

Chatham County

PRE-DISASTER MITIGATION PLAN

Developed on Cooperation from the Governments of:

Chatham County
City of Savannah
City of Garden City
City of Pooler
City of Tybee Island
City of Port Wentworth
Town of Thunderbolt
Town of Bloomingdale

January 2005

**Chatham Emergency Management
Agency**

Chatham Emergency Management Agency
PRE-DISASTER MITIGATION PLAN
January 2005

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- II. Natural Hazard – Tornado:

Map indicating values and depicting damage estimates of effected population and critical facilities.

III. Natural Hazard – Rainwater Flood:

Map indicating values and depicting damage estimates of effected population and critical facilities.

IV. Natural Hazard – Storm Surge:

Map indicating values and depicting damage estimates of effected population and critical facilities.

Appendix B – Growth and Development Trends:

Chatham County 2015 Comprehensive Plan Summary, July 1994.

Appendix C – Other Planning documents:

- I. Chatham County Flood Mitigation Plan Unincorporated Chatham County, December 2002.
- II. Socio-Economic and Land Use Data, Chatham Urban Transportation Study, January 2000.
- III. Future Land Use Plan and Zoning Strategy for the Unincorporated Portion of West Chatham County, Chatham County, June 1996
- IV. Chatham County Open Space Plan Supplemental Survey Document, Chatham County-Savannah Metropolitan Planning Commission, 1996.
- V. Islands Area Community Plan, Chatham County-Savannah Metropolitan Planning Commission, Draft 2, April 2001.
- VI. Islands Land Use Plan, Chatham County-Savannah Metropolitan Planning Commission, October 1985.
- VII. Chatham County / Savannah Countywide Open Space Plan, Chatham County-Savannah Metropolitan Planning Commission, 1996.

Appendix D – Worksheets used in planning process:

- I. Completed Part #1 CEMA/local worksheets:
 - a. Worksheet # 1, Identify the Hazard
 - b. Worksheet # 2, Profile Hazard Events
 - c. Worksheet # 3a, Inventory of Assets
 - d. Worksheet # 3b, Critical Facility and Critical Infrastructure Inventory Assets Worksheets

- II. Other Part #3 misc. worksheets
 - a. Worksheet # 1, Identify Alternative Mitigation Actions
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Appendix E – Copies of Misc. Planning Documentation:

- I. Public Notice
- II. Meeting Agendas
- III. Sign-in Sheets
- IV. GEMA/FEMA Correspondence
- V. Local Media Coverage
- VI. Other

Appendix F – Glossary

Chatham Emergency Management Agency
PRE-DISASTER MITIGATION PLAN
January 2005

Chapter 1 – Introduction

I. Purpose

1. Need

Chatham County has a history of both natural and technological disasters, with potential for still greater effects. In order to reduce the financial, economic and human impacts of those disasters, mitigation actions can and should be initiated.

2. Authority

The Georgia Emergency Management Act of 1981 authorized the Chatham Emergency Management Agency (CEMA). CEMA was authorized to develop and implement a Plan for mitigation actions by Local Government Resolution for Emergency Management executed by the Chatham County Commission and local municipalities on 25 April 2000.

3. Statement of the Problem

CEMA has conducted a Capabilities Assessment and Analysis of Existing Conditions, including prioritization of needed mitigation actions. An approved Mitigation Plan pursuant to part 44 of the Code of Federal Regulations (44CFR201), sections 206 et seq. and meeting the Minimum Standards of Acceptability of Federal Emergency Management Agency (FEMA) Region IV is also needed to receive Hazard Mitigation Grant Program (HMGP) project grants after November 1, 2003. Without HMGP project grants, many of the necessary mitigation actions will have to be deferred or obviated.

4. Purpose of this Plan

The purpose of this Plan is to consolidate, collate and organize the data from CEMA's Capabilities Assessment and Analysis of Existing Conditions and to make Chatham County eligible for Hazard Mitigation Grant Program (HMGP) project grants in order to reduce impacts of natural and technological disasters.

II. Methodology

1. The Planning Area

The planning area includes all of Chatham County, GA with population of 232,064 in 448 square miles with seven municipalities: Bloomingdale, Garden City, Pooler, Port Wentworth, Savannah, Thunderbolt and Tybee Island.

2. The Planning Process

A kickoff meeting was held in January 2003 to initiate drafting of the plan; invitations were disseminated by: mass fax, email, media outlet distribution and public TV to members of the Local Emergency Planning Committee (LEPC), public and private partners and the general public.

A municipal meeting to discuss municipal hazards, vulnerabilities and critical facilities was held in March 2003 with public partners and members of the general public. Invitation was again by mass fax, email and public television.

Follow-on municipal meetings to discuss municipal hazards, vulnerabilities and critical facilities were held in April and May 2003 with public partners and members of the general public. Invitation was again by mass fax, email and public television.

A public comment period was held in July 2003 to address the Goals and Objectives of the plan; invitations were disseminated to members of the LEPC, public and private partners and the general public.

A Draft Review was held in September 2003 for members of the LEPC, public and private partners and the general public. Invitation distribution was by mass fax, email, media outlet distribution, public TV and Regional Library distribution.

3. Prioritization

The criteria used to evaluate Strategic Mitigation Actions were drawn from the Social, Technical, Administrative, Political, Technical, Economic and Environmental (STAPLEE) model described in the Federal Emergency Management Agency's (FEMA's) State and Local Mitigation Planning How-to Guide #3, Developing The Mitigation Plan. Details are contained in Appendix D.

Those Mitigation Actions given high priority are in two groups: life safety-related actions that can be accomplished relatively quickly and critical facilities on which other emergency management systems are dependent, for example communications focal points.

Those actions likely to require extended time frames to accomplish received medium priority status.

4. Participants

During the five meetings and comment periods, members of the Local Emergency Planning Committee (LEPC), public and private partners and the general public were included. These meetings and comment periods were staffed by CEMA.

III. Organization of The Plan

This Plan follows the chapter titles and sequence laid out in the Georgia Emergency Management Agency's (GEMA's) Supplement to the Pre-Disaster Mitigation Local Plan Template, as follows:

- Cover page
- Table of contents
- I. Introduction
- II. Natural hazard, risk and vulnerability (HRV) summary
- III. Technological hazard, risk and vulnerability (HRV) summary
- IV. Natural hazard mitigation goals and objectives
- V. Technological hazard mitigation goals and objectives
- VI. Executing the plan
- VII. Conclusion
- VIII. Appendices
 - a. Details of listed natural and technological hazards
 - b. Executive summary of Chatham County's comprehensive plan
 - c. Additional applicable documentation
 - d. Worksheets used in planning (blanks included to use when / if additional data becomes available)
 - e. Meetings' attendees, minutes, resolutions and GEMA approvals
 - f. Glossary

IV. Hazard, Risk and Vulnerability Summary, Goals and Objectives

1. Hazard Summary -- Chatham County is subject to:

- Coastline erosion
- Coastal storms
- Drought
- Earthquakes
- Extreme heat
- Rainwater flooding
- Hurricanes
- Severe winter storms
- Tornadoes
- Wildfire (smoke and haze from Macintosh County)
- Hurricane surge

No tsunami, landslide, dam/levee failure or sinkhole data for Chatham County was found.

2. Risk Summary -- Of those twelve natural hazards, the most frequent events involve coastal storms (113 from 1960 to present), hurricanes with

such related hazards as storm surge, tornadoes (23 touchdowns since 1955), and rainwater flooding (5 hurricanes from 1979 to present and 10 rainwater flooding events since 1985).

3. Vulnerability Summary -- Very high proportions of Chatham County's population (100% in hurricanes), structures (ranging from 35-100%) and critical facilities (up to 89% of the County's 501 such facilities) are exposed to these large-scale events with closely tied vulnerabilities and potential damage estimates. The Goals and Objectives for this Plan reflect Chatham County's logical desire to apply mitigation actions to reduce those vulnerabilities and losses.

4. Goals and Objectives

- a. Goal 1: Protect existing and future structures, especially critical facilities from hurricane and coastal storm damage.

Objective 1.1: Encourage adaptation of hurricane-force wind protection measures.

Objective 1.2: Improve utility and communications infrastructure hurricane survivability.

Objective 1.3: Improve public assistance and education.

Objective 1.4: Improve post-hurricane recovery procedures.

- b. Goal 2: Minimize losses to existing and future structures, especially critical facilities, from tornado damage.

Objective 2.1: Develop a Tornado Shelter Program

Objective 2.2: Improve Chatham County's Tornado preparedness system.

- c. Goal 3: Minimize losses to existing and future structures, especially critical facilities, from flood damage.

Objective 3.1: Reduce the effect of freshwater flooding through public education.

Objective 3.2: Reduce the effect of freshwater flooding through effective land management practices.

Objective 3.3: Promote governmental support of flood mitigation programs.

- d. Goal 3: Minimize the effect of storm surge on public and private facilities.

V. Multi-jurisdictional Special Considerations

The vulnerabilities cited above point out their comprehensive nature, as any one event is capable of effect throughout Chatham County and its seven municipalities. Reviewing the Pre Disaster Mitigation Critical Facility and Critical Infrastructure Assets Inventory, the 501 structures or buildings identified are controlled by: utilities, local government agencies, school districts, health care organizations, independent and municipal fire departments, Federal government agencies including the Armed Forces, private educational organizations, state agencies including universities, and religious healthcare institutions. Several highways and other transportation links connect with adjacent counties to the south and west, and to South Carolina on the north. The State of Georgia Department of Transportation has jurisdiction on many of the highways. The Inland Waterway connects both north and south and, like our U.S. Highways, involves another aspect of Federal jurisdiction. CSX Transportation System, Inc., Norfolk Southern Railroad and AMTRACK, Inc. are also located within Chatham County and governed by Federal rules and regulations.

In summary, virtually all mitigation actions will necessarily involve multi-jurisdictional considerations.

VI. Hazards, Risks and Vulnerabilities

Chatham County is subject to the following natural hazards, with representative risks and vulnerabilities as shown:

1. Hurricane and Coastal Storm: Chatham County is subject to wind events up to and including Category 5 Hurricanes. The National Oceanographic and Atmospheric Administration's data on the County's Hurricane and Coastal Storm map indicates that 230,730 people, or 99% of population and 447, or 89% of its 501 critical structures/buildings can be effected, for a loss of \$38.4 billion at Fair Market Values.
2. Tornado: During the past 50 years and Chatham County's history of 23 tornado strikes, the county has been subject to no greater than category 2 on the Fujita Pearson tornado scale. However, tornadoes up and including Category 5 could occur with sustained wind speeds exceeding 300 mph. The 230,730 residents, or 99% of population and 447, or 89% of its 501 critical structures/buildings could be effected by tornado strikes, for a loss of \$38.4 billion at Fair Market Values.

3. Rainwater Flood: The National Flood Insurance Program's (NFIP's) data on the 100 Year and Local Historical Flooding map for Chatham County indicates that 148,634 people, or 64% of the County's population and 175 critical facilities, or 35% of its 501 critical structures/buildings can be effected, for a loss of \$21.59 billion at Fair Market Values.
4. Storm Surge: 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 501 critical structures/buildings can be effected for a loss of \$26.9 billion at Fair Market Values. Please note that the SLOSH modeling includes only Categories 1 through 3 Hurricanes, though Chatham County is subject to Hurricanes through Category 5.
5. Possible, but unlikely: Coastal Erosion, Dam/Levee Failure, Drought, Earthquake, Extreme Heat, Landslides/Sinkholes, Severe Winter Storm/Freeze, Tsunami and Wildfire. Those natural hazards are included here in compliance with FEMA's State and Local Mitigation Planning How-to Guide #3 -- Developing the Mitigation Plan and FEMA Region IV's The Local Mitigation Plan Minimum Standards of Acceptability.
6. Goals
The Goals for all of the above significant threats/prevalent hazards are summarized as follows:
 - a. Protect existing and future structures, especially critical facilities from hurricane and coastal storm damage.
 - b. Minimize losses to existing and future structures, especially critical facilities, from tornado damage.
 - c. Minimize losses to existing and future structures, especially critical facilities, from flood damage.
7. Special Needs
Seniors, people who are mentally and physically challenged, the homebound and infants are listed in FEMA publications as groups with special needs. In planning mitigation actions, Chatham County will include their representatives to incorporate mitigation actions that will reduce the high-probability high-impact hazards' effects on this vulnerable segment of the County's population. Foreseeable factors are: early warning specifically directed to those groups in order to facilitate preparations for evacuation, identification of transportation system elements adapted to their needs, and preparation of shelters/reception areas for their special needs.

VII. Adoption, implementation, monitoring and evaluation

1. Adoption: Contingent upon FEMA approval, this Plan will be submitted to Chatham County's seven local municipalities for adoption and subsequently by action requesting a Local Government Resolution, to the Chatham County Commission for approval.
2. Implementation: Because of the several types of mitigation actions to be employed, implementation methodologies will vary. Please see Chapter 6 – Executing the plan, Section I – Implementation Action Plan. For practicality, mitigation actions that can be accomplished through policy adoption by the County's governmental bodies, accompanied by mitigation actions likely to incur low local budgetary impacts, will be selected as pilot actions to demonstrate feasibility.

VIII. Local resolution for plan adoption

Contingent upon FEMA approval, this Plan will be submitted to Chatham County's seven local municipalities for adoption and subsequently by action requesting a Local Government Resolution, to the Chatham County Commission for approval.

Chapter 2 – Natural Hazard, Risk and Vulnerability Summary

I. Natural Hazard – Hurricanes and Coastal Storms

1. Risk Assessment.

Chatham County is subject to coastal storms up and including Category 5 Hurricanes, in which case sustained wind speeds exceeding 155 mph can be expected with gusts potentially above 200 mph.

2. Type, Location and Extent of these Hazards.

Hurricanes have the potential to effect all of Chatham County for the duration of a single event. Coastal Storms by definition, have the most severe effects on the coastal verge of Chatham County, but will cause damage and endanger people in the adjacent areas as well.

3. Previous Occurrences and Future Probabilities

As reported by NOAA (see Appendix A) five hurricanes struck Chatham County since 1979. Each of these storms affected all of Chatham County. While the worst damage from future hurricanes is likely to be concentrated around the eye's track over the ground, in a Category 5 event that could result in near-total devastation over a track as much as 250 miles across,

with the point of entry on the coastline and direction of such paths thereafter are unpredictable. Many hurricanes spawn tornadoes. In January 2005 <fema floodmaps.net> forecasts the chance that a tropical storm or hurricane will effect Chatham County during the whole June to November hurricane season as 33 percent; the probability of a hurricane during the same period is 5 percent.

There have been 113 coastal storms in Chatham County since 1960; specific dates and locations are shown in Appendix A. The Hazard Frequency Table indicates a historic interval of .38 with a historic frequency percent of chance each year of 2.60. Over the past 10 years the record of storm frequency per year has been 3.4, over the past 20 years it has been 1.6, and over the past 50 years it has been 2.34 per year.

4. Vulnerabilities

Data provided by the National Oceanographic and Atmospheric Administration (NOAA) on the Chatham County Hurricane map (Appendix A) indicates that 230,730 people, or 99% of the County's population and 447, or 89% of its 501 critical structures/buildings can be effected, for a loss of \$38.4 billion at Fair Market Values.

Specific vulnerabilities are identified in the Critical Facility and Critical Infrastructure Inventory Assets Worksheets found in Appendix D. Particularly vulnerable populations exist in: the educational buildings, nursing homes, recreation facilities and seniors' centers.

5. Types and Numbers of Existing and Future Buildings, Infrastructure and Critical Facilities in the Identified Hazard Areas.

With 447 (or 89% of Chatham County's total of 501) existing critical structures/buildings in the parts of Chatham County identified on the County's Hurricanes and Coastal Storms map, and the County's most recent projected growth rate (1990-2000) of 13.2% per year, approximately 648 critical structures/buildings can be projected to be in the Hazard Area by 2003. For 2004, the expected number can reach 733. Projected exposed population by 2004 can reach 378,868.

6. Estimated Potential Dollar Losses – Vulnerable Structures

Using Chatham County's most recent projected annual development rate (1990-2000) of 13.2% per year, over the four years since the data for the County's Hurricane and Tornadoes maps were developed, the potential loss exposure at Fair Market Values could reach \$56.235 billion in 2003, and \$63.658 billion in 2004.

7. General Description of Land Uses and Development Trends

All of unincorporated Chatham County has a current Land Use Plan. The overall Land Use Plan has three adoption dates: for the Southeast's it is 2003, the Islands are 2001, and the remaining majority is 1994. The projected value of development per year is \$166,058,000.

The International Building Code was adopted in 2002, and Chatham County has an Inspections/Permitting Office. The Chatham County Stormwater Ordinance, Chatham County Engineering Manual, Subdivision Regulations, the Land Disturbance Ordinance, the Wetlands Protection Ordinance, and a Groundwater Recharge regulation regulate drainage structures.

The basis for those figures is in the Capabilities Assessment and Analysis of Existing Conditions worksheet, which is in Appendix D.

I. Natural Hazard –Tornadoes

1. Risk Assessment.

Although in the past 50 years of Chatham County's tornado history, the county has been subject to no greater than category 2 on the Fujita Pearson tornado scale, tornadoes up and including Category 5 could occur with sustained wind speeds exceeding 300 mph.

2. Type, Location and Extent of these Hazards.

All categories of tornado have the potential to occur anywhere in Chatham County.

3. Previous Occurrences and Future Probabilities

Twenty-three tornadoes have been recorded in Chatham County since 1955; specific dates and locations are also shown in Appendix A.

Though a single tornado may be limited to a touchdown footprint two miles across along a curved track of 30 miles or more based on regional historic data, there is no practical way to determine where in the County future tornadoes effects are likely. However, tornadoes up and including Category 5 could occur with sustained wind speeds exceeding 300 mph.

The Hazard Frequency Table indicates a historic interval of 2.17 with a historic frequency percent of chance each year of .46. Over the past 10 years the record of frequency per year has been .5, over the past 20 years it has been .25, and over the past 50 years it has been .46 per year.

4. Vulnerabilities

Data provided by the National Oceanographic and Atmospheric Administration (NOAA) on the Chatham County map at Appendix A indicates that 230,730 people, or 99% of the County's population and 447, or 89% of its 501 critical structures/buildings can be effected, for a loss of \$38.4 billion at Fair Market Values.

Specific vulnerabilities are identified in the Critical Facility and Critical Infrastructure Inventory Assets Worksheets found in Appendix D. Particularly vulnerable populations exist in: the educational buildings, nursing homes, recreation facilities and seniors' centers.

5. Types and Numbers of Existing and Future Buildings, Infrastructure and Critical Facilities in the Identified Hazard Areas.

With 447 (or 89% of Chatham County's total of 501) existing critical structures/buildings in the parts of Chatham County identified on the County's Tornadoes map, and the County's most recent projected growth rate (1990-2000) of 13.2% per year, approximately 648 critical structures/buildings can be projected to be in the Hazard Area by 2003. For 2004, the expected number can reach 733. Projected exposed population by 2004 can reach 378,868.

6. Estimated Potential Dollar Losses – Vulnerable Structures

Using Chatham County's most recent projected annual development rate (1990-2000) of 13.2% per year, over the four years since the data for the County's Tornadoes map was developed, the potential loss exposure at Fair Market Values could reach \$56.235 billion in 2003, and \$63.658 billion in 2004.

7. General Description of Land Uses and Development Trends

All of unincorporated Chatham County has a current Land Use Plan. The overall Land Use Plan has three adoption dates: for the Southeast's it is 2003, the Islands are 2001, and the remaining majority is 1994. The projected value of development per year is \$166,058,000.

The International Building Code was adopted in 2002, and Chatham County has an Inspections/Permitting Office. The Chatham County Stormwater Ordinance, Chatham County Engineering Manual, Subdivision Regulations, the Land Disturbance Ordinance, the Wetlands Protection Ordinance, and a Groundwater Recharge regulation regulate drainage structures.

The basis for those figures is in the Capabilities Assessment and Analysis of Existing Conditions worksheet, which is in Appendix D.

III. Natural Hazard – Rainwater Flood

1. Risk Assessment.

Chatham County historically and as shown by the National Flood Insurance Program's (NFIP's) 100 Year Flooding data is subject to flooding over an estimated 60% of the County's total surface area.

2. Type, Location and Extent of these Hazards.

Rainwater flooding is usually characterized by slow rise of water levels with isolated instances of rapid pooling and overflow flooding where stormwater control structures are compromised or where stormwater control measures constrained by local tax revenues have been outpaced by development. In that context, please note the previously documented rapid growth projection of 13.2%, with development value of \$166,058,000 per year in Chatham County.

3. Previous Occurrences and Future Probabilities

There have been ten flooding events since 1985; these events are documented by date and location of occurrence in Appendix A, Chatham County Hazard by Type.

The probability of complete flooding should be anticipated from Chatham County's coastline and its southeastern boundary inland to State Highway 204 and from the coastline between Ossabaw Sound and Tybee Island inland northwestward to a line between Vernonburg and Thunderbolt. The area of almost complete flooding also extends from Oglethorpe Avenue/State Highway 21 northeastward to the north and west County lines. In the remaining (roughly pie-shaped) segment, excepting much of the Savannah metropolitan area, approximately 50% of the land can be expected to flood; based on historic recurrence intervals, the historic frequency % chance per year is .50. A graphic illustration of that description can be seen on the Chatham County 100 Year & Local Historical Flooding map, which is in Appendix A.

4. Vulnerabilities

The 100 Year & Local Historical Flooding map for Chatham County based on NFIP data, indicates that 148,634 people, or 64% of the County's

population and 175, or 34% of its 501 critical structures/buildings can be affected. The total number of buildings that can be affected is 36,257.

Specific vulnerabilities are identified in the Critical Facility and Critical Infrastructure Inventory Assets Worksheets found in Appendix D. Particularly vulnerable populations exist in: the educational buildings, nursing homes, recreation facilities and seniors' centers. While personnel 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 the County's resources and abilities to respond to collateral emergencies. Emergencies that often accompany extensive flooding include total loss structural fires.

5. Types and Numbers of Existing and Future Buildings, Infrastructure and Critical Facilities in the Identified Hazard Areas.

As outlined above, 175, or 34% of Chatham County's 501 critical structures/buildings can be affected. The total number of buildings that can be affected is 36,257.

6. Estimated Potential Dollar Losses – Vulnerable Structures

To estimate Chatham County's Estimated Potential Dollar Losses, the ratio of 175 critical structures/buildings in 100 Year & Local Historical Flooding map's data box to the total of 501 such structures/buildings identified in the Critical Facility and Critical Infrastructure Inventory Assets Worksheets (please see Appendix D) was used. The resulting 35% was used to estimate potential dollar losses for Structure Displacement Cost per day. That amount is \$5,094,795.00.

Should a representative 175 of the County's 501 critical structures/buildings be rendered unusable, their replacement value would be approximately \$642,572.00

Should those structures/buildings contents be rendered unusable, their contents value would be approximately \$612,705.00.

The potential for residential and commercial losses is \$18.659 billion at Fair Market Value.

7. General Description of Land Uses and Development Trends

All of unincorporated Chatham County has a current Land Use Plan. The overall Land Use Plan has three adoption dates: for the Southeast's it is 2003, the Islands are 2001, and the remaining majority is 1994. The projected value of development per year is \$166,058,000.

The International Building Code was adopted in 2002, and Chatham County has an Inspections/Permitting Office. The Chatham County Stormwater Ordinance, Chatham County Engineering Manual, Subdivision Regulations, the Land Disturbance Ordinance, the Wetlands Protection Ordinance, and a Groundwater Recharge regulation regulate drainage structures.

The basis for those figures is in the Capabilities Assessment and Analysis of Existing Conditions worksheet, which is in Appendix D.

IV. Natural Hazard – Storm Surge

1. Risk Assessment.

Although Chatham County has no record of storm surge, the National Hurricane Center's data reflected on the Chatham County Sea, Lake and Overland Surges from Hurricanes (SLOSH) modeling map's Surge Zones indicates that 76% of the County's population and 57% of its critical structures/buildings could be effected. Please note that the SLOSH modeling includes only Categories 1 through 3 Hurricanes, though Chatham County is subject to Hurricanes through Category 5.

2. Type, Location and Extent of these Hazards.

a. Type

As noted above, Chatham County is subject to Hurricanes through Category 5, though the available data extends only through Category 3 hurricanes. When tropical storms come ashore, they frequently drop greater amounts of rain, contributing to a combination of surge and rainwater flooding with attendant complications for: government agencies charged with facilitating floodwater removal, emergency responders responsible for life safety issues, and utilities restoring the infrastructure that is essential to the economic base of the County and its municipalities.

b. Location and Extent

For Category 1 hurricanes, The National Hurricane Center's SLOSH model data shows flooding along the southwestern County boundary from approximately Interstate 95 seaward along the coastline, thence along the northeastern County boundary to the County's northernmost point. Almost contiguous flooding is shown extending inland from those boundaries approximately to State Highway 204 until it turns north at Vernonburg, then northeast to Thunderbolt, then north to the Savannah River. During a Category 1 storm, flooding in general follows the watercourses northwestward as far as Interstate 95. For an adequate concept of the

several areas the model shows as unlikely to be covered, please see the SLOSH Cat 1, 2, 3 & TS Surge Zones map in Appendix A.

For Category 2 hurricanes, the SLOSH model depicts flooding from the southern boundary of Chatham County, covering approximately 50% of the high ground left uncovered by surge during Category 1 events in the high hazard areas. Again, the best understanding will be obtained by viewing the SLOSH Cat 1, 2, 3 & TS Surge Zones map in Appendix A.

For Category 3 hurricanes, much of Chatham County between Interstate 16 and the southwestern County boundary will be affected as far as US Highway 17. Please refer to the SLOSH map in Appendix A.

3. Previous Occurrences and Future Probabilities

a. Previous Occurrences

Five hurricanes have affected Chatham County since 1979. Because of the unpredictable tracks of hurricanes, forecasts of future probabilities beyond averaging landfalls along the County's coastline over a similar time period (5 in 24 years) are unlikely to prove accurate. However, the National Weather Service notes that in "...the period from 1959 –1989... there were no major hurricanes (i.e. Cat 3 or higher) to affect the Carolinas or Georgia. With the exception of Hurricane Hugo, an active decade for tropical activity in the Atlantic basin had not occurred since the 1950s; accordingly, within the past 50 years, there is no record of significant storm surge effecting Chatham County.

b. Future Probabilities

Although there is no recent record of storm surge effecting Chatham County, information from the National Weather Service, and in particular from the National Hurricane Center, stress that the United States coastlines may be returning to a more normal pattern. That is, hurricanes can be expected to strike the Georgia coastline more frequently than our population's memories lead them to expect. Based on historic recurrence intervals, the historic frequency % chance per year is 4.00. In January 2005 <femafloodmaps.net> forecast the chance that a hurricane capable of bringing storm surge that could effect Chatham County during the whole of June to November as 5 percent. Even in the absence of historical prescient, to fail to plan for the possibility of such a potentially devastating event would be negligent. (See Hurricane Probability Appendix A-1)

4. Vulnerabilities

The Chatham County SLOSH Cat 1, 2, 3 and TS (tropical storm) Surge Zones map data estimates that 177,179 people in Chatham County (76%

of the population) are likely to be affected, with 286 critical facilities, or 57% of the County's total of 501 such facilities exposed.

Specific vulnerabilities are identified in the Critical Facility and Critical Infrastructure Inventory Assets Worksheets found in Appendix D. Vulnerable populations would be in: the educational buildings, nursing homes, recreation facilities and seniors' centers.

Personnel casualties during Hurricanes are unlikely to be limited as in Rainwater Flooding because of the missiles propelled by Hurricanes' high winds, compounding the rescue, evacuation and sheltering demands on Chatham County's emergency response resources.

5. Types and Numbers of Existing and Future Buildings, Infrastructure and Critical Facilities in the Identified Hazard Areas.

The worksheets for Critical Facility and Critical Infrastructure Inventory Assets can be found in Appendix D. They identify 501 such buildings/facilities ranging from government administrative centers through: water supply assets, emergency responders' stations and quarters, communications nodes, medical treatment and special needs facilities, and storm/wastewater control structures.

6. Estimated Potential Dollar Losses – Vulnerable Structures

The Chatham County Storm Surge map data identifies a potential cost of \$1.133 billion. Affected buildings could be as many as 72,228, which equates to \$29.79 billion at Fair Market Values for residential and commercial properties.

Additionally, the potential maximum dollar impacts on Chatham County's Critical Facility and Critical Infrastructure Inventory Assets could reach \$1,019,194 in structure replacement values, and \$999,829 in contents value at 2003 costs.

7. General Description of Land Uses and Development Trends

Chatham County's 1990 through 2000 growth rate of 13.2% establishes a development trend reflecting the desire of many who come as tourists to return and become residents, both part- and full-time. The projected value of the resulting development per year is \$166,058,000.

The recreation and other economic service sectors' growth to keep pace with this trend is part of that, and land use restrictions to limit property and human casualty losses from natural hazards have been adopted by both The County and its municipalities.

Chatham County has a comprehensive a Land Use Plan. There is an ongoing \$150,000,000 drainage improvement program funded by taxpayers.

The bases for those figures are in the Capabilities Assessment and Analysis of Existing Conditions worksheet, which is in Appendix D.

Chapter 3 – Technological Hazard, Risk and Vulnerability Summary

Technological Hazards will be addressed in a subsequent planning phase.

Chapter 4 – Natural Hazard Mitigation Goals and Objectives

Narrative: Overall Community Mitigation Goals, Policies and Values

I. Community Mitigation Goals

1. The Goals for all of Chatham County's Natural Hazards are summarized as follows:
 - a. Protect people in Chatham County as well as existing and future structures, especially critical facilities, from hurricane and coastal storm damage.
 - b. Minimize exposure to people in Chatham County and reduce losses in existing and future structures, especially critical facilities, from tornado damage.
 - c. Minimize exposure to people in Chatham County and reduce losses in existing and future structures, especially critical facilities, from flood damage.
 - d. Minimize exposure to people in Chatham County and reduce losses in existing and future structures, especially critical facilities, from storm surge damage.

II. Identification & Analysis of Range of Mitigation Options

1. Structural and non-structural mitigation
 - a. Please see the definitions of Structural and Non-Structural mitigations in the Glossary, Appendix F.
 - b. Those Mitigation Actions given high priority are in two groups: life safety-related actions that can be accomplished relatively quickly and

changes to protect critical facilities on which other emergency management systems are dependent, for example communications focal points.

- c. Those actions likely to require extended time frames to accomplish received medium priority status.
2. Existing policies, regulations, ordinances and land use
 - a. Chatham County has a comprehensive Land Use Plan.
 - b. Chatham County has a property acquisition program.
 - c. The International Building Code was adopted in 2002, and Chatham County has an Inspections/Permitting Office. The Chatham County Stormwater Ordinance, Chatham County Engineering Manual, Subdivision Regulations, the Land Disturbance Ordinance, the Wetlands Protection Ordinance, and a Groundwater Recharge regulation regulate drainage structures.
 3. Community values, historic & special considerations

Historic-Cultural

Representative of Chatham County's historical attractions, the Savannah Historic District, a National Historic Landmark, is significant for its distinctive grid plan as well as its 18th and 19th century architecture. The district encompasses the original town plan laid out in 1733 by Gen. James E. Oglethorpe, founder of the British colony of Georgia. Most of the original squares remain and are surrounded by fine examples of buildings in the Georgian, Greek revival and Gothic styles. Several important sites associated with the African American community exist in the district, including the city's first black school, and the 1896 home of a working-class African American family.

Recreational

Eighteen miles east of Savannah, Tybee Island with its wide, 3-mile long beach backed by sand dunes is another tourist destination for sunbathers, people-watchers and enjoying the waves of the Atlantic Ocean. The island's south-end pier and pavilion provides strolling above the ocean and listening to the music of live bands. With all those, it is representative of Chatham County's pull and hold on people who come to visit. Many of those choose to relocate and become full- or part-time residents, accounting in part for the County's 13.2% growth rate through 2000.

Economic Drivers

The healthcare industry, led by Candler Hospital, Inc. and Memorial Health University as well as Gulfstream Aerospace Corp, JCB, and International Paper Company are vital supplements to the service economy that support tourism and its related growth in Chatham County.

The preservation of these attractions and economic drivers is an important motivator to quality construction and implementation of this Mitigation Plan.

III. Natural Hazard – Mitigation Strategy and Recommendations

1. When establishing high, medium and low priorities, STAPLEE criteria were applied during the discussions of individual steps regarding the perceived benefits and the expected costs of each action. A full cost-benefit analysis will be performed in conjunction with seeking outside funding.
 - a. Mitigation Goal #1 – Protect people in Chatham County as well as existing and future structures, especially critical facilities, from hurricane and coastal storm damage. All cities and municipalities within Chatham County will be encouraged to adopt these measures.
 1. Objective #1: Encourage adaptation of hurricane-force wind protection measures.
 - a). Task A – Develop and expand public education wind protection programs (High Priority)
 1. Action Step: Include information in the County Outreach Mailer concerning wind protection programs and wind-blown missile effect hazards.
 - b). Task B -- Encourage removal of potential wind blown missile-effect hazards (High Priority)
 1. Action Step: Include information in the County Outreach Mailer concerning wind protection programs and wind-blown missile effect hazards.
 - c). Task C – Amend County Building Code to require wind protective measures be incorporated in all future critical facility constructions. (Medium Priority)

- d). Task D – Engage consultant to evaluate critical facilities and recommend appropriate wind retrofit protection measures. (Medium Priority)
 - e). Task E. – Review building codes for proper wind strength and safety regulations and for consistency with state and federal regulations. (High Priority)
- 2). Objective #2 – Improve utility and communications infrastructure hurricane survivability.
- a). Task A – Persuade utility departments to inspect and remove trees that, if damaged, would threaten utility infrastructure and critical facilities. (High Priority)
 - 1. Action Step: Public Works and Arborist coordination is needed for trees located on County rights-of-way.
 - b). Task B – Explore wireless radio communication systems (Low Priority)
 - c). Task C – Conduct a feasibility study to determine methods of improving the survivability of the Tybee Island communications site. (Low Priority)
 - d). Task D – Relocate the Southside radio site. (Low Priority)
 - e). Task E – Relocate fiber cable supporting the County Emergency Operations Center to below ground. (Medium Priority)
 - f). Task F – Evaluate survivability of critical infrastructure communications. (Medium Priority)
- 3). Objective #3 – Improve public assistance and education. All cities within Chatham County will be encouraged to adopt these measures.
- a). Task A – Develop a program of volunteers to assist citizens with limited or restricted means to prepare for the onset of and/or evacuate in the event of a hurricane. (High Priority)
 - b). Task B -- Require nursing homes and assisted living facilities to have a County Emergency Management Agency approved emergency plan that includes evacuation. (High Priority)

- c). Task C – Increase public education and awareness of mitigation measures to reduce hurricane and wind damage. (High Priority)
 - 1. Action Step: Persuade County Engineering to include information in the County Outreach Mailers on mitigation measures to reduce hurricane and wind damage.

- 4). Objective #4: Improve post-hurricane recovery procedures.
 - a). Task A: Develop a plan for the use of public parking garages to shelter, rather than evacuate, non-essential public works supplies and equipment. Emphasis by the City of Savannah. (Low Priority)
 - 1. Action Step: Persuade Chatham County Engineering to complete a Public Works drainage SOP that includes post-storm recovery information.

 - b). Mitigation Goal #2: Minimize losses to existing and future structures, especially critical facilities from Tornado damage occurring within Chatham County. All cities and municipalities within Chatham County will be encouraged to adopt these measures.
 - 1). Objective #1 – Develop a Tornado Shelter Program
 - a). Task A -- Amend County Building Code to require all trailer parks to build and maintain tornado Community Safe Shelters capable of accommodating their residents. (Medium Priority)

 - b). Task B -- Amend County building code to require all new public construction include tornado Community Safe Shelter facilities capable of accommodating the structure's maximum occupancy; encourage the use of generator power. (High Priority)

 - c). Task C -- Amend County building code to require all new private construction include Tornado Safe Rooms capable of accommodating the structure's occupants. (High Priority)

 - d). Task D -- Retrofit any difficult to evacuate critical facilities, such as schools or nursing homes, to include Tornado Safe Shelter areas capable of accommodating the structure's occupants. (High Priority)

 - 2). Objective # 2: Improve the County Tornado Preparedness System

- a). Task A – Require day care facilities, nursing homes and assisted living residences to have tornado plans and operable NOAA weather radios.
 - b). Task B -- Expand the County siren-warning program. (Medium Priority)
 - c). Task C -- Require new communications tower construction to include a provision for sirens. (High Priority)
 - d). Task D – Increase public education and awareness of mitigation measures to reduce the effects of tornado damage. (High Priority)
 - 1. Action Step: Persuade County Engineering to include information in the County Outreach Mailers to educate and alert the public on the dangerous effects of tornado damage.
- c. Mitigation Goal #3: Minimize losses to existing and future structures, especially critical facilities, from flood damage within Chatham County. Except as noted or emphasized, all cities and municipalities within Chatham County will be encouraged to adopt these measures.
- 1). Objective #1: Through public education, reduce the impact of freshwater flooding.
 - a). Task A – Change all local government references from Flood Plain to Flood Area. (High Priority)
 - b). Task B – Educate the public regarding the use of permeable concrete paving and freshwater flooding preventative measures. (Low Priority)
 - 1. Action Step: Persuade County Engineering to continue to include information in the County Outreach Mailers regarding permeable concrete paving and freshwater flood preventative measures.
 - c). Task C – Enhance the public education program to provide information regarding changes to a Flood Area, increase awareness of general flood information and promote flood mitigation measures. All cities and municipalities other than Pooler and Bloomingdale, which have no recorded flooding problems, will be encouraged to establish these programs. (High Priority)

- d). Task D – Promote the acquisition and permanent protection of flood areas for community parks and recreation areas through funding from the State Greenspace program, SPLOST and applicable grant programs. (High Priority)
- d. Mitigation Goal #4: Minimize the impact of storm surge on public and private facilities. Particular emphasis will be placed on adoption by Tybee, Thunderbolt, Vernonburg, Savannah, Garden City, and the unincorporated areas of Chatham County.
- 1).Objective #1: Through public education, reduce the impact of storm surge.
- a). Task A – Graphically indicate storm surge potential at various locations. (Low Priority)
 - b). Task B – Evaluate causeways for storm surge sustainability and stability. (Medium Priority)
 - c). Task C – Increase public education and awareness regarding the effects and dangers of storm surge. (High Priority)
 - 1. Action Step – Persuade The County Engineering Department to examine alternative means of satisfying public awareness using SAGIS.org or some other web site.

Chapter 5 – Technological Hazard Mitigation Goals and Objectives

Technological Hazards will be addressed in a subsequent phase.

Chapter 6 – Executing The Plan

I. Implementation Action Plan

County and Municipalities’ officials affected by this Plan will designate the appropriate agencies within their jurisdictions to review this plan, evaluate the pre-assigned Priorities, develop specific work plan proposals, and implement this plan. Chapter 4 of this Plan prioritizes the Action Step Task as being “High, Medium, or Low” Priority. High Priority designated Task will be considered first for implementation by Local Officials; Medium Priority will be considered after the High Priority Task, and the Low Priority Task will be considered after the Medium Priority Task. These priority designations were derived by the Planning Committee after consideration of the STAPLEE Criteria and utilizing a cost-benefit review. The cost-benefit review relied on the experience and expertise of the Planning Committee members to derive perceived benefits and the reasonably

expected costs of each action. A formal cost-benefit analysis will be performed in conjunction with seeking funding to implement the various Task to insure County and Municipality Officials and any affected outside agencies have sufficient information to make good managerial decisions concerning the various Action Step Tasks. Local governments must incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive plans, Emergency Operations Plans, Capital Improvement Plans, and other such plans when appropriate. This plan will be presented to the writers, consultants and/or committees responsible for comprehensive plans, response plans and other such documents for their use in incorporating mitigation actions in support of their community preparedness programs.

II. Evaluation

County and Municipalities' officials designated to implement this Plan will include suitable reporting procedures to insure effectiveness in their implementation instructions by providing a project status report that will include which implementation processes worked well, any difficulties encountered, how coordination efforts were proceeding, and which strategies should be revised. In order to maximize benefits, prior to funding, a formal cost benefits analysis will be conducted to the satisfaction of the funding institution (e.g. County, Municipality, or other involved outside agency).

III. Plan update and maintenance

The Chatham Emergency Management Agency (CEMA) will establish a routine schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle. When the provisions of this plan are put to the test by an event of the hazard types provided for in it, lessons learned shall be collected and collated. A review and analysis shall then be conducted by CEMA, and appropriate findings made public and provided to participating organizations by the same methods used to develop this plan, with periods for public and those organizations' comments following.

The public's and organizations' comments shall be considered by CEMA, and appropriate data from the review, analysis and public comments used to modify the provisions of this plan. The modifications shall be promulgated by the same methods used to develop this plan.

Summary reports shall be made to the County's policy-making bodies and to GEMA.

Chapter 7 – Conclusion

I. Conclusion Summary

Chatham County has a history of both natural and technological disasters, with potential for still greater effects.

In order to reduce the financial, economic and human impacts of such disasters, the Chatham County Commission and local municipalities authorized the Chatham Emergency Management Agency (CEMA) to develop and implement a Plan for mitigation actions.

CEMA conducted a Capabilities Assessment and Analysis of Existing Conditions, then developed an inventory of potential mitigation actions. Individuals as well as public and private organizations that could be effected by mitigation actions were invited to participate in the development of a Plan to implement those actions.

The resulting Plan is now being made available for public comment, with potential for incorporation of any additional comments received to still further improve it and meet the needs of the people of Chatham County.

This document is that Plan.

II. References

1. Publications:

- a. Chatham Emergency Management Agency, Hurricane Plan, May 2001.
- b. Chatham Emergency Management Agency, Emergency Operations Plan, September 2001.

2. Web Sites: <http://www.cema.chathamcounty.gov>

Appendices:

Appendix A – Hazard Identification, Risk Assessment and Vulnerability (HRV)

I. Natural Hazard – Hurricane and Coastal Storm

Map indicating values and depicting damage estimates of effected population and critical facilities.

II. Natural Hazard – Tornado

Map indicating values and depicting damage estimates of effected population and critical facilities.

III. Natural Hazard – Rainwater Flood

Map indicating values and depicting damage estimates of effected population and critical facilities.

IV. Natural Hazard – Storm Surge

Map indicating values and depicting damage estimates of effected population and critical facilities.

Appendix B – Growth and Development Trends

Chatham County 2015 Comprehensive Plan Summary, July 1994.

Appendix C – Other Planning documents

- I. Chatham County Flood Mitigation Plan Unincorporated Chatham County, December 2002.
- II. Socio-Economic and Land Use Data, Chatham Urban Transportation Study, January 2000.
- III. Future Land Use Plan and Zoning Strategy for the Unincorporated Portion of West Chatham County, Chatham County, June 1996
- IV. Chatham County Open Space Plan Supplemental Survey Document, Chatham County-Savannah Metropolitan Planning Commission, 1996
- V. Islands Area Community Plan, Chatham County-Savannah Metropolitan Planning Commission, Draft 2, April 2001.
- VI. Islands Land Use Plan, Chatham County-Savannah Metropolitan Planning Commission, October 1985.
- VII. Chatham County / Savannah Countywide Open Space Plan, Chatham County-Savannah Metropolitan Planning Commission, 1996.

Appendix D – Worksheets used in planning process

- I. Completed Part #1 CEMA/local worksheets:
 - a. Worksheet # 1, Identify the Hazard
 - b. Worksheet # 2, Profile Hazard Events
 - c. Worksheet # 3a, Inventory of Assets

- d. Worksheet # 3b, Critical Facility and Critical Infrastructure Inventory Assets Worksheets

II. Other Part #3 misc. worksheets or planning process documents:

- a. Worksheet # 1, Identify Alternative Mitigation Actions
- b. Worksheet # 3, Local Mitigation Capability Assessment Scoring of Hazard Potential
- c. Worksheet # 4, Evaluate Alternative Mitigation Actions
- d. Worksheet # 5, Prioritized Alternative Mitigation Actions

Appendix E – Copies of Misc. Planning Documentation

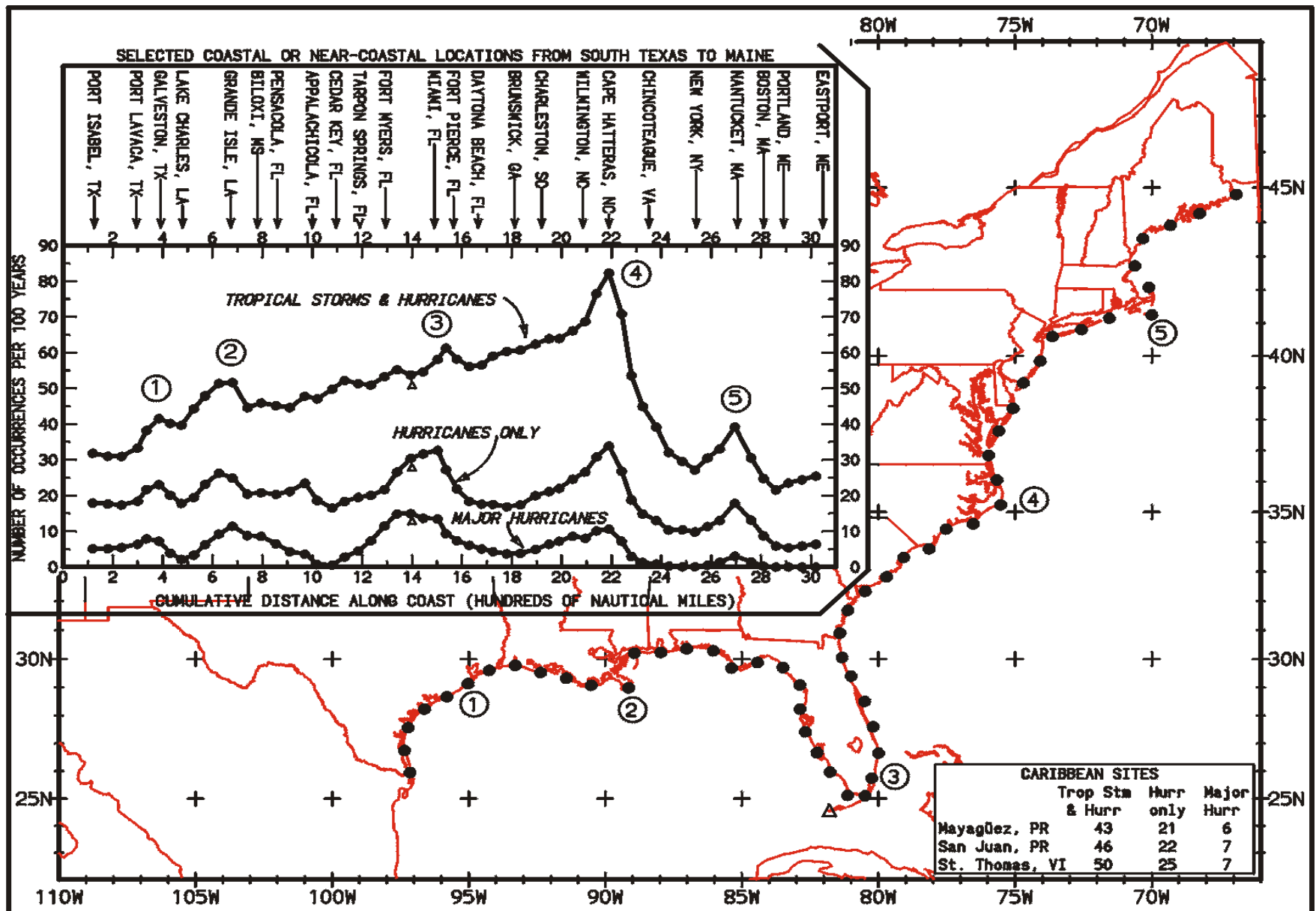
- I. Public Notice
- II. Meeting Agendas
- III. Sign-in Sheets
- IV. GEMA/FEMA Correspondence
- V. Local Media Coverage
- VI. Other

Appendix F – Glossary

Hazard Identification, Risk Assessment and Vulnerability
 Natural Hazard – Hurricane and Coastal Storm

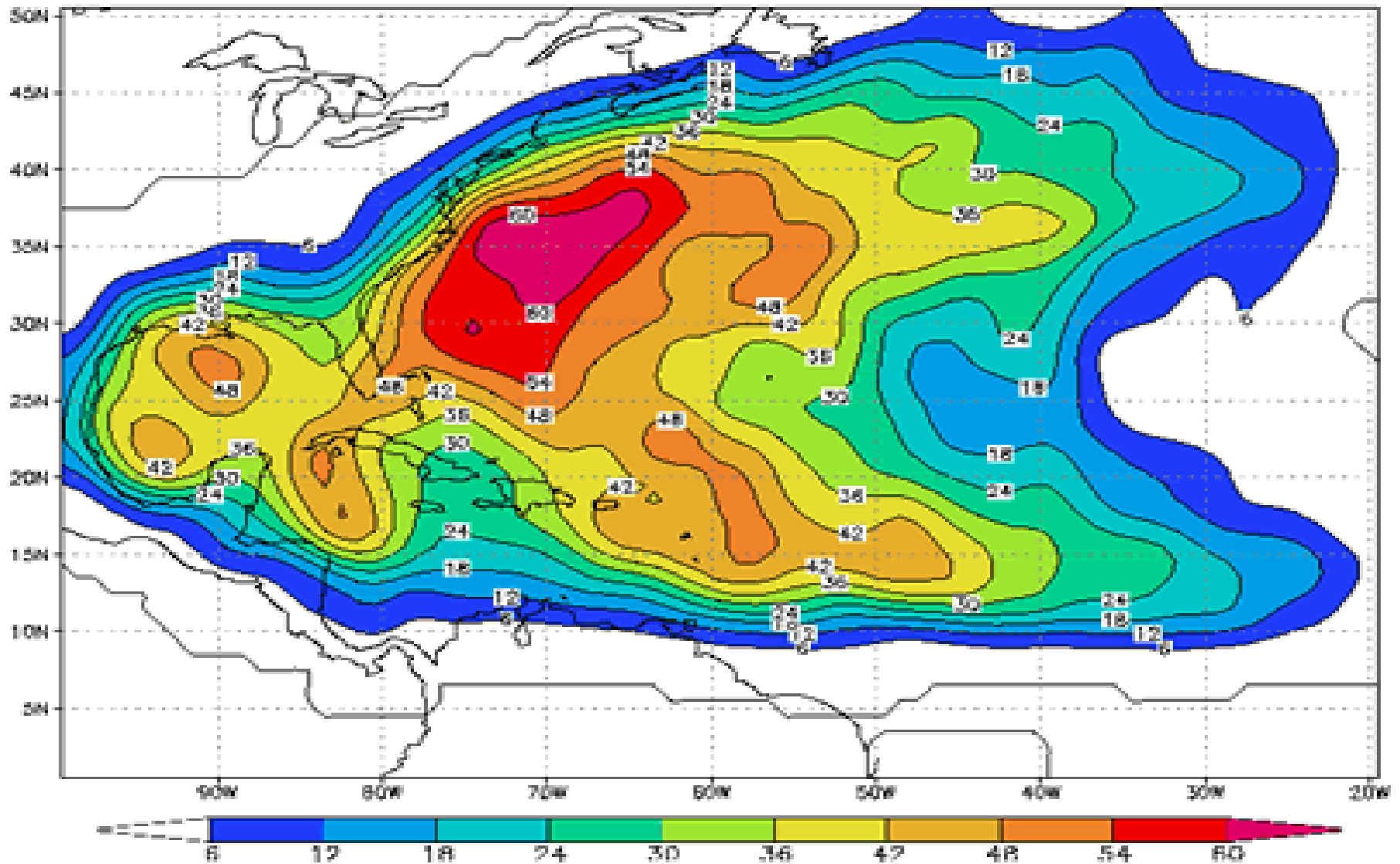
Appendix A 1

Hazard	Number of Events in Historic Record	Number of Years in Historic Record	Number of Events in Past 10 Years	Number of Events in Past 20 Years	Number of Events in Past 50 Years	Historic Recurrence Interval (years)	Historic Frequency % chance/year	Past 10 Year Record Frequency Per Year	Past 20 Year Record Frequency Per Year	Past 50 Year Record Frequency Per Year
Hurricane Wind	117	45	34	32	117	0.38	2.60	3.4	1.6	2.34



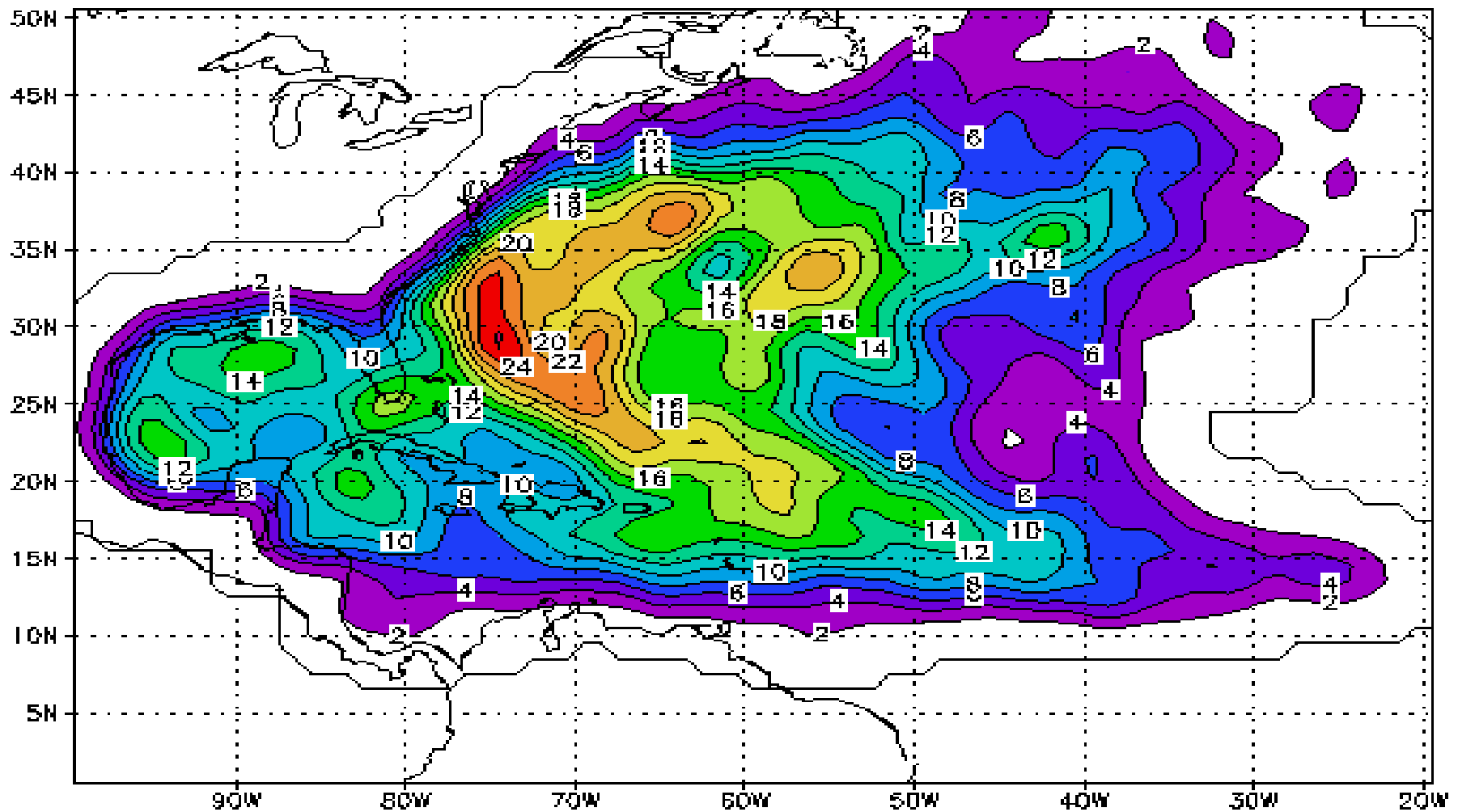
This figure shows the number of hurricane and tropical storm occurrences per 100 years. According to this figure, Miami receives an average 60 storms per century.

Empirical Probability of a Named Storm

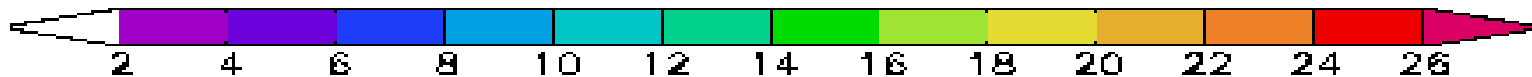


The figure here shows for any particular location what the chance is that a **tropical storm or hurricane** will affect the area sometime during the whole June to November hurricane season. We utilized the years 1944 to 1999 in the analysis and counted hits when a storm or hurricane was within about 100 miles (165 km). *(The reason for using the 1944-1999 data set is because aircraft recon was being used at this time.)*

Probability of an Hurricane



This graphic displays an areas probability of being struck by a hurricane (Tropical Storms not included) each year. A hit is defined by the eye of the hurricane passing within 60nm of a particular area. Miami has a 14%-16% probability of being hit by a hurricane each year.



Hazard Identification, Risk Assessment and Vulnerability
 Natural Hazard - Tornado

Appendix A II

Hazard	Number of Events in Historic Record	Number of Years in Historic Record	Number of Events in Past 10 Years	Number of Events in Past 20 Years	Number of Events in Past 50 Years	Historic Recurrence Interval (years)	Historic Frequency % chance/year	Past 10 Year Record Frequency Per Year	Past 20 Year Record Frequency Per Year
Tornado	23	50	5	5	23	2.17	0.46	0.5	0.25

Hazard Identification, Risk Assessment and Vulnerability
Rainwater Flooding

Hazard	Number of Events in Historic Record	Number of Years in Historic Record	Number of Events in Past 10 Years	Number of Events in Past 20 Years	Number of Events in Past 50 Years	Historic Recurrence Interval (years)	Historic Frequency % chance/year	Past 10 Year Record Frequency Per Year	Past 20 Year Record Frequency Per Year
Floods	10	20	5	10		2.00	0.50	0.5	0.5

Hazard Identification, Risk Assessment and Vulnerability
Storm Surge

Hazard	Number of Events in Historic Record	Number of Years in Historic Record	Number of Events in Past 10 Years	Number of Events in Past 20 Years	Number of Events in Past 50 Years	Historic Recurrence Interval (years)	Historic Frequency % chance/year	Past 10 Year Record Frequency Per Year	Past 20 Year Record Frequency Per Year
Hurricane Surge - Cat 1	1	25	0	0	1	25.00	4.00	0	0

Other Planning Documents
Chatham County Flood Mitigation Plan – Unincorporated Chatham County

Other Planning Documents
Socio-Economic and Land Use Data – Chatham Urban Transportation Study

Other Planning Documents
Future Land Use Plan and Zoning Strategy for the Unincorporated

Other Planning Documents
Chatham County Open Space Plan

Appendix C IV

Other Planning Documents
Islands Area Community Plan

Appendix C V

Other Planning Documents
Islands Land Use Plan

Appendix C VI

Other Planning Documents
Chatham County Open Space Plan

Appendix C VII

GEMA Worksheet #1

Identify the Hazard

Step 1

Date: June 2003

What kinds of natural hazards can affect you?

Task A **Task B** *Use this space to record information you find for each of the hazards you will be researching. Attach additional pages as necessary.*

- Avalanche _____
- Costal Erosion** 1 _____
- Costal Storm** 2 ✓ _____
- Dam Failure** _____
- Drought 3 _____
- Earthquake** 4 _____
- Expansive Soils _____
- Extreme Heat 5 _____
- Rainwater Flood** 6 ✓ _____
- Hurricane** 7 ✓ _____
- Land Slide _____
- Severe Winter Storm 8 _____
- Tornado** 9 ✓ _____
- Tsunami** _____
- Volcano _____
- Wildfire** 10 _____
- Hazard Material _____
- Radiological _____
- Hurricane Surge** 11 ✓ _____
- Other _____
- Other _____

Hazard or Event Description (Type of hazard, date of event, number of injuries, cost and types of damage, etc.)	Source of Info	Map Available for this Hazard?	Scale of Map
1. Erosion marked by loss of linear depositional shoreline and occasional extreme local coastal instability	Skidaway Inst., EPA & DNR	No	N/A
2. 113 coastal storms from 1960 to pres. (see App A-1)	NOAA	Yes	1:250,000
3. Aug '99 thru Aug '02	NOAA	No	N/A
4. Two earthquakes influenced Chatham County: 1886 & 1903	USGS	No	N/A
5. Four events from 1996 to 2002	NOAA	No	N/A
6. Ten floods from 1985 to pres (see App A-3)	NOAA	Yes	1:250,000
7. Five hurricanes from 1979 to pres. (See App A-1)	NOAA	Yes	1:250,000
8. Five events from 1980 to pres.	NOAA & local media	No	N/A
9. 23 tornado touchdowns from 1955 to pres.(See App A-2)	FEMA	Yes	1:250,000
10. May 2001, Chatham County affected by smoke & haze from Macintosh Cy fires	CEMA local observation	No	N/A
11. Surge from five hurricanes from 1979 to pres. (See App A-4)	NOAA	Yes	

GEMA Worksheet #1
Identify the Hazard

Appendix D1a

Error! Not a valid link.

Hazard	Number of Events in Historic Record	Number of Years in Historic Record	Number of Events in Past 10 Years	Number of Events in Past 20 Years	Number of Events in Past 50 Years	Historic Recurrence Interval (years)	Historic Frequency % chance/year	Past 10 Year Record Frequency Per Year	Past 20 Year Record Frequency Per Year
Hurricane & Coastal Storm	117	45	34	32	117	0.38	2.60	3.4	1.6
Tornado	23	50	5	5	23	2.17	0.46	0.5	0.25
Floods	10	20	5	10		2.00	0.50	0.5	0.5
Storm Surge	1	25	0	0	1	25.00	4.00		

GEMA Worksheet #2

Profile Hazard Events Step 2

County: Chatham

Date: June 2003

You can use existing maps from:

- Road Maps
- USGS topographic maps or Digital Orthophoto Quarter Quads (DOQQ)
- Topographic and/or planimetric maps from other agencies
- Aerial topographic and/or planimetric maps
- Field Surveys
- GIS software
- CADD software
- Digitized paper map

Title of Map	Scale	Date
Aerial Topo	Any	2003
Field Surveys		2003
GIS Software		2003
CAD Software		2003
Digitized paper maps	Any	As required

Task B. Obtain a hazard event profile.	Task C. Record your hazard event profile information.
<p>Coastal Storm / Coastal Erosion</p> <ol style="list-style-type: none"> 1. Get a copy of your FIRM. SAGIS 2. Verify that the FIRM is up-to-date and complete. <p>Current</p> <ol style="list-style-type: none"> 3. Determine the annual rate of coastal erosion. 5.65 cubic yards per linear foot of beach per year 4. Find your design wind speed. <p>East of Lazaretto Creek (Tybee): 130 mph with 3-second bursts West to I-16 @ Chatham Pkwy & South to 201 @ King George Bl: 120 mph West to County boundary: 110 mph</p>	<ol style="list-style-type: none"> 1. Transfer the boundaries of your coastal storm hazard areas onto your base map. 2. Transfer the BFEs onto your base map. 3. Record the erosion rates on your base map. 4. Record the design wind speed here and on your base map: <p>East of Lazaretto Creek (Tybee): 130 mph with 3-second bursts West to I-16 @ Chatham Pkwy & South to 201 @ King George Bl: 120 mph West to County boundary: 110 mph</p>
Dam Failure N/A	
Drought Aug '99 thru Aug '02	County-wide, no map
Extreme Heat: Four events from '96 to '02	County-wide, no map
<p>Flood</p> <ol style="list-style-type: none"> 1. Get a copy of your FIRM. SAGIS 2. Verify the FIRM is up-to-date and complete. Current & complete 	<ol style="list-style-type: none"> 1. Transfer the boundaries from your firm onto your base map (floodway, 100-yr flood, 500-yr flood). 2. Transfer the BFEs onto your base map.
Hurricane: Appendix A1	Appendix A1
Severe Winter Storm: Five storms '80 to present	County-wide, no map
<p>Tornado</p> <ol style="list-style-type: none"> 1. Find your design wind speed. East of Lazaretto Creek (Tybee): 130 mph with 3-second bursts West to I-16 @ Chatham Pkwy & South to 201 @ King George Bl: 120 mph West to County boundary: 110 mph 	<ol style="list-style-type: none"> 1. Record your design wind speed: _____ 2. If you have more than one design wind speed, print, download or copy your design wind speed zones, copy the boundary of your design wind speed zones on your base map, then record the design wind speed zones on your base map.
Wildfire: '02 Adjacent county affected Chatham County by smoke	County-wide, no map
Other: Map the hazard. Hurricane Surge	<ol style="list-style-type: none"> 1. Record hazard event info on your base map.

GEMA Worksheet #2 Profile Hazard Events Step 2a

GEMA will be providing you with a base map, USGS topos and DOQQ as part of our deliverables to local government for the planning process. Additionally, we will be providing you with detailed hazard layer coverages. These data layers originate from state or nationwide coverage or datasets. Therefore, it is important for local government to assess what you already have at the local level. It is important for you at the local level to have an idea of what existing maps you have available for the planning process. Some important things to think about:

- 1) What maps do we already have in the county that would be relevant to the planning process? Critical facilities, Roads & Rivers, SLOSH, NFIP/FIRM, Air Photos & GIS of entire county.
- 2) Have other local plans used maps or mapping technology where there is specific data that is also needed in my local plan? Water, sewage, wells, pumps, bridges and vulnerabilities.
- 3) What digital maps do we have? Complete GIS.
- 4) Do we have any Geographic Information System (GIS) data, map themes or layers or databases here at the local level (or regional) that we can use? Yes.
- 5) If we do have any GIS data, where is it located at, and who is our local expert? SAGIS, Metropolitan Planning Commission.
- 6) Are there any ongoing GIS or mapping initiatives at the local level in other planning or mapping efforts? If so, what are they, and what are the timetables for completion? Continuous ongoing process at municipal, city and county levels.
- 7) Are there mapping needs that have been identified at the local level in the past? If so, what are they and when were they identified? Continuous ongoing process.
- 8) Of the existing maps, GIS data and other digital mapping information, what confidence do we have at the local level that it is accurate data? SAGIS has 20 years of verified data.

GEMA Worksheet #3a
Inventory of Assets Rainwater Flooding

Appendix D I c

GEMA Worksheet #3a
Inventory of Assets Storm Surge

Appendix D I c

GEMA Worksheet #3a
Inventory of Assets Hurricane & Coastal Storm

GEMA Worksheet #3a
Inventory of Assets Tornado

Appendix D I c

Worksheet #3b
Critical Facility and Critical Infrastructure Inventory Assets Worksheet

Worksheet #1
Identify Alternative Mitigation Actions

Worksheet #3
Local Mitigation Capability Assessment

Worksheet #4
Evaluate Alternative Mitigation Actions

Worksheet #5
Prioritized Alternative Mitigation Actions

Copies of Misc. Planning Documentation: Public Notice

Appendix E I

Copies of Misc. Planning Documentation: Meeting Agendas

Appendix E II

Copies of Misc. Planning Documentation: Sign-in Sheets

Appendix E III

Copies of Misc. Planning Documentation: GEMA/FEMA Correspondence

Copies of Misc. Planning Documentation: Local Media Coverage

Appendix E V

Copies of Misc. Planning Documentation: Other

Appendix E VI

Glossary

Applicant

A state agency, local government, or eligible private nonprofit organization who submits a request to the Grantee for disaster assistance under the state's grant.

Case Management

A systems approach to provision of equitable and fast service to applicants for disaster assistance. Organized around the needs of the applicant, the system consists of a single point of coordination, a team of on-site specialists, and a centralized, automated filing system.

CEMA

Chatham Emergency Management Agency

Cost Estimating Format (CEF)

A forward pricing methodology for estimating the total cost of repair for large permanent projects by use of construction industry standards. The format uses a base cost estimate and design and construction contingency factors, applied as a percentage of the base cost.

Declaration

The President's decision that a major disaster qualifies for federal assistance under the Stafford Act.

Emergency Work

That work which must be done immediately to save lives and to protect improved property, public health and safety, or to avert or lessen the threat of a major disaster. Emergency work frequently includes clearance and removal of debris and temporary restoration of essential public facilities and services.

Facility

Any publicly or privately owned building, works, system, or equipment, built or manufactured, or an improved and maintained natural feature. Land used for agricultural purposes is not a facility.

FEMA

Federal Emergency Management Agency

Force Account

An applicant's own labor forces and equipment.

GEMA

Georgia Emergency Management Agency

Hazard

A natural, human-caused (anthropogenic), or technological (accidental) potential event

likely to cause adverse human impacts, environmental damage, loss of public confidence, functional impairments, legal exposures, physical damage, or combinations of those. Hazards are usually described by intensity (as in hurricane categories) coupled with frequency (time between such events).

Hazard Mitigation

Any cost-effective measure that will reduce the potential for damage to a facility from a disaster event.

Immediate Needs Funding (INF)

An advance of grant funds to assist with payment of emergency work within the first 60 days after a disaster strikes. The amount of funding is normally 50% of the federal share of emergency costs as identified during the preliminary damage assessment.

Improved Property

A structure, facility, or item of equipment that was built, constructed, or manufactured. Land used for agricultural purposes is not improved property.

Kickoff Meeting

The initial meeting between an applicant and the Public Assistance Coordinator. At this working session, the applicant turns in a list of damages and receives comprehensive information about the Public Assistance program and detailed guidance for their specific circumstances.

Large Project

Eligible project, either emergency or permanent work, with a damage dollar value of \$52,000 or greater.

Mitigation

Actions taken to reduce risk of human impacts, environmental damage, loss of public confidence, functional impairments, legal exposures, or physical damage. Please see also Non-Structural Mitigation and Structural Mitigation for action categories.

Mitigation Plan

A document to consolidate, collate and organize Capabilities Assessment and Analysis of Existing Conditions data from in order to reduce impacts of natural and technological disasters.

Non-Structural Mitigation

Actions taken to reduce risk to people, facilities or structures that do not involve major physical changes. Examples are: adding hurricane shutters at a building's windows, implementing public awareness programs informing people of the hazards in their area, distributing brochures and kits with survival necessities, installing water sensors that trigger shutdown of critical electrical and electronic systems when water reaches dangerous levels, and installing smoke and hazardous materials detectors in the heating, ventilation and air conditioning (HVAC) intakes to keep dangerous gasses from reaching a building's occupants.

See also Structural Mitigation.

Permanent Work

That work that must be performed through repairs or replacement to restore an eligible facility on the basis of its pre-disaster design, use, and current applicable standards. (Category C-G)

Preliminary Damage Assessment (PDA)

A survey to determine the impact and magnitude of damage caused by the disaster and the resulting unmet needs of the public sector and community at large. The PDA is the basis for estimating total disaster-related damage and evaluating the need to request a Presidential declaration of disaster.

Prioritization

Assigning a sequence for implementation of proposed alternative mitigation actions by application of the criteria to evaluate them, as described in the Federal Emergency Management Agency's (FEMA's) State and Local Mitigation Planning How-to Guide #3 -- Developing The Mitigation Plan.

Project Formulation

A technique for determining small projects by consolidating like work items into one project to expedite approval and funding and to facilitate project management.

Project Worksheet (PW)

Form used to document the damage and develop the scope of work for repair of a damage site.

Project Officer (PO)

An emergency management employee with demonstrated experience and training in management of large and complex repair projects.

Private Nonprofit Organization (PNP)

Any non-governmental agency or entity that currently has either an effective ruling letter from the U.S. Internal Revenue Service granting tax exemption or satisfactory evidence from the state that the non-revenue producing organization or entity is a nonprofit one organized or operating under state law.

Public Assistance (PA)

Supplementary federal assistance provided under the Stafford Act to state and local governments or certain private, nonprofit organizations other than assistance for the direct benefit of individuals and families.

Public Assistance Coordinator (PAC)

An emergency management employee who is responsible for providing continuity of service to an applicant in the Public Assistance program.

Request for Public Assistance (Request)

The official notification of intent to apply for public assistance monies following declaration of a disaster. It is a short form that asks for general identifying information about an applicant.

Small Project

Eligible project, either emergency or permanent work, with a damage dollar value of less than \$52,000.

Special Considerations

Factors that must be addressed before federal grant money can be obligated to repair or restore damaged facilities. These factors include, but are not limited to, general and flood insurance, historic preservation, environmental protection, and hazard mitigation.

Stafford Act

The Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended.

Structural Mitigation

Activities involving reduction of risk by major physical alterations to structures or facilities. Examples are: moving a building housing a critical function to an area unlikely to flood, strengthening the roof-to-wall ties to reduce the risk of separation during high winds, constructing a safe room in a building where tornadoes are likely, erection of a berm or levee to keep flood waters away from a structure. See also Non-Structural Mitigation.

Specialist

An emergency management employee with demonstrated technical expertise in a defined specialty.

Validation

The pre-funding verification that proposed or completed work projects meet statutory and regulatory compliance.

Vulnerability

A estimate of the potential effects of a particular hazard on a category of assets. Examples: a property damage estimate from a Category 3 hurricane within a county; estimated number of human casualties from an explosive detonation at a specific place of public assembly; and estimated economic losses from a power outage at a tourist attraction on a summer weekend.