32.019531	-81.087155	101,939	0.77
16	HMGP 1311-0007	City of Savannah	1501 Spalding Street	Savannah	32.019893	-81.086966	142,351	0.33
							2,360,943	0.56

Table 13-2, FEMA's IA Housing Inspection Surveys (Matthew)

IA Housing Inspections	HWM Location	Foundation	Address	City	Latitude	Longitude	Ground Elevation	Matthew WSE	Comments
0.67	First Floor	Crawl Space	1519 Forsyth Road	SAVANNAH	32.01889	81.08663	7	10.67	FPE is 3 feet above grade

Table 13-1, Losses Avoided Calculations (Matthew)

Acquisition	FFE	Building SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Matthew WSE	Mental Stress and Productivity Costs	Totals
1	11.1	3239	\$ 103	-0.43	\$ 333,617	13.4	\$ 44,705	8.1	27,023	-	10.67	13,622	\$ 85,350
2	9.9	1530	\$ 103	0.77	\$ 157,590	23.3	\$ 36,718	13.3	20,959	11,185	10.67	13,622	\$ 82,485
3	10.4	1770	\$ 103	0.27	\$ 182,310	13.4	\$ 24,430	8.1	14,767	-	10.67	13,622	\$ 52,819
4	8.59	2420	\$ 103	2.08	\$ 249,260	32.1	\$ 80,012	17.9	44,618	22,370	10.67	13,622	\$ 160,622
5	11.4	983	\$ 103	-0.73	\$ 101,249	2.5	\$ 2,531	2.4	2,430	-	10.67	-	\$ 4,961
6	11.8	2107	\$ 103	-1.13	\$ 217,021	2.5	\$ 5,425	2.4	5,209	-	10.67	-	\$ 10,634
7	10.36	1814	\$ 103	0.31	\$ 186,842	13.4	\$ 25,037	8.1	15,134	-	10.67	13,622	\$ 53,793
8	9.83	1758	\$ 103	0.84	\$ 181,074	23.3	\$ 42,190	13.3	24,083	11,185	10.67	13,622	\$ 91,080
9	9.85	1790	\$ 103	0.82	\$ 184,370	23.3	\$ 42,958	13.3	24,521	11,185	10.67	13,622	\$ 92,287
10	9.08	1977	\$ 103	1.59	\$ 203,631	32.1	\$ 65,366	17.9	36,450	22,370	10.67	13,622	\$ 137,808
11	8.61	1802	\$ 103	2.06	\$ 185,606	32.1	\$ 59,580	17.9	33,223	22,370	10.67	13,622	\$ 128,795
12	9.45	2267	\$ 103	1.22	\$ 233,501	23.3	\$ 54,406	13.3	31,056	11,185	10.67	13,622	\$ 110,269
13	9.76	2267	\$ 103	0.91	\$ 233,501	23.3	\$ 54,406	13.3	31,056	11,185	10.67	13,622	\$ 110,269
14	10.1	1630	\$ 103	0.57	\$ 167,890	23.3	\$ 39,118	13.3	22,329	11,185	10.67	13,622	\$ 86,255
15	9.9	1432	\$ 103	0.77	\$ 147,496	23.3	\$ 34,367	13.3	19,617	11,185	10.67	13,622	\$ 78,791
16	10.7	1500	\$ 103	-0.03	\$ 154,500	13.4	\$ 20,703	8.1	12,515	-	10.67	13,622	\$ 46,840
											190,708	1,333,057	
											364,989	145,408	
											5,559,983.06	0.60	
											190,708	1,333,057	
											3,325,910.02		

Properties	64
Totals	
Costs	5,559,983.06
ROI	0.60
Losses Avoided	3,325,910.02

Total Daily Displacement Cost/Residence* **\$249**

*Assumes 2.53/household from Census Bureau and federal per diem rates used for Chatham

Table 1-0. Depth-Damage Functions

Depth	Mean of Damage, Structure	Mean of Damage, Contents
-2	0	0
-1	2.5	2.4
0	13.4	8.1
1	23.3	13.3
2	32.1	17.9
3	40.1	22
4	47.1	25.7
5	53.2	28.8
6	58.6	31.5
7	63.2	33.8
8	67.2	35.7

Table 13-1. Acquisitions in the West Savannah Neighborhood

Grant type	Year or Declaration	Applicant	Address	City	Latitude	Longitude	Costs	ROI	
1	FMA	1997-001	City of Savannah	107 Fell Street	Savannah	32.088149	-81.120791	\$ 13,120	4.79
2	HMGP	1042-0001	City of Savannah	105 BAKER ST	City of Savannah	32.088735	-81.121355	\$ 12,329	5.09
3	HMGP	1042-0001	City of Savannah	107 BAKER ST	City of Savannah	32.088661	-81.121399	\$ 13,177	5.18
4	HMGP	1042-0001	City of Savannah	109 BAKER ST	City of Savannah	32.08857	-81.121457	\$ 10,200	7.83
5	HMGP	1042-0001	City of Savannah	110 BAKER ST	City of Savannah	32.08852	-81.121008	\$ 9,702	3.50
6	HMGP	1042-0001	City of Savannah	111 BAKER ST	City of Savannah	32.088471	-81.121516	\$ 14,604	4.83
7	HMGP	1042-0001	City of Savannah	112 BAKER ST	City of Savannah	32.088407	-81.121066	\$ 21,071	4.50
8	HMGP	1042-0001	City of Savannah	113 BAKER ST	City of Savannah	32.088385	-81.121572	\$ 28,616	3.15
9	HMGP	1042-0001	City of Savannah	116 BAKER ST	City of Savannah	32.088242	-81.121117	\$ 25,616	3.70
10	HMGP	1042-0001	City of Savannah	117 BAKER ST	City of Savannah	32.088308	-81.121637	\$ 36,516	2.97
11	HMGP	1042-0001	City of Savannah	118 BAKER ST	City of Savannah	32.088226	-81.121691	\$ 14,664	7.09
12	HMGP	1042-0001	City of Savannah	119 BAKER ST	City of Savannah	32.088226	-81.121691	\$ 7,716	9.15
13	HMGP	1042-0001	City of Savannah	120 BAKER ST	City of Savannah	32.088055	-81.121311	\$ 20,949	2.76
14	HMGP	1042-0001	City of Savannah	121 BAKER ST	City of Savannah	32.088146	-81.121764	\$ 135,036	0.81
15	HMGP	1042-0001	City of Savannah	123 BAKER ST	City of Savannah	32.088051	-81.121834	\$ 5,236	13.52
16	HMGP	1042-0001	City of Savannah	124 BAKER ST	City of Savannah	32.087991	-81.121355	\$ 37,616	1.54
17	HMGP	1042-0001	City of Savannah	126 BAKER ST	City of Savannah	32.087923	-81.121396	\$ 16,652	4.69
18	HMGP	1042-0001	City of Savannah	130 BAKER ST	City of Savannah	32.087769	-81.121518	\$ 16,916	4.44
19	HMGP	1042-0001	City of Savannah	132 BAKER ST	City of Savannah	32.087676	-81.121596	\$ 18,668	3.43
20	HMGP	1042-0001	City of Savannah	201 FELL ST	City of Savannah	32.087073	-81.121565	\$ 21,896	1.69
21	HMGP	1042-0001	City of Savannah	203 FELL ST	City of Savannah	32.087002	-81.121606	\$ 5,582	5.11
22	HMGP	1042-0001	City of Savannah	205 FELL ST	City of Savannah	32.086927	-81.121646	\$ 6,793	7.38
23	HMGP	1042-0001	City of Savannah	207 FELL ST	City of Savannah	32.086875	-81.121683	\$ 15,364	3.26
24	HMGP	1042-0001	City of Savannah	209 FELL ST	City of Savannah	32.086798	-81.121738	\$ 31,616	1.83
25	HMGP	1042-0001	City of Savannah	8 JENKS ST	City of Savannah	32.088741	-81.121732	\$ 11,389	8.67
26	HMGP	1042-0001	City of Savannah	12 JENKS ST	City of Savannah	32.088659	-81.121808	\$ 9,310	4.56
27	HMGP	1042-0001	City of Savannah	14 JENKS ST	City of Savannah	32.088584	-81.121859	\$ 15,554	6.28
28	HMGP	1042-0001	City of Savannah	106 JENKS ST	City of Savannah	32.088805	-81.121681	\$ 3,126	33.03
29	HMGP	1042-0001	City of Savannah	107 JENKS ST	City of Savannah	32.088673	-81.122238	\$ 9,557	5.57
30	HMGP	1042-0001	City of Savannah	109 JENKS ST	City of Savannah	32.08864	-81.12226	\$ 9,738	7.82
31	HMGP	1042-0001	City of Savannah	111 JENKS ST	City of Savannah	32.08858	-81.122301	\$ 33,516	0.98
							\$ 631,844		3.45

HMMA acquisitions

Table 13-2, FEMA's IA Housing Inspection Surveys (Irma)

HWM	HWM Location	Foundation	Address	City	Latitude	Longitude	Ground Elevation	Irma WSE	Comments
0.25	First Floor	Crawl Space	225 Fell Street	SAVANNAH	32.08625	81.12203	9	11.25	FFE is 2 feet above grade

Table 13-1, Losses Avoided Calculations (Irma)

FFE	Building SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Irma WSE	Mental Stress and Productivity Costs	Totals				
1	10.2	1008	\$	1.05	\$	103,824	23.3	\$	24,191	13.3	13,809	11,185	13,622	\$	62,807	
2	10.29	1007	\$	0.96	\$	103,721	23.3	\$	24,167	13.3	13,795	11,185	13,622	\$	62,769	
3	9.16	627	\$	2.09	\$	64,581	32.1	\$	20,731	17.9	11,560	22,370	13,622	\$	68,283	
4	8.79	852	\$	2.46	\$	87,756	32.1	\$	28,170	17.9	15,708	22,370	13,622	\$	79,870	
5	11.34	918	\$	-0.09	\$	94,554	13.4	\$	12,670	8.1	7,659	-	13,622	\$	33,951	
6	9.09	672	\$	2.16	\$	69,216	32.1	\$	22,218	17.9	12,390	22,370	13,622	\$	70,600	
7	9.49	1142	\$	1.76	\$	117,626	32.1	\$	37,758	17.9	21,055	22,370	13,622	\$	94,805	
8	8.7	672	\$	2.55	\$	69,216	40.1	\$	27,756	22	15,228	33,556	13,622	\$	90,161	
9	8.57	744	\$	2.68	\$	76,632	40.1	\$	30,729	22	16,859	33,556	13,622	\$	94,766	
10	8.67	960	\$	2.58	\$	98,880	40.1	\$	39,651	22	21,754	33,556	13,622	\$	108,582	
11	8.74	888	\$	2.51	\$	91,464	40.1	\$	36,677	22	20,122	33,556	13,622	\$	103,977	
12	8.89	672	\$	2.36	\$	69,216	32.1	\$	22,218	17.9	12,390	22,370	13,622	\$	70,600	
13	10.11	875	\$	1.14	\$	90,125	23.3	\$	20,999	13.3	11,987	11,185	13,622	\$	57,793	
14	10.62	2240	\$	0.63	\$	230,720	23.3	\$	53,758	13.3	30,686	11,185	13,622	\$	109,251	
15	9.63	676	\$	1.62	\$	69,628	32.1	\$	22,351	17.9	12,463	22,370	13,622	\$	70,806	
16	9.95	875	\$	1.30	\$	90,125	23.3	\$	20,999	13.3	11,987	11,185	13,622	\$	57,793	
17	9.13	816	\$	2.12	\$	84,048	32.1	\$	26,979	17.9	15,045	22,370	13,622	\$	78,016	
18	8.99	760	\$	2.26	\$	78,280	32.1	\$	25,128	17.9	14,012	22,370	13,622	\$	75,132	
19	10.73	1040	\$	0.52	\$	107,120	23.3	\$	24,959	13.3	14,247	11,185	13,622	\$	64,013	
20	10.84	1056	\$	0.41	\$	108,768	13.4	\$	14,575	8.1	8,810	-	13,622	\$	37,007	
21	10.76	672	\$	0.49	\$	69,216	13.4	\$	9,275	8.1	5,606	-	13,622	\$	28,503	
22	10.46	672	\$	1.03	\$	69,216	23.3	\$	16,127	13.3	9,206	11,185	13,622	\$	50,140	
23	10.6	672	\$	0.65	\$	69,216	23.3	\$	16,127	13.3	9,206	11,185	13,622	\$	50,140	
24	10.46	873	\$	0.79	\$	89,919	23.3	\$	20,951	13.3	11,959	11,185	13,622	\$	57,718	
25	8.68	806	\$	2.57	\$	83,018	40.1	\$	33,290	22	18,264	33,556	13,622	\$	98,732	
26	10.45	468	\$	0.80	\$	48,204	23.3	\$	11,232	13.3	6,411	11,185	13,622	\$	42,450	
27	9.07	1198	\$	2.18	\$	123,394	32.1	\$	39,609	17.9	22,088	22,370	13,622	\$	97,689	
28	9.45	1306	\$	1.80	\$	134,518	32.1	\$	43,180	17.9	24,079	22,370	13,622	\$	103,251	
29	9.8	755	\$	1.45	\$	77,765	23.3	\$	18,119	13.3	10,343	11,185	13,622	\$	53,269	
30	9.73	780	\$	1.52	\$	80,340	32.1	\$	25,789	17.9	14,381	22,370	13,622	\$	76,162	
31	11.11	872	\$	0.14	\$	89,816	13.4	\$	12,035	8.1	7,275	-	13,622	\$	32,932	
									\$	782,420		\$	440,381	\$	536,890	
													\$	422,282	\$	2,181,972

Table 14-1, Acquisitions in the Cuyler/Brownsville Neighborhood

Grant type	Year or Declaration	Applicant	Address	City	Latitude	Longitude	Costs	ROI		
HMA acquisitions	1	FMA	1997	City of Savannah	1247 W 42nd Street	Savannah	32.057308	-81.118076	36,646	1.62
	2	FMA	1997	City of Savannah	2372 Ogeechee Road	Savannah	32.057533	-81.118389	81,791	0.68
	3	FMA	1997	City of Savannah	1245 West 42nd Street	Savannah	32.057267	-81.117905	31,992	2.79
	4	HMG	1033	City of Savannah	2343 Ogeechee Rd	Savannah	32.057888	-81.118882	62,458	0.56
	5	HMG	1033	City of Savannah	2345 Ogeechee Rd	Savannah	32.057856	-81.119196	44,609	0.78
	6	HMG	1033	City of Savannah	1251 W 42nd St	Savannah	32.057348	-81.11826	33,013	2.36
	7	HMG	1033	City of Savannah	1241 W 42nd St	Savannah	32.057227	-81.117721	62,356	1.04
	8	HMG	1033	City of Savannah	2380 Ogeechee Rd	Savannah	32.057492	-81.119121	68,887	0.63
	9	HMG	1033	City of Savannah	2376 Ogeechee Rd	Savannah	32.057533	-81.118547	65,662	0.63
							\$	487,414	1.03	

Table 14-2, FEMA's IA Housing Inspection Surveys (Irma)

HWM	HWM Location	Foundation	Address	City	Latitude	Longitude	Ground Elevation	Irma WSE	Comments
0.92	First Floor	Crawl Space	1239 W 42nd Ave	SAVANNAH	32.05722	-81.1176	6	8.92	FFE is 2 feet above grade

Table 14-1, Losses Avoided Calculations (Irma)

Acquisition	FFE	Building SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Irma WSE	Mental Stress and Productivity Costs	Totals		
1	7.7	912	\$ 103	1.22	\$ 93,936	23.3	\$ 21,887	13.3	12,493	11,185	8.92	13,622	\$ 59,188		
2	7.8	828	\$ 103	1.12	\$ 85,284	23.3	\$ 19,871	13.3	11,343	11,185	8.92	13,622	\$ 56,021		
3	6.6	1037	\$ 103	2.32	\$ 106,811	32.1	\$ 34,286	17.9	19,119	22,370	8.92	13,622	\$ 89,398		
4	8.9	959	\$ 103	0.02	\$ 98,777	13.4	\$ 13,236	8.1	8,001	-	8.92	13,622	\$ 34,859		
5	8.9	959	\$ 103	0.02	\$ 98,777	13.4	\$ 13,236	8.1	8,001	-	8.92	13,622	\$ 34,859		
6	7.9	1406	\$ 103	1.02	\$ 144,818	23.3	\$ 33,743	13.3	19,261	11,185	8.92	13,622	\$ 77,811		
7	7.6	1063	\$ 103	1.32	\$ 109,489	23.3	\$ 25,511	13.3	14,562	11,185	8.92	13,622	\$ 64,880		
8	8.72	1352	\$ 103	0.20	\$ 139,256	13.4	\$ 18,660	8.1	11,280	-	8.92	13,622	\$ 43,562		
9	9.27	1258	\$ 103	-0.35	\$ 129,574	13.4	\$ 17,363	8.1	10,495	-	8.92	13,622	\$ 41,480		
										\$	114,555	\$	122,598	\$	502,058

Table 15-1. Acquisitions in the West Lake Neighborhood

Grant type	Year or Declaration	Applicant	Address	City	Latitude	Longitude	Costs	ROI
HMA acquisitions	1 PDM	Chatham County	1907 Blue Jay Ave.	Savannah	32.034449515	-81.1401825	\$ 93,991	0.53
	2 PDM	Chatham County	1909 Blue Jay Ave.	Savannah	32.03442095	-81.14030347	\$ 93,991	0.53
	3 PDM	Chatham County	1915 Blue Jay Ave.	Savannah	32.0344634	-81.14082531	\$ 80,491	0.62
	4 PDM	Chatham County	1918 Blue Jay Ave.	Savannah	32.03499765	-81.14089417	\$ 87,241	0.57
	5 PDM	Chatham County	1920 Blue Jay Ave.	Savannah	32.0350647	-81.1410623	\$ 84,086	0.50
	6 PDM	Chatham County	1921 Blue Jay Ave.	Savannah	32.03477755	-81.14116105	\$ 86,491	0.33
	7 PDM	Chatham County	1922 Blue Jay Ave.	Savannah	32.03514685	-81.1412606	\$ 90,491	0.46
	8 PDM	Chatham County	1923 Blue Jay Ave.	Savannah	32.03484958	-81.14133842	\$ 79,491	0.08
	9 PDM	Chatham County	1923 Westlake Ave.	Savannah	32.0355116	-81.14126274	\$ 83,741	0.10
	10 PDM	Chatham County	1924 Blue Jay Ave.	Savannah	32.03519012	-81.14140745	\$ 91,490	0.07
	11 PDM	Chatham County	1932 Blue Jay Ave.	Savannah	32.0354804	-81.14250743	\$ 81,497	0.08
	12 PDM	Chatham County	1933 Blue Jay Ave.	Savannah	32.03521218	-81.14262105	\$ 83,491	0.08
						\$ 1,036,492	0.34	

Table 15-2. FEMA's IA Housing Inspection Surveys (Matthew)

HWM Location	Foundation	Address	City	Latitude	Longitude	Ground Elevation	Irma WSE	Comments
First Floor Slab		West Lake Apts 1,13,35,36,100	SAVANNAH				15.57	5 properties avg flood deth .43 feet less than Matthew
						Average WSE	15.57	

Table 15-1. Losses Avoided Calculations (Irma)

Acquisition	FFE	Building SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Irma WSE	Mental Stress and Productivity Costs	Totals
1	15.58	1650	\$ 103	-0.01	\$ 169,950	13.4	\$ 22,773.30	8.1	13,766	-	15.57	13,622	\$ 50,161
2	15.51	1650	\$ 103	0.06	\$ 169,950	13.4	\$ 22,773	8.1	13,766	-	15.57	13,622	\$ 50,161
3	15.61	1650	\$ 103	-0.04	\$ 169,950	13.4	\$ 22,773	8.1	13,766	-	15.57	13,622	\$ 50,161
4	15.69	1650	\$ 103	-0.12	\$ 169,950	13.4	\$ 22,773	8.1	13,766	-	15.57	13,622	\$ 50,161
5	15.51	1300	\$ 103	0.06	\$ 133,900	13.4	\$ 17,943	8.1	10,846	-	15.57	13,622	\$ 42,411
6	16.07	1278	\$ 103	-0.50	\$ 131,634	13.4	\$ 17,639	8.1	10,662	-	15.57	13,622	\$ 41,923
7	15.77	1278	\$ 103	-0.20	\$ 131,634	13.4	\$ 17,639	8.1	10,662	-	15.57	13,622	\$ 41,923
8	16.32	1300	\$ 103	-0.75	\$ 133,900	2.5	\$ 3,348	2.4	3,214	-	15.57	-	\$ 6,561
9	16.18	1650	\$ 103	-0.61	\$ 169,950	2.5	\$ 4,249	2.4	4,079	-	15.57	-	\$ 8,328
10	16.2	1278	\$ 103	-0.63	\$ 131,634	2.5	\$ 3,291	2.4	3,159	-	15.57	-	\$ 6,450
11	16.63	1300	\$ 103	-1.06	\$ 133,900	2.5	\$ 3,348	2.4	3,214	-	15.57	-	\$ 6,561
12	16.41	1300	\$ 103	-0.84	\$ 133,900	2.5	\$ 3,348	2.4	3,214	-	15.57	-	\$ 6,561
							\$ 161,896		\$ 104,113		\$ 81,732		\$ 347,741

Table 16-1. Acquisitions in the Carver Heights Neighborhood

Grant type	Year or Declaration	Applicant	Address	City	Latitude	Longitude	Costs	ROI
HMA acquisitions	1. HMGP	City of Savannah	1310 Stokes St	Savannah	32.0752	-81.118418	\$ 41,837	1.28
	2. HMGP	City of Savannah	1012 Stokes St	Savannah	32.074719	-81.116685	\$ 40,181	0.14
	3. HMGP	City of Savannah	1008 Stokes St	Savannah	32.074412	-81.115639	\$ 58,857	0.11
	4. HMGP	City of Savannah	1006 Stokes St	Savannah	32.074454	-81.115822	\$ 37,213	0.15
	5. HMGP	City of Savannah	1029 Stokes St	Savannah	32.074542	-81.117256	\$ 53,894	0.11
	6. HMGP	City of Savannah	1011 Stokes St	Savannah	32.074299	-81.116268	\$ 36,232	0.91
	7. LPDM	2008	City of Savannah	1010 Stokes St	Savannah	32.07451	-81.1116	\$ 21,725
						\$ 289,938	0.48	

Table 16-2. FEMA's IA Housing Inspection Surveys (Irma)

HWM	HWM Location	Foundation	Address	City	Latitude	Longitude	Ground Elevation	Irma WSE	Comments
0.33	First Floor	Slab	1311 Stokes	SAVANNAH			9	9.58	FFE is 3 inches above grade

Table 16-1. Losses Avoided Calculations (Irma)

Acquisition	FFE	Building SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Irma WSE	Mental Stress and Productivity Costs	Totals
1	8.7	768	\$ 103	0.88	\$ 79,104	23.3	\$ 18,431	13.3	10,521	11,185	9.58	13,622	\$ 53,759
2	10.7	1102	\$ 103	-1.12	\$ 113,506	2.5	\$ 2,838	2.4	2,724	-	9.58	-	\$ 5,562
3	10.8	1283	\$ 103	-1.22	\$ 132,149	2.5	\$ 3,304	2.4	3,172	-	9.58	-	\$ 6,475
4	10.3	1100	\$ 103	-0.72	\$ 113,300	2.5	\$ 2,833	2.4	2,719	-	9.58	-	\$ 5,552
5	10.6	1134	\$ 103	-1.02	\$ 116,802	2.5	\$ 2,920	2.4	2,803	-	9.58	-	\$ 5,723
6	9.3	879	\$ 103	0.28	\$ 90,537	13.4	\$ 12,132	8.1	7,333	-	9.58	13,622	\$ 33,087
7	9.8	660	\$ 103	-0.22	\$ 67,980	13.4	\$ 9,109	8.1	5,506	-	9.58	13,622	\$ 28,238
					\$ 51,566		\$ 34,779		\$ 40,866		\$ 138,397		\$ 138,397

Totals	Properties	59
	Costs	\$ 2,445,688
	ROI	1.30
	Losses Avoided	\$ 3,170,168



Photo: Cheryl McDaniel

Loss Avoidance Study Property Acquisitions located in Savannah, Georgia



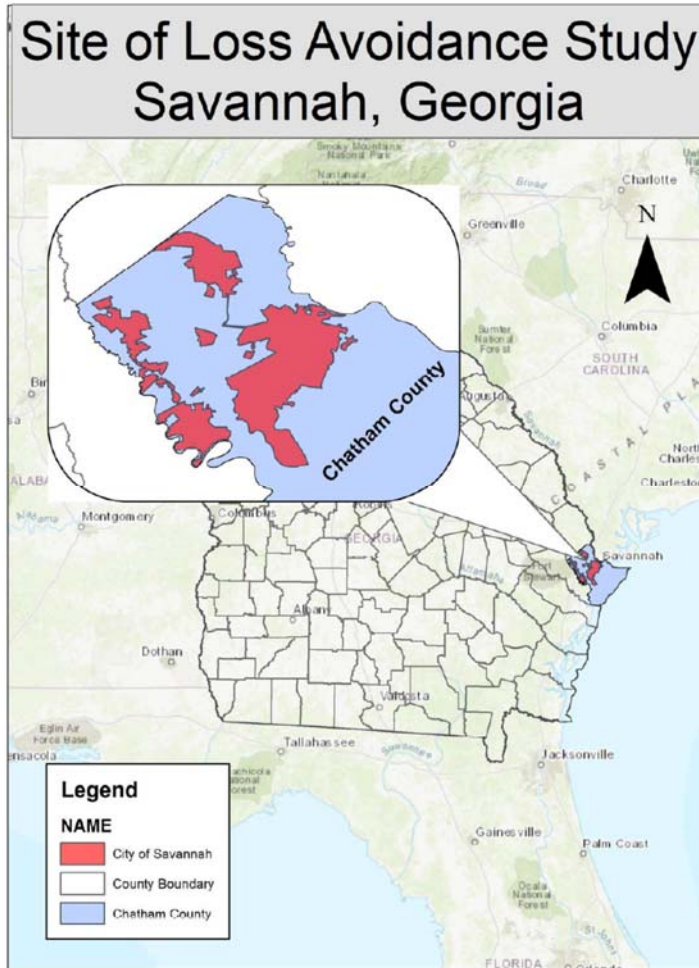
FEMA

DR-8284-GA, Hurricane Matthew

DR-4338-GA, Hurricane Irma

September 2018





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<http://www.ajc.com/entertainment/savannah-walloped-tybee-island-swamped-irma/YvLcqdkYlhAwqaSTACnw2O/>

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Index of Acronyms

BCA - Benefit Cost Analysis

BRV - Building replacement value

EDW - Enterprise Database Warehouse

DDF - Depth damage function

FFE - First floor elevations

FEV - Flood Event Viewer

FMA - Flood Mitigation Assistance Program

FEMA - Department of Homeland Security's Federal Emergency Management Agency

GSA – General Services Administration

GEMA/HS - Georgia Emergency Management & Homeland Security Agency

GMIS - Georgia Mitigation Information System

HMA - Hazard Mitigation Assistance

HMGP - Hazard Mitigation Grant Program

HWM - High water mark

IA - Individual Assistance

LAS - Loss Avoidance Study

MAP - Mitigation Action Plan

PDM - Pre-Disaster Mitigation Program

SHMO - State Hazard Mitigation Officer

SLOSH - Seismic, Sea, Lake, and Overland Surges from Hurricanes

SFHA - Special Flood Hazard Area

STAPLEE - Social, Technical, Administrative, Political, Legal, Economic, and Environmental

USACE - The US Army Corps of Engineers

USGS - US Geological Survey

WSE - Water surface elevation

Executive Summary

The Georgia State Hazard Mitigation Officer (SHMO) requested a loss avoidance study to be included in the DR-4338 Hazard Mitigation Joint Implementation Strategy. The request was to study effectiveness of the Hazard Mitigation Assistance (HMA) grant funds used to remove structures from high-risk flood areas in Chatham County, Georgia. Both the State of Georgia Enhanced Mitigation Plan and the Chatham County Mitigation Plan include acquisition of properties in flood-prone areas as an objective.

This study included 94 properties acquired with HMA grants (Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, and Pre-Disaster Mitigation Program) since 1997 in Savannah, GA. The studied properties were acquired for a cost of \$8.2 million. The calculated losses avoided are \$6.6 million from Hurricane Matthew in 2016. The losses avoided ratio is 0.81. This means for every dollar invested in the property acquisition, \$0.81 in damages was avoided from this single event. The calculated losses avoided is \$5.4 million from Hurricane Irma in 2017. The losses avoided ratio is 0.66. This means for every dollar invested in the property acquisition, \$0.66 in damages was avoided from this single event. However, the savings will not stop with Hurricanes Matthew and Irma. Because these structures have been permanently removed from high risk flood areas, the losses avoided will continue to add up with every flooding event into perpetuity.

Introduction

Following two hurricanes in consecutive years, Hurricane Matthew (2016) and Hurricane Irma (2017), that impacted the same coastal Georgia counties and led to two major disaster declarations (DR-4284-GA and DR-4338-GA), the Georgia Emergency Management & Homeland Security Agency (GEMA/HS) requested the Department of Homeland Security's Federal Emergency Management Agency (FEMA) conduct a Loss Avoidance Study (LAS) to assess the effectiveness of acquisition projects in impacted areas of Savannah, Georgia. The hurricane events were analyzed to determine the Loss Avoidance Ratio, which is the losses that were avoided compared to the grant resources invested.

Background

Mitigation is defined by FEMA as any sustained action taken to reduce or eliminate long-term risk to people and property from hazards and their effects. Every year, FEMA provides States and communities access to grants for projects that will reduce or eliminate risks from natural hazards. HMA grants include post-disaster grants under the Hazard Mitigation Grant Program (HMGP) and pre-disaster grants under the Pre-Disaster Mitigation Program (PDM) and the Flood Mitigation Assistance Program (FMA).

Acquisition and demolition or relocation of structures, particularly those in mapped Special Flood Hazard Areas (SFHA), are eligible for HMA grants. An acquisition and demolition project includes the purchase of land and structure, demolition or relocation of the structure, removal of utilities and deed restriction of the land as open space for perpetuity. The open space is returned to the natural floodplain and may be used for compatible and limited purposes such as outdoor recreational activities if so desired by the local government and approved by FEMA. FEMA considers this type of mitigation to be 100 percent effective against future property damages.

The Georgia Enhanced State Hazard Mitigation Plan

The Georgia Enhanced State Hazard Mitigation Plan was approved on March 31, 2014 and expires on March 30, 2019. Since 2008 Georgia has had an Enhanced State Plan which makes Georgia eligible for up to 20% funding in the HMGP (15% is standard State Plan). In addition to inland flooding, coastal hazards and dam failures may result in the submission of acquisition grant applications. The Georgia Mitigation Information System (GMIS) is used to provide updated mapping to local communities for the flood, wildfire, landslide, Seismic, Sea, Lake, and Overland Surges from Hurricanes (SLOSH) and wind hazards. Georgia is dedicated to providing support and guidance to the counties and communities in the development of hazard mitigation plans to ensure a more disaster resilient state. The mitigation action plan includes the support of local government cost-effective requests for project funding through available grant opportunities. These grants can be used to mitigate repetitive loss properties with priority given to severe repetitive loss properties and removal of repetitive loss properties from the regulatory floodway. Georgia makes assisting local communities with eligible acquisition/elevation, flood proofing, and storm water projects a high priority. The Georgia Enhanced State Hazard Mitigation Plan includes, by county, an assessment of hazards and social vulnerability.

The Chatham County Hazard Mitigation Plan

The Chatham County Hazard Mitigation Plan was approved on February 5, 2016 and expires on February 4, 2021. All the participating jurisdictions have adopted the plan, which includes the Cities of Bloomingdale, Garden City, Pooler, Port Wentworth, Savannah, Tybee Island and the Town of Thunderbolt. Chatham County has a composite hazard and social vulnerability score of 15.3, which is the highest score for the State of Georgia. The composite assessment is a compilation of the social vulnerability scores and the hazard risk score for Storm Surge, Wind, Flood, Wildfire, and Earthquake. The values, ranging from 0 to 20 represent the least to the most hazardous areas in the state, respectively. Identified hazards which could potentially cause a community to request acquisition grants are flood, storm surge, sea level rise, and hurricane/tropical storm. To prioritize the Mitigation Action Plan (MAP) for each participating jurisdiction, a Priority Risk Index, along with STAPLEE (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) criteria, was used to identify each hazard as a high, moderate, or low risk. Goals and mitigation strategies were then developed from this risk assessment. The mitigation action "Promote the acquisition by conservation organizations of flood areas for community green space" is prioritized as low.

Since 1997, FEMA, GEMA/HS, and the City of Savannah have invested \$24.45 million for the acquisition and demolition of 347 properties. This study included 94 properties acquired with HMA grants (Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, and Pre-Disaster Mitigation Program) since 1997 in Savannah, GA

History

Chatham County, one of the original counties in the State of Georgia was created February 5, 1777. In this coastal Georgia County, there are several cities and towns including the City of Savannah and six inhabited islands. The county is bounded by water on three sides with the Savannah River to the north, Ogeechee River to the south, and the Atlantic Ocean to the east resulting in 32.6% of the total area of the county being covered by water. Its population of 265,128 residents as reported by the 2010 U.S. Census reside within the county's 632 square miles.

Prior to 2016, the Georgia coast had experienced no major hurricanes since the late 1800s. The last hurricane to cause any impacts to the Georgia coast was Hurricane David which hit on September 4-5, 1979. Hurricane David was a Category 2 storm that reportedly did minimal damage. Hurricane David brought sustained winds of 58 mph (gusts of 68 mph), 6.86 inches of rain, and a storm surge of 12 feet above mean sea level. (National Weather Service. (1979)) Prior to David, the Georgia coast experienced nearly a century long stretch without a tropical storm. During the 19th Century, records indicate six major hurricanes impacted the Georgia coast: one each in 1804, 1813, 1824, 1854, 1893, and 1898. Of particular note, the August 1893 Sea Islands hurricane was blamed for thousands of deaths in Georgia and South Carolina.

"Landfall just south of Savannah, GA as a Cat 3 hurricane. Moved north-northeast through the SC Midlands and weakened into a Cat 1 hurricane before reaching Columbia, SC. The storm hit near high tide and produced a catastrophic storm surge of 16+ feet, wind gusts greater than 115 mph, significant damage northward through around Charleston and ~2,000 deaths (mostly due to the storm surge). Downtown Savannah was spared complete inundation. The storm

essentially marked the beginning of the end of the phosphate industry in the area.”
(Weather.gov)

Hurricane Matthew

On October 5th 2016, Hurricane Matthew traveled in a parallel path with the southern U.S. Atlantic coast, eventually making U.S. landfall near Myrtle Beach, SC as a Category 1 storm. This storm killed 47 people in the U.S. including three in Georgia. The center of Matthew remained off shore, 20 miles east of Tybee Island. As Matthew passed, the eastern portions of Chatham County experienced sustained hurricane force winds. Two-hundred fifty thousand people in Georgia were left without power, and Street Simons Island near Brunswick was completely cut off from the coast. Over the area affected by the storm, 2.1 million cubic yards of vegetative debris was generated. Damages to homes and businesses in Georgia alone was greater than \$90 million in insured losses, and included 30,000 claims. (Wenk 2016)

In Savannah and Chatham County, mass evacuations took tens of thousands of people away from their homes during the storm. Those who stayed endured overnight curfews and the Red Cross transported over 20,000 to safety shelters. High winds, heavy rains and storm surge coupled with tidal flows, damaged and flooded neighborhoods. Many large and majestic live oak trees throughout the city blocked streets and tore down electrical poles and wires causing problems for home and business owners for several days. Damage to Savannah and Tybee Island was significant, but not devastating. Bridges that would normally return evacuees to their homes were blocked by debris causing delays in the return to homes and businesses and frustrating owners.

Hurricane Irma

Hurricane Irma, in 2017, was the second major hurricane, and the first Category 5 hurricane of the 2017 Atlantic hurricane season. Irma's intensity dropped slightly before it made its first U.S. landfall on September 10 near Cudjoe Key, FL with maximum sustained winds at 130 mph. As a slightly weakened Irma, it made a second U.S. landfall, the same day, at Marco Island, FL then weakened and moved north, up the Florida peninsula and into South Georgia.

Prior to landfall, the Georgia Governor Nathan Deal declared a state of emergency initially for all six coastal counties and eventually expanded this to cover 30 counties in southeast and east central Georgia. Later, a mandatory evacuation order was issued for all areas east of U.S. I-95. In the end, the state of emergency was expanded to cover 94 counties south of Atlanta. By the end of the event, over a half-million people on the Georgia coast were displaced by mandatory evacuation orders. On September 10, Governor Deal expanded the state of emergency to cover the entire state.

Irma entered Georgia as a strong tropical storm. Irma left 1.5 million residents in Georgia without power, and in total 45 people, including four Georgians, lost their lives due to the hurricane. High winds, large flying debris and heavy rains damaged many houses and knocked down trees, causing widespread damage to power lines. Georgia Power, along with aid provided by the Georgia National Guard, mobilized over 5000 individuals. Preliminary estimates in the early days after the storm reached \$350 million in insured damages, and untold millions in uninsured damage.

DR-4338- GA Hazard Mitigation Joint Implementation Strategy

The Joint Implementation Strategy outlines a method and process to identify and implement hazard mitigation opportunities in response to damage from flooding and wind associated with Hurricane Irma. The Georgia SHMO requested a losses avoided study to be included in the Strategy. The Georgia SHMO requested the subject of the study to be losses avoided from use of HMA grants for acquisitions and demolitions in Chatham County, Georgia. The acquisitions and demolitions were made possible through the receipt of HMGP grant funds associated with DR-1033 to DR-1761, and receipt of PDM and FMA grants funds from 2004 to 2011. There were nearly 400 property acquisitions in Chatham County during this period. This LAS selected acquisitions where Individual Assistance (IA) Housing Inspections for DR-4338-GA were in close proximity to a cluster of acquisitions. A total of 94 acquisition sites in the City of Savannah were found to be near IA inspections.

Methodology

Site Selection

High water mark (HWM) information can sometimes be established based on water gauge data collected during an event. The US Geological Survey (USGS) Flood Event Viewer (FEV), which publishes high water mark observations, was used to collect data. The USGS FEV has survey data at 17 locations in Chatham County. However, the HWM observations were not in close proximity to the areas of focus for this study, so it did not provide relevant analysis. Therefore, this study instead analyzed water depth information collected during preliminary damage assessments completed by FEMA IA teams. To select relevant sites where water depth information was recorded, a geospatial analysis was completed using topographic information and locations of property acquisitions and structures visited by IA teams.

The Savannah Area Geographic Information System (SAGIS) was used to determine the ground elevation where IA housing inspections were completed. The IA housing inspection noted the depth of water above the first floor and type of foundation of each structure. Through a comparison of ground elevations, type of foundation and water depths at all identified locations, the water surface elevation (WSE) in each neighborhood was determined. Data from locations separated from the acquisition sites by a topographical feature, such as a major roadway, was not used if it appeared the feature could cause a change in hydraulics between the sites. The WSE was then used along with the first floor elevations (FFE) reported by the State of Georgia at each acquisition site to calculate the water depth which would have occurred at each acquired property. Data from the SAGIS.org website was used to validate the FFEs provided.

Analysis

The US Army Corps of Engineers (USACE) generic depth damage function (DDF) was used to estimate the amount of structure and building contents damage expected based on the water depth. The USACE DDF estimates the amount of damage as a percentage of building replacement value (BRV) based on depth of water in the structure. The SHMO data included BRV, contents value and size of the structures acquired. The BRV provided by the SHMO appeared to be from when the acquisitions were completed; some acquisitions occurred more than 20 years ago. Therefore, to get a current estimate of losses avoided, FEMA researched the BRV on the National Home Builders website for current BRV. The latest

information available from 2015, indicated the national average cost to build a single family home is \$103/SF. This square foot cost was used with the square footage from the SHMO data to determine a current BRV. Likewise building contents was based the use of the same BRV. The FEMA BCA software defaults building contents equal to 100% of structure value. For example, an average 2000 SF home with a \$206,000 structure value and \$206,000 contents value with 2 feet flood water depth would have structural damage of 32.1% BRV ($\$206,000 \times 0.321 = \$66,126$) and content damage of 17.9% BRV ($\$206,000 \times 0.179 = \$36,874$). The DDF values are included in Table 1-0.

When a flooding event occurs, residents are frequently displaced to a temporary location until repairs are made to residences. These displacement costs are estimates based on GSA lodging rates (\$117/night), meal and incidental expenses (\$59/person/day) less the costs for meals prepared at home (\$7/person/day) for the specific location. The duration of displacement attributed to repairing a flooded home is estimated at 45 days/foot water depths. In this loss avoidance study, it is assumed there would be 2 people and 1 worker for each property or \$221/day displacement costs. For the average home mentioned above the total displacement cost is $\$221/\text{day} \times 45 \text{ days/foot} \times 2 \text{ foot water depth}$ for a total of \$19,890.

In addition to the building repairs, content replacement, and displacement costs, there is an economic value for the mental stress and anxiety and lost productivity experienced by the residents of a flooded structure. The values are \$2443/person for mental stress and anxiety, and \$8736/worker for lost productivity. For the average home mentioned above the total mental stress and anxiety and lost productivity cost is $2 \times \$2,443$ plus \$8,736 for a total of \$13,622.

The total losses avoided are the summation of building repairs (\$66,126), content replacement (\$36,874), displacement costs (\$19,890), and mental stress and anxiety and lost productivity (\$13,622). For the average home mentioned above the total damage resulting in 2 feet water depth is \$136,512.

The measure of the effectiveness of the projects in the study is compared against the total project costs. Total project costs include the property's fair market value, demolition costs, appraisal fees, real estate fees, and other typical fees associated with an acquisition. The total project costs were provided by the GA SHMO and pulled from FEMA Enterprise Database Warehouse (EDW).

Results

Selected Properties

This study analyzed water depth information collected during preliminary damage assessments completed by IA teams. IA completed over 750 and nearly 400 housing inspections in Chatham County during Hurricanes Matthew and Irma respectively. Housing inspections without a HWM recorded were removed from the data, and the remaining inspections with a HWM were mapped geospatially to determine which inspections were located near a cluster of HMA acquisitions and could be used to determine dependable results.

The property selection produced five clusters of acquisitions and IA housing inspections where losses avoided can be determined. Each of the five clusters are detailed below.

1. Margaret Street Neighborhood

The Margaret Street Neighborhood includes 11 properties acquired by the City of Savannah. The properties were acquired with HMGP funds from DR-1042 and FY2005 PDM grants. The total project costs for the 11 properties was \$1,236,850. The GIS Map (Appendix B, Figure 1.1) shows the locations of the acquisitions, IA housing inspections, and the location of the SFHA. The details of each property acquired along Margaret Street are included in Appendix A, Table 1-1. The IA housing inspection team conducted two surveys in close proximity to the Margaret Street acquisitions. The IA housing inspection information is included in Appendix A, Table 1-2 (Matthew) and Table 1-3 (Irma).



Figure 1.2 Picture looking East, North side of Margaret Street, Photo, Kent Elrick, FEMA Reservist

A photograph of the area after the completed acquisitions is shown in Figure 1.2.

1.1 Matthew Losses

The WSE derived from the IA housing inspection is 6.67 feet. Given this WSE, the loss avoided from the acquisition of the 11 properties on Margaret Street is \$21,291. The detailed calculations of losses avoided are shown in Table 1-4. The losses avoided ratio for the Margaret Street Neighborhood is $\$21,291/\$1,236,850 = 0.04$.

1.2 Irma Losses

The WSE derived from the IA housing inspection is 10.08 feet. Given this WSE, the loss avoided from the acquisition of the 11 properties on Margaret Street is \$725,023. The detailed calculations of losses avoided are shown in Table 1-5. The losses avoided ratio for the Margaret Street Neighborhood is $\$725,023/\$1,236,850 = 0.57$.

2. Bonnie Drive Neighborhood Area

The Bonnie Drive Neighborhood area includes acquisitions on E. Derenne Avenue, Vicksburg Drive, Bonnie Drive, and LaRoche Court. The City of Savannah acquired 25 properties in the neighborhood. These selected properties were acquired with HMGP grants funds from DR-1033 to DR-1761 and FY2007 PDM grants. The total project costs for the 25 properties was \$1,783,277. The GIS Map (Appendix B, Figure 2.1) shows the locations of the acquisition, IA housing inspections, and the location of the SFHA. The details of each property acquired in the Bonnie Drive Neighborhood are included in Appendix A, Table 2-1. The IA housing inspection team conducted three surveys in close proximity to the Bonnie Drive Neighborhood acquisitions. The IA housing inspection information is included in Appendix A, Table 2-2 (Matthew) and Table 2-3 (Irma).



Figure 2.2 Picture looking East, North side of Bonnie Drive, Photo, Kent Elrick, FEMA Reservist

A photograph of the area after the completed acquisitions is shown in Figure 2.2.

2.1 Matthew Losses

The WSE derived from the IA housing inspection is 13 feet. Given this WSE, the losses avoided from the acquisition of the 25 properties in the Bonnie Drive Neighborhood is \$1,972,448. The detailed calculations of losses avoided are shown in Table 2-4. The losses avoided ratio for the Bonnie Drive Neighborhood is $\$1,972,448/\$1,783,277 = 1.11$.

2.2 Irma Losses

The WSE derived from the IA housing inspection is 11.67 feet. Given this WSE, the losses avoided from the acquisition of the 25 properties in the Bonnie Drive Neighborhood is \$1,097,697. The detailed calculations of losses avoided are shown in Table 2-5. The losses avoided ratio for the Bonnie Drive Neighborhood is $\$1,097,697/\$1,783,277 = 0.62$.

3. Woodley Road Neighborhood:

The Woodley Road Neighborhood includes acquisitions on Linwood Road, Juniper Circle, and Woodley Road. The City of Savannah acquired 31 properties in the neighborhood. These selected properties were acquired with HMGP grant funds from DR-1033 to DR-1311 and a FY2011 PDM grant. Total project costs for the 30 properties was \$2,637,193. The GIS Map (Appendix B, Figure 3.1) shows the locations of the acquisition, IA housing inspections and the location of the SFHA. The details of each property acquired in the Woodley Road Neighborhood are included in Appendix A, Table 3-1. The IA housing inspection team conducted one survey in close proximity to the Woodley Neighborhood acquisitions. The IA housing inspection information is included in Appendix A, Table 3-2 (Matthew) and Table 3-3 (Irma).



Figure 3.2 Picture of 305 Linwood Road, Photo, Kent Elrick, FEMA Reservist

A photograph of the area after the completed acquisitions is shown in Figure 3.2.

3.1 Matthew Losses

The WSE derived from the IA housing inspections is 17.08 feet. Given this WSE, the losses avoided from the acquisition of the 31 properties in the Woodley Road Neighborhood is \$994,005. The detailed calculations of losses avoided are shown in Table 3-4. The losses avoided ratio for the Woodley Road Neighborhood is $\$1,510,083/2,637,193 = 0.57$.

3.2 Irma Losses

The WSE derived from the IA housing inspections is 15.08 feet. Given this WSE, the losses avoided from the acquisition of the 31 properties in the Woodley Road Neighborhood is \$80,924. The detailed calculations of losses avoided are shown in Table 3-5. The losses avoided ratio for the Woodley Road Neighborhood is $\$80,924/2,637,193 = 0.03$.

4. Wilshire Boulevard Neighborhood:

The Wilshire Boulevard Neighborhood includes acquisitions on Vineyard Drive and Wilshire Boulevard. The City of Savannah acquired 10 properties in the neighborhood. These selected properties were acquired with HMGP grant funds and FY2004 FMA grant funds. Total project costs for acquisitions of the 11 properties is \$986,179. The GIS Map (Appendix B, Figure 4.1) shows the locations of the acquisitions, IA housing inspections and the location of the SFHA. The details of each property acquired in the Wilshire Boulevard Neighborhood are included in Appendix A, Table 4-1. The IA housing inspection conducted two surveys in close proximity to the Wilshire Boulevard Neighborhood acquisitions. The IA housing inspection information is included in Appendix A, Table 4-2 (Matthew) and Table 4-3 (Irma).



Figure 4.2 Picture of 117 Wilshire Road, Photo, Kent Elrick, FEMA Reservist

A photograph of the area after the completed acquisitions is shown in Figure 4.2.

4.1 Matthew Losses

The WSE derived from the IA housing inspections is 23.17 feet. Given this WSE, the losses avoided from the acquisitions of the 31 properties in the Woodley Road Neighborhood are \$2,950,263. The detailed calculations of losses avoided are shown in Table 4-4. The losses avoided ratio for the Woodley Road Neighborhood is $\$2,950,263/\$986,179 = 2.99$.

4.2 Irma Losses

The WSE derived from the IA housing inspections are 20.67 feet. Given this WSE, the losses avoided from the acquisition of the 31 properties in the Woodley Road Neighborhood are \$2,551,179. The detailed calculations of losses avoided are shown in Table 4-5. The losses avoided ratio for the Woodley Road Neighborhood is $\$2,659,008/\$986,179 = 2.70$.

5. Nina Court Neighborhood:

The Nina Court Neighborhood includes Wesley Street, Kandlewood Street, Chatham Street, Nina Court and Paradise Drive. The City of Savannah acquired 15 properties in the neighborhood. These selected properties were acquired with HMGP grant funds from DR-1033 to DR-1311 and FY2011 PDM grant funds. Total project costs for the 15 properties was \$1,503,159. The GIS Map (Appendix B, Figure 5.1) shows the locations of the acquisitions, IA housing inspections and the location of the SFHA. The details of each property acquired in the Nina Court Neighborhood is included in Appendix A, Table 5-1. The IA housing inspection team conducted two surveys in close proximity to the Nina Court Neighborhood acquisitions. The IA housing inspection information is included in Appendix A, Table 5-2 (Matthew) and Table 5-3 (Irma).



Figure 5.2 Picture of 7 Nina Court, Photo, Kent Elrick, FEMA Reservist

A photograph of the area after the completed acquisitions is shown in Figure 5.2.

5.1 Matthew Losses

The WSE derived from the IA housing inspections is 11.58 feet. Given this WSE, the losses avoided from the acquisition of the 15 properties in the Nina Court Neighborhood are \$105,823. The detailed calculations of losses avoided are shown in Table 5-4. The losses avoided ratio for the Nina Court Neighborhood is $\$105,823/\$1,505,159 = 0.07$.

5.2 Irma Losses

The WSE derived from the IA housing inspections is 13.93 feet. Given this WSE, the losses avoided from the acquisition of the 15 properties in the Nina Court Neighborhood are \$861,305. The detailed calculations of losses avoided are shown in Table 5-5. The losses avoided ratio for the Nina Court Neighborhood is $\$861,305/\$1,505,159 = 0.57$.

Conclusion

FEMA, the State of Georgia and City of Savannah have funded the acquisition of 347 properties in Savannah, GA at the cost of \$24.45 million. This study analyzed avoided losses from Hurricanes Irma and Matthew for 94 properties in five neighborhoods, which were acquired for \$8.2 million. The calculated losses avoided for these events due to acquisition of these properties is \$12 million. The losses avoided ratio is 1.47. A summary of losses avoided for both hurricanes is shown in Table 6-1. Table 6-2 shows the losses avoided ratio for both hurricanes.

No field survey work was completed for this study. The results of this study are based on the IA housing inspection data provided, SAGIS, and other publicly available data sources. The accuracy of the housing inspection is one inch and FFE accuracy is one foot. A more detailed and accurate study could have been completed with a field survey crew with the sole purpose to conduct a study.

Sources:

FEMA, Individual Assistance housing inspection field data. Unpublished raw data.

USGS FloodEvent Viewer, <https://stn.wim.usgs.gov/FEV/#IrmaSeptember2017>.

State of Georgia, Hazard Mitigation Assistance acquisitions. Unpublished raw data.

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Appendix A

Table 1-0, Depth-Damage Functions
 Damage Function for One Story SFR w/o basement

Depth	Mean of Damage, Structure	Mean of Damage, Contents
-2	0	0
-1	2.5	2.4
0	13.4	8.1
1	23.3	13.3
2	32.1	17.9
3	40.1	22
4	47.1	25.7
5	53.2	28.8
6	58.6	31.5
7	63.2	33.8
8	67.2	35.7

Table 1-1, Acquisitions in the Margaret Street Neighborhood

	Grant type	Year or Declaration	Applicant	Address	City	Latitude	Longitude
HMA acquisitions	1 PDM	2005	City of Savannah	2305 Margaret St	Savannah	32.039663	-81.057161
	2 PDM	2005	City of Savannah	2308 Margaret St	Savannah	32.040188	-81.056969
	3 PDM	2005	City of Savannah	2309 Margaret St	Savannah	32.039802	-81.056891
	4 PDM	2005	City of Savannah	2310 Margaret St	Savannah	32.040131	-81.056785
	5 PDM	2005	City of Savannah	2311 Margaret St	Savannah	32.039755	-81.056659
	6 PDM	2005	City of Savannah	2313 Margaret St	Savannah	32.039706	-81.056403
	7 PDM	2005	City of Savannah	2320 Margaret St	Savannah	32.040032	-81.056371
	8 PDM	2005	City of Savannah	2322 Margaret St	Savannah	32.039988	-81.056209
	9 PDM	2005	City of Savannah	2328 Margaret St	Savannah	32.03997	-81.055983
	10 PDM	2005	City of Savannah	2316 Margaret St	Savannah	32.040084	-81.056542
	11 HMGP	1042	City of Savannah	2315 Margaret ST	Savannah	32.039660	-81.056163

Table 1-2, FEMA's IA Housing Inspection Surveys (Matthew)

IA Housing Inspections	HWM	HWM Location	Foundation	Address	City	Ground Elevation	Matthew WSE
	0.83	First Floor	Slab	2400 Block, 39TH ST	SAVANNAH	6	6.83
0.50	First Floor	Slab	2400 Block, 39TH ST	SAVANNAH	6	6.50	
						Average WSE	6.67

Table 1-3, FEMA's IA Housing Inspection Surveys (Irma)

IA Housing Inspections	HWM	HWM Location	Foundation	Address	City	Ground Elevation	Irma WSE
	0.08	First Floor	Slab	2600 Block of EVERGREEN AVE	SAVANNAH	10	10.08
	0.08	First Floor	Slab	2300 Block of E 42ND ST	SAVANNAH	10	10.08
Average WSE							10.08

Table 1-4, Losses Avoided Calculations (Matthew)

HMA Acquisition	FFE	Building SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Mental Stress and Productivity Costs	Losses Avoided	Cost	Ratio	
1	10	2062	\$ 103	-3.34	\$ 212,386	0	\$ -	0	-	-	-	-	157,399	0.00	
2	10.4	1530	\$ 103	-3.74	\$ 157,590	0	\$ -	0	-	-	-	-	124,027	0.00	
3	10.4	1750	\$ 103	-3.74	\$ 180,250	0	\$ -	0	-	-	-	-	141,778	0.00	
4	11.4	981	\$ 103	-4.74	\$ 101,043	0	\$ -	0	-	-	-	-	91,122	0.00	
5	8.6	1566	\$ 103	-1.94	\$ 161,298	0	\$ -	0	-	-	-	-	130,868	0.00	
6	8.7	1425	\$ 103	-2.04	\$ 146,775	0	\$ -	0	-	-	-	-	92,974	0.00	
7	8.6	1574	\$ 103	-1.94	\$ 162,122	0	\$ -	0	-	-	-	-	101,272	0.00	
8	10.9	1336	\$ 103	-4.24	\$ 137,608	0	\$ -	0	-	-	-	-	115,745	0.00	
9	7	1225	\$ 103	-0.34	\$ 126,175	13.4	\$ 16,907	8.1	10,220	-	-	27,128	110,324	0.25	
10	9.2	1296	\$ 103	-2.54	\$ 133,488	0	\$ -	0	-	-	-	-	119,464	0.00	
11	6.87	1327	\$ 103	-0.21	\$ 136,681	13.4	\$ 18,315	8.1	11,071	-	-	29,386	78,877	0.37	
(1) from sagis.org							\$ 35,223		\$ 21,291	\$ -	\$ -	\$ 56,514	\$ 1,263,850	0.04	
(2) from NAHB															

Table 1-5, Losses Avoided Calculations (Irma)

HMA Acquisition	FFE	Building SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Mental Stress and Productivity Costs	Losses Avoided	Cost	Ratio	
1	10	2062	\$ 103	0.08	\$ 212,386	13.4	\$ 28,460	8.1	17,203	829	13,622	60,114	157,399	0.38	
2	10.4	1530	\$ 103	-0.32	\$ 157,590	13.4	\$ 21,117	8.1	12,765	-	-	33,882	124,027	0.27	
3	10.4	1750	\$ 103	-0.32	\$ 180,250	13.4	\$ 24,154	8.1	14,600	-	-	38,754	141,778	0.27	
4	11.4	981	\$ 103	-1.32	\$ 101,043	2.5	\$ 2,526	2.4	2,425	-	-	4,951	91,122	0.05	
5	8.6	1566	\$ 103	1.48	\$ 161,298	23.3	\$ 37,582	13.3	21,453	14,752	13,622	87,409	130,868	0.67	
6	8.7	1425	\$ 103	1.38	\$ 146,775	23.3	\$ 34,199	13.3	19,521	13,757	13,622	81,099	92,974	0.87	
7	8.6	1574	\$ 103	1.48	\$ 162,122	23.3	\$ 37,774	13.3	21,562	14,752	13,622	87,710	101,272	0.87	
8	10.9	1336	\$ 103	-0.82	\$ 137,608	2.5	\$ 3,440	2.4	3,303	-	-	6,743	115,745	0.06	
9	7	1225	\$ 103	3.08	\$ 126,175	40.1	\$ 50,596	22	27,759	30,664	13,622	122,640	110,324	1.11	
10	9.2	1296	\$ 103	0.88	\$ 133,488	23.3	\$ 31,103	13.3	17,754	8,785	13,622	71,263	119,464	0.60	
11	6.87	1327	\$ 103	3.21	\$ 136,681	40.1	\$ 54,809	22	30,070	31,957	13,622	130,458	78,877	1.65	
(1) from sagis.org							\$ 325,760		\$ 188,414	\$ 115,495	\$ 95,354	\$ 725,023	\$ 1,263,850	0.57	
(2) from NAHB															

Table 2-1, Acquisitions in the Bonnie Drive Neighborhood

	Grant type	Year or Declaration	Applicant	Address	City	Latitude	Longitude
HMA acquisitions	1	HMGP	1761	City of Savannah	2402 E Derenne Ave	Savannah	32.017889 -81.068683
	2	HMGP	1686	City of Savannah	2302 E. Derenne Ave	Savannah	32.018045 -81.069686
	3	HMGP	1686	City of Savannah	2306 E. Derenne Ave	Savannah	32.017971 -81.069433
	4	HMGP	1686	City of Savannah	2310 E. Derenne Ave	Savannah	32.017927 -81.069217
	5	HMGP	1686	City of Savannah	2312 E. Derenne Ave	Savannah	32.017848 -81.06872
	6	HMGP	1033	City of Savannah	2304 Vicksburg DR	Savannah	32.019434 -81.068510
	7	HMGP	1033	City of Savannah	2313 Vicksburg DR	Savannah	32.019047 -81.068595
	8	HMGP	1033	City of Savannah	2309 Vicksburg DR	Savannah	32.019108 -81.068697
	9	HMGP	1033	City of Savannah	2401 Vicksburg DR	Savannah	32.018871 -81.068223
	10	HMGP	1033	City of Savannah	5310 Bonnie DR	Savannah	32.018684 -81.068320
	0	HMGP	1033	City of Savannah	5314 Bonnie DR	Savannah	32.018516 -81.068383
	12	HMGP	1033	City of Savannah	5318 Bonnie DR	Savannah	32.018343 -81.068442
	13	HMGP	1033	City of Savannah	5322 Bonnie DR	Savannah	32.018186 -81.068510
	14	HMGP	1033	City of Savannah	5326 Bonnie DR	Savannah	32.018067 -81.068565
	15	HMGP	1033	City of Savannah	5 La Roche CT	Savannah	32.018075 -81.068036
	16	HMGP	1033	City of Savannah	6 La Roche CT	Savannah	32.018325 -81.067926
	17	HMGP	1033	City of Savannah	2417 Vicksburg DR	Savannah	32.018627 -81.067469
	18	HMGP	1033	City of Savannah	2415 Vicksburg DR	Savannah	32.018684 -81.067643
	19	HMGP	1033	City of Savannah	2409 Vicksburg DR	Savannah	32.018731 -81.067837
	20	HMGP	1033	City of Savannah	2405 Vicksburg DR	Savannah	32.018817 -81.068024
	21	HMGP	1033	City of Savannah	5321 Bonnie DR	Savannah	32.016150 -81.068971
	22	PDM	2007	City of Savannah	5317 Bonnie DR	Savannah	32.018312 -81.068930
	23	HMGP	1033	City of Savannah	5313 Bonnie DR	Savannah	32.018526 -81.068874
	24	HMGP	1033	City of Savannah	5309 Bonnie DR	Savannah	32.018709 -81.068777
	25	HMGP	1033	City of Savannah	5305 Bonnie DR	Savannah	32.018896 -81.068692

Table 2-2, FEMA's IA Housing Inspection Surveys (Matthew)

IA Housing Inspections	HWM	HWM Location	Foundation	Address	City	Ground Elevation	Matthew WSE
	0.33	First Floor	Slab	4900 Block of LaRoche	SAVANNAH	13	13.33
						Average WSE	13.33

Table 2-3, FEMA's IA Housing Inspection Surveys (Irma)

IA Housing Inspections	HWM	HWM Location	Foundation	Address	City	Ground Elevation	Irma WSE
	0.67	First Floor	Slab	5100 Block of LAROCHE AVE	SAVANNAH	11	11.67
	0.25	First Floor	Slab	2200 Block of VICKSBURG DR	SAVANNAH	12	12.95
	0.08	First Floor	Slab	2500 Block of OAK FOREST DR	SAVANNAH	11	11.08
Average WSE							11.90

Table 2-4, Losses Avoided Calculations (Matthew)

HMA Acquisition	FFE	SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Mental Stress and Productivity Costs	Losses Avoided	Cost	Ratio
	1	11.6	1128	\$ 103	1.73	\$ 116,184	32.1	\$ 37,295	17.9	\$ 20,797	\$ 17,205	13,622	\$ 88,919	\$ 105,191
2	10.5	1275	\$ 103	2.83	\$ 131,325	40.1	\$ 52,661	22	\$ 28,892	\$ 28,144	13,622	\$ 123,319	\$ 100,813	1.22
3	9.8	1173	\$ 103	3.53	\$ 120,819	47.1	\$ 56,906	25.7	\$ 31,050	\$ 35,106	13,622	\$ 136,684	\$ 119,194	1.15
4	10.7	1087	\$ 103	2.63	\$ 111,961	40.1	\$ 44,896	22	\$ 24,631	\$ 26,155	13,622	\$ 109,305	\$ 99,348	1.10
5	10.4	888	\$ 103	2.93	\$ 91,464	40.1	\$ 36,677	22	\$ 20,122	\$ 29,139	13,622	\$ 99,560	\$ 96,101	1.04
6	12.2	1488	\$ 103	1.13	\$ 153,264	23.3	\$ 35,711	13.3	\$ 20,384	\$ 11,238	13,622	\$ 80,954	\$ 77,092	1.05
7	11	737	\$ 103	2.33	\$ 75,911	32.1	\$ 24,367	17.9	\$ 13,588	\$ 23,172	13,622	\$ 74,749	\$ 52,225	1.43
8	11.9	734	\$ 103	1.43	\$ 75,602	23.3	\$ 17,615	13.3	\$ 10,055	\$ 14,221	13,622	\$ 55,514	\$ 56,207	0.99
9	13.2	1450	\$ 103	0.13	\$ 149,350	13.4	\$ 20,013	8.1	\$ 12,097	\$ 1,293	13,622	\$ 47,025	\$ 66,358	0.71
10	11.3	1072	\$ 103	2.03	\$ 110,416	32.1	\$ 35,444	17.9	\$ 19,764	\$ 20,188	13,622	\$ 89,018	\$ 47,644	1.87
11	11.2	1159	\$ 103	2.13	\$ 119,377	32.1	\$ 38,320	17.9	\$ 21,368	\$ 21,183	13,622	\$ 94,493	\$ 60,598	1.56
12	11.3	1262	\$ 103	2.03	\$ 129,986	32.1	\$ 41,726	17.9	\$ 23,267	\$ 20,188	13,622	\$ 98,803	\$ 63,020	1.57
13	11.45	765	\$ 103	1.88	\$ 78,795	32.1	\$ 25,293	17.9	\$ 14,104	\$ 18,697	13,622	\$ 71,716	\$ 43,206	1.66
14	12.17	909	\$ 103	1.16	\$ 93,627	23.3	\$ 21,815	13.3	\$ 12,452	\$ 11,536	13,622	\$ 59,426	\$ 61,040	0.97
15	12.1	1504	\$ 103	1.23	\$ 154,912	23.3	\$ 36,094	13.3	\$ 20,603	\$ 12,232	13,622	\$ 82,552	\$ 106,340	0.78
16	11.67	1601	\$ 103	1.66	\$ 164,903	32.1	\$ 52,934	17.9	\$ 29,518	\$ 16,509	13,622	\$ 112,582	\$ 89,852	1.25
17	11.5	726	\$ 103	1.83	\$ 74,778	32.1	\$ 24,004	17.9	\$ 13,385	\$ 18,199	13,622	\$ 69,210	\$ 50,660	1.37
18	13.77	1557	\$ 103	-0.44	\$ 160,371	13.4	\$ 21,490	8.1	\$ 12,990	\$ -	-	\$ 34,480	\$ 65,719	0.52
19	13.63	1009	\$ 103	-0.30	\$ 103,927	13.4	\$ 13,926	8.1	\$ 8,418	\$ -	-	\$ 22,344	\$ 39,753	0.56
20	14.4	1170	\$ 103	-1.07	\$ 120,510	2.5	\$ 3,013	2.4	\$ 2,892	\$ -	-	\$ 5,905	\$ 60,695	0.10
21	12.2	744	\$ 103	1.13	\$ 76,632	23.3	\$ 17,855	13.3	\$ 10,192	\$ 11,238	13,622	\$ 52,907	\$ 39,568	1.34
22	10	1128	\$ 103	3.33	\$ 116,184	40.1	\$ 46,590	22	\$ 25,560	\$ 33,117	13,622	\$ 118,889	\$ 126,051	0.94
23	11	726	\$ 103	2.33	\$ 74,778	32.1	\$ 24,004	17.9	\$ 13,385	\$ 23,172	13,622	\$ 74,183	\$ 48,561	1.53
24	11	1125	\$ 103	2.33	\$ 115,875	32.1	\$ 37,196	17.9	\$ 20,742	\$ 23,172	13,622	\$ 94,731	\$ 58,136	1.63
25	10.9	726	\$ 103	2.43	\$ 74,778	32.1	\$ 24,004	17.9	\$ 13,385	\$ 24,166	13,622	\$ 75,177	\$ 49,904	1.51
							\$ 789,848		\$ 443,645	\$ 439,271	\$ 299,684	\$ 1,972,448	\$ 1,783,277	1.11

Table 2-5, Losses Avoided Calculations (Irma)

HMA Acquisition	FFE	SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Mental Stress and Productivity Costs	Losses Avoided	Cost	Ratio
1	11.6	1128	\$ 103	0.30	\$ 116,184	13.4	\$ 15,569	8.1	\$ 9,411	\$ 2,984	13,622	\$ 41,585	\$ 105,191	0.40
2	10.5	1275	\$ 103	1.40	\$ 131,325	23.3	\$ 30,599	13.3	\$ 17,466	\$ 13,923	13,622	\$ 75,610	\$ 100,813	0.75
3	9.8	1173	\$ 103	2.10	\$ 120,819	32.1	\$ 38,783	17.9	\$ 21,627	\$ 20,885	13,622	\$ 94,916	\$ 119,194	0.80
4	10.7	1087	\$ 103	1.20	\$ 111,961	23.3	\$ 26,087	13.3	\$ 14,891	\$ 11,934	13,622	\$ 66,534	\$ 99,348	0.67
5	10.4	888	\$ 103	1.50	\$ 91,464	32.1	\$ 29,360	17.9	\$ 16,372	\$ 14,918	13,622	\$ 74,272	\$ 96,101	0.77
6	12.2	1488	\$ 103	-0.30	\$ 153,264	13.4	\$ 20,537	8.1	\$ 12,414	\$ -	-	\$ 32,952	\$ 77,092	0.43
7	11	737	\$ 103	0.90	\$ 75,911	23.3	\$ 17,687	13.3	\$ 10,096	\$ 8,951	13,622	\$ 50,356	\$ 52,225	0.96
8	11.9	734	\$ 103	0.00	\$ 75,602	13.4	\$ 10,131	8.1	\$ 6,124	\$ -	-	\$ 16,254	\$ 56,207	0.29
9	13.2	1450	\$ 103	-1.30	\$ 149,350	2.5	\$ 3,734	2.4	\$ 3,584	\$ -	-	\$ 7,318	\$ 66,358	0.11
10	11.3	1072	\$ 103	0.60	\$ 110,416	23.3	\$ 25,727	13.3	\$ 14,685	\$ 5,967	13,622	\$ 60,001	\$ 47,644	1.26
11	11.2	1159	\$ 103	0.70	\$ 119,377	23.3	\$ 27,815	13.3	\$ 15,877	\$ 6,962	13,622	\$ 64,275	\$ 60,598	1.06
12	11.3	1262	\$ 103	0.60	\$ 129,986	23.3	\$ 30,287	13.3	\$ 17,288	\$ 5,967	13,622	\$ 67,164	\$ 63,020	1.07
13	11.45	765	\$ 103	0.45	\$ 78,795	13.4	\$ 10,559	8.1	\$ 6,382	\$ 4,475	13,622	\$ 35,038	\$ 43,206	0.81
14	12.17	909	\$ 103	-0.27	\$ 93,627	13.4	\$ 12,546	8.1	\$ 7,584	\$ -	-	\$ 20,130	\$ 61,040	0.33
15	12.1	1504	\$ 103	-0.20	\$ 154,912	13.4	\$ 20,758	8.1	\$ 12,548	\$ -	-	\$ 33,306	\$ 106,340	0.31
16	11.67	1601	\$ 103	0.23	\$ 164,903	13.4	\$ 22,097	8.1	\$ 13,357	\$ 2,287	13,622	\$ 51,363	\$ 89,852	0.57
17	11.5	726	\$ 103	0.40	\$ 74,778	13.4	\$ 10,020	8.1	\$ 6,057	\$ 3,978	13,622	\$ 33,677	\$ 50,660	0.66
18	13.77	1557	\$ 103	-1.87	\$ 160,371	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 65,719	0.00
19	13.63	1009	\$ 103	-1.73	\$ 103,927	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 39,753	0.00
20	14.4	1170	\$ 103	-2.50	\$ 120,510	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 60,695	0.00
21	12.2	744	\$ 103	-0.30	\$ 76,632	13.4	\$ 10,269	8.1	\$ 6,207	\$ -	-	\$ 16,476	\$ 39,568	0.42
22	10	1128	\$ 103	1.90	\$ 116,184	32.1	\$ 37,295	17.9	\$ 20,797	\$ 18,896	13,622	\$ 90,610	\$ 126,051	0.72
23	11	726	\$ 103	0.90	\$ 74,778	23.3	\$ 17,423	13.3	\$ 9,945	\$ 8,951	13,622	\$ 49,941	\$ 48,561	1.03
24	11	1125	\$ 103	0.90	\$ 115,875	23.3	\$ 26,999	13.3	\$ 15,411	\$ 8,951	13,622	\$ 64,983	\$ 58,136	1.12
25	10.9	726	\$ 103	1.00	\$ 74,778	23.3	\$ 17,423	13.3	\$ 9,945	\$ 9,945	13,622	\$ 50,936	\$ 49,904	1.02
							\$ 461,704		\$ 268,071	\$ 149,971	\$ 217,952	\$ 1,097,697	\$ 1,783,277	0.62

Table 3-1, Acquisitions in the Woodley Road Neighborhood

	Grant type	Year or Declaration	Applicant	Address	City	Latitude	Longitude	
HMA acquisitions	1	HMGP	1271	City of Savannah	313 Linwood Dr	Savannah	31.975156	-81.140547
	2	HMGP	1042	City of Savannah	407 Linwood RD	Savannah	31.976134	-81.143744
	3	HMGP	1033	City of Savannah	132 Juniper CIR	Savannah	31.974920	-81.137751
	4	HMGP	1033	City of Savannah	130 Juniper CIR	Savannah	31.975179	-81.137708
	5	HMGP	1033	City of Savannah	128 Juniper CIR	Savannah	31.975314	-81.137595
	6	HMGP	1033	City of Savannah	126 Juniper CIR	Savannah	31.975381	-81.137366
	7	HMGP	1033	City of Savannah	124 Juniper CIR	Savannah	31.975449	-81.137132
	8	HMGP	1033	City of Savannah	312 Linwood RD	Savannah	31.975595	-81.140417
	9	HMGP	1033	City of Savannah	310 Linwood RD	Savannah	31.975550	-81.140149
	10	HMGP	1033	City of Savannah	308 Linwood RD	Savannah	31.975496	-81.139904
	11	HMGP	1033	City of Savannah	306 Linwood RD	Savannah	31.975420	-81.139645
	12	HMGP	1033	City of Savannah	304 Linwood RD	Savannah	31.975334	-81.139375
	13	HMGP	1033	City of Savannah	12405 Woodley RD	Savannah	31.975066	-81.138905
	14	HMGP	1033	City of Savannah	12403 Woodley RD	Savannah	31.975268	-81.138931
	15	HMGP	1033	City of Savannah	12401 Woodley RD	Savannah	31.975533	-81.139066
	16	HMGP	1033	City of Savannah	303 Woodley RD	Savannah	31.975679	-81.139345
	17	HMGP	1311	City of Savannah	327 Woodley RD	Savannah	31.976519	-81.142094
	18	HMGP	1033	City of Savannah	12404 Woodley RD	Savannah	31.975426	-81.138467
	19	HMGP	1033	City of Savannah	12406 Woodley RD	Savannah	31.975269	-81.138444
	20	HMGP	1033	City of Savannah	12408 Woodley RD	Savannah	31.975117	-81.138417
	21	HMGP	1033	City of Savannah	12410 Woodley RD	Savannah	31.974934	-81.138434
	22	HMGP	1033	City of Savannah	12412 Woodley RD	Savannah	31.974591	-81.138268
	23	PDM	2011	City of Savannah	12411 Woodley RD	Savannah	31.974919	-81.138673
	24	HMGP	1033	City of Savannah	12407 Woodley RD	Savannah	31.974749	-81.138848
	25	HMGP	1033	City of Savannah	303 Linwood RD	Savannah	31.974740	-81.139095
	26	HMGP	1033	City of Savannah	305 Linwood RD	Savannah	31.974833	-81.139426
	27	HMGP	1033	City of Savannah	307 Linwood RD	Savannah	31.974931	-81.139784
	28	HMGP	1033	City of Savannah	309 Linwood RD	Savannah	31.975033	-81.140036
	29	HMGP	1033	City of Savannah	311 Linwood RD	Savannah	31.975106	-81.140321
	30	HMGP	1033	City of Savannah	12402 Woodley RD	Savannah	31.975671	-81.138500
	31	HMGP	1311	City of Savannah	108 Juniper Cir	Savannah	31.974881	-81.135099

Table 3-2, FEMA's IA Housing Inspection Surveys (Matthew)

IA Housing Inspections	HWM	HWM Location	Foundation	Address	City	Ground Elevation	Matthew WSE
	0.08	First Floor	Slab	200 Block of Windsor	SAVANNAH	17	17.08
Average WSE							17.08

Table 3-3, FEMA's IA Housing Inspection Surveys (Irma)

IA Housing Inspections	HWM	HWM Location	Foundation	Address	City	Ground Elevation	Irma WSE
	0.08	First Floor	Slab	00 Block of AUSTIN DR	SAVANNAH	15	15.08
Average WSE							15.08

Table 3-4, Losses Avoided Calculations (Matthew)

HMA Acquisition	FFE	SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Mental Stress and Productivity Costs	Losses Avoided	Cost	Ratio
	1	16.9	1375	\$ 103	0.18	\$ 141,625	13.4	\$ 18,978	8.1	\$ 11,472	\$ 1,790	13,622	\$ 45,861	\$ 78,704
2	16.3	1880	\$ 103	0.78	\$ 193,640	23.3	\$ 45,118	13.3	\$ 25,754	\$ 7,757	13,622	\$ 92,251	\$ 78,440	1.18
3	16.62	1754	\$ 103	0.46	\$ 180,662	13.4	\$ 24,209	8.1	\$ 14,634	\$ 4,575	13,622	\$ 57,039	\$ 80,566	0.71
4	16.03	1768	\$ 103	1.05	\$ 182,104	23.3	\$ 42,430	13.3	\$ 24,220	\$ 10,442	13,622	\$ 90,714	\$ 68,576	1.32
5	17.25	1221	\$ 103	-0.17	\$ 125,763	13.4	\$ 16,852	8.1	\$ 10,187	\$ -	-	\$ 27,039	\$ 67,566	0.40
6	16.58	1698	\$ 103	0.50	\$ 174,894	23.3	\$ 40,750	13.3	\$ 23,261	\$ 4,973	13,622	\$ 82,606	\$ 81,564	1.01
7	17.72	1200	\$ 103	-0.64	\$ 123,600	2.5	\$ 3,090	2.4	\$ 2,966	\$ -	-	\$ 6,056	\$ 65,140	0.09
8	17.51	1306	\$ 103	-0.43	\$ 134,518	13.4	\$ 18,025	8.1	\$ 10,896	\$ -	-	\$ 28,921	\$ 93,974	0.31
9	17.18	1125	\$ 103	-0.10	\$ 115,875	13.4	\$ 15,527	8.1	\$ 9,386	\$ -	-	\$ 24,913	\$ 74,835	0.33
10	16.53	1348	\$ 103	0.55	\$ 138,844	23.3	\$ 32,351	13.3	\$ 18,466	\$ 5,470	13,622	\$ 69,909	\$ 88,512	0.79
11	16.62	1510	\$ 103	0.46	\$ 155,530	13.4	\$ 20,841	8.1	\$ 12,598	\$ 4,575	13,622	\$ 51,636	\$ 98,483	0.52
12	16.95	1637	\$ 103	0.13	\$ 168,611	13.4	\$ 22,594	8.1	\$ 13,657	\$ 1,293	13,622	\$ 51,166	\$ 84,504	0.61
13	16.38	1522	\$ 103	0.70	\$ 156,766	23.3	\$ 36,526	13.3	\$ 20,850	\$ 6,961	13,622	\$ 77,960	\$ 92,395	0.84
14	17.21	1031	\$ 103	-0.13	\$ 106,193	13.4	\$ 14,230	8.1	\$ 8,602	\$ -	-	\$ 22,831	\$ 81,463	0.28
15	17.25	1323	\$ 103	-0.17	\$ 136,269	13.4	\$ 18,260	8.1	\$ 11,038	\$ -	-	\$ 29,298	\$ 86,695	0.34
16	16.59	1393	\$ 103	0.49	\$ 143,479	13.4	\$ 19,226	8.1	\$ 11,622	\$ 4,873	13,622	\$ 49,343	\$ 93,930	0.53
17	18.6	1073	\$ 103	-1.52	\$ 110,519	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 78,215	0.00
18	15.93	1150	\$ 103	1.15	\$ 118,450	23.3	\$ 27,599	13.3	\$ 15,754	\$ 11,437	13,622	\$ 68,411	\$ 99,823	0.69
19	15.89	1421	\$ 103	1.19	\$ 146,363	23.3	\$ 34,103	13.3	\$ 19,466	\$ 11,835	13,622	\$ 79,025	\$ 79,020	1.00
20	15.84	1240	\$ 103	1.24	\$ 127,720	23.3	\$ 29,759	13.3	\$ 16,987	\$ 12,332	13,622	\$ 72,699	\$ 65,930	1.10
21	16.6	1076	\$ 103	0.48	\$ 110,828	13.4	\$ 14,851	8.1	\$ 8,977	\$ 4,774	13,622	\$ 42,224	\$ 63,586	0.66
22	17.21	1484	\$ 103	-0.13	\$ 152,852	13.4	\$ 20,482	8.1	\$ 12,381	\$ -	-	\$ 32,863	\$ 92,702	0.35
23	18.3	1454	\$ 103	-1.22	\$ 149,762	2.5	\$ 3,744	2.4	\$ 3,594	\$ -	-	\$ 7,338	\$ 136,960	0.05
24	16.75	1995	\$ 103	0.33	\$ 205,485	13.4	\$ 27,535	8.1	\$ 16,644	\$ 3,282	13,622	\$ 61,083	\$ 90,057	0.68
25	15.94	1199	\$ 103	1.14	\$ 123,497	23.3	\$ 28,775	13.3	\$ 16,425	\$ 11,337	13,622	\$ 70,159	\$ 84,257	0.83
26	16	1421	\$ 103	1.08	\$ 146,363	23.3	\$ 34,103	13.3	\$ 19,466	\$ 10,741	13,622	\$ 77,931	\$ 95,011	0.82
27	16.55	1387	\$ 103	0.53	\$ 142,861	23.3	\$ 33,287	13.3	\$ 19,001	\$ 5,271	13,622	\$ 71,180	\$ 92,498	0.77
28	17.08	1444	\$ 103	0.00	\$ 148,732	13.4	\$ 19,930	8.1	\$ 12,047	\$ -	-	\$ 31,977	\$ 96,799	0.33
29	16.83	1323	\$ 103	0.25	\$ 136,269	13.4	\$ 18,260	8.1	\$ 11,038	\$ 2,486	13,622	\$ 45,406	\$ 86,232	0.53
30	16.87	1198	\$ 103	0.21	\$ 123,394	13.4	\$ 16,535	8.1	\$ 9,995	\$ 2,088	13,622	\$ 42,240	\$ 73,904	0.57
31	19.86	1195	\$ 103	-2.78	\$ 123,085	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 86,852	0.00
							\$ 697,969		\$ 411,383	\$ 128,291	\$ 272,440	\$ 1,510,083	\$ 2,637,193	0.57

Table 3-5, Losses Avoided Calculations (Irma)

HMA Acquisition	FFE	SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Mental Stress and Productivity Costs	Losses Avoided	Cost	Ratio
1	16.9	1375	\$ 103	-1.82	\$ 141,625	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 78,704	0.00
2	16.3	1880	\$ 103	-1.22	\$ 193,640	2.5	\$ 4,841	2.4	\$ 4,647	\$ -	-	\$ 9,488	\$ 78,440	0.12
3	16.62	1754	\$ 103	-1.54	\$ 180,662	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 80,566	0.00
4	16.03	1768	\$ 103	-0.95	\$ 182,104	2.5	\$ 4,553	2.4	\$ 4,370	\$ -	-	\$ 8,923	\$ 68,576	0.13
5	17.25	1221	\$ 103	-2.17	\$ 125,763	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 67,566	0.00
6	16.58	1698	\$ 103	-1.50	\$ 174,894	2.5	\$ 4,372	2.4	\$ 4,197	\$ -	-	\$ 8,570	\$ 81,564	0.11
7	17.72	1200	\$ 103	-2.64	\$ 123,600	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 65,140	0.00
8	17.51	1306	\$ 103	-2.43	\$ 134,518	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 93,974	0.00
9	17.18	1125	\$ 103	-2.10	\$ 115,875	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 74,835	0.00
10	16.53	1348	\$ 103	-1.45	\$ 138,844	2.5	\$ 3,471	2.4	\$ 3,332	\$ -	-	\$ 6,803	\$ 88,512	0.08
11	16.62	1510	\$ 103	-1.54	\$ 155,530	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 98,483	0.00
12	16.95	1637	\$ 103	-1.87	\$ 168,611	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 84,504	0.00
13	16.38	1522	\$ 103	-1.30	\$ 156,766	2.5	\$ 3,919	2.4	\$ 3,762	\$ -	-	\$ 7,682	\$ 92,395	0.08
14	17.21	1031	\$ 103	-2.13	\$ 106,193	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 81,463	0.00
15	17.25	1323	\$ 103	-2.17	\$ 136,269	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 86,695	0.00
16	16.59	1393	\$ 103	-1.51	\$ 143,479	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 93,930	0.00
17	18.6	1073	\$ 103	-3.52	\$ 110,519	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 78,215	0.00
18	15.93	1150	\$ 103	-0.85	\$ 118,450	2.5	\$ 2,961	2.4	\$ 2,843	\$ -	-	\$ 5,804	\$ 99,823	0.06
19	15.89	1421	\$ 103	-0.81	\$ 146,363	2.5	\$ 3,659	2.4	\$ 3,513	\$ -	-	\$ 7,172	\$ 79,020	0.09
20	15.84	1240	\$ 103	-0.76	\$ 127,720	2.5	\$ 3,193	2.4	\$ 3,065	\$ -	-	\$ 6,258	\$ 65,930	0.09
21	16.6	1076	\$ 103	-1.52	\$ 110,828	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 63,586	0.00
22	17.21	1484	\$ 103	-2.13	\$ 152,852	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 92,702	0.00
23	18.3	1454	\$ 103	-3.22	\$ 149,762	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 136,960	0.00
24	16.75	1995	\$ 103	-1.67	\$ 205,485	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 90,057	0.00
25	15.94	1199	\$ 103	-0.86	\$ 123,497	2.5	\$ 3,087	2.4	\$ 2,964	\$ -	-	\$ 6,051	\$ 84,257	0.07
26	16	1421	\$ 103	-0.92	\$ 146,363	2.5	\$ 3,659	2.4	\$ 3,513	\$ -	-	\$ 7,172	\$ 95,011	0.08
27	16.55	1387	\$ 103	-1.47	\$ 142,861	2.5	\$ 3,572	2.4	\$ 3,429	\$ -	-	\$ 7,000	\$ 92,498	0.08
28	17.08	1444	\$ 103	-2.00	\$ 148,732	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 96,799	0.00
29	16.83	1323	\$ 103	-1.75	\$ 136,269	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 86,232	0.00
30	16.87	1198	\$ 103	-1.79	\$ 123,394	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 73,904	0.00
31	19.86	1195	\$ 103	-4.78	\$ 123,085	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 86,852	0.00
							\$ 41,288		\$ 39,636	\$ -	\$ -	\$ 80,924	\$ 2,637,193	0.03

Table 4-1, Acquisitions in the Wilshire Blvd Neighborhood

	Grant type	Year or Declaration	Applicant	Address	City	Latitude	Longitude	
HMA acquisitions	1	HMGP	1033	City of Savannah	18 Vineyard DR	Savannah	31.985041	-81.133375
	2	HMGP	1033	City of Savannah	16 Vineyard DR	Savannah	31.984967	-81.133700
	3	HMGP	1311	City of Savannah	6 Vineyard DR	Savannah	31.984796	-81.134902
	4	HMGP	1033	City of Savannah	113 Wilshire BLVD	Savannah	31.984087	-81.134827
	5	HMGP	1033	City of Savannah	117 Wilshire BLVD	Savannah	31.984221	-81.135236
	6	HMGP	1033	City of Savannah	110 Wilshire BLVD	Savannah	31.984325	-81.134233
	7	HMGP	1033	City of Savannah	108 Wilshire BLVD	Savannah	31.984259	-81.134008
	8	HMGP	1033	City of Savannah	209 Wilshire BLVD	Savannah	31.984729	-81.137217
	9	FMA	2004	City of Savannah	115 Wilshire Blvd	Savannah	31.984158	-81.135056
	10	HMGP	1271	City of Savannah	106 Wilshire Blvd	Savannah	31.98433	-81.133774
	11	HMGP	1271	City of Savannah	2 Wilshire Blvd	Savannah	31.984706	-81.135421

Table 4-2, FEMA's IA Housing Inspection Surveys (Matthew)

IA Housing Inspections	HWM	HWM Location	Foundation	Address	City	Ground Elevation	Matthew WSE
	0.17	First Floor	Slab	400 Block of Wilshire	SAVANNAH	23	23.17
Average WSE							23.17

Table 4-3, FEMA's IA Housing Inspection Surveys (Irma)

IA Housing Inspections	HWM	HWM Location	Foundation	Address	City	Ground Elevation	Irma WSE
	0.25	First Floor	Slab	00 Block of MONTCLAIR BLVD	SAVANNAH	20	20.25
	0.08	First Floor	Slab	00 Block of BURBANK BLVD	SAVANNAH	21	21.08
Average WSE							20.67

Table 4-4, Losses Avoided Calculations (Matthew)

HMA Acquisition	FFE	SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Mental Stress and Productivity Costs	Losses Avoided	Cost	Ratio
1	11.6	1711	\$ 103	11.57	\$ 176,233	67.2	\$ 118,429	35.7	\$ 62,915	\$ 115,064	13,622	\$ 310,029	\$ 121,274	2.56
2	11.12	1517	\$ 103	12.05	\$ 156,251	67.2	\$ 105,001	35.7	\$ 55,782	\$ 119,837	13,622	\$ 294,242	\$ 86,290	3.41
3	14.25	1320	\$ 103	8.92	\$ 135,960	67.2	\$ 91,365	35.7	\$ 48,538	\$ 88,709	13,622	\$ 242,234	\$ 80,066	3.03
4	12.8	1568	\$ 103	10.37	\$ 161,504	67.2	\$ 108,531	35.7	\$ 57,657	\$ 103,130	13,622	\$ 282,939	\$ 110,795	2.55
5	11.26	1225	\$ 103	11.91	\$ 126,175	67.2	\$ 84,790	35.7	\$ 45,044	\$ 118,445	13,622	\$ 261,901	\$ 78,942	3.32
6	12.07	1632	\$ 103	11.10	\$ 168,096	67.2	\$ 112,961	35.7	\$ 60,010	\$ 110,390	13,622	\$ 296,982	\$ 84,676	3.51
7	13.03	1304	\$ 103	10.14	\$ 134,312	67.2	\$ 90,258	35.7	\$ 47,949	\$ 100,842	13,622	\$ 252,671	\$ 79,666	3.17
8	12.21	1540	\$ 103	10.96	\$ 158,620	67.2	\$ 106,593	35.7	\$ 56,627	\$ 108,997	13,622	\$ 285,839	\$ 84,355	3.39
9	11.65	1024	\$ 103	11.52	\$ 105,472	67.2	\$ 70,877	35.7	\$ 37,654	\$ 114,566	13,622	\$ 236,719	\$ 115,694	2.05
10	12.44	1050	\$ 103	10.73	\$ 108,150	67.2	\$ 72,677	35.7	\$ 38,610	\$ 106,710	13,622	\$ 231,618	\$ 69,703	3.32
11	11.7	1202	\$ 103	11.47	\$ 123,806	67.2	\$ 83,198	35.7	\$ 44,199	\$ 114,069	13,622	\$ 255,088	\$ 74,718	3.41
							\$ 1,044,677		\$ 554,985	\$ 1,200,759	\$ 149,842	\$ 2,950,263	\$ 986,179	2.99

Table 4-5, Losses Avoided Calculations (Irma)

HMA Acquisition	FFE	SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Mental Stress and Productivity Costs	Losses Avoided	Cost	Ratio
1	11.6	1711	\$ 103	9.07	\$ 176,233	67.2	\$ 118,428.58	35.7	\$ 62,915	\$ 90,168	13,622	\$ 285,134	\$ 121,274	2.35
2	11.12	1517	\$ 103	9.55	\$ 156,251	67.2	\$ 105,000.67	35.7	\$ 55,782	\$ 94,942	13,622	\$ 269,346	\$ 86,290	3.12
3	14.25	1320	\$ 103	6.42	\$ 135,960	58.6	\$ 79,672.56	31.5	\$ 42,827	\$ 63,814	13,622	\$ 199,936	\$ 80,066	2.50
4	12.8	1568	\$ 103	7.87	\$ 161,504	67.2	\$ 108,530.69	35.7	\$ 57,657	\$ 78,234	13,622	\$ 258,044	\$ 110,795	2.33
5	11.26	1225	\$ 103	9.41	\$ 126,175	67.2	\$ 84,789.60	35.7	\$ 45,044	\$ 93,549	13,622	\$ 237,005	\$ 78,942	3.00
6	12.07	1632	\$ 103	8.60	\$ 168,096	67.2	\$ 112,960.51	35.7	\$ 60,010	\$ 85,494	13,622	\$ 272,087	\$ 84,676	3.21
7	13.03	1304	\$ 103	7.64	\$ 134,312	67.2	\$ 90,257.66	35.7	\$ 47,949	\$ 75,947	13,622	\$ 227,776	\$ 79,666	2.86
8	12.21	1540	\$ 103	8.46	\$ 158,620	67.2	\$ 106,592.64	35.7	\$ 56,627	\$ 84,102	13,622	\$ 260,944	\$ 84,355	3.09
9	11.65	1024	\$ 103	9.02	\$ 105,472	67.2	\$ 70,877.18	35.7	\$ 37,654	\$ 89,671	13,622	\$ 211,823	\$ 115,694	1.83
10	12.44	1050	\$ 103	8.23	\$ 108,150	67.2	\$ 72,676.80	35.7	\$ 38,610	\$ 81,814	13,622	\$ 206,723	\$ 69,703	2.97
11	11.7	1202	\$ 103	8.97	\$ 123,806	67.2	\$ 83,197.63	35.7	\$ 44,199	\$ 89,174	13,622	\$ 230,192	\$ 74,718	3.08
							\$ 1,032,985		\$ 549,274	\$ 926,907	\$ 149,842	\$ 2,659,008	\$ 986,179	2.70

Table 5-1, Acquisitions in the Nina Court Neighborhood

	Grant type	Year or Declaration	Applicant	Address	City	Latitude	Longitude
HMA acquisitions	1	HMGP	1033	City of Savannah	122 Chatham ST	Savannah	31.995011 -81.120268
	2	PDM	2011	City of Savannah	202 Chatham St	Savannah	31.994800 -81.119996
	3	HMGP	1033	City of Savannah	206 Chatham ST	Savannah	31.994827 -81.119601
	4	HMGP	1033	City of Savannah	210 Chatham ST	Savannah	31.994785 -81.119425
	5	HMGP	1033	City of Savannah	214 Chatham ST	Savannah	31.994745 -81.119252
	6	HMGP	1033	City of Savannah	218 Chatham ST	Savannah	31.994700 -81.119111
	7	HMGP	1033	City of Savannah	213 Wesley ST	Savannah	31.995680 -81.118820
	8	HMGP	1033	City of Savannah	210 Kandlewood DR	Savannah	31.995419 -81.119108
	9	HMGP	1033	City of Savannah	214 Kandlewood DR	Savannah	31.995331 -81.118790
	10	HMGP	1686	City of Savannah	202 Kandlewood Dr	Savannah	31.995551 -81.119557
	11	HMGP	1311	City of Savannah	3 Nina Court	Savannah	31.994023 -81.124742
	12	HMGP	1311	City of Savannah	5 Nina Court	Savannah	31.994111 -81.124491
	13	HMGP	1311	City of Savannah	7 Nina Court	Savannah	31.994088 -81.124276
	14	HMGP	1311	City of Savannah	9 Nina Court	Savannah	31.994 -81.124038
	15	HMGP	1311	City of Savannah	11 Nina Court	Savannah	31.993765 -81.123998
	16	PDM	2011	City of Savannah	16 Paradise Drive	Savannah	31.993503 -81.124285

Table 5-2, FEMA's IA Housing Inspection Surveys (Matthew)

IA Housing Inspections	HWM	HWM Location	Foundation	Address	City	Ground Elevation	Matthew WSE
	1.58	First Floor	Slab	200 Block of Wesley	SAVANNAH	10	11.58
	Average WSE						11.58

Table 5-3, FEMA's IA Housing Inspection Surveys (Irma)

IA Housing Inspections	HWM	HWM Location	Foundation	Address	City	Ground Elevation	Irma WSE
	0.08	First Floor	Slab	200 Block of CHATHAM ST	SAVANNAH	14	14.08
	0.08	First Floor	Slab	100 Block of CHATHAM ST	SAVANNAH	13	13.78
							13.93

Table 5-4, Losses Avoided Calculations (Matthew)

HMA Acquisition	FFE	SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Mental Stress and Productivity Costs	Losses Avoided	Cost	Ratio
1	13.22	975	\$ 103	-1.64	\$ 100,425	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 67,538	0.00
2	11.6	2024	\$ 103	-0.02	\$ 208,472	13.4	\$ 27,935	8.1	\$ 16,886	\$ -	-	\$ 44,821	\$ 105,060	0.43
3	12.66	1192	\$ 103	-1.08	\$ 122,776	2.5	\$ 3,069	2.4	\$ 2,947	\$ -	-	\$ 6,016	\$ 91,767	0.07
4	13.24	1913	\$ 103	-1.66	\$ 197,039	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 124,544	0.00
5	13.5	1418	\$ 103	-1.92	\$ 146,054	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 96,125	0.00
6	13.96	1392	\$ 103	-2.38	\$ 143,376	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 86,039	0.00
7	11.71	956	\$ 103	-0.13	\$ 98,468	13.4	\$ 13,195	8.1	\$ 7,976	\$ -	-	\$ 21,171	\$ 62,907	0.34
8	12.37	1189	\$ 103	-0.79	\$ 122,467	2.5	\$ 3,062	2.4	\$ 2,939	\$ -	-	\$ 6,001	\$ 61,449	0.10
9	11.6	1256	\$ 103	-0.02	\$ 129,368	13.4	\$ 17,335	8.1	\$ 10,479	\$ -	-	\$ 27,814	\$ 72,521	0.38
10	14	1225	\$ 103	-2.42	\$ 126,175	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 128,492	0.00
11	14.97	1170	\$ 103	-3.39	\$ 120,510	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 90,212	0.00
12	14.89	1372	\$ 103	-3.31	\$ 141,316	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 105,811	0.00
13	14.59	1125	\$ 103	-3.01	\$ 115,875	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 88,260	0.00
14	14.53	1500	\$ 103	-2.95	\$ 154,500	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 112,995	0.00
15	14.21	1980	\$ 103	-2.63	\$ 203,940	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 70,733	0.00
16	13.9	1394	\$ 103	-2.32	\$ 143,582	0	\$ -	0	\$ -	\$ -	-	\$ -	\$ 138,707	0.00
							\$ 64,596		\$ 41,227	\$ -	\$ -	\$ 105,823	\$ 1,503,159	0.07

Table 5-5, Losses Avoided Calculations (Irma)

HMA Acquisition	FFE	SF	BRV (\$/SF)	Depth	Building Replacement Cost (NAHB)	% structure damage	Structure damage	% content damage	Content Damage	Displacement Costs	Mental Stress and Productivity Costs	Losses Avoided	Cost	Ratio
1	13.22	975	\$ 103	0.71	\$ 100,425	23.3	\$ 23,399	13.3	\$ 13,357	\$ 7,094	13,622	\$ 57,472	\$ 67,538	0.85
2	11.6	2024	\$ 103	2.33	\$ 208,472	32.1	\$ 66,920	17.9	\$ 37,316	\$ 23,205	13,622	\$ 141,063	\$ 105,060	1.34
3	12.66	1192	\$ 103	1.27	\$ 122,776	23.3	\$ 28,607	13.3	\$ 16,329	\$ 12,663	13,622	\$ 71,221	\$ 91,767	0.78
4	13.24	1913	\$ 103	0.69	\$ 197,039	23.3	\$ 45,910	13.3	\$ 26,206	\$ 6,895	13,622	\$ 92,633	\$ 124,544	0.74
5	13.5	1418	\$ 103	0.43	\$ 146,054	13.4	\$ 19,571	8.1	\$ 11,830	\$ 4,310	13,622	\$ 49,333	\$ 96,125	0.51
6	13.96	1392	\$ 103	-0.03	\$ 143,376	13.4	\$ 19,212	8.1	\$ 11,613	\$ -	-	\$ 30,826	\$ 86,039	0.36
7	11.71	956	\$ 103	2.22	\$ 98,468	32.1	\$ 31,608	17.9	\$ 17,626	\$ 22,111	13,622	\$ 84,967	\$ 62,907	1.35
8	12.37	1189	\$ 103	1.56	\$ 122,467	32.1	\$ 39,312	17.9	\$ 21,922	\$ 15,547	13,622	\$ 90,403	\$ 61,449	1.47
9	11.6	1256	\$ 103	2.33	\$ 129,368	32.1	\$ 41,527	17.9	\$ 23,157	\$ 23,205	13,622	\$ 101,511	\$ 72,521	1.40
10	14	1225	\$ 103	-0.07	\$ 126,175	13.4	\$ 16,907	8.1	\$ 10,220	\$ -	-	\$ 27,128	\$ 128,492	0.21
11	14.97	1170	\$ 103	-1.04	\$ 120,510	2.5	\$ 3,013	2.4	\$ 2,892	\$ -	-	\$ 5,905	\$ 90,212	0.07
12	14.89	1372	\$ 103	-0.96	\$ 141,316	2.5	\$ 3,533	2.4	\$ 3,392	\$ -	-	\$ 6,924	\$ 105,811	0.07
13	14.59	1125	\$ 103	-0.66	\$ 115,875	2.5	\$ 2,897	2.4	\$ 2,781	\$ -	-	\$ 5,678	\$ 88,260	0.06
14	14.53	1500	\$ 103	-0.60	\$ 154,500	2.5	\$ 3,863	2.4	\$ 3,708	\$ -	-	\$ 7,571	\$ 112,995	0.07
15	14.21	1980	\$ 103	-0.28	\$ 203,940	13.4	\$ 27,328	8.1	\$ 16,519	\$ -	-	\$ 43,847	\$ 70,733	0.62
16	13.9	1394	\$ 103	0.03	\$ 143,582	13.4	\$ 19,240	8.1	\$ 11,630	\$ 331	13,622	\$ 44,824	\$ 138,707	0.32
							\$ 392,847		\$ 230,499	\$ 115,362	\$ 122,598	\$ 861,305	\$ 1,503,159	0.57

Table 6-1, Summary of Losses Avoided for Hurricanes Matthew and Irma

Neighborhood	Event	Structure	Contents	Displacement	MS and LP	Total	Costs
Margaret Street	Matthew	\$ 35,223	\$ 21,291	\$ -	\$ -	\$ 56,514	
	Irma	\$ 325,760	\$ 188,414	\$ 115,495	\$ 95,354	\$ 725,023	\$ 1,263,850
Bonnie Drive	Matthew	\$ 789,848	\$ 443,645	\$ 439,271	\$ 299,684	\$ 1,972,448	
	Irma	\$ 461,704	\$ 268,071	\$ 149,971	\$ 217,952	\$ 1,097,697	\$ 1,783,277
Woodley Road	Matthew	\$ 697,969	\$ 411,383	\$ 128,291	\$ 272,440	\$ 1,510,083	
	Irma	\$ 41,288	\$ 39,636	\$ -	\$ -	\$ 80,924	\$ 2,637,193
Wilshire Boulevard	Matthew	\$ 1,044,677	\$ 554,985	\$ 1,200,759	\$ 149,842	\$ 2,950,263	
	Irma	\$ 1,032,985	\$ 549,274	\$ 926,907	\$ 149,842	\$ 2,659,008	\$ 986,179
Nina Court	Matthew	\$ 64,596	\$ 41,227	\$ -	\$ -	\$ 105,823	
	Irma	\$ 392,847	\$ 230,499	\$ 115,362	\$ 122,598	\$ 861,305	\$ 1,503,159
Total		\$ 4,886,896	\$ 2,748,425	\$ 3,076,055	\$ 1,307,712	\$ 12,019,089	\$ 8,173,657

Table 6-2, Losses Avoided Ratio

Losses Avoided	\$ 12,019,089
Costs	\$ 8,173,657
Losses Avoided Ratio	1.47

Appendix B

Loss Avoidance Study - Margaret Street Neighborhood

Acquisitions in the Margaret Street Neighborhood						
Address	Grant Type	Year or Declaration	Matthew Event		Irma Event	
			Depth of Water	Ratio	Depth of Water	
2305 Margaret St	PDM	2005	-3.34	0.00	0.08	
2308 Margaret St	PDM	2005	-3.74	0.00	-0.32	
2309 Margaret St	PDM	2005	-3.74	0.00	-0.32	
2310 Margaret St	PDM	2005	-4.74	0.00	-1.32	
2311 Margaret St	PDM	2005	-1.94	0.00	1.48	
2313 Margaret St	PDM	2005	-2.04	0.00	1.38	
2320 Margaret St	PDM	2005	-1.94	0.00	1.48	
2322 Margaret St	PDM	2005	-4.24	0.00	-0.82	
2328 Margaret St	PDM	2005	-0.34	0.25	3.08	
2316 Margaret St	PDM	2005	-2.54	0.00	0.88	
2315 Margaret St	HMGP	1042	-0.21	0.37	3.21	
Overall Losses Avoided Ratio Per Event					0.04	0.57

FEMA's IA Housing Inspection Surveys							
Address	Foundation	Ground Elevation	Matthew Event		Irma Event		WSE
			HWM	WSE	HWM	WSE	
2600 Block of EVERGREEN AVE	Slab	10			0.08	0.08	10.08
2300 Block of E 42ND ST	Slab	10			0.08	0.08	10.08
2400 Block of 39TH ST	Slab	6	0.83	6.83			
2400 Block of 39TH ST	Slab	6	0.50	6.50			

IA Study Sites - MATTHEW (Arrow icon)

IA Study Sites - IRMA (Arrow icon)

Acquisitions (Red X icon)

Flood Hazard Zones

- 1% Annual Chance Flood Hazard (Light Blue)
- Regulatory Floodway (Light Blue)
- Special Floodway (Light Blue)
- Area of Undetermined Flood Hazard (Yellow)
- 0.2% Annual Chance Flood Hazard (Orange)
- Future Conditions 1% Annual Chance Flood Hazard (Dark Orange)
- Area with Reduced Risk Due to Levee (Dark Orange)

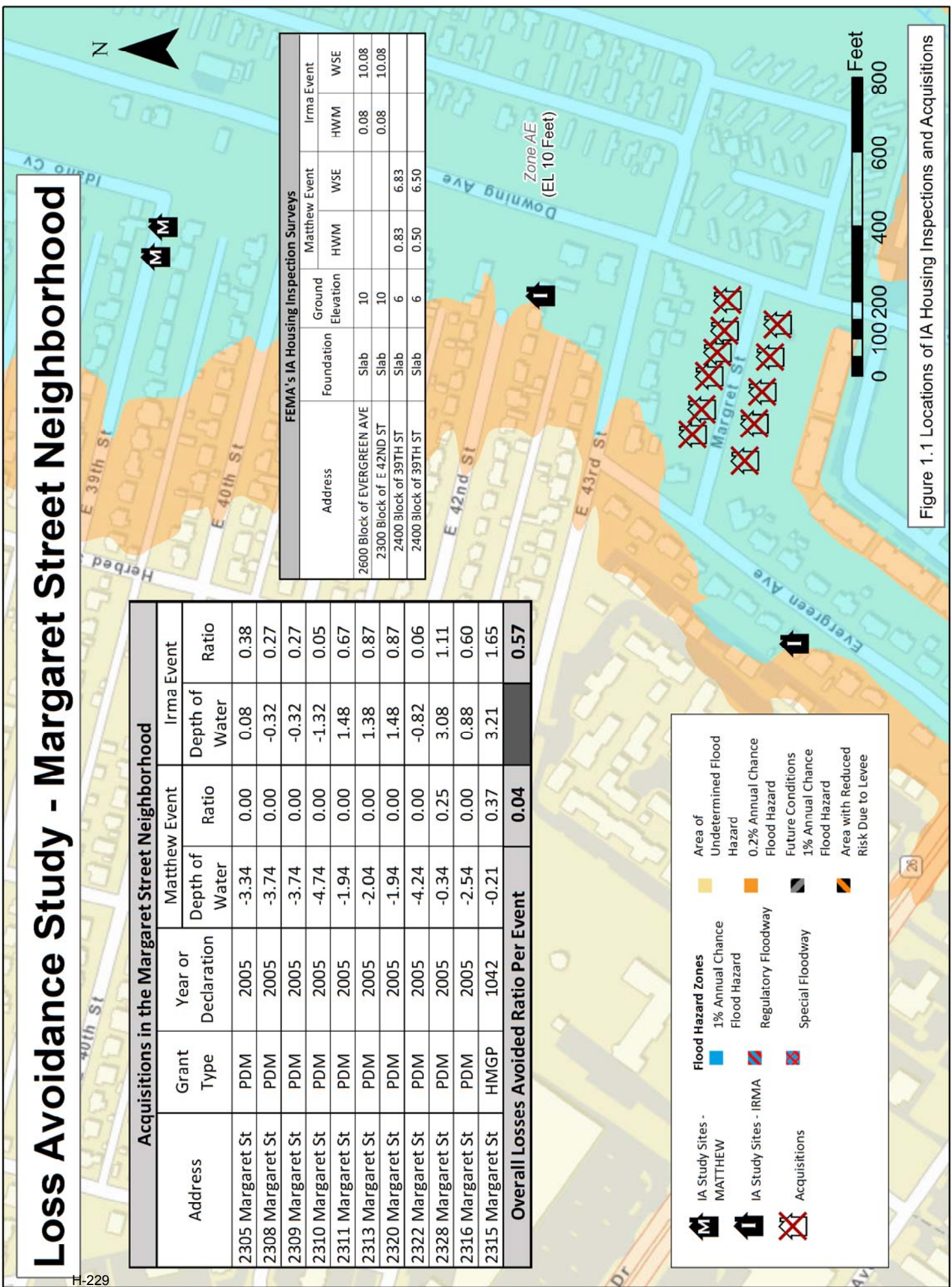


Figure 1.1 Locations of IA Housing Inspections and Acquisitions

Loss Avoidance Study - Bonnie Drive Neighborhood

Acquisitions in the Bonnie Drive Neighborhood						
Address	Grant Type	Year or Declaration	Matthew Event		Irma Event	
			Depth of Water	Ratio	Depth of Water	Ratio
2402 E Derenne Ave	HMGP	1761	1.7	0.85	0.3	0.40
2302 E. Derenne Ave	HMGP	1686	2.8	1.22	1.4	0.75
2306 E. Derenne Ave	HMGP	1686	3.5	1.15	2.1	0.80
2310 E. Derenne Ave	HMGP	1686	2.6	1.10	1.2	0.67
2312 E. Derenne Ave	HMGP	1686	2.9	1.04	1.5	0.77
2304 Vicksburg DR	HMGP	1033	1.1	1.05	-0.3	0.43
2313 Vicksburg DR	HMGP	1033	2.3	1.43	0.9	0.96
2309 Vicksburg DR	HMGP	1033	1.4	0.99	0.0	0.29
2401 Vicksburg DR	HMGP	1033	0.1	0.71	-1.3	0.11
5310 Bonnie DR	HMGP	1033	2.0	1.87	0.6	1.26
5314 Bonnie DR	HMGP	1033	2.1	1.56	0.7	1.06
5318 Bonnie DR	HMGP	1033	2.0	1.57	0.6	1.07
5322 Bonnie DR	HMGP	1033	1.9	1.66	0.5	0.81
5326 Bonnie DR	HMGP	1033	1.2	0.97	-0.3	0.33
5 La Roche CT	HMGP	1033	1.2	0.78	-0.2	0.31
6 La Roche CT	HMGP	1033	1.7	1.25	0.2	0.57
2417 Vicksburg DR	HMGP	1033	1.8	1.37	0.4	0.66
2415 Vicksburg DR	HMGP	1033	-0.4	0.52	-1.9	0.00
2409 Vicksburg DR	HMGP	1033	-0.3	0.56	-1.7	0.00
2405 Vicksburg DR	HMGP	1033	-1.1	0.10	-2.5	0.00
5321 Bonnie DR	HMGP	1033	1.1	1.34	-0.3	0.42
5317 Bonnie DR	PDM	2007	3.3	0.94	1.9	0.72
5313 Bonnie DR	HMGP	1033	2.3	1.53	0.9	1.03
5309 Bonnie DR	HMGP	1033	2.3	1.63	0.9	1.12
5305 Bonnie DR	HMGP	1033	2.4	1.51	1.0	1.02
Overall Losses Avoided Ratio Per Event			1.11		0.62	

Legend:

- IA Study Sites - MATTHEW: Upward arrow symbol
- IA Study Sites - IRMA: Downward arrow symbol
- Acquisitions: Red 'X' symbol
- Flood Hazard Zones:
 - 1% Annual Chance Flood Hazard: Yellow square
 - 0.2% Annual Chance Flood Hazard: Orange square
 - Regulatory Floodway: Blue hatched square
 - Special Floodway: Red hatched square
- Area of Undetermined Flood Hazard: Yellow square with diagonal line
- Future Conditions 1% Annual Chance Flood Hazard: Orange square with diagonal line
- Area with Reduced Risk Due to Levee: Black square with diagonal line

Address	Foundation	Ground Elevation	Matthew Event		Irma Event	
			HWM	WSE	HWM	WSE
5100 Block of LAROCHE AVE	Slab	11			0.67	11.67
2200 Block of VICKSBURG DR	Slab	12			0.25	12.95
2500 Block of OAK FOREST DR	Slab	11			0.08	11.08
4900 Block of LaRoche	Slab	13	0.33	13.33		



AREA OF MINIMAL FLOOD HAZARD ZONE X

Figure 2.1 Locations of IA Housing Inspections and Acquisitions

Loss Avoidance Study - Woodley Rd Neighborhood

Legend

- IA Study Sites - MATTHEW: House icon with 'M'
- IA Study Sites - IRMA: House icon with 'I'
- Acquisitions: House icon with 'X'
- Flood Hazard Zones:
 - 1% Annual Chance Flood Hazard: Yellow square
 - 0.2% Annual Chance Flood Hazard: Orange square
 - Future Conditions 1% Annual Chance Flood Hazard: Light blue square
 - Area with Undetermined Flood Hazard: Yellow square with diagonal lines
- Regulatory Floodway: Blue wavy line
- Special Floodway: Blue wavy line with diagonal lines
- Area with Reduced Risk Due to Levee: Yellow square with diagonal lines



Address	Grant Type	Year of Declaration	Matthew Event		Irma Event		
			Depth of Water	Ratio	Depth of Water	Ratio	
313 Linwood Dr	HMG	1271	0.2	0.58	-1.8	0.00	
407 Linwood RD	HMG	1042	0.8	1.18	-1.2	0.12	
132 Juniper CIR	HMG	1033	0.5	0.71	-1.5	0.00	
130 Juniper CIR	HMG	1033	1.1	1.32	-0.9	0.13	
128 Juniper CIR	HMG	1033	-0.2	0.40	-2.2	0.00	
126 Juniper CIR	HMG	1033	0.5	1.01	-1.5	0.11	
124 Juniper CIR	HMG	1033	-0.6	0.09	-2.6	0.00	
312 Linwood RD	HMG	1033	-0.4	0.31	-2.4	0.00	
310 Linwood RD	HMG	1033	-0.1	0.33	-2.1	0.00	
308 Linwood RD	HMG	1033	0.5	0.79	-1.4	0.08	
306 Linwood RD	HMG	1033	0.5	0.52	-1.5	0.00	
304 Linwood RD	HMG	1033	0.1	0.61	-1.9	0.00	
12405 Woodley RD	HMG	1033	0.7	0.84	-1.3	0.08	
12403 Woodley RD	HMG	1033	-0.1	0.28	-2.1	0.00	
12401 Woodley RD	HMG	1033	-0.2	0.34	-2.2	0.00	
303 Woodley RD	HMG	1033	0.5	0.53	-1.5	0.00	
327 Woodley RD	HMG	1311	-1.5	0.00	-3.5	0.00	
12404 Woodley RD	HMG	1033	1.2	0.69	-0.8	0.06	
12406 Woodley RD	HMG	1033	1.2	1.00	-0.8	0.09	
12408 Woodley RD	HMG	1033	1.2	1.10	-0.8	0.09	
12410 Woodley RD	HMG	1033	0.5	0.66	-1.5	0.00	
12412 Woodley RD	HMG	1033	-0.1	0.35	-2.1	0.00	
12411 Woodley RD	PDM	2011	-1.2	0.05	-3.2	0.00	
12407 Woodley RD	HMG	1033	0.3	0.68	-1.7	0.00	
305 Linwood RD	HMG	1033	1.1	0.83	-0.9	0.07	
303 Linwood RD	HMG	1033	1.1	0.82	-0.9	0.08	
307 Linwood RD	HMG	1033	0.5	0.77	-1.5	0.08	
309 Linwood RD	HMG	1033	0.0	0.33	-2.0	0.00	
311 Linwood RD	HMG	1033	0.3	0.53	-1.7	0.00	
12402 Woodley RD	HMG	1033	0.2	0.57	-1.8	0.00	
108 Juniper Cir	HMG	1311	-2.8	0.00	-4.8	0.00	
Overall Losses Avoided Ratio Per Event							0.57

Address	Matthew Event		Irma Event	
	Foundation	Ground Elevation	Foundation	Ground Elevation
00 Block of AUSTIN DR	Slab	15	Slab	15.08
200 Block of Windsor	Slab	17	Slab	17.08

Figure 3.1 Locations of IA Housing Inspections and Acquisitions

Loss Avoidance Study - Wilshire Blvd Neighborhood

Legend

- IA Study Sites - MATTHEW:
- IA Study Sites - IRMA:
- Acquisitions:
- Flood Hazard Zones:
 - 1% Annual Chance Flood Hazard:
 - Regulatory Floodway:
 - Special Floodway:
- Area of Undetermined Flood Hazard:
- 0.2% Annual Chance Flood Hazard:
- Future Conditions 1% Annual Chance Flood Hazard:
- Area with Reduced Risk Due to Levee:



AREA OF MINIMAL FLOOD HAZARD Zone X

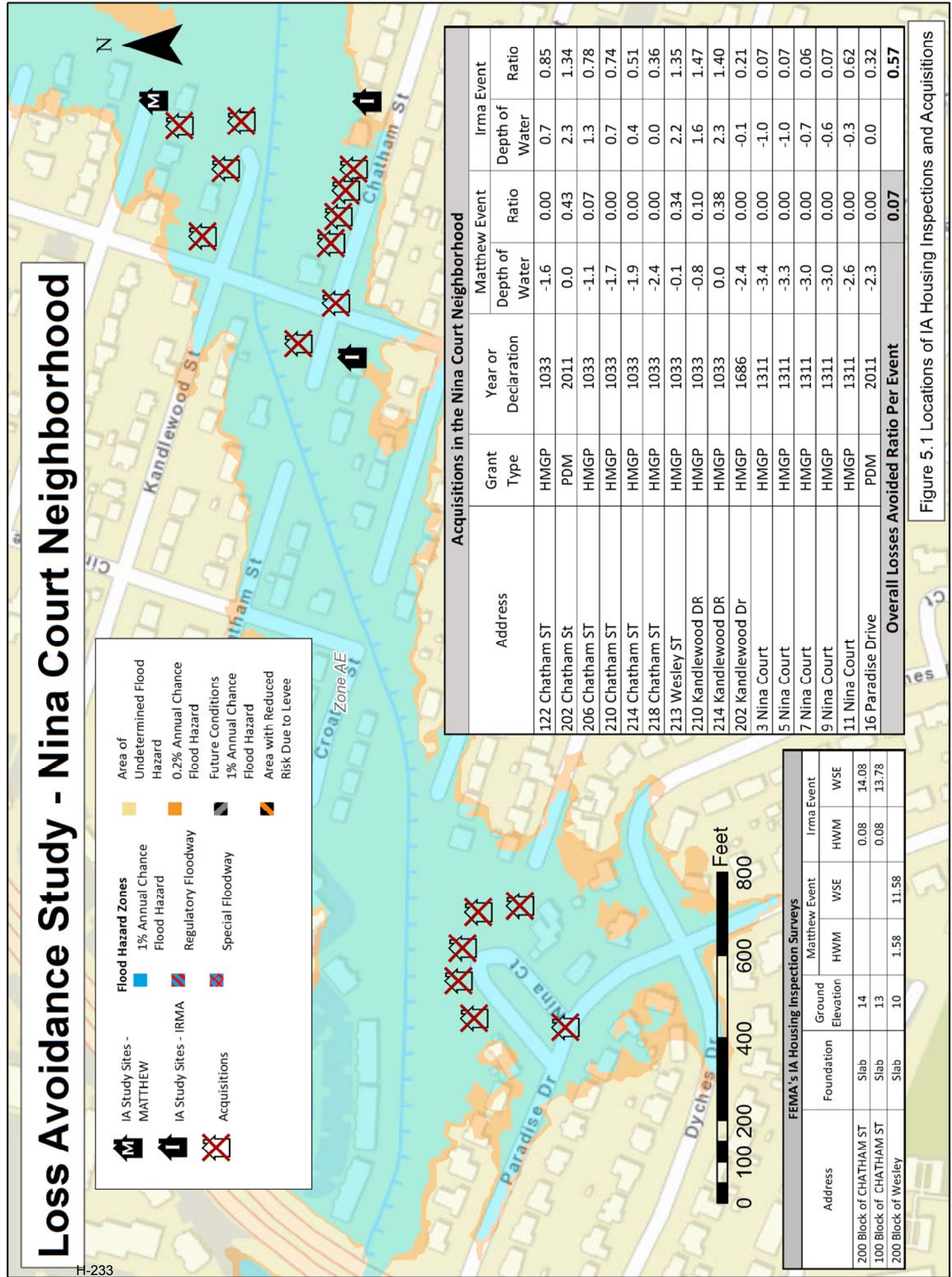
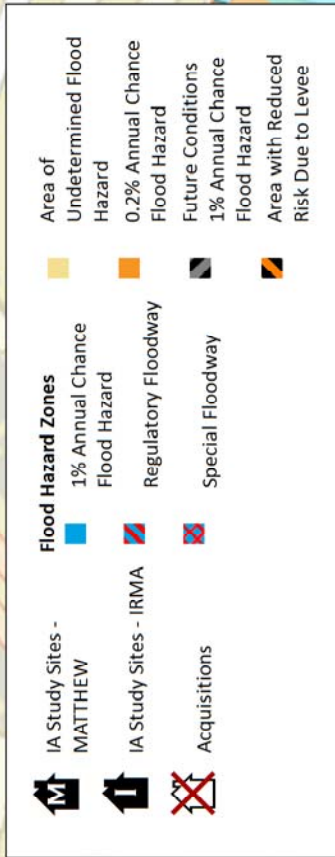
Acquisitions in the Wilshire Blvd. Neighborhood			
Address	Grant Type	Year or Declaration	Irma Event
18 Vineyard DR	HMGp	1033	Depth of Water: 9.1, Ratio: 2.35
16 Vineyard DR	HMGp	1033	Depth of Water: 9.5, Ratio: 3.12
6 Vineyard DR	HMGp	1311	Depth of Water: 6.4, Ratio: 2.50
113 Wilshire Blvd	HMGp	1033	Depth of Water: 7.9, Ratio: 2.33
117 Wilshire Blvd	HMGp	1033	Depth of Water: 9.4, Ratio: 3.00
110 Wilshire Blvd	HMGp	1033	Depth of Water: 8.6, Ratio: 3.21
108 Wilshire Blvd	HMGp	1033	Depth of Water: 7.6, Ratio: 2.86
209 Wilshire Blvd	HMGp	1033	Depth of Water: 8.5, Ratio: 3.09
115 Wilshire Blvd	FMA	2004	Depth of Water: 9.0, Ratio: 1.83
106 Wilshire Blvd	HMGp	1271	Depth of Water: 8.2, Ratio: 2.97
2 Wilshire Blvd	HMGp	1271	Depth of Water: 9.0, Ratio: 3.08
Overall Losses Avoided Ratio Per Event			2.99

FEMA's IA Housing Inspection Surveys

Address	Foundation	Ground Elevation	Matthew Event		Irma Event	
			HWM	WSE	HWM	WSE
00 Block of MONTCLAIR BLVD	Slab	20			0.25	20.25
00 Block of BURBANK BLVD	Slab	21			0.08	21.08
400 Block of Wilshire	Slab	23	0.17	23.17		

Figure 4.1 Locations of IA Housing Inspections and Acquisitions

Loss Avoidance Study - Nina Court Neighborhood



Acquisitions in the Nina Court Neighborhood						
Address	Grant Type	Year or Declaration	Depth of Water	Ratio	Irma Event	Ratio
122 Chatham ST	HMGp	1033	-1.6	0.00	0.7	0.85
202 Chatham St	PDM	2011	0.0	0.43	2.3	1.34
206 Chatham ST	HMGp	1033	-1.1	0.07	1.3	0.78
210 Chatham ST	HMGp	1033	-1.7	0.00	0.7	0.74
214 Chatham ST	HMGp	1033	-1.9	0.00	0.4	0.51
218 Chatham ST	HMGp	1033	-2.4	0.00	0.0	0.36
213 Wesley ST	HMGp	1033	-0.1	0.34	2.2	1.35
210 Kandlewood DR	HMGp	1033	-0.8	0.10	1.6	1.47
214 Kandlewood DR	HMGp	1033	0.0	0.38	2.3	1.40
202 Kandlewood Dr	HMGp	1686	-2.4	0.00	-0.1	0.21
3 Nina Court	HMGp	1311	-3.4	0.00	-1.0	0.07
5 Nina Court	HMGp	1311	-3.3	0.00	-1.0	0.07
7 Nina Court	HMGp	1311	-3.0	0.00	-0.7	0.06
9 Nina Court	HMGp	1311	-3.0	0.00	-0.6	0.07
11 Nina Court	HMGp	1311	-2.6	0.00	-0.3	0.62
16 Paradise Drive	PDM	2011	-2.3	0.00	0.0	0.32
Overall Losses Avoided Ratio Per Event				0.07	0.57	

Address	Ground Elevation		Matthew Event		Irma Event	
	Foundation	Slab	HWM	WSE	HWM	WSE
200 Block of CHATHAM ST	Slab	14	0.08	14.08	0.08	13.78
100 Block of CHATHAM ST	Slab	13	0.08	13.78		
200 Block of Wesley	Slab	10	1.58	11.58		

Figure 5.1 Locations of IA Housing Inspections and Acquisitions

Disaster or Year	Project Number	Funding Source	Applicant	ADDRESS	GMIS ID	Mitigation Action	Date Mitigated	Cost	Loss Avoided Date	Loss Avoided Amount	Return on Investment
1033	1	HMGP	City of Newton	180 S Main St	65	Acquisition	10/03/95	\$21,790	1/4/2016	\$76,072	3.49
1033	1	HMGP	City of Newton	154 S Main St	67	Acquisition	09/11/96	\$18,821	1/4/2016	\$42,339	2.25
1033	1	HMGP	City of Newton	156 S Main St	93	Acquisition	09/20/96	\$4,036	1/4/2016	\$50,558	12.53
1033	13	HMGP	Baker County	568 N Main St	1059	Acquisition	11/21/96	\$17,614	1/4/2016	\$45,529	2.58
1033	13	HMGP	Baker County	568 N Main St	1060	Acquisition	11/21/96	\$17,614	1/4/2016	\$87,003	4.94
1033	4	HMGP	Dougherty County	162 (160) Lovers Ln Rd	10	Acquisition	05/10/96	\$63,699	1/4/2016	\$181,677	2.85
1033	4	HMGP	Dougherty County	2700 Robinson's Pnt Dr	13	Acquisition	01/08/96	\$72,960	1/4/2016	\$170,485	2.34
1033	4	HMGP	Dougherty County	2418 Cherry Laurel Ln	23	Acquisition	06/03/96	\$7,201	1/4/2016	\$114,283	15.87
1033	22	HMGP	City of Albany	408 Cherry Ave	937	Acquisition	05/26/99	\$14,079	1/4/2016	\$70,267	4.99
1033	22	HMGP	City of Albany	408 Corn Ave	938	Acquisition	06/16/98	\$10,086	1/4/2016	\$99,003	9.82
1033	22	HMGP	City of Albany	409 Cherry Ave	939	Acquisition	08/06/96	\$12,400	1/4/2016	\$83,944	6.77
1033	22	HMGP	City of Albany	411 Cherry Ave	941	Acquisition	08/06/96	\$12,899	1/4/2016	\$93,368	7.24
1033	22	HMGP	City of Albany	412 Cherry Ave	943	Acquisition	07/06/99	\$13,607	1/4/2016	\$101,300	7.44
1033	22	HMGP	City of Albany	413 Cherry St	944	Acquisition	08/06/96	\$6,262	1/4/2016	\$62,879	10.04
1033	22	HMGP	City of Albany	414 Cherry Ave	946	Acquisition	09/10/98	\$15,740	1/4/2016	\$103,435	6.57
1033	22	HMGP	City of Albany	414 Corn Ave	947	Acquisition	07/27/99	\$35,769	1/4/2016	\$140,315	3.92
1033	22	HMGP	City of Albany	416 Cherry Ave	949	Acquisition	08/20/96	\$8,192	1/4/2016	\$143,612	17.53
1033	22	HMGP	City of Albany	417 Cherry Ave	950	Acquisition	05/08/96	\$31,431	1/4/2016	\$112,662	3.58
1033	22	HMGP	City of Albany	420 Corn Ave	953	Acquisition	07/21/98	\$12,293	1/4/2016	\$167,640	13.64
1033	22	HMGP	City of Albany	421 Cherry Ave	954	Acquisition	04/29/99	\$8,891	1/4/2016	\$135,814	15.28
1033	22	HMGP	City of Albany	423 Cherry Ave	956	Acquisition	05/25/99	\$36,666	1/4/2016	\$120,547	3.29
1033	22	HMGP	City of Albany	423 Holloway Ave	957	Acquisition	08/12/97	\$50,273	1/4/2016	\$150,137	2.99
1033	22	HMGP	City of Albany	425 Cherry Ave	958	Acquisition	05/15/96	\$11,370	1/4/2016	\$130,249	11.46
1033	22	HMGP	City of Albany	428 Cherry Ave	962	Acquisition	09/23/96	\$13,874	1/4/2016	\$121,759	8.78
1311	1	HMGP	Lee County	100 Creekside Pl	348	Acquisition	11/1/2011	\$89,331	12/26/2015	\$126,147	1.41
1311	1	HMGP	Lee County	284 Cypress Point Cir	362	Acquisition	10/1/2000	\$54,570	12/26/2015	\$291,892	5.35
1311	1	HMGP	Lee County	316 Cypress Point Cir	364	Acquisition	12/1/2000	\$99,331	12/26/2015	\$251,686	2.53
1311	1	HMGP	Lee County	726 Creekside Dr	368	Acquisition	4/1/2002	\$141,608	12/26/2015	\$58,731	0.41
1311	1	HMGP	Lee County	730 Creekside Dr	369	Acquisition	4/1/2001	\$190,731	12/26/2015	\$77,812	0.41
1033	199	HMGP	Lee County	540 Creekside Dr	418	Acquisition	11/1/1999	\$47,232	12/26/2015	\$232,692	4.93
1033	199	HMGP	Lee County	618 Creekside Dr	419	Acquisition	12/1/2000	\$155,226	12/26/2015	\$87,969	0.57
1033	199	HMGP	Lee County	626 Creekside Dr	420	Acquisition	10/1/2000	\$108,434	12/26/2015	\$204,017	1.88
1033	199	HMGP	Lee County	710 Creekside Dr	421	Acquisition	4/16/2003	\$8,275	12/26/2015	\$143,522	17.34
1033	199	HMGP	Lee County	780 Creekside Dr	422	Acquisition	12/1/2000	\$115,238	12/26/2015	\$168,787	1.46
1033	9	HMGP	Lee County	634 Creekside Dr	997	Acquisition	12/21/1995	\$31,375	12/26/2015	\$106,412	3.39
1033	9	HMGP	Lee County	754 Northampton Rd	998	Acquisition	12/7/1995	\$78,550	12/26/2015	\$283,254	3.61
1033	9	HMGP	Lee County	646 Lovers Lane Rd	1001	Acquisition	3/13/1996	\$37,910	12/26/2015	\$112,199	2.96
1033	9	HMGP	Lee County	796 Northampton Rd	1002	Acquisition	1/12/1996	\$71,590	12/26/2015	\$168,613	2.36
1033	9	HMGP	Lee County	109 Creekside Place	1003	Acquisition	12/19/1995	\$69,790	12/26/2015	\$49,263	0.71
1033	9	HMGP	Lee County	759 Northampton Rd	1005	Acquisition	12/11/1995	\$18,400	12/26/2015	\$229,207	12.46
Totals								\$1,835,160		\$5,197,082	2.83

Information from FEMA Loss Avoidance Study

Disaster or Year	Project Number	Funding Source	Applicant	ADDRESS	Mitigation Action	Cost	Loss Avoided Date	Loss Avoided Amount	Return on Investment
2005	7	PDM	City of Savannah	2328 Margaret St	Acquisition	\$ 110,324	10/3/2016	\$ 27,128	0.25
1042	3	HMG	City of Savannah	2315 Margaret ST	Acquisition	\$ 78,877	10/3/2016	\$ 29,386	0.37
1761	14	HMG	City of Savannah	2402 E Derenne Ave	Acquisition	\$ 105,191	10/3/2016	\$ 88,919	0.85
1686	8	HMG	City of Savannah	2302 E. Derenne Ave	Acquisition	\$ 100,813	10/3/2016	\$ 123,319	1.22
1686	8	HMG	City of Savannah	2306 E. Derenne Ave	Acquisition	\$ 119,194	10/3/2016	\$ 136,684	1.15
1686	8	HMG	City of Savannah	2310 E. Derenne Ave	Acquisition	\$ 99,348	10/3/2016	\$ 109,305	1.10
1033	196	HMG	City of Savannah	2312 E. Derenne Ave	Acquisition	\$ 96,101	10/3/2016	\$ 99,560	1.04
1033	196	HMG	City of Savannah	2304 Vicksburg DR	Acquisition	\$ 77,092	10/3/2016	\$ 80,954	1.05
1033	196	HMG	City of Savannah	2313 Vicksburg DR	Acquisition	\$ 52,225	10/3/2016	\$ 74,749	1.43
1033	196	HMG	City of Savannah	2309 Vicksburg DR	Acquisition	\$ 56,207	10/3/2016	\$ 55,514	0.99
1033	196	HMG	City of Savannah	2401 Vicksburg DR	Acquisition	\$ 66,358	10/3/2016	\$ 47,025	0.71
1033	196	HMG	City of Savannah	5310 Bonnie DR	Acquisition	\$ 47,644	10/3/2016	\$ 89,018	1.87
1033	196	HMG	City of Savannah	5314 Bonnie DR	Acquisition	\$ 60,598	10/3/2016	\$ 94,493	1.56
1033	196	HMG	City of Savannah	5318 Bonnie DR	Acquisition	\$ 63,020	10/3/2016	\$ 98,803	1.57
1033	196	HMG	City of Savannah	5322 Bonnie DR	Acquisition	\$ 43,206	10/3/2016	\$ 71,716	1.66
1033	196	HMG	City of Savannah	5326 Bonnie DR	Acquisition	\$ 61,040	10/3/2016	\$ 59,426	0.97
1033	196	HMG	City of Savannah	5 La Roche CT	Acquisition	\$ 106,340	10/3/2016	\$ 82,552	0.78
1033	196	HMG	City of Savannah	6 La Roche CT	Acquisition	\$ 89,852	10/3/2016	\$ 112,582	1.25
1033	196	HMG	City of Savannah	2417 Vicksburg DR	Acquisition	\$ 50,660	10/3/2016	\$ 69,210	1.37
1033	196	HMG	City of Savannah	2415 Vicksburg DR	Acquisition	\$ 65,719	10/3/2016	\$ 34,480	0.52
1033	196	HMG	City of Savannah	2409 Vicksburg DR	Acquisition	\$ 39,753	10/3/2016	\$ 22,344	0.56
1033	196	HMG	City of Savannah	2405 Vicksburg DR	Acquisition	\$ 60,695	10/3/2016	\$ 5,905	0.10
1033	196	HMG	City of Savannah	5321 Bonnie DR	Acquisition	\$ 39,568	10/3/2016	\$ 52,907	1.34
2007	2	PDM	City of Savannah	5317 Bonnie DR	Acquisition	\$ 126,051	10/3/2016	\$ 118,889	0.94
1033	196	HMG	City of Savannah	5313 Bonnie DR	Acquisition	\$ 48,561	10/3/2016	\$ 74,183	1.53
1033	196	HMG	City of Savannah	5309 Bonnie DR	Acquisition	\$ 58,136	10/3/2016	\$ 94,731	1.63
1033	196	HMG	City of Savannah	5305 Bonnie DR	Acquisition	\$ 49,904	10/3/2016	\$ 75,177	1.51
1271	4	HMG	City of Savannah	313 Linwood Dr	Acquisition	\$ 78,704	10/3/2016	\$ 45,861	0.58
1042	3	HMG	City of Savannah	407 Linwood RD	Acquisition	\$ 78,440	10/3/2016	\$ 92,251	1.18
1033	196	HMG	City of Savannah	132 Juniper CIR	Acquisition	\$ 80,566	10/3/2016	\$ 57,039	0.71
1033	196	HMG	City of Savannah	130 Juniper CIR	Acquisition	\$ 68,576	10/3/2016	\$ 90,714	1.32
1033	196	HMG	City of Savannah	128 Juniper CIR	Acquisition	\$ 67,566	10/3/2016	\$ 27,039	0.40
1033	196	HMG	City of Savannah	126 Juniper CIR	Acquisition	\$ 81,564	10/3/2016	\$ 82,606	1.01
1033	196	HMG	City of Savannah	124 Juniper CIR	Acquisition	\$ 65,140	10/3/2016	\$ 6,056	0.09
1033	196	HMG	City of Savannah	312 Linwood RD	Acquisition	\$ 93,974	10/3/2016	\$ 28,921	0.31

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Disaster or Year	Project Number	Funding Source	Applicant	ADDRESS	Mitigation Action	Cost	Loss Avoided Date	Loss Avoided Amount	Return on Investment
1033	196	HMGP	City of Savannah	310 Linwood RD	Acquisition	\$ 74,835	10/3/2016	\$ 24,913	0.33
1033	196	HMGP	City of Savannah	308 Linwood RD	Acquisition	\$ 88,512	10/3/2016	\$ 69,909	0.79
1033	196	HMGP	City of Savannah	306 Linwood RD	Acquisition	\$ 98,483	10/3/2016	\$ 51,636	0.52
1033	196	HMGP	City of Savannah	304 Linwood RD	Acquisition	\$ 84,504	10/3/2016	\$ 51,166	0.61
1033	196	HMGP	City of Savannah	12405 Woodley RD	Acquisition	\$ 92,395	10/3/2016	\$ 77,960	0.84
1033	196	HMGP	City of Savannah	12403 Woodley RD	Acquisition	\$ 81,463	10/3/2016	\$ 22,831	0.28
1033	196	HMGP	City of Savannah	12401 Woodley RD	Acquisition	\$ 86,695	10/3/2016	\$ 29,298	0.34
1033	196	HMGP	City of Savannah	303 Woodley RD	Acquisition	\$ 93,930	10/3/2016	\$ 49,343	0.53
1033	196	HMGP	City of Savannah	12404 Woodley RD	Acquisition	\$ 99,823	10/3/2016	\$ 68,411	0.69
1033	196	HMGP	City of Savannah	12406 Woodley RD	Acquisition	\$ 79,020	10/3/2016	\$ 79,025	1.00
1033	196	HMGP	City of Savannah	12408 Woodley RD	Acquisition	\$ 65,930	10/3/2016	\$ 72,699	1.10
1033	196	HMGP	City of Savannah	12410 Woodley RD	Acquisition	\$ 63,586	10/3/2016	\$ 42,224	0.66
1033	196	HMGP	City of Savannah	12412 Woodley RD	Acquisition	\$ 92,702	10/3/2016	\$ 32,863	0.35
2011	3	PDM	City of Savannah	12411 Woodley RD	Acquisition	\$ 136,960	10/3/2016	\$ 7,338	0.05
1033	196	HMGP	City of Savannah	12407 Woodley RD	Acquisition	\$ 90,057	10/3/2016	\$ 61,083	0.68
1033	196	HMGP	City of Savannah	303 Linwood RD	Acquisition	\$ 84,257	10/3/2016	\$ 70,159	0.83
1033	196	HMGP	City of Savannah	305 Linwood RD	Acquisition	\$ 95,011	10/3/2016	\$ 77,931	0.82
1033	196	HMGP	City of Savannah	307 Linwood RD	Acquisition	\$ 92,498	10/3/2016	\$ 71,180	0.77
1033	196	HMGP	City of Savannah	309 Linwood RD	Acquisition	\$ 96,799	10/3/2016	\$ 31,977	0.33
1033	196	HMGP	City of Savannah	311 Linwood RD	Acquisition	\$ 86,232	10/3/2016	\$ 45,406	0.53
1033	196	HMGP	City of Savannah	12402 Woodley RD	Acquisition	\$ 73,904	10/3/2016	\$ 42,240	0.57
1033	196	HMGP	City of Savannah	18 Vineyard DR	Acquisition	\$ 121,274	10/3/2016	\$ 310,029	2.56
1033	196	HMGP	City of Savannah	16 Vineyard DR	Acquisition	\$ 86,290	10/3/2016	\$ 294,242	3.41
1311	7	HMGP	City of Savannah	6 Vineyard DR	Acquisition	\$ 80,066	10/3/2016	\$ 242,234	3.03
1033	196	HMGP	City of Savannah	113 Wilshire BLVD	Acquisition	\$ 110,795	10/3/2016	\$ 282,939	2.55
1033	196	HMGP	City of Savannah	117 Wilshire BLVD	Acquisition	\$ 78,942	10/3/2016	\$ 261,901	3.32
1033	196	HMGP	City of Savannah	110 Wilshire BLVD	Acquisition	\$ 84,676	10/3/2016	\$ 296,982	3.51
1033	196	HMGP	City of Savannah	108 Wilshire BLVD	Acquisition	\$ 79,666	10/3/2016	\$ 252,671	3.17
1033	196	HMGP	City of Savannah	209 Wilshire BLVD	Acquisition	\$ 84,355	10/3/2016	\$ 285,839	3.39
2004	2	FMA	City of Savannah	115 Wilshire Blvd	Acquisition	\$ 115,694	10/3/2016	\$ 236,719	2.05
1271	4	HMGP	City of Savannah	106 Wilshire Blvd	Acquisition	\$ 69,703	10/3/2016	\$ 231,618	3.32
1271	4	HMGP	City of Savannah	2 Wilshire Blvd	Acquisition	\$ 74,718	10/3/2016	\$ 255,088	3.41
2011	3	PDM	City of Savannah	202 Chatham St	Acquisition	\$ 105,060	10/3/2016	\$ 44,821	0.43
1033	196	HMGP	City of Savannah	206 Chatham St	Acquisition	\$ 91,767	10/3/2016	\$ 6,016	
1033	196	HMGP	City of Savannah	213 Wesley ST	Acquisition	\$ 62,907	10/3/2016	\$ 21,171	0.34
1033	196	HMGP	City of Savannah	210 Kandlewood DR	Acquisition	\$ 61,449	10/3/2016	\$ 6,001	0.10

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Disaster or Year	Project Number	Funding Source	Applicant	ADDRESS	Mitigation Action	Cost	Loss Avoided Date	Loss Avoided Amount	Return on Investment
1033	196	HMGF	City of Savannah	214 Kandlewood DR	Acquisition	\$ 72,521	10/3/2016	\$ 27,814	0.38
Additional Properties evaluated by the State									
1033	196	HMGF	City of Savannah	1310 Stokes St	Acquisition	\$ 41,837	10/3/2016	\$ 53,759	1.28
1033	196	HMGF	City of Savannah	1012 Stokes St	Acquisition	\$ 40,181	10/3/2016	\$ 5,562	0.14
1033	196	HMGF	City of Savannah	1008 Stokes St	Acquisition	\$ 58,857	10/3/2016	\$ 6,475	0.11
1033	196	HMGF	City of Savannah	1006 Stokes St	Acquisition	\$ 37,213	10/3/2016	\$ 5,552	0.15
1033	196	HMGF	City of Savannah	1029 Stokes St	Acquisition	\$ 53,894	10/3/2016	\$ 5,723	0.11
1033	196	HMGF	City of Savannah	1011 Stokes St	Acquisition	\$ 36,232	10/3/2016	\$ 33,087	0.91
2008	1	LPDM	City of Savannah	1010 Stokes St	Acquisition	\$ 21,725	10/3/2016	\$ 28,238	1.30
2007	12	PDM	Chatham County	1907 Blue Jay Ave.	Acquisition	\$ 93,991	10/3/2016	\$ 50,161	0.53
2007	12	PDM	Chatham County	1909 Blue Jay Ave.	Acquisition	\$ 93,991	10/3/2016	\$ 50,161	0.53
2007	12	PDM	Chatham County	1915 Blue Jay Ave.	Acquisition	\$ 80,491	10/3/2016	\$ 50,161	0.62
2007	12	PDM	Chatham County	1918 Blue Jay Ave.	Acquisition	\$ 87,241	10/3/2016	\$ 50,161	0.57
2007	12	PDM	Chatham County	1920 Blue Jay Ave.	Acquisition	\$ 84,086	10/3/2016	\$ 42,411	0.50
2007	12	PDM	Chatham County	1921 Blue Jay Ave.	Acquisition	\$ 86,491	10/3/2016	\$ 41,923	0.48
2007	12	PDM	Chatham County	1922 Blue Jay Ave.	Acquisition	\$ 90,491	10/3/2016	\$ 41,923	0.46
2007	12	PDM	Chatham County	1923 Blue Jay Ave.	Acquisition	\$ 79,491	10/3/2016	\$ 42,411	0.53
2007	12	PDM	Chatham County	1923 Westlake Ave.	Acquisition	\$ 83,741	10/3/2016	\$ 50,161	0.60
2007	12	PDM	Chatham County	1924 Blue Jay Ave.	Acquisition	\$ 91,490	10/3/2016	\$ 41,923	0.46
2007	12	PDM	Chatham County	1932 Blue Jay Ave.	Acquisition	\$ 81,497	10/3/2016	\$ 6,561	0.08
2007	12	PDM	Chatham County	1933 Blue Jay Ave.	Acquisition	\$ 83,491	10/3/2016	\$ 42,411	0.51
1033	196	HMGF	City of Savannah	1911 Hobson Ave.	Acquisition	\$ 7,507	10/3/2016	\$ 58,170	7.75
2003	1	FMA	City of Savannah	1633 Vassar St	Acquisition	\$ 102,040	10/3/2016	\$ 78,376	0.77
2003	1	FMA	City of Savannah	1635 Vassar St	Acquisition	\$ 106,110	10/3/2016	\$ 78,376	0.74
1761	14	HMGF	City of Savannah	4705 Heritage Street	Acquisition	\$ 139,580	10/3/2016	\$ 82,070	0.59
1033	196	HMGF	City of Savannah	1627 Vassar St	Acquisition	\$ 91,145	10/3/2016	\$ 72,910	0.80
2008	1	LPDM	City of Savannah	4703 Heritage Street	Acquisition	\$ 153,566	10/3/2016	\$ 47,637	0.31
1997	1	FMA	City of Savannah	1247 W 42nd Street	Acquisition	\$ 36,646	10/3/2016	\$ 59,188	1.62
1997	1	FMA	City of Savannah	2372 Ogeechee Road	Acquisition	\$ 81,791	10/3/2016	\$ 56,021	0.68
1997	1	FMA	City of Savannah	1245 West 42nd Street	Acquisition	\$ 31,992	10/3/2016	\$ 89,398	2.79
1033	196	HMGF	City of Savannah	2343 Ogeechee Rd	Acquisition	\$ 62,458	10/3/2016	\$ 34,859	0.56
1033	196	HMGF	City of Savannah	2345 Ogeechee Rd	Acquisition	\$ 44,609	10/3/2016	\$ 34,859	0.78
1033	196	HMGF	City of Savannah	1251 W 42nd St	Acquisition	\$ 33,013	10/3/2016	\$ 77,811	2.36
1033	196	HMGF	City of Savannah	1241 W 42nd St	Acquisition	\$ 62,356	10/3/2016	\$ 64,880	1.04
1033	196	HMGF	City of Savannah	2380 Ogeechee Rd	Acquisition	\$ 68,887	10/3/2016	\$ 43,562	0.63
1033	196	HMGF	City of Savannah	2376 Ogeechee Rd	Acquisition	\$ 65,662	10/3/2016	\$ 41,480	0.63

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Disaster or Year	Project Number	Funding Source	Applicant	ADDRESS	Mitigation Action	Cost	Loss Avoided Date	Loss Avoided Amount	Return on Investment
2008	2	FMA	Chatham County	2 Clarendon Road	Acquisition	\$ 358,832	10/3/2016	\$ 13,062	0.04
1033	196	HMGF	City of Savannah	1216 W 51st St	Acquisition	\$ 56,546	10/3/2016	\$ 6,167	0.11
1042	2	HMGF	City of Savannah	1203 W. 50TH ST	Acquisition	\$ 24,388	10/3/2016	\$ 30,231	1.24
1042	2	HMGF	City of Savannah	1203 W. 51TH ST	Acquisition	\$ 30,407	10/3/2016	\$ 68,348	2.25
1042	2	HMGF	City of Savannah	1214 W. 51TH ST	Acquisition	\$ 20,380	10/3/2016	\$ 3,634	0.18
1042	2	HMGF	City of Savannah	1224 W. 50TH ST	Acquisition	\$ 27,204	10/3/2016	\$ 40,727	1.50
1042	2	HMGF	City of Savannah	1129 W. 49TH ST	Acquisition	\$ 20,287	10/3/2016	\$ 5,466	0.27
1042	2	HMGF	City of Savannah	2801 STANLEY ST	Acquisition	\$ 38,010	10/3/2016	\$ 9,286	0.24
1042	2	HMGF	City of Savannah	2807 STANLEY ST	Acquisition	\$ 40,323	10/3/2016	\$ 54,812	1.36
1042	2	HMGF	City of Savannah	2902 STANLEY ST	Acquisition	\$ 27,114	10/3/2016	\$ 37,096	1.37
1042	2	HMGF	City of Savannah	2906 STANLEY ST	Acquisition	\$ 24,155	10/3/2016	\$ 31,958	1.32
1042	2	HMGF	City of Savannah	3401 STANLEY ST	Acquisition	\$ 49,831	10/3/2016	\$ 84,031	1.69
1042	2	HMGF	City of Savannah	3405 STANLEY ST	Acquisition	\$ 44,385	10/3/2016	\$ 5,855	0.13
1042	2	HMGF	City of Savannah	3407 STANLEY ST	Acquisition	\$ 23,385	10/3/2016	\$ 33,818	1.45
1761	14	HMGF	City of Savannah	1513 Woodland Circle	Acquisition	\$ 230,313	10/3/2016	\$ 85,350	0.37
1033	194	HMGF	City of Savannah	1501 Forsyth Road	Acquisition	\$ 114,574	10/3/2016	\$ 82,485	0.72
1033	194	HMGF	City of Savannah	1431 Spalding Road	Acquisition	\$ 132,784	10/3/2016	\$ 52,819	0.40
1033	194	HMGF	City of Savannah	1430 Whitney Road	Acquisition	\$ 156,905	10/3/2016	\$ 160,622	1.02
1033	194	HMGF	City of Savannah	1441 Whitney Road	Acquisition	\$ 142,122	10/3/2016	\$ 4,961	0.03
1033	194	HMGF	City of Savannah	1447 Whitney Road	Acquisition	\$ 172,002	10/3/2016	\$ 10,634	0.06
1033	194	HMGF	City of Savannah	5413 Woodland Dr	Acquisition	\$ 150,816	10/3/2016	\$ 53,793	0.36
1033	194	HMGF	City of Savannah	5513 Woodland Dr	Acquisition	\$ 135,229	10/3/2016	\$ 91,080	0.67
1033	194	HMGF	City of Savannah	5519 Woodland Dr	Acquisition	\$ 118,971	10/3/2016	\$ 92,287	0.78
1033	194	HMGF	City of Savannah	1514 Forsyth Road	Acquisition	\$ 149,835	10/3/2016	\$ 137,808	0.92
1033	194	HMGF	City of Savannah	1513 Forsyth Road	Acquisition	\$ 137,207	10/3/2016	\$ 128,795	0.94
1033	194	HMGF	City of Savannah	1507 Spalding Road	Acquisition	\$ 169,720	10/3/2016	\$ 110,269	0.65
1033	194	HMGF	City of Savannah	1507 Forsyth Road	Acquisition	\$ 175,642	10/3/2016	\$ 110,269	0.63
1271	4	HMGF	City of Savannah	1508 Forsyth Road	Acquisition	\$ 130,534	10/3/2016	\$ 86,255	0.66
1271	4	HMGF	City of Savannah	1502 Forsyth Road	Acquisition	\$ 101,939	10/3/2016	\$ 78,791	0.77
1271	7	HMGF	City of Savannah	1501 Spalding Street	Acquisition	\$ 142,351	10/3/2016	\$ 46,840	0.33
Totals						\$11,384,469		\$9,921,042	0.87

Information from FEMA Loss Avoidance Study

Disaster or Year	Project Number	Funding Source	Applicant	ADDRESS	Mitigation Action	Cost	Loss Avoided Date	Loss Avoided Amount	Return on Investment
2005	7	PDM	City of Savannah	2305 Margaret St	Acquisition	\$ 157,399	9/12/2017	\$ 60,114	0.38
2005	7	PDM	City of Savannah	2308 Margaret St	Acquisition	\$ 124,027	9/12/2017	\$ 33,882	0.27
2005	7	PDM	City of Savannah	2309 Margaret St	Acquisition	\$ 141,778	9/12/2017	\$ 38,754	0.27
2005	7	PDM	City of Savannah	2311 Margaret St	Acquisition	\$ 91,122	9/12/2017	\$ 4,951	0.05
2005	7	PDM	City of Savannah	2310 Margaret St	Acquisition	\$ 130,868	9/12/2017	\$ 87,409	0.67
2005	7	PDM	City of Savannah	2313 Margaret St	Acquisition	\$ 92,974	9/12/2017	\$ 81,099	0.87
2005	7	PDM	City of Savannah	2320 Margaret St	Acquisition	\$ 101,272	9/12/2017	\$ 87,710	0.87
2005	7	PDM	City of Savannah	2322 Margaret St	Acquisition	\$ 115,745	9/12/2017	\$ 6,743	0.06
2005	7	PDM	City of Savannah	2328 Margaret St	Acquisition	\$ 110,324	9/12/2017	\$ 122,640	1.11
2005	7	PDM	City of Savannah	2316 Margaret St	Acquisition	\$ 119,464	9/12/2017	\$ 71,263	0.60
1042	3	HMG	City of Savannah	2315 Margaret St	Acquisition	\$ 78,877	9/12/2017	\$ 130,458	1.65
1761	14	HMG	City of Savannah	2402 E Derenne Ave	Acquisition	\$ 105,191	9/12/2017	\$ 41,585	0.40
1686	8	HMG	City of Savannah	2302 E. Derenne Ave	Acquisition	\$ 100,813	9/12/2017	\$ 75,610	0.75
1686	8	HMG	City of Savannah	2306 E. Derenne Ave	Acquisition	\$ 119,194	9/12/2017	\$ 94,916	0.80
1686	8	HMG	City of Savannah	2310 E. Derenne Ave	Acquisition	\$ 99,348	9/12/2017	\$ 66,534	0.67
1686	8	HMG	City of Savannah	2312 E. Derenne Ave	Acquisition	\$ 96,101	9/12/2017	\$ 74,272	0.77
1033	196	HMG	City of Savannah	2304 Vicksburg DR	Acquisition	\$ 77,092	9/12/2017	\$ 32,952	0.43
1033	196	HMG	City of Savannah	2313 Vicksburg DR	Acquisition	\$ 52,225	9/12/2017	\$ 50,356	0.96
1033	196	HMG	City of Savannah	2309 Vicksburg DR	Acquisition	\$ 56,207	9/12/2017	\$ 16,254	0.29
1033	196	HMG	City of Savannah	2401 Vicksburg DR	Acquisition	\$ 66,358	9/12/2017	\$ 7,318	0.11
1033	196	HMG	City of Savannah	5310 Bonnie DR	Acquisition	\$ 47,644	9/12/2017	\$ 60,001	1.26
1033	196	HMG	City of Savannah	5314 Bonnie DR	Acquisition	\$ 60,598	9/12/2017	\$ 64,275	1.06
1033	196	HMG	City of Savannah	5318 Bonnie DR	Acquisition	\$ 63,020	9/12/2017	\$ 67,164	1.07
1033	196	HMG	City of Savannah	5322 Bonnie DR	Acquisition	\$ 43,206	9/12/2017	\$ 35,038	0.81
1033	196	HMG	City of Savannah	5326 Bonnie DR	Acquisition	\$ 61,040	9/12/2017	\$ 20,130	0.33
1033	196	HMG	City of Savannah	5 La Roche CT	Acquisition	\$ 106,340	9/12/2017	\$ 33,306	0.31
1033	196	HMG	City of Savannah	6 La Roche CT	Acquisition	\$ 89,852	9/12/2017	\$ 51,363	0.57
1033	196	HMG	City of Savannah	2417 Vicksburg DR	Acquisition	\$ 50,660	9/12/2017	\$ 33,677	0.66
1033	196	HMG	City of Savannah	5321 Bonnie DR	Acquisition	\$ 39,568	9/12/2017	\$ 16,476	0.42
2007	2	PDM	City of Savannah	5317 Bonnie DR	Acquisition	\$ 126,051	9/12/2017	\$ 90,610	0.72
1033	196	HMG	City of Savannah	5313 Bonnie DR	Acquisition	\$ 48,561	9/12/2017	\$ 49,941	1.03
1033	196	HMG	City of Savannah	5309 Bonnie DR	Acquisition	\$ 58,136	9/12/2017	\$ 64,983	1.12
1033	196	HMG	City of Savannah	5305 Bonnie DR	Acquisition	\$ 49,904	9/12/2017	\$ 50,936	1.02
1042	3	HMG	City of Savannah	407 Linwood RD	Acquisition	\$ 78,440	9/12/2017	\$ 9,488	0.12
1033	196	HMG	City of Savannah	130 Juniper CIR	Acquisition	\$ 68,576	9/12/2017	\$ 8,923	0.13
1033	196	HMG	City of Savannah	126 Juniper CIR	Acquisition	\$ 81,564	9/12/2017	\$ 8,570	0.11
1033	196	HMG	City of Savannah	308 Linwood RD	Acquisition	\$ 88,512	9/12/2017	\$ 6,803	0.08
1033	196	HMG	City of Savannah	12405 Woodley RD	Acquisition	\$ 92,395	9/12/2017	\$ 7,682	0.08
1033	196	HMG	City of Savannah	12404 Woodley RD	Acquisition	\$ 99,823	9/12/2017	\$ 5,804	0.06
1033	196	HMG	City of Savannah	12406 Woodley RD	Acquisition	\$ 79,020	9/12/2017	\$ 7,172	0.09
1033	196	HMG	City of Savannah	12408 Woodley RD	Acquisition	\$ 65,930	9/12/2017	\$ 6,258	0.09
1033	196	HMG	City of Savannah	303 Linwood RD	Acquisition	\$ 84,257	9/12/2017	\$ 6,051	0.07
1033	196	HMG	City of Savannah	305 Linwood RD	Acquisition	\$ 95,011	9/12/2017	\$ 7,172	0.08
1033	196	HMG	City of Savannah	305 Linwood RD	Acquisition	\$ 92,498	9/12/2017	\$ 7,000	0.08
1033	196	HMG	City of Savannah	18 Vineyard DR	Acquisition	\$ 121,274	9/12/2017	\$ 285,134	2.35
1033	196	HMG	City of Savannah	16 Vineyard DR	Acquisition	\$ 86,290	9/12/2017	\$ 269,346	3.12
1311	7	HMG	City of Savannah	6 Vineyard DR	Acquisition	\$ 80,066	9/12/2017	\$ 199,936	2.50

DR4338 Mitigation Effectiveness Report

Disaster of Year	Project Number	Funding Source	Applicant	ADDRESS	Mitigation Action	Cost	Loss Avoided Date	Loss Avoided Amount	Return on Investment
1033	196	HMGP	City of Savannah	113 Wilshire Blvd	Acquisition	\$ 110,795	9/12/2017	\$ 258,044	2.33
1033	196	HMGP	City of Savannah	117 Wilshire Blvd	Acquisition	\$ 78,942	9/12/2017	\$ 237,005	3.00
1033	196	HMGP	City of Savannah	110 Wilshire Blvd	Acquisition	\$ 84,676	9/12/2017	\$ 272,087	3.21
1033	196	HMGP	City of Savannah	108 Wilshire Blvd	Acquisition	\$ 79,666	9/12/2017	\$ 227,776	2.86
1033	196	HMGP	City of Savannah	209 Wilshire Blvd	Acquisition	\$ 84,355	9/12/2017	\$ 260,944	3.09
2004	2	FMA	City of Savannah	115 Wilshire Blvd	Acquisition	\$ 115,694	9/12/2017	\$ 211,823	1.83
1271	4	HMGP	City of Savannah	106 Wilshire Blvd	Acquisition	\$ 69,703	9/12/2017	\$ 206,723	2.97
1271	4	HMGP	City of Savannah	2 Wilshire Blvd	Acquisition	\$ 74,718	9/12/2017	\$ 230,192	3.08
1033	196	HMGP	City of Savannah	122 Chatham ST	Acquisition	\$ 67,538	9/12/2017	\$ 57,472	0.85
2011	3	PDM	City of Savannah	202 Chatham St	Acquisition	\$ 105,060	9/12/2017	\$ 141,063	1.34
1033	196	HMGP	City of Savannah	206 Chatham ST	Acquisition	\$ 91,767	9/12/2017	\$ 71,221	0.78
1033	196	HMGP	City of Savannah	210 Chatham ST	Acquisition	\$ 124,544	9/12/2017	\$ 92,633	0.74
1033	196	HMGP	City of Savannah	214 Chatham ST	Acquisition	\$ 96,125	9/12/2017	\$ 49,333	0.51
1033	196	HMGP	City of Savannah	218 Chatham ST	Acquisition	\$ 86,039	9/12/2017	\$ 30,826	0.36
1033	196	HMGP	City of Savannah	213 Wesley ST	Acquisition	\$ 62,907	9/12/2017	\$ 84,967	1.35
1033	196	HMGP	City of Savannah	210 Kandlewood DR	Acquisition	\$ 61,449	9/12/2017	\$ 90,403	1.47
1033	196	HMGP	City of Savannah	214 Kandlewood DR	Acquisition	\$ 72,521	9/12/2017	\$ 101,511	1.40
1686	8	HMGP	City of Savannah	202 Kandlewood Dr	Acquisition	\$ 128,492	9/12/2017	\$ 27,128	0.21
1311	7	HMGP	City of Savannah	3 Nina Court	Acquisition	\$ 90,212	9/12/2017	\$ 5,905	0.07
1311	7	HMGP	City of Savannah	5 Nina Court	Acquisition	\$ 105,811	9/12/2017	\$ 6,924	0.07
1311	7	HMGP	City of Savannah	7 Nina Court	Acquisition	\$ 88,260	9/12/2017	\$ 5,678	0.06
1311	7	HMGP	City of Savannah	9 Nina Court	Acquisition	\$ 112,995	9/12/2017	\$ 7,571	0.07
1311	7	HMGP	City of Savannah	11 Nina Court	Acquisition	\$ 70,733	9/12/2017	\$ 43,847	0.62
2011	3	PDM	City of Savannah	16 Paradise Drive	Acquisition	\$ 138,707	9/12/2017	\$ 44,824	0.32
Additional Properties evaluated by the State									
1997	1	FMA	City of Savannah	107 Fell Street	Acquisition	\$ 13,120	9/12/2017	\$ 62,807	4.79
1042	1	HMGP	City of Savannah	105 BAKER ST	Acquisition	\$ 12,329	9/12/2017	\$ 62,769	5.09
1042	1	HMGP	City of Savannah	107 BAKER ST	Acquisition	\$ 13,177	9/12/2017	\$ 68,283	5.18
1042	1	HMGP	City of Savannah	109 BAKER ST	Acquisition	\$ 10,200	9/12/2017	\$ 79,870	7.83
1042	1	HMGP	City of Savannah	110 BAKER ST	Acquisition	\$ 9,702	9/12/2017	\$ 33,951	3.50
1042	1	HMGP	City of Savannah	111 BAKER ST	Acquisition	\$ 14,604	9/12/2017	\$ 70,600	4.83
1042	1	HMGP	City of Savannah	112 BAKER ST	Acquisition	\$ 21,071	9/12/2017	\$ 94,805	4.50
1042	1	HMGP	City of Savannah	113 BAKER ST	Acquisition	\$ 28,616	9/12/2017	\$ 90,161	3.15
1042	1	HMGP	City of Savannah	116 BAKER ST	Acquisition	\$ 25,616	9/12/2017	\$ 94,766	3.70
1042	1	HMGP	City of Savannah	117 BAKER ST	Acquisition	\$ 36,516	9/12/2017	\$ 108,582	2.97
1042	1	HMGP	City of Savannah	118 BAKER ST	Acquisition	\$ 14,664	9/12/2017	\$ 103,977	7.09
1042	1	HMGP	City of Savannah	119 BAKER ST	Acquisition	\$ 7,716	9/12/2017	\$ 70,600	9.15
1042	1	HMGP	City of Savannah	120 BAKER ST	Acquisition	\$ 20,949	9/12/2017	\$ 57,793	2.76
1042	1	HMGP	City of Savannah	121 BAKER ST	Acquisition	\$ 135,036	9/12/2017	\$ 109,251	0.81
1042	1	HMGP	City of Savannah	123 BAKER ST	Acquisition	\$ 5,236	9/12/2017	\$ 70,806	13.52
1042	1	HMGP	City of Savannah	124 BAKER ST	Acquisition	\$ 37,616	9/12/2017	\$ 57,793	1.54
1042	1	HMGP	City of Savannah	126 BAKER ST	Acquisition	\$ 16,652	9/12/2017	\$ 78,016	4.69
1042	1	HMGP	City of Savannah	130 BAKER ST	Acquisition	\$ 16,916	9/12/2017	\$ 75,132	4.44
1042	1	HMGP	City of Savannah	132 BAKER ST	Acquisition	\$ 18,668	9/12/2017	\$ 64,013	3.43
1042	1	HMGP	City of Savannah	201 FELL ST	Acquisition	\$ 21,896	9/12/2017	\$ 37,007	1.69
1042	1	HMGP	City of Savannah	203 FELL ST	Acquisition	\$ 5,582	9/12/2017	\$ 28,503	5.11
1042	1	HMGP	City of Savannah	205 FELL ST	Acquisition	\$ 6,793	9/12/2017	\$ 50,140	7.38
1042	1	HMGP	City of Savannah	207 FELL ST	Acquisition	\$ 15,364	9/12/2017	\$ 50,140	3.26

DR4338 Mitigation Effectiveness Report

Disaster or Year	Project Number	Funding Source	Applicant	ADDRESS	Mitigation Action	Cost	Loss Avoided Date	Loss Avoided Amount	Return on Investment
	1042	1 HMGP	City of Savannah	209 FELL ST	Acquisition	\$ 31,616	9/12/2017	\$ 57,718	1.83
	1042	1 HMGP	City of Savannah	8 JENKS ST	Acquisition	\$ 11,389	9/12/2017	\$ 98,732	8.67
	1042	1 HMGP	City of Savannah	12 JENKS ST	Acquisition	\$ 9,310	9/12/2017	\$ 42,450	4.56
	1042	1 HMGP	City of Savannah	14 JENKS ST	Acquisition	\$ 15,554	9/12/2017	\$ 97,689	6.28
	1042	1 HMGP	City of Savannah	106 JENKS ST	Acquisition	\$ 3,126	9/12/2017	\$ 103,251	33.03
	1042	1 HMGP	City of Savannah	107 JENKS ST	Acquisition	\$ 9,557	9/12/2017	\$ 53,269	5.57
	1042	1 HMGP	City of Savannah	109 JENKS ST	Acquisition	\$ 9,738	9/12/2017	\$ 76,162	7.82
	1042	1 HMGP	City of Savannah	111 JENKS ST	Acquisition	\$ 33,516	9/12/2017	\$ 32,932	0.98
	1997	1 FMA	City of Savannah	1247 W 42nd Street	Acquisition	\$ 36,646	9/12/2017	\$ 59,188	1.62
	1997	1 FMA	City of Savannah	2372 Ogeechee Road	Acquisition	\$ 81,791	9/12/2017	\$ 56,021	0.68
	1997	1 FMA	City of Savannah	1245 West 42nd Street	Acquisition	\$ 31,992	9/12/2017	\$ 89,398	2.79
	1033	196 HMGP	City of Savannah	2343 Ogeechee Rd	Acquisition	\$ 62,458	9/12/2017	\$ 34,859	0.56
	1033	196 HMGP	City of Savannah	2345 Ogeechee Rd	Acquisition	\$ 44,609	9/12/2017	\$ 34,859	0.78
	1033	196 HMGP	City of Savannah	1251 W 42nd St	Acquisition	\$ 33,013	9/12/2017	\$ 77,811	2.36
	1033	196 HMGP	City of Savannah	1241 W 42nd St	Acquisition	\$ 62,356	9/12/2017	\$ 64,880	1.04
	1033	196 HMGP	City of Savannah	2380 Ogeechee Rd	Acquisition	\$ 68,887	9/12/2017	\$ 43,562	0.63
	1033	196 HMGP	City of Savannah	2376 Ogeechee Rd	Acquisition	\$ 65,662	9/12/2017	\$ 41,480	0.63
	2007	12 PDM	Chatham County	1907 Blue Jay Ave.	Acquisition	\$ 93,991	9/12/2017	\$ 50,161	0.53
	2007	12 PDM	Chatham County	1909 Blue Jay Ave.	Acquisition	\$ 93,991	9/12/2017	\$ 50,161	0.53
	2007	12 PDM	Chatham County	1915 Blue Jay Ave.	Acquisition	\$ 80,491	9/12/2017	\$ 50,161	0.62
	2007	12 PDM	Chatham County	1918 Blue Jay Ave.	Acquisition	\$ 87,241	9/12/2017	\$ 50,161	0.57
	2007	12 PDM	Chatham County	1920 Blue Jay Ave.	Acquisition	\$ 84,086	9/12/2017	\$ 42,411	0.50
	2007	12 PDM	Chatham County	1921 Blue Jay Ave.	Acquisition	\$ 86,491	9/12/2017	\$ 28,301	0.33
	2007	12 PDM	Chatham County	1922 Blue Jay Ave.	Acquisition	\$ 90,491	9/12/2017	\$ 41,923	0.46
	2007	12 PDM	Chatham County	1923 Blue Jay Ave.	Acquisition	\$ 79,491	9/12/2017	\$ 6,561	0.08
	2007	12 PDM	Chatham County	1923 Westlake Ave.	Acquisition	\$ 83,741	9/12/2017	\$ 8,328	0.10
	2007	12 PDM	Chatham County	1924 Blue Jay Ave.	Acquisition	\$ 91,490	9/12/2017	\$ 6,450	0.07
	2007	12 PDM	Chatham County	1932 Blue Jay Ave.	Acquisition	\$ 81,497	9/12/2017	\$ 6,561	0.08
	2007	12 PDM	Chatham County	1933 Blue Jay Ave.	Acquisition	\$ 83,491	9/12/2017	\$ 6,561	0.08
	1033	196 HMGP	City of Savannah	1310 Stokes St	Acquisition	\$ 41,837	9/12/2017	\$ 53,759	1.28
	1033	196 HMGP	City of Savannah	1012 Stokes St	Acquisition	\$ 40,181	9/12/2017	\$ 5,562	0.14
	1033	196 HMGP	City of Savannah	1008 Stokes St	Acquisition	\$ 58,857	9/12/2017	\$ 6,475	0.11
	1033	196 HMGP	City of Savannah	1006 Stokes St	Acquisition	\$ 37,213	9/12/2017	\$ 5,552	0.15
	1033	196 HMGP	City of Savannah	1029 Stokes St	Acquisition	\$ 53,894	9/12/2017	\$ 5,723	0.11
	1033	196 HMGP	City of Savannah	1011 Stokes St	Acquisition	\$ 36,232	9/12/2017	\$ 33,087	0.91
	2008	1 LPDM	City of Savannah	1010 Stokes St	Acquisition	\$ 21,725	9/12/2017	\$ 28,238	1.30
Totals				130		\$ 8,742,011		\$ 8,594,125	0.98

Appendix H-IV
EMMIE Reports

Date: 07-12-2018			Federal Emergency Management Agency					
Public Assistance Mitigation Profile								
Disaster: FEMA-4165-DR-GA								
Category	Large Projects	Small Projects	Total Projects	# of Projects w HM to Total # Projects	% of HMP Projects	HMP \$ Awarded	Total \$ Awarded on Projects	% of \$ Awarded on Projects with HMP to Total \$ Awarded
Codes and Standards	0	0	0	0%	0%	\$ -	\$ -	0%
Good Construction Practices	0	0	0	0%	0%	\$ -	\$ -	0%
Mitigation Policy	0	0	0	0%	0%	\$ -	\$ -	0%
15%	0	0	0	0%	0%	\$ -	\$ -	0%
B/C	0	0	0	0%	0%	\$ -	\$ -	0%
List	0	0	0	0%	0%	\$ -	\$ -	0%
Not Applicable	1	1	2	1%	100%	\$ -	\$ 461,327.24	0.79%
Other	0	0	0	0%	0%	\$ -	\$ -	0%
Projects with HM	1	1	2	1%	100%	\$ -	\$ 461,327.24	1%
Projects	48	259	307			\$ -	\$ 58,602,380.59	100%

Note: The Mitigation Policy row shows a summary of its subcategories.

The Projects with HMP calculation at the bottom does not count the Mitigation Policy line, only its subcategories.

HM - 406 Mitigation (HMP, Codes and Standards, Mitigation Policy, etc.)

HMP = Hazard Mitigation Proposals

Date: 07-12-2018			Federal Emergency Management Agency					
Public Assistance Mitigation Profile								
Disaster: FEMA-4215-DR-GA								
Category	Large Projects	Small Projects	Total Projects	# of Projects w HM to Total # Projects	% of HMP Projects	HMP \$ Awarded	Total \$ Awarded on Projects	% of \$ Awarded on Projects with HMP to Total \$ Awarded
Codes and Standards	0	0	0	0%	0%	\$ -	\$ -	0%
Good Construction Practices	0	0	0	0%	0%	\$ -	\$ -	0%
Mitigation Policy	0	0	0	0%	0%	\$ -	\$ -	0%
15%	0	0	0	0%	0%	\$ -	\$ -	0%
B/C	0	0	0	0%	0%	\$ -	\$ -	0%
List	0	0	0	0%	0%	\$ -	\$ -	0%
Not Applicable	0	0	0	0%	0%	\$ -	\$ -	0%
Other	0	0	0	0%	0%	\$ -	\$ -	0%
Projects with HM	0	0	0	0%	0%	\$ -	\$ -	0%
Projects	15	85	100			\$ -	\$ 14,008,031.48	100%

Note: The Mitigation Policy row shows a summary of its subcategories.

The Projects with HMP calculation at the bottom does not count the Mitigation Policy line, only its subcategories.

HM - 406 Mitigation (HMP, Codes and Standards, Mitigation Policy, etc.)

HMP = Hazard Mitigation Proposals

Date: 07-12-2018			Federal Emergency Management Agency					
Public Assistance Mitigation Profile								
Disaster: FEMA-4259-DR-GA								
Category	Large Projects	Small Projects	Total Projects	# of Projects w HM to Total # Projects	% of HMP Projects	HMP \$ Awarded	Total \$ Awarded on Projects	% of \$ Awarded on Projects with HMP to Total \$ Awarded
Codes and Standards	0.00	0.00	0.00	0%	0%	\$ -	\$ -	0%
Good Construction Practices	1.00	4.00	5.00	2%	3%	\$ 386,988.16	\$ 864,349.30	3.18%
Mitigation Policy	16.00	27.00	43.00	19%	26%	\$ 2,466,988.16	\$ 7,249,737.50	26.64%
15%	9.00	15.00	24.00	11%	14%	\$ 176,840.29	\$ 2,312,411.73	8.50%
B/C	0.00	0.00	0.00	0%	0%	\$ -	\$ -	0%
List	7.00	12.00	19.00	8%	11%	\$ 2,290,147.87	\$ 4,937,325.77	18.14%
Not Applicable	29.00	89.00	118.00	52%	71%	\$ -	\$ 10,953,254.35	40.25%
Other	0.00	0.00	0.00	0%	0%	\$ -	\$ -	0%
Projects with HM			0.00	74%	100%	\$ 2,853,043.96	\$ 19,067,341.15	70.06%
Projects			0.00			\$ 2,468,884.36	\$ 27,214,082.50	100%

Note: The Mitigation Policy row shows a summary of its subcategories.

The Projects with HMP calculation at the bottom does not count the Mitigation Policy line, only its subcategories.

HM - 406 Mitigation (HMP, Codes and Standards, Mitigation Policy, etc.)

HMP = Hazard Mitigation Proposals

Date: 07-12-2018		Federal Emergency Management Agency						
Public Assistance Mitigation Profile								
Disaster: FEMA-4284-DR-GA								
Category	Large Projects	Small Projects	Total Projects	# of Projects w HM to Total # Projects	% of HMP Projects	HMP \$ Awarded	Total \$ Awarded on Projects	% of \$ Awarded on Projects with HMP to Total \$ Awarded
Codes and Standards	0	1	1	0%	1%	\$ -	\$ 12,881.25	0.01%
Good Construction Practices	0	0	0	0%	0%	\$ -	\$ -	0.00%
Mitigation Policy	8	24	32	7%	17%	\$ 953,558.58	\$ 3,326,307.67	2.60%
15%	3	3	6	1%	3%	\$ 32,109.12	\$ 1,131,211.14	0.95%
B/C	0	0	0	0%	0%	\$ -	\$ -	0.00%
List	5	21	26	5%	14%	\$ 921,449.46	\$ 2,195,096.53	1.85%
Not Applicable	28	125	153	32%	82%	\$ -	\$ 12,798,344.06	10.78%
Other	0	0	0	0%	0%	\$ -	\$ -	0.00%
Projects with HM	36	150	186	39%	100%	\$ 953,558.58	\$ 16,137,532.98	13.60%
Projects	119	360	479			\$ 995,558.58	\$ 118,678,635.27	100.00%

Note: The Mitigation Policy row shows a summary of its subcategories.

The Projects with HMP calculation at the bottom does not count the Mitigation Policy line, only its subcategories.

HM - 406 Mitigation (HMP, Codes and Standards, Mitigation Policy, etc.)

HMP = Hazard Mitigation Proposals

Date: 07-12-2018			Federal Emergency Management Agency					
Public Assistance Mitigation Profile								
Disaster: FEMA-4294-DR-GA								
Category	Large Projects	Small Projects	Total Projects	# of Projects w HM to Total # Projects	% of HMP Projects	HMP \$ Awarded	Total \$ Awarded on Projects	% of \$ Awarded on Projects with HMP to Total \$ Awarded
Codes and Standards	0	0	0	0%	0%	\$ -	\$ -	0%
Good Construction Practices	0	0	0	0%	0%	\$ -	\$ -	0%
Mitigation Policy	2	2	4	5%	14%	\$ 90,023.00	\$ 371,321.42	1.87%
15%	0	0	0	0%	0%	\$ -	\$ -	0%
B/C	0	0	0	0%	0%	\$ -	\$ -	0%
List	2	2	4	5%	14%	\$ 90,023.00	\$ 371,321.42	1.87%
Not Applicable	7	17	24	32%	86%	\$ -	\$ 5,906,233.97	29.69%
Other	0	0	0	0%	0%	\$ -	\$ -	0%
Projects with HM	9	19	28	37%	100%	\$ 90,023.00	\$ 6,277,555.39	31.56%
Projects	18	57	75			\$ 90,023.00	\$ 19,893,892.59	100%

Note: The Mitigation Policy row shows a summary of its subcategories.

The Projects with HMP calculation at the bottom does not count the Mitigation Policy line, only its subcategories.

HM - 406 Mitigation (HMP, Codes and Standards, Mitigation Policy, etc.)

HMP = Hazard Mitigation Proposals

Date: 07-12-2018			Federal Emergency Management Agency					
Public Assistance Mitigation Profile								
Disaster: FEMA-4297-DR-GA								
Category	Large Projects	Small Projects	Total Projects	# of Projects w HM to Total # Projects	% of HMP Projects	HMP \$ Awarded	Total \$ Awarded on Projects	% of \$ Awarded on Projects with HMP to Total \$ Awarded
Codes and Standards	0	0	0	0%	0%	\$ -	\$ -	0%
Good Construction Practices	0	1	1	1%	2%	\$ -	\$ 32,969.55	0.11%
Mitigation Policy	3	10	13	8%	20%	\$ 78,006.80	\$ 931,022.39	3.17%
15%	0	0	0	0%	0%	\$ -	\$ -	0%
B/C	0	0	0	0%	20%	\$ -	\$ -	0%
List	3	10	13	8%	20%	\$ 78,006.80	\$ 931,022.39	3.17%
Not Applicable	18	34	52	32%	79%	\$ -	\$ 10,649,775.44	36.31%
Other	0	0	0	0%	0%	\$ -	\$ -	0%
Projects with HM	21	45	66	40%	100%	\$ 78,006.80	\$ 11,613,767.38	39.60%
Projects	38	126	164			\$ 100,455.80	\$ 29,327,193.69	100%

Note: The Mitigation Policy row shows a summary of its subcategories.

The Projects with HMP calculation at the bottom does not count the Mitigation Policy line, only its subcategories.

HM - 406 Mitigation (HMP, Codes and Standards, Mitigation Policy, etc.)

HMP = Hazard Mitigation Proposals

Appendix H-V
Silver Jackets Charter



FEMA



US Army Corps
of Engineers®



Note

Georgia Silver Jackets
Flood Risk Management Team Charter

Georgia Silver Jackets
Flood Risk Management Team Charter



Charley English, Director
Georgia Emergency Management Agency

Date: 9/24/2010

Georgia Silver Jackets

Flood Risk Management Team Charter

This charter establishes and formalizes the expectations for implementation of the Silver Jackets Flood Risk Management Team for the State of Georgia. The collaborative agreement forged by this charter in no way limits participating agencies from taking actions in accordance with their existing authorities and charges, nor does it encumber them with additional financial commitments to support the team or its recommendations.

This charter will be reviewed annually and may be revised at any time per the consent of the core agencies.

VISION STATEMENT

Establish and strengthen intergovernmental partnerships that result in comprehensive and sustainable solutions to Georgia's flood hazards.

MISSION STATEMENT

Through an intergovernmental team of state and Federal agencies, a collaborative process will:

- Facilitate strategic, integrated life-cycle mitigation actions to reduce the threat, vulnerability and consequences of flooding in the State of Georgia;
- Create or supplement a mechanism to collaboratively solve issues and implement or recommend solutions;
- Identify and implement ways to leverage available resources and information among agencies;
- Increase and improve flood risk communication and outreach;
- Inform the U.S. Army Corps of Engineers District Commander and State-level agency directors during response and recovery activities; and
- Integrate mitigation into recovery actions.

GOALS

- Ensure continuous collaboration for flood mitigation, response, and recovery activities before, during, and after flooding;
- Establish an ongoing, regularly scheduled forum for examining all types of solutions for flood risk management;
- Develop and maintain a common information matrix on State and federal programs which identifies limitations and opportunities;
- Provide a unified set of recommendations on programs that could be combined or amended to create integrated, comprehensive and sustainable solutions;
- Create a multi-agency technical resource gateway for state and local agencies;
- Coordinate team efforts into the updates of the Georgia Hazard Mitigation Plan;
- Provide assistance for implementing high priority actions identified in the Georgia Hazard Mitigation Plan;
- Jointly develop and deliver a unified flood risk outreach message to better educate and advise mutual customers;
- Develop and deliver a plan to inform all audiences about risk concepts, including residual risk;

- Jointly provide specific input to agencies on barriers that their existing programs, policies or processes present to effective flood risk management;
- Catalog and share information on past and future projects and initiatives; and
- Prioritize current and future initiatives individually and collectively.

ROLES AND RESPONSIBILITIES

The Flood Risk Management Team will involve interagency cooperation. Membership will vary based on available resources and team project focus. Representatives may be from the regional and state levels of the organizations. All participating agencies will contribute experience and information to all team efforts.

As this team evolves, other state and Federal agencies may choose to participate in this initiative, however; the core agencies that will be involved at all times are:

- Federal Emergency Management Agency (FEMA)
- U.S. Army Corps of Engineers (USACE)
- U.S. Environmental Protection Agency (EPA)
- Georgia Department of Natural Resources (GA DNR)
- Georgia Emergency Management Agency (GEMA)
- Natural Resources Conservation Service (NRCS)
- United States Geologic Survey (USGS)
- National Weather Service (NWS)
- U.S. Economic Development Administration (EDA)
- Federal Highway Administration (FHWA)

Initially, the lead agency will be the USACE. The Savannah District will serve as the lead Corps of Engineers District. The Savannah District will maintain and distribute a contact sheet. With the support of a team consensus, the leadership role may rotate among the core members. With the support of team members, the agency assuming the leadership role is responsible for organizing, coordinating and facilitating team meetings, as well as recording and maintaining final meeting minutes. The representative of the lead agency may request assistance in performing any of these responsibilities.

MEETINGS

At a minimum, meetings will be conducted on a quarterly basis. Coordination may occur through email and teleconferencing. Agendas for meetings shall go out at least one week prior to meeting. Draft meeting minutes shall be distributed for review and presented for formal approval at the following meeting. The Savannah District will maintain final minutes and post on the Georgia Silver Jackets web site.

DECISIONS

Decisions will be accomplished by the team through consensus after discussion. If a decision cannot be reached through consensus, the secondary method will be by voting. The core agencies that should be involved in all major decisions include: FEMA, USACE, EPA, GA DNR, GEMA, NRCS, USGS, NWS, EDA, and FHWA.

Appendix I
Georgia Disaster Resilient Construction Codes



Georgia State International Building Code

Appendix N Disaster Resilient Construction (2012 Edition)



Georgia Department of Community Affairs
Local Government Assistance Division
60 Executive Park South, N.E.
Atlanta, Georgia 30329-2231
(404) 679-3118
www.dca.ga.gov

January 1, 2013

GEORGIA STATE INTERNATIONAL BUILDING CODE
APPENDIX N
DISASTER RESILIENT CONSTRUCTION

The INTERNATIONAL BUILDING CODE, 2012 Edition, published by the International Code Council, when used in conjunction with the Georgia State Amendments to the INTERNATIONAL BUILDING CODE, 2012 Edition and Appendix N Disaster Resilient Construction, shall constitute the official *Georgia State Minimum Standard Building Code*.

FORWARD

Introduction

The Department of Community Affairs (DCA) was awarded a grant through the U.S. Department of Housing and Urban Development (HUD) to develop Disaster Resilient Building Code (DRBC) Appendices for the International Building Code (IBC) and the International Residential Code (IRC). The DRBC Appendices are optional regulations that local jurisdictions may adopt, in whole or in part, through local ordinance. A task force of stakeholders was appointed to look for opportunities to improve any code provisions relating to damage from hurricane, flood, and tornado disasters. In addition to the approved recommendations from the task force, the state has developed and will conduct a comprehensive training program for code enforcement officials on the importance, implementation and enforcement of the Disaster Resilient Construction Appendices.

The meetings for the Disaster Resilient Building Code Appendices Task Force were open to the public, interested individuals and organizations that desired participation. The technical content of currently published documents on flooding, high-wind construction, and storm shelters, were used and referenced. Those publications included documents of the International Code Council (ICC), American Society of Civil Engineers (ASCE), the Federal Emergency Management Agency (FEMA), Mitigation Assessment Team (MAT) Program, Georgia Emergency Management Agency/Homeland Security (GEMA), APA – The Engineered Wood Association, National Institute of Standards and Technology (NIST), National Oceanic and Atmospheric Administration (NOAA), National Science Foundation (NSF), The State of Florida, American Forest & Paper Association’s American Wood Council, Southern Forest Products Association, NAHB Research Center, Insurance Institute for Business & Home Safety, and the Federal Alliance for Safe Homes.

Adoption

Local jurisdictions may adopt this entire appendix with chosen options or specific sections that apply to their communities through a local ordinance. The adopting ordinance must also be filed on record with DCA. A sample ordinance has been included in this document to assist the local jurisdictions with the adoption process. Recommended training is being offered to assist code enforcement officials in the implementation and enforcement of the appendices documents. Contact DCA at (404) 679-3118 or www.dca.ga.gov for more information.

Neither The Disaster Resilient Building Code Appendices Task Force, its members nor those participating in the development of Appendix N Disaster Resilient Construction accept any liability resulting from compliance or noncompliance with the provisions of Appendix N Disaster Resilient Construction.

The 2012 Disaster Resilient Building Code (DRBC) Appendices Task Force was charged with the development of two appendices. One appendix is for the International Residential Code and the other appendix is for the International Building Code. These two appendices 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 also developed new provisions to be included in the appendices that address these issues. These appendices contain increased construction requirements for disaster resilience and are intended to be made available for adoption by local jurisdictions in the State of Georgia.

These appendices have reasonable and substantial connection with the public health, safety, and general welfare. In addition, the financial impact and costs associated with these appendices have been taken into consideration.

Members:

Mr. Gregori Anderson, Chairman, States Codes Advisory Committee (SCAC)
Mr. David L. Adams, , Vice Chairman, States Codes Advisory Committee (SCAC)
Mr. Bill Abballe, AIA, American Institute of Architects (AIA) – Georgia Chapter
Mr. John Hutton, P.E., S.E., American Council of Engineering Companies of Georgia (ACEC/G)
Mr. Ron Anderson, Code Consultant
Mr. Lamar Smith, Home Builders Association of Georgia (HBAG)
Mr. Thomas Harper, Georgia State Inspectors Association (GSIA)
Mr. Tom Buttram, Building Officials Association of Georgia (BOAG)
Capt. Zane Newman, Georgia State Fire Marshal’s Office (Local Fire Official)
Mr. Terry Lunn, Georgia Emergency Management Agency (GEMA)
Mr. Alan Giles, , CFM, Georgia Department of Natural Resources (EPD / Floodplain Management Unit)
Mr. Tony Hebert, HUD Georgia State Representative (Region IV Office)
Mr. Jim C. Beck, Sr., Georgia Underwriting Association
Mr. Tim Thornton, Georgia Association of Realtors (GAR)
Mr. Steve Harrison, Building Owners and Managers Association – Georgia (BOMA)
Mr. Tom Aderhold, Georgia Apartment Association (GAA)
Mr. Tim Bromley, Accessibility Consultant – Georgia State ADA Coordinator’s Office
Mayor Mark Mathews, Georgia Municipal Association (GMA)
Commissioner Jeff Long, Association of County Commissioners of Georgia (ACCG)

Ad Hoc Subcommittee:

Mr. Tom Buttram, Chairman, DRBC Task Force Liaison (BOAG)
Mr. Ron Anderson, Vice Chairman, Code Consultant
Mr. Stephen V. Skalko, Concrete Industry
Mr. Jeffrey B. Stone, Wood Industry (AWC)
Mr. Robert Wills, Steel Industry (AISC)
Mr. Tom Cunningham, PhD., Residential Building Design
Mr. Duncan J. Hastie, P.E., Disaster Mitigation

DCA Staff:

Mr. Ted Miltiades, Director of Construction Codes & Industrialized Buildings
Mrs. Deirdre “Dee” Leclair, DRBC Grant Project Manager
Mr. Max Rietschier, Lead Codes Consultant
Mr. Bill Towson, 2012 International Residential Code Task Force Liaison, Code Consultant
Mr. Calvin Jordan, 2012 International Building Code Task Force Liaison, Code Consultant

How to Use Appendix N Disaster Resilient Construction

The appendix may be adopted in whole or in part by Local Jurisdictions to fit the needs of their community. The following sample ordinance has been provided to aid in the process of indentifying Chapters and Sections of the appendix that may be adopted. The format easily allows for choosing to adopt, revise or delete individual Chapters and Sections. Download the MS Word (.doc) version from the DCA website to take advantage of the dropdown menu choices and edit ability features of the document. Note that in Chapter 3, choose one of three options for flood elevation. Only one option may be chosen and that option must be higher than what has been previously adopted and enforced by the jurisdiction. Also note that in Chapter 4, choose one of three options for increased wind load. Only one option may be chosen and that option must be higher than what has been previously adopted and enforced by the jurisdiction. The Sample Ordinance document takes into account the flood elevation option in Chapter 3 and the wind load option in Chapter 4 of this appendix.

**SAMPLE ORDINANCE FOR ADOPTION OF
GEORGIA STATE INTERNATIONAL BUILDING CODE**

**APPENDIX N
DISASTER RESILIENT CONSTRUCTION**

ORDINANCE NO. _____

An ordinance of the [JURISDICTION] adopting the latest edition as adopted and amended by the Georgia Department of Community Affairs of *Appendix N Disaster Resilient Construction* regulating and governing the mitigation of hazard to life and property from natural weather related disasters, high-wind damages, flooding, and establishing construction standards for storm shelters in the [JURISDICTION]; providing for the issuance of permits and collection of fees therefore; repealing Ordinance No. ____ of the [JURISDICTION] and all other ordinances or parts of the laws in conflict therewith.

The [GOVERNING BODY] of the [JURISDICTION] does ordain as follows:

Section 1. That a certain document, three (3) copies of which are on file in the office of the [TITLE OF JURISDICTION'S KEEPER OF RECORDS] of [NAME OF JURISDICTION], being marked and designated as *Appendix N Disaster Resilient Construction* to the International Building Code, the latest edition as adopted and amended by the Georgia Department of Community Affairs, be and is adopted as the *Appendix N Disaster Resilient Construction* of the [JURISDICTION], in the State of Georgia for regulating and governing the mitigation of hazard to life and property from natural weather related disasters, high-wind damages, flooding, and establishing construction standards for storm shelters; providing for the issuance of permits and collection of fees therefore; and each and all of the regulations, provisions, penalties, conditions and terms of said *Appendix N Disaster Resilient Construction* on file in the office of the [JURISDICTION] are hereby referred to, adopted, and made a part hereof, as if fully set out in this ordinance, with the additions, insertions, deletions and changes, if any prescribed in Section 2 of this ordinance.

Section 2. [NAME OF JURISDICTION] hereby:

Choose an item. CHAPTER AN1 SCOPE AND ADMINISTRATION Choose an item.

Choose an item. SECTION AN101 ADMINISTRATION Choose an item.

Choose an item. AN101.1 Purpose Choose an item.

Choose an item. AN101.2 Objectives Choose an item.

Choose an item. AN101.3 Scope Choose an item.

AN101.3.1 Insert [Name Of Jurisdiction] for [NAME OF JURISDICTION].

Choose an item. AN101.4 Violations Choose an item.

Insert [Name Of Jurisdiction] for [NAME OF JURISDICTION].

Choose an item. SECTION AN102 APPLICABILITY Choose an item.

Choose an item. AN102.1 General Choose an item.

Choose an item. AN102.2 Other laws Choose an item.

Choose an item. AN102.3 Referenced codes and standards Choose an item.

Choose an item. SECTION AN103 POST DISASTER EVENT INSPECTIONS GUIDLINES Choose an item.

Choose an item. AN103.1 Inspections Choose an item.

Choose an item. AN103.1.1 Right of entry Choose an item.

Choose an item. AN103.2 Types of inspections Choose an item.

Choose an item. AN103.3 Post disaster building safety evaluation chart Choose an item.

Choose an item. Figure AN103.3 Post Disaster Building Safety Evaluation Chart Choose an item.

Choose an item. AN103.4 Evaluation Forms Choose an item.

Insert [Name Of Jurisdiction] for [NAME OF JURISDICTION].

Choose an item. AN103.5 Placement and remove of placards Choose an item.

Choose an item. CHAPTER AN2 DEFINITIONS Choose an item.

Choose an item. SECTION AN201 GENERAL Choose an item.

Choose an item. AN201.1 Scope Choose an item.

Choose an item. AN201.2 Terms defined in other codes Choose an item.

Choose an item. AN201.3 Terms not defined Choose an item.

Choose an item. SECTION AN202 DEFINITIONS Choose an item.

Choose an item. CHAPTER AN3 FLOOD-RESISTANT CONSTRUCTION Choose an item.

Choose an item. SECTION AN301 HAZARD IDENTIFICATION Choose an item.

Choose an item. AN301.1 Identification of flood hazard areas Choose an item.

Insert [Name Of Jurisdiction] for [NAME OF JURISDICTION].

Insert [Date of Issuance] for [DATE OF ISSUANCE].

Choose an item. SECTION AN302 SCOPE Choose an item.

Choose an item. AN301.1 Flood Loads Choose an item.

Choose an item. FLOOD ELEVATION OPTION Choose an item. Choose an item.

Choose an item. SECTION AN303 FLOOD DAMAGE-RESISTANT MATERIALS Choose an item.

Choose an item. AN303.1 Flood damage-resistant materials Choose an item.

Choose an item. AN303.2 Location of flood damage-resistant materials Choose an item.

Choose an item. AN303.3 Fasteners and connectors used for flood-resistant materials Choose an item.

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Choose an item. SECTION AN401 GENERAL Choose an item.

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Choose an item. AN402 DEFINITIONS AND NOTATIONS Choose an item.

Choose an item. AN403 WIND LOADS Choose an item.

Choose an item. AN403.1 Wind Directionality Factor Choose an item.

Choose an item. AN403.2 Exposure Choose an item.

Choose an item. AN403.3 Enclosure classification Choose an item.

Choose an item. AN403.4 Continuous operation of Risk Category IV buildings Choose an item.

Choose an item. SECTION Choose an item. Choose an item.

Choose an item. CHAPTER AN5 STORM SHELTERS, SAFE ROOMS AND BEST AVAILABLE REFUGE AREAS Choose an item.

Choose an item. SECTION AN501 GENERAL Choose an item.

Choose an item. AN501.1 General Choose an item.

Choose an item. AN501.2 Occupant load Choose an item.

Choose an item. AN501.3 Construction documents Choose an item.

Choose an item. AN501.4 Signage Choose an item.

Choose an item. SECTION AN502 DEFINITIONS AND NOTATIONS Choose an item.

Choose an item. AN502.1 Definitions Choose an item.

Choose an item. AN502.2 Additional definitions Choose an item.

Choose an item. SECTION AN503 BEST AVAILABLE REFUGE AREAS Choose an item.

Choose an item. AN503.1 General Choose an item.

Choose an item. AN503.2 Occupant Density Choose an item.

Choose an item. AN503.3 Identification of best available refuge areas Choose an item.

Choose an item. SECTION AN504 APPLICABILITY Choose an item.

Choose an item. AN504.1 Required storm shelters or safe rooms Choose an item.

Section 3. That Ordinance No. ____ of [JURISDICTION] entitled [FILL IN HERE THE COMPLETE TITLE OF THE LEGISLATION OR LAWS IN EFFECT AT THE PRESENT TIME SO THAT THEY WILL BE REPEALED BY DEFINITE MENTION] and all other ordinances or parts of laws in conflict herewith are hereby repealed.

Section 4. That if any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this ordinance. The [GOVERNING BODY] hereby declares that it would have passed this law, and each section, subsection, clause or phrase thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses and phrases be declared unconstitutional.

Section 5. That nothing in this ordinance or in *Appendix N Disaster Resilient Construction* hereby adopted shall be construed to affect any suit or proceeding impending in any court, or any rights acquired, or liability incurred, or any cause or causes of action acquired or existing under any act or ordinance hereby repealed as cited in Section 3 of this ordinance; nor shall any just or legal right or remedy of any character be lost, impaired or affected by this ordinance.

Section 6. That the **[JURISDICTION'S KEEPER OF RECORDS]** is hereby ordered and directed to cause this ordinance to be published. (An additional provision may be required to direct the number of times the ordinance is to be published and to specify that it is to be in a newspaper in general circulation. Posting may also be required.)

Section 7. That this ordinance and the rules, regulations, provisions, requirements, orders and matters established and adopted hereby shall take effect and be in full force and effect **[TIME PERIOD]** from and after the date of its final passage and adoption.

Section 8. Chapter AN6 Resources, of this document is intended to be used by the building officials as a resource guide.

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APPENDIX N DISASTER RESILIENT CONSTRUCTION

CHAPTER AN1 SCOPE AND ADMINISTRATION

SECTION AN101 ADMINISTRATION

AN101.1 Purpose. The scope of this appendix is to promote enhanced public health, safety and general welfare and to reduce public and private property losses due to hazards and natural disasters associated with flooding, high-winds, and windborne debris above that which is provided in the general provisions of this appendix.

AN101.2 Objectives. The objectives of this appendix are to:

1. Protect human life, to minimize property loss and to minimize the expenditures of public money associated with natural weather related disasters, including flooding, tornadoes and other high-wind events.
2. Establish enhanced design and construction regulations consistent with nationally recognized good practices for the safeguarding of life and property.

AN101.3 Scope.

AN101.3.1 The provisions of this appendix are not mandatory unless specifically referenced in an adopting ordinance of [NAME OF JURISDICTION]. If adopted, the provisions shall apply to all new development and to substantial improvements to existing development.

AN101.3.2 The provisions of this appendix supplement the jurisdiction's building and fire codes to provide for enhanced provisions to mitigate the hazard to life and property from natural weather related disasters, including flooding, tornadoes and other high-wind events.

AN101.3.3 The provisions of this appendix establish design and construction standards for storm shelters.

AN101.4 Violations. Any violation of a provision of this appendix or failure to comply with a permit of variance issued pursuant to this appendix or any requirement of this appendix shall be handled in accordance with the ordinances of [NAME OF JURISDICTION].

SECTION AN102 APPLICABILITY

AN102.1 General. This appendix provides enhanced minimum requirements for development of new construction and substantial improvement of existing development above that contained in the *International Building Code (IBC)*.

AN102.1.1 The provisions of this appendix shall apply to all new construction and additions, and shall apply to substantial alterations in flood hazard areas unless it is technically infeasible or otherwise exempted in Section 3403.2 of the *International Building Code*.

AN102.1.2 Regardless of the category of work being performed, the work shall not cause the structure to become unsafe or adversely affect the performance of the building; shall not cause an existing mechanical or plumbing system to become unsafe, hazardous, insanitary or overloaded; and unless expressly permitted by these provisions, shall not make the building any less compliant with this appendix or to any previously approved alternative arrangements than it was before the work was undertaken.

AN102.1.3 Where there is a conflict between a requirement of the *International Building Code* and a requirement of this appendix, the requirement of this appendix shall govern. Where there is a conflict between a general requirement of this appendix and a specific requirement of this appendix, the specific requirement shall govern. Where, in any specific case, different sections of this appendix specify different materials, methods of construction or other requirements, the most restrictive shall govern.

AN102.2 Other laws. The provisions of this appendix shall not be deemed to nullify any provisions of local, state or federal law.

AN102.3 Referenced codes and standards. The codes and standards referenced in this appendix shall be those that are listed in Chapter AN7 and such codes and standards shall be considered as part of the requirements of this appendix to the prescribed extent of each such reference. Where differences occur between provisions

this appendix and referenced codes and standards, the provisions of this appendix shall apply.

SECTION AN103 POST DISASTER EVENT INSPECTIONS GUIDELINES

AN103.1 Inspections. The building official or agents shall inspect buildings and structures to determine the habitability of each with the goal of getting the community back into their residences quickly and safely. Inspections shall always be performed by teams of at least two individuals, also known as disaster assessment teams.

AN103.1.1 Right of entry. Unless permitted under the exigent circumstances provisions or from an order from State or Federal Authorities, disaster assessment teams shall confirm the right of entry requirements with the incident commander. Upon approval, the assessment teams shall be authorized to enter the structure or premises at reasonable times to inspect or perform duties as provided by this code, provided that the structure or premises be occupied, that credentials are presented, that entry is requested, and that entry is granted by the owner or person having charge over the structure or premises.

AN103.2 Types of inspections.

AN103.2.1 Rapid evaluation. Rapid evaluation is performed after a disaster event to determine if a building is apparently safe or obviously unsafe. The evaluation should last 10 to 30 minutes per building and shall be performed by the building official and/or their designated responders. Evaluation shall determine if a detailed evaluation is necessary. Placards are posted on buildings indicating status as one of the following:

1. INSPECTED
2. RESTRICTED USE
3. UNSAFE

See Section AN605 for Placards that may be reproduced for use in the field during evaluations. The jurisdiction shall alter placards to meet the jurisdiction and building department's requirements.

AN103.2.2 Detailed evaluation. Detailed evaluation is a thorough visual examination of a damaged building performed by a team of two, including an inspector and a design professional. Evaluation should last 30 minutes to 4 hours per building. Evaluation shall determine necessary restrictions on a damaged building's use, the need for an engineering evaluation or to evaluate postings.

AN103.2.3 Engineering evaluation. When indicated by the building official as necessary, engineering evaluations shall be completed by a registered design professional hired by the building owner.

AN103.3 Post disaster building safety evaluation chart. See Figure AN103.3 for Post Disaster Building Safety Evaluation Chart.

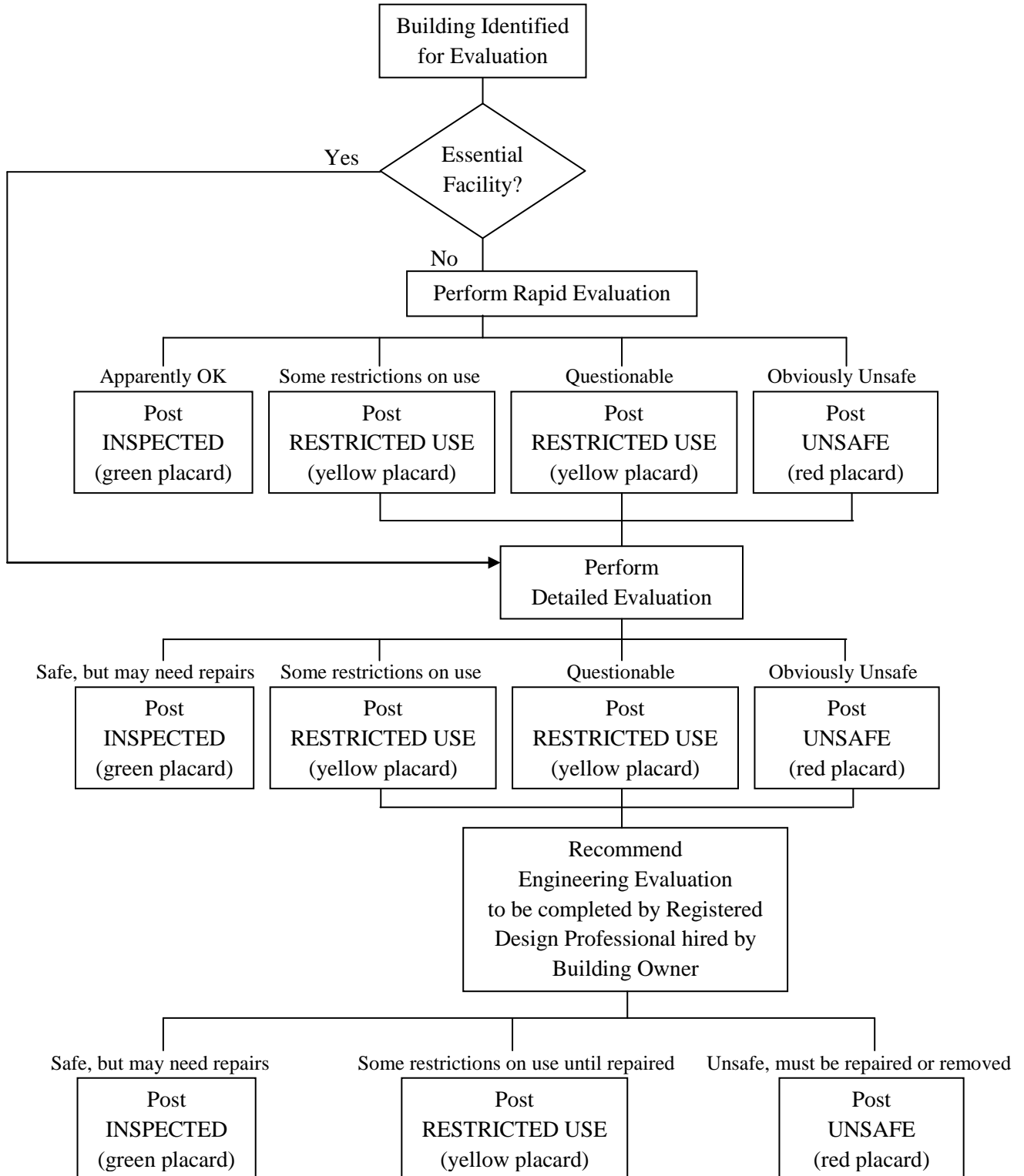
AN103.4 Evaluation Forms. *ATC-45 Rapid Evaluation Safety Assessment Form* and *ATC-45 Detailed Evaluation Safety Assessment Form* shall be used by [Name of Jurisdiction]'s Building Official for post disaster inspections. See Section AN605 for copies of the Safety Assessment Forms.

AN103.5 Placement and removal of placards.

AN103.5.1 Placement. Placards are to be posted in a clearly visible location near the main entrance and shall be visible from the public right-of-way. RESTRICTED USE or UNSAFE placards shall be placed at all entrances.

AN103.5.2 Removal. Placards shall not be removed or replaced, except by the authorized representatives of the local jurisdiction.

Figure AN103.3 Post Disaster Building Safety Evaluation Chart ^a



^(a) *When Disaster Strikes* by the International Code Council, Inc., Seventh Printing: November 2011, copyright 2007

CHAPTER AN2 DEFINITIONS

SECTION AN201 GENERAL

AN201.1 Scope. Unless otherwise expressly stated the following words and terms shall, for the purposes of this appendix, have the meanings shown in this chapter.

AN201.2 Terms defined in other codes. Where terms are not defined in this appendix and are defined in other *International Codes*, such terms shall have the meanings ascribed to them as in those codes.

AN201.3 Terms not defined. Where terms are not defined through the methods authorized by this section, such terms shall have their ordinarily accepted meanings such as the context implies.

SECTION AN202 DEFINITIONS

500-YEAR FLOOD. Flood having a 0.2% annual probability of being equaled or exceeded.

ADVISORY BASE FLOOD ELEVATION (ABFE). An advisory base flood elevation (BFE) issued by the Federal Emergency Management Agency (FEMA) that reflects post-storm conditions and vulnerability to damages from future flooding.

BASE FLOOD. Flood having a 1% chance of being equaled or exceeded in any given year, also referred to as the 100-year flood.

BASE FLOOD ELEVATION (BFE). The elevation of flooding, including wave height, having a 1% chance of being equaled or exceeded in any given year established relative to the National Geodetic Vertical Datum (NGVD), North American Vertical Datum (NAVD) or other datum specified on the *Flood Insurance Rate Map (FIRM)*.

BUILDING OFFICIAL. The officer or other designated authority charged with the administration and enforcement of the *International Building Code*, or the building official's duly authorized representative.

DESIGN FLOOD. The greater of the following two flood events:

- (1) The *base flood*, affecting those areas identified as *special flood hazard areas* on the community's FIRM;

- (2) The flood corresponding to the area designated as a *flood hazard area* on a community's *flood hazard map* or otherwise legally designated.

DESIGN FLOOD ELEVATION (DFE). The elevation of the *design flood*, including wave height, relative to the datum specified on the community's legally designated flood hazard map. In areas designated as Zone AO, the *design flood elevation* shall be the elevation of the highest existing grade of the building's perimeter plus the depth number (in feet) specified on the flood hazard map.

FLOOD [DAMAGE]-RESISTANT MATERIAL. Any building product [material, component or system] capable of withstanding direct and prolonged contact with floodwaters without sustaining significant damage.

FLOOD HAZARD AREA. The area subject to flooding during the *design flood*.

FLOOD HAZARD MAP. Map delineating *flood hazard areas* adopted by the authority having jurisdiction.

FLOOD INSURANCE RATE MAP (FIRM). An official map of a community on which the Federal Emergency Management Agency (FEMA) has delineated both the *special flood hazard areas* and the risk premium zones applicable to the community.

FREEBOARD. A factor of safety expressed in feet above a flood level for purposes of floodplain management.

FUTURE-CONDITIONS FLOOD. The flood having a 1% chance of being equaled or exceeded in any given year based on future-conditions hydrology. Also known as the 100-year future-conditions flood.

FUTURE-CONDITIONS FLOOD ELEVATION. The flood standard equal to or higher than the Base Flood Elevation. The future-conditions flood elevation is defined as the highest water surface anticipated at any given point during the future-conditions flood.

**CHAPTER AN3
FLOOD-RESISTANT CONSTRUCTION**

Forward: This appendix provides three different options for increased freeboard. The jurisdiction may pick only one option that is higher than previously adopted and enforced by the jurisdiction. The National Flood Insurance Program (NFIP) minimum standards reference Base Flood Elevation without any freeboard in high risk flood hazard areas. Due to the flood damage prevention updates performed during the Map Modernization initiative that led to flood risks being digitally identified in all 159 Georgia counties, all Georgia NFIP participating communities have freeboard standards that meet or exceed the 1 foot standard used in the State model ordinances for areas where BFEs have been established.

**SECTION AN301
HAZARD IDENTIFICATION**

AN301.1 Identification of flood hazard areas. To establish flood hazard areas:

- (a) flood hazard map adopted by jurisdiction based on areas of special flood hazard as identified by the Federal Emergency Management Agency in an engineering report entitled “The Flood Insurance Study of [INSERT NAME OF JURISDICTION],” dated [INSERT DATE ISSUANCE], and amended or revised with the accompanying Flood Insurance Rate Map (FIRM) and Flood Boundary and Floodway Map (FBFM) and related supporting data along with any revisions thereto.
- (b) FIRM maps provided by the Federal Emergency Management Agency.

**SECTION AN302
SCOPE**

AN302.1 Flood loads. Buildings designed and constructed in flood hazard areas defined in IBC Section 1612.2 shall comply with the following:

AN302.1.1 Flood hazard areas without base flood elevations. In flood hazard areas without base flood or future-conditions flood elevation data, new construction and substantial improvements of existing structures shall have the lowest floor of the lowest enclosed area (including basement) elevated no less than three (3) feet above the highest adjacent grade to the building foundation.

OPTION A – FLOOD ELEVATION

AN302.1.2 Increase to base flood elevation requirements. Floors required by ASCE 24 to be built above base flood elevations as follows:

The higher of:

- (a) Design flood elevation plus one (1) foot, or
- (b) Base flood elevation plus one (1) foot, or
- (c) Advisory base flood elevation, or
- (d) Future-conditions plus one (1) foot, if known or

- (e) 500-year flood, if known

OPTION B– FLOOD ELEVATION

AN302.1.3 Increase to base flood elevation requirements. Floors required by ASCE 24 to be built above base flood elevations as follows:

The higher of:

- (a) Design flood elevation plus two (2) feet, or
- (b) Base flood elevation plus two (2) feet, or
- (c) Advisory base flood elevation, or
- (d) Future-conditions plus one (1) foot, if known or
- (e) 500-year flood, if known

OPTION C – FLOOD ELEVATION

AN302.1.4 Increase to base flood elevation requirements. Floors required by ASCE 24 to be built above base flood elevations as follows:

The higher of:

- (a) Design flood elevation plus three (3) feet, or
- (b) Base flood elevation plus three (3) feet, or
- (c) Advisory base flood elevation, or
- (d) Future-conditions plus one (1) foot, if known or
- (e) 500-year flood, if known

**SECTION AN303
FLOOD DAMAGE-RESISTANT MATERIALS**

AN303.1 Flood damage-resistant materials. Flood damage-resistant materials comply with FEMA Technical Bulletin 2, Table 2. Types, Uses, and Classifications of Materials.

AN303.2 Location of flood damage-resistant materials. Building components and materials located below the increase to base flood elevation as determined by the local jurisdiction in accordance with AN302.1 shall be flood damage-resistant as defined by Section AN303.1.

AN303.3 Fasteners and connectors used for flood damage-resistant materials. Fasteners and connectors used for flood damage-resistant materials to be made of stainless steel, hot-dipped zinc-coated galvanized steel, mechanically deposited-zinc coated, silicon bronze or copper. Copper fasteners shall not be permitted for use in conjunction with steel.

CHAPTER AN4 HIGH-WIND RESISTIVE CONSTRUCTION

SECTION AN401 GENERAL

AN401.1 Applications. Buildings, and parts thereof shall be designed to withstand the minimum wind loads and meet the opening protection requirements of IBC Section 1609 as modified in this chapter. **Wind Load Option A, B or C shall be selected. Table AN401.1 may be used to assist in the selection of an appropriate Wind Load Option.**

AN401.2 Limitations. The following limitations shall apply to the design and construction of buildings with respect to winds.

AN401.2.1 Empirical masonry. The empirical masonry provisions in IBC Section 2109 or Chapter 5 of TMS 402/ACI 530/ASCE 5 shall not be permitted to be used for the wind load resisting elements of buildings, or parts of buildings or other structures.

AN401.2.2 Unreinforced (plain) masonry. The unreinforced masonry provisions in IBC Section 2109 or sections 2.2, 3.2 or 8.2 of TMS 402/ACI 530/ASCE 5 shall not be permitted to be used for the wind load resisting elements of buildings, or parts of buildings or other structures.

AN401.2.3 Conventional light-frame construction. The *conventional light-frame construction* provisions in IBC Section 2308 shall not be permitted to be used for the wind load resisting elements of buildings, or parts of buildings or other structures.

Exception: Compliance with AF&PA WFCM shall be permitted subject to the limitations therein and the limitations of this appendix.

SECTION AN402 DEFINITIONS AND NOTATIONS

AN402.1 General. The following terms are defined in Chapter 2 of the International Building Code:

**CONVENTIONAL LIGHT-FRAME
CONSTRUCTION.**

MASONRY.

Unreinforced (plain) masonry.

WIND-BORNE DEBRIS REGION.

WIND SPEED, V_{ult} .

SECTION AN403 WIND LOADS

AN403.1 Wind Directionality Factor. The directionality factor for Wind Option B and C shall be taken as 1.0.

AN403.2 Exposure. Wind pressures for Wind Option B and C shall be based on exposure category C or D in accordance with IBC Section 1609.4 or ASCE 7.

AN403.3 Enclosure classification. The enclosure classification shall be determined in accordance with ASCE 7 with the largest door or window on a wall that receives positive external pressure considered as an opening.

AN403.4 Continuous operation of Risk Category IV buildings. When a building or an internal area within a building in Risk Category IV is required to remain operational during a design wind event (target performance level OB), that building or that internal area shall be designed in accordance with ICC-500 or FEMA-361.

SECTION AN404 WIND LOAD OPTION A

AN404.1 Basic wind speed. The ultimate design wind speed, V_{ult} , for use in the design of buildings and structures shall be obtained from IBC Section 1609.3.

AN404.2 Debris Hazard and Protection of Openings. Buildings shall be designed for impact resistance in accordance with IBC Section 1609.1.2 or ASCE 7.

Exception:

1. For Risk Category III buildings with a Life Safety target performance level for the entire building, the exterior glazing shall be impact resistant or be protected with an impact resistant covering meeting the requirements of ASTM E1996.
2. For Risk Category IV buildings with an Immediate Occupancy target performance level for the entire building, the exterior glazing shall be impact resistant or be protected with an impact resistant covering meeting the requirements of ASTM E1996 for *Enhanced Protection*.

**SECTION AN405
WIND LOAD OPTION B**

AN405.1 Basic wind speed. The ultimate design wind speed, V_{ult} , for use in the design of Risk Category I buildings and structures shall be obtained from IBC Section 1609.3. The ultimate design wind speed, V_{ult} , for use in the design of Risk Category II buildings and structures shall be obtained from IBC Figure 1609B. The ultimate design wind speed, V_{ult} , for use in the design of Risk Category III and IV buildings and structures shall be obtained from IBC Figure 1609B or 135 mph, whichever is greater.

AN405.2 Debris Hazard and Protection of Openings. Buildings shall be designed for impact resistance in accordance with this Section in addition to IBC Section 1609.1.2 or ASCE 7.

Exception:

1. For Risk Category IV buildings, all components of the exterior envelope shall be impact resistant or be protected with an impact resistant covering meeting the requirements of ASTM E1996 for *Enhanced Protection*.

**SECTION AN406
WIND LOAD OPTION C**

AN406.1 Basic wind speed. The ultimate design wind speed, V_{ult} , for use in the design of Risk Category I buildings and structures shall be obtained from IBC Section 1609.3. The ultimate design wind speed, V_{ult} , for use in the design of Risk Category II buildings and structures shall be obtained from IBC Figure 1609B. The ultimate design wind speed, V_{ult} , for use in the design of Risk Category III and IV buildings and structures shall be obtained from IBC Figure 1609B or 170 mph, whichever is greater.

AN406.2 Debris Hazard and Protection of Openings. Buildings shall be designed for impact resistance in accordance with this Section in addition to IBC Section 1609.1.2 or ASCE 7.

Exception:

1. For Risk Category IV buildings, all components of the exterior envelope shall be impact resistant or be protected with an impact resistant covering meeting the requirements of ASTM E1996 for *Enhanced Protection*.

**Table AN401.1
WIND LOAD OPTIONS:**

TARGET PERFORMANCE LEVELS AND DESIGN CRITERIA⁴

OPTION	DESIGN WIND EVENT	Risk Category II ¹			Risk Category III ¹			Risk Category IV ¹		
		Target Performance Level ²	Min Wind Speed V_{ult}	Wind-Borne Debris	Target Performance Level ²	Min Wind Speed V_{ult}	Wind-Borne Debris	Target Performance Level ²	Min Wind Speed V_{ult}	Wind-Borne Debris
A	EF0 & 1 Tornado – IBC level Hurricane	CP ³	IBC 1609.3	IBC 1609.1.2 or ASCE 7	CP ³	IBC 1609.3	IBC 1609.1.2 or ASCE 7	CP ³	IBC 1609.3	IBC 1609.1.2 or ASCE 7
					LS		Glazing	IO ⁵		Glazing
B	EF2 Tornado – Cat 3 Hurricane	CP ³ for EF0-EF1-IBC Hurricane for Risk Cat. III/IV	IBC 1609.3 for Risk Cat. III/IV	IBC 1609.1.2 or ASCE 7	LS	145 mph	Req'd for glazing per IBC 1609.1.2 and ASCE 7	IO ⁵	145 mph	Exterior Envelope
C	EF3 Tornado – Cat 4 Hurricane	CP ³ for EF0-EF1-IBC Hurricane for Risk Cat. III/IV	IBC 1609.3 for Risk Cat. III/IV	IBC 1609.1.2 or ASCE 7	LS	170 mph	Req'd for glazing per IBC 1609.1.2 and ASCE 7	IO ⁵	170 mph	Exterior Envelope

Notes:

1. Risk Category per IBC Section 1604.5
2. Performance Levels:
 CP: Collapse Prevention
 LS: Life Safety
 IO: Immediate Occupancy
 OB: Operational Building
3. LS for occupants away from exterior envelope. IO for storm shelters or safe rooms.
4. See Section AN401 and Section AN403 for additional limitations and criteria.
5. OB for building or an internal area within a building designed to ICC-500 or FEMA 361.

CHAPTER AN5 STORM SHELTERS, SAFE ROOMS AND BEST AVAILABLE REFUGE AREAS

SECTION AN501 GENERAL

AN501.1 General. This section applies to the location and construction of storm shelters and safe rooms when constructed as separate detached buildings or as internal areas within buildings for the purpose of providing safe refuge for storms that produce high winds, such as tornados and hurricanes, and to the selection of best available refuge areas. Storm shelters shall be designed and constructed in accordance with IBC Section 423. Safe rooms shall be designed and constructed in accordance with FEMA 361. Storm shelters, safe rooms, and best available refuge areas shall be located on an accessible route.

Exception: *Residential Safe Rooms* and safe rooms serving a Business Group B Occupancy and having an *occupant load* not exceeding 16 persons may be constructed in accordance with FEMA 320.

AN501.2 Occupant load. The occupant load for storm shelters and safe rooms shall be determined by ICC 500 and FEMA 361 respectively.

AN501.3 Construction documents. Construction documents for buildings containing a storm shelter or safe room shall include the information required in ICC 500 or FEMA 361 respectively. Construction documents for buildings with access to a remote community storm shelter or safe room shall indicate the location of and access to the community storm shelter or safe room. Construction documents for buildings not containing or without access to a remote storm shelter or safe room, shall indicate the best available refuge area.

AN501.4 Signage. The location(s) of storm shelters, safe rooms or the best available refuge area(s) shall be clearly marked with a permanent sign.

SECTION AN502 DEFINITIONS AND NOTATIONS

AN502.1 Definitions. The following terms are defined in Chapter 2 of the International Building Code:

DWELLING UNITS.

OCCUPANT LOAD.

STORM SHELTER.

Community Storm Shelter.

Residential Storm Shelter.

AN502.2 Additional definitions.

BEST AVAILABLE REFUGE AREAS. Areas in a building that have been deemed by a registered design professional to likely offer the greatest safety for building occupants during a tornado or hurricane. Because these areas were not specifically designed as storm shelters or safe rooms, their occupants may be injured or killed during a tornado or hurricane. However, people in the best available refuge areas are less likely to be injured or killed than people in other areas of a building.

SAFE ROOM. A building, structure or portions thereof, constructed in accordance with FEMA 361 and designed for use during a severe wind storm event, such as a hurricane or tornado.

Community Safe Room. A safe room not defined as a “Residential Safe Room”

Residential Safe Room. A safe room serving occupants of *dwelling units* and having an *occupant load* not exceeding 16 persons.

SECTION AN503 BEST AVAILABLE REFUGE AREAS

AN503.1 General. Best available refuge area occupants may be injured or killed during a tornado or hurricane. However, people in the best available refuge areas are less likely to be injured or killed than people in other areas of a building.

AN503.2 Occupant Density. The minimum required floor area per occupant for best available refuge area(s) shall be determined in accordance with ICC 500 Table 501.1.1.

AN503.3 Identification of best available refuge areas. Best available refuge areas shall be identified by a registered design professional in accordance with the Wind Hazard Checklist of FEMA 361, Appendix B and FEMA P-431.

SECTION AN504 APPLICABILITY

AN504.1 Required storm shelters or safe rooms.

1. All new kindergarten through 12th grade schools with 50 or more occupants in total, per school, shall have a storm shelter or safe room.
2. All new 911 call stations, emergency operation centers, and fire, rescue, ambulance, and police stations shall have a storm shelter or safe room.

CHAPTER AN6 RESOURCES

SECTION AN601 CONTACTS

Georgia Department of Community Affairs (DCA) Construction Codes

Georgia State Amendments to the State Minimum
Standard Codes

<http://www.dca.ga.gov/development/constructioncodes/programs/codeAmendments.asp>

Phone: 404-679-3118

Georgia Department of Natural Resources (DNR) Floodplain Management

4220 International Parkway, Ste. 101
Atlanta, GA 30354-3902

www.georgiadfirm.com

Phone: 404-675-1757

Federal Emergency Management Agency (FEMA)

www.fema.gov; www.floodsmart.gov

www.fema.gov/rebuild/buildingscience/

FEMA Publications and Technical Bulletins:

www.fema.gov/library/index.jsp

www.fema.gov/plan/prevent/floodplain/techbul.shtm

Georgia Emergency Management Agency (GEMA)

Georgia Office of Homeland Security

P.O. Box 18055

Atlanta, GA 30316-0055

www.gema.ga.gov

www.ready.ga.gov

Phone: 404-635-7000

Georgia Association of Regional Commissions (GARC)

www.garc.ga.gov

<http://garc.ga.gov/main.php?Regional-Commissions-2>

(for assistance in identifying Flood Hazard Areas)

International Code Council (ICC)

www.iccsafe.org

National Weather Service

www.srh.weather.gov

State Fire Marshal's Office

2 Martin Luther King Jr. Drive

Suite 920 / West Tower

Atlanta, Georgia 30334

www.oci.ga.gov

Phone: 404-656-7087

SECTION AN602 EMERGENCY INSPECTION KIT^b

- | | | |
|--|---|---|
| <input type="checkbox"/> Staff's disaster response management plan | <input type="checkbox"/> Safety glasses | <input type="checkbox"/> Duct tape |
| <input type="checkbox"/> Team contact list | <input type="checkbox"/> Sunglasses | <input type="checkbox"/> Staples & stapler |
| <input type="checkbox"/> Area maps | <input type="checkbox"/> Pocket knife | <input type="checkbox"/> Staple gun |
| <input type="checkbox"/> Official identification | <input type="checkbox"/> Matches | <input type="checkbox"/> Calculator |
| <input type="checkbox"/> Personal identification | <input type="checkbox"/> Antibacterial hand wipes or alcohol-based hand sanitizer | <input type="checkbox"/> Tire repair kit |
| <input type="checkbox"/> Inspection forms and placards | <input type="checkbox"/> Insect repellent (w/ Deet or Picaridin) | <i>Remember to grab:</i> |
| <input type="checkbox"/> Communication equipment | <input type="checkbox"/> Sunscreen (SPF 15 or greater) | <input type="checkbox"/> Personal identification |
| <input type="checkbox"/> Clipboard | <input type="checkbox"/> Camera | <input type="checkbox"/> Rain gear, extra clothing |
| <input type="checkbox"/> Hard hat | <input type="checkbox"/> Black markers | <input type="checkbox"/> Water bottle |
| <input type="checkbox"/> Orange safety vest | <input type="checkbox"/> Pens & pencils | <input type="checkbox"/> Prescription medication |
| <input type="checkbox"/> Dust mask | <input type="checkbox"/> Envelope for expense receipts | <input type="checkbox"/> Cell phone and charger |
| <input type="checkbox"/> Work gloves | <input type="checkbox"/> Compass, GPS unit | <input type="checkbox"/> Cash for personal expenses |
| <input type="checkbox"/> Steel toe and waterproof boots | <input type="checkbox"/> Backpack, waistpack | <input type="checkbox"/> Toiletries |
| <input type="checkbox"/> Whistle | <input type="checkbox"/> Flashlight and extra batteries | |
| <input type="checkbox"/> First aid kit | <input type="checkbox"/> Battery-operated radio | |
| <input type="checkbox"/> Latex gloves | | |

(b) *Disaster Mitigation: A Guide for Building Departments* by the International Code Council, Inc., copyright 2009

SECTION AN603
SAFETY TIPS ^a

1. Always travel in teams of at least two people.
2. Always wear a hard hat, gloves, goggles, safety vest, and dust masks.
3. Always wear safety shoes capable of protecting the toes and bottom of the foot.
4. Survey the building exterior completely before entering.
5. Enter building only if authorized and if deemed safe to do so.
6. Be alert for falling objects.
7. In case of fire, injuries or victims, evacuate the area and alert the fire department immediately.
8. Avoid downed power lines and buildings under them or water surrounding them.
9. In case of gas leaks, shut off the gas (if possible) and report the leak.
10. In a flood situation, have a “walking stick.”

(a)*When Disaster Strikes* by the International Code Council, Inc., Seventh Printing: November 2011, copyright 2007

SECTION AN604
MAJOR DISASTER PROCESS
(from link <http://www.fema.gov/hazard/dproc.shtm>)

A Major Disaster Declaration usually follows these steps:

- **Incident occurs and local government responds**, supplemented by neighboring communities and volunteer agencies. If overwhelmed, turn to the state for assistance;

Generally the local government will issue a local state of emergency

- **The State responds** with state resources, such as the National Guard and state agencies;

Prior to committing state resources, the Governor will declare a state of emergency in the counties impacted by the event for which assistance is needed.

- **Damage assessment** by local, state, federal, and volunteer organizations determine losses and recovery needs;

Generally the locals will submit a preliminary damage assessment to the state and the state will review and determine if state and/or federal assistance is needed. If federal assistance is needed, the state will request FEMA perform a preliminary joint damage assessment. If the Governor determines that the incident is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments then supplementary Federal assistance is requested (next step).

- **A Major Disaster Declaration** is requested by the Governor, based on the damage assessment, and agreement to commit state funds and resources to the long-term recovery;
- **FEMA evaluates** the request and recommends action to the White House based on the disaster, the local community and the state’s ability to recover;
- **The President approves** the request or FEMA informs the Governor it has been denied. This decision process could take a few hours or several weeks depending on the nature of the disaster.

SECTION AN605
SAMPLE EVALUATION FORMS AND INSPECTION PLACARDS ^b (following pages)

Figure AN605.1^b

ATC-45 Rapid Evaluation Safety Assessment Form

Inspection

Inspector ID: _____ Inspection date: _____

Affiliation: _____ Inspection time: _____ AM PM

Areas inspected: Exterior only Exterior and interior

Building Description

Building name: _____

Address: _____

Building contact/phone: _____

Number of stories: _____

"Footprint area" (square feet): _____

Number of residential units: _____

Type of Building

Mid-rise or high-rise Pre-fabricated

Low-rise multi-family One- or two-family dwelling

Low-rise commercial

Primary Occupancy

Dwelling Commercial Government

Other residential Offices Historic

Public assembly Industrial School

Emergency services Other: _____

Evaluation

Investigate the building for the conditions below and check the appropriate column. **Estimated Building Damage (excluding contents)**

Observed Conditions:	Minor/None	Moderate	Severe	Estimated Building Damage (excluding contents)
Collapse, partial collapse, or building off foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> None
Building significantly out of plumb or in danger	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> > 0 to < 1%
Damage to primary structural members, racking of walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 1 to < 10%
Falling hazard due to nonstructural damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 10 to < 30%
Geotechnical hazard, scour, erosion, slope failure, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 30 to < 70%
Electrical lines / fixtures submerged / leaning trees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 70 to < 100%
Other (specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 100%

See back of form for further comments.

Posting

Choose a posting based on the evaluation and team judgment. Severe conditions endangering the overall building are grounds for an Unsafe posting. Localized Severe and overall Moderate conditions may allow a Restricted Use posting.

INSPECTED (Green placard) **RESTRICTED USE** (Yellow placard) **UNSAFE** (Red placard)

Record any use and entry restrictions exactly as written on placard: _____

Number of residential units vacated: _____

Further Actions Check the boxes below only if further actions are needed.

Barricades needed in the following areas: _____

Detailed Evaluation recommended: Structural Geotechnical Other: _____

Substantial Damage determination recommended

Other recommendations: _____

See back of form for further comments.

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Figure AN605.2^b

ATC-45 Detailed Evaluation Safety Assessment Form

Inspection

Inspector ID: _____ Inspection date: _____

Affiliation: _____ Inspection time: _____ AM PM

Final Posting
from page 2

Inspected
 Restricted Use
 Unsafe

Building Description

Building name: _____

Address: _____

Building contact/phone: _____

Number of stories: _____

"Footprint area" (square feet): _____

Number of residential units: _____

Type of Building

Mid-rise or High-rise
 Low-rise multi-family
 Low-rise commercial

Pre-fabricated
 One- or two-family dwelling
 Other: _____

Primary Occupancy

Dwelling
 Other residential
 Public assembly
 Emergency services

Commercial
 Offices
 Industrial
 Other: _____

Government
 Historic
 School

Evaluation

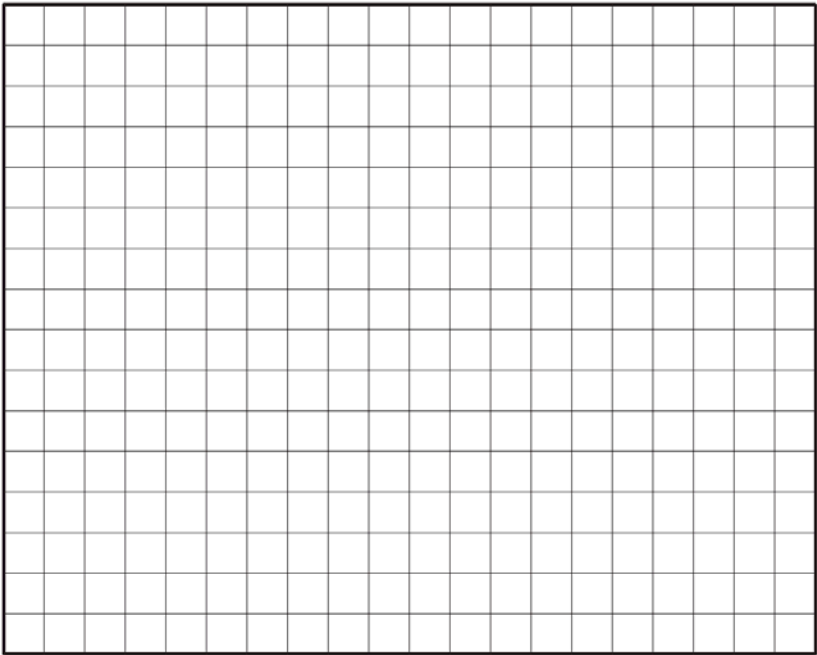
Investigate the building for the conditions below and check the appropriate column. There is room on the second page for a sketch.

	Minor/None	Moderate	Severe	Comments
Overall hazards:				
Collapse or partial collapse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Building or story lean or drift	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Fractured or displaced foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Structural hazards:				
Failure of significant element/connection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Column, pier, or bearing wall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Roof/floor framing or connection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Superstructure/foundation connection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Moment frame	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Diaphragm/horizontal bracing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Vertical bracing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Shear wall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Nonstructural hazards:				
Parapets, ornamentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Canopy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Cladding, glazing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Ceilings, light fixtures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Stairs, exits, access walkways, gratings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Interior walls, partitions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Mechanical & electrical equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Elevators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Building contents, other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Geotechnical hazards:				
Slope failure, debris impact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Ground movement, erosion, sedimentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Differential settlement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Continue on page 2

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Figure AN605.2^b (Continued)

ATC-45 Detailed Evaluation Safety Assessment Form		Page 2
Building name: _____		Inspector ID: _____
<p>Sketch Make a sketch of the damaged building in the space provided. Indicate damage points.</p>		
<p>Estimated Building Damage (excluding contents)</p> <p><input type="checkbox"/> None</p> <p><input type="checkbox"/> > 0 to < 1%</p> <p><input type="checkbox"/> 1 to < 10%</p> <p><input type="checkbox"/> 10 to < 30%</p> <p><input type="checkbox"/> 30 to < 70%</p> <p><input type="checkbox"/> 70 to < 100%</p> <p><input type="checkbox"/> 100%</p>		
<p>Posting If there is an existing posting from a previous evaluation, check the appropriate box.</p> <p>Previous posting: <input type="checkbox"/> INSPECTED <input type="checkbox"/> RESTRICTED USE <input type="checkbox"/> UNSAFE Inspector ID: _____ Date: _____</p> <p>If necessary, revise the posting based on the new evaluation and team judgment. <i>Severe</i> conditions endangering the overall building are grounds for an Unsafe posting. Local <i>Severe</i> and overall <i>Moderate</i> conditions may allow a Restricted Use posting. Indicate the current posting below and at the top of page one, whether the posting has been revised or not.</p> <p><input type="checkbox"/> INSPECTED (Green placard) <input type="checkbox"/> RESTRICTED USE (Yellow placard) <input type="checkbox"/> UNSAFE (Red placard)</p> <p>Record any use and entry restrictions exactly as written on placard: _____</p> <p>_____</p> <p>Number of residential units vacated: _____</p>		
<p>Further Actions Check the boxes below only if further actions are needed.</p> <p><input type="checkbox"/> Barricades needed in the following areas: _____</p> <p>_____</p> <p><input type="checkbox"/> Engineering Evaluation recommended: <input type="checkbox"/> Structural <input type="checkbox"/> Geotechnical <input type="checkbox"/> Other _____</p> <p><input type="checkbox"/> Substantial Damage determination recommended</p> <p><input type="checkbox"/> Other recommendations: _____</p> <p>_____</p>		

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Figure AN605.3^b

INSPECTED

LAWFUL OCCUPANCY PERMITTED

This structure has been inspected (as indicated below) and no apparent structural hazard has been found.

Date _____
Time _____

Inspected Exterior Only

Inspected Exterior and Interior

Report any unsafe condition to local authorities; reinspection may be required.

This facility was inspected under emergency conditions for:

Inspector Comments:

(Jurisdiction)

Inspector ID / Agency

Facility Name and Address:

**Do Not Remove, Alter, or Cover this Placard
until Authorized by Governing Authority**

Figure AN605.4^b

RESTRICTED USE

Caution: This structure has been inspected and found to be damaged as described below:

Date _____
Time _____

Entry, occupancy, and lawful use are restricted as indicated below:

- Do not enter the following areas: _____
- Brief entry allowed for access to contents: _____
- Other restrictions: _____

Facility name and address:

This facility was inspected under emergency conditions for:

(Jurisdiction)

Inspector ID / Agency

**Do Not Remove, Alter, or Cover this Placard
until Authorized by Governing Authority**

Figure AN605.5^b

UNSAFE

**DO NOT ENTER OR OCCUPY
(THIS PLACARD IS NOT A DEMOLITION ORDER)**

This structure has been inspected, found to be seriously damaged and is unsafe to occupy, as described below:

Date _____
Time _____

This facility was inspected under emergency conditions for:

(Jurisdiction)

Do not enter, except as specifically authorized in writing by jurisdiction. Entry may result in death or injury.

Facility Name and Address:

Inspector ID / Agency

**Do Not Remove, Alter, or Cover this Placard
until Authorized by Governing Authority**

CHAPTER AN7 REFERENCES

REFERENCED STANDARDS

ASCE Standards ASCE/SEI 24-05 Flood Resistant Design and Construction
 FEMA P-320, Third Edition / August 2008 Taking Shelter From the Storm: Building a Safe Room For Your Home or Small Business, Includes Construction Plans and Cost Estimates
 FEMA 361, Second Edition / August 2008 Design and Construction Guidance for Community Safe Rooms
 FEMA P-431, Second Edition/October 2009 Tornado Protection: Selecting Refuge Areas in Buildings
 FEMA Technical Bulletin 2, Table 2. Types, Uses, and Classifications of Materials

REFERENCED RESOURCES

- (a) *When Disaster Strikes* by the International Code Council, Inc., Seventh Printing: November 2011, copyright 2007
- (b) *Disaster Mitigation: A Guide for Building Departments* by the International Code Council, Inc., copyright 2009

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Georgia State
International Residential Code

Appendix R
Disaster Resilient Construction
(2012 Edition)



Georgia Department of Community Affairs
Local Government Assistance Division
60 Executive Park South, N.E.
Atlanta, Georgia 30329-2231
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www.dca.ga.gov

January 1, 2013

GEORGIA STATE INTERNATIONAL RESIDENTIAL CODE
APPENDIX R
DISASTER RESILIENT CONSTRUCTION

The INTERNATIONAL RESIDENTIAL CODE, 2012 Edition, published by the International Code Council, when used in conjunction with the Georgia State Amendments to the INTERNATIONAL RESIDENTIAL CODE, 2012 Edition and Appendix R Disaster Resilient Construction , shall constitute the official *Georgia State Minimum Standard Residential Code*.

FORWARD

Introduction

The Department of Community Affairs (DCA) was awarded a grant through the U.S. Department of Housing and Urban Development (HUD) to develop Disaster Resilient Building Code (DRBC) Appendices for the International Building Code (IBC) and the International Residential Code (IRC). The DRBC Appendices are optional regulations that local jurisdictions may adopt, in whole or in part, through local ordinance. A task force of stakeholders was appointed to look for opportunities to improve any code provisions relating to damage from hurricane, flood, and tornado disasters. In addition to the approved recommendations from the task force, the state has developed and will conduct a comprehensive training program for code enforcement officials on the importance, implementation and enforcement of the Disaster Resilient Construction Appendices.

The meetings for the Disaster Resilient Building Code Appendices Task Force were open to the public, interested individuals and organizations that desired participation. The technical content of currently published documents on flooding, high-wind construction, and storm shelters, were used and referenced. Those publications included documents of the International Code Council (ICC), American Society of Civil Engineers (ASCE), the Federal Emergency Management Agency (FEMA), Mitigation Assessment Team (MAT) Program, Georgia Emergency Management Agency/Homeland Security (GEMA), APA – The Engineered Wood Association, National Institute of Standards and Technology (NIST), National Oceanic and Atmospheric Administration (NOAA), National Science Foundation (NSF), The State of Florida, American Forest & Paper Association’s American Wood Council, Southern Forest Products Association, NAHB Research Center, Insurance Institute for Business & Home Safety, and the Federal Alliance for Safe Homes.

Adoption

Local jurisdictions may adopt this entire appendix with chosen options or specific sections that apply to their communities through a local ordinance. The adopting ordinance must also be filed on record with DCA. A sample ordinance has been included in this document to assist the local jurisdictions with the adoption process. Recommended training is being offered to assist code enforcement officials in the implementation and enforcement of the appendices documents. Contact DCA at (404) 679-3118 or www.dca.ga.gov for more information.

Neither The Disaster Resilient Building Code Appendices Task Force, its members nor those participating in the development of Appendix R Disaster Resilient Construction accept any liability resulting from compliance or noncompliance with the provisions of Appendix R Disaster Resilient Construction.

The 2012 Disaster Resilient Building Code (DRBC) Appendices Task Force was charged with the development of two appendices. One appendix is for the International Residential Code and the other appendix is for the International Building Code. These two appendices 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 also developed new provisions to be included in the appendices that address these issues. These appendices contain increased construction requirements for disaster resilience and are intended to be made available for adoption by local jurisdictions in the State of Georgia.

These appendices have reasonable and substantial connection with the public health, safety, and general welfare. In addition, the financial impact and costs associated with these appendices have been taken into consideration.

Members:

Mr. Gregori Anderson, Chairman, States Codes Advisory Committee (SCAC)
Mr. David L. Adams, , Vice Chairman, States Codes Advisory Committee (SCAC)
Mr. Bill Abballe, AIA, American Institute of Architects (AIA) – Georgia Chapter
Mr. John Hutton, P.E., S.E., American Council of Engineering Companies of Georgia (ACEC/G)
Mr. Ron Anderson, Code Consultant
Mr. Lamar Smith, Home Builders Association of Georgia (HBAG)
Mr. Thomas Harper, Georgia State Inspectors Association (GSIA)
Mr. Tom Buttram, Building Officials Association of Georgia (BOAG)
Capt. Zane Newman, Georgia State Fire Marshal’s Office (Local Fire Official)
Mr. Terry Lunn, Georgia Emergency Management Agency (GEMA)
Mr. Alan Giles, CFM, Georgia Department of Natural Resources (EPD / Floodplain Management Unit)
Mr. Tony Hebert, HUD Georgia State Representative (Region IV Office)
Mr. Jim C. Beck, Sr., Georgia Underwriting Association
Mr. Tim Thornton, Georgia Association of Realtors (GAR)
Mr. Steve Harrison, Building Owners and Managers Association – Georgia (BOMA)
Mr. Tom Aderhold, Georgia Apartment Association (GAA)
Mr. Tim Bromley, Accessibility Consultant – Georgia State ADA Coordinator’s Office
Mayor Mark Mathews, Georgia Municipal Association (GMA)
Commissioner Jeff Long, Association of County Commissioners of Georgia (ACCG)

Ad Hoc Subcommittee:

Mr. Tom Buttram, Chairman, DRBC Task Force Liaison (BOAG)
Mr. Ron Anderson, Vice Chairman, Code Consultant
Mr. Stephen V. Skalko, P.E. Concrete Industry
Mr. Jeffrey B. Stone, PhD., Wood Industry (AWC)
Mr. Robert Wills, Steel Industry (AISC)
Mr. Tom Cunningham, PhD., Residential Building Design
Mr. Duncan J. Hastie, P.E., Disaster Mitigation

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Mr. Max Rietschier, Lead Codes Consultant
Mr. Bill Towson, 2012 International Residential Code Task Force Liaison, Code Consultant
Mr. Calvin Jordan, 2012 International Building Code Task Force Liaison, Code Consultant

How to Use Appendix R Disaster Resilient Construction

The appendix may be adopted in whole or in part by Local Jurisdictions to fit the needs of their community. The following sample ordinance has been provided to aid in the process of indentifying Chapters and Sections of the appendix that may be adopted. The format easily allows for choosing to adopt, revise or delete individual Chapters and Sections. Download the MS Word (.doc) version from the DCA website to take advantage of the dropdown menu choices and edit ability features of the document. Note that in Chapter 3, choose one of three options for flood elevation. Only one option may be chosen and that option must be higher than what has been previously adopted and enforced by your jurisdiction. Also note that in Chapter 4, choose one of four options for increased wind speed. Only one option may be chosen and that option must be higher than the mapped wind speed shown in the International Residential Code. The Sample Ordinance document takes into account the flood elevation option in Chapter 3 and the wind speed option in Chapter 4 of this appendix.

**SAMPLE ORDINANCE FOR ADOPTION OF
GEORGIA STATE INTERNATIONAL RESIDENTIAL CODE
APPENDIX R
DISASTER RESILIENT CONSTRUCTION
ORDINANCE NO. _____**

An ordinance of the [JURISDICTION] adopting the latest edition as adopted and amended by the Georgia Department of Community Affairs of *Appendix R Disaster Resilient Construction* regulating and governing the mitigation of hazard to life and property from natural weather related disasters, high-wind damages, flooding, and establishing construction standards for storm shelters in the [JURISDICTION]; providing for the issuance of permits and collection of fees therefore; repealing Ordinance No. ____ of the [JURISDICTION] and all other ordinances or parts of the laws in conflict therewith.

The [GOVERNING BODY] of the [JURISDICTION] does ordain as follows:

Section 1. That a certain document, three (3) copies of which are on file in the office of the [TITLE OF JURISDICTION'S KEEPER OF RECORDS] of [NAME OF JURISDICTION], being marked and designated as *Appendix R Disaster Resilient Construction* to the International Residential Code, the latest edition as adopted and amended by the Georgia Department of Community Affairs, be and is adopted as the *Appendix R Disaster Resilient Construction* of the [JURISDICTION], in the State of Georgia for regulating and governing the mitigation of hazard to life and property from natural weather related disasters, high-wind damages, flooding, and establishing construction standards for storm shelters; providing for the issuance of permits and collection of fees therefore; and each and all of the regulations, provisions, penalties, conditions and terms of said *Appendix R Disaster Resilient Construction* on file in the office of the [JURISDICTION] are hereby referred to, adopted, and made a part hereof, as if fully set out in this ordinance, with the additions, insertions, deletions and changes, if any prescribed in Section 2 of this ordinance.

Section 2. [NAME OF JURISDICTION] hereby:

Choose an item. CHAPTER AR1 SCOPE AND ADMINISTRATION Choose an item.

Choose an item. SECTION AR101 ADMINISTRATION Choose an item.

Choose an item. AR101.1 Purpose Choose an item.

Choose an item. AR101.2 Objectives Choose an item.

Choose an item. AR101.3 Scope Choose an item.

AR101.3.1 Insert [Name Of Jurisdiction] for [NAME OF JURISDICTION].

Choose an item. AR101.4 Violations Choose an item.

Insert [Name Of Jurisdiction] for [NAME OF JURISDICTION].

Choose an item. SECTION AR102 APPLICABILITY Choose an item.

Choose an item. AR102.1 General Choose an item.

Choose an item. AR102.2 Other laws Choose an item.

Choose an item. AR102.3 Referenced codes and standards Choose an item.

Choose an item. SECTION AR103 POST DISASTER EVENT INSPECTIONS GUIDLINES Choose an item.

Choose an item. AR103.1 Inspections Choose an item.

Choose an item. AR103.1.1 Right of entry Choose an item.

Choose an item. AR103.2 Types of inspections Choose an item.

Choose an item. AR103.3 Post disaster building safety evaluation chart Choose an item.

Choose an item. Figure AR103.3 Post Disaster Building Safety Evaluation Chart Choose an item.

Choose an item. AR103.4 Evaluation forms Choose an item.

Insert [Name Of Jurisdiction] for [NAME OF JURISDICTION].

Choose an item. AR103.5 Placement and remove of placards Choose an item.

Choose an item. CHAPTER AR2 DEFINITIONS Choose an item.

Choose an item. SECTION AR201 GENERAL Choose an item.

Choose an item. AR201.1 Scope Choose an item.

Choose an item. AR201.2 Terms defined in other codes Choose an item.
Choose an item. AR201.3 Terms not defined Choose an item.
Choose an item. SECTION AR202 DEFINITIONS Choose an item.
Choose an item. CHAPTER AR3 FLOOD-RESISTANT CONSTRUCTION Choose an item.
Choose an item. SECTION AR301 HAZARD IDENTIFICATION Choose an item.
Choose an item. AR301.1 Identification of flood hazard areas Choose an item.
Insert [Name Of Jurisdiction] for [NAME OF JURISDICTION].
Insert [Date] for [INSERT DATE ISSUANCE].
Choose an item. SECTION AR302 SCOPE Choose an item.
Choose an item. AR302.1 Flood loads Choose an item.
Choose an item. FLOOD ELEVATION OPTION Choose an item. Choose an item.
Choose an item. SECTION AR303 FLOOD DAMAGE-RESISTANT MATERIALS Choose an item.
Choose an item. AR303.1 Flood damage-resistant materials Choose an item.
Choose an item. AR303.2 Location of flood damage-resistant materials Choose an item.
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Choose an item. SECTION AR401 GENERAL Choose an item.
Choose an item. AR401.1 Scope Choose an item.
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Choose an item. SECTION Choose an item. Choose an item.
Choose an item. SECTION AR406 FASTENERS AND CONNECTIONS FOR CLADDING Choose an item.
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Choose an item. AR408.3 Attachment Choose an item.
Choose an item. CHAPTER AR5 RESIDENTIAL STORM SHELTERS AND SAFE ROOMS Choose an item.
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Choose an item. AR501.1 General Choose an item.
Choose an item. SECTION AR502 RESIDENTIAL STORM SHELTERS AND SAFE ROOMS Choose an item.
Choose an item. AR502.1 Residential storm shelters Choose an item.
Choose an item. AR502.2 Residential safe rooms Choose an item.

Section 3. That Ordinance No. ____ of [JURISDICTION] entitled [FILL IN HERE THE COMPLETE TITLE OF THE LEGISLATION OR LAWS IN EFFECT AT THE PRESENT TIME SO THAT THEY WILL BE REPEALED BY DEFINITE MENTION] and all other ordinances or parts of laws in conflict herewith are hereby repealed.

Section 4. That if any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this ordinance. The [GOVERNING BODY] hereby declares that it would have passed this law, and each section, subsection, clause or phrase thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses and phrases be declared unconstitutional.

Section 5. That nothing in this ordinance or in *Appendix R Disaster Resilient Construction* hereby adopted shall be construed to affect any suit or proceeding impending in any court, or any rights acquired, or liability incurred, or any cause or causes of

action acquired or existing under any act or ordinance hereby repealed as cited in Section 3 of this ordinance; nor shall any just or legal right or remedy of any character be lost, impaired or affected by this ordinance.

Section 6. That the [JURISDICTION'S KEEPER OF RECORDS] is hereby ordered and directed to cause this ordinance to be published. (An additional provision may be required to direct the number of times the ordinance is to be published and to specify that it is to be in a newspaper in general circulation. Posting may also be required.)

Section 7. That this ordinance and the rules, regulations, provisions, requirements, orders and matters established and adopted hereby shall take effect and be in full force and effect [TIME PERIOD] from and after the date of its final passage and adoption.

Section 8. Chapter AR6 Resources of this document is intended to be used by the building officials as a resource guide.

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APPENDIX R DISASTER RESILIENT CONSTRUCTION

CHAPTER AR1 SCOPE AND ADMINISTRATION

SECTION AR101 ADMINISTRATION

AR101.1 Purpose. The scope of this appendix is to promote enhanced public health, safety and general welfare and to reduce public and private property losses due to hazards and natural disasters associated with flooding, high-winds, and windborne debris above that which is provided in the general provisions of this appendix.

AR101.2 Objectives. The objectives of this appendix are to:

1. Protect human life, to minimize property loss and to minimize the expenditures of public money associated with natural weather related disasters, including flooding, tornadoes and other high-wind events.
2. Establish enhanced design and construction regulations consistent with nationally recognized good practices for the safeguarding of life and property.

AR101.3 Scope.

AR101.3.1 The provisions of this appendix are not mandatory unless specifically referenced in an adopting ordinance of [NAME OF JURISDICTION]. If adopted, the provisions shall apply to all new development and to substantial improvements to existing development.

AR101.3.2 The provisions of this appendix supplement the jurisdiction's building codes to provide for enhanced provisions to mitigate the hazard to life and property from natural weather related disasters, including flooding, tornadoes and other high-wind events.

AR101.3.3 The provisions of this appendix establish design and construction standards for storm shelters.

AR101.4 Violations. Any violation of a provision of this appendix or failure to comply with a permit of variance issued pursuant to this appendix or any requirement of this appendix shall be handled in accordance with the ordinances of [NAME OF JURISDICTION].

SECTION AR102 APPLICABILITY

AR102.1 General. This appendix provides enhanced minimum requirements for development of new construction and substantial improvement of existing development above that contained in the *International Residential Code* (IRC).

AR102.1.1 Regardless of the category of work being performed, the work shall not cause the structure to become unsafe or adversely affect the performance of the building; shall not cause an existing mechanical or plumbing system to become unsafe, hazardous, insanitary or overloaded; and unless expressly permitted by these provisions, shall not make the building any less compliant with this appendix or to any previously approved alternative arrangements than it was before the work was undertaken.

AR102.1.2 Where there is a conflict between a requirement of the *International Residential Code* and a requirement of this appendix, the requirement of this appendix shall govern. Where there is a conflict between a general requirement of this appendix and a specific requirement of this appendix, the specific requirement shall govern. Where, in any specific case, different sections of this appendix specify different materials, methods of construction or other requirements, the most restrictive shall govern.

AR102.2 Other laws. The provisions of this appendix shall not be deemed to nullify any provisions of local, state or federal law.

AR102.3 Referenced codes and standards. The codes and standards referenced in this appendix shall be those that are listed in Chapter AR7 and such codes and standards shall be considered as part of the requirements of this appendix to the prescribed extent of each such reference. Where differences occur between provisions this appendix and references and standards, the provisions of this appendix shall apply.

SECTION AR103
POST DISASTER EVENT INSPECTIONS
GUIDELINES

AR103.1 Inspections. The building official or agents shall inspect residential buildings and structures to determine the habitability of each with the goal of getting the community back into their residences quickly and safely. Inspections shall always be performed by teams of at least two individuals, also known as disaster assessment teams.

AR103.1.1 Right of entry. Unless permitted under the exigent circumstances provisions or from an order from State or Federal Authorities, disaster assessment teams shall confirm the right of entry requirements with the incident commander. Upon approval, the assessment teams shall be authorized to enter the structure or premises at reasonable times to inspect or perform duties as provided by this code, provided that the structure or premises be occupied, that credentials are presented, that entry is requested, and that entry is granted by the owner or person having charge over the structure or premises.

AR103.2 Types of inspections.

AR103.2.1 Rapid evaluation. Rapid evaluation is performed after a disaster event to determine if a building is apparently safe or obviously unsafe. The evaluation should last 10 to 30 minutes per building and shall be performed by the building official and/or their designated responders. Evaluation shall determine if a detailed evaluation is necessary. Placards are posted on buildings indicating status as one of the following:

1. INSPECTED
2. RESTRICTED USE
3. UNSAFE

See Section AR605 for Placards that may be reproduced for use in the field during evaluations. The jurisdiction shall alter placards to meet the jurisdiction and building department's requirements.

AR103.2.2 Detailed evaluation. Detailed evaluation is a thorough visual examination of a damaged building performed by a team of two, including an inspector and a design professional. Evaluation should last 30 minutes to 4 hours per building. Evaluation shall determine necessary restrictions on a damaged building's use, the need for an engineering evaluation or to evaluate postings.

AR103.2.3 Engineering evaluation. When indicated by the building official as necessary, engineering evaluations shall be completed by a registered design professional hired by the building owner.

AR103.3 Post disaster building safety evaluation Chart. See Figure AR103.3 for Post Disaster Building Safety Evaluation Chart.

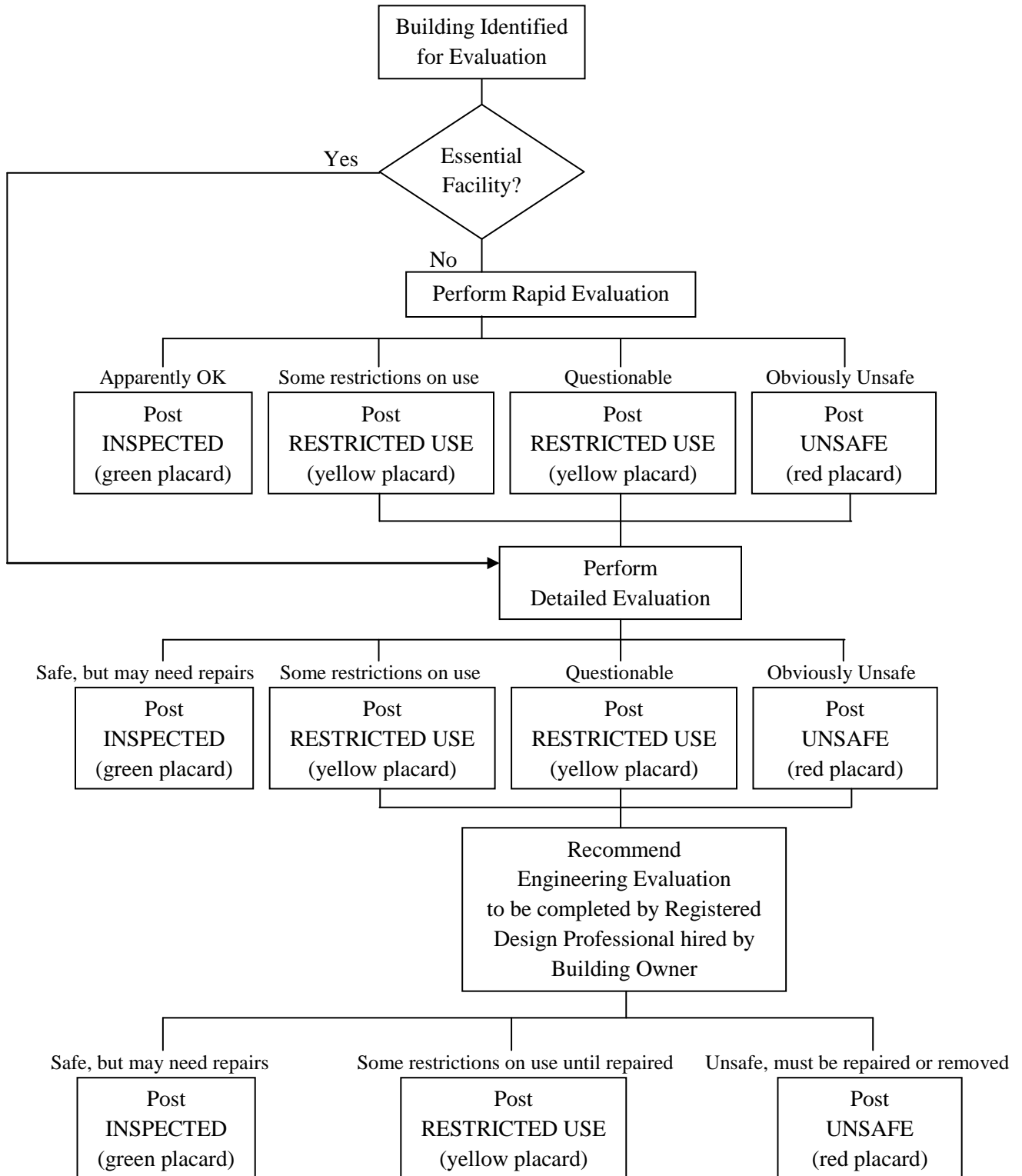
AR103.4 Evaluation forms. *ATC-45 Rapid Evaluation Safety Assessment Form* and *ATC-45 Detailed Evaluation Safety Assessment Form* shall be used by [NAME OF JURISDICTION]'s Building Official for post disaster inspections. See Section AR605 for copies of the Safety Assessment Forms.

AR103.5 Placement and removal of placards.

AR103.5.1 Placement. Placards are to be posted in a clearly visible location near the main entrance and shall be visible from the public right-of-way. In addition RESTRICTED USE or UNSAFE placards shall be placed at all entrances.

AR103.5.2 Removal. Placards shall not be removed or replaced, except by the authorized representatives of the local jurisdiction.

Figure AR103.3 Post Disaster Building Safety Evaluation Chart ^a



^(a) *When Disaster Strikes* by the International Code Council, Inc., Seventh Printing: November 2011, copyright 2007

CHAPTER AR2 DEFINITIONS

SECTION AR201 GENERAL

AR201.1 Scope. Unless otherwise expressly stated the following words and terms shall, for the purposes of this appendix, have the meanings shown in this chapter.

AR201.2 Terms defined in other codes. Where terms are not defined in this appendix and are defined in other *International Codes*, such terms shall have the meanings ascribed to them as in those codes.

AR201.3 Terms not defined. Where terms are not defined through the methods authorized by this section, such terms shall have their ordinarily accepted meanings such as the context implies.

SECTION AR202 DEFINITIONS

500-YEAR FLOOD. Flood having a 0.2% annual probability of being equaled or exceeded.

ADVISORY BASE FLOOD ELEVATION (ABFE). An advisory base flood elevation (BFE) issued by the Federal Emergency Management Agency (FEMA) that reflects post-storm conditions and vulnerability to damages from future flooding.

BASE FLOOD. Flood having a 1% chance of being equaled or exceeded in any given year, also referred to as the 100-year flood.

BASE FLOOD ELEVATION (BFE). The elevation of flooding, including wave height, having a 1% chance of being equaled or exceeded in any given year established relative to the National Geodetic Vertical Datum (NGVD), North American Vertical Datum (NAVD) or other datum specified on the *Flood Insurance Rate Map (FIRM)*.

BUILDING OFFICIAL. The officer or other designated authority charged with the administration and enforcement of the *International Residential Code*, or the building official's duly authorized representative.

DESIGN FLOOD. The greater of the following two flood events:

- (1) The *base flood*, affecting those areas identified as *special flood hazard areas* on the community's FIRM;

- (2) The flood corresponding to the area designated as a *flood hazard area* on a community's *flood hazard map* or otherwise legally designated.

DESIGN FLOOD ELEVATION (DFE). The elevation of the *design flood*, including wave height, relative to the datum specified on the community's legally designated flood hazard map. In areas designated as Zone AO, the *design flood elevation* shall be the elevation of the highest existing grade of the building's perimeter plus the depth number (in feet) specified on the flood hazard map.

FLOOD [DAMAGE]-RESISTANT MATERIAL. Any building product [material, component or system] capable of withstanding direct and prolonged contact with floodwaters without sustaining significant damage.

FLOOD HAZARD AREA. The area subject to flooding during the *design flood*.

FLOOD HAZARD MAP. Map delineating *flood hazard areas* adopted by the authority having jurisdiction.

FLOOD INSURANCE RATE MAP (FIRM). An official map of a community on which the Federal Emergency Management Agency (FEMA) has delineated both the *special flood hazard areas* and the risk premium zones applicable to the community.

FREEBOARD. A factor of safety expressed in feet above a flood level for purposes of floodplain management.

FUTURE-CONDITIONS FLOOD. The flood having a 1% chance of being equaled or exceeded in any given year based on future-conditions hydrology. Also known as the 100-year future-conditions flood.

FUTURE-CONDITIONS FLOOD ELEVATION. The flood standard equal to or higher than the Base Flood Elevation. The future-conditions flood elevation is defined as the highest water surface anticipated at any given point during the future-conditions flood.

CHAPTER AR3 FLOOD-RESISTANT CONSTRUCTION

Forward: This appendix provides three different options for increased freeboard. The jurisdiction may pick only one option that is higher than previously adopted and enforced by the jurisdiction. The National Flood Insurance Program (NFIP) minimum standards reference Base Flood Elevation without any freeboard in high risk flood hazard areas. Due to the flood damage prevention updates performed during the Map Modernization initiative that led to flood risks being digitally identified in all 159 Georgia counties, all Georgia NFIP participating communities have freeboard standards that meet or exceed the 1 foot standard used in the State model ordinances for areas where BFEs have been established.

SECTION AR301 HAZARD IDENTIFICATION

AR301.1 Identification of flood hazard areas. To establish flood hazard areas:

- (a) flood hazard map adopted by jurisdiction based on areas of special flood hazard as identified by the Federal Emergency Management Agency in an engineering report entitled “The Flood Insurance Study of [INSERT NAME OF JURISDICTION],” dated [INSERT DATE ISSUANCE], and amended or revised with the accompanying Flood Insurance Rate Map (FIRM) and Flood Boundary and Floodway Map (FBFM) and related supporting data along with any revisions thereto.
- (b) FIRM maps provided by the Federal Emergency Management Agency.

SECTION AR302 SCOPE

AR302.1 Flood loads. Buildings designed and constructed in flood hazard areas defined in Table R301.2(1) of the *International Residential Code* shall comply with the following:

AR302.1.1 Flood hazard areas without base flood elevations. In flood hazard areas without base flood or future-conditions flood elevation data, new construction and substantial improvements of existing structures shall have the lowest floor of the lowest enclosed area (including basement) elevated no less than three (3) feet above the highest adjacent grade to the building foundation.

OPTION A – FLOOD ELEVATION

AR302.1.2 Increase to base flood elevation requirements. Floors required by ASCE 24 to be built above base flood elevations as follows:

The higher of:

- (a) Design flood elevation plus one (1) foot, or
- (b) Base flood elevation plus one (1) foot, or
- (c) Advisory base flood elevation, or
- (d) Future-conditions plus one (1) foot, if known or

- (e) 500-year flood, if known

OPTION B– FLOOD ELEVATION

AR302.1.3 Increase to base flood elevation requirements. Floors required by ASCE 24 to be built above base flood elevations as follows:

The higher of:

- (a) Design flood elevation plus two (2) feet, or
- (b) Base flood elevation plus two (2) feet, or
- (c) Advisory base flood elevation, or
- (d) Future-conditions plus one (1) foot, if known or
- (e) 500-year flood, if known

OPTION C – FLOOD ELEVATION

AR302.1.4 Increase to base flood elevation requirements. Floors required by ASCE 24 to be built above base flood elevations as follows:

The higher of:

- (a) Design flood elevation plus three (3) feet, or
- (b) Base flood elevation plus three (3) feet, or
- (c) Advisory base flood elevation, or
- (d) Future-conditions plus one (1) foot, if known or
- (e) 500-year flood, if known

SECTION AR303 FLOOD DAMAGE-RESISTANT MATERIALS

AR303.1 Flood damage-resistant materials. Flood damage-resistant materials comply with FEMA Technical Bulletin 2, Table 2. Types, Uses, and Classifications of Materials.

AR303.2 Location of flood damage-resistant materials. Building components and materials located below the increase to base flood elevation as determined by the local jurisdiction in accordance with AR302.1 shall be flood damage-resistant as defined by Section AR303.1.

AR303.3 Fasteners and connectors used for flood damage-resistant materials. Fasteners and connectors used for flood damage-resistant materials to be made of stainless steel, hot-dipped zinc-coated galvanized steel, mechanically deposited-zinc coated, silicon bronze or copper. Copper fasteners shall not be permitted for use in conjunction with steel.

CHAPTER AR4 HIGH-WIND RESISTIVE CONSTRUCTION

Forward: This appendix provides four different options for increased wind speed. The jurisdiction may pick only one option that is higher than the mapped wind speed shown in the International Residential Code.

SECTION AR401 GENERAL

AR401.1 Scope. The provisions of this appendix shall govern the structural design of one- and two-family dwellings (townhouses) not more than three stories in height with separate means of egress and their accessory structures. The building or structure shall comply with all aspects of the International Residential Code in addition to the requirements of this appendix.

AR401.2 Continuous load path. A continuous load path shall be provided to transmit the applicable forces from the roof assembly to the foundation.

AR401.3 Adoption of wind speed. [INSERT NAME OF JURISDICTION] adopts Option [PICK A, B, C, or D] MINIMUM WIND SPEED [INSERT WIND SPEED].

AR401.4 Alternative materials, design and methods of construction and equipment. The provisions of this appendix are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this appendix, provided such material is listed and tested for such application intended. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this appendix, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this appendix. Compliance with the specific performance-based provisions of the International Codes in lieu of specific requirements of this appendix shall also be permitted as an alternate.

AR401.4.1 Tests. Whenever there is insufficient evidence of compliance with the provisions of this appendix, or evidence that a material or method does not conform to the requirements of this appendix, or in order to substantiate claims for alternative materials or methods, the *building official* shall have the authority to require tests as evidence of compliance to be made at no expense to the *jurisdiction*. Test methods shall be as specified in this appendix or by other recognized test standards. In the absence of recognized and accepted test methods, the *building official* shall approve the testing procedures. Tests shall be performed by an

approved agency. Reports of such tests shall be retained by the *building official* for the period required for retention of public records.

SECTION AR402 OPTION A – MINIMUM WIND SPEED 100 MPH

AR402.1 Wind speed. Buildings shall be designed and constructed to comply with minimum wind speed of 100 mph Exposure B in accordance with AR402.1.1 or in accordance with Prescriptive Method AR402.2. Buildings with minimum wind speed of 100 mph Exposure C shall be in accordance with AR402.1.1.

AR402.1.1 Design methods. The design of buildings for wind loads shall be in accordance with one or more of the following methods:

1. *AF&PA Wood Frame Construction Manual (WFCM)*, or
2. *AF&PA Wood Frame Construction Manual Guide to Wood Construction in High Wind Areas for One- and Two-Family Dwellings: 100 MPH Exposure B (WFCM)*; or
3. *ICC Standard for Residential Construction in High-Wind Regions (ICC 600)*; or
4. *ASCE Minimum Design Loads for Buildings and Other Structures (ASCE 7)*; or
5. *AISI Standard for Cold-Formed Steel Framing – Prescriptive Method For One- and Two-Family Dwellings (AISI S230)*; or
6. *International Building Code*; or
7. *Concrete walls in accordance with R404 and R611 of the International Residential Code*; or
8. *Walls of structural insulated panels in accordance with R613 of the International Residential Code*.

AR402.2 Prescriptive wood frame construction method deemed to comply with 100 MPH Exposure B. Prescriptive construction method for wood frame structures shall be in accordance with IRC requirements for 100 mph Exposure B construction as modified in this section. A continuous load path shall be provided to transmit uplift forces from the roof assembly to the ground as follows:

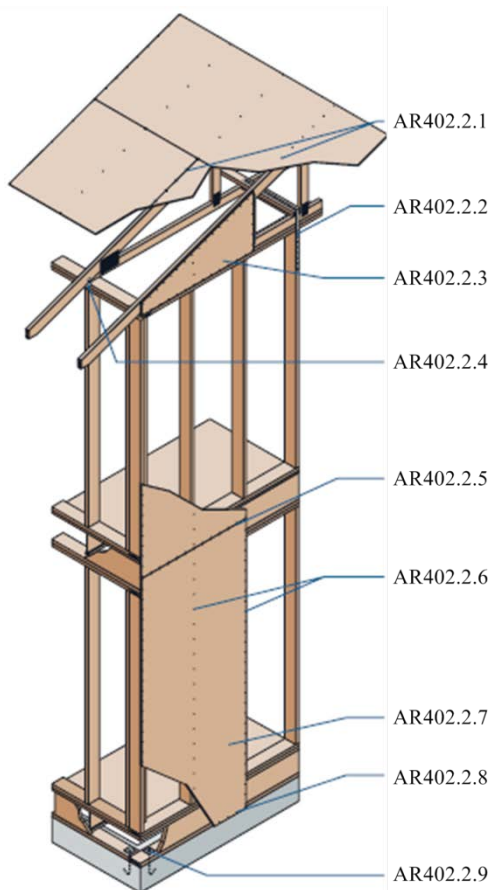


Figure AR402.2^b

(b) Form No. M310B © 2011 APA – The Engineered Wood Association.

AR402.2.1 Roof sheathing attachment. Nail roof sheathing with 8d ring shank (or deformed shank) (0.131" x 2-1/2") nails at 4 inches on center along the ends of the sheathing and gable end framing 6 inches on center along intermediate framing. See Figure AR402.2.1.

AR402.2.2 Gable end wall connection. Tie gable end walls back to the structure. See Figure AR402.2.2.

AR402.2.3 Gable end wall sheathing. Continuously sheath gable end walls with wood structural panels or equivalent approved material meeting loading requirements. See Figure AR402.2.3.

AR402.2.4 Roof framing to wall connection. Connect roof framing to wall using an approved connector or connectors having allowable loads when attached to Southern Pine or Douglas Fir lumber of 585 pounds in the upward direction, 485 pounds in the direction parallel to the wall and 165 pounds in the direction perpendicular to the wall. Attachment to be

on exterior face of the exterior walls. See Figure AR402.2.4.

AR402.2.5 Sheathing attachment at elevated floor level. Nail upper story sheathing and lower story sheathing into common wood structural panel or engineered rim board. See Figure AR402.2.5.

AR402.2.6 Wall sheathing attachment. Attach wall sheathing with 8d common (0.131" x 2-1/2") nails at 4 inches on center at end and edges of wood structural panels and 6 inches on center in the intermediate framing. See Figure AR402.2.6a. Adjacent edges in wood structural panel wall sheathing that do not occur over common framing members shall be attached to flat wise blocking as illustrated in Figure AR402.2.6b.

AR402.2.7 Continuous wall sheathing. Continuously sheath all walls with wood structural panels or equivalent approved material meeting loading requirements. Continuously sheath areas around openings for windows and doors. Minimum wall bracing requirements shall be in accordance with IRC Section R602.10 or R602.12 continuous sheathing methods as modified in Section AR402.2.

AR402.2.8 Wall sheathing to sill plate connection. Extend sheathing material to lap the sill plate. See Figure AR402.2.8.

AR402.2.9 Anchor bolt connection. Space 1/2" anchor bolts with 7 inches of embedment 48 inches on center with 0.229" x 3" x 3" square plate washers with slotted holes. See Figure AR402.2.9. There shall be a minimum of 2 bolts per plate section with one bolt located not more than 12" or less than 3.5" from each end of the plate section.

AR402.2.10 Top plate intersection detail. Double top plates shall be provided at the top of all exterior stud walls. The double plates shall overlap at corners and at intersections with other exterior or interior load bearing walls. Double top plates shall be lap-spliced with end joints offset in accordance with the minimum requirements given in the *WFCM Guides to Wood Construction in High Wind Areas for One- and Two-Family Dwellings: 100 MPH Exposure B*. See Figure AR402.2.10.

AR402.3 Wall openings. Uplift load path connections at wall openings shall be in accordance with IRC Section R602.3.5.

NAIL ROOF SHEATHING WITH 8d RING SHANK (0.131" X 2-1/2") OR DEFORMED SHANK NAILS AT 4" ON CENTER ALONG THE ENDS OF THE SHEATHING AND GABLE END FRAMING 6 INCHES ON CENTER ALONG INTERMEDIATE FRAMING

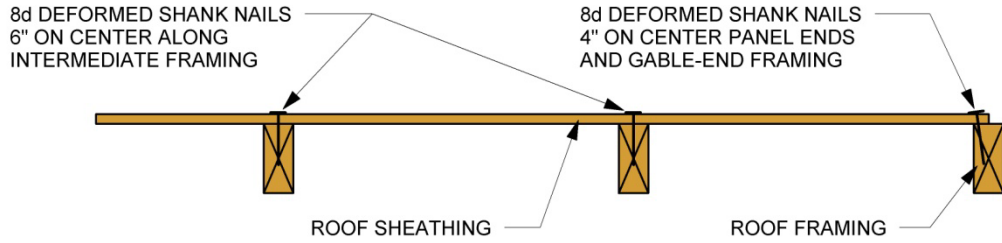


Figure AR402.2.1^b
Roof Sheathing Attachment Detail

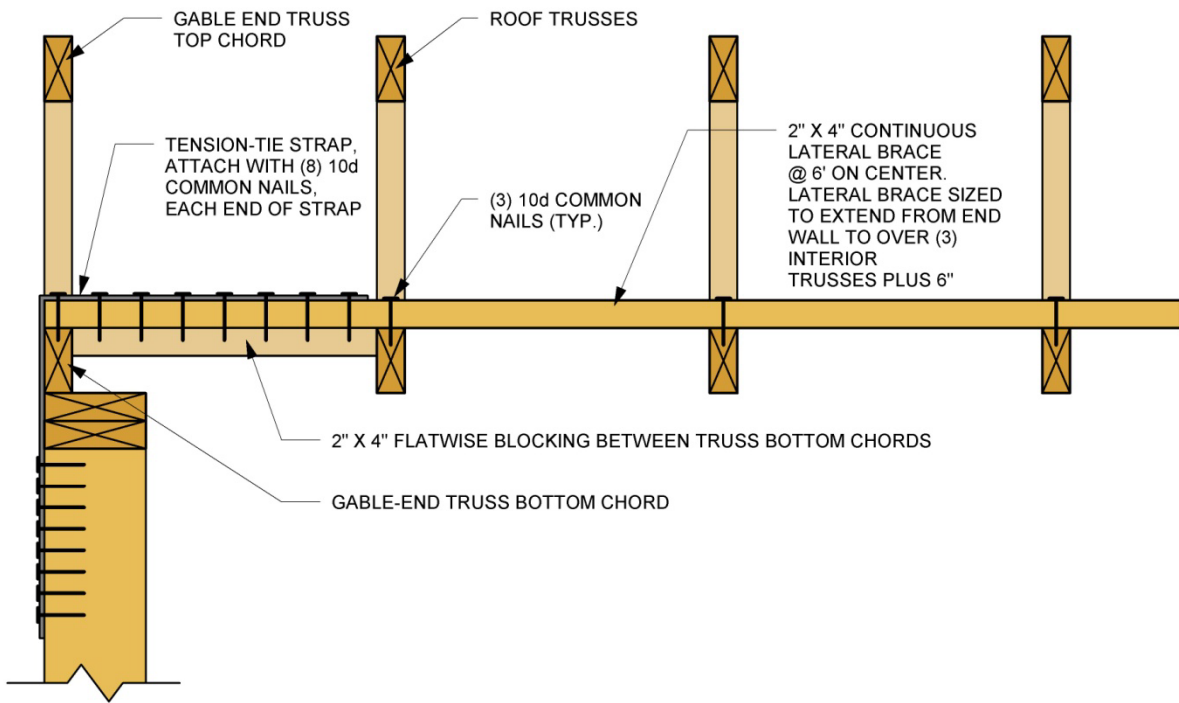


Figure AR402.2.2^b
Gable End Wall Connection Detail

SHEATH GABLE END WALLS WITH WOOD STRUCTURAL PANELS OR EQUIVALENT APPROVED MATERIAL MEETING LOADING REQUIREMENTS

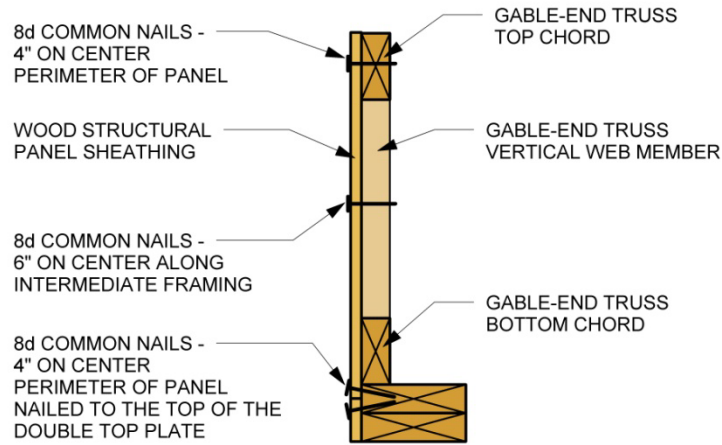


Figure AR402.2.3^b
Gable End Wall Sheathing Detail

ROOF FRAMING TO WALL CONNECTION WITH FRAMING ANCHOR TO MEET UPLIFT AND SHEAR CAPACITY ATTACHED ON SHEATHING SIDE OF THE EXTERIOR WALLS

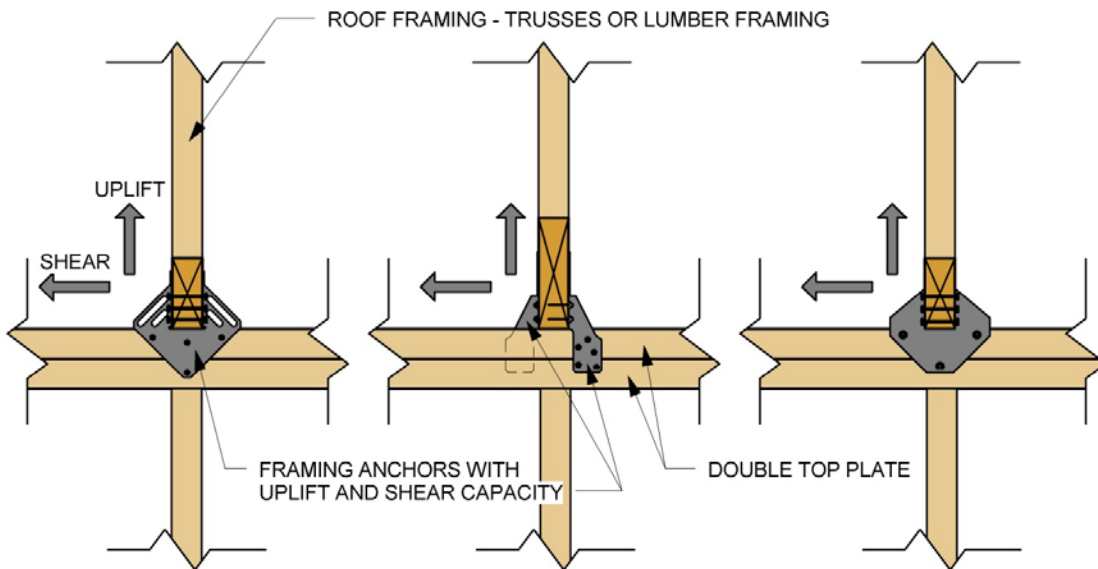


Figure AR402.2.4^b
Roof Framing to Wall Connection Detail

NAIL OFF UPPER STORY AND LOWER STORY SHEATHING INTO COMMON WOOD STRUCTURAL PANEL RIM BOARD

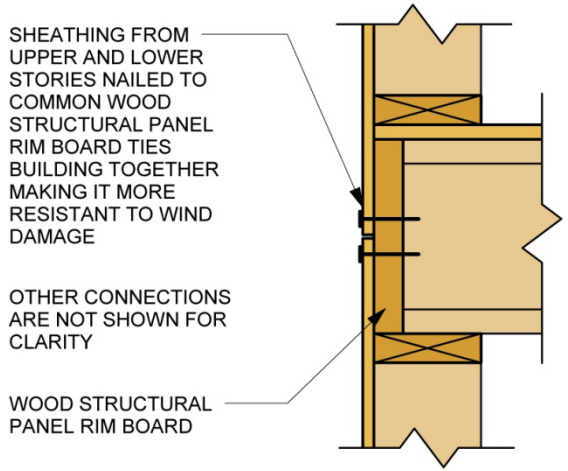


Figure AR402.2.5^b
Sheathing Attachment at Elevated Floor Level Detail

NAIL WALL SHEATHING WITH 8d COMMON (0.131" X 2-1/2") NAILS AT 4" ON CENTER IN THE BOUNDARY OF WOOD STRUCTURAL PANEL WALLSHEATHING AND 6" ON CENTER IN THE INTERMEDIATE STUDS

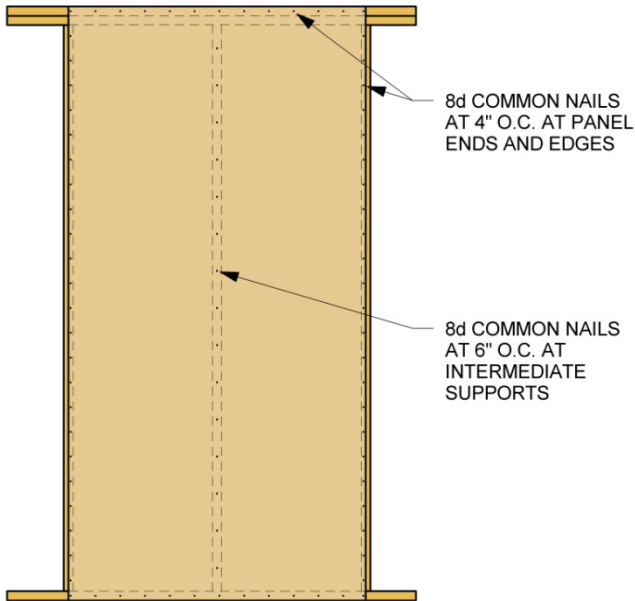


Figure AR402.2.6a^b
Wall Sheathing Attachment Detail

WOOD STRUCTURAL PANEL FLAT-WISE BLOCKING DETAIL

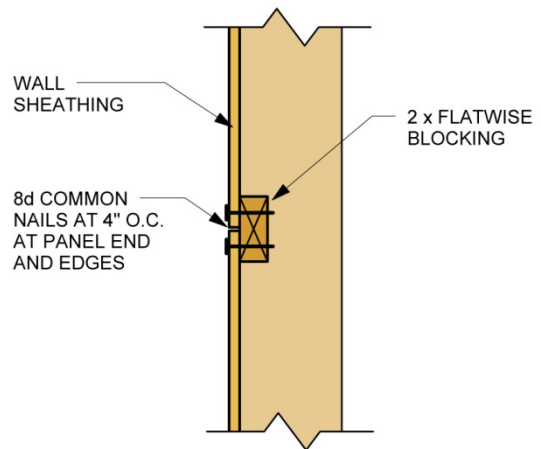


Figure AR402.2.6b
Panel Splice Detail

EXTEND WOOD STRUCTURAL PANEL SHEATHING AT BOTTOM WALL TO SILL PLATE INTERSECTION

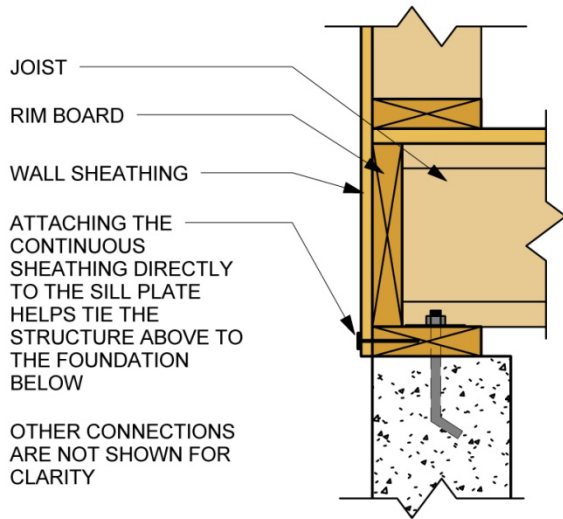


Figure AR402.2.8^b

Wall Sheathing to Sill Plate Connection Detail

SPACE 1/2" ANCHOR BOLTS 48" ON CENTER WITH 0.229" X 3" X 3" SLOTTED SQUARE PLATE WASHERS AT THE WALL TO SILL PLATE INTERSECTION

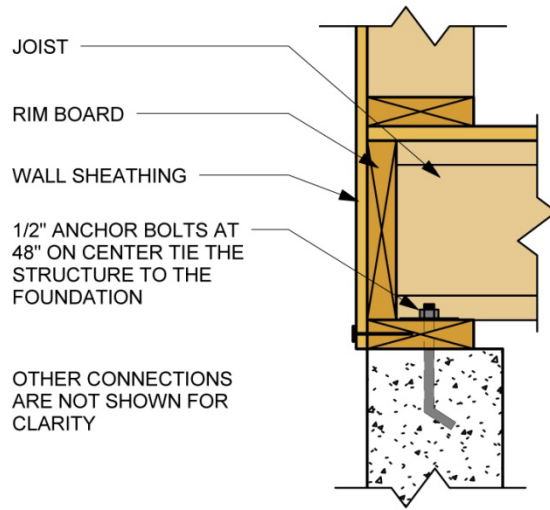


Figure AR402.2.9^b

Anchor Bolt Connection Detail

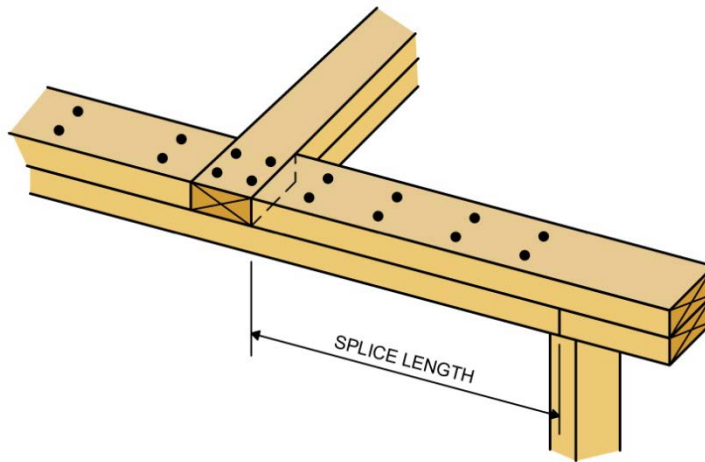


Figure AR402.2.10^c

Top Plate Intersection Detail

(b) *Form No. M310B* August 2011 APA – The Engineered Wood Association

(c) *WFCM Guide to Wood Construction in High Wind Areas for One- and Two-Family Dwellings* – American Forest & Paper Association and the American Wood Council

SECTION AR403

OPTION B –MINIMUM WIND SPEED 110 MPH

AR403.1 Wind speed. Buildings shall be designed and constructed to comply with minimum wind speed of 110 mph Exposure B.

AR403.1.1 Design methods. The design of buildings for wind loads shall be in accordance with one or more of the following methods:

1. AF&PA *Wood Frame Construction Manual* (WFCM); or
2. ICC *Standard for Residential Construction in High-Wind Regions* (ICC 600); or
3. ASCE *Minimum Design Loads for Buildings and Other Structures* (ASCE 7); or
4. AISI *Standard for Cold-Formed Steel Framing – Prescriptive Method For One- and Two-Family Dwellings* (AISI S230); or
5. *International Building Code*; or
6. *Concrete walls in accordance with R404 and R611 of the International Residential Code*; or
7. *Walls of structural insulated panels in accordance with R613 of the International Residential Code*.

SECTION AR404

OPTION C –MINIMUM WIND SPEED 120 MPH

AR404.1 Wind speed. Buildings shall be designed and constructed to comply with minimum wind speed of 120 mph Exposure B.

AR404.1.1 Design methods. The design of buildings for wind loads shall be in accordance with one or more of the following methods:

1. AF&PA *Wood Frame Construction Manual* (WFCM); or
2. ICC *Standard for Residential Construction in High-Wind Regions* (ICC 600); or
3. ASCE *Minimum Design Loads for Buildings and Other Structures* (ASCE 7); or
4. AISI *Standard for Cold-Formed Steel Framing – Prescriptive Method For One- and Two-Family Dwellings* (AISI S230); or
5. *International Building Code*; or
6. *Concrete walls in accordance with R404 and R611 of the International Residential Code*; or
7. *Walls of structural insulated panels in accordance with R613 of the International Residential Code*.

SECTION AR405

OPTION D – MINIMUM WIND SPEED 130 MPH

AR405.1 Wind speed. Buildings shall be designed and constructed to comply with minimum wind speed of 130 mph Exposure B.

AR405.1.1 Design methods. The design of buildings for wind loads shall be in accordance with one or more of the following methods:

1. AF&PA *Wood Frame Construction Manual* (WFCM); or
2. ICC *Standard for Residential Construction in High-Wind Regions* (ICC 600); or
3. ASCE *Minimum Design Loads for Buildings and Other Structures* (ASCE 7); or
4. AISI *Standard for Cold-Formed Steel Framing – Prescriptive Method For One- and Two-Family Dwellings* (AISI S230); or
5. *International Building Code*; or
6. *Concrete walls in accordance with R404 and R611 of the International Residential Code*.

SECTION AR406

FASTENERS AND CONNECTORS FOR CLADDING

AR406.1 Fasteners and connectors for cladding. Fasteners and connectors to be made of stainless steel, hot-dipped zinc-coated galvanized steel, mechanically deposited-zinc coated, silicon bronze or copper. Copper fasteners shall not be permitted for use in conjunction with steel.

SECTION AR407

FENESTRATION

AR407.1 Design pressure. Exterior windows and doors shall be designed to resist the design wind loads specified in *International Residential Code* Table R301.2(2) adjusted for height and exposure per *International Residential Code* Table R301.2(3) based on the minimum wind speed specified in this appendix by the local jurisdiction.

AR407.2 Anchorage methods. Window and door assembly anchoring systems shall be in accordance with the manufacturer's published recommendations to achieve the design pressure specified per Section AR407.1. Substitute anchoring systems shall provide equal or greater anchoring performance as demonstrated by accepted engineering practice. Anchorage shall not exceed the spacing for the tested rated performance.

SECTION AR408
ROOFING

AR408.1 Secondary water barrier. Underlayment shall be two layers applied in the following manner:

- (a) **Self-adhering tape as first layer.** Install minimum 4 inch wide self-adhering modified bitumen tape over sheathing joints. Seal deck penetrations with self-adhering modified bitumen tape. **ASTM D 226 Type I, ASTM D 4869 Type I or ASTM D 6757** as second layer. Apply a 19-inch strip of underlayment felt parallel to and starting at eaves, secure with low-profile, capped-head nails or thin metal disks attached with roofing nails. Fasten at approximately 6 inches on center along the laps and at approximately 12 inches on center along a row in the field of the sheet between the side laps. All laps shall be a minimum of 4 inches. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches, fasten as before. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.
- (b) **Two layers of ASTM D 226 Type I, ASTM D 4869 Type I or ASTM D 6757.** For each layer, apply a 19-inch strip of underlayment felt parallel to and starting at eaves, secure with low-profile, capped-head nails or thin metal disks attached with roofing nails. Fasten at approximately 6 inches on center along the laps and at approximately 12 inches on center along a row in the field of the sheet between the side laps. All laps shall be a minimum of 4 inches. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches, fasten as before. Distortions in the underlayment shall not interfere with the ability of the shingles to seal.

Exception: As an alternative, adhered underlayment complying with ASTM D 1970 shall be permitted.

AR408.2 Fasteners.

AR408.2.1 Underlayment fasteners. Underlayment shall be attached using metal or plastic cap corrosion-resistant nails with a head diameter of not less than 1 inch with a thickness of at least 32-gauge sheet metal. The cap-nail shank shall be a minimum of 12 gauge with a sufficient length to penetrate through the roof sheathing or a minimum of 3/4 inch into the roof sheathing.

AR408.2.2 Asphalt shingles fasteners. Where asphalt shingles shall be applied with corrosion-resistant nails with shanks made of minimum 12 gauge wire and a minimum head diameter of 3/8 inch. Nails shall be long enough to penetrate 3/4 inch into the roof deck. Where the deck is less than 3/4 inch thick, the nails shall be long enough to penetrate completely through plywood decking and extend at least 1/8 inch through the roof deck.

AR408.3 Attachment. Where asphalt shingles shall have a minimum number of fasteners required by the manufacturer, but not less than six fasteners per strip shingle or three fasteners per individual shingle. Drive nail head flush with the shingle surface per figure AR408.2.

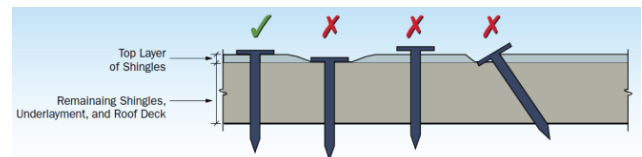


Figure AR408.2^d

(d) FEMA Home Builder's Guide to Coastal Construction Technical Fact Sheet No. 7.3 Asphalt Shingle Roofing for High Wind Regions.

CHAPTER AR5
RESIDENTIAL STORM SHELTERS AND SAFE ROOMS

SECTION AR501
GENERAL

AR501.1 General. This section applies to the construction of residential storm shelters and safe rooms when constructed as separate detached buildings or as internal areas within buildings for the purpose of providing safe refuge for storms that produce high winds, such as tornados and hurricanes. Residential storm shelters or safe rooms shall be offered as an optional package.

SECTION AR502
RESIDENTIAL STORM SHELTERS AND SAFE ROOMS

AR502.1 Residential storm shelters. Residential storm shelters when constructed shall be in compliance with the following:

1. *ICC/NSSA-500* per IRC Section R323.

AR502.2 Residential safe rooms. Residential safe rooms when constructed shall be in compliance with the following:

1. *FEMA 361 Design and Construction Guidance for Community Safe Rooms*; or
2. *FEMA 320 Taking Shelter from the Storm: Building a Safe Room For Your Home and Small Business*

CHAPTER AR6 RESOURCES

SECTION AR601 CONTACTS

Georgia Department of Community Affairs (DCA) Construction Codes

Georgia State Amendments to the State Minimum
Standard Codes

<http://www.dca.ga.gov/development/constructioncodes/programs/codeAmendments.asp>

Phone: 404-679-3118

Georgia Department of Natural Resources (DNR) Floodplain Management

4220 International Parkway, Ste. 101
Atlanta, GA 30354-3902

www.georgiadfirm.com

Phone: 404-675-1757

Federal Emergency Management Agency (FEMA)

www.fema.gov; www.floodsmart.gov

www.fema.gov/rebuild/buildingscience/

FEMA Publications and Technical Bulletins:

www.fema.gov/library/index.jsp

www.fema.gov/plan/prevent/floodplain/techbul.shtm

Georgia Emergency Management Agency (GEMA)

Georgia Office of Homeland Security

P.O. Box 18055

Atlanta, GA 30316-0055

www.gema.ga.gov

www.ready.ga.gov

Phone: 404-635-7000

Georgia Association of Regional Commissions (GARC)

www.garc.ga.gov

<http://garc.ga.gov/main.php?Regional-Commissions-2>

(for assistance in identifying Flood Hazard Areas)

International Code Council (ICC)

www.iccsafe.org

National Weather Service

www.srh.weather.gov

State Fire Marshal's Office

2 Martin Luther King Jr. Drive

Suite 920 / West Tower

Atlanta, Georgia 30334

www.oci.ga.gov

Phone: 404-656-7087

SECTION AR602 EMERGENCY INSPECTION KIT^e

- | | | |
|--|---|---|
| <input type="checkbox"/> Staff's disaster response management plan | <input type="checkbox"/> Safety glasses | <input type="checkbox"/> Duct tape |
| <input type="checkbox"/> Team contact list | <input type="checkbox"/> Sunglasses | <input type="checkbox"/> Staples & stapler |
| <input type="checkbox"/> Area maps | <input type="checkbox"/> Pocket knife | <input type="checkbox"/> Staple gun |
| <input type="checkbox"/> Official identification | <input type="checkbox"/> Matches | <input type="checkbox"/> Calculator |
| <input type="checkbox"/> Personal identification | <input type="checkbox"/> Antibacterial hand wipes or alcohol-based hand sanitizer | <input type="checkbox"/> Tire repair kit |
| <input type="checkbox"/> Inspection forms and placards | <input type="checkbox"/> Insect repellent (w/ Deet or Picaridin) | <i>Remember to grab:</i> |
| <input type="checkbox"/> Communication equipment | <input type="checkbox"/> Sunscreen (SPF 15 or greater) | <input type="checkbox"/> Personal identification |
| <input type="checkbox"/> Clipboard | <input type="checkbox"/> Camera | <input type="checkbox"/> Rain gear, extra clothing |
| <input type="checkbox"/> Hard hat | <input type="checkbox"/> Black markers | <input type="checkbox"/> Water bottle |
| <input type="checkbox"/> Orange safety vest | <input type="checkbox"/> Pens & pencils | <input type="checkbox"/> Prescription medication |
| <input type="checkbox"/> Dust mask | <input type="checkbox"/> Envelope for expense receipts | <input type="checkbox"/> Cell phone and charger |
| <input type="checkbox"/> Work gloves | <input type="checkbox"/> Compass, GPS unit | <input type="checkbox"/> Cash for personal expenses |
| <input type="checkbox"/> Steel toe and waterproof boots | <input type="checkbox"/> Backpack, waistpack | <input type="checkbox"/> Toiletries |
| <input type="checkbox"/> Whistle | <input type="checkbox"/> Flashlight and extra batteries | |
| <input type="checkbox"/> First aid kit | <input type="checkbox"/> Battery-operated radio | |
| <input type="checkbox"/> Latex gloves | | |

(e) *Disaster Mitigation: A Guide for Building Departments* by the International Code Council, Inc., copyright 2009

SECTION AR603

SAFETY TIPS ^a

1. Always travel in teams of at least two people.
2. Always wear a hard hat, gloves, goggles, safety vest, and dust masks.
3. Always wear safety shoes capable of protecting the toes and bottom of the foot.
4. Survey the building exterior completely before entering.
5. Enter building only if authorized and if deemed safe to do so.
6. Be alert for falling objects.
7. In case of fire, injuries or victims, evacuate the area and alert the fire department immediately.
8. Avoid downed power lines and buildings under them or water surrounding them.
9. In case of gas leaks, shut off the gas (if possible) and report the leak.
10. In a flood situation, have a “walking stick.”

(a) *When Disaster Strikes* by the International Code Council, Inc., Seventh Printing: November 2011, copyright 2007

SECTION AR604

MAJOR DISASTER PROCESS

(from link <http://www.fema.gov/hazard/dproc.shtm>)

A Major Disaster Declaration usually follows these steps:

- **Incident occurs and local government responds**, supplemented by neighboring communities and volunteer agencies. If overwhelmed, turn to the state for assistance;

Generally the local government will issue a local state of emergency

- **The State responds** with state resources, such as the National Guard and state agencies;

Prior to committing state resources, the Governor will declare a state of emergency in the counties impacted by the event for which assistance is needed.

- **Damage assessment** by local, state, federal, and volunteer organizations determine losses and recovery needs;

Generally the locals will submit a preliminary damage assessment to the State and the State will review and determine if state and/or federal assistance is needed. If federal assistance is needed, the state will request FEMA perform a preliminary joint damage assessment. If the Governor determines that the incident is of such severity and magnitude that effective response is beyond the capabilities of the State and the affected local governments then supplementary Federal assistance is requested (next step).

- **A Major Disaster Declaration** is requested by the Governor, based on the damage assessment, and agreement to commit state funds and resources to the long-term recovery;
- **FEMA evaluates** the request and recommends action to the White House based on the disaster, the local community and the state's ability to recover;
- **The President approves** the request or FEMA informs the Governor it has been denied. This decision process could take a few hours or several weeks depending on the nature of the disaster.

SECTION AR605

SAMPLE EVALUATION FORMS AND INSPECTION PLACARDS ^e (following pages)

Figure AR605.1 °

ATC-45 Rapid Evaluation Safety Assessment Form

Inspection

Inspector ID: _____ Inspection date: _____

Affiliation: _____ Inspection time: _____ AM PM

Areas inspected: Exterior only Exterior and interior

Building Description

Building name: _____ Type of Building

Address: _____ Mid-rise or high-rise Pre-fabricated

_____ Low-rise multi-family One- or two-family dwelling

_____ Low-rise commercial

Building contact/phone: _____ Primary Occupancy

Number of stories: _____ Dwelling Commercial Government

"Footprint area" (square feet): _____ Other residential Offices Historic

Number of residential units: _____ Public assembly Industrial School

_____ Emergency services Other: _____

Evaluation

Investigate the building for the conditions below and check the appropriate column.

Observed Conditions:	Minor/None	Moderate	Severe	Estimated Building Damage (excluding contents)
Collapse, partial collapse, or building off foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> None
Building significantly out of plumb or in danger	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> > 0 to < 1%
Damage to primary structural members, racking of walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 1 to < 10%
Falling hazard due to nonstructural damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 10 to < 30%
Geotechnical hazard, scour, erosion, slope failure, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 30 to < 70%
Electrical lines / fixtures submerged / leaning trees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 70 to < 100%
Other (specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> 100%

See back of form for further comments.

Posting

Choose a posting based on the evaluation and team judgment. Severe conditions endangering the overall building are grounds for an Unsafe posting. Localized Severe and overall Moderate conditions may allow a Restricted Use posting.

INSPECTED (Green placard) **RESTRICTED USE** (Yellow placard) **UNSAFE** (Red placard)

Record any use and entry restrictions exactly as written on placard: _____

Number of residential units vacated: _____

Further Actions

Check the boxes below only if further actions are needed.

Barricades needed in the following areas: _____

Detailed Evaluation recommended: Structural Geotechnical Other: _____

Substantial Damage determination recommended

Other recommendations: _____

See back of form for further comments.

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Figure AR605.2^e

ATC-45 Detailed Evaluation Safety Assessment Form

Inspection

Inspector ID: _____ Inspection date: _____

Affiliation: _____ Inspection time: _____ AM PM

Final Posting
from page 2

Inspected
 Restricted Use
 Unsafe

Building Description

Building name: _____

Address: _____

Building contact/phone: _____

Number of stories: _____

"Footprint area" (square feet): _____

Number of residential units: _____

Type of Building

Mid-rise or High-rise
 Low-rise multi-family
 Low-rise commercial

Pre-fabricated
 One- or two-family dwelling
 Other: _____

Primary Occupancy

Dwelling
 Other residential
 Public assembly
 Emergency services

Commercial
 Offices
 Industrial
 Other: _____

Government
 Historic
 School

Evaluation

Investigate the building for the conditions below and check the appropriate column. There is room on the second page for a sketch.

	Minor/None	Moderate	Severe	Comments
Overall hazards:				
Collapse or partial collapse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Building or story lean or drift	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Fractured or displaced foundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Structural hazards:				
Failure of significant element/connection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Column, pier, or bearing wall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Roof/floor framing or connection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Superstructure/foundation connection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Moment frame	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Diaphragm/horizontal bracing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Vertical bracing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Shear wall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Nonstructural hazards:				
Parapets, ornamentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Canopy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Cladding, glazing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Ceilings, light fixtures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Stairs, exits, access walkways, gratings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Interior walls, partitions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Mechanical & electrical equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Elevators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Building contents, other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Geotechnical hazards:				
Slope failure, debris impact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Ground movement, erosion, sedimentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Differential settlement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Continue on page 2

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INSPECTED

LAWFUL OCCUPANCY PERMITTED

This structure has been inspected (as indicated below) and no apparent structural hazard has been found.

- Inspected Exterior Only
- Inspected Exterior and Interior

Report any unsafe condition to local authorities; reinspection may be required.

Inspector Comments:

Facility Name and Address:

Date

Time

This facility was inspected under emergency conditions for:

(Jurisdiction)

Inspector ID / Agency

Do Not Remove, Alter, or Cover this Placard until Authorized by Governing Authority

RESTRICTED USE

Caution: This structure has been inspected and found to be damaged as described below:

Date _____
Time _____

Entry, occupancy, and lawful use are restricted as indicated below:

- Do not enter the following areas: _____
- Brief entry allowed for access to contents: _____
- Other restrictions: _____

Facility name and address:

This facility was inspected under emergency conditions for:

(Jurisdiction)

Inspector ID / Agency

**Do Not Remove, Alter, or Cover this Placard
until Authorized by Governing Authority**

UNSAFE

**DO NOT ENTER OR OCCUPY
(THIS PLACARD IS NOT A DEMOLITION ORDER)**

This structure has been inspected, found to be seriously damaged and is unsafe to occupy, as described below:

Date _____
Time _____

This facility was inspected under emergency conditions for:

(Jurisdiction)

Do not enter, except as specifically authorized in writing by jurisdiction. Entry may result in death or injury.

Facility Name and Address:

Inspector ID / Agency

**Do Not Remove, Alter, or Cover this Placard
until Authorized by Governing Authority**

CHAPTER AR7 REFERENCES

REFERENCED STANDARDS

ASCE Standards ASCE/SEI 24-05 Flood Resistant Design and Construction
FEMA P-320, Third Edition / August 2008 Taking Shelter From the Storm: Building a Safe Room For Your Home or Small Business, Includes Construction Plans and Cost Estimates
FEMA 361, Second Edition / August 2008 Design and Construction Guidance for Community Safe Rooms
FEMA Technical Bulletin 2, Table 2. Types, Uses, and Classifications of Materials

REFERENCED RESOURCES

- (a) *When Disaster Strikes* by the International Code Council, Inc., Seventh Printing: November 2011, copyright 2007
- (b) *Form No. M310B* August 2011 APA – The Engineered Wood Association; www.apawood.org
- (c) *WFCM Guide to Wood Construction in High Wind Areas for One- and Two-Family Dwellings* – American Forest & Paper Association and the American Wood Council; www.awc.org
- (d) *FEMA Home Builder’s Guide to Coastal Construction Technical Fact Sheet No. 7.3 Asphalt Shingle Roofing for High Wind Regions*.
- (e) *Disaster Mitigation: A Guide for Building Departments* by the International Code Council, Inc., copyright 2009

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Appendix J

Georgia State Laws Relating to Mitigation

Georgia Laws Relating to Mitigation

Georgia Emergency Management Act of 1981, as amended, O.C.G.A § 38-3-1

Under provision of the Georgia Emergency Management Act of 1981, as amended, subject to the direction and control of the Governor, the GEMA Director shall be responsible for the program of emergency management in the state. The Director shall coordinate emergency management activities of all agencies/organizations within the state and serve as a liaison with other states and the federal government.

Soil and Water Conservation Districts Law, O.C.G.A §§ 2-6-20 to 23 & § 2-6-27

In 1937 the General Assembly of the State of Georgia enacted the Georgia Soil Conservation Districts Law. Act No. 399 stated:

“It is hereby declared to be the policy of the legislature to provide for the conservation of the soil and soil resources of this State, and for the control and prevention of soil erosion, and thereby to preserve the natural resources, control floods, prevent impairment of dams and reservoirs, assist in maintaining the navigability of rivers and harbors, preserve wildlife, protect health, safety and general welfare of the people of this State.”

It also included a provision that supported the establishment of the Georgia Soil and Water Conservation Commission to serve as an administrative and technical assistance provider to local conservation districts.

Coastal Marshlands Protection, O.C.G.A. § 12-5-280

The Coastal Marshlands Protection Act provides the Coastal Resources Division with the authority to protect tidal wetlands. The Coastal Marshlands Protection Act limits certain activities and structures in marsh areas and requires permits for other activities and structures. Erecting structures, dredging, or filling marsh areas require a Marsh Permit administered through the Coastal Management Program. In cases where the proposed activity involves construction on State owned tidal water bottoms, a Revocable License issued by the Coastal Resources Division may also be required. Marsh Permits and Revocable Licenses are not issued for activities that are inconsistent with the Georgia Coastal Management Program.

Georgia Safe Dams Act of 1978, O.C.G.A §§ 12-5-370 to 385

The Georgia Safe Dams Act provides for the inspection and permitting of certain dams to protect the health, safety, and welfare of Georgia residents. The Environmental Protection Division of the Georgia Department of Natural Resources is responsible for inspecting and certifying dams.

Erosion and Sedimentation Act, O.C.G.A § 12-7-1

The Georgia Erosion and Sedimentation Act requires that each county or municipality adopt a comprehensive ordinance establishing procedures governing land-disturbing activities based on the minimum requirements established by the Act. The Erosion and Sedimentation Act is administered by the Environmental Protection Division of the

Georgia Department of Natural Resources, and by local governments. Permits are required for specified "land disturbing activities," including the construction or modification of manufacturing facilities, construction activities, certain activities associated with transportation facilities, activities on marsh hammocks, etc. With certain constraints, permitting authority can be delegated to local governments.

Georgia Environmental Policy Act, O.C.G.A § 12-16-1

The Georgia Environmental Policy Act (GEPA) requires that all State agencies and activities prepare an Environmental Impact Report as part of the decision making process. This is required for all activities that may have an impact on the environment. Alternatives to the proposed project or activity must be considered as part of the report.

Metropolitan North Georgia Water Planning District Act, O.C.G.A § 12-5-570

The Metropolitan North Georgia Water Planning District (Metro Water District) was created by the Georgia General Assembly in 2001 to establish policy, create plans and promote intergovernmental coordination of all water issues in the District from a regional perspective. The Metro Water District includes 15 counties and over 92 cities within the metro Atlanta region.

The primary purpose of the Metro Water District is to develop regional and watershed-specific plans for stormwater management, wastewater treatment and water supply and conservation. Three comprehensive water plans, originally adopted in 2003, were updated in 2009:

- District-wide Watershed Management Plan
- Long-term Wastewater Management Plan
- Water Supply and Water Conservation Management Plan

These plans will protect water quality and public water supplies in and downstream of the region, protect recreational values of the waters in and downstream of the region, and minimize potential adverse impacts of development on waters in and downstream of the region.

Uniform Codes Act, O.C.G.A. § 8-2-20

There are twelve adopted construction codes in Georgia. Each of these separate codes typically consist of a base code (e.g. The International Building Code as published by the International Code Council) and a set of Georgia amendments to the base code. Eight of these codes are "mandatory" (are applicable to all construction whether or not they are locally enforced) and four are "permissive" (only applicable if a local government chooses to adopt and enforce one or more of these codes).

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

Revisions to the Georgia law were necessary to bring Georgia into compliance with the National Manufactured Home Improvement Act of 2000 with respect to manufactured home installation, installation inspections and dispute resolution procedures.

Georgia Planning Act of 1989, O.C.G.A §45-12-200

The Georgia Planning Act is the foundation for community and regional planning in the state. It acknowledges that "Coordinated and comprehensive planning by all levels of government within the State of Georgia is of vital importance to the state and its citizens. The state has an essential public interest in promoting, developing, sustaining, and assisting coordinated and comprehensive planning by all levels of government. This article is intended to provide for the coordination of planning, at the direction of the Governor, by departments, agencies, commissions, and other institutions of the state, and this article shall be liberally construed to achieve that end."

The Georgia Planning Act of 1989 encourages each local government in the state to develop a comprehensive plan to guide its activities over a 20-year planning horizon. In order to provide local governments with guidelines to use in preparing their comprehensive plans, the Act called for the Georgia Departments of Community Affairs and Natural Resources to develop a set of minimum requirements to be met in each local plan. These minimum requirements are known as the "Minimum Planning Standards".

The environmental planning criteria that follow are the part of the Minimum Planning Standards that deals specifically with the protection of water supply watersheds, groundwater recharge areas, wetlands, river corridors, and mountains. These criteria were developed by the Department of Natural Resources (DNR) as mandated in Part V of the Georgia Planning Act and in the Mountains and River Corridors Protection Act.

Mountain and River Corridor Protection Act, §12-2-8

The statute that is informally known as the Mountain and River Corridor Protection Act (O.C.G.A.12-2-8) authorizes the Department of Natural Resources to develop minimum standards for the protection of river corridors (and mountains, watersheds, and wetlands) that can be adopted by local governments. The Act is administered by the Environmental Protection Division.

Georgia Forest Fire Protection Act, O.C.G.A §12-6-80 to §12-6-93

According to the Georgia Forest Fire Protection Act, all forest fire protection work is under the direction of the Georgia Forestry Commission (GFC). The Act gives the GFC the authority to go on any land for the purpose of preventing, controlling, or suppressing any fire burning uncontrolled on any forest land. This law also requires a permit issued by GFC for the burning of woods, lands, marshes, or other flammable vegetation.

Georgia Prescribed Burning Act, O.C.G.A §12-6-145

The Georgia General Assembly, recognizing that the forestlands and resources of the state are a natural resource of great economic value to the citizens of the state and that prescribed burning is a resource protection and land management tool which benefits the safety of the public, Georgia's forest resources, the environment and the economy of the state, enacted the Georgia Prescribed Burning Act (Ga. Code Ann. 12-6-145 – 12-6-149).

The purpose of the Act is to authorize and promote the continued use of prescribed burning for community protection, silvicultural, environmental, and wildlife purposes.

The legislature understood that – as the state’s population continues to grow – pressures from liability issues and smoke nuisance complaints cause prescribed burn practitioners to limit burn activity and reduce the benefits to the state.

House Bill 169, passed into law in 2010, created the Georgia Geospatial Advisory Council (GGAC)

This law created the Georgia Geospatial Advisory Council and tasked DNR Environmental Protection Division (EPD) with coordinating state executive branch departments and agencies to appoint members of the council, which may consist of representatives from state departments and agencies, local governments, universities, regional commissions, or any other entity the division determines to be a stakeholder active in the development or consumption of reliable geospatial resources. This council will audit the geospatial capabilities at the county, region and state level. The audit shall contain a complete status update and recommendations for utilizing the geospatial capabilities in Georgia to meet Federal Emergency Management Agency notification requirements, recommendations for moving forward to achieve governmental data interoperability and enhanced delivery of services to Georgia citizens through the geospatial approach, and any other information determined by the council to be necessary for the advancement of geospatial technology. This law is to be repealed on June 30, 2012.