

# **Natural Disaster-Risk Assessment Hinesville Georgia**

## **Hinesville, Georgia: Located in Liberty County in the State of Georgia**

**GEORGIA SOUTHERN UNIVERSITY**

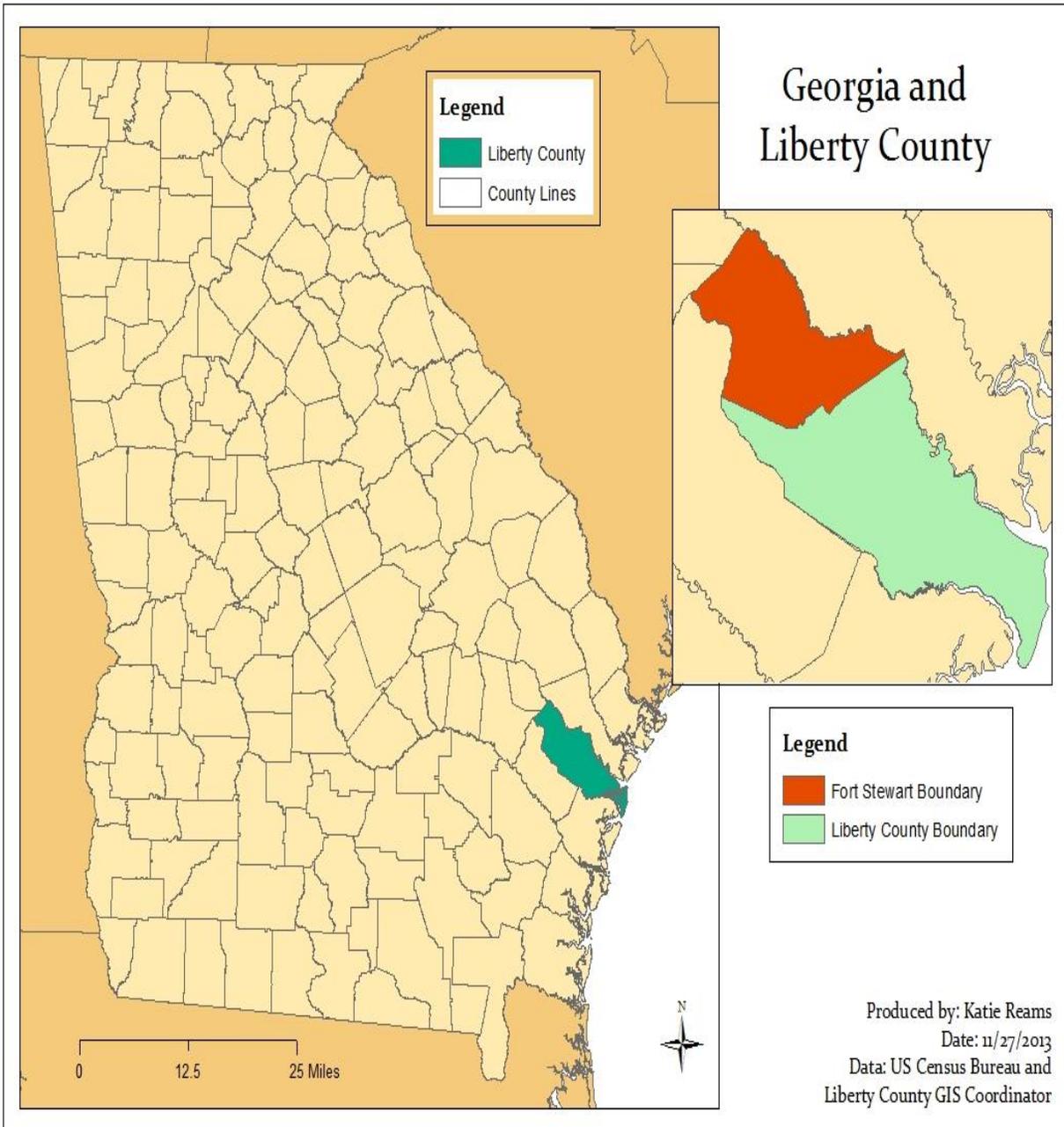
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## I. PURPOSE OF THE RISK MITIGATION PLAN

As a result of the hazard mitigation planning process undertaken by Liberty County officials and the constituent cities located within Liberty County, the City of Hinesville has already participated in gathering a great deal of information regarding the County's disaster history, the presence of natural and technological hazards, the likelihood of each of these hazards occurring within the County, and the potential impacts, losses, and challenges these hazards present to the community.

The risk assessment process documented in this paper involves a review of the Multi-Jurisdictional Hazard mitigation plan already in place for Liberty County and evaluating how well it applies to the hazard mitigation profile for Hinesville. Furthermore it is an expanded goal of this study to identify vulnerable populations within the city that might be in need of additional assistance in the event of certain identified hazards and to identify educational programs and activities that might help prepare such vulnerable populations for such hazards. This assessment evaluates the impact of natural hazards on the human-built environment, businesses, social structure and services, and the natural environment of Hinesville, Georgia by reviewing past work in this area and tailoring those results to Hinesville. The assessment provides information about the areas where the hazards may occur, the value of existing land and property in those areas, and an analysis of the potential risk to life, property, and the environment that may result from natural hazards in the event that they were to occur. To be specific here are the elements present in this risk assessment (LCEMA; 2010):

1) **Hazard Identification** identifies geographic locations in Hinesville that are potentially subject to hazard, the intensity of the hazard, and the probability of its occurrence. The maps used for this assessment were obtained from the National Oceanic and Atmospheric Administration and by the Hinesville GIS office, and are frequently used to display hazard identification data. In Hinesville we have identified four major hazards that consistently affect or threaten its geographic area: hurricanes, floods/flashfloods, tornadoes, and thunderstorms/ windstorms. These hazards were identified through analysis of data from the State of Georgia's Natural Hazard Risk Management, Homeland Security, Federal Emergency Management Agency (FEMA), National Oceanic and Atmospheric Administration (NOAA) and historical data from the City of Hinesville.

2) **Profiling Hazard Events** describes the causes and characteristics of each hazard, how they have affected Hinesville in the past, and what part of the city's population, infrastructure, and environment have historically been vulnerable to each specific hazard. A profile of each hazard addressed in this plan is provided from Hinesville's Natural Hazard Risk Assessed by FEMA. .

3) **Vulnerability Assessment /Inventorying Assets** combine hazard identification with an inventory of existing (or planned) property and population that would be exposed to a hazard. Critical facilities in the city are of concern because, they are needed to provide essential products

and services that are necessary to preserve the welfare to fulfill important public safety, emergency response, and/or disaster recovery functions.

4) **Risk Analysis/Estimating Potential Losses** involves estimating the damage, injuries, and financial losses likely to be sustained from hazard events in Hinesville should they occur. This analysis used mathematical models from Liberty County's Multi-Jurisdictional Hazard mitigation plan to measure components of the risk of each hazard and the magnitude of the impact that may result from the hazard event, and the likelihood of the hazard occurring.

5) **Development Trends and Land Use** within the community are assessed. This plan provides an overall comprehensive description of the important need for an immediate Risk Mitigation in the City of Hinesville from the Multi-Jurisdictional Hazard mitigation plan from Liberty County in 2010.

6) Recommendations on **Communications Preparedness** are provided with respect to establishing an effective disaster information outreach and educational strategy for the City of Hinesville. The successful implementation of this goal is to educate all Hinesville citizens about those actions which must be taken when a hazard occurs, and the necessary precautions they will need to take to avoid the inherent risks associated with those hazards. Also it provides informative/educational strategies to provide timely and accurate information to the public in case of the occurrences of all four disasters that are the subject matter of this study.

In response to the unacceptable loss of life and property from natural disasters, Liberty County developed its initial hazard mitigation plan in May of 1998 which provided momentum for making homes, businesses, and communities as safe as possible against the impacts of hurricanes, floods, tornadoes, wildfires, and other natural hazards. An update was completed in 2005 and by assessing the effectiveness of prior and current programs and activities in the community and identifying shortfalls; mitigation measures were further developed to help reduce Liberty County's exposure to these natural hazards. An additional update was prepared in 2010 and forms the foundation for much of this report.

## II. CITY OVERVIEW

Hinesville is a city in Liberty County, Georgia. It covers an area of 16.3 square miles (42 km<sup>2</sup>), of which 16.2 square miles (42 km<sup>2</sup>) is land and 0.1 square miles (0.26 km<sup>2</sup>) (0.61%) is water. Hinesville is located next to the Atlantic coast containing an abundance of coastal streams and waterways. The city of Hinesville is part of the Hinesville-Fort Stewart metropolitan area, which comprises all of Liberty County and neighboring Long County.

According to the U.S Census Hinesville has an estimated population of 34,751 by 2012, has grown continuously, and growth is expected into the foreseeable future. The Hinesville population has increased by 9.5% from 2000 to 2012. In 2012, there were 34,751 people, 10,528 households, and 8,032 families residing in the city. The population density was 2,143.0 people per square mile (723.5/km<sup>2</sup>). There were 11,742 housing units at an average density of 724.0 per square mile (279.5/km<sup>2</sup>). Hinesville has experienced significant population growth in recent years, a trend that is expected to continue.

The overall population is well dispersed though predominantly young with 34.2% under the age of 18, 13.8% from 18 to 24, 36.0% from 25 to 44, 12.9% from 45 to 64, and 3.1% are 65 years of age or older. The median age is 26 years. For every 100 females there were 97.3 males. For every 100 females age 18 and over, there were 95.3 males. The median income for a household in the city is about \$35,013, and the median income for a family is an average of \$36,221. Males had a median income of \$27,135 versus \$20,813 for females.

The per capita income for the city was \$14,300. About 13.8% of families and 14.8% of the population were below the poverty line, including 20.9% of those under age 18 and 12.3% of that age 65 or over. (U.S Census Bureau)

Hinesville City Guide & Data	
<u>Population</u> (2012)	34,751
<u>Population</u> (2000)	30,534
<u>Population growth</u>	9.5%
<u>Household income</u>	\$44,635
<u>Income per capita</u>	\$14,300
<u>Male/Female ratio</u>	0.95:1
<u>Males 18-39 years</u>	43.1%
<u>Females 18-39 years</u>	41.4%
<u>Married</u> (15yrs and older)	62.8%
<u>Have children</u> (under 18yrs)	66.1%

Copyright 2010-2013 AreaVibes Inc. / U.S Census Bureau

## HOUSING OVERVIEW/ PROPERTY VALUE

The median home value in Hinesville is 9.9% less than the Georgia average and 41.1% less than the National average. The median price asked for homes in Hinesville is 13.6 % less than the Georgia average and 26.7 % less than the National average. The median rental rates in Hinesville are 6.3% greater than the Georgia average and 8% less than the National average.

Statistic	Hinesville	Georgia	National
Average number of people per household	2.9	2.6	3
Median value owner occupied home	\$118,000	\$130,901	\$200,419
Median property taxes paid	\$1,450	\$992	\$1,696
Median rent asked	\$737	\$693	\$801
Percent owner occupied	51.5%	63.3%	72.3%
Percent renter occupied	48.5%	36.7%	27.7%

Data is from 2010 estimates on City-data.com

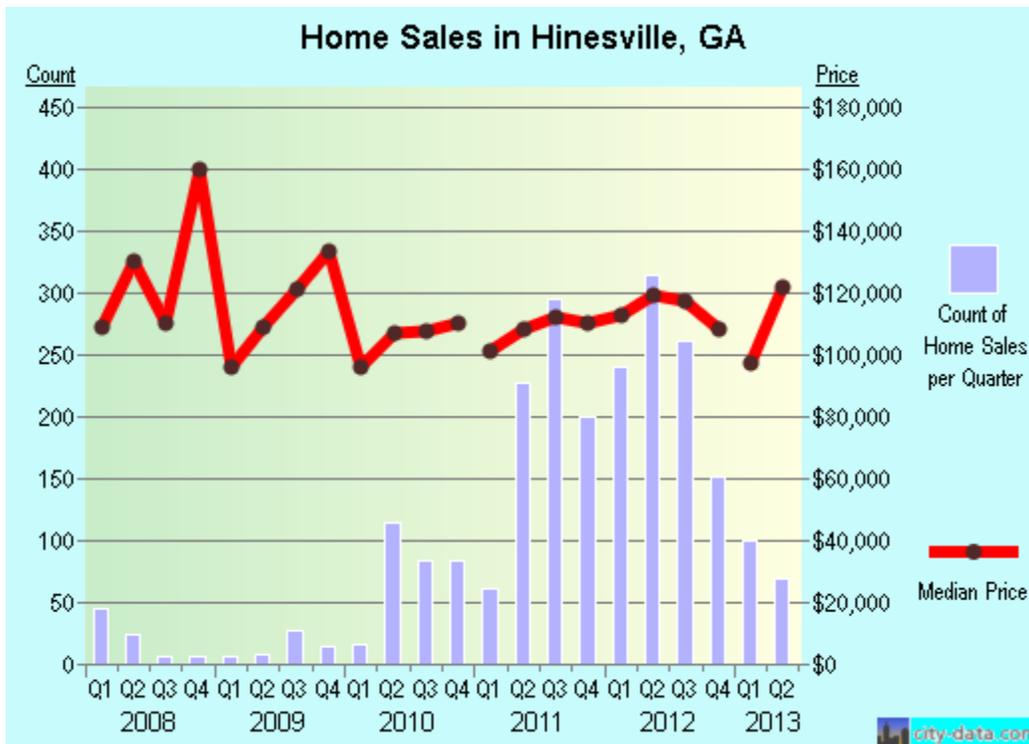


Table from City-data.com

### III. LIBERTY COUNTY HAZARD MITIGATION RESULTS

The following information comes from the Liberty County Emergency Management Agency (LCEMA) (2010) update to the county predisaster multi-hazard mitigation plan prepared in 2010. Hazard mitigation planning originally began due to the unacceptable loss of life and property from several natural disasters, which led to the hazard mitigation plan developed in May of 1998. This plan provided momentum for making homes, businesses, and communities as safe as possible against the impacts of *hurricanes, floods, tornadoes, wildfires, and other natural hazards* (LCEMA; 2010). Updates to the plan were made in 2005 and an update to the 2005 Plan was initiated in January of 2010 with funding support from the Georgia Emergency Management Agency and the Federal Emergency Management Agency. Michael Baker Jr., Inc. provided planning support and guidance to Liberty County throughout the update process. Three hazards discussed in the 2010 mitigation plan are of particular interest to Hinesville, and are described in the following paragraphs. Please note that hurricanes, thunderstorms, and windstorms are all encompassed in the “Severe Winds” hazard description.

#### 1. **TORNADOS – Hazard Description**

Tornadoes are nature’s most violent storms. Spawned from powerful thunderstorms, tornadoes can cause fatalities and devastate a neighborhood in seconds. A tornado appears as a rotating, funnel shaped cloud that extends from a thunderstorm to the ground with whirling winds that can reach 300 miles per hour. Damage paths can be in excess of one mile wide and 50 miles long. Every state is at some risk from this hazard Federal Emergency Management Agency (FEMA). Some tornadoes are clearly visible, while rain or nearby low-hanging clouds obscure others. Occasionally, tornadoes develop so rapidly that little, if any, advance warning is possible. Before a tornado hits, the wind may die down and the air may become very still. A cloud of debris can mark the location of a tornado even if a funnel is not visible. Tornadoes generally occur near the trailing edge of a thunderstorm. It is not uncommon to see clear, sunlit skies behind a tornado (Ready.Gov).

#### 2. **SEVERE WINDS– Hazard Description**

Severe wind can occur alone, such as during straight-line wind events and derechos, or it can accompany other natural hazards, including hurricanes and severe thunderstorms. Severe wind poses a threat to lives, property, and vital utilities primarily due to the effects of flying debris or downed trees and power lines. Severe wind will typically cause the greatest damage to structures of light construction, particularly manufactured homes (FEMA).

#### 3. **FLOODING– Hazard Description**

A flood is the partial or complete inundation of normally dry land. The various types of flooding include riverine flooding, coastal flooding, and shallow flooding. Common impacts of flooding include damage to personal property, buildings, and infrastructure; bridge and road closures; service disruptions; and injuries or even fatalities (FEMA).

In the 2010 Liberty County Emergency Management Agency (LCEMA) (2010) study, a Risk Factor approach was used that produces numerical values that allow identified hazards to be ranked in a manner that indicates those hazards which represent a greater hazard risk to the communities in the study. The Risk Factor values are obtained by assigning values to five categories that, when combined; summarize the overall risk for each hazard: *probability, impact, spatial extent, warning time, and duration*. Each risk component was assigned a value ranging from 1 to 4. To calculate the Risk Factor (RF) value for a given hazard, the assigned value for each risk component category is multiplied by the weighting factor for that component. Quantitative analysis related to each component value was considered using Geographic Information System (GIS) capabilities and FEMA’s HAZUS methodology for estimating the potential losses from disasters. Then, a qualitative approach was used to provide additional insights on the specific local risks associated with each hazard. The higher the RF value, the greater the hazards risk. The formula used is as follows:

$$\text{Risk Factor (RF) Value} = [(\text{Probability} \times .30) + (\text{Impact} \times .30) + (\text{Spatial Extent} \times .20) + (\text{Warning Time} \times .10) + (\text{Duration} \times .10)]$$

Table: Liberty County Multi-Jurisdictional Hazard Mitigation Plan 2010

Liberty County Emergency Management Agency (LCEMA) (2010) used this formula to predict the probability of actual threats to Liberty County and its incorporated jurisdictions. Based on the RF analysis, the natural hazard with the highest risk potential is “Coastal Storm”, which has a value of 3.2. This is primarily due to the probability of the hazard occurring and the spatial extent of the potential widespread damage within the affected areas of the County. “Windstorm” was qualitatively calculated as second in risk potential, with a value of 2.7. The technological or human-made hazard with the highest risk potential was found to be “Hazardous Materials”, with a value of 2.9. This is primarily due to a lack of warning time and a high level of probability.

The conclusions drawn from the qualitative and quantitative assessments, combined with final determinations from the Liberty County Mitigation Planning Committee, were fitted into three categories for a final summary of hazard risk for Liberty County based on High, Moderate or Low risk designations.

<b>HIGH RISK (3.0 or higher) Coastal Storms</b>
<b>Moderate Risk (2.0-2.9) Windstorms, Flooding, Disease, Wildfire, Vector-borne disease, Drought, Hazardous Material</b>
<b>LOW RISK (0.1 – 1.9) No hazards were ranked as a LOW RISK</b>



Table: Liberty County Multi-Jurisdictional Hazard Mitigation Plan 2010

The 2010 mitigation plan prioritized possible projects, program and policy alternatives to help make Liberty County and participating municipalities less vulnerable while improving the economic, social, and environmental health of the community. The plan identified ways to link hazard mitigation policies and programs with complementary community goals that are related to housing, economic development, community revitalization, recreational opportunities, transportation improvements, environmental quality, land development, and public health and safety. The results represented an effort to make Liberty County and participating jurisdictions more livable communities and a much safer place to live.

The 2010 mitigation plan suggested that coastal storms were the higher risk. All assets are considered at risk from this hazard. This includes 73,624 people, or 100% of the County's population and all critical facilities, structures, and infrastructure, including people and structures within Hinesville. While all assets are considered at risk from tornadoes as well, a particular tornado would only cause damages along its specific track (LCEMA; 2010). Furthermore, due to the sporadic nature of tornado activity, all buildings, infrastructure, and critical facilities were considered at an equal risk for loss due to windstorm damage. Parts of Hinesville are also at risk from possible flood.

Hurricanes, flooding, and wind damage are interrelated (for example, hurricanes can cause flooding, high winds and tornado activity), and thus the impacts of these hazards may overlap.

### **Hurricanes or Coastal Storms**

The probability of a hurricane affecting Liberty County is high with the passage of time. The minimum daylight warning time for hurricane landfall is 18-24 hours. The frequency of a major hurricane historically, Category IV or V, has been one every ten years since 1979. Minor storms can be expected as often as every year. Based on historical frequencies, there is a 13.39 percent change of a hurricane or tropical storm event occurring in any given year.

Controllability of hurricane damage is limited to the mitigation measures of building codes, land-use management, and setback and elevation criteria.

Duration of the actual onslaught is from several hours to several days, depending upon the forward movement of the hurricane. The duration of the aftereffects including cleanup and infrastructure repair, varies with the severity of the storm and can range from several days to several years.

The scope of damage ranges with the severity of the hurricane, from minimal damage to nearly total destruction of community facilities, business and residences. Building collapses may create major mass casualty incidents.

The intensity of impact will vary with the scope and location of damage

## **Flood**

The frequency of moderate flooding is at least once a year; major flooding is generally limited to once in five years. Controllability of flood damage is limited to mitigation measures of land-use management and elevation criteria. Clearance of debris along stream ways can also affect flooding and resulting property damage.

The duration of the actual event is from several hours to several days.

The scope of damage varies with the severity of flooding.

The intensity of impact ranges from a few houses with water damage to several hundred houses involved, including road washouts and bridge damage.

## **Tornado and Windstorm**

Predictability of tornadoes in Liberty County is uncertain. The frequency of a major tornado (EF2), based on past history, is approximately one every ten years, with two or three lesser windstorm occurrences, including straight line shear winds, yearly.

The controllability of tornado damage is limited to local plans and building codes and rapid warning.

The duration of actual onslaught is relatively short.

The scope of damage varies with the severity of a tornado or windstorm, varying from moderate to total destruction within certain portions of the study area.

The intensity of impact varies with the scope and location of damage.

## **IV. IMPACT ANALYSIS**

Liberty County's Multi-Jurisdictional Hazard Mitigation plan indicates that the City of Hinesville is subject to an average to high probability of experiencing windstorm- and flood-related hazards. There have been a total of 2,438 extreme weather events within 50 miles of Hinesville recorded from 1950 to 2010 as follows:

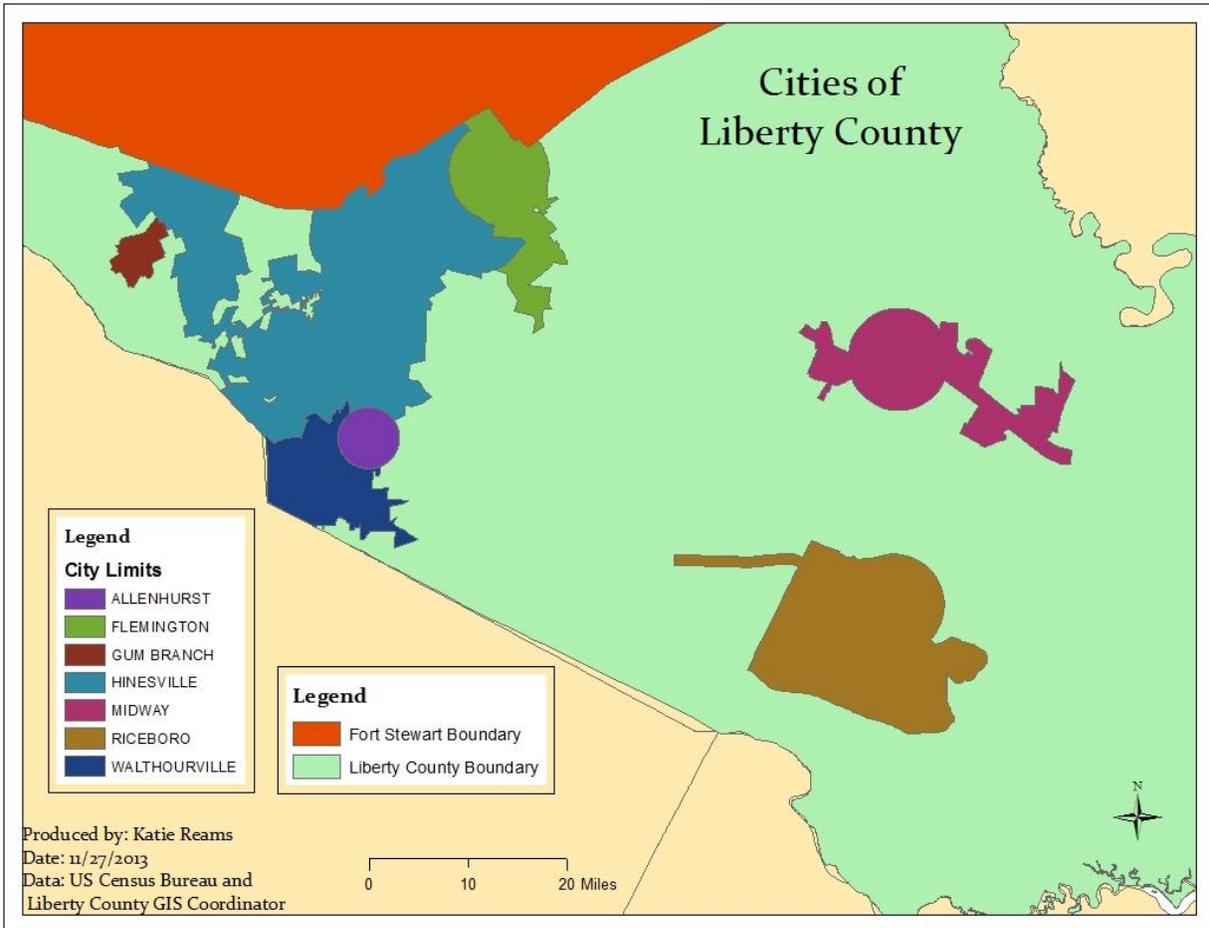
<b>Type</b>	<b>Count</b>
<b>Tornado</b>	1
<b>Hurricane</b>	3
<b>Flooding</b>	170
<b>Wind</b>	1,460

Table: 2013World Media Group, LLC

The history of these events in Hinesville demonstrates the vulnerability of the city, and the high necessity for a risk mitigation plan. As noted, the numbers provided seem to indicate a greater risk for Hinesville mainly from wind damage and flood, emanating from hurricanes, tornadoes, or other windstorms.

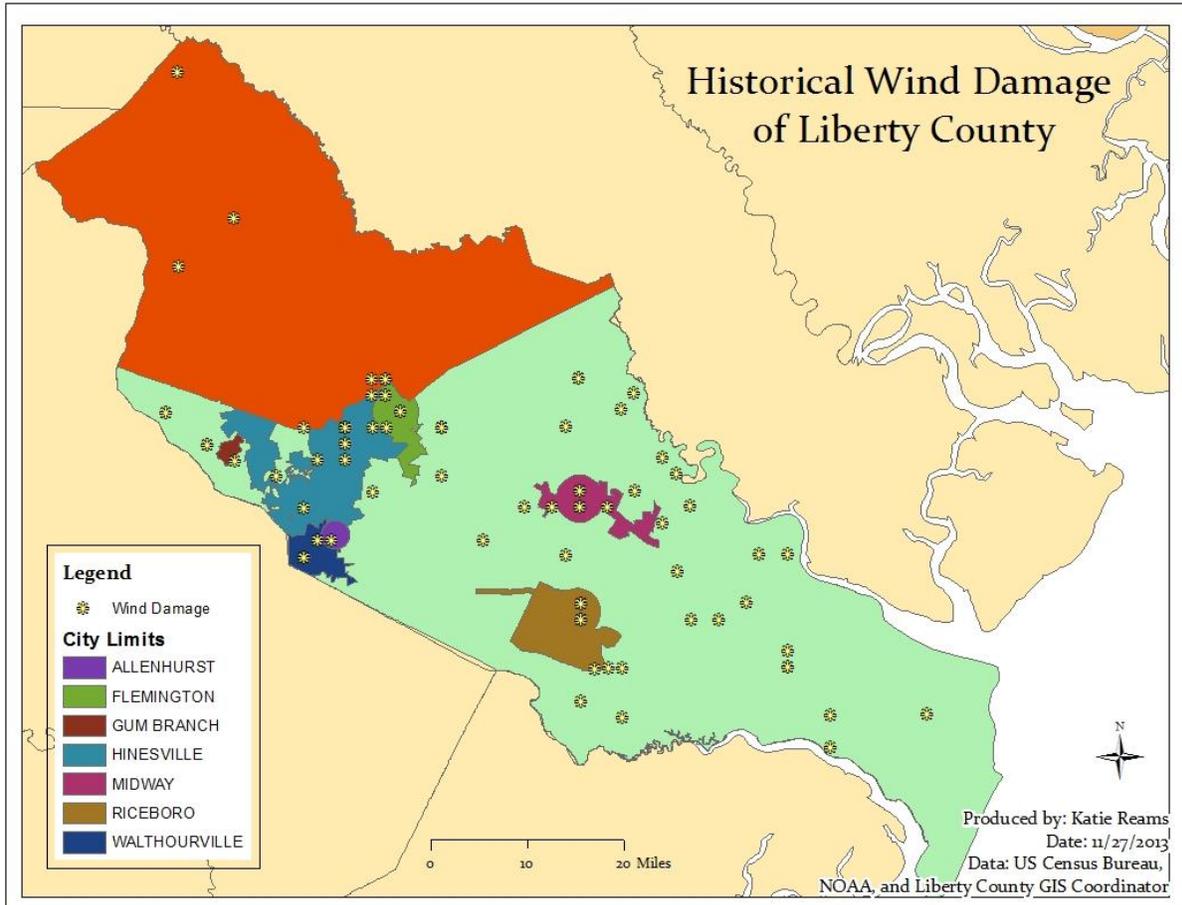
Map IV.1 shows the municipalities located within Liberty County.

#### IV.1 Cities of Liberty County (Hinesville)



Map IV.2 shows the historical wind damage for Liberty County, indicating the county as a whole has experienced a high number of severe wind damage in the past and is more likely to experience them in the future.

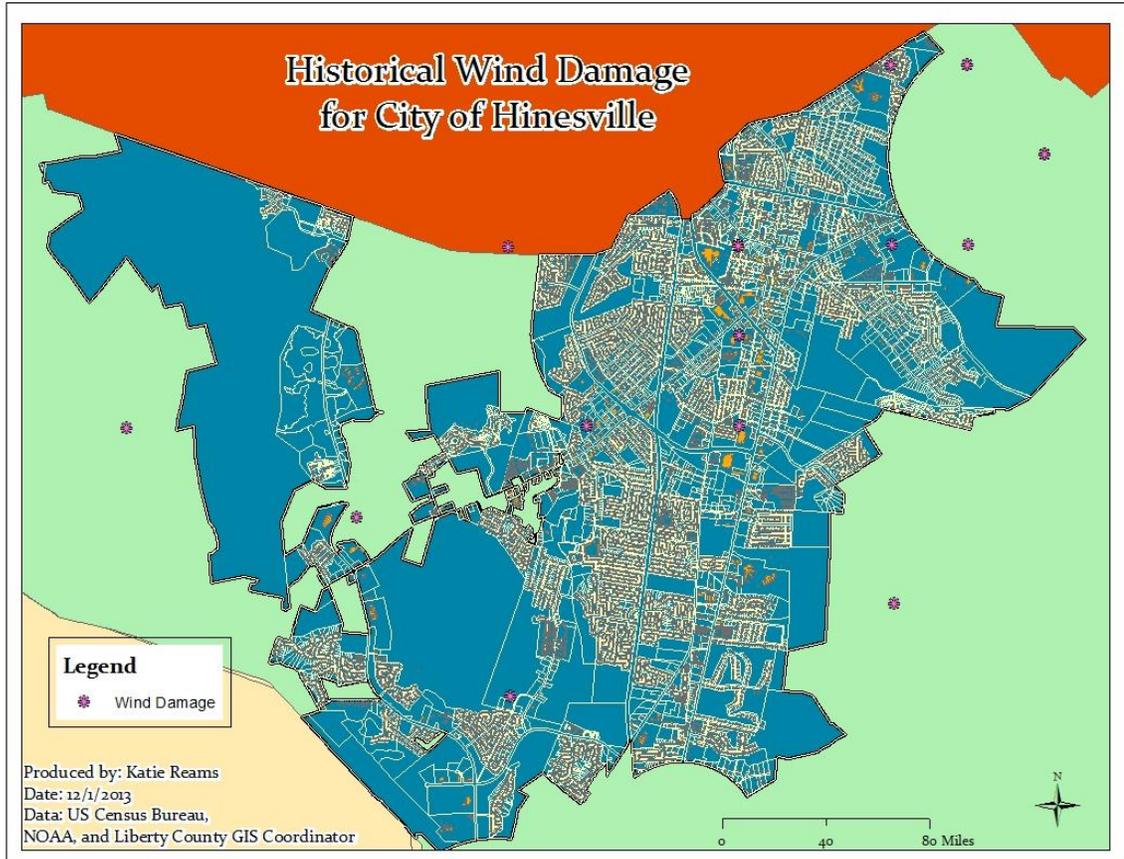
### IV.2 Liberty County Wind Damage



Looking at the City of Hinesville there are high numbers of wind damage, indicating the higher risk in an event of a natural disaster. With severe thunderstorms likely mixed with a severe windstorm, the damages are likely to be higher impacting a high percentage of the Hinesville population.

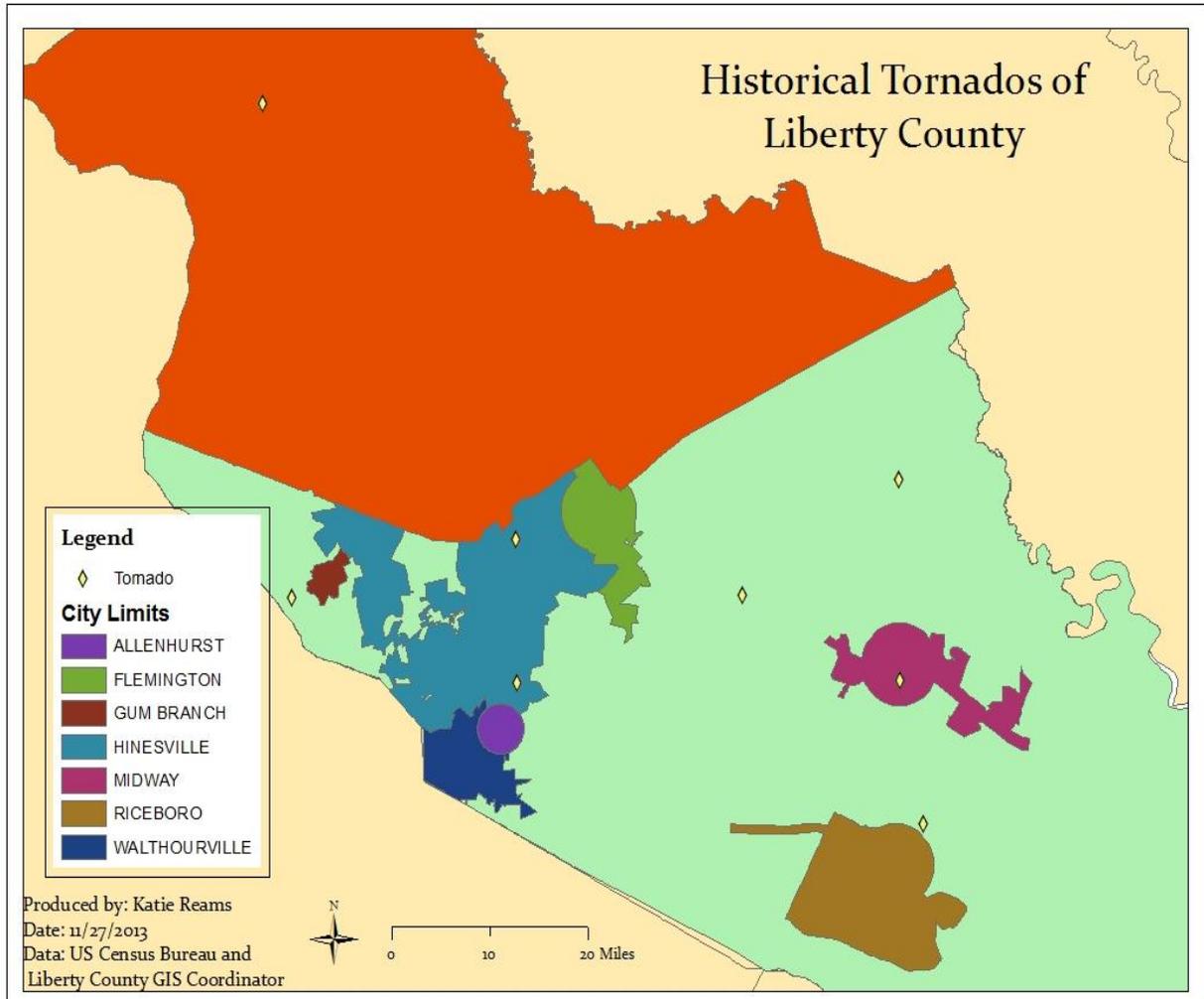
Map IV.3 shows the historical wind damage for Hinesville, indicating a relatively large portion of Hinesville is subject to severe wind damage.

### IV.3 Hinesville Wind Damage



Map IV.4 shows the historical tornado activity in and around Hinesville.

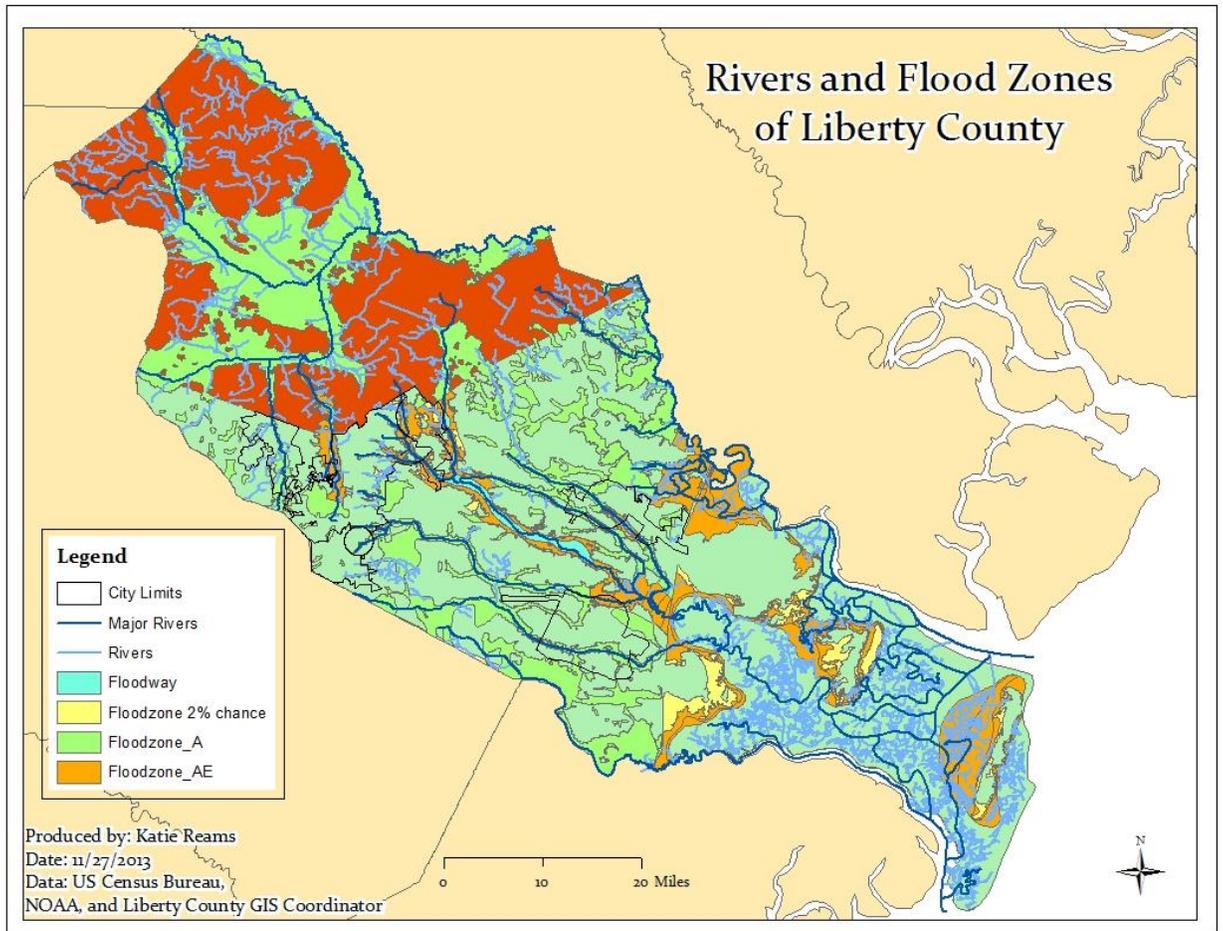
#### IV.4 Historical Tornadoes of Liberty County (Hinesville)



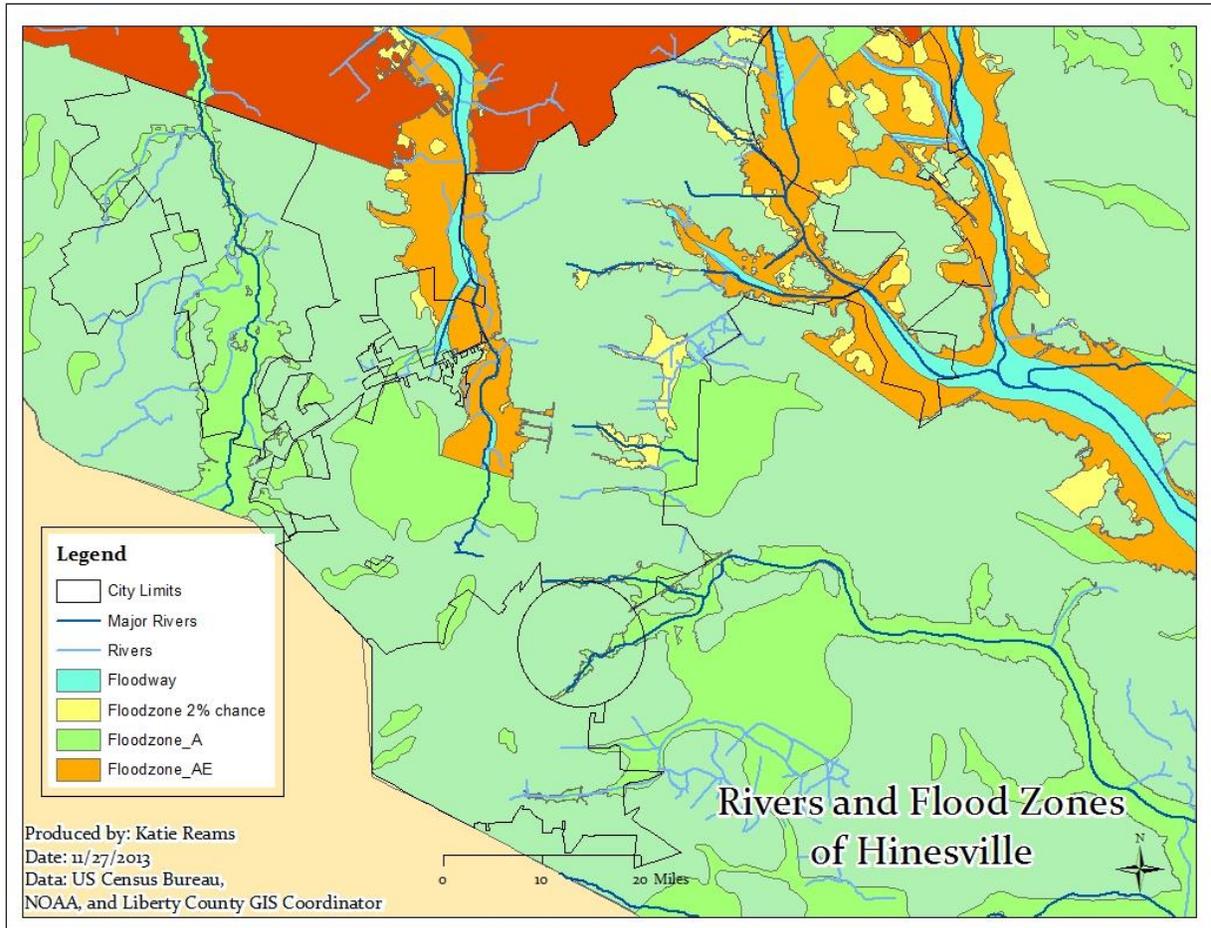
According to the Liberty county Multi-Jurisdictional Hazard Mitigation plan there are high probabilities of wind and flood hazards overlapping as they occur, affecting the value of existing land and property, the environment, and potential risk to life. Looking at the span of historical tornado events in and around Hinesville from 1950 to 2009. Based on this analysis, tornadoes are less of a hazard to Hinesville based on their frequency of occurrence than wind damage and flooding from common windstorms. Floods and Wind damage are at a higher risk of impacting and affecting the Hinesville population but tornadoes do occur and can cause great damage and loss of life. Tornadoes can also bring rain, that can lead to various types of flooding include riverine flooding, coastal flooding, and shallow flooding. Some common impacts of flooding, whether caused by tornadoes or not, include damage to personal property, buildings and infrastructure; bridge and road

closures; service disruptions; injuries and potentially fatalities. With a mixture of some of these hazards the risk factor rises higher. Map IV.4 shows the historical flood zones within Liberty County and Map IV.5 shows the flood zones within Hinesville.

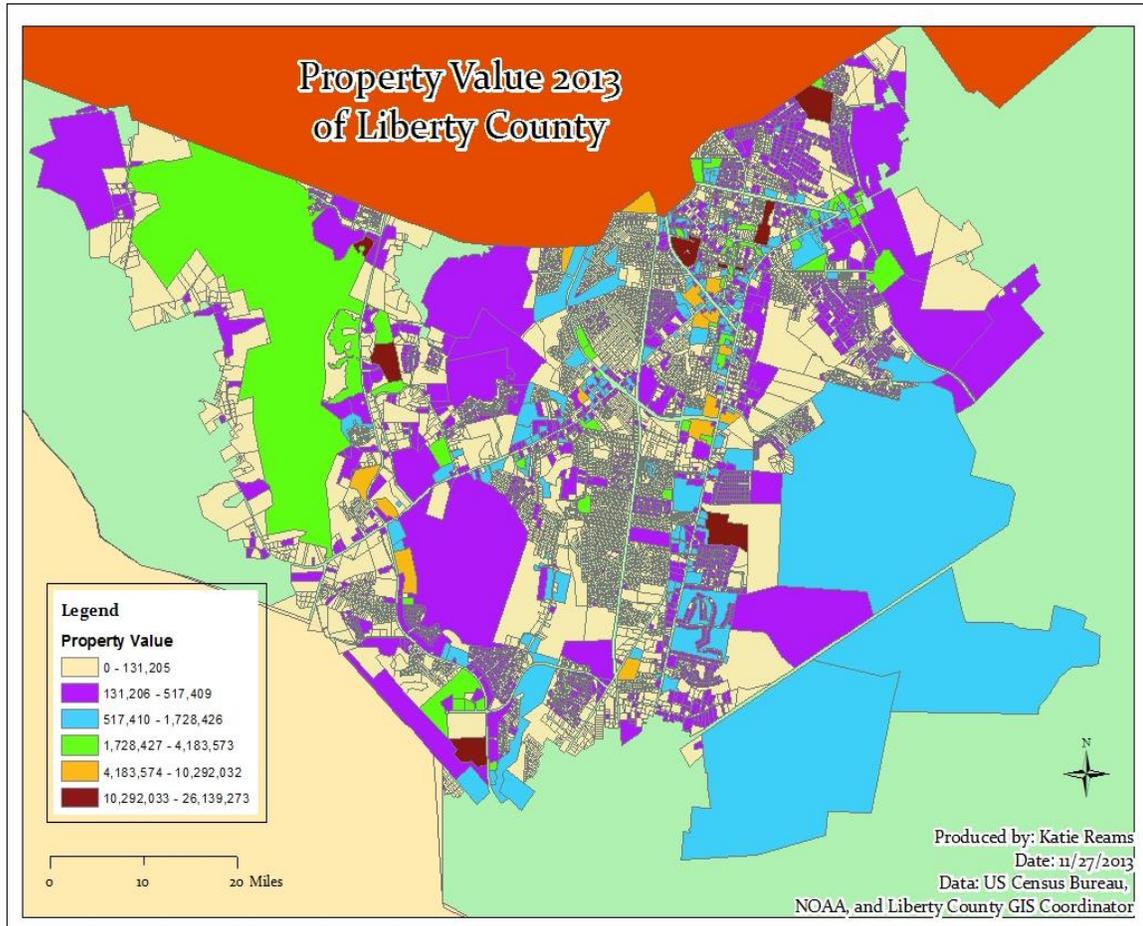
#### IV.5 Historical Flood Zones of Liberty County (Ft. Stewart in Red)



## IV.6 Rivers and Flood Zones of (Hinesville)



#### IV.7 Property Values of Liberty County 2013 (Hinesville)



As can be seen in Map IV.6 and keeping in mind the flood zone locations as shown in Map IV.5, Hinesville has a number of communities within flood zones where the average property value ranges from 0-\$131,205. It is logical to assume that the owners of these properties might be predominantly lower-income residents and, therefore, more in need of assistance both before and after a flood event. According to the U.S Census Data the average home in Hinesville has about 2 individuals per household and a high percentage of children. The properties with values ranging from 10,292,033 to 26,139,273 are board of education facilities, meaning that they are primarily schools. These buildings may contain a vulnerable population of children during sudden events, such as windstorm, tornadoes, or flash flooding.

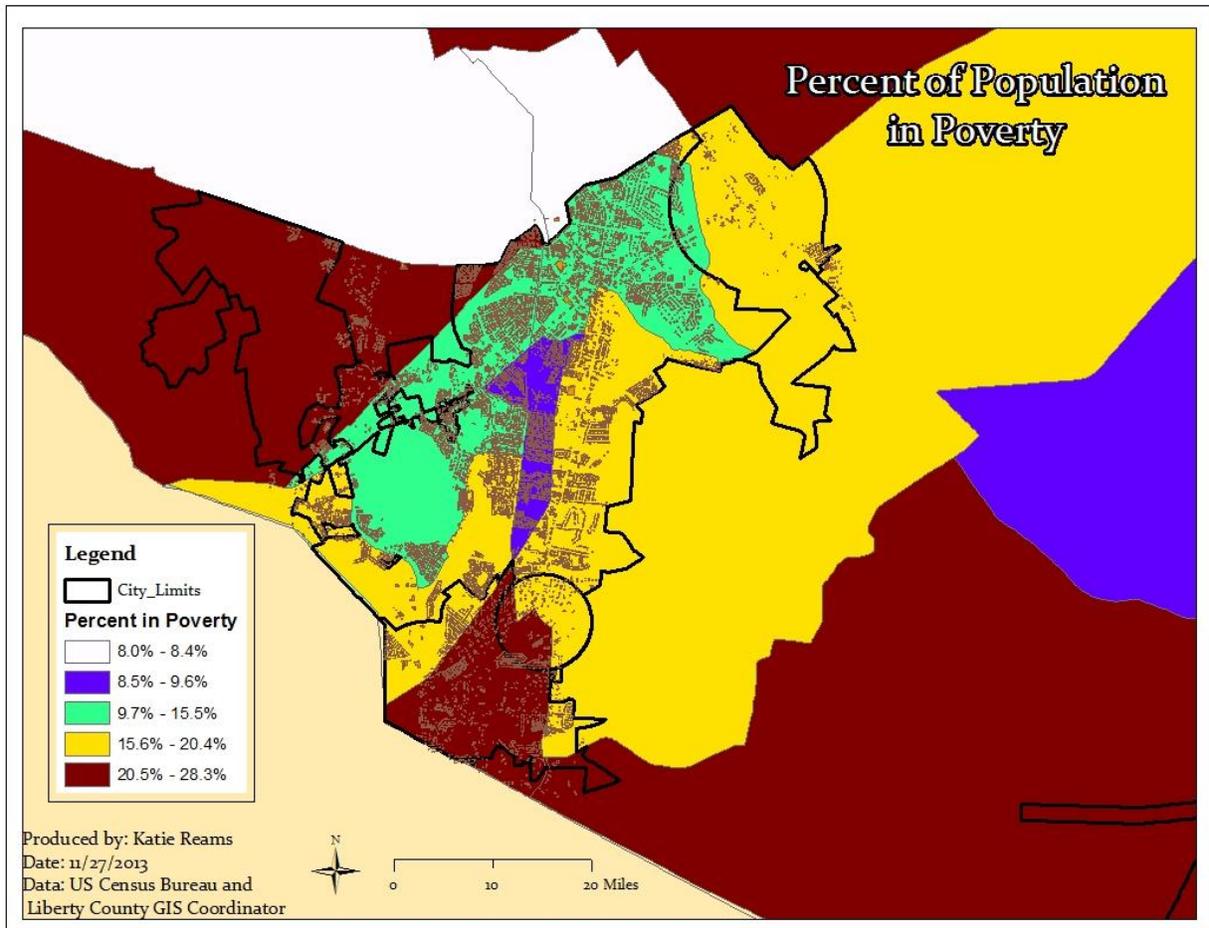
Overall this Hinesville Risk Assessment concurs with the 2010 Liberty County Multi-Jurisdictional Hazard Mitigation plan. The first step in the preparation of this Hinesville risk assessment involved collecting and reviewing the best data available from a variety of sources, as follows:

- Liberty County natural disasters and extremes, Liberty County, Georgia
- Geographic Information Systems Office - Liberty County

- Georgia Emergency Management Agency- (Mitigation Planning)
- The Liberty County Property Information Systems
- The Liberty County Hazard/ Vulnerability Analysis
- Georgia Emergency Operational Plan
- Georgia Flood Map - Assessment and Planning
- The United States Census Bureau

The second step in the risk assessment process involved a review of the Georgia Emergency Operational Plan for the City of Hinesville. The natural hazard vulnerability & probability assessments within Hinesville were compared with historical vulnerability & probability assessments for Liberty County; similarities and differences will be documented for the final presentation for the Hinesville city manager's office.

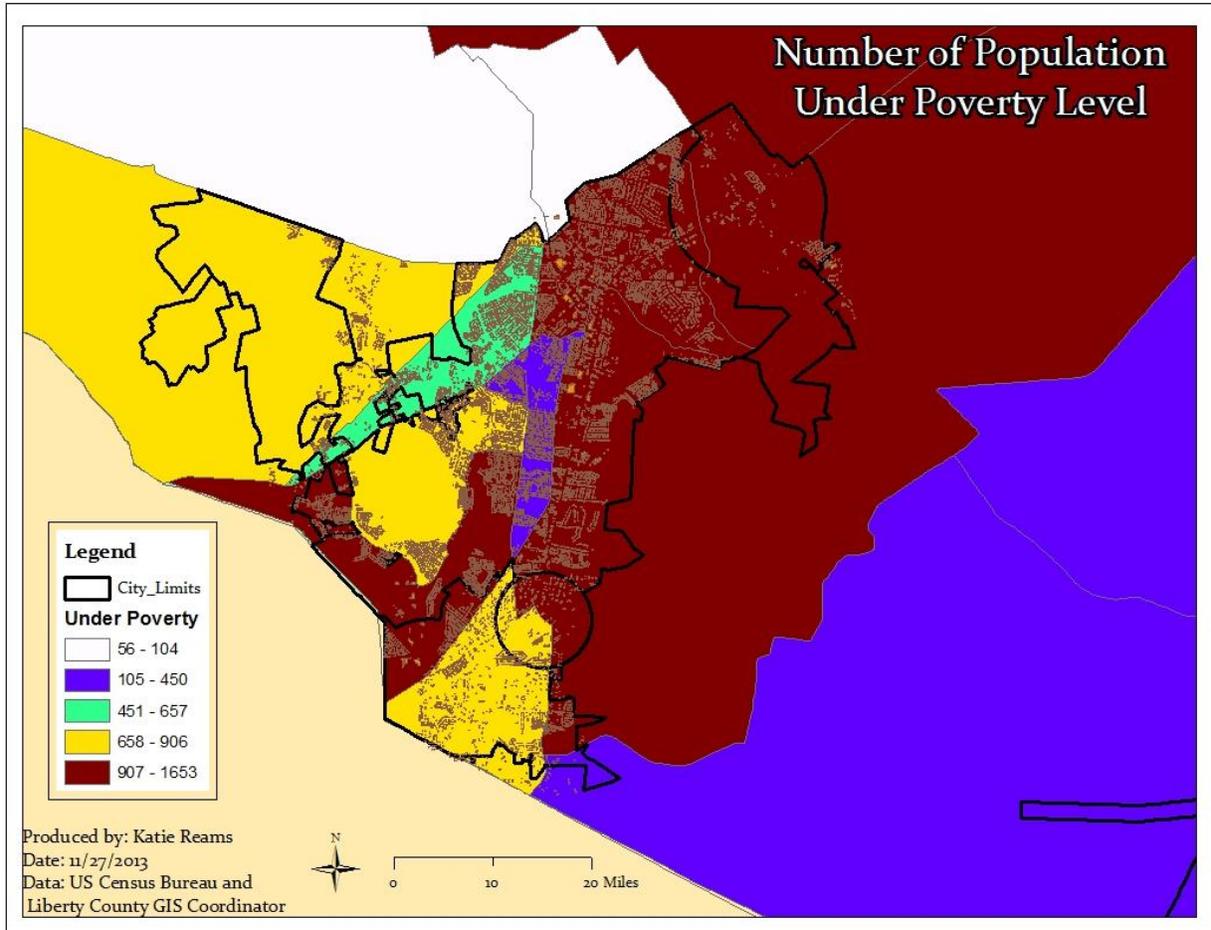
## V. IMPACT ANALYSIS



### V.1 Property Values of Liberty County 2013 (Hinesville)

The uncertainty of not knowing that a crisis may descend at any time and not knowing how one will cope affects the poor population to a greater degree than those who have more resources. Looking at Map V.1, it is clear that a high percentage of the population within flood zones is living under the poverty level. This reinforces the conclusion drawn from the analysis of property values as shown in Map IV.6. Poor populations are often among the most vulnerable in society because they are the most exposed to a wide array of risks. Their low income means they are less able to save and accumulate assets. That in turn restricts their ability to deal with a crisis when it strikes. A majority of the City's citizens are living in poverty, therefore it is important that risk mitigation planning considers ways to help build and make those communities stronger. It is a necessity to target education to those who live in these areas in order to reduce the potential impact of potential hazards. If the City of Hinesville is able to help the poor prepare for, cope with, and recover from the crises created by natural disasters it will help contain physical costs resulting in savings that the city can use to invest in risk-reduction measures and to replace assets lost or damaged during hazard events.

## V.2 Number of Individuals under Poverty in Liberty County 2013 (Hinesville)



## **VI. PUBLIC AWARENESS AND PUBLIC EDUCATION**

### **Integrating public education for disaster reduction**

A variety of federal, state, and private-sector initiatives has resulted in the development of a wide array of tools to support public hazard education. At this time, Hinesville does not provide easily accessible public information regarding potential hazards, activities to mitigate risk, and those actions to take before, during, and after the occurrence of an event. This assessment is designed to help the City of Hinesville plan and develop alternative public awareness and public education efforts that will support disaster risk reduction. It supports the prior Liberty County Hazard Mitigation Plans developed in 1998, 2005, and 2010. This information serves as a blueprint for public education regarding disaster mitigation efforts by providing specific operational guidance that should be used to make citizens aware of the hazards they face and how they should plan their response to those hazards.

### **Why is community education programs needed?**

The City of Hinesville has indicated interest in placing a strong emphasis on public awareness and public education for disaster risk reduction due to the great number of citizens that may be negatively affected by natural hazards. The fact that many of those citizens are members of vulnerable populations such as the poor, education is deemed especially important to the protection of those who will have more difficulty protecting themselves. Additionally, these hazards are likely to negatively impact schools, housing, and local businesses, all of which will benefit from targeted, specific information related to hazard mitigation. The regular occurrence of severe weather events in the Hinesville area points to a need for increasing focus on raising public awareness and providing education to help reduce the damage to lives and properties of these hazard events. This assessment will assist the City of Hinesville in the implementation of these educational activities.

The following are existing approaches and strategies already in use for public education and disaster reduction undertaken by the City of Hinesville:

### **Public Safety Education Programs**

The Hinesville Fire Department currently provides public safety education programs dedicated to safeguarding the lives, property, and the environment of the City of Hinesville through education, preparedness, prevention, and response to emergency incidents. The department works in the community and directly with local schools to provide safety education and services to all residents of Hinesville. Below is a list of available programs.

- Baby Sitting Program
- Blood Pressure Checks
- Child Safety Seat Checks

- CPR Classes
- Daycare Provider Class
- Fire Extinguisher Classes
- Gun Safety Lock Program
- Home Safety Check
- Hunters Safety Program
- Scald Prevention Program
- Speakers Bureau
- Truck/Apparatus Display
- Vial of Life

### **Flood Hazard**

Citizen education and awareness are facilitated by available flood maps and flood protection references in the Department of Inspections and Liberty Consolidated Planning Commission offices. These offices provide citizens with in-depth information on flooding, past flood problems in the area, and copies of elevation certificates for properties. Even if citizens do not believe they are in a floodplain, they are encouraged to become more informed about the specifics of their neighborhoods.

If requested, the Public Works Department will visit a property to review its flood status and explain ways to stop flooding or prevent flood damage.

The Department of Inspections provides information related to floodplains and flooding issues, drainage, or sewer backup problems, as well as information about local flood hazard maps and permit requirements. Citizens can also review and receive assistance with permit requirements for flood hazard areas and flood damage prevention.

For those who do not have flood insurance, The City of Hinesville advises their citizens to talk to their property agents. The City of Hinesville participates in the National Flood Insurance Program (NFIP) which makes federally backed flood insurance available for all eligible buildings, whether they are in a flood plain or not.

### **General Public Education**

The City of Hinesville provides most of its public safety education online, through the local news, by citizens signing up to receive weather warnings, and by provision of GIS Maps. Most of these services are online, limiting access for those who do not have access to computers and the World Wide Web.

Based on preliminary research and testing, it takes about 10 minutes for the average person to gain access to natural hazard information, with additional time required to navigate and find information as to where to go in case of occurrence of any of the high-probability natural hazard events that regularly impact Hinesville.

These findings indicate a risk related to communications, social marketing and public education for disaster impact reduction. As in most cities, in the City of Hinesville there really is no one, single 'general public'. Instead, there are many different publics, each affected on by a wide variety of differing social and cultural dynamics and vulnerabilities. It is important that the city establish an early planning process capable of targeting citizens in vulnerable populations that are highly at risk from tornadoes, winds, flood, and thunderstorm damages. Proper targeting of risk-reduction education to these populations can help to limit damage from hazard events and potentially save lives. Early planning will benefit all locations and populations, including those likely to face less serious damages than each of the targeted market segments.

### **What would a natural hazard prevention and reduction campaign look like?**

Public awareness and public education for disaster reduction in Hinesville can be used to turn available risk mitigation knowledge into specific local action to reduce known disaster risks and to prepare citizens for the aftermath of hazard events. Educational efforts should mobilize people through clear messages, supported with detailed information on what to expect from specific hazards, evacuation requirements and routes, shelter locations and availability, and similar information.

Hazard awareness alone does not necessarily lead directly to people adopting risk-reduction measures. Researchers have identified a number of factors that affect how people respond to risk reduction efforts. These factors can be used to guide public education efforts as follows:

- People will take action when they know that a specific action they take can reduce risks during a specific hazard event. Educational efforts should emphasize the direct cause and effect relationship between citizen actions and desired outcomes.
- People often take action when they are convinced that their actions will be effective. The use of concrete, real life examples of the success of proposed risk reduction efforts should be emphasized.
- People take action when they believe in their own ability to carry out the tasks expected of them. Break down expectations into the smallest possible units that are demonstrably easy for the citizen to undertake.
- People need to be stimulated to seek information. A public awareness campaign that includes the participation of the education establishment and the private sector can be used to stir interest.

- People seek consensus, and want validation from many sources before they act (for example: friends, experts, public authorities, respected community leaders, radio, television and web sites), so educational efforts should be targeted from multiple sources pitching a coordinated and consistent message.
- People go along with what they think others are doing. (This means that it is important to focus on positive local examples: negative threats do not generally work as well).
- Three types of people are able to start ‘pro-social epidemics’ that result in wide acceptance of the risk-reduction message: connectors, who bring people together; information specialists (in other words, experts); and salespeople who have the ability to persuade. People who inhabit these roles within the community, and whose voices carry respect and weight, should be recruited for participation in education efforts.
- The most memorable lessons are learned from stories that are simple, unexpected, concrete, credible and emotional. Messages should be crafted with this in mind and, if possible, some of the messaging should be delivered by people who have the credibility borne from having lived through significant hazards themselves. • The gradual process of behavioral change moves from contemplation to planning, then to action, and finally to maintenance. To a great degree this process is driven by repetition of the message, delivery by a range of actors who approach the problems from various perspectives, and through an array of trusted delivery mechanisms.

It is good practice to start with easy tasks that will make a difference, and to help people experience, document and share their successes.

### **Who should the City of Hinesville work with to achieve this goal?**

Partnerships are important to the success of public education and awareness efforts. Good strategies grow from collaboration, and cooperation is essential for developing consistent, harmonized and standardized messages that will repeat frequently enough to become common knowledge.

### **Planning**

A pre-disaster education program should provide outreach to each vulnerable population within the city and messages should be specifically targeted to such populations. Such a program could be partially embedded within the Hinesville Fire Department’s efforts at winning public support for the shared goals and objectives of new awareness campaigns.

The City should establish key partners for ‘ground-trothing’ (gathering on-site data to verify information gleaned from remote sources) by engaging representatives of all of the city’s intended beneficiaries. Hinesville should continue working with Liberty County and involve

county individuals in the process of developing training methods and approaches and in reviewing programs and materials.

These partnerships could function as an advisory council to help promote public education for disaster reduction objectives overall by targeting different groups of citizens and individuals as discussed within the following chart:

Who	Why?
<p><b>Civic sector:</b> All those with similar goals and working in overlapping geographic areas. They may include non-governmental organizations (NGOs), professional and trade organizations, school administrators, teachers and parents.</p>	<p>Collaboration is more effective than competition. Some of these partners will act as important bridges to different parts of your target audience.</p> <p>Some partnerships may be official and formal, while others may be simple and informal. The goal is to reach the vulnerable population as much as possible.</p>
<p><b>Private sector:</b> Large corporations, including utility and insurance companies, mass media, medium sized local businesses and small businesses and individual entrepreneurs</p>	<p>To help reach wide audiences with clear and simple messages such as insurance companies providing incentives for residents with flood insurance. Corporate social responsibility efforts can be designed to be mutually beneficial and provide additional messaging to target audiences. When employers support a cause, this strengthens credibility of the city, and it also increases awareness.</p>
<p><b>Children and youth:</b> Younger children and youth can be influential drivers of disaster-prevention behavior</p>	<p>Younger children are most effective in communicating lessons learned at school with their parents, while older youth are most effective and influential with their peers</p>
<p><b>Organizations:</b> Governmental, intergovernmental, private and civic organizations and individuals</p>	<p>These organizations may be inclined to support you in your long-term and sustained efforts at public education for risk reduction, especially if your risk avoidance goals align with their institutional goals.</p>

**Elderly and the Handicapped:** The older population are not very technologically advanced but are proactive once they learn about preventative methods against any disaster

In many cases the elderly are influential with extended families and with each other. Making the effort to educate the elderly in risk prevention and hazard response can be an effective way of diffusing data on an intergenerational basis.

The handicapped understand the unique risks and issues faced by those who live with handicaps that are manageable under normal conditions, but become a deadly issue when faced with a natural hazard. Their input will be critical for both understanding the needs of the handicapped during a hazard event and in communicating mitigation activities to the handicapped community at large.

Within each community, or at least within each vulnerable community, it may be possible to create citizen emergency response teams that can work to identify and reduce potential hazards in homes and work areas. These teams can be taught the techniques for triage and initial treatment of injuries in emergency situations, to act as the first lines of defense until professional help arrives. They can also act as a first line of search and rescue efforts within their communities and can be taught fire control and suppression techniques. These groups might be more influential within their communities than any outsider could be, and therefore might be one of the most effective means of getting the public motivated to be attentive to the multiple messages being delivered through the educational program.

## **IMPROVEMENTS IN WEB DESIGN**

The existing City of Hinesville website primarily addresses hazard mitigation through references to other sites, including FEMA. It is easy to get lost in the sea of information that is available to anyone who follows these links. In an emergency, the information overload would likely confuse the reader rather than help him or her. As an educational tool, the information is far too broad and technical to hold the interest of the average citizen long enough to accomplish the objective of teaching that citizen what to do to prepare for and survive a hazard event. Citizens need to have concise, easily understood instructions for each type of hazard and for each phase of the hazard event readily available on the website. The instructions should not be generalized as they are if gleaned from massive FEMA information load, but should be specific to the City of Hinesville and the risks its citizens will likely face. In the beginning, this information will likely be static. Ideally, over time the information will be available through interactive modules that

deliver to the citizen the exact information desired based on imminent hazards. These modules could provide mapping functionality that allows the citizen to understand exactly how a potential hazard might affect their property and their lives. This functionality could be customized to the point of allowing the citizen to input their address and immediately read information on potential hazards and mitigation efforts that could be pursued.

Social media tools could be used to immediately enhance communication with citizens. During non-hazard periods, social media could be used to disseminate information on preparedness to citizens and to answer specific questions posed by citizens online. When a hazard is imminent, communication could switch to warning the populace as the hazard develops and announcing evacuation routes and shelter locations, if needed.

The City of Hinesville website should contain a high-level link or tab dedicated to natural disaster education and mitigation so the above information can be easily accessed from any page within the website.

These efforts may qualify for grant funding under the Hazard Mitigation Grant Program (HMGP). Eligible projects include those that address a repetitive hazard, or one that poses a significant risk to life and property, and provides a long term or permanent solution for reducing the threat posed by the hazard. Examples include warning systems that have mitigation as an essential component (Georgia Emergency Management Agency/Homeland Security, 2013).

## **CONCLUSION:**

As a result of the hazard mitigation planning process for Liberty County, Hinesville officials obtained a great deal of information and knowledge regarding the immediate area's disaster history, and the likelihood of each of these hazards occurring within the city: tornado, flood, wind damage, and the potential impacts, losses, and challenges these hazards represent to the City of Hinesville.

The general planning process and detailed analyses presented in the 2010 Liberty County Multi-jurisdictional Hazard Mitigation Plan and its predecessor efforts provided a well-reasoned and solid foundation for the conclusions reached in this study. The identification and re-evaluation of hazards that have occurred historically within Liberty County substantiate the conclusions reached in the original county-level studies. Assessments have been made by the Liberty County Emergency Management Agency to determine the vulnerability of the community to various hazards and to determine hazard-specific losses.

In addition to that the 2010 Liberty County Multi-jurisdictional Hazard Mitigation Plan this assessment seeks to incorporate communication preparedness, prevention and mitigation recommendations to promote actions that will reduce the risk of future disasters. These communication recommendations are proposed to enhance and promote a more efficient disaster management operation. By doing so, it will enhance communication with the public, and

establishing effective disaster communication strategy that will provide timely and accurate information to the public in all four emergency management: mitigation, preparedness, response and recovery. With the implementation of the proposed changes, the City of Hinesville hopes to help make Hinesville a safer place to live and work for all of its citizens.

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## Works Cited

- Mitigation's Value to Society*. (2010). Retrieved 10 2013, from Georgia Emergency Management Agency:  
<http://www.gema.ga.gov/content/atts/mitigation/Hazard%20Mitigation/Planning/Mitigation's%20Value%20to%20Society.pdf>
- (2013). Retrieved 10 2013, from Georgia Emergency Management Agency: <http://www.gema.ga.gov/>
- 2010 Liberty County Multi-Jurisdictional Hazard Mitigation Plan. (2013, 11). Hinesville, Georgia, United States.
- Georgia Emergency Operations Plan*. (2013). Retrieved 10 2013, from Georgia Emergency Management Agency:  
<http://www.gema.ga.gov/content/atts/prepare/Plans%20and%20Maps/Plan%20Library/GEOP2010.pdf>
- Hinesville, Georgia*. (2013). Retrieved 10 2013, from City-Data: <http://www.city-data.com/city/Hinesville-Georgia.html>
- Multi-Hazard Mitigation Planning*. (2013, 9 25). Retrieved 10 2013, from FEMA: [www.fema.gov/multi-hazard-mitigation-planning](http://www.fema.gov/multi-hazard-mitigation-planning)
- National Weather Data in KML/KMZ formats*. (2013, 8). Retrieved 11 2013, from NOAA: [www.srh.noaa.gov/gis/kml](http://www.srh.noaa.gov/gis/kml)
- QuickFacts*. (2013, 7 27). Retrieved 10 2013, from U.S. Census Bureau:  
<http://quickfacts.census.gov/qfd/states/13/1338964.html>
- Federal Emergency Management Agency. (2013). *Georgia Hurricane Evacuation Study*.
- Georgia Emergency Management Agency. (2012). *Regional Threat and Hazard Identification*.
- Georgia Emergency Management Agency/Homeland Security. (2013). *Hazard Mitigation Grant Program*. Retrieved November 2013, from [www.gema.ga.gov/gemaohsv10.nsf/062206ec92d93fed8525772d00426b16/8b3e33329e537c9c852577450054644d?OpenDocument](http://www.gema.ga.gov/gemaohsv10.nsf/062206ec92d93fed8525772d00426b16/8b3e33329e537c9c852577450054644d?OpenDocument)
- Georgia Floodplain Mapping Program*. (n.d.). Retrieved 10 2013, from Georgia Flood Mapping Assessment & Planning: [www.georgiafirm.com](http://www.georgiafirm.com)
- Homeland Security. (2012). *Regional Threat and Hazard Identification - Comprehensive Preparedness Guide Toolkit*.
- Homeland Security. (2013). *Regional Threat and Hazard Identification - Comprehensive Preparedness Guide*.
- Liberty County Hazard Mitigation Plan Update*. (n.d.). Retrieved 10 2013, from Liberty County Hazard Mitigation Plan :  
<https://sites.google.com/a/libertycountygahmpupdate.com/home/>
- Map and Certificates*. (n.d.). Retrieved 10 2013, from City of Hinesville, Georgia:  
<http://www.cityofhinesville.org/index.aspx?NID=354>
- Mitigation Planning*. (n.d.). Retrieved 10 2013, from Georgia Emergency Management Agency:  
[www.gema.gov/content/atts/mitigation/Hazard%20Mitigation/Planning/Mitigation%20Planning.pdf](http://www.gema.gov/content/atts/mitigation/Hazard%20Mitigation/Planning/Mitigation%20Planning.pdf)

*Mitigation Planning.* (n.d.). Retrieved 10 2013, from Georgia Emergency Management Agency:

<http://www.gema.ga.gov/gemaohsv10.nsf/5a33c59722fd8f85257726004f0575/d8f78c52e7d3d068852577270056ca2b?OpenDocument&Highlight=0,natural,hazards>