

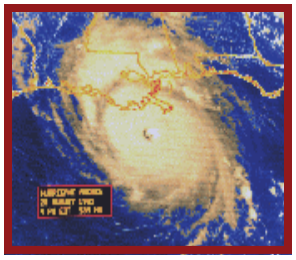

BAMBERG COUNTY NATURAL HAZARD MITIGATION PLAN

Prepared by the Lower Savannah Council of Governments on behalf of Bamberg County

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Part One:

Introduction and Process

1.1 Introduction: Natural Hazard Mitigation Plan

After review by the Task Force Committee, this section of the plan has remained the same for the update process.

The Natural Hazard Mitigation Plan is required by the Federal Emergency Management Agency (FEMA) for all counties in the State of South Carolina. The initiation of hazard planning by local governments came into effect after the signing of the Disaster Mitigation Act of 2000 (DMA 2000). This document is the Natural Hazard Mitigation Plan for Bamberg County and its incorporated municipalities.

Following the passage of the DMA 200, states and local governments are now required to develop and adopt a hazard mitigation plan in order to remain eligible for FEMA mitigation grant funding. Communities with an adopted plan will become "pre-positioned" and potentially more apt to receive available mitigation funds.

Natural hazards, including floods, hurricanes, earthquakes and severe winter storms, are a part of the world around us. Their occurrence is natural and inevitable, and there is little we can do to control their force and intensity. Bamberg County faces a variety of these hazards, each of which is discussed in Part Two: Risk Assessment.

Through the adoption of hazard mitigation planning practices, we can minimize the impact of hazards on people and the built environment. The Bamberg County Natural Hazard Mitigation Plan is designed to be a logical, information-driven plan that systematically identifies and guides the implementation of mitigation actions, including policies or site-specific projects designed to make Bamberg County and its incorporated municipalities safer from the threat of natural hazards.

Hazard mitigation involves the use of specific measures to reduce the impact of hazards on people and the built environment. Measures may include both structural and non-structural techniques, such as protecting buildings and infrastructure from the forces of nature or wise floodplain management practices. Actions may be taken to protect both existing and/or future development. It is widely accepted that the most effective mitigation measures are implemented before an event at the local government level, where decisions on the regulation and control of development are ultimately made.

Hazard mitigation planning is the first of the four "phases of emergency management," followed by preparedness, response, and recovery. This prevention-related concept of emergency management often gets the least attention, yet it is one of the most important steps in creating a disaster-resistant community.

Figure 1: Phases of Emergency Management

1.2 Area Background

After review by the Task Force Committee, this section has been revised as part of the update process to include 2008 population estimates and median household incomes for the County and it's incorporated municipalities.

Bamberg County is centrally located in the southern part of the state and characterizes the Lowcountry lifestyle. Bamberg County is located in the southwestern coastal plains of South Carolina and is bordered by Allendale, Barnwell, Colleton, Dorchester, Hampton and Orangeburg Counties. Bamberg County is considerably a more rural environment compared to that of its neighboring counties. The Edisto River is Bamberg County's boundary on the northeast, the Salkehatchie River on the southwest, with the Little Salkehatchie River running through the middle of the county.

Bamberg County's population is estimated at 15,503 per 2008 US Census Bureau estimates. The annual average temperature is 64.3°F. Rainfall averages at approximately 47.44 inches with a mean snowfall rate of 1 inch *(South Carolina State Climatology Office).*

The County contains five municipalities: Bamberg, Denmark, Ehrhardt, Govan, and Olar. Bamberg serves as the County Seat. The Town of Bamberg is situated in the northern part of Bamberg County, and is in the southern region of South Carolina, known as the Coastal Plains.

Figure 2 below illustrates the area demographic background of Bamberg County and its incorporated municipalities.

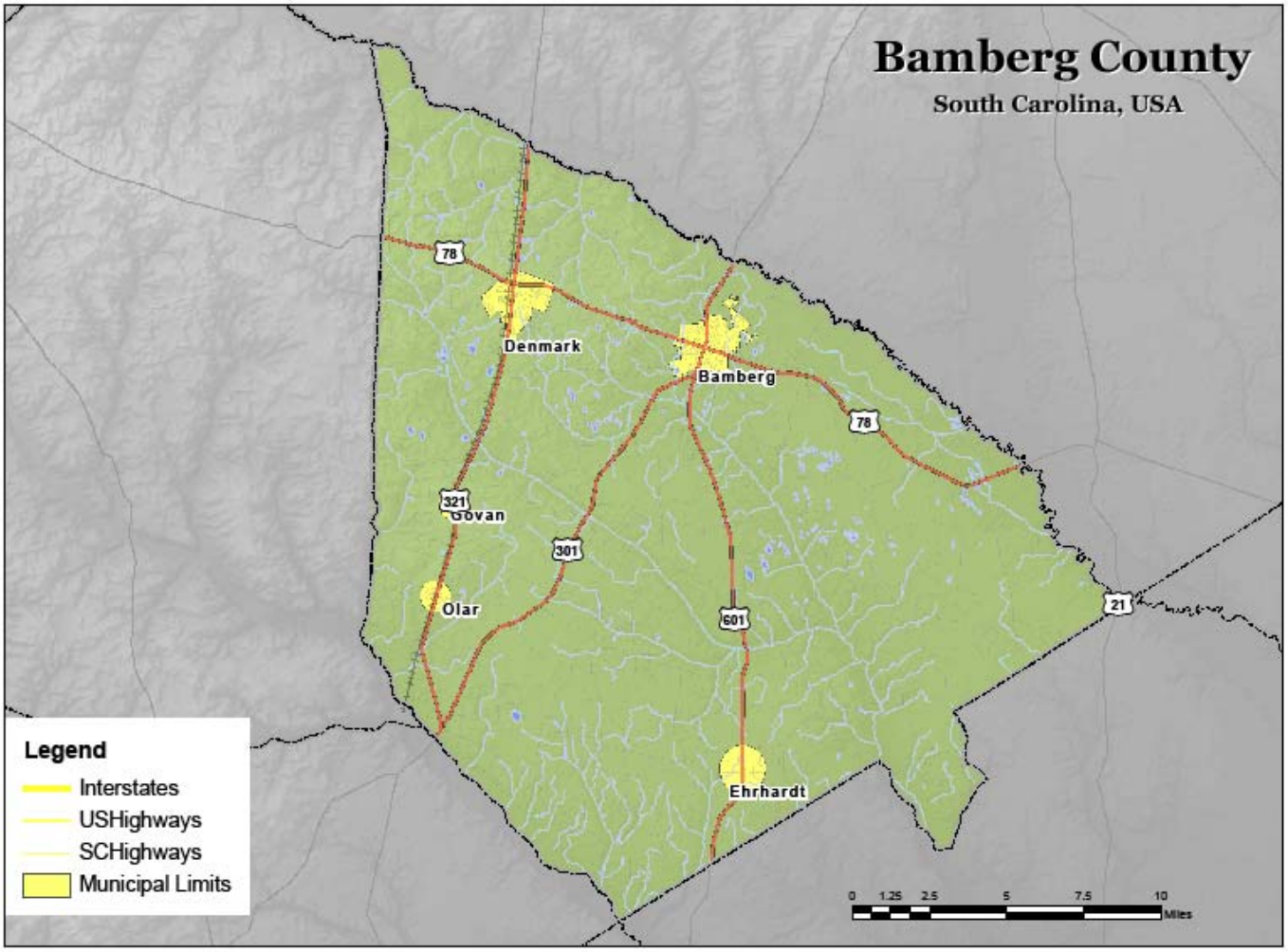
Figure 2. Area Demographic Background

	2008 Population	2008 Median Household Income
Bamberg County	15,503	$28,147
Town of Bamberg	3,322	$24,787
City of Denmark	3,022	$23,160
Town of Ehrhardt	584	$31,765
Town of Govan	62	$19,000
Town of Olar	170	$37,250

Source: US Census Bureau/Pcensus

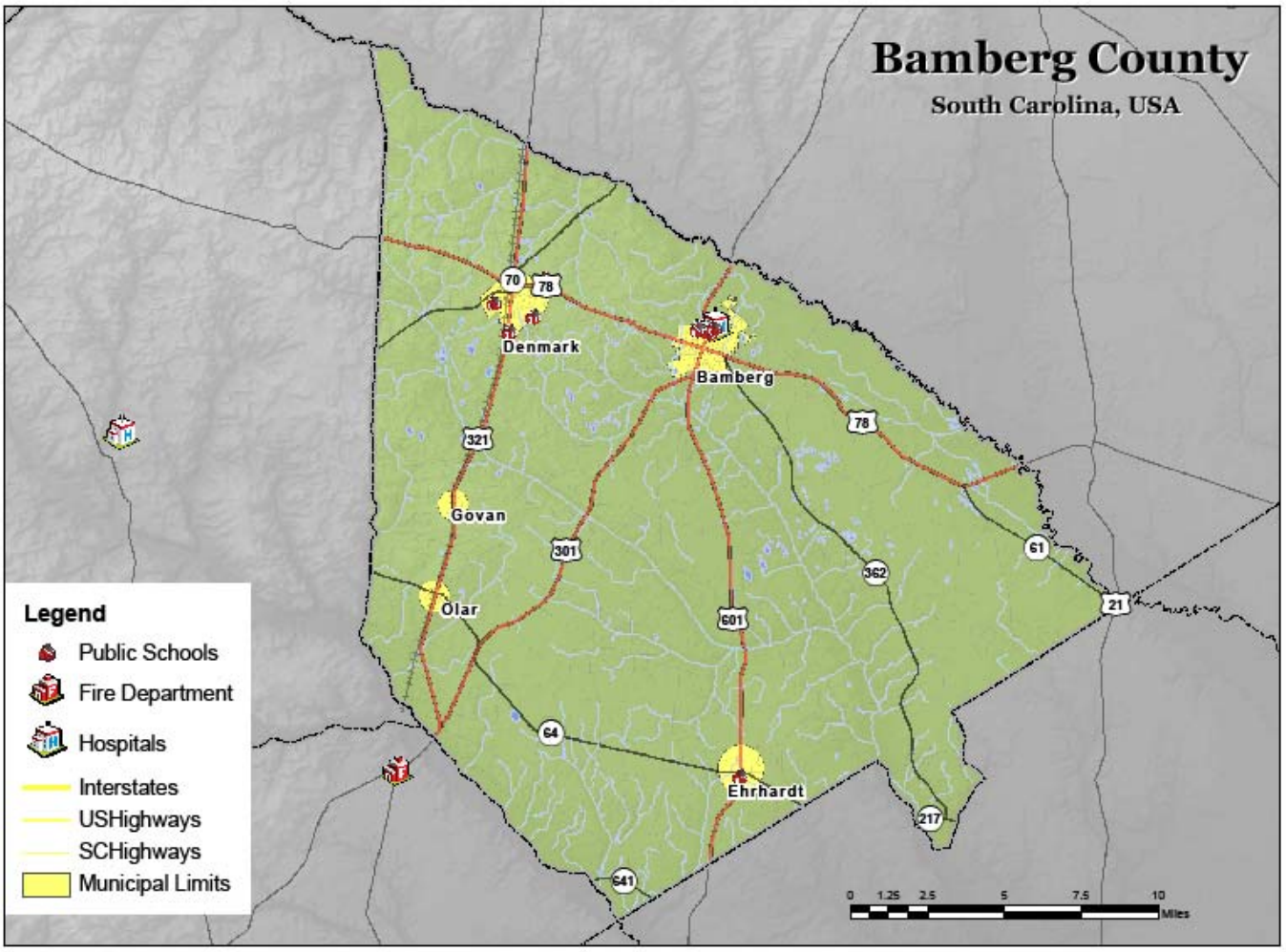
The following map reveals the area of Bamberg County, which is the focus of this plan.

Map 1: Location Map



The following map includes critical facilities within Bamberg County.

Map 2: Critical Facilities Map



1.3 Purpose

After review by the Task Force Committee, this section of the plan remained unchanged as part of the update process.

This plan is designed to be both strategic as well as comprehensive in nature, providing a long-term vision of how the county will address hazards over time. The concept of multi-objective planning is emphasized throughout this document, identifying ways to link hazard mitigation policies and programs with complimentary goals of the county related to housing, economic development, recreational opportunities, transportation improvements, environmental quality, and public health and safety.

Mitigation planning offers many benefits, including:

- Saving lives and property;
- Saving money;
- Speeding recovery following disasters;
- Reducing future vulnerability through wise development and post-disaster recovery and reconstruction;
- Expediting the receipt of pre-disaster and post-disaster grant funding; and
- Demonstrating a firm commitment to improving community health and safety.

More importantly, mitigation planning has the potential to produce long-term benefits by breaking the repetitive cycle of disaster damages, injuries and loss of life. A core assumption of hazard mitigation is that a pre-disaster investment can significantly reduce the demand for post-disaster assistance. Further, the adoption of mitigation actions enables local residents, businesses and industries to more quickly recover from a disaster, getting the economy back on track sooner and with less interruption.

The benefits of mitigation planning go beyond reducing hazard vulnerability. Measures such as the acquisition or regulation of land in known hazard areas can help achieve multiple community goals, such as preserving open space, maintaining environmental health and enhancing recreational opportunities.

The purpose of this Plan is to:

1. To protect life, safety and property by reducing the potential for future damages and economic losses that result from natural hazards;

2. Meet the requirements of the DMA 2000, and therefore qualify for additional grant funding in the following programs: Hazard Mitigation Grant Program, and Pre-Disaster Mitigation Program;

3. To speed recovery and redevelopment following future disaster events;

4. To demonstrate a firm local commitment to hazard mitigation principles; and

5. To comply with both state and federal legislative requirements for local hazard mitigation plans.

Once adopted, the mitigation plan will help the communities of Bamberg County to take greater advantage of State and Federal funding opportunities for eligible hazard mitigation projects. For instance, to qualify for Federal aid for technical assistance and post-disaster funding, local jurisdiction must comply with the Disaster Mitigation Act of 2000 (DMA 2000) and its implementing regulations based on the *Local Multi-Hazard Mitigation Planning Guidance*, published by FEMA in July, 2008. The Bamberg County Natural Hazard Mitigation Plan has been prepared to address these hazard mitigation planning requirements. The FEMA Review Criteria in the preface of the document describes each of the major planning requirements and identifies where in the plan document they are addressed.

Another key purpose of the planning process is to ensure that proposals for mitigation actions are reviewed and coordinated among the participating jurisdictions within the County, and supported by technical assistance from appropriated regional, State and Federal agencies. In this way there is a high level of confidence that mitigation actions proposed by one jurisdiction, when implemented, will be compatible with the interests of adjacent jurisdictions and unlikely to duplicate or interfere with mitigation initiatives proposed by others. The last but not the least purpose of the Bamberg County Plan is to provide each participating local jurisdiction with a plan of action that can be adopted and implemented pursuant to its own authorities and responsibilities.

1.4 The Planning Process

After review by the Task Force Committee, the following changes were made to this section as part of the update process:

FEDERAL REQUIREMENTS FOR LOCAL HAZARD MITIGATION PLANS

Requirement 201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include:

(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;

(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and

(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information

Requirement 201.6(c)(1): The plan **shall** document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

This plan is designed to provide a blueprint for hazard mitigation activities in the general sense of the program and is structured to serve as a basis for specific hazard mitigation efforts for any disaster. It is recognized, however, that updates may be required to address specific issues arising from a given disaster.

This plan is currently being updated to comply with State and Federal mandates. As a result of the update, new elements will be included as necessary to meet FEMA regulations.

This plan identifies hazards and considers ways to reduce vulnerability to natural hazards in Bamberg County. It encompasses a range of life- and property-saving hazard mitigation initiatives in the categories of mitigation coordination, acquisition/relocation/retrofitting, floodplain management, public safety, emergency preparedness, earthquake, tornado, drought, etc. Both short-term and long-term hazard mitigation measures are identified in order to help all state and local agencies allocate resources in a responsible manner in order to provide for the public safety, public health, and general welfare of all the people in Bamberg County.

This plan has taken into account the mitigation experience, and a variety of mitigation projects, from other counties near or surrounding Bamberg County and the State of South Carolina.

It has taken advantage of the collective mitigation knowledge of many State, Federal, and Local officials, as well as representatives from both the public and private sectors, and is designed as one component to help safeguard the citizens of Bamberg County. As such, it should significantly contribute to the mitigation of future disasters.

Bamberg County utilized federal and state guidance documents, existing local plans and studies, and data to develop this plan. More specifically, the Bamberg County Comprehensive Plan provided demographical statistics that were incorporated into this plan; the Bamberg County Land Development Regulations provided specific no-build scenarios in the floodplains and building codes enforcement; and the SC HMP 2007 provided a framework and was used as a guide to updating this plan. Other specific examples include:

Figure 3. Existing Plans/Studies/Guides

Plans/Studies/Guides	Author
Bamberg County Multi-Jurisdictional HMP	Bamberg County/LSCOG
Hazard Mitigation Assistance FY 2009 Unified Guidance	FEMA
FY 2008 PDM Program Guidance	FEMA
SC Floodplain Management Quick Guide 2008	SCDNR
Hazard Mitigation Planning	FEMA
Bamberg County Comprehensive Plan	Bamberg County/LSCOG
National Flood Insurance Program	FEMA
SC HMP 2007	SCEMD
SC Emergency Operations Plan	SCEMD

This plan utilized the process required by the Federal Emergency Management Agency to develop the plan. A Hazard Mitigation Planning Crosswalk is found in Appendix D and provides a summary of plan requirements, including where they are located. The hazard mitigation planning process included the following steps, listed in the order in which they were undertaken and will be described in greater detail throughout the plan:

- Step 1: Establish a Core Planning Team (Task Force)
- Step 2: Data collection, Risk Assessment
- Step 3: Hazard Identification
- Step 4: Create Hazard Mitigation Plan
- Step 5: Develop Goals and Mitigation Strategies
- Step 6: Adopt and Implement Plan

The planning process followed in Bamberg County was intended to enhance public awareness and understanding about how the community could become safer from the impacts of future disasters. The plan provides a decision tool for management by department staff in local governments, local elected and appointed officials, business and industry, community associations and other key institutions and organizations to take actions to address vulnerabilities to future disasters. It provides proposals for specific projects and programs that are needed to eliminate or minimize the vulnerability of the County. One component of the hazard mitigation planning process was a capability assessment of existing policies, programs and regulations for managing growth and development within the County. The study contractors reviewed relevant County and local government comprehensive plans, zoning ordinances, floodplain regulations, and building codes to gain an understanding as to how current development regulations and practices either hinder or support hazard mitigation initiatives.

This process also involved reviewing current mitigation-related policies of local and county government and comparing them to the hazards that threaten the jurisdiction and the relative risks they pose to the community. This comparison supports and justifies efforts to propose enhancement to policies, programs, and regulations that should be implemented to create a more disaster-resistant future for Bamberg County. This process was led by the Bamberg County Hazard Mitigation Task Force members and supported by the Lower Savannah Council of Governments staff.

1.5 Planning Process Documentation

As part of the update process, the Task Force Committee reviewed this section and made the necessary member additions to the committee, participating municipality additions, and meeting dates and times.

The following is documentation of the various steps of the planning process. The preparation of the plan required a series of meetings and workshops for facilitating discussion and initiating data collection efforts. More importantly, the meetings and workshops prompted continuous input and feedback throughout the planning and update process. Sign-in sheets, letters, agendas, surveys, and news releases are included in the appendix of this document.

Bamberg County Natural Hazard Mitigation Plan Task Force Committee

The plan was developed through a Task Force Committee comprised of LSCOG staff, the heads of the county emergency service offices, representatives from the incorporated municipalities, and private entities. The committee helped to guide the creation and development of the plan, and participated in the five-year update process of the plan. These committee members were chosen as a result of their expertise in hazard preparation and planning within their respective county and municipalities.

The Task Force Committee includes:

Mayor Alton McCollum	Town of Bamberg
Bruce Watson	Town of Bamberg
Mayor Gerald Wright	City of Denmark
Scott Neely	Town of Ehrhardt
Mayor Johnnie Ganus	Town of Govan
Mayor Walter O'Rear	Town of Olar
Jim Pruitt	Bamberg County Emergency Services
Sharon Hammond	Bamberg County Emergency Services Director
Amanda Sievers	Lower Savannah Council of Governments
William Aultman	Lower Savannah Council of Governments
Jeff Derwort	Lower Savannah Council of Governments

Participating Municipalities:

Town of Bamberg
City of Denmark

Town of Ehrhardt
Town of Govan
Town of Olar

SCEMD PDM Grant Application Workshop: August 22nd, 2008, 9:00 a.m. - 3:00 p.m.
LSCOG staff and Bamberg County emergency management attended a workshop on how to apply for grants through FEMA's PDM program for FY 2009.

HMP Update meeting: September 17th, 2008, 10:00 a.m.
LSCOG staff and all six county emergency management directors and county administrators met to discuss the plan update and requirements.

SCEMD Mitigation Planning Workshop for Local Governments: October 29th-20th, 2008
LSCOG staff attended a two day workshop designed to inform them about the update of the HMP.

Preparation of PDM 2009 Application for HMP Updates: September 2008-December 4th, 2008
LSCOG staff prepared and submitted the 2009 PDM grant for updating all six county HMP's.

SCEMD Mitigation Workshop: April 14th-15th, 2009
SCEMD held a workshop for all stakeholders to aid them in the update of the HMP.

Letter requesting submittal of Task Force Committee: July 1st, 2009
Letters were mailed to all county emergency management coordinators requesting they form their Task Force.

Letter to all elected officials: July 16th, 2009
Letters were mailed to all elected officials informing them that the HMP update would be taking place soon.

Hazard Mitigation Plan Update Meeting Memo: August 5th, 2009
A memo was sent to all county EMD's and Task Force Committee members informing them of upcoming kick-off meetings regarding the HMP update.

Memorandum of Agreement sent to County: August 18th , 2009

MOA's were mailed to all County Administrators with the county match requirement, to be signed and returned to LSCOG. Letter also informed them that LSCOG was successful in being awarded the FEMA PDM grant to update the HMP.

HMP Update Meeting and Public Comment on Draft Plan: August, 27th, 2009, 10:00 a.m.

LSCOG staff met with Bamberg County Task Force and Emergency Management to discuss the plan update and requirements. The public was invited to attend this meeting as well to comment on the Draft Plan.

SCEMD, LSCOG, County Meeting: April 8th, 2010

A meeting was held with County Emergency Managers, LSCOG staff, and SCEMD mitigation staff to discuss the status of the update of the plans.

HMP Crosswalk Review: June 30th, 2010, 2:00 p.m.

A meeting was held to review the draft plan with the Bamberg County Emergency Services Director to make sure all criteria was met.

Bamberg County 2nd Public Hearing on the Final Draft Plan:

A public hearing was scheduled for the citizens of Bamberg County to make comments and review the Final Draft HMP.

1.6 Participants Involved in the Planning Process

After review by the Task Force Committee, no changes were made as part of the update process.

The plan is intended to serve as a coordinative tool through which local agencies and organizations identify complimentary objectives that systematically reduce the impact of hazards in Bamberg County. The plan also serves to coordinate and integrate the responsibilities, authorities and programs of the "participating" and "cooperating" agencies and organizations.

County and Municipality Participation

County, city, and town participation must be defined in order to create a standard for participation in order for the entities to be considered as participants in the Natural Hazard Mitigation Plan process. Invitations (by phone and letter) were extended to mayors, administrators, and managers to attend the County Hazard Mitigation Meetings. Officials were informed through the letters that LSCOG needed their input and comments in order to be considered active participants in the plan.

In order for the county to approve the plan and be an official participant of this planning process, they must satisfy the following consideration:

- The county Emergency Management Director must be a member of the Natural Hazard Plan Task Force Committee and provide input and comments to the plan.

In order for cities and towns to be official participants of the planning process, they must satisfy one of the following considerations:

- The mayor, administrator, or manager attends a county or public meeting and provides input and comments concerning the Natural Hazard Mitigation Plan.
- The mayor, administrator, or manager appoints a city or town employee to attend a county or public meeting and provides input and comments concerning the Natural Hazard Mitigation Plan.
- A LSCOG Planning staff member personally discusses the Natural Hazard Mitigation Plan with a mayor, administrator, manager, or appointed municipal representative and receives input and comments from that individual.

Bamberg County Local Government Participation

City of Bamberg

City of Denmark

Town of Ehrhardt

Town of Govan

Town of Olar

Non-Participating Municipalities

Bamberg County was successful in achieving 100% participation from all five incorporated municipalities in the planning and update process of the Natural Hazard Mitigation Plan.

1.7 Public Participation

After review by the Task Force Committee, the public participation process was revised to include more opportunities for public input and for neighboring communities and other agencies to be able to participate in the planning update process.

Throughout the planning and update process, there have been opportunities for public input. The process provided neighboring communities, other agencies, the private sector, and academia an opportunity to participate in the planning process. To engage the community in the hazard mitigation planning process, the Task Force Committee held public input meetings designed to inform the participants about hazard mitigation, generate discussion, and receive feedback on the HMP; letters were sent to communities; news releases in area newspapers and other media outlets informed area residents; etc.

Public meetings were held during the drafting stage and prior to plan adoption. During the project kick-off meeting the planning process was described and initial findings of the risk assessment presented for review and comment. Each of the meetings was advertised through various types of notices, including notices in the local newspaper. In addition, copies of the risk assessment and final draft plan were made available for the public at various viewing locations in the county and the municipalities. An email address and the telephone number of Lower Savannah COG were provided with the draft plan to provide a mechanism for the public to provide comments back to plan development facilitators. The public was informed of the final draft availability and the opportunity for comment through notices placed in local newspapers. All comments that were received to date from the public were reviewed and incorporated into the final version of the plan as appropriate.

1. Public Meeting during the Drafting Stage of the Plan

The public was invited to attend a meeting for Bamberg County on August 27th, 2009 at 10:00 a.m., to comment on the drafting stage of the Hazard Mitigation Plan. The invitation was extended through public notices in the newspaper. At the public meeting, LSCOG staff presented the county's risk assessment, which included natural hazards and critical facilities. The public had the opportunity to comment on the plan during its drafting stage throughout the process. In addition to the draft stage of the plan, the public was invited to make comments on the final draft plan on Monday, August 9th at 6:30 p.m. in the Bamberg County Council Chambers.

2. Public Notice of Adoption of Plan

In addition, to the kick-off meeting, the public will be invited to the plan adoption hearing of the governing bodies of the participating jurisdictions. A public notice of the adoption hearing will be inserted in local newspapers available within all participating jurisdictions.

Part Two:

Risk Assessment

2.1 Types of Risks

As part of the plan update process, the Task Force Committee reviewed and analyzed this section. Each hazard description was reassessed and updated to include most current data and the two newly participating jurisdictions. This section also included the requirements below:

FEDERAL REQUIREMENTS FOR LOCAL HAZARD MITIGATION PLANS

Requirement 201.6(c)(2): The plan **shall** include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identifies hazards.

Requirement 201.6(c)(2)(i): The risk assessment **shall** include a description of the type of all natural hazards that can affect the jurisdiction.

Risk Assessment

The Risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural or man-made hazards. The results of this risk assessment assist Bamberg County and its incorporated municipalities and unincorporated areas in identifying and understanding their risks from natural hazards. This information also serves as the foundation for the development of the mitigation plan and strategies to help reduce risks from future hazard events. The Risk Assessment section answers the fundamental question that fuels the hazard mitigation planning process: *What would happen if a hazardous event occurred in Bamberg County or its incorporated municipalities*?

Risk Assessment Approach

- Determine which hazards pose a serious risk to Bamberg County.
- Describe what these hazards can do to physical, social, and economic assets of Bamberg County.
- Identify which areas of the County are most vulnerable to damage from these hazards.
- Determine damages that may result from the identified hazards.
- Use the Risk Assessment section to identify mitigation actions and set priorities for implementation.

FEMA Requirements Addressed

The Task Force Committee used a risk assessment process consistent with the procedures and steps presented in the FEMA How-To-Guide "Understanding Your Risks: Identifying Hazards and Estimating Losses." The committee used the four-step risk assessment process shown in Figure 4.

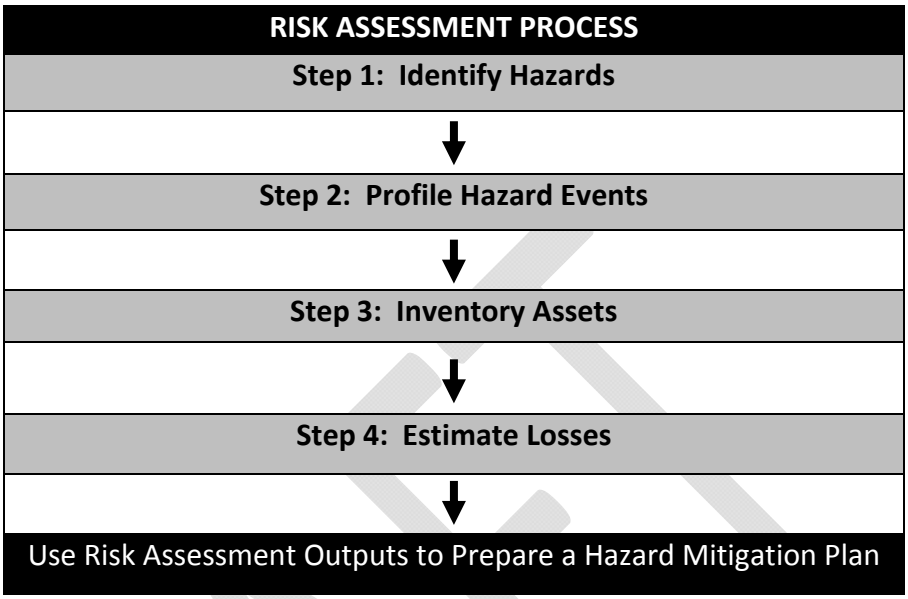


Figure 4: Risk Assessment Process

Hazard Identification

The first step in the risk assessment process was to identify each of the hazards that can occur within Bamberg County and its incorporated municipalities. This hazard identification process began with a review of previous hazard events based on historical data. Also, information was collected through general discussion at Task Force Meetings concerning hazard identification and prioritization of these risks. The USC Hazards Lab provided historical findings as well. The findings from these sources were utilized to determine the priority hazards for Bamberg County and its incorporated municipalities and unincorporated areas, which will become the focus of the mitigation strategies developed in the remainder of this plan.

The following will provide a factual basis for mitigation project proposals described later in this plan. The following points will be addressed for each natural hazard in this section:

Type

A brief description is provided for each hazard addressed in this section.

Location

The location of past events is mapped or listed in this section.

Extent

The effect and impact of past events is examined in this section for each hazard type.

Probability

To determine the probability of a natural hazard event, the number of events, total number of years those events have been recorded, and the frequency of events must be determined. The recurrence interval is also helpful in portraying how common a certain type of hazard is. Dividing the number of years by the number of events produces the recurrence interval, or how often the event will occur per year. The percentage frequency of events is determined by dividing the number of events by the total number of years and multiplying by 100. This gives a reliable sense of the chance a hazard will occur per year.

Vulnerability

The overall vulnerability of each individual hazard is discussed and analyzed for Bamberg County and its municipalities. A rating of high, mid level, and low vulnerability is given to each hazard. Vulnerability is determined by assessing the probability and extent of the hazards that affect the specific area.

Of the many types of hazards that threaten the United States, there are some that have never occurred in South Carolina. Those hazards that have threatened the Lower Savannah Region of South Carolina will be addressed. The hazards that have been examined in this plan were decided on by LSCOG staff and the Task Force Committee.

The following are the specific hazards that will be examined in this section of the Natural Hazard Mitigation Plan, in no particular order.

1. Tornadoes/Severe Windstorm
2. Hurricanes
3. Hail
4. Drought
5. Earthquakes
6. Wildfires
7. Flood
8. Winter Storms

Figure 5. Jurisdictions Affected by Hazard Type	
Hazard	**Jurisdictions Affected**
Tornadoes/Severe Windstorms	Specific Jurisdictions
Hurricanes	Countywide
Hail	Specific Jurisdictions
Drought	Countywide
Earthquakes	Specific Jurisdictions
Wildfires	Countywide
Flood	Countywide
Winter Storms	Countywide

Profiling Hazards

FEDERAL REQUIREMENTS FOR LOCAL HAZARD MITIGATION PLANS

Requirement 201.6(c)(2)(i): The risk assessment **shall** include a description of the location and extent of all natural hazards that can affect the jurisdiction. The plan **shall** include information on previous occurrences of hazard events and on the probability of future hazard events.

It is important to understand the types of hazards that affect Bamberg County and its municipalities. Projects and actions will be discussed in further detail to address these natural hazards which threaten this region. The extent of the hazard and its future probability are important considerations to take when preparing for an event.

Tornado/Severe Windstorm Analysis

Hazard Description:

A tornado is a violent storm with winds up to 300 miles per hour. It appears as a rotating funnel-shaped cloud, gray to black in color, extending toward the ground from the base of a thundercloud. The average tornado moves southwest to northeast at a forward speed of 30 miles per hour, but tornadoes can move in any direction and may vary from stationary to 70 miles per hour. Tornadoes are most frequent east of the Rocky Mountains during spring and summer months between the hours of 3 PM and 9 PM. In the South, tornadoes touch down most frequently from the month of March through May. Tornadoes may also accompany hurricanes. Tornadoes are especially dangerous because they appear transparent until they begin to pick up debris and dust. These short-lived storms are most violent of all atmospheric phenomena, and over a small area, are the most destructive. Approximately 800 tornadoes occur across the nation each year, resulting in nearly 80 deaths and 1,500 injuries. Damage paths can exceed on mile wide and 50 miles long.

Windstorms are often associated with other storms, such as hurricanes or severe thunderstorms, but may occur independently. High winds can cause downed trees and power lines, flying debris, and building collapses, all of which may lead to power outages, transportation disruptions, damage to buildings and vehicles, and injury or death. Flying debris is the primary cause of damage during a windstorm.

Severity

The Fujita Scale (F-Scale) is the standard measurement for rating the strength of a tornado. The National Weather Service (NWS) bases this scale on an analysis of damage after a tornado to infer wind speeds. On February 1, 2007, the NWS transitioned from the F-Scale to the Enhanced Fujita Scale (EF-Scale). The EF-Scale is considerably more complex and enables surveyors to assess tornado severity with greater precision. Figure 6 details both scales below.

F-Scale and EF-Scale				
F-Scale	**3-sec. gust speed (mph)**	**EF-Scale**	**3-sec. gust speed (mph)**	**TYPICAL DAMAGE**
F0	45-78	**EF0**	65-85	Light damage. Some damage to chimneys. Branches broken off trees. Shallow-rooted trees pushed over; signboards damaged.
F1	79-117	**EF1**	86-109	Moderate damage. Peels surface off roofs. Mobile homes pushed off foundations or overturned. Moving autos blow off roads.
F2	118-161	**EF2**	110-137	Considerable damage. Roofs torn off frame houses. Mobile homes demolished. Boxcars overturned. Large trees snapped or uprooted. Light-object missiles generated. Cars lifted off ground.
F3	162-209	**EF3**	138-167	Severe damage. Roofs and some walls torn off well-constructed houses. Trains overturned. Most trees in forest uprooted. Heavy cars lifted off the ground and thrown.
F4	210-261	**EF4**	168-199	Devastating damage. Well-constructed houses leveled. Structures with weak foundations blown away some distance. Cars thrown and large missiles generated.
F5	262-327	**EF5**	200-234	Incredible damage. Strong frame houses leveled off foundations and swept away. Automobile-sized missiles fly through the air in excess of 100 meters. Trees debarked. Incredible phenomena will occur.

Figure 6: F-Scale and EF-Scale

The Beaufort Wind Scale is a simplified scale to aid in the estimation of wind speed and corresponding typical effects. Figure 7 below illustrates the wind scale.

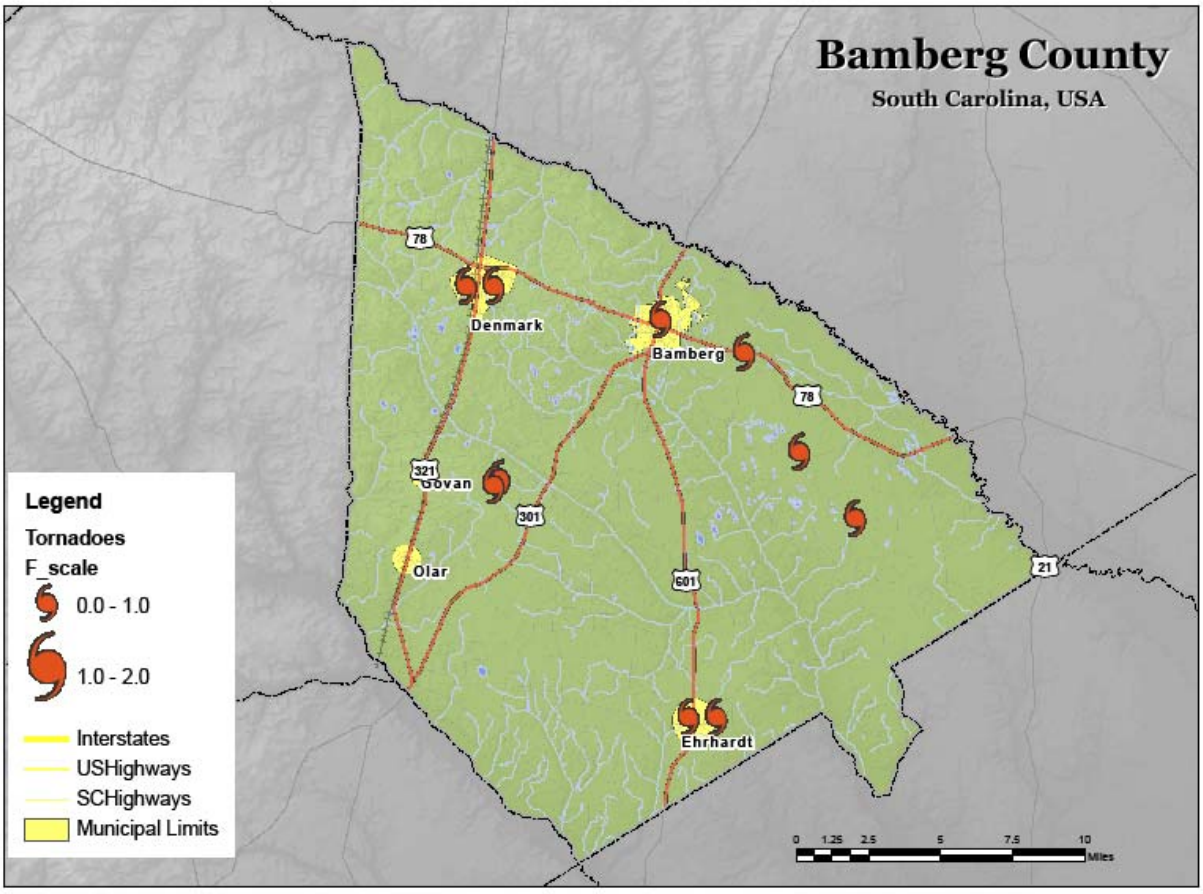
Beaufort Wind Scale		
Wind Speed (mph)	**Name**	**Damage**
25-31	Strong Breeze	Large branches in motion; whistling in telephone wires; umbrellas used with difficulty
32-38	Near Gale	Whole trees in motion; resistance felt while walking against the wind
39-46	Gale	Twigs break off of trees; wind impedes walking
47-54	Strong Gale	Slight structural damage to chimneys and slate roofs
55-63	Storm	Seldom felt inland; trees uprooted; considerable structural damage
64-72	Violent Storm	Very rarely experienced; widespread structural damage; roofing peels off buildings; windows broken; mobile homes overturned
73+	Hurricane	Widespread structural damage; roofs torn off homes; weak buildings and mobile homes destroyed; large trees uprooted

Figure 7: Beaufort Wind Scale

Location

The tornado touchdowns for Bamberg County and its incorporated municipalities, and all unincorporated areas of the County, can be seen on the tornado map. There have been 17 recorded touchdowns in Bamberg County over the past 59 recorded years. The tornado touchdown map shows the location of each tornado touchdown point, and the general time frame in which it occurred. The risk assessment is based on reported tornado events. Therefore, the occurrence of events seems to be highest in areas with higher population densities. Tornado touchdowns in rural areas frequently occur without report.

Map 3: Tornado Map



Extent

Figure 8 below illustrates the historic occurrences and locations of tornadoes that have affected Bamberg County and its incorporated municipalities. A tornado can occur anywhere in the County. Bamberg County has experienced 17 noted tornadoes in the past 59 years.

Figure 8. Historic Occurrences of Tornadoes in Bamberg County

Date	Event	Location	Description
6/24/1951	Tornado	County	F1 Magnitude Property damage recorded at $25K
11/23/1961	Tornado	County	F0 Magnitude Property damage recorded at $0.3K
4/23/1983	Tornado	County	F3 Magnitude Property damage recorded at $2.5M 4 injuries reported
8/16/1994	Tornado	Govan	F1 Magnitude Property damage recorded at $50K 1 injury reported
3/8/1998	Tornado	Govan	F0 Magnitude
4/15/1999	Tornado	Midway/County	F0 Magnitude Property damage recorded at $0.5K
9/23/2000	Tornado	Denmark	F1 Magnitude
6/12/2001	Tornado	Ehrhardt	F0 Magnitude
9/7/2004	Tornado	Ehrhardt	F0 Magnitude
1/13/2006	Tornado	Bamberg	F0 Magnitude
5/7/2006	Tornado	Bamberg	F0 Magnitude
2/13/2007	Tornado	Olar	F0 Magnitude
4/15/2007	Tornado	Springtown/County	F0 Magnitude Property damage recorded at $1.0K
4/15/2007	Tornado	Ehrhardt	F0 Magnitude
3/15/2008	Tornado	Denmark	F1 Magnitude
3/15/2008	Tornado	Bamberg	F1 Magnitude
5/20/2008	Tornado	Govan	F1 Magnitude

Source: NCDC

These tornadoes have caused a total of five (5) injuries and no fatalities. The tornadoes that have touched down in Bamberg County have ranged from F0 to F3 magnitudes. Of the tornadoes, ten (10) were F0, six (6) were F1, and one (1) was a F3. According to Figure 6, the wind speeds of these tornadoes have ranged from 45 miles per hour to 209 miles per hour, and had the potential to cause severe damage.

Probability

Figure 9. Tornado Probability for Bamberg County				
Municipality	**# of Events**	**Years in Record**	**Recurrence Interval**	**Hazard Frequency %**
Bamberg	3	59	19.6	5%
Denmark	2	59	29.5	3%
Ehrhardt	3	59	19.6	5%
Govan	3	59	19.6	5%
Olar	1	59	59	2%
Unincorporated	5	59	11.8	8%
Source: NCDC				

Though infrequent, tornadoes are not unprecedented in Bamberg County. Over the past 59 years, 17 tornadoes have touched down within the County. Based on the historic frequency, an estimate of one tornado will touchdown in the unincorporated area every 11 to 12 years. The frequency of which a tornado could hit each year in the County is approximately 8%.

The incorporated municipalities have experienced a range of one to three tornadoes over the past 59 years. The City of Bamberg, Town of Ehrhardt, and Town of Govan are estimated to have one tornado every 19 to 20 years; with a frequency of 5% per year. The City of Denmark is estimated to have one tornado every 29 to 30 years, with a frequency of 3% per year. The Town of Olar has experienced one tornado in the past 59 years, and has a frequency of 2%.

Vulnerability

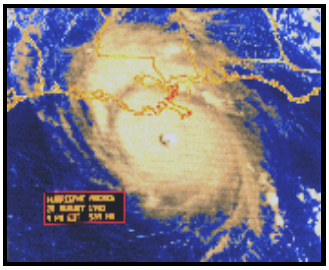
High wind events can pose a serious threat to people and infrastructure. Bamberg County, in particular its incorporated municipalities (urban core), provides an environment where numerous objects can become flying debris and severely injure people and damage structures.

Structural vulnerability to wind is related to the building's construction type. Wood structures and manufactured homes are more susceptible to wind damage, while steel and concrete buildings are most resistant.

Based on the results from Figure 9, Bamberg County has a low vulnerability to tornadoes. The percent chance a tornado will touch down in the unincorporated area of the county is 8% in a year time frame.

From the past 59 years, there was only one F3 category tornado that reported major damage for the unincorporated county ($2.5M in property damage and four injuries). The other 16 past events did not exceed the F1 category storm and minimal damage occurred. The impact of tornado events on each participating jurisdiction varies, and from the tornado extent section one can see that the impact of past tornadoes on the county as a whole has been low.

Hurricane/Tropical Storm Analysis



Hazard Description

Hurricanes, including coastal storms and tropical storms can have affects on inland areas and not just coastal areas. Bamberg County has been affected by hurricanes/tropical storms in the past.

Tropical Storms and Hurricanes

A hurricane is a type of tropical cyclone, which is a generic term for a low-pressure system that generally forms in the tropics. Thunderstorms and, in the Northern Hemisphere, a counterclockwise circulation of winds near the earth's surface accompany the cyclone. Tropical cyclones are classified as follows:

- A tropical depression is an organized system of clouds and thunderstorms, with a defined surface circulation, and maximum sustained winds of 38 miles per hour or less.
- A tropical storm is an organized system of strong thunderstorms, with a defined surface circulation, and maximum sustained winds of 39 to 73 miles per hour.
- A hurricane is an intense tropical weather system of strong thunderstorms, with a well-defined surface circulation, and maximum sustained winds of 74 miles per hour or higher.

Atlantic hurricane season lasts from June to November, averaging eleven (11) tropical storms each year, six (6) of which turn into hurricanes. According to the National Hurricane Center, the Atlantic hurricane season is currently in a period of heightened activity that began around 1995, and could last at least another decade.

Heavy rain, coastal flooding, and powerful winds are commonly associated with hurricanes. Storm surge is often the greatest hurricane-related hazard. Storm surge is water that is pushed toward the shore by the force of the winds swirling around the storm. This advancing surge combines with the normal tides to create the hurricane storm tide, which can increase the mean water level fifteen (15) feet or more. In addition, wind driven waves are superimposed on the storm tide. This rise in water level can cause severe inundation in coastal areas, particularly when the storm tide coincides with the normal high tides.

Severity

The NWS uses the Saffir-Simpson Scale to classify hurricane severity. The scale categorizes a hurricane's present intensity on a one (1) to five (5) rating and provides an estimate of property damage and coastal flooding upon landfall. Wind speed determines a hurricane's Saffir-Simpson Scale rating since storm surge is greatly dependent on the coastline shape and slope of the continental shelf. Figure 10 below illustrates the Saffir-Simpson Hurricane Scale.

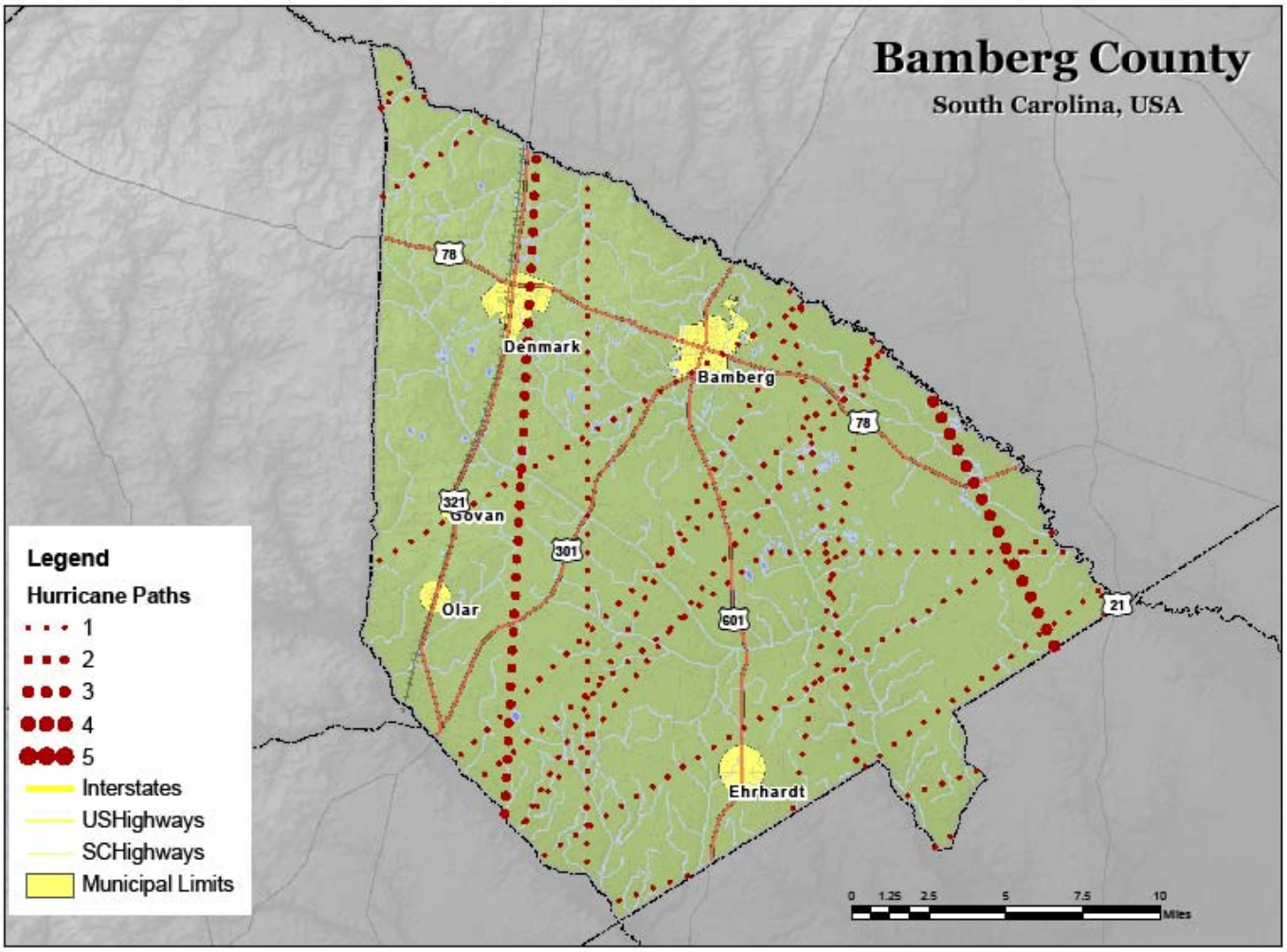
Saffir-Simpson Hurricane Scale				
Category	**Storm Surge (ft)**	**Winds (mph)**	**Damage**	**Damage Description**
1	6.1 – 10.5	74 – 95	Moderate	• Damage primarily to trees and unanchored homes • Some damage to poorly constructed signs • Coastal road flooding
2	13.0 – 10.5	96 – 110	Moderate-Severe	• Some roofing material, door, and window damage to buildings • Considerable damage to shrubbery and trees • Flooding of low-lying areas
3	14.8 – 25	111 – 130	Extensive	• Some structural damage to residences and utility buildings • Foliage blown off trees and large trees blown down • Structures close to the coast will have structural damage by floating debris
4	24.6 – 31.3	131 – 155	Extreme	• Curtainwall failures with utilities and roof structures on residential buildings • Shrubs, trees, and signs all blown down • Extensive damage to doors and windows • Major damage to lower floors of structures near the shore
5	Not predicted	>155	Catastrophic	• Complete roof failure on many residences and industrial buildings • Some complete building and utility failures • Severe, extensive window and door damage • Major damage to lower floors of all structures close to shore

Figure 10: Saffir-Simpson Hurricane Scale

Location

Identification of hurricane tracks/tropical storms was based on the most recent data available from NOAA Coastal Services Center. The map below shows hurricane and tropical storm tracks in Bamberg County and its incorporated municipalities.

Map 4: Hurricane/Tropical Storm Map



Extent

The hurricane map above illustrates the travel patterns of the recorded hurricane tracks and tropical storms. Actual hurricane landings have not posed a true threat to Bamberg County, however, the storms aftermath have been identified as an event risk. The hurricane track map has identified 38 named and unnamed hurricane events that have been tracked through the county dating back to 1851 through 2006. Of these recorded events, all 38 measured within the aforementioned Hurricane Scale, ranging from a category 1 to a category 4. This equated to moderate to extreme damage, including damage to trees and shrubbery, damage to buildings, and flooding.

In the past 155 years there have been a recorded 110 tropical storms in the county ranging in wind speeds of 35 mph to 60 mph. The aftermath affects of these tropical storms produces unusually heavy rains and some flash flooding in the area.

Probability

The following figures show hurricane/tropical storm probability in Bamberg County. However, because actual landings of hurricanes have not occurred in this particular area, the data is an estimate of the unusual occurrence of excessive winds, heavy rainfall, and flooding.

Figure 11. Hurricane Probability for Bamberg County

	# of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (% Chance per Year)
Countywide	38	155	4.0	24.5%

Source: NOAA

Figure 12. Tropical Storm Probability for Bamberg County

	# of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (% Chance per Year)
Countywide	110	155	1.4	70.9%

Source: NOAA

According to the most reliable hurricane/tropical storm data, there is a 24.5% chance a hurricane will impact the Bamberg County area during any given hurricane season, and a 71% chance a tropical storm will impact the county. During the recorded 155-year period, a recurrence interval of approximately every four years was calculated that a hurricane event could occur. During the same time period, a recurrence interval of 1.4 years was calculated for a tropical storm event.

Vulnerability

Based on the results from figure 11, Bamberg County has a low vulnerability to hurricanes. Minor occurrences of unusually heavy rainfall, flooding, and excessive winds have affected the area due to the impact of a coastal hurricane. However, a hurricane landing pattern is

unpredictable until the formation of the storm and until it is within a short time frame from landing. Therefore, it is not reasonable to assume that hurricane occurrences are not a foreseen threat in the future based solely on past events.

As far as tropical storm occurrences, it can be concluded that Bamberg County has a high vulnerability based on the results from figure 12 (71% hazard frequency per year).

Hail Storm Analysis

Hazard Description

Hailstorms are a result of severe thunderstorms. Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until, having developed sufficient weight, fall as precipitation, as balls or irregularly shaped masses of ice greater than 0.75 inches in diameter. The size of hailstones is a direct function of the size and severity of the storm. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a function of the intensity of heating at the Earth's surface. Higher temperature gradients relative to elevation above the surface result in increased suspension time and hailstone size. *(Source: SC State HMP).*

Severity

Bamberg County has experienced a total of 46 hailstorm events that have been documented in the past 34 years (1975 -2009). The City of Bamberg has experienced 10 hail events in 14 years, the City of Denmark has a recorded 14 events in the same timeframe, the Town of Ehrhardt has had six events, the Town of Govan has no recorded history of a hail event, the Town of Olar has seven recorded events in a 12 year timeframe, and the unincorporated area of the County has experienced 9 hail events in 31 years.

Hail can cause serious damage, notably to automobiles, aircraft, skylights, glass-roofed structures, livestock, and most commonly, agricultural crops. Rarely, massive hailstones have been known to cause concussions or fatal head trauma.

According to the National Climatic Data Center, the State of South Carolina has experienced 4,201 hail events from 1950 to 2009. During this time span, all the counties in the state experienced hailstorms of varying sizes, up to four inches in diameter. These events total an estimated $48,682,000 in property damage, $3,202,000 in crop damage, caused 17 reported injuries, and one reported fatality.

Hailstone size is often reported as compared to known objects rather than reporting the actual diameter. Below in figure 13 is a list of commonly used objects for this purpose.

Hailstone Size to Object Comparison	
Object/Coin	**Hailstone size (inches)**
Pea	0.25 in
Marble	0.50 in
Penny	0.75 in
Nickel	0.88 in
Ping-pong ball	1.50 in
Golf ball	1.75 in
Tennis ball	2.50 in
Baseball	2.75 in
Grapefruit	4.00 in
Softball	4.50 in

Figure 13: Hailstone Size to Object Comparison

Location

There is no map to reflect hailstorm locations for Bamberg County and its incorporated municipalities. There have been a recorded 46 hail events since 1975 in Bamberg County. Hail size recorded in the county ranges from 0.75 inches to 2.75 inches.

Extent

Bamberg County has experienced 46 hail events that have been documented in the past 34 years (1975-2009). A list of the events and dates they occurred in each municipality and unincorporated areas of the County is shown in Figure 14 below.

Figure 14. Historic Occurrences of Hailstorms in Bamberg County

Date(s)	Event	Location	Description(s)
1975-2006	Hail	County	· 0.75 to 2.75 inches in diameter (penny to baseball size hail)
1994-2008	Hail	Bamberg	· 0.75 to 1.75 inches in diameter (penny to golf ball size hail)
1995-2009	Hail	Denmark	· 0.75 to 1.50 inches in diameter (penny to ping pong ball size hail)
1994-2008	Hail	Ehrhardt	· 0.75 to 1.75 inches in diameter (penny to golf ball size hail)
1975-2009	Hail	Govan	· no hail event recorded
1997-2009	Hail	Olar	· 0.75 to 2.00 inches in diameter (penny to golf ball size hail) · 1 recorded injury and 1 recorded fatality

Source: NCDC

The recorded hailstorms over the past 34 years have caused one recorded injury and one fatality in the county. On May 20th, 2008, in the Town of Olar, one individual was injured due to flying glass in her vehicle. There was no information provided for the one fatality in the Town of Olar. Although no monetary estimates were reported for property damage or crop damage, storm surveys in the County reported homes with damaged siding, windows, and roofs; vehicles with broken windows and vehicles being badly dented; and crops flattened.

Bamberg County has experienced a total of 46 hailstorm events that have been documented in the past 34 years (1975 -2009). The City of Bamberg has experienced 10 hail events in 14 years (1994-2008), the City of Denmark has a recorded 14 events in the same timeframe (1995-2009), the Town of Ehrhardt has had six events (1994-2008), the Town of Govan has no recorded history of a hail event, the Town of Olar has seven recorded events in a 12 year timeframe (1997-2009), and the unincorporated area of the County has experienced 9 hail events in 31 years (1975-2006). Hail size ranged from 0.75 inches (penny) to 2.75 inches (baseball) for the County and its incorporated municipalities.

Probability

Based on the recorded hailstorm events for Bamberg County, there is a probability that a hailstorm will occur at least once, if not more every year in the County (0.7). A hailstorm event has more than a 100% likelihood of occurring every year in the County (135.2%).

Figure 15. Hailstorm Probability for Bamberg County

Municipality	# of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (% Chance per Year)
Bamberg	10	14	1.4	71.4%
Denmark	14	14	1	100%
Ehrhardt	6	14	2.3	42.8%
Govan	0	34	*	*
Olar	7	12	1.7	58.3%
Unincorporated	9	31	3.4	29.0%

Source: NCDC

* Unable to calculate (cannot divide by zero)

** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year

Vulnerability

Overall, Bamberg County has a moderate vulnerability to hail. The majority of hail events occurred in the incorporated municipalities of the County. There is over a 100% chance that a hail event may occur in Bamberg County each year. The City of Denmark has a 100% chance that hail may occur each year; the Town of Bamberg has a 71.4% chance that hail may occur each year.

A range of 0.75 to 2.75 inches in hail size is common for Bamberg County and its incorporated municipalities. No estimated values for property damage or crop damage were reported; however, there was one reported injury and one fatality as a result of the hailstorm events. The degree of damage to property and crop is dependent on the hail size. Hailstorms can cause damage to roofs, automobiles, power lines, trees, gardens, agricultural crop, and other structural damage.

Drought Analysis

Hazard Description

The NWS describes four types of drought: meteorological, agricultural, hydrological, and socioeconomic.

Meteorological drought is defined in terms of the departure from a normal precipitation pattern and the duration of the drought hazard. Meteorological drought has a slow-onset that usually takes at least three months to develop and may last for several seasons or years.

Agricultural drought links the various characteristics of meteorological drought to agricultural impacts. The focus is on precipitation shortages and soil-water deficits. A plant's demand for water is dependent on prevailing weather conditions, biological characteristics of the specific plant, its stage of growth, and the physical and biological properties of the soil.

Hydrological drought refers to deficiencies in surface water and sub-surface water supplies. The frequency and severity of hydrological drought is often defined on a watershed basin scale. Although climate is a primary contributor, other factors such as changes in land use, land degradation, and the construction of dams all affect the hydrological characteristics of the basin. Hydrological droughts often lag behind meteorological and agricultural droughts.

Socioeconomic drought occurs when physical water shortage begins to affect the population, individually and collectively. Most socioeconomic definitions of drought associate it with supply, demand, and economic good.

Drought differs from other hazards in many ways. First, the effects of drought take a considerable amount of time to accumulate and the extent of the hazard can linger for prolonged periods after the drought itself had ceased. Second, the absence of a definitive and universally accepted definition of drought complicates the determination of whether a drought is occurring and the level of its severity. Third, compared to other natural hazards, the geographical area, impacts, and duration of drought are difficult to quantify.

Severity

The Palmer Drought Severity Index was developed in the 1960's and uses temperature and rainfall information in a formula to determine dryness. It has become the semi-official drought index. The Palmer Index is most effective in determining long term drought. It uses a zero (0) as normal, and drought is shown in terms of minus numbers; (i.e. minus 2 is moderate drought, minus 3 is severe drought, and minus 4 is extreme drought).

As of December 9, 2009, the entire state of South Carolina is in a normal status based on the State Climatology Office. The SC Drought Response Committee has removed drought declaration for all counties. Frequent rainfall and coverage over the previous months have alleviated the drought conditions statewide.

Over the past four years (2006-2010) Bamberg County has ranged in drought status from normal to severe. Below in figure 16 a list of Bamberg County's drought status can be seen for the past four years.

Figure 16. Drought Status for Bamberg County

Date/Year	Status
December 2009 - April 2009	Normal
February 2009- September 2008	Incipient
August 2008-April 2008	Moderate
January 2008-September 2007	Severe
June-07	Moderate
May-07	Incipient
February 2007 - April 2006	Normal

Source: SC State Climate Office

Location

Droughts are region-wide natural disasters and will be addressed in that way. There is no specific location mapping for droughts in the Bamberg County region.

Extent

In the Bamberg County region, declarations of drought occur frequently. Statistics from the USC Hazards and Vulnerability Research Institute show that from the years 1950 to 2005 there have been a recorded 33 declared droughts. During 2000 to 2003, average precipitation was low, making the area especially dry. Agricultural production was affected by the lack of rain and extremely high temperatures. In the summer months the range for drought is abnormally dry to severely dry. From figure 16 above it can be assumed that Bamberg County experiences periods of moderate to severe drought.

The following is a list of impacts associated with drought. Each one can directly or indirectly impact Bamberg County's economy, environment, and people.

Drought Impacts		
Economy	**Environment**	**People**
• Damage to crops • Increase in food prices • Increased transportation costs for food • Reduced dairy and livestock production • Increased fire hazard • Loss to recreational and tourism industry • Revenue loss to water reliant businesses • Loss of navigability of rivers and canals • Reduction of economic development	• Reduction and degradation of fish and wildlife habitat • Wind and water erosion of soils • Loss of wetlands • Increased number and severity of fires • Air quality effects • Damage to plant species • Lower water levels in reservoirs, lakes, and ponds • Water quality effects (i.e., salt concentration, increased water temperature, pH, dissolved oxygen, turbidty)	• Food shortages • Public dissatisfaction with government • Loss of aesthetic values • Reduction or modification of recreational activities • Health issues related to use restrictions • Increased fire hazard • Mental and physical stress • Decrease in quality of life • Increased poverty • Population migrations

Figure 17: Drought Impacts

Probability

It should be noted that droughts are region-wide natural disasters and will be addressed in that way. There is no location mapping for droughts in the Bamberg County region. In the Bamberg County region, declarations of drought occur frequently. Historical data reports that there have been 33 drought declarations from 1950 to 2005.

Figure 18. Drought Probability for Bamberg County

	# of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (% Chance per Year)
Drought	33	55	1.6	60.0%

Source: USC Hazards and Vulnerability Research Institute

From the above figure 18 it can be expected that the Bamberg County region will have a drought declaration approximately every two years, with a 60% chance of a drought period occurring every year.

Vulnerability

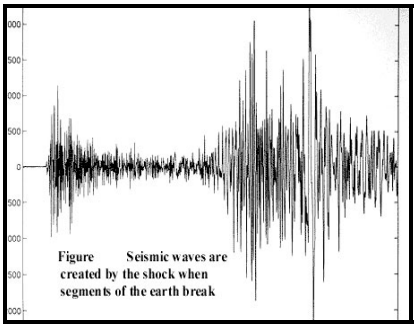
Overall, the Bamberg County region is moderately affected by abnormal to severe levels of drought. Droughts cause devastating affects to agricultural production. The vulnerability of the Bamberg County region to instances of drought is moderate.

Each drought produces a unique set of impacts, depending not only on its severity, duration, and spatial extent, but also on ever-changing social conditions. A wide-range of factors, both physical and social, determines society's vulnerability to drought.

Understanding both direct and indirect impacts (see Figure 17) is one of the most significant challenges in preparing for drought. The direct impacts include loss of revenue from businesses reliant on water, such as car washes, landscapers, and manufacturers. In a drought, water use restrictions may force businesses to suspend all or a portion of their activities. The indirect impacts associated with drought may be far-reaching. The more removed the impact from the cause, the more complex the link to the cause. Indirect impacts are diffused, making it very difficult to determine financial estimates of damages.

It should be mentioned that all incorporated municipalities in Bamberg County have a Drought Management Plan and Response Policy in place as required by the South Carolina Drought Response Act 2000. The purpose of the plan is to establish procedures for managing water demand and evaluating supply options before and during a drought-related water shortage.

Earthquake Analysis



Hazard Description

An earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. Most earthquakes originate from faults, or a break in the rocks that make up the earth's crust, along which rock on either side that have moved past each other. As the rocks move past one another, they occasionally stick, causing a gradual buildup of energy or strain. Eventually, this accumulated energy becomes so great that it is abruptly released in the form of seismic waves, which travel away from the earthquake's source (or focus) deep underground, causing the shaking (ground acceleration) at the earth's surface, known as an earthquake. The point on the earth's surface that is directly above the focus is the epicenter.

Ground acceleration caused by earthquakes has the potential to destroy buildings and infrastructure and cause loss of life. Aftershocks are typically smaller than the main shock, and can continue over a period of weeks, months, or years after the initial earthquake is felt. In addition to the effects of ground acceleration, earthquakes can also cause landslides, and liquefaction under certain conditions. Liquefaction occurs when unconsolidated, saturated soils exhibit fluid-like properties due to intense shaking and vibrations experienced during an earthquake. Together, ground shaking, landslides, and liquefaction can damage and destroy buildings, disrupt utilities (i.e. gas, electric, phone, water), and trigger fires.

According to the U.S. Geological Survey (USGS) Earthquake Hazards Program, most earthquakes occur at the boundaries where the earth's tectonic plates meet, although it is possible for earthquakes to occur entirely within plates. Bamberg County and its incorporated municipalities are located well within the North American plate, far from the plate boundary located east in the Atlantic Ocean. Seismic research is ongoing with regard to causes of earthquakes in regions far from plate margins. Regardless of where they are centered, earthquakes can affect locations beyond their point of origin.

Severity

The terms magnitude and intensity are used to describe the overall severity of an earthquake. The severity of an earthquake depends on the amount of energy released at the epicenter, the distance from the epicenter, and the underlying soil type.

All these factors affect how much the ground shakes, known as Peak Ground Acceleration (PGA) and what a building experiences, known as Spectral Acceleration (SA) during an earthquake.

An earthquake's magnitude is a measurement of the total amount of energy and is expressed in terms of the Richter scale. Intensity measures the effects of an earthquake at a particular place and is expressed in terms of the Modified Mercalli scale. Figure 19 shows the approximate comparison between Richter scale magnitude and Modified Mercalli Intensity (MMI).

Magnitude and Intensity Comparison	
Richter Magnitude Scale	**Typical Maximum MMI**
1.0 to 3.0	I
3.0 to 3.9	II to III
4.0 to 4.9	IV to V
5.0 to 5.9	VI to VII
6.0 to 6.9	VII to IX
7.0 and Higher	VIII or Higher

Figure 19: Magnitude and Intensity Comparison

Figure 20 describes the effects of the various intensity ratings.

MMI Scale Rating	
MMI	**Damage/Perception**
I	• Not felt except by a very few under especially favorable conditions
II	• Felt only by a few people at rest, especially on upper floors of buildings
III	• Felt quite noticeably by people indoors, especially on upper floors of buildings • Many people do not recognize it as an earthquake • Standing motor cars may rock slightly • Vibrations similar to the passing of a truck

IV	• Felt indoors by many, outdoors by few during the day • At night, many awakened • Dishes, windows, doors, disturbed; walls make cracking sound • Sensation like heavy truck striking building • Standing motor cars rocked noticeably
V	• Felt by nearly everyone; many awakened • Some dishes, windows broken • Unstable objects overturned • Pendulum clocks may stop
VI	• Felt by all; many frightened • Some heavy furniture moved • Few instances of fallen plaster • Damage slight
VII	• Damage negligible in buildings of good design and construction • Slight to moderate damage in well-built ordinary structures • Considerable damage in poorly built or badly designed structures • Some chimneys broken
VIII	• Damage slight in specially designed structures • Considerable damage in ordinary substantial buildings with partial collapse • Damage great in poorly built structures • Fall of chimneys, factory stacks, columns, monuments, walls • Heavy furniture overturned
IX	• Damage considerable in specially designed structures • Well-designed frame structures thrown out of plumb • Damage great in substantial buildings, with partial collapse • Buildings shifted off foundations
X	• Some well-built wooden structures destroyed • Most masonry and frame structures destroyed with foundations • Rails bent
XI	• Few, if any masonry or frame structures remain standing • Bridges destroyed • Rails bent greatly
XII	• Total damage • Lines of sight and level are distorted • Objects thrown into the air

Figure 20: MMI Scale

Location

Earthquakes are possible in Bamberg County and its incorporated municipalities. Approximately three earthquakes, not measuring on the Richter scale (Magnitude of 0), were recorded in the County all within the same year and month (May, 1897). Figure 21 gives the timeframe, location, and magnitude of the three events.

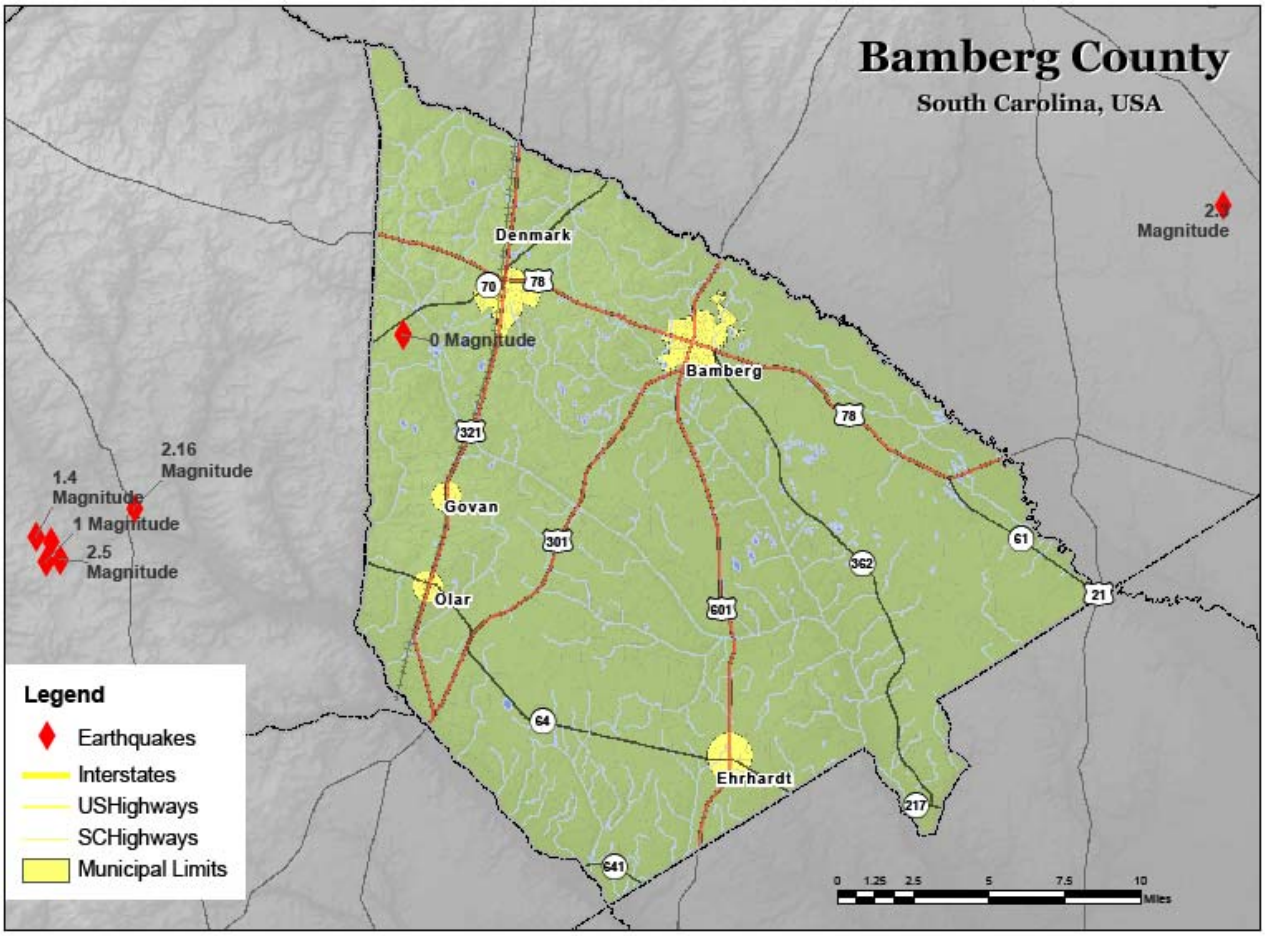
Figure 21. Historic Occurrences of Earthquakes in Bamberg County

Date	Location	Richter Magnitude	Damage Perception
May 6, 1897	County	0	Not Felt
May 24, 1897	County	0	Not Felt
May 27, 1897	County	0	Not Felt

Source: USC Hazards and Vulnerability Research Institute

The following map shows earthquakes in Bamberg County and the surrounding area. In Bamberg County there have been three documented earthquake events over the past 113 years (1897-2010).

Map 5: Earthquake Map



Extent

Bamberg County has experienced three recorded earthquakes over a 113 year timeframe (1897-2010). All three events were in the unincorporated area; southwest of the City of Denmark and appear to have occurred all in the same area and during the same month and year (May, 1897). Of the three earthquakes, none measured on the Richter scale.

Probability

Figure 22. Earthquake Probability for Bamberg County

Location	# of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (% Chance per Year)
County	3	113	37.6	2.6%

Source: USC Hazard and Vulnerability Research Institute

In the past recorded 113 years, three earthquake events have occurred in the unincorporated area of Bamberg County. Of these events, none of them measured on the Richter scale. Based on the above figure, Bamberg County has a 2.6% probability of an earthquake occurring every year, and a recurrence interval of every 37.6 years.

Vulnerability

The infrequency of major earthquakes, coupled with low magnitude events in the past can led one to perceive that Bamberg County and its incorporated municipalities are not vulnerable to a damaging earthquake. While the towns and county do not sit on a major fault system, they are nonetheless susceptible to earthquakes. A high-magnitude earthquake could cause significant financial losses, casualties, and disruptions in critical facilities and services. Dams, bridges, and other infrastructure are also a concern and could incur serious damage from an earthquake.

A building's construction is a key factor in how well it can withstand the forces produced by earthquakes. Unreinforced masonry buildings are most at risk in an earthquake because the walls are prone to collapse outward. Steel and wood buildings have more ability to absorb the energy from an earthquake. Wood buildings with proper foundation ties have rarely collapsed in earthquakes.

Currently there is no reliable method for predicting the time, place, and size of an earthquake. Earthquakes typically occur with little or no warning. Based on the previous events and potential for great losses, Bamberg County and its incorporated municipalities has a low vulnerability to earthquakes.

Wildfire Analysis

Hazard Description

Any forest fire, brush fire, grass fire, or any other outdoor fire that is not controlled and supervised is called a wildfire. These fires cause damage to the forest resource as well as wildlife habitat, water quality, and air quality. Wildfires are the most common natural hazard in South Carolina.

According to the South Carolina Forestry Commission (SCFC), from 1998 to 2006, an average of 3,295 fires occurred annually and were handled by the SCFC, burning an average of 22,949 acres each year. The SCFC reports that the forest fire danger is usually highest in late winter and early spring (January through mid-April) when the vegetation is dead or dormant. March is usually the busiest month for SCFC firefighters.

According to the SCFC, nearly 98 percent of all the wildfires in the state are human caused. The leading cause of wildfires, which accounts for between 40 and 45 percent of all wildfires reported, are the result of someone intentionally setting fire to someone else's property. Burning debris, such as trash, yard waste, construction waste, and agricultural fields often burns out of control, causing 30 to 35 percent of wildfires annually. Equipment use causes about 5 percent of wildfires, usually due to faulty equipment such as farm equipment or hot catalytic converters on automobiles. Between 4 and 5 percent of wildfires are caused by careless smoking. Between 3 and 5 percent of the state's wildfires are caused by children playing with matches, lighters and fireworks. Wildfires caused by campfires account for 1 to 3 percent of fires, occurring mainly during the summer months. Fires that are started by sparks resulting from carbon build-up on railroad tracks cause 1 to 2 percent of the annually reported wildfires. Miscellaneous fires such as those caused by negligence of adults using fireworks, structural fires that ignite nearby wooded areas, or unattended warming fires account for four to six percent of wildfires. Lightning only causes about 2 percent of the annually reported fires in the state. (Source: SCEMD State HMP)

Severity

The severity of a wildfire is based on the damage to the forest resource, wildlife, water and air quality, and the number of acres damaged. For this section, wildfire will be discussed on a county wide level. There is no particular event of wildfire that is illustrated on an individual jurisdiction basis.

Location

Particular events of wildfire will not be discussed on an individual jurisdiction basis, events will be understood to be county wide and presented as such.

The areas within the county that are at a greater risk of wildfires are those areas that have a higher density of vegetation and forests. The land coverage map in the Appendix shows forested and scrub/shrub areas, largely within the unincorporated county, that are at risk due to wildfire events. Smaller county jurisdictions; Govan and Olar, with close proximity to high risk rural areas face a higher risk than the more urbanized jurisdictions of Bamberg, Denmark, and Ehrhardt. Though the outskirts of urban areas are at risk due to the proximity of forested and vegetated areas, the risk in the urban core is comparatively lower.

Extent

The South Carolina Forestry Commission has historical data for wildfires in Bamberg County dating back to 1946 through 2009. During this 63 year period 4,304 wildfires have been documented in the county. In this 63 year timeframe approximately 35,448 acres have been destroyed in the county. Yearly averages have been calculated to give an estimate of how many wildfires occur in the county and how much damage was caused. Figure 23 below depicts a 5, 15, 25, 40, and 50 year average for the county.

Figure 23. Bamberg County Wildfire Averages

	5 Year	15 Year	25 Year	40 Year	50 Year
Wildfires	24	37	55	61	60
Acres	184	168	239	269	378

Source: SC Forestry Commission

Probability

From 1946 to 2009 there have been a recorded 4,304 wildfire events in Bamberg County. The total number of acres affected was 21,049. Figure 24 below depicts the wildfire probability for Bamberg County.

Figure 24. Wildfire Probability for Bamberg County

	# of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (% Chance per Year)
Wildfire	4,304	63	<0.50	6,831.7%**

Source: SC Forestry Commission ** Percent is greater than 100.00, therefore hazard can be expected to occure more than once per year

The areas within the county that are at a greater risk of wildfires are those areas that have a higher density of vegetation and forests. Though the outskirts of urban areas area at risk due to the proximity of forested and vegetated areas, the risk in the urban core is comparatively lower.

Vulnerability

Overall, Bamberg County has a moderate vulnerability to wildfires. The probability of one or more wildfires in the county per year is highly likely (greater than 100%). Unincorporated areas within the county are at an even greater risk and vulnerability to wildfires due to the fact that there is more wooded acreage compared to that of the urbanized towns. By law, the South Carolina Forestry Commission is responsible for wild land fire protection outside of corporate town or city limits. South Carolina law regulates outdoor burning in unincorporated areas. Except within town or city limits, anyone planning to burn outdoors must:

1. Notify the Forestry Commission before starting the fire
2. Clear a firebreak around the area to be burned
3. Have adequate tools, equipment, and personnel on hand to control the fire
4. Stay with the fire until it is completely safe.

After examining past events, wildfires have not caused a great amount of significant reported damage within the county. Therefore, when taking into consideration the high probability of wildfire in the county, and the past history of the event, Bamberg County has a moderate level vulnerability to wildfire.

Flood Analysis

Hazard Description

The National Flood Insurance Program defines a flood as a general and temporary condition of partial or complete inundation of normally dry land areas. South Carolina is especially vulnerable to flooding because of its low elevation and frequency of storms. There are three distinct types of flooding, two of which affect Bamberg County and its incorporated municipalities: coastal flooding, river flooding, and flash flooding.

Coastal Flooding

Long and short wave surges that affect the shores of the open ocean, bays, and tidally influenced rivers, streams, and inlets cause coastal flooding. The astronomic tide and meteorological forces such as nor'easters and hurricanes influence the movement of coastal waters.

River Flooding

River flooding is caused when rivers and streams overflow their banks. Flooding from large rivers usually results from large-scale weather systems that generate prolonged rainfall over wide areas. These same weather systems may cause flooding of smaller basins that drain to major rivers. Small rivers and streams are susceptible to flooding from more localized weather systems that cause intense rainfall over small areas.

Flash Flooding

Short-term, high-intensity rainfall that occurs in inland areas with poor drainage often produces flash floods. Densely populated areas have a high risk for flash floods. The construction of buildings, highways, driveways, and parking lots increases runoff by reducing the amount of rain absorbed by the ground. During periods of heavy rainfall, storm drains may become overwhelmed and flood roads and buildings. Low spots, such as basements are especially vulnerable to flash floods.

Severity

The National Weather Service (NWS) categorizes flooding as major, moderate, and minor. Figure 25 below gives a description of the three flooding categories.

NWS Flood Categories	
Category	**Description**
Major	• Extensive inundation and property damage • Often involves the evacuation of people and the closure of both primary and secondary roads
Moderate	• Inundation of secondary roads • Transfer to higher elevation necessary to save property • Some evacuation may be required
Minor	• Minimal or no property damage • Possibly some public inconvenience

Figure 25: NWS Flood Categories

Location

Identification of floodplain areas within the county and the incorporated municipalities was based on the most recent Flood Insurance Rate Maps (FIRM) produced by FEMA. These maps display the locations of all of the major water bodies in the county and delineate the 100-year floodplain boundaries (Zone A). These are areas that have a one percent (1%) chance of equaling or exceeding the recorded base flood elevation during any year. Map 6 below identifies flood prone areas within Bamberg County.

Map 6: Flood Map

Extent

The following figure 26 gives specific information concerning flooding events and their location within Bamberg County.

Figure 26. Historic Occurrences of Flooding in Bamberg County			
Date	**Location**	**Type**	**Description**
October 13, 1994	Statewide	Flash Flooding	· All counties within South Carolina were given flash flood warnings · Total property damage for state: $2.0M · Total crop damage for state: $8K
October 13, 1994	Statewide	Coastal/Flash Flooding	· All counties within South Carolina were given flash flood warnings followed by coastal flooding in the 10 counties in the Charleston National Weather Service Office area · Total property damage for state: $25.0M · Total crop damage for state: $50K
January 7, 1995	County	Flooding	· Street flooding especially on US 78 · Estimated property damage for Bamberg County: $1K
August 26, 1995	County	Flash Flooding/Flood	· Heavy rains washed out bridges in Bamberg County · $125K in damages to roads · Estimated $30K in property damage · $5K in damages to businesses
September 23, 2000	County	Flash Flooding	· EPD reported flooded streams, roadways with washouts, and sever flooded homes
August 3, 2003	Bamberg and Olar	Flash Flooding	· Police and Sheriff reported roads flooded in Olar and on US 301 near Bamberg
August 24, 2006	Ehrhardt	Flash Flooding	· SCDOT reported flooding along Long Branch and Colston Branch streams, flooding Bethel Road and Colston Road
May 25, 2009	Bamberg	Flash Flooding	· Sheriff reported several roads flooded with 1 to 3 feet of water in Bamberg and the surrounding area · Reported $4K in property damage and $4K in crop damage
Source: NCDC			

Probability

FEMA Flood Insurance Rate Maps (FIRM's) delineate special flood-hazard areas and the risk zones in a community. These special flood-hazard areas identify locations that have a chance of experiencing coastal or river flooding in any given year. The 100-year flood designation means the area has a 1% chance of flooding in any given year.

Based on analysis of records from the National Climatic Data Center, and FEMA's FIRMs, Bamberg County and its incorporated municipalities have a history of experiencing flooding. Bamberg County had eight reported floods/flash floods over a 59 year period (1950 to 2009),

two being within the Town of Bamberg, one in the Town of Olar, one in the Town of Ehrhardt, and three in the unincorporated area of the county. Bamberg County has a 13.5% chance of a flood event to occur each year within the county, and a risk of at least one flood to occur every seven years based on the documented history of flooding.

The City of Denmark and Town of Govan have no recorded flood event in the past 59 years. However, FEMA FIRM's do indicted special flood hazard areas (SFHAs) subject to inundation by the 1% annual chance of flood in Zone A.

The Town of Bamberg has had two flood events to be recorded in the past 59 years. This equates to a yearly flood frequency of 3.3% and a recurrence interval of every 29.5 years. FEMA FIRM's illustrate SFHAs, Zones A and AE, in the southwest portion of the town near US 301. Flooding would primarily be caused by excessive rains which could potentially overflow Halfmoon Branch and Tributary. Base flood elevations in Zone AE range from 141 to 150 feet.

The Town of Ehrhardt has one flood event to be recorded in the past 59 years. SFHAs are illustrated on the FIRM's along Savannah Creek and show Zone AE with base flood elevations of 95 to 132 feet.

In the unincorporated area of the county, five events have been recorded in the past 59 years. There is a % frequency per year that a flood will occur, with one flood occurring every to years in the unincorporated areas of the county. However, there are numerous SFHAs indicated on the FEMA FIRM's subject to inundation by the 1% annual chance of flood in Zone A and Zone AE. Bamberg County has many creeks, rivers, and streams (i.e. Edisto River, Salkehatchie River, Lemon Creek, Colston Branch). These water bodies could cause damage should overflowing occur during unusual rainfall.

Figure 27. Flood Probability for Bamberg County

Location	# of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (% Chance per Year)
Bamberg	2	59	29.5	3.3%
Denmark	0	59	*	*
Ehrhardt	1	59	59	1.6%
Govan	0	59	*	*
Olar	1	59	59	1.6%
Unincorporated	5	59	11.8	8.4%

Source: NCDC *Unable to calculate (cannot divide by zero)

Vulnerability

Severe rainstorms can cause area drainage systems to overflow, resulting in flooded roads. This excessive flooding of the highway network can eventually cause permanent damage to the road infrastructure. Also, there were reports of flooding to homes. Bamberg County has reported over a 59 year period $35K in property damage, $125K in road damage, $5K damage to businesses, and $4K in damage to crops. Overall, Bamberg County has a low vulnerability to flooding.

FEDERAL REQUIREMENTS FOR LOCAL HAZARD MITIGATION PLANS

Requirement 201.6(c)(2)(ii): The risk assessment **must** also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged by floods.

Repetitive Loss Properties

Repetitive loss properties are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program within any 10-year period since 1978. After reviewing such properties and structures within the plan area of Bamberg County and its incorporated municipalities, one such property has been identified. In the Town of Bamberg, one single family dwelling has been identified as a repetitive loss property.

NFIP Participation

The National Flood Insurance Program (NFIP) enables property owners in participating communities to purchase insurance protection from the government against losses from flooding. Participation in the NFIP is based on an agreement between local communities and the federal government which states that if a community will adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in SFHAs, the federal government will make flood insurance available within the community as a financial protection against flood losses. After reviewing FEMA's "Community Status Book Report for Communities Participating in the National Flood Program," Bamberg County is an active participant in the National Flood Insurance Program (NFIP) and has continued compliance with NFIP requirements and objectives. The Town of Bamberg and Town of Denmark are active participants as well. The Town of Ehrhardt is not a participant in the NFIP. The Town of Govan and Town of Olar are not listed and therefore are considered not mapped.

One of the primary objectives of the NFIP is to guide development away from high-flood risk areas. NFIP regulations minimize the impact of structures that are built in SFHAs by requiring them not to cause obstructions to the natural flow of floodwaters. As a condition of Bamberg County's participation in the NFIP, those structures built within SFHAs must adhere to strict floodplain management regulations enforced by the community.

Winter Storm Analysis

Hazard Description

Winter storms are often thought of as a snowstorm. While this can be true, there are also other types of weather associated with winter storms that can be extremely hazardous.

Storms and Strong Winds

Sometimes winter storms are accompanied by strong winds creating blizzard conditions with blinding wind-driven snow, severe drifting, and dangerous wind chill. Strong winds with these intense storms and cold fronts can knock down trees, utility poles, and power lines.

Extreme Cold

Extreme cold often accompanies a winter storm or is left in its wake. Prolonged exposure to the cold can cause frostbite or hypothermia and become life-threatening. In areas unaccustomed to winter weather, near freezing temperatures are considered “extreme cold.” Freezing temperatures can cause severe damage to citrus fruit crops and other vegetation. Pipes may freeze and burst in homes that are poorly insulated or without heat.

Ice Storms

Heavy accumulations of ice can bring down trees, electrical wires, telephone poles and lines, and communication towers. Communications and power can be disrupted for days while utility companies work to repair the extensive damage. Even small accumulations of ice may cause extreme hazards to motorists and pedestrians.

Heavy Snow Storms

Heavy snow can immobilize a region and paralyze a city, stranding commuters, stopping the flow of supplies, and disrupting emergency and medical services. In rural areas, homes and farms bay be isolated for days, and unprotected livestock may be lost. The cost of snow removal, repairing damages, and loss of business can have large economic impacts on cities and towns.

A winter storm develops from three basic elements: cold air, moisture, and lift. Below freezing temperatures in the clouds and near the ground are necessary to make snow and/or ice; moisture is needed to form clouds and precipitation; and something to raise the moist air to

form the clouds and cause precipitation is required (i.e. warm air colliding with cold air and being forced to rise over the cold dome).

Severity

The severity of a winter storm depends on several factors including temperature, wind speed, type of precipitation, rate of deposition, and time of day and/or year the storm occurs. Everyone is potentially at risk during winter storms. The actual threat to the individual depends on the specific situation. Recent observations indicate the following:

- Related to ice and snow:
    - About 70% occur in automobiles
    - About 25% are people caught out in the storm
    - Majority are males over 40 years old
- Related to exposure to cold:
    - 50% are people over 60 years old
    - Over 75% are males
    - About 20% occur in the home

Dangers associated with exposure to cold include frostbite, hypothermia, and wind chill.

Location

There have been four significant winter storms recorded in Bamberg County within the past 59 years. The most recent storm took place on January 29, 2005. The following figure 28 details the four storms that affected the County. Individual jurisdictions are not discussed in detail because the events were part of a county wide and statewide disaster. The participating jurisdictions are assumed to be incorporated in the winter event report.

Figure 28. Historic Occurrences of Winter Storms in Bamberg County

Date	Location	Type	Description
January 2, 2002	Statewide	Winter Storm	· Ice accumulations ranged from 1/4 to 1 inch · Snow accumulations ranged from 2 to 8 inches · Trees and power lines down · Numerous auto accidents · Driving conditions were treacherous
January 25, 2004	Statewide	Ice Storm	· Ice accumulations of 1/2 to 3/4 of an inch · Six people were injured in traffic related accidents · Trees and power lines down · Numerous auto accidents · Driving conditions were treacherous · Total damage estimates were $28.5M Statewide
December 26, 2004	Statewide	Ice Storm	· Ice accumulations of 1/4 to 3/4 of an inch · Trees and power lines down · Numerous auto accidents · Driving conditions were treacherous · Several power outages reported · Accumulation of sleet up to an inch
January 29, 2005	Statewide	Ice Storm	· Ice accumulations of 1/4 to 1/2 of an inch on trees and other structures · Numerous auto accidents · Overpasses and bridges iced over · Several power outages reported

Source: NCDC

Extent

The four significant winter storms/ice storms that affected Bamberg County as part of a statewide event caused minor damages; auto accidents, downed power lines and trees, power outages, ice accumulations.

Probability

Figure 29. Winter Storm Probability for Bamberg County

Location	# of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (% Chance per Year)
County/Statewide	4	59	14.7	6.7%

Source: NCDC

Based on the data from the above figure, it is estimated that a winter storm event may occur every 14.7 years, with a 6.7% chance of a storm occurring every year in Bamberg County. However, mild winter storm events are common in this region of the State. Typically Bamberg County experiences some ice, sleet, or snow event annually. During the months of December to March these events are more likely to occur.

Vulnerability

Heavy accumulations of snow can distress a community; standing commuters, closing vital businesses and facilities, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow can also result in downed trees and power lines. The cost of snow removal, repairing damages, and the loss of business can have a severe economic impact on Bamberg County and its communities.

Ice storms can also have a significant impact on the County. Heavy accumulations of ice can bring down trees and topple utility poles and communication towers. Ice can disrupt communication and power for days while utility companies repair extensive damage. Even small accumulations of ice can be extremely dangerous to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces.

Overall, Bamberg County has a low vulnerability to major winter storms. In examining these four documented events, it is evident that such winter storms can cause much damage to a community that is not prepared for such hazardous conditions involving heavy ice, sleet, and snow.

2.2 Overall Risk Probability and Frequency

The Task Force Committee reviewed this section for the update process and made the necessary changes to Figure 30 to reflect the updated statistics described in Section 2.1.

To determine the probability of a natural hazard event, the number of events, total number of years those events have been recorded, and the frequency of events must be determined. The recurrence interval is also helpful in portraying how common a certain type of hazard is. Dividing the number of years by the number of events produces the recurrence interval, or how often the event will occur per year. The percentage frequency of events is determined by dividing the number of events by the total number of years and multiplying by 100. This gives a reliable sense of the chance a hazard will occur per year.

Figure 30 below is necessary in determining overall hazard vulnerability. The figure also helps to define what types of events are more frequent in Bamberg County.

Figure 30. All Hazards Probability for Bamberg County

Hazard	# of Events	Years in Record	Recurrence Interval (in years)	Hazard Frequency % (chance per year)
Tornado	17	59	3.4	28.8%
Hurricane/Tropcial Storm	38	155	4.0	24.5%
Hail	46	35	0.7	131.4%**
Drought	33	55	1.6	60.0%
Earthquake	3	113	37.6	2.6%
Wildfire	4,304	63	<0.5	6,831.7%**
Flood	8	59	7.3	13.5%
Winter Storm (Snow & Ice)	4	59	14.7	6.7%

Data Sources: National Climatic Data Center, USC Hazards and Vulnerability Research Institute, SC State Climate Office, SC Forestry Commission

* Unable to calculate (cannot divide by zero) ** Percent is greater than 100%, therefore hazard can be expected to occure more than once per year

2.3 Overall Vulnerability Assessment

No changes were made to the mathematical methodology for prioritizing hazards, after review by the Task Force Committee. However, the overall vulnerability summary figures on the following pages have changed due to the updated hazard data as part of the update process.

Prioritization of Hazards for Bamberg County

Based on these findings and the results of technical research the following hazards were selected as priority hazards for Bamberg County: Tornadoes, Hurricanes/Tropical Storms, Hail, Drought, Earthquakes, Wildfires, Flooding, and Winter Storms.

To assess and evaluate hazards, four criteria have been established by the task force committee and each has been given a rating of low, medium, or high risk.

1. History – A record of occurrences
2. Vulnerability – The number of people and the value of property that could be affected
3. Impact – Assuming the greatest event possible and the worst case scenario.
4. Probability – The likelihood an event will occur (chances per year)
5. Priority Score- Composite score value for each hazard weighing priority attention to planning

In the scoring system, each of the four criteria identified for describing and analyzing potential hazards is assigned a rating and their respective number.

Low	1 point
Medium	5 points
High	10 points

Since some criteria are judged to be more important than others, a weighting factor was established to balance out the total scoring. The following weights are used:

History	2
Vulnerability	5
Impact	10
Probability	7

A composite score for each hazard is arrived at by multiplying the score value assigned to each criterion by its weight and then summing the four totals. For example:

Hazard: Flood

History	Medium	5pts x 2 (weighting factor) = 10 pts
Vulnerability	Medium	5pts x 5 (weighting factor) = 25 pts
Impact	High	10pts x 10 (weighting factor) = 100 pts
Probability	Medium	5pts x 7 (weighting factor) = 35 pts
		Total = 160 pts

All information has been compiled and created as to the various hazards in the County. Those hazards with the highest numerical scores will receive priority attention for planning and mitigation purposes. The methods used for determining the rating of High, Medium, and Low risks are as follows:

History: Risk determined by past occurrences in each participating jurisdiction, where available, and by county wide occurrences.

Vulnerability: Based on the total population from the jurisdiction and an estimated projection on property values and facilities within the jurisdiction.

Impact: Risk determination was established by taking into account the vulnerability of the jurisdiction/county as well as past history of occurrence. Determination was also based on the extent of the event located in previous hazard profile section of the plan.

Probability: Determined by hazard frequency percentage located in the previous section of overall risk probability and frequency.

The following figures 31 and 32 are the overall vulnerability summary for hazards within Bamberg County and its incorporated jurisdictions. Plan goals and objectives are prioritized according to this figure.

Figure 31. Bamberg County Hazard Identification and Analysis Worksheet					
Bamberg County					
Type of Hazard	**Probability**	**Vulnerability**	**Impact**	**History**	**Total Score**
Tornado	Low	Low	Medium	Low	
Priority Score:	7	5	50	2	**64**
Hurricane/Tropical Storm	Low	Low	Low	Low	
Priority Score:	7	5	10	2	**24**
Hail	High	Medium	High	High	
Priority Score:	70	25	100	20	**215**
Drought	High	Medium	Medium	High	
Priority Score:	70	25	50	20	**165**
Earthquake	Low	Low	Low	Low	
Priority Score:	7	5	10	2	**24**
Flood	Low	Low	Low	Low	
Priority Score:	7	5	10	2	**24**
Wildfire	High	Medium	Medium	High	
	70	25	50	20	**165**
Winter Storms	Low	Medium	Medium	Low	
Priority Score:	7	25	50	2	**84**

Figure 32. Bamberg County: Incorporated Jurisdictions Hazard Identification and Analysis Worksheet						
Municipality	**Type of Hazard**	**Probability**	**Vulnerability**	**Impact**	**History**	**Total Score**
Bamberg	Tornado	Low	Medium	Low	Low	
	Priority Score:	7	25	10	2	**44**
	Hurricane/Tropical Storm	COUNTYWIDE				
	Priority Score:					
	Hail	Medium	Medium	Medium	High	
	Priority Score:	35	25	50	20	**130**
	Drought	COUNTYWIDE				
	Priority Score:					
	Earthquake	Low	Low	Low	Low	
	Priority Score:	7	5	10	2	**24**
	Wildfire	COUNTYWIDE				
	Priority Score:					
	Flood	COUNTYWIDE				
	Priority Score:					
	Winter Storms	COUNTYWIDE				
	Priority Score:					
Denmark	Tornado	Low	Low	Low	Low	
	Priority Score:	7	5	10	2	**24**
	Hurricane/Tropical Storm	COUNTYWIDE				
	Priority Score:					
	Hail	High	Medium	Medium	High	
	Priority Score:	70	25	50	20	**165**

	Drought	COUNTYWIDE				
	Priority Score:					
	Earthquake	Low	Low	Low	Low	
	Priority Score:	7	5	10	2	**24**
	Wildfire	COUNTYWIDE				
	Priority Score:					
	Flood	COUNTYWIDE				
	Priority Score:					
	Winter Storms	COUNTYWIDE				
	Priority Score:					
Ehrhardt	Tornado	Low	Low	Low	Low	
	Priority Score:	7	5	10	2	**24**
	Hurricane/Tropical Storm	COUNTYWIDE				
	Priority Score:					
	Hail	Medium	Low	Low	Medium	
	Priority Score:	35	5	10	10	**60**
	Drought	COUNTYWIDE				
	Priority Score:					
	Earthquake	Low	Low	Low	Low	
	Priority Score:	7	5	10	2	**24**
	Wildfire	COUNTYWIDE				
	Priority Score:					
	Flood	COUNTYWIDE				
	Priority Score:					
	Winter Storms	COUNTYWIDE				
	Priority Score:					
Govan	Tornado	Low	Low	Low	Low	
	Priority Score:	7	5	10	2	**24**
	Hurricane/Tropical Storm	COUNTYWIDE				
	Priority Score:					
	Hail	Low	Low	Low	Low	
	Priority Score:	7	5	10	2	**24**
	Drought	COUNTYWIDE				
	Priority Score:					
	Earthquake	Low	Low	Low	Low	
	Priority Score:	7	5	10	2	**24**
	Wildfire	COUNTYWIDE				
	Priority Score:					
	Flood	COUNTYWIDE				
	Priority Score:					
	Winter Storms	COUNTYWIDE				
	Priority Score:					
Olar	Tornado	Low	Low	Low	Low	
	Priority Score:	7	5	10	2	**24**
	Hurricane/Tropical Storm	COUNTYWIDE				
	Priority Score:					

	Hail	Medium	Low	Low	Medium	
	Priority Score:	35	5	10	10	**60**
	Drought	COUNTYWIDE				
	Priority Score:					
	Earthquake	Low	Low	Low	Low	
	Priority Score:	7	5	10	2	**24**
	Wildfire	COUNTYWIDE				
	Priority Score:					
	Flood	COUNTYWIDE				
	Priority Score:					
	Winter Storms	COUNTYWIDE				
	Priority Score:					

Bamberg County Property Assessment

As reported from the County Tax Assessors office, Bamberg County properties have been assessed as following:

Residential:	$198,429,123
All Other:	$76,078,873
Agricultural:	$47,041,701
Commercial:	$34,985,366
Mobile Home:	$26,675,600
Multiple Lot Value:	$359,000

There are a recorded 14,027 total parcels within Bamberg County. When determining the vulnerability and impact for each jurisdiction, these numbers were taken into consideration and used to calculate the priority score.

2.4 Community Mitigation Capability Assessment

No changes were made to this section after the Task Force Committee reviewed and analyzed during the update process.

Purpose

The main purpose of this section is to examine the policies, ordinances, and codes that have been put in place to reduce the impacts of natural hazards. In some instances, especially in the more rural jurisdictions, such existing plans do not exist. In these cases, the town is typically covered underneath the county's plans. The following is a collection of policies concerning natural hazards, mitigation, and emergency preparedness, reviewed by the Lower Savannah Council of Governments. This section is essential for the examination of current natural hazard mitigation. The review of the following plans aided the development of this hazard mitigation by allowing the plan developers to see what is already in place to deal with natural hazards.

Bamberg County's Emergency Management Division provides overall coordination during major emergencies, such as hurricanes, tornados, and other natural and manmade disasters. The EMD is responsible for all hazards planning, natural and technological, hazard mitigation, preparedness for, response to, and recovery from disasters, and the coordination of the Emergency Preparedness Committee.

Bamberg County has an Emergency Operations Plan that was developed for use by Bamberg County Government Officials to ensure mitigation and preparedness, appropriated response, and timely recovery from hazards that may affect Bamberg County. The plan has three major parts: letter of promulgation approves the plan and assigns responsibilities, basic plan outlines polices and general procedures that provide a common basis for joint county and municipal governments operations in a natural, technological, or purposeful harm disaster, and Emergency Support Functions (ESFs) providing guidelines for the development of appropriate mechanisms to facilitate the prompt and efficient application of resources in any emergency or disaster situation.

Comprehensive plans and zoning ordinances exist in Bamberg County and the Town of Bamberg. Integrating mitigation concepts and policies with existing comprehensive plans provides and expanded means for implementing initiatives through established, legal frameworks. The foundation of these plans lies in the promotion of health, safety, efficiency, and well being for all segments of the population. Some of the primary plan objectives include preservation of the County's unique natural environment and historic heritage, creation of a stable and diverse economy, and promoting sustainable developments. A local hazard mitigation initiative can be strengthened by finding opportunities where the implementation of

other County goals and policies also supports the mitigation recommendations presented in this plan.

Zoning ordinances cover the unincorporated areas of the county and some municipalities. Zoning can be used to restrict growth in high risk areas, allow low density development or designate only certain uses in hazard prone areas. All the zoning ordinances require erosion control practices for ground disturbing activities, protection of existing waterways, and revegetation. These practices and others promote best management practices and reduce the risk of flooding hazard in particular.

Bamberg County has land development regulations that provide policy for infrastructure for new development. Like zoning regulations, these regulations provide best management practices to reduce the risk of flooding hazards.

Building codes are important in mitigation because codes are developed for areas of the state in consideration of types, frequency and intensity of hazards present in that geographic region. Consequently, structures that are built to applicable codes are inherently resistant to many hazards like strong wind, floods, and earthquakes. Additionally, Bamberg County has a mobile and manufactured home ordinance that provides separate standards for those types of housing

Intergovernmental cooperation is a great asset to the implementation of hazard mitigation actions. This way local, county, and State agencies can act as resources for each other. Interaction between the County, towns, and regional planning organizations occurs in areas such as plan development and grant writing.

The major conclusion reached after conducting the capability assessment is that Bamberg County will need to rely on technical and financial assistance from various resources to effectively implement hazard mitigation actions over the next five years. The constraints facing the County and especially the municipalities include both limited staff resources and extremely limited funding.

During this planning process, it is apparent that the County has a strong capability to bring together various groups to work together in crafting better communities of the future. The same cooperative effort, if joined with the appropriate technical and financial assistance from regional, state, and federal resources, can be harnessed to implement the priority hazard mitigation actions. A sustained effort by citizens, staff, and local officials can create a more sustainable and disaster resistant future.

Each of the local governments has the capacity to handle mitigation issues, but are limited due to funding and limited staff. The results of the capability assessment help to provide the framework for developing recommendation for specific mitigation actions. It also helps to identify shortfalls in the local government capabilities as well as draw attention to existing

successes. The capability assessment was analyzed then used to rank the mitigation strategies according to the capability of the county or the municipalities to implement the actions.

Incorporation of the requirements of the mitigation plan into existing planning mechanisms

Existing Planning Mechanisms

Jurisdiction	Comprehensive Plan	Capital Improvement Plan	Building Code	Flood Hazard Ordinance	Zoning Ordinance	Emergency Operations Plan
Bamberg County	Yes	Yes	Yes	Yes	Yes	Yes
Bamberg	Yes	No	Yes*	Yes	Yes	No
Denmark	No	No	Yes*	Yes	No	No
Ehrhardt	No	No	Yes*	Yes	No	No
Govan	No	No	Yes*	No	No	No
Olar	No	No	Yes*	No	No	No

*Enforced by County

There are several ways to incorporate the hazard mitigation plan requirements into the existing planning processes. First, the comprehensive plans are updated every five years and cover features of the jurisdictions such as natural resources and community facilities. Planning commissions within each jurisdiction revise the plans then recommend the revised plan to the local governing bodies for approval. Using this process, hazard mitigation elements can be included in plan updates.

None of the jurisdictions have capital improvement plans, however, capital improvement activities are usually included as part of the comprehensive plans. The zoning ordinances are built from the findings of the comprehensive plan, so changes to the zoning ordinances can be made after the comprehensive plan is updated.

Updating the comprehensive plan would cover areas such as economic development, land use, natural resources, road construction and community facilities. From that, the zoning ordinance could reflect needed changes for issues such as development, land uses, storm water retention or road grading activities.

Building codes are standard across the county and can be updated with hazard mitigation findings by the governing body of each local government. In addition, the state has adopted the

Southern Building Code. As changes are made to the state building code by the state legislature local jurisdictions may adopt those changes and incorporate them into local building codes.

Public hearings, which provide an opportunity for public comment, are required prior to adoption of any of the above planning mechanisms.

Part Three:

Mitigation Strategy

3.1 Mitigation Strategy

After review and analysis from the Task Force Committee, the Mitigation Strategy section has remained unchanged for the update process.

The Mitigation Strategy section describes how Bamberg County and its incorporated municipalities will reduce or eliminate potential losses from hazards identified in the Natural Hazard Risk Assessment section. The strategy focuses on existing and potential mitigation actions that will mitigate the effects of a natural hazard event on Bamberg County's population, economy, and property. The Mitigation Strategy is a coordinated effort by various agencies and partners to develop and implement a comprehensive range of inventive and effective natural hazard mitigation actions.

Mitigation Strategy Approach

- Establish mitigation goals and objectives that aim to reduce or eliminate Bamberg County's long-term vulnerability to natural-hazard events
- Identify and analyze a comprehensive range of hazard-specific mitigation actions that aim to achieve the goals and objectives of the Mitigation Strategy
- Describe how Bamberg County will prioritize, implement, and administer mitigation actions

FEMA Requirements

The Task Force Committee developed the mitigation strategy consistent with the process and steps presented in the Federal Emergency Management Agency's (FEMA) How-To-Guide: Developing the Mitigation Plan. This section satisfies the following requirements:

- **Requirement §201.6(c)(3)(i):** The hazard mitigation strategy ***shall*** include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
- **Requirement §201.6(c)(3)(ii):** The mitigation strategy ***shall*** include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. The mitigation strategy must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.
- **Requirement §201.6(c)(3)(iii):** The mitigation strategy ***shall*** include an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized,

implemented, and administered by the local jurisdiction. Prioritization ***shall*** include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Process

Using the findings from the risk assessment and the capabilities assessment as a guide the task force developed the following mitigation goals, objectives, and strategies for implementation. Goals and objectives were developed by the Task Force, Lower Savannah Council of Government representatives, and FEMA representatives and included a period provided for comment and revision. Once the final goals and objectives were determined the Task Force developed the mitigation strategies that would aid the county and participating jurisdictions in meeting the goals and objectives identified in the plan. Strategies were selected using the information obtained from the capabilities assessment, which identified existing programs and shortfalls related to mitigation activities.

The first step in the mitigation actions and prioritization process was the county Task Force reviewed a broad range of potential mitigation actions. From these proposed actions, the Task Force developed a prioritization method based on a number of different factors. The projects were ranked based on a cost-benefit review that showed which projects were most needed, which of these projects was the most likely to be accomplished, and which would most effectively address mitigation needs. Those projects that required minimal funds were considered higher in priority because of the high likelihood that they could be accomplished as well as having a maximum cost-benefit ratio.

In addition to reviewing potential monetary costs, the team considered the social impact of each potential project, the technical capabilities of the local government to carry through the project, impact on the environment, ability of the local government to maintain the project, and any political or legal effects of the decision. Actions that can immediately aid in the mitigation of the most likely and dangerous natural hazards are higher in priority under each of the goals for Bamberg County and the participating municipalities. This cost-benefit review was the basis for each of the project feasibility rankings.

Each action and project includes the following: a priority rank, project name, description, responsible party, and timeframe. The participating municipalities will rely on grants and other sources in order to fund mitigation projects.

Based on the recommendations of the Task Force the following implementation schedule has been developed. Projects have been listed by priority according to the ranking assigned by the Task Force (High, Medium, or Low). Feasibility to implement the projects is also ranked High, Medium or Low based on the results of the capability assessment.

Cost Benefit Review

A key criterion for mitigation projects to be eligible for funding is that they must be cost-effective. If the project benefits are higher than the project costs, then the project is cost-effective. In order to ensure a consistent approach in determining the cost-effectiveness of all mitigation projects, Bamberg County will use the FEMA Benefit Cost Analysis (BCA) module and process. A Benefit-Cost Analysis (BCA) is a method for determining the potential positive effects of a specific mitigation action and comparing them to the cost of the action. To assess and demonstrate the cost-effectiveness of mitigation actions, FEMA has developed a suite of BCA software, including hazard-specific modules. Agencies seeking funding under one of FEMA's mitigation grant programs will perform a detailed BCA using this software prior to the submission of the grant application. Bamberg County will weigh the effectiveness of the mitigation actions based on the implementation timeframe, the history of occurrences for specific hazards, and the cost of the project.

Implementation and Administration

The following categories have been identified as information for each action that will guide Bamberg County and its participating municipalities in the implementation and administration of the actions: description, agencies, timeframe, cost, funding source, and priority. It also serves to coordinate the various agencies involved to avoid duplicating or conflicting efforts. The mitigation strategies contain a wide variety of actions that mitigate the effects of natural hazards on the population, economy, and property of Bamberg County.

Implementation Key	
Column Header	**Description**
Mitigation Action & Description	Contains the title and description of the action
Agency	Lists the agency that has primary jurisdiction over the mitigation action and any supporting entities that will assist in the implementation, funding, or maintenance of the mitigation action
Project Timeframe/Duration	Estimates when the project will begin and approximately how long it will take to complete. "Ongoing" refers to actions that are either underway or have no definitive end date
Estimated Project Cost	Estimates costs associated with implementing each mitigation action
Possible Funding Source(s)	Identifies possible sources of funding including capital funding, grants, bonds, and other types of funding
FEMA Category	Identifies the associated FEMA mitigation action category (Prevention, Property Protection, Public Education and Awareness, Natural Resource Protection, Emergency Services, and Structural Projects)
Goals and Objectives	Identifies the hazard mitigation goals and objectives addressed by the mitigation action
Priority	Lists the results of the mitigation action prioritization

3.2 Bamberg County Goals and Objectives

The Task Force Committee reviewed and analyzed the County's goals and objectives and revised Figure 33 as part of the update process.

Developing Goals and Objectives

The first step in developing a hazard mitigation strategy is to establish goals and objectives that aim to reduce or eliminate Bamberg County's long-term vulnerability to natural hazard events. Mitigation goals are general guidelines explaining what the County and its participating municipalities want to achieve in terms of hazard and loss prevention. Objectives are specific, measurable strategies or implementation steps used to achieve the identified goals. Developing clear goals and objectives helped reinforce Bamberg County's overall purpose and mission for undertaking a mitigation planning process.

The goals and objectives set forth below provide the necessary framework to develop a mitigation strategy. Bamberg County will re-evaluate its hazard mitigation goals and objectives each plan maintenance cycle to ensure they continue to represent the hazard mitigation priorities.

Hazard Mitigation Goals and Objectives	
Goal 1: Protect public health and safety	
Objective 1.1	Improve systems that provide warning and emergency communications.
Objective 1.2	Reduce the impacts of hazards on vulnerable populations.
Objective 1.3	Train emergency responders.
Objective 1.4	Strengthen local building code enforcement.
Goal 2: Increase public preparedness and awareness for natural disasters	
Objective 2.1	Enhance understanding of natural hazards and the risks they pose.
Objective 2.2	Improve hazard information, including databases, maps, articles in local media, instructional web site, pamphlets, information packets, etc.
Objective 2.3	Improve public knowledge of hazards and protective measures allowing individuals to appropriately prepare for and respond to hazard events.
Goal 3: Protect property	
Objective 3.1	Implement mitigation programs that protect critical facilities and services, and promote reliability of lifeline systems to minimize impacts from hazards, maintain operations, and expedite recovery in an emergency.
Objective 3.2	Consider known hazards when identifying a site for new facilities and systems.
Objective 3.3	Adopt and enforce public policies to minimize hazard impacts on buildings, infrastructure, and neighborhoods and enhance safe construction in high hazard areas.
Objective 3.4	Integrate new hazard and risk information into building codes and land use planning mechanisms.

Objective 3.5	Educate public officials, developers, realtors, contractors, building owners, and the public about hazard risks and building requirements.
Hazard Mitigation Goals and Objectives	
Goal 4: Emergency Services	
Objective 4.1	Immediate actions taken in response to a hazard event can minimize the impact of hazard incidents on people and property.
Goal 5: Reduce the potential effects of flooding on homes and buildings in Bamberg County	
Objective 5.1	Continue the implementation of zoning codes.
Objective 5.2	Study flood areas to implement needed changes in development and storm drainage.
Goal 6: Ensure protection and emergency shelters	
Objective 6.1	Shelters must be identified to provide protection to the public.
Objective 6.2	Identify buildings approved for occupancy during natural hazards.
Objective 6.3	The number of shelters should be adequate and safe for the amount of people that may potentially need them.

Figure 33: Bamberg County Hazard Mitigation Goals and Objectives

3.3 Bamberg County Mitigation Actions

Additional mitigation actions were included in this section based on the Task Force Committee review and recommendations. Those changes can be seen in Figure 34 on page 79.

Mitigation actions include programs, plans, projects, or policies that help reduce or eliminate the long-term risk to human life and property from natural hazards. The Task Force Committee identified and analyzed a comprehensive range of hazard-specific mitigation actions with particular emphasis on actions that affect new and existing buildings and infrastructure within Bamberg County, and also the protection of the citizens.

Identification

The Task Force Committee identified both existing and potential mitigation actions within their respective agencies that have the following criteria:

- Reduce or eliminate the long-term risk to human life and property from at least one of the eight natural hazards identified in the Risk Assessment Section
- Fall under one or more of the six FEMA mitigation action categories
- Achieve one or more of the hazard mitigation goals and objectives

Mitigation Action Categories

FEMA organizes mitigation actions into six broad categories. These categories allow similar types of mitigation actions to be compared, and provides a standardized method for eliminating unsuitable actions. All mitigation actions identified in this strategy fall within one of the FEMA mitigation action categories below:

1. **Prevention:** Government administrative or regulatory actions or processes that influence the way land buildings are developed and built. These actions also include public activities that reduce hazard losses. Examples from this strategy include building and construction code revisions, zoning regulation changes, and computer-hazard modeling.

2. **Property Protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples from this strategy include seismic retrofits, roadway elevations, and floodproofing.

3. **Public Education and Awareness:** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Examples from this strategy include programs that target severe repetitive loss properties and vulnerable populations.

4. **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples from this strategy include projects creating open space or wetlands.

5. **Emergency Services:** Actions that protect people and property during and immediately after a disaster or hazard event. Examples from this strategy include enhancements that provide advanced warning and redundant communications.

6. **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Examples from this strategy include projects that control floodwater, reconstruct dams and seawalls, and construct green roofs.

Summary of Mitigation Actions

The final list of Bamberg County's mitigation actions is in the figure below. Many of the actions protect public health and safety, promote a sustainable economy, protect the environment, and increase public preparedness for disasters. The mitigation actions are the County's programs, plans, projects, or policies that the county may implement to help reduce or eliminate the long-term risk to human life and property from natural hazards. The Task Force identified, analyzed, and prioritized all actions based on the hazard vulnerability, historical occurrence of the hazard, cost effectiveness, and compliance with NFIP.

Status on Strategies

After reevaluating and reviewing the mitigation actions for the plan update, it was evident that some of the previous strategies for Bamberg County were not implemented due to the lack of funding sources. *Note some mitigation actions identified in the plan update may not ultimately be implemented due to prohibitive costs, scale, low benefit/cost analysis rations, or other concerns*

Bamberg County Hazard Mitigation Actions											
Mitigation Action and Description	**Agency**	**Timeframe**	**Hazard(s)**	**Estimated Project Cost**	**Possible Funding Source(s)**	**FEMA Category**	**Goals and Objectives**	**Prioritization**	**Implementation Status**	**Implementation Schedule**	**Milestones Achieved, Impediments to Implementation**
Develop a continuing communications and education program including instructional web-site, pamphlets, information packets and articles in the local media.	Bamberg County/Emergency Management	*Ongoing	ALL	N/A	PDM, HMGP	Public Education and Awareness	2.1,2.2,2.3	Medium	Depending on funding	5 years	Depending on funding
Implement and enforce zoning codes and building codes to ensure no new structures are built within the floodplains.	Bamberg County/Building and Planning	Completed	Flood	N/A	N/A	Prevention	3.2,3.6,5.1,5.2	High	Complete	Continuous process	Enforcement is necessary
Establishment and identification of emergency shelters during times of natural hazards.	Emergency Management	Completed	ALL	N/A	N/A	Emergency Services/Property Protection	1.2, 6.1, 6.2, 6.3	Medium	Complete	In place	Achieved
Identify flood prone areas and determine appropriate improvements to drainage services and levels of flood protection.	Bamberg County/ SCDNR/SCDOT	*Ongoing	Flood	N/A	Federal and State Grants	Property Protection	3.2,3.5,3.6,5.1,5.2	Medium	Depending on funding	5 years	Depending on funding
Develop an enhanced notification system for the citizens using a variety of communication media to simultaneously notify, alert, and/or instruct citizens prior to and during an emergency.	Bamberg County/Emergency Management	Completed	ALL	N/A	PDM/HMGP	Emergency Services/Public Education and Awareness	1.1,1.2,1.3,2.1	Medium	Complete	In place	Emergency telephone notification system, National Weather Service transmitter, Alert FM System

Retro Fit Critical Facilities and install backup generators in select governmental buildings to provide power during blackouts and emergency operations	Emergency Management	*Ongoing	ALL	N/A	PDM/HMGP	Emergency Services/Property Protection	3.1,3.2,3.3,3.4,3.5,3.6	High	Depending on funding	5 years	This is a new strategy and will depend on funding
Continue to regularly inspect roads and bridges throughout the county to ensure they are ready for extra service if a disaster strikes. *US 78 to be widened	Bamberg County/SCDOT/Emergency Management	*Ongoing	ALL	N/A	General Fund/Local or Federal grants	Emergency Services/Prevention	1.2,2.3,4.1	High	This will be an on-going project that will continue to be implemented and developed over time	Continuous	This is a new strategy
Continue to regularly review local government comprehensive plans and ordinances to ensure that they include provisions for pre- and post-disaster planning.	Bamberg County Planning and Development	*Ongoing	ALL	N/A	Local or Federal grants	Prevention/Property Protection	1.4,2.2,3.2.3.3,3.4,3.5,5.1,5.2	High	Continuous process	In place; continuous	Achieved; done on a regular basis
Installation of new roofs and windows at Bamberg-Ehrhardt High School and Denmark-Olar High School. Both locations serve as disaster shelters	Bamberg County/Emergency Management	*Ongoing	ALL	$0.5M-$1M	PDM/HMGP	Property Protection	2.1,2.2,5.2	High	Depending on funding	5 years	This is a new strategy and will depend on funding
Expansion of Bamberg County Emergency Operations Center	Bamberg County/Emergency Management	*Ongoing	ALL	N/A	PDM/HMGP	Emergency Services/Public Education and Awareness	2.1,2.2,2.3,1.2,4.1	Medium	Depending on funding	5 years	This is a new strategy and will depend on funding
Purchase new required FCC radios that are 25 megahertz – 12.5 megahertz for County Emergency Management	Bamberg County/Emergency Management	Immediate	ALL	N/A	PDM/HMGP	Emergency Services/Public Education and Awareness	1.1,2.3	High	Depending on funding	5 years	This is a new strategy and will depend on funding

Figure 34: Bamberg County Hazard Mitigation Actions

*Ongoing is defined as continuing without termination or interruption

3.4 Town of Bamberg Goals and Objectives

The Task Force Committee reviewed and analyzed the Town of Bamberg's goals and objectives and revised Figure 35 as part of the update process.

Developing Goals and Objectives

The first step in developing a hazard mitigation strategy is to establish goals and objectives that aim to reduce or eliminate the Town of Bamberg's long-term vulnerability to natural hazard events. Mitigation goals are general guidelines explaining what the Town wants to achieve in terms of hazard and loss prevention. Objectives are specific, measurable strategies or implementation steps used to achieve the identified goals. Developing clear goals and objectives helped reinforce Bamberg's overall purpose and mission for undertaking a mitigation planning process.

The goals and objectives set forth below provide the necessary framework to develop a mitigation strategy. The Town of Bamberg will re-evaluate its hazard mitigation goals and objectives each plan maintenance cycle to ensure they continue to represent the hazard mitigation priorities.

Hazard Mitigation Goals and Objectives	
Goal 1: Protect public health and safety	
Objective 1.1	Improve systems that provide warning and emergency communications.
Objective 1.2	Reduce the impacts of hazards on vulnerable populations.
Objective 1.3	Train emergency responders.
Objective 1.4	Strengthen local building code enforcement.
Goal 2: Increase public preparedness and awareness for natural disasters	
Objective 2.1	Enhance understanding of natural hazards and the risks they pose.
Objective 2.2	Improve hazard information, including databases, maps, articles in local media, instructional web site, pamphlets, information packets, etc.
Objective 2.3	Improve public knowledge of hazards and protective measures allowing individuals to appropriately prepare for and respond to hazard events.
Goal 3: Protect property	
Objective 3.1	Implement mitigation programs that protect critical facilities and services, and promote reliability of lifeline systems to minimize impacts from hazards, maintain operations, and expedite recovery in an emergency.
Objective 3.2	Consider known hazards when identifying a site for new facilities and systems.
Objective 3.3	Adopt and enforce public policies to minimize hazard impacts on buildings, infrastructure, and neighborhoods and enhance safe construction in high hazard areas.
Objective 3.4	Integrate new hazard and risk information into building codes and land use planning mechanisms.
Objective 3.5	Educate public officials, developers, realtors, contractors, building owners, and

	the public about hazard risks and building requirements.
Hazard Mitigation Goals and Objectives	
Goal 4: Emergency Services	
Objective 4.1	Immediate actions taken in response to a hazard event can minimize the impact of hazard incidents on people and property.
Goal 5: Reduce the potential effects of flooding on homes and buildings in the Town of Bamberg	
Objective 5.1	Continue the implementation of zoning codes.
Objective 5.2	Study flood areas to implement needed changes in development and storm drainage.
Goal 6: Ensure protection and emergency shelters	
Objective 6.1	Shelters must be identified to provide protection to the public.
Objective 6.2	Identify buildings approved for occupancy during natural hazards.
Objective 6.3	The number of shelters should be adequate and safe for the amount of people that may potentially need them.

Figure 35: Town of Bamberg Hazard Mitigation Goals and Objectives

3.5 Town of Bamberg Mitigation Actions

Additional mitigation actions were included in this section based on the Task Force Committee review and recommendations. Those changes can be seen in Figure 36 on page 85.

Mitigation actions include programs, plans, projects, or policies that help reduce or eliminate the long-term risk to human life and property from natural hazards. The Task Force Committee identified and analyzed a comprehensive range of hazard-specific mitigation actions with particular emphasis on actions that affect new and existing buildings and infrastructure within the Town of Bamberg, and also the protection of the citizens.

Identification

The Task Force Committee identified both existing and potential mitigation actions within their respective agencies that have the following criteria:

- Reduce or eliminate the long-term risk to human life and property from at least one of the eight natural hazards identified in the Risk Assessment Section
- Fall under one or more of the six FEMA mitigation action categories
- Achieve one or more of the hazard mitigation goals and objectives

Mitigation Action Categories

FEMA organizes mitigation actions into six broad categories. These categories allow similar types of mitigation actions to be compared, and provides a standardized method for eliminating unsuitable actions. All mitigation actions identified in this strategy fall within one of the FEMA mitigation action categories below:

1. **Prevention:** Government administrative or regulatory actions or processes that influence the way land buildings are developed and built. These actions also include public activities that reduce hazard losses. Examples from this strategy include building and construction code revisions, zoning regulation changes, and computer-hazard modeling.

2. **Property Protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples from this strategy include seismic retrofits, roadway elevations, and floodproofing.

3. **Public Education and Awareness:** Actions to inform and educate citizens, elected

officials, and property owners about the hazards and potential ways to mitigate them. Examples from this strategy include programs that target severe repetitive loss properties and vulnerable populations.

4. **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples from this strategy include projects creating open space or wetlands.

5. **Emergency Services:** Actions that protect people and property during and immediately after a disaster or hazard event. Examples from this strategy include enhancements that provide advanced warning and redundant communications.

6. **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Examples from this strategy include projects that control floodwater, reconstruct dams and seawalls, and construct green roofs.

Summary of Mitigation Actions

The final list of the Town of Bamberg's mitigation actions is in the figure below. Many of the actions protect public health and safety, promote a sustainable economy, protect the environment, and increase public preparedness for disasters. The mitigation actions are the town's programs, plans, projects, or policies that the town may implement to help reduce or eliminate the long-term risk to human life and property from natural hazards. The Task Force identified, analyzed, and prioritized all actions.

Status on Strategies

After reevaluating and reviewing the mitigation actions for the plan update, it was evident that none of the previous strategies for the Town of Bamberg were implemented due to the lack of funding sources. *Note some mitigation actions identified in the plan update may not ultimately be implemented due to prohibitive costs, scale, low benefit/cost analysis rations, or other concerns*

Town of Bamberg Hazard Mitigation Actions											
Mitigation Action and Description	**Agency**	**Hazard(s)**	**Timeframe**	**Estimated Project Cost**	**Possible Funding Source(s)**	**FEMA Category**	**Goals and Objectives**	**Prioritization**	**Implementation Status**	**Implementation Schedule**	**Milestones Achieved, Impediments to Implementation**
Develop a continuing communications and education program including instructional web-site, pamphlets, information packets and articles in the local media.	County/Emergency Management	ALL	Immediate	N/A	PDM, HMGP	Public Education and Awareness	2.1, 2.2, 2.3	High	Depending on funding	End of 2012-over a 3-year term	Identify funding source
Implement and enforce zoning codes and building codes to ensure no new structures are built within the floodplains.	Town of Bamberg/Building and Planning	Flood	*Ongoing	N/A	N/A	Prevention	1.4, 3.2, 3.3	Medium	Completed	Currently in place	Continuous process that requires enforcement
Establishment and identification of emergency shelters during times of natural hazards.	County/Emergency Management	ALL	Complete	N/A	N/A	Emergency Services/ Property Protection	1.2, 2.3, 6.1, 6.2, 6.3	Low	Completed	Currently in place	Completed at this date
Identify flood prone areas and determine appropriate improvements to drainage services and levels of flood protection.	Emergency Management/ SCDNR	Flood	*Ongoing	N/A	Federal and State Grants	Property Protection	2.1, 2.2, 5.2	Low	Depending on funding	5 years	New identified action
Develop an enhanced notification system for the citizens using a variety of communication media to simultaneously notify, alert, and/or instruct citizens prior to and during an emergency	County/Emergency Management	ALL	*Ongoing	N/A	PDM/HMGP	Emergency Services/ Public Education and Awareness	1.1, 2.3, 4.1	Medium	Depending on funding	5 years	Would be based on funding
Retrofit Critical Facilities and install backup generators where necessary	State Emergency Management	ALL	*Ongoing	N/A	PDM/HMGP	Emergency Services/Property Protection	1.1,1.3,2.3, 3.1,3.3,3.4, 3.5,4.1,6.1, 6.2	High	Depending on funding	5 Years	New identified action

Figure 36: Town of Bamberg Hazard Mitigation Actions

*Ongoing is defined as continuing without termination or interruption

3.6 City of Denmark Goals and Objectives

The Task Force Committee reviewed and analyzed the City of Denmark's goals and objectives and revised Figure 37 as part of the update process.

Developing Goals and Objectives

The first step in developing a hazard mitigation strategy is to establish goals and objectives that aim to reduce or eliminate the City of Denmark's long-term vulnerability to natural hazard events. Mitigation goals are general guidelines explaining what the City wants to achieve in terms of hazard and loss prevention. Objectives are specific, measurable strategies or implementation steps used to achieve the identified goals. Developing clear goals and objectives helped reinforce Denmark's overall purpose and mission for undertaking a mitigation planning process.

The goals and objectives set forth below provide the necessary framework to develop a mitigation strategy. The City of Denmark will re-evaluate its hazard mitigation goals and objectives each plan maintenance cycle to ensure they continue to represent the hazard mitigation priorities.

Hazard Mitigation Goals and Objectives	
Goal 1: Protect public health and safety	
Objective 1.1	Improve systems that provide warning and emergency communications.
Objective 1.2	Reduce the impacts of hazards on vulnerable populations.
Objective 1.3	Train emergency responders.
Objective 1.4	Strengthen local building code enforcement.
Goal 2: Increase public preparedness and awareness for natural disasters	
Objective 2.1	Enhance understanding of natural hazards and the risks they pose.
Objective 2.2	Improve hazard information, including databases, maps, articles in local media, instructional web site, pamphlets, information packets, etc.
Objective 2.3	Improve public knowledge of hazards and protective measures allowing individuals to appropriately prepare for and respond to hazard events.
Objective 2.4	Educate residents on meaning of warning systems and scheduled testing of systems.
Objective 2.5	Provide maps for evacuation and distribute pamphlet "Things to Know: In case of a hurricane in Bamberg County."
Goal 3: Protect property	
Objective 3.1	Implement mitigation programs that protect critical facilities and services, and promote reliability of lifeline systems to minimize impacts from hazards, maintain operations, and expedite recovery in an emergency.
Objective 3.2	Consider known hazards when identifying a site for new facilities and systems.
Objective 3.3	Adopt and enforce public policies to minimize hazard impacts on buildings, infrastructure, and neighborhoods and enhance safe construction in high hazard

	areas.
Objective 3.4	Integrate new hazard and risk information into building codes and land use planning mechanisms.
Objective 3.5	Educate public officials, developers, realtors, contractors, building owners, and the public about hazard risks and building requirements.
Objective 3.6	Cutting of dead trees along roadsides.
Hazard Mitigation Goals and Objectives	
Goal 4: Emergency Services	
Objective 4.1	Immediate actions taken in response to a hazard event can minimize the impact of hazard incidents on people and property.
Objective 4.2	Sound warning systems located in Denmark City Hall to be used for notifying public during cases of emergency.
Goal 5: Reduce the potential effects of flooding on homes and buildings in the City of Denmark	
Objective 5.1	Continue the implementation of zoning codes.
Objective 5.2	Study flood areas to implement needed changes in development and storm drainage.
Goal 6: Ensure protection and emergency shelters	
Objective 6.1	Shelters must be identified to provide protection to the public.
Objective 6.2	Identify buildings approved for occupancy during natural hazards.
Objective 6.3	The number of shelters should be adequate and safe for the amount of people that may potentially need them.
Goal 7: Natural Resource Protection	
Objective 7.1	Continue agreement with Bamberg and City of Denmark for use of water in emergency or drought.

Figure 37: City of Denmark Hazard Mitigation Goals and Objectives

3.7 City of Denmark Mitigation Actions

Additional mitigation actions were included in this section based on the Task Force Committee review and recommendations. Those changes can be seen in Figure 38 on page 90.

Mitigation actions include programs, plans, projects, or policies that help reduce or eliminate the long-term risk to human life and property from natural hazards. The Task Force Committee identified and analyzed a comprehensive range of hazard-specific mitigation actions with particular emphasis on actions that affect new and existing buildings and infrastructure within the City of Denmark, and also the protection of the citizens.

Identification

The Task Force Committee identified both existing and potential mitigation actions within their respective agencies that have the following criteria:

- Reduce or eliminate the long-term risk to human life and property from at least one of the eight natural hazards identified in the Risk Assessment Section
- Fall under one or more of the six FEMA mitigation action categories
- Achieve one or more of the hazard mitigation goals and objectives

Mitigation Action Categories

FEMA organizes mitigation actions into six broad categories. These categories allow similar types of mitigation actions to be compared, and provides a standardized method for eliminating unsuitable actions. All mitigation actions identified in this strategy fall within one of the FEMA mitigation action categories below:

1. **Prevention:** Government administrative or regulatory actions or processes that influence the way land buildings are developed and built. These actions also include public activities that reduce hazard losses. Examples from this strategy include building and construction code revisions, zoning regulation changes, and computer-hazard modeling.

2. **Property Protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples from this strategy include seismic retrofits, roadway elevations, and floodproofing.

3. **Public Education and Awareness:** Actions to inform and educate citizens, elected

officials, and property owners about the hazards and potential ways to mitigate them. Examples from this strategy include programs that target severe repetitive loss properties and vulnerable populations.

4. **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples from this strategy include projects creating open space or wetlands.

5. **Emergency Services:** Actions that protect people and property during and immediately after a disaster or hazard event. Examples from this strategy include enhancements that provide advanced warning and redundant communications.

6. **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Examples from this strategy include projects that control floodwater, reconstruct dams and seawalls, and construct green roofs.

Summary of Mitigation Actions

The final list of the City of Denmark's mitigation actions is in the figure below. Many of the actions protect public health and safety, promote a sustainable economy, protect the environment, and increase public preparedness for disasters. The mitigation actions are the town's programs, plans, projects, or policies that the town may implement to help reduce or eliminate the long-term risk to human life and property from natural hazards. The Task Force identified, analyzed, and prioritized all actions.

Status on Strategies

After reevaluating and reviewing the mitigation actions for the plan update, it was evident that none of the previous strategies for the City of Denmark were implemented due to the lack of funding sources. *Note some mitigation actions identified in the plan update may not ultimately be implemented due to prohibitive costs, scale, low benefit/cost analysis rations, or other concerns*

City of Denmark Hazard Mitigation Actions											
Mitigation Action and Description	**Agency**	**Hazard(s)**	**Timeframe**	**Estimated Project Cost**	**Possible Funding Source(s)**	**FEMA Category**	**Goals and Objectives**	**Prioritization**	**Implementation Status**	**Implementation Schedule**	**Milestones Achieved, Impediments to Implementation**
Develop a continuing communications and education program including instructional web-site, pamphlets, information packets and articles in the local media.	County/Emergency Management	ALL	Immediate	N/A	PDM, HMGP	Public Education and Awareness	2.1, 2.2, 2.3	High	Depending on funding	End of 2012-over a 3-year term	Identify funding source
Implement and enforce zoning codes and building codes to ensure no new structures are built within the floodplains.	City of Denmark/Building and Planning	Flood	*Ongoing	N/A	N/A	Prevention	1.4, 3.2, 3.3	Medium	Completed	Currently in place	Continuous process that requires enforcement
Establishment and identification of emergency shelters during times of natural hazards.	County/Emergency Management	ALL	Complete	N/A	N/A	Emergency Services/ Property Protection	1.2, 2.3, 6.1, 6.2, 6.3	Low	Completed	Currently in place	Completed at this date
Identify flood prone areas and determine appropriate improvements to drainage services and levels of flood protection.	Emergency Management/ SCDNR	Flood	*Ongoing	N/A	Federal and State Grants	Property Protection	2.1, 2.2, 5.2	Low	Depending on funding	5 years	New identified action
Notification of the public in cases of emergency. Sound warning system located in Denmark City Hall.	Denmark/Emergency Management	ALL	*Ongoing	N/A	PDM/HMGP	Emergency Services/ Public Education and Awareness	1.1, 2.3, 4.1	Medium	Depending on funding	5 years	Would be based on funding
Retrofit Critical Facilities	Emergency Management	ALL	*Ongoing	N/A	PDM/HMGP	Emergency Services/Property Protection	1.1,1.3,2.3, 3.1,3.3,3.4, 3.5,4.1,6.1, 6.2	High	Depending on funding	5 years	New identified action
The City of Denmark has an extensive grass cutting program. Continue the practice of cutting grass on the side of roads.	City of Denmark	ALL	*Ongoing	N/A	Local funds, PDM, HMGP	Property Protection	3.1,6.3	Medium	Depending on funding	5 years	Would be based on funding
Maintain agreement between Bamberg and Denmark for the use of water in emergency or drought.	Denmark/Bamberg	Drought	*Ongoing	N/A	PDM, HMGP	Natural Resource Protection	7.1	Medium	Depending on funding	5 years	Would be based on funding

Figure 38: City of Denmark Hazard Mitigation Actions

*Ongoing is defined as continuing without termination or interruption

3.8 Town of Ehrhardt Goals and Objectives

The Task Force Committee reviewed and analyzed the Town of Ehrhardt's goals and objectives and revised Figure 39 as part of the update process.

Developing Goals and Objectives

The first step in developing a hazard mitigation strategy is to establish goals and objectives that aim to reduce or eliminate the Town of Ehrhardt's long-term vulnerability to natural hazard events. Mitigation goals are general guidelines explaining what the Town wants to achieve in terms of hazard and loss prevention. Objectives are specific, measurable strategies or implementation steps used to achieve the identified goals. Developing clear goals and objectives helped reinforce Ehrhardt's overall purpose and mission for undertaking a mitigation planning process.

The goals and objectives set forth below provide the necessary framework to develop a mitigation strategy. The Town of Ehrhardt will re-evaluate its hazard mitigation goals and objectives each plan maintenance cycle to ensure they continue to represent the hazard mitigation priorities.

Hazard Mitigation Goals and Objectives	
Goal 1: Protect public health and safety	
Objective 1.1	Improve systems that provide warning and emergency communications.
Objective 1.2	Reduce the impacts of hazards on vulnerable populations.
Goal 2: Increase public preparedness and awareness for natural disasters	
Objective 2.1	Enhance understanding of natural hazards and the risks they pose.
Objective 2.2	Improve hazard information, including databases, maps, articles in local media, instructional web site, pamphlets, information packets, etc.
Objective 2.3	Improve public knowledge of hazards and protective measures allowing individuals to appropriately prepare for and respond to hazard events.
Goal 3: Protect property	
Objective 3.1	Implement mitigation programs that protect critical facilities and services, and promote reliability of lifeline systems to minimize impacts from hazards, maintain operations, and expedite recovery in an emergency.
Objective 3.2	Consider known hazards when identifying a site for new facilities and systems.
Objective 3.3	Adopt and enforce public policies to minimize hazard impacts on buildings, infrastructure, and neighborhoods and enhance safe construction in high hazard areas.
Objective 3.4	Integrate new hazard and risk information into building codes and land use planning mechanisms.

Hazard Mitigation Goals and Objectives	
Goal 4: Emergency Services	
Objective 4.1	Immediate actions taken in response to a hazard event can minimize the impact of hazard incidents on people and property.
Goal 5: Reduce the potential effects of flooding on homes and buildings in the Town of Ehrhardt	
Objective 5.1	Consider the implementation of zoning codes, to be enforced by the County.
Objective 5.2	Study flood areas to implement needed changes in development and storm drainage.
Goal 6: Ensure protection and emergency shelters	
Objective 6.1	Shelters must be identified to provide protection to the public.
Objective 6.2	Identify buildings approved for occupancy during natural hazards.
Objective 6.3	The number of shelters should be adequate and safe for the amount of people that may potentially need them.

Figure 39: Town of Ehrhardt Hazard Mitigation Goals and Objectives

3.9 Town of Ehrhardt Mitigation Actions

Additional mitigation actions were included in this section based on the Task Force Committee review and recommendations. Those changes can be seen in Figure 40 on page 95.

Mitigation actions include programs, plans, projects, or policies that help reduce or eliminate the long-term risk to human life and property from natural hazards. The Task Force Committee identified and analyzed a comprehensive range of hazard-specific mitigation actions with particular emphasis on actions that affect new and existing buildings and infrastructure within the Town of Ehrhardt, and also the protection of the citizens.

Identification

The Task Force Committee identified both existing and potential mitigation actions within their respective agencies that have the following criteria:

- Reduce or eliminate the long-term risk to human life and property from at least one of the eight natural hazards identified in the Risk Assessment Section
- Fall under one or more of the six FEMA mitigation action categories
- Achieve one or more of the hazard mitigation goals and objectives

Mitigation Action Categories

FEMA organizes mitigation actions into six broad categories. These categories allow similar types of mitigation actions to be compared, and provides a standardized method for eliminating unsuitable actions. All mitigation actions identified in this strategy fall within one of the FEMA mitigation action categories below:

1. **Prevention:** Government administrative or regulatory actions or processes that influence the way land buildings are developed and built. These actions also include public activities that reduce hazard losses. Examples from this strategy include building and construction code revisions, zoning regulation changes, and computer-hazard modeling.

2. **Property Protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples from this strategy include seismic retrofits, roadway elevations, and floodproofing.

3. **Public Education and Awareness:** Actions to inform and educate citizens, elected

officials, and property owners about the hazards and potential ways to mitigate them. Examples from this strategy include programs that target severe repetitive loss properties and vulnerable populations.

4. **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples from this strategy include projects creating open space or wetlands.

5. **Emergency Services:** Actions that protect people and property during and immediately after a disaster or hazard event. Examples from this strategy include enhancements that provide advanced warning and redundant communications.

6. **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Examples from this strategy include projects that control floodwater, reconstruct dams and seawalls, and construct green roofs.

Summary of Mitigation Actions

The final list of the Town of Ehrhardt's mitigation actions is in the figure below. Many of the actions protect public health and safety, promote a sustainable economy, protect the environment, and increase public preparedness for disasters. The mitigation actions are the town's programs, plans, projects, or policies that the town may implement to help reduce or eliminate the long-term risk to human life and property from natural hazards. The Task Force identified, analyzed, and prioritized all actions.

Status on Strategies

The Town of Ehrhardt did not participate in the original HMP process. The following mitigation actions are new and have been identified for this update, as the Town of Ehrhardt is now a participating municipality in Bamberg County's HMP. *Note some mitigation actions identified in the plan update may not ultimately be implemented due to prohibitive costs, scale, low benefit/cost analysis rations, or other concerns*

Town of Ehrhardt Hazard Mitigation Actions											
Mitigation Action and Description	**Agency**	**Hazard(s)**	**Timeframe**	**Estimated Project Cost**	**Possible Funding Source(s)**	**FEMA Category**	**Goals and Objectives**	**Prioritization**	**Implementation Status**	**Implementation Schedule**	**Milestones Achieved, Impediments to Implementation**
Develop a continuing communications and education program including instructional web-site, pamphlets, information packets and articles in the local media.	County/Emergency Management	ALL	Immediate	N/A	PDM, HMGP	Public Education and Awareness	2.1, 2.2, 2.3	High	Depending on funding	End of 2012-over a 3-year term	Identify funding source
Consider the implementation of zoning codes and building codes to ensure no new structures are built within the floodplains.	Town of Ehrhardt/County	Flood	*Ongoing	N/A	N/A	Prevention	1.4, 3.2, 3.3	Medium	Depending on funding	5 years	Continuous process that requires enforcement
Establishment and identification of emergency shelters during times of natural hazards.	County/Emergency Management	ALL	Complete	N/A	N/A	Emergency Services/ Property Protection	1.2, 2.3, 6.1, 6.2, 6.3	Low	Completed	Currently in place	Completed at this date
Identify flood prone areas and determine appropriate improvements to drainage services and levels of flood protection.	Emergency Management/ SCDNR	Flood	*Ongoing	N/A	Federal and State Grants	Property Protection	2.1, 2.2, 5.2	Low	Depending on funding	5 years	New identified action
Notification of the public in cases of emergency.	County/Emergency Management	ALL	*Ongoing	N/A	PDM/HMGP	Emergency Services/ Public Education and Awareness	1.1, 2.3, 4.1	Medium	Depending on funding	5 years	Would be based on funding
Retrofit Critical Facilities	Emergency Management	ALL	*Ongoing	N/A	PDM/HMGP	Emergency Services/Property Protection	1.1,1.3,2.3, 3.1,3.3,3.4, 3.5,4.1,6.1, 6.2	High	Depending on funding	5 years	New identified action

Figure 40: Town of Ehrhardt Hazard Mitigation Actions

*Ongoing is defined as continuing without termination or interruption

3.10 Town of Govan Goals and Objectives

The Task Force Committee reviewed and analyzed the Town of Govan's goals and objectives and revised Figure 41 as part of the update process.

Developing Goals and Objectives

The first step in developing a hazard mitigation strategy is to establish goals and objectives that aim to reduce or eliminate the Town of Govan's long-term vulnerability to natural hazard events. Mitigation goals are general guidelines explaining what the Town wants to achieve in terms of hazard and loss prevention. Objectives are specific, measurable strategies or implementation steps used to achieve the identified goals. Developing clear goals and objectives helped reinforce Govan's overall purpose and mission for undertaking a mitigation planning process.

The goals and objectives set forth below provide the necessary framework to develop a mitigation strategy. The Town of Govan will re-evaluate its hazard mitigation goals and objectives each plan maintenance cycle to ensure they continue to represent the hazard mitigation priorities.

Hazard Mitigation Goals and Objectives	
Goal 1: Protect public health and safety	
Objective 1.1	Improve systems that provide warning and emergency communications.
Objective 1.2	Reduce the impacts of hazards on vulnerable populations.
Goal 2: Increase public preparedness and awareness for natural disasters	
Objective 2.1	Enhance understanding of natural hazards and the risks they pose.
Objective 2.2	Improve hazard information, including databases, maps, articles in local media, instructional web site, pamphlets, information packets, etc.
Objective 2.3	Improve public knowledge of hazards and protective measures allowing individuals to appropriately prepare for and respond to hazard events.
Goal 3: Protect property	
Objective 3.1	Implement mitigation programs that protect critical facilities and services, and promote reliability of lifeline systems to minimize impacts from hazards, maintain operations, and expedite recovery in an emergency.
Objective 3.2	Consider known hazards when identifying a site for new facilities and systems.
Objective 3.3	Adopt and enforce public policies to minimize hazard impacts on buildings, infrastructure, and neighborhoods and enhance safe construction in high hazard areas.
Objective 3.4	Integrate new hazard and risk information into building codes and land use planning mechanisms.

Hazard Mitigation Goals and Objectives	
Goal 4: Emergency Services	
Objective 4.1	Immediate actions taken in response to a hazard event can minimize the impact of hazard incidents on people and property.
Goal 5: Reduce the potential effects of flooding on homes and buildings in the Town of Govan	
Objective 5.1	Consider the implementation of zoning codes, to be enforced by the County.
Objective 5.2	Study flood areas to implement needed changes in development and storm drainage.
Goal 6: Ensure protection and emergency shelters	
Objective 6.1	Shelters must be identified to provide protection to the public.
Objective 6.2	Identify buildings approved for occupancy during natural hazards.
Objective 6.3	The number of shelters should be adequate and safe for the amount of people that may potentially need them.

Figure 41: Town of Govan Hazard Mitigation Goals and Objectives

3.11 Town of Govan Mitigation Actions

Additional mitigation actions were included in this section based on the Task Force Committee review and recommendations. Those changes can be seen in Figure 42 on page 100.

Mitigation actions include programs, plans, projects, or policies that help reduce or eliminate the long-term risk to human life and property from natural hazards. The Task Force Committee identified and analyzed a comprehensive range of hazard-specific mitigation actions with particular emphasis on actions that affect new and existing buildings and infrastructure within the Town of Govan, and also the protection of the citizens.

Identification

The Task Force Committee identified both existing and potential mitigation actions within their respective agencies that have the following criteria:

- Reduce or eliminate the long-term risk to human life and property from at least one of the eight natural hazards identified in the Risk Assessment Section
- Fall under one or more of the six FEMA mitigation action categories
- Achieve one or more of the hazard mitigation goals and objectives

Mitigation Action Categories

FEMA organizes mitigation actions into six broad categories. These categories allow similar types of mitigation actions to be compared, and provides a standardized method for eliminating unsuitable actions. All mitigation actions identified in this strategy fall within one of the FEMA mitigation action categories below:

1. **Prevention:** Government administrative or regulatory actions or processes that influence the way land buildings are developed and built. These actions also include public activities that reduce hazard losses. Examples from this strategy include building and construction code revisions, zoning regulation changes, and computer-hazard modeling.

2. **Property Protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples from this strategy include seismic retrofits, roadway elevations, and floodproofing.

3. **Public Education and Awareness:** Actions to inform and educate citizens, elected

officials, and property owners about the hazards and potential ways to mitigate them. Examples from this strategy include programs that target severe repetitive loss properties and vulnerable populations.

4. **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples from this strategy include projects creating open space or wetlands.

5. **Emergency Services:** Actions that protect people and property during and immediately after a disaster or hazard event. Examples from this strategy include enhancements that provide advanced warning and redundant communications.

6. **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Examples from this strategy include projects that control floodwater, reconstruct dams and seawalls, and construct green roofs.

Summary of Mitigation Actions

The final list of the Town of Govan's mitigation actions is in the figure below. Many of the actions protect public health and safety, promote a sustainable economy, protect the environment, and increase public preparedness for disasters. The mitigation actions are the town's programs, plans, projects, or policies that the town may implement to help reduce or eliminate the long-term risk to human life and property from natural hazards. The Task Force identified, analyzed, and prioritized all actions.

Status on Strategies

After reevaluating and reviewing the mitigation actions for the plan update, it was evident that none of the previous strategies for the Town of Govan were implemented due to the lack of funding sources. *Note some mitigation actions identified in the plan update may not ultimately be implemented due to prohibitive costs, scale, low benefit/cost analysis rations, or other concerns*

Town of Govan Hazard Mitigation Actions											
Mitigation Action and Description	**Agency**	**Hazard(s)**	**Timeframe**	**Estimated Project Cost**	**Possible Funding Source(s)**	**FEMA Category**	**Goals and Objectives**	**Prioritization**	**Implementation Status**	**Implementation Schedule**	**Milestones Achieved, Impediments to Implementation**
Develop a continuing communications and education program including instructional web-site, pamphlets, information packets and articles in the local media.	County/Emergency Management	ALL	Immediate	N/A	PDM, HMGP	Public Education and Awareness	2.1, 2.2, 2.3	High	Depending on funding	End of 2012-over a 3-year term	Identify funding source
Consider the implementation of zoning codes and building codes to ensure no new structures are built within the floodplains.	Town of Govan/County	Flood	*Ongoing	N/A	N/A	Prevention	1.4, 3.2, 3.3	Medium	Depending on funding	5 years	Continuous process that requires enforcement
Establishment and identification of emergency shelters during times of natural hazards.	County/Emergency Management	ALL	Complete	N/A	N/A	Emergency Services/ Property Protection	1.2, 2.3, 6.1, 6.2, 6.3	Low	Completed	Currently in place	Completed at this date
Identify flood prone areas and determine appropriate improvements to drainage services and levels of flood protection.	Emergency Management/ SCDNR	Flood	*Ongoing	N/A	Federal and State Grants	Property Protection	2.1, 2.2, 5.2	Low	Depending on funding	5 years	New identified action
Notification of the public in cases of emergency.	County/Emergency Management	ALL	*Ongoing	N/A	PDM/HMGP	Emergency Services/ Public Education and Awareness	1.1, 2.3, 4.1	Medium	Depending on funding	5 years	Would be based on funding
Retrofit Critical Facilities	Emergency Management	ALL	*Ongoing	N/A	PDM/HMGP	Emergency Services/Property Protection	1.1,1.3,2.3, 3.1,3.3,3.4, 3.5,4.1,6.1, 6.2	High	Depending on funding	5 years	New identified action

Figure 42: Town of Govan Hazard Mitigation Actions

*Ongoing is defined as continuing without termination or interruption

3.12 Town of Olar Goals and Objectives

The Task Force Committee reviewed and analyzed the Town of Olar's goals and objectives and revised Figure 43 as part of the update process.

Developing Goals and Objectives

The first step in developing a hazard mitigation strategy is to establish goals and objectives that aim to reduce or eliminate the Town of Olar's long-term vulnerability to natural hazard events. Mitigation goals are general guidelines explaining what the Town wants to achieve in terms of hazard and loss prevention. Objectives are specific, measurable strategies or implementation steps used to achieve the identified goals. Developing clear goals and objectives helped reinforce Olar's overall purpose and mission for undertaking a mitigation planning process.

The goals and objectives set forth below provide the necessary framework to develop a mitigation strategy. The Town of Olar will re-evaluate its hazard mitigation goals and objectives each plan maintenance cycle to ensure they continue to represent the hazard mitigation priorities.

Hazard Mitigation Goals and Objectives	
Goal 1: Protect public health and safety	
Objective 1.1	Improve systems that provide warning and emergency communications.
Objective 1.2	Reduce the impacts of hazards on vulnerable populations.
Goal 2: Increase public preparedness and awareness for natural disasters	
Objective 2.1	Enhance understanding of natural hazards and the risks they pose.
Objective 2.2	Improve hazard information, including databases, maps, articles in local media, instructional web site, pamphlets, information packets, etc.
Objective 2.3	Improve public knowledge of hazards and protective measures allowing individuals to appropriately prepare for and respond to hazard events.
Goal 3: Protect property	
Objective 3.1	Implement mitigation programs that protect critical facilities and services, and promote reliability of lifeline systems to minimize impacts from hazards, maintain operations, and expedite recovery in an emergency.
Objective 3.2	Consider known hazards when identifying a site for new facilities and systems.
Objective 3.3	Adopt and enforce public policies to minimize hazard impacts on buildings, infrastructure, and neighborhoods and enhance safe construction in high hazard areas.
Objective 3.4	Integrate new hazard and risk information into building codes and land use planning mechanisms.

Hazard Mitigation Goals and Objectives	
Goal 4: Emergency Services	
Objective 4.1	Immediate actions taken in response to a hazard event can minimize the impact of hazard incidents on people and property.
Goal 5: Reduce the potential effects of flooding on homes and buildings in the Town of Olar	
Objective 5.1	Consider the implementation of zoning codes, to be enforced by the County.
Objective 5.2	Study flood areas to implement needed changes in development and storm drainage.
Goal 6: Ensure protection and emergency shelters	
Objective 6.1	Shelters must be identified to provide protection to the public.
Objective 6.2	Identify buildings approved for occupancy during natural hazards.
Objective 6.3	The number of shelters should be adequate and safe for the amount of people that may potentially need them.

Figure 43: Town of Olar Hazard Mitigation Goals and Objectives

3.13 Town of Olar Mitigation Actions

Additional mitigation actions were included in this section based on the Task Force Committee review and recommendations. Those changes can be seen in Figure 44 on page 105.

Mitigation actions include programs, plans, projects, or policies that help reduce or eliminate the long-term risk to human life and property from natural hazards. The Task Force Committee identified and analyzed a comprehensive range of hazard-specific mitigation actions with particular emphasis on actions that affect new and existing buildings and infrastructure within the Town of Olar, and also the protection of the citizens.

Identification

The Task Force Committee identified both existing and potential mitigation actions within their respective agencies that have the following criteria:

- Reduce or eliminate the long-term risk to human life and property from at least one of the eight natural hazards identified in the Risk Assessment Section
- Fall under one or more of the six FEMA mitigation action categories
- Achieve one or more of the hazard mitigation goals and objectives

Mitigation Action Categories

FEMA organizes mitigation actions into six broad categories. These categories allow similar types of mitigation actions to be compared, and provides a standardized method for eliminating unsuitable actions. All mitigation actions identified in this strategy fall within one of the FEMA mitigation action categories below:

1. **Prevention:** Government administrative or regulatory actions or processes that influence the way land buildings are developed and built. These actions also include public activities that reduce hazard losses. Examples from this strategy include building and construction code revisions, zoning regulation changes, and computer-hazard modeling.

2. **Property Protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples from this strategy include seismic retrofits, roadway elevations, and floodproofing.

3. **Public Education and Awareness:** Actions to inform and educate citizens, elected

officials, and property owners about the hazards and potential ways to mitigate them. Examples from this strategy include programs that target severe repetitive loss properties and vulnerable populations.

4. **Natural Resource Protection:** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples from this strategy include projects creating open space or wetlands.

5. **Emergency Services:** Actions that protect people and property during and immediately after a disaster or hazard event. Examples from this strategy include enhancements that provide advanced warning and redundant communications.

6. **Structural Projects:** Actions that involve the construction of structures to reduce the impact of a hazard. Examples from this strategy include projects that control floodwater, reconstruct dams and seawalls, and construct green roofs.

Summary of Mitigation Actions

The final list of the Town of Olar's mitigation actions is in the figure below. Many of the actions protect public health and safety, promote a sustainable economy, protect the environment, and increase public preparedness for disasters. The mitigation actions are the town's programs, plans, projects, or policies that the town may implement to help reduce or eliminate the long-term risk to human life and property from natural hazards. The Task Force identified, analyzed, and prioritized all actions.

Status on Strategies

The Town of Olar did not participate in the original HMP process. The following mitigation actions are new and have been identified for this update, as the Town of Olar is now a participating municipality in Bamberg County's HMP. *Note some mitigation actions identified in the plan update may not ultimately be implemented due to prohibitive costs, scale, low benefit/cost analysis rations, or other concerns*

Town of Olar Hazard Mitigation Actions											
Mitigation Action and Description	**Agency**	**Hazard(s)**	**Timeframe**	**Estimated Project Cost**	**Possible Funding Source(s)**	**FEMA Category**	**Goals and Objectives**	**Prioritization**	**Implementation Status**	**Implementation Schedule**	**Milestones Achieved, Impediments to Implementation**
Develop a continuing communications and education program including instructional web-site, pamphlets, information packets and articles in the local media.	County/Emergency Management	ALL	Immediate	N/A	PDM, HMGP	Public Education and Awareness	2.1, 2.2, 2.3	High	Depending on funding	End of 2012-over a 3-year term	Identify funding source
Consider the implementation of zoning codes and building codes to ensure no new structures are built within the floodplains.	Town of Olar/County	Flood	*Ongoing	N/A	N/A	Prevention	1.4, 3.2, 3.3	Medium	Depending on funding	5 years	Continuous process that requires enforcement
Establishment and identification of emergency shelters during times of natural hazards.	County/Emergency Management	ALL	Complete	N/A	N/A	Emergency Services/ Property Protection	1.2, 2.3, 6.1, 6.2, 6.3	Low	Completed	Currently in place	Completed at this date
Identify flood prone areas and determine appropriate improvements to drainage services and levels of flood protection.	Emergency Management/ SCDNR	Flood	*Ongoing	N/A	Federal and State Grants	Property Protection	2.1, 2.2, 5.2	Low	Depending on funding	5 years	New identified action
Notification of the public in cases of emergency.	County/Emergency Management	ALL	*Ongoing	N/A	PDM/HMGP	Emergency Services/ Public Education and Awareness	1.1, 2.3, 4.1	Medium	Depending on funding	5 years	Would be based on funding
Retrofit Critical Facilities	Emergency Management	ALL	*Ongoing	N/A	PDM/HMGP	Emergency Services/Property Protection	1.1,1.3,2.3, 3.1,3.3,3.4, 3.5,4.1,6.1, 6.2	High	Depending on funding	5 years	New identified action

Figure 44: Town of Olar Hazard Mitigation Actions

*Ongoing is defined as continuing without termination or interruption

Part Four:

Plan Maintenance

4.1 Plan Maintenance and Update

As part of the update process, the Task Force Committee reviewed and analyzed this section and made the following changes: the monitoring initiatives were added, Figure 45 on page 109 gives a new plan update timeframe, incorporation of the plan into existing planning mechanisms, and the continued public involvement.

The Plan Maintenance section of Bamberg County's Natural Hazard Mitigation Plan (HMP) describes the formal process that will ensure the Plan remains an effective and relevant document. This section establishes the method and schedule for monitoring, evaluating, and updating the HMP during a five-year plan-update cycle. It also established how Bamberg County will maintain community involvement in the Plan.

Plan Maintenance Approach

- Incorporate hazard mitigation actions into existing planning mechanisms
- Determine how mitigation projects and actions will be monitored
- Establish indicators of effectiveness or success
- Develop an evaluation and revision schedule to ensure the Plan is up-to-date at the end of the five-year cycle
- Establish a process for public input and community involvement during the planning cycle

FEMA Requirements Addressed

The Task Force Committee created a plan maintenance strategy consistent with the process and steps presented in the FEMA How-To-Guide: Bringing the Plan to Life (FEMA 386-4). The following FEMA requirements are addressed in this section:

- **Requirement §201.6(c)(4)(i):** The plan maintenance process ***shall*** include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
- **Requirement §201.6(c)(4)(ii):** The plan ***shall*** include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, where appropriate.
- **Requirement §201.6(c)(4)(iii):** The plan maintenance process ***shall*** include a discussion on how the community will continue public participation in the plan maintenance process.

Monitoring

Bamberg County will monitor the implementation of mitigation actions identified in the Plan. During the five-year planning cycle, the following initiatives will be undertaken.

- Collect reports from the agencies involved in implementing mitigation projects or activities identified in the Mitigation Strategy section of this Plan
- Maintain and update the mitigation action table
- Conduct site visits and obtain reports of completed or initiated mitigation actions to incorporate in the plan revision as needed
- Research and document new natural disaster information pertaining to Bamberg County and its incorporated municipalities during the planning cycle and incorporate into a revised Risk Assessment section as needed
- Organize meetings on an as needed basis with the Task Force Committee to discuss relevant hazard mitigation issues, provide status updates, and discuss available grant opportunities
- Coordinate, compile, and disseminate hazard mitigation funding information and applications
- Convene a meeting of the Task Force Committee following a natural disaster or when funding is announced to prioritize and submit potential mitigation actions for funding

The above activities outline plan maintenance during the four years leading up to the fifth year of the planning cycle. The Task Force Committee will be responsible for compiling, documenting, and incorporating all changes derived from the activities listed above into a revised plan document.

Evaluation

The Bamberg County HMP will be evaluated on an as needed basis to determine the effectiveness of its projects, programs, and policies. The Task Force Committee will be responsible for scheduling and organizing the meetings, collecting, analyzing and incorporating reports, and providing revised drafts. The Task Force Committee members will assess the current version of the Plan and determine the improvements necessary for the plan update.

A thorough examination of the Plan will take place during the fifth year of the process to ensure Bamberg County has an updated HMP at the end of the planning cycle. The Task Force Committee will review the goals and action items to determine their relevance to changing situations in the County and incorporated municipalities, as well as changes in State or Federal policy, and to ensure they are addressing current and expected conditions. The Committee will look at any changes in County resources that may influence the plan implementation (such as

funding) and program changes to determine need for reassignment. The Committee will also review all portions of the Plan to determine if this information should be updated or modified, given any new available data. The Committee will evaluate the content of the Plan using the following criteria:

- Are the mitigation actions effective?
- Are there any changes in land development that affect mitigation priorities?
- Are the goals, objectives, and mitigation actions relevant given any changes in the County?
- Are the goals, objectives, and mitigation actions relevant given any changes to State or Federal regulations or policy?
- Is there any new data that affects the Risk Assessment portion of the Plan?

Update

The Task Force Committee will update the HMP every five years to reflect the results of the reports and on-going plan evaluation. Throughout the planning cycle, the Committee will compile new information and incorporate it into the Plan. The Committee will also assess and incorporate recommended comments expressed by FEMA in the initial review into the plan revision. At the end of the planning cycle, the Committee will submit the updated Plan to the State Emergency Management Office (SCEMD) and FEMA for review. After FEMA has approved the Calhoun County HMP, the County and its incorporated municipalities will formally adopt the Plan. The following figure is an outline of how the Plan will be updated after the 2010 FEMA approval.

Plan Update Schedule		
Timeframe	**Participants**	**Outcome**
First quarter 2011	Task Force Committee	Discuss mitigation action progress and possible plan improvements
Fourth quarter 2012	Task Force Committee	Reconvene to discuss mitigation action progress and plan improvements
First quarter 2013	Bamberg County	Apply for plan update grant funding
First quarter 2014	Task Force Committee	Reconvene and begin plan update
Third quarter 2014	Task Force Committee, SCEMD	Submit draft plan update to SCEMD for review and comments
Fourth quarter 2014	FEMA, Task Force Committee, SCEMD	Submit plan to FEMA for final approval
First quarter 2015	Bamberg County, participating municipalities	Re-adopt the FEMA-approved HMP

Figure 45: Plan Update Schedule

Incorporation into Existing Planning Mechanisms

As part of the local capability assessment conducted during the planning process, the Task Force Committee identified current plans, programs, policies/ordinances, and studies/reports that will augment or help support mitigation planning efforts. The Committee, which will meet on an as needed basis, will be the mechanism for ensuring the County and the participating municipalities integrates hazard mitigation into their future planning activities. Following the HMP approval and adoption, the Committee will work to incorporate, where applicable, the HMP into the planning mechanisms identified on page 69 under Section 2.4: Community Mitigation Capability Assessment. Incorporating the hazard mitigation strategies into these identified planning mechanisms is a fairly simple process. For example, the comprehensive plans include natural resources, land usage, and community facilities information that could easily include hazard mitigation elements into the plans.

Throughout the plan maintenance cycle, the Committee will work to integrate hazard mitigation goals and actions into the general operations of Bamberg County agencies and the participating municipalities. The Committee will work with agencies to identify opportunities as outlined below:

- Update work plans, policies, or procedures to include hazard mitigation concepts
- Establish mitigation funding within capital and operational budgets
- Issue plans, policies, executive orders, regulations, or other directives to carry out mitigation actions
- Add hazard mitigation elements to all applicable plans

Continued Public Involvement

Bamberg County is dedicated to continued public involvement in the hazard mitigation planning and review process. During all phases of plan maintenance, the public will have the opportunity to provide feedback. The 2010 Plan will be maintained and available for review through 2014. Individuals will have an opportunity to submit comments for the Plan update at any time. The Task Force Committee will compile all comments and present them at the meetings where members will consider them for incorporation into the revision. To help publicize the revised plan, a notice will be posted requesting feedback on an updated draft HMP. The Committee will hold community involvement meetings with representatives from various agencies.

Part Five:

Plan Adoption

5.1 Overview

Formal plan adoption is a required part of the planning process and demonstrates Bamberg County, the Town of Bamberg, City of Denmark, Town of Ehrhardt, Town of Govan, and Town of Olar's commitment to fulfilling the mitigation goals and objectives outlined in the Plan. In addition to fulfilling the requirements of the Disaster Mitigation Act of 2000, the County Council and Town/City Council adoption of the Hazard Mitigation Plan (HMP) will establish the Plan as a policy for Bamberg County and the participating municipalities, which will define the actions the various agencies should take to comply with or implement the HMP.

Following a formal plan review by the Federal Emergency Management Agency (FEMA) and the South Carolina Emergency Management Division (SCEMD), FEMA will issue an "Approval Pending Adoption" to Bamberg County. Upon review and approval of the HMP, Bamberg County Council, Bamberg Town Council, Denmark City Council, Ehrhardt Town Council, Govan Town Council, and Olar Town Council will then formally adopt the HMP.

Plan Adoption Process

- Obtain "Approval Pending Adoption" status from FEMA
- Draft an adoption resolution or an ordinance to meet plan requirements and demonstrate Bamberg County's, Bamberg's, Denmark's, Ehrhardt's, Govan's, and Olar's commitment to protect its residents and built environment from the effects of natural hazards
- Adopt HMP

FEMA Requirements Addressed

Bamberg County and the Task Force Committee created a plan adoption strategy consistent with the process steps presented in FEMA's How-To-Guide: Bringing the Plan to Life (FEMA 386-4). This section satisfies the following FEMA requirement:

- **Requirement §201.6(c)(5):** The local hazard mitigation plan ***shall*** include documentation that the plan had been formally adopted by the governing body of the jurisdiction requesting approval of the plan.

5.2 Adoption Resolution/Ordinance

RESOLUTION TO BE INSERTED UPON ADOPTION

5.3 SCEMD Approval Letter

SCEMD APPROVAL LETTER TO BE INSERTED

5.4 FEMA Approval Letter

FEMA APPROVAL LETTER TO BE INSERTED

Part Six:

Appendices

Appendix A: Acronym List

Acronym List	
Acronym	**Definition**
BCA	Benefic-Cost Analysis
BFE	Base Flood Elevation
BMP	Best Management Practices
DMA 2000	Disaster Mitigation Act of 2000
DOT	Department of Transportation
EF-Scale	Enhanced Fujita Scale
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
F-Scale	Fujita Scale
Ft	Feet
FTA	Federal Transit Administration
FY	Fiscal Year
GIS	Geographic Information System
HAZUS-MH	Hazards U.S. Multi-Hazard
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
MMI	Modified Mercalli Intensity
Mph	Miles Per Hour
N/A	Not Applicable
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
PDM	Pre-Disaster Mitigation
SRL	Severe Repetitive Loss
STAPLEE	Social, Technical, Administrative, Political, Legal, Economical, Environmental
TBD	To Be Determined

Appendix B: Glossary

Glossary	
Term	**Definition**
100-Year Flood	The term "100-year flood" can be misleading. The 100-year flood does not necessarily occur once every 100 years. Rather, it is the flood that has a 1 % chance of being equaled or exceeded in any given year. Thus, the 100-year flood could occur more than once in a relatively short period of time. The Federal Emergency Management Agency (FEMA) defines it as the 1 % annual chance flood, which is now the standard definition used by most federal and state agencies and by the National Flood Insurance Program (NFIP).
Agricultural Drought	Links the various characteristics of meteorological drought to agricultural impacts, while focusing on precipitation shortages and soil-water deficits.
Annualized Capital Stock Losses	Long-term average losses in a given year
Base Flood Elevation (BFE)	The water surface elevation of a 100-year flood event (a flood that has a 1 % chance of occurring in any given year as defined by the NFIP). The base flood is a statistical concept used to ensure that all properties
Beaufort Wind Scale	A simplified scale to aid in the estimation of wind speed and corresponding typical effects.
Benefit-Cost Analysis	A systematic, quantitative method of comparing projected benefits to projected costs of a project or policy. It is used as a measure of cost
Capability Assessment	Provides a description and analysis of a community's current capacity to address threats associated with hazards. The assessment includes two components: an inventory of an agency's mission, programs, and policies, and an analysis of its capacity to carry them out. A capability assessment is an integral part of the planning process in which a community's actions to reduce losses are identified, reviewed, and analyzed, and the framework for implementation is identified.
Coastal Storms	Tropical cyclones formed in the atmosphere over warm ocean areas. Wind speeds reach 74 miles per hour or more and blow in a large spiral around a relatively calm center or "eye. Circulation is counterclockwise in the Northern Hemisphere.
Community Rating System	A voluntary program under the NFIP that rewards participating communities (provides incentives) for exceeding the minimum requirements of the NFIP and completing activities that reduce

	flood hazard risk by providing flood insurance premium discounts.
Cultural Facilities	A critical facility is vital to the City's ability to provide essential services and protect life and property. Loss of a critical facility would result in a severe economic or catastrophic impact.
Dam Failure	An uncontrolled release of impounded water resulting in downstream flooding.
Debris	The scattered remains of assets broken or destroyed during the occurrence of a hazard. Debris caused by wind or water hazards can cause additional damage to other assets.
Disaster Mitigation Act of 2000 (DMA 2000)	The latest federal legislation enacted to encourage and promote proactive, pre-disaster planning as a condition of receiving financial assistance under the Robert T. Stafford Act. The DMA emphasizes planning for disasters before they occur. Under the DMA, a pre-disaster hazard mitigation program and new requirements for the national post-disaster hazard mitigation grant program (HMGP) were established.
Drought	A prolonged period with no rain. Limited winter precipitation accompanied by moderately dry periods during the spring and summer months can also lead to drought conditions.
Earthquakes	The sudden motion or trembling of the ground produced by abrupt displacement of rock masses, usually within the upper 10–20 miles of the earth's surface.
Enhanced Fujita Scale	National Weather Service's revised Fujita-scale, which is a complex, systematic approach to measuring the strength of a tornado.
Federal Emergency Management Agency (FEMA)	An independent federal agency (now part of the Department of Homeland Security) created in 1978 to provide a single point of accountability for all federal activities related to disaster mitigation and emergency preparedness, response, and recovery.
Flash Flooding	Caused by short-term, high-intensity rainfall that occurs in inland areas
Flood Insurance Rate Map (FIRM)	The official map of a community for which FEMA has delineated the special flood hazard area (SFHA) and the risk premium zones applicable to the community.
Floodplain	Any land area that becomes inundated with water during a flood

Floods	A general and temporary condition of partial or complete inundation on normally dry land. Flooding can be categorized as coastal, riverine, or flash.
Fujita Scale (F-Scale)	Standard measurement for rating the strength of a tornado.
Geographic Information Systems (GIS)	A computer software application that relates data regarding physical and other features on the earth to a database for mapping and analysis.
Goal	A general guideline that explains what is to be achieved. Goals are usually broad-based, long-term, policy-type statements and represent global visions. Goals help define the benefits that a plan is trying to
Ground Acceleration	Shaking of the ground resulting from seismic waves caused by an earthquake.
Hailstorms	Shower-like precipitation in the form of irregular pellets, or balls of ice more than five millimeters in diameter, falling from a cumulonimbus
Hazard	A source of potential danger or adverse condition that could harm people and/or cause property damage.
Hazard Mitigation	Reduction or alleviation of the loss of life, personal injury, and property damage that could result from a disaster through long- and short-term strategies. Hazard mitigation involves strategies such as planning, policy changes, programs, projects, and other activities that could mitigate the impacts of hazards.
Hazard Mitigation Grant Program (HMGP)	Authorized under Section 202 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, the HMGP is administered by FEMA and provides grants to states, tribes, and local governments to implement hazard mitigation actions after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to disasters and to enable mitigation activities to be implemented as a community recovers from a disaster.
Hazard Mitigation Plan (HMP)	A collaborative document that identifies hazards that could affect a community, assesses vulnerability to hazards, and represents consensus decisions reached on how to minimize or eliminate the
Hazards U.S. Multi-Hazard (HAZUS-MH)	A nationally applicable standardized methodology and software program, developed by FEMA, which is under contract with the National Institute of Building Sciences. The program estimates potential losses from earthquakes, hurricane winds, and floods. In HAZUS-MH, current scientific and engineering knowledge is coupled with Geographic Information Systems (GIS) technology to produce estimates of hazard-

Hurricane	A tropical storm with winds that have reached a constant speed of 74
Intensity (earthquakes)	Measures the effects of an earthquake at a particular place and is
Magnitude (earthquakes)	Measurement of the total amount of energy and is expressed in terms of the Richter scale
Mitigation Actions	Specific projects, plans, or policies that achieve goals and objectives that minimize the effects from a disaster and reduce the loss of life and
Mitigation Strategy	A systematic process for analyzing, prioritizing, and implementing the identified mitigation actions in the Hazard Mitigation Plan.
Modified Mercalli Intensity	A scale used for measuring the intensity of an earthquake. The scale quantifies the effects of an earthquake on the Earth's surface, humans, objects of nature, and man-made structures on a scale of I through XII
National Flood Insurance Program (NFIP)	The three components of the NFIP are flood insurance, floodplain management, and flood hazard mapping. Nearly 20,000 communities across the United States and its territories participate in the NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. In exchange, the NFIP makes Federally backed flood insurance available to homeowners, renters, and business owners in these communities. Community participation in the NFIP is voluntary
Objective	A short-term aim that, when combined with other objectives, forms a strategy or course of action to meet a goal. Unlike goals, objectives are specific and measurable.
Peak Ground Acceleration (PGA)	Measures the rate of change in motion of the earth’s surface and expresses it as a percent of the established rate of acceleration due to
Preparedness	Actions that strengthen the capability of government, citizens, and communities to respond to disasters.
Presidential Disaster Declaration	Typically made for events that cause more damage than state and local governments and resources can handle without federal government assistance. Generally, no specific dollar loss threshold has been established for such declarations. A Presidential Disaster Declaration puts into motion long-term federal recovery programs, some of which are matched by state programs, designed to help disaster victims, businesses, and public entities.

Recovery	Recovery refers to actions taken by an individual or community after a catastrophic event to restore order and community lifelines.
Repetitive Loss Property	Any NFIP-insured property that, since 1978 and regardless of any change(s) of ownership during that period, has experienced any of the following:1) Four or more paid flood losses exceeding $1,000 each 2) Two paid flood losses exceeding $1,000 each within any 10-year period since 1978 3)Three or more paid losses that equal or exceed the current value of the insured property
Richter Scale	A logarithmic scale used to express the total amount of energy released by an earthquake. Its values typically fall between 0 and 9, with each increase of 1 representing a 10-fold increase in energy.
Risk	The estimated impact that a hazard would have on people, services, facilities, and structures in a community. Risk measures the likelihood of a hazard occurring and resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate, or low hazard. Risk also can be expressed in terms of potential monetary losses associated with the intensity of likelihood of sustaining damage above a particular threshold due to occurrence of a specific type of the hazard.
Risk Assessment	The process of measuring potential loss of life, personal injury, economic injury, and property damage resulting from hazards. This process assesses the vulnerability of people, buildings, and infrastructure to hazards and focuses on 1) hazard description 2) severity 3) probability 4) location 5) historic occurrences 6) impact to NYC 7) structural vulnerability and 8) potential loss estimates.
River Flooding	Caused when rivers and streams overflow their banks.
Saffir-Simpson Scale	Use by the National Weather Service, this scale uses wind speed to determine the category strength of a hurricane on a scale of 1 to 5.
STAPLEE	A set of criteria used to examine the Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) opportunities and constraints of implementing a particular mitigation measure using a consistent framework.
Storm Surge	An offshore rise of water associated with a low-pressure weather system, typically a tropical cyclone. Storm surge is caused primarily by high winds pushing on the ocean's surface. The wind causes the water to pile up higher than the ordinary sea level.

Tornadoes	A local atmospheric storm, generally of short duration, formed by winds rotating at very high speeds, usually in a counterclockwise direction. The vortex, up to several hundred yards wide, is visible to the observer as a whirlpool-like column of winds rotating about a hollow cavity or funnel.
Tropical Depression	An organized system of clouds and thunderstorms, with a defined surface circulation, and maximum sustained winds of 38 miles per hour or less.
Tropical Storms	An organized system of strong thunderstorms, with a defined surface circulation, and maximum sustained winds of 39 to 73 miles per hour.
Wildfires	Any instance of uncontrolled burning in grasslands, brush, or woodlands.
Windstorms	Short-duration events involving straight-line winds or gusts exceeding 50 mph. These gusts can produce winds of sufficient strength to cause property damage. Windstorms are especially dangerous in areas with significant tree stands, exposed property, poorly constructed buildings, mobile homes (manufactured housing units), major infrastructure, and aboveground utility lines. A windstorm can topple trees and power lines; cause damage to residential, commercial, critical facilities; and leave tons of debris in its wake.
Winter Storms	Includes ice storms and blizzards. Extreme cold often accompanies winter storms. The National Weather Service (NWS) characterizes blizzards as being combinations of winds in excess of 35 mph with considerable falling or blowing snow, which frequently reduces visibility.

Appendix C: Meetings, Notices, Sign-in Sheets

SC Emergency Management Division
2779 Fish Hatchery Road
West Columbia, SC 29172
(803) 737-8500 FAX (803) 737-8570
Visit our website at www.scemd.org

TRAINING GRAM

Workshop Announcement:
Pre-Disaster Mitigation Grant (PDM) Application

Date: 22 August, 2008

Location: SCEMD, Pine Ridge Armory, 2779 Fish Hatchery Road,
West Columbia, SC 29172 – Downstairs Training Room
Course Time: 9:00 a.m. - 3:00 p.m.

Course Description: This workshop is designed to train stakeholders in how to apply for grants through the Federal Emergency Management Agency's Pre-Disaster Mitigation (PDM) Program for Fiscal Year 2009. The PDM program provides funds to state and local governments and PNPs to prepare Pre-Disaster Mitigation plans and to conduct a variety of projects intended to lessen the impact of a disaster on communities when it occurs. Topics include, environmental compliance, types of projects, eligible and ineligible projects, Benefit-Cost Analysis (BCA), FEMA's selection process, planning development, Scope of Work (SOW), work scheduling, cost estimation and case studies. This is one of a series of workshops to be held in Columbia, via statewide teleconference, and at other locations around the state with other dates to be announced. Please check the SCEMD web page for schedule updates.

Who Should Attend: The target audience for this course includes Tribal and local government officials, community and business leaders, emergency service personnel, emergency managers, state agency administrators, county and municipal administrators, local Councils of Governments, special-purpose districts, private non-profit organizations, and other stakeholders.

Workshop Cost: This is a free workshop.
To apply: Go to our website at **www.scemd.org (click on Training then click on SCEMD Course Application Instructions) and follow the instructions.** Applicants selected to attend the course will be notified by email three weeks prior to the course.

If you have questions regarding this training or other training events call or email SCEMD Training at 803-737-8500 or training@emd.state.sc.us . Additional information concerning on-line registration is available at www.scemd.org (click on training).

Lower Savannah Council of Governments
P.O. Box 850, Aiken, South Carolina, 29802
Tel. (803) 649-7981 - Fax (803) 649-2248
www.lscog.org

MEMO

TO: County Emergency Management Coordinators
CC: County Administrators, SC EMD
FROM: Amanda J. Sievers, LSCOG
DATE: September 8th, 2008
RE: Local Government Hazard Mitigation Plans

Lower Savannah Council of Governments is holding a meeting on **Wednesday, September 17th at 10:00am** in the LSCOG large conference room. We will be updating you on the hazard mitigation process and the requirements of the Disaster Mitigation Act of 2000 (DMA 2000).
Your county hazard mitigation plan is scheduled to be updated within the next two years in order to comply with FEMA regulations. We need to begin immediately with the planning process in order to ensure that your Pre-Disaster Mitigation (PDM) funding is not at stake. Enclosed you will find a list of eligible activities for PDM funded projects.

The PDM grant will provide for a comprehensive regional hazard mitigation plan that the LSCOG, with county participation, will undertake. The plan will be consistent with other regional plans in the state and will comply with FEMA regulations regarding DMA 2000. Without a FEMA-approved hazard mitigation plan, local governments will not be eligible for PDM funding. Though counties are not required to partner with the COG in developing the plans, we suggest that for the sake of consistency and to ensure compliance, all Lower Savannah counties participate.

It is essential that both administrators and emergency management coordinators attend this very important meeting. I anticipate your attendance and look forward to seeing you on **Wednesday, September 17th at 10:00am.** If there are any questions please feel free to contact me at (803) 649-7981 or email asievers@lscog.org.

Serving the counties of: Aiken ~ Allendale ~ Bamberg ~ Barnwell ~ Calhoun ~ Orangeburg

LOWER SAVANNAH COUNCIL OF GOVERNMENTS

Regional Hazard Mitigation Planning Meeting

Agenda

September 17th, 2008

Welcome and Introductions	*Jennifer Tinsley*
Update of Pre-Disaster Mitigation (PDM) Program -Hazard Mitigation Planning	*Amanda Sievers*
Current Status and Timeframe for Plans -Plan Updates	*Amanda Sievers*
PDM Grant Application Process	*Amanda Sievers*
Memorandum of Agreement	*Jennifer Tinsley*
General Discussion	*All*
Adjourn	

LOWER SAVANNAH REGION HAZARD MITIGATION MEETING

Lower Savannah Council of Governments Large Conference Room

September 17th, 2008 10:00AM – 12:00PM

ATTENDANCE SHEET

	NAME	AGENCY	PHONE #	EMAIL
1.	Roger Riley	Barnwell Co.	803 541-1001	rriley@barnwellsc.com
2.	Tina M. Matthews	Barnwell Co	803-541-1000	tmatthews@barnwellsc.com
3.	Ed Young	SCEMD REG 6	803 909 2663	E Young@emd.sc.gov
4.	PAUL MATTHEWS	AIKEN CO EMD	803 642-1670	Pmatthews@aikencountysc.gov
5.	Gidget Stanley	Allendale EMA	803-584-4081	gstanley@allendalecounty.com
6.	CLAY KILLIAN	AIKEN CO	803-642-2012	CKILLIAN@aikencountysc.gov
7.	SHARON HAMMOND		803-245-4313	Bamberg2@bellsouth.net
8.	LEE PRICHETT	Calhoun Co.	803 874-2435	cc.admin@sc.rr.com
9.	Bill Minkiewicz	Calhoun Co.	803 655-7625	cces@alltel.net
10.	Gray Wyatt	SCEMD	803-737-8846	gwyatt@emd.sc.gov
11.	Amanda K Loach	SCEMD	803-737-8665	aloach@emd.sc.gov
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Lower Savannah Council of Governments
P.O. Box 850, Aiken, South Carolina, 29802
Tel. (803) 649-7981 - Fax (803) 649-2248
www.lscog.org

MEMO

To: County Administrators
CC: County Emergency Management Directors
From: Jennifer D. Tinsley, Director of Planning and IT
Date: September 18, 2008
Re: Hazard Mitigation Plan Updates for the Lower Savannah Region

As a follow up to our meeting on September 17th, I would like to summarize the hazard mitigation status for the Lower Savannah region. Lower Savannah Council of Governments (LSCOG) would like to assist the local governments in its six-county region with updating the county hazard mitigation plans.

Hazard mitigation plans are important for several reasons: reducing the potential for private property loss and public property damage; minimizing possible disruptions to a community's economy as a result of a disaster; and protecting hospitals, power plants and other vital facilities from hazard-related damages or losses. The plans are required under the **Disaster Mitigation Act of 2000** and must be in place in order for local governments to continue to receive Federal planning assistance funds. Once a hazard mitigation plan is approved by FEMA and adopted by the local government, it must be updated **every five years** to maintain eligibility for funding of pre-disaster mitigation planning grants. **Local mitigation plans must be approved by FEMA in order for communities to receive pre-disaster mitigation grants for local mitigation projects.**

In the Lower Savannah region, all county plans were adopted in March 2005 and therefore must be updated before March 2010. The LSCOG plans to apply for a Pre-Disaster Mitigation (PDM) planning grant to assist the counties with updating their hazard mitigation plans. As we did with the original hazard mitigation plans, we are proposing that the counties provide the required 25% match for the PDM grant.

The PDM planning grant budget is as follows, assuming participation from all six counties:

PROJECT COST: $75,000 ($12,500 per county)
FEMA SHARE: $56,250
COUNTY MATCH: $18,750 ($3,125 per county)

Please keep in mind that the plans will need to be updated whether or not the grant is awarded. The PDM planning grant cycle will be very competitive and there is no assurance that the grant will be funded.

If your county plans on participating in this project, **we will need a letter of commitment for the match funds ($3,125) before October 24th,** which is the deadline for submitting the PDM grant application to SCEMD. Any other documentation of support from the community would be helpful as well. We will be working with your Emergency Management Director throughout the grant application process.

Please feel free to contact me or Amanda Sievers at 803.649.7981 if you have any questions. We look forward to working with you on this important project.

Bamberg County

October 13, 2008

Jennifer D. Tinsley, Director of Planning and IT
Lower Savannah Council of Governments
P.O. Box 850
South Carolina, 29802

Jennifer,

The Bamberg County Hazard Mitigation Plan is set to expire in February 2010. Under the Disaster Mitigation Act of 2000, this plan is required to be updated so we can continue receiving Federal planning assistance funds.

The Lower Savannah Council of Governments (LSCOG) was very instrumental in assisting Bamberg County with our existing plan and getting it approved.

This letter confirms the agreement between Bamberg County and the Lower Savannah Council of Governments (LSCOG) to apply for a Pre-Disaster Mitigation (PDM) planning grant, which will assist in the continuing efforts for Bamberg County to update our Hazard Mitigation Plan. Under this agreement, Bamberg County will provide one sixth of the 25% match, which is $3,125 per county as shown below in the PDM planning grant budget.

Project Cost:	$75,000 ($12,500 per county)
FEMA Share:	$56,250
County Match:	$18,750 ($3,125 per county)

Bamberg County is pleased to continue a relationship with Lower Savannah Council of Governments under the Hazard Mitigation Plan.

Sincerely,

Rose N. Dobson-Elliott

Administrator

OCT 16 2008

2959 MAIN HIGHWAY • P.O. BOX 149 • BAMBERG, SOUTH CAROLINA 29003
(803) 245-5191 FAX (803) 245-3027

SC Emergency Management Division
2779 Fish Hatchery Road
West Columbia, SC 29172
(803) 737-8500 FAX (803) 737-8570
Visit our website at www.scemd.org

TRAINING GRAM

Workshop Announcement:
Mitigation Planning Workshop for Local Governments (G318)

Course Dates: October 29-30, 2008

Course Times: 10:00 a.m. - 5:00 p.m. (1st day)
8:30 a.m. - 4:00 p.m. (2nd day)

Course Location: SCEMD, Pine Ridge Armory, 2779 Fish Hatchery Road, West Columbia, SC 29172

Course Description: This 2-day workshop is designed to aid local jurisdictions in the update of Local Hazard Mitigation Plans. This workshop discusses the Disaster Mitigation Act of 2000 which amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act by, among other things, adding a new section 322--Mitigation Planning. Section 322 requires local governments to prepare and adopt jurisdiction-wide hazard mitigation plans as a condition of receiving Hazard Mitigation Grant Program (HMGP) funds to "brick and mortar" mitigation projects. The Mitigation Planning Workshop for Local Governments assists representatives of local communities or multi-jurisdictional planning areas to develop a mitigation plan that meets community needs as well as the Section 322 local government planning requirements as described in 44 CFR Section 201.6. This workshop explains each of the requirements, demonstrates how FEMA's new Mitigation Planning How-to-Guides can be used to address each requirement, and provides opportunities to begin the planning process in group activities with representatives of the same community planning area.

Who Should Attend: The target audience for this workshop includes the following representatives of local government: local planners, county planners, COG's, emergency managers, emergency program managers, other staff with expertise needed for mitigation projects.

Workshop Cost: This is a free workshop.
Reimbursements: Eligible participants living more than 50 miles from the course location will be reimbursed the cost of lodging and meals at the current state reimbursement rate. Information on making hotel reservation and travel reimbursements will be provided along with a course acceptance email.
To apply: Go to our website at **www.scemd.org (click on Training then click on SCEMD Course Application Instructions) and follow the instructions.** Applicants selected to attend the course will be notified by email no later than August 15, 2008.

If you have specific questions regarding Mitigation Training please contact Gray Warr at 803-737-8846. For general training information contact SCEMD Training at 803-737-8500 or training@emd.state.sc.us Additional information concerning on-line registration is available at www.scemd.org (click on training)

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Visit our website at www.scemd.org

TRAINING GRAM

Workshop Announcement:
Mitigation Planning Workshop for Local Governments (G318)

Course Dates: April 14-15, 2009
Course Times: 10:00 a.m. - 5:00 p.m. (1st day)
8:30 a.m. - 4:00 p.m. (2nd day)
Course Location: SCEMD, Pine Ridge Armory, 2779 Fish Hatchery Road, West Columbia, SC 29172
Course Description: This 2-day workshop is designed to aid local jurisdictions in the update of Local Hazard Mitigation Plans. This workshop discusses the Disaster Mitigation Act of 2000 which amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act by, among other things, adding a new section 322--Mitigation Planning. Section 322 requires local governments to prepare and adopt jurisdiction-wide hazard mitigation plans as a condition of receiving Hazard Mitigation Grant Program (HMGP) funds to "brick and mortar" mitigation projects. The Mitigation Planning Workshop for Local Governments assists representatives of local communities or multi-jurisdictional planning areas to develop a mitigation plan that meets community needs as well as the Section 322 local government planning requirements as described in 44 CFR Section 201.6. This workshop explains each of the requirements, demonstrates how FEMA's new Mitigation Planning How-to-Guides can be used to address each requirement, and provides opportunities to begin the planning process in group activities with representatives of the same community planning area.

Who Should Attend: The target audience for this workshop includes the following representatives of local government: local planners, county planners, COG's, emergency managers, emergency program managers, other staff with expertise needed for mitigation projects.

Workshop Cost: This is a free workshop.
Reimbursements: Eligible participants living more than 50 miles from the course location will be reimbursed the cost of lodging and meals at the current state reimbursement rate. Hotel and travel reimbursements information will be provided along with a course acceptance notification.
NEW APPLICATION PROCEDURES

Course registration will open approximately 4 months prior to the course date. To apply, go to www.scemdlms.org. Applicants selected to attend the course will be notified by email approximately three weeks prior to the course. Your response is required in order to complete the registration and enrollment process for the course. One week prior to the course you will receive a reminder email requesting final confirmation of attendance. In order to insure receipt of all LMS correspondence, be sure your contact information, especially your email address, is current in LMS.

If you have questions regarding this training or other training events call or email SCEMD Training at 803-737-8500 or training@emd.sc.gov. Additional information concerning on-line registration is available at www.scemd.org (click on training).

Lower Savannah Council of Governments
P.O. Box 850, Aiken, South Carolina, 29802
Tel. (803) 649-7981 - Fax (803) 649-2248
www.lscog.org

MEMO

TO: County Emergency Management Coordinators

CC: County Administrators

FROM: Amanda J. Sievers, LSCOG

DATE: July 1st, 2009

RE: Hazard Mitigation Plan Updates for the Lower Savannah Region

Lower Savannah Council of Governments (LSCOG) has been successful in the Pre-Disaster Mitigation (PDM) 2009 selection for a grant award to develop mitigation plan updates. Your county hazard mitigation plan is scheduled to be updated in order to comply with FEMA regulations. We need to begin immediately with the planning process in order to ensure that your PDM funding is not at stake.

LSCOG will be sending a Memorandum of Agreement to all counties once an official grant award notification has been received. Meanwhile, we are requesting that all county Emergency Management Coordinators begin forming their Hazard Mitigation Task Force Committees (police chief, fire chief, public works director, etc.), who will be active participants in the mitigation plan update process.

The PDM grant will provide for a comprehensive regional natural hazard mitigation plan that the LSCOG, with county participation, will undertake. Hazard mitigation plans are important for several reasons: reducing the potential for private property loss and public property damage; minimizing possible disruptions to a community's economy as a result of disaster; and protecting vital facilities (e.g. hospitals, power plants, etc.) from natural hazard-related damages or losses. The plan will be consistent with other regional plans in the state and will comply with FEMA regulations regarding Disaster Mitigation Act (DMA) 2000. Without a FEMA-approved natural hazard mitigation plan, local governments will not be eligible to receive PDM funding for local mitigation projects.

LSCOG is requesting that all Emergency Management Coordinators submit their Task Force Committee contact information to Amanda J. Sievers by Thursday, July 16th, 2009. It is essential to form your Task Force Committee in order to move forward with the plan update. We would like to achieve 100% participation from all jurisdictions, including each municipality in the region. Please keep this in mind when selecting your Task Force Committee. I anticipate your timely response with the necessary information so we can begin scheduling meetings with you.

If there are any questions please feel free to contact me at (803) 649-7981 or email asievers@lscog.org.

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www.lscog.org

MEMO

TO: **Elected Officials of the Lower Savannah Region**

CC: **County Emergency Management Directors**

FROM: **Amanda Sievers, Associate Planner**

DATE: **July 16th, 2009**

RE: **Natural Hazard Mitigation Plan Update**

The Lower Savannah Council of Governments (LSCOG) in conjunction with SC Emergency Management Division, FEMA Region IV, and the six counties of the LSCOG region are in the process of updating your natural hazard mitigation plan as required by the Disaster Mitigation Act of 2000. The six counties- Aiken, Allendale, Bamberg, Barnwell, Calhoun, and Orangeburg- are all participating in the planning process. This memorandum serves to inform you that your municipal participation is needed to achieve full compliance.

All jurisdictions, including municipalities, are **required** to have a FEMA approved natural hazard mitigation plan in order to receive grant funding through the FEMA grant program. LSCOG is assisting with the plan updates, but each municipality must also participate and adopt the multi-jurisdictional plan of their respective county in order to remain eligible for FEMA funding. LSCOG, FEMA, SCEMD, and County EMD's are strongly urging all municipalities to participate so as to lessen the impact of natural disasters and maintain grant eligibility. We expect 100% participation from all municipalities.

County EMD have been contacting the municipalities in their respective counties, and have begun forming task force committees who will be official participants of the plan update. The County EMD have provided their committee's contact information to LSCOG, who is in the process of scheduling upcoming meetings with each county and the task force committees to discuss the required plan update.

You will be informed soon of the task force meeting for your area. It is critical that a representative of your municipality participate in these efforts.

If your municipality has not previously participated in the planning process of the natural hazard mitigation plan, and you have questions or concerns, please feel free to contact Amanda J. Sievers at (803) 649-7981 or asievers@lscog.org as soon as possible to discuss how your local input is critical to developing an effective plan.

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Tel. (803) 649-7981 - Fax (803) 649-2248
www.lscog.org

MEMO

TO: County Emergency Management Directors and Elected Officials
CC: Task Force Committee Members
FROM: Amanda Sievers, LSCOG
DATE: August 5th, 2009
RE: Hazard Mitigation Plan Update Meetings

This MEMO serves to inform you that the Lower Savannah COG has scheduled three kick-off meetings regarding the county hazard mitigation plan update. In order to develop the plans we need your input and participation.

We have scheduled the meetings for August 25th, 26th, and 27th. Please see the following for the specific date/time and location for your county meeting:

County	Date/Time	Place
Aiken/Barnwell	**Tues. August 25th @ 10:00 AM**	Aiken- Aiken County Council Auditorium
Calhoun/ Orangeburg	**Wed. August 26th @ 10:00 AM**	Orangeburg- Orangeburg County Administrative Building (3rd Floor Training Room)
Allendale/Bamberg	**Thurs. August 27th @ 10:00 AM**	Bamberg- Bamberg County Council Chambers

You need only attend the meeting scheduled for your county. We will be discussing hazard mitigation goals and strategies, so come prepared to provide input for your county.

It is important that we get input from everyone involved in the hazard mitigation planning process. Your future funding is at stake.

Feel free to contact me at (803) 649-7981 or asievers@lscog.org if you have any questions.

Lower Savannah
Council of Governments

P.O. Box 850, Aiken, South Carolina, 29802
Tel. (803) 649-7981 - Fax (803) 649-2248
www.lscog.org

November 18, 2009

Mrs. Rose Dobson-Elliott
County Administrator
Bamberg County Government
P.O. Box 149
Bamberg, SC 29003

Dear Rose,

Enclosed you will find the Memorandum of Agreement between Bamberg County and Lower Savannah Council of Governments (LSCOG) to update the county's hazard mitigation plan. LSCOG has successfully been awarded the FEMA Pre-Disaster Mitigation Grant # **PDMC-PL-04-SC-2009-001.** The grant period is 07/14/2009 through 07/14/2012. Two copies of the MOA have been provided. Please sign both of the copies; keeping one for your records, and sending the other copy back to LSCOG.

Thank you for your cooperation. Please do not hesitate to contact me should you have questions or need any additional information.

Sincerely,

F. Wayne Rogers
Executive Director
Lower Savannah Council of Governments

FWR/ajs

Cc: Ms. Sharon Hammond, Bamberg County Emergency Management Director

LOWER SAVANNAH COUNCIL OF GOVERNMENTS

Hazard Mitigation Planning Meeting

Agenda

August 27th, 2009

Welcome and Introductions	*Amanda Sievers*
Hazard Mitigation Planning Update	*Amanda Sievers*
Current Status and Timeframe for Plans	*Amanda Sievers*
Plan Update Process	*Amanda Sievers*
General Discussion	*All*
Adjourn	

ALLENDALE AND BAMBERG COUNTY HAZARD MITIGATION MEETING

BAMBERG COUNTY COUNCIL CHAMBERS

AUGUST 27, 2009 10:00AM

ATTENDANCE SHEET

	NAME	AGENCY	PHONE #	EMAIL
1.	Sharon Hammond	Bamberg EMA	803-245-7313	bamberg1@bellsouth.net
2.	Gidget Stanley	Allendale EMA	803-584-4031	gstanley@allendalecountyco
3.	Jim Pruitt	Bamberg EMA	803-245-4513	jimpruitt@bellsouth.net
4.	Scott Neely	Town of Ehrhardt	803-267-5335	rsneely@atlantic.net
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14				
15.				

Appendix D: Hazard Mitigation Crosswalk Review

LOCAL MITIGATION PLAN REVIEW CROSSWALK

Local Mitigation Plan Review and Approval Status

Jurisdiction: Bamberg County	**Title of Plan: Bamberg County Multi-Jurisdictional Natural Hazard Mitigation Plan**	**Date of Plan: 3/5/10**
Local Point of Contact: Sharon Hammond **Title: County Emergency Services Director** **Agency: Bamberg County**	**Address:** **P.O. Box 119** **Bamberg, SC 29003**	
Phone Number: (803) 245-4313	**E-Mail: bamberg9@bellsouth.net**	
State Reviewer:	**Title:**	**Date:**
FEMA Reviewer:	**Title:**	**Date:**
Date Received in FEMA Region		
Plan Not Approved		
Plan Approved		
Date Approved		

Jurisdiction:	**NFIP Status***			
	Y	**N**	**N/A**	**CRS Class**
County Wide	**X**			
Town of Bamberg	X			
City of Denmark	X			
Town of Ehrhardt		X		
Town of Govan			X	
Town of Olar			X	

LOCAL MITIGATION PLAN REVIEW CROSSWALK

*** Notes:** **Y = Participating** **N = Not Participating** **N/A = Not Mapped**

PREREQUISITE(S)

1. Adoption by the Local Governing Body

***Requirement §201.6(c)(5)*:** *[The local hazard mitigation plan **shall** include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Has the local governing body adopted **new or updated** plan?	Sect. 5.2, p 113	To be adopted upon approval		X
B. Is supporting documentation, such as a resolution, included?	Sect. 5.2, p 113	Resolution to be inserted upon approval and adoptiong		X
		SUMMARY SCORE		

2. Multi-Jurisdictional Plan Adoption

***Requirement §201.6(c)(5)*:** *For multi-jurisdictional plans, each jurisdiction requesting approval of the plan **must** document that it has been formally adopted.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Does the **new or updated** plan indicate the specific jurisdictions represented in the plan?	Sect. 1.5, p 11			X
B. For each jurisdiction, has the local governing body adopted the **new or updated** plan?	Sect. 5.2, p 113	To be adopted upon approval		X
C. Is supporting documentation, such as a resolution, included for each participating jurisdiction?	Sect. 5.2, p 113	To be adopted upon approval		X
		SUMMARY SCORE		

3. Multi-Jurisdictional Planning Participation

***Requirement §201.6(a)(3)*:** *Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process … Statewide plans will not be accepted as multi-jurisdictional plans.*

Element	**Location in the Plan** (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Does the **new or updated** plan describe **how** each jurisdiction participated in the plan's development?	Sect. 1.5, p 12 Sect. 1.6, pp15-16			X

	App. C, p 124			
B. Does the updated plan identify all participating jurisdictions, including new, continuing, and the jurisdictions that no longer participate in the plan?	Sect. 1.6, pp15-16	Bamberg County achieved 100% participation		X
		SUMMARY SCORE		

PLANNING PROCESS: ***§****201.6(b): An open public involvement process is essential to the development of an effective plan.*

4. Documentation of the Planning Process

Requirement §201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include:*
(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): *[The plan **shall** document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	**SCORE**	
			N	**S**
A. Does the plan provide a narrative description of the process followed to prepare the **new or updated** plan?	Sect. 1.4, pp 9-11 Sect. 1.7, p 17	The planning process is described and the steps that were undertaken. A public participation process is also described in Sect. 1.7		X
B. Does the **new or updated** plan indicate who was involved in the **current** planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan committee, provided information, reviewed drafts, *etc*.?)	Sect. 1.5, pp 12-14 Sect. 1.6, pp 15-16 Sect. 1.7, p 17	The planning process is documented and the participating municipalities involved. All meetings, training, and public comment hearings are recorded. A public participation process is also described.		X
C. Does the **new or updated** plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?)	Sect. 1.7, p 17			X
D. **Does the new or updated plan discuss the** opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?	Sect. 1.7, p 17			X
E. Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?	Sect. 1.4, p 10	List of existing planning mechanisms and ways incorporated into the HMP		X
F. Does the updated plan document how the planning team reviewed and analyzed each section of the plan and whether each section was revised as part of the update process?	Opening, italicized paragraph/sentence of each Section	Explains how plan either changed or remained the same for the update process		X

LOCAL MITIGATION PLAN REVIEW CROSSWALK

4. Documentation of the Planning Process

Requirement §201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include:*
(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): *[The plan **shall** document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

	Location in the	SCORE	
SUMMARY SCORE			

RISK ASSESSMENT: *§201.6(c)(2): The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.*

5. Identifying Hazards

Requirement §201.6(c)(2)(i): *[The risk assessment **shall** include a] description of the type … of all natural hazards that can affect the jurisdiction.*

Element	Location in the **Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan include **a description** of the types of **all natural hazards** that affect the jurisdiction?	Sect. 2.1, pp 19-22	Tornadoes, Hurricanes, Hail, Drought, Earthquakes, Wildfires, Flood, Winter Storms		X
		SUMMARY SCORE		

6. Profiling Hazards

Requirement §201.6(c)(2)(i): *[The risk assessment **shall** include a] description of the … location and extent of all natural hazards that can affect the jurisdiction. The plan **shall** include information on previous occurrences of hazard events and on the probability of future hazard events.*

Element	Location in the **Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the risk assessment identify the **location** (*i.e.*, geographic area affected) of each natural hazard addressed in the **new or updated** plan?	Sect. 2.1, pp 22-60	Each hazard is identified and addressed by location		X
B. Does the risk assessment identify the **extent** (*i.e.*, magnitude or severity) of each hazard addressed in the **new or updated** plan?	Sect. 2.1, pp 22-60	The extent of each hazard is addressed by location		X
C. Does the plan provide information on **previous**	Sect. 2.1, pp 22-60	A historical record of hazard occurrences is addressed		X

occurrences of each hazard addressed in the **new or updated** plan?				
D. Does the plan include the **probability of future events** (*i.e.*, chance of occurrence) for each hazard addressed in the **new or updated** plan?	Sect. 2.1, pp 22-60	The probability of future events is described for each hazard addressed by location		X
		SUMMARY SCORE		

7. Assessing Vulnerability: Overview

Requirement §201.6(c)(2)(ii): *[The risk assessment **shall** include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community.*

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	**SCORE** N	**SCORE** S
A. Does the **new or updated** plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard?	Sect. 2.2, p 61 Sect. 2.3, pp 62-66			X
B. Does the **new or updated** plan address the **impact** of each hazard on the jurisdiction?	Sect. 2.1, pp 22-60 Sect. 2.3, pp 62-66			X
		SUMMARY SCORE		

8. Assessing Vulnerability: Addressing Repetitive Loss Properties

Requirement §201.6(c)(2)(ii): *[The risk assessment] **must** also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged floods.*

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	**SCORE** N	**SCORE** S
A. Does the new or updated plan describe vulnerability in terms of the types and numbers of *repetitive loss properties* located in the identified hazard areas?	Sect. 2.1, p 56	The Town of Bamberg has one recorded residential property		X
		SUMMARY SCORE		

9. Assessing Vulnerability: Identifying Structures

Requirement §201.6(c)(2)(ii)(A): *The plan **should** describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area … .*

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	**SCORE** N	**SCORE** S
A. Does the **new or updated** plan describe vulnerability in terms of the **types and numbers** of **existing** buildings, infrastructure, and critical facilities located in the identified hazard areas?	N/A	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		

LOCAL MITIGATION PLAN REVIEW CROSSWALK

B. Does the **new or updated** plan describe vulnerability in terms of the **types and numbers** of **future** buildings, infrastructure, and critical facilities located in the identified hazard areas?	N/A	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
		SUMMARY SCORE		

10. Assessing Vulnerability: Estimating Potential Losses

Requirement §201.6(c)(2)(ii)(B): *[The plan **should** describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate … .*

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	**SCORE** N	**SCORE** S
A. Does the **new or updated** plan estimate **potential dollar losses** to vulnerable structures?	N/A	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
B. Does the **new or updated** plan describe the **methodology** used to prepare the estimate?	N/A	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
		SUMMARY SCORE		

11. Assessing Vulnerability: Analyzing Development Trends

Requirement §201.6(c)(2)(ii)(C): *[The plan **should** describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.*

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	**SCORE** N	**SCORE** S
A. Does the **new or updated** plan describe land uses and development trends?	N/A	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
		SUMMARY SCORE		

12. Multi-Jurisdictional Risk Assessment

Requirement §201.6(c)(2)(iii): *For multi-jurisdictional plans, the risk assessment **must** assess each jurisdiction's risks where they vary from the risks facing the entire planning area.*

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	**SCORE** N	**SCORE** S
A. Does the **new or updated** plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?	Sect. 2.1, pp 22-60			X
		SUMMARY SCORE		

LOCAL MITIGATION PLAN REVIEW CROSSWALK

MITIGATION STRATEGY: *§201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.*

13. Local Hazard Mitigation Goals

Requirement §201.6(c)(3)(i): *[The hazard mitigation strategy **shall** include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

Element	Location in the **Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A Does the **new or updated** plan include a description of mitigation **goals** to reduce or avoid long-term vulnerabilities to the identified hazards?	Sect. 3.2, pp 75-76 Sect. 3.4, pp 81-82 Sect. 3.6, pp 86-87 Sect. 3.8, pp 91-92 Sect. 3.10, pp 96-97 Sect. 3.12, pp 101-102	Bamberg County and its participating municipalities have a list of goals and objectives to develop a mitigation strategy		X
		SUMMARY SCORE		

14. Identification and Analysis of Mitigation Actions

Requirement §201.6(c)(3)(ii): *[The mitigation strategy **shall** include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.*

Element	Location in the **Plan** (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan identify and analyze a **comprehensive range** of specific mitigation actions and projects for each hazard?	Sect. 3.3, pp 79-80 Sect. 3.5, p 85 Sect. 3.7, p 90 Sect. 3.9, p 95 Sect. 3.11, p 100 Sect. 3.13, p 105			X
B Do the identified actions and projects address reducing the effects of hazards on **new** buildings and infrastructure?	Sect. 3.3, pp 77-80 Sect. 3.5, pp 83-85 Sect. 3.7, pp 88-90 Sect. 3.9, pp 93-95 Sect. 3.11, pp 98-100 Sect. 3.13, pp 103-105			X
C. Do the identified actions and projects address reducing the effects of hazards on **existing** buildings and infrastructure?	Sect. 3.3, pp 77-80 Sect. 3.5, pp 83-85 Sect. 3.7, pp 88-90 Sect. 3.9, pp93-95			X

	Sect. 3.11, pp98-100 Sect 3.13, pp 103-105			
		SUMMARY SCORE		

15. Identification and Analysis of Mitigation Actions: National Flood Insurance Program (NFIP) Compliance

Requirement: §201.6(c)(3)(ii): *[The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and contin1ued compliance with NFIP requirements, as appropriate.*

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	**SCORE**	
			N	**S**
A. Does the new or updated plan describe the jurisdiction (s) participation in the NFIP?	Sect. 2.1, p 56			X
B. Does the mitigation strategy identify, analyze and prioritize actions related to continued compliance with the NFIP?	Sect. 3.3, pp 79-80 Sect. 3.5, p 85 Sect. 3.7, p 90 Sect. 3.9, p 95 Sect. 3.11, p 100 Sect. 3.13, p 105	The mitigation strategies for Bamberg County and municipalities maintains a conscious effort to comply with NFIP		X
		SUMMARY SCORE		

16. Implementation of Mitigation Actions

Requirement: §201.6(c)(3)(iii): *[The mitigation strategy section **shall** include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization **shall** include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	**SCORE**	
			N	**S**
A. Does the **new or updated** mitigation strategy include how the actions are **prioritized**? (For example, is there a discussion of the process and criteria used?)	Sect. 3.3, pp 77-80 Sect. 3.5, pp 83-85 Sect. 3.7, pp 88-90 Sect. 3.9, pp 93-95 Sect. 3.11, pp 98-100 Sect. 3.13, pp 103-105			X
B. Does the **new or updated** mitigation strategy address how the actions will be implemented and administered, including the responsible department , existing and potential resources and the timeframe to complete each action?	Sect. 3.3, pp 79-80 Sect. 3.5, p 85 Sect. 3.7, p 90 Sect. 3.9, p 95 Sect. 3.11, p 100 Sect. 3.13, p 105			X

C. Does the **new or updated** prioritization process include an emphasis on the use of a **cost-benefit review** to maximize benefits?	Sect. 3.1, p 74			X
D. Does the **updated** plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (*i.e.*, deferred), does the updated plan describe why no changes occurred?	Sect. 3.3, pp 79-80 Sect. 3.5, p 85 Sect. 3.7, p 90 Sect. 3.9, p 95 Sect. 3.11, p 100 Sect. 3.13, p 105			X
		SUMMARY SCORE		

17. Multi-Jurisdictional Mitigation Actions

Requirement §201.6(c)(3)(iv): *For multi-jurisdictional plans, there **must** be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.*

Element	**Location in the Plan** (section or annex and page #)	**Reviewer's Comments**	**SCORE**	
			N	**S**
A Does the **new or updated** plan include identifiable **action items** for each jurisdiction requesting FEMA approval of the plan?	Sect. 3.3, pp 79-80 Sect. 3.5, p 85 Sect. 3.7, p 90 Sect. 3.9, p 95 Sect. 3.11, p 100 Sect. 3.13, p 105			X
B. Does the **updated** plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (*i.e.*, deferred), does the updated plan describe why no changes occurred?	Sect. 3.3, pp 79-80 Sect. 3.5, p 85 Sect. 3.7, p 90 Sect. 3.9, p 95 Sect. 3.11, p 100 Sect. 3.13, p 105			X
		SUMMARY SCORE		

LOCAL MITIGATION PLAN REVIEW CROSSWALK

PLAN MAINTENANCE PROCESS

18. Monitoring, Evaluating, and Updating the Plan

Requirement §201.6(c)(4)(i): *[The plan maintenance process **shall** include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan describe the method and schedule for **monitoring** the plan, including the responsible department?	Sect. 4.1, p 108			X
B. Does the **new or updated** plan describe the method and schedule for **evaluating** the plan, including how, when and by whom (*i.e.* the responsible department)?	Sect. 4.1, pp 108-109			X
C. Does the **new or updated** plan describe the method and schedule for **updating** the plan within the five-year cycle?	Sect. 4.1, p 109			X
		SUMMARY SCORE		

19. Incorporation into Existing Planning Mechanisms

Requirement §201.6(c)(4)(ii): *[The plan **shall** include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan identify other local planning mechanisms available for incorporating the mitigation requirements of the mitigation plan?	Sect. 4.1, p 110 Sect. 2.4, p 69			X
B. Does the **new or updated** plan include a process by which the local government will incorporate the mitigation strategy and other information contained in the plan (*e.g.*, risk assessment) into other planning mechanisms, when appropriate?	Sect. 4.1, p 110			X
C. Does the **updated** plan explain how the local government incorporated the mitigation strategy and other information contained in the plan (*e.g.*, risk assessment) into other planning mechanisms, when appropriate?	Sect. 4.1, p 110			X
		SUMMARY SCORE		

Continued Public Involvement

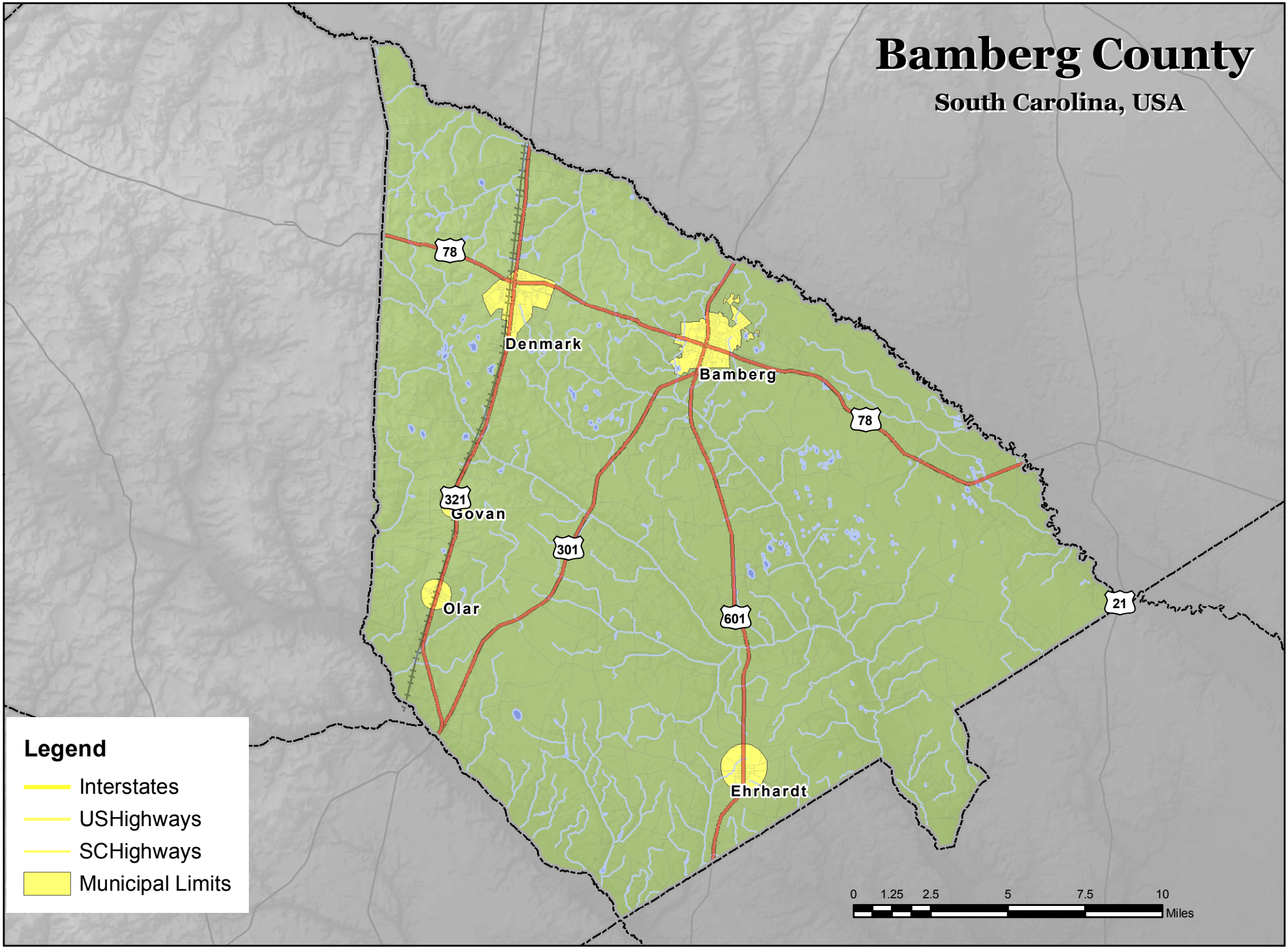
Requirement §201.6(c)(4)(iii): *[The plan maintenance process **shall** include a] discussion on how the community will continue public participation in the plan maintenance process.*

	Location in the	SCORE

LOCAL MITIGATION PLAN REVIEW CROSSWALK

Element	Plan (section or annex and page #)	Reviewer's Comments	N	S
A. Does the **new or updated** plan explain how **continued public participation** will be obtained? (For example, will there be public notices, an on-going mitigation plan committee, or annual review meetings with stakeholders?)	Sect. 4.1, p 110			X
		SUMMARY SCORE		

Appendix E: Hazard Maps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South Carolina, USA
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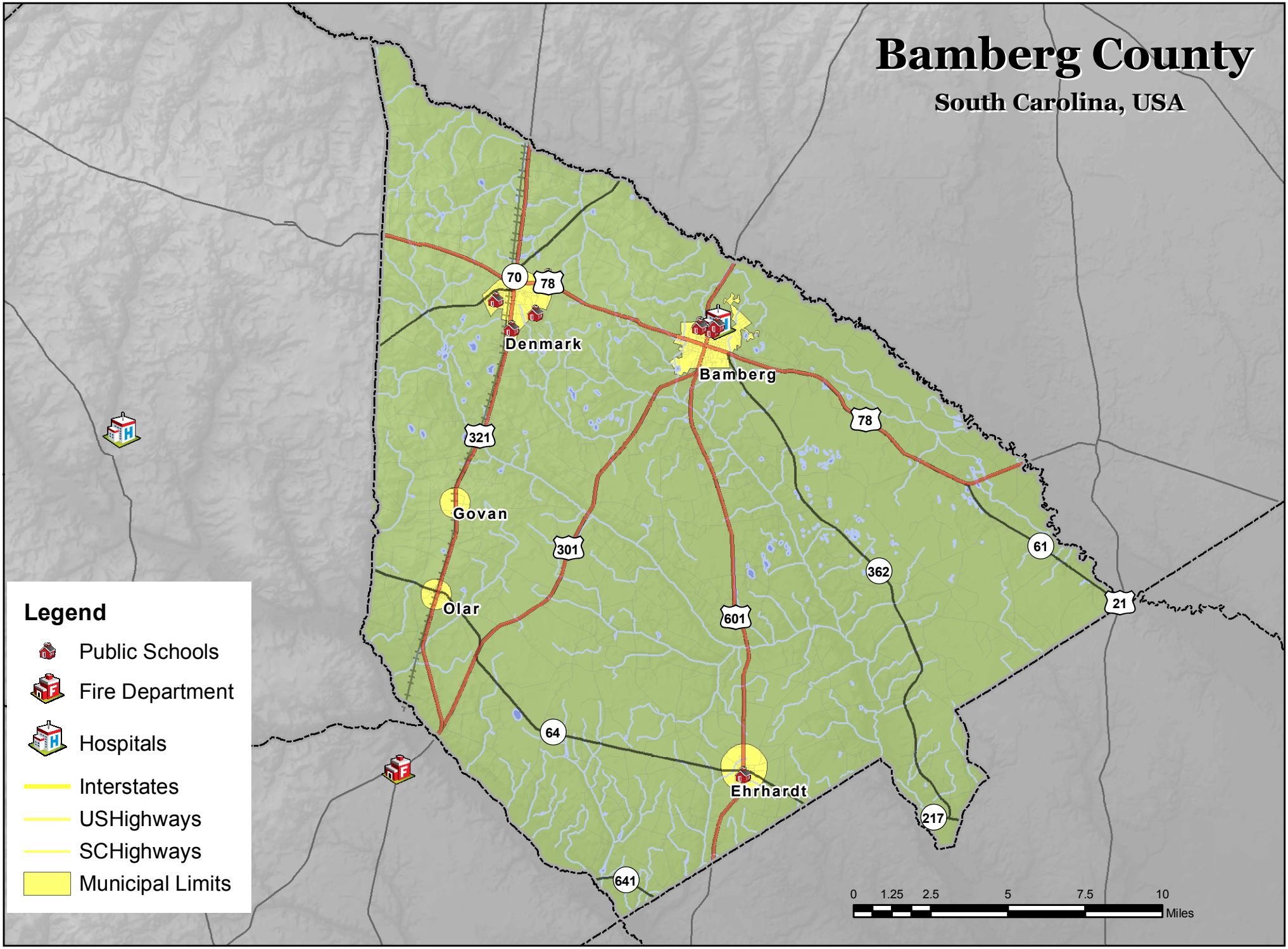
Denmark
Bamberg
78
321
Govan
301
Olar
601
21
Ehrhardt
Legend
Interstates
USHighways
SCHighways
Municipal Limits
0 1.25 2.5 5 7.5 10
Miles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South Carolina, USA
Denmark
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Govan
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Ehrhardt
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78
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64
641
601
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61
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217
Legend
Public Schools
Fire Department
Hospitals
Interstates
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Municipal Limits
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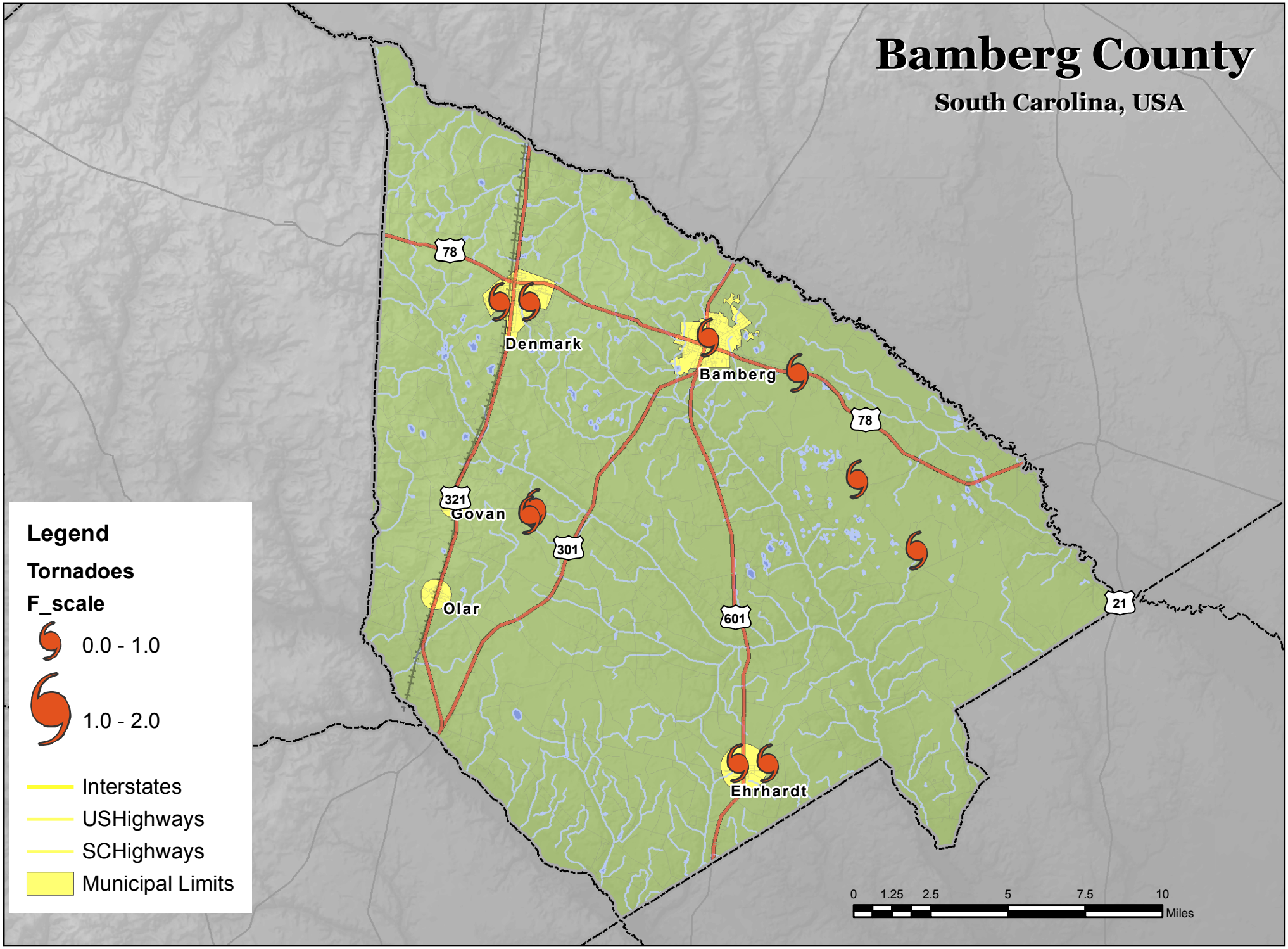
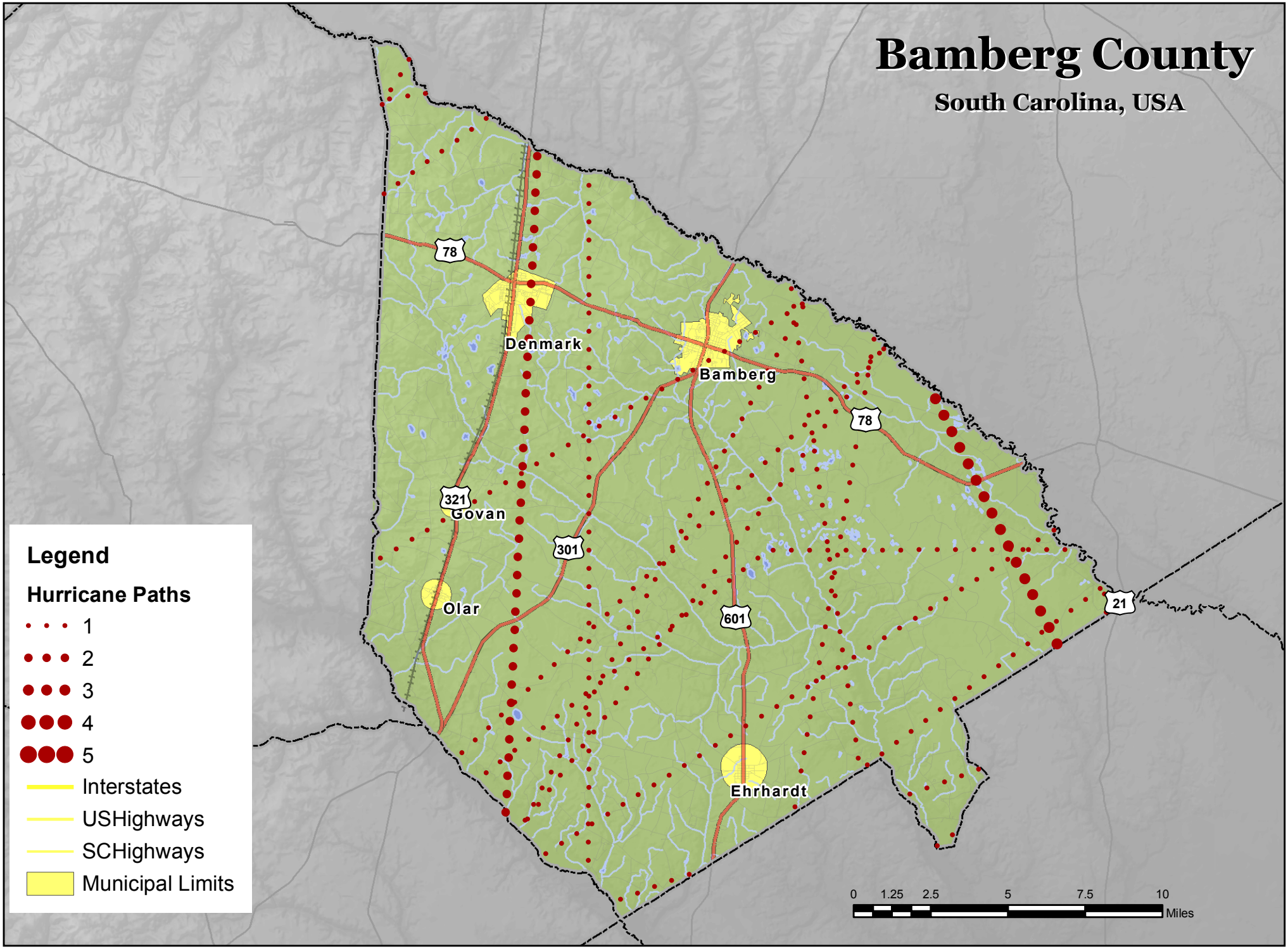
Miles


Bamberg County
South Carolina, USA
Denmark
Bamberg
Govan
Olar
Ehrhardt
78
78
321
301
601
21
Legend
Tornadoes
F_scale
0.0 - 1.0
1.0 - 2.0
Interstates
USHighways
SCHighways
Municipal Limits
0 1.25 2.5 5 7.5 10
Miles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South Carolina, USA
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Denmark
Bamberg
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321
Govan
301
Olar
601
21
Ehrhardt
Legend
Hurricane Paths
1
2
3
4
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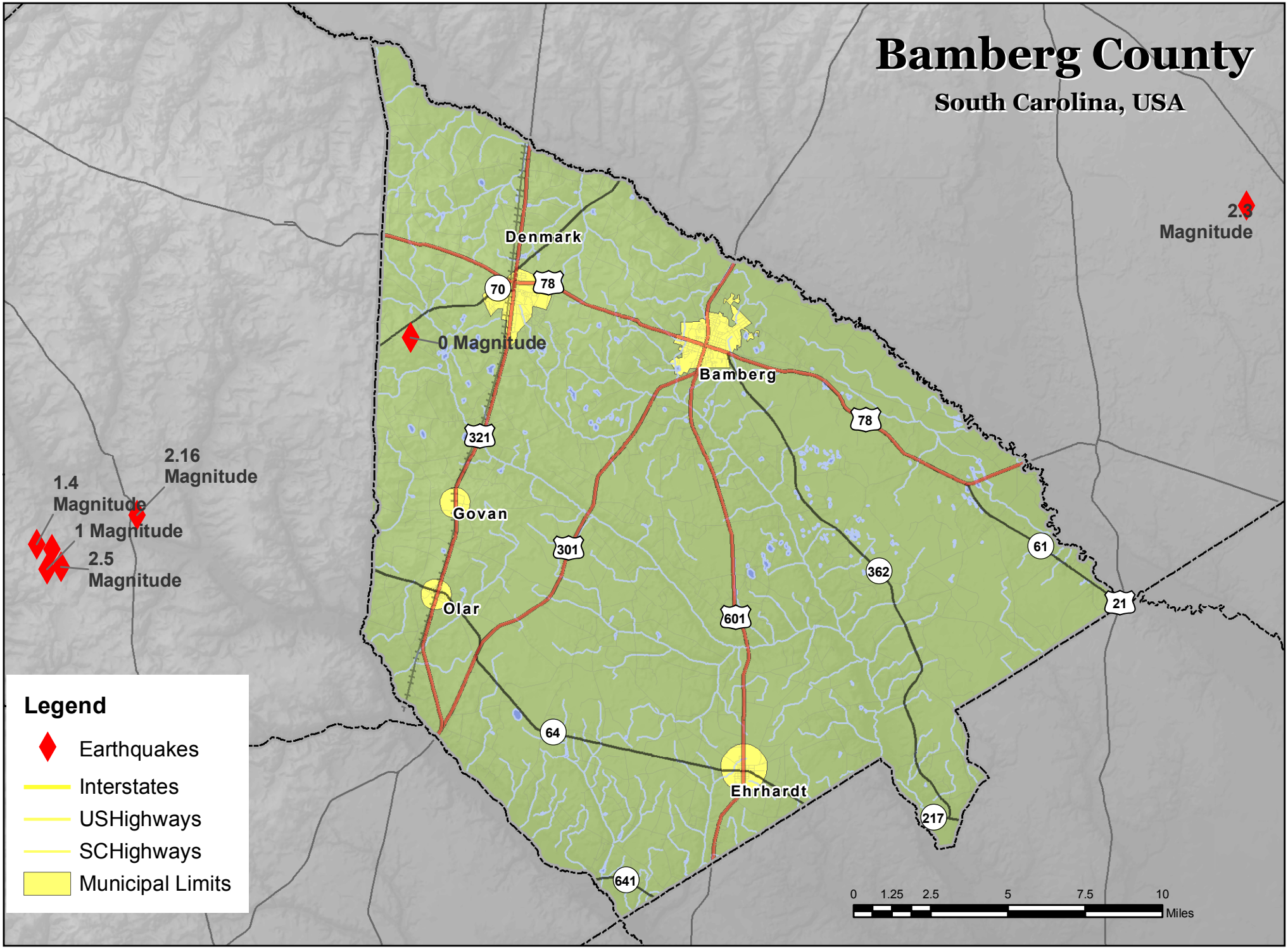
Interstates
USHighways
SCHighways
Municipal Limits
0 1.25 2.5 5 7.5 10
Miles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South Carolina, USA
2.3 Magnitude
Denmark
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Bamberg
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321
2.16 Magnitude
1.4 Magnitude
1 Magnitude
2.5 Magnitude
Govan
301
362
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Olar
601
21
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Ehrhardt
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641
0 1.25 2.5 5 7.5 10
Miles
Legend
Earthquakes
Interstates
USHighways
SCHighways
Municipal Limits