



## **Flood Mitigation Plan**

### **Unincorporated Chatham County**

December 21, 2012



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## Flood Mitigation Plan Unincorporated Chatham County, Georgia

### Section 1: Introduction and Background

#### 1.1 NFIP-CRS Certification Requirements

This document was prepared to satisfy the certification requirements of the *National Flood Insurance Program Community Rating System Coordinator's Manual (April 06, 2012 Draft Edition)*. Chatham County participates in the National Flood Insurance Program (NFIP) sponsored by the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA), in order to qualify residents for flood insurance. The County also voluntarily participates in the Community Rating System (CRS), whereby residents qualify for discounted premiums. The County has been an active participant in the CRS program since 1991.

A flood mitigation plan is required by all CRS communities that have ten or more repetitive loss properties that have not received mitigation. Unincorporated Chatham County has a total of 44 repetitive loss properties on record with FEMA. A repetitive loss property is one for which two or more claims of \$1,000 or more were paid by the NFIP within any given 10-year period since 1978. Of those 44 properties, six were mitigated in recent years via relocation or acquisition/demolition. In some cases, the mitigation projects were accomplished using a 75% federal match from Hazard Mitigation Assistance Program (HMA) funds. These federal grant funding opportunities would not have been available without a multi-hazard mitigation plan that was formally adopted by the community.

Maintaining and periodically re-evaluating flood mitigation plans every five years is required to continue participation in good standing with the CRS certification, and to maintain discounted rates on flood insurance policies. In 2012, the Chatham County Flood Mitigation Plan (the Plan) was updated to maintain the County's CRS certification.

#### 1.2 Purpose

The general purpose of the Plan is to protect people and property from potential flood damages while maintaining good standing with FEMA's NFIP and CRS programs. This Plan also serves as a guide to the community to reduce the number repetitive loss properties through acquisitions, as well as by improving the County's canal and storm drainage system. Chatham County plans to

accomplish these goals by continuing to be aggressive with mitigation and structural projects, coupled with governmental ordinances and regulations designed to provide planning guidance for future development and construction. The County also intends to expand current outreach programs, to maintain the flood mitigation program via assistance through federal grant programs, and to continue with capital improvement drainage projects to alleviate structural flooding within the County's flood-prone communities. Finally, the Plan is designed to educate the residents of Chatham County about the hazards of flooding, to suggest loss reduction measures, and to raise awareness of the beneficial functions of the floodplain.

## **Section 2: Planning Process**

The Plan was developed and organized following the ten step process under Section 510, "Floodplain Management Planning", *National Flood Insurance Program Community Rating System Coordinator's Manual (April 6, 2012 Draft Edition)*. The ten step planning process includes:

1. Organize;
2. Involve the public;
3. Coordinate;
4. Assess the hazard;
5. Assess the problem;
6. Set goals;
7. Review possible activities;
8. Draft an action plan;
9. Adopt the plan; and
10. Implement, evaluate, and revise the plan.

During the 2012 Flood Mitigation Plan update process, each major section was reviewed and (where applicable) updated to meet and ensure compliance with each aspect of the Coordinator's Manual 5-Year Update Requirements.

For *Section 2: Planning Process*, the update was completed by organizing numerous committee meetings and community outreach efforts, and by a thorough review of newly-available information and data. This included:

- a public review of the Draft Plan Update prior to adoption,
- an evaluation of new studies, reports, and technical information, and
- a review of the community's needs, goals, and plans for the area that have been recently published.

To update *Section 3: Risk Assessment*, the hazard and problem assessments were reviewed and updated, as applicable. This included updating the floodplain and other hazard maps, describing annexations of flood prone areas, discussing additional repetitive loss properties, describing completed mitigation projects and increased development in the floodplain or watershed, and discussing new flood control projects, lack of maintenance of flood control projects, historical hazard events, and any other changes in flooding conditions or development.

*Section 4: Mitigation Strategy's* update process included a review of the goals and an update to the action plan, to account for appropriate changes and provide the status of current mitigation projects.

Finally, *Step 5: Plan Maintenance* reviewed annual evaluation reports, and documented that the updated Plan was adopted by the Chatham County Board of Commissioners.

## **2.1 Committee Organization, Structure, and Participation**

The Chatham County Director of Engineering (County Engineer) serves as the CRS Coordinator for Chatham County, and directs both the development and implementation of the Flood Mitigation Plan.

The County's Department of Engineering staff is heavily involved in the Planning Committee (the Committee), as they are the technical experts regarding floodplain management in Chatham County. Key individuals from the Department of Engineering staff include:

- the County's Drainage Engineer;
- the County's Plan Development Coordinator;
- the County's Senior Engineer;
- the County's Plan Reviewer; and
- the County's Floodplain Administrator/CRS Program Manager.

The Planning Committee (the Committee) includes not only County Department of Engineering staff, but personnel from Chatham Emergency Management Agency (CEMA), the Chatham County-Savannah Metropolitan Planning Commission (MPC), the Department of Public Works, the Department of Building and Safety and Regulatory Services, the County Manager's Office of Public Information, and the Department of Finance. In addition to these formal departments and agencies, stakeholders from the community were also involved in both the formal committee makeup and the overall Plan Update process.

CEMA provided David Grotyohann, an Emergency Management Specialist, and Dennis Jones, the Deputy Director and Chief of Staff, for the Committee, while the MPC provided Jackie J. Teel, the Comprehensive and Natural Resources Director.

The Chatham County-Savannah Metropolitan Planning Commission (MPC) is the community's land use and comprehensive planning agency. They are actively involved in the development and maintenance of the Plan's update. This is demonstrated by regular attendance at meetings and their participation in the review of draft sections of the Plan Update while it was in development. (See Appendix B for documentation of attendance via meeting sign in sheets, and an email from Jackie Teel confirming review of draft Plan Update.)

The following table identifies the members of the 2012 Plan Update Planning Committee, and provides their titles and agency/organizations represented. This table includes County staff members, outside agency stakeholders, and stakeholders from the general public.

<b>Name</b>	<b>Title</b>	<b>Agency/Organization</b>
A.G. Bungard	County Engineer	Chatham County, Department of Engineering
Suzanne Cooler	Senior Engineer	Chatham County, Environmental Department
Nick Millionis	Stormwater Engineer	Chatham County, Environmental Department
William Uhl	County Drainage Engineer	Chatham County, Drainage Division
Kevin Hayes	Drainage Engineer	Chatham County, Drainage Division
David Anderson	GIS Analyst	Chatham County,
Michael Blakely	Committee Chair Floodplain Administrator /CRS Program Coordinator	Chatham County, Department of Engineering, Floodplain Management
Donna Bragg	Meeting Coordinator	Chatham County, Department of Engineering
Jackie Jackson Teel	Committee Co-Chair Director	Chatham County-Savannah Metropolitan Planning Commission
Noel Perkins	Director – GISP	Chatham County-Savannah Metropolitan Planning Commission
Jack Butler	Comprehensive Planner	Chatham County-Savannah Metropolitan Planning Commission
Clifford Bascomb	Assistant Director	Chatham County, Building and Safety
Maze Newsome	Superintendent Storm	Chatham County, Public Works, Stormwater Maintenance
William Martin	Assistant Superintendent	Chatham County, Public Works, Stormwater Maintenance
Marc Ginsberg	GIS Analyst	Chatham County, Public Works
Misty Selp	GIS Analyst	Chatham County, Public Works
Al Lipsey	Deputy Director	Chatham County, Department of Parks
Lisa Foley	Assistant Superintendent	Chatham County, Department of Parks
David Grotyohann	Emergency Management Specialist	Chatham County, Emergency Management Agency
Dennis Jones	Deputy Director and Chief of Staff	Chatham County, Emergency Management Agency
Pete Nichols	Public Information Officer	Chatham County, Manager's Office, Public Information Division
Chuck Voelker	Insurance Risk Manager	Chatham County, Department of Finance
Russell Moncrief	Stormwater Program Manager	Fort Stewart/HAAF
Rose McComb	Clerk	Town of Thunderbolt, Zoning Administration
Mike Felrouic	Code Enforcement Official	Town of Thunderbolt
Jay Deering	President	Wilmington Park Homeowner's Association
Jimmy Brown	Emergency Management Director	Tybee Island Emergency Management Agency
Mike Konter	Vice President	Homebuilder's Association of Savannah
Daniel Peavy	Staff Engineer	Moffatt and Nichol
Ryan Purvis	Staff Engineer	Moffatt and Nichol
Diane Proudfoot	Assistant City Clerk	City of Bloomingdale
Todd Jones	Environmental Health Manager	Chatham County Public Health Department
Slade Cole	Assistant Area Engineer of Construction	Georgia Department of Transportation
Weldon Street	Director of Plant Operations	Marshes of Skidaway Island, Plant Operations and Environmental Services
Lynn Harden	Move-in Coordinator	Marshes of Skidaway Island
Clark Alexander	Professor, Director	Skidaway Institute of Oceanography

Name	Title	Agency/Organization
Hugh Futrell	Assistant Chief	Southside Fire and EMS
Mike Godbold	Emergency Manager	Garden City, Emergency Management Agency
Scott Allis	Director	Garden City, Planning Department
Evan Bennett	Staff Engineer	Wolverton and Associates
Tom McDonald	Department Manager	City of Savannah, Floodplain / Permit Administration
Jeff Morris	Economist	US Army Corps of Engineers
Monica Simon-Dodd		US Army Corps of Engineers
Henry Morgan	Committee Member	General Public - home owner
Mark Konter	Committee Member	General Public - home owner
Delisha Moss	Committee Member	General Public – student studying Floodplain Management
Robert Dickensheets	Committee Member	General Public – student studying Floodplain Management
Faith Palmer	Committee Member	General Public – student studying Floodplain Management
Keon Hayward	Committee Member	General Public – student studying Floodplain Management
Diane Deering	Committee Member	General Public – home owner
Michelle Southworth	Committee Member	General Public – student studying Floodplain Management
Kirk McElveen	Committee Member	General Public – renter
Ben Lockhart	Committee Member	General Public – home owner

The Planning Committee acts as a single body, with a Chair and a Co-Chair serving as the head of the Committee, primarily for organizational and administrative purposes (i.e., note taking, scheduling, etc.). All discussions, decisions, and activities are held, determined, or reviewed by the entire Committee. All individuals attending the Planning Meetings – whether agency staff or public stakeholder – have the opportunity to participate in all Committee activities, decisions, and discussions, and all members of the Committee have a voice in the process.

Nine formal committee update meetings were held in 2012, in order to coordinate and draft this Plan Update; many more individual meetings were held between staff members, the CRS Program Manager, and the public stakeholders. At each meeting, the Committee discussed at least one step in the planning process.

The minutes from the formal meetings held during the Plan Update development process are located in Appendix B, as are the sign in sheets verifying each member’s attendance and the number of meetings conducted. This appendix also contains documentation verifying the communication between the plan developers and external stakeholders.

## 2.2 Public Involvement

A critical step in the plan update process was to involve the public. The public was invited to all committee meetings through public announcements on outdoor bulletin boards, the Department of





Engineering's Website, Facebook, public notices, and direct invitation letters to stakeholders. (Refer to Appendix B for documentation of public announcements, invitation letters to committee meetings, and meeting documentation, including sign-in sheets for members of the general public and other stakeholders.)

Additional public information activities implemented to explain the planning process and encourage public input to the planning committee included a consistently updated project website, collection of public questionnaires and additional public outreach efforts. The project website explained the planning process, posted times and locations for committee meetings, meeting agenda, status reports, and a draft copy of the Plan Update for review.

As a precursor to the 2012 Plan Update, a one page public questionnaire which describes the Plan Update and its purpose was published in the *Penny Saver*, a local newspaper, on April 25, 2012. Chatham County citizens were requested to submit information concerning natural hazards and specific flood or drainage related problems that they have experienced and to offer possible solutions to these problems. Readers were requested to make comments and suggestions to the Chatham County Department of Engineering in writing via fax, letter or e-mail. More than 14,000 questionnaires were published and distributed at a cost of approximately \$1,800 to Chatham County.



*Public outreach campaign at Lake Mayer*

Approximately 200 citizens and interested parties either submitted “hard copies” of responses to the office or phoned into the office to express their concerns. In general, the majority of the comments received stated, “No flooding or drainage concerns to report.” This is most likely due to the fact that during the time period the questionnaires were mailed, Chatham County was experiencing a drought, which resulted in a significant rain deficit. All questionnaires that were received via the U.S. mail, fax, or e-mail were replied to, in accordance with the means stipulated on the document. A multitude of phone calls from interested citizens were received. Callers were generally interested in knowing if their property was located within the floodplain, and the flood zone in which they were located. Incoming phone calls were received by various engineering staff members. The exact number of phone calls and voice mail messages received was not tracked; however, an estimated 30 calls per month for approximately 3 months were received. All callers and voicemail messages requesting a reply were accommodated. (A copy of the *Penny Saver* one page questionnaire insert is included in Appendix B. A representative sampling of the responses from Chatham County citizens and interested parties is also included in Appendix B.) To review all of the questionnaire responses, please contact the Chatham County Department of Engineering.

In addition to this public information activity, a similar activity was undertaken in October 2012. A questionnaire was sent to public stakeholders in identified flood-prone areas, via the United States Postal Service (USPS). This questionnaire was sent to similar stakeholders like those that were contacted during the plan re-write effort in 2007. A copy of this questionnaire can be found in Appendix B. As of November 2012, no responses were received from the October 2012 mailer. Any responses received after November 2012 will be added to future updates of this Plan.

During the 2012 update process, there were several additional public outreach efforts completed to explain the plan update process and to seek public input on the process. On April 14<sup>th</sup> and 20<sup>th</sup>, 2012, booths were set up at Lake Mayer and Oglethorpe Mall, respectively, to explain the Flood Mitigation Plan and seek public comments. (Refer to Appendix B for documentation of public outreach efforts.)

Public information meetings were also held in many of the County's flood prone areas during the first two months of the planning process; this was to allow public comment, suggestions and recommendations regarding natural hazards, problems and possible solutions from the public to be considered and incorporated in the plan update process. Some of the frequent flood areas visited included Georgetown, Henderson, Heron Crest Villas, Isle of Hope and Wilmington Park subdivisions. When possible, representatives of the Planning Committee attended homeowner's association meetings during their regular monthly meeting sessions. The attendees were introduced to the planning process and were provided with a copy of the 2007 Plan to review, and to familiarize them with the plan's format. Following the Plan's presentation, the attendees were asked to offer comments and suggestions to improve the Plan Update. They were asked to review the Plan not only with respect to their general community, but with respect to the County as a whole. In other cases, such as at Georgetown and Henderson, meetings were conducted with the homeowner's association board members. (Meeting agendas, invitations, sign in sheets, and minutes from each gathering can be found at Appendix B.)

Comments, suggestions and recommendations were also requested from various neighborhood advisory groups and homeowner associations. The Highlands Neighborhood Association collected comments regarding the property owners' drainage concerns. The comments submitted were limited to specific drainage needs on their immediate property, rather than with the County's structural drainage improvement system. Engineering staff did, however, respond to these requests and concerns, which have been included at Appendix B. Comments were also received from two outside agencies, as well as a reply from one local government. These organizations were the Georgia Department of Natural Resources and the Chatham Environmental Forum. Their comments and suggestions were reviewed and discussed by the Planning Committee. Submittals that were considered viable by the planning committee were integrated into the final draft of this Plan Update. The comments and suggestions from the two agencies mentioned are attached in Appendix B.

Additionally, several local advisory groups and other associations within the identified flood-prone areas were contacted and provided the opportunity to review the Draft Plan Update. They were requested to return any comments, suggestions and recommendations in writing within ten

working days of receiving the Draft Plan Update. Some of the groups and organizations included the Savannah Area Chamber of Commerce, and the homeowner's associations of Hampton Place, Southbridge, Dutch Island, and The Landings. Appendix B includes the submitted comments, suggestions and recommendations.

The most up-to-date version of the Draft Plan Update, as it existed during the month of August 2012, was placed on the Chatham County website for review and comment ([www.chathamcounty.org](http://www.chathamcounty.org)). Website users were requested to review the Draft Plan Update, and were encouraged to offer input to the planning committee. A link was provided to allow website users to respond directly from the site. The Draft Plan Update remained on the website for approximately 4 weeks during the month of August 2012. A copy of the web page announcing the posting of Chatham County's Flood Mitigation Plan is included in Appendix B.

A public information meeting was held on August 14, 2012 in the Department of Engineering Conference Room, at 124 Bull Street, Room 430, Savannah, Georgia. An announcement regarding the meeting was published on the County's website, Facebook public media, in public locations and on bulletin boards, and advertised on the Chatham County cable network on Channel 16 on August 6, 2012. This forum allowed all attendees an opportunity to perform a review of the Draft Plan Update, and to offer suggestions, comments and recommendations prior to the final Plan Update submittal to the Board of Commissioners for adoption. Appendix B includes a copy of the announcement published on the internet along with documentation verifying both the meeting and the attendees.

The Draft Plan Update was submitted to a representative of FEMA's insurance consultant, French & Associates, Ltd., for review and comment regarding Activity 510 and general CRS compliance under the April 6, 2012 Draft of the *National Flood Insurance Program Community Rating System Coordinator's Manual and Crosswalk*. This was to ensure that the updated 2012 Flood Mitigation Plan would obtain as many points as possible when it was reviewed under the new guidance, currently scheduled for implementation in 2013.

A second public meeting was held on Thursday, December 6, 2012 in the Department of Engineering Conference Room, located at 124 Bull Street, Room 430, Savannah, Georgia. On Monday, November 19, 2012, announcements regarding the meeting were published on the County's website, the County's Facebook account, in various public locations and on bulletin boards, and advertised on the Chatham County cable network on Channel 16 (Chatham County Government Channel) on Comcast. Previously contacted members of the general public, outside agency and community organizations were contacted and asked to review the draft Flood Mitigation Plan and to comment on its content. They were contacted using a combination of email and the United States Postal Service and submitted a copy of the Draft Flood Mitigation Plan. Two Flood Mitigation Plan Questionnaires were distributed to the general public and stakeholders using email and the United States Postal Service. Copies of the questionnaires and submitted comments can also be found in Appendix B.

During the December 6<sup>th</sup> Planning Committee meeting, the forum mainly focused on addressing the comments and suggestions made by French & Associates and allowed all attendees an

opportunity to perform a review of the Draft Plan Update and offer suggestions, comments and recommendations prior to the Draft Plan Update's submittal to the Board of Commissioners for adoption. Appendix B includes a copy of the announcement published on the website along with documentation verifying both the meeting and the attendees.

### **2.3 Incorporation of Existing Documents**

The Plan Update was developed with the support and cooperation of the Chatham Emergency Management Agency's (CEMA) Pre-Disaster Hazard Mitigation Plan, dated December 2010, and CEMA's Emergency Operation Plan (EOP), dated April 2006. During the 2012 Plan Update process, a formal review of all relevant new studies, reports and technical information was performed and relevant information contained therein was incorporated into the Plan Update. .

The incorporation of the EOP's topics relative to specific flood protection needs include evacuation routes within and outside of the county, traffic control points, public information procedures, as well as flood and hurricane information. A review of the historical data and project information published in the *FEMA Flood Insurance Study, Unincorporated Areas of Chatham County, Georgia*, dated May 19, 1987, and from the *Unincorporated Chatham County Stormwater Capital Improvement Program*, Chatham County Department of Engineering, dated May, 1997 was also performed. Relevant data from these documents were used in the development of this Plan Update.

During the plan update process, the Pre-Disaster Hazard Mitigation Plan's identified list of local vulnerabilities and impacts to all hazards were considered and incorporated (where applicable), particularly as they related to assessing hazards and problems. Additional information from the Georgia Coastal Hazards Portal, the State of Georgia Hazard Mitigation Plan, National Oceanic and Atmospheric Administration (NOAA) and University of Georgia's Carl Vinson Institute were included, to begin addressing sea-level rise and coastal erosion issues within the Plan Update.

### **2.4 Agency and Organizational Coordination**

The request and selection for outside agency participation were based upon property protection, public safety responsibilities, and jurisdictional boundary of adjacent municipalities. The organizations and agencies were contacted to see if any of Chatham County's proposed projects or policies would impact any projects the municipalities were considering or proposing, to ensure that all flood mitigation efforts were coordinated and in concert. Appendix B contains documentation of invitations, contacts, and meetings. Coordination documentation is in the form of emails, formal letters, phone calls, meeting notes. The following agencies were contacted and requested to participate in the development of this Flood Mitigation Plan Update; asterisks indicate that the agency/organization was visited by the Planning Committee Chair:

- The American Red Cross;
- Bryan County Department of Engineering & Inspections\*;
- Chatham County Board of Education;
- Chatham County Department of Building Safety & Regulatory Services;
- Chatham County Department of Public Works and Parks Services\*;

- Chatham County Health Department;
- Chatham Environmental Forum;
- Commissioner, Dr. Priscilla Thomas, District 8\*;
- Effingham County Planning & Engineering\*;
- FEMA Region IV;
- Fort Stewart/Hunter Army Airfield (HAAF);
- Georgetown Homeowner's Association (HOA)\*;
- Georgia Department of Economic Development;
- Georgia Department of Natural Resources/Floodplain Management (DNR);
- Georgia Department of Transportation;
- Georgia Emergency Management Agency;
- Georgia Environmental Protection Division (EPD);
- Henderson HOA\*;
- Highlands Neighborhood Association\*;
- Homebuilders Association of Greater Savannah;
- Isle of Hope HOA;
- Local Emergency Planning Commission (LEPC)\*;
- Marshes Complex;
- Marshes of Skidaway Island's Director of Plant Operations & Environmental;
- Marshes of Skidaway Island's Move-in Coordinator;
- Metropolitan Planning Commission (MPC)\*;
- Moffatt & Nichol, Staff Engineer;
- National Oceanic and Atmospheric Administration;
- Office of the Chatham County Attorney;
- The Salvation Army;
- Savannah Area Chamber of Commerce;
- Savannah Economic Development Authority (SEDA);
- Savannah Utility Coordinating Committee (SUCC)\*;
- Skidaway Institute of Oceanography\*;
- State of Georgia Insurance Commissioner;
- State of Georgia NFIP Coordinator\*;
- The municipalities and towns within Chatham County, consisting of: Savannah\*, Tybee Island, Pooler\*, Bloomingdale, Port Wentworth, Garden City\*, Thunderbolt, and Vernonburg;
- U. S. Army Corps of Engineers (USACE)\*; and
- Wilmington Park HOA\*.

Each of the agencies, organizations, and local governments were provided a description letter which explained the Flood Mitigation Plan update development process, as well as provided a copy of the Draft Plan for review. Written comments, suggestions, and recommendations were requested within 10 business days of receiving the Draft Plan Update. Comments were requested to be submitted via e-mail, fax, or letter.

Additionally, each agency was extended an invitation to participate in both the July 31 and December 6, 2012, Flood Mitigation Planning meeting, as well as all proceeding meetings, which were held in the Engineering Conference Room of the Old Chatham County Courthouse. (Appendix B includes copies of the description letters, invitations sent to each agency, and meeting minutes.)

Finally, the Plan update development effort also included requesting participation in the Plan Update process from the Local Emergency Planning Commission (LEPC) committee members at the March 21, and the November 28, 2012 meetings. The LEPC committee members consist of approximately 55 emergency management professionals from various local emergency management agencies, governments, and area large private employers. During the March meeting, each member of the LEPC was asked to take a copy of the 2007 Plan to their staff for review and comment. During the November meeting, they were asked to review the recently adopted Plan and to comment on common problems, applicable development policies, mitigation strategies, and to identify any observed conflicts in policy, programs, and regulations that may exist. Finally, they were asked to submit comments, recommendations, and suggestions to the Chatham County CRS Program Manager, and were invited to become active participants in future meetings.

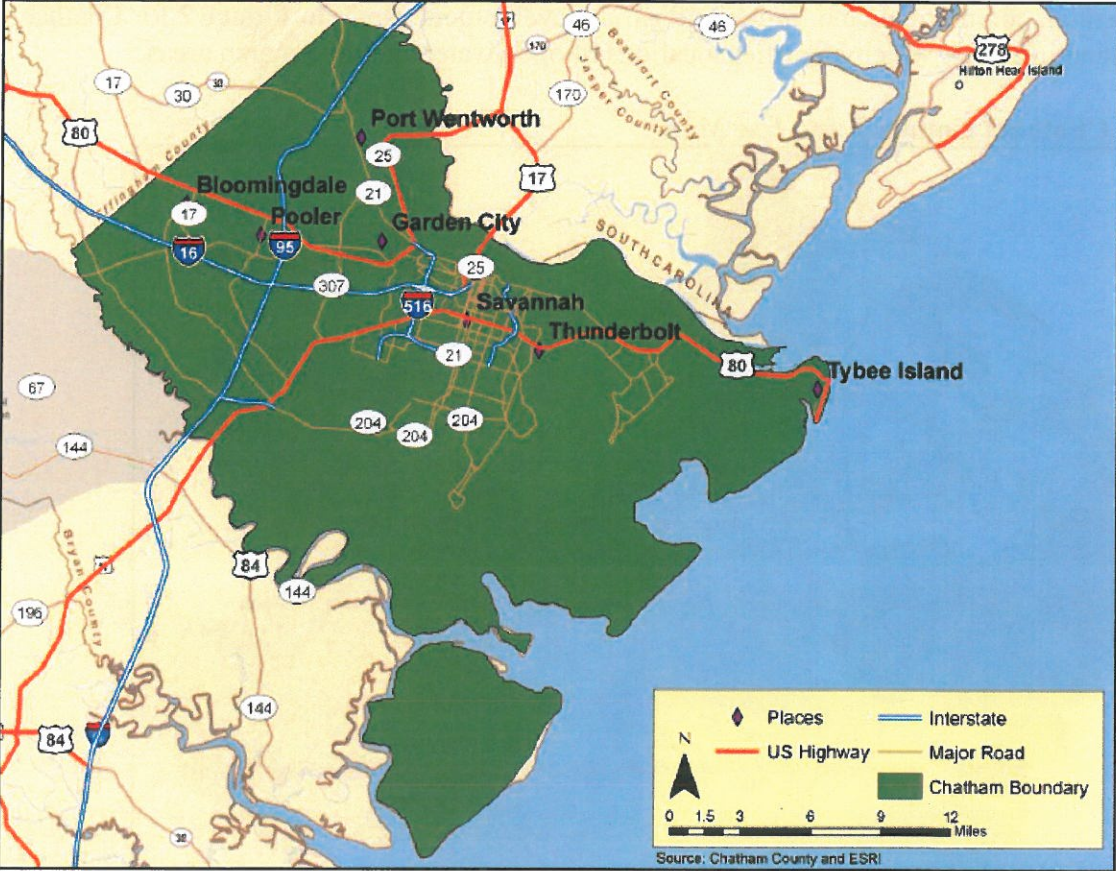
### **Section 3: Risk Assessment**

#### **3.1 Hazard Assessment**

Chatham County consists of approximately 445 square miles of land, and is located in the southeastern portion of Georgia. Chatham County is a coastal county, which borders the Atlantic Ocean. The Atlantic Ocean coastline accounts for approximately 30 miles of Chatham County's eastern border.

**Figure 1** (following page) displays a vicinity map of Chatham County. Chatham County is situated on a low coastal plain, with much of its area consisting of tidal marshes and swamps. Elevations range from below sea level at the coast to approximately 50 feet mean sea level in the northwestern portion of the County. Chatham County has vast areas of wetlands and natural storm water detention features.

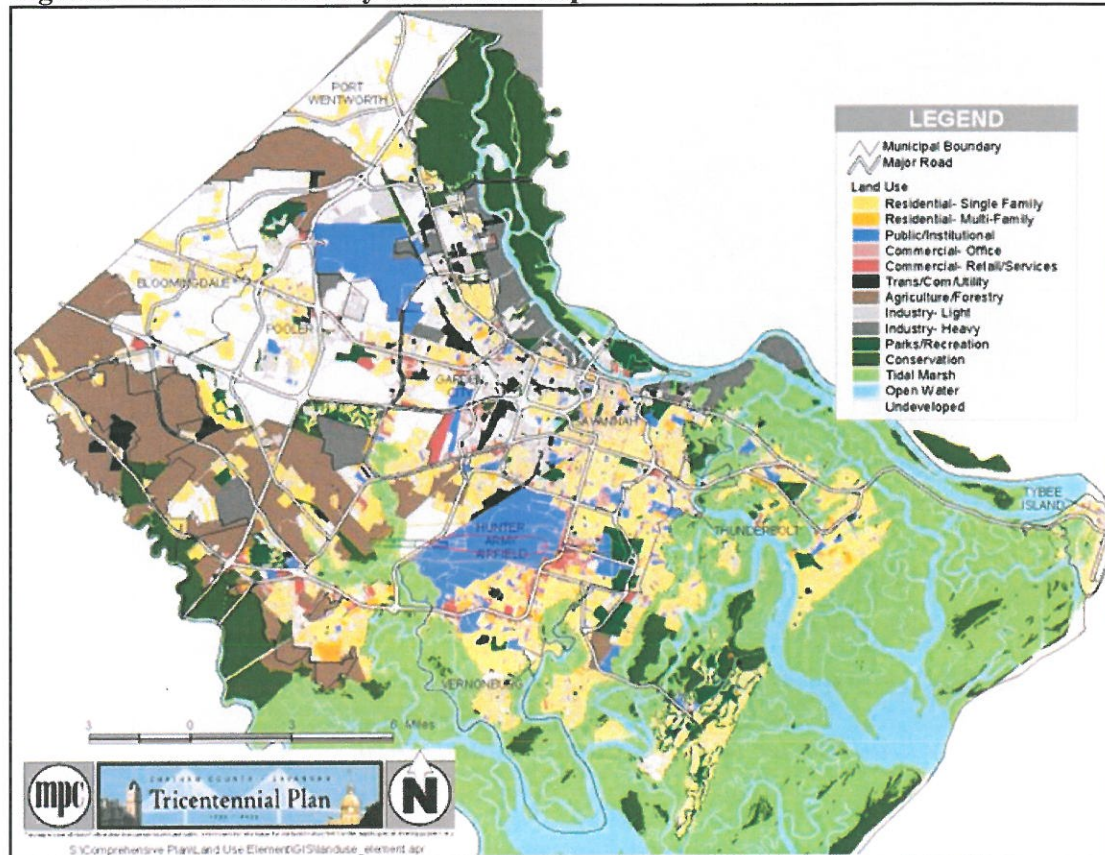
Figure 1: Chatham County Vicinity Map



Source: Chatham County Pre-Disaster Hazard Mitigation Plan, 2010.

Approximately 61% of unincorporated Chatham County’s floodplain is marshland/tidal areas with residential, commercial, and limited industrial development. Refer to **Figure 2** for Chatham County’s land use map, which identifies locations of open water and tidal marsh areas.

**Figure 2: Chatham County Land Use Map**



Source: Chatham County Comprehensive Plan, 2006.

Chatham County is subject to a variety of man-made and natural hazards (Refer to Appendix F for a complete description of the location, severity, history, and future probability of events for all identified natural and man-made hazards that affect Chatham County). However, the major focus of the Flood Mitigation Plan is on naturally occurring hazards that include rainwater flooding, coastal storms (including nor’easters, tropical depressions, tropical storms, and hurricanes), storm surge, sea-level rise, and coastal erosion.

Note: According to the Natural Resource Conservation Service (NRCS), there are no dams inventoried for Chatham County. In addition, there are no levees in the USACE National Levee Database. Therefore, these less frequent flood hazards were not assessed in this Plan Update, as there is no risk to Chatham County from these hazards.

*History and General Sources of Flooding*

Coastal storms are the type of hazard events that have historically impacted this area most frequently, with 91 coastal storms on record since 1853, four of which occurred in the past 10



years. Of the 91 coastal storms that have impacted Chatham County, five developed into a hurricane.

Rainwater flooding is the second most impactful hazard event, with at least 39 events that have caused damages on record since 1985.

Chatham County has no history of flooding with a frequency greater than the 100-year.

Chatham County experienced significant rainfall events in 1994, 1996, and 1999 which resulted in flooding within many areas of the County. Details of these events are as follows:

*October 1994:* A record 19.84 inches of rain fell on Chatham County. The majority of this rain fell in an eleven day period in early October, from the 2<sup>nd</sup> until the 13<sup>th</sup>, with the heaviest rainfall occurring during the afternoon and evening of the 12<sup>th</sup>. This rainfall coincided with the inbound tide, resulting in unusually high tidal gauge readings for the period. In some instances, the observed water level was more than 2 feet above the predicted tidal level, due in part to a full moon event that coincided with the rain and the tide. This rainfall event resulted in 228 NFIP claims in Chatham County, for a total of \$958,910.82 in payments.

*July 1996:* 5.23 inches of rainfall were recorded on July 5<sup>th</sup>. This rainfall was unusual in that it occurred in a three hour period in the middle of the day. This event resulted in 43 NFIP claims, for a total of \$329,328.06 in payments.

*June 1999:* 14.25 inches of rainfall fell on Chatham County on the 29<sup>th</sup>. This rainfall fell throughout the day, with the heaviest rainfall occurring between approximately 7am and noon. This event was significant in terms of NFIP claims, resulting in 255 claims for a total of \$1,662,651.76.

These three events produced a total of 536 NFIP claims, and resulted in total payments of \$2,950,890.64.

Other significant rainfall events that resulted in flooding occurred in June 2002:

- June 7<sup>th</sup> – 1.8 inches in under one hour, with more than another inch falling later in the evening;
- June 20<sup>th</sup> – more than half an inch fell in under an hour;
- June 21<sup>st</sup> – unusually heavy rainfall throughout the day resulted in unusually high tidal observations later in the evening;
- June 22<sup>nd</sup> – heavy rainfall in the overnight hours, with almost half an inch falling between 3:35am and 4:24am alone; and
- June 23<sup>rd</sup> – almost an inch of rain fell every twenty minutes between noon and 1pm.

Finally, in December 2009 another series of significant rain events occurred in Chatham County. These heavy rain events resulted in significantly higher-than-usual tide levels on several occasions throughout the month.

*Assets in the Special Flood Hazard Area*

As of 2012, unincorporated Chatham County has approximately 36,591 structures. Of these structures, approximately 16,456 are located within the Special Flood Hazard Area. These structures include approximately 15,353 single and multi-family houses, as well as approximately 1,025 institutional, industrial, and commercial structures.

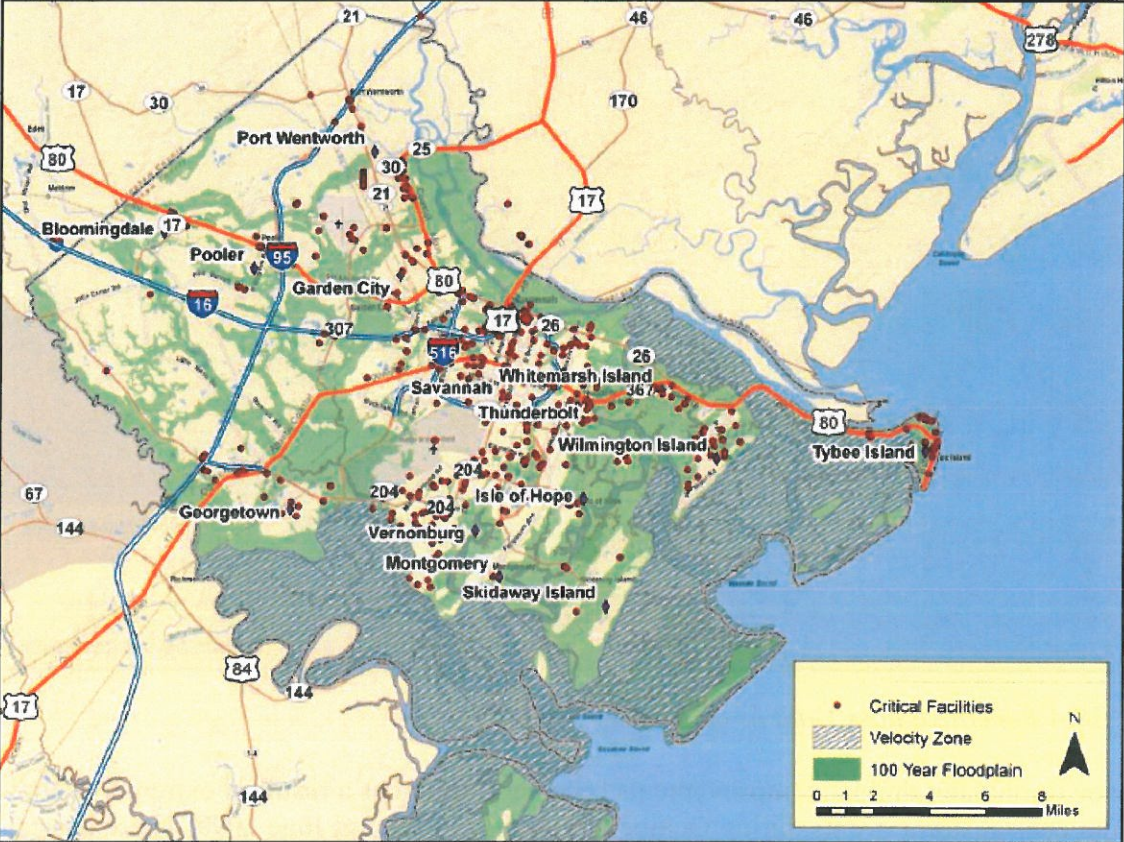
Chatham County has significant physical assets that could be impacted by flooding – specifically by storm surge or flooding associated with a hurricane. The following table provides an overview of the values and types of assets that could be impacted, based on the storm category. Note that this storm category is based on SLOSH modeling, and assumes that surge heights are in concert with wind speeds, which may not be the case in reality. Appendix H contains details of these assets.

Storm Category	Asset Type	Estimated Value
Category 1	Parks and Recreation Facilities	at least \$14,916,600
	Lift Stations	at least \$970,584
	Well Sites	at least \$2,201,948
	Traffic Signals	at least \$1,500,000
Category 2	Parks and Recreation Facilities	at least \$16,143,900
	Lift Stations	at least \$1,592,278
	Well Sites	at least \$4,772,338
	Traffic Signals	at least \$4,625,000
	Drawbridge	at least \$1,030,000
Category 3	Parks and Recreation Facilities	at least \$23,584,200
	Lift Stations	at least \$2,159,166
	Well Sites	at least \$5,297,848
	Traffic Signals	at least \$5,000,000
	Drawbridges	at least \$3,090,000
	Drop off Center	at least \$400,000
Category 4	Parks and Recreation Facilities	at least \$23,584,200
	Lift Stations	at least \$2,159,166
	Well Sites	at least \$5,844,948
	Traffic Signals	at least \$5,125,000
	Drawbridges	at least \$4,120,000
	Drop off Center	at least \$400,000
Category 5	Parks and Recreation Facilities	at least \$23,584,200
	Lift Stations	at least \$2,159,166
	Well Sites	at least \$5,844,948
	Traffic Signals	at least \$5,125,000
	Drawbridges	at least \$4,120,000
	Drop off Center	at least \$400,000

There are approximately 518 critical facilities in the identified Special Flood Hazard Area, which includes police precincts, fire stations, schools, and immediate medical facilities.

Refer to **Figure 3** (following page) for the general location of critical facilities in relation to the Special Flood Hazard Area (including V zones). The loss of any one of these critical facilities to flooding could have serious consequences for Chatham County, as these facilities are – by definition – essential to the success of any response and/or recovery to a hazard event in Chatham County, and must be available for use and operation when they are needed. Should these critical facilities be inundated by flooding, or should ingress/egress be restricted, the residents of Chatham County could be left without emergency services.

**Figure 3: Location of Critical Facilities in Relation to the Floodplain and Velocity Zone**



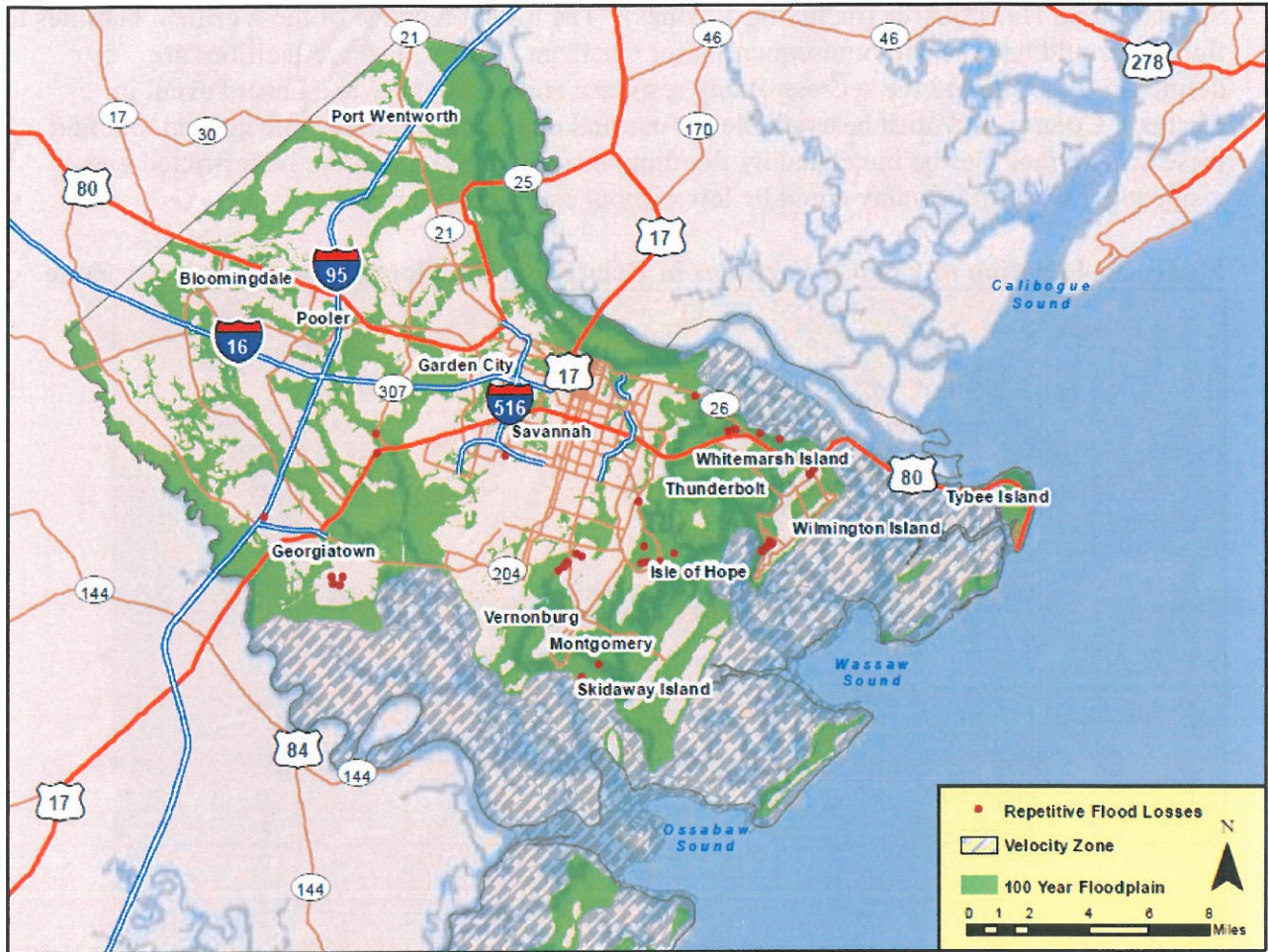
Source: Chatham County Pre-Disaster Hazard Mitigation Plan, 2010.

*Repetitive Loss Properties and the Special Flood Hazard Area*

Repetitive Loss properties are a significant portion of the claims payments that the NFIP pays out, and the Repetitive Loss properties in Chatham County are no exception to this. Since 1978, there have been 702 NFIP claims filed for damages to Repetitive Loss properties in Chatham County, with payments for those claims totaling \$3,433,955.92.

Currently, Unincorporated Chatham County has a total of 44 repetitive loss properties. As of July 2012, six of these properties were mitigated via relocation or acquisition/demolition. Refer to **Figure 4** for the general locations of Repetitive Loss Properties in Chatham County.

**Figure 4: Locations of Repetitive Loss Properties and the SFHA**



*Source: FEMA Repetitive Loss Data as of January 31, 2011.*

The need for stormwater drainage improvements became apparent as a result of extremely heavy rainfall from coastal storm events during October 1994, July 1996, and June 1999. These coastal storm events were un-named storms that caused county-wide structural flooding. Although numerous factors throughout the County contributed to the need for drainage improvements, none were more pronounced than the flooding that occurred to both property and structures during the specific storm events previously mentioned. It should be noted that the “Claims” represent flood loss claims from only those properties with more than one flood insurance claim. This analysis, therefore, does not include flooding of properties with only one claim or those without flood insurance.

*Chatham County’s Floodplains and Drainage Basins*

Appendix C contains a number of maps that depict the County’s Drainage Basins and the identified Special Flood Hazard Areas within County.

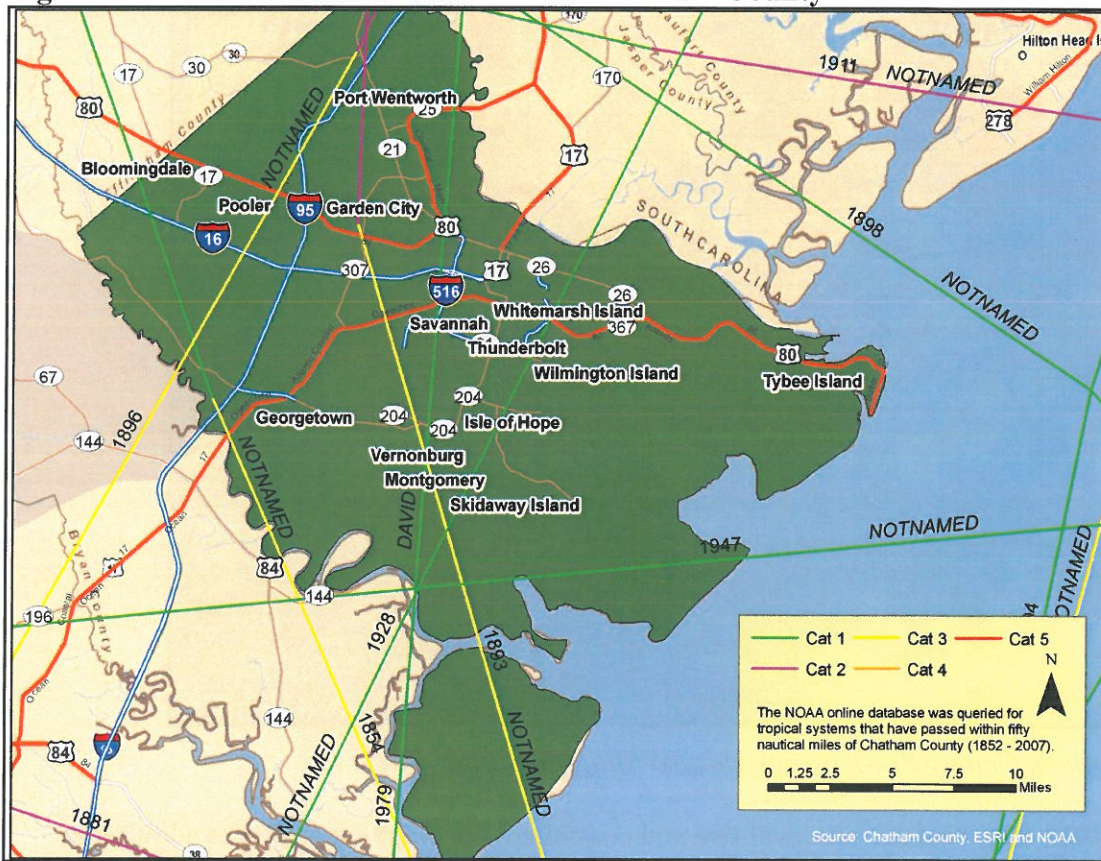
A total of nine jurisdictions contribute to the watersheds within Chatham County. Over recent years, the limits of these municipalities have changed due to annexation, thus impacting the overall unincorporated area. The flood basin is illustrated in the previously developed areas as well as the undeveloped areas.

Appendix D contains an assessment as to the causes of flooding within each community that has identified flood concerns. These discussions were derived from various drainage studies, windshield surveys performed during some storm events, and from citizen comments. Nuisance or non-structural flooding is addressed later in this document.

### Storm Surge

The National Weather Service (NWS) has termed Georgia hurricanes a “sleeping giant.” The last major hurricane to directly make landfall in Chatham County was in 1893. According to NOAA, since 1853 there have been 91 coastal storms, including 5 hurricanes that affected Chatham County. Refer to **Figure 5** for historical hurricane tracks for Chatham County.

**Figure 5: Historical Hurricane Tracks for Chatham County**



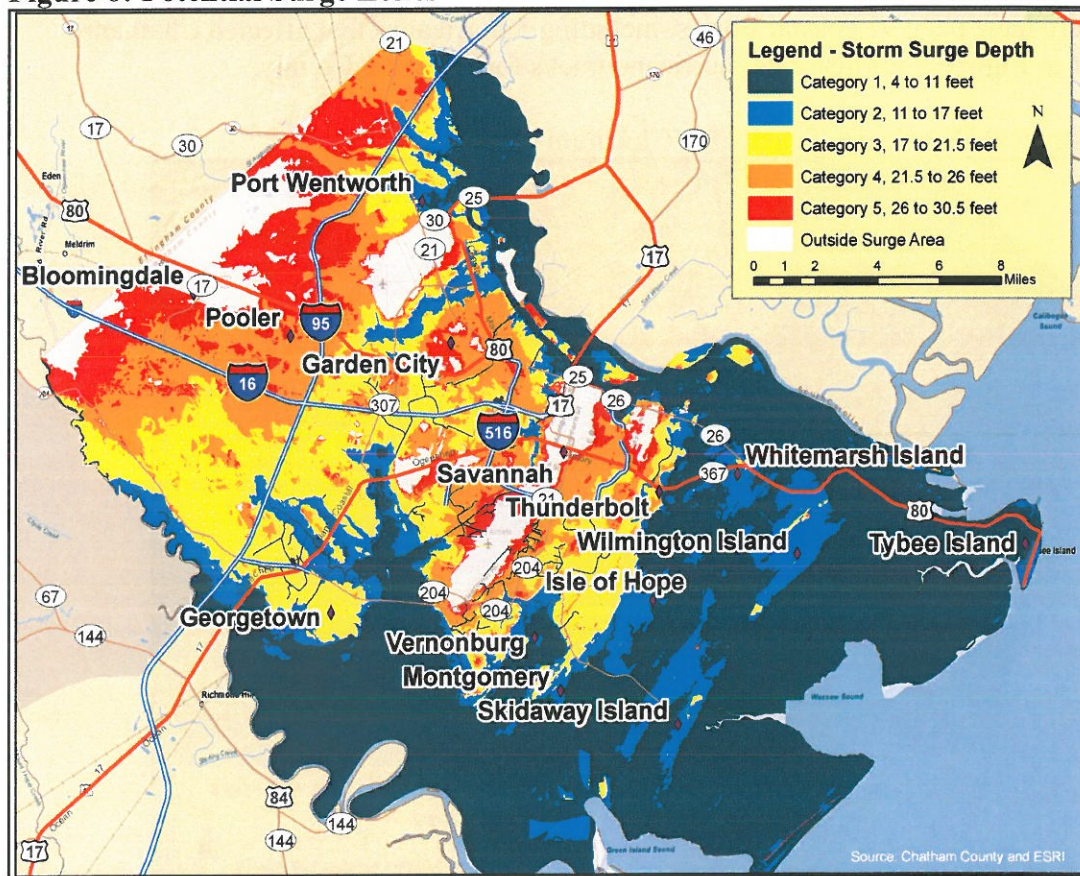
Source: Chatham County Pre-Disaster Hazard Mitigation Plan, 2010.

Storm surge is a large volume of water that sweeps across the coastline where a hurricane makes landfall. According to the 2010 Chatham County Pre-Disaster Hazard Mitigation Plan, there is

no record of direct storm surge events in recent history. In 1893, the “Sea Islands Hurricane” made landfall near Savannah in late August, taking the lives of an estimated 1,000-2,000 people in the storm surge.

To identify vulnerable areas to storm surge, the National Hurricane Center’s Sea, Lake and Overland Surges from Hurricanes (SLOSH) modeling software was utilized. As illustrated below, the results of the model indicate that 73% of the County’s population and 66% of its critical structures/buildings could be affected by storm surge. Refer to **Figure 6** for potential storm surge zones from hurricane events. (Note: At the time this model was run, the NWS still combined surge and wind speed into hurricane category classifications. This practice has since been discontinued. Future SLOSH model runs will reflect this recent change.)

**Figure 6: Potential Surge Zones**



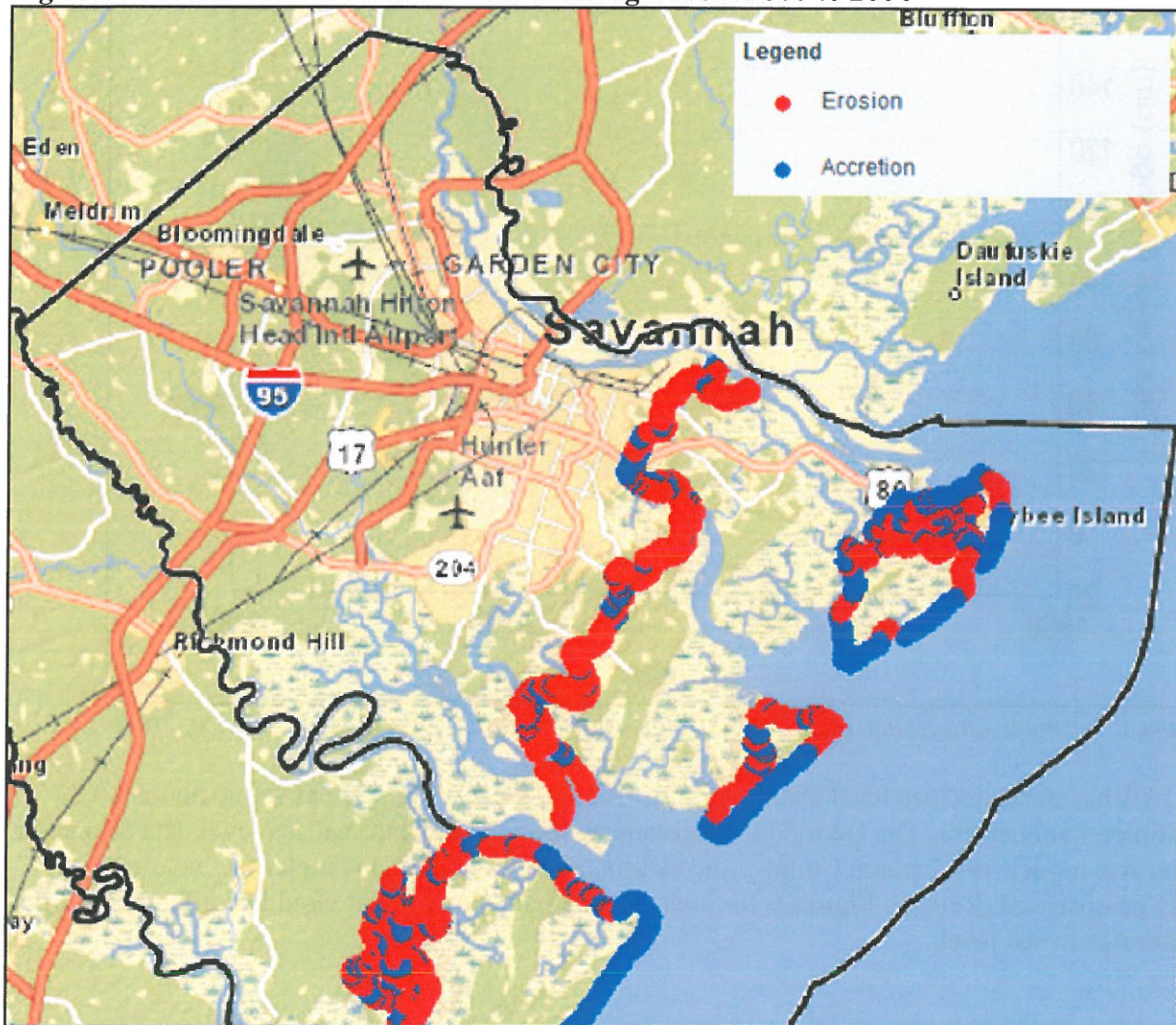
Source: Chatham County Pre-Disaster Hazard Mitigation Plan, 2010.

During the 2012 Plan Update, sea-level rise and coastal erosion were identified as additional hazards that could further impact Chatham County. Each of these identified hazards is reviewed for their potential vulnerabilities and impacts to Chatham County, including maps of affected areas.

### Coastal Erosion

Coastal erosion is defined by FEMA as “the wearing or washing away of coastal lands”. Coastal erosion is occurring in Chatham County due to a variety of environmental and human factors, and has become a major cause of concern for the area. Driven by a rising sea level, large storms at sea and powerful ocean waves, erosion wears away the beaches along Chatham County’s coastline and barrier islands. Refer to **Figure 7** for Chatham County coastal erosion and accretion changes from 1800 to 2004. As depicted in this figure, Chatham County’s areas with significant coastal erosion occurrence are near McQueen’s Island Trail, Skidaway Island, the Wassaw National Wildlife Refuge, Tybee Island, and the Wilmington/Whitemarsh Island areas.

**Figure 7: Coastal Erosion and Accretion Changes from 1800 to 2004**



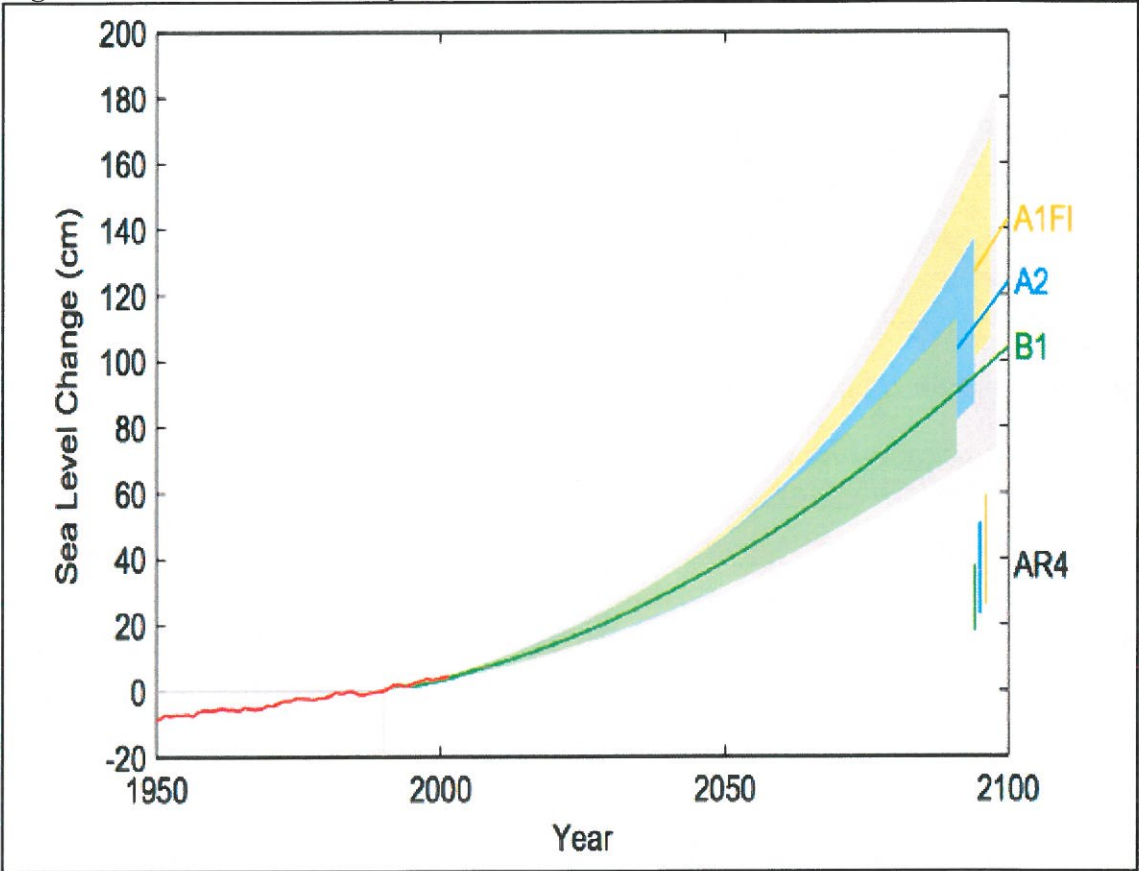
Source: Georgia Coastal Hazards Portal, 2012.

### Sea Level Rise

The degree to which sea level rise accelerates due to climate change could vary based on future global efforts to reduce greenhouse gas emissions. The Intergovernmental Panel on Climate

Change (IPCC) accounts for this variability by using low and high emission scenarios in its sea level rise projections. The most recent IPCC projections are considered conservative by most experts, as they do not include rapid ice sheet melting. Based on IPCC temperature projections, The National Academy of Science has modeled sea level rise for three different emission scenarios (Refer to **Figure 8**).

**Figure 8: Sea Level Rise Projections from 1990 to 2100**

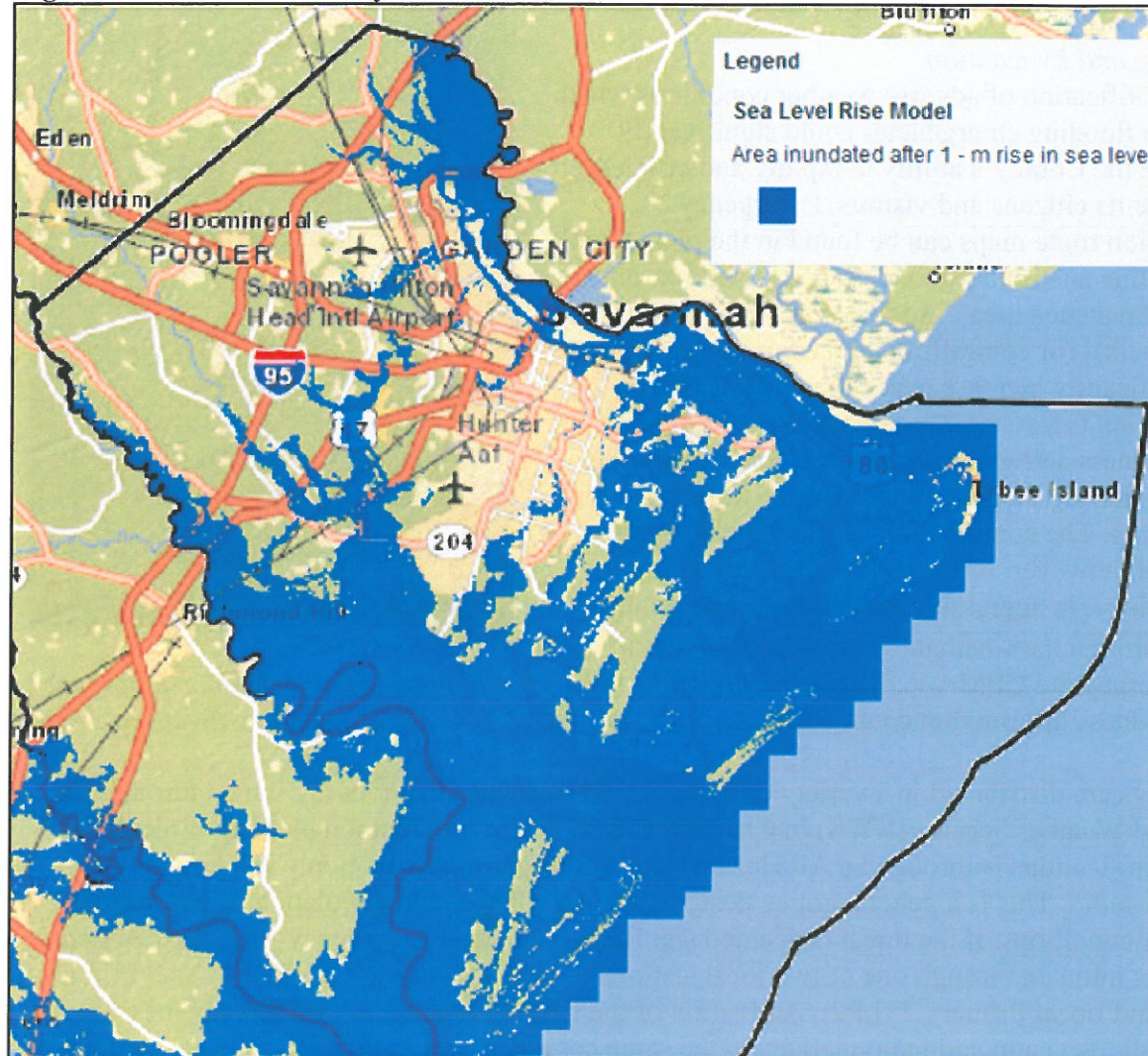


Source: Vermeer and Rahmstorf, *Proceedings of the National Academy of Science*, 2009.

NOAA has measured sea level changes at Fort Pulaski since 1935 and has found about a 0.33 millimeter annual rise. The Georgia Conservancy extrapolated historical sea level data into a sea level rise model for Chatham County, and estimated that by 2100, one meter of sea level rise may be observed. Refer to **Figure 9** for areas in Chatham County that would be affected by a one meter rise in sea level.



**Figure 9: Areas Affected by 1 Meter Rise in Sea Level**



*Source: Georgia Coastal Hazards Portal, 2012.*

Flooding is a significant hazard for Chatham County, but it is not the only hazard facing the County. Other identified hazards include tornadoes, severe storms, drought, and fire. Refer to Appendix F for information regarding the County's current multi-hazard risk assessment, which is part of the 2010 Pre-Disaster Mitigation Plan.

### **3.2 Flood Problem Assessment**

In general, Chatham County's flooding problems are caused by its low elevations and flat slopes, and the interaction of these geographic features with fluctuating tides. The flat slopes result in slow stormwater movement during periods of heavy rain fall. The storm water also accumulates in low-lying areas, which can result in flooding.

This section assesses the problems associated with flooding throughout Chatham County, and identifies in general terms the potential impacts that can be expected from future flood events. First, though, is a discussion regarding the County's Warning and Evacuation System, which is

designed to lessen these impacts where possible.

#### *Warning and Evacuation*

Early notification of adverse weather conditions which produce flooding emergencies could significantly increase the County's ability to rapidly and efficiently evacuate its citizens and visitors. Emergency evacuation route maps can be found in the phone book and on-line and road signs identify evacuation routes out of threatened areas. Additionally, the I-16 inbound lane reversal (or contraflow) procedures are expected to significantly increase evacuation efforts. Early notification is also vital to evacuation, mitigation and preparedness activities. Chatham County employs several alerting mediums to maximize warning to the threat area. The combination of all available avenues does not, however, reach 100% of the threatened population. An aggressive education campaign is in place through the Chatham County Department of Engineering and CEMA to distribute mitigation and preparedness information county-wide.



*Chatham County Outdoor Emergency Warning Siren Program*

Warnings are distributed in a variety of methods. Primary notifications are issued through the National Weather Service (NWS) in Charleston, SC. The most common method of receipt of these notifications is through an All Hazard Alert Monitor, more commonly referred to as a weather radio. This is a general notice designed to alert the general population of hazardous weather conditions. If the threat is deemed significant, the local Emergency Broadcast System (EBS) is initiated through one of two local stations required to manage the EBS; Local Primary 1 (LP1) and Local Primary 2 (LP2). Activation of the EBS broadcasts the emergency message across all television and radio markets in the same coverage area as the LP1 and LP2 stations. Finally, CEMA maintains the option of activating the County's Emergency Warning Siren Network should the threat pose an immediate and extreme threat to life or property.

Even through deployment of these methods, there is no guarantee that the entire population in the threatened area is notified of an emergency. Expanding the warning capability to a fully functioning system would include installation of river gauges designed to monitor rising river and stream water levels (excluding the twice daily tidal influences) and expansion of the current emergency warning program. Once installed, water levels above a defined threshold will alert emergency management officials so that an analysis can be conducted and corresponding notification can be initiated. In an emergency, if the threat is such that notification is required, emergency management officials have the option of activating any of the alert methods defined above.

*Employers in the Floodplain & Impacts from Future Flooding*

Local flooding conditions are complicated by new developments within areas that were previously wetlands. As a result, there is an increased demand on existing stormwater drainage systems, as pervious wetland areas are transformed into impervious residential, commercial, and industrial areas. Also, some of the storm drainage systems are in need of repair and improvements while others are undersized for the recent development that have occurred around them which further complicates drainage issues. Chatham County’s National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, issued April 2012, requires each storm structure to be inspected and maintained, as needed, in a 5 year period. To address this need, Unincorporated Chatham County has an on going Drainage System Maintenance Program. Refer to Appendix I for the drainage system maintenance reports and documentation reflecting the previous twelve months.

In Unincorporated Chatham County, three major employers are located entirely within the floodplain:

- The Landings Club: This private club employs 400 people;
- Great Dane Trailers: This division office for the refrigerated trailer manufacturer employs 650 people; and
- Kerr-McGee Pigments Savannah: This pigment manufacturer employs 420 people.

In addition, there are a variety of employers that have assets and staff located both within and outside the floodplain. These employers are detailed in the following table.

Major Employers in Chatham County with Assets/Staff located partially in the Floodplain		
Company	Sector	# of Employees
<b>Private Non-Manufacturers</b>		
Wal-Mart	Retail	1,675
Kroger	Retail Food	1,100
Publix	Retail Food	433
Goodwill Industries	Non-Profit Organization	385
<b>Manufacturers</b>		
Gulfstream Aerospace	Jet Aircraft	4,300
International Paper	Paper Products	1,800
Georgia-Pacific Savannah River Mill	Paper Products	1,408
Imperial Sugar	Refined Sugar	400
R. B. Baker	Asphalt	350
<b>Education/Government</b>		
Board of Education	Public Schools	4,309
Chatham County	Government	1,600
Georgia Ports Authority	Ship Terminal Operations	741

All of these major employers, both those fully in the floodplain and those that are only partially exposed, employ approximately 3.5% of the community work force.

The percentage of major employers in Unincorporated Chatham County that are located within the floodplain is not insignificant. Future flood events that are widespread or significant could result in physical damages and loss of business income for any or all of these employers. This

would have economic impacts throughout the County, and could have significant economic impacts for both these employers and their employees.

#### *Rainwater Flooding Impacts to Vulnerable People*

Rainwater flooding has the potential to significantly impact vulnerable populations, structures, infrastructure, critical facilities and economic activity. Although human casualties during this type of flooding may be limited compared to flooding accompanied by high winds, the probable evacuation and sheltering requirements can quickly deplete County resources and abilities to respond to collateral emergencies.

#### *Public Health Concerns from Future Flooding*

According to the Center for Disease Control and Prevention, additional public health impacts during flooding events can occur from mold growth and contaminated water. Mold often grows in structures after a flood event. Populations with asthma, chronic lung conditions, or a weak immune system can contract mold-caused infection in lungs if they are in contact with mold spores. Another potential public health vulnerability can occur because water distribution and waste water facilities are located in the floodplain and could become or cause contamination. Flood events can contaminate drinking water supplies and nearby waterways with intestinal bacteria, such as E. Coli, Salmonella, and Shigella.

#### *Impacts to Critical Facilities from Future Flooding*

There are 131 county owned critical facilities in Unincorporated Chatham County that are vulnerable to flooding; this exposure is estimated at \$276 million. The majority of these facilities are categorized as water distribution, wastewater, or administration. Impacts to these critical facilities could result in disruptions of government services, damage to critical facility structures, and degradation of surface and groundwater from wastewater and stormwater runoff.

#### *Impacts to Transportation Infrastructure from Future Flooding*

Transportation infrastructure is also significantly vulnerable to flood events. Rainwater flood impacts could include inundation of roadways, disruption of public transit, reduction of transportation accessibility, and an increased rate of automobile accidents. Significant amounts of rainwater can also cause nuisance flooding, which can impair traffic flows. Although the occurrences are limited, the inconvenience caused by nuisance flooding has prompted the Chatham County Department of Public Works to map and monitor these areas during severe weather conditions. Nuisance flooding occurs county-wide, though it is typically found on streets within neighborhoods and small communities. Within these areas, the storm drain systems have inadequate capacity or are in need of maintenance and/or repair to handle the sudden large volumes of rainwater from high intensity storms. A map is included in Appendix E which shows the known flood prone (nuisance flooding) areas, and the area flood insurance claims. This map also shows the County's structural drainage projects that were designed to help alleviate the nuisance flooding. Appendix E also contains a table named *Flooding (Hot Spots) Information Sheet* which lists the names of streets and intersections and provides some details about each of the flood-prone area catch basins.

### *Structures and Populations at Risk from Future Flooding*

Approximately 64% (148,634 people) of the population of Unincorporated Chatham County and as many as 35% of critical facilities (175 various structures) could potentially be impacted by structural and nuisance flooding. Such losses would result in excess of \$21.59 B at fair market value estimates. This data was obtained from the NFIP data on the 100 Year and Local Historical Flooding map for Chatham County. The total number of buildings that can be affected is more than 36,000.

Land Use	Total Properties	Total Value
Agricultural	7	\$13,902,000
Commercial	1,982	\$3,901,974,137
Historic	6	\$3,135,500
Industrial	527	\$1,156,567,560
Residential	26,932	\$8,816,807,777
Transitional	0	\$0
Utilities	75	\$22,432,148
Conservation Agricultural	42	\$75,292,210

*Source: Chatham County Pre-Disaster Hazard Mitigation Plan, 2010.*

### *NFIP Claims*

According to FEMA's data, unincorporated Chatham County has more than 19,000 flood insurance policy holders. Of those, more than 1,018 flood loss insurance claims have been filed since 1978. The total estimated dollar loss from these claims is \$6,805,207. In all likelihood, this figure represents only a percentage of the actual cost of flooding in Chatham County, as it only accounts for those properties that have and NFIP policy in effect.

### *Sources of Flooding*

The various sources of flooding and the resulting complications listed previously have had some detrimental impacts within and around the communities of Wilmington Park, Romney Place, the Louis Mills Canal area, Halcyon Bluff Subdivision, Golden Isles Subdivision, Georgetown, and the Quacco Canal areas. As stated earlier, some 746 structures within unincorporated Chatham County received insurance claim pay-outs for flood damages. These structures include repetitive flood damaged buildings as well as buildings that have been subjected to flood damage only once. The total sum of the insurance claims paid as of August 2012 totals more than \$ 4.1M.

Chatham County is vulnerable to hurricanes and hurricane surges. Although this region has rarely been impacted in recent years, according to FEMA's Hazards United States – Multi Hazard (HAZUS-MH) modeling software, a single Category 5 hurricane surge could impact the entire population of the county. All 518 critical facilities – valued at more than \$1.75 B – could be impacted. All 113,067 structures/buildings in the County could receive some damage, for a total loss of more than \$45 B. Damages occur as a result of high winds, storm surge and flooding. Refer to **Figure 10** for a summary of HAZUS results of a Category 5 hurricane scenario.

**Figure 10: Summary of HAZUS results, Category 5 Hurricane**

Number of Buildings Damaged				
<i>Damage State</i>	<i>Residential</i>	<i>Commercial</i>	<i>Other</i>	<i>Total</i>
Minor	900	20	10	900
Moderate	5,900	200	70	6,100
Severe	22,000	1,500	700	24,000
Destruction	50,000	400	100	50,000
<b>Total</b>	<b>78,000</b>	<b>2,000</b>	<b>800</b>	<b>81,000</b>
<b>Shelter Requirements</b>				
Displaced Households (# Households)				84,000
Short Term Shelter (# People)				23,000
<b>Economic Loss ( \$ Millions )</b>				
Capital Stock				19,988
Residential Property			14,220	
Commercial Property			3,918	
Other Property			1,850	
Business Interruption (Income)				3,663
<b>Total Direct Economic Loss</b>				<b>23,650</b>

*Source: Chatham County Pre-Disaster Hazard Mitigation Plan, 2010.*

*Impacts to Property from Future Flooding*

Damage to residential, commercial and industrial property has the potential to adversely affect Chatham County’s ability to collect ad valorem taxes. Property taxes are billed based on an assessed value as of January 1 of each year. Hurricane season runs from June 1 to November 30. Value notices are issued during May and June, and have a 60 to 90 day appeal period. Damages which occur during June, July, or August could give reason to appeal the current valuation.

In the event of a major incident, property that has not been rebuilt or restored would be subject to a new assessment as of the next January 1 assessment year. This has the potential to significantly and unexpectedly reduce Chatham County revenues, which would impact other services. The sales and hotel/motel tax revenues will also be adversely affected for any significant periods of power loss or other interruptions of normal business or tourist activity. 80% of Chatham County’s General Fund M&O operating revenues are derived from taxes. In FY-2011, budgeted revenues include \$128 M in ad valorem real and personal property taxes, and \$16 M in sales tax. Chatham County’s Special Service District budget receives 60% of its revenue from taxes. This includes \$27 M in ad valorem taxes, and \$1.2 M in hotel/motel taxes. Currently, there is no mechanism available to Chatham County to offset this potential loss of revenue.

The National Hurricane Center’s Sea, Lake and Overland Surges from Hurricanes (SLOSH) modeling for Chatham County Surge Zones indicates that 76% of the County’s population and 57% of its more than 500 critical structures/buildings can be affected for a loss of \$26.9B at fair market values. Storm surge vulnerabilities and impacts vary by storm surge zone. The Chatham County Storm Surge map data identifies a potential estimated damage of more than \$38 B. The

total number of buildings that could be affected is 95,289. Estimated damages to critical facilities and infrastructure assets could reach \$1,324,327,578. Refer to the following table for exposed properties within each surge zone, by type of property.

	<b>Agricultural</b>	<b>Commercial</b>	<b>Historic</b>	<b>Industrial</b>	<b>Residential</b>	<b>Critical Facilities</b>
Category 1	1	118	1	19	4,639	35
Category 2	6	1,190	6	278	23,437	64
Category 3	9	2,066	0	422	24,054	98
Category 4	25	2,885	5	443	24,233	104
Category 5	4	1,047	0	68	9,986	41

*Source: Chatham County Pre-Disaster Hazard Mitigation Plan, 2010.*

The Savannah Morning News printed a story on January 8, 2007 entitled, “*What if a Category 4 hit here?*” The story is based upon the airing of a television segment by The Weather Channel called, “*It Could Happen Tomorrow,*” and the possibility of a Category 4 storm hitting Savannah at high tide. The story reflected the opinions of national hurricane and emergency management experts as well as the local citizens. The article states that the residents believe Savannah is somewhat “hurricane proof.” The experts say “the city is vulnerable to a potential land falling hurricane and that complacency puts a large part of the Savannah populace at great risk.” Chuck Watson, a Savannah-based hurricane researcher, states that a significant storm could produce \$30 B in direct economic damage, leave 200,000 area residents homeless, and kill up to 3,000 people.

*Coastal Erosion*

According to FEMA, erosion can occur across a wide range of timeframes – it can be gradual (occurring over a long period of time, such as over many years); more rapid (occurring over a relatively short period of time, such as weeks or months); or episodic (occurring during a single coastal storm event over a short period of time, such as hours or days).

Chatham County’s coastal buildings, critical facilities, infrastructure, and natural resources are highly vulnerable to impacts from coastal erosion. Erosion can reduce the embedment of a structure’s foundation into the soil, causing shallow foundations to collapse, lateral movement, or overturning from lateral loads. In addition, erosion can increase the vulnerability of structures to flood events, by exposing the foundation to increased lateral flood loads (i.e., greater still water depths, possibly higher wave heights, and higher flow velocities).

As of the development of this Plan Update, rates of erosion along different sections of Chatham County are unquantified, but in the US, coastal erosion is responsible for approximately \$500 M per year in coastal property loss, including damage to structures and loss of land. To mitigate coastal erosion, the federal government spends an average of \$150 M every year on beach nourishment and other shoreline erosion control measures. Despite these efforts, a 2000 Heinz Center study found that erosion may claim one out of four houses within 500 feet of US shorelines by mid-century.

In addition, the destruction of natural beaches and resources by coastal erosion could cause long-term economic and social problems for Chatham County. A recent article in the *Savannah Morning News*, dated July 11, 2012, highlighted significant erosion problems on McQueen’s

Island Trail, a historic trail site. Erosion in this area caused gaps in the trailways, and damaged public property on the site. Other areas along the beaches and riverfronts have also seen significant erosion which has reduced the beach area and natural resources. According to the Savannah Area Chamber of Commerce, the tourism industry is one of the largest economic drivers of Chatham County. In 2011, direct spending from tourism totaled \$1.94 B, and hotel room tax revenues totaled \$15.5 M. Over time, the erosion to Chatham County's natural resources could impact tourism, and thus County revenues.

### *Sea Level Rise*

The IPCC defines sea-level rise vulnerability as “the extent to which a natural or social system is susceptible to sustaining damage from climate change”. This is a function of the exposure of the system to climatic hazards, the sensitivity of the system to changes in climate, and the adaptive capacity of the system to moderate or offset the potential damages of climate change (Kleinosky, 2006). Some of the direct impacts of sea level rise in Chatham County include:

- Inundation of lowlands;
- Accelerated coastal erosion;
- Increased flooding; and
- Increased salinity of rivers and aquifers.

The most significant impact from sea level rise is the gradual and permanent submergence of land by water determined by gradient of the local topography. This results in shoreline retreat, which will be exacerbated by increased rates in erosion and flooding in vulnerable areas. The University of Georgia River Basin Center modeled a meter of sea level rise for the year 2100. The overall findings from that year were an 8% *decrease* in dry land and 11% *increase* in wetland. The marshes and wetland will be the first to be inundated, and that water will come into the coastal areas, tidal creeks, rivers, and marshes.

Another major impact of sea level rise is the increased salinity of rivers and aquifers from salt water intrusion. Loss of wetlands and river ways will impact the water quality of the rivers and streams within Chatham County. This could permanently impact Chatham County's natural ecosystems and way of life noting that the primary source of drinking water for this region is the Floridian Aquifer.

### **3.3 Floodplain Natural Functions and Management**

Chatham County has several river corridors which are the strips of land that flank major rivers in Georgia. These corridors are of vital importance to the ecosystems of the area, in that they help preserve those qualities that make a river suitable as a habitat for wildlife, a site for recreation, and a source for clean drinking water. River corridors also allow the free movement of wildlife from area to area within the state, help control erosion and river sedimentation, and help absorb floodwaters.

The Coastal Georgia Regional Development Center prepared a Regional River Corridor Protection Plan for the 6 coastal and 4 inland counties within their jurisdiction. The Plan describes the ten coastal local governments and the associated rivers that are affected by the



Georgia Department of Natural Resources Mountain and River Corridor Protection Act, and puts forward a regional plan for the protection of river corridors. The Plan provides for construction of road crossings, acceptable uses of river corridors, maintenance of a vegetative buffer along rivers for a minimum of 100 feet from the river's edge (residential structures are allowed within the buffer zone), timber production standards, wildlife and fisheries management, recreation, and other uses. Chatham County is one of the eight coastal counties affected by the River Corridor Protection Act and therefore, as required, has adopted a Regional River Corridor Protection Plan for portions of the Ogeechee River.

The maintenance of a 100-foot natural vegetative buffer, often referred to as a “riparian buffer”, on both sides of any protected river is required under the River Corridor Protection Act. Similarly, the State of Georgia Erosion and Sedimentation Act requires that land disturbing activities shall not be conducted within 25 feet of the banks of any State waters, thus mandating a riparian buffer 25 feet in width.

Riparian buffers are of particular importance to the overall protection of water quality and habitat, especially within the Lowcountry and coastal areas of Georgia. Scientific research and documentation cite many reasons for riparian buffers, including: a) to reduce the volume and velocity of stormwater run-off in order to protect the hydrological profiles of the surrounding waterways; b) to reduce the sediment and pollutants going into the open water; c) to provide upland wildlife habitat areas and; d) to help maintain the in-stream temperatures provided by the shade within the tree canopy of the buffer system. They also provide the following functions: Improved water quality, flood water storage, increased property value, noise reduction, wildlife habitat and viewing, groundwater recharge, increased shoreline stability and reduced erosion.

The primary effect of the buffer on the waterbody and the overall watershed is to reduce non-point source pollution from human activities upstream of the riparian area. Run-off water filtered through a well maintained buffer zone carries fewer nutrients, chemicals and sediment into the waters and helps to protect the natural profile of the shoreline. For example, studies show that a minimal buffer of 35 feet will often remove over 60 percent of sediment and pollutants before they enter the water, thereby greatly reducing the detrimental impacts to the area. With this in mind, in 2001 the MPC set forth development standards in the Islands Area Community Plan for Chatham County’s Oatland, Talahi, Whitemarsh, and Wilmington Islands and the Southeast Chatham County Community Plan. This plan established a minimum riparian buffer of 35 feet, 30 percent of which may be altered by pruning and selective clearing for access and to maintain view corridors. Such practices as these typically result in reduced stormwater run-off and improved water quality essential for environmental protection and flood control, buffering adjacent neighborhoods, and enhancing community appearance.

Chatham County has enacted a zoning district for marsh conservation. According to the Unincorporated Chatham County Zoning Ordinance (2001) the purpose of the Conservation Marsh (C-M) District is to encourage all reasonable public and private uses and developments of the marshlands that will not be significantly detrimental to the biological ecology, aquatic life, wildlife, recreation, and scenic resources of the marshlands. The uses will not pollute the inlets and coastal waters with human or industrial wastes or the long-term silting that would result

from unduly disturbing the marshlands. The purpose of the C-M district is to protect and conserve a natural land and water condition for the recreational, economic and general welfare of the citizens of Chatham County.

Natural floodplains generally include marsh areas and low lying areas along waterways such as canals. Open parks such as Henderson and Bacon Park Golf Courses also have natural floodplains. The natural floodplains reduce flood damages by allowing flood waters to spread out over large areas, which facilitates absorption into the ground, reduces flow rates and serves as a flood storage area to reduce downstream peaks. Residents should all do their part to help keep the floodplains and floodplain waters free of contaminants such as oil, paint, anti-freeze and pesticides. These chemicals pollute the marsh waters, thus decreasing the water quality that local wildlife depends upon for their habitat. Chatham County also has barrier islands such as Little Tybee, Ossabaw, Cabbage and Wassaw Islands. These islands serve as a natural protective barrier to incoming hurricane forces such as wave attack and serve to reduce tidal and wind energies as well as serve as natural aquatic habitats, wetlands, marshes and estuaries.

### **3.4 Impact of Population Trends and New Development**

As stated earlier in this Plan Update, Chatham County includes eight municipalities and the unincorporated area. In 1980, the population of the City of Savannah was approximately 2.5 times the combined population of the other municipalities and Unincorporated Chatham County. By 2000, this factor was less than 1.5. Many of the same conditions that influenced regional growth affected the growth of the non-urbanized areas of the County. The most significant factor was the development of the islands east of Savannah. Although the municipalities in West Chatham County experienced double digit growth between 1990 and 2000, much of this growth was the result of annexations of land formerly in the unincorporated area. But in spite of the loss by annexation of almost 9,000 acres in western Chatham County, the population doubled between 1980 and 2000. Most of this population growth has taken place on Wilmington, Whitmarsh, Talahi, and Skidaway Islands.

In general, population and development (as well as redevelopment) in Chatham County are moving westward, specifically west of I-95, as there is limited further development or redevelopment that can occur east of I-95. While the eastern portion of the County is not yet built out, it can be challenging to obtain development or redevelopment permits, as this area is heavily regulated due to the significant flooding concerns in this portion of the County due to coastal surge.

The Metropolitan Planning Commission (MPC) reviews the historic population growth according to the decennial census and assumes that the population will grow at that same rate over the planning period. The MPC has developed a method of estimating population growth each year based on the number of residential building permits issued during the year. The population estimated according to this method is recalibrated every ten years, when the national Census count is published. Although the decennial census is considered the most accurate estimation of population, a well-documented problem with the Census is that marginal and minority populations are generally under counted. In Chatham County, the under count is exacerbated by the number of students, military, second-homeowners, and retirees who are full

or part time residents but who may not report their primary residence in Chatham County. At any given time, approximately 25% of the population of Chatham County is not included in any official population count. The uncounted population includes commuters who live in surrounding counties but who work and trade in Chatham County, second-homeowners who spend only part of the year in the county, students at local universities which attract state, national, and international students, military personnel who are stationed in the region temporarily, and tourists.

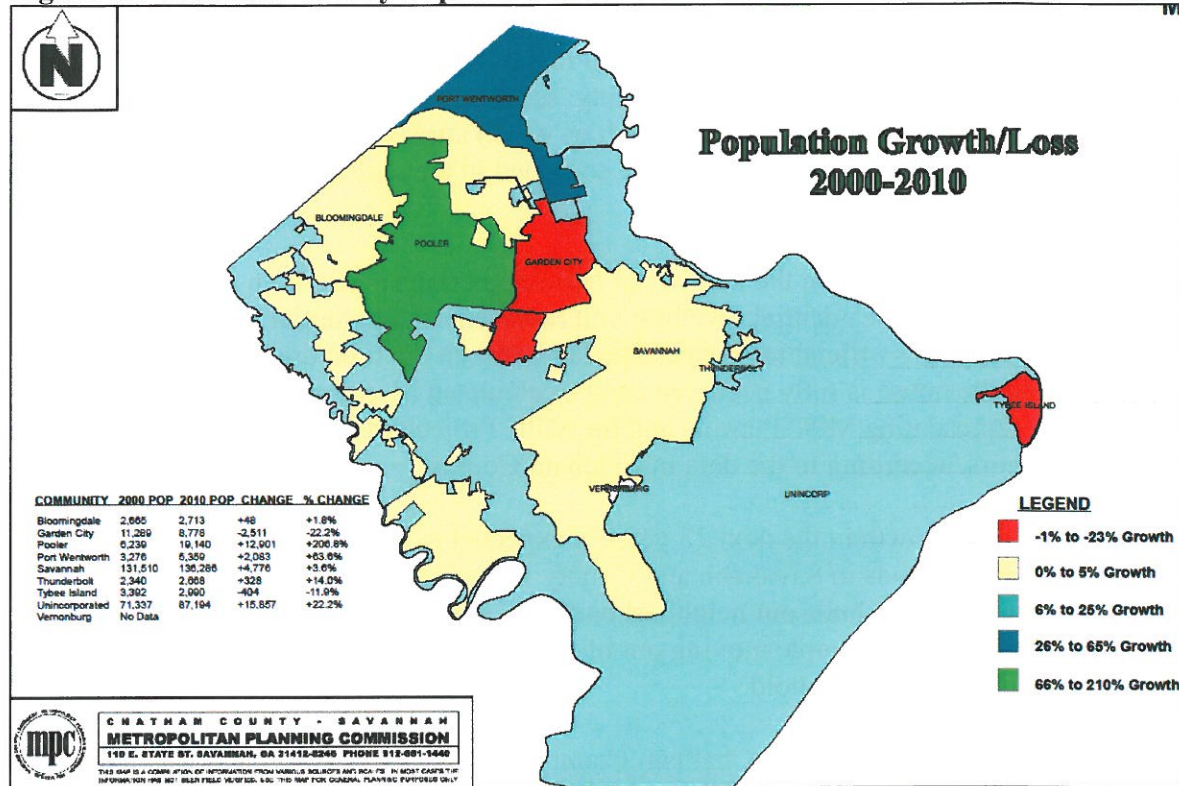
Estimating the population based on the number of building permits is useful in planning for roads and utilities because a residential dwelling unit represents the potential for population regardless of the occupant's official residence. The lag between the time the building permit is issued and the time the house is fully occupied can be calculated by comparing the difference between the lines representing MPC Permits and the MPC Projections. The time lag averages between 4 and 5 years, according to the data in Chatham County.

Most of the population growth in the next 25 years is expected to be in the western areas of the County. Stable neighborhoods in Savannah and County will experience very little growth, and the population of many of the built-out neighborhoods will show a decline. The decline, however, is not attributable to people moving out of the neighborhood but to a decline in the number of people living in a household.

In 1960, the average household size in Chatham County was 3.47 people. In 2000, the average had decreased to 2.58. The national household average size in 2000 was 2.67 and in the southern region (Maryland to Texas) household size was 2.64. The smaller household size in Chatham County reflects the number of retirees who have moved into the area. This trend is expected to continue as the area becomes attractive to retirees as an alternative to other areas in the sunbelt which have become congested. In 2030, the household size in Chatham County is expected to be 2.38.

In general, population levels increase in Chatham County from 1960 – 2000 an average 0.07 % where the average population increase from 2000 - 2005 averaged 2.0 %. Refer to the following **Figure 11** for areas within Chatham County where populations have grown or reduced from 2000 to 2010.

Figure 11: Chatham County Population Growth/Loss from 2000 to 2010



Source: Metropolitan Planning Commission

### Section 4: Mitigation Strategy

Section 4: Mitigation Strategy serves as the long-term blueprint for reducing the potential losses profiled in Section 3: Risk Assessment. Section 4 begins with a description of the Plan Update’s goals. Goals are broad concepts, which taken together provide a framework for carrying out the Plan Update’s intent to mitigate or permanently reduce flood risk. The Plan’s goals are consistent with other community and State of Georgia goals for the affected areas.

After these goals were developed, the Committee reviewed possible activities that could prevent or reduce the severity of the problems describe in Section 3. A systematic review of a wide range of activities was performed by the Planning Committee to measure the benefits and costs of different flood mitigation projects or activities.

Once all potential activities were reviewed, the Planning Committee drafted an Action Plan, consisting of appropriate activities that will permanently reduce the risk of current and future flooding impacts. Activities were chosen based on Chatham County’s resources, hazards, and vulnerable properties, as well as, to develop a balanced approach. Activities included measures from all of CRS’s floodplain management activity categories.

#### **4.1 Goals**

The committee met on June 6, 2012, to evaluate and update the Plan's goals. Goals were selected on the basis of their ability to address community issues and the vulnerabilities identified in *Section 3 – Risk Assessment*. The Committee identified the following goals to guide the long-term Mitigation Strategy, and discussed the examples provided as evidence that the established goals were reasonable and achievable:

##### **Goal 1 - Establish measures to prevent flooding**

Examples of goal achievement include maintenance programs, stormwater management programs, and flood control structure evaluation programs; does not include dams and levees, as the conditions in Chatham County do not lend themselves to such structures, but does include all other measures that will prevent or reduce future flooding conditions

##### **Goal 2 – Floodplain management regulatory activities**

Examples of goal achievement include adopted ordinances for stormwater management, flood damage prevention, engineering, and the like, as well as public outreach activities to ensure information is available and compliance is achieved; all of these types of activities serve to alleviate future flooding conditions.

##### **Goal 3 - Implement property protection activities**

Examples of goal achievement include public outreach and education activities, and the adoption and enforcement of floodplain-related regulations, ordinances, building codes, and setbacks, all of which help to alleviate future flooding conditions by strengthening and mitigating buildings against flooding.

##### **Goal 4 - Ensure natural resource protection**

Examples of goal achievement include preservation of the several conservation areas throughout the County, each of which is protected by a restrictive covenant; in addition, the County is actively pursuing the acquisition of additional conservation areas, which will ease future flooding conditions by allowing the natural movement of water throughout portions of the floodplain.

##### **Goal 5 - Enhance emergency services**

Examples of goal achievement include CEMA's use of Global Connect, which is a reverse 911 system that allows the County to provide emergency information to residents who have registered for such notifications, which helps to move people out of harm's way.

##### **Goal 6 - Construct structural projects**

Examples of goal achievement include the County's tidal gates, and several canal improvement projects that are either funded or are pending funding. These structural projects help to alleviate future flooding conditions by providing for or redirecting water flow in the floodplain. As has been stated throughout this Plan Update, Chatham County does not build or maintain traditional flood control structures, such as dams or levees

## **Goal 7 - Perform public information activities**

Examples of goal achievement include public education and outreach efforts by the Planning Committee Chair throughout this Plan Update process, mass mailings to residents that are likely to be impacted by future flooding conditions, joint outreach efforts with the City of Savannah, and a variety of education materials (both FEMA and locally produced) that are available in public spaces, such as libraries. Chatham County believes that public education and outreach is a key component to appropriately responding to future flooding conditions, and seeks to educate and inform the public accordingly.

The Committee determined that each of these goals will be beneficial to Chatham County in the management of its floodplains, and that each one would improve future flooding conditions.

### **4.2 Review of Possible Activities**

Based on a thorough review of the comments and suggestions gathered by the interested agencies, individuals, and the Planning Committee, all CRS activity categories were selected for review. These activities were selected for review because of their immediate and direct potential to impact and/or to reduce flood levels, the immediate need for community improvements, natural area preservation, and funding limitations.

#### **4.2.1 Review of Preventive Measure Activities**

Chatham County presently uses floodplain mapping and data to produce flood zone determination letters and elevation certificates, upon request. Additionally, the County maps or plots repetitive and single flood damaged properties to identify problem areas and inform the general public of vulnerable flood areas. Chatham County is expanding its Geographical Information System (GIS) database to include historical Flood Insurance Rate Maps and Flood Hazard Boundary Maps. This information will reduce time required to make flood determinations regarding grandfathering inquiries and historic determinations.

Open space preservation is an activity that is often accomplished through building demolition and land acquisition. The State of Georgia and Chatham County both own open space properties within unincorporated Chatham County. Each respective area has specific land development restrictions associated with them, based on the governing body's laws. As a practice, the Planning Committee works with outside agencies and other conservation groups in an attempt to increase open space acreage when qualified properties are identified within the County's jurisdiction.

In addition, Chatham County implements and maintains a rigorous maintenance schedule, which ensures that flooding will not occur due to issues like clogged storm drains or damaged culverts.

Although they are recognized as a measure to prevent future flooding, Chatham County's conditions do not lend themselves to the construction of dams, levees, or other such flood control structures, and so these types of structures are not part of the County's preventative flood measures.

#### 4.2.2 Floodplain Management Regulatory Activities

Floodplain management regulation is covered through the Chatham County Flood Damage Prevention Ordinance (FDPO) which was developed after the State of Georgia's model ordinance. An adopted feature of the State Ordinance is the requirement of one foot of freeboard above the Base Flood Elevation (BFE). The freeboard requirement is applied County-wide within the regulated Special Flood Hazard Area.

An additional flood damage prevention activity instituted by the FDPO is no encroachments (including development) within designated floodways. A Planning Committee discussion was conducted on restricting fill materials without compensation, and creating more restrictive enclosure limits for areas below the BFE. It was anticipated that both topics would generate significant controversy and opposition with the Home Builder's Association.

Building codes apply to the construction methods of residential and business structures. Examples of flood damage prevention measures include: the installation of hydrostatic vents within structures with crawl spaces; elevation of utilities and utility components above the BFE for structures located in the AE-Flood Zone; the restriction of structural fill; minimum set back requirements from mean high tide waters; and the space below lowest supporting member must remain open and free of obstruction within VE-Flood Zones. The requirement of elevation certificates on each structure within the Special Flood Hazard Area helps to insure proper construction for appropriate insurance rate determination.

The Metropolitan Planning Commission (MPC) is responsible for planning the physical growth and future development of the unincorporated areas of the County. In order to fulfill that responsibility, the office prepares a revised general plan periodically, updates the rules governing subdivision of property, reviews and revises the zoning laws that regulate the use of property and administers both the Subdivision Code and the Zoning Ordinance. These regulatory measures reinforce FEMA's No Adverse Impact policy, where the phrase "Do No Harm" was coined. Such policies aid in keeping one homeowner from creating a bad or adverse situation for his neighbor by performing simple home improvements activities. These policies are reviewed periodically by Chatham County and MPC staff in attempts to improve the program.

In addition, the MPC also oversees the Comprehensive Plan for Unincorporated Chatham County. The Comprehensive Plan is a community vision document that consists of three parts: the Community Assessment, the Public Participation Plan, and the Community Agenda. The Community Agenda includes a Strategic Plan which contains the community's goals and a list of strategies that will result in achieving the goals; and a Short Term Work Program (STWP) that identifies who will accomplish the goals, the cost, and a time of completion.

In 2011, the community identified several challenges that were not previously recognized when the current Strategic Plan and associated Short Term Work Program was adopted. One of the most notable challenges not previously included was the impact of sea level rise on development patterns. The MPC has since updated the Comprehensive Plan to include strategies focused on

sea level rise and is planning to present the amended document to the County Commission for adoption in late 2012.

Section 24-707 of the Chatham County Storm Water Management Ordinance requires minimum design requirements of conveyance systems to safely convey the 100-year, 24 hour return frequency storm event such that there is no increase in flood elevations, either upstream or downstream. This activity is achieved through the development of drainage canal improvements with increased capacity and flows as well as onsite stormwater management and treatment. The drainage system maintenance program is assisted by acquiring right-of-way areas for the construction of access roads and easements so that obstructions within water ways can be removed. Stormwater management requirements are implemented to maintain pre-runoff conditions.

The County also maintains a Storm Water Management Plan, which describes the following programs and efforts:

#### **Flood Management Capital Improvement Project (CIP)**

The County operates a Capital Improvement Program to address structural flood management and drainage issues. As part of this program, the County identifies the various drainage and flooding problems within the County and develops a proposed engineered solution to the problem in the form of a CIP. CIPs include the installation of new structures and the retrofit, upgrade, or replacement of existing, inadequate structures.

#### **Flood Damage Prevention Ordinance**

Chatham County currently has a Flood Damage Prevention Ordinance that serves to protect water quality by limiting the impacts that floodwaters can have on the environment. The purpose of the Flood Damage Prevention Ordinance is to: restrict or prohibit land uses that result in increases in erosion, flood heights, or velocities; control the alteration of natural floodplains, stream channels, and natural protective barriers which are involved in the accommodation of flood waters; control filling, grading, dredging, and other development which may increase erosion or flood damage; and prevent or regulate the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards to other lands. This ordinance is administered by the Department of Engineering and is required for participation in the National Flood Insurance Program.

#### **Floodplain Mapping**

Chatham County Department of Engineering maintains the FEMA Digital Flood Insurance Rate Maps (DFIRMs). The County considers the impact to existing floodplains when reviewing and permitting new development per their Flood Damage Prevention Ordinance. County staff will utilize the flood maps for land use planning and site plan review and approval.

#### **Flood Management CIP Land Disturbing Activity Permit**

Chatham County has a program to implement CIP projects within the County to improve infrastructure so as to alleviate flooding and provide better service to citizens. County staff, or a contracted consultant, is required to meet the requirements for a Land Disturbing Activity Permit



when designing and implementing CIP projects. These requirements include development of Erosion and Sedimentation Control Plans (ESCPs) and Stormwater Management Plans (SWMP) to protect water quality during construction and operation of the CIP. ESCPs will be designed to meet the minimum requirements of the County's E&S Control Ordinance and the GESA. SWMP will meet the requirements of the County's Stormwater Management Ordinance, Engineering Policy, GSMM, and CSS. The County Department of Engineering, or contracted consultant, will also inspect the CIP during construction to ensure that the ESCP and SWMP have been properly implemented. After the completion of the project, the Department of Engineering, or contracted consultant, will ensure that the site is properly stabilized.

Unincorporated Chatham County is adjacent to coastal properties located on the barrier islands which include, but is not limited to, Cabbage Island, Raccoon Key, and Little Tybee Island. These islands are uninhabited and thus not subjected to human destruction. They are protected from development by State and Federal laws, which in turn allow dunes and beach front areas to remain in their natural state and ever evolving state.

#### 4.2.3 Review of Property Protection Activities

Building acquisition/demolition is often undertaken as a property protection activity within Chatham County. Although many property owners that have suffered flood damage are interested in the 75% federal match from the Hazard Assistance Grant Program funds, their homes fail to qualify for federal grant funding under FEMA's Benefit-Cost Analysis (BCA). Property Information Cards previously submitted to homeowners that have suffered flood damages typically indicate a lack of interest in participating in the relocation, elevation, or retrofitting of their homes, leaving acquisition as the preferred activity by residents.

Currently, Chatham County engages in programs like the over bank protection program, and erects structural drainage projects capable of handling a 50-year storm event. A number of property protection projects including property protection projects in the following areas are currently underway in flood prone areas:

- Wilmington Park Canal (drainage improvements to maintain access)
- Golden Isles (drainage improvements to alleviate drainage issues in the neighborhood)
- Whippoorwill Road Drainage (relocate and improve a canal tidegate to improve access for maintenance)
- Laberta-Cresthill Area (culvert replacement to improve drainage)
- Norwood Drainage Outfalls (drainage improvement to improve capacity and access for maintenance)
- Henderson/Gateway (drainage improvements)
- Shipyard-Beaulieu Area (drainage improvements and improvement maintenance access)
- Lehigh-Shipyard Lane Area (drainage improvements to alleviate nuisance flooding)
- Cottonvale Road (drainage improvements and improvement maintenance access)

Some of these projects are discussed in more detail in Section 4.3. All of these projects are detailed in the September 2012 CRS Report, found in Appendix G.

The map located in Appendix D shows red dots which represent all structures within Chatham County that have been flooded on more than one occasion. These are the structures that the above actions are proposed to mitigate. Due to size, this image is only located in Appendix D. Please see Appendix D for more details and imagery.

Sewer backup protection devices are not presently available for gravity sewer laterals. A clean out open to the atmosphere inserted at a lower elevation than the interior sewer plumbing connections would technically serve as backup protection system, however, realistically that addition would create more hazards than it would alleviate, i.e., animal/debris trap, odor problems, unsightly, and unsanitary conditions. For these reasons the Planning Committee elected not to pursue this concept as a future flood protection project.

Flood insurance is always encouraged to homeowners within Chatham County. A new approach suggested during a Planning Committee meeting is to target those homeowners that currently do not have flood insurance in order to encourage them to obtain a policy. Data from the NFIP Repetitive Loss Update Worksheets was cross referenced with the Chatham County GIS database to isolate and identify those parcels located in the high flood risk areas. The Committee determined that 21,834 parcels in the high flood risk areas did not have flood insurance policies. The additional cost for an outreach project using insurance information is estimated to be approximately \$11,500 based on 21,834 parcels targeted. This project may prove to be cost prohibitive depending on the 2013 and future County budget allotments. Also discussed was the possibility of placing roadside signs along routes and at entrances into subdivisions within the 100-year floodplain to notify potential homebuyers and current homeowners of the risk of flooding within these areas. The type and number of signs required within the County must be determined before a project value can be assigned. There were also discussions about methods to persuade realtors to notify potential home buyers interested in purchasing within the 100-year flood zone. The Planning Committee decided that it would require state level interaction to mandate this activity. The intent is to contact the Secretary of the State of Georgia to determine policy and procedure regarding this effort. Further information will need to be gathered to implement this activity.

#### 4.2.4 Review of Natural Resource Protection Activities

The State of Georgia's model Wetland Protection Ordinance was consulted to review wetland protection activities in Chatham County. The Planning Committee, and County residents as a whole, agree that wetlands are indispensable and fragile natural resources to Chatham County. As such, there exists restrictive land use language written within local ordinances to preserve currently identified wetland areas.

Erosion and sediment control problems typically become apparent during land disturbing activities. Chatham County aggressively regulates erosion and sedimentation control problems by requiring all staff members that are assigned or associated with construction or land disturbing activities projects to become certified by the Georgia Soil and Water Conservation Commission. Improving this regulatory activity can be accomplished by increasing public knowledge and awareness and by having increased site inspections. Currently there exist vast campaigns executed by Chatham County to educate the general public. Budgetary constraints,

however, limit any increases in personnel for additional onsite inspections, so current levels of inspections will be maintained rather than increased for the foreseeable future.

Natural area preservation programs are intended to protect the highest quality examples of native ecosystems and rare plants and animal species. A few examples of these areas located within Chatham County include the Blue Sky Preserve, Whitemarsh Preserve and Pennyworth Island Preserve totaling more than 975 acres. These areas are currently protected or in the process of being protected through conservation easements and therefore are permanently protected from future development. The Chatham County Board of Commissioners established the Chatham County Resource Protection Commission (RPC) in 2008 through its adoption of the Chatham County Resource Protection Ordinance. The Ordinance provides criteria for the RPC to select sites for protection, as well as establish a fund for property acquisition and protection. The RPC identified 117 sites with natural and ecological value worth preserving. Many of the sites were evaluated and negotiations are ongoing for purchase of the top five sites. Once these sites are acquired, the amount of protection for natural resources will be increased.

Chatham County currently does not have a formal natural area restoration plan or committee, though they have purchased several conservation areas throughout the County, and are actively seeking to purchase additional property for conservation efforts. Such plans and committees are usually headed up by the parks and recreation department of local governments. The general intent of a natural area restoration plan is to raise awareness of the importance of natural areas and their contribution to the livability of the community and to promote the stewardship of natural areas within the community and oversee a variety of activities that enhance their function and value. In an attempt to accomplish this goal, Chatham County has specific areas designated for natural area restoration. These include, but are not limited to The Wetlands Mitigation Bank, the Saltmarsh Mitigation Bank and Westlake-Lamarville Restoration Project. The Westlake-Lamarville property was once a low income housing subdivision, but was recently mitigated and restored to a natural area, thereby increasing the natural resource protection within Chatham County.

The Planning Committee recognizes that stormwater quality is essential to both the economy and to the quality of life in Chatham County. The Metropolitan Planning Commission (MPC) is actively involved in water quality regulations with enforcement falling to the Department of Engineering. The Department of Engineering enforces the design and construction of water quality infrastructure, based on the Coastal Stormwater Supplement (CSS) to the Georgia Stormwater Management Manual (GSMM), for all development projects in Unincorporated Chatham County. The activities implemented to improve water quality are tied to the National Pollutant Discharge Elimination System (NPDES) program mandated by the State of Georgia Environmental Protection Division (GA EPD). Improving this regulatory component can be accomplished by increasing public knowledge and awareness and by having increased site inspections. There are campaigns to educate the general public, but budgetary constraints limit any increases in personnel, so current effort levels will be maintained for the foreseeable future.

Chatham County's coastal barrier protection activities fall under the jurisdiction of the U.S. Fish and Wildlife Service, as mandated by the Coastal Barrier Resource Act. Areas so designated

were made ineligible for direct or indirect federal financial assistance that might support development, including flood insurance, except for emergency lifesaving activities. Such areas are mapped and monitored by Chatham County, to ensure there is no development.

Chatham County currently has no defined environmental corridors. An environmental corridor is a continuous system of open space in urban and urbanizing areas, that include environmentally sensitive lands and natural resources requiring protection from disturbance and development, and lands needed for open space and recreational use. Although not contiguous, Chatham County does have a series of open space areas located throughout the County. These areas account for approximately 25% of Chatham County's regulated floodplain areas and are presently credited under the CRS program. The Flood Mitigation Planning Committee is working diligently to identify additional open space areas in order to limit development for expanded drainage storage capacity and to protect environmentally sensitive areas and natural resources.

Natural areas, such as woodlands and forest, can deliver the functions of protection or conservation if they remain in their natural state and under good natural ecological conditions or are managed in a sustainable manner. Two such tracts that exist within Chatham County are the previously mentioned Wetland Mitigation Bank and Westlake-Lamarville Restoration Project. Chatham County invests in the success of these projects for economic longevity. Blue Sky Preserve and Whitemarsh Preserve were also purchased to continue the preservation and protection of environmental resources in Chatham County.

Additional public outreach campaigns are implemented in Chatham County. They exist in the form of such programs as "Adopt a Stream" and "Adopt a Wetland". These are statewide programs of the Georgia Department of Natural Resources, Environmental Protection Division, designed to promote and increase water quality awareness, public education and community involvement in protecting one of our most valuable resources-water. Adopt-A-Stream operates in Chatham County through the Chatham County-Savannah Metropolitan Planning Commission. Additional public acknowledgment is usually delivered in the form of road sign notices, periodical publications, public radio and television broadcast.



Volunteers adopt a segment of a stream, canal, or other body of water for one year. During this year, Adopt-A-Stream groups select various monitoring activities that best suit their own goals and interests and are committed to studying and protecting the streams, rivers, and wetlands of the area. Georgia Adopt-A-Stream (AAS) is funded in part by the U.S. Environmental Protection Agency. Adopt-A-Stream involves volunteers of all ages and backgrounds, including individuals, school groups, scout troops and civic organizations. There are a variety of levels of involvement in Adopt-A-Stream, from quarterly visual surveys and litter pickups, to monthly chemical testing and one time habitat improvement projects.

There is also an "Adopt -A- Wetland" program that highlights freshwater wetland values and functions, and guides volunteers through the monitoring of soils, vegetation and hydrology. A separate Coastal Adopt-A-Wetland Monitoring manual and program created by University of Georgia (UGA) Marine Extension (MAREX) Service provides guidance for volunteers interested in monitoring coastal habitats and the biological and chemical parameters specific to marine conditions. This manual introduces the functions and values of wetlands and presents the basics of understanding the plants, soils and hydrology in wetlands. The purpose of the Adopt-A-Wetland program is to heighten awareness of wetlands and their values.

Finally, Chatham County actively seeks to inform residents of the known erosion rates and increasing still water levels that adversely impact Chatham County parcels. Specifically, we seek to inform those current or future property owners of properties that are located adjacent to canals, streams and river beds that are subject to being inundated by flood waters in relatively short periods of time. This information will typically be provided to inquirers of elevation certificates and flood zone determination letters for properties located within the impacted areas. The County seeks to make these property owners aware of potential changes to their property, specifically as it relates to erosion in the area, or the potential for erosion in the area.

#### 4.2.5 Review of Emergency Services Activities

Emergency service activities mainly fall under the domain of the Chatham Emergency Management Agency (CEMA). This agency is directly responsible for health and safety maintenance, hazard threat recognition, hazard warning, and hazard response operations. To a lesser extent, they are also responsible for critical facility protection and post-disaster mitigation actions. In comparison to this list of emergency service activities, the group could not come up with any activities that could be improved on or newly created. CEMA informed the Planning Committee that they are constantly expanding existing services to be even more responsive and to increase current emergency services coverage within the County.

Currently, CEMA utilizes Global Connect which works as a community notification system. The system allows early notification to residents who have previously registered for the service of hazardous conditions. Additionally, CEMA possess the capability of disseminating early warnings via the internet through social media such as Face Book, Twitter and the County Website.

CEMA also has a County wide siren network, which is used as an emergency warning system. CEMA expects to expand its current siren network by adding more sirens and to include automated activation with notification from the National Weather Service Center located in Charleston, South Carolina. The siren system will eventually be voice-capable in order to announce the threat, and will be linked with local public and private school systems.

#### 4.2.6 Review of Structural Projects Activities

The Chatham County Departments of Engineering and Public Works have implemented numerous structural projects throughout the County that include channel modifications, stormwater system improvements, the use of structural flood gates, and regular maintenance schedules. Structural projects are designed to the 50-year storm event for an added measure of

flood protection, rather than to the more common 100-year-storm event level. High flood prone areas and frequent flood prone areas are identified and mapped by the Departments of Engineering and Public Works. During periods of frequent and anticipated heavy rainfall events, the Standard Operating Procedures (SOP) of the Department of Public Works require these areas to be checked prior to and immediately after a given storm event. It is also asked that citizens, through various outreach materials and public service messages, report any drainage structure that is obstructed and therefore unable to receive storm and flood waters.

Traditional structural flood control projects (such as levees, floodwalls, and seawalls) have not been used within Chatham County, due to the conditions within the County that make these types of structural flood control projects less than feasible or desirable. Although Chatham County includes beach front properties located on the barrier islands, these islands are uninhabited and do not require the need for beach nourishment. Dune maintenance is regulated and performed by the state, and Chatham County has no authority to perform dune maintenance activities.

#### 4.2.7 Review of Public Outreach Activities

Chatham County currently teams with the City of Savannah and the MPC to conduct outreach campaigns to residents within the floodplain and to the general public. These efforts consist of two separate mailings targeted to those citizens living within the floodplain, according to individual address from the tax digest data base. The general community is targeted via a mass mailing using the *Savannah Morning News*. A certified letter from the *Savannah Morning News* stating that at least 90% of the population is reached during this outreach effort (a minimum CRS requirement) is included.

Other mailings executed solely by Chatham County includes an information letter about flood insurance, which targets residents within or near repetitive flood loss properties, and letters mailed to insurance agents, realtors, and mortgage lenders. Copies of Flood Insurance Rate Maps (FIRMS), floodplain information, and general map information are placed within the local libraries and other public buildings. Technical assistance is provided to homeowners, real estate agents, and insurance agents through requests for elevation certificates, flood zone determination letters, and general flood history of community neighborhoods. This technical data includes benefits of the natural floodplains, storm water information, water quality and environmental protection educational material, and property protection measures.

The Planning Committee discussed real estate disclosures during the planning process. The Committee attempted to come up methods of persuading the real estate agents within our community to promptly inform potential homeowners of the need for flood insurance and for the potential flood hazard of each property. There are no state or federal laws mandating this practice while potential buyers are looking for property. The difficulty of this activity is determining a maintainable incentive, to encourage the real estate agents to disclose the information automatically and promptly to the home buyer. Discussion on this topic is an ongoing effort.

### 4.3 Action Plan

The Action Plan is derived from the goals and review of activities listed above. Each flood mitigation action is classified by the goal it advances. Each action item is subject to the benefits

it provides, the responsible department(s), project timeline, and funding source. All six CRS categories were chosen to be a part of the Action Plan.

*Actions Completed Since 2007 Plan*

Since the 2007 FMP was developed, there have been 19 activities that have been implemented to mitigate the risk of flooding for Chatham County. A brief summation of these activities follows:

1. **Pipemakers Canal:** The project includes canal widening, bank stabilization, sluice gates and culverts. Staff anticipates construction of Phase 2A (from Daniel Street to Dean Forest Road) to be complete by September 2012. The County opened bids for construction of the Phase 2B (west of Dean Forest to the west end of the Savannah Airport) on July 10, 2012. The Board of Commissioners approved award of a construction contract in August 2012. Staff is also engaged in a project to identify and obtain canal rights of way west of I-95.
2. **Pipemakers Pump Station:** The project was identified in the 2003-2008 SPLOST as a part of capital improvements to the Pipemakers Canal Drainage Basin. The hydraulic model is complete. The design team is currently working on development of a concept plan, cost analysis and determination of permitting issues.
3. **Hardin Canal:** The project includes canal widening, bank stabilization, bridges and culverts. Projects that replaced culverts at SR 307 (Dean Forest Road) and within the Southbridge Golf Course are complete. Staff is pursuing drainage improvements in the area of the recently completed culvert project at Dean Forest Road. A project to extend a maintenance access road and improve an outfall into the canal is underway.
4. **Queensbury Drainage Improvements:** The project area is south of Montgomery Cross Road and west of Ferguson Avenue (includes Tara Manor, Ennis Mobile Home Park - Elmhurst Court and the Forest City Gun Club). Design is underway on a project to improve drainage at Tara Manor. A project to improve drainage and provide maintenance access in the area of Remington Drive is complete.
5. **Wilmington Park Canal:** The Wilmington Park Canal extends from North Cromwell Road to the Wilmington River (about 1.4 miles). The project includes canal widening, bank stabilization and culverts. Construction to replace five undersized culverts along the canal is anticipated to begin in September 2012. A project to improve drainage from the southern portion of Ashley Road is underway. The existing outfall from this area is not accessible due to a lack of drainage easements.
6. **Golden Isles:** The project relieved neighborhood drainage issues, including structural flooding of homes by constructing an upgraded storm sewer system. Construction work is substantially complete.
7. **Louis Mills/Redgate Canal:** The Louis Mills and Redgate Canals are tributaries to the South Springfield Canal. Improvements are complete between Garrard Avenue and the

CSX Railroad. A project to extend the improvements to a point north of Marshall Avenue is under design.

8. **Ogeechee Farms Area:** The Ogeechee Farms project includes improvements to canals and culverts. Phase I was completed in July 2005 (piped about 0.2 miles of channel south of Vidalia Road and replaced a road crossing at Waynesboro Road.) Phase II was completed in June 2010 (replaced five undersized culverts south of and under Vidalia Road.) Construction commenced for Phase III at Ridgeland Road and Yemassee Road in February 2012 and is expected to be complete by September 2012.
9. **Whippoorwill Road Drainage:** The project will relocate and improve a canal tidegate structure to a location that can be accessed for maintenance. The existing structure is undersized and was damaged by previous storm events. It cannot be accessed for repair or maintenance because it is located on private property. Design and permitting is underway for a replacement structure in a new location that is accessible for maintenance.
10. **Laberta-Cresthill Area:** The project will relieve flooding within the Cresthill Subdivision. Construction on Laberta Avenue and Whitefield Avenue commenced in August 2011. The project is complete.
11. **Norwood Drainage Outfalls:** The project will improve drainage capacity and access for maintenance for two drainage outfalls from Norwood Avenue. Construction of improvements is complete at Norwood Place. Design work and permitting are underway for the outfall near Skidaway Road.
12. **Henderson/Gateway:** Drainage is provided by the Little Neck Canal and the Henderson Branch Canal (combined length about 2 miles). Projects to replace the golf cart culvert and culverts at Henderson Oaks Drive and Little Neck Road are complete. Staff is investigating further improvements to facilitate improved drainage from the Gateway area.
13. **Shipyard-Beaulieu Area:** The project will be accomplished in phases. The first phase to replace the storm drain pipe at Beaulieu Avenue was completed in January 2010. The second phase will replace three undersized storm drain pipes and reshape the existing ditch. Acquisitions of required easements are complete. Final design work and permitting are underway.
14. **Lehigh-Shipyard Lane Area:** The project will relieve roadside drainage issues causing nuisance flooding in the Lehigh Avenue and Shipyard Lane area. Final design work and permitting are complete.
15. **Grange Road Canal:** The project to relieve flooding extends from Pipemakers Canal to north of Grange Road (about 1.8 miles). The Grange Road Canal outfall to the Pipemakers Canal was improved in 2004. An all weather access road for the Grange Road Canal between Bourne Avenue and the Pipemakers Canal was also constructed at



that time. In 2010 the Georgia Ports Authority (GPA) presented a plan to the County involving expansion of GPA facilities in Garden City and the construction of drainage systems affecting the Grange Road Canal.

16. **LaRoche Culvert:** The project includes the replacement of a drainage culvert located under LaRoche Avenue north of Lansing Avenue. The culvert replacement is in response to a deteriorating brick arch culvert with several cracks. Final design work and permitting are complete. Bids opened in April 2012 exceeded project budget and were rejected. The design is being modified to lower construction costs.
17. **Wahlstrom Road:** The project will address drainage and maintenance access along the portion of Wahlstrom Road north of the railroad tracks. The drainage infrastructure in the area received infrequent maintenance in the past due to extensive industrial activities in the area and lack of access. Current work is directed toward identifying ownership and responsibility of existing infrastructure and locating existing drainage easements and rights of way.
18. **Wymberly Area:** The project will address inadequate neighborhood drainage including roadside ditches, culverts and rear yard areas not accessible for maintenance of public systems. In early 2012 staff presented conceptual plans to stakeholders of the Wormsloe Historic Site and received preliminary verbal agreement for the improvements. Design work is underway.
19. **Cottonvale Road Drainage:** The project will relieve drainage and maintenance access issues causing nuisance flooding in the Cottonvale Road area. Acquisition of a required easement is complete. Final design plans are underway.

#### *2012 Plan Update Mitigation Action Plan*

During the 2012 FMP Update process, additional actions were identified that will mitigate the long-term risk of flooding in Chatham County. Implementing preventive flooding methods and public outreach campaigns provide relatively immediate short-term flood relief. A short-term project is one that can be initiated and completed within approximately 6 months. The long-term flood relief comes from the construction of various structural related projects and the cooperative efforts of a multi-jurisdictional managed stormwater plan. Structural projects and stormwater management plans often are completed within 1-5 years. Education, mapping, regulations, codes and other administrative activities often have an on-going timeline. Additional information regarding on-going and proposed capital improvement projects in association with the repetitive loss communities can be in the Unincorporated Chatham County Stormwater Capital Improvement Program.

A discussion as to the methodology used to determine the prioritization of these actions can be found at the end of this section. Chatham County's flood mitigation actions for each goal include:

**Goal 1: Establish measures to prevent flooding.**

*Action 1.1: Develop GIS floodplain mapping to produce flood zone determinations.*

Benefits: Development of more accurate GIS floodplain mapping will enhance the identification of flood risk areas, and allow for better floodplain determinations.

Type of Activity: Property protection; floodplain management regulation

Responsible Department: Department of Engineering; Department of Public Works

Project Timeline: On-going

Funding Source(s): FEMA's Map Modernization Program; local funds

Project Timeline: On-going

Prioritization: High

*Action 1.2: Preserve open space lands through building demolition and acquisition.*

Benefits: Preserving open space lands through building demolition and acquisition can make a valuable contribution to managing surface water run-off.

Type of Activity: Property protection

Responsible Department: Department of Engineering; Department of Public Works; Georgia Emergency Management Agency; State of Georgia Environmental Protection Division

Project Timeline: On-going

Funding Source: Hazard Mitigation Assistance Grants

Prioritization: Moderate

*Action 1.3: Regulate development within the floodplain through the Flood Damage Prevention Ordinance.*

Benefits: Prevent flood impacts before they occur by limiting development within the floodplain or requiring new structures to be built above the BFE.

Type of Activity: Floodplain management regulation; preventative activities

Responsible Department: Department of Engineering; Department of Building Safety and Regulatory Services

Project Timeline: On-going

Funding Source: Local funds

Prioritization: High

*Action 1.4: Regulate construction methods of residential and business structures through building codes.*

Benefits: Utilizing building codes to ensure residential and business structures are built to meet specific minimum standards reduces the potential for hazard impacts.

Type of Activity: Floodplain management regulation; preventative activities; property protection

Responsible Department: Department of Building Safety & Regulatory Services

Project Timeline: On-going

Funding Source: Local funds

Prioritization: High

*Action 1.5: Manage growth and development in the County through a constantly updated Master Plan and the MPC's Comprehensive Plan.*

Benefits: Managing growth and development within vulnerable hazard areas mitigates the potential for hazard impacts.

Type of Activity: Preventative activities; floodplain management regulation

Responsible Department: Department of Engineering; Metropolitan Planning Commission

Project Timeline: On-going

Funding Source: Local funds

Prioritization: Moderate

*Action 1.6: Develop stormwater conveyance systems.*

Benefits: Properly designed stormwater conveyance systems are effective in preventing erosion and can channel stormwater runoff.

Type of Activity: Structural project; preventative activity; natural resource protection

Responsible Department: Department of Engineering; Department of Public Works

Project Timeline: On-going

Funding Source: Hazard Mitigation Assistance Grants and local funds

Prioritization: High

*Action 1.7: Implement stormwater management regulations.*

Benefits: Development of stormwater management regulations will allow Chatham County to regulate the type of development that would impact stormwater runoff.

Type of Activity: Preventative activities; property protection; natural resource protection

Responsible Department: Department of Engineering; Metropolitan Planning Commission

Project Timeline: On-going

Funding Source: Local funds

Prioritization: Moderate

*Action 1.8: Maintain drainage systems.*

Benefits: Proper maintenance of drainage systems ensures maximum drainage capacity and life of the capital investment.

Type of Activity: Preventative activity; structural projects

Responsible Department: Department of Engineering; Department of Public Works

Project Timeline: On-going

Funding Source: Local funds

Prioritization: High

**Goal 2: Implement Property Protection Activities.**

*Action 2.1: Acquire/demolition repetitive loss properties.*

Benefits: Acquiring/demolition of repetitive loss properties eliminate their risk of flood risk.

Type of Activity: Property protection

Responsible Department: Department of Engineering

Project Timeline: On-going

Funding Source: Hazard Mitigation Assistance Grants

Prioritization: Moderate

*Action 2.2: Relocate, elevate or retrofit repetitive loss properties.*

Benefits: Relocating, elevation or retrofitting repetitive loss properties permanently reduces their risk of flooding.

Type of Activity: Property protection

Responsible Department: Department of Engineering

Project Timeline: On-going

Funding Source: Hazard Mitigation Assistance Grants

Prioritization: Low

*Action 2.3: Encourage the purchase of flood insurance for Chatham County homeowners that currently do not have it.*

Benefits: Insurance claims are paid to damage structures even if a disaster is not declared. Insurance reimburses you for all covered building losses up to \$250,000 and \$500,000 for businesses. Contents coverage is also available up to \$100,000 for homeowners and \$500,000 for businesses.

Type of Activity: Property protection; public information activities

Responsible Department: Department of Engineering, Information and Communication Services; Public Information Office

Project Timeline: Short-term

Funding Source: Local funds

Prioritization: High

*Action 2.4: Display road signs along routes and at entrances into subdivisions within the 100-year floodplain.*

Benefits: Flood zone signs alert people of the locations of flood risk areas.

Type of Activity: Public information

Responsible Department: Department of Engineering; Department of Public Works.

Project Timeline: Short-term

Funding Source: Local funds

Prioritization: Moderate

### **Goal 3: Ensure Natural Resource Protection.**

*Action 3.1: Preserve wetland and natural resource areas.*

Benefits: The preservation of wetland and natural resource areas can provide a valuable contribution to managing surface water run-off and ensure the survival of Chatham County's fragile natural systems.

Type of Activity: Natural resources protection

Responsible Department: Department of Engineering; Metropolitan Planning Commission; Chatham County Resource Protection Commission; Georgia Department of Natural Resource.

Project Timeline: On-going

Funding Source: Local funds

Prioritization: High

*Action 3.2: Regulate erosion and sedimentation control problems*

Benefits: Regulating construction or land disturbance projects reduces the rate of potential erosion and sedimentation.

Type of Activity: Natural resources protection; preventative activities

Responsible Department: Department of Engineering; Georgia Soil and Water Conservation Commission.

Project Timeline: On-going

Funding Source: Local funds

Prioritization: Moderate

*Action 3.3: Develop a natural area restoration plan.*

Benefits: Natural area restoration plans protect the highest quality examples of native ecosystems and rare plants and animal species.

Type of Activity: Natural resources protection

Responsible Department: Department of Parks and Recreation; Department of Engineering

Project Timeline: Long-term

Funding Source: Local funds or additional grant source

Prioritization: Low

*Action 3.4: Monitor and improve water quality.*

Benefits: Monitoring and improving water quality is essential to maintaining and improving the health and economy of Chatham County.

Type of Activity: Natural resources protection

Responsible Department: Department of Engineering; Department of Public Works; Metropolitan Planning Commission

Project Timeline: Long-term

Funding Source: Local funds or additional grant source

Prioritization: Moderate

*Action 3.5: Regulate development within Chatham County's coastal barrier areas.*

Benefits: Managing growth within Chatham County's coastal barrier areas reduces the risk of damage from flood, storm surge, and coastal storm events.

Type of Activity: Preventative activities; floodplain management regulation; natural resources protection

Responsible Department: US Fish and Wildlife Service; State of Georgia

Project Timeline: On-going

Funding Source: Local funds or additional grant source

Prioritization: High

*Action 3.6: Conserve natural and ecological functions.*

Benefits: Ensure that natural and ecological resources are not impacted by development and can provide a valuable contribution to managing surface water run-off.

Type of Activity: Natural resources protection

Responsible Department: Department of Public Works; The Resource Protection Commission; Georgia Forestry Commission

Project Timeline: On-going

Funding Source: Local funds or additional grant source

Prioritization: Moderate

#### **Goal 4: Enhance Emergency Services.**

*Action 4.1: Integrate the Flood Mitigation Plan into the Emergency Operations Plan, Pre-Disaster Hazard Mitigation Plan, Comprehensive Plan, and Capital Improvement Program.*

Benefits: Increased ability to implement actions.

Type of Activity: Emergency services; floodplain management regulation; preventative actions

Responsible Department: Department of Public Works; CEMA; Metropolitan Planning Commission

Project Timeline: Short-term

Funding Source: Local funds

Prioritization: High

*Action 4.2: Develop post-disaster mitigation procedures that assign responsibilities for public information, code enforcement, planning and other efforts that encourage, mandate, and/or fund loss reduction activities.*

Benefits: Build-back more resilient to future disaster events.

Type of Activity: Emergency services; floodplain management regulations; public information activities

Responsible Department: CEMA; Metropolitan Planning Commission; Department of Engineering; Department of Public Works; Department of Building Safety & Regulatory Services

Project Timeline: Long-term

Funding Source: Local funds or additional grant source

Prioritization: Moderate

**Goal 5: Construct Structural Projects.**

*Action 5.1: Implement channel modifications, storm drain improvements, the use of structural floodgates and regular maintenance schedules.*

Benefits: Mitigate stormwater runoff and increase drainage capacity.

Type of Activity: Structural projects; natural resources protection

Responsible Department: Department of Engineering; Department of Public Works

Project Timeline: Long-term

Funding Source: Hazard Mitigation Assistance Grants, local funds or additional grant source

Prioritization: High

*Action 5.2: Implement other flood control structures*

Benefits: Mitigate stormwater runoff and increase drainage capacity.

Type of Activity: Structural projects; natural resources protection

Responsible Department: Department of Engineering; Department of Public Works

Project Timeline: Long-term

Funding Source: Hazard Mitigation Assistance Grants, local funds or additional grant source

Prioritization: Moderate

**Goal 6: Perform Public Information Activities.**

*Action 6.1: Implement an outreach campaign to educate residents on flood risks, maps, and mitigation activities.*

Benefits: Educate the public about flood risks, vulnerable areas, and mitigation activities.

Type of Activity: Public information activities; preventative activities

Responsible Department: Public Information Office; Metropolitan Planning Commission; Department of Engineering; City of Savannah

Project Timeline: On-going

Funding Source: Hazard Mitigation Assistance Grants, local funds or additional grant source



Prioritization: Moderate

*Action 6.2: Provide technical assistance to homeowners, real estate agents and insurance agents through requests for elevation certificates, flood zone determination letters, general flood history of community neighborhoods.*

Benefits: Assist the population in making decisions about the purchasing of property and its flood risk.

Type of Activity: Public information activity

Responsible Department: Public Information Office; Department of Engineering; City of Savannah

Project Timeline: On-going

Funding Source: Local funds or additional grant source

Prioritization: High

*Action 6.3: Provide education material on the benefits of natural floodplains, stormwater information, water quality, and environmental protection education.*

Benefits: Educate the public about the benefits of natural floodplains, stormwater information, water quality, and environmental protection.

Type of Activity: Public information activities

Responsible Department: Public Information Office; Department of Engineering; Metropolitan Planning Commission

Project Timeline: On-going

Funding Source: Local funds or additional grant source

Prioritization: Moderate

*Action 6.4: Develop web-based outreach efforts.*

Benefits: Educate the public about flood risks, vulnerable areas, and mitigation activities.

Type of Activity: Public information activities

Responsible Department: Public Information Office; Department of Engineering; Metropolitan Planning Commission

Project Timeline: Short-term

Funding Source: Local funds

Prioritization: Moderate

*Action Plan Prioritization Methodology*

Each Planning Committee member was asked to rank each project's priority, in their opinion. Each project was assigned a ranking of Low, Moderate, or High by each Committee member. These rankings were then assigned a numerical value of 3 (High), 2 (Moderate), or 1 (Low). The responses were averaged, and an overall ranking for each project was assigned using the scale below:

High: 17-24 total points  
Moderate: 11-16 total points  
Low: 0-10 total points

The table on the following page provides details of each ranking that each project received, and the overall ranking assigned, based on the scale above.

**Table: Action Plan Prioritization Ranking (October 2012)**

Action	Activity Description	JJ Teal	Marc G.	Mike B.	Bill Uhl	Kirk M.	Dave G.	Nick M.	Faith P.	Results
1.1	Develop GIS floodplain mapping	High (3)	High (3)	High (3)	Moderate (2)	Moderate (2)	High (3)	High (3)	High (3)	High (22)
1.2	Preserve open space lands	Low (1)	Low (1)	Moderate (2)	Low (1)	Moderate (2)	Moderate (2)	Moderate (2)	Moderate (2)	Moderate (13)
1.3	Regulate development in floodplain via Ordinance	High (3)	n/a	High (3)	High (3)	High (3)	Low (1)	High (3)	High (3)	High (19)
1.4	Regulate construction methods via building codes	High (3)	n/a	High (3)	High (3)	High (3)	High (3)	High (3)	Moderate (2)	High (20)
1.5	Manage growth and development in the County	Moderate (2)	n/a	Moderate (2)	High (3)	High (3)	High (3)	Moderate (2)	Low (1)	Moderate (16)
1.6	Develop stormwater conveyance system	Moderate (2)	High (3)	High (3)	High (3)	High (3)	Moderate (2)	High (3)	High (3)	High (22)
1.7	Implement stormwater management regulations	High (3)	n/a	Moderate (2)	High (3)	Moderate (2)	Moderate (2)	High (3)	Low (1)	Moderate (16)
1.8	Maintain drainage system	High (3)	High (3)	High (3)	High (3)	Moderate (2)	High (3)	High (3)	High (3)	High (23)
2.1	Acquire/demolition repetitive loss properties	Moderate (2)	n/a	Moderate (2)	High (3)	Moderate (2)	Low (1)	High (3)	Moderate (2)	Moderate (15)
2.2	Relocate, elevate or retrofit repetitive loss properties	Low (1)	n/a	Low (1)	Low (1)	Moderate (2)	Low (1)	High (3)	Low (1)	Low (10)
2.3	Encourage purchase of flood insurance	High (3)	Na/	High (3)	High (3)	Moderate (2)	High (3)	Moderate (2)	Moderate (2)	High (18)
2.4	Display flood zone on road signs	Moderate (2)	Low (1)	High (3)	High (3)	Low (1)	Low (1)	Low (1)	Low (1)	Moderate (13)
3.1	Preserve wetlands and natural resource areas	High (3)	n/a	High (3)	High (3)	Moderate (2)	Moderate (2)	Moderate (2)	Moderate (2)	High (17)
3.2	Regulate erosion and sedimentation control problems	Moderate (2)	n/a	High (3)	Low (1)	Moderate (2)	High (3)	Low (1)	Moderate (2)	Moderate (14)
3.3	Develop a natural area restoration plan	Low (1)	Low (1)	Low (1)	Low (1)	Moderate (2)	Moderate (2)	Moderate (2)	Low (1)	Low (11)
3.4	Monitor and improve water quality	Moderate (2)	High (3)	Moderate (2)	Low (1)	Moderate (2)	High (3)	Low (1)	High (3)	Moderate (17)
3.5	Regulate development within Chatham County's coastal barrier areas	High (3)	n/a	High (3)	High (3)	Moderate (2)	Low (1)	High (3)	Moderate (2)	High (17)
3.6	Conserve natural and ecological function	High (3)	Low (1)	High (3)	Low (1)	Moderate (2)	Low (1)	High (3)	Moderate (2)	Moderate (16)
4.1	Merge FMP with the Emergency Operation Plan etc	High (3)	Low (1)	High (3)	High (3)	Moderate (2)	High (3)	Moderate (2)	High (3)	High (20)
4.2	Develop post-disaster mitigation procedures	High (3)	Low (1)	Low (1)	Moderate (2)	Moderate (2)	Moderate (2)	High (3)	Moderate (2)	Moderate (16)
5.1	Implement channel modification improvements	Moderate (2)	High (3)	Low (1)	High (3)	Moderate (2)	Low (1)	High (3)	High (3)	High (18)
5.2	Implement other flood control structures	Moderate (2)	Moderate (2)	Low (1)	High (3)	Moderate (2)	Moderate (2)	Moderate (2)	Low (1)	Moderate (15)
6.1	Implement an outreach campaign	High (3)	n/a	High (3)	Moderate (2)	Moderate (2)	High (3)	Moderate (2)	Low (1)	Moderate (16)
6.2	Provide technical assistance	Moderate (2)	n/a	High (3)	High (3)	Moderate (2)	Moderate (2)	Moderate (2)	Moderate (2)	High (17)
6.3	Provide educational materials	Low (1)	n/a	Moderate (2)	Moderate (2)	Moderate (2)	High (3)	Low (1)	High (3)	Moderate (14)
6.4	Develop web-based outreach efforts	Moderate (2)	n/a	Moderate (2)	Low (1)	Moderate (2)	High (3)	Moderate (2)	Moderate (2)	Moderate (14)

*Note: An effort was made to have each member of the Planning Committee provide their prioritization ranking for the Action Plan. Due to scheduling conflicts, this was not possible. However, the prioritization presented in this Plan Update represents the collective opinion of the Planning Committee.*

### *Post-Disaster Mitigation Policies and Procedures*

Post-disaster redevelopment planning was reviewed as a mechanism to ensure that Chatham County establishes policies and procedures for long-term redevelopment and sustainability. According to the Florida's Post-Disaster Redevelopment Planning Guidebook, being prepared for the complexity of redevelopment in a compressed timeframe following a major disaster, local officials may struggle with recovery decisions and miss opportunities for public participation in reshaping the community's future. To become more disaster-resilient, local governments should plan for what must happen after rescue and recovery operations have finished in order to return the community to normalcy or perhaps rebuild an even better community. Through the development of a Post-Disaster Redevelopment Plan, local governments can create a long-term recovery and development strategy to implement during the pre- and post-disaster periods in pursuit of a sustainable community. Chatham County accomplishes these goals through the Disaster Recovery Plan dated October 2009. The Disaster Recovery Plan can be reviewed by contacting Chatham Emergency Management Agency at (912) 201-4500 or by assessing the following website <http://www.chathamemergency.org/general/em-program-organization.php>

Chatham County also has a post-disaster debris management plan (including pre-positioned contracts and identified staging areas for debris, which were chosen in consideration of the floodplain), and is in the process of developing a Continuity of Operations Plan, which will allow the County to more effectively respond to and recover from future flood events.

### *Action Items for Mitigation of Other Identified Hazards*


A listing of action items for other identified hazards was developed as part of the 2010 Pre-Disaster Multi-Hazard Mitigation Plan. Please refer to Appendix F for a listing of those actions.

## **5. Plan Maintenance**

The Chatham County Flood Mitigation Plan is a living document that must be amended or revised as new funding becomes available, as changes in community priorities arise, or as flood risks change. The CRS Coordinator is responsible for implementing the Chatham County Flood Mitigation Plan. The CRS Coordinator is also responsible for maintaining adequate stakeholder involvement from the general public and outside agencies and organizations as with the initial meetings. The Planning Committee will assist in evaluating the current status of the plan, suggest project and activity updates and assist in preparing quarterly progress reports that will be used to develop the annual evaluation report submitted to FEMA for recertification. The Plan is monitored, reviewed, and revised based on annual evaluation reports. Refer to Appendix G for annual evaluation reports.

During the 2012 planning update process, the Planning Committee decided to have quarterly Plan Maintenance Meetings. Increasing the number of times a year the committee meets will result in more progress toward implementing the Plan Update over the next 5 years. Minutes from Quarterly Plan Maintenance Meetings can be found in Appendix G.

This Plan Update was adopted on December 21, 2012.



A.G. Bungard, P.E.  
County Engineer  
CRS Coordinator

**APPENDIX A:  
ADOPTION RESOLUTION**

TO: Board of Commissioners

THRU:   
R.E. Abolt, County Manager

FROM:   
A. G. Bungard, P.E., County Engineer

**ISSUE:** Request Board adopt by resolution the revised Flood Mitigation Plan (FMP) for Unincorporated Chatham County as part of the Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP).

**BACKGROUND:** As a participant in the FEMA NFIP Community Rating System (CRS), Unincorporated Chatham County is required to update the Flood Mitigation Plan every five years.

**FACTS AND FINDINGS:**

1. On December 7, 2001, the Board adopted the County's first FMP. The FMP was revised and adopted on August 24, 2007 and again on September 21, 2012.
2. A FMP adopted by the Board and approved by FEMA is an integral step in the County's participation in the NFIP to further reduce flood insurance premiums.
3. The FMP is the culmination of more than a year of planning and coordination with the eight municipalities in the County, various outside agencies, homeowner associations and the general public.
4. The Flood Mitigation Planning Committee determined several CRS points were not realized with the September 21, 2012 plan adoption. This document is intended to recapture those points. With the approval of the revised FMP by FEMA and other related CRS activities, staff anticipates increasing Chatham County's CRS rating from a Classification 6 (a 20% discount) to CRS Classification 5. A Classification 5 rating provides a 25 percent discount on flood insurance premiums issued within high flood risk areas or areas where flood insurance is required by FEMA. It also provides for a 10% discount on flood policies located in low and moderate flood risk areas or within areas where flood insurance is not required by FEMA.

**ALTERNATIVES:**

1. To request the Board adopt by resolution the revised FMP for Unincorporated Chatham County as part of the FEMA NFIP.
2. To not adopt the revised FMP for Unincorporated Chatham County as part of FEMA NFIP.

**FUNDING:** No funds are required.

**POLICY ANALYSIS:** FEMA requires that the plan be adopted by the local community governing body.

**RECOMMENDATION:** That the Board approve Alternative No. 1.

# The County of Chatham Georgia

## Resolution

WHEREAS, Chatham County participates in the National Flood Insurance Program (NFIP) sponsored by the Federal Emergency Management Agency (FEMA) in order to qualify residents for flood insurance and,

WHEREAS, Chatham County participates voluntarily in the NFIP Community Rating System (CRS) whereby residents qualify for discounted flood insurance premiums and,

WHEREAS, Chatham County is required to maintain a current Flood Mitigation Plan and revise it at least every 5 years, and review and update it at least annually and,

WHEREAS, a Flood Mitigation Plan is required by FEMA due to the number of repetitive flood loss properties within the County since 1978 in order to maintain its certification and rating and,


WHEREAS, the Plan was prepared and coordinated in accordance with the guidelines by the FEMA NFIP/CRS Coordinator's Manual Draft Edition, April 6, 2012 and,

WHEREAS, the Plan must be adopted in the form of an official act by the governing body,

NOW, THEREFORE, BE IT HEREBY RESOLVED that the Board of Chatham County Commissioners endorses the Unincorporated Chatham County Flood Mitigation Plan.

Adopted this 21<sup>th</sup> day of December 2012.

  
Pete Liakakis, Chairman  
Chatham County Board of Commissioners

  
Janice Bocook, Clerk  
Chatham County Board of Commissioners

ATTEST:

  
R. Jonathan Hart  
County Attorney



Please Note:

Appendices B through I contains files that are too large to display on this web page. These documents can be made available upon request by contacting Michael Blakely, CFM of the Chatham County Department of Engineering at (912) 652-7814 or by email at [mblakely@chathamcounty.org](mailto:mblakely@chathamcounty.org)

