

# Lowcountry Region Natural Hazard Mitigation Plan



## Colleton County

Town of Cottageville ♦ Town of Edisto Beach ♦ Town of Lodge ♦ Town of Smoaks  
City of Walterboro ♦ Town of Williams



## Hampton County

Town of Brunson ♦ Town of Estill ♦ Town of Furman ♦ Town of Gifford ♦ Town of Hampton  
Town of Luray ♦ Town of Scotia ♦ Town of Varnville ♦ Town of Yemassee



## Jasper County

City of Hardeeville ♦ Town of Ridgeland

**2015**



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# Introduction:

## Natural Hazard Mitigation Plan

The Natural Hazard Mitigation Plan is required by the Federal Emergency Management Agency (FEMA) for all counties in the State of South Carolina. This document is the Natural Hazard Mitigation Plan for Colleton, Hampton, and Jasper Counties, prepared by the Lowcountry Council of Governments. This plan “is the representation of the jurisdiction’s commitment to reduce the risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards.” This plan also serves as a guide for the State Emergency Management Division in its effort to provide technical assistance and to prioritize project funding for South Carolina’s counties and municipalities. The following map shows the counties that are included in this plan. These three counties combined with Beaufort County, make up South Carolina’s Lowcountry Region.

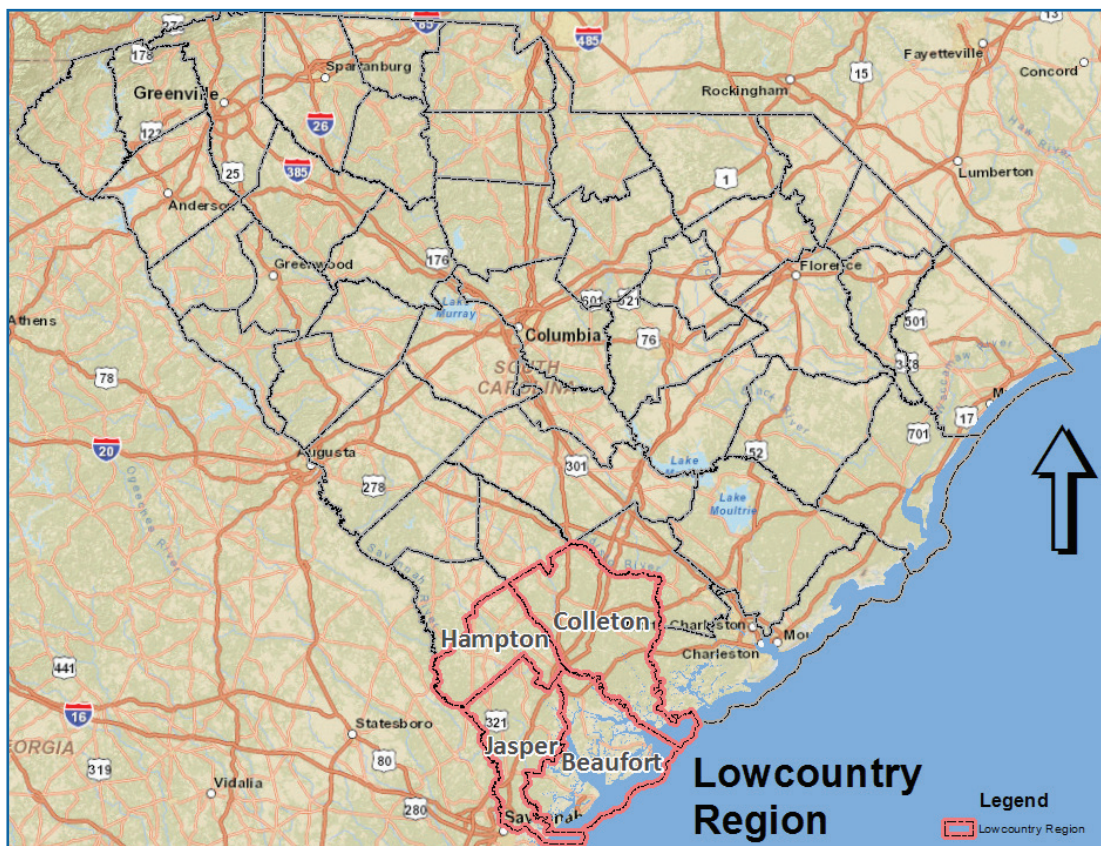


Figure 1: Lowcountry Location Map

## Lowcountry Population

	Census 2000	Census 2010	2014 Estimate	Percent Change	Average Annual Percent Change 2010	Percent Change 2010-2014	Average Annual Percent Change 2010-2014
Colleton County	38,264	38,892	37,771	1.64%	0.16%	-2.88%	-0.72%
Cottageville town	707	766	740	7.78%	0.78%	-3.00%	-1.00%
Edisto Beach town	641	414	592	-8.28%	-0.08%	42.00%	10.74%
Lodge town	114	120	118	5.26%	0.53%	-1.67%	-0.42%
Smoaks town	140	126	124	-10.00%	-1.00%	-1.59%	0.00%
Walterboro city	5,153	5,398	5,281	4.75%	0.48%	-2.17%	-0.54%
Williams town	116	117	115	0.86%	0.09%	-1.71%	-0.43%
Hampton County	21386	21090	20,405	-1.38%	-0.14%	-3.30%	-1.10%
Brunson town	589	554	531	-5.94%	-0.59%	-4.15%	-1.04%
Estill town	2,425	2,040	2,025	-15.88%	-1.59%	-0.74%	-0.18%
Furman town	286	239	231	-16.43%	-1.64%	-3.35%	-0.84%
Gifford town	370	288	276	-22.16%	-2.22%	-4.17%	-1.04%
Hampton town	2,837	2,808	2,702	-1.02%	-0.10%	-3.77%	-0.94%
Luray town	115	127	124	10.43%	1.04%	-2.36%	-0.59%
Scotia town	227	215	210	-5.29%	-0.53%	-2.33%	-0.58%
Varnville town	2,074	2,162	2,093	4.24%	0.42%	-3.19%	-0.80%
Yemassee town	807	1027	993	27.26%	2.73%	-3.31%	-0.83%
Jasper County	20,678	24,777	27,170	19.82%	1.98%	7.47%	2.49%
Hardeeville city	1,793	2,952	4,789	64.64%	6.46%	62.23%	15.56%
Ridgeland town	2,518	4,036	4,076	60.29%	6.03%	0.99%	0.25%
Lowcountry Total	201,265	246,992	261,198	22.72%	2.27%	3.82%	1.27%

Figure 2: Lowcountry Population Growth



## Area Background

There are seventeen municipalities within Colleton, Hampton, and Jasper County. The populations of the three counties are growing at an uneven rate, with development occurring in the Hardeeville area along the US 278 Corridor between I-95 and SC 170, and slow decline in population in places settled rurally across the region. Growth is centered on the Beaufort, Bluffton, and Hilton Head (in adjacent Beaufort County) and Hardeeville (in Jasper County) urban area. There has also been growth, but to a lesser extent, in Ridgeland, also in Jasper County. Colleton and Hampton Counties have seen small declines in population since the 2010 Census, and housing construction has slowed.

The Lowcountry is characterized by its proximity to the ocean, saltwater marshes, forested wetlands, and large tracts of pine forests. Lowcountry forested areas support diverse wildlife communities, clean water, renewable material, and recreation. They can also provide fuel for wildfire if they are not managed. The elevation slopes up gently inland with tidal creeks reaching into the three major watershed groups: The Savannah, Salkehatchie, and Edisto Rivers. The marshes and wetlands make construction problematic because of environmental constraints but also make a place unique to live near. The area's abundant saltwater marshes, filled with sea grass, weaken and/or dissipate waves and retain sediment during storms, a value hard to put a price on. The landscape is a desirable place to call home, where a waterfront, marsh view, or other distinctive waterbody exist, though the landscape also makes housing vulnerable to flooding and wind damage (Hazardus-MH Model).

The Lowcountry Region is bisected by Interstate-95 and US 278 runs somewhat diagonally from the northwest to the southeast. In Jasper County, more than 40,000 cars and trucks are traveling by I-95 on a typical day (SCDOT 2013). The interstate is not only a major cross-country corridor, it is a critical conduit for the local economy and a gateway to the region's top tourist destinations. The region's economy is also driven, in part, by both the Port of Charleston and the Port of Savannah and multiple military installations in the Beaufort and Savannah areas. US 17 connects the Lowcountry to the south to downtown Savannah and the future Jasper Ocean Terminal, planned for southern Jasper County and to the north to Charleston. The region is served by CSX rail and Amtrak, with a passenger depot at Yemassee. There is a general aviation airport in each of the three counties, in addition to the nearby Charleston and Savannah-Hilton Head International Airports. All major transportation modes would be impacted by a significant hazard situation.

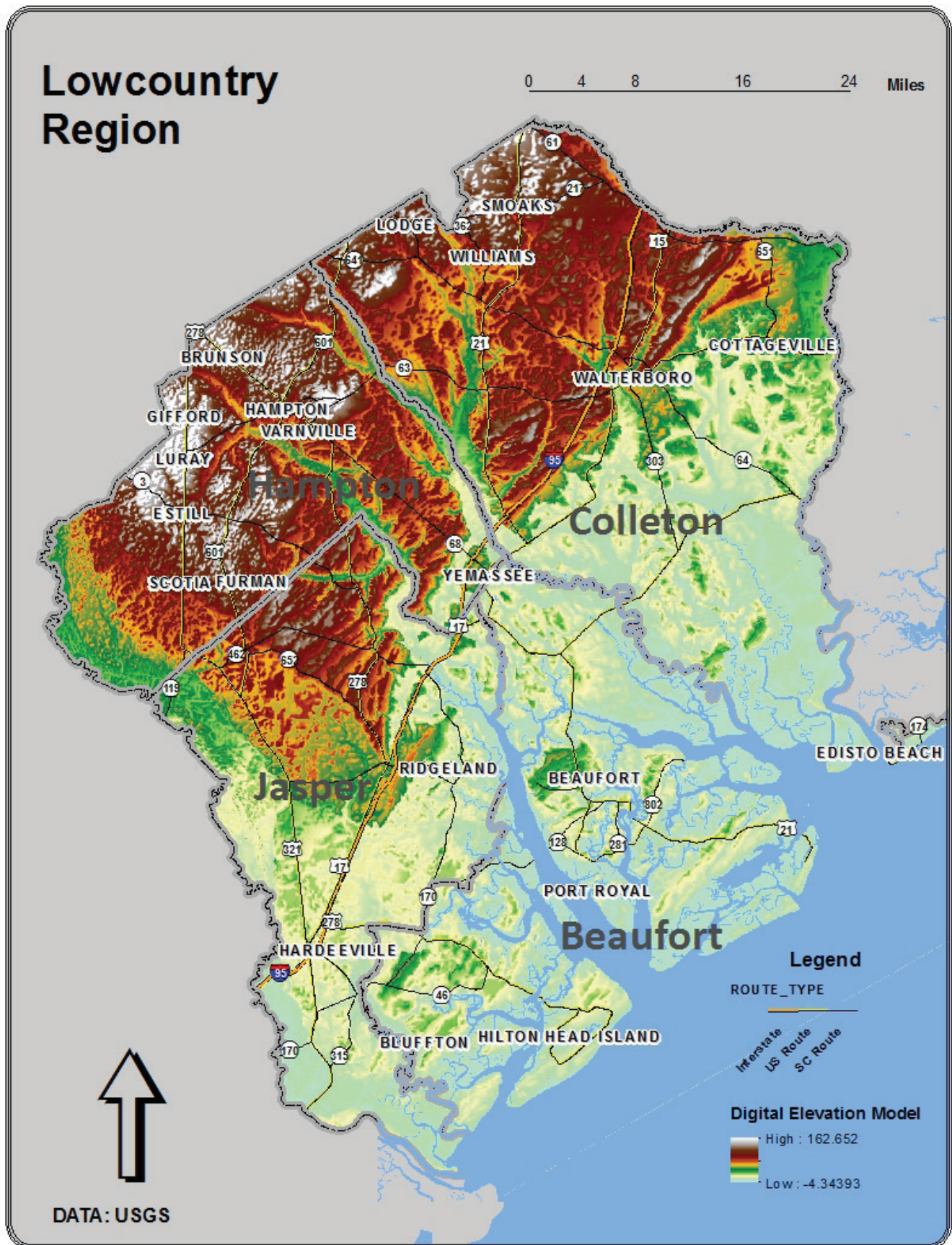


Figure 3: Lowcountry Elevation Map



# Planning Process Documentation

The following is documentation of the various steps of our planning process. Meeting minute notes, sign-in sheets and news releases are included in the appendix of this document.

## **Plan Update Process**

At the end of July 2014, the Lowcountry Council of Governments began work on the Multi-jurisdictional Hazard Mitigation Plan for Colleton, Hampton and Jasper Counties. Building on the foundation of the 2004 and 2009 Plans, the LCOG staff began the process of reviewing the 2009 Plan by looking at the Goals and Actions and seeing where progress had been made. Reflecting on the previous plan, and utilizing new information, the 2015 update includes new assessments utilizing FEMA's Hazus MH, Model and a restructured review of social vulnerability, an analysis provided by the University of South Carolina. This Plan also will show a review of critical facilities, existing conditions, and new demographic information and mapping.

## **Data and GIS Analysis: Lowcountry Council of Governments**

This step of the planning process included the gathering of information for the Natural Hazard Mitigation Plan. Hazard descriptions and historical data were collected during this time. Detailed spatial data is in the risk assessment section of this document. Hazard research was conducted to determine the natural hazards that have affected Colleton, Hampton, and Jasper Counties. Information concerning hazards was obtained from the South Carolina Emergency Management Division, University of South Carolina Hazards Lab, National Oceanic and Atmospheric Administration, FEMA, local information from residents and from the county and municipal employees and representatives. Hazard locations were mapped and listed from these sources. Data was also collected concerning critical facilities and current documents and plans in place to deal with natural hazards affecting the Lowcountry Region.

## **Development of the Natural Hazard Mitigation Plan Steering Committee: Lowcountry Council of Governments**

At this step of the planning process, the Natural Hazard Mitigation Plan Steering Committee was formed. The committee included LCOG staff and the heads of the county emergency service offices. The Steering Committee helped to guide the creation and development of the Natural Hazard Mitigation Plan. These committee members were chosen as a result of their expertise in natural hazard preparation and planning within their respective counties and municipalities that fall with their jurisdictions. The Steering Committee Includes:

- Suzanne Gant, Director, Colleton County Emergency Preparedness Agency
- Susanne Peebles, Director, Hampton county Emergency Preparedness Division
- Russell Wells, Deputy Chief, Jasper County Emergency Services
- Ginnie Kozak, Planning Director, LCOG
- Jonathan Sherwood, Community and Regional Planner, LCOG

## **Steering Committee Meeting #1:**

**June 2014: 10 a.m.**

Before this meeting was held, Lowcountry Council of Governments staff met with each county Director of EMD to ensure their understanding of the project and the process. The preliminary Steering Committee Meeting was held in order to discuss action updates, Planning Committee meetings, County Council meetings, and the future of the Natural Hazard Mitigation Plan. The minutes can be seen in the appendix.

## **Steering Committee Meeting #2:**

**February 2015**

This meeting emphasized updating and refining the goals of the 2009 Plan. The consensus was to focus work on regional benefits of plan making and emergency preparedness. Specific examples include the colocated shelter in Ridgeland, evacuation and special population needs, and information back-up in Hampton County for displaced governments.

## **Stakeholder Interviews**

Staff from the LCOG developed a questionnaire for the emergency managers to complete. This information assisted in the analysis of completed actions and documentation of the need for future actions. Staff also worked with county officials, during one-on-one meetings to update actions, critical facilities database and mapping. County Staff also reached out to community members to find where actions had taken place in regards to nursing homes and other critical facilities.

## **Hazard Identification**

The communities in the three counties are very small: only one has a population of greater than 5,000 and three have fewer than 120 residents. For Emergency Management, as well as other government functions, since the municipalities have few or no staff of their own, they depend entirely upon county Emergency Management departments for their planning. The municipalities that will join Colleton, Hampton and Jasper Counties in approving the Lowcountry Multijurisdictional Hazard Mitigation Plan are the Town of Edisto Beach and the City of Walterboro.

## **Jurisdictional Adoption**

The communities in the three counties are very small: only one has a population of greater than 5,000 and three have fewer than 120 residents. For Emergency Management, as well as other government functions, since the municipalities have few or no staff of their own, they depend entirely upon county Emergency Management departments for their planning. The municipalities that will join Colleton, Hampton and Jasper Counties in approving the Lowcountry Multijurisdictional Hazard Mitigation Plan are the Town of Edisto Beach and the City of Walterboro.

## **Capability Assessment**

As identified in the last Hazard Mitigation Plan, the action items and goals of the plan were to be included and appended into Comprehensive Plans, Zoning Ordinances, and any other land use plans that are held within the jurisdictions addressed by this plan. This section lists where these plans include references to hazard mitigation, and how they are to be continually updated to represent a continued effort of update and inclusion.

# A Regional Approach

There is a long and successful tradition in the Lowcountry for local governments and their agencies to work together—both formally and informally—to provide services to area residents, especially in times of natural disasters. Transportation planning, law enforcement and firefighting, watershed improvements, housing neighboring local governments that have been evacuated in the face of oncoming natural disasters and emergency response mutual aid agreements are a just a few of successful initiatives between jurisdictions. As a guiding principle, this plan aims to build on and improve regional cooperation, which is now reflected in the goals and actions within this document.

Vital networks such as transportation systems, utilities, and watersheds are highly interconnected despite political boundaries and require the cooperation of multiple jurisdictions due to the large and complex scale of service provision. Taking these factors into account, as well as the unique topographic features of the Lowcountry, and the proximity to the ocean, it is imperative for local officials to continue to be able to plan and work together before, during, and after a natural hazard event.

The fact that the process for updating the plans for all four counties in the Lowcountry brought Beaufort County into the Steering Committee, sums up the approach taken in the Region—both during this updating initiative and in ongoing activities—demonstrates this. Although Beaufort County has a separate plan that is also being updated again by LCOG, which has not had a negative effect on intergovernmental cooperation. Planners at LCOG worked to find overlapping actions and helped to highlight opportunities for a shared regional approach.

For example, during the stakeholder meetings it was found that there is a need for increased coordination between the Counties and SCDOT, FEMA, and SCMED in regard to reimbursement for debris removal following a natural hazard; among the counties this work is being done, as part of the ongoing Regional cooperative approach to natural disasters, but there are impediments to one jurisdiction being reimbursed by senior levels of government for that work across the boundary line in another county. Therefore, a new mitigation action recommends convening future discussions between these stakeholders on specific issues regarding reimbursement and agreements.

This Regional approach will assist in meeting the overall goals, detailed later in the Plan, will focus on certain actions that will benefit multiple jurisdictions:

- **Co-located shelter serving residents from multiple counties**
- **Regional storage, warehousing and distribution of supplies and equipment mutual assistance agreements among counties and SCDOT**
- **Transportable shared generator capacity**
- **Communication Infrastructure**
- **Intelligent Transportation Systems (ITS) and Transportation Planning**

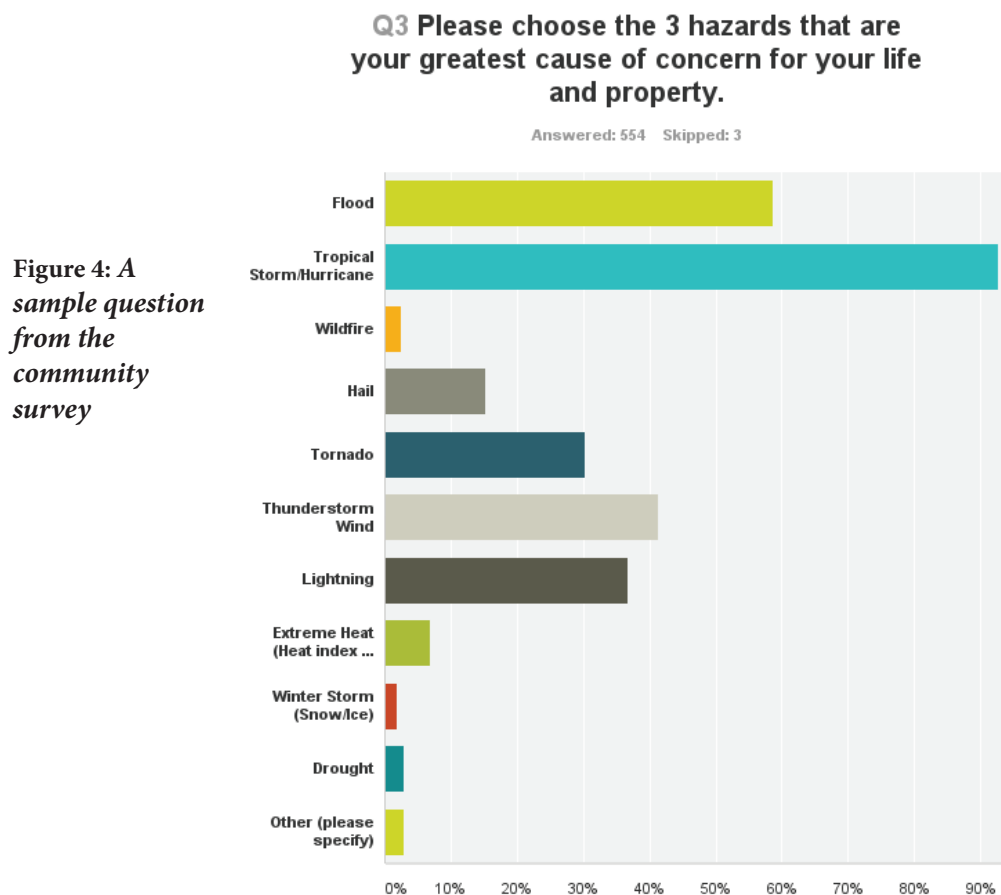
## Public Participation

After a review of the public participation methods, and their results, for the 2004 and 2009 Plans, it was concluded that while a lot of effort had gone into public outreach, the effectiveness was limited. Sign-in sheets from the meetings for the original Plans and the first update showed inadequate attendance, and consisting primarily of jurisdictional staff who were already involved in the process as committee members and/or stakeholders. Previously, LCOG staff publicized meetings in the three counties through the purchase of costly ads in the papers of record in each county and news releases, which often resulted in newspaper articles, to the region's media.

Utilizing the currently available new and different ways of reaching area residents, LCOG has experienced success recently using them during other projects in the area. As well, the Lowcountry's communities, as is the case in many parts of the US, are experiencing public meeting "fatigue" or "burn-out" after many public meetings and workshops related to planning and development. As a result, LCOG staff developed an approach that would take advantage of the now widespread use of social media and computers, smartphones and other devices to obtain meaningful input the public.

Using methods outlined in the Hazard Mitigation Planning Handbook from FEMA, a new approach was implemented for the 2015 update. This effort involved enlisting local officials, community organizations, planned communities (such as Sun City), elected officials, and local media to utilize their social media and email connections to promote participation in the process. In-person outreach to distribute and then gather information in regards to natural hazard mitigation was still a very integral part of the process. The objective was to encourage folks in the communities to spread the word about the updates to the Plans and the need to complete a brief survey. The effort included an online survey and the use of a Facebook page. This in combination with one region-wide presentation to elected officials of all four of the Lowcountry's counties, and the many stakeholder interviews, which included an Emergency Manager questionnaire, created a balanced approach that was not reliant on traditional public meetings.

The 2009 Plan included a survey, however, participation was low. The 2015 survey (Appendix C) followed the same approach used in the other new LCOG planning efforts mentioned above. It was designed to be convenient as it was limited to 10 questions and available online and by paper copy. The idea was to be concise in design while still allowing space for comments if residents would like to add relevant information that was not covered within the questionnaire itself.. Nearly 100 individuals from across the four-county region of the Lowcountry provided applicable comments. There were 763 overall responses from all four counties, with a total of 247 from Colleton, Hampton, and Jasper Counties. For Colleton County (0.05%), it was a better proportion of the population, as far as participation, than the more populous Beaufort County (0.02%). The Survey effort in Colleton County focused on the faith-based communities. If residents wished to express their concerns, the survey was open continuously for more than two months, unlike a public meeting which would limit access due to the location, hours, and day of the week.



**Figure 4: A sample question from the community survey**

As part of the multifaceted outreach campaign, a presentation to the LCOG Board of Directors occurred on October 22, 2015, which was open to the public and publicized with the agenda. This body is comprised of 28 elected mayors and council members from the four-county region, including Beaufort, Colleton, Hampton, and Jasper Counties. The venue lends to the regional focus of the Plan. The presentation concentrated on the region's shared and differing conditions, such as sociodemographic factors and building trends. Then presentation explained the completed and proposed actions. Members were encouraged to spread the word about the Plan and follow-up with comments or concerns, and several even completed surveys when the meeting was over.

# **Plan Monitoring, Evaluation and Maintenance**

The Hazard Mitigation Plan will be monitored and maintained by staff at LCOG, in cooperation with the Steering Committee. LCOG will regularly evaluate the Plan annually, or more frequently as conditions change and modifications are needed. The Steering Committee will continue to meet once annually, or as necessary to coordinate improvements, evaluate changes, and amend the plan, where needed, over the next five years. While the mitigation actions will be completed by each individual jurisdiction, LCOG staff will assist with providing data and the writing of the grants, when requested.

In coordination with the Steering Committee, LCOG's role is to:

- Facilitate Steering Committee meetings
- Notify the jurisdictions of grant opportunities
- Assist with grant writing
- Update the database of Community Mitigation Actions
- Evaluate changes to Community Mitigation Actions
- Update database of storm/hazard events
- Update general mapping
- Update socio-economic data
- Draft notices to the media and public on Plan changes or related activities taking place

It will be the responsibility of the jurisdictions to integrate hazard mitigation planning principles included in this Plan in other local planning initiatives, such as comprehensive planning and capital improvement programs (CIP). If requested, LCOG will provide technical assistance to local jurisdictions to ensure new initiatives complement this Hazard Mitigation Plan.

## **Continued Public Involvement**

As part of this plan, there are year-round activities associated with public information and preparation for hazards, which is the responsibility of each individual jurisdiction. LCOG will facilitate a continued discussion for the general public, including on a Facebook page that provides tips, information on potential events from the perspective of past regional storms, and other information as it becomes available. The strategy will provide an outlet for engagement from the community about natural hazard mitigation between plan updates. A web page is also set up on the Lowcountry Council of Governments' website to highlight community aspects of this plan and will be updated as needed. A PDF version of this Plan is also available via the website.



# 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. The Lowcountry Council of Governments developed the criteria for counties and municipalities to be official participants in the planning process. The criteria have been established so that county and municipal representatives participate sufficiently enough to add to and comment on the plan.

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

- The county EMS Director is a member of the Natural Hazard Plan Steering Committee and provides input and comments on the plan and the planning process.
- 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 attended a county or public meeting concerning the Natural Hazard Mitigation Plan and provided input or comments.
  - The mayor, administrator, or manager appointed a city or town employee to attend a county or public meeting concerning the Natural Hazard Mitigation Plan and provided input or comments.
  - An LCOG Planning staff member personally discussed the Natural Hazard Mitigation Plan with a mayor, administrator, manager, or appointed municipal representative, and were provided with input or comments.
  - A mayor, administrator, or manager, was invited to meetings, sent emails about the process, or sent input or comments.

## Official Participants (As of July 2015)

All three counties and Walterboro and Edisto Beach therein were invited, emailed, called, and notified of the process. They were all identified as key players in the Planning Committees, and each EMD notified, invited, and informed them of the process and their input. They were all given copies of the Draft and asked to respond with corrections or input. This plan has several jurisdictions participating in the plan.

## Participating Counties

**Colleton County:** EMD attended Steering Committee Meetings, attended Public meetings, attended and help lead Planning Committee Meetings, assisted with conducting the survey, posted things the website, helped form the Planning Committee Meeting and contacted the members.

**Hampton County:** EMD attended Steering Committee Meetings, attended Public meetings, attended and help lead Planning Committee Meetings, posted things to the website, provided input on actions, helped form the Planning Committee Meeting and contacted the members.

**Jasper County:** EMD reviewed notes of meetings, attended Planning Committee Meetings, and provided input on actions.

Participating Jurisdictions/Stakeholders				
		Steering Committee	Stakeholder Interviews	Document Review
<b>Colleton County</b>				
Kevin Griffin	County Administration			
Barry McRoy	Fire Chief			
Suzanne P. Gant	Emergency Manager	✓	✓	
Philip Slayter	Planning Director		✓	
Theodore Reed	Chief Building Official			
Bill Huffins	Flood Plains Manager	✓	✓	
Iris Hill	Edisto Beach		✓	
Jeff Molinari	City of Walterboro		✓	
<b>Hampton County</b>				
Rose Dobson-Elliot	County Administrator			
Chris Altman	Emergency Services Director	✓	✓	
Susanne Peeples	Emergency Manager	✓	✓	
Greg Cook	Fire Chief		✓	
Randy Crews	Building Inspector		✓	
<b>Jasper County</b>				
Andrew P. Fulghum	County Administrator			
Wilbur Daley	Fire Chief/ Emergency Manager	✓	✓	
Rusty Wells	Deputy Chief	✓		
LeNolon Edge	Planning & Building Director		✓	

**Figure 5: Jurisdiction Participation Table**



# Hazards

The following factors are organized for analysis and will aid in the determination of the mitigation project proposals later in this plan. Each point listed below will be addressed for each natural hazard:

## Type

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

## Location

The location of past events and/or hazards potential is mapped or listed in this section.

## Extent

The strength or magnitude of the hazard.

## Probability

The probability data of a hazard occurring in any given year was retrieved from the South Carolina Hazard Assessment for 2013 compiled by the South Carolina Emergency Management Division. This is different from the last plan, in which the numbers were computed at the Lowcountry Council of Governments. Thanks to updated technology and an increase in hazard mitigation awareness, we were able to use the data compiled by SCEMD, and researched by USC's Research Center to retrieve probability scores.

## Vulnerability

The overall vulnerability of each individual hazard is discussed and analyzed for each participating county and municipality. Each participating county and municipality are given a rating of high, mid-level, and low vulnerability to each hazard. The vulnerability is determined by assessing the probability and historical loss data from each hazard.

## **Type**

Of the many types of hazards that threaten the United States, the Three-County Mitigation Plan will only discuss those that have historically affected the areas discussed. One hazard has been identified that was not in the previous plan, Extreme Heat, because although no property damage has occurred from it, there have been fatalities. The following are the specific hazards that have affected the area, and will be examined in this section of the Natural Hazard Mitigation Plan.

1. Tornadoes
2. Hurricanes
3. Windstorms
4. Lightning
5. Hail
6. Drought
7. Earthquakes
8. Wildfires
9. Flood
10. Winter Storms
11. Coastal Erosion
12. Extreme Heat

It is important to understand the types of hazards that affect the three counties covered in this plan. Later, projects and actions will address the natural hazards that threaten the three counties and their participating municipalities. The extent of the hazard and its future probability are also important to take into consideration when preparing for an event.

# Tornado

**A** Tornado is a “violently rotating column of air extending from a thunderstorm to the ground” (NOAA). Tornadoes can be extremely violent storms that can have relatively low wind speeds (less than 73 mph) to very high winds in excess of 300 miles per hour. Approximately 1,000 tornadoes touch down and are reported in the Country each year. On average, there are about eighty deaths and 1,500 injuries resulting from tornado strikes in the Unites states. In the South, tornadoes touch down most frequently from the month of March through May (NOAA).

Since 1950, there have been numerous tornadoes in South Carolina. The State averages approximately eleven tornadoes a year, which ranks twenty-sixth in the nation for tornado strikes. Tornadoes have claimed forty-seven casualties in South Carolina and have injured 1,057 residents since 1950 (SCEMD). The following table explains tornado classifications, wind speeds, and a typical damage description of the six categories of tornadoes.

Scale:	Typical Damage:
<b>EF-0</b> (65-85 mph)	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
<b>EF-1</b> (86-110 mph)	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
<b>EF-2</b> (111-135 mph)	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
<b>EF-3</b> (136-165 mph)	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
<b>EF-4</b> (166-200 mph)	Devastating damage. Whole frame houses Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
<b>EF-5</b> (>200 mph)	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yd); high-rise buildings have significant structural deformation; incredible phenomena will occur.
<b>EF</b> <b>No rating</b>	Inconceivable damage. Should a tornado with the maximum wind speed in excess of EF-5 occur, the extent and types of damage may not be conceived.

Figure 6: *Tornado Damage Scale*

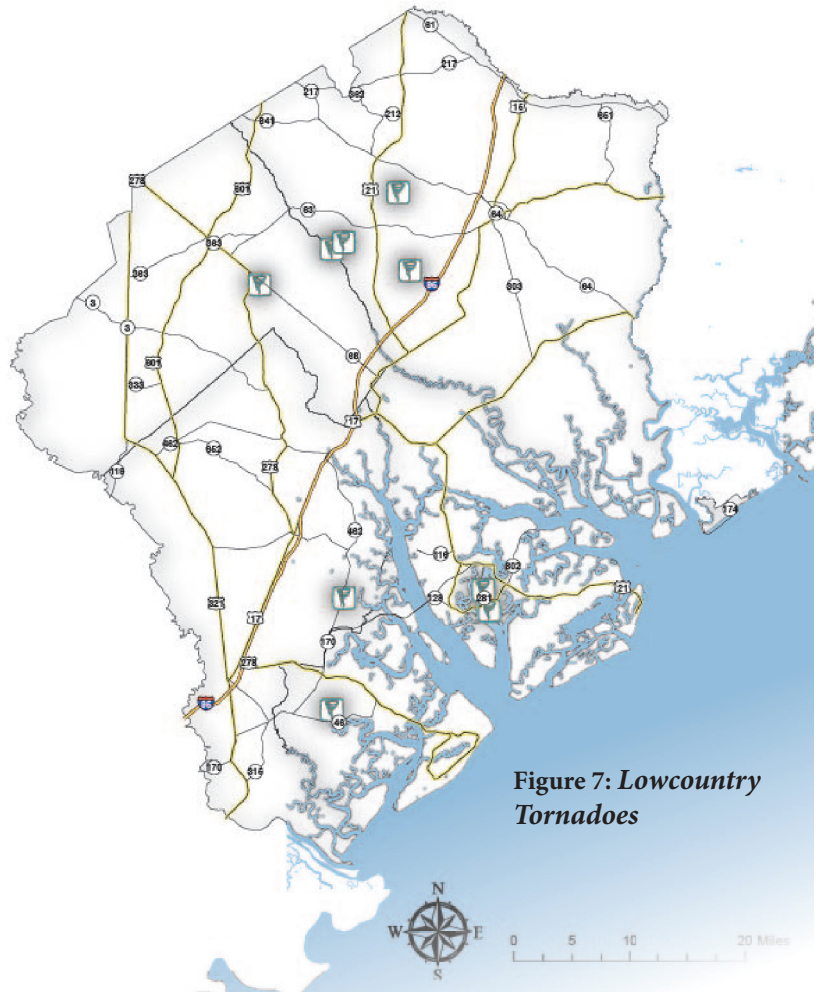
## Location

The tornado touchdowns for all three counties can be seen on the tornado map. Each county has had tornado touchdowns within its limits. The tornado touchdown map shows the location of each tornado touchdown, and the general time frame in which it occurred. As a spatial event, all three counties are equally at risk to tornadoes.

## Colleton

Colleton County has experienced nineteen notable tornadoes. They occurred in the following time frames:

- 1950-1964: 3
- 1964-1975: 1
- 1975-1986: 4
- 1986-1995: 2
- 1995-2001: 3
- 2002-2008: 6
- 2009-2013: 1



**Figure 7: Lowcountry Tornadoes**

These tornadoes have caused a total of 11 injuries, nine of which occurred in the last noted tornado in 2007. There have been no fatalities due to tornadoes in the county. The tornadoes that have touched down in Colleton have ranged from F0 to F1. According to the preceding table, the wind speeds of these tornadoes have ranged from less than 73 miles per hour to 112 miles per hour and had the potential to cause damage. According to the Tornado damage scale chart, tornadoes that have touched down in Colleton County had the ability to peel the surface of roofs, push mobile homes off of foundations, overturn mobile homes, and blow moving off of the roads.

The following is specific local NOAA information concerning some of the events that occurred within the county and its municipalities.

### August 1st, 1994

Colleton County: 14 Miles North West of Walterboro

A tornado blew down trees, damaged the roof of farm building, several cars and farm equipment. The storm caused \$5,000 in property damage.

### September 3rd, 1998

Colleton County: South of Bennett's Point

A tornado traveled 3 miles at a magnitude of F1. Tornado damage was confined mostly to a wooded marsh area which uprooted trees and snapped off tree limbs. A roof was a blown off of a barn as well during this storm.

**Sept 3rd, 1998**

Colleton County: South of Green Pond

A F1 tornado traveled one mile and blew the roof off a barn, snapped off tree limbs, and uprooted several trees on a private plantation.

**April 15th, 1999**

Colleton County: West of Ritter

A F1 tornado traveled 2 miles and caused \$10,000 dollars in property damage. Roof damage occurred to a house and several outdoor buildings, along with several trees uprooted or snapped off 15 to 20 feet above the ground.

**June 12th, 2001**

Colleton County: 6 Miles South East of Walterboro

As the remnants of Tropical Storm Allison moved across the southeastern states, numerous funnel clouds developed with several of them actually touching down for brief periods of time. None of them produced any major damage. In most cases, there were trees snapped off about 15 to 20 feet above the ground.

**July 2nd, 2003**

Colleton County: 1 Mile South East of Smoaks

Tornado touched down just south of Smoaks. Several trees were uprooted or snapped off. A mobile home suffered roof damage and the family's dog was killed. At least one car was crushed when a tree landed on it.

**September 06, 2004**

Colleton County:

5 Miles North West of Jacksonboro

A tornado knocked down trees. Hurricane Frances made landfall on the Florida Panhandle and continued to track in a generally northward direction into Georgia, before turning more to the northeast. This track placed the Charleston County Warning Area in the favorable right side of the remnants of Frances which produced numerous tornadoes and areas of straight line wind damage over southeast Georgia and south coastal South Carolina. Several Georgia counties also experienced flash flooding as there were isolated rainfall amounts of 5 to 8 inches over a 24 to 36 hour period. This was on top of already saturated ground from heavy rains during the month of August. The South Carolina counties experienced more nuisance type flooding as the rainfall amounts were not as high as what occurred in southeast Georgia.

**April 26th, 2006**

Colleton County: 8 Miles West South West of Walterboro

Tornado touched down briefly about 9.5 miles WSW of Walterboro in Colleton County at 655 PM EDT. The tornado touched down several additional times briefly as it traveled ESE 1.5 miles. The tornado lifted for the last time 8 miles WSW of Walterboro at 658 PM EDT. The Tornado uprooted and snapped off numerous large trees with one falling on and crushing a vehicle and another landing on a lawn tractor. A trampoline was tossed 100 feet...several screens and a screen door were blown off a house and could not be found. There was also shingle damage and minor roof damage to the house. A hay barn was also damaged. Winds were estimated between 80 and 90 mph.

### **April 15th, 2007**

Colleton County: 1 Mile South East of Islandton

The Tornado snapped off or uprooted hundreds of tree and destroyed a large-framed barn with debris spread over a half-mile to the northeast. A large object hit a house breaking out three windows and knocking some of the bricks loose. The siding was also torn from the house. A large 8000-pound horse trailer was lifted up and carried 500 feet. An 800-pound grain wagon was lifted and carried 400 feet before landing on the ground. A bass boat was flipped over and a 4 wheeler was damaged along with other farm equipment. A tree also fell on a mobile home. Winds with this Tornado were estimated to be 110 mph using the new Enhanced Fujita Scale.

### **April 15th, 2007**

Colleton County: 2 Miles East South East of Islandton

This Tornado carried two empty grain silos about 100 feet, snapped off or uprooted dozens of trees, destroyed a large portion of an outbuilding, and severely injured a dog. Maximum sustained winds with this Tornado were estimated to be 95 mph.

### **April 15th, 2007**

Colleton County: 3 Miles South West of Ruffin

This Tornado overturned 3 mobile homes and shifted another 7 mobile homes off there foundations. It tore the skirting away from another mobile home, destroyed a storage shed, and snapped off or uprooted dozens of trees. A couple of trees fell on a house. A vehicle and an outbuilding were also damaged. There were 9 minor injuries. Winds with this Tornado were estimated to be 100 mph using the Enhanced Fujita Scale.

### **February 24th, 2012**

Colleton County: Islandton

This Tornado touched down near Islandton, SC in Colleton County damaging several residences. The most damage was done to an abandoned homestead. Several other homes suffered damage along Jamison Court and Forks Road near Islandton. Trees, as well as a power line, snapped and were torn down in the area.

### **Hampton**

According to the USC hazard data, Hampton County has experienced thirteen notable tornadoes. They occurred in the following time frames:

- 1950-1964: 1
- 1964-1975: 2
- 1975-1986: 3
- 1986-1995: 0
- 1995-2001: 3
- 2002-2008: 4
- 2009-2013: 0

These tornadoes have not caused fatalities, but there were 6 injuries. The tornadoes that have touched down in Hampton have ranged from F0 to F1. According to the preceding table, the wind speeds of these tornadoes have ranged from less than 73 miles per hour to 112 miles per hour and had the potential to cause damage. According to the Tornado force classification chart, tornadoes that have touched down in Hampton County had the ability to peel the surface of roofs, push mobile homes off of foundations, overturn mobile homes, and blow moving off of the roads.

The following is specific local NOAA information concerning some of the events that occurred within Hampton County and its municipalities.

### **June 12th, 2001**

Hampton County: 6 Miles North East of Hampton

A F1 tornado traveled 6 miles and damaged a courthouse and several trees were snapped off 15 to 20 feet above the ground. As the remnants of Tropical Storm Allison moved across the southeastern states, numerous funnel clouds developed with several of them actually touching down for brief periods of time. None of them produced any major damage. In most cases, there were trees snapped off about 15 to 20 feet above the ground.

### **July 1st, 2003**

Hampton County: 6 Miles North East of Hampton

Tornado touched down just southwest of the city of Hampton and snapped or uprooted numerous trees and downed power lines. The Dollar General Store was heavily damaged when the tornado caused three of the walls to collapse almost completely. Several homes sustained damage when trees fell on top of them.

### **September 7th, 2004**

Hampton County: 5 Miles North of Brunson

A tornado knocked down trees in the county before crossing into Allendale county. Hurricane Frances made landfall over the Florida Panhandle and continued to track in a generally northward direction into Georgia, before turning more to the northeast. This track placed the Charleston County Warning Area in the favorable right side of the remnants of Frances which produced numerous tornadoes and areas of straight line wind damage over southeast Georgia and south coastal South Carolina. Several Georgia counties also experienced flash flooding as there were isolated rainfall amounts of 5 to 8 inches over a 24 to 36 hour period. This was on top of already saturated ground from heavy rains during the month of August. The South Carolina counties experienced more nuisance type flooding as the rainfall amounts were not as high as what occurred in southeast Georgia.

### **September 27th, 2004**

Hampton County: 4 Miles North East of Early Branch

A weak tornado knocked down several trees.

### **May 11th, 2008**

Hampton County: 2 Miles South East of Varnville

A trained weather spotter reported a weak rope Tornado near Almeda, South Carolina. The Tornado was seen in contact with the ground for approximately 2 minutes. No damage resulted from the weak Tornado.



## Jasper

Jasper County has experienced eight notable tornadoes. They occurred in the following time frames:

- 1950-1964: 0
- 1964-1975: 1
- 1975-1986: 1
- 1986-1995: 0
- 1995-2001: 2
- 2002-2008: 4
- 2009-2013: 1

These tornadoes have not caused fatalities and only caused injuries to one person. The tornadoes that have touched down in Jasper have ranged from F0 to F1. According to the preceding table, the wind speeds of these tornadoes have ranged from less than 73 miles per hour to 112 miles per hour and had the potential to cause damage. According to the Tornado force classification chart, tornadoes that have touched down in Jasper County had the ability to peel the surface of roofs, push mobile homes off of foundations, overturn mobile homes, and blow moving off of the roads.

### April 9th, 1998

Jasper County: 2 Miles West of Hardeeville

A F1 tornado traveled 1 mile and caused damage to trees, shingles to be taken off of nearby roofs, and damage to several other buildings. This F1 tornado was spawned by the same supercell that produced the F3 tornado in Bryan County, Georgia that moved into western Effingham County and lifted with no further touchdown until the Hardeeville area.

### September 6th-7th, 2004

The following four tornadoes occurring September 6th-7th, 2004 resulted in conjunction with hurricane Frances that made landfall over the Florida Panhandle and continued to track in a generally northward direction into Georgia, before turning more to the northeast. This track placed the Charleston County Warning Area in the favorable right side of the remnants of Frances which produced numerous tornadoes and areas of straight line wind damage over southeast Georgia and south coastal South Carolina. Several Georgia counties also experienced flash flooding as there were isolated.

## Tornado Probability

	Number of Events	Years in Record	Recurrence Interval (Years)	Probability
Colleton	9	63	7.00	14.29%
Hampton	13	63	4.54	22.03%
Jasper	9	63	7.00	14.29%



# Hurricanes

**H**urricanes are severe tropical storms “with winds that have reached a constant speed of 74 miles per hour or more” (FEMA). Hurricanes commonly form in the Caribbean Sea, Atlantic Ocean, and the Gulf of Mexico. Hurricanes can cause devastating effects resulting from violent winds, waves, rains, and floods. In an average year, there are six hurricanes over the Atlantic Ocean. An average of five hurricanes strike the United States every three years (NOAA). South Carolina is one of the most vulnerable states to hurricanes in the United States (SCEMD). The following chart shows hurricane levels, wind speed, and the damage that it is able to cause.

Category	Sustained Wind	Types of Damage Due to Hurricane
1	74-95 mph 64-82 kt 119-153 km/h	<b>Very dangerous winds will produce some damage:</b> Well-constructed frame homes could have damage to roof, shingles, and vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph 83-95 kt 154-177 km/h	<b>Extremely dangerous winds will cause extensive damage:</b> Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129 96-112 kt 178-208 km/h	<b>Devastating damage will occur:</b> Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156 mph 113-136 kt 209-251 km/h	<b>Catastrophic damage will occur:</b> Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157 mph or higher 252 km/h or higher 137 kt or higher	<b>Catastrophic damage will occur:</b> A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Figure 8: *Hurricane Category Description*

## Location

The following map shows hurricane “eye” tracking in the Lowcountry Region, the year of the event, and force of the storms. Hurricane eyes have passed over all of the counties covered in this plan. Because of the width of a hurricane, these natural hazards will be examined at a regional level. All three counties are equally at risk for hurricanes. All counties are equally at risk to the impacts of hurricanes, although coastal areas are more susceptible to storm surge (See figure 10 and Flooding Section).

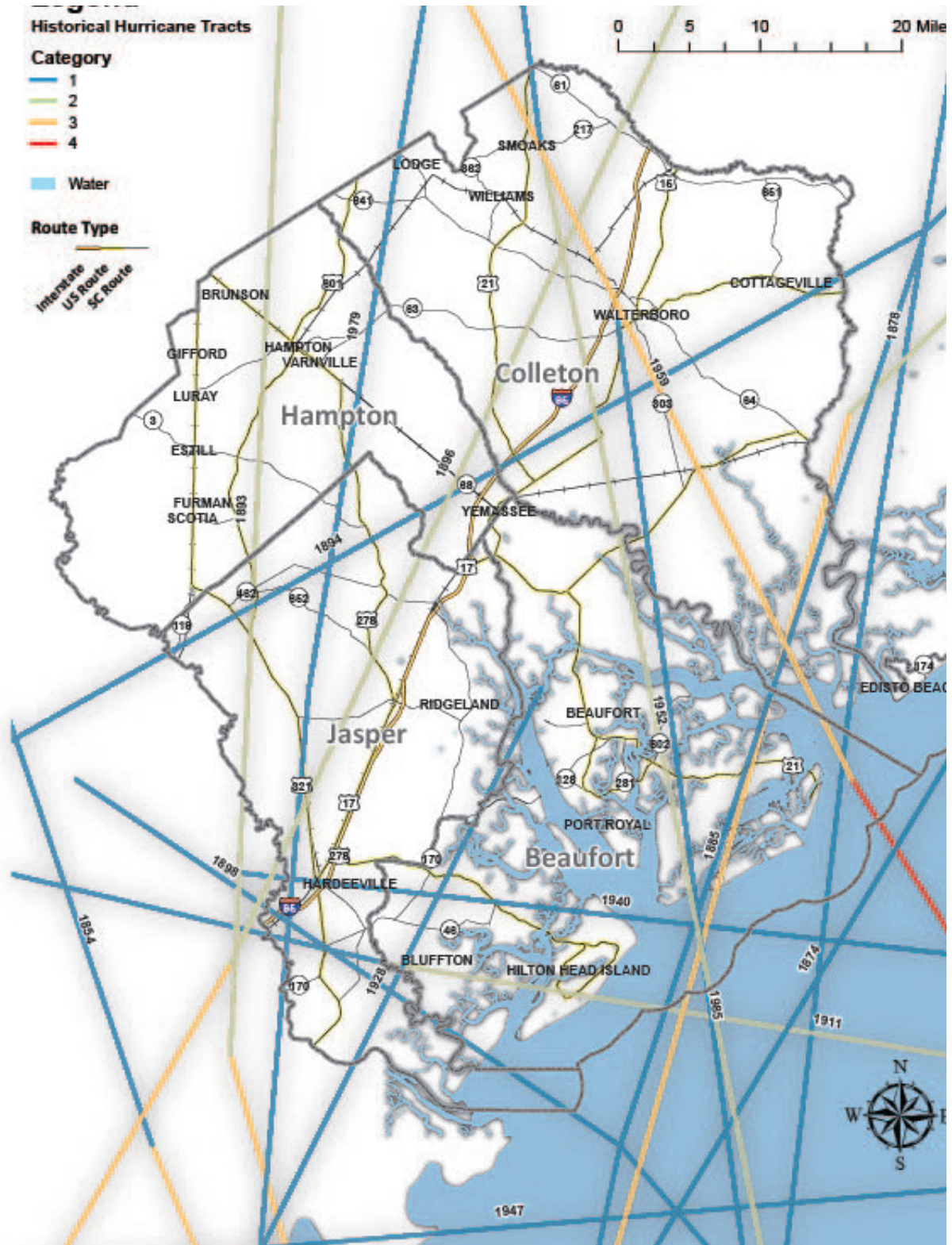


Figure 9: Historical Hurricane Paths

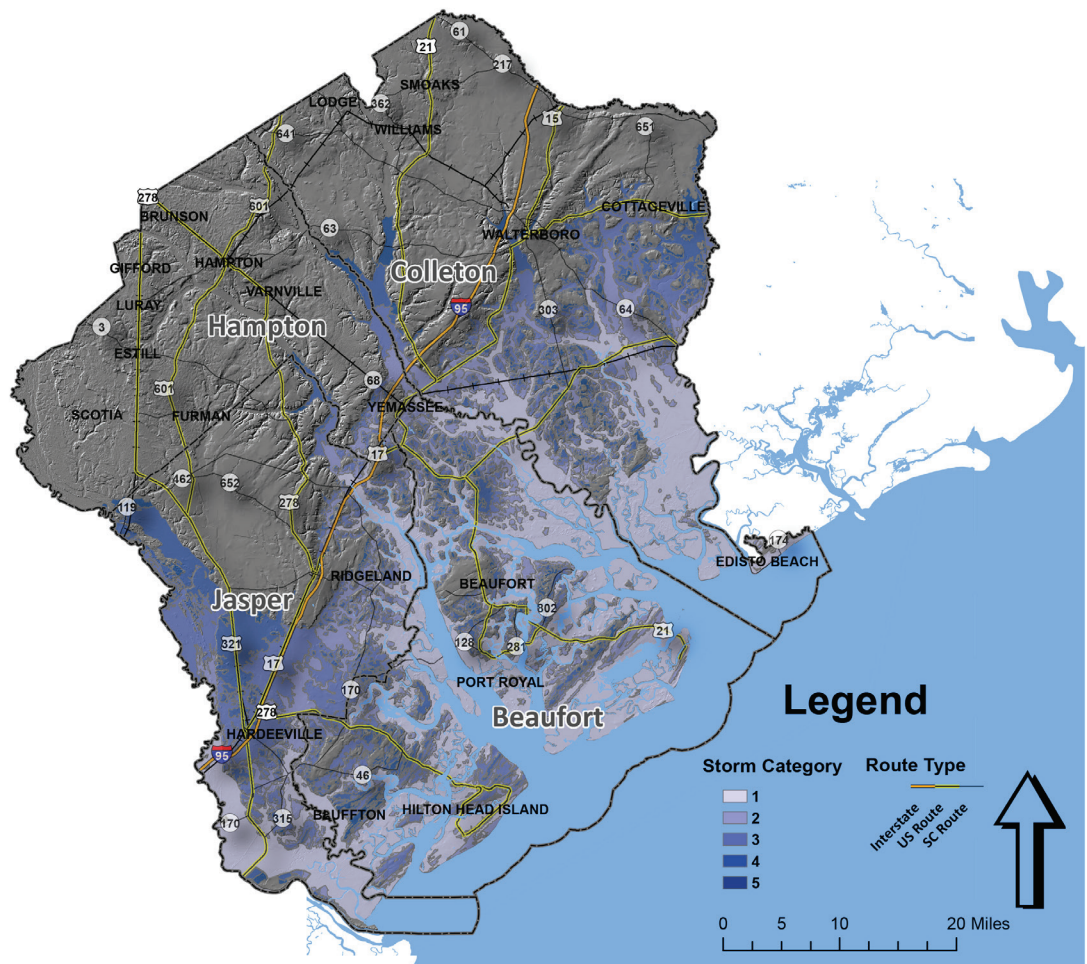


Figure 10: Storm Surge Map

## Extent

### Entire Region

There have been numerous hurricanes with various forces throughout the history of the Lowcountry Region. The hurricane map shows twenty-four hurricane eyes that have passed through the region. While there have been numerous “lesser” tropical storms, there have been hurricanes with categories ranging from one to four. The wind speeds of the hurricanes striking the Lowcountry Region have ranged from 74 miles per hour to 155 miles per hour (USC). According to the hurricane level table, the hurricanes that have struck the region are classified as storms that can cause a considerable amount of destruction. The wind speed of the stronger hurricanes in our region has had the ability to cause a storm surge up to eighteen feet, roof failure on small structures, complete destruction of mobile homes, and flooding.

The following are hurricanes that have affected the area:

In 1996, Hurricane Bertha came close to the south coastal counties of South Carolina but did not cause significant damage. The maximum sustained winds (36kts) and peak gust (50kts) both occurred at the Charleston City Office on 7/12/96. Bertha's most significant impact was on tourism where the estimated loss revenue approached \$20,000,000. Nearly \$11,000,000 of that was in Beaufort/Hilton Head area. A few places along the Charleston coast experienced moderate beach erosion (NOAA).



In 1996, Hurricane Edouard moved northward across the Atlantic Ocean, a couple of hundred miles east of the South Carolina coast, causing minor beach erosion along coastal areas of Charleston and Colleton counties (NOAA)

### **Hurricane Floyd - 1999**

In 1999, Hurricane Floyd weakened to a category three hurricane as it approached the southeast Georgia and southern South Carolina coasts on the morning of September 15th. The storm brushed the area during the late afternoon and evening as it took a more north and northeast course toward North Carolina. Sustained winds of tropical storm force were reported from Savannah, on the southeast Georgia coast, to Charleston, on the South Carolina coast, with wind gusts to hurricane force in the Charleston area. The highest sustained wind speed was 58 mph at the downtown Charleston office, which also had the highest gust (85 mph). In general, 3 to 5 inches of rainfall was reported across the area. Tides were 3.5 feet above normal with a maximum tide height 10.66 ft. ASL ( 7.71 MLLW) at downtown Charleston. Minor to moderate beach erosion occurred along the South Carolina coast. Many businesses and homes suffered major damage with thousands of homes suffering at least minor damage in Charleston County, where \$10,500,000 in damage was reported. Beaufort County reported \$750,000 damage, with Berkeley and Dorchester counties reporting \$500,000 dollars each. Well over a thousand trees were down, which contributed to over 200,000 people across south coastal South Carolina being without power at times on the night of September 15. There were sporadic reports of roofs being torn from homes or businesses across the area (NOAA).

1999 was the last time a Hurricane hit the area. There have been no new Hurricane events since the last plan.

These Hurricanes have massive transportation impacts and a need to increase shelter space. These issues are addressed through future action items, such as camera creation, lane widening, and shelter creation.

### **Hurricane Probability**

There is a moderate probability of a Hurricane in the Lowcountry is moderate but the damage potential is high. See below.

	<b>Number of Events</b>	<b>Years in Record</b>	<b>Recurrence Interval (Years)</b>	<b>Probability</b>
Colleton	<b>23</b>	<b>162</b>	<b>7.04</b>	<b>14.20%</b>
Hampton	<b>13</b>	<b>162</b>	<b>12.46</b>	<b>8.02%</b>
Jasper	<b>18</b>	<b>162</b>	<b>9.00</b>	<b>11.11%</b>

# Wind

**W**ind commonly accompanies most severe weather. Wind damage potential is high in many areas in the United States. South Carolina is located in an area that has a high potential for damaging winds, especially because the state is prone to tropical storms, tropical depressions, and hurricanes. Besides being a coastal state that is affected by tropical weather, the area's location is also in a high wind zone.

## Location

According to FEMA's wind zone map, the Lowcountry Region of South Carolina is in Zone III. Residents and the structures in Zone III should be prepared for wind speeds up to 200 miles per hour. Wind is a spatial event and affects all counties and jurisdictions within.

## Extent

### Colleton

Colleton County has experienced 442 significant windstorms between 1950 and 2013. There have not been any fatalities or injuries due to windstorms in the county. However, property damage has resulted from the storms. Approximately \$1,000,000 in property damage has resulted from windstorms in Colleton during these 62 years. Since the last Plan there have been 75 wind events with property damage (Sheldus 2015).

### Hampton

Hampton County has experienced 177 significant windstorms between 1950 and 2013. There has been one death, and one injury sustained due to windstorms in the county. There has been approximately \$200,000 in total property damage that has resulted from windstorms in Hampton County during these fifty-eight years. There have been 56 Event since the last Plan. Since the last plan there were 38 wind event with property damage (Sheldus 2015).

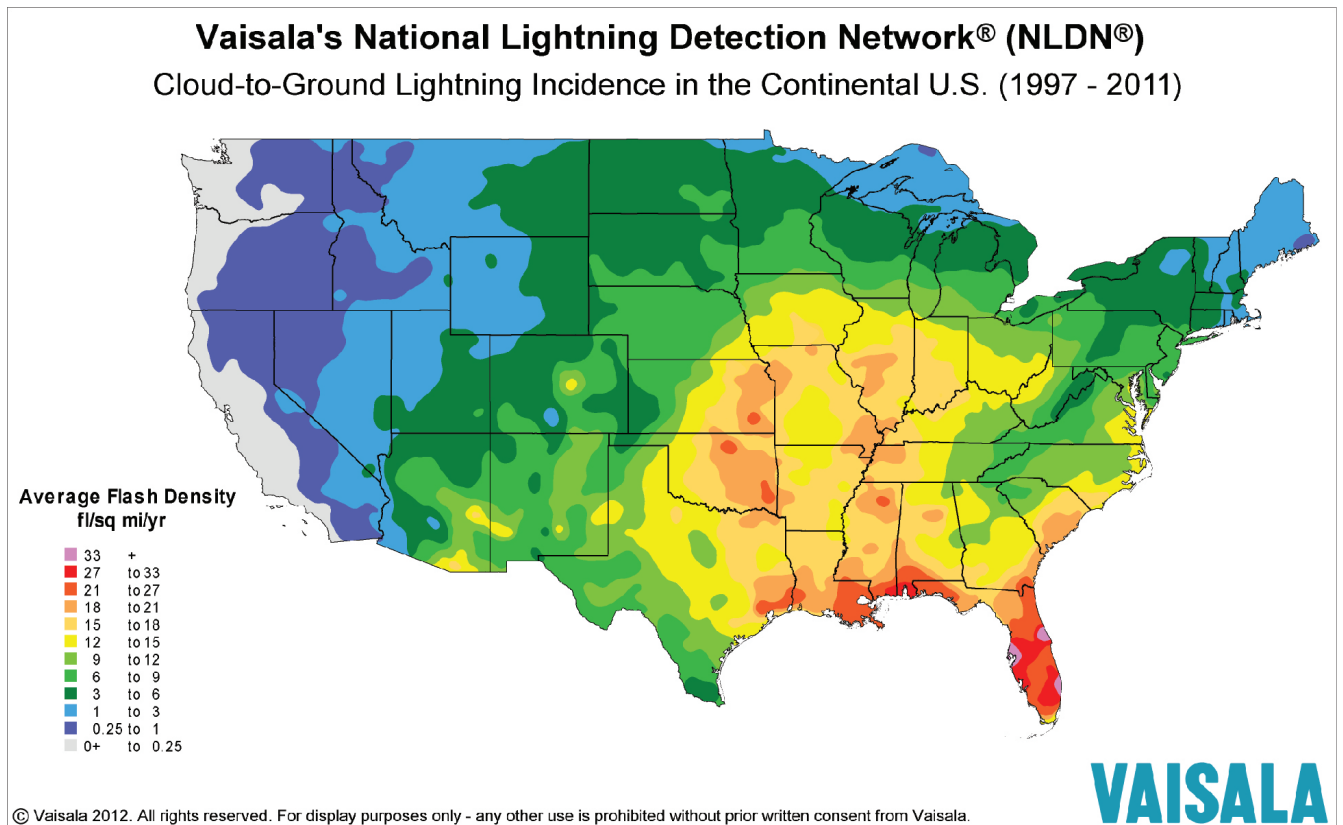
### Jasper

Jasper County has experienced 195 significant windstorms between 1950 and 2013. There have not been any fatalities and two injuries due to windstorms in the county. There has been approximately, \$300,000 in total property damage that has resulted from the windstorms during this period of time. There have been 41 wind events that have caused property damage since the last Plan (SHELDUS 2015)

## Wind Probability

	Number of Events	Years in Record	Recurrence Interval (Years)	Probability
Colleton	442	63	0.14	714.29%**
Hampton	177	63	0.36	277.77%**
Jasper	195	63	0.32	312.50%**

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



**Figure 11: National Cloud-to-Ground Lightning Incidence**

## Lightning

According to NOAA, “Lightning is the most dangerous and frequently encountered weather hazard that most people experience each year. It is the second most frequent killer in the United States with nearly 100 deaths and 500 injuries each year.” Not only is lightning common throughout the country, but the Lowcountry as well.

### Location

Lightning strikes in South Carolina are common. FEMA provides the following information on lightning: “Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a “bolt.” This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches a temperature approaching 50,000 degrees Fahrenheit in a split second. The rapid heating and cooling of air near the lightning causes thunder.”

Location

### Extent

Lighting is a spatial event and affects all counties and jurisdictions within equally. According to Figure 11, all three counties have 18-21 lightning flashes per square mile per year (VAISLA 2014).

## Lightning Facts:

- There is no safe place outdoors when a thunderstorm is nearby.
- The vast majority of lightning victims were going to a safe place but waited too long before seeking safe shelter.
- More than 80% of lightning fatality victims are male, typically between the ages of 15 and 40.
- Lightning fatalities are most common during summer afternoons and evenings.
- The energy from one lightning flash could light a 100-watt light bulb for more than 3 months.
- Many wildfires are ignited by lightning.
- The channel of air through which lightning passes can be heated to 50,000°F—hotter than the surface of the sun! The rapid heating and cooling of the air near the lightning channel causes a shock wave that results in the sound we know as “thunder.” (Source: NOAA)

## Colleton

According to NOAA data, while there have been numerous lightning strikes and events within the county, there has only been one notable strike which resulted in \$10k worth of property damage. None have resulted in fatalities, injuries, or crop damage. According to local information, a severe storm produced a lightning strike in July of 1998 that struck a barn and started a fire. In 2005, lightning struck the Lowcountry Regional Airport in Walterboro. The strike blew open a hole in the asphalt that was about 6 feet long, 3 feet wide and 6 inches deep.

Event: Lightning

Begin Date: 31 Jul 2009, 15:55:00 PM EST

Begin Location: 3 Miles North West of Walterboro

Begin LAT/LON: 32°55'N / 80°40'W

End Date: 31 Jul 2009, 15:55:00 PM EST

End Location: Not Known

Magnitude: 0

Fatalities: 0

Injuries: 0

Property Damage: \$ 10.0K

Crop Damage: \$ 0.0K

Description:

EVENT NARRATIVE: Law Enforcement reported that lightning started a structure fire on Lakewood Drive near Walterboro, South Carolina. EPISODE NARRATIVE: The sea breeze pushing into a highly unstable air mass, resulted in scattered thunderstorm development across southern South Carolina.

## Hampton

While there have been numerous lightning strikes and events within the county, there have been only two notable strikes which have resulted in fatalities, injuries, or crop damage. One lightning incident caused approximately \$100,000 in property damage within the county. The following is NOAA information on that lightning strike in Hampton.

Event: Lightning

Begin Date: 26 Aug 1995, 0222 EST

Begin Location: Scotia

End Location: Not Known

Property Damage: \$ 100,000  
Description:  
Lightning-set fire destroyed a home.

Event: Lightning  
Begin Date: 04 Jun 2000, 04:05:00 PM EST  
Begin Location: Early Branch  
End Date: 04 Jun 2000, 04:05:00 PM EST  
End Location: Early Branch  
Magnitude: 0  
Fatalities: 0  
Injuries: 0  
Property Damage: \$ 0.0  
Crop Damage: \$ 0.0  
Description:  
Lightning caused several fires.

### Jasper

According to the USC data, there have been numerous lightning strikes and events within the county, but there have not been any notable strikes that have resulted in fatalities, injuries, property damage, or crop damage. However, local insight from Jasper public meetings in previous plans did include information concerning a damaging lightning strike. There have been no notable strikes since the last plan was completed.

## Lightning Probability

Lightning strikes are very common because they result from severe weather. Lightning has caused little significant impact in the Lowcountry Region, though. The probability of significant damaging lightning strikes is low. The following figures show the probability of a significant lightning strike in the three counties.

	Number of Events	Years in Record	Recurrence Interval (Years)	Probability
Colleton	2	20	10	10%
Hampton	2	20	10	10%
Jasper	0	20	*	*

\*Indicates cannot determine amount (cannot divide by 0)



# Hail

**H**ail are frozen droplets of water that thaw and freeze while wind patterns (updrafts and down-drafts) take them between colder and warmer elevations within a thunderstorm cloud. Each time the droplet re-freezes, another layer of ice is added to the object, thus making it larger until it falls to the earth. Hail is a costly result of severe weather in the United States. In an average year, hail causes one billion dollars in crop and property damage each year in this country (NOAA).

## Location

Hail is a spatial event and affects all counties and jurisdictions within.

## Extent

### Colleton

Colleton County has experienced 89 significant storms that have produced hail. There have been no reported injuries or fatalities, but there have been almost \$3,000 in damages. There have been 18 events since the last Plan (NCDC 2015), but none with damage (SHELDUS 2015)

Event: Hail

Begin Date: 29 Nov 1994, 1544 CST

Begin Location: 3 Miles South East of Walterboro

End Location: Not Known

Magnitude: 0.75 inches

Property Damage: \$ 2.0K

Event: Hail

Begin Date: 15 Mar 2008, 19:26:00 PM EST

Begin Location: 1 Mile North West of Hendersonville

Begin LAT/LON: 32°47'N / 80°43'W

End Date: 15 Mar 2008, 19:26:00 PM EST

End Location: Not Known

Magnitude: 1.00 inches

Property Damage: \$ 0.5K

EVENT NARRATIVE: Quarter sized hail was reported by a trained weather spotter in Hendersonville, South Carolina. A small dead tree was also reported down.

### Hampton

Hampton County has experienced 33 significant storms that have produced hail. There have been no reported injuries, crop damage, or property damage that has resulted from these events. There have been nine hail events since the last Plan (NCDC 2015), but none with damage (SHELDUS 2015)

## Jasper

Jasper County has experienced 26 significant storms that have produced hail. There have been no reported injuries and crop damage, but \$5,000 of property damage has resulted. Since the last plan no new damages have been reported.

Event: Hail

Begin Date: 20 Jun 1995, 1350 EST

Begin Location: Pineland

End Location: Not Known

Magnitude: 0.75 inches

Property Damage: \$ 5,000

Description:

Three-quarters inch hail and trees down.

## Hail Probability

	Number of Events	Years in Record	Recurrence Interval (Years)	Probability
Colleton	89	63	0.7	142.86%**
Hampton	33	63	1.91	52.35%
Jasper	26	63	2.42	41.32%

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

# Drought

According to NOAA, a “drought is a period of abnormally dry weather which persists long enough to produce a serious hydrological imbalance (for example crop damage, water supply shortage, etc.) The severity of the drought depends upon the degree of moisture deficiency, the duration and the size of the affected area.”

## Location

Droughts are region-wide natural disasters and will be addressed that way. The implications are both urban and rural in nature as water supply becomes an issue. Agriculture is often the first industry to notice the effects of drought, especially if it occurs during the growing season. Persistent drought will affect all industries (SCDNR State Climatology)

## Extent

There have been 21 significant droughts in the Lowcountry Region. Droughts have afflicted the Lowcountry Region in recent history (USC). During 2000 to 2003, the area was very dry and average rain amounts were low. Agricultural operations were negatively affected by the lack of rain and high temperature. According to the South Carolina EMD, the state has had significant droughts in 1983, 1986, 1993, and from 1998 to 2003. The drought in 1983 was very severe, causing thirty-nine counties to seek emergency relief, and agricultural, forestry, and industrial losses that totaled more than 500 million dollars.

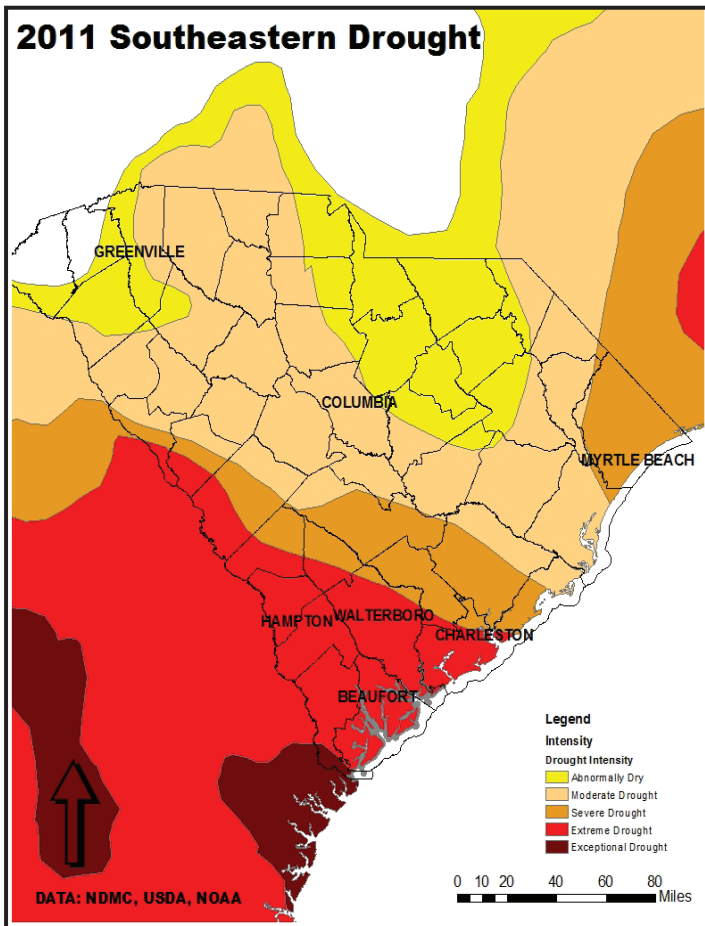


Figure 12: 2011 Southeastern Drought

The latest severe drought occurred in 2011, though the event did not meet the dollar threshold to be considered significant enough to be factored into the probability numbers. The effects were still evident as agriculture wells began to run dry in Hampton County. As of this writing for the 2015 Plan update, drought conditions have begun to emerge where more than 90 percent of the state is now considered abnormally dry or worse (U.S. Drought Monitor).

## Region Drought Probability

Number of Events	Years in Record	Recurrence Interval	Probability
21	59	2.81	35.59%

# Earthquakes

**E**arthquake is a term used to describe both sudden slip on a fault, and the resulting ground shaking and radiated seismic energy caused by the slip, or by volcanic or magmatic activity, or other sudden stress changes in the earth (USGS).

## Extent

Magnitude and intensity are important to understanding when discussing earthquakes. The following information is from the USGS: “Magnitude and Intensity measure different characteristics of earthquakes. Magnitude measures the energy released at the source of the earthquake. Magnitude is determined from measurements on seismographs. Intensity measures the strength of shaking produced by the earthquake at a certain location. Intensity is determined from effects on people, human structures, and the natural environment. The following table gives intensities that are typically observed at locations near the epicenter of earthquakes of different magnitudes.”

### Comparison of maximum intensity and magnitude:

Typical Maximum Intensity	Description of Shaking and Damage	Magnitude
I	Not felt except by a very few under especially favorable conditions.	1.0 – 3.0
II	Felt only by a few persons at rest, especially on upper floors of buildings.	3.0 – 3.9
III	Noticeably felt by persons indoors, especially on upper floors. Many people do not recognize it as an earthquake. Parked cars may rock slightly. Vibrations similar to passing truck.	
IV	Felt indoors by many, outdoors by a few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like truck striking building. Parked cars visibly rock.	
V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.	4.0 – 4.9
VI	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.	5.0 – 5.9
VII	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken. Noticed by drivers in moving cars.	
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.	6.0 – 6.9
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.	7.0 and higher
XI	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.	
XII	Damage total. Lines of sight and level are distorted. Objects thrown into the air.	



Source: USGS Magnitude/Intensity Comparison ([http://earthquake.usgs.gov/learn/topics/mag\\_vs\\_int.php](http://earthquake.usgs.gov/learn/topics/mag_vs_int.php))

Figure 13: Earthquake Intensity Description

## Location

### All Regions

Seventy percent of earthquakes in South Carolina originate from the Middleton Place-Summerville Seismic Zone. This seismic zone is in close proximity to the Lowcountry Region of South Carolina. The following map shows earthquakes in Colleton County and surrounding counties in South Carolina. In the Lowcountry Region, there have been three earthquakes, two in Colleton and one in Beaufort County. There have been numerous earthquakes in Berkeley, Dorchester, and Charleston Counties, all of which are in close proximity to the Lowcountry Region.

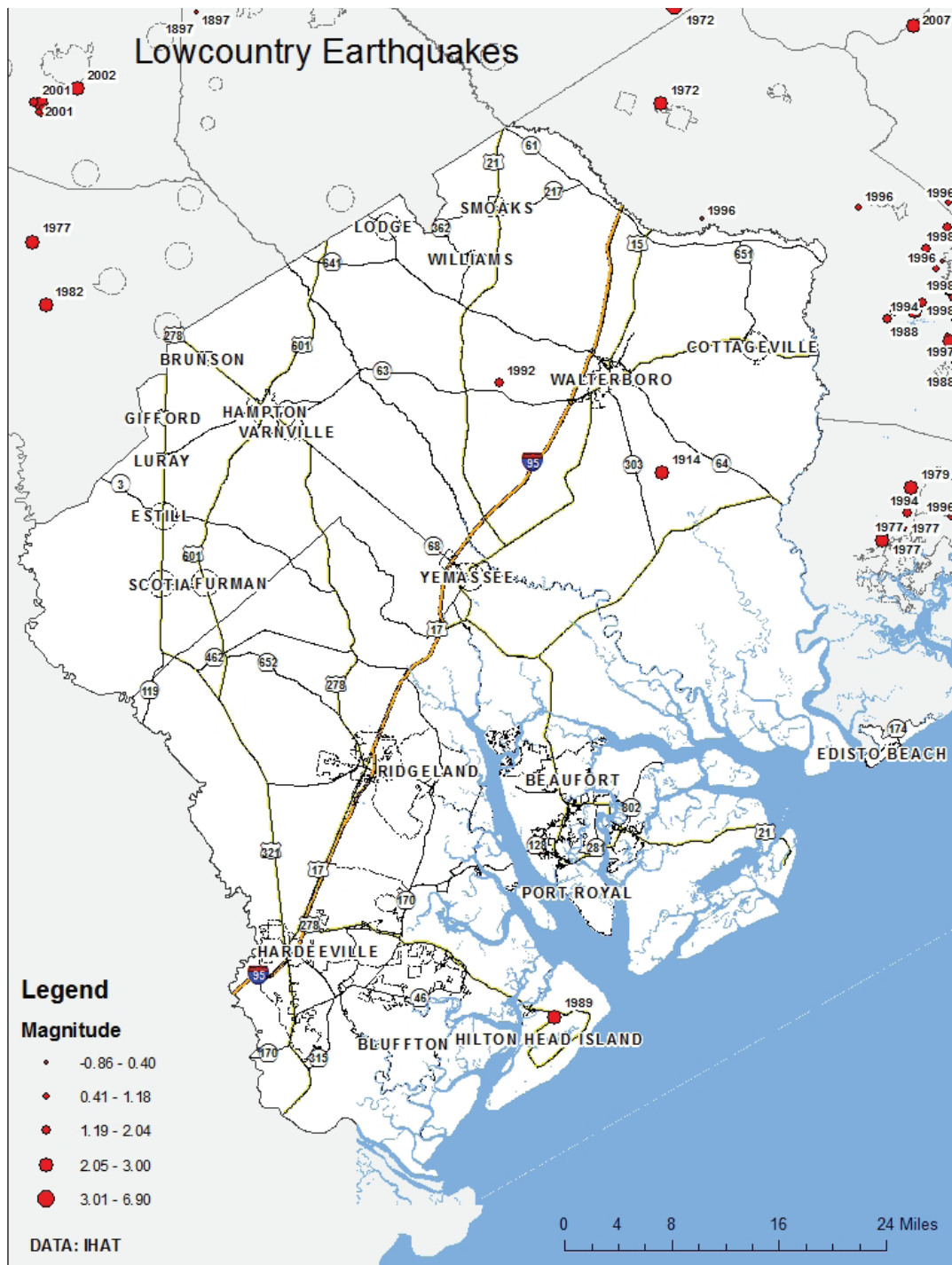


Figure 14: Lowcountry Historical Earthquakes Map

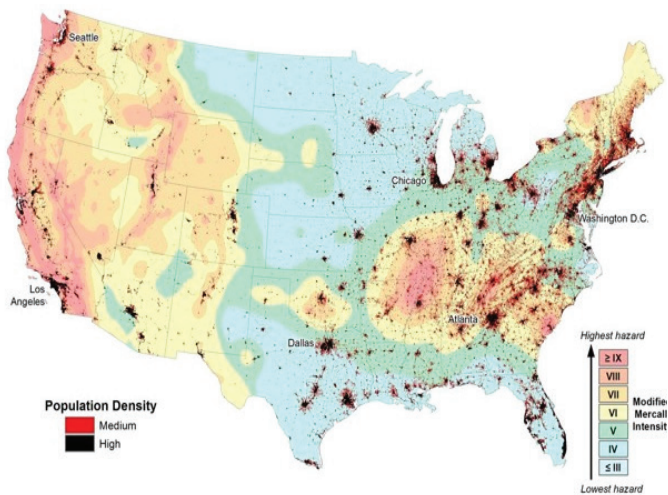


## All Regions

There is an average of 10 to 15 earthquakes annually in the State of South Carolina. Of these ten to fifteen, about three to five of them are felt by residents. Two of the earthquakes (1886 and 1913) originating in the Charleston area have been considered to be some of the most destructive earthquakes in United States history (SCEMD).

In the Lowcountry Region, there have been three earthquakes, two in Colleton and one in Beaufort. The first in Colleton was in 1914 and measured a magnitude of 2.7. The second occurred in 1992 and measured a magnitude of 1.4. The earthquake in Beaufort was in 1989 and measured a magnitude of 2.8. None of the earthquakes originating in the Lowcountry area has been severe or has had the potential for damage.

There have been numerous earthquakes in Berkeley, Dorchester, and Charleston Counties, all of which are in close proximity to the north of the Lowcountry Region.



Earthquakes originating from the Middleton Place-Summerville Seismic Zone have produced earthquakes up to a magnitude of 6.9 (In the year 1886). Another significant earthquake such as the event in 1886 could potentially cause damage in the Lowcountry Region and especially in Colleton County. The Lowcountry is in close proximity to the Middleton Place-Summerville Seismic Zone.

Since the last Hazard Mitigation Plan, there have been no new earthquakes to hit any of the three counties.

## Earthquake Probability

The probability of earthquakes is very low. There have been only three epicenters in the region (including Beaufort County), over many years. Since 1698, there have only been two major earthquakes originating from the Middleton Place-Summerville Seismic Zone.

	Number of Events	Years in Record	Recurrence Interval (Years)	Probability
Colleton	2	314	157	0.64%
Hampton	0	314	0	*
Jasper	0	314	0	*



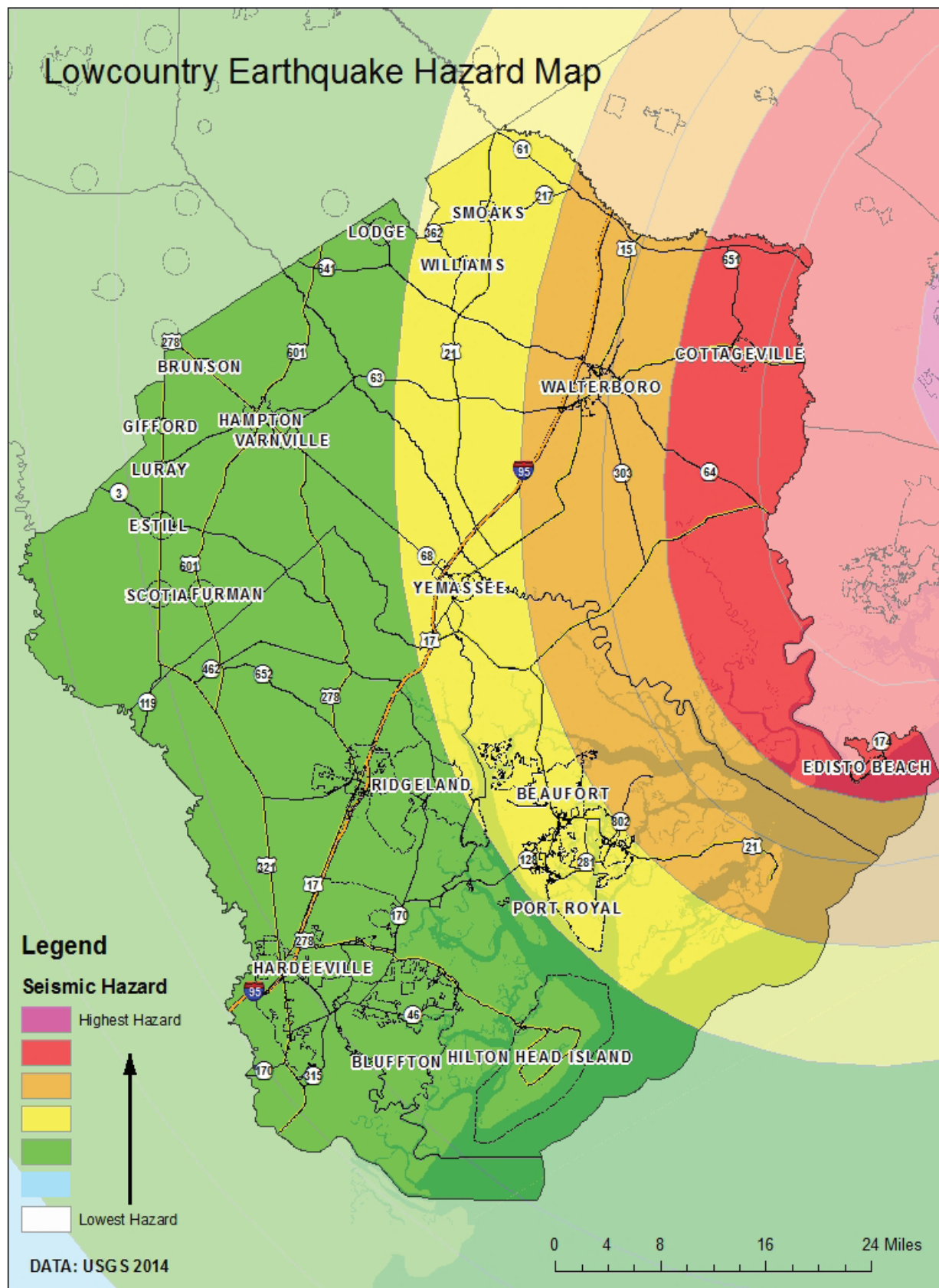


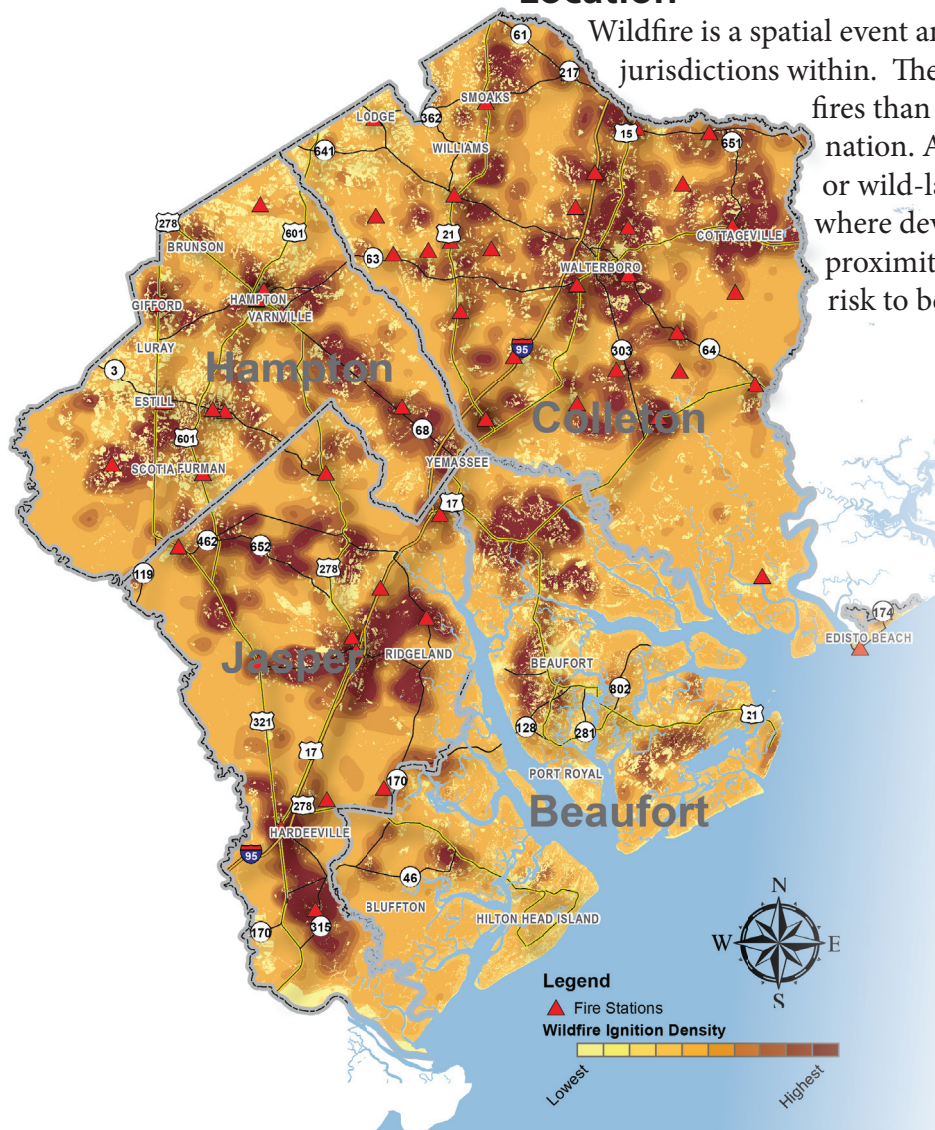
Figure 15: Lowcountry Earthquake Hazard Map

# Wildfire

Wildfires are the most common natural hazards in South Carolina. Approximately 5,000 wildfires occur in South Carolina each year. Wildfires can result from by natural causes, but most result from human action. The prevalent cause of fires arson or debris burning. There is an average of 30,000 acres a year burnt by wildfires in the State (SCEMD). The following lists the cause of fires in South Carolina by percentages:

## Location

Wildfire is a spatial event and affects all counties and jurisdictions within. The South, in general, has more fires than any other geographic area in the nation. Areas with growing populations, or wild-land-urban interface areas, where development is occurring in close proximity to forests, have an increased risk to be exposed to wildfire.



## Wildfire Causes

- Woods Arson - 40-45%
- Debris Burning - 30-35%
- Equipment Use - 5%
- (Fireworks, etc.) - 4-6%
- Smoking - 4-5%
- Children - 3-5%
- Lightning - 2%
- Campfires - 1-3%
- Railroads - 1-2%

(Source: South Carolina Forestry Commission)

**Ignition Density** –Wildfire tends to follow areas with population density, transportation corridors, and the presence of industrial and recreation vehicles in woodlands (Southern Fire Exchange, 2013). The map below shows that wildfires in the Lowcountry are occurring near or around the region's major transportation corridors, particularly Interstate-95 and population centers. Data was obtained from federal, state and local fire department report data sources for the years 1997 to 2002.

## Possible Community Wildfire Fuel Reduction Actions

- Conduct home risk assessments
- Develop “prescriptions” for defensible space around homes
- Organize neighborhood clean-up days
- Find funding for cost share/free treatments for residents that need assistance in creating defensible space around their homes
- Organize chipping or slash disposal opportunities
- Identify demonstration houses
- Identify and implement community or neighborhood fuel breaks

## Extent

### Colleton

Over the past 50 years, there has been an average of 259 fires per year in Colleton County. As a result of these fires, the average number of acres burnt per year was 2,078. There have been 4,390 reported fires in the past 21 years of record. There have been no notable wildfires since the previous plan.

### Hampton

Over the past 50 years, there has been an average of 102 fires per year in Hampton County. As a result of these fires, the average number of acres burnt in these years was 595.2. There have been 1,751 reported fires in the past 21 years of record. There have been no notable wildfires since the previous plan.

### Jasper

Over the past 50 years, there has been an average of 220 fires per year in Jasper County. As a result of these fires, the average number of acres burnt in these years was 1,886. There have been 3,280 reported fires in the past 21 years of record. There has been one notable wildfire since the previous plan.

## Wildfire Probability

Wildfires are highly probable across the Region.

	Number of Events	Years in Record	Recurrence Interval (Years)	Probability
Colleton	4,390	25	<0.50	20904.76%**
Hampton	1,751	25	<0.50	8338.10%**
Jasper	0	314	<0.057	15628.57%**

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



# Flood

In the United States, floods and flash floods are the first ranked natural hazard in deaths. The National Flood Insurance Program defines a flood as “a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties (at least one of which is your property) from: overflow of inland or tidal waters, unusual and rapid accumulation or runoff of surface waters from any source, or a mudflow.”

South Carolina is especially vulnerable to flooding because of its low elevation and frequency of storms. There are two main forms of flooding: riverine and coastal. Riverine flooding occurs during periods of heavy rain when the natural drainage systems' carrying capacities cannot handle the amount of water resulting from a rainstorm. Coastal flooding occurs during storms that cause high wind speeds, storm surge, rain, and erosion (SCEMD).



*Photo Credit: Colleton Today, KM - 2015 Flood Colleton County*

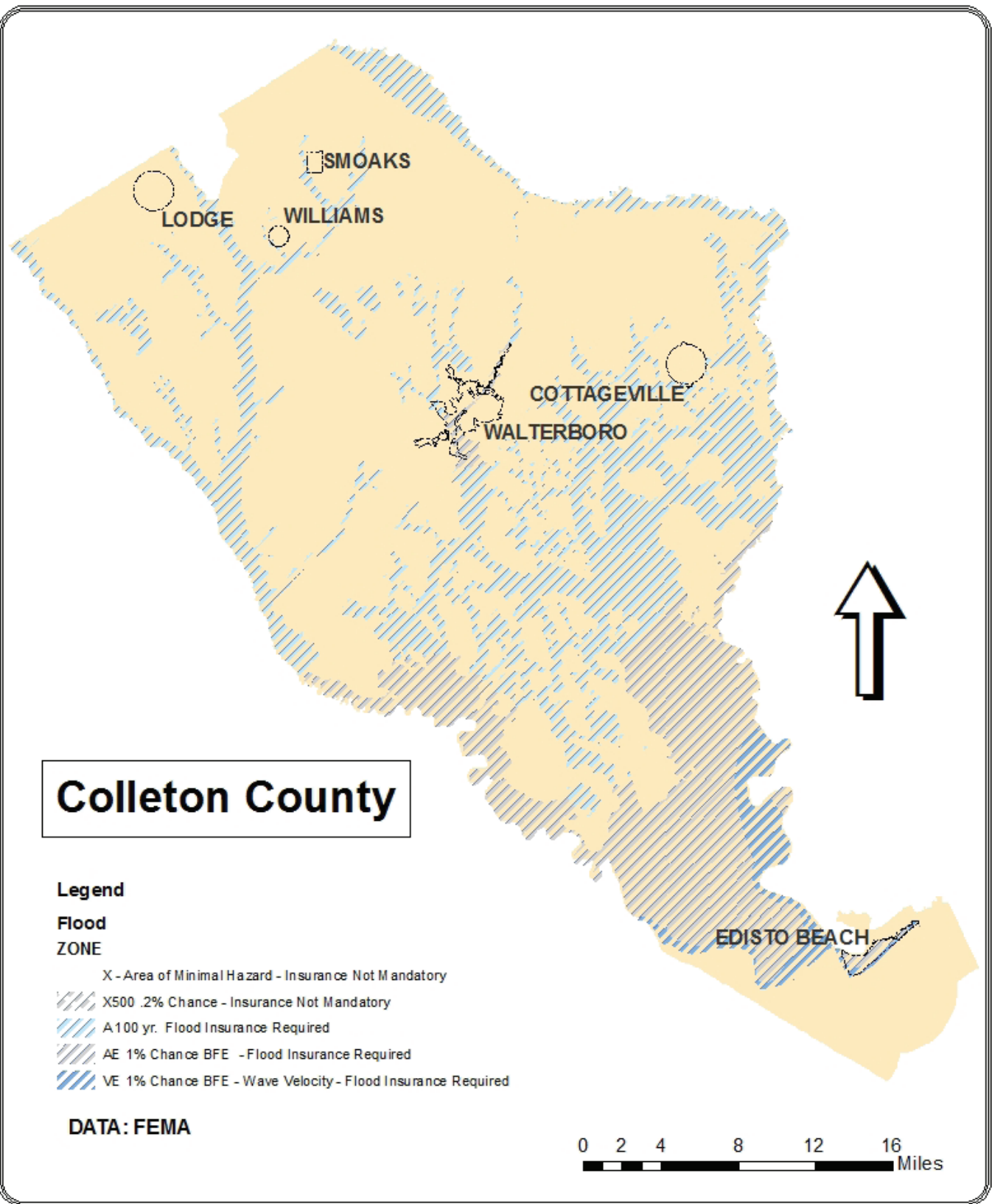
An important concept to understand is the 100-year flood elevation. This is the boundary of the flood elevation that has a 1- percent chance of being equaled or exceeded each year. Thus, the 100-year flood could occur more than once in a relatively short period of time. The 100-year flood, which is the standard used by most Federal and state agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management and to determine the need for flood insurance.

Hurricane storm surges can cause flooding deep into the Lowcountry Region. Each hurricane level can push water further inland. Surge maps will follow in this section.

All jurisdictions participate in the National Flood Insurance Program (NFIP) as appropriate, except for, Smoaks. The Town of Smoaks has a small population (125) and very little land area in a floodplain, which is undeveloped. There are currently no efforts for the Town of Smoaks to participate in the NFIP. There are specific indications of this in plans and law. In compliance with this, and to prevent flooding, there are specific actions for each jurisdiction in order to mitigate against flood events. Colleton County and the Town of Edisto Beach participate in the Community Rating System (CRS).

## Location

The following mapping shows FEMA flood zone designations and storm surge potential by hurricane level. FEMA's Map Service Center designates the following Acronyms in terms of risk areas.



**Flood**

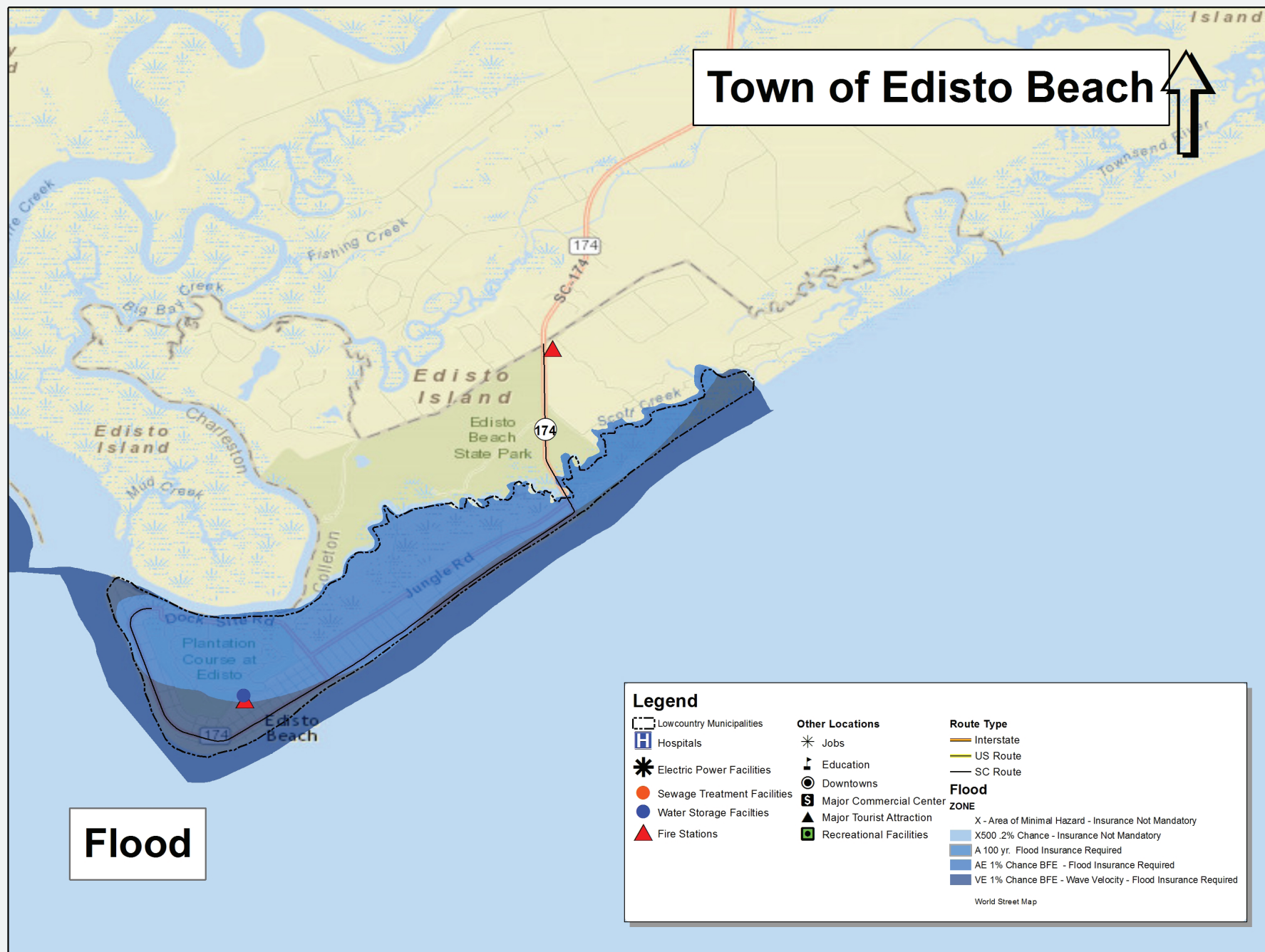


Figure 17: Town of Edisto Beach Flood Map



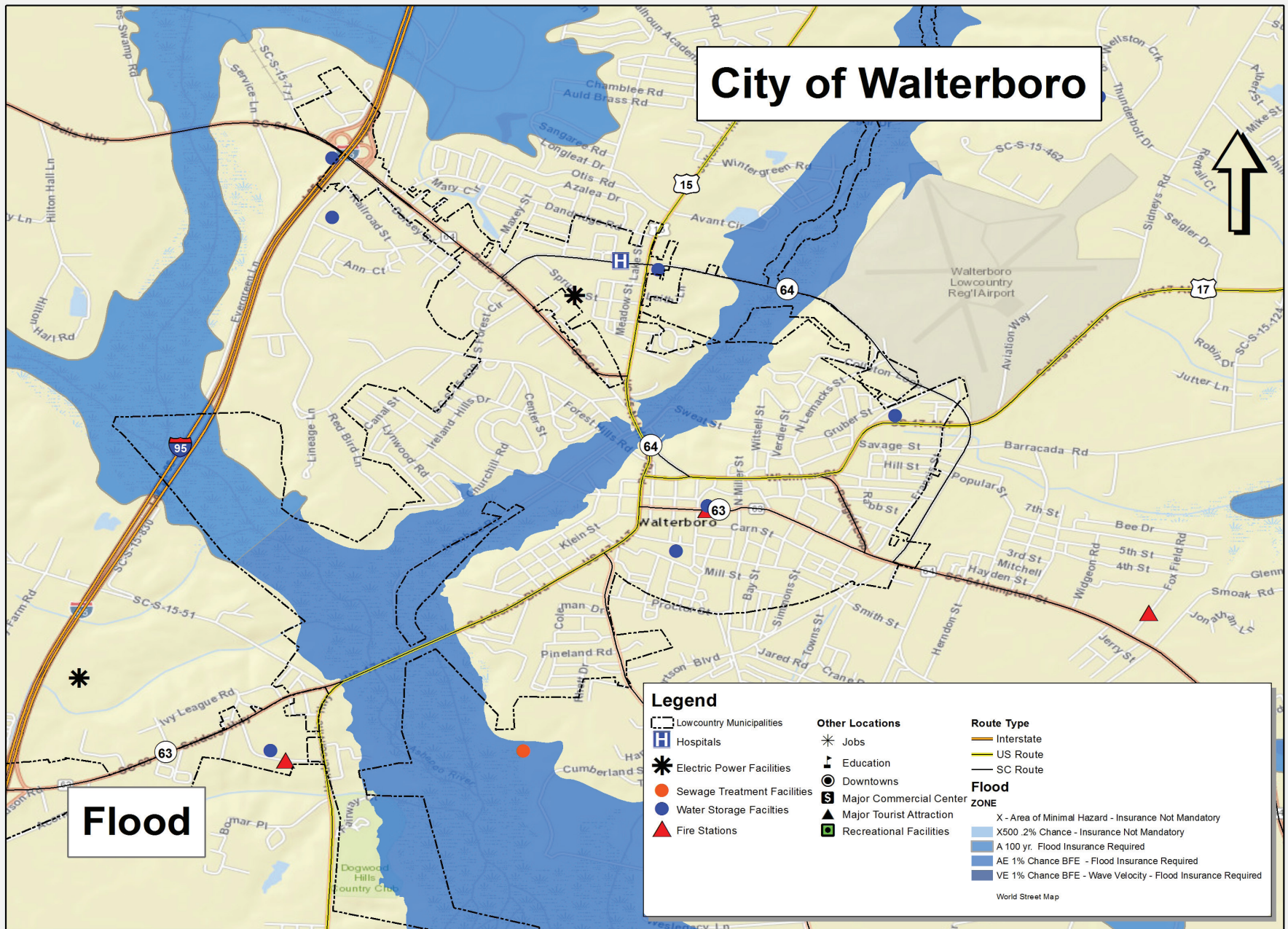
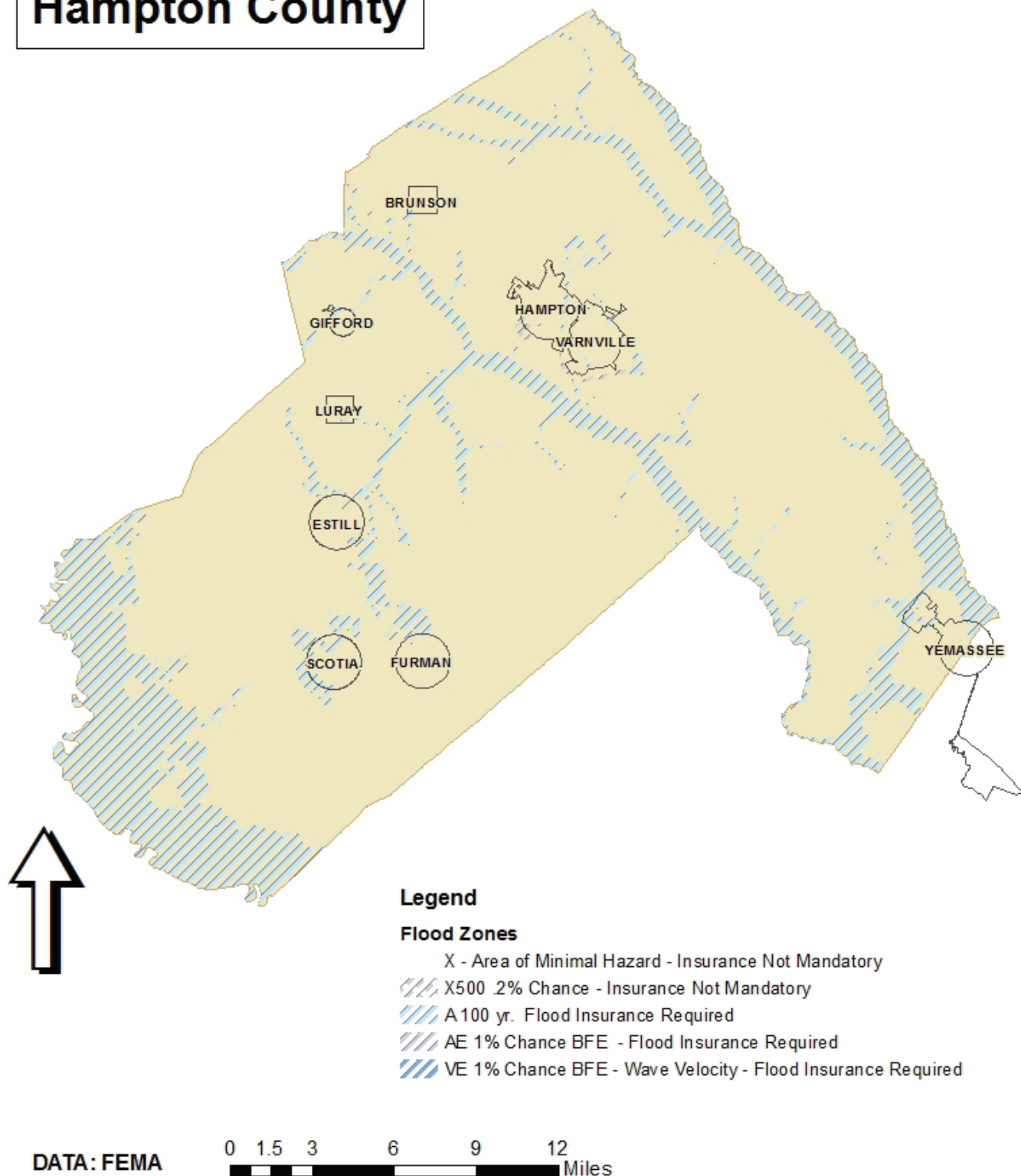


Figure 18: City of Walterboro Flood Map

# Hampton County



**Flood**

Figure 19: Hampton County Flood Zones Map





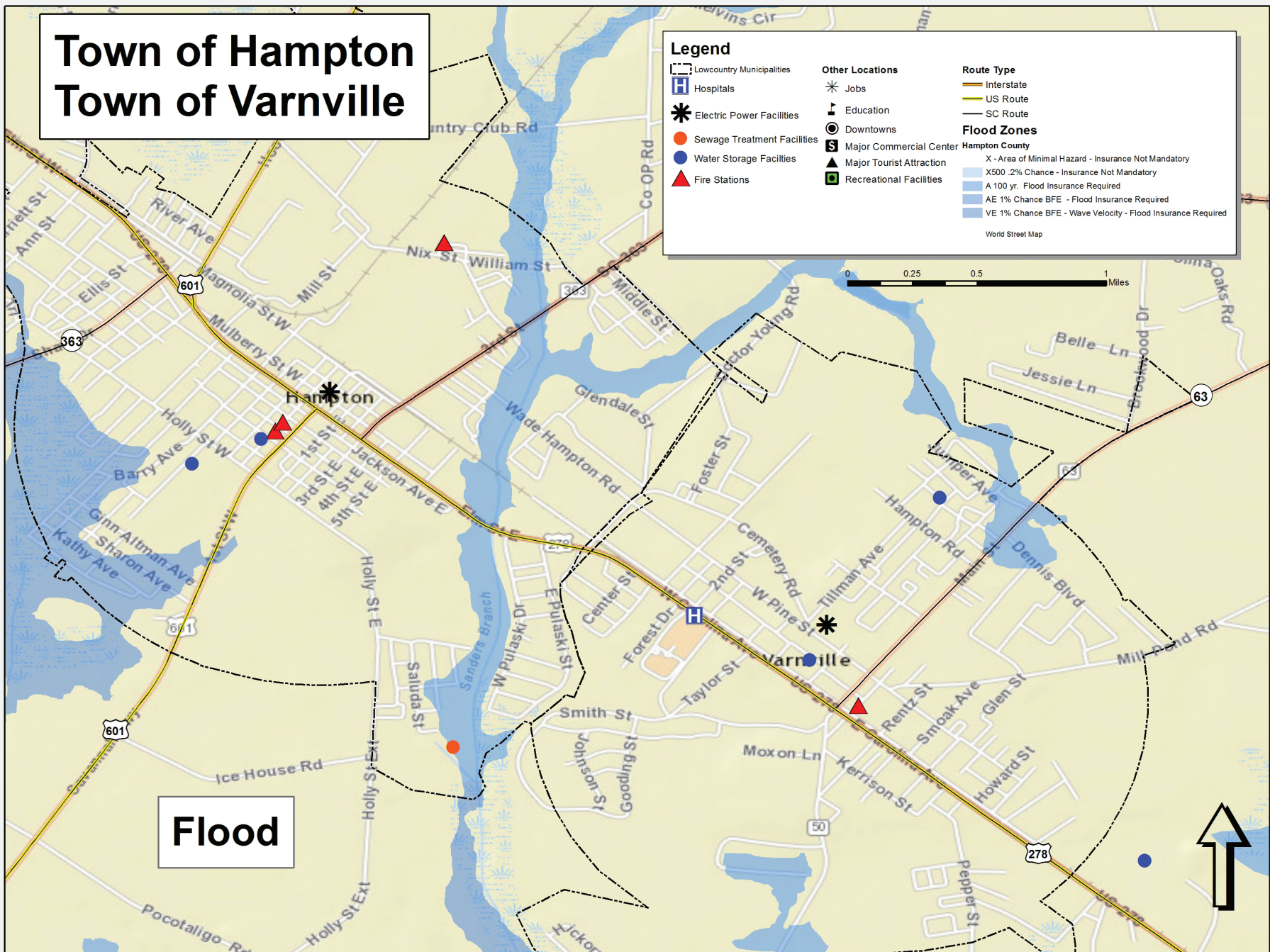


Figure 21: Town of Hampton | Town of Varnville Flood Map



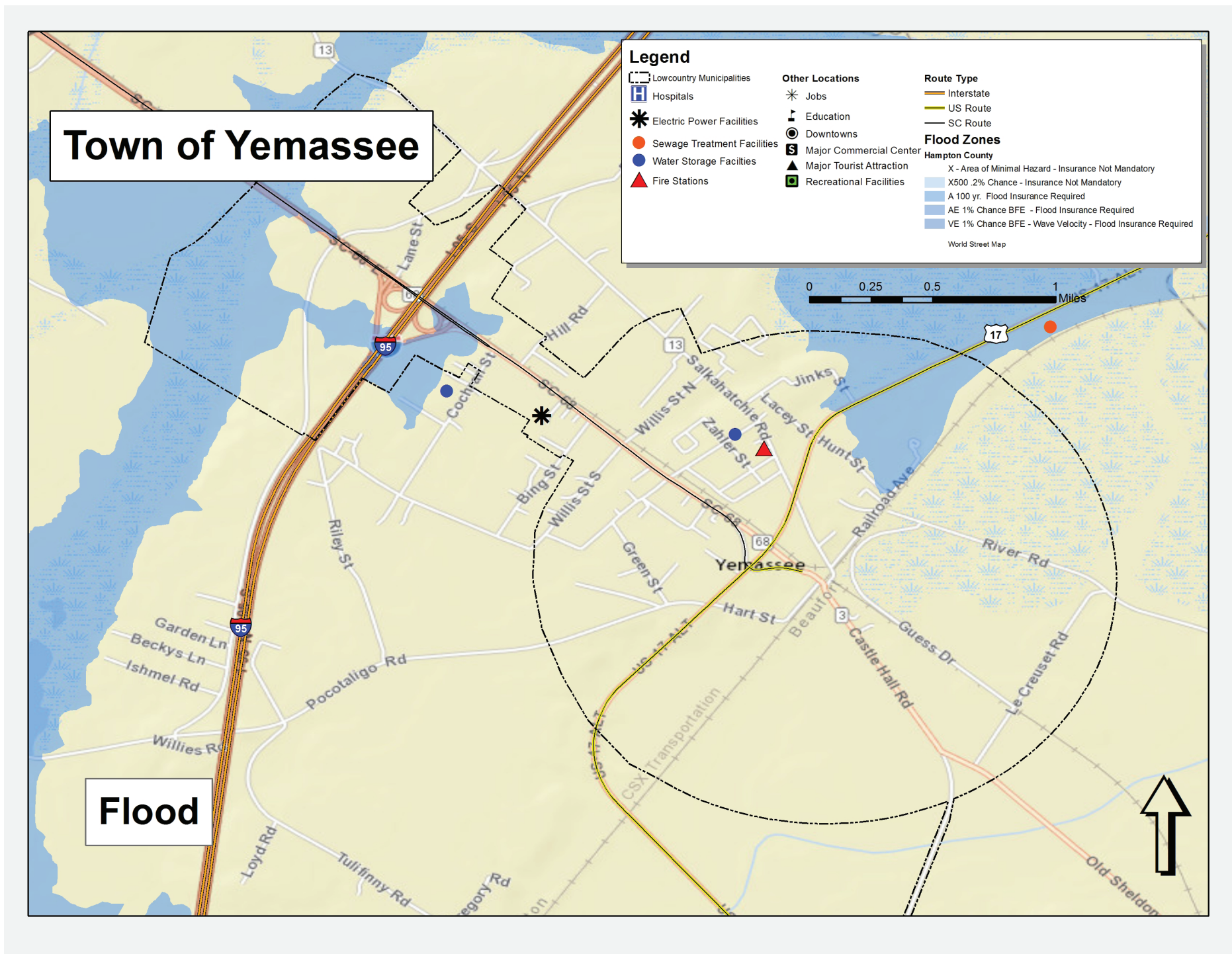
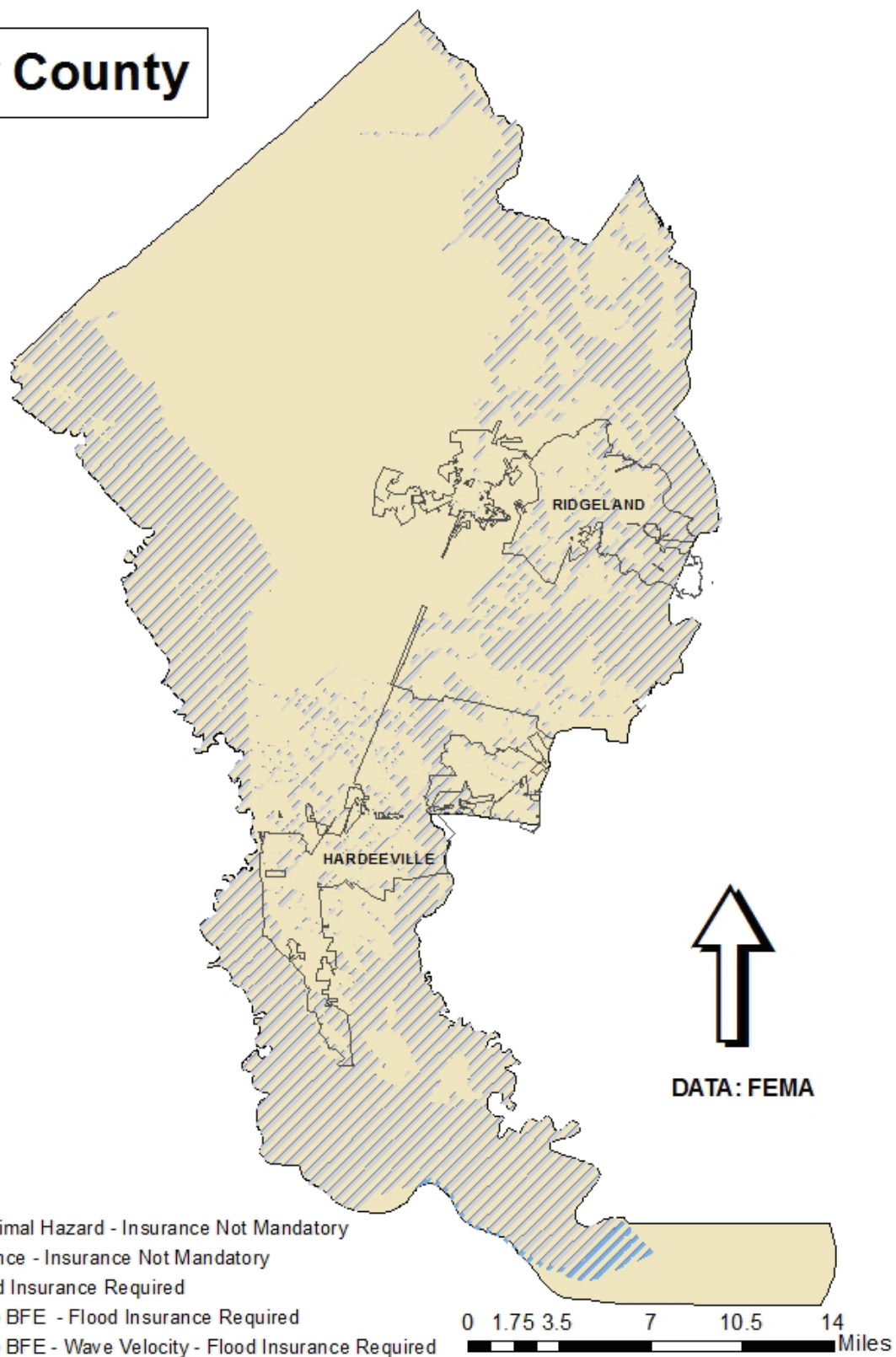


Figure 22: Town of Yemassee Flood Map

# Jasper County

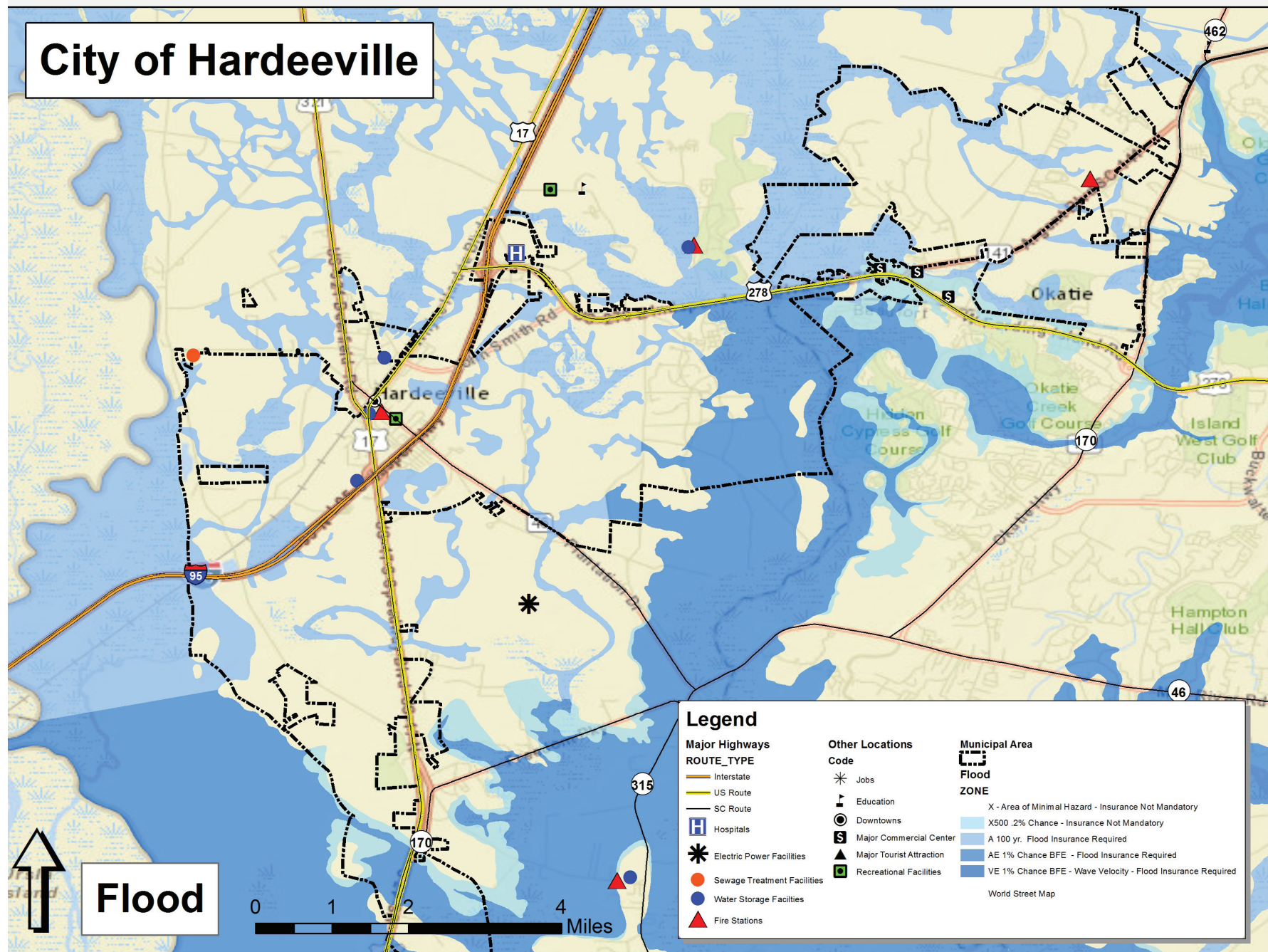


**Flood**

Figure 23: Jasper County Flood Zones Map



# City of Hardeeville





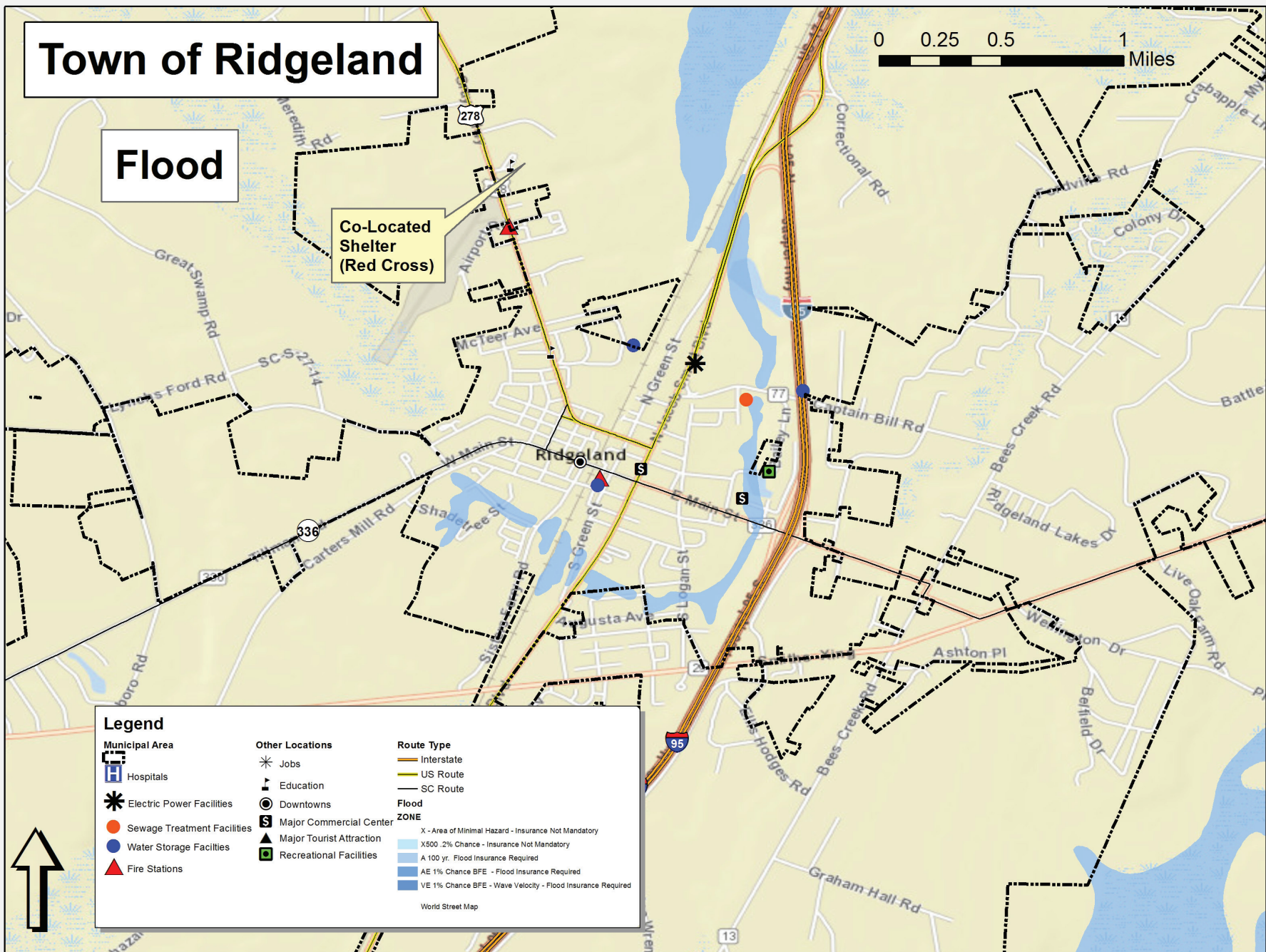


Figure 24: Town of Ridgeland Flood Map

## **Extent**

### **Colleton**

There are several areas that are affected by floods in the region, with the majority located along the Edisto River and in the Town of Edisto Beach, in Colleton County. For the Edisto River, flooding begins at 10 ft. where numerous river access roads including Happiness Lane, Canon Road, Cardinal Lane, Huckleberry Ln., and Gater Walk become affected. Major flooding occurs at 15 ft. where extensive damage to homes and cabins in the Canadys area can be expected (Source NWS). The entire Town of Edisto Beach lies within the 100-year flood plain. Any land area there is statistically susceptible to water inundation, with a 26 percent chance that a 100-year flood will occur within a 30-year time period. The previous plan mentioned that there was only one structure in the entire three-county region that is considered a repetitive loss structure, but now there are 17 residential structures in the Town of Edisto Beach. The following information is specific localized flooding information (NOAA). There have been 20 incidents of flooding within the last 63 years of record. Of those, six have occurred since the last Mitigation Plan. Note: Official data does not include the October 2015 floods.

### **Hampton**

There have been localized road washouts and flooding on route 321 in Hampton County. Localized flooding events occur, but none were significant. There are no repetitive loss flood areas in Hampton County. There have been some localized flooding events, however. In 2013, wetter than average conditions persisted throughout the summer, washing out dirt roads and causing agricultural problems. The following information is specific localized flooding information (NOAA). Since the last Mitigation plan, four flooding incidents occurred. For areas along the Savannah River, The Stokes Bluff neighborhood is vulnerable. When the river reaches 18 ft., homes around Arrowhead Court become affected and at 21.6 ft one foot of water covers Stokes Landing Rd. At this level, several homes become inaccessible (NWS).

### **Jasper**

The original 2004 Plan mentioned that there have only been two properties in Jasper County which have been affected by flooding that are considered repetitive loss areas. Now, however, no structures lie within the boundaries of Jasper. In July 2013, the Savannah River surpassed flood stage and crested at 18.38 ft., flooding forested areas and making one area along Tom Goethe Rd. impassible. At 13.3 ft., one foot of water covers Tom Goethe Rd. to just after the pavement ends at 14.5 the bottom floor of river front homes there become flooded (NWS). The following information is specific localized flooding information (NOAA). Out of the ten flood incidents to occur in Jasper County, over the last 63 years, no significant flood events have occurred since the last Mitigation Plan.

# Flooding Probability

Flooding probability in the Lowcountry varies by location. Threats come from riverine, flash, and coastal flooding. Colleton County is the most flood-prone, followed by Jasper and Hampton Comities. See table below.

	Number of Events	Years in Record	Recurrence Interval (Years)	Probability
Colleton	20	63	3.15	31.75%
Hampton	9	63	7.00	14.29%
Jasper	10	63	6.3	15.87%

## Hurricane Surge Probability

The following figures show hurricane probability and hurricane storm surge probability by the level of a hurricane. Hurricane storm surge causes flooding and can reach miles inland. These surges have the potential to cause massive property damage. The hurricane surge data is the same as that in the last plan since there have been no new hurricanes in the past 5 years.

	Events	Years	Recurrence Interval	Annual Average	Probability of 1+ annually
<b>Colleton County</b>					
Hurricane Surge 1	41	150	3.66	0.27	25.92
Hurricane Surge 2	22	150	6.82	0.15	18.13
Hurricane Surge 3	8	150	18.75	0.05	9.52
Hurricane Surge 4	4	150	37.5	0.03	9.52
Hurricane Surge 5	0	150	*	0	0
<b>Hampton County</b>					
Hurricane Surge 1	35	150	4.29	0.23	18.3
Hurricane Surge 2WW	19	150	7.89	0.13	9.52
Hurricane Surge 3	6	150	25	0.04	9.52
Hurricane Surge 4	3	150	50	0.02	9.52
Hurricane Surge 5	0	150	*	0	0
<b>Jasper County</b>					
Hurricane Surge 1	43	150	3.49	0.29	25.92
Hurricane Surge 2	22	150	6.82	0.15	18.13
Hurricane Surge 3	8	150	18.75	0.05	9.52
Hurricane Surge 4	3	150	50	0.02	9.52
Hurricane Surge 5	0	150	*	0	0



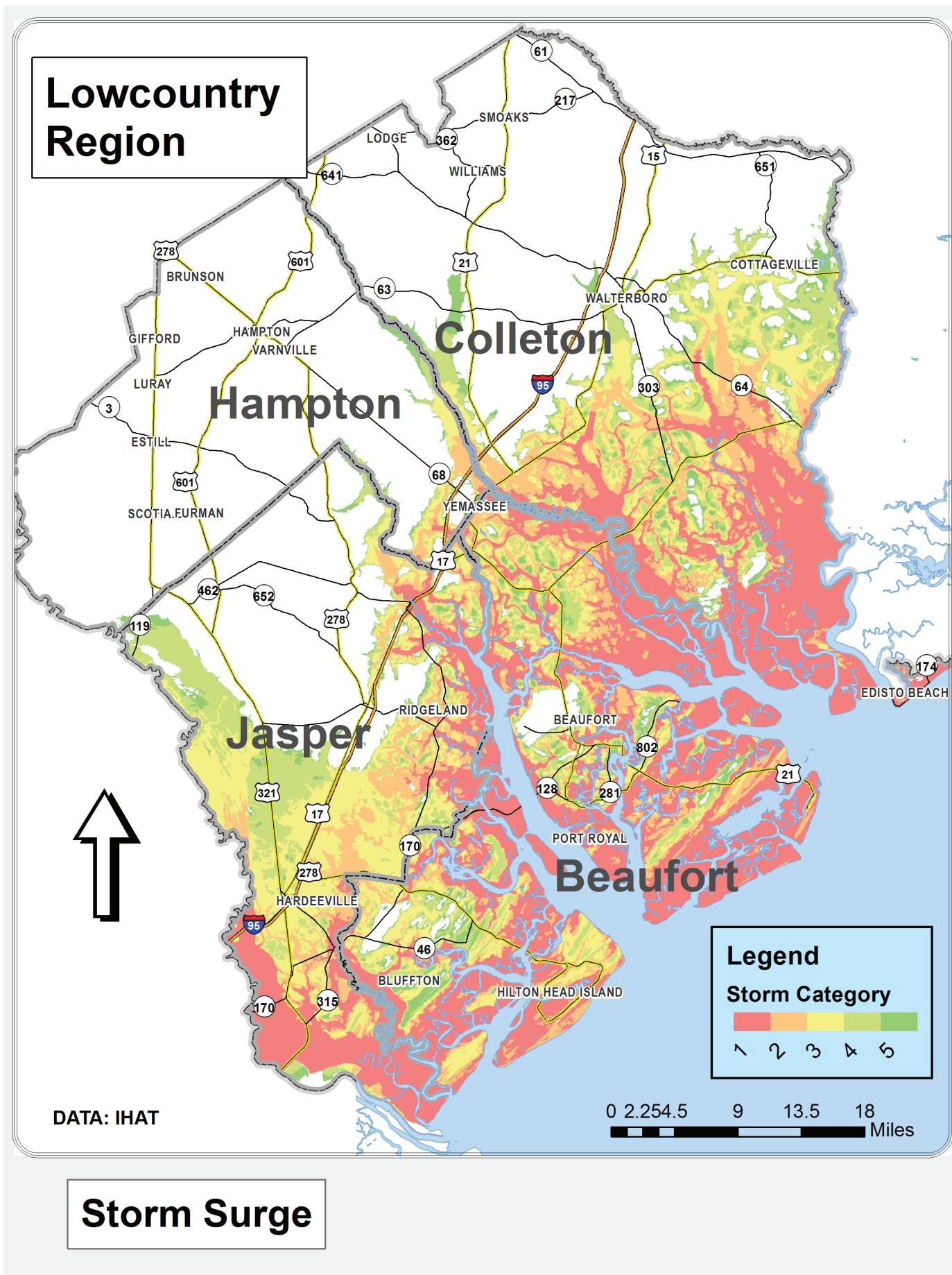


Figure 25: Lowcountry Storm Surge Map



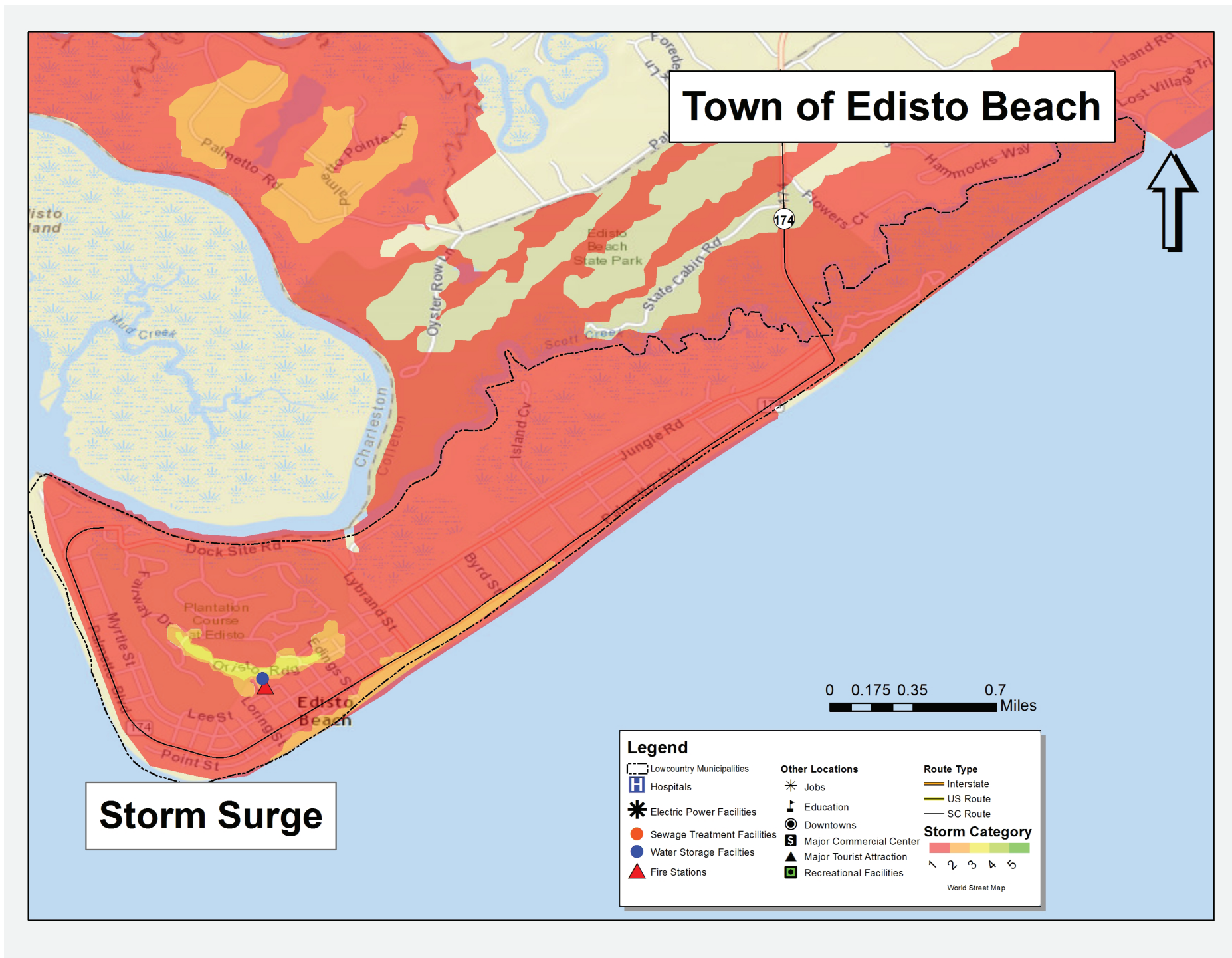


Figure 26: Town of Edisto Beach Storm Surge Map



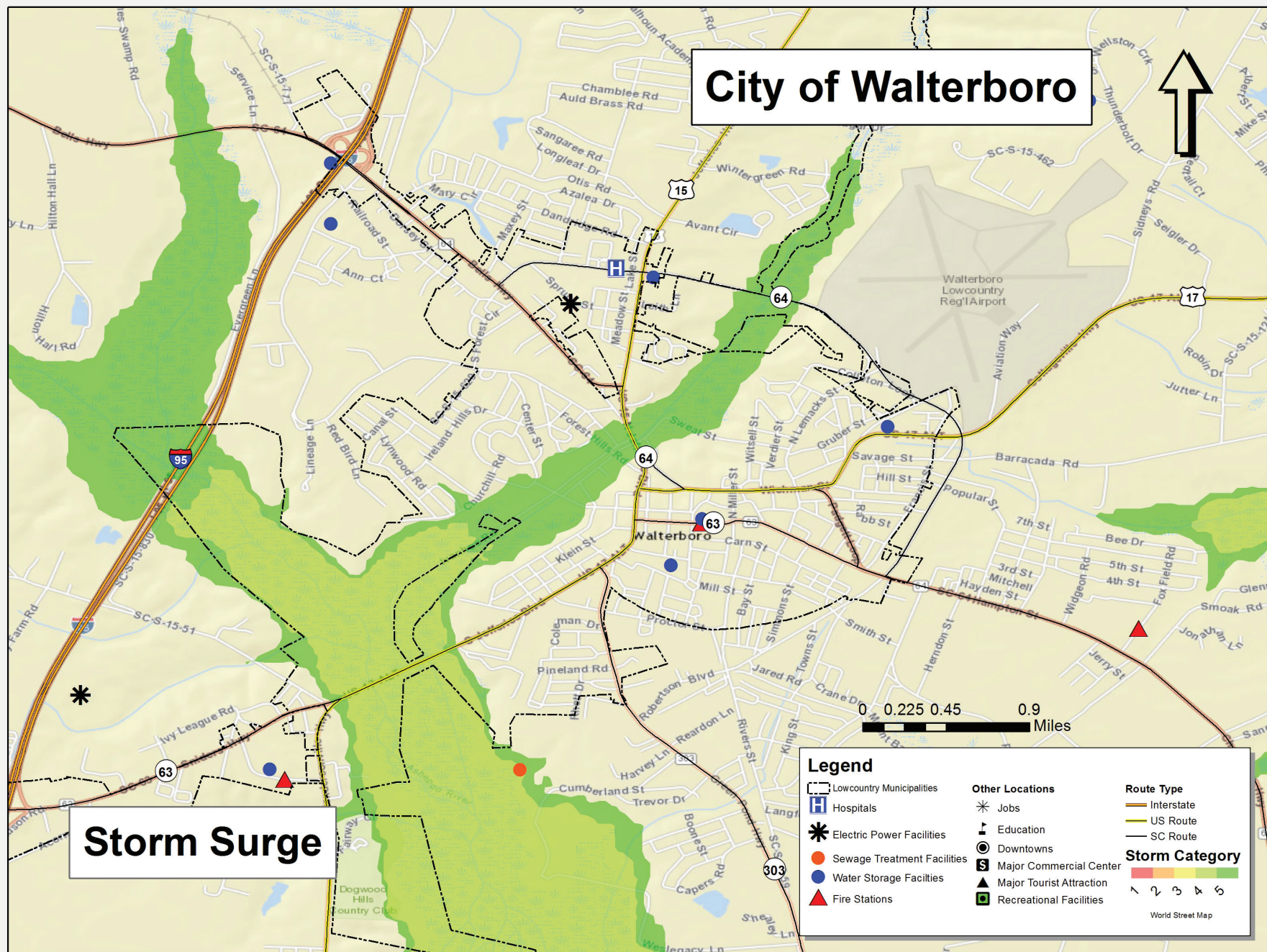
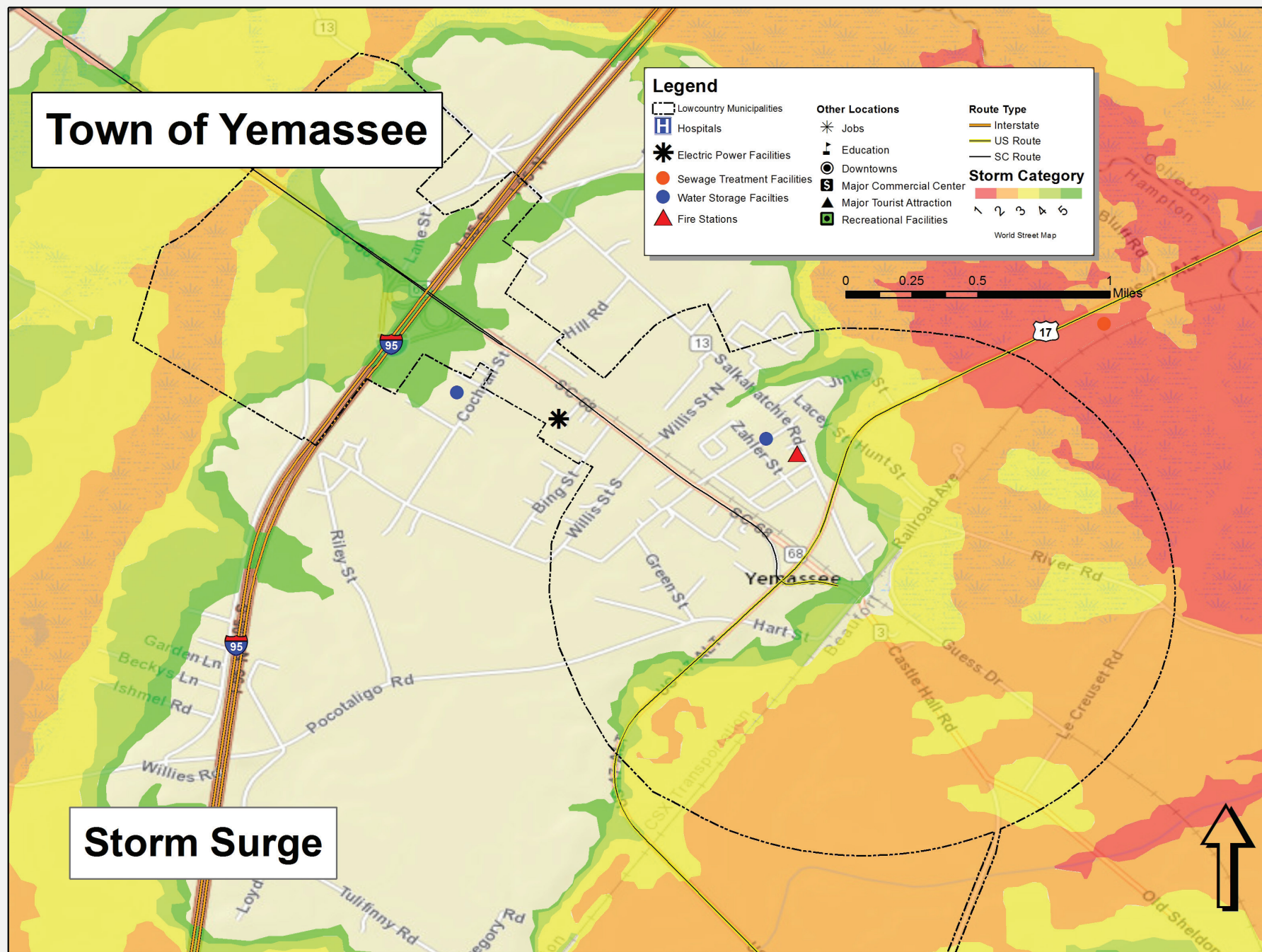


Figure 27: City of Walterboro Storm Surge Map





**Figure 28: Town of Yemassee Storm Surge Map**



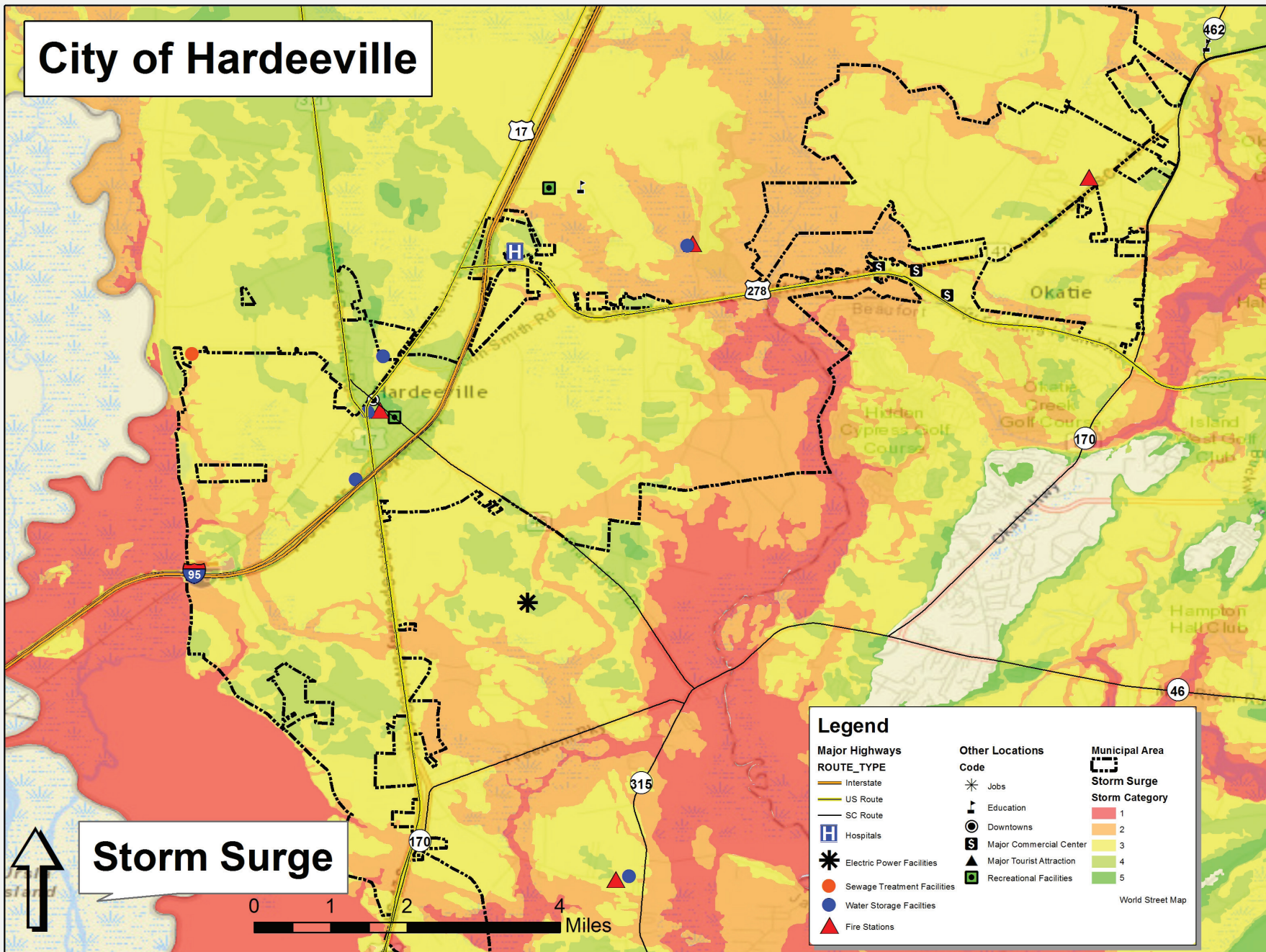


Figure 29: City of Hardeeville Storm Surge Map



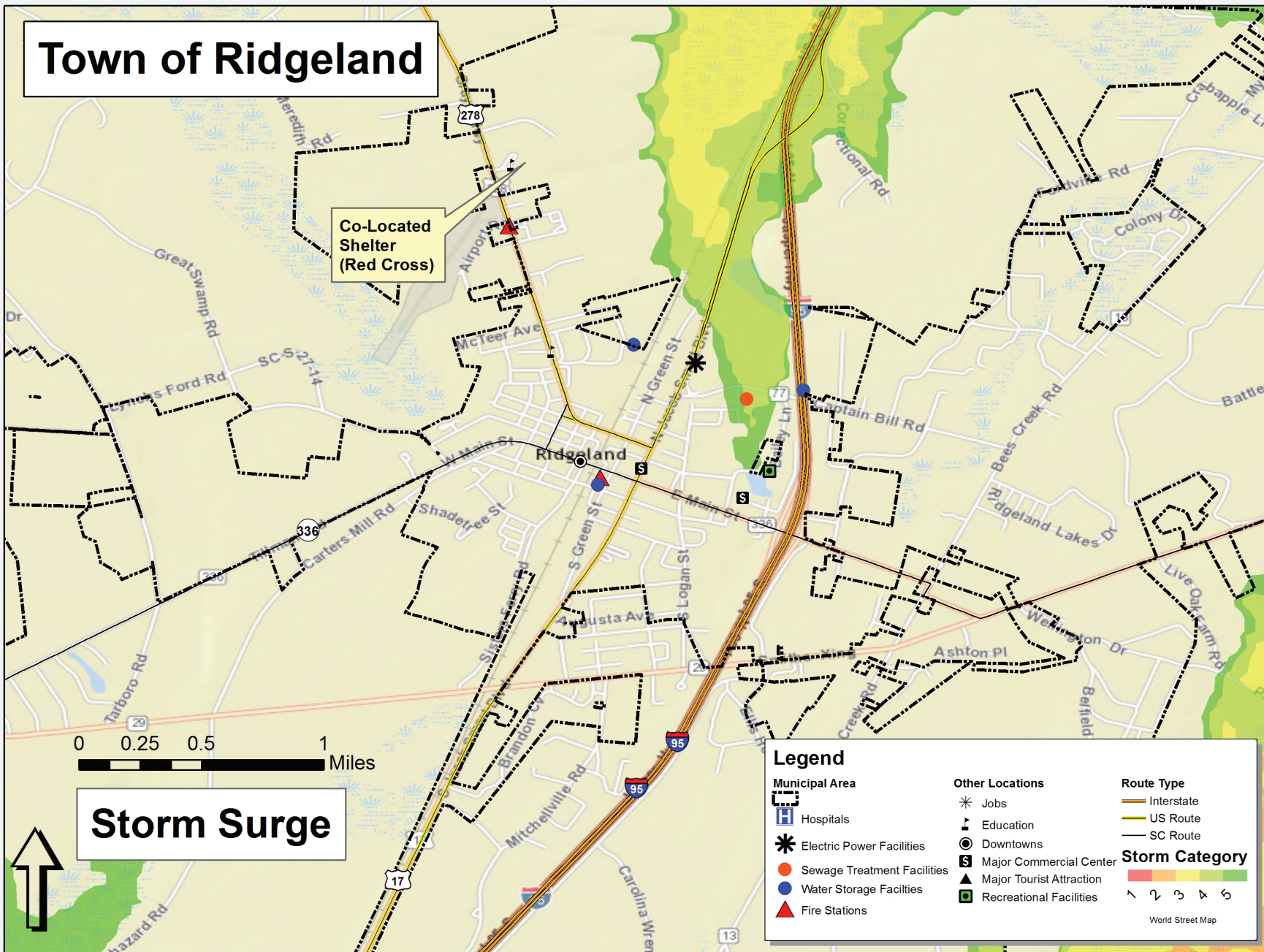
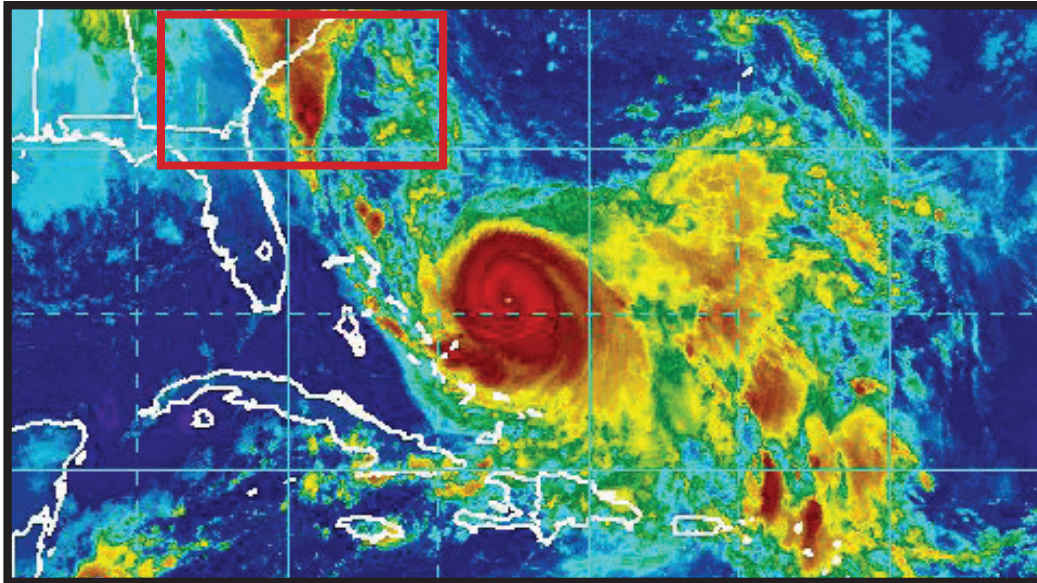


Figure 30: Town of Ridgeland Storm Surge Map





## Flood of 2015

In early October of 2015, as this Plan was being finished, a powerful slow-moving low pressure system over the southeastern United States interacted with tropical moisture associated with Hurricane Joaquin in the Atlantic Ocean. The system unleashed unprecedented widespread torrential rains that persisted for more than 72 hours across South Carolina.

Storm surge combined with high tide and heavy rain caused coastal flooding at Edisto Beach, as well as Charleston, and numerous other coastal communities, inundating local roads. Residents were asked to stay in their homes, if safe. On Edisto Beach, roads were closed, including the causeway, some for more than 24 hours, and motorists could not go on or off the island. Overall, approximately 15 people died statewide, though, none reported in the Lowcountry Region. The roads around Edisto Beach Town hall became inundated and was inaccessible by car.

Heavy rainfall and flash flooding in the Central Midlands caused catastrophic damage to the transportation networks and potable water infrastructure. Dams failed, flooding numerous neighborhoods in the City of Columbia and surrounding areas. Massive flood waters began to flow towards the Lowcountry through the Edisto River watershed and eventually Colleton County, where the river level crested at 16.2 ft. at Gavins Ferry, the highest since 1945. Numerous structures nearby flooded, roads were closed for more than a week, and a Major Presidential Disaster Declaration was issued for Colleton County. As of this writing more than 170 individuals in Colleton County have applied for assistance through FEMA.

Planning staff at the LCOG ran FEMA's HAZUS-MH Model for the Edisto River watershed in Colleton County, using a scenario with river levels reached during the flood. Total replacement costs, according to the model, were \$26-30 Million. A majority of the damage occurred to residential property, with most of that being manufactured housing.

# Winter Storms

**W**inter storms (consisting of snow, ice, and cold temperatures) can cause major problems in regions that are not prepared for them. These types of storms can damage property, create safety risks, destroy crops and valuable timber, damage infrastructure components such as power lines, and have enormous economic impacts (SCEMD).



*Colleton County: Ice Storm 2014*

*Photo Credit: Colleton Fire*

## Location

Winter storms are a spatial event and affects all counties and jurisdictions within. There have been between five and seven significant winter storms within Colleton, Hampton, and Jasper Counties. The NCDC (National Climate Data Center) only lists the most recent five, but area residents and the previous mitigation plan speak of two others, one in 1989 and one in 1994. The most recent severe winter storms took place in 2000, 2002, 2004, and 2014. The following is the local insight into these most recent storms that affected the Lowcountry Region.

January, 2000. 1-2 inches of snow fell over Southern South Carolina. Sleet and freezing rain were also produced from this storm. Numerous accidents on the roadways were reported.

January 2002. Snow, sleet, and hail we produced from this storm. Accidents and a large amount of homes and businesses without power were reported.

January 2004. Storm front producing freezing rain and freezing drizzle. Ice accretion was generally in the 1/4 inch to around 1/2 inch range. There were trees, large limbs and power lines down that disrupted the power over the low country for several days.

## Extent

The significant winter storms within the three counties caused few fatalities, but no reported injuries or property loss. Note: the data available at the time of the Update did not included the 2014 Storm. The storms that have struck the region have caused downed power lines and slippery roads.

## Colleton

Event: Low Temperature

Begin Date: 23 Jan 1994,

Begin Location: Not Known

End Location: Not Known

Fatalities: 1

Description: An eighty-five-year-old woman died from cold exposure.

## Hampton

Event: Low Temperature

Begin Date: 21 Dec 1994,

Begin Location: Not Known

End Location: Not Known

Fatalities: 1

Description: Male died from hypothermia.

The other two events, one in 2000 and 2002, did not incur any monetary damage or injury.

Event: Low Temperature/ Winter Storm

Begin Date: 10 Jan 2014,

Fatalities: 1

Description: Twenty-four year old woman died in car crash, which was indirectly caused by icy roads and dangerous driving conditions.

## Jasper

The event in Jasper occurred in 2000, and did not incur any monetary damage or injury. Probability

## Probability

Winter storms are unlikely in this region of the country. The overall climate usually prevents these types of storms from occurring.

	Number of Events	Years in Record	Recurrence Interval (Years)	Probability
Colleton	5	63	12.6	7.94%
Hampton	3	63	21.0	4.76%
Jasper	2	63	31.5	3.17%

## The Ice Storm of 2014

A February 2014 storm front produced freezing rain and snow. Ice accretion was at about 1/4 inch to 1/2 inch. One fatality is attributed to the winter storm. Many trees were downed and power was out in significant portions of the region for days. Roadways were impassible, hundreds of businesses closed, and thousands of children stayed home from school. Agencies were overwhelmed by debris removal, and as a result, government agencies activated contracts for removal services. The entire state was declared a state of emergency and the U.S. Federal Government declared a major natural disaster. Shelters were activated. During the event, the middle school shelter in Colleton County experienced power loss and difficulties with generators. The City of Walterboro municipal buildings lost power for more than two days.

The overall cost of the storm was considerable. Statewide, the timber industry alone confirmed \$360 million trees lost or damaged. (See below for county totals) SCE&G officials noted that the damage from the storm to their utility infrastructure, was worse than the effects of Hurricane Hugo.

## Forestry Losses

As a result of the February 2014 Ice Storm, the timber industry sustained heavy losses in Colleton and Hampton Counties (See table below). In South Carolina, damage occurred over a 170 mile by 70-mile corridor from the Savannah River to the North Carolina border, which included major portions of Hampton and Colleton County. (SC Forestry Commission).

### Acres by Damage Class

	Acres Damaged	Light	Moderate	Heavy	Value Damaged
Colleton	238,508	74,639	10,758	1,542	\$20,278,781
Hampton	110,023	35,475	5,113	733	\$9,638,317

Source: SC Forestry Commission

Figure 31: Ice Storm of 2014: Forestry Losses

## Government Losses

Below is a summary of reimbursable costs incurred by the local government in the February 2014 Ice Storm, including emergency management services. Jasper County did not experience significant costs. For Colleton County, the Ice Storm was one of the worst natural disasters in history. In 2015, Colleton County was continuing to work on resolving the budgetary issues incurred due to the storm. Total storm expenses totaled \$3.24 million there, with \$2.15 million reimbursed, leaving more than a \$1 million dollars left to the County.

Colleton County (total)	\$ 2,656,155.97
Colleton County	\$ 2,512,713.39
Colleton County Disabilities & Special Needs	\$ 17,176.86
Colleton County School Supt	\$ 20,333.83
Walterboro	\$ 105,931.89
Hampton County (total)	\$ 444,981.52
Estill	\$ 4,079.37
Hampton County	\$ 339,005.53
Hampton, Town of	\$ 50,473.70
Varnville	\$ 51,422.92

Figure 32: Ice Storm of 2014: Government Losses



# Coastal Erosion and Shoreline Change

Coastal erosion results from wave action and storm surge from coastal storms, and as a result, beaches lose the valuable commodity of sand. This hazard results in the displacement of shoreline caused from the forces of waves and currents. Dramatic changes occur when northeasters and tropical systems in the Atlantic.

Another coastal factor, sea-level rise, is caused by global glacial melt, the expansion of warmer water, land subsidence, and ocean currents. Globally, sea-levels are expected to rise at a minimum of three feet this century (NASA, 2015). Locations on the east coast are experiencing faster rates of rising seas than that on the west coast, where in some locations, the seas are actually lowering. Locally, Sea-levels are measured by NOAA at Fort Pulaski, GA (3.08 mm/yr. increase) and Charleston, SC (3.16 mm/yr. increase) using long term tide gauge data. The two locations, respectively are at north and south coastal ends of the Lowcountry region. Activity is expected to accelerate with the melting of the polar icecaps.

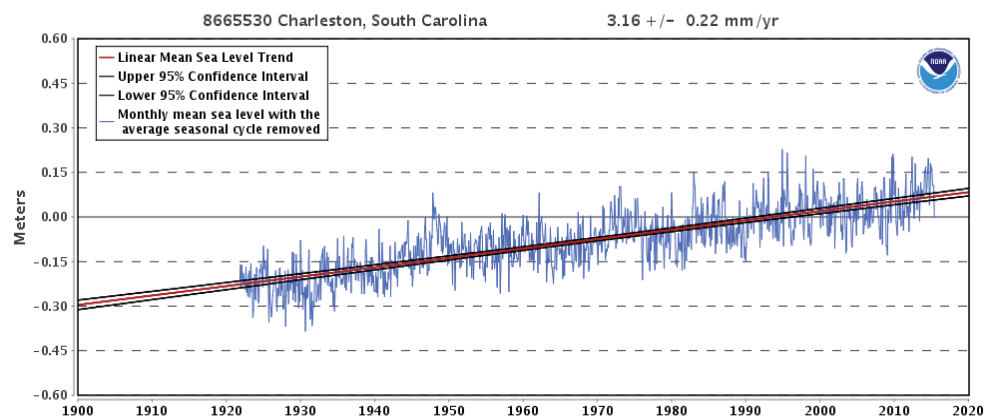


Figure 33: NOAA Charleston Ocean Monitor

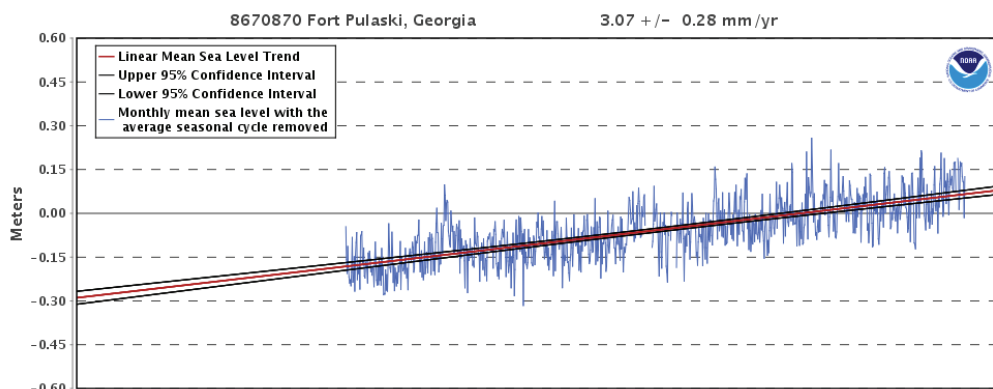


Figure 34: NOAA Fort Pulaski Ocean Monitor





## **Potential impacts of sea level rise on the coast of the Lowcountry are:**

- Loss of coastal habitats and resources
- Increased beach-dune-marsh erosion
- Loss of recreation resources (beaches, marshes)
- Salt-water intrusion to water wells, septic systems
- Elevated storm-surge flooding levels
- Greater, more frequent coastal inundation
- Increased risk to urban infrastructure
- Greater risk to human safety & development

## **Location**

Coastal erosion occurs on the shore of Edisto Beach, in Colleton County. Coastal erosion is not an issue in Hampton County because it is not a coastal county. The long-term effects of sea-level rise does have the potential to impact Hampton County's watersheds and flood plains in the Yemassee area. While coastal erosion is not a significant hazard for Jasper County, sea-level rise has the potential to have major impacts on coastal flood plains and marshland areas. Hurricane Edward was just one of many tropical storms and hurricanes that have caused erosion along Edisto Beach during the past several decades.

## **Extent**

Colleton County, Town of Edisto Beach

Coastal erosion has occurred on the coast of the Town of Edisto Beach. Hurricane Edward moved northward across the Atlantic Ocean, a couple of hundred miles east of the South Carolina coast causing minor beach erosion along coastal areas of Charleston and Colleton counties.

Over the last 50 years, more than \$14 million of town, state and federal funds have been spent on beach renourishment.

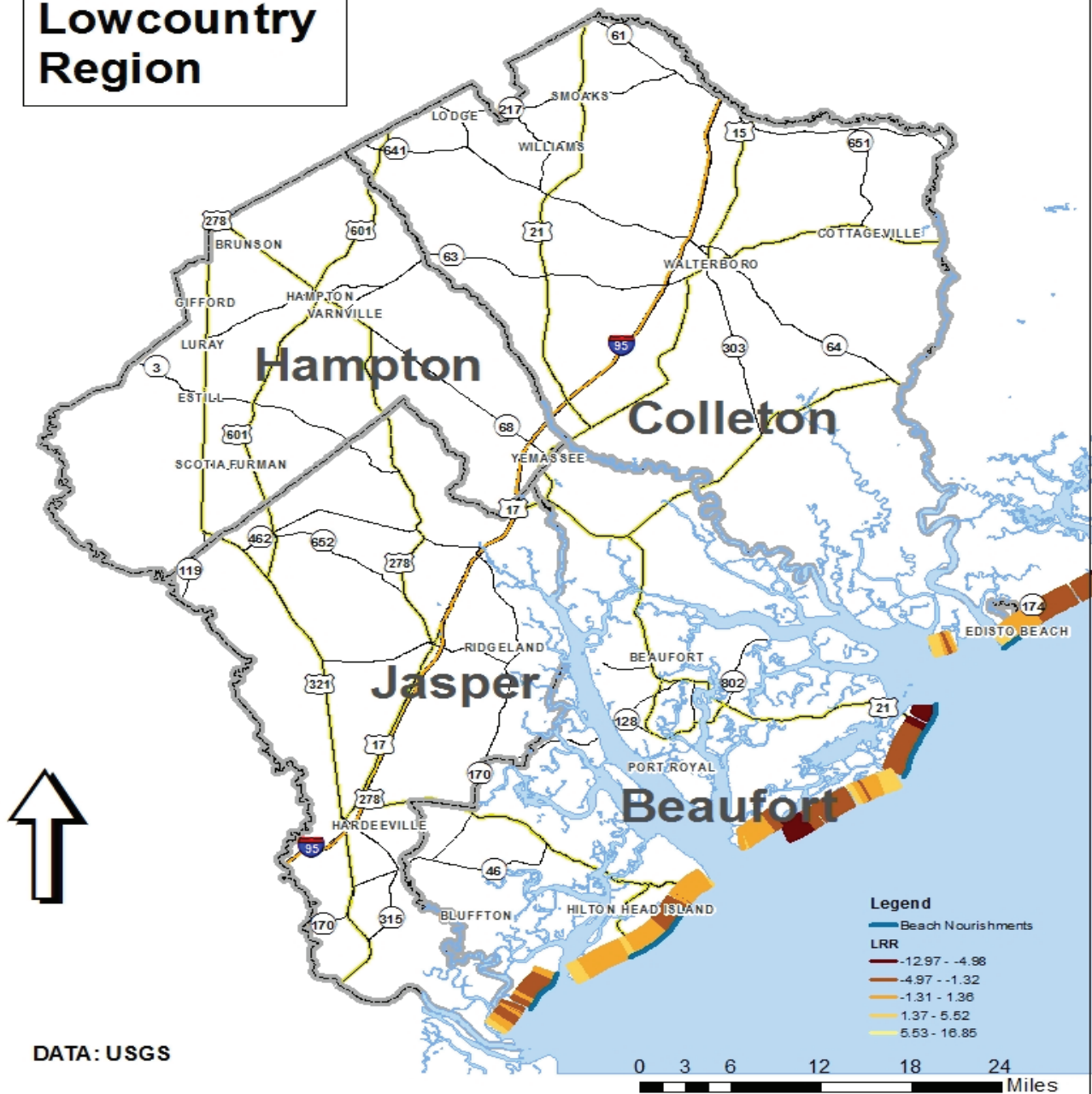
In the mid-1950s, erosion near the pavilion had progressed so far, groins alone were not sufficient to protect Palmetto Boulevard (SR 174). The South Carolina Highway Department combined groin construction with the first renourishment of Edisto Beach in 1954 using sand, shells and mud from the marsh behind the island. Excavations created the "Yacht Basin" and reclaimed nearly 1.2 miles of shoreline between Groins 1 and 12. Although dredging volumes totaled 830,000 cubic yards much of the material was unsuitable for the beach and washed away because it was too fine.

In April 1995, selected areas of Edisto Beach were renourished (a total of 155,000 cubic yards between Groins 1 to 17 and 24 to 28), and groins were repaired (CSE 1996 (a,b), 1997, 1999, 2001). The borrow area was located ~2,500 ft off “the Point” at the southern tip of Edisto Beach and was characterized by coarse beach-quality sand. By the summer of 2001, roughly one-third of the renourishment volume was still present in the project area. With erosion of the 1995 nourishment sand, groins became more exposed and less effective for sand retention.

The 2006 beach restoration project was necessitated by increased erosion rates in down-coast areas, insufficient protection of beachfront properties, and insufficient beach width to support dune formation and recreational beach access. The 2006 beach renourishment project addressed critically eroded areas along the majority of the beachfront and added to the sand supply and beach width. The project was constructed between March and May of 2006 by Great Lakes Dredge and Dock Company and was engineered by Coastal Science Engineering. The length of the project area was 18,258 linear feet, including 3,200 linear feet in the state park area. Fill volumes were varied along the beach with the goals of achieving a standard, minimum profile volume of at least 100 cubic yards/feet for the length of the project area. Total sand volume added was 877,647 cubic yards of which 181,728 were placed along the park (north of Groin 1) and 695,919 cubic yards were placed between Groins 1 and 27. The cost of the project was \$7,697,500. The Town of Edisto Beach and the South Carolina Department of Parks Recreation and Tourism sponsored the project with a combination of local, county, and state funds. Both the House of Representatives and the Senate overrode the Governor’s veto to the Beach Renourishment Act providing the Town of Edisto Beach \$4.75 million for the project. Of this amount \$1.75 million was used on State Park property. The remaining \$3 million was funded from Colleton County (\$1.5 million) and local accommodations tax funds (\$1.5 million). The Town is currently permitting a beach nourishment project scheduled for the fall of 2016.

A Feasibility Study was completed by the U.S. Army Corps of Engineers in 2014 and on September 5, 2014, the USACE Chief recommended the Edisto Beach National Economic Development Plan to reduce hurricane and storm damage by constructing beach fill and groin extensions.

## Lowcountry Region



## Coastal Erosion

Figure 35: Coastal Erosion Map

# Extreme Heat

Worldwide, 2014 was the hottest year on record and 2015 is on course to be hotter. Locally, temperatures are expected to increase this century. NOAA has projected the number of 95 degrees or hotter days, to increase by more than 20 days between the years 2041- 2070.

Heat kills by taxing the human body beyond its abilities. In an average year, about 175 Americans succumb to the effects of summer heat. Among the large continental family of natural hazards, only the cold of winter - not lightning, hurricanes, tornadoes, floods, or earthquakes - takes a greater toll. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. (NCDC)

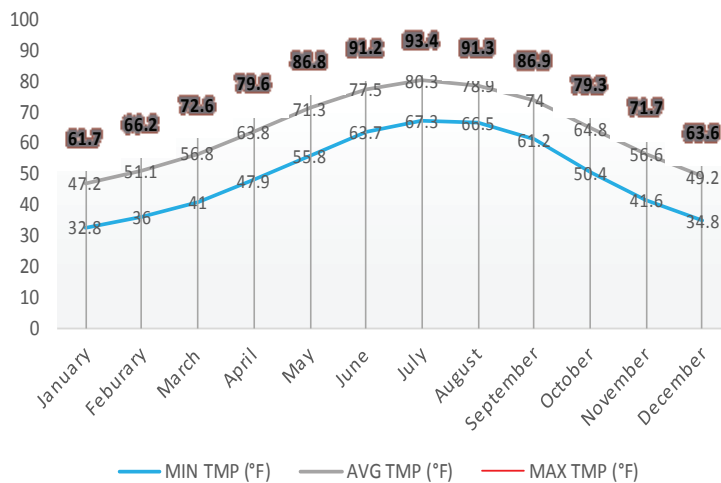


Figure 36: Average Temperature Chart

Extreme Heat, often associated with a period of drought, has a high potential to cause agricultural losses (including livestock), and wild fires are much more likely to occur. High heat conditions can damage roadways and lead to electrical brownouts. The hydrologic impacts of the heat wave and drought include exceptionally low water levels in many streams and rivers.

## Location

The three-county region is located in southern South Carolina, and as such, experiences high temperatures and high levels of humidity. The summer months experience the highest heat and humidity levels.

The NCDC, identified August 27, 2007 as a time of extremely high temperatures across the nation. The map below shows the effect on the waterways. Note how South Carolina, especially in and around the three-county region, had among the lowest water levels in the state.

## Extent

### Lowcountry Region

The Lowcountry has experienced temperatures as high as 107 degrees. The warmest month, on average, is July. The graph (Figure: 16) shows the average temperatures for the Lowcountry as The National Climatic Data Center has the same data for Hampton and Colleton, suggesting that the numbers apply to each of the counties.

## Probability

The probability of Extreme Heat within Colleton, Jasper, and Hampton is high.

	Number of Events	Years in Record	Recurrence Interval (Years)	Probability
Colleton	7	63	2.86	34.97%
Hampton	7	63	2.86	34.97%
Jasper	7	63	2.86	34.97%



# Overall Hazard Probability and Frequency

To determine the probability of a natural hazard event; the number of events, years in the record, and recurrence interval, 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 (years). The probability of each hazardous event was collected from the South Carolina emergency management Division in coordination with the Hazard & Vulnerability Research Institute. These figures are necessary to determine overall hazard vulnerability. The figures also help to define what types of events are more frequent in each county.

<b>Colleton</b>	Number of Events	Years in Record	Recurrence Interval (Years)	Probability
Tornado	9	63	7.00	14.26%
Hurricane	23	162	14.2	7.04%
Windstorms	442	63	<0.05	701.59%
Lightning	2	20	10	10.00%
Hail	89	63	0.71	140.85%
Drought	21	63	3.00	33.33%
Earthquake	2	314	157	0.63%
Wildfire	4,390	25	<0.50	17560.00%
Flood	20	63	3.15	31.75%
Winter Storm	5	63	12.6	7.94%
Extreme Heat	7	20	2.86	34.97%
Coastal Erosion	2 Renourishments	63	31.5	High

Figure 37: *Colleton County Probability Table*

<b>Hampton</b>	Number of Events	Years in Record	Recurrence Interval (Years)	Probability
Tornado	13	63	4.85	20.62%
Hurricane	13	162	12.46	8.03%
Windstorms	177	63	<0.50	280.95%
Lightning	2	20	10	10.00%
Hail	33	63	1.91	52.36%
Drought	21	63	3.00	33.33%
Earthquake	0	314	*	*
Wildfire	1,751	25	<0.50	7003.99%
Flood	9	63	7.00	14.28%
Winter Storm	3	63	21.00	4.76%
Extreme Heat	7	20	2.86	34.97%
Coastal Erosion	N/A	N/A	N/A	N/A

Figure 38: *Hampton County Probability Table*



<b>Jasper</b>	<b>Number of Events</b>	<b>Years in Record</b>	<b>Recurrence Interval (Years)</b>	<b>Probability</b>
Tornado	8	63	7.87	12.71%
Hurricane	18	162	9.00	11.11%
Windstorms	95	63	0.66	151.51%
Lightning	0	20	*	*
Hail	26	63	2.42	41.32%
Drought	21	63	3.00	33.33%
Earthquake	0	314	*	*
Wildfire	3,282	25	<0.50	13127.99%
Flood	10	63	6.3	15.87%
Winter Storm	1	63	63	1.58%
Extreme Heat	7	20	2.86	34.97%
Coastal Erosion	N/A	N/A	N/A	N/A

**Figure 39: Jasper County Probability Table**

# Overall Vulnerability Assessment

The vulnerability assessment has two separate parts. The first part focuses on the assets (buildings, infrastructure) that are vulnerable to damage. This includes population data, building value data and critical facility data. The second part is the assessment of how much at risk each area is to the given hazard and based on the probability of that hazard within a given year, it is compared to the historical occurrence. Some events happen often, but affect little, while others happen minimally, but when and if they occur, affect a great deal.

## Colleton County Assets Source: HAZUS - MH

	Total Exposure (\$1000s)	Residential	Commercial	Industrial	Agriculture	Religion	Government	Education
Colleton County	3,562,528.00	2,723,692.00	507,907.00	129,537.00	23,515.00	107,756.00	30,354.00	39,770.00
Town of Cottageville	26,149.00	18,155.00	6,077.00	527.00	156.00	822.00	412.00	-
Town of Edisto Beach	455,891.00	39,253.00	11,743.00	1,378.00	425.00	1,050.00	1,135.00	907.00
Town of Lodge	15,312.00	11,445.00	2,067.00	74.00	179.00	-	19.00	-
Town of Smoaks	2,427.00	2,427.00	-	-	-	-	-	-
City of Walterboro	430,852.00	261,547.00	103,625.00	9,942.00	1,172.00	25,109.00	16,213.00	13,244.00
Town of Williams	7,045.00	5,461.00	1,315.00	-	232.00	-	37.00	-
Unincorporated Area	2,624,852.00	1,985,404.00	383,080.00	117,616.00	21,351.00	80,775.00	12,438.00	25,619.00

Figure 40: Colleton County Exposure: Replacement Costs Table

## Asset Inventory

There are two main areas with concentrated building value in Colleton County, the town of Edisto Beach and the City of Walterboro. Edisto Beach has the highest vulnerability to exposure in terms of potential costs related to a hazard for any municipality in the Colleton County. A contributing factor high-value beach front homes in the town, on the other hand, commercial activity is low in proportion to residential value when compared to other places in the County. The residential and government buildings have a high risk of damage caused by flooding and wind due to a storm of tropical nature. Many residential units would be vulnerable to even a Category 1 surge level, the lowest level of flooding caused by a hurricane. Unincorporated coastal areas are also vulnerable to storms, but housing density is lower in those areas.

## Hampton County Assets

Hampton County commercial assets are centered in Estill, Hampton, and Varnville. A majority of the County's schools and government facilities are mainly located in the same towns, with private a limited number of private educational institutions located in rural areas. Residential areas are spread-out across the County, along with the religious institutions. Hampton County flood prone areas are generally separated from densely developed areas. A few areas along the Savannah River, near Stokes Bluff, pose a problem to a small number of residential units. For storm surge, small portions of the county are vulnerable in the Yemassee area, including the sewage treatment plant there.

	Total Exposure (\$1000s)	Residential	Commercial	Industrial	Agriculture	Religion	Government	Education
<b>Hampton County</b>	1,551,141	1,204,955	188,820	51,523.00	9,044	49,054	15,130	32,615
<b>Town of Brunson</b>	29,476	23,287	1,315		232		37	
<b>Town of Estill</b>	147,717	95,844	25,821	4,512.00	352	5,277	1,734	14,177
<b>Town of Furman</b>	9,719	7,955	764	933.00	-	-	67.00	
<b>Town of Gifford</b>	8,613	7,737	494	8.00	64	-	134	
<b>Town of Hampton</b>	240,728	149,210	57,120	12,271.00	743	14,537	3,485	3,362
<b>Town of Luray</b>	2,221	2,221	-	-	-	-	-	-
<b>Town of Scotia</b>	1,945	1,,688	257	-	-	-	-	-
<b>Town of Varnville</b>	123,466	83,882	14,665	4,289.00	370	4,551	1,602	4,437
<b>Town of Yemassee</b>	75,508	51,673	11,691	6,484.00	192	2,937	768	1,763
<b>In Hampton Co.</b>	69,251	47,661	10,308	5,735.00	80	2,936	768	1,763
<b>In Beaufort Co.</b>	6,257	4,012	1,383	749.00	112	1.00	-	-
<b>Unincorporated Area</b>	911,748	781,458	76,693	23,026.00	7,091	21,752	7,303	8,876

Figure 41: *Hampton County Exposure: Replacement Costs Table*

## Jasper County Assets

For the Jasper County, assets are concentrated in the municipalities where population centers and housing exist, but a significant portion of residential assets are in unincorporated areas. The City of Hardeeville has the highest concentration of assets and replacement costs in incorporated areas. Educational facilities are located in both Hardeeville and Ridgeland, with the Administration in Ridgeland. Assets are, for the most part, out of flood prone-areas. Residential neighborhoods along SC 462, according to HAZUS modeling, is vulnerable to wind and storm surge. Developing areas of Hardeeville are also vulnerable to storm surge in the event of a major hurricane (Category 3-5).

	Total Exposure (\$1000s)	Residential	Commercial	Industrial	Agriculture	Religion	Government	Education
Jasper County	1,866,889.	1,455,127.00	281,951.00	62,754.00	6,675.00	29,672.00	11,652.00	19,058.00
City of Hardeeville	235,690.00	145,180.00	55,995.00	17,632.00	425.00	7,102.00	1,699.00	7,657.00
Town of Ridgeland	177,252.00	97,979.00	53,783.00	10,077.00	1,538.00	6,568.00	4,544.00	2,763.00
Unincorporated Area	1,453,947.00	1,211,968.00	172,173.00	35,045.00	4,712.00	16,002.00	5,409.00	8,638.00
Three County Total:	6,980,558.00	5,383,774.00	978,678.00	243,814.00	39,234.00	186,482.00	57,136.00	91,443.00

Figure 42: *Jasper County Exposure: Replacement Cost Table*

## Building Permits

In addition to the value of current buildings, there are several building permits which indicate future growth. Below is a table that shows the building permit counts per county between 2009 and 2014. Growth in the Lowcountry is uneven and centered in the southeastern sector of the region, particularly in Beaufort and Jasper Counties. Building activity slowed during the housing and financial crisis in 2007 and 2008, but regained some momentum over the last few years, though the activity is not back to the level seen in the housing boom of the mid-2000s. For the purposes of this Plan, Jasper County currently has the highest rate of residential and commercial building development occurring in the region around the Hardeeville area, including Hilton Head Lakes and portions of Sun City that exist in Jasper County. A major appeal to build in this area is the close proximity to the ocean and the mild winters.



## Colleton County Building Permits

In unincorporated Colleton County, standard single-family homes have been constructed at an inconsistent pace over the last several years, but manufactured housing has seen an up-tick over the last two years. These structures have special considerations for wind and flood damage. The pace of manufactured home permitting is considerably higher than that of single-family stick – built housing in unincorporated Colleton County. Building activity in the localities is low.

	2014	2013	2012	2011	2010	2009
SF Number	31	24	28	32	71	50
SF Value	\$6,005,745	\$9,629,254	\$6,218,549	\$7,151,779	\$8,166,518	\$8,549,476
Average SF (w/o Land)	\$193,733.71	\$401,218.92	\$222,091.04	\$223,493.09	\$115,021.38	\$170,989.52
MH Number	147	163	86	118	177	220
MH Value	N/A	N/A	N/A	N/A	N/A	\$4,025,343
MF Number	0	0	0	0	0	0
MF Value	0	\$0	0	\$0.00	\$0.00	0
Commercial Number	6	16	7	18	30	13
<b>Walterboro</b>						
Commercial Value	\$4,748,813	\$9,636,470	\$2,398,468.00	\$4,187,000.00	\$4,319,882	\$4,025,343.00
SF Number	0	0	1.00	1	2	5
SF Value	0	\$0	\$225,000.00	\$275,000	\$335,000.00	\$881,315.00
Average SF (w/o Land)	0	\$0	\$225,000.00	\$275,000	\$167,500.00	\$176,263.00
MH Number	0	N/A	N/A	0	0	0
MH Value	0	N/A	N/A	\$0.00	\$0.00	0
MF Number	0	0	0	0	0	0
MF Value	0	\$0	0	\$0.00	\$0.00	\$0.00
Commercial Number	0	0	1	2	0	2
Commercial Value	0	\$0	\$250,000.00	\$1,099,500.00	\$0.00	\$1,807,275.00

Figure 43: Colleton County Building Permits 2009-2015

## Hampton County Building Permits

Hampton County building permit data shows that growth is low, with manufactured housing permitting at roughly the same pace as stick-built housing. Hampton County data is not separated by the municipality because building permitting and inspection is done through county offices.

	2014	2013	2012	2011	2010	2009
SF Number	5	12	7	9	15	27
SF Value	\$912,396	1,757,200.83	\$1,252,908.57	\$1,496,661.97	\$2,478,754	\$6,278,779.36
Average SF (w/o Land)	182479.2	\$251,028.69	\$178,986.94	\$166,295.77	\$165,250	\$232,547.38
MH Number	18	0	22	14	18	14
MH Value	\$1,430,668	\$0	\$1,014,400.00	\$1,064,093.00	\$1,148,717	\$799,390.00
MF Number	0	0	0	0	0	0.00
MF Value	0	\$0	0	\$0.00	\$0.00	0
Commercial Number	1	5	4	5	4	1
Commercial Value	\$1,250,000	\$1,082,896	\$15,957,549.88	\$3,334,808.40	\$786,301	\$1,375,000

Figure 44: *Hampton County Building Permits 2009-2014*

## Jasper County Building Permits

Unincorporated Jasper County building data show that manufactured housing is out-pacing single-family stick-built home permitting. A majority of the new single-family housing growth is occurring in the Hardeeville area along US 278 between Interstate-95 and SC 170. The Argent Boulevard area has also experienced significant growth over the last few years. Structures in this area are vulnerable to hurricane storm surge at category 3 level. Some roads and isolated housing are vulnerable to 1 and 2 category storms.

## Jasper County Building Permits

	2014	2013	2012	2011	2010	2009
SF Number	26	15	12	14	14	26
SF Value	\$4,089,213	\$3,958,940.25	\$3,179,813.88	\$2,732,619.80	\$2,568,368.69	\$5,929,380.00
Average SF (w/o Land)	\$157,277.42	\$263,929.35	\$264,984.49	\$195,187.13	\$183,454.90	\$228,053
MH Number	85	82	103	92	82	93
MH Value	N/A		N/A	data not collected	data not collected	\$3,720,000.00
MF Number	0	0	0	0	0	0
MF Value	0	0	0	\$0.00	\$0.00	\$0.00
Commercial Number	8	7	3	1	4	7
Commercial Value	\$2,105,454	\$9,651,826	\$4,179,994.00	\$653,982.00	\$2,883,447.48	\$8,021,251.32
<b>Hardeeville</b>						
SF Number	203	189	155	147	104	91
SF Value	\$51,216,000	#####	\$38,263,292.20	#####	\$25,629,336	\$22,240,663.00
Average SF (w/o Land)		\$253,851.85		\$254,313.85	\$246,435.92	\$244,402.89
MH Number	0	0	N/A	0	0	3
MH Value	0	0	N/A	\$0.00	\$0.00	\$141,184.00
MF Number	0	0	0	0	10	0
MF Value	0	0	0	\$0.00	\$4,983,598.00	0
Commercial Number	5	6	6	13	5	6
Commercial Value	\$2,508,558	1,906,000.00	\$2,665,015.80	\$5,872,587.79	\$1,576,934	\$7,435,687.10
<b>Ridgeland</b>						
SF Number	0	0	0	3	9	8
SF Value	\$0	\$0	0	\$441,000.00	\$519,063.63	\$939,192.00
Average SF (w/o Land)	\$0	\$0	0	\$147,000.00	\$57,673.74	\$117,399.00
MH Number	0	0	0	0	1	0
MH Value	\$0	\$0	0	\$0.00	data not collected	0
MF Number	0	0	0	0	0	0
MF Value	\$0	\$0	0	\$0.00	\$0.00	0
Commercial Number	0	0	1	1	9	4
Commercial Value	\$0	\$0	\$250,000.00	\$1,800,000.00	\$357,545	\$1,423,420.00

Figure 45: Jasper County Building Permits 2009-2015

## Lowcountry Sewer Certifications

The Lowcountry Council of Governments uses 208 sewer certifications to track areas likely to see future development. Note the area below, circled in red, along US 278 and SC 170. Development is occurring in the Sun City area that exists in Jasper County. Sun City is a community of 14,000 designed for individuals over the age of 50. This area may require special considerations geared toward an aging population.

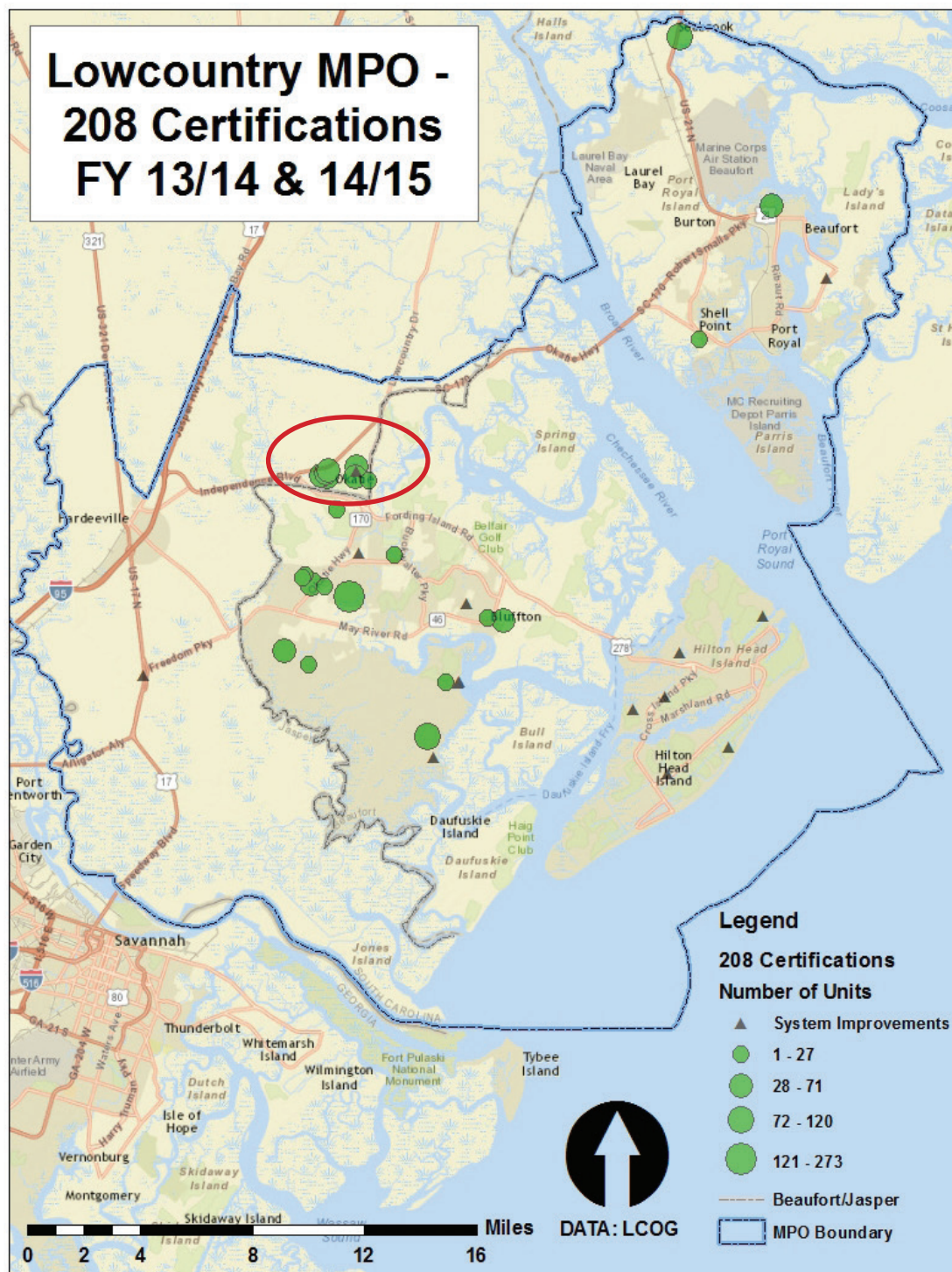


Figure 46: Lowcountry MPO 208 Permits Map



# Vulnerability by Hazard

This section organizes vulnerability in terms of hazard type, and then location. Since each jurisdiction has relatively the same amount of probability within each county, unless noted, their vulnerability is similar.

## Tornado

### Colleton

(Town of Cottageville • Town of Edisto Beach • Town of Lodge • Town of Smoaks • City of Walterboro • Town of Williams)

Overall, Colleton County has a low vulnerability to tornadoes, although tornados increased by 50% since the last report. The probability has risen from 18.13% to 32% that one or more tornadoes will touch down in a year time frame. Past events have not exceeded the F1 category storm and minimal damage has occurred from tornadoes in Colleton County. One tornado in 2007 accounts for nine of the eleven overall injuries due to tornados.

### Hampton

(Town of Brunson • Town of Estill • Town of Furman • Town of Gifford • Town of Hampton • Town of Luray • Town of Scotia • Town of Varnville • Town of Yemassee)

Overall, Hampton County has a low vulnerability to tornadoes. There is a low probability (22.03%) that one or more tornadoes will touch down in a year time frame. Past events have not exceeded the F1 category storm and minimal damage has occurred from tornadoes in Hampton County. From the tornado extent section, one can see that the impact of past tornadoes in the county has been low.

### Jasper

(City of Hardeeville • Town of Ridgeland)

Overall, Jasper County has a low vulnerability to tornadoes. There is a low probability (13.56%) that one or more than one tornadoes will touch down in a year time frame. Past events have not exceeded the F1 category storm and minimal damage has occurred from tornadoes in Jasper County. From the tornado extent section, one can see that the impact of past tornadoes in the county has been low.

DATA: SHEL DUS

## Hurricane

### Colleton

(Town of Cottageville • Town of Edisto Beach • Town of Lodge • Town of Smoaks • City of Walterboro • Town of Williams)

Overall, Colleton County is vulnerable to hurricanes with a 14.56% probability that one or more hurricanes will strike Colleton County in a year time frame. It is clear from examining past events that hurricanes can cause a significant amount of damage to the coastal regions of South Carolina. Hurricanes up to level four and storm surge level four have struck Colleton County in the past. These storms, as well as lesser ones (level one, two, and three), have the potential to cause great damage to this coastal county.

### Hampton

(Town of Brunson • Town of Estill • Town of Furman • Town of Gifford • Town of Hampton • Town of Luray • Town of Scotia • Town of Varnville • Town of Yemassee)

Overall, Hampton County is vulnerable to hurricanes with an 8.23% probability that one or more hurricanes will strike Hampton County in a year time frame. It is clear from examining past events that hurricanes can cause a significant amount of damage to the coastal regions of South Carolina. Hurricanes up to level four and storm surge level four have struck Hampton County in the past. These storms, as well as lesser ones (level one, two, and three), have the potential to cause great damage to this coastal county.

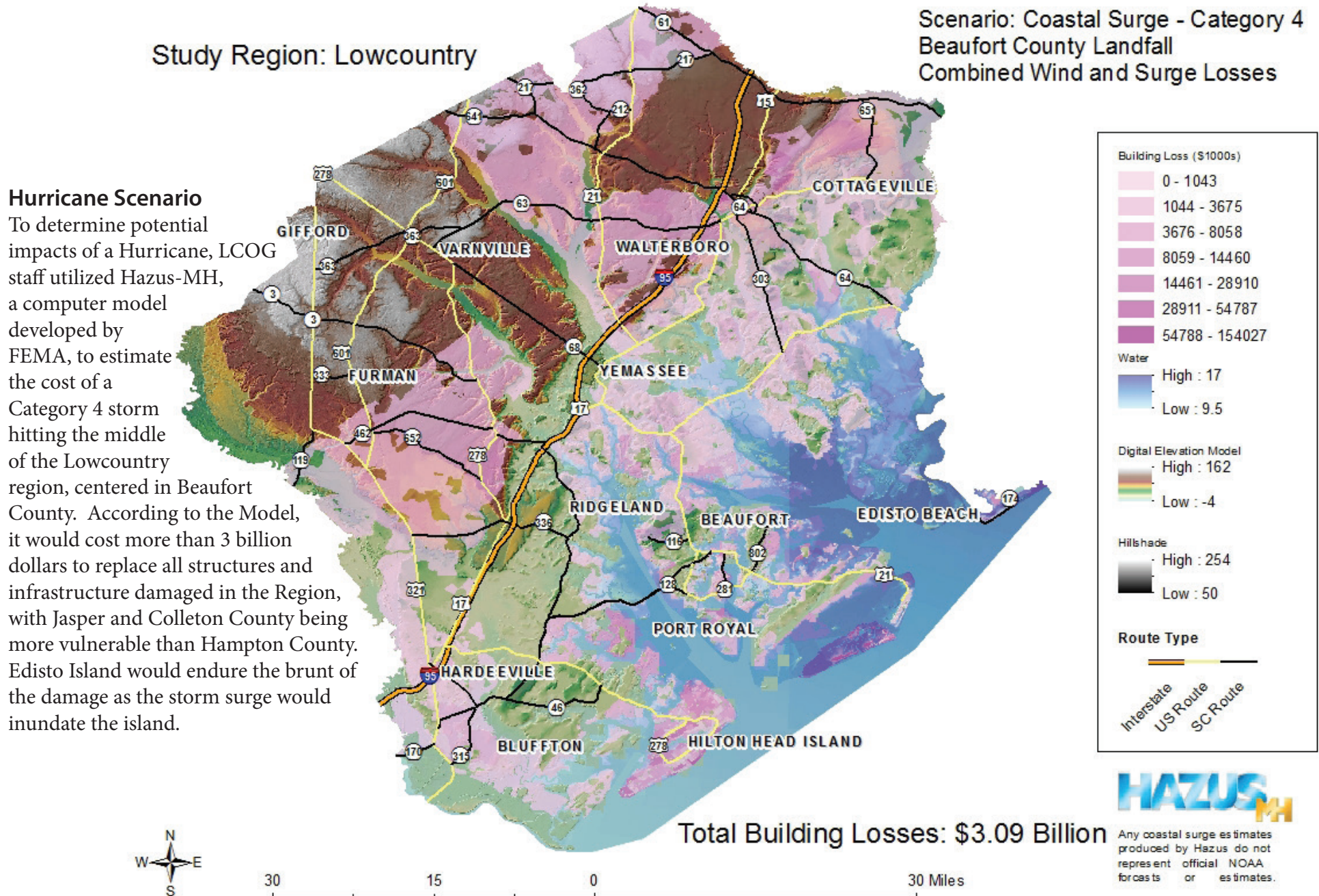
### Jasper

(City of Hardeeville • Town of Ridgeland)

Overall, Jasper County is vulnerable to hurricanes with a 11.39% probability that one or more hurricanes will strike Jasper County in a year time frame. It is clear from examining past events that hurricanes can cause a significant amount of damage to the coastal regions of South Carolina. Hurricanes up to level four and storm surge level four have struck Jasper County in the past. These storms, as well as lesser ones (level one, two, and three) have the potential to cause great damage to this coastal county.

DATA: SHEL DUS

Figure 47: Hazus-MH Hurricane Scenario



## Windstorms

### Colleton

(Town of Cottageville • Town of Edisto Beach • Town of Lodge • Town of Smoaks • City of Walterboro • Town of Williams)

Overall, Colleton County has a high vulnerability to windstorms. There is a very high probability (416.95%) that one or more damaging windstorms will strike Colleton County in a year time frame. It is clear from examining past events that windstorms can cause damage to property in Colleton County. The high probability and damaging effects of windstorms result in a high vulnerability to this natural hazard.

### Hampton

(Town of Brunson • Town of Estill • Town of Furman • Town of Gifford • Town of Hampton • Town of Luray • Town of Scotia • Town of Varnville • Town of Yemassee)

Overall, Hampton County has a high vulnerability to windstorms. There is a very high probability (191.53%) that one or more damaging windstorms will strike Hampton County in a year time frame. It is clear from examining past events that windstorms can cause damage to property in Hampton County. The high probability and damaging effects of windstorms result in a high vulnerability to this natural hazard.

### Jasper

(City of Hardeeville • Town of Ridgeland)

Overall, Jasper County has a high vulnerability to windstorms. There is a very high probability (161.02%) that one or more damaging windstorms will strike Hampton County in a year time frame. It is clear from examining past events that windstorms can cause damage to property in Jasper County. The high probability and damaging effects of windstorms result in a high vulnerability to this natural hazard.

DATA: SHELDUS

## Lightning

### Colleton

(Town of Cottageville • Town of Edisto Beach • Town of Lodge • Town of Smoaks • City of Walterboro • Town of Williams)

Overall, Colleton County has a low vulnerability to lightning strikes. There is a very low probability (12.50%) that one or more damaging lightning strike will occur in Colleton County in a year time frame. It is clear from examining past events that lightning can be dangerous, but the probability of such an event is very low. Overall, the County's vulnerability to such an event is low.

### Hampton

(Town of Brunson • Town of Estill • Town of Furman • Town of Gifford • Town of Hampton • Town of Luray • Town of Scotia • Town of Varnville • Town of Yemassee)

Overall, Hampton County has a low vulnerability to lightning strikes. There is a very low probability (12.50%) that more than one damaging lightning strike will occur in Hampton County in a year time frame. It is clear from examining past events that lightning can be dangerous, but the probability of such an event is very low. Overall, the County's vulnerability to such an event is low.

### Jasper

(City of Hardeeville • Town of Ridgeland)

Overall, Jasper County has a low vulnerability to lightning strikes. There is a very low probability. Since no incident of lightning has caused damage or harm, the probability of a damaging lightning strike cannot be determined. It is clear from examining past events that lightning can be dangerous, but the probability of such an event is very low. Overall, the County's vulnerability to such an event is low.

DATA: SHELDUS



## **Hail**

### **Colleton**

(Town of Cottageville • Town of Edisto Beach • Town of Lodge • Town of Smoaks • City of Walterboro • Town of Williams)

Overall, Colleton County has a low vulnerability to damaging hail storms. There is a high probability (150.85%) that more than one hail producing storm will occur in Colleton County in a year time frame. However, it is clear from examining past events that hail storms have not caused any significant reported damage within the County. While the probability of a hail storm is high in Colleton County, the extent of past storms has been low. Overall, the County's vulnerability to such an event is low.

### **Hampton**

(Town of Brunson • Town of Estill • Town of Furman • Town of Gifford • Town of Hampton • Town of Luray • Town of Scotia • Town of Varnville • Town of Yemassee)

Overall, Hampton County has a low vulnerability to damaging hail storms. There is a high probability (55.93%) that more than one hail producing storm will occur in Hampton County in a year time frame. However, it is clear from examining past events that hail storms have not caused any significant reported damage within the County. While the probability of a hail storm is high in Hampton County, the extent of past storms has been low. Overall, the County's vulnerability to such an event is low.

### **Jasper**

(City of Hardeeville • Town of Ridgeland)

Overall, Jasper County has a low vulnerability to damaging hailstorms. There is a high probability (44.07%) that more than one hail producing storm will occur in Jasper County in a year time frame. However, it is clear from examining past events that hail storms have caused little significant reported damage within the County. While the probability of a hail storm is high in Jasper County, the extent of past storms has been low. Overall, the County's vulnerability to such an event is low.

DATA: SHELDUS

## **Drought**

Drought, as mentioned previously affects the entire region at once, and is not localized by jurisdiction.

### **Region**

Overall, the region has a high vulnerability to drought. There is a medium probability (35.59%) that one or more drought will occur in a year time frame. Droughts can greatly affect the agricultural production. While the probability of drought is medium, the extent of previous droughts has been high. Overall, the vulnerability to such an event is high.



## Earthquakes

### Colleton

(Town of Cottageville • Town of Edisto Beach • Town of Lodge • Town of Smoaks • City of Walterboro • Town of Williams)

Overall, Colleton County has a mid-level vulnerability to earthquakes. The probability of one or more earthquake epicenters to originate in Colleton County is very low (0.65%). However, the County is in very close proximity to the Middleton Place - Summerville Seismic Zone. There have been numerous earthquakes in the Counties North and East of Colleton County. Some of the earthquakes originating from this zone have been devastating. While the probability of an earthquake is very low in Colleton County, the extent of past earthquakes has been high in neighboring counties. Overall, when taking into consideration the low probability of earthquakes in Colleton County, and the high extent of events in neighboring counties, the County has a mid-level vulnerability to this hazard.

### Hampton

(Town of Brunson • Town of Estill • Town of Furman • Town of Gifford • Town of Hampton • Town of Luray • Town of Scotia • Town of Varnville • Town of Yemassee)

Overall, Hampton County has a low vulnerability to earthquakes. No earthquakes have originated or affected Hampton County thus far, and therefore, the probability cannot be determined. Overall, when taking into consideration the low probability and past history of the hazardous event, the County has a low vulnerability to this hazard.

### Jasper

(City of Hardeeville • Town of Ridgeland)

Overall, Jasper County has a low vulnerability to earthquakes. No earthquakes have originated or affected Hampton County thus far, and therefore, the probability cannot be determined. Overall, when taking into consideration the low probability of earthquakes in Jasper County, and past history of the hazardous event, the County has a low vulnerability to this hazard.

## Wildfire

### Colleton

(Town of Cottageville • Town of Edisto Beach • Town of Lodge • Town of Smoaks • City of Walterboro • Town of Williams)

Overall, Colleton County has a mid-level vulnerability to fires. The probability of one or more wildfires in Colleton County is very high (20,904.76%). However, it is clear from examining past events that there have been numerous fires, but they have not caused a great amount of significant reported damage within the County. Overall, when taking into consideration the high probability of fire in the county, and the past history of the event, the county has a mid-level vulnerability to fire.

### Hampton

(Town of Brunson • Town of Estill • Town of Furman • Town of Gifford • Town of Hampton • Town of Luray • Town of Scotia • Town of Varnville • Town of Yemassee)

Overall, Hampton County has a mid-level vulnerability to fires. The probability of one or more wildfires in Hampton County is very high (8,338.10%). However, it is clear from examining past events that there have been numerous fires, but they have not caused a great amount of significant reported damage within the County. Overall, when taking into consideration the high probability of fire in Hampton, and the past history of the event, the County has a mid-level vulnerability to fire.

### Jasper

(City of Hardeeville • Town of Ridgeland)

Overall, Jasper County has a mid-level vulnerability to fires. The probability of one or more wildfires in Jasper County is very high (15,628.57%). However, it is clear from examining past events that there have been numerous fires, but they have not caused a great amount of significant reported damage within the County. Overall, when taking into consideration the high probability of fire in Jasper, and the past history of the event, the County has a mid-level vulnerability to fire.

DATA: SHEL DUS

## **Flood**

There is only one Repetitive Loss Area in the Three-County region. It is residential property located in the unincorporated area of Jasper county.

Since flood levels change depending on elevation, there is a change in the vulnerability level of specific jurisdictions. Unlike other types of hazards, the vulnerability in each jurisdiction is different than the County as a whole. Based on maps and FEMA's Map Service Center, vulnerability will be determined for each jurisdiction. According to FEMA's Map Service Center, only areas within a B and X shaded are a mid-level risk to flooding, and C and X unshaded are low. All other acronyms, A, AE, A1-30, AH, AO, AR, A99 have a high risk, and D is undetermined.

### **Colleton**

(Town of Cottageville • Town of Edisto Beach  
• Town of Lodge • Town of Smoaks • City of  
Walterboro • Town of Williams)

Overall, Colleton County has a mid-level vulnerability to flooding. Almost half of the county is in a FEMA 100 year flood zone. Storm surge from hurricanes also has the ability to reach 1/3 of the way into the county. Flooding can cause considerable damage. This fact, along with an examination of flood zone and storm surge mapping, results in the County's mid-level vulnerability to floods.

There are several areas that are affected by floods in the region, with the majority located in the Town of Edisto Beach, in Colleton County. The entire Town of Edisto Beach lies within the 100-year flood-plain. Any land area there is statistically susceptible to water inundation, with a 26 percent chance that a 100-year flood will occur within a 30-year time period. The previous plan mentioned that there have been repetitive loss areas within Colleton County, two within the County, and ten alone within Edisto Beach. However, now there are 17 structures in the Town of Edisto Island in Colleton County. The following information is specific localized flooding information (NOAA). There have been 14 incidents of flooding within the last 59 years of record. Of those, three have occurred since the last Mitigation Plan.

## **Cottageville**

The Town of Cottageville is within the ANI region of the flood zone and, therefore, has a high vulnerability to flooding.

### **Edisto Beach**

The Town of Edisto Beach has a high level of vulnerability to flooding (within the A and AE regions). The entire island where the town is located is within the 100-year flood zone. Storm surge from a category 2 hurricane also has the potential to cover the entire island and town. Edisto Beach, being a barrier island, has a high vulnerability to flood because of its geographic location on the coast of South Carolina.

### **Lodge**

The Town of Lodge has a mid-level of vulnerability to flooding. It lies within a shaded and unshaded X area. There is a river nearby, but not directly in the Town of Lodge.

### **Smoaks**

The Town of Smoaks has a low vulnerability to flooding. Although adjacent to a river, it still lies within the unshaded X area of the map.

### **Walterboro**

The City of Walterboro has a low vulnerability to flooding. Very little of the city is located within the 100-year flood zone, besides a small area in the South West portion. A stream running through the middle of the city limits is the only other area that could be affected by a 100-year flood. A hurricane of any level could not cause storm surge to reach Walterboro's city limits. Overall, the City of Walterboro has a low vulnerability to flooding because of its inland location and a small amount of streams and water within its limits.

### **Williams**

The Town of Williams has a low vulnerability to flooding. Although adjacent to a river, it still lies within the unshaded X area of the map.

## **Hampton**

(Town of Brunson •Town of Estill •Town of Furman • Town of Gifford •Town of Hampton •Town of Luray •Town of Scotia •Town of Varnville • Town of Yemassee)

Hampton County has a low vulnerability to flooding. There is very little developed land that falls within the 100 year flood zone. Hurricanes of all levels can produce storm surge that is able to reach the South East corner of the county, but the affected area is very small. Overall, Hampton County has a low vulnerability to flooding because of its inland location, limited amount of major water bodies, and small area that can be reached by hurricane storm surge. There are no repetitive loss flood areas in Hampton County.

## **Brunson**

The Town of Brunson has a low vulnerability to flooding. No part of the town lies within the 100 year flood zone and storm surge is unable to reach the town because of its inland location. Because of this, the vulnerability is low.

## **Estill**

The Town of Estill has a low vulnerability to flooding. No part of the town lies within the 100 year flood zone and storm surge is unable to reach the town because of its inland location. Because of this, the vulnerability is low.

## **Furman**

The Town of Furman has a low vulnerability to flooding. No part of the town lies within the 100 year flood zone and storm surge is unable to reach the town because of its inland location. Because of this, the vulnerability is low.

## **Gifford**

The Town of Gifford has a low vulnerability to flooding. No part of the town lies within the 100 year flood zone and storm surge is unable to reach the town because of its inland location. Because of this, the vulnerability is low.

## **Hampton**

The Town of Hampton has a low vulnerability to flooding. Small portions of the town lie within the 100-year flood zone and storm surge is unable to reach the town because of its inland location. Because of this, the vulnerability is low.

## **Luray**

The Town of Luray has a low vulnerability to flooding. No part of the town lies within the 100-year flood zone and storm surge is unable to reach the town because of its inland location. Because of this, the vulnerability is low.

## **Scotia**

The Town of Scotia has a low vulnerability to flooding. No part of the town lies within the 100-year flood zone and storm surge is unable to reach the town because of its inland location. Because of this, the vulnerability is low.

## **Varnville**

The Town of Varnville has a low vulnerability to flooding. Small portions of the town lies within the 100-year flood zone and storm surge is unable to reach the town because of its inland location. Because of this, the vulnerability is low.

## **Yemassee**

The Town of Yemassee has a mid-level vulnerability to flooding. There are some areas that fall within the 100-year flood zone. Southern Yemassee is also vulnerable to storm surge from level 3-5 hurricanes. The area within 100-year flood zones and the risk of hurricane storm surge results in the Town's mid-level vulnerability to flooding.

## **Jasper**

(City of Hardeeville •Town of Ridgeland)

Overall, Jasper County has a mid-level vulnerability to flooding. Almost half of the county is in a FEMA 100- year flood zone. Storm surge from hurricanes also has the ability to reach 1/3 of the way into the county. Flooding can cause considerable damage. This fact, along with an examination theof flood zone and storm surge mapping, results in the County's mid-level vulnerability to floods.

The last plan mentioned that there have only been two properties in Jasper County which have been affected by flooding that are considered repetitive loss areas. Now, however, there is only one structure still considered as a repetitive loss structure within the three-county region, and that structure does lie within the boundaries of Jasper. It is a residential structure and is in the unincorporated area.



## Winter Storms

### Colleton

(Town of Cottageville • Town of Edisto Beach  
• Town of Lodge • Town of Smoaks • City of  
Walterboro • Town of Williams)

Overall, Colleton County has a low level of vulnerability to winter storms. The probability of one or more winter storms in Colleton County is low (6.78%). It is clear from examining past events that winter storms have not caused a great amount of significant reported damage within the County. Overall, when taking into consideration the low probability of winter storms in Colleton, and the past history of the event, the County has a low vulnerability to winter storms.

### Hampton

(Town of Brunson • Town of Estill • Town of  
Furman • Town of Gifford • Town of Hampton •  
Town of Luray • Town of Scotia • Town of Varnville  
• Town of Yemassee)

Overall, Hampton County has a low level of vulnerability to winter storms. The probability of one or more winter storms in Hampton County is low (3.39%). It is clear from examining past events that winter storms have not caused a great amount of significant reported damage within the County. Overall, when taking into consideration the low probability of winter storms in Hampton, and the past history of the event, the County has a low vulnerability to winter storms.

### Jasper

(City of Hardeeville • Town of Ridgeland)

Overall, Jasper County has a low level of vulnerability to winter storms. The probability of one or more winter storms in Jasper County is low (1.69%). It is clear from examining past events that winter storms have not caused a great amount of significant reported damage within the County. Overall, when taking into consideration the low probability of winter storms in Jasper, and the past history of the event, the County has a low vulnerability to winter storms.

DATA: SHELDUS

## Coastal Erosion

### Edisto Beach

The Town of Edisto Beach within Colleton County is the only jurisdiction susceptible to Coastal Erosion. It is highly vulnerable to coastal erosion considering the fact that it is a coastal town. Its low elevation and geographic location and features result in its high vulnerability to coastal erosion.

DATA: SHELDUS

## Extreme Heat

### Region

Extreme Heat affects all three counties similarly. Although they are susceptible to extreme heat due to the tropical climate of the region, community damage due to Extreme Heat, unless it manifests itself as another type of Hazard; tropical storm, drought, or fire, however it is expected to increase in the coming years, making damage to infrastructure more of a vulnerability to the region. It has however, caused fatalities. The overall vulnerability of the region is medium due to the high chance of occurrence but the low historic data of injury and loss.

## Vulnerability Assessment

The following is a vulnerability summary table of the participating counties and municipalities. The entities are most vulnerable to the high level (red) hazards. Mid-level hazards are highlighted in brown. The entities have the lowest vulnerability to the yellow highlighted hazards. Hazards that are not highlighted are not a threat to the county or municipality. Plan goals and objectives will be prioritized according to this table.

	Tornado	Hurricanes	Windstorms	Lightning	Hail	Drought	Earthquakes	Wildfires	Flood	Winter Storms	Coastal Erosion	Extreme Heat
Colleton Co.	x	x	x	x	x	x	x	x	x	x		x
Cottageville	x	x	x	x	x	x	x	x	x	x		x
Edisto Beach	x	x	x	x	x	x	x	x	x	x	x	x
Lodge	x	x	x	x	x	x	x	x	x	x		x
Smoaks	x	x	x	x	x	x	x	x	x	x		x
Walterboro	x	x	x	x	x	x	x	x	x	x		x
Williams	x	x	x	x	x	x	x	x	x	x		x
Hampton Co.	x	x	x	x	x	x	x	x	x	x		x
Brunson	x	x	x	x	x	x	x	x	x	x		x
Estill	x	x	x	x	x	x	x	x	x	x		x
Furman	x	x	x	x	x	x	x	x	x	x		x
Gifford	x	x	x	x	x	x	x	x	x	x		x
Hampton (town)	x	x	x	x	x	x	x	x	x	x		x
Luray	x	x	x	x	x	x	x	x	x	x		x
Scotia	x	x	x	x	x	x	x	x	x	x		x
Varnville	x	x	x	x	x	x	x	x	x	x		x
Yemassee	x	x	x	x	x	x	x	x	x	x		x
Jasper Co.	x	x	x	x	x	x	x	x	x	x		x
Hardeeville	x	x	x	x	x	x	x	x	x	x		x
Ridgeland	x	x	x	x	x	x	x	x	x	x		x

Figure 48: Lowcountry Risk Assessment Table

- Low Vulnerability indicates that either the area is unlikely to incur the hazard, or if it does, there is a low chance property damage or injury will result.
- Mid Vulnerability indicates that there is a decent chance the Hazard will occur, and if it does it most likely will cause some damage or injury.
- High Vulnerability indicates that the area is highly susceptible to the Hazard, and has historic data of extreme loss or fatality.

# Community Mitigation Plan Review

The mitigation requirements of this plan can be incorporated into other various plans and mechanism of the counties and corresponding jurisdictions. Such plans include Comprehensive Plans, Zoning Ordinances, Land Use Plans, Flood Mitigation Plans, and others.

The counties and jurisdictions thereof are encouraged to update their plans to incorporate policies set forth from this mitigation plan. The current plans have been examined and there are policies already set forth that correspond to hazard mitigation and the overall goals of the mitigation plan. Some of these policies as discovered in the plans through the review are identified below. Note that not all plans are mentioned, nor are all policies identified. Further incorporation is encouraged as these plans continue to be amended and updated.

The following is a compilation of policies concerning natural hazards, mitigation, and emergency preparedness, reviewed by the Lowcountry 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.

	Comprehensive Plan Year	Addresses Natural Hazards	Sets Policy	Critical Facilities	Ordinance	Description	Items
Colleton County	2009	x	x	x	x	Emphasis on flooding and critical facilities	Continue the construction of additional Fire-Rescue and the Emergency Medical facilities as recommended to maintain and improve county wide response times and ISO ratings.
Cottageville	2003						
Edisto Beach	2010	x	x	x	x	Flood Plain Ordinance	Beach Management Plan with Army Corps of Engineers. Zoning overhaul.
Lodge	Unknown						
Smoaks	Unknown						
Walterboro	2010	x	x	x		Refers to Hazard Mitigation Plan, Open Space/Natural Resource Conservation	
Williams	Unknown						

Figure 49: Community Plan Review

	Comprehensive Plan Year	Addresses Natural Hazards	Sets Policy	Critical Facilities	Ordinance	Description	Items
Hampton County	2008	x	x	x		Emphasis on natural resources, development patterns, and critical facilities	Intergovernmental and Inter agency Coordination is essential to the successful achievement of all of the above objectives. Economic Development Commission, both school districts, Emergency Management, the Sheriff's office and the Fire Department and other organizations should be involved as Hampton County's development process evolves. (Page 13)  Wetland Protection Although wetlands are protected by state and federal legislation, local governments have the authority to conserve wetlands. Some of local governments' available tools are the development of regulations which support lower ratios of impervious surfaces, resource protection areas, performance-based development, overlay protection corridors, environmental guidelines for subdivisions, and land-use planning based on infrastructure availability. Implementation of any of these tools should be based on a comprehensive wetlands protection plan. (Page 17)
Brunson	2000						
Estill	2010	x	x	x		Emphasis on wetland protection as a means to protect flood plains	
Furman	Unknown						
Gifford	Unknown						
Hampton	2008						
Luray	Unknown						
Scotia	Unknown						
Varnville	2012	x	x	x		Emphasis on wetland and floodplain protection	Flood Plain Protection in Zoning Ordinance
Yemassee	2005						



	Comprehensive Plan Year	Addresses Natural Hazards	Sets Policy	Critical Facilities	Ordinance	Description	Items
Jasper County	2007	x	x	x		Emphasis on flood plain management and fire/ems protection.	Protect the natural flow of rivers and streams by reviewing the County's flood damage prevention regulations for conformance with the most current floodway protections and floodplain management techniques. Page 31. Develop a Fire Protection and EMS Master Plan for Jasper County that ensures adequate fire protections and emergency medical services throughout the County and identifies the improvements necessary to reduce ISO fire ratings and, consequently, reduce fire insurance costs for citizens and businesses. Page 113.
Hardeeville	2009	x	x	x			
Ridgeland	2007	x	x	x		Emphasis on areas with repetitive flooding, wetland protection	Within the Town, much of the vacant land generally south of Adams Street has been declared to be a special Flood Hazard Area of the U.S. Department of Housing and Urban Development. Essentially, this means that the area has been determined to be subject to 50-year floods. Before property in this area can be developed and before it can qualify for Federal Flood Insurance, the Town must have regulations in effect assuring that development in these areas meets certain requirements related to elevation, etc. All of this means that, from an environmental standpoint, future development in the Ridgeland area will be highly dependent on (1) each

#### Jasper Ocean Terminal

At the present time, development of the proposed Jasper Ocean Terminal is still in the planning and preliminary design phases. With no financing yet committed, the project is not likely to begin construction for at least a decade. As a result, there are currently no plans or proposals for related development to occur within the foreseeable future. The situation will be continue to be closely monitored.

# Social Vulnerability

## Social Vulnerability Methodology

Social vulnerability analysis uses a statistical method to assess multiple socioeconomic variables. By assigning a weight for each, a spatial analysis can be done by looking at the cumulative impact of multiple factors. Some variables include age, gender, race and ethnicity, housing, and income -- all can be indicators of vulnerability. The Lowcountry Region's variables of significance are poverty, race and ethnicity, percentage of mobile homes, median household income, and households with no car.

## Lowcountry Analysis

Based on the scores provided by the University of South Carolina, areas along, and just east of the Interstate-95 corridor, have an increased risk of vulnerability and at higher rates than the Lowcountry as a whole. According to the analysis, the Ridgeland area east of Interstate 95, West of SC 170, and North of US 278 has a high vulnerability. Portions of the area described are also the fastest growing in the three-county region. According to 2010 Census, the area also is marked by a higher rate of households without cars, growing number of seniors and a higher percentage of the population for which English is their second language. See the following maps.

The analysis suggests areas where mitigation efforts should be focused. These measures could be utilized anywhere in the region, but special consideration may be appropriate in locations with higher social vulnerability.

### Mitigation measures may include:

- A vegetation survey to estimate the need for debris removal after the event. Tree removal in and around critical facilities as well as housing in low-income areas. Housing studies to determine needed fixes to make homes less vulnerable including extreme heat and winter weather.
- Seniors needs, including heating and cooling
- Drainage concerns addressed with a holistic approach, including vegetative planting, rigorous maintenance, and fortification where needed.
- Public transit should be explored along with hurricane evacuation needs.

## Lowcountry

## Social Vulnerability

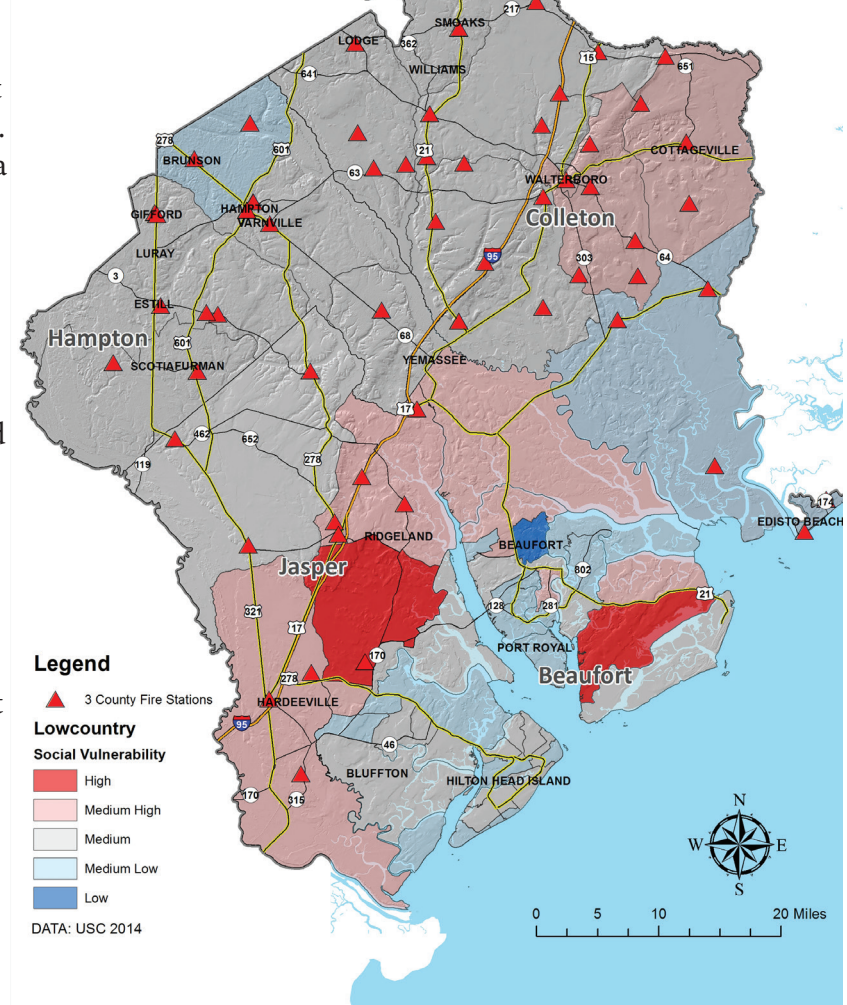


Figure 50: Social Vulnerability

# Critical Facilities

This part of the Natural Hazard Mitigation plan concerns the assets of the counties and the critical facilities located within their boundaries. Mitigation 20/20 defines critical facilities as structures and areas “in the community whose presence or operation are ‘critical’ or ‘vital’ to the safety and well fare of the community” (Mitigation 20/20). The process of taking inventory, locating, and mapping these facilities is essential to the process of assessing their vulnerability to the hazards examined in Part One. According to Shawn Putnam of the State of South Carolina’s EMD:

"Critical facility/infrastructure will be defined as critical facilities/infrastructure that perform emergency services or functions necessary for community survivability or continuation of government services and must remain operational or return to operation within 72 hours following a disaster."

Each of the three county directors has supplied lists of the facilities that are most critical to the counties. Critical facilities can be the following:

- Hurricane Shelters
- Dialysis Centers
- Utilities: Water, Sewer and Electric
- Police
- Fire
- EMS
- Hospitals
- Administration Buildings

The following pages include the mapping of the critical facilities and utilities for Colleton, Hampton, and Jasper Counties. It is important that these facilities are protected from natural hazards and severe weather and that their structural integrity is maintained by means of necessary improvements.

## Shelters and Evacuation Routes

The following map shows designated hurricane shelters and evacuation routes in the Lowcountry Region. There are shelters in all three counties covered in this plan. Because of its low elevation and the amount of water within its limits, Beaufort County does not have any hurricane-approved shelters. Beaufort residents rely on the shelters in Jasper and Hampton Counties. Residents in Charleston County rely on hurricane shelters in Colleton County. Colleton, Hampton, and Jasper County shelters must have the carrying capacity to shelter residents from neighboring counties. This is important because Beaufort County’s evacuation routes travel through Hampton and Jasper Counties while Charleston County routes travel through Colleton County.



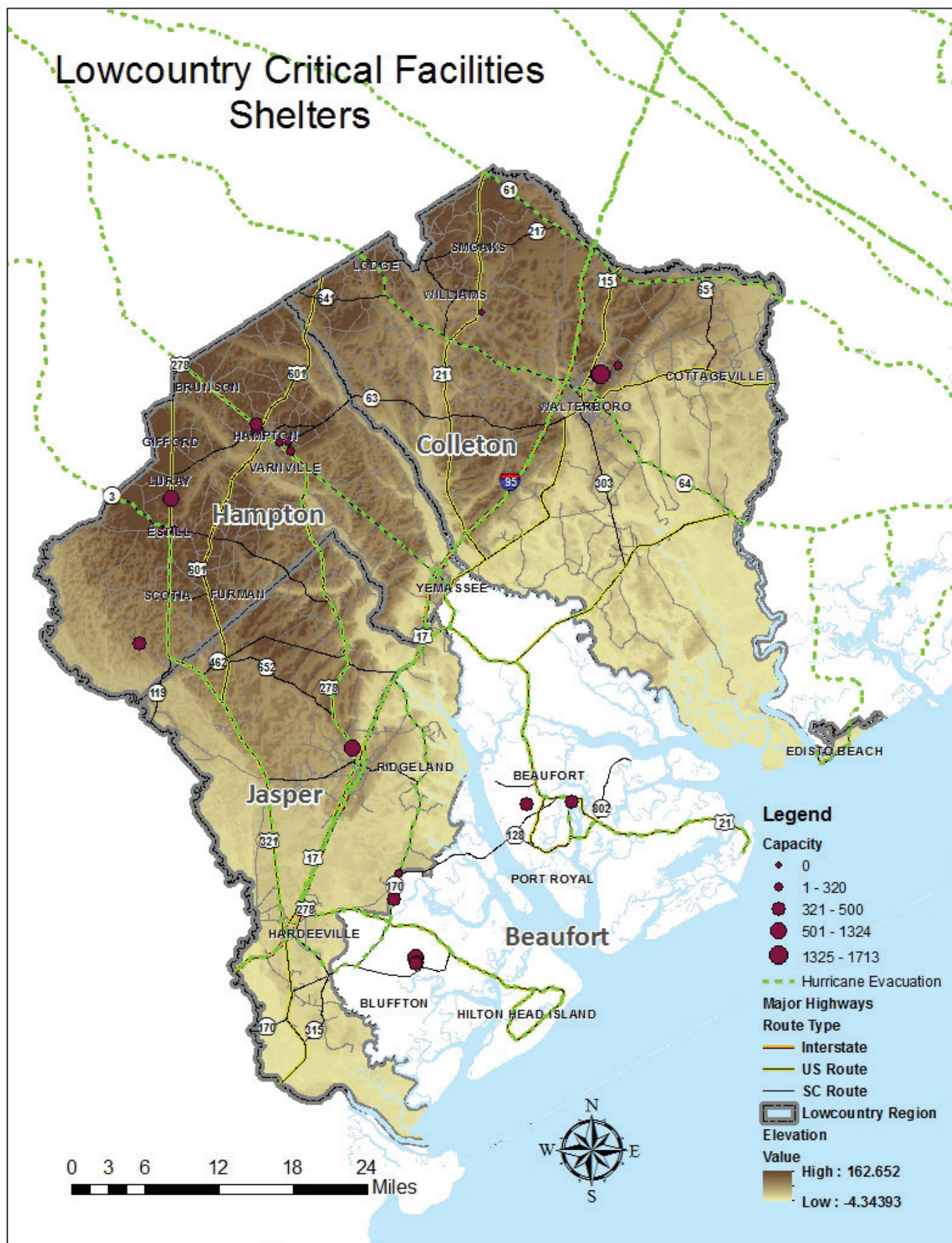


Figure 51: Lowcountry Shelter Map



Location	Street	City	Zipcode	County	BU POWER	Capacity	SLOSHLoss	Staffing
Colleton County								
Northside Elementary School	1929 Industrial Rd	Walterboro	29488	Colleton	G	154	5-Apr	9
Ruffin Middle School	155 Patriot Ln	Ruffin	29475	Colleton	G	0	None	9
Colleton County Middle School	1379 Tuskegee Airmen Drive	Walterboro	29488	Colleton	G	1713		0
Hampton County								
Estill High School	1450 Columbia Hwy	Estill	29918	Hampton	G	900	None	17
Hampton Elementary School	505 S Hoover St	Hampton	29924	Hampton	G	450	None	9
Varnville Elementary School	395 E Pine St	Varnville	29944	Hampton	G	320	None	9
Ben Hazel Primary School	628 West Railroad Ave	Hampton	29924	Hampton		450	None	9
Estill Elementary School	319 Fourth Street East	Estill	29918	Hampton		238	None	9
Estill Middle School	555 Third Street West	Estill	29928	Hampton		245	None	9
Wade Hampton High School	201 Airport Rd	Varnville	29944	Hampton	G	270	None	9
North District Middle School	507 Tillman Ave	Varnville	29944	Hampton		210		0
Jasper County								
Ridgeland School Complex	250 Jaguar Trail	Ridgeland	29936	Jasper	G	1100	None	21
Robertville Community Center	US Hwy 321	Garnett	29922	Jasper		457	None	9
Coosawhatchie Community Center	SC Hwy 462 W.	Ridgeland	29936	Jasper		283	??	9

Figure 52: Lowcountry Shelter Table

# Lowcountry Critical Facilities



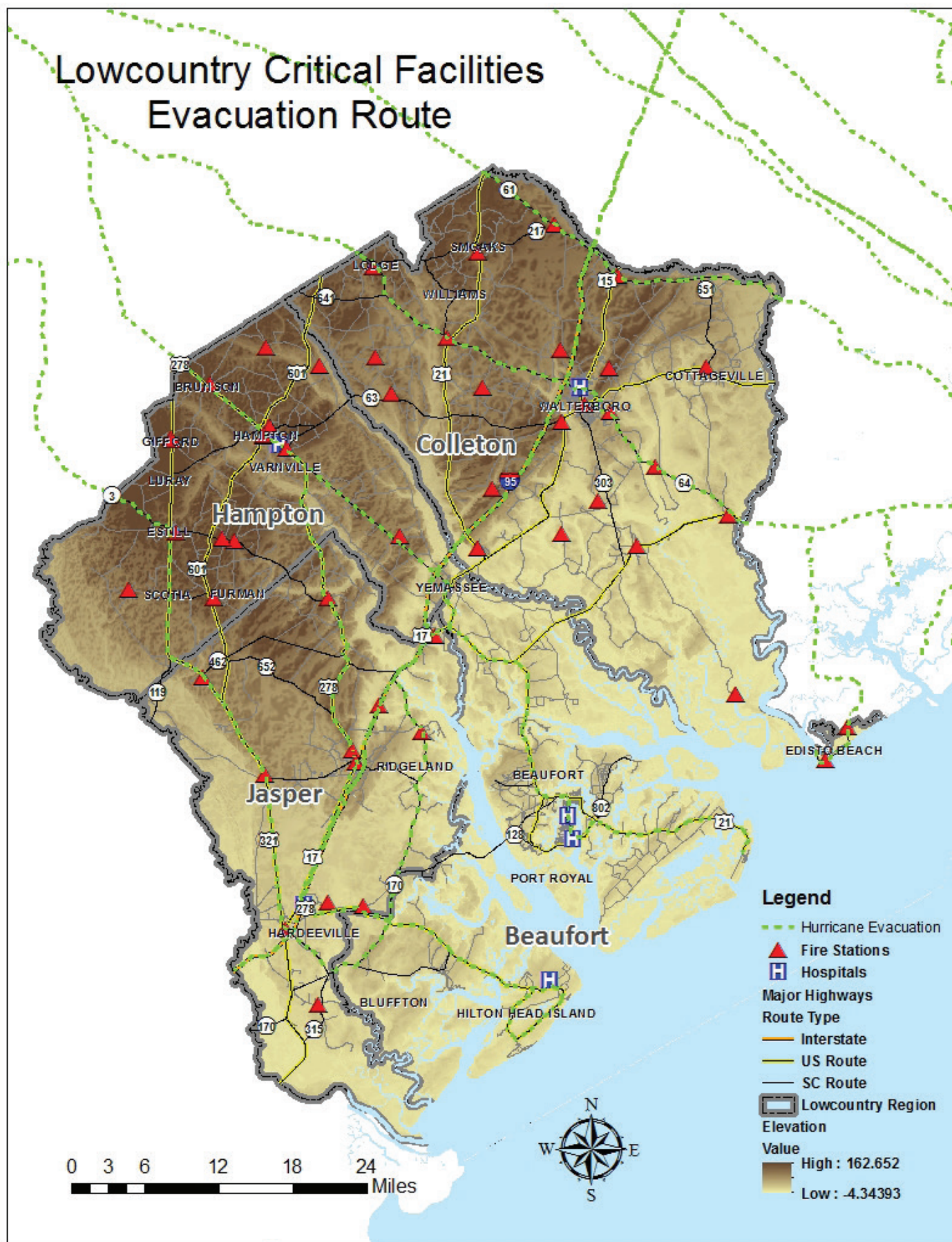
Figure 53: Lowcountry Fire Stations Map

# Lowcountry Critical Facilities Health Care



Figure 54: Lowcountry Health Care Facilities Map







# Lowcountry Critical Facilities Water and Sewer Facilities

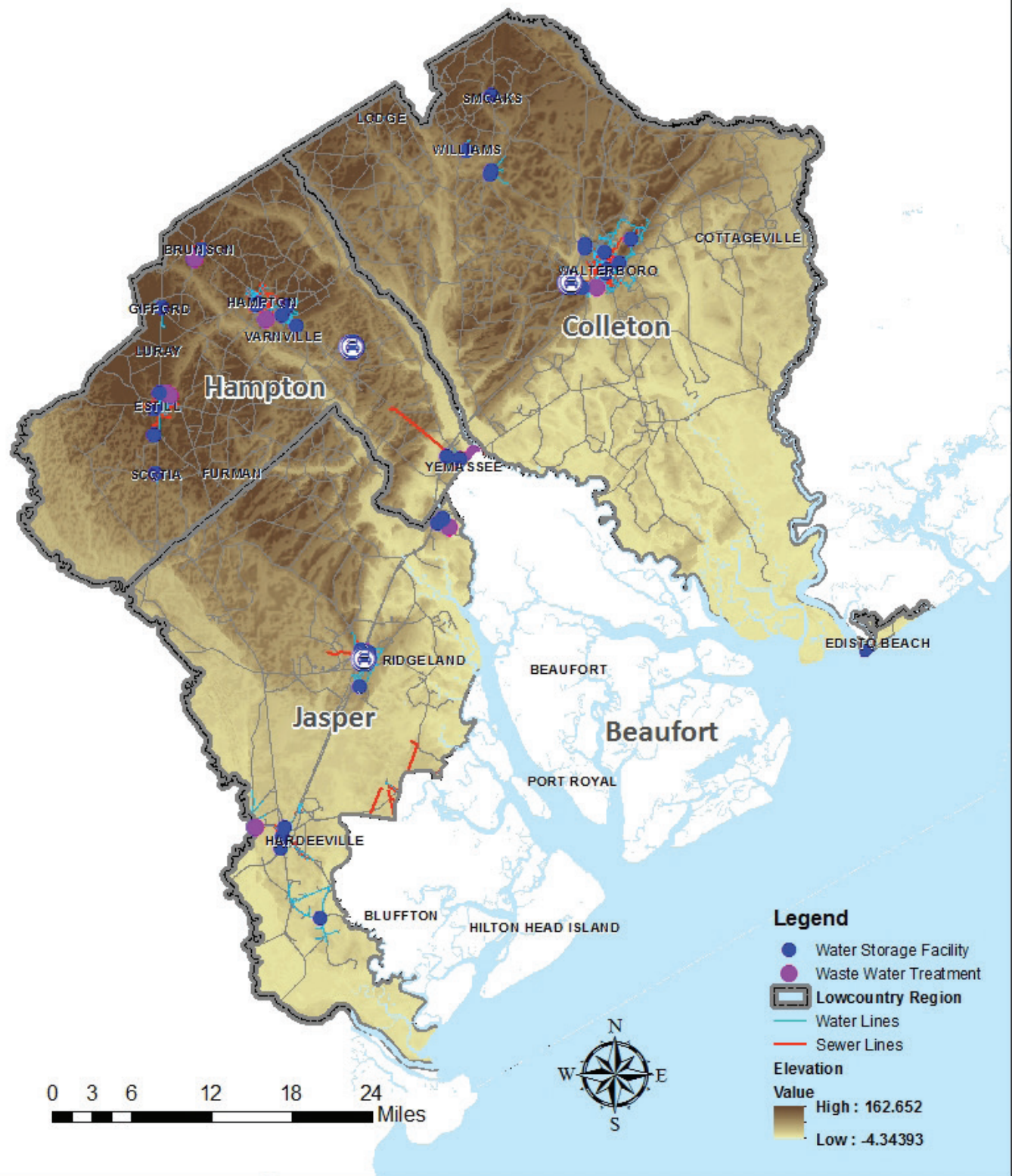


Figure 56: Lowcountry Water and Wastewater Map

# Review of Previous Plan

The mitigation strategy brings positive change in the community by reducing vulnerability to damage by natural hazards. This mitigation strategy was prepared in correspondence with the identified Steering Committee, Planning Committee, an overview of previous actions, a new and updated assessment of risks to the area, and input from the public this plan serves.

In order to understand the proper action items for the communities this plan serves, an assessment of the actions from the previous plan was conducted by the Steering Committee. Since the action items from the last plan were similar across the board for each jurisdiction, the EMD from the County, the overall overseer of hazard mitigation, updated the items below for all affected jurisdictions. From this, and various community meetings, a new list of actions was created per jurisdiction. Several of the action items from the last plan were unable to be completed and were deferred or represent ongoing needs. These items will consist of the bulk of this plan. Below is a list of the action items set forth for each corresponding county, and then the respectable completion or incompleteness data thereof. Most of the items left incomplete were due to a lack of funding.

## Assessment of Previous Action Items

The Lowcountry Council of Governments compiled an EXCEL™ table of previously recommended action items and distributed them to the Emergency Managers of each of the three counties. They updated the progress or lack thereof for each action. Most of the actions from the previous plan are ongoing or have been deferred due to lack of money. The status of these actions is found under the STATUS section, and everything is color coded for ease of reading. YELLOW items are ongoing or continuous items from the last plan. ORANGE, are items that have been completed, and WHITE items are the newly identified items.

# Updated Mitigation Strategy

Based on the previous plan and the first update, corresponding goals, and actions, this Mitigation Strategy serves as the most recent update and presents the forward motion of the counties. This section presents the general goals for the counties and municipalities participating in this plan. The bulleted points under each goal are objectives, which are more specific. The goals and objectives will then be accomplished by implementing specific short-term strategies and actions.

## Goals & Objectives

The goals and objectives in this plan were developed by the Natural Hazards Steering Committee, with the assistance of Lowcountry Council of Governments, and from comments and input from participants in the county, online and paper surveys, and public meetings. These goals are consistent with the goals of the last Mitigation Plan. Although the goals and objectives have changed little, only to strengthen the regional approach to the Plan. The designated action steps have been improved upon.



## **Actions and Projects**

Actions have been prioritized using a similar approach as was used in the 2009 Plan. Considering legal, economic, political, and environmental conditions, each of these areas was ranked as either a cost or a benefit, and then scores corresponded to a high, mid, or low ranking. Therefore, if an action item received a low ranking, it means that there was a high cost. Low, however, does not mean, however, that the action is not of importance. Actions that can immediately aid in the mitigation of the most likely and dangerous natural hazards are higher in priority under each of the ten goals for each participating county and municipality. The cost-benefit review was done in which actions that have maximum benefits from their associated costs are ranked higher in priority than those that have lower benefits from their costs. Additionally, action prioritization was assessed based on retaining NFIP compliance. NFIP compliance is based on three basic aspects, flood plain identification and mapping, flood-plain management, and flood insurance. Currently, the only Lowcountry community sanctioned under the NFIP is Smoaks



# Goals and Objectives

During the 2015 update process, Stakeholders met to review the existing Goals and Objectives. It was determined, in order to reflect the actions that have been occurring and technological and physical advances, it was important to make the plan's Goals more regionally focused. In the event of a large-scale incident, all jurisdictions will need to work together. These changes are reflected in the physical and operational approaches. Other areas in which the region's governments and agencies work together include transportation, the environment, and health care.

New and modified goals are influenced by:

## Altered conditions due to disaster events

- The Ice Storms of 2014 exposed some vulnerabilities in terms of emergency facility readiness and environmental factors such as tree cover and debris removal.
- In the summer 2013, continuous summer heavy rains in Hampton County washed away rural roads, making it difficult for certain residents to reach their homes.

## Changing community needs

- The steering committee has encouraged a regional approach to hazard mitigation, including the use of a co-located shelter in the Town of Ridgeland that will support thousands of evacuees in the event of a major hazard, such as a hurricane.
- Newly available technology to support information and data needs.
- New demographics, including increasing Hispanic and aging populations.

## New hazard impacts

- Sea-level rise and extreme heat are hazards with increasing concern.
- Changes in the development patterns that could influence the effects of hazards
- Areas in southeastern Jasper County, along US 278 and SC 170 are seeing renewed growth since the Great Recession of 2007-2008, where there is a potential for storm surge and high social vulnerability, noted in risk sections of the plan.
- Other areas are expected to have a small decline in population for the foreseeable future.

## Overall Guiding Principles:

- Bridging the unique needs and common goals of the four counties and their communities.
- Saving lives and protecting property.
- Taking a regional approach.
- Complementing the State Plan.
- Accessing funding to implement recommendations (projects and policies).



### **Goal #1 Ensure the Protection of All Critical Facilities.**

#### **Objectives**

- a. Protect facilities from natural hazard threats.
- b. Identify and schedule repairs and other improvements needed in order to ensure buildings are in adequate conditions and with adequate equipment to function in the event of a disaster.

### **Goal #2 Evacuation is safe, efficient, and shelters have sufficient carrying capacity.**

#### **Objectives**

- a. Evacuation routes should be proven safe and efficient. Counties work with each other and SCDOT on highways connecting the counties
- b. The number of area shelters should be adequate and safe for the amount of people that may potentially use them. The shelters should be able to accommodate all members of the area's population, including those with special medical or other needs.

### **Goal #3 Increase Public Education and Awareness of Natural Hazards**

#### **Objective**

- a. Develop an ongoing public communications and education program including a website, pamphlets, informational packets, and articles in the local media.
- b. Incorporate the use of social media, including Facebook™ and Twitter™ to ensure that as many segments of the population as possible are reached.

### **Goal #4 Enhancement and Adoption of New Policies and Projects to Mitigate Natural Hazards**

#### **Objective**

- a. Plans, codes, zoning, and other mechanisms should address natural hazard mitigation, and expand on present policies to further protect the counties and incorporated municipalities (floodplains, repetitive loss areas, etc.). All jurisdictions should adopt the state building code.

### **Goal #5 Emergency Response: Preparedness EMS, police, fire, and other departments should have sufficient and up to date equipment and training in order to ensure the safety of residents.**

#### **Objectives**

- a. There should be funding to buy new equipment (e.g., communications and power) if necessary.
- b. There should be funding to train employees if necessary.
- c. Maintain and enhance working relationships among the departments among all four counties.
- d. Coordinate with the county and regional offices of the various state human services departments.

**Goal #6 Reduce the Impact of Wind on Homes and Buildings.** Wind damage is a threat to homes and buildings in the region. Means should be taken to decrease the effects of wind on homes and buildings within the counties.

Objectives

- a. Code revisions to reduce the impact of wind on homes and buildings.
- b. Grants, including SC Safe Homes, for preventative measures (such as housing grants).

**Goal #7 Reduce the Impact of Floods on Homes and Buildings.** Projected sea-level rises in the Lowcountry will be included, utilizing such information and mapping as is currently available to help determine the areas and magnitude of impacts.

Objectives

- a. Zoning enforcement, floodplains.
- b. Grants for preventative measures, to include elevation and property acquisition.
- c. Building code revisions
- d. Stormwater management
- e. Work toward the lowering of the CRS rating.

**Goal #8 Maintain the IT capabilities of local governments to ensure continuity of operations in the event of disaster**

Objective

- a. Support the use of centralized technology, located as far inland as possible.
- b. Develop a hosted (for instance, the “cloud”) storage system.

**Goal #9 Ensure the Protection and Continued and Uninterrupted Operation of Communications on a regional basis**

Objective

- a. Determine if the current regional communications infrastructure is adequate to meet the needs.
- b. Identify what improvements are needed.

**Goal #10 Ensure the Protection of Utilities**

Objective

- a. Utilities must be inspected and assessed of their capability and vulnerability to handle natural disasters.

# Actions Update

The 2009 Plan was evaluated to see where action had been taken and where improvements were still needed. A majority of those actions were implemented by the respective counties. Specific notes are available in the following action tables. While the counties have played a major role, and will continue in that capacity, during the review it was found that individual non-governmental institutional facilities made major strides in reducing their vulnerabilities to natural hazards. During this time, some of these facilities, especially those in Colleton and Hampton Counties, had to activate their emergency systems in the Ice Storm of February 2014.

The completed and new/ongoing actions will be divided into four categories:

- Local plans and Regulations
- Structure and Infrastructure
- Natural Systems protection, and
- Education and awareness

## Completed Actions

Below is a summary of completed regional actions between 20010-2015:

### Local plans and Regulations

- Jasper County passed a stormwater manual and ordinance, which will have an impact on all future development in the unincorporated areas of the county, where some locations are the fastest growing in the region. This policy will ensure that stormwater is partially captured by best management practices.
- Town of Varnville completed a major update for their Comprehensive Plan and a new Zoning Ordinance, which aims protect flood-plains, wetlands and promotes open space.
- The Lowcountry Regional Water Quality Management plan includes new recommendations for the protection of water quality and septic systems.

### Structure and Infrastructure

- Private facilities, such as Pruitt Health's nursing home in Walterboro made significant progress in ensuring that their building is less vulnerable to storms by trimming and removing trees, improving roofing, and increasing backup power capacity.
- The creation of the Lowcountry Regional Water System, which combined water systems in a majority of Hampton County's municipalities in, improving efficiency.
- The Town of Varnville, Hampton, Yamasee and the City of Walterboro have all made waterline improvements and sewer improvements.
- A new public health facility in Hampton County has been slated for development and is in the beginning stages of construction. They also operate in emergency situations as a shelter for populations with unique medical needs. A building was finished in Jasper County
- Beaufort Jasper Water Sewer Authority continues to connect areas that have known septic failures, such as the Old Bailey's Circle neighborhood.
- In 2014, a large-scale solar farm began operations in Colleton County. The region can capture powerful solar rays to produce electric power.
- Hampton County purchased a new server for data backup and storage.
- Hampton County built a new fire station at Miley, improving service coverage.
- Colleton County built or purchased five fire stations, expanding service coverage.

## Natural Systems Protection

- The town of Edisto Beach, in coordination with the County, Army Corps of Engineers, and the federal government have come up with a multi-year plan to enhance and protect the beach there with beach nourishment and sand dune restoration.
- The City of Walterboro focused efforts on clearing grub, improving exterior conditions and overgrown vegetation in a low-income neighborhood in the spring of 2015.

## Education and awareness

- Drills have been conducted in the schools and the nursing homes throughout the region
- A major evacuation simulation occurred in June of 2015, in coordination with Jasper County, Beaufort County, the American Red Cross, and Palmetto Breeze, the region's public transit provider.
- The National Guard conducted an emergency water drill at Lake Warren.
- Earthquake education has regularly occurred throughout the region on an annual basis.
- Weather radios have been distributed to schools and other institutions in Hampton County.

## New and Ongoing Actions

The completed, new, and continued actions listed in the following pages are intended to correspond with associated natural hazards and support meeting the stated goals of the participating jurisdictions. They complement area land use policies, including comprehensive plans. New actions are based on changing conditions and the reassessment of goals and objectives of the new Plan.

Below is a summary of the new proposed actions based on the above changes and new goals and objectives:

## Local plans and Regulations

- Small Area Plans - Identify vulnerable Housing, neighborhoods, and districts. Determine the value and run a cost-benefit analysis on improvements, such as weatherproofing, elevating and flood proofing structures, and assessing community fuel reduction actions for wildfire prevention. Communities will identify areas for improvement such as safe affordable housing. An analysis should be provided to determine the vulnerability for the Lowcountry's many historic neighborhoods, housing, and buildings and make improvements where appropriate.
- Churches, other faith-based institutions, and schools reside in the neighborhoods. They will inevitably play an important role in the event of a disaster. It is essential to know the capabilities of the facilities that provide food, shelter, and social structure in the event of a disaster and find any needs for improvement to their capabilities.
- The region's counties and municipalities will continue to include natural hazard mitigation measures in their land use plans and zoning ordinances.
- New stormwater measures will be issued where appropriate to comply with federal regulation.
- Colleton County will continue to participate in the Community Rating System (CRS) and make improvements to gain incentives thus lowering risk and reducing insurance rates. Flood studies will be conducted in accordance with FEMA policy to meet requirements.



## Structure and Infrastructure

### Transportation –

Most natural hazards identified in the risk assessment will impact transportation systems. The Lowcountry's populated barrier islands have special considerations as a result of hurricane storm surge and sea-level rise vulnerabilities. In addition to the thousands of locals that depend on these roads every day, tourists, by millions annually, become heavily reliant on the networks. If an evacuation is necessary, all the major road networks in the region have a potential to be burdened with heavy traffic conditions.

- Install cameras at Estill and Hampton
- Improve roadways for evacuation.
- Recalibrate traffic timing and increase the use of Intelligent Traffic Systems (ITS), in continued cooperation with Beaufort County in growing areas.
- Assess the threat of sea-level rise on the major highways and bridges.
- Continue to build-in hazard vulnerability and resilience into the transportation planning decision-making process.
- Improve transit for socially vulnerable populations and establish regular routes.
- Conduct a cost benefits analysis for improving the region's county airports in terms of mitigation of hazards. Airports should have continued investments in hangars and other improvements to ensure the ability to receive supplies. The region benefits from all three county airports.

### Utilities -

The protection, continuity, and restoration of electric, gas, water, and sewer services to people, business, and government during and after hazard events is a key function. Utility companies regularly clear vegetation around pipelines and power lines and removing problem foliage.

- Improve Wastewater systems as these type of facilities can be vulnerable to long duration power outages and flooding due to the proximity of systems to the area's waterways. Back-up systems and mitigating flooding where needed are necessary.
- Continue to connect, where cost effective and weighing environmental benefits, areas that have known septic failures, such as Beaufort Jasper Water Sewer Authority's project connecting the Old Bailey's Circle neighborhood in Jasper County.
- Conduct a regional survey to identify the impacts of energy use and determine present and future energy needs.
- Identify and analyze renewable energy options: costs, benefits, environmental effects, technological potential, and political acceptability.
- Conserve energy and provide educational and marketing efforts, especially in periods of extreme weather conditions, such as heat, cold, and drought.

## Shelters -

All three counties have at least one major shelter. Shelters will continuously be assessed to determine their suitability for evacuees. Backup power capabilities, structural soundness, and window protection should be improved where needed. Shelters in Hampton and Jasper Counties will include individuals from Beaufort County. Colleton County could receive people from the metro Charleston area if there are evacuations in portions of that county. Drills are an ongoing exercise. Beaufort and Jasper Counties conducted a major Hurricane evacuation drill for the Jasper shelter staffed by the American Red Cross in June of 2015 in coordination with Palmetto Breeze, the region's transit agency.

- **Co-located Shelter** -- A shelter is proposed in the Town of Ridgeland at the High School Complex for thousands of regional evacuees. It is currently designated as a shelter but at lower capacity levels. County officials have been coordinating with SCEMD and the Governor's office for grant funding. The facility is in need of improved backup power capabilities and shutters to cover building's windows in corridors and rooms where evacuees will be present. A pet shelter is proposed at that location to encourage people with limited resources and pets to evacuate. Persons with unique medical needs.
- The jurisdictions will identify any **special medical needs populations** that may require specific resources during the event of a hazard or long-term power outages. Excessive heat and severe winter weather will also apply.
- **Senior Centers - Cooling and Warming Centers** – The senior centers in the City of Hardeeville and Town of Yemassee are designated places where the elderly can go if there is extreme cold or heat. The centers should evaluate for energy efficiency and backup power capabilities. Since Edisto Beach is removed from direct access to County facilities, a senior cooling center should be set up at the Civic Center there.

## Technology

**Emergency Operations Centers** - There are three main Emergency Operations Centers (EOCs) in the region's county seats. EOCs need to update video conferencing systems and improve data capabilities. In Hampton and Jasper Counties, normal day-to-day operations take place in EOCs and space considerations need to be addressed. All Counties will continue to monitor the physical conditions and communication capabilities of the EOCs, including mobile facilities and make improvements where needed.

- Colleton County EOC should be connected to the other Lowcountry EOCs via fiber optic loop.
- IDAM, or other damage assessment software should be utilized to ensure timely data that enables decision-makers and FEMA to act swiftly.
- **Data Storage** and Access Data storage improvements have been made, but technology has changed since the last plan with the advancement of "cloud" computing, which can be accessed anywhere. County officials will continue to assess their best options and improve remote capabilities to ensure the continuity of government functions.

An emergency services staffing and resources needs evaluation should be provided to find areas where improvements should be made and make recommendations. Special considerations will be made for growing areas of the region to address the changing needs as addressed in the Plan.

The Lowcountry is fortunate to have hundreds of square miles dedicated to natural resources that contribute in immeasurable ways to the quality-of-life and economy. These systems protect life and property and have a significance that extends well outside this area. There are several major land conservation areas, including, but not limited to the ACE Basin, Savannah National Wildlife Refuge, and the Webb Wildlife Area. The region's numerous inland wetlands and swamps provide a sink for flood water in the event of riverine flooding. Wetlands moderate changes in water supply during dry weather. It will benefit the region to continue the tradition of working together in identifying and acquiring large tracts of land for protection, farming, and sustainable forestry.

- **Shoreline anchoring:** Coastal wetlands “anchor” barrier beaches and sand dunes to the mainland. As new sediment washes into the marsh with each tide, the marsh surface maintains elevation as sea level rises.
- **Storm surge protection:** Coastal wetlands slow wind-driven waves, and help to protect uplands from erosion during storm-related coastal flooding.
- **Pollutant buffering:** By trapping sediments and filtering water, marshes prevent pollution from reaching surface and ground water.
- **Vital habitat:** Many species of birds, fish, and other wildlife use salt marshes for food and shelter. Marshes provide nursery and breeding habitat for commercially valuable fish and shellfish.
- **Recreational uses:** Coastal wetlands support activities such as hunting, fishing, birdwatching, clamming, etc.

The map displays the Lowcountry region of South Carolina, highlighting various wetland types. Major cities and towns labeled include Hampton, Colleton, Jasper, Beaufort, and Bluffton. The map also shows the Savannah National Wildlife Refuge and the Webb Wildlife Center. A legend in the bottom left corner identifies the following wetland types: Estuarine and Marine Deepwater (light blue), Estuarine and Marine Wetland (dark blue), Freshwater Emergent Wetland (light green), Freshwater Forested/Shrub Wetland (dark green), Freshwater Pond (medium blue), Lake (dark blue), Other (brown), and Riverine (light blue). A scale bar at the bottom right indicates distances of 0, 5, and 10 miles. A compass rose is also present in the bottom right corner.

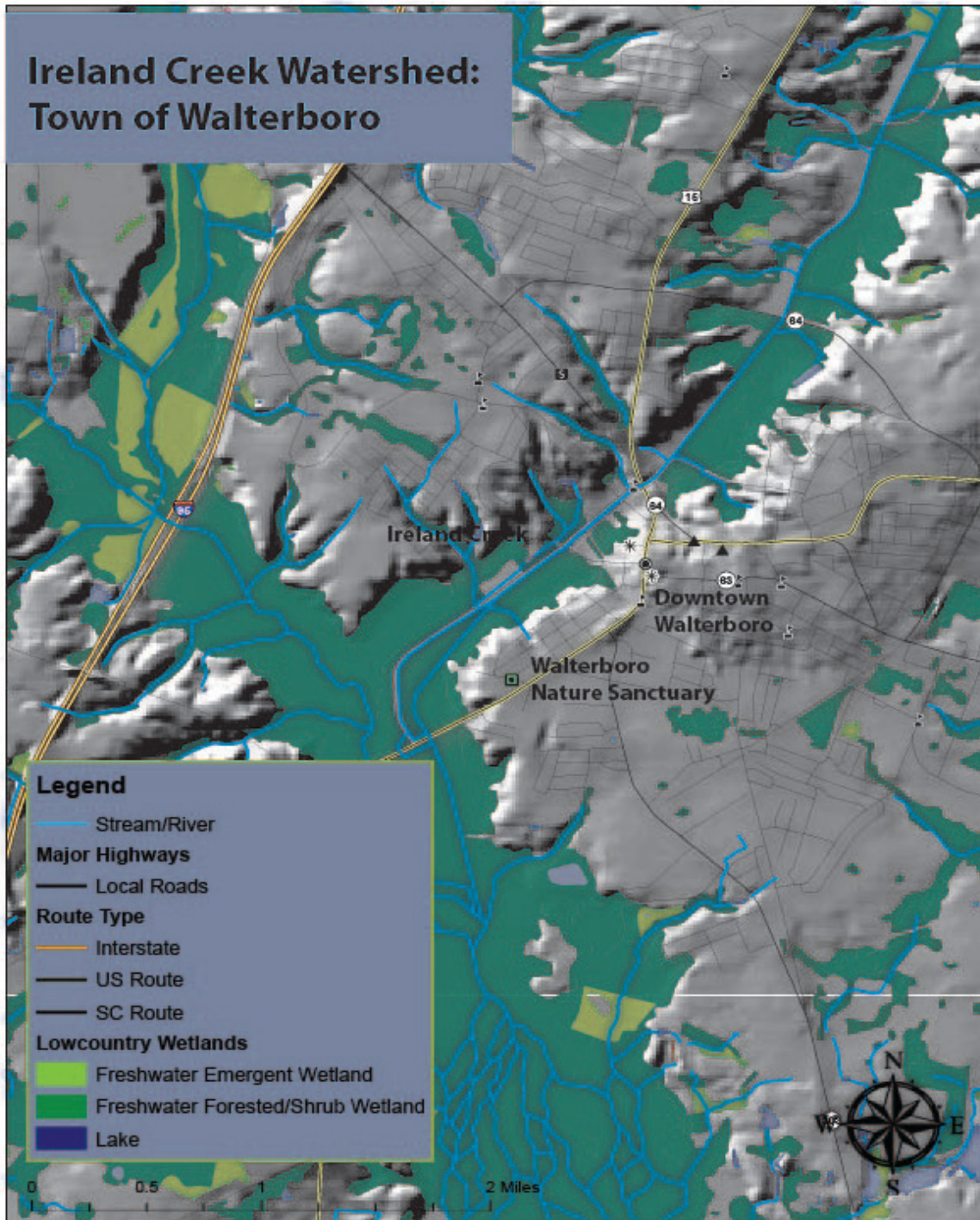
### Legend

## Lowcountry Wetlands

- |   |                                   |
|---|-----------------------------------|
| ■ | Estuarine and Marine Deepwater    |
| ■ | Estuarine and Marine Wetland      |
| ■ | Freshwater Emergent Wetland       |
| ■ | Freshwater Forested/Shrub Wetland |
| ■ | Freshwater Pond                   |
| ■ | Lake                              |
| ■ | Other                             |
| ■ | Riverine                          |



- **Ireland Creek watershed preservation and Sediment Removal, City of Walterboro.**  
The Ireland Creek forms part of the Ashepoo River headwaters. It also provides flood water storage capacity for the City of Walterboro. The city has preserved more than 800 acres of hardwood flats in a braided creek ecosystem as a wildlife sanctuary in the heart of Walterboro. for environmental and recreational purposes Over the years sediment has collected in the creek bed where straightening had been done, making water-flow more constricted. There is now a need to remove the sediment to ensure flood protection to the nearby urban areas.





### **Lowcountry Agriculture -**

During the Drought of 2012, some farmers experienced problems with their water supply as the water table lowered and wells went dry in Hampton County locations. The United States Department of Agriculture streamlined the disaster response designation process and declared disasters in many of South Carolina's Counties. Water conservation practices are encouraged even in times of wetter conditions to maintain technology and readiness as well as allowing groundwater to recharge. Regular conservation farming will improve soil conditions and hold moisture.

*Right: A Hampton County Farm Utilizes a high tunnel.  
Photo Credit: Ken Hawkins*



- Farmers, in general, are vulnerable to all hazardous conditions. Areas farmers should coordinate with NRCS for grants and financial assistance in order to implement hoop houses, high tunnels, water conservation design methods, and growing drought-resistant crops. These methods can protect crops from the elements while providing season extension. Residential landscaping practices and creative design will limit outdoor watering needs.

### **Tree Canopy -**

- Small area studies and plans will help homeowners, businesses, and government recognize beneficial trees and identify harmful trees in their landscapes. Having an incentive program that provided for tree planting and removal can help spur action. Trees promote the sense of well-being and can increase retail expenditures, property values, and air quality, making them a good return-on-investment if used as a resource. Debris removal can be a laborious and costly task after a storm. Hampton and Colleton County incurred millions in expenses due to debris removal after the Ice Storms that affected the region in January and February of 2013.

**Beach Renourishment and Coastal Fortification** -The Town of Edisto Beach will continue to work with the Army Corp of Engineers, County officials, and state partners to protect and enhance the beach, such as dune restoration and beach nourishment.

- Primary Dune Reconstruction over dune boardwalk
- Groin Extension
- Elevation and Retreat

## Education and Awareness

- **Social Media** - During the Ice Storms and subsequent power outages of 2013. Mobile technology played an important role in communicating information. Emergency Managers in Hampton County utilized Facebook and mobile technology to disperse information during the power outages. The region will expand on this technology by including software in the 911 system to take social media calls for assistance. Social media strategies will be a part of a broader marketing strategy for this Plan. Communities will incorporate social media strategies where resources are available.
- **Radio Stations** - Area radio stations, specifically WBHC 92.1 Allendale, should be outfitted with backup power capabilities to ensure continuous communication means to all residents during and after natural hazard events. Beaufort County stations do not reach all of Hampton County. Grants have been applied for and work will continue in support of this action.
- **Ham Radio** Lowcountry officials have been successful in coordinating with HAM radio operators in the past. HAM radio operators will serve as a redundant system in case other channels go down or if needed in any other capacity. County Emergency Management will continue to identify and coordinate with those individuals.
- **Weather Radios** Weather Radios or portable radios will be dispensed to area schools, churches, daycares, and offices and they have been in the past. Programs should be offered to offer residents radios at reduced costs.
- **Marketing** Emergency Managers in Colleton, Hampton, and Jasper Counties regularly visit schools, nursing homes, hospitals, etc. to conduct drills, classes, and other training for students and professionals. Staff distributes information to area hotels and tourism bureaus. These practices will continue and new methods will be utilized with mobile technology such as Twitter and Facebook where appropriate.

## Other Regional Actions

Action as a region is considered a key approach by the Steering Committee. In addition to those above, actions will include: a generator needs assessment, communication links between the counties, and staff resources.

- **Regional Backup Power** -Generators are very costly, and it's impossible to service every building that is considered critical. Communities need better backup power capabilities, but providing local match can be difficult for any one jurisdiction. A possible approach for backup power is to utilize transportable generators that the facilities/local governments could potentially share, where needed, when one area may have power and the others not. This has become apparent during the past several weather events in the four-county area; one or two counties suffer significant damage and the others are relatively unaffected. The idea would be to study the region's facilities and determine the power needs and connections that would be required or standardized. In the event of widespread power outage a generator could be moved to the location with the greatest benefit as determined by the study.
- **Regional Communication** -The region will ensure public safety radio communication and data telecommunications to monitor threats and responses and allow region-wide interoperability. The region will provide a comprehensive assessment of the needs within the communities for mobile data services and the capabilities of the available technologies.
- **Mutual Aid Agreements** - The Region will establish mutual aid agreements with the South Carolina Department of Transportation.
- **Emergency Warehousing** - The region's counties will continue to work together in developing a regional warehouse to store supplies in the event of a disaster.
- **Other Regional Resources** -The region will consider having one person for the all three counties to coordinate various hazard mitigation initiatives that impact the region as a whole. The person would work to implement actions, study the needs, apply for grants, build alliances between the public and private sectors, and improve the capacity to respond to threats.

## Action Not Achieved.

Due to funding impediments, and in some cases lack of support, many actions were not completed. Due to changing conditions explained above, some actions will not be proposed in the new Plan and have been discarded. Some actions achieved in the previous plan updates, or that are no longer relevant, will not be included. At the same time, new actions are being recommended.



# Community Actions

The following section has the action items listed and organized by associated hazard, priority, associated goal, cost level , and responsible party. Green items are ongoing from previous plans, where action may have occurred, but future action is still needed. Blue are proposed actions new or revised. Yellow actions show items that are deferred or not complete, Uncolored action boxes indicate completed actions. The Tables are organized by county then Town or City.

Colleton County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Possible Future Impediment
Ongoing										
Proposed										
Not Complete										
Complete										

Ongoing activities are those that occur annually.

Figure 58: Actions Example Table

## Colleton County Actions

Colleton County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Possible Future Impediment
Add generators to radio stations to ensure emergency public information.	All Hazards	High	9	Med.	PDM	Emergency Management/ Private	2 yrs.	Proposed		Local Match
Increase reserve fuel storage at the Emergency Operations Center	All Hazards	Low	1,9	Med.-High	PDM	Emergency Management/ SCDOT	5 yrs.	Proposed		Local Match
Provide information to residents on how to prepare homes, family, and property for disasters.	All Hazards	High	3	Low	Local	Emergency Management	1 yrs.	Ongoing		Funding
Plan for and maintaining adequate road and debris clearing capabilities. Continue to establish mutual aid agreements., including with SCDOT.	Hurricanes, Extreme Winter	High	6	Low	Local	Public Works	1 yrs.	Proposed		Funding
Encourage farmers to implement soil and water conservation practices that foster soil health and improve soil quality to help increase resiliency and mitigate the impacts of droughts.	Drought	Med.	3	Low	NRCS	Soil and Water Conservation/ NRCS/ Extension	2 yrs.	Proposed		Local Match
Oversee strict adherence to newest building standards by monitoring new renovations and construction.	All Hazards	High	6,7	Low	Local	Building Inspector	1 yrs.	Ongoing		Compliance

Colleton County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Possible Impediment
Utilize social media and post information listing what one should have if a hazard strikes. Post same information in public spaces, including home improvement stores.	All Hazards	High	3,9	Low	Local	Emergency Management/ Retailers	1 yrs.	Proposed		Participation
Identify and protect wetlands that serve as flood storage areas	Flooding	Med.	7	High	Forestry Commission	County	5 yrs.	Proposed		Local Match
Inspect and manage vegetation that could damage critical facilities.	Hurricane	High	6,7	Low	Local/PDM	Public Works	1 yrs.	Ongoing		Local Match
Coordinate with Churches and other faith based intuitions to understand services they provide in the aftermath of an event. Evaluate needs.	All Hazards	Med.	3,4	Low	Local/PDM	Emergency Management	2 yrs.	Proposed		Local Match
Identify specific at-risk populations that may be exceptionally vulnerable in the event of long-term power outages	All Hazards	High	3,4	Low	Local	Social Services	3 yrs	Proposed		Local Match
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	High	3,9	Low	Local/PDM	Emergency Management	1 yrs.	Ongoing		None
Acquire software enabling social media calls to be integrated into the 911 Dispatch systems.	All Hazards	High	3,9	Low	Local/PDM	Emergency Services/ Sheriffs Office	1 yrs.	Proposed		Local Match
Update aerial imaging and mapping of county.	All Hazards	Low	6,7	High	Local	Assessors/ Building	5 yrs.	Proposed		Local Match
Identify ham radio operators	All Hazards	Med.	9	Low	Local	Emergency Management	1 yrs.	Ongoing		Participation

Colleton County Mitigation Action	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	High	3,4	Low	Local	County	2 yrs.	Proposed		Local Match
Identify and analyze renewable energy options: costs, benefits, environmental effects, technological potential, and political acceptability	All Hazards	Low	1,4,,8,9	Med.	Local/Private Sector	County	5 yrs.	Proposed		Local Match
Conduct an inventory and map current community facilities, including tele-communications; assess the condition of facilities for determining if repair or replacement is required. Identify current community facilities deficiencies and future needs.	All Hazards	High	1,4,8,9	Med.	PDM	County	5 yrs.	Proposed		Local Match
Improve existing critical facilities by replacing doors and windows at older facilities.	Hurricanes, Extreme Winter	High	1,2,8,9	Med.	PDM	County	5 yrs.	Ongoing		Local Match
Ensure critical facilities have adequate emergency power resources, including fuel storage.	All Hazards	High	1,2,4,8,9	Med.	PDM, Local	County	5 yrs.	Ongoing		Local Match
Increase tree plantings (Safely) around buildings to shade parking lots and along public rights-of-way.	Extreme Heat	Med.	4	Med.-High	Forestry Commission/ Private Sector	Public Works/ Parks	5 yrs.	Proposed		Local Match



Colleton County Mitigation Action	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Do an assessment and cost benefit-analysis for making improvement to the County Airport. Make Improvements where needed.	All Hazards	Low	1,2,4,8,9	Med.-High	PDM, Local	County	5 yrs.	Proposed		Local Match
Provide provisions for transportation to get those in need to emergency shelters.	Hurricanes, Extreme Winter	Med.	4	Med.	PDM	County, COA, Social Services, LRTA	5 yrs.	Proposed		Local Match
Identify and Elevate roads and bridges above the base flood elevation to maintain dry access. In situations where flood waters tend to wash roads out, construction, reconstruction, or repair can include not only attention to drainage, but also stabilization or armoring of vulnerable shoulders or embankments.	Hurricanes/ Flooding	Low	1,4,7	Very High	FHWA, Special Legislation	County,LCOG, FWY	25 yrs.	Proposed		Local Match
Create small area plans for stormwater drainage and housing in neighborhoods and watersheds with high vulnerabilities. Make Improvements	Hurricanes/ Flooding	Med.	4,7,8	Low	CDBG	County	5 yrs.	Proposed		Local Match
Provide hazard training in schools	Earthquake	High	3	Low	PDM, Local	Emergency Management	1 yrs.	Ongoing		None
Install Cameras on hurricane evacuation routes.	Hurricane, Earthquake, Winter Weather	High	8,9	Med.	PDM, SCDOT	County, SCDOT	5 yrs.	Ongoing		Local Match

Colleton County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediments
Retrofit selected fire stations so they can serve as a shelter for emergency workers during events. Pre-wired for generators, supplied with generators.	All Hazards	Med.	1	Med.-High	PDM	County	5 yrs.	Ongoing		Local Match
Continue review; Critical Facilities evaluated. Inspections, Reinforcements, and remodeling so structures physically capable to withstand hazards.	All Hazards	High	1	500k	local funds, CDBG, PDM	County official	3-5 years	Partial: Con.	Facilities undergo a continuous review for structural deficiencies.	Funding
Backup power adequate so can be up and running shortly after disaster. Generators essential. Need them in Critical Facilities	All Hazards	High	1	500k	local funds, PDM	County official	3-5 years	Partial: Continued	Emergency Generators at Emergency Preparedness & 911 Dispatch Center.	Funding
Backup power for Em. Shelters. Continue project encumber generator connections and generator purchases.	All Hazards	High	1	100k	local funds	County official	3-5 years	Partial: Continued	Based on above explanation	Funding
Replace old or leaky roofs on specific critical facilities to preserve the structures.	All Hazards	High	1	1 mil.	PDM, CDBG	County official	3-5 years	No Action: Deferred	No funding to support	Funding
Fire Station Upgrades. Retrofit certain fire stations to meet International Building codes Wind design requirements so it can serve as a shelter for emergency workers during events. Pre-wired for generators, supplied with generators.	All Hazards	High	1	2 mil.	PDM, CDBG, HMGP	County official	3-5 years	No Action	No funding to support	Funding
Evacuation Route Study. In-depth study to analyze current efficiency, adequacy, and safety of evacuation routes within Colleton.	Hurricane Flood	Mid	2	100k	local funds, PDM	County official	3-5 years	Ongoing	State Mandated	Funding, Personnel

Colleton County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Special Needs Evac. Study. Continue nursing home and hospital evacuation plans assessed to ensure safety and efficiency	Hurricane Flood	Mid	2	10k	local funds, PDM	County official	1 year (annually)	Ongoing	Evacuation plans reviewed annually. Limited funding needed to support	Limited support
Backup Power Evaluation. Ensure shelters have adequate emergency power resources.	Hurricane Flood	Mid	2	500k	local funds, PDM	County official	3-5 years	Ongoing	Based on above explanation--All shelters wired for generator connectivity. No funding to support generator purchases.	Funding
Evacuation measures for those in need. Provisions for transportation to get those in need to emergency shelters	Hurricane Flood	High	2	50k	local funds, PDM	County official	1-2 years	Ongoing	Ongoing review based on need	Reviewed every year. Personnel.
Shelter List Publication	Hurricane/ Flood		2					Complete		
Special Need Population Inventory. Identify vulnerable and special needs members of the population.	All Hazards	High	2	20k	local funds, PDM	County official	1 year (annually)	Ongoing	Continuous update of plans	Reviewed every year. Personnel.
Develop rescue and evacuation procedures for special populations	All Hazards	High	2	20k	local funds, PDM	County official	2 year (annually)	Ongoing	Continuous update of plans	Reviewed every year. Personnel.
Conduct detailed Floodplain management planning and mapping in accordance with the CRS.	Flood	High	7	High	Local funds, PDM	Planning	2 Years	Proposed		Local Match

Colleton County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Em. Service Workers shelter. Several County buildings identified as future hurricane shelters for emergency works. These need strengthening.	Hurricane Flood	High	2	750k	PDM, CDBG, HMGP	County official	3-5 years	No Action: Deferred	No funding to support	Funding
Shelter Development. Strengthen county and municipality buildings in order to designate as hurricane shelters	Hurricane Flood	High	2	1.5 mil	PDM, CDBG, HMGP	County official	3-5 years	No Action: Deferred	No funding to support	Funding
Warning systems education: educate residents of meaning warning systems and schedule testing.	Tornado Hurricane	Low	3	50k	PDM, HMGP	County official	1-3 years	No Action: Deferred	No funding to support	Funding
Public Ed. And Awareness: Teaching residents how to prepare homes, family, and property for disasters.	All Hazards	Low	3	15k	local funds, PDM	County official	1 year (annually)	Ongoing	Ongoing	Public Will
Public Ed. And Awareness. Packets circulated during season of hazard.	All Hazards	Low	3	20k	local funds, PDM	County official	Ongoing	Ongoing	Ongoing	Public Will
Web site to include instruction and information of what to do in hazard emergency, including evacuation routes and shelters.	All Hazards		3					Complete		



Colleton County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Tourist Ed. Continue coordination of work with the visitor's bureau to alert tourists to possible hazards in areas of vulnerability. Materials can be left in visitor centers, hotels, attractions, etc.	All Hazards	Mid	3	25k	local funds, PDM	County official	Ongoing	Ongoing	Ongoing	Public Will
Instigate earthquake training in schools	Earthquake	Mid	3	10k	local funds, PDM	County official	1-2 years	Some		Funding
Handout SC's Earthquake Preparedness of Schools brochure, and implement training.	Earthquake	Mid	3	30k	local funds, PDM	County official	1-2 years	Some		Funding/ personnel
Posted boards near grocery stores and hardware stores listing what one should have if a hazard struck	Earthquake, Tornado, Hurricane, Flood	High	3	30k	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Funding
Sell portable radios for everyone, so that they can tune in when a hazard is near, occurring, or the aftermath	Earthquake, Tornado, Hurricane, Flood	High	3	30k	local funds, PDM	County official	1-2 years	2009 Plan	Not Complete	Political Will, Public Will, Funding
Publicize events at local hardware stores that show how to save your property during a hazard	Hail, Earthquake, Hurricane, Wind	High	3	50k	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Political Will, Public Will, Funding

Colleton County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Provide free water and set up water stations when the temperature will be about 102	Extreme Heat	High	3	50k	local funds, PDM	County official	1-2 years	2009 Plan	Not Complete	Political Will, Funding
Train those in rural areas for how to protect their homes, and what to do during an event	All Hazards	High	3	250k	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Funding, Public Will
Provide training to personnel who will in the future deal with hazard mitigation and the grant writing thereof	All Hazards	High	3	150k	local funds, PDM	County official	3-5 years	2009 Plan	Ongoing	Funding
Train people with equipment and supplies for a winter storm	Winter Storm	High	3	50k	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Funding (need supplies first)
Offer a list of city foresters, county extension offices, local nurseries and landscape firms that can provide advise on tree selection for your area and soil conditions.	Lightning, Wild Fire	High	3	2k	local funds	County official	1-2 years	2009 Plan	Not Complete	Public will to use the services
Continue to oversee strict adherence to new building standards by closely monitoring all new renovations and construction.	All Hazards	Low	4	50k	local funds, PDM, CDBG	County official	Ongoing	Ongoing	State Mandated	Funding, Public Will, Political Will

Colleton County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Create Incentive, publicize, or provide, fans or other types of cooling elements for popular outdoor areas during times of high heat	Extreme Heat	Low	4	100k	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Funding, Public Will, Political Will
Pave highways to allow 4 lanes of traffic to evacuate during hazard	Hurricane	Low	4	7 mil.	local funds, PDM, HMGP	County official	5 or more years	2009 Plan	Not Complete	Funding
Purchase support vehicles to reach rural locations during hazard	Hurricane	Low	4	1 mil.	PDM	County official	1-3 years	Support vehicles were purchased, but not for rural areas.		Funding
Provide materials for stranded motorists during a hazard	All Hazards	Mid	4	2 mil.	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Funding
Assess trees in public areas to see if they are dead, dying, or could cause potential problems if struck by lightning or are fire conducive.	Lightning, Wild Fire	Mid	4	30k	local funds, PDM	County official	3-5 years	Tree cleared after ice storm. Some tree were cleared at the Pruitt Health and Behavioral Health	Ongoing	Political and public will, funding
Remove potential tree problems	Lightning, Wild Fire	Mid	4	250k	local funds, PDM, HMGP	County official	3-5 years	Tree cleared after ice storm. Some tree were cleared at the Pruitt Health and Behavioral Health	Ongoing	Political and public will, funding

Colleton County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Pave highways to allow 4 lanes of traffic to evacuate during hazard	Hurricane	Low	4	7 mil.	local funds, PDM, HMGP	County official	5 or more years	2009 Plan	Ongoing	Funding
Purchase support vehicles to reach rural locations during hazard	Hurricane	Low	4	1 mil.	PDM	County official	1-3 years	Support vehicles were purchased, but not for rural areas.	Some Action	Funding
Provide materials for stranded motorists during a hazard	All Hazards	Mid	4	2 mil.	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Funding
Assess trees in public areas to see if they are dead, dying, or could cause potential problems if struck by lightning or are fire conducive.	Lightning, Wild Fire	Mid	4	30k	local funds, PDM	County official	3-5 years	Trees cleared after ice storm.	Ongoing	Political and public will, funding
Remove potential tree problems	Lightning, Wild Fire	Mid	4	250k	local funds, PDM, HMGP	County official	3-5 years	Trees were cleared at the Pruitt Health and Behavioral Health	Ongoing	Political and public will, funding
Purchase equipment and supplies in case of a winter storm.	Winter Storm	Mid	4	500k	PDM, HMGP	County official	3-5 years	2009 Plan	Not Complete	Funding



Colleton County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Set up community compost pile that people can purchase soil from to help enrich soil properties and protect against drought.	Drought	Mid	4	75k	local funds, PDM	County official	5 or more years	2009 Plan	Not Complete	Public and Political Will
Incentivize against bagging leaves and grass, this also enriches the soil.	Drought	High	4	50k	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Public and Political Will
Provide a place for blankets, and coverings, that people can pick up and use for property protection during hail.	Hail	High	4	50k	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Funding, Political and Public Will.
Provide shelter spaces during hail and other storms.	Hail, Winter Storm, Lightning	High	4	500k	local funds, PDM, CDBG	County official	3-5 years	2009 Plan	Not Complete	Funding
Obtain portable repeaters	All Hazards	High	4	25k	local funds, PDM	Town of Edisto Beach	1-2 years	2009 Plan	Complete	Funding
Conduct Inventory/survey for county's emergency response services to identify existing needs or shortfalls in personnel, equipment, or required resources.	All Hazards	High	5	10k	local funds, PDM	County official	Ongoing	Ongoing	Continuous review	Public Will

Colleton County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Em. Resp. Training. Employees and emergency workers trained for specific natural hazard events.	All Hazards	High	5	20k	local funds, PDM	County official	Ongoing	Ongoing	Meeting, & drills scheduled with response agencies to keep them aware of the different hazards.	Will of workers to attend
Purchase equipment that would help emergency response and preparedness.	All Hazards	High	5	500k	local funds, PDM, HMGP	County official	3-5 years	Ongoing	Based on funding	Funding
Building Code Wind Standards. Adhere to newest building standards	All Hazards	Low	6	500k	local funds, PDM, CDBG	County official	Ongoing	Ongoing	State Mandated	Funding, Public Will, Political Will
Vegetation Management. Inspect and manage vegetation that could damage critical facilities.	Wind, Wildfire	Mid	6	50k	local funds, PDM, CDBG	County official	Ongoing	Ongoing	The beach renourished, and it is an ongoing project	Funding, infrastructure
Residential Roof Survey. Roof study for grant money for new roofs on homes to ensure that homes can sustain high wind speeds.	Wind, Hurricane	High	6	50k	local funds, PDM, CDBG	County official	1-3 years	Ongoing	Ongoing project	Funding, infrastructure
Update floodplain maps by 2010	Flood	Mid	7	10k	local funds, PDM, FMA	County official	1-2 years	Partial	In process to be completed 2010	In the process, if something impedes the process.

Colleton County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Zoning and building codes and policies constantly updated and enforced to ensure no new structures built within floodplains.	Flood	Mid	7	50k	local funds, PDM, FMA	County official	Ongoing	Ongoing	Tighter regulations adopted; ongoing	Political, Public Will
Wetland Protection: Stringent rules against removal of wetlands.	Flood	Mid	7	15k	local funds, PDM, FMA	County official	Ongoing	Ongoing	Regulations enacted	
Enforce rules against removal of wetlands.	Flood	Mid	7	50k	local funds, PDM, FMA	County official	Ongoing	2009 Plan	Not Complete	Political, Public Will, Funding
Wetland Protection. Preservation through education of public about buffer zones and regulating these through development ordinances.	Flood	High	7	35k	local funds, PDM, FMA	County official	Ongoing	Ongoing	Ongoing review based on need	Public Will
Structure Sealing. Provide waterproof doors and seals for wall openings an/or seal components for critical facilities within flood zones.	Flood	High	7	100k	local funds, PDM, FMA, SRL	County official	1-2 years	No Action: Deferred	No funding to support	Funding
Install back-flow prevention valves in sewers and drains at critical facilities	Flood	High	7	100k	local funds, PDM, FMA, SRL	County official	1-2 years	No Action: Deferred	No funding to support	Funding
Water Seals Improve seals on all wall penetrations below flood water levels at critical facilities	Flood	High	7	75k	local funds, PDM, FMA, SRL	County official	3-5 years	No Action: Deferred	No funding to support	Funding

Colleton County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Storm water drainage study and plan to identify drainage ditches and promote cleanup.	Flood	High	7	50k	local funds, PDM, FMA	County official	1-2 years	No Action: Deferred	No funding to support	Funding
Acquire and preserve parcels of land subject to repetitive flooding or areas known to have been affected by flooding at a great extent.	Flood	High	7	300k	local funds, PDM, FMA	County official	3-5 years	No Action: Deferred	No funding to support	Funding, Public Will, Political Will
Consider areas subject to repetitive flooding for acquisition for parks and other permanent open space.	Flood	High	7	100k	local funds, PDM, FMA	County official	3-5 years	No Action: Deferred	No funding to support	Funding, Public Will, Political Will
Provide county and constituent municipalities with laptops for backing up important data prior to disaster striking in order to set up temporary offices elsewhere.	All Hazards	Mid	8	100k	local funds, PDM	County official	3-5 years	No Action: Deferred	No funding to support	Funding
Scanning of important data and information.	All Hazards	High	8	30k	local funds, PDM	County official	1-2 years	No Action: Deferred	No funding to support	Funding
Construction of a safe storage area to house important information and documents.	All Hazards	High	8	150k	local funds, PDM	County official	3-5 years	No Action: Deferred	No funding to support	Funding



Colleton County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Possible Future Impediment
Inspection of communication lines to ensure reliability.	All Hazards	Mid	9	40k	local funds, PDM	County official, Provider	3-5 years	No Action: Deferred	No funding to support	Funding
Improvement of old or worn communication lines.	All Hazards	Mid	9	200k	local funds, PDM	County official, Provider	3-5 years	No Action: Deferred	No funding to support	Funding
Provide updated weather radios to schools for early warning.	All Hazards	High	9	Low				Completed	All schools in Colleton County provided with NOAA Weather Radios -NWS	
Inspection of Lines: Ensure lines clear of limbs or other obstructions that may damage them during windstorms or other natural hazards.	All Hazards	High	9	200k	local funds, PDM	County official, Provider	Ongoing	Ongoing		Funding
Creation of mobile dispatch unit to ensure communications not eliminated due to natural hazard.	All Hazards	High	9	350k	local funds, PDM	County official	3-5 years	No Action: Deferred	No funding to support	Funding
In need of Portable Repeaters to upgrade Colleton County's emergency communication systems in case of power outage. Current system inadequate.	All Hazards	High	9	250k	local funds, PDM	County official	1-2 years	No Action: Deferred	No funding to support	Funding

Colleton County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Establish satellite telephone system for use in case of emergencies	All Hazards	High	9	150k	local funds, PDM	County official	1-2 years	Ongoing	1 satellite telephone installed at Emergency Preparedness	Funding
Creation of camera system to oversee traffic and threats to traffic from hazards.	All Hazards	High	9	350k	local funds, PDM, HMGP	County official	3-5 years	No Action: Deferred	No funding to support	Funding
Inspection of utility lines.	All Hazards	Mid	10	40k	local funds, PDM	County official, Provider	1-2 years	No Action: Deferred	No funding to support	Funding
Improvement of utilities.	All Hazards	Mid	10	100k	local funds, PDM	County official, Provider	3-5 years	No Action: Deferred	No funding to support	Funding
Replacement of utilities.	All Hazards	Mid	10	250k	local funds, PDM	County official, Provider	5 or more years	Deferred	Ongoing project. No Generators yet.	Funding
Strengthen utility poles/conductor fixtures within Colleton County.	All Hazards	High	10	250k	local funds, PDM	County official, Provider	5 or more years	No Action: Deferred	No funding to support	Funding

Cottageville County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Survey tree cover to ensure decreased vulnerability. Make improvements.	Wind	Med	1,6	Med	PDM	EM	Ongoing			Funding
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	Med	9	Low	PDM	EM	Ongoing			Funding
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	Med	6,7,8	Low	PDMD	EM	Ongoing			Funding

Town of Edisto Island Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Make needed improvements to the causeway and bridge as it is the primary evacuation route.	All Hazards	High	2	Very High	local funds, PDM	SCDOT/ FHWA	1-2 years	Proposed		Funding
Creation of camera system to oversee traffic and threats to traffic from hazards.	All Hazards	High	2	Med	local funds, PDM, HMGP	SCDOT	3-5 years	No Action: Deferred	Complete/ Add Additional	Funding
Make Improvements to fire station, including weather proofing doors.	All Hazards	Mid	1,5,6,9	40k	local funds, PDM	Fire	1-2 years	No Action: Deferred	Complete	Funding
Water proof selected lift stations.	All Hazards	High	10	Med	local funds, PDM	Fire	3-5 years	No Action: Deferred		Funding
Ensure generator capacity at lift and pump stations.	All Hazards	Mid	10	250k	local funds, PDM	Public Works	5 or more years	Proposed	Ongoing project. No Generators yet.	Funding
Develop off-site emergency facilities, including storage and mobile command center.	All Hazards	High	1,5,6,9	250k	local funds, PDM	Town	5 or more years	No Action: Deferred		Funding
Ensure generator capacity at the Civic Center to enable the facility to be designated a heating and cooling center for senior population.	Extreme Heat and Winter	High	1	Med.	Local, PDM	Public Works		Proposed		Funding'
Install windows with impact glazing at the the municipal complex.	Hurricane, Wind	High	1,5,6,9,10	Med.	Local, PDM	Public Works		Proposed		Funding
Purchase and Maintain the needed equipment to clear debris.	Wind, Hurricane, Flood	High	1,5,6,9,10	Med	Local, PDM	Public Works/ Fire	Ongoing	New		Funding



Town of Edisto Island Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Build new fire station.	Coastal Erosion	Med.	1,5,6,7,9	High	PDM, Local	Fire	5 years			Funding
Construct primary dunes and lengthen groin system per Arm Corps of Engineers Alternatives.	Coastal Erosion	Med.	1, 7,10	Very High	Local, State, Federal	Army Corps of Engineers	5 years	Environ. Complete		Funding
Ensure strict building regulation for elevated buildings and retreat.	Coastal Erosion and Sea Level Rise	High	6,7	Low	Local	Town Building Dept.	Ongoing	New Zoning	New Zoning	Enforcement
Create small area plans for stormwater drainage and housing in neighborhoods and watersheds with high vulnerabilities. Make Improvements	Flood, Wind	Med	6,7	Med	Local, PDM	Public Works	Ongoing			Local Match
Install lightning protection devices and methods, such as lightning rods and grounding, on communications infrastructure and other critical facilities.	Lightning	Med	1,2,3,4	Med	Local, PDM	Public Works	5 years			Funding

Town of Edisto Island Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Include measures such as structural bracing, shutters, laminated glass in window panes, and hail-resistant roof coverings or flashing in building design to minimize damage.	Hail	Med.	1,2,4	Low	Local, PDM	Public Works, Building depts.	5 yrs			Funding
Perform maintenance including fuel management techniques such as pruning and clearing dead vegetation, selective logging, cutting high grass, planting fire-resistant vegetation, and creating fuel/fire breaks.	Wildfire	Med.	1,2,3,4	Low	Local, PDM	Public Works	5 yrs			Funding
Develop new or upgrading existing water delivery systems to eliminate breaks and leaks.	Drought	Med.	1,2,3,4	High	Local, PDM	Public Works	5 yrs			Funding
Developing an inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage, including pre-1940s homes and homes with cripple wall foundations	Earthquake	Med.	1,2,3,4	Low	Local, PDM	Building Dept.	5 yrs			Funding

Town of Lodge Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Survey tree cover to ensure decreased vulnerability. Make improvements.	Wind	Med	1,6	Med	PDM	EM	Ongoing			Funding
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	Med	9	Low	PDM	EM	Ongoing			Funding
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	Med	6,7,8	Low	PDMD	EM	Ongoing			Funding

Town of Smoaks Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Survey tree cover to ensure decreased vulnerability. Make improvements.	Wind	Med	1,6	Med	PDM	EM	Ongoing			Funding
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	Med	9	Low	PDM	EM	Ongoing			Funding
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	Med	6,7,8	Low	PDMD	EM	Ongoing			Funding



City of Walterboro Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Survey tree cover to ensure decreased vulnerability. Make improvements.	Wind	Med	1,6	Med	PDM	EM	Ongoing			Funding
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	Med	9	Low	PDM	EM	Ongoing			Funding
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	Med	6,7,8	Low	PDM	EM	Ongoing			Funding
Create small area plans for stormwater drainage and housing in neighborhoods and watersheds with high vulnerabilities. Make Improvements	All Hazards	Med	1,2,3,4,5,6,7,8, 10	Med.	PDM	EM	5 Years			Funding
Clear the sediment in the Ireland Creek.	Flood		7	High	NRCS, PDM, Local	ACE	5 Years	Proposed		Funding
Ensure that the Fire Dept. has the needed apparatus.	All Hazards	Med	1,9,10	High						Funding

## Hampton County Actions

Hampton County Mitigation Actions	Associated Hazards	"Priority/ Score"	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Add generators to radio stations to ensure emergency public information.	All Hazards	High	9	Med.	PDM	Emergency Management/ Private	2 yrs.	Proposed		Local Match
Add traffic cameras at Savannah Hwy and Elm St.	Hurricane	High	8,9	Med.	PDM	Emergency Management/ SCDOT	2 yrs.	Proposed		Local Match
Increase reserve fuel storage at the Emergency Operations Center	All Hazards	Low	1,9	Med.-High	PDM	Emergency Management/ SCDOT	5 yrs.	Proposed		Local Match
Provide information to residents on how to prepare homes, family, and property for disasters.	All Hazards	High	3	Low	Local	Emergency Management	1 yrs.	Ongoing		Funding
Plan for and maintaining adequate road and debris clearing capabilities.	Hurricanes, Extreme Winter	High	6	Low	Local	Public Works	1 yrs.	Proposed		Funding
Encourage farmers to implement soil and water conservation practices that foster soil health and improve soil quality to help increase resiliency and mitigate the impacts of droughts.	Drought	Med.	3	Low	NRCS	Soil and Water Conservation/ NRC/Extension	2 yrs.	Proposed		Local Match
A new generator for the City's Wastewater Treatment Plant – the current generator that we have is at the end of its useful life.	All Hazards	High	1, 10	\$81,000	PDM	Public Works	5 years	Proposed		Funding

Hampton County Mitigation Actions	Associated Hazards	Priority/ Score"	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Oversee strict adherence to newest building standards by monitoring new renovations and construction.	All Hazards	High	6,7	Low	Local	Building Inspector	1 yrs.	Ongoing		Compliance
Identify ham radio operators	All Hazards	Med.	9	Low	Local	Emergency Management	1 yrs.	Ongoing		Participation
Utilize social media and post information listing what one should have if a hazard strikes. Post same information in public spaces, including home improvement stores.	All Hazards	High	3,9	Low	Local	Emergency Management/ Retailers	1 yrs.	Proposed		Participation
Identify and protect wetlands that serve as flood storage areas	Flooding	Med.	7	High	Forestry Commission	County	5 yrs.	Proposed		Local Match
Inspect and manage vegetation that could damage critical facilities.	Hurricane	High	6,7	Low	Local/PDM	Public Works	1 yrs.	Ongoing		Local Match
Coordinate with Churches and other faith based intuitions to understand services they provide in the aftermath of an event. Evaluate needs.	All Hazards	Med.	3,4	Low	Local/PDM	Emergency Management	2 yrs.	Proposed		Local Match

Hampton County Mitigation Actions	Associated Hazards	Priority/ Score"	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Identify specific at-risk populations that may be exceptionally vulnerable in the event of long-term power outages	All Hazards	High	3,4	Low	Local	Social Services	3 yrs	Proposed		Local Match
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	High	3,9	Low	Local/PDM	Emergency Management	1 yrs.	Ongoing		None
Acquire software enabling social media calls to be integrated into the 911 Dispatch systems.	All Hazards	High	3,9	Low	Local/PDM	Emergency Services/ Sheriffs Office	1 yrs.	Proposed		Local Match
Update aerial imaging and mapping of county.	All Hazards	Low	6,7	High	Local	Assesors/ Building	5 yrs.	Proposed		Local Match
Install generator at Hampton County Senior Center - cooling center – Yemassee.	Extreme Heat/Cold	Med.	2	Med.	PDM	COA	2 yrs.	Proposed		Local Match
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	High	3,4	Low	Local	County	2 yrs.	Proposed		Local Match



Hampton County Mitigation Actions	Associated Hazards	Priority/ Score"	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Identify and analyze renewable energy options: costs, benefits, environmental effects, technological potential, and political acceptability	All Hazards	Low	1,4,,8,9	Med.	Local/Private Sector	County	5 yrs.	Proposed		Local Match
Conduct an inventory and map current community facilities, including tele-communications; assess the condition of facilities for determining if repair or replacement is required. Identify current community facilities deficiencies and future needs.	All Hazards	High	1,4,8,9	Med.	PDM	County	5 yrs.	Proposed		Local Match
Improve existing critical facilities by replacing doors and windows at older facilities.	Hurricanes, Extreme Winter	High	1,2,8,9	Med.	PDM	County	5 yrs.	Ongoing		Local Match
Ensure critical facilities have adequate emergency power resources, including fuel storage.	All Hazards	High	1,2,4,8,9	Med.	PDM, Local	County	5 yrs.	Ongoing		Local Match
Increase tree plantings (Safely) around buildings to shade parking lots and along public rights-of-way.	Extreme Heat	Med.	4	Med.-High	Forestry Commission/ Private Sector	Municipalities	5 yrs.	Proposed		Local Match
Do an assessment and cost benefit-analysis for making improvement to the County Airport. Make Improvements where needed.	All Hazards	Low	1,2,4,8,9	Med.-High	PDM, Local	County	5 yrs.	Proposed		Local Match

Hampton County Mitigation Actions	Associated Hazards	Priority/ Score"	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Provide provisions for transportation to get those in need to emergency shelters.	Hurricanes, Extreme Winter	Med.	4	Med.	PDM	County, COA, Social Services, LRTA	5 yrs.	Proposed		Local Match
Identify and Elevate roads and bridges above the base flood elevation to maintain dry access. In situations where flood waters tend to wash roads out, construction, reconstruction, or repair can include not only attention to drainage, but also stabilization or armoring of vulnerable shoulders or embankments.	Hurricanes/ Flooding	Low	1,4,7	Very High	FHWA, Special Legislation	County, LCOG, FHwy	25 yrs.	Proposed		Local Match
Create small area plans for stormwater drainage and housing in neighborhoods and watersheds with high vulnerabilities. Make Improvements	Hurricanes/ Flooding	Med.	4,7,8	Low	CDBG	County	5 yrs.	Proposed		Local Match
Provide hazard training in schools	Earthquake	High	3	Low	PDM, Local	Emergency Management	1 yrs.	Ongoing		None
Facility Evaluated: Critical Facilities evaluated. Inspections, Reinforcements, and remodeling so structures physically capable to withstand hazards.	All Hazards	Low	1	250k	local funds	County official	3-5 years	Ongoing	Hampton County Courthouse was re-constructed in 2008	Lack of will since this was done not too long ago, but should continue in the future.
Backup power adequate so can be up and running shortly after disaster. Generators essential.			1					Complete	The EOC is operational with Generator Power	

Hampton County Mitigation Actions	Associated Hazards	Priority/ Score"	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Electronic Manual Transfer Switches for Em Shelters: Hampton County shelters are in need of three electric manual transfer switches per shelter, 27 total. The cost is \$4,200 each, fully installed.			1					Complete	All Shelters have manual transfer switches installed	
Reinforcements, and remodeling on structures so can physically capable to withstand hazards	All Hazards	Low	1	3 Mil.	PDM, RFC, CDBG	County official	3-5 years	Old	DeLoach Building Re-molded	Dependant on Inspections, and then on funding.
Power Generators for Critical Facilities: Hampton County needs twelve 40-60kw generators. The cost is \$800 each. These will provide limited power to fire departments and EMS bases.	All Hazards	Mid	1	50k	PDM, FMA	County official	5 or more years	Partial: Deferred	Only one Fire Department has Generator Power and the EMS is housed at this facility. Estill, SC	Funding
Roof Repair: Replacement of older or leaky roofs on specific critical facilities to preserve structures.	All Hazards	Mid	1	150k	PDM, RFC	County official	3-5 years	No Action: Deferred	The secondary EOC located at the B.T. DeLoach Building has not been replaced.	Funding
SPEC building hardened	All Hazards	High	1	6 mil.	PDM, FMA, RFC	County official	5 or more years	2009 Plan	Not Complete	Funding
Evacuation route Study			2					Complete	Evacuations route studies were completed in 2008-2009	

Hampton County Mitigation Actions	Associated Hazards	Priority/ Score"	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Special Needs Evacuation Study	All Hazards	Mid	2	10k	PDM, local funds	County official	1-2 years	partial: Deferred	Special Needs in Hampton County only has room for 10 persons	Priorities
Backup Power Evaluation	All Hazards	High	2	10k	PDM, local funds	County official	1-2 years	partial: Deferred	the only back up powers would be generators for Hampton County	Priorities
Evacuation measures for those in need	All Hazards	High	2	45k	PDM local Funds	County official	3-5years	partial: Deferred	one case at a time due to limited personal in the community t	Limited Personnel
Shelter List Publication	Hurricane/ Flood		2					Complete	Shelters are well publicized in HC	
Special Need Population Inventory	All Hazards	High	2	20k	PDM local Funds	County official	1-2 years	On going		Limited Personnel
Hurricane Shutters for Emergency Shelters	Wind, Tornado	High	2	50k	PDM local Funds	County official		No Action: Deferred	Still needed at Wade Hampton High	Funding



Hampton County Mitigation Actions	Associated Hazards	Priority/ Score"	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Shelter Development	All Hazards	High	2	2mil	PDM, HMGP, FMA, RFC	County official	5 or more years	No Action: Deferred	After a recent studies HC lost shelter space	Funding and Space
Rescue and Evacuation for Special Populations	All Hazards	Mid	2	35k	PDM, local funds	County official	1-5 years	Ongoing	Due to limited personal this would be a slow process	Funding g and Personnel
Survey schools and other buildings as possible shelter locations	Hurricane	High	2	50k	PDM, local Funds	County official	1-2 years	2009 Plan		Funding
Bring designated buildings up to code for shelter space to withstand wind, such as replacing roofs and putting graphite walls	Hurricane, Wind, Tornado	High	2	9 mil.	PDM, HMGP	County official	3-5 years	2009 Plan	Deloach Building Remolded	Funding
Install/Keep up to date with Warning Systems	Hurricane, Tornado	Low	3	5mil	PDM	County official	3-5years	2009 Plan	Ongoing	Funding, political will
Web site to include instruction and information of what to do in hazard emergency, including evacuation routes and shelters.			3					Complete	Yes www. hamptoncountysc.org	

Hampton County Mitigation Actions	Associated Hazards	Priority/ Score"	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Warning System Education: Educate residents of warning systems meaning and schedule testing	Hurricane, Tornado	Low	3	20k	PDM, local funds	County official	3-5years	Ongoing: Deferred	Hampton county needs a warning system for both sides of the county	Depends on Warning System being created
Workshops and Classes: Teach residents how to prepare homes, family, and property for disasters	All Hazards	Mid	3	10k	PDM, local funds	County official	1-2years	Ongoing	Education to the community is taught at several events at least 8 times during the year through education, media and press	Lack of Personnel
Public Ed. And Awareness- Informational Packets: Packets circulated during season of hazard.	All Hazards	Mid	3	20k	PDM, local funds	County official	1-2 years	Ongoing	media communications	Lack of media communications, personnel
Tourist Education: Coordination with Visitor's bureau to alert tourists to potential hazards	All Hazards	Mid	3	20k	local funds	County official	1-2years	No Action: Deferred	lack of time/ infrastructure	Lack of time/ infrastructure
Instigate earthquake training in schools	Earthquake	Mid	3	10k	local funds	County official	1-2 years	2009 Plan	Ongoing	Funding
Handout SC's Earthquake Preparedness of Schools brochure, and implement training.	Earthquake	Mid	3	30k	local funds	County official	1-2 years	2009 Plan		Funding/personnel

Hampton County Mitigation Actions	Associated Hazards	Priority/ Score"	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Posted boards near grocery stores and hardware stores listing what one should have if a hazard struck	Earthquake, Tornado, Hurricane, Flood	Mid	3	30k	PDM, local funds	County official	3-5 years	2009 Plan	Not Complete	Funding
Sell portable radios for everyone, so that they can tune in when a hazard is near, occurring, or the aftermath	Earthquake, Tornado, Hurricane, Flood	High	3	30k	PDM, local funds	County official	1-2 years	2009 Plan	Distributed radios to schools and other public institutions.	Political Will, Public Will, Funding
Publicize events at local hardware stores that show how to save your property during a hazard	Hail, Earthquake, Hurricane, Wind	High	3	50k	PDM, local funds	County official	3-5 years	2009 Plan	Not Complete	Political Will, Public Will, Funding
Provide free water and set up water stations when the temperature will be about 102	Extreme Heat	High	3	50k	PDM, local funds	County official	1-2 years	2009 Plan	Not Complete	Political Will, Funding
Train those in rural areas for how to protect their homes, and what to do during an event	All Hazards	High	3	250k	PDM, local funds	County official	3-5 years	2009 Plan	Not Complete	Funding, Public Will
Provide training to personnel who will in the future deal with hazard mitigation and the grant writing thereof	All Hazards	High	3	150k	PDM, local funds	County official	3-5 years	2009 Plan	County Hired a Grant Writer	Funding

Hampton County Mitigation Actions	Associated Hazards	Priority/ Score"	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Train people with equipment and supplies for a winter storm	Winter Storm	High	3	50k	PDM, local funds	County official	3-5 years	2009 Plan	Not Complete	Funding (need supplies first)
Offer a list of city foresters, county extension offices, local nurseries and landscape firms that can provide advise on tree selection for your area and soil conditions.	Lightning, Wild Fire	High	3	2k	PDM, local funds	County official	1-2 years	2009 Plan	Not Complete	Public will to use the services
Building Code: Oversee strict adherence to newest building standards by monitoring new renovations and construction.	All Hazards	Low	4	50k	PDM, CDBG, local funds	County official	3-5years	Ongoing: Deferred	Building official uses latest codes	Funding/Lack of Personnel
Incentive, publicize, or provide fans or other types of cooling elements for popular outdoor areas during times of high heat	Extreme Heat	Low	4	100k	PDM, local funds	County official	3-5 years	2009 Plan	Not Complete	Funding, Public Will, Political Will
Pave highways to allow 4 lanes of traffic to evacuate during hazard	Hurricane	Low	4	7 mil.	PDM, HMGP	County official	5 or more years	2009 Plan	Not Complete	Funding
Purchase support vehicles to reach rural locations during hazard	Hurricane	Low	4	1 mil.	PDM	County official	1-3 years	2009 Plan	Not Complete	Funding

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Provide materials for stranded motorists during a hazard	All Hazards	Low	4	2 mil.	PDM, local funds	County official	3-5 years	2009 Plan	Not Complete	Funding
Assess trees in public areas to see if they are dead, dying, or could cause potential problems if struck by lightning or are fire conducive.	Lightning, Wild Fire	Mid	4	30k	PDM	County official	3-5 years	2009 Plan	Not Complete	Political and public will, funding
Remove potential tree problems	Lightning, Wild Fire	Mid	4	250k	PDM	County official	3-5 years	2009 Plan	Trees were removed after Ice Storm of 2013	Political and public will, funding
Purchase equipment and supplies in case of a winter storm.	Winter Storm	Mid	4	500k	PDM, HMGP	County official	3-5 years	2009 Plan	Not Complete	Funding
Set up community compost pile that people can purchase soil from to help enrich soil properties and protect against drought.	Drought	Mid	4	75k	PDM, local funds	County official	5 or more years	2009 Plan	Not Complete	Public and Political Will
Incentivize against bagging leaves and grass, this also enriches the soil.	Drought	Mid	4	50k	PDM, local funds	County official	3-5 years	2009 Plan	Not Complete	Public and Political Will



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Provide a place for blankets, and coverings, that people can pick up and use for property protection during hail.	Hail	Mid	4	50k	PDM, local funds	County official	3-5 years	2009 Plan	Not Complete	Funding, Political and Public Will.
Provide shelter spaces during hail and other storms.	Hail, Winter Storm, Lightning	High	4	500k	PDM	County official	3-5 years	2009 Plan	Not Complete	Funding
Em Resp. Prep Equipment: Purchase specific piece of equipment that would help emergency response and preparedness.	All Hazards	Mid	5	200k	PDM	County official	1-2 years	ongoing	Not Complete	Funding
Em. Resp. Prep. Eval. :Conduct Inventory/ survey for county's emergency response services to identify existing needs or shortfalls in personnel, equipment, or required resources.			5					Complete	Emergency Manager does ongoing drill and trainings at Nursing Homes, Schools, and Hospital.	
Em. Resp. Training: Employees and emergency workers trained for specific natural hazard events.			5					Complete	Ongoing	
Vegetation Management: Inspect and manage vegetation that could damage critical facilities if felled by wind	Wind	Mid	6	100k	PDM	County official	1-5 years	Ongoing	funding/ personnel	Funding, Personnel, Expertise

Hampton County Mitigation Actions	Associated Hazards	Priority/ Score"	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Res. Roof Conditions Survey: Roof study for new roofs on homes to ensure can sustain high wind speeds	Wind/ Hurricane	Mid	6	50k	PDM CDBG	County official	1-2 years	No Action: Deferred	This would be a project if funded that we could do.	Funding
Building Code Wind Standards: Adhere to new building standards (ISO 9000 Building Standards as of 2004)	Wind/ Hurricane	Mid	6	150K	PDM, CDBG, local funds	County official	1-5 years	Ongoing	funding/ personnel	funding/ personnel
Flood map update	Flood	Low	7	50k	FMA, PDM	County official	By 2010	Ongoing	completed by Sept. 2010	Should be completed, loss of funding, or personnel might halt.
Enforcement of rules against removal of wetlands	Flood	Mid	7	50k	PDM, FMA	County official	ongoing	2009 Plan	Not Complete	Lack of personnel
Wet land Protection: Preservation through education of public about buffer zones and regulating these through development ordinances.	Flood	Mid	7	50k	PDM, local funds	County official	1-2 years	Yes (ongoing)	Comprehensive Plan update	Funding/ personnel
Structure Sealing: Provide waterproof doors and seals for wall openings and/or seal components for critical facilities w/in flood zones.	Flood/ Hurricane	Mid	7	100k	PDM, FMA, SRL, HMGP, CDBG	County official	3-5 years	No Action: Deferred	no, funding	Funding

Hampton County Mitigation Actions	Associated Hazards	Priority/ Score"	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Water Seals: Improve seals on all wall penetrations below flood water levels at critical facilities	Flood	Mid	7	100k	PDM, FMA, SRL, HMGP, CDBG	County official	3-5years	No Action: Deferred	no funding	Funding
Storm water drainage study and plan to identify drainage ditches and promote cleanup	Flood	High	7	50k	PDM, local funds	County official	1-2years	No Action: Deferred	no funding	Funding
Land Acq: Acquire and preserve parcels of land subject to repetitive flood	Flood	High	7	2 mil.	PDM, FMA, local funds	County official	1-2 years	No Action: Deferred	Impeded by lack of funding	Funding, political will, public will
Land Acq: Purchase areas subject to repetitive flooding for acquisition for parks and other permanent open space	Flood	High	7	2mil.	PDM, FMA, local funds	County official	5 or more years	No Action: Deferred	Impeded by lack of funding	Funding, political will, public will
Flood Zone Building Policies: Zoning and building codes should ensure no new structures built within floodplains.			7					Complete	Yes Building & Zoning Code do prevent new structures from being build in the flood plain	
Wetland Protection: Stringent rules against removal of wetlands.			7					Complete	County complies with the stringent rules on wetlands that are established and monitored by the Corp of Engineers	

Hampton County Mitigation Actions	Associated Hazards	Priority/ Score"	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Creation of mobile dispatch unit to ensure communications not eliminated due to natural hazard.	All Hazards	Low	9	1 mil.	PDM	County official	3-5 years	Ongoing	This is an ongoing project never completed	Funding
Camera system to oversee traffic and threats to traffic from hazards	All Hazards	Mid	9	1 mil.	PDM, HMGP	County official	3-5 years	Ongoing	A traffic camera is needed at 278 and 68and another at 601 and 278	Funding
Inspection of communication lines to ensure reliability.	All Hazards	High	9	200k	local funds, PDM	County official, Provider	Ongoing	Completed so far (ongoing)	ongoing	Funding
Improvement of old or worn communication lines.			9					Complete	Hampton County has fiber optic capabilities	
School Weather Radios: Provide updated weather radios to schools for early warning.			9					Complete	All Schools have NOAA Radio's	
Inspection of utility lines.	All Hazards	Mid	10	40k	local funds, PDM	County official, Provider	1-2 years	Completed so far (ongoing)	yes SCE&G and Palmetto Coop	Funding
Improvement of utilities.	All Hazards	Mid	10	100k	local funds, PDM	County official, Provider	3-5 years	Completed so far (ongoing)	Yes	Funding
Replacement of utilities.	All Hazards	Mid	10	250k	local funds, PDM	County official, Provider	5 or more years	No Action: Deferred	None	Funding
Strengthen utility poles/ conductor fixtures within Colleton County.	All Hazards	High	10	250k	local funds, PDM	County official, Provider	5 or more years	ongoing	As needed.	Funding

Hampton County Mitigation Actions	Associated Hazards	Priority/ Score"	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Install back-flow prevention valves in sewers and drains at critical facilities			7					Complete	Complete	
Keep up to date with technological advancements, including but not limited to, setting up a remote database for important files for backup.	All Hazards	Mid	8	150k	PDM, local funds	County official	1-3 years	2009 Plan		Funding, Technological knowledge
Continue to Scan important and historic documents to backup information and to compile with State Archive requirements.	All Hazards	High	8	20k	PDM, local funds	County official	1-3 years	2009 Plan		Funding
Provide county and constituent municipalities with laptops for backing up important data prior to disaster striking in order to set up temporary offices elsewhere.			8					Complete	Yes through our It Department	
Scanning of important data and information.			8					Complete	Complete	
Construction of a safe storage area to house important information and documents.			8					Complete	Complete	
Inspection of Lines: Ensure lines are clear of limbs or other obstructions that may cause damage during windstorms or other natural hazards	All Hazards	Low	9	100k	PDM	County official	Ongoing	ongoing, as needed	ongoing, as needed, probably needs a second look, and higher priority	Funding, personnel



Town of Brunson Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Survey tree cover to ensure decreased vulnerability. Make improvements.	Wind	Med	1,6	Med	PDM	EM	Ongoing			Funding
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	Med	9	Low	PDM	EM	Ongoing			Funding
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	Med	6,7,8	Low	PDM	EM	Ongoing			Funding
Create small area plans for stormwater drainage and housing in neighborhoods and watersheds with high vulnerabilities. Make Improvements	All Hazards	Med	1,2,3,4,5,6,7,8, 10	Med.	PDM	EM	5 Years			Funding

Town of Estill Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Survey tree cover to ensure decreased vulnerability. Make improvements.	Wind	Med	1,6	Med	PDM	EM	Ongoing			Funding
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	Med	9	Low	PDM	EM	Ongoing			Funding
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	Med	6,7,8	Low	PDM	EM	Ongoing			Funding
Create small area plans for stormwater drainage and housing in neighborhoods and watersheds with high vulnerabilities. Make Improvements	All Hazards	Med	1,2,3,4,5,6,7,8, 10	Med.	PDM	EM	5 Years			Funding

Town of Furman Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Survey tree cover to ensure decreased vulnerability. Make improvements.	Wind	Med	1,6	Med	PDM	EM	Ongoing			Funding
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	Med	9	Low	PDM	EM	Ongoing			Funding
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	Med	6,7,8	Low	PDM	EM	Ongoing			Funding
Create small area plans for stormwater drainage and housing in neighborhoods and watersheds with high vulnerabilities. Make Improvements	All Hazards	Med	1,2,3,4,5,6,7,8, 10	Med.	PDM	EM	5 Years			Funding

Town of Gifford Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Survey tree cover to ensure decreased vulnerability. Make improvements.	Wind	Med	1,6	Med	PDM	EM	Ongoing			Funding
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	Med	9	Low	PDM	EM	Ongoing			Funding
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	Med	6,7,8	Low	PDM	EM	Ongoing			Funding
Create small area plans for stormwater drainage and housing in neighborhoods and watersheds with high vulnerabilities. Make Improvements	All Hazards	Med	1,2,3,4,5,6,7,8, 10	Med.	PDM	EM	5 Years			Funding

Town of Hampton Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Survey tree cover to ensure decreased vulnerability. Make improvements.	Wind	Med	1,6	Med	PDM	EM	Ongoing			Funding
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	Med	9	Low	PDM	EM	Ongoing			Funding
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	Med	6,7,8	Low	PDM	EM	Ongoing			Funding
Create small area plans for stormwater drainage and housing in neighborhoods and watersheds with high vulnerabilities. Make Improvements	All Hazards	Med	1,2,3,4,5,6,7,8, 10	Med.	PDM	EM	5 Years			Funding



Town of Luray Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Survey tree cover to ensure decreased vulnerability. Make improvements.	Wind	Med	1,6	Med	PDM	EM	Ongoing			Funding
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	Med	9	Low	PDM	EM	Ongoing			Funding
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	Med	6,7,8	Low	PDM	EM	Ongoing			Funding
Create small area plans for stormwater drainage and housing in neighborhoods and watersheds with high vulnerabilities. Make Improvements	All Hazards	Med	1,2,3,4,5,6,7,8, 10	Med.	PDM	EM	5 Years			Funding

Town of Scotia Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Survey tree cover to ensure decreased vulnerability. Make improvements.	Wind	Med	1,6	Med	PDM	EM	Ongoing			Funding
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	Med	9	Low	PDM	EM	Ongoing			Funding
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	Med	6,7,8	Low	PDM	EM	Ongoing			Funding
Create small area plans for stormwater drainage and housing in neighborhoods and watersheds with high vulnerabilities. Make Improvements	All Hazards	Med	1,2,3,4,5,6,7,8, 10	Med.	PDM	EM	5 Years			Funding

Town of Varnville Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Survey tree cover to ensure decreased vulnerability. Make improvements.	Wind	Med	1,6	Med	PDM	EM	Ongoing			Funding
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	Med	9	Low	PDM	EM	Ongoing			Funding
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	Med	6,7,8	Low	PDM	EM	Ongoing			Funding
Create small area plans for stormwater drainage and housing in neighborhoods and watersheds with high vulnerabilities. Make Improvements	All Hazards	Med	1,2,3,4,5,6,7,8, 10	Med.	PDM	EM	5 Years			Funding

Town of Yemassee Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Survey tree cover to ensure decreased vulnerability. Make improvements.	Wind	Med	1,6	Med	PDM	EM	Ongoing			Funding
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	Med	9	Low	PDM	EM	Ongoing			Funding
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	Med	6,7,8	Low	PDM	EM	Ongoing			Funding
Create small area plans for stormwater drainage and housing in neighborhoods and watersheds with high vulnerabilities. Make Improvements	All Hazards	Med	1,2,3,4,5,6,7,8, 10	Med.	PDM	EM	5 Years			Funding

## Jasper County Actions

Jasper County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	MSTN	Future Impediment
Ensure critical facilities have adequate emergency power resources, including fuel storage.	All Hazards	High	1	Med.	PMD	Emergency Managemen	2 yrs.	Proposed		Funding
Conduct a study on the possible usage of transportable generators on a regional basis for critical facilities.	All Hazards	Med.	1	Low	PMD	Emergency Managemen	5 yrs.	Proposed		Funding
Provide provisions for transportation to get those in need to emergency shelters.	All Hazards	Med.	1	Med.	Local	"Emergency Managemen/ LRTA"	5 yrs.	Proposed		Funding
Identify specific at-risk populations that may be exceptionally vulnerable in the event of long-term power outages	All Hazards	High	3,4	Low	Local	"Social Services"	2 yrs.	Proposed		Funding
Identify and Elevate roads and bridges above the base flood elevation to maintain dry access. In situations where flood waters tend to wash roads out, construction, reconstruction, or repair can include not only attention to drainage, but also stabilization or armoring of vulnerable shoulders or embankments.	Hurricanes/ Flooding	Low	1	Very High	FHWA	MPO// SCDOT/ Coutny	25 yrs	Proposed		Funding
Plan for and maintaining adequate road and debris clearing capabilities.	Hurricanes/ Flooding/ Extreme Winter	High		Low	Local	Public Works	2 yrs.	Proposed		Funding



Jasper County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Encourage farmers to implement soil and water conservation practices that foster soil health and improve soil quality to help increase resiliency and mitigate the impacts of droughts.	Drought	Med.	3	Low	NRCS	County/Soil Conservation District/ Extension	5 yrs.	Proposed		
Acquire software enabling social media calls to be integrated into the 911 Dispatch systems.	All Hazards	High	3,5,8,9	Low	PMD	Emergency Management	1 yrs.	Proposed		
Identify and analyze renewable energy options: costs, benefits, environmental effects, technological potential, and political acceptability	All Hazards	Low	1,2,4,5,8,9	Med.	Local	County	5 yrs.	Proposed		
Conduct an inventory and map current community facilities, including tele-communications; assess the condition of facilities for determining if repair or replacement is required. Identify current community facilities deficiencies and future needs.	All Hazards	High	6,7,10	Low	PMD, Local	County	3 yrs.	Proposed		
Utilize social media and post information listing what one should have if a hazard strikes. Post same information in public spaces, including home improvement stores.	All Hazards	High	3	Low	Local	County	1 yrs.	Proposed		
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	High	3	Low	Local	County	2 yrs.	Proposed		

Jasper County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status
Identify and protect wetlands that serve as flood storage areas	Flooding/ Hurricanes	Med.	4,	Med.	Local	County	5 yrs.	Proposed
Provide hazard training in schools	Earthquakes	High	3	Low	Local	Emergency Management	1 yrs.	Ongoing
Create small area plans for stormwater drainage and housing in neighborhoods or watersheds with high vulnerabilities. Make Improvements.	Flooding/ Hurricanes	Med.	7	Low	Local, EPA	County	2 yrs.	Proposed
Install generator at Jasper County Senior Center - cooling center – Ridgeland.	Excessive Heat/Cold	Med.	1	Med.	Local, COA	COA	2 yrs.	Proposed
Do an assessment and cost benefit-analysis for making improvement to the County Airport. Make Improvements where needed.	All Hazards	Low	1,4	Med.-High	PMD, Local	County	5 yrs.	Proposed
Update aerial imaging and mapping of county.	All Hazards	Low	1,2,4,5,8,9	High	Local	County	5 yrs.	Proposed

Jasper County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
RE-roofing the EMS Building: County EMS headquarters in need of new roof.	All Hazards	Mid	1	500k	local funds, PDM, CDBG	County official	3-5 years	No Action: Deferred	Still trying to find monies to re-roof entire Emergency Service Bld.	Funding
Facility Eval. :Critical Facilities evaluated. Inspections, Reinforcements, and remodeling so structures physically capable to withstand hazards.	All Hazards	High	1	25k	local funds, PDM, CDBG	County official	1-2 years	Complete, Ongoing	Emergency Service building has Hurricane shutters on all windows	Funding
Backup power adequate so can be up and running shortly after disaster. Generators essential.			1					Complete	Emergency Service building has an emergency back up generator to run entire building.	
Switches, Wiring, and Hookups for Critical Facilities: Prep critical facilities for emergency generators to power facility			1					Completed	Completed	
Shelter Development: Strengthen buildings in order to designate them as hurricane shelters.	Hurricane	High	2	750k	local funds, PDM, CDBG	County official	3-5 years	No Action: Deferred	Do not have at this time.	Funding
Develop rescue and evacuation procedures for special populations	All Hazards	High	2	25k	local funds, PDM	County official	1-2 years	No Action: Deferred	Working on	Funding,

Jasper County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Special Needs Evacuation Study: Nursing home and hospital evacuation plans assessed to ensure safety and efficiency	All Hazards	High	2	25k	local funds, PDM	County official	1-2 years	No Action: Deferred	No Funding. Deferred	Funding, Personnel
Backup Power Eval. Ensure all shelters have adequate emergency power resources.	All Hazards	High	2	40k	local funds, PDM	County official	1-2 years	Ongoing	Completed	Funding
Special Need Population Inventory: Identify vulnerable and special needs members of the population.	All Hazards	High	2	15k	local funds, PDM	County official	1-2 years	No Action: Deferred	No Funding. Deferred	Funding, Personnel
Evac. Measures for Those in Need: Make provisions for transportation for those in need to emergency shelters.	All Hazards	High	2	25k	local funds, PDM	County official	1-2 years	No Action: Deferred	No Funding. Deferred	Funding, Personnel
Evac. Route Study: In-depth study to analyze current efficiency, adequacy, and safety of evacuation routes within county.			2					Complete	routes have been made evacuation routes and are on the mapping as such. Not sure if on in-depth study has been done.	
Shelter List Publication: Publish list of approved shelters.			2					Complete	There is a approved list at SCEMD	
Instigate earthquake training in schools	Earthquake	Mid	3	10k	local funds, PDM	County official	1-2 years	2009 Plan	Not Complete	Funding
Handout SC's Earthquake Preparedness of Schools brochure, and implement training.	Earthquake	Mid	3	30k	local funds, PDM	County official	1-2 years	2009 Plan	Not Complete	Funding/ personnel

Jasper County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Posted boards near grocery stores and hardware stores listing what one should have if a hazard struck	Earthquake, Tornado, Hurricane, Flood	High	3	30k	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Funding
Sell portable radios for everyone, so that they can tune in when a hazard is near, occurring, or the aftermath	Earthquake, Tornado, Hurricane, Flood	High	3	30k	local funds, PDM	County official	1-2 years	2009 Plan	Not Complete	Political Will, Public Will, Funding
Publicize events at local hardware stores that show how to save your property during a hazard	Hail, Earthquake, Hurricane, Wind	High	3	50k	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Political Will, Public Will, Funding
Provide free water and set up water stations when the temperature will be about 102	Extreme Heat	High	3	50k	local funds, PDM	County official	1-2 years	2009 Plan	Not Complete	Political Will, Funding
Train those in rural areas for how to protect their homes, and what to do during an event	All Hazards	High	3	250k	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Funding, Public Will
Provide training to personnel who will in the future deal with hazard mitigation and the grant writing thereof	All Hazards	High	3	150k	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Funding



Jasper County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Train people with equipment and supplies for a winter storm	Winter Storm	High	3	50k	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Funding (need supplies first)
Offer a list of city foresters, county extension offices, local nurseries and landscape firms that can provide advise on tree selection for your area and soil conditions.	Lightning, Wild Fire	High	3	2k	local funds	County official	1-2 years	2009 Plan	Not Complete	Public will to use the services
Education and public outreach regarding any and all potential natural hazards.	All Hazards	High	3	25k	local funds, PDM	County official	Continuous.	2009 Plan	Ongoing	Funding, Personnel
Warning System Education: educate residents of meaning warning systems and schedule testing.	Hurricane, Tornado	High	3	15k	local funds, PDM, HMGP	County official	3-5 years	No Action: Deferred	No Funding. Deferred	Funding, Proper outreach
Public Ed. And Awareness- Workshops and Classes: Continue teaching residents how to prepare homes, family, and property for disasters.	All Hazards	High	3	20k	local funds, PDM	County official	Continuous.	Ongoing.	Ongoing, no funding/ infrastructure to hold actual workshops at this time. Giving out pamphlets during hazard seasons.	Funding
Public Ed. And Awareness- Informational Packets: Packets continued to be circulated during season of hazard.	All Hazards	High	3	15k	local funds, PDM	County official	Continuous.	Complete, Ongoing	Ongoing. Giving out pamphlets during hazard seasons.	Funding, Personnel

Jasper County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Tourist Ed. : Coordination of work with the visitor's bureau to alert tourists to possible hazards in areas of vulnerability. Materials can be left in visitor centers, hotels, attractions, ect.	All Hazards	High	3	20k	local funds, PDM	County official	1-2 years	No Action: Deferred	No Funding. Deferred	Funding, Personnel
Incentivize, publicize, or provide, fans or other types of cooling elements for popular outdoor areas during times of high heat	Extreme Heat	Low	4	100k	local funds, PDM	County official	3-5 years	2009 Plan	COA can provide window a/c units for aging individuals.	Funding, Public Will, Political Will
Pave highways to allow 4 lanes of traffic to evacuate during hazard	Hurricane	Low	4	7 mil.	local funds, PDM, HMGP	County official	5 or more years	2009 Plan	US 17 Project to Widen Road from SC 315 to Savannah	Funding
Purchase support vehicles to reach rural locations during hazard	Hurricane	Low	4	1 mil.	PDM	County official	1-3 years	2009 Plan	Not Complete	Funding
Provide materials for stranded motorists during a hazard	All Hazards	Mid	4	2 mil.	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Funding
Assess trees in public areas to see if they are dead, dying, or could cause potential problems if struck by lightning or are fire inductive.	Lightning, Wild Fire	Mid	4	30k	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Political and public will, funding

Jasper County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Remove potential tree problems	Lightning, Wild Fire	Mid	4	250k	local funds, PDM, HMGP	County official	3-5 years	2009 Plan	Utilities	Political and public will, funding
Purchase equipment and supplies in case of a winter storm.	Winter Storm	Mid	4	500k	PDM, HMGP	County official	3-5 years	2009 Plan	Not Complete	Funding
Set up community compost pile that people can purchase soil from to help enrich soil properties and protect against drought.	Drought	Mid	4	75k	local funds, PDM	County official	5 or more years	2009 Plan	Not Complete	Public and Political Will
Incentivize against bagging leaves and grass, this also enriches the soil.	Drought	High	4	50k	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Public and Political Will
Provide a place for blankets, and coverings, that people can pick up and use for property protection during hail.	Hail	High	4	50k	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Funding, Political and Public Will.
Provide shelter spaces during hail and other storms.	Hail, Winter Storm, Lightning	High	4	500k	local funds, PDM, CDBG	County official	3-5 years	2009 Plan	Not Complete	Funding

Jasper County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Obtain portable repeaters	All Hazards	High	4	25k	local funds, PDM	County official	1-2 years	2009 Plan	Not Complete	Funding
Building Code: Oversee strict adherence to new building standards by closely monitoring all new renovations and construction.	All Hazards	High	4	30k	local funds, PDM, CDBG	County official	1-5 years	Ongoing	The Building Department follows the 2006 International Building Code and the 2006 International Residential Code. The County will automatically adopt the 2009 version following the State's adoption.	Funding, Personnel, Public/Private Will
Increase HAM radio capabilities through new towers and equipment. Equip critical facilities and emergency vehicles.	All Hazards	High	5	25k	local funds, PDM,	County official	1-2 years	2009 Plan	Not Complete	Funding
Acquire all-terrain vehicles and boats for special emergency and rescue operations.	All Hazards	High	5	250k	local funds, PDM	County official	3-5 years	2009 Plan	Not Complete	Funding
Em. Response Training of employees and emergency workers for specific natural hazard events.	All Hazards	High	5	50k	local funds, PDM	County official	1-5 years	Completed: Ongoing	Completed: Ongoing	Personnel
Em. Response Prep. Eval: Conduct Inventory/survey for county's emergency response services to identify existing needs or shortfalls in personnel, equipment, or required resources.			5					Complete	Working on plans to educate all personnel on the need of quick response and how to utilize equipment that we have on hand.	
Em. Resp. Prep Equipment: Purchase specific piece of equipment that would help emergency response and preparedness.			5					Complete	Fire Rescue has a new ATV for rough terrain areas.	

Jasper County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Vegetation Management: inspect and manage vegetation that could damage critical facilities if felled by wind.	Wind, Hurricane	High	6	50k	local funds, PDM	County official	1-5 years	Completed thus far: Ongoing	Working with Public Works.	Personnel
Res. Roof Conditions Survey: Roof study for grant money for new roofs on homes to ensure that homes can sustain high wind speeds.	Wind, Hurricane	High	6	50k	local funds, PDM, CDBG	County official	1-2 years	No Action: Deferred	No Funding. Deferred	Funding
Building Code Wind Standards: Adhere to new building standards (ISO 9000 Building Standards as of this plan)	All Hazards	Mid	6	120k	local funds, PDM, CDBG	County official	3-5 years	Ongoing	The County will automatically adopt the latest version following the State's adoption.	Funding
Wetland Protection: Stringent rules & enforcement against removal of wetlands.	Flood	Mid	7	50k	local funds, PDM	County official	1-2 years	No Action: Deferred	Jasper County relies on State and Federal agencies to regulate wetland impacts and associated mitigation.	Personnel, Public/Private Will
Wetland Protection: Preservation through education of public about buffer zones and regulating these through development ordinances.	Flood	High	7	15k	local funds, PDM	County official	1-2 years	No Action: Deferred	While there is no formal education regarding riparian buffers, all development proposals are assessed on a case by case basis and reviewed.	Personnel
Structure Sealing: Provide waterproof doors and seals for wall openings an/ or seal components for critical facilities within flood zones.	Flood	High	7	150k	local funds, PDM, CDBG, FMA,	County official	1-2 years	No Funding. Deferred	No Funding. Deferred	Funding



Jasper County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Install back-flow prevention valves in sewers and drains at critical facilities	Flood	High	7	150k	local funds, PDM, CDBG, FMA,	County official	1-2 years	No Funding. Deferred	No Funding. Deferred	Funding
Water Seals: Improve seals on all wall penetrations below flood water levels at critical facilities	Flood	High	7	150k	local funds, PDM, CDBG, FMA,	County official	1-2 years	No Funding. Deferred	No Funding. Deferred	Funding
Storm water drainage study and plan to identify drainage ditches and promote cleanup.	Flood	High	7	15k	local funds, PDM, CDBG, FMA,	County official	1-2 years	No Funding. Deferred	No Funding. Deferred	Funding
Land Acq.: Acquire and preserve parcels of land subject to repetitive flooding or areas known to have been affected by flooding at a great extent.	Flood	High	7	250k	local funds, PDM, CDBG, FMA,	County official	3-5 years	No Action: Deferred	This is not a priority and would only consider if there was a specific grant for this reason.	Funding, Personnel, Public/Private Will
Land Acq.: Consider areas subject to repetitive flooding for acquisition for parks and other permanent open space.	Flood	High	7	250k	local funds, PDM, CDBG, FMA,	County official	3-5 years	No Action: Deferred	Same as above.	Personnel
Map Update: Update floodplain maps.	Flood	High	7	15k	local funds, PDM, CDBG, FMA,	County official	1-2 years	Ongoing	Ongoing	Funding

Jasper County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Flood Zone Building Policies: Zoning and building codes should ensure no new structures built within floodplains.			7					Completed	Jasper County has adopted a Model Flood Damage Prevention Ordinance.	
Provide county with laptops for backing up important data prior to disaster striking in order to set up temporary offices elsewhere.			8					Complete	County has a back up server for most of all the data	
Scanning of important data and information.			8					Complete	New scanning system to put old documents on server.	
Construction of a safe storage area to house important information and documents.			8					Complete	New Government Building has storage for most documents.	
Creation of mobile dispatch unit to ensure communications not eliminated due to natural hazard.	All Hazards	High	9	45k	local funds, PDM, HMGP	County official	3-5 years	No Action: Deferred	No funds to establish this. Would like to have a mobile unit.	Funding
Creation of camera system to oversee strategic locations during times of emergency (including the Jasper County Airport and strategic evacuation routes and intersections).	All Hazards	High	9	150k	local funds, PDM, HMGP	County official	5 or more years	No Action: Deferred	No Funding. Deferred	Funding
Inspection of communication lines to ensure reliability.	All Hazards	High	9	50k	local funds, PDM	County official, Provider, Public Works	Continuous.	Ongoing		Funding

Jasper County Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Improvement of old or worn communication lines.	All Hazards	High	9	50k	local funds, PDM	County official, Provider, Public Works	Continuous.	Ongoing		Funding, Proper Communication
Inspection of lines: Ensure lines clear of limbs or other obstructions that may damage them during windstorms or other natural hazards.	All Hazards	High	9	50k	local funds, PDM	County official, Provider, Public Works	Continuous.	Ongoing		Funding, Proper Communication
School Weather Radios: Provide updated weather radios to schools for early warning.	All Hazards		9					Complete		
Inspection of utility lines.	All Hazards	High	10	50k	local funds, PDM	County official, Provider, Public Works	Continuous.	Ongoing		Funding, Proper Communication
Improvement of utilities.	All Hazards	High	10	50k	local funds, PDM	County official, Provider, Public Works	Continuous.	Ongoing		Funding, Proper Communication
Replacement of utilities.	All Hazards	High	10	75k	local funds, PDM	County official, Provider, Public Works	Continuous.	Ongoing		Funding, Proper Communication
Strengthen utility poles/conductor fixtures	All Hazards	High	10	75k	local funds, PDM	County official, Provider, Public Works	Continuous.	Ongoing		Funding, Proper Communication

City of Hardeeville Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Survey tree cover to ensure decreased vulnerability. Make improvements.	Wind	Med	1,6	Med	PDM	EM	Ongoing			Funding
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	Med	9	Low	PDM	EM	Ongoing			Funding
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	Med	6,7,8	Low	PDM	EM	Ongoing			Funding
Create small area plans for stormwater drainage and housing in neighborhoods and watersheds with high vulnerabilities. Make Improvements	All Hazards	Med	1,2,3,4,5,6,7,8,10	Med.	PDM	EM	5 Years			Funding

City of Ridgeland Mitigation Actions	Associated Hazards	Priority/ Score	Goal (number)	Estimated Cost	Potential Funding	Responsible Department	Schedule	Status	Milestones	Future Impediment
Survey tree cover to ensure decreased vulnerability. Make improvements.	Wind	Med	1,6	Med	PDM	EM	Ongoing			Funding
Promote use of National Oceanic and Atmospheric Administration (NOAA) weather radios.	All Hazards	Med	9	Low	PDM	EM	Ongoing			Funding
Conduct Targeted Hazard Mitigation Educational Programs in areas with known social vulnerability.	All Hazards	Med	6,7,8	Low	PDM	EM	Ongoing			Funding
Create small area plans for stormwater drainage and housing in neighborhoods and watersheds with high vulnerabilities. Make Improvements	All Hazards	Med	1,2,3,4,5,6,7,8, 10	Med.	PDM	EM	5 Years			Funding



# **Appendix A: Emergency Manager Questionnaire**



## **Lowcountry Region Hazard Mitigation Plan Emergency Manager Questionnaire**

The responses to the questionnaire will assist LCOG in determining the status of proposed actions in the 2009 Multi-Jurisdictional Hazard Mitigation Plan. Questions refer to any activities from 2009-2015. Items listed were part of proposals in the 2009 Plan. Please feel free to mark or comment on any area that is no longer needed.

- 1) What improvements have been made to the critical facilities infrastructure? Please be specific as possible, naming the place, cost and what work was completed, if known.
  - New or Repaired Fire Stations (including roofing and weatherization projects)
  - Headquarters, Dispatch Centers, Mobile Dispatch Vehicle
  - Major Health Facilities, Nursing Homes
  - Schools, Shelters
  - Data Storage, Back-up
  - Generators
  - Road paving and widening, Traffic Cameras, Utilities – tree trimming and removal, Potable Water Improvements (Water Stations)
  - Land acquisitions
- 2) Which known facilities are in need of improvements to strengthen their durability during and after an event? What are the needs?
- 3) Has there been a loss, major damage, or closing of critical facilities, if so which facilities and why?
- 4) What studies or surveys have been undertaken to better understand the weaknesses and needs in regards to hazard mitigation?
  - Evacuation Needs Study, Special Needs Population Study
  - Urban Tree Cover Vulnerability and Risks Study, Power Line Survey
  - Stormwater Drainage Study
  - Areas with Repetitive Flooding Study
  - Nursing Home Safety and Evacuation Survey
  - Shelter Suitability Survey
  - Inventory of Emergency Response Survey

- 5) What educational or marketing efforts have been made in terms of hazard preparedness?
- Training for Grant Writing
  - Outreach to rural population
  - Educational Series in Schools
  - Composting Program
  - Hazard Publication to tourist and hotels
- 6) Have there been changes in leadership for emergency services personnel, if so what positions, who?
- 7) Have grant funds been allocated for improvements to emergency services? If so, for what purpose, which source and how much?
- 8) Has there been any purchase and/or distribution of emergency supplies? If so, what, for who, and the estimated cost?
- Weather Radios
  - Fans
  - Support Vehicles
  - Major equipment, please describe
  - Generators
  - Satellite Phones
- 9) What natural disasters or major events have triggered the utilization or deployment of emergency management services? What costs were associated with the event?
- 10) If debris removal was required, what resources, including cost, were needed and what was the estimated volume, if known?
- Labor
  - Trucks
  - Public Works

## **Appendix B: Community Survey**

**FOR IMMEDIATE RELEASE:**

The Lowcountry Council of Governments (LCOG) is currently updating the Pre-Disaster Hazard Mitigation Plans for Beaufort, Colleton, Hampton and Jasper counties. This is required every five years by FEMA and the South Carolina Emergency Management Division (SCEMD) “to reflect changes in development, progress in local mitigation efforts, and changes in priorities, ...”. FEMA, through SCEMD, is funding the majority of the cost of the work; the counties are all providing their shares of the required local match.

The original plans were prepared approximately 10 years ago, and the first updates were completed in 2010 for all four counties by LCOG.

Although detailed goals and objectives have changed over time, the Overall Guiding Principles have stayed the same, including:

- Saving lives and protecting property.
- Accessing funding to implement recommendations (projects and policies).

Lowcountry residents have the opportunity to take part in the planning to prevent major property damage and other losses caused by natural disasters. Risks and hazards—including wind, wildfires, ice storms and flooding—have been identified and assessed. The next step requires structuring a list of possible action steps to help mitigate any damage caused by these and other hazards. Suggestions, comments and questions from area residents will ensure that all members of the community are represented and no concerns are overlooked. LCOG has prepared a very brief survey that will only take a few minutes to complete. Follow this link to access the short questionnaire: <https://www.surveymonkey.com/r/lcoghazardsurvey>

If you have any questions or would like to have a hard copy of the survey, please contact Jonathan Sherwood or Lawrence Holdsworth at 843-726-5536 or [jsherwood@lowcountrycog.org](mailto:jsherwood@lowcountrycog.org) or [lholdsworth@lowcountrycog.org](mailto:lholdsworth@lowcountrycog.org).

For ongoing information about the project, check with our Facebook page: <https://www.facebook.com/LowcountryNaturalHazardPlanning?fref=ts>





## 2015 Lowcountry Hazard Mitigation Plan Household Survey

Thank you for your input!

**Lowcountry residents have the opportunity to take part in planning to prevent major property damage and other losses caused by natural disasters, as the Lowcountry Council of Governments updates the Pre-Disaster Hazard Mitigation Plans for Beaufort, Colleton, Hampton and Jasper counties. The updates are on their way. Risks and hazards—including wind, wildfires, ice storms and flooding—have been identified and assessed. The next step requires structuring list of possible action steps to help mitigate any damage caused by these and other hazards. Suggestions, comments and questions from area residents will ensure that all members of the community are represented and no concerns are overlooked.**

**While it is important to be prepared, there is another reason for planning: in order to receive grant money for hazard mitigation projects, or to receive aid after a disaster, FEMA requires that plans be updated every five years, and that time is now.**

**The Plan updates are funded by FEMA, through the South Carolina Emergency Management Division (SCEMD), with the local match provided by the counties.**

1. In what county is your household located?

- ☐ Beaufort
- ☐ Colleton
- ☐ Hampton
- ☐ Jasper
- ☐ Other

2. Which of the following hazards have caused life or property damage at your place of residence?

- ☐ Flood
- ☐ Tropical Storm/Hurricane
- ☐ Wildfire
- ☐ Hail
- ☐ Tornado
- ☐ Thunderstorm Wind
- ☐ Lightning
- ☐ Extreme Heat (Heat index of at least 105 °F for more than 3 hours per day for 2 consecutive days)
- ☐ Winter Storm (Snow/Ice)
- ☐ Drought
- ☐ Other (please specify)

3. Please choose the 3 hazards that are your greatest cause of concern for your life and property.

- ☐ Flood
- ☐ Tropical Storm/Hurricane
- ☐ Wildfire
- ☐ Hail
- ☐ Tornado
- ☐ Thunderstorm Wind
- ☐ Lightning
- ☐ Extreme Heat (Heat index of at least 105 °F for more than 3 hours per day for 2 consecutive days)
- ☐ Winter Storm (Snow/Ice)
- ☐ Drought
- ☐ Other (please specify)

4. Have you made any improvements to your property to protect against natural hazards?

- ☐ Yes
- ☐ No

5. If you answered yes to question 4, please indicate what type of improvements you have made.

- ☐ Insulation
- ☐ Window and Door Reinforcements/Replacements
- ☐ Elevation of Structure
- ☐ Tree Maintenance/Removal
- ☐ Roof Replacement/Repair
- ☐ Brush Removal
- ☐ Other (please specify)

6. If you answered no to question 4, which of the following home improvements would you benefit from the most?

- ☐ Insulation
- ☐ Window and Door Reinforcements/Replacements
- ☐ Elevation of Structure
- ☐ Tree Maintenance/Removal
- ☐ Roof Replacement/Repair
- ☐ Brush Removal
- ☐ Other (please specify)

7. Please indicate your level of agreement with the following statement: My household is prepared in the event of a natural disaster.

Strongly Disagree	Disagree	Disagree Somewhat	Neutral	Agree Somewhat	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. What is the best way for you to receive information on how to make your home and community more resistant to natural hazards? Please choose 3.

- ☐ Television
- ☐ Radio
- ☐ Email
- ☐ Social Media (Facebook, Twitter)
- ☐ Conventional Mail
- ☐ Public Meetings/Workshops
- ☐ Website
- ☐ Newspaper

Other (please specify)

9. A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. Please tell us how important you think each one is for your community to consider pursuing.

	Not important	Somewhat important	Very Important
<b>Prevention</b> - Examples include heightened standards for hazard-resistant construction, increased regulation of construction in hazard-prone areas as well as enhanced enforcement of existing regulations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Property Protection</b> - Examples include relocation, elevation, structural repairs, and storm shutters.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Natural Resource Protection</b> - Examples include floodplain protection, habitat preservation, wetland restoration and forest management.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Not important                      Somewhat important                      Very Important

**Structural Projects -**

Examples include dams, levees, seawalls detention / retention basins, channel modification, retaining walls and storm sewers.

☐
☐
☐

**Emergency Services -**

Examples include warning systems, evacuation planning, emergency response training, and protection of critical facilities or systems.

☐
☐
☐

**Public Education and**

**Awareness -** Examples include outreach projects, school education programs, library materials and demonstration events.

☐
☐
☐

10. Do you have any other comments, questions, or concerns?



## **Appendix C: Community Survey Analysis**

## APPENDIX D

### SURVEY

#### Survey Development and Distribution

The survey was developed referencing previous surveys conducted by LCOG, as well as surveys included in Hazard Mitigation Plans nationwide. The length of the survey was kept short to maximize convenience and encourage responses. Rather than attempting to duplicate existing sources of data, questions were designed to assess personal experiences and perceptions of natural hazards, individual planning and preparation, as well as support of community-wide mitigation strategies.

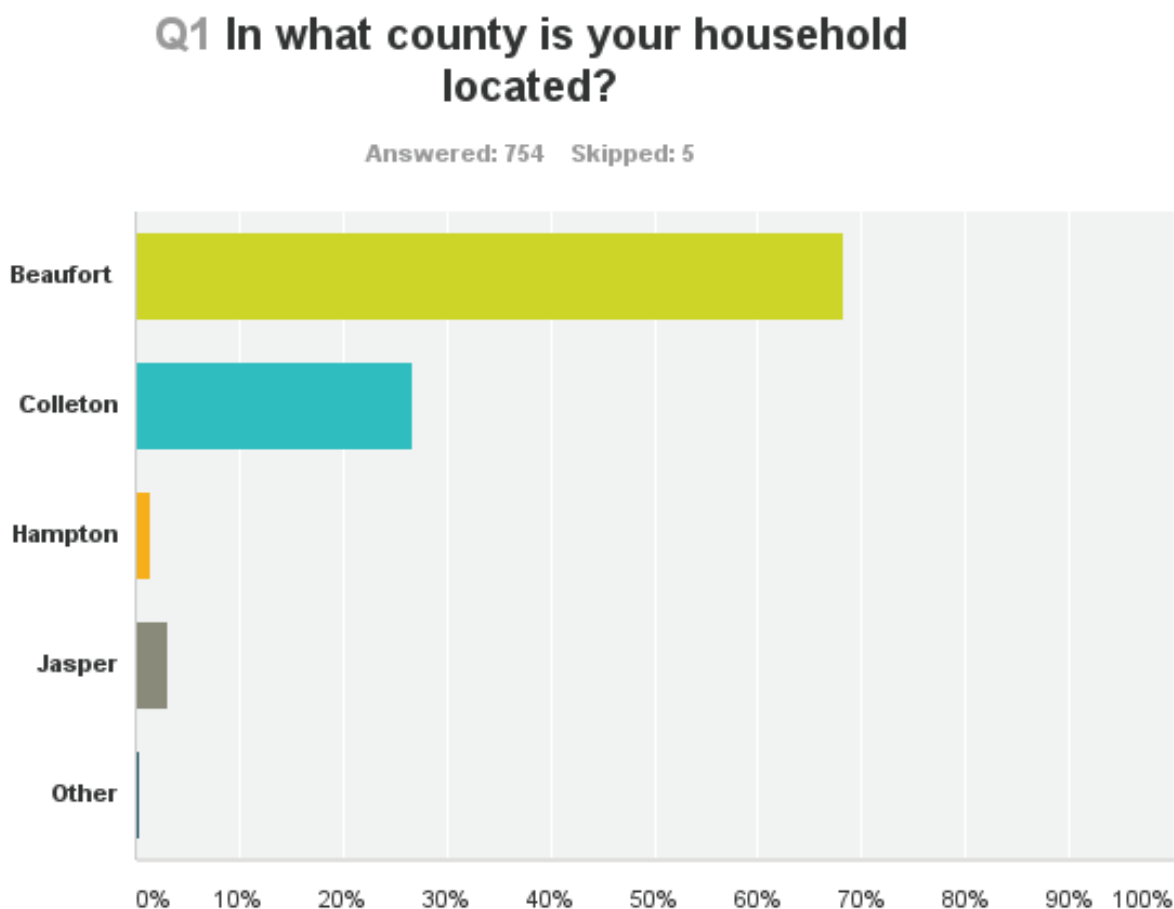
The survey was designed and largely distributed through Survey Monkey, an online service that allows users to send/post links by which respondents can access the survey online. Several hundred copies were also printed to capture respondents that may not have web access. Many local leaders distributed the survey link and instructions via email blasts, social media, or posting on local government webpages. For example, Mayor Keyserling of the City of Beaufort sent a link to the survey in his weekly newsletter to residents. Colleton County officials provided paper copies of the survey to residents applying for relief funds following the recent flooding of the Edisto River.

#### Example of Survey Posting on Hilton Head Island Homepage



## Results and Analysis

### Question 1.

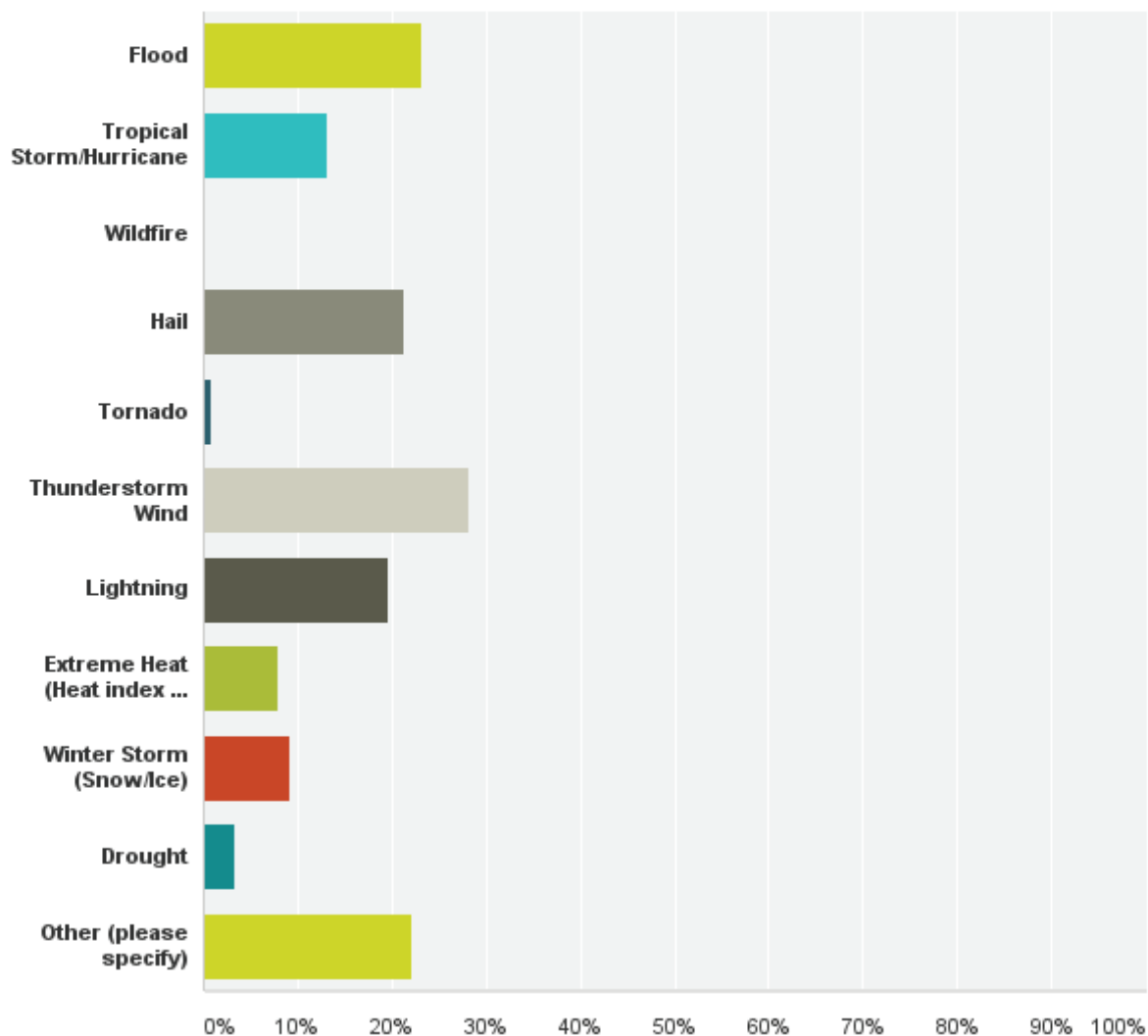


Over 750 survey responses were collected over the period of 2 months. The vast majority of survey respondents were located in Beaufort County, where population is most concentrated in the region. Colleton County recorded a significant number of responses as survey collection coincided with the collection of documents for FEMA reimbursement following the flooding of the Edisto River. The significant amount of coastline and/or extensive hydrological networks in these counties may contribute to the heightened public awareness of, and interest in hazard threats.

## Question 2

### Q2 Which of the following hazards have caused life or property damage at your place of residence?

Answered: 542 Skipped: 217

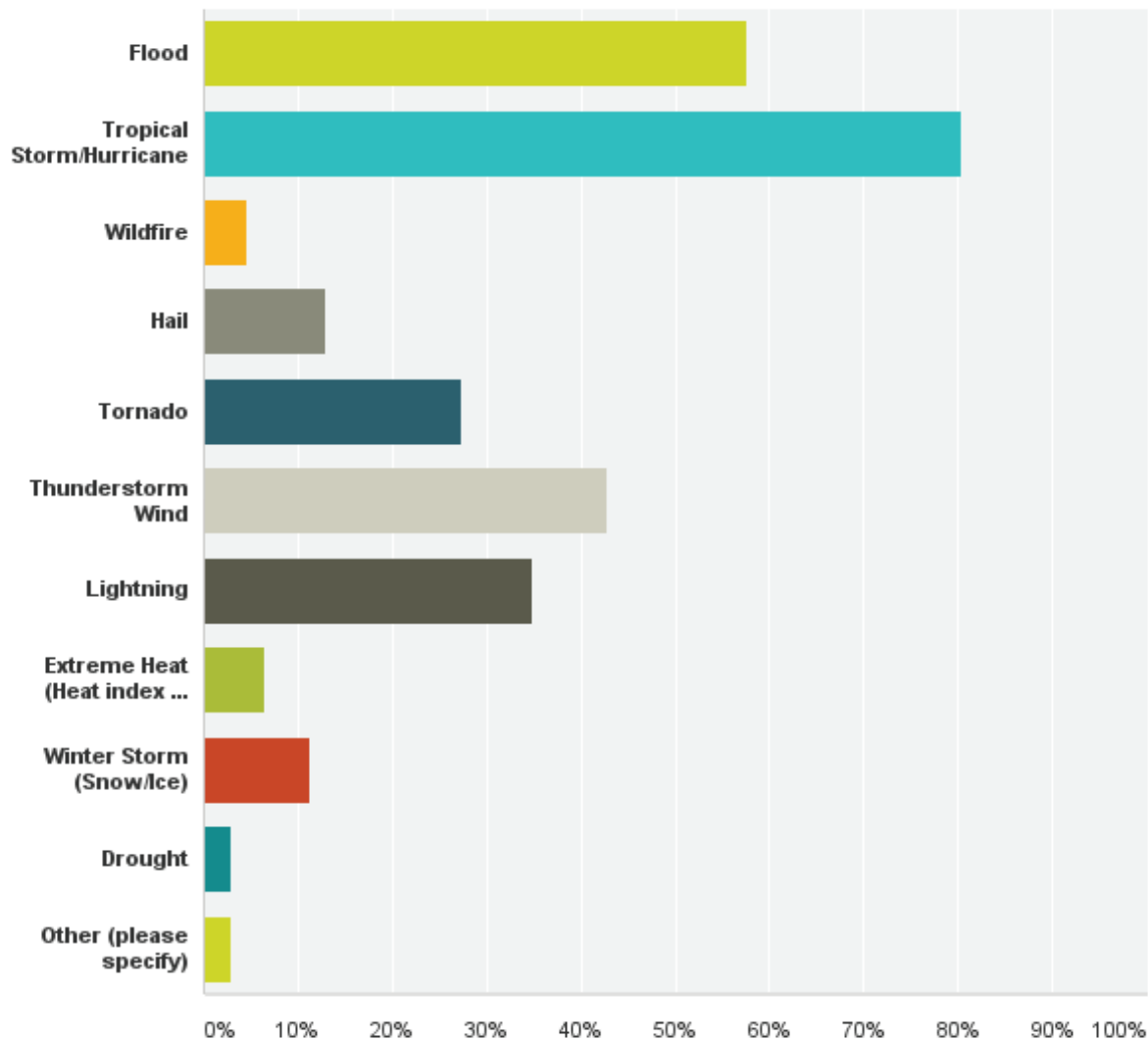


The most frequently cited hazards to cause damage to property for Lowcountry householders correlate highly with the frequency by which these events occur. Hail, flood, thunderstorm wind and lightening were top contributors to property damage or injury among respondents.

### Question 3.

#### Q3 Please choose the 3 hazards that are your greatest cause of concern for your life and property.

Answered: 746 Skipped: 13



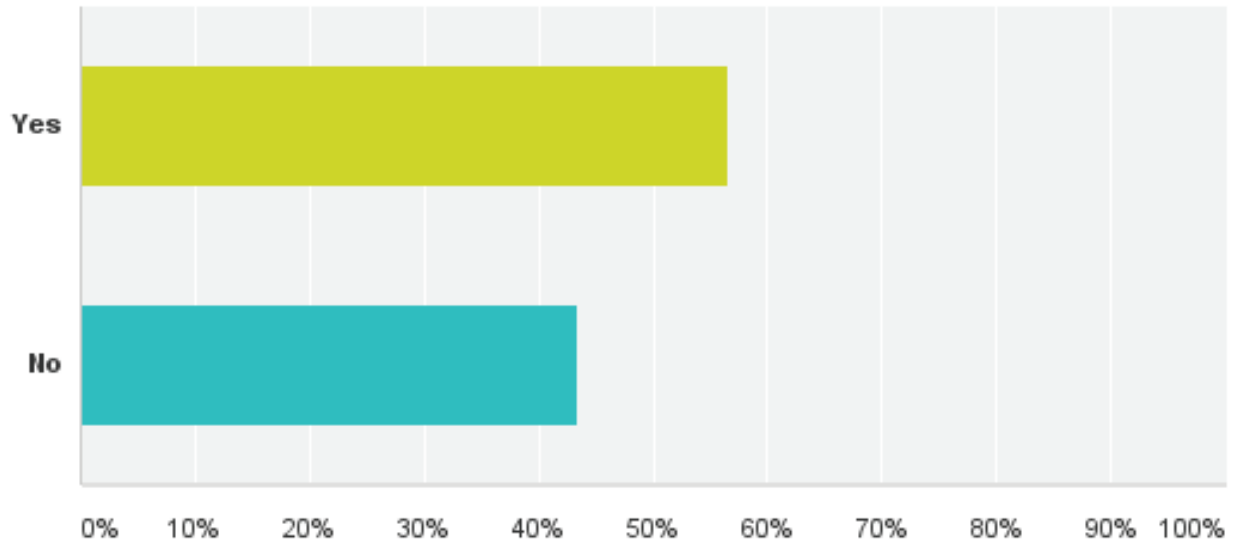
When asked to choose the hazard that was the greatest cause of concern for life and property respondents indicated the hazards that while may not occur with the greatest frequency, had the potential to cause the greatest amount of damage in a single event. The top three hazards of greatest concern were tropical storms/hurricanes, flooding and thunderstorms. These data support with the vulnerability analysis presented in the HMP and the focus of mitigation actions on these hazards.



#### Question 4

### Q4 Have you made any improvements to your property to protect against natural hazards?

Answered: 738 Skipped: 21

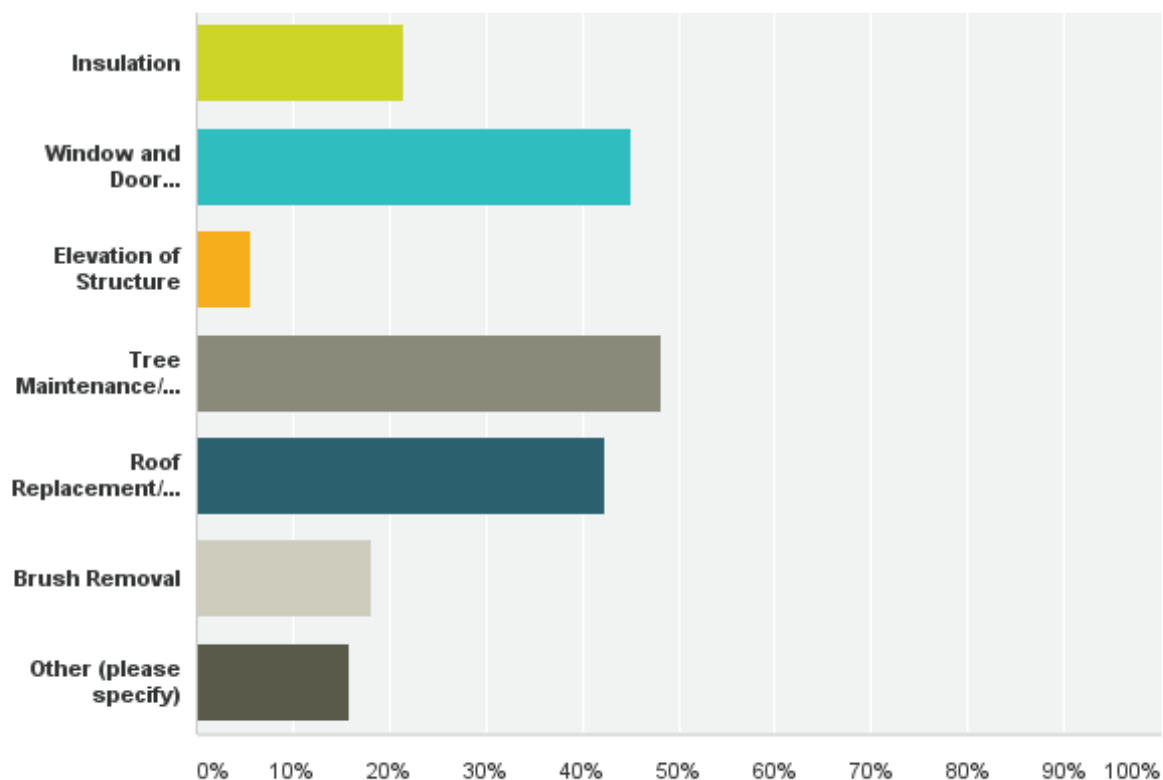


Roughly 55% of respondents indicated that they had made improvements to their homes to reduce their vulnerability to hazards. This statistic indicates a majority among respondents who are aware of hazard risks, are sufficiently concerned and with adequate means to make investments in protections to their property. The importance of a balance of both private and public action to reduce risk cannot be overstated. Relatively small improvements such as protections to windows and doors can mean the difference between minor damage and total destruction in a high wind event. As identified in the plan, public officials can facilitate private investment by helping to identify funding opportunities or assisting homeowners to apply for individual funding for improvements.

## Question 5

### Q5 If you answered yes to question 4, please indicate what type of improvements you have made.

Answered: 441 Skipped: 318



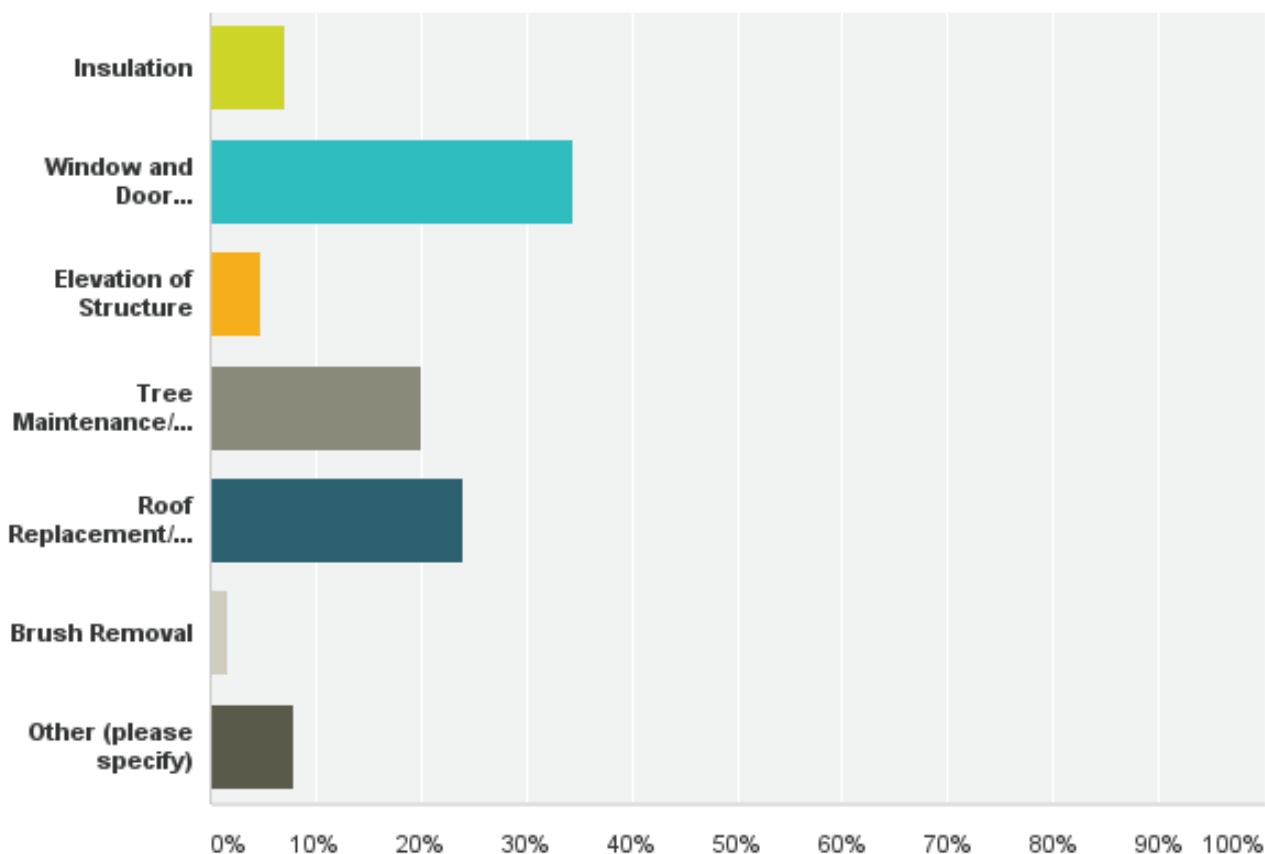
The most common improvements made by homeowners to increase resilience to natural hazards include the maintenance and removal of trees in the vicinity of homes and the replacement/enhancement of roofs, windows and doors. In addition to reducing vulnerability to high winds and debris, enhancement/replacement of windows and doors can increase energy efficiency in heating and cooling, providing long-term cost savings for homeowners.

Tree maintenance is largely an issue for individual property owners as private lands greatly outnumber public properties. Tree ordinances generally act to preserve existing canopy in new development, but do not extend into the maintenance or removal of vulnerable trees. These vulnerable trees represent a public concern in addition to private ones in terms of debris and the damage caused to utilities/infrastructure. Public agencies can encourage homeowners to take action on this issue by offering pickup of yard waste which then can be turned into mulch or compost for use in gardening and landscaping.

## Question 6

### Q6 If you answered no to question 4, which of the following home improvements would you benefit from the most?

Answered: 361 Skipped: 398



For respondents who had not yet made improvements to their properties, roofs, windows, and tree maintenance were identified as the highest priority investments. Local agencies can contribute to homeowners taking action by providing information on the benefits of these improvements, and identifying programs such as SC safe homes whereby individuals can apply for funding for home improvements.

## Question 7

**Q7 Please indicate your level of agreement with the following statement: My household is prepared in the event of a natural disaster.**

Answered: 744 Skipped: 15

	Strongly Disagree	Disagree	Disagree Somewhat	Neutral	Agree Somewhat	Agree	Strongly Agree	Total	Weighted Average
(no label)	5.91% 44	6.59% 49	12.77% 95	17.20% 128	30.24% 225	23.79% 177	3.49% 26	744	3.43

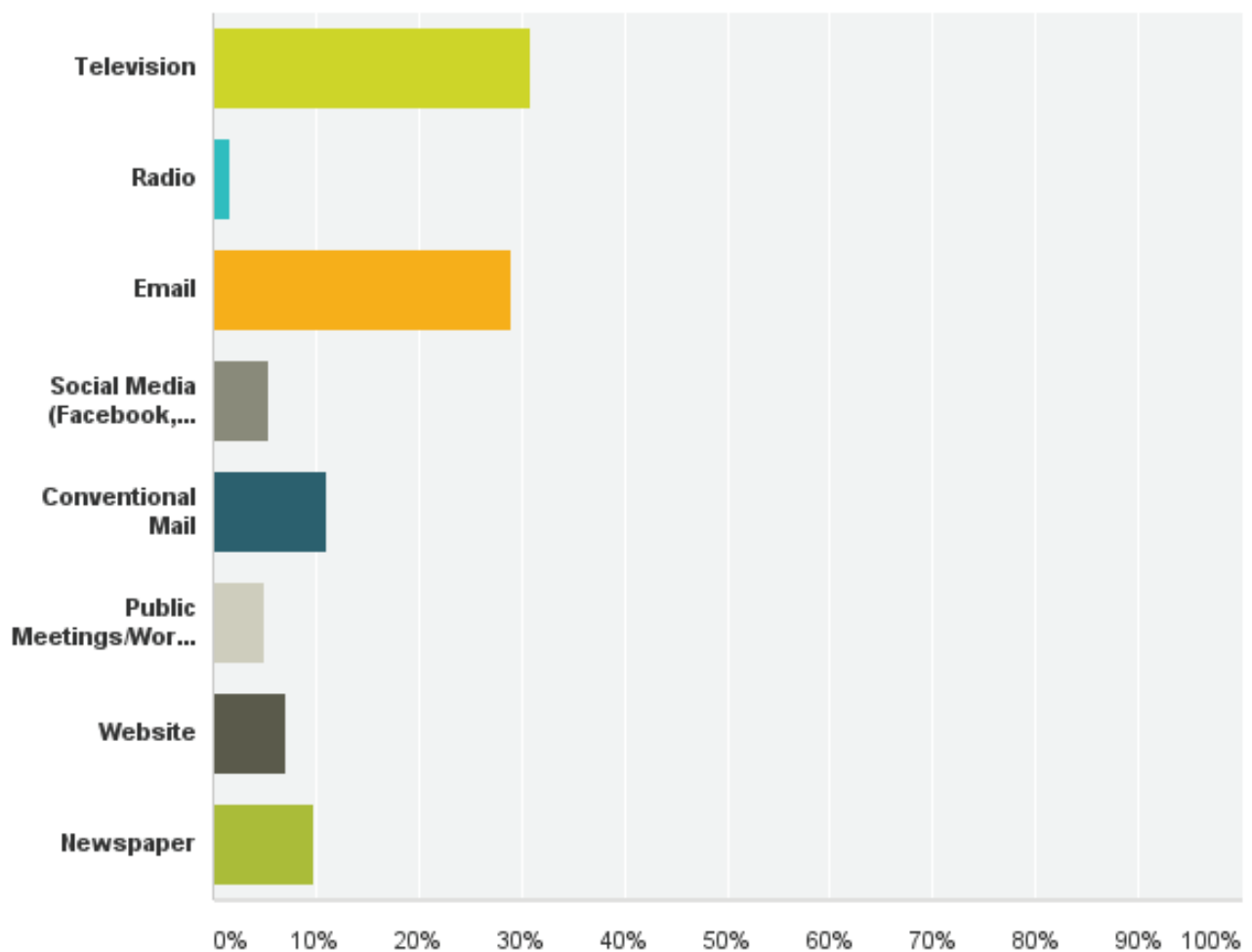
Here respondents indicated that while a majority of households are ready to some degree in the event of a disaster, that further planning is required for complete confidence in their level of preparation. These responses validate the continuing efforts of public agencies to provide information on household-level emergency planning.

## Question 8

In regard to which methods respondents preferred for communication of information on hazard preparation and planning, television was cited as the favorite with email and conventional mail following in second and third place respectively. Coordination with regional media such as that conducted by Beaufort County and Hilton Head Island are key strategies informed by these responses. Respondents also indicated the dominant role of computers in the dissemination of information, and now that smartphones are commonly used to access email, the importance of this method of communication is paramount. It should be noted that as this survey was distributed largely through email and online sources, it may disproportionately capture those with a preference for this media. Diverse strategies are required to reach audiences with a variety of preferences and differing levels of access to technology. The survey responses also support the continuing distribution of brochures and other literature through conventional mail.

# Q8 What is the best way for you to receive information on how to make your home and community more resistant to natural hazards?

Answered: 743 Skipped: 16





## Question 9

	Not important	Somewhat important	Very Important	Total	Weighted Average
Prevention - Examples include heightened standards for hazard-resistant construction, increased regulation of construction in hazard-prone areas as well as enhanced enforcement of existing regulations.	3.48% 25	33.01% 237	63.51% 456	718	2.60
Property Protection - Examples include relocation, elevation, structural repairs, and storm shutters.	2.60% 19	42.05% 307	55.34% 404	730	2.53
Natural Resource Protection - Examples include floodplain protection, habitat preservation, wetland restoration and forest management.	5.38% 39	34.48% 250	60.14% 436	725	2.55
Structural Projects - Examples include dams, levees, seawalls detention / retention basins, channel modification, retaining walls and storm sewers.	10.39% 74	36.52% 260	53.09% 378	712	2.43
Emergency Services - Examples include warning systems, evacuation planning, emergency response training, and protection of critical facilities or systems.	2.19% 16	12.02% 88	85.79% 628	732	2.84
Public Education and Awareness - Examples include outreach projects, school education programs, library materials and demonstration events.	4.14% 30	33.93% 246	61.93% 449	725	2.58

When asked to indicate the level of importance of community-wide hazard mitigation efforts respondents overwhelmingly favored investments in emergency services and critical facilities. The second most supported strategy related to prevention strategies such as hazard resistant construction standards, enforcement of building and zoning codes, and regulation of construction in hazard-prone areas. While these two categories achieved the greatest support, all strategies were endorsed to a large degree in the survey.

## Question 10

This section of the survey allowed respondents to provide additional comments on anything related to the survey, including issues that weren't addressed in the questions. Approximately 100 respondents chose to provide additional comments and the following table is a summary of the major themes that emerged. One of the issues of greatest concern was the expense and operation of storm shutters, particularly for seniors who may not have the required strength to place temporary protection measures. Another frequently raised issue was that of evacuation, not only relating to the potential for congestion, but also the confusion over designated routes, particularly for new residents.

## **Future Survey Design**

The significant level of participation and community input achieved through the survey process should inform the development of future hazard mitigation plans and planning processes. This process has the benefit of maximizing convenience for residents, while providing time and cost saving for planners. However, there are limitations which can be explored in future plans. For example, the distribution of the survey being largely through electronic means risks the over-representation of respondents with access to computers and preferences for electronic communication. Paper surveys were distributed in some areas, but this practice could be expanded in future plans.

In addition to distributing surveys to the County as a whole, surveys could be targeted to particularly vulnerable areas or populations, such as those identified in the SOVI analysis. Special needs populations, seniors, or Spanish-speaking residents all represent special interests that could be identified for a more in-depth exploration of their needs in emergency preparedness and recovery.

## **Appendix D: Steering Committee**

## **Objectives**

- a. Protect facilities from natural hazard threats.
- b. Identify and schedule repairs and other improvements needed in order to ensure buildings are in adequate conditions and with adequate equipment to function in the event of a disaster.

### **Goal #2 Evacuation is safe, efficient, and shelters have sufficient carrying capacity.**

## **Objectives**

- a. Evacuation routes should be proven safe and efficient. Counties work with each other and SCDOT on highways connecting the counties
- b. The number of area shelters should be adequate and safe for the amount of people that may potentially use them. The shelters should be able to accommodate all members of the area's population, including those with special medical or other needs.

### **Goal #3 Increase Public Education and Awareness of Natural Hazards**

## **Objective**

- a. Develop an ongoing public communications and education program including a web site, pamphlets, informational packets, and articles in the local media.
- b. Incorporate the use of social media, including Facebook™ and Twitter™ to ensure that as many segments of the population as possible are reached.

### **Goal #4 Enhancement and Adoption of New Policies and Projects to Mitigate Natural Hazards**

## **Objective**

- a. Plans, codes, zoning, and other mechanisms should address natural hazard mitigation, and expand on present policies to further protect the counties and incorporated municipalities (floodplains, repetitive loss areas, etc). All jurisdictions should adopt the state building code.

### **Goal #5 Emergency Response: Preparedness EMS, police, fire, and other departments should have sufficient and up to date equipment and training in order to ensure the safety of residents.**

## **Objectives**

- a. There should be funding to buy new equipment (e.g., communications and power) if necessary.
- b. There should be funding to train employees if necessary.
- c. Maintain and enhance working relationships among the departments among all four counties.
- d. Coordinate with the county and regional offices of the various state human services departments.

**Goal #6 Reduce the Impact of Wind on Homes and Buildings.** Wind damage is a threat to homes and buildings in the region. Means should be taken to decrease the effects of wind on homes and

buildings within the counties.

### **Objectives**

- a. Code revisions to reduce the impact of wind on homes and buildings.
- b. Grants, including SC Safe Homes, for preventative measures (such as housing grants).

**Goal #7 Reduce the Impact of Floods on Homes and Buildings. Projected sea-level rises in the Lowcountry will be included, utilizing such information and mapping as is currently available to help determine the areas and magnitude of impacts.**

### **Objectives**

- a. Zoning enforcement, floodplains.
- b. Grants for preventative measures, to include elevation and property acquisition.
- c. Building code revisions
- d. Stormwater management
- e. Work toward the lowering of the CRS rating.

~~**Goal #8 Ensure Maintain the Safety of Data. IT capabilities of local governments to ensure continuity of operations in the event of disaster**~~

### ~~**Objective**~~

- ~~a. Provide the counties and municipalities with the technology, equipment and training to back up important files.~~
- ~~a. Support the use of centralized technology, located as far inland as possible.~~
- ~~b. Develop a hosted (for instance, the “cloud”) storage system.~~

**Goal #9 Ensure the Protection and Continued and Uninterrupted Operation of Communications on a regional basis**

### **Objective**

- a. Communication lines should be frequently inspected and their capability and vulnerability assessed.
- a. Determine if the current regional communications infrastructure is adequate to meet the needs.
- b. Identify what improvements are needed.

**Goal #10 Ensure the Protection of Utilities**

## Objective

- a. Utilities must be inspected and assessed of their capability and vulnerability to handle natural disasters.

***This plans update will do a similar assessment and revision of implementation/action projects and activities undertaken since 2010.***



**MEETING NOTES**  
**Hazard Mitigation Steering Committee**  
**Meeting of the Policy Committee**  
**Thursday, September 24, 2015 – 10:00 a.m.**  
**Lowcountry Council of Governments Boardroom**

**Attendees**

**Beaufort County Staff**

Eric Larson-Director of Environmental Engineering

**Colleton County Staff**

Suzanne Gant-Emergency Manager

**Hampton County Staff**

Chris Allman-Director of Emergency Services

Blake Hodges-Director of Public Works

**Jasper County Staff**

Russell Wells-Deputy Director of Emergency Services

**Town of Hilton Head**

Marcy Benson-Senior Grants Administrator

**South Carolina Emergency Management Department**

Andrew Phillips-Hazard Mitigation Specialist

**LCOG Staff**

Ginnie Kozak-Planning Director

Jonathan Sherwood-Community and Regional Planner

Lawrence Holdsworth-Regional Planner

1. **Welcome and Introduction of Members**
2. **Progress Report on Plan Updates and Presentations on Three-Counties and Beaufort County Plans.**
  - a. Mr. Holdsworth and Mr. Sherwood gave presentations on the plan updates including an overview of FEMA plan requirements, updated economic, demographic, and meteorological data, information regarding the previous plan's recommendations, and updated goals and actions for the new plans.
  - b. Mr. Allman posed the question of whether the Hazus-MH software could distinguish between properties that had or had not obtained flood insurance. Mr. Phillips responded that due to matters of privacy, this data could not be provided for analysis.
  - c. Ms. Gant indicated interest in obtaining the number of buildings contained in flood zones. Mr. Sherwood said this was possible, and provided the approximate number of buildings for Colleton County.
  - d. Mr. Phillips described the limitation of the Hazus software in predicting the damage from storms when it is

## **Lowcountry Hazard Mitigation Plan Update: Steering Committee**

**Meeting #1, Thursday, February 5, 2015, 10:30 a.m.**

**Location: LCOG Boardroom**

### **Attendees**

Katie Norris	SCEMD
Charlotte Norris	SCEMD
Suzanne Gant	Colleton County EPA
Sirena Memminger	Colleton County EPA
Wilbur A. Daley	Jasper County ES
Russell Wells	Jasper County ES
Chris Altman	Hampton County Emergency Services Director
Greg Cook	Hampton County Fire/Rescue
Susanne D. Peebles	HC EMD
Chuck Atkinson	Beaufort County
John Webber	Beaufort County

### **Meeting Summary**

Since we focused our attention—very productively--on revising the Goals and Objectives (below) to bring them up to date and to better meet everyone's current and future needs, the following section takes the place of standard meeting notes. The yellow highlighted sections are the changes that were developed through our discussions.

### **Goals and Objectives Review and Revision**

As with the previous update, the planning process will include a review of whether and how well the goals and objectives developed in 2010 have been met and whether and how they need to be modified, updated or removed/replaced. Those goals and objectives are:

#### **Overall Guiding Principles:**

- Bridging the unique needs and common goals of the four counties and their communities.
- Saving lives and protecting property.
- Taking a regional approach.
- Complimenting the State Plan.
- Accessing funding to implement recommendations (projects and policies).

**Goal #1 Ensure the Protection of All Critical Facilities.**

applied strictly according to the Saffir-Simpson Hurricane rating scale. He related that the size of the storm in area, as well as the tide level on landfall can be highly influential in the storm's impact.

- e. Mr. Allman suggested the SCEMD Hurricane model as a valuable resource for predicting the extent of storms. Ms. Kozak responded that future meetings of the group could cover more technical aspects, including various approaches to modeling different hazards.
- f. Mr. Wells confirmed the accuracy of the wildfire ignition density map from Mr. Sherwood's presentation, informing the group that there is a proactive regime of prescribed burning occurring in Jasper County. Mr. Allman offered that the Clemson Extension has been integral to these efforts. Mr. Hodges described the accumulation of broomstraw as a potential risk factor for wildfire ignition. Ms. Gant commented that her office is typically not involved with wildfire prevention measures.

### **3. Review of Local Government Consultations.**

- a. Lists of contacts made by LCOG during the planning process were distributed to the attendees. No additions to the list were recommended.

### **4. Review of Public Involvement Process: Preliminary Result of Survey**

- a. Ms. Kozak described the need to reconsider the public involvement strategy for this planning process considering the sparse attendance at previous HMP public meetings. She noted that this experience has resulted in the current emphasis on electronic communication through Survey Monkey and social media, while using local newspapers and individuals to spread the word about the survey.
- b. Mr. Sherwood updated the group on the preliminary number of survey responses gathered through Survey Monkey. Mr. Sherwood said the majority of responses had come thus far from Beaufort County, and that LCOG would need the help of this group to distribute the survey within their jurisdictions.
- c. Ms. Gant volunteered that she had contacts that could help distribute surveys to populations that may not easily be reached through electronic means. Mr. Sherwood and Ms. Kozak suggested that LCOG could assist in providing paper surveys for Colleton County.

### **5. Review of Action Recommendations.**

- a. Mr. Holdworth related the potential for regional collaboration in providing a storage facility for donated emergency supplies. Mr. Wells said there are plans already in motion to provide such a facility in Jasper County, with several sites under consideration. He described the potential for this facility to be a location for emergency generators, another identified mitigation area. Mr. Allman said that Hampton County is planning for the use of an industrial site south of Varnville on Highway 278 for storage of emergency supplies. Mr. Allman described the generator issue as one of statewide concern, and suggested that there could be initiatives to approach it at that scale.
- b. Ms. Gant said that since the 2009 plan, Walterboro and Colleton County emergency dispatches had been consolidated.
- c. Mr. Allman reported that the County now had paid firefighters Monday through Friday.
- d. Mr. Sherwood recommended further engagement with the faith-based community in coordinating disaster response. Ms. Gant responded that there are existing SCEMD and Army Corps projects engaging civic associations, providing supplies and training from the Red Cross. Mr. Wells offered that religious affiliation requires consideration for sheltering post-hazard due to differences in customs. He indicated that further exploration of faith based groups for assistance with sheltering may improve the experience for evacuees with specific needs for accommodation.
- e. Mr. Sherwood proposed the use of intelligent traffic systems to reduce congestion in evacuation. Mr. Wells expressed concern over the lack of road widening on key evacuation routes such as 278, especially with the expanding population and industry in Southern Beaufort and Jasper County. Mr. Allman suggested that reversing lanes along key corridors could alleviate congestion, but is prohibited by SCDOT. Ms. Kozak said SCDOT designates major highways as evacuation routes, which may restrict the area's ability to consider alternatives.
- f. Mr. Allman broached the issue of a pending agreement between the counties and SCDOT for the clearance of

debris on state roads. Mr. Wells expressed concern over the terms of reimbursement for work completed. Mr. Larson emphasized the need for a coordinated approach between the counties in responding to the issue. Mr. Allman related that following a recent ice storm, Hampton County crews crossed county boundaries to bring SCE&G trucks to restore service, demonstrating the point that debris removal must be approached regionally. Mr. Hodges related the fact that for FEMA reimbursement, the regional approach must be codified, otherwise work done in other counties will not be reimbursed. Ms. Kozak suggested that the LCOG could play a role in bringing the counties, SCDOT and SCEMD together in a meeting to discuss future agreements for service provision. Kozak went on to stress the importance of this issue for the region for its relevance to issues beyond transportation. Mr. Allman recommended that an investigation of a mutual assistance agreement for debris removal could be incorporated into the HMP as a mitigation action.

- g. Mr. Allman offered another example of how the counties are working together to provide services and reduce hazard vulnerability. Allman described the fiber optic loop that connects the emergency dispatches and EOC's of Beaufort, Hampton, and Jasper. The provision of this connection ensures the continued operation of communications between facilities in the event of a disruption at a single location. Ms. Gant expressed interest in the potential of Colleton County becoming connected to this service.
- h. Mr. Allman commented that there are significant opportunities for grant funding through DHEC. Mr. Wells indicated the potential benefit of a regional grant writer to explore opportunities for funding cross-jurisdictional projects. Mr. Wells explained further that applications for regional projects rise quickly in the application process compared to those oriented to more parochial interests.

#### **6. Schedule for Completion and Submission to SCEMD**

- a. Ms. Kozak said the three-county plan was in the process of final revisions. Mr. Holdsworth suggested that a first draft of Beaufort County plan could be expected in the coming weeks.

## **Appendix E: LCOG Board Meeting**



## Lowcountry Council of Governments

Phone (843) 726-5536  
Fax (843) 726-5165  
Email: [office@lowcountrycog.org](mailto:office@lowcountrycog.org)  
Website: [www.lowcountrycog.org](http://www.lowcountrycog.org)

PO Box 98  
Yemassee, SC 29945-0098  
Delivery Address: 634 Campground Rd.  
Office at Point South: I-95 Exit 33 at US Hwy. 17

### **AGENDA**

**LOWCOUNTRY COUNCIL OF GOVERNMENTS BOARD OF DIRECTORS MEETING  
THURSDAY, OCTOBER 22, 2015  
6:30 P.M.  
POINT SOUTH, SOUTH CAROLINA**

Fellowship begins at 6:00 p.m.

1. Call to Order
  - 1.1. Pledge of Allegiance
  - 1.2. Invocation
  - 1.3. Introduction of Guests and Staff
  - 1.4. Proxies
  - Action 1.5. Approval of September 24, 2015 Minutes \*
  - Action 1.6. Approval of 2016 Meeting Schedule \*
2. Presentation
  - 2.1. Presentation of the LCOG Agency Audit for Fiscal Year Ending June 30, 2015 – Lisa Wechsler \*
3. Reports
  - 3.1. Finance Report for September 2015 – Sherry Smith  
*Report to be distributed during the meeting*
  - 3.2. Community and Economic Development Report – Michelle Knight \*
  - 3.3. Director's Report – Sabrena Graham \*
  - 3.4. Planning Report – Ginnie Kozak
    - 3.4.1. Update on Hazard Mitigation Plan
    - 3.4.2. SCDOT Quarterly Report – For information
    - 3.4.3. The People and the Economy of the Lowcountry Report \*
    - 3.4.4. 208 Report – For information \*
    - 3.4.5. Regional Unemployment Chart – For information \*
4. Council Time
- Action 5. Adjourn

\* attachment

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Serving Beaufort • Colleton • Hampton • Jasper Counties

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LOWCOUNTRY COUNCIL OF GOVERNMENTS  
Board Meeting  
**ATTENDANCE, MILEAGE AND PROXY INFORMATION**

Date of Meeting: October 22, 2015

Board Member	Attended Meeting (Please Sign)	Proxy for (Print Name)	Mileage Reimbursement (Fill In Round Trip Miles To Request Payment)
<b><u>Beaufort County</u></b>			
Phil Cromer	<i>Phil Cromer</i>		
Gerald Dawson	<i>Gerald Dawson / CS</i>		<i>on file</i>
Brian Flewelling	<i>B. S. Flewelling</i>		<i>on file</i>
Herbert Glaze	<i>Herbert Glaze</i>		
Marc A. Grant			
Mary Beth Heyward			
Alice Howard			
Bill McBride	<i>Bill McBride</i>		<i>on file</i>
Joseph McDormick	<i>J. McDormick</i>		
Jerry Stewart	<i>Jerry Stewart</i>		<i>on file</i>
Lisa Sulka			
<b><u>Colleton County</u></b>			
Esther S. Black	<i>Esther S. Black</i>		
Bobby Bonds	<i>Bobby Bonds</i>		<i>on file</i>
Jane Darby	<i>Jane Darby</i>		
Joseph Flowers	<i>Joseph Flowers</i>		<i>on file</i>
Tommy Mann			
Evon Robinson			
Gene Whetsell	<i>Gene Whetsell</i>		
<b><u>Hampton County</u></b>			
Frankie Bennett	<i>Frankie Bennett</i>		<i>on file</i>
Pete Hagood	<i>P. Hagood</i>		<i>on file</i>
Pete Mixson	<i>Pete Mixson</i>		<i>on file</i>
Buddy Phillips	<i>Buddy Phillips</i>		<i>on file</i>
Nat Shaffer			
<b><u>Jasper County</u></b>			
Henry Etheridge			
Henry Lawton	<i>Henry Lawton</i>		
Joey Malphrus	<i>Joey Malphrus</i>		
Gwen Smith	<i>Gwen Smith</i>		<i>on file</i>
Michael Sweeney	<i>Michael Sweeney</i>		<i>67 miles</i>