

# **Bibb County, Georgia**

## **Pre-Disaster Mitigation Plan**

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## **Stakeholders**

The Bibb County Board of Commissioners, in conjunction with the Macon-Bibb County Emergency Management Agency (EMA), amended and updated the Bibb County Pre-Disaster Mitigation Plan, through the planning processes described herein. This Pre-Disaster Mitigation planning process was completed in cooperation with Bibb County's two municipalities: the Cities of Macon and Payne City, as well as Macon State College. Additionally, representatives from various community agencies participated in the update of this important document. The Middle Georgia Regional Commission facilitated the planning process and documented all significant accomplishments and milestones.

## **CHAPTER 1: INTRODUCTION**

**I.** Pursuant to requirements stated in the Disaster Mitigation Act of 2000, counties across the nation were required to create a Pre-Disaster Mitigation Plan to address the community's vulnerability to hazards prior to a disaster event. In 2002, Bibb County recognized the need to initiate work on such a plan in an expeditious manner to ensure that the county would have a plan in place by the deadline imposed in the legislation. In 2004, the county's efforts culminated in the adoption of the Bibb County Pre-Disaster Mitigation Plan. The intent of the Pre-Disaster Mitigation Plan is to help Bibb County reduce risks from natural and technological hazards, and also to serve as a roadmap for decision makers as they commit time and resources to reduce the effects of potential hazards. Community leaders hope to use this plan as part of a coordinated mitigation strategy geared towards developing a safe and livable environment for all Bibb County citizens.

In 2009, Bibb County initiated efforts to amend and update the Bibb County Pre-Disaster Mitigation Plan. Macon-Bibb EMA, once again requested the assistance of the Middle Georgia Regional Commission, a regional planning agency which facilitated the development of the initial Bibb County Pre-Disaster Mitigation Plan. The plan update includes a detailed and comprehensive analysis and evaluation of critical community facilities, hazard events, losses, and current plans. From this analysis and evaluation, an updated prioritized list of goals, objectives and strategies, designed to further ensure the safety of Bibb County residents, was developed. The Bibb County Pre-Disaster Mitigation Plan is intended to be a working document where hazard mitigation measures are continually monitored and implemented throughout the community.

**II.** The process of updating the Bibb County Pre-Disaster Mitigation Plan began with the selection of community representatives to serve on the planning committee. The various departments, organizations and agencies which made up the original planning committee were invited to participate in the plan update process. In fact, some of the original planning committee members elected to serve once again on the committee. Several new organizations and agencies were asked to participate in the plan update, to include Macon State College and the Medical Center of Central Georgia. Risk assessment findings as well as goals and objectives specific to Macon State College are identified in Macon State's Disaster Resistant University Plan found in Appendix C. It is also important to note that all jurisdictions that participated in the development of the original Pre-Disaster Mitigation Plan (i.e., Bibb County and the Cities of Macon and Payne City) also participated fully in the update of the plan.

The full planning committee acted as a steering agent for the Pre-Disaster Mitigation Plan update process, ultimately responsible for all new goals, objectives, and action items contained herein. In addition to the full planning committee, a separate executive subcommittee was formed. The executive subcommittee was comprised of planning team members with expert knowledge regarding all phases of emergency management, hazard identification, and mitigation strategy. These members have a vast working

knowledge of the various mitigation resources available to the county and its municipalities. This subcommittee worked closely with the Middle Georgia Regional Commission regarding the format and construction of the plan as well as final plan content.

The planning process consisted of facilitation of all meetings by the Middle Georgia Regional Commission. Revisions were made through this planning process to ensure that all components of the plan were as accurate and up-to-date as possible. Specific tasks undertaken in the update of the Bibb County Pre-Disaster Mitigation Plan includes, but is not limited to the following:

- **Critical Facilities** – Reviewed critical facilities inventory contained in the 2004 Pre-Disaster Mitigation Plan to ensure data is current and accurate; modified/updated as applicable. Collected and compiled a detailed inventory of all new, or previously unrecorded critical facilities, and the characteristics of those facilities, located within the county. A locally developed data collection form was utilized to record all relevant information. Data was entered into the Georgia Mitigation Information System (GMIS).
- **Identify/Profile Hazards** – Reviewed hazards data contained in the 2004 Pre-Disaster Mitigation Plan to determine if information is still relevant and applicable. Researched various historical records, reviewed existing plans and reports, gathered pertinent data from a variety of internet websites, and conducted interviews with experts in the local community in order to identify any additional natural and technological hazards that might affect the county and its member cities.
- **Vulnerability & Loss Analysis** – Conducted a detailed risk assessment for the county. Reviewed and analyzed hazard event profiles and critical facilities to determine potential losses from hazard events. Potential losses include life, building, infrastructure, and community assets. Reviewed vulnerability and loss data contained in the 2004 Pre-Disaster Mitigation Plan; updated data as applicable.
- **Developed Mitigation Goals & Strategies** – Identified, analyzed and prioritized various mitigation goals, objectives, and action steps. Utilized the results of the countywide risk assessment to develop specific hazard mitigation goals, as well as a comprehensive strategy to address the mitigation priorities within the community. Reviewed goals and strategies contained in the 2004 Pre-Disaster Mitigation Plan; updated as applicable.

As mentioned previously, numerous participants were involved in the update of this document. Representatives of the public and private sectors were afforded seats at the planning table. The list of planning committee participants and their titles are as follows:

Johnny Wingers  
Macon-Bibb EMA Director

Leroy Jackson, Captain  
Macon-Bibb Fire Department

LaTravius Smith  
Macon-Bibb EMA Operations Officer

Donald Mercer, Major  
Macon-Bibb Fire Department

David Gowan  
Bibb County Schools  
Director of Risk Management

Ryan Logan, Emergency Services  
American Red Cross  
Central Georgia Chapter

Kari Kitchens  
Bibb County Grant Resources Administrator

Clifford Rushin, Asst. Fire Chief  
Macon-Bibb Fire Department

David Fortson  
Bibb County Engineering

Bill Causey  
City of Macon Engineering

Daniel Strandburg  
Medical Center of Central Georgia

Richard Mullis, Mayor  
Payne City

David Sims, Dir. Of Plant Operations  
Macon State College

Carl Dudley  
Macon State College

Through the planning process, with the individuals identified above participating, complete records were maintained for all meetings, to include the full committee and the executive subcommittee. This documentation includes agendas, sign-in sheets and labor documentation forms verifying the community's in-kind local match. All records and data is maintained and retained by the Middle Georgia Regional Commission for a period no less than three years from the date of GEMA/FEMA approval, should either entity seek to audit for verification purposes.

The plan update was prepared by assembling the ideas, thoughts, and research of the Bibb County Pre-Disaster Mitigation Planning Committee. The assembly of the plan document was completed by the Middle Georgia Regional Commission staff. The ideas, thoughts, and actions of the committee were put together into one comprehensive document. A draft was presented to the full committee for its review and comment.

Two Public Hearings were conducted during the planning process in an effort to solicit public input and participation into the local plan update (*see Public Hearing Notices and Agendas in Appendix E*). The first public hearing was held early in the planning process, on August 5, 2009, affording the public an opportunity to comment on the plan update during the drafting stage. Although, no members of the community attended the hearing, representatives from the Pre-Disaster Mitigation Planning Committee and the Middle Georgia Regional Commission were on hand to provide information and receive comments.

A second public hearing was held on March 10, 2010, at the conclusion of the planning process when a draft of the plan update was available for review. Representatives from the Pre-Disaster Mitigation Planning Committee and the Middle Georgia Regional Commission were again on hand to provide information and receive comments, however; no members of the general public attended the hearing.

**III.** The specific steps and processes taken to update this plan are explained and summarized in each chapter and section of this document. Generally speaking, an update to the Hazard Risk and Vulnerability (HRV) assessment was accomplished by compiling and reviewing historical data on the location of specific hazards, the value of existing property in hazard locations, and analyzing the risk to life, property, and the environment that could potentially result from future hazard events. Additionally, a capabilities assessment was conducted by the Macon-Bibb County EMA, collaboratively with the planning committee, to determine areas of vulnerability, ability, and action. More specifically, the Bibb County Pre-Disaster Mitigation Planning Committee accomplished the HRV assessment/update by conducting the following steps:

*Inventory of Critical Facilities* – Critical facilities are important to the community in that they provide essential products or services to the public that are necessary to preserve the welfare and quality of life in the county. Additionally, these facilities fulfill important public safety, emergency response, and/or disaster recovery functions. Bibb County critical facilities were reviewed, updated, mapped, and illustrated as found in Appendix A.

*Hazard Identification* – Maps and historical data sources were reviewed and analyzed in order to identify the geographic extent, intensity, and probability of occurrence for various hazard events. The Planning Committee verified that the six natural hazards and one technological hazard, as originally identified in the initial Pre-Disaster Mitigation Plan, were still valid. (see GEMA Worksheet #1 – Appendix D).

*Profiling Hazard Events* – The causes and characteristics of each hazard were analyzed to determine how each has affected Bibb County in the past, with particular emphasis on hazard events occurring since adoption of the original plan. Analysis included examining what part of Bibb County’s population and infrastructure (to include an examination of each individual jurisdiction) has been most vulnerable to each specific hazard. A profile of each natural hazard is provided in Chapter 2, with technological hazards portrayed in Chapter 3.

*Vulnerability Assessment* – This step was accomplished by comparing each previously identified hazard with the inventory of affected critical facilities and population exposed to each hazard. Updated and revised data and information was utilized in conducting the assessment. Additionally, as part of the update process, the presence of repetitive loss structures were addressed in assessing vulnerability as well as an analysis of development trends and an attempt to assess each participating jurisdiction’s risks where they may vary from the risks facing the entire county.



*Estimating losses* – Utilizing the best available data (as updated), this step involved estimating damage and financial losses likely to be sustained within a given geographic area by the use of a mathematical model. The planning committee again elected to utilize the same method of estimating losses used during the original planning process. Structure loss combined with content loss and function loss is examined at intervals of 25 percent, 50 percent, 75 percent, and 100 percent. Describing vulnerability in terms of monetary losses provides the county with a common framework in which to measure the effects of hazards on critical facilities.

Additionally, during the plan update process, the Planning Committee considered the recommendations provided by FEMA as a result of their review of the original Bibb County Pre-Disaster Mitigation Plan. Specifically, greater emphasis was placed on identifying and assessing the vulnerability of specific structures during the community Risk Assessment.

Also, the Planning Committee discussed possible future buildings, infrastructure and critical facilities when assessing vulnerability related to each of the identified hazard events. However, it should be noted that both Planning Committee members and local officials, are reluctant to identify specific future planned buildings and/or infrastructure due to changing and uncertain budgets. There are no known significant developments, infrastructure expansions or critical facilities anticipated for completion over the five-year planning period. Planning Committee members agreed that all future Plan updates will incorporate any and all changes regarding new facilities and infrastructure. Any significant additions of community facilities/infrastructure will necessitate an immediate update of the Plan.

**IV.** As identified in the Table of Contents, the Bibb County Pre-Disaster Mitigation Plan is organized as follows: *Chapter 1* provides an introduction to the original planning process as well as actions taken during the update of the plan. It includes the purpose and intent of the plan, the methodology used in developing and updating the plan, a list of those involved in the planning process and a descriptive narrative of how each section of the plan was reviewed, analyzed and revised.

*Chapter 2* profiles the various natural hazards that can occur within the community while *Chapter 3* addresses technological hazards. *Chapter 4* identifies specific community-based mitigation goals, objectives and strategies for each of the identified natural hazards, with *Chapter 5* identifying goals, objectives and strategies to mitigate any technological hazards that may occur within the community. *Chapter 6* provides for the assignment of various mitigation activities to certain individuals/organizations to ensure that the plan is implemented and carried out. Included is an evaluation and monitoring component as well as a process for future plan updates. *Chapter 7* concludes with a summary of the plan and identification of all references.

Additionally, the plan contains a series of appendices that incorporate various planning tools and supporting documentation. It should be noted that Appendix E fully documents the plan update process. This appendix is presented in chronological order showing the

sequence of events and actions that occurred. The planning committee felt this would be helpful to community officials during future plan updates.

**V.** Current research confirms that within Bibb County, the most prevalent, significant, natural hazard events continue to be thunderstorm winds that routinely strike, especially during the spring and summer seasons. Additionally, hazardous materials spills are the most prevalent technological hazard encountered within Bibb County. This was determined by reviewing 58 years of data, the time period for which data is available. Bibb County has also identified and verified five additional natural hazard events which could significantly impact the community in a negative manner. These five events are: tornados, flooding, drought, lightning, and winter storms.

No new or additional natural hazards were identified for inclusion in the plan. Extreme Heat was considered and discussed, but Hazard, Risk and Vulnerability Analysis determined the frequency of occurrence and degree of impact (e.g. injuries, deaths, property damage) in Bibb County and the Cities of Macon and Payne City to be minimal or non-existent for the hazard event. It is the intent of the committee to make the Bibb County Pre-Disaster Mitigation Plan a practical and useful document for local officials by focusing mitigation efforts towards those hazard events that pose the greatest threat and highest likelihood of occurrence.

**VI.** As set forth by the Bibb County Service Delivery Strategy, resulting from Georgia House Bill 489, the Emergency Management Agency is the overall implementing agency for projects such as Pre-Disaster Mitigation. All communities within Bibb County (Cities of Macon and Payne City and the unincorporated portion of the county) have authorized to allow Macon-Bibb EMA to act on their behalf, in a prudent manner. Documentation to this extent from the existing Service Delivery Strategy can be found in Appendix C. The Cities of Macon and Payne City and the unincorporated county were included in the planning process. Participation from each jurisdiction was solicited and received by Macon-Bibb EMA. As a result, a truly multi-jurisdictional plan was created for Bibb County with ideas and viewpoints of all entities included.

During the update process, the livelihood of all Bibb County residents was considered through a thorough evaluation of all significant entities which included schools, healthcare facilities, government buildings, and public utilities. Disaster events also have the potential to severely impact certain vulnerable and/or special needs populations within the county. According to the 2009 Georgia County Guide, senior citizens (65 years of age and over) living in the county constitute 12.8 percent of the population, with 51 percent of those 65 years of age and over classified as disabled. Additionally, 22.5 percent of the county's population in the 21-64 years of age bracket is considered disabled. Pre-disaster mitigation planning for vulnerable and special needs populations in Bibb County should also take into consideration the presence of 74 licensed day care facilities, ten nursing homes, three hospitals and the Georgia Academy for the Blind.

**VII.** The Bibb County Board of Commissioners and the Macon City Council formally adopted the updated Plan and authorized its submission to GEMA and FEMA for their respective review and approval. Should any changes or alterations of the plan be required by either of these entities, Macon-Bibb EMA is instructed to make such changes to ensure that Bibb County has a compliant plan in place. The Macon-Bibb EMA Director is also charged with bringing together a committee to periodically review and update the plan. At a minimum, at least one representative from Bibb County and the Cities of Macon and Payne City will be included on the committee. The committee will review the plan annually and update it accordingly. A full, comprehensive plan update (facilitated with an expanded planning committee) will be accomplished in five-year increments.

**VIII.** Bibb County, the 54<sup>th</sup> county formed in the State of Georgia, totals approximately 255 square miles. The county is strategically located in the center of the state with ready access to the Eastern Seaboard via Interstate 16 and north to the City of Atlanta via Interstate 75. Macon-Bibb is home to Wesleyan College, founded in 1836 as the Georgia Female College, the first college in the world chartered to grant degrees to women, Macon State College as well as Mercer University. Additionally, Macon is home to the Georgia Music Hall of Fame and the Georgia Sports Hall of Fame.

Near the end of the 19<sup>th</sup> century, William Sims Payne had the Payne Cotton Mill built in the northwest section of Bibb County. Homes were built for employees adjacent to the cotton mill. In 1919, this community became incorporated as the Town of Payne City. With the growth of the City of Macon, Payne City has become known as the “Intercity”, because it is completely encircled by the City of Macon.

Current (2008) U.S. Census Bureau estimates place the total population of Bibb County at 155,216 residents. The City of Macon has a 2008 estimated population of 92,775 and Payne City 164 residents. Analysis of total population trends reveal that Bibb County, as a whole, is expected to continue to experience modest growth in terms of increasing population; however, the City of Macon is projected to decrease in population as residents migrate into the county.

Population changes will surely place increased demands on current infrastructure, require greater levels of community services, and stimulate further changes in land use. As the population shifts, new roads are built, homes constructed, businesses open, and school systems are expanded. All of these activities initiate land use changes. The fact that much of this increased development is occurring on urban fringes and extending into previously rural areas is having a determining and transformative effect on the character and nature of the historically rural landscape of the county. Concurrent with this development, a shift in demand related to the provision of critical services such as water, sewer, fire and police can be anticipated.

The economic base of Bibb County can best be illustrated by evaluating the various sectors or industries that constitute the community’s economy in terms of their relative importance and impact. According to the Georgia Department of Labor’s 2008 Industry

Mix, the service industry is the largest employment sector within Bibb County, as over three-quarters (75.9%) of the county's jobs are service-oriented in nature. Out of the service sector, healthcare/social assistance and retail trade are the largest employers at 17.8% and 12.7% respectively. The second largest sector is government employment; comprising 13.1% of jobs, with the majority concentrated in local government employment. Manufacturing industries make up the third largest employment sector at 10.9%. Projections from Woods & Poole Economics (2008) indicate that these same three economic sectors will continue to provide the bulk of employment in Bibb County over the next two decades.

From an economic development perspective, it is noteworthy that Macon-Bibb County has over 1200 acres of Business and Industrial Parks, strong utility infrastructure, and is home to Central Georgia Technical College. Macon-Bibb County is also well served by its strategic location in the state and the presence of three Interstates (I-75, I-475, and I-16).

## **CHAPTER 2: NATURAL HAZARD, RISK & VULNERABILITY SUMMARY**

During the plan update process, the Bibb County Pre-Disaster Mitigation Planning Committee utilized the natural hazards identified in the original plan as a baseline for discussion and analysis. The planning committee then reviewed, discussed and considered other natural hazards that could potentially affect Bibb County. They ultimately determined that six natural hazards pose a direct, measurable threat to the community (see GEMA Worksheet #1 – Appendix D). They reaffirmed that of these, the entire county is exposed to five of the six hazards; tornados, drought, thunderstorm winds, lightning, and winter storms. Flooding, on the other hand, is isolated to select areas of the county that are within the flood plain and/or hazard area. Each of these potential hazards is addressed individually, with data to support the committee’s findings and recommendations. Additionally, each hazard is followed by a summary of changes resulting from the plan update.

After having identified the natural hazards that pose a significant threat to the community, the Planning Committee proceeded to “profile” each hazard event in order to help answer the question: How Bad Can it Get? This process consisted of examining hazard frequency data, assessing existing maps (i.e. road maps, topographic maps, aerial photography, etc.) and technology (e.g. Geographic Information System (GIS) and digital mapping) that may already exist at the local level, and inventorying assets and facilities exposed to each hazard event. GEMA Worksheet #2 (see Appendix D) and GEMA Worksheets #3a and #3b (see Appendix A) were helpful planning tools utilized by the Planning Committee during this process. Also, new and/or projected development, to include buildings and infrastructure, was researched, discussed, and given consideration.

As indicated previously, during the plan update process, the Planning Committee considered the possible inclusion of extreme heat as an additional hazard event. Analysis and discussion determined that extreme heat does not pose a significant threat to Bibb County and the Cities of Macon and Payne City. Conditions of extreme heat, as defined by the Centers for Disease Control and Prevention, are “summertime temperatures that are substantially hotter and/or more humid than average for location at that time of year.” Hazard frequency data failed to support the consideration of extreme heat. Hot and humid conditions are typical in Middle Georgia during summer months, with hotter than average temperatures being rare. Additionally, Planning Committee members determined that Macon-Bibb is well prepared to handle heat-related events and sufficiently mitigates against such.

### **I. Flooding** (see Appendix A for related data)

The susceptibility of a river or stream to flooding is dependent upon several different variables. Among these are topography, ground saturation, rainfall intensity and duration, soil types, drainage, drainage patterns of streams, and vegetative cover. A large amount of rainfall over a short time span can result in flash flood conditions. A small amount of rain can also result in floods in locations where the soil is saturated from a previous wet period or if the rain is concentrated in an area of impermeable surfaces such as large

parking lots, paved roadways, etc. Topography and ground cover are contributing factors for floods in that water runoff is greater in areas with steep slopes and little or no vegetation.

The Bibb County Pre-Disaster Mitigation Planning Committee re-examined historical data from the original plan as well as more recent data made available through the National Climatic Data Center (NCDC), for effects of flooding on the community. Within Bibb County, flooding has caused significant damage on several occasions. Most notably, in 1994, as a result of Tropical Storm Alberto, middle Georgia received approximately 14 inches of rain within a few hours. This caused dramatic flooding throughout Bibb County, including significant areas of the City of Macon. The standing floodwaters lingered throughout the county for several days. The total dollar value of damages paid by GEMA/FEMA as a result of this flood was in excess of \$190 million. Regionally, the Ocmulgee River is the most significant body of water, bisecting middle Georgia into eastern and western segments. During the flood of 1994, the Ocmulgee overflowed into downtown Macon rendering the city helpless for more than a week.

Although, not to the severe extent of what was experienced in 1994, flooding within Bibb County is a somewhat common event. It is typically characterized by a culvert or dry streambed taking on excessive water during heavy rainstorms with flash flooding resulting. With the exception of specifically identified flood hazard areas (see Flood Hazard Area Maps in Appendix A), there are no significant differences between the county and its two municipalities (Macon and Payne City) in terms of the risks and vulnerabilities associated with flash-flooding. Fifty-eight years of data was collected for the purpose of determining hazard frequency; however, no flooding events are documented as having occurred within the first forty-eight years of the analysis. According to the National Climatic Data Center, four flood events have occurred in Bibb County since local adoption in 2004 of the original Pre-Disaster Mitigation Plan (see *Hazard Frequency Table* in Appendix D). Eleven flood events have occurred within the past ten years. Four of these flood events caused damages of more than \$400,000. Utilizing reliable data from the past ten years, which reflects four *significant* flood events having occurred in that time frame, it can be inferred that a flood event causing more than \$400,000 in damage is likely to occur every three years in Bibb County. Data is not currently available or detailed enough to determine differences in future risks between the county and its two municipalities.

As accomplished during development of the original plan, during the update process, assets (to include critical facilities) were examined using risk-based analysis to determine the vulnerability within Bibb County (see Appendix A, GEMA Worksheet #3a). Bibb County has several critical public facilities located within flood prone areas. The Georgia Academy for the Blind, Healthsouth Central Georgia Rehabilitation Hospital, Rocky Creek Branch Library, and the Lower Poplar Street Wastewater Treatment Facility are all located within flood prone areas. Combined, these facilities have a replacement value of over \$10 million (see GMIS Critical Facility Inventory Report in Appendix A).

Additionally, research reveals that Bibb County has some very problematic areas regarding repeat flooding. Five privately owned residential properties within the City of Macon have been identified by the National Flood Insurance Program (NFIP) as targeted repetitive loss properties, with two of the five categorized as severe repetitive loss properties (see Appendix A, GEMA Worksheet #3b). A repetitive loss structure is defined as one of the following: (a) structures with four or more claims paid under the National Flood Insurance Program of at least \$1,000 per occurrence; (b) structures with two or more claims in 10 years with the cumulative damages exceeding the value of the property, or; (c) structures with three or more claims with the cumulative damages exceeding the value of the property. A Severe Repetitive Loss Structure is either a structure with four or more claims of at least \$5,000 per occurrence, or a structure with two or more claims within 10 years with the cumulative damages of the claims exceeding the market value of the structure.

According to the Bibb County Tax Assessors Office, the total value of these five properties is in excess of \$688,000. Macon-Bibb County EMA and City of Macon officials have been in discussions with GEMA Hazard Mitigation Planners regarding possible mitigation options regarding these properties.

Flood loss estimation is an approximate effort, at best. Direct loss to infrastructure, critical facilities and businesses in terms of repair and replacement is relatively easy to define. However, estimating indirect costs can present significant challenges. During the update of the plan, the planning committee elected to use the same methodology employed during the development of the original Pre-Disaster Mitigation Plan. Specifically, function loss for each critical facility is determined by adding functional downtime to displacement time/costs. In determining which individual critical facilities would sustain the largest potential losses, the planning committee considered the structure loss, the content loss, and function loss for each facility.

It should also be noted that Bibb County has over 2,900 agricultural acres in flood prone areas with an estimated crop value of \$1.25 million. Bibb County could potentially lose as much as 14% of its total annual crop yield if a major flood event were to occur during the growing season. Newly constructed facilities and infrastructure will be evaluated and included in all future plan updates.

During the update of the Bibb County Pre-Disaster Mitigation Plan, the planning committee felt it would be beneficial to examine land use and development issues as they relate to mitigation planning for flood hazard events. Bibb County, the City of Macon both participate in the National Flood Insurance Program. Due to a lack of revenue and resources, Payne City does not participate in the program, however; there are no known flooding risks or vulnerabilities in Payne City, in that there are no floodplains located in Payne City. It should be noted that Payne City is an extremely small municipality, completely surrounded by the City of Macon; actually a “city within a city.” With a population of only 164 residents and one part-time city employee, all community services are provided through agreements with the City of Macon, Bibb County and the Macon Water Authority.

Both Bibb County and the City of Macon have enacted flood damage prevention ordinances. Within the City of Macon and Bibb County are areas that are identified as being within flood hazard districts. No zoning permit may be issued until a floodplain development permit has been obtained from either the City of Macon or Bibb County. Additionally, manufactured homes (mobile homes) are not allowed within a floodway except in existing manufactured home parks or subdivisions. All construction must adhere to the Georgia State Minimum Standard Codes. The minimum standards established by these codes provide reasonable protection to persons and property within structures that comply with the regulations for most natural hazards. Specific mitigation goals, objectives and action steps related to flooding vulnerability are found in Chapter 4.

**Summary of Changes:** Hazard history and frequency data related to flooding was updated from the original plan; probability of future occurrences was adjusted accordingly; maps were created utilizing the Georgia Mitigation Information System (GMIS); repetitive loss properties were researched and analyzed as part of the risk assessment; vulnerability in terms of dollar values and/or percent of damage was updated; a new analysis of land use, development trends and existing ordinances and regulations was accomplished; flooding susceptibility for each jurisdiction was re-examined via GMIS on-line tool.

## **II. Tornado** (see Appendix A for hazard area map and related data)

During update of the plan, the committee reviewed historical data from the NCDC, the Georgia Tornado Database, and the Tornado History Project to determine the past effects of tornados. A tornado is a violently rotating column of air extending from a thunderstorm cloud to the ground. The most violent tornados are capable of tremendous destruction, in some cases extreme devastation, with wind speeds that can exceed 250 miles per hour. Damage paths can be of varying widths up to and exceeding one mile, with the length of the path up to fifty miles long. Tornados are the most unpredictable and destructive of all weather phenomena that affect Bibb County. Tornado season in Georgia typically runs from March through August; however, tornados can strike at any time of year if the deadly atmospheric conditions are present.

As no one can predict when or where a tornado might touch down, all of Bibb County is vulnerable to the threat of a tornado. There are no significant differences between the county and the Cities of Macon and Payne City in terms of the risks and vulnerabilities associated with tornados. Because of the infrequency in which tornados actually touch down, data is not sufficient to make a reliable determination regarding frequency of occurrence, or future probability of occurrence, for each individual jurisdiction within Bibb County.

In the past fifty-eight years, the touch down of fifteen tornados has been verified in Bibb County (see *Hazard Frequency Table* in Appendix D). Additionally, the county has experienced countless tornado watches during this same time period. Trend analysis indicates that a tornado will touch down in Bibb County every 3.87 years. This equates to a 25.86% chance of a tornado touching down in Bibb County in any given year.



Tornadoes tend to strike in somewhat random fashion, making the task of reliably calculating a recurrence interval extremely difficult. The damage potential associated with a tornado is extremely high. In 2008, a Category F2 tornado (Significant Tornado, 113-157 mph) touched down in Bibb County. The tornado, referred to as the Mother's Day Tornado, because it struck on May 11, 2008 – Mother's Day, inflicted \$4.5M in damages to Bibb County and the City of Macon. The campus of Macon State College alone lost in excess of 3,900 trees and incurred approximately \$3.4M in repair and cleanup costs.

The Fujita Scale is typically used to rate the intensity of a tornado by examining the damage caused by the tornado after it has passed over man-made structures. The scale ranges from F0 to F6 with an F0 tornado having wind speeds of 40-72 mph and damage typically minor (e.g. damage to chimneys; tree branches broken; shallow-rooted trees pushed over; and damage to signs). The other end of the scale is represented by an F6 tornado, with wind speeds between 319 and 379 mph and capable of lifting automobiles into the air and completely destroying buildings.

Historical data indicates that Bibb County has experienced three F0 tornados, five F1 tornados, four F2 tornados and three F3 tornado since 1952. With this in mind, Bibb County can reasonably expect the extent of damage resulting from most tornados to be characterized primarily by roof damage, mobile homes pushed off of foundations or overturned, and damage to trees, utility poles and sign posts.

Although infrequent, the potential devastation associated with a tornado dictates appropriate mitigation measures. It can be assumed that all facilities within Bibb County could be damaged by a tornado as such weather events are indiscriminate as to when or where they strike. An obstacle to accurate loss estimation is the fact that losses may vary widely even within one category of natural hazard, depending on place and location. For instance, a tornado may hop from one location to another in a primarily rural area of the county, creating virtually no economic damage, whereas a similar hazard event in an urban area might create millions of dollars in damages. Compounding this obstacle to accurate loss estimation is that tornados range considerably in their intensity and duration. Utilizing a straight-lined method for estimating losses, it can be assumed that structures with the greatest replacement value will be the structures that sustain the most monetary damage.

Operating on the assumption that a facility would sustain at least 75% damage in the event of a tornado, some of the more vulnerable facilities from a monetary standpoint are Mercer University, Macon State College, Wesleyan College, and the Macon Centreplex, which includes Macon City Auditorium, Macon Coliseum and Convention Center. Businesses susceptible to significant monetary damage include Government Employees Insurance Company (GEICO), and the Macon Mall (see GMIS Critical Facility Inventory Report in Appendix A). In addition, facilities with vulnerable populations include Coliseum Medical Center, the Medical Center of Central Georgia, several nursing homes and personal care homes, as well as over 60 public and private schools located

throughout Bibb County. GEMA Worksheet #3a in Appendix A reflects totals for types of assets, their values, and local populations exposed to tornados.

All of Bibb County has the same design wind speed as indicated by *FEMA How-to Guide #2: Understanding Your Risks* and the Georgia Mitigation Information System (GMIS). Additionally, the entire county has the potential to be affected by a tornado. As a result, any steps taken to lessen the effect of a tornado should be undertaken at a county-wide level to ensure that the most stringent regulations are in place for protecting vital facilities and infrastructure within the community. Bibb County is located in wind zone III, which is associated with 200-mph wind speeds. The county currently has no land use or development trends related specifically to tornados. Existing building codes do not require structures to meet or exceed design wind speeds of 200 mph, however, construction must adhere to the Georgia State Minimum Standard Codes. The minimum standards established by these codes provide reasonable protection to persons and property within structures that comply with the regulations for most natural hazards.

Land use and development trends were examined and discussed, but were determined to be not overly relevant to mitigation planning for tornados. This is due to a tornado's propensity to strike anywhere within the county and with varying degrees of severity. Developing around or away from a tornado is not feasible.

Overall, Bibb County has high exposure to potential damage from tornados. Should a tornado hit certain portions of the county that are highly concentrated with homes or any of the critical facilities identified, significant damage could occur, depending on the strength and duration of the event. However, the planning committee determined that due to the indiscriminate nature of tornados, mitigation activities should be applicable to the entire planning area.

**Summary of Changes:** Hazard history and frequency data related to tornados was updated from the original plan; probability of future occurrences was adjusted accordingly; changes in land use and development trends were examined for applicability; GMIS on-line tool was utilized for mapping and analysis.

**III. Drought** (see Appendix A for hazard area map and related data)

The Bibb County Pre-Disaster Mitigation Planning Committee again reviewed historical data from NCDC, the Georgia Department of Natural Resources and the Georgia Forestry Commission in order to fully evaluate drought conditions in Bibb County. By definition, drought is a prolonged period of moisture deficiency. Drought conditions affect the cultivation of crops, as well as water availability and water quality. Drought is also a key factor in wildfire development. Drought conditions make natural fuels (grass, brush, trees, dead vegetation, etc.) more fire-prone. Several areas of Bibb County are made up of forest and woodlands.

Bibb County, as well as the State of Georgia and much of the southeast, has been mired in a drought for much of the past decade. During these climatically challenging times, agricultural crops have experienced damage throughout the county and the southeast.

Drought conditions are potentially threatening in many regards to the health and well-being of Bibb County's residents.

Data on drought conditions is available through the National Climatic Data Center, but it is difficult to ascertain its usefulness. Many of the recorded occurrences are for the same sustained period of drought, making the numbers somewhat misleading. Because of the conflicting data that is available, it is difficult to determine how often drought conditions can be predicted within Bibb County.

During droughts, the community is exposed to several potentially harmful situations. Water levels can drop dangerously low as evidenced in 2001-2002 and again in 2006-2007. Additionally, dry grass and underbrush increase the threat of fire to a dangerous level. Fortunately, Bibb County has been spared from any wildfire activity destroying numerous acres and real estate. Most significantly, however, agricultural products grown within the county have sustained the most damage during drought. To date, agricultural losses have been the primary losses associated with drought as no critical facilities have sustained any damage or downtime due to dry weather.

As there are no available records that indicate any damage to critical facilities resulting from drought, the assumption is made that this is a trend that has a reasonable chance of continuing. Dry weather typically does not harm structures; however, fires can occur as a result of dry weather. Therefore, the Bibb County Pre-Disaster Mitigation Committee concurred with the findings of the original plan that drought represents no credible threat to critical facilities.

Since no damage is anticipated to critical facilities as a result of droughts, then the estimated losses to critical facilities is still considered to be \$0. Crop damage cannot be accurately quantified due to the fact that different crops require different amounts of rain and different temperature requirements. Additionally, duration of the drought and the severity of the drought are other variables that preclude accurately identifying a cost associated with crop damage.

With drought having little to no impact on facilities, and no reported instances of significant wildfire activity resulting from drought, agricultural losses are most likely to extend from drought conditions. While difficult to quantify a monetary impact, historical data indicates that most periods of drought in Bibb County have been short in duration, typically lasting a single growing season. This same data suggests that the extent of drought typically felt in Bibb County would be classified as moderate with periodic droughts (lasting over multiple seasons) considered significant or severe.

From a land use perspective, Bibb County currently has no land use or development trends related to drought conditions. Land use codes do require that firebreaks be utilized in areas susceptible to wildfires. An examination of Bibb County indicates that less concentrated areas of the county are more vulnerable to experience agricultural losses associated with drought. As there is more agricultural land located within unincorporated Bibb County, the likelihood of damage sustained to crops is much greater than within the

Cities of Macon and Payne City. However, being more concentrated does not exclude an area from having losses associated with drought conditions.

After careful consideration, the Bibb County Pre-Disaster Mitigation Planning Committee has determined that the financial damage associated with drought should be minimal to any facilities or vital infrastructure within the county (see Appendix A, GEMA Worksheet #3a). Vulnerability exists for agricultural commodities, but quantifying the vulnerability is not possible due to the different variables discussed above. While crop damage resulting from drought is primarily confined to agricultural areas of the county, water shortages impact all Bibb County residents. Therefore, the planning committee determined that any potential mitigation measures should target the entire planning area.

Droughts do not have the immediate effects of other natural hazards, but sustained drought can cause severe economic stress to not only the agricultural interests in Bibb County, but to the entire State. The potential negative effects of sustained drought are numerous. In addition to an increased threat of wildfires, drought can affect municipal and industrial water supplies, stream-water quality, water recreation facilities, hydropower generation, as well as agricultural and forest resources.

**Summary of Changes:** Hazard history and frequency data related to drought was updated from the original plan; probability of future occurrences was adjusted accordingly; changes in land use and development trends were examined for applicability; GMIS on-line tool was utilized for mapping and analysis.

#### **IV. Thunderstorm Winds** (see Appendix A for hazard area map and related data)

The Bibb County Pre-Disaster Mitigation Planning Committee again utilized NCDC data to research the historical impact of thunderstorm winds within the county during the update process. Thunderstorm winds are generally short in duration involving straight-line winds and/or gusts in excess of 50 miles per hour. Thunderstorm winds tend to affect areas of the county with significant tree stands, areas with exposed property and infrastructure, and above ground utilities. Thunderstorm winds can cause power outages, cause transportation and economic disruptions, significant property damage, and pose a high risk for injuries or loss of life.

There are no significant differences between the county and the Cities of Macon and Payne City in terms of risks and vulnerabilities associated with thunderstorm winds. Existing data is not suitable or sufficient to make a reliable determination regarding frequency of occurrence, or future probability of thunderstorm winds for each individual jurisdiction within Bibb County. As illustrated in the wind hazard maps found in Appendix A, the entire county, including Macon and Payne City, has the same Wind Hazard Score. With a Wind Hazard Score of 2, Bibb County residents can typically expect 90 to 99 mile per hour winds during thunderstorm events. The Wind Hazard Score is reflective of the 2000 International Building Code.

Data substantiates the fact that the most prevalent hazard events occurring in Bibb County are thunderstorm winds. During spring and summer seasons, the county typically experiences countless thunderstorms, some packing significant winds. As a result of these winds, properties are often damaged, whether from roofs blowing off, trees being downed or loose debris.

Since 1950, 163 thunderstorm and high wind events have been recorded in Bibb County (see *Hazard Frequency Table* in Appendix D). While many of these thunderstorm wind events have been recorded within the past twenty years (113 events), this is primarily due to more accurate record keeping. In the same fifty-eight year period, twenty-seven injuries and nine deaths have been attributed to thunderstorm winds in Bibb County. On average, three thunderstorms each year produce winds strong enough to inflict significant damage to facilities within the county. As previously indicated, severe thunderstorm winds occur more frequently than any other natural hazard event within Bibb County. When considering the probability of future occurrence, NCDC data indicates that Bibb County and its two municipalities have a staggering 280 percent chance of at least one thunderstorm occurring each year.

In evaluating assets that are susceptible to thunderstorm winds, the committee concurred with the findings documented in the original plan that all critical facilities, as well as all public, private and commercial property, is susceptible to thunderstorm winds (see Appendix A, GEMA Worksheet #3a). However, there are varying degrees of vulnerability based upon the type of structure and its location. The planning committee again used a straight-line method for estimating losses, with some of the county's school facilities being the most likely to be impacted by damage sustained from thunderstorm winds; specifically, Southwest High, Central High, and Appling Middle School (see GMIS Critical Facility Report in Appendix A).

Overall, thunderstorm winds pose one of the greatest threats to the livelihood of citizens in Bibb County. As thunderstorms tend to "pop-up" anytime and anywhere, this hazard poses a serious threat to both lives and property and impacts the entire planning area. As with tornados, the planning committee determined that limiting land use and development was not useful in preparation for thunderstorm winds, but because it is the most frequent hazard that affects Bibb County, it is recommended that specific attention be given to ensure that structures within Bibb County are built to appropriate code standards. Presently, Bibb County has building codes which regulate the construction of new facilities within the county; however, fallen trees and limbs can still inflict significant damage to any facility.

***Summary of Changes:*** Hazard history and frequency data related to thunderstorm winds was updated from the original plan; probability of future occurrences was adjusted accordingly; changes in land use and development trends were examined for applicability; GMIS on-line tool was utilized for mapping and analysis.

## V. **Lightning** (see Appendix A for hazard area map and related data)

During the update of the Bibb County Pre-Disaster Mitigation Plan, the Planning Committee researched historical data from the National Climatic Data Center and the Georgia Forestry Commission relating to lightning strikes in Bibb County. By definition, all thunderstorms are accompanied by lightning. The electrical charge from lightning can potentially be as much as 100 million volts. Lightning strikes proceed from cloud to cloud, cloud to ground, or where high structures are involved, from ground to cloud. Lightning strikes in Bibb County are most prevalent during summer months, coinciding with thunderstorm season.

Lightning associated with thunderstorms occurs frequently within the county, as does strikes on structures and facilities. As a result, property owners incur personal property damage. Lightning, as with many of the hazards identified in this plan, can strike anywhere and at any time. There are no significant differences between the county and the Cities of Macon and Payne City in terms of the risks and vulnerabilities associated with lightning. Existing data is not suitable or sufficient to make a reliable determination regarding frequency of occurrence, or future probability for each individual jurisdiction within Bibb County.

NCDC reports seven lightning events occurring since 1995, despite the fact that “local knowledge” indicates many more instances (see *Hazard Frequency Table* in Appendix D). Realizing that it is extremely difficult to have documentation of every lightning strike within the community, the committee recognized the need to rely on both local knowledge and historical data in evaluating the impact of lightning. Utilizing the best data available, however, it can be inferred that lightning can be expected to hit Bibb County once every 8.29 years. Calculating that all seven of the recorded events occurred within the past 20 years, the recurrence interval is reduced to one lightning strike every 2.86 years. One could also assume that lightning would damage either a structure or vegetation in approximately fifty percent of the recorded strikes.

Lightning can cause varying degrees of damage to a facility should it be hit. Most common damage is from lightning running in and destroying electrical equipment (contents of facilities) and starting fires in the structure that is hit. Additionally, during drought-like conditions, lightning strikes in dry, wooded areas can cause ignition of natural fuels, producing brush and wildfires.

GEMA Worksheet #3a and GMIS Critical Facility Inventory Reports found in Appendix A help to illustrate the potential monetary impact to the community. Some of the high-cost critical facilities subject to lightning damage include the community’s many schools and educational facilities, valued at over \$250 million. Worksheet 3a reflects a total of 113,354 structures vulnerable to lightning strikes valued at over \$3 billion.

Land use and development trends were examined and discussed, but were considered by the planning committee as not applicable to mitigation planning for lightning. As with tornados, lightning’s propensity to strike anywhere within the county negates limiting land use or development as a means of mitigation.

Currently, all newly constructed facilities within Bibb County are to be properly grounded to minimize the devastating effect of lightning strikes. Although all lightning strikes cannot be avoided, properly grounded facilities can minimize the effect should lightning strike a location. Bibb County does not currently require lightning rods to be installed on critical facilities or private structures.

Despite the fact that documentation is only available to indicate a very few lightning strikes within the county, this hazard causes more damage than one might imagine. The Macon-Bibb Fire Department can provide evidence that numerous structures in the community have been damaged due to lightning. This evidence is much more indicative of the extent to which lightning threatens and impacts the community than the few recorded instances reported by NCDC. Local officials estimate at least 25 lightning strikes to structures having occurred within the last three years, with damage to structures and electrical components estimated in excess of \$20,000. This data suggests that the extent in which lightning impacts Bibb County is a great deal more significant (average of 8.3 strikes per year) than what is reflected in recorded data. With such a high number of strikes occurring each year, any single incident could potentially result in a large structural fire and resulting property damage. The Pre-Disaster Mitigation Committee recognizes this is a harmful event in the community and measures should be taken to lessen its effects over the entire planning area.

***Summary of Changes:*** Hazard history and frequency data related to lightning was updated from the original plan; probability of future occurrences was adjusted accordingly; changes in land use and development trends were examined for applicability; GMIS on-line tool was utilized for mapping and analysis.

## **VI. Winter Storms** (see Appendix A for hazard area map and related data)

The Bibb County Pre-Disaster Mitigation Planning Committee researched historical data from NCDC, local newspapers, and local knowledge to arrive at historical winter storm events during the update of the plan. In addition to snow, winter storms bring the threat of freezing rain and ice storms to Bibb County. A heavy accumulation of ice, especially when accompanied by high winds, devastates trees and power lines. When ice forms on sidewalks, streets, roads, or highways, each becomes extremely hazardous to pedestrians and motorists in Bibb County. There are no significant differences between the county and the Cities of Macon and Payne City in terms of the risks and vulnerabilities associated with winter storms. Data is simply not suitable or sufficient to make an accurate assessment regarding frequency of occurrence, or future probability for each individual jurisdiction within Bibb County.

Research indicates that Bibb County has experienced significant snow or ice approximately once each decade. Bibb County, like much of Middle Georgia, does not have equipment necessary to keep the community functional in the event of a massive winter storm. When these types of storms occur, the community is crippled in many cases. NCDC and local newspapers indicate six winter storm incidents in the past fifty-

eight years (see *Hazard Frequency Table* in Appendix D). There is a 10.34 percent chance of a winter storm impacting Bibb County in any given year. This equates into one winter storm every 9.67 years.

Unlike most natural hazards that typically threaten both people and property, winter storms often expose primarily people to the greatest risk. GEMA Worksheet #3a in Appendix A depicts the total number of structures, the value of those structures and the population exposed to the winter storm hazard. While damage to buildings resulting from winter storms is minimal, it is important to note that approximately 276,822 people either reside, work in, or visit these structures on a daily basis and are vulnerable to the effects of winter storms.

Winter storms, unlike other natural hazards, typically afford communities some advance warning. The National Weather Service issues winter storm warnings and advisories as these storms make their way south. Unfortunately, even with advance warning, some of the most destructive winter storms have occurred in the southern United States, where buildings, infrastructure and crops are not typically designed to sustain severe winter conditions. Also, motorists not accustomed to driving in snow and icy conditions pose an additional danger on roads and highways.

In 1973, Bibb County was shut-down due to approximately 18 inches of snow that fell in one day. Ten years later, in January 1983, Bibb County was struck with another significant snowstorm. In March of 1993, another winter storm consisting of significant amounts of ice hit Bibb County producing icy conditions along roads and downing power lines in the county. The community has also documented a two-inch snowstorm that hit Bibb County in January of 2002 causing dangerous travel conditions over a twenty-four hour period. These events are fairly infrequent, and therefore, it is impractical for Bibb County to procure and maintain the necessary equipment to address such weather conditions. Additionally, land use and development trends were analyzed, but were determined to be not applicable to mitigation planning due to the nature of winter storms (encompasses the entire planning area) and their infrequent occurrence.

The extent to which the community is vulnerable to this hazard is evident when examining snow and ice accumulations from previous storms. As stated, this is an infrequent hazard event, however; accumulations have averaged between 3-5 inches. This is exceptionally high for the middle Georgia region and the problem is exasperated due to the lack of snow and ice removal equipment. As little as one half-inch of accumulation can wreck havoc on the community.

Within the county, damage to facilities is caused primarily by downed trees and power lines crashing into or falling onto facilities. Consequently, gaping holes are created in the structure or fires are ignited as a result of the severe weather. Also, during times of snow and ice, generally associated with very cold temperatures, persons with inadequate heat have a tendency to try warming their homes at all costs, which frequently results in structure fires as the heat source ignites flammable materials. Winter storms are typically short in duration, and the damage associated with them is often minimal, particularly to



critical facilities (see GMIS Inventory Report in Appendix A for possible monetary damages); however, the potentially crippling affect this hazard poses, necessitates mitigation measures being undertaken to lessen its impact.

***Summary of Changes:*** Hazard history and frequency data related to winter storms was updated from the original plan; probability of future occurrences was adjusted accordingly; changes in land use and development trends were examined for applicability; GMIS on-line tool was utilized for mapping and analysis.

### **CHAPTER 3: TECHNOLOGICAL HAZARD, RISK & VULNERABILITY** **SUMMARY**

#### **I. Hazardous Materials Spills** (see Appendix A for hazard area map and related data)

In an effort to expand the scope of this plan, the Bibb County Pre-Disaster Mitigation Planning Committee set out to integrate technological or “human-caused” hazards into the planning process. The term, “technological hazard” refers to incidents resulting from human activities such as the manufacture, transportation, storage, and use of hazardous materials. This plan assumes that hazards resulting from technological sources are accidental, and that their consequences are unintended. Research has determined that only one technological hazard (hazardous material spills) poses a direct, measurable threat to Bibb County.

During the update of the Plan, the Bibb County Pre-Disaster Mitigation Planning Committee reviewed historical data from the Environmental Protection Division of the Georgia Department of Natural Resources in their research involving hazardous material spills in Bibb County. A major source of hazardous spills is along roadways, highways and railways. Hazardous materials are substances that are harmful to the health and safety of people and property. Facilities that produce, process or store hazardous materials are at risk, as are facilities that treat or dispose of hazardous waste.

Statistically, there are no significant differences between the county and its two municipalities (Macon and Payne City) in terms of the risks and vulnerabilities associated with hazardous material spills. However, Macon’s population, as a percentage, is less at risk to a rail-related hazardous materials spill than the population of Payne City, due to a rail line running directly through Payne City and its small population. Hazardous material spills occur rather frequently within Bibb County. Over one third of the recorded spills in Bibb County have been transportation related. This is directly attributable to the presence of three Interstate Highways (I-75, I-475 and I-16) running through portions of the county and the City of Macon. During the past sixteen years there have been a total of 105 recorded spills in Bibb County. Thirty-one of the spills were transportation related with seventy-four being fixed location spills. Bibb County has a stunning 462.50% chance of a fixed location hazardous material spill and a 193.75% chance of a transportation related hazardous material spill occurring in any given year (see *Hazard Frequency Table* in Appendix D).

Data was obtained from the Toxics Release Inventory (1987 – 2005) and the Hazardous Site Response Notification database made available by the Georgia Department of Natural Resources, Environmental Protection Division. While the data was analyzed to determine noteworthy differences between the county and the city in terms of the risks and vulnerabilities associated with hazardous materials spills, no clear patterns emerged. Existing data is not suitable or sufficient to make a reliable determination regarding frequency of occurrence, or future probability of hazardous materials spills related to each individual jurisdiction within Bibb County.

The most vulnerable asset exposed to hazardous material spills is often the environment, with waterways being the most impacted. Research indicates that the waterway most often impacted by hazardous material spills in Bibb County, is the Ocmulgee River. Recorded data indicates that transportation related spills contribute to most of the waterway contaminations. There are no facilities or industries in Bibb County that produce extraordinarily large amounts of hazardous materials. Historical data indicates most fixed location spills have been minor in nature, consisting of diesel, mineral oil, or gasoline spills.

It is difficult to determine the damage to the environment associated with hazardous material spills. Bibb County has no recorded instances of critical facilities or other property being damaged as a result of hazardous material spills. All critical facilities within the county are susceptible to experiencing downtime due to hazardous materials spills. Persons occupying certain critical facilities may be forced to evacuate the premises should spills of certain substances occur in close proximity to the structure, thus creating downtime at the facility. Additionally, some of the facilities have potentially harmful substances stored on site. Should these materials be spilled, the potential exists for damage to property, as well as evacuations due to the contaminants.

The potential extent of this hazard on the planning area is difficult to quantify. Each potential spill would be unique in its magnitude and severity. Past data and information does not allow for an accurate profile of this hazard event, however; the important thing to keep in mind is the potential catastrophic nature of this technological hazard and the need for the community to be prepared and vigilant. GEMA Worksheet 3a and the GMIS Critical Facility Inventory Reports located in Appendix A, help to illustrate the sheer number of buildings, infrastructure and people exposed to this hazard on a daily basis.

There are no specific regulations that can prevent the spill of hazardous materials within the county boundaries. However, mitigation measures can be taken to help ensure that vital natural resources and critical facilities are adequately protected in the event of a hazardous materials spill. Land use and development trends were examined for possible application related to hazardous materials spills and mitigation measures. With continued residential and commercial development occurring in Bibb County, best management practices should be followed in relation to minimizing the impact of hazardous materials spills on residences, businesses and environmentally sensitive areas. Examples include: using infrastructure availability to steer certain types of development (those prone to hazardous materials spills) away from areas of natural, cultural, historic and environmentally sensitive resources; using appropriate setbacks to minimize risks to citizens and businesses from transportation-related hazardous materials spills; developing general policies and protection measures for those industries/developments that use, store or transport hazardous materials.

***Summary of Changes:*** Hazard history and frequency data related to hazardous materials spills was updated from the original plan; probability of future occurrences was adjusted accordingly; changes in land use and development trends were examined for applicability; GMIS on-line tool was utilized for mapping and analysis.

## **CHAPTER 4: LOCAL NATURAL HAZARD MITIGATION GOALS & OBJECTIVES / COMMUNITY MITIGATION GOALS, POLICIES & VALUES**

This chapter identifies a series of community goals, objectives and action steps pertaining to each of the natural hazards identified in Chapter 2. As part of the update process, the planning committee performed a comprehensive review of the goals, objectives and strategies listed in the original plan. The committee also discussed overall community mitigation goals and values to ensure consistency with those identified for each natural hazard. Existing policies, regulations, ordinances and land use were examined for applicability; new and/or projected development, to include buildings and infrastructure, was researched and given consideration.

The planning committee also revisited the STAPLEE Criteria (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) in evaluating alternative mitigation actions (see GEMA Worksheet #4 in Appendix D). Finally, adjustments were made as necessary to those goals, objectives and action steps that were re-evaluated and determined to still be valid; new goals, objectives and action steps were added where applicable. Each hazard is followed by a summary of changes resulting from the plan update initiative.

The Planning Committee also identified and validated several methods of public education and awareness regarding natural hazard mitigation. All public information efforts are aimed at keeping the citizens of Bibb County fully engaged in the implementation and periodic maintenance of this mitigation plan. Many of these education and awareness tools are multi-hazard in nature and include the following: implementing a countywide crisis alert or notification system, distribution of informational brochures or pamphlets, public and private sector briefings, workshops and demonstrations, Public Service Announcements, etc.

The section that follows (as well as corresponding section in Chapter 5) serves as the Bibb County Mitigation Action Plan. Each natural and technological hazard is described along with relevant goals and objectives. Specific action steps designed to achieve each objective are identified, along with the agency or department responsible for implementation. An estimated cost is provided as well as various funding mechanisms, the affected jurisdiction(s), a projected timeline towards implementation, the priority of the action as determined by the Pre-Disaster Mitigation Planning Committee, and finally the status of the action or project.

**I. Flooding** – As previously stated (see Chapter 2, Section I), flooding has caused considerable damage within Bibb County over the past half century. The update committee concurred with the original planning document that due to the presence of three substantial bodies of water located in Bibb County (the Ocmulgee River, Lake Tobesofkee and Lake Wildwood), as well as the presence of six high hazard dams (Lake Wildwood Dam, Lakeside Dam, Fenley Ryther Dam, VFW Lake Dam, Durr Dam and Fowler Lake Dam) efforts to reduce the level of exposure to flooding should be considered. In previous flooding instances, damage has been sustained to roads, bridges, natural resources, public facilities, as well as private homes and businesses.

The mitigation goals and objectives identified for flooding are also consistent with the overall community mitigation goal of making Bibb County and its municipalities less vulnerable to the effects of natural hazards through development of a coordinated mitigation strategy. A part of this coordinated mitigation strategy is the current and continued participation of Bibb County and the City of Macon in the National Flood Insurance Program (NFIP). As noted previously, a lack of revenue and resources prevents Payne City from participating in the NFIP. With Payne City not located within a floodplain, there is no corresponding risk or vulnerability to flooding.

The Bibb County Pre-Disaster Mitigation Planning Committee considered a range of mitigation options related to flooding and identified both structural and non-structural mitigation measures to ensure that the community adequately tackles all relevant issues. This may result in alteration to current policies/practices, land use applications and building codes, if deemed necessary. With 62 entries on the National Register of Historic Places, the Planning Committee recognizes the importance of considering these valuable assets in developing appropriate and effective mitigation strategies. The mitigation goals, objectives and action steps identified here are all a part of the community’s ongoing strategy for ensuring continued compliance with the National Flood Insurance Program. Mitigation goals, objectives and action steps for flooding, as determined by the committee, are as follows:

**Mitigation Goal #1: To minimize losses of life and property due to flooding in Bibb County and the Cities of Macon and Payne City.**

***Objective #1: To protect critical facilities, roads and bridges, businesses, residential property and vulnerable populations from the effects of flooding.***

**Action Step #1:** Address stormwater management and drainage issues throughout the county and as applicable in each of the two municipalities.

Responsible Department or Agency: Public Works / Engineering  
Anticipated Cost: \$5M - \$7.5M (\$1,680,000 – Bibb County; \$5M – City of Macon)  
Existing & Potential Funding Sources: Grant/Loan Assistance, SPLOST  
Jurisdiction: Bibb County & the Cities of Macon and Payne City  
Timeframe: 2015  
Priority: High

Status: Active

**Action Step #2:** As a NFIP compliance strategy component, seek to buyout and remove any flood prone properties as applicable.

Responsible Department or Agency: Bibb County / City of Macon

Anticipated Cost: \$300-\$500K / Staff Time

Existing & Potential Funding Sources: GEMA/FEMA

Jurisdiction: Bibb County, City of Macon

Timeframe: 2015

Priority: Low

Status: New

**Action Step #3:** As a NFIP compliance strategy component, ensure continued enforcement of all floodplain management ordinances and regulations.

Responsible Department or Agency: Bibb County / City of Macon

Anticipated Cost: Staff Time

Existing & Potential Funding Sources: General Revenues

Jurisdiction: Bibb County, City of Macon

Timeframe: Ongoing

Priority: High

Status: Active

**Summary of Changes:** During the update of the Bibb County Pre-Disaster Mitigation Plan, the Planning Committee elected to combine the individual stormwater management/drainage issues into a single Action Step (Objective #1, Action Step #1). This was necessitated by the fluid and changing nature of the community's stormwater management projects, particularly from a funding and priority perspective.

Additionally, the Action Step from the original plan to "*petition FEMA and the U.S. Corps of Engineers to undertake a study as to the feasibility of rerouting the Ocmulgee River at the old water pumping station*" was deleted from the Plan update. This step was deemed obsolete due to the fact that in 2009, the Amerson Water Works Park was opened at the site, and now serves as a passive recreation park along the Ocmulgee Heritage Trail. Action Steps #2 and #3 are added as a part of the community's NFIP continued compliance strategy.

**II. Tornado** – As indicated in *Chapter 2, Section II*, of all of the natural hazards profiled in this plan, tornadoes have the potential to inflict the greatest amount of damage to Bibb County. The Bibb County Pre-Disaster Mitigation Planning Committee recognizes the important role advance planning plays in the mitigation process. There is great benefit in identifying appropriate steps that can be taken to help minimize losses in the event of a tornado touching down in Bibb County.

Mother's Day 2008 will be remembered by many in Bibb County and the City of Macon for the destructive tornado that tore through the community. An F2 tornado, with wind speeds up to 130 mph, touched down near the Lizella area and then tracked northeast to the shore of Lake Tobesofkee, continuing on into the City of Macon. The tornado did not produce a continuous path, but did produce sporadic areas of major damage. The most significant damage occurred in the City of Macon along Eisenhower Parkway and Pio Nono Avenue where two businesses were destroyed and several others sustained heavy damage. Macon State College was also hit hard by the tornado, snapping or uprooting more than 50 percent of the trees on campus and inflicting significant damage to several buildings, with the gymnasium sustaining the worst damage.

This destructive tornado, and countless tornado watches that fortunately never materialized, provide a constant reminder of the potential for tornadic activity within Bibb County. Mitigation measures identified by the committee can be used by local officials to take appropriate actions whereby the community is potentially spared future losses.

During the update process, the Planning Committee recognized that there are varied historic and special considerations that pose a challenge to the community's mitigation efforts. Bibb County lists 62 entries on the National Register of Historic Places. Some of the more prominent of these include the Ocmulgee National Monument, the Cannonball House, the Johnston-Hay House, the Grand Opera House and the Macon Downtown Historic District. Additionally, the presence of over 40 schools, 10 nursing homes, and 3 hospitals, all located within the community, represent populations particularly vulnerable to tornadoes, as well as most other natural hazards. Bibb County Schools currently employs alert and notification procedures to move students out of modular buildings (not designed to sustain strong winds) and into safer facilities when tornadoes or other high-wind hazard events threaten.

The Bibb County Pre-Disaster Mitigation Planning Committee considered a range of mitigation options related to tornadoes and identified both structural and non-structural mitigation goals, objectives and action steps. The goals and objectives identified here may result in the creation of new policies and procedures to administer implementation. Additionally, some existing policies, regulations or ordinances may need to be modified or amended.

The mitigation goals and objectives identified for tornadoes are consistent with the overall community mitigation goal of creating a safe and livable environment for all Bibb

County citizens. Mitigation goals, objectives and action steps for tornados, as determined by the committee, are as follows:

**Mitigation Goal #1: To minimize losses of life and property due to high winds from tornadoes in Bibb County and the Cities of Macon and Payne City.**

*Objective #1: To protect all Bibb County citizens from the effects of high winds from tornadoes.*

**Action Step #1:** Maintain/monitor tornado warning sirens throughout the county with a goal of 100 percent coverage.

Responsible Department or Agency: Macon-Bibb EMA

Anticipated Cost: \$2-5K annually

Existing & Potential Funding Sources: General Revenues

Jurisdiction: Bibb County and the Cities of Macon and Payne City

Timeframe: On-going

Priority: High

Status: Active

**Action Step #2:** Continue demolition of unsafe/condemned buildings located in the City of Macon and unincorporated Bibb County.

Responsible Department or Agency: City of Macon - Economic and Community Development (ECD) / Bibb County Engineering

Anticipated Cost: \$1M annually

Existing & Potential Funding Sources: Grant Programs / HUD

Jurisdiction: Bibb County and the City of Macon

Timeframe: On-going

Priority: Moderate

Status: Active

*Objective #2: To encourage protection of residential and commercial structures in Bibb County and the Cities of Macon and Payne City.*

**Action Step #1:** Encourage sheltering-in-place through the distribution of FEMA brochures through Planning & Zoning and American Red Cross functions.

Responsible Department or Agency: Macon-Bibb Planning & Zoning / Red Cross

Anticipated Cost: \$200-\$500 annually

Existing & Potential Funding Sources: Red Cross Donations, General Revenues

Jurisdiction: Bibb County and the City of Macon

Timeframe: 2011

Priority: Moderate

Status: Deferred



**Action Step #2:** Continue public education and awareness program regarding dangers posed by tornados and high winds.

Responsible Department or Agency: Macon-Bibb EMA  
Anticipated Cost: Staff Time  
Existing & Potential Funding Sources: General Revenues  
Jurisdiction: Bibb County and the Cities of Macon and Payne City  
Timeframe: On-going  
Priority: High  
Status: Active

***Summary of Changes:*** Under Objective #1, Action Step #2 Bibb County was added as a jurisdiction targeting unsafe buildings for demolition. This is as a result of several structures being severely damaged in unincorporated Bibb County during the 2008 Mother's Day Tornado. Also, during the update process, the Planning Committee elected to remove some actions steps that were included in the original Pre-Disaster Mitigation Plan, but have since been determined to be not practical or feasible. These include: ***“Identify high-density vulnerable populations (manufactured home parks) and work to construct a shelter”*** (unable to obtain property owner support); ***“Create ordinance mandating the retrofitting of existing manufactured homes (pre 1990s) to be better secured to ground”*** (not politically viable) and ***“Lobby Model Building Code Congress to include safe room in building code”*** (not politically viable).

Those action steps that remain unchanged from the original Pre-Disaster Mitigation Plan were reviewed by the Planning Committee and found to be valid and still meaningful to the community. A review of the STAPLEE criteria substantiates this finding. Although not accomplished or implemented during the past planning period, due to budgetary and/or personnel limitations, they remain relevant.

**III. Drought** – As indicated in *Chapter 2, Section III*, drought conditions can prove costly to Bibb County due to the agricultural crop damage that results. However, from a danger or hazard perspective, the greatest threat posed by drought conditions is from potential wildfires. There are several areas of the county made up of forest and woodlands. The possibility for wildfires is distinct and poses a significant threat to the county. Forest fires are generally the result of dry conditions combined with lightning or carelessness; a disturbing convergence of three different natural hazards. During the update of the Plan, the Committee determined that little can be done to mitigate the effects of severe drought, whereas drought inflicted wildfires can be mitigated to a certain extent.

The Plan update committee identified several non-structural mitigation measures in hopes of minimizing the potentially destructive effects of drought-inflicted wildfires. The planning committee's focus is on the preservation of life and property, with particular emphasis on vulnerable populations and critical facilities. This may result in modifications to current policies and the implementation of local ordinances to ensure suggested mitigation measures are initiated. Specific mitigation goals, objectives and action steps for drought inflicted wildfires, as determined by the committee, are as follows:

**Mitigation Goal #1: To minimize losses of life and property in Bibb County due to wildfires resulting from drought conditions.**

***Objective #1: To protect critical facilities and vulnerable populations from the effects of wildfires resulting from drought conditions.***

**Action Step #1:** Identify critical facilities in wildfire hazard areas and develop protective action plan.

Responsible Department or Agency: Macon-Bibb Fire Department

Anticipated Cost: Staff Time

Existing & Potential Funding Sources: General Revenues

Jurisdiction: Bibb County and the City of Macon

Timeframe: 2010

Priority: Moderate

Status: Deferred

***Objective #2: To encourage protection of residential and commercial structures.***

**Action Step #1:** Encourage minimum width private road & driveway standards to allow emergency vehicles access, as well as to decrease grades at stream crossings for the same effect.

Responsible Department or Agency: Macon Bibb P&Z

Anticipated Cost: Staff Time

Existing & Potential Funding Sources: General Revenues

Jurisdiction: Bibb County

Timeframe: On-going  
Priority: Moderate  
Status: Active

**Action Step #2:** Educate existing homeowners in the County during Fire Fund solicitation; assess and inform of driveway issues.

Responsible Department or Agency: Macon-Bibb Fire Department  
Anticipated Cost: Staff Time  
Existing & Potential Funding Sources: General Revenues  
Jurisdiction: Bibb County  
Timeframe: On-going  
Priority: Moderate  
Status: Active

**Action Step #3:** Distribution of pamphlets to homeowners on clearing underbrush a safe distance from the house.

Responsible Department or Agency: Macon-Bibb EMA / Fire Department  
Anticipated Cost: \$500 / Staff Time  
Existing & Potential Funding Sources: General Revenues  
Jurisdiction: Bibb County and the City of Macon  
Timeframe: 2012  
Priority: Moderate  
Status: Deferred

**Summary of Changes:** No changes. The goals, objectives and actions steps remain unchanged from the original Pre-Disaster Mitigation Plan. They were reviewed by the Planning Committee and found to be valid and still meaningful to the community. A review of the STAPLEE criteria substantiates this finding. Although not accomplished or implemented during the past planning period, due to budgetary and/or personnel limitations, they remain relevant.

**IV. Thunderstorm Winds** – It should be noted that many of the goals, objectives and related action items associated with tornados also pertain to thunderstorm winds. Tornados are much more destructive and less frequent than thunderstorm winds, but both pose the same threats to Bibb County citizens. Thunderstorm winds are the most frequently occurring natural hazard in the county and have the greatest chance of affecting the county each year (see Chapter 2, Section IV). Surprisingly, of all of the natural hazards profiled in this plan, thunderstorm winds have resulted in the greatest number of recorded deaths over the 58-year history studied. The citizens of Bibb County may not be aware of just how deadly this hazard is. The mitigation goals, objectives and action steps identified for both tornados and thunderstorm winds provide for a viable mitigation strategy to reduce, or avoid, long-term vulnerabilities associated with these hazards.

On average, three severe thunderstorms strike Bibb County each year that are capable of causing significant structural and property damage. Although heavy thunderstorm winds do not routinely affect critical facilities within the community, there is a real threat posed to these facilities as, primarily, roofs and windows could be damaged. During the update process, the planning committee agreed that mitigation measures could be undertaken to help minimize the affects of thunderstorm winds on the community.

The mitigation goals, objectives and action steps identified for thunderstorm winds are consistent with the overall community mitigation goal of creating a safe and livable environment for all Bibb County citizens. Mitigation goals, objectives and action steps for thunderstorm winds, as determined by the committee, are as follows:

**Mitigation Goal #1: To minimize losses of life and property due to high winds from thunderstorms in Bibb County and the Cities of Macon and Payne City.**

***Objective #1: To protect citizens and vulnerable populations from the effects of high winds due to thunderstorms.***

**Action Step #1:** Continue countywide tornado/high winds public safety and awareness campaign; includes encouraging all citizens to have a weather radio for monitoring purposes.

Responsible Department or Agency: Macon-Bibb EMA  
Anticipated Cost: Staff Time  
Existing & Potential Funding Sources: General Revenues  
Jurisdiction: Bibb County and the Cities of Macon and Payne City  
Timeframe: On-going  
Priority: High  
Status: Active

**Action Step #2:** Assess condition of trees/limbs and other potential hazards located on private property in Payne City that could negatively impact roads and infrastructure during thunderstorm wind events; provide property owners with suggested mitigation actions.

Responsible Department or Agency: Payne City Mayor and Council  
Anticipated Cost: Staff Time  
Existing & Potential Funding Sources: General Revenues  
Jurisdiction: Payne City  
Timeframe: 2012  
Priority: Moderate  
Status: New

***Summary of Changes:*** During the update process, the Planning Committee elected to remove one action step under Objective #1 that was included in the original Pre-Disaster Mitigation Plan, but has since been accomplished and is no longer applicable. The specific action step removed was: ***“Provide weather radios to elderly, rural and low-income citizens.”*** Macon Bibb EMA has distributed weather radios to all schools in the planning area as well as Senior Centers, Nursing Homes and Assisted Living Facilities. Additionally, Action Step #1 above was modified to reflect “continuation” (original plan stated “initiate”) of a public safety and awareness campaign. Macon-Bibb EMA accomplishes this annually during Severe Weather Awareness Week as well as through release of other periodic Public Service Announcements. Action Step #2 was added at the request of Payne City officials.

**V. Lightning** – As noted in *Chapter 2, Section V*, lightning strikes, although relatively rare in occurrence, have a high danger potential associated with them. Lightning can cause severe damage to both structures and their contents. Fire, resulting from a lightning strike, is also a constant threat. Although critical facilities have not experienced significant damage from lightning strikes, there are still several mitigation measures that can be initiated to guard against future damaging strikes. The mitigation measures identified during the update of the Plan can be used by both local officials and Bibb County citizens in initiating effective mitigation actions.

The Bibb County Pre-Disaster Mitigation Planning Committee considered a range of mitigation options related to lightning and identified both structural and non-structural mitigation measures to ensure that the community adequately tackles all issues related to lightning events. Public education and awareness is also a key component of any mitigation strategy dealing with the dangers posed by lightning. These mitigation measures may result in alteration to current policies and practices in order to ensure proper implementation steps are undertaken.

The county’s historic and special considerations (as previously identified) pose the same challenges for local officials and community planners when developing mitigation strategies for lightning. The mitigation goals and objectives identified for lightning are consistent with the overall community mitigation goal of creating a safe and livable environment for all Bibb County citizens and for making Bibb County and its two municipalities less vulnerable to the effects of lightning. Mitigation goals, objectives and action steps for lightning, as determined by the planning committee, are as follows:

**Mitigation Goal #1: To minimize losses of life and property due to lightning in Bibb County and the Cities of Macon and Payne City.**

***Objective #1: To protect critical facilities and the general public from the effects of lightning.***

**Action Step #1:** Perform periodic inspections of all City and County critical facilities for proper grounding.

Responsible Department or Agency: City of Macon Central Services / Bibb County Buildings and Properties

Anticipated Cost: Staff Time

Existing & Potential Funding Sources: General Revenues

Jurisdiction: Bibb County and the City of Macon

Timeframe: On-going

Priority: High

Status: Active

**Action Step #2:** Perform periodic inspections of other key critical facilities (e.g. Bibb County Schools, Macon State College, Hospital, etc.) for proper grounding.

Responsible Department or Agency: Bibb County BOE / Macon State College / Medical Center of Central Georgia, etc.  
Anticipated Cost: Staff Time  
Existing & Potential Funding Sources: General Revenues  
Jurisdiction: Bibb County and the City of Macon  
Timeframe: On-going  
Priority: High  
Status: Active

***Objective #2: To encourage protection of residential and commercial structures.***

**Action Step #1:** Distribute informational brochures on installing lightning rods and surge protectors through Planning & Zoning in order to encourage residential and commercial protection.

Responsible Department or Agency: Macon-Bibb Planning & Zoning  
Anticipated Cost: \$200-\$500 annually  
Existing & Potential Funding Sources: Manufactures / Vendors, General Revenues  
Jurisdiction: Bibb County and the City of Macon  
Timeframe: 2011  
Priority: Moderate  
Status: Deferred

**Action Step #2:** Incorporate information on benefits of lightning rods and surge protectors in Public Service Announcements made during Lightning Awareness Month.

Responsible Department or Agency: Macon-Bibb EMA  
Anticipated Cost: Staff Time  
Existing & Potential Funding Sources: General Revenues  
Jurisdiction: Bibb County and the City of Macon  
Timeframe: 2010  
Priority: High  
Status: New

***Summary of Changes:*** During the update process, the Planning Committee elected to modify some actions steps listed under both Objective #1 and Objective #2. Specifically, inspection of City and County critical facilities will be performed periodically rather than just once as indicated in the original Pre-Disaster Mitigation Plan. An additional action step was added to reflect periodic inspection of other critical facilities in the community. Also, the distribution of informational brochures pertaining to lightning rods and surge protectors was combined into a single action step. An action step to issue a Public Service Announcement during Lightning Awareness Month was added. Finally, two action steps were removed during the Plan update. These include: ***“Install lightning rods on high value critical facilities”*** and ***“Install surge protectors at power entrance of applicable critical facilities.”*** Both were removed due to budgetary considerations.

**VI. Winter Storms** – Within Bibb County there is a legitimate concern over the threat of periodic winter storms (see Chapter 2, Section VI). Bibb County does not receive the amounts of snow and ice that other areas of the country receive; however, this alone poses a problem in that the community does not have the equipment necessary to combat treacherous weather conditions. In the middle Georgia region, the formation of ice on roads, tree limbs, and power lines is the cause of most damage. The Bibb County Pre-Disaster Mitigation Planning Committee determined during the update of this plan that several steps could be undertaken to ensure that the affects of winter storms within the community are minimized.

During the update of the plan, the committee again elected to focus on non-structural mitigation measures in addressing winter storm conditions. Because of the infrequent nature of winter storms in Bibb County, and the cost-prohibitive nature of many structural mitigation projects, the planning committee determined that measures related to the safety, comfort, and continuation of services for Bibb County citizens were the most practical and beneficial.

Implementation of these measures may involve altering or modifying current policies and practices. Currently, there are no historic or special considerations that pose extraordinary challenges for the community related to the affects of winter storms. Also, the mitigation goals and objectives identified for winter storms are consistent with the overall community mitigation goal of creating a safe and livable environment for all Bibb County citizens and for making Bibb County and the Cities of Macon and Payne City less vulnerable to the effects of natural hazards. Mitigation goals, objectives and action steps for winter storms, as determined by the committee, are as follows:

**Mitigation Goal #1: To minimize losses of life and property due to effects of winter storms in Bibb County and the Cities of Macon and Payne City.**

***Objective #1: To protect critical facilities and vulnerable populations from the effects of winter storms in Bibb County and the Cities of Macon and Payne City.***

**Action Step #1:** Inventory and assess need for generators throughout the planning area.

Responsible Department or Agency: Macon-Bibb EMA  
Anticipated Cost: Staff Time  
Existing & Potential Funding Sources: General Revenues  
Jurisdiction: Bibb County and the Cities of Macon and Payne City  
Timeframe: 2010  
Priority: High  
Status: New

**Action Step #2:** Assess and identify needed resources for alerting citizens of road conditions and mitigating impacted roadways and bridges.



Responsible Department or Agency: Public Works / Engineering  
Anticipated Cost: Staff Time  
Existing & Potential Funding Sources: General Revenues  
Jurisdiction: Bibb County and the City of Macon  
Timeframe: 2010  
Priority: High  
Status: New

**Action Step #3:** Pursue identified resources needed for mitigating impacted roadways and bridges.

Responsible Department or Agency: Public Works / Engineering  
Anticipated Cost: \$100K  
Existing & Potential Funding Sources: Grants, General Revenues  
Jurisdiction: Bibb County and the City of Macon  
Timeframe: 2012  
Priority: Moderate  
Status: New

**Summary of Changes:** During the update process, the Planning Committee elected to modify Action Step #1. The action step was expanded to include inventorying and assessing the need for generators throughout the entire planning area, versus just in City and County facilities as stated in the original Pre-Disaster Mitigation Plan. Also, Action Steps #2 and #3 were added during the Plan update

**VII. All Hazards** – During the update of the Bibb County Plan, the Pre-Disaster Mitigation Planning Committee felt it critical to continue the concept of multi-hazard planning (as found in the original Bibb County Pre-Disaster Mitigation Plan) that is applicable to a wide range of hazards, as opposed to looking at only hazard-specific mitigation measures. The focus or goal of the planning committee was to develop a list of suggested mitigation measures that potentially offer the greatest benefit to the greatest number of citizens.

The Bibb County Pre-Disaster Mitigation Planning Committee considered both structural and non-structural mitigation measures when developing adequate and appropriate mitigation measures. Mitigation options range from public information initiatives to development of contingency plans. Some of these mitigation measures may be pursued individually by member jurisdictions (i.e. Macon or Payne City). However, to the greatest degree possible, any multi-hazard mitigation steps undertaken should be instituted on a countywide basis in keeping with the goal of providing the greatest benefit to the greatest number. Several of these measures may require alterations to current policies as well as the implementation of local ordinances to ensure the mitigation measures are undertaken. Mitigation goals, objectives and actions items are as follows:

**Mitigation Goal #1: Develop and implement education and awareness programs aimed at mitigating the effects of natural hazards and reducing the risk to citizens, critical facilities, private property, businesses and schools located in Bibb County and the Cities of Macon and Payne City.**

*Objective #1: Develop natural hazard mitigation awareness programs for public and private sector organizations.*

**Action Step #1:** Through the use of Public Service Announcements, inform citizens of various mitigation and preparedness activities and programs available throughout the community.

Responsible Department or Agency: Macon-Bibb EMA  
Anticipated Cost: Staff Time  
Existing & Potential Funding Sources: General Revenues  
Jurisdiction: Bibb County and the Cities of Macon and Payne City  
Timeframe: On-going  
Priority: High  
Status: Active

**Mitigation Goal #2: Minimize the potential loss of life from hazard events by ensuring sufficient quantities of emergency shelters are available in Bibb County.**

*Objective #1: To provide adequate emergency shelter protection to the citizens of Bibb County.*

**Action Step #1:** Partner with the American Red Cross to evaluate and study the quantity and adequacy of Red Cross approved shelters in Bibb County; determine need for shelter volunteers and associated training.

Responsible Department or Agency: Macon-Bibb EMA / Red Cross  
Anticipated Cost: Staff Time  
Existing & Potential Funding Sources: General Revenues  
Jurisdiction: Bibb County and the Cities of Macon and Payne City  
Timeframe: On-going  
Priority: High  
Status: Active

**Mitigation Goal #3: To protect Macon-Bibb employees and citizens while in city/county buildings and on city/county property from the effects of hazard events.**

***Objective #1: Implement procedures to minimize the potential loss of life or injury to Macon-Bibb employees and citizens.***

**Action Step #1:** Develop, test and implement hazard specific emergency response and evacuation plans for key (high occupancy) city and county buildings.

Responsible Department or Agency: Macon-Bibb EMA  
Anticipated Cost: Staff Time  
Existing & Potential Funding Sources: General Revenues  
Jurisdiction: Bibb County and the City of Macon  
Timeframe: 2012  
Priority: Moderate  
Status: Deferred

**Action Step #2:** Conduct training for city and county employees on proper emergency response and building evacuation procedures.

Responsible Department or Agency: Macon-Bibb EMA  
Anticipated Cost: Staff Time  
Existing & Potential Funding Sources: General Revenues  
Jurisdiction: Bibb County and the City of Macon  
Timeframe: 2012  
Priority: Moderate  
Status: Deferred

**Summary of Changes:** Under Objective #1, two actions steps were combined into one. In the original Pre-Disaster Mitigation Plan, the two action steps dealt individually with conducting informational briefings and distributing informational materials. During the update process, the Planning Committee elected to combine both into usage of Public Service Announcements. An objective and three corresponding actions steps were removed from the Plan during the update process. The deleted objective (“**Implement a**

means of hazard/crisis communication/notification throughout Bibb County”) and the Action Steps “*research available communication, emergency notification or alert systems...*”, “*coordinate with affected organizations and citizens to ensure maximum participation...*”, and “*obtain and implement a hazard/crisis communication or notification system...*” have been accomplished with the implementation of CodeRED emergency notification system in Bibb County. Additionally, Bibb County Schools utilize the Connect-Ed emergency notification system.

Under Mitigation Goal #2, two action steps were combined into one. In the original Pre-Disaster Mitigation Plan there were individual action steps for both evaluating shelter adequacy and determining need for volunteers and training; these have been combined into one. Also, another objective and three corresponding actions steps were removed from the Plan during the update process. The deleted objective (“**Establish an on-going role for the Bibb County Pre-Disaster Mitigation Plan Committee**”) and the Action Steps “*establish clear roles for committee members...*”, “*develop a mechanism to annually update and evaluate the mitigation plan*”, and “*conduct a full revision of the Plan every 5 years...*” have been accomplished. Each is addressed in the narrative of the Pre-Disaster Mitigation Plan update.

## **CHAPTER 5: LOCAL TECHNOLOGICAL HAZARD MITIGATION GOALS & OBJECTIVES / COMMUNITY MITIGATION GOALS, POLICIES & VALUES**

**I. Hazardous Materials Spills** – During the plan update process, the Bibb County Pre-Disaster Mitigation Planning Committee validated and confirmed that hazardous materials spills constitute the most prevalent technological hazard potentially damaging to the community. As indicated in *Chapter 3, Section I*, the threat to Bibb County is exacerbated due to the presence of three Interstate Highways running through the county. Mitigation of this hazard is best accomplished by close adherence to rules, regulations and procedures established by the chemical manufacturers and the federal government, primarily the Department of Transportation, the Environmental Protection Agency and the Occupational Safety and Health Administration. With this in mind, the planning committee identified mitigation measures geared towards training and awareness with an emphasis placed on natural resource protection.

The Planning Committee also identified and validated several methods of public education and awareness regarding technological hazard mitigation. They include the following: implementing a countywide crisis alert or notification system, distribution of informational brochures or pamphlets, public and private sector briefings, workshops and demonstrations, Public Service Announcements, etc.

The Plan update committee has identified non-structural mitigation measures related to hazardous material spills. Implementation of these measures may require modifications to current policies and procedures. There are no historic or special considerations that pose extraordinary challenges for the community in regards to facilities that are subject to hazardous material spills. Mitigation goals and objectives identified for hazardous materials spills are consistent with the overall community mitigation goal of creating a safe and livable environment for all Bibb County citizens and for making Bibb County and the Cities of Macon and Payne City less vulnerable to the effects of technological hazards. Mitigation goals, objectives and action steps for hazardous materials spills, as determined by the committee, are as follows:

**Mitigation Goals #1: To minimize losses of life and property due to hazardous material spills in Bibb County and the Cities of Macon and Payne City.**

***Objective #1: To protect critical facilities and the general public from the effects of hazardous material spills in Bibb County and the Cities of Macon and Payne City.***

**Action Step #1:** Pursue any available training to help local officials prepare, plan for, and effectively handle, hazardous materials accidents and incidents; ensure trained personnel stay current and proficient.

Responsible Department or Agency: Macon-Bibb Fire Department / EMA

Anticipated Cost: \$5,000K annually / Staff Time

Existing & Potential Funding Sources: General Revenues

Jurisdiction: Bibb County and the City of Macon

Timeframe: On-going

Priority: High  
Status: Active

***Summary of Changes:*** During the update process, the Planning Committee elected to delete two Action Steps pertaining to hazardous materials spills. Specifically, ***“Identify groundwater recharge areas in the County near transportation routes and assess/correct for vulnerability”*** and ***“Study well vulnerability to hazardous materials spills.”*** Both action steps have been accomplished via the Macon Water Authority (MWA) through completion of a Watershed Assessment and Protection Plan. Remaining action step is unchanged from the original Pre-Disaster Mitigation Plan. A review of the STAPLEE criteria indicates proposed activity is still valid and relevant.

## **CHAPTER 6: EXECUTING THE PLAN**

**I. Implementation / Action Plan:** The Bibb County Pre-Disaster Mitigation Plan update process was overseen by Macon-Bibb County EMA. Facilitation of the planning process was conducted by the Middle Georgia Regional Commission. The Bibb County Board of Commissioners authorized submission of the plan update to both GEMA and FEMA for their respective approvals. Upon favorable responses from each of these agencies, the Board of Commissioners will reconvene and formally adopt this plan and direct its implementation.

As a result of this update process, the Macon-Bibb County EMA Director shall assume the responsibility of upkeep and maintenance of the plan. It shall be the responsibility of the Macon-Bibb County EMA Director to ensure that the plan is utilized as a guide for undertaking mitigation measures within the community. The EMA Director shall also be authorized to reconvene the planning committee to periodically review and update the plan throughout the useful life of the plan, not to exceed five years.

Through this process, the EMA Director shall identify mitigation projects that have been undertaken within the community. During subsequent updates to the plan, these projects shall be noted within the planning document to indicate their status (i.e. completed, underway, postponed, cancelled, etc.). Additionally, the planning committee shall continue to brainstorm, identify, and prioritize any additional mitigation projects that the community can/should undertake.

Each mitigation action item identified in this plan was prioritized by the members of the Bibb County Pre-Disaster Mitigation Plan update committee. Priority categories consist of High, Moderate and Low. The methodology involved a comprehensive review of the projects identified in the original plan, a determination as to those projects still active and/or relevant to the community, and identification of new projects to be included in the plan update. Several criteria were set forth to assist committee members in the prioritization of these projects. These criteria include perceived cost benefit of the action, availability of potential funding sources, overall feasibility, measurable milestones within the project, whether multiple objectives were addressed, and political support for the project.

Through the prioritization process, several projects emerged as being of greater priority than others. Some of the projects involved expending considerable amounts of funds to undertake the action. Other projects allowed the community to pursue completion of the project under grant funding. Still others required no significant financial commitment by the community.

The determination of the cost benefit of a project was based upon the anticipated cost in relation to the perceived benefit of the action taken (see Worksheet #4 in Appendix D). If there was a high price tag associated with a project, yet minimal numbers of people would benefit, the project was considered to have a low cost benefit. Conversely, if minimal expenditures were required and the entire community would benefit, this

received a favorable cost benefit rating. All projects were evaluated to determine the favorability of the benefit in relation to the cost associated with completing the project.

Additionally, committee members utilized criteria referenced above (availability of potential funding sources, overall feasibility, measurable milestones within the project, whether multiple objectives were addressed, and political support for the project) in order to determine the final prioritization of the project. Through discussion and debate, the committee collectively ranked their priorities, obtained consensus, and inserted the prioritized list of projects into the plan.

A comprehensive review on the part of the Executive Subcommittee substantiated that the goals, objectives, strategies and action items identified in this Bibb County Pre-Disaster Mitigation Plan update are consistent with other important community planning documents (see Appendix B and C). These include the Macon State College Pre-Disaster Mitigation Plan, the Bibb County/Cities of Macon and Payne City Joint Comprehensive Plan, the Middle Georgia Regional Plan, the Middle Georgia Regionally Important Resources (RIR) Plan, the Macon-Bibb Solid Waste Management Plan (SWMP), the Macon-Bibb County Emergency Operations Plan, and the Middle Georgia Economic Development District's Comprehensive Economic Development Strategy (CEDS). Additionally, over the previous five-year planning period, the Bibb County Pre-Disaster Mitigation Plan was utilized by community planners and local officials during the update of these other planning mechanisms, and when appropriate, the Plan's data, mitigation strategies and action steps were incorporated into these documents.

New mitigation projects identified in this update of the Bibb County Pre-Disaster Mitigation Plan will also be evaluated for possible inclusion in the next update of the Bibb County Short Term Work Program (STWP) as well as the Community Agenda portion of the Regional Plan update in 2011. In addition, relevant sections of this Pre-Disaster Mitigation Plan update will be included in the next revision of the Macon-Bibb County Emergency Operations Plan. Bibb County and the Cities of Macon and Payne City are committed to ensuring all relevant mitigation strategies identified in this plan will be incorporated and integrated into existing plans, as well as all applicable future planning efforts.

**II. Evaluation/Monitoring/Updating:** As mentioned previously, the Macon-Bibb County EMA Director will be charged with ensuring that this plan is monitored and periodically updated in subsequent years. An analysis of the previously approved plan's method and schedule for monitoring, evaluating, and updating the plan has indicated a high degree of success and satisfaction among local officials and community stakeholders. The method of evaluation employed, as agreed upon by the Pre-Disaster Mitigation Planning Committee, will consist of utilizing a report of accomplishments to illustrate what actions/projects were undertaken, the completion date (or current status) of those actions/projects, the cost of the actions/projects, and whether the actions/projects were deemed to be successful.



Pursuant to the requirements set forth in the Disaster Mitigation Act of 2000, the community is again required to update and evaluate the plan no more than five years after its adoption. At the discretion of the Macon-Bibb County EMA Director, the committee that is designated to review and update the plan will convene in order to evaluate progress within the community. The Director is encouraged to maintain regular meetings, either quarterly, semi-annually, or annually to preserve continuity and consistency throughout the process.

No later than the conclusion of the five year period following approval of the plan update, the Macon-Bibb County EMA Director shall submit a revised Pre-Disaster Mitigation Plan to GEMA for its approval. It is important to note that the plan update process, as established by the planning committee, is subject to change, depending upon subsequent regulations and/or requirements set forth by GEMA and FEMA.

**III. Plan Update and Maintenance/Public Involvement:** Because the Pre-Disaster Mitigation Plan is intended to help ensure a safe and livable environment for all Bibb County citizens, it is imperative that citizen involvement be an integral part of the planning process. Since adoption of the original Bibb County Pre-Disaster Mitigation Plan in 2004, citizens have been kept involved and apprised of plan progress through such forums as regularly scheduled meetings of the Board of Commissioners, public hearings, Public Service Announcements, and applicable newspaper coverage. This same level of public education and awareness and citizen involvement will continue over the next five years until the next required update of the Bibb County Pre-Disaster Mitigation Plan. When specific issues dictate, public hearings will be conducted, and all other community planning efforts (Comprehensive Plan, Regional Plan, CEDS) will afford citizens the opportunity to participate in and comment on the need to incorporate hazard mitigation initiatives.

## **CHAPTER 7: CONCLUSION**

After undertaking the first update to the Pre-Disaster Mitigation Plan, the community has obtained a great deal of information regarding disaster history, the presence of natural and technological hazards, and the impacts that these hazards present to the community. The update process began with the identification and verification of hazards that have occurred within Bibb County over the past fifty plus years. This was followed with updating critical facilities data within the community. Assessments were then made to determine the vulnerability of the community to various hazards and determine their potential losses. After evaluation of the potential losses within the community, goals and strategies were developed to implement mitigation measures within the community. These goals and strategies were then prioritized and were used to formulate an action plan that the community can undertake to make it a safer place to live and work.

Additionally, the plan update process included reconvening the planning committee and continued citizen involvement through two public hearings that were conducted in order to provide members of the community with the opportunity to comment and make suggestions about disaster mitigation, both present and future, within the community. It is hoped that this plan update will serve well the citizens of Bibb County and the Cities of Macon and Payne City, and will help to foster a countywide hazard mitigation mindset through local government leadership and community-based partnerships, leading the way to a safe and livable environment for all Bibb County citizens.

**Sources** – Numerous sources were utilized to ensure that the most complete planning document could be assembled. In an effort to ensure that all data sources consulted are cited, references are listed in the following format: 1) publications, 2) web sites, 3) other sources.

**Publications:**

FEMA *How-to Guides* for Local Mitigation Planning

GEMA Local Multi-Hazard Mitigation Planning Guidance

*2001 Middle Georgia Hazard Mitigation Resource CD* (Middle Georgia RDC)

2009 Georgia County Guide

2008 Woods & Poole Economics, Inc.

*Georgia Tornado Database 1808 – 2002* (Westbrook)

*The Macon Telegraph*

**Web Sites:**

Bibb County, GA ([www.co.bibb.ga.us](http://www.co.bibb.ga.us))

Bibb County Board of Education ([www.bibb.k12.ga.us](http://www.bibb.k12.ga.us))

City of Macon ([www.cityofmacon.net](http://www.cityofmacon.net))

FEMA ([www.fema.gov](http://www.fema.gov))

GEMA ([www.gema.state.ga.us](http://www.gema.state.ga.us))

Georgia Department of Education ([www.doe.k12.ga.us](http://www.doe.k12.ga.us))

Georgia Department of Labor ([www.dol.state.ga.us](http://www.dol.state.ga.us))

Georgia Department of Natural Resources ([www.gadnr.org](http://www.gadnr.org))

National Climatic Data Center ([www.ncdc.noaa.gov](http://www.ncdc.noaa.gov))

Payne City ([www.paynecity.com](http://www.paynecity.com))

Roadside Georgia: National Register of Historic Places ([www.roadsidegeorgia.com](http://www.roadsidegeorgia.com))

Tornado History Project ([www.tornadohistoryproject.com](http://www.tornadohistoryproject.com))

Other Sources:

American Red Cross, Central Georgia Chapter

Bibb County Health Department

Bibb County Tax Assessor

Georgia Forestry Commission

Georgia Power Company

Greater Macon Chamber of Commerce

Georgia Mitigation Information System (GMIS)

Macon Economic Development Commission

Macon Water Authority

Middle Georgia Regional Commission Area Agency on Aging (AAA)