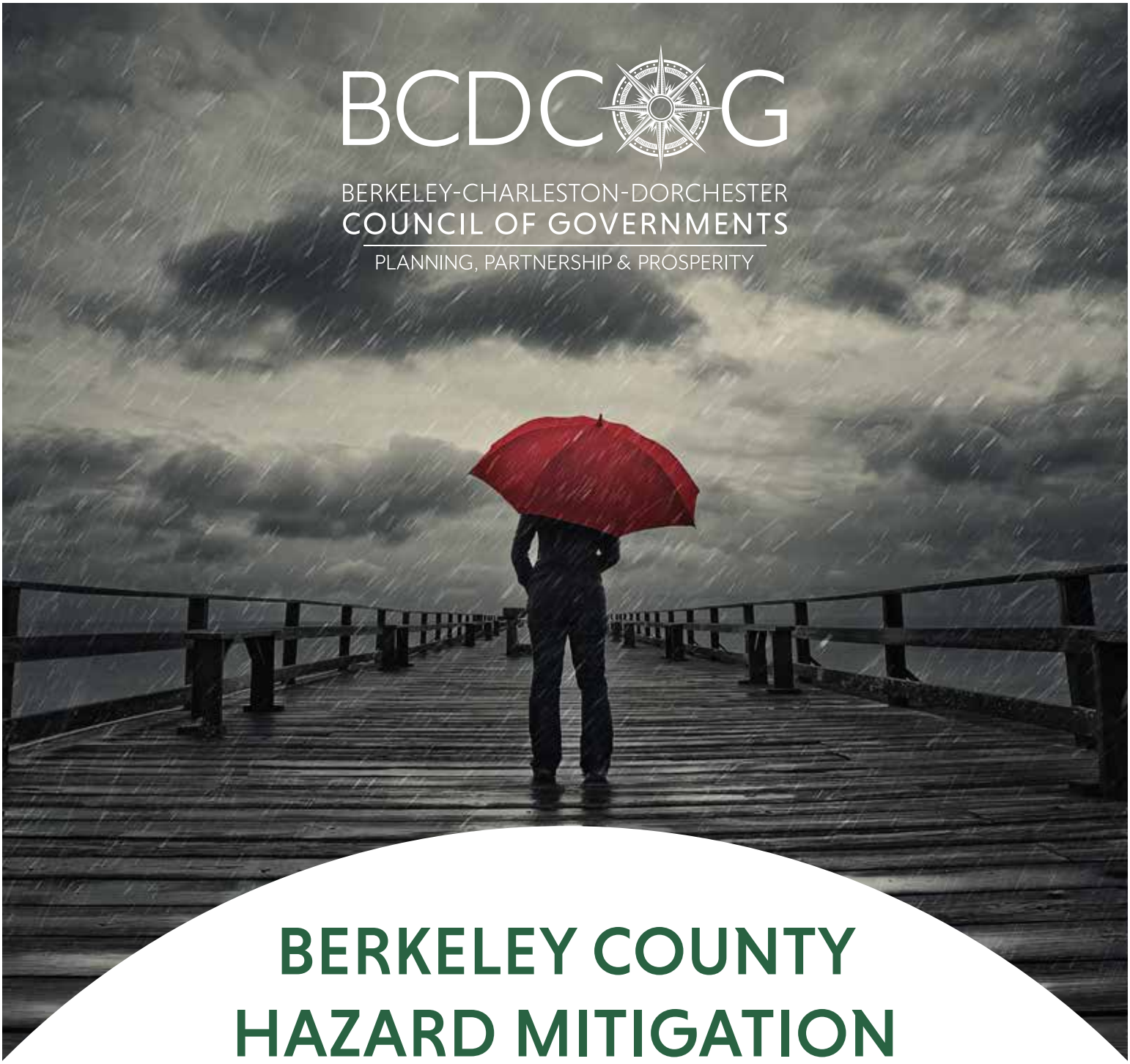

BCDCOG

BERKELEY-CHARLESTON-DORCHESTER
COUNCIL OF GOVERNMENTS

PLANNING, PARTNERSHIP & PROSPERITY

BERKELEY COUNTY HAZARD MITIGATION PLAN

April 6, 2020
Update

BERKELEY
COUNTY SC

RICH HISTORY.
BRIGHT FUTURE.
One Berkeley

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EXECUTIVE SUMMARY

Berkeley County is threatened by various types of hazards. These natural and man-made hazards endanger the health and safety of the citizens of the County, jeopardize economic vitality, and imperil the quality of the environment. Berkeley County contracted with the Berkeley-Charleston-Dorchester Council of Governments (BCDCOG) to facilitate a comprehensive planning process for this update of the Berkeley County Hazard Mitigation Plan (BCHMP). This BCHMP update document adheres to the planning process developed for local governments as well as South Carolina's Emergency Management Department, which will incorporate the County's plan into its statewide hazard mitigation plan.

To develop this BCHMP update, BCDCOG and Berkeley County staff implemented a planning process using detailed analyses to identify the hazards threatening Berkeley County, assess the relative risks posed by those hazards, and propose strategies to meet mitigation objectives and goals. Hazard event and mitigation planning information is compiled from numerous sources including the University of South Carolina Hazards and Vulnerability Research Institute (HVRI), the South Carolina Emergency Management Division (SCEMD), the South Carolina Forestry Commission (SCFC), the Special Hazard Events and Losses Database (SHELDUS), and the Lowcountry Hazards Lab at the College of Charleston (CofC). Additionally, the Social Vulnerability Index (SoVI) and the Baseline Resilience Indicators for Communities (BRIC) from HVRI are reviewed for overall County-level vulnerability and the United States Center for Disease Control (CDC) Social Vulnerability Index (SVI) is used to assess the potential vulnerable areas at census tract-level within Berkeley County. These are measures that the Federal Emergency Management Agency (FEMA) will use throughout a disaster event to determine where aid is needed.

The BCDCOG and Berkeley County Emergency Preparedness Department (BCEPD) convened a committee and met individually with stakeholders that included local government planners, emergency managers, administrators, utilities, and others to assist in steering the planning process. This group, along with other community representatives, worked to identify projects and programs that will reduce hazard vulnerabilities and increase recovery resources. These resulting projects and programs are entered as "Mitigation Action Plans" in this document. Mitigation Action Plans are developed by each jurisdiction for implementation as resources become available. Through these combined efforts, the risks to life and property are reduced and Berkeley County and its communities will become more resilient.

This document details the work required to develop the planning organization, undertake the required analyses, and coordinate the mitigation initiatives proposed by the participating jurisdictions. This 2020 document is an update to the 2015 Berkeley County Hazard Mitigation Plan update approved by FEMA and adopted by the local governments. When implemented, it is anticipated that this 2020 BCHMP update will make the people, neighborhoods, businesses and institutions of Berkeley County safer from the impacts of future hazard events.

INTRODUCTION

A disaster or natural hazard may impact residents at any time and frequently without warning. Some hazards may be common or obvious, but others infrequent or undetectable. Impacts of hazards may range from minor to catastrophic. Hazards have the potential to cause evacuations, confine residents to their homes, disrupt basic municipal services, or cause loss of life and/or property. Although a community cannot always predict when and where a hazard will occur, it can plan ways to reduce the risk of damage and loss during a hazard event and allocate resources afterward. Local hazard mitigation planning can aid in protecting a community from loss of life, property, natural resources, and money. The Federal Emergency Management Agency (FEMA) defines local hazard mitigation planning as:

> *"the representation of the jurisdiction's commitment to reduce risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards."*
>
> *(FEMA Interim Rule)*

HAZARD MITIGATION PLAN BACKGROUND

Berkeley County is located in the South Carolina Lowcountry and covers about 1,230 square miles. From 2010 to 2018, Berkeley County was ranked the 3rd fastest growing (by percentage change) in South Carolina and the 37th fastest growing in the United States according to American Fact Finder. The robust growth of Berkeley County amplifies the need for sound hazard mitigation planning. The County is susceptible to several hazards. However, the geographic location and proximity to certain hazards introduce greater potential impacts for Berkeley County than for some other South Carolina counties. For example, the Francis Marion National Forest introduces the potential for wildfires and the dams of Lake Marion, Lake Moultrie, and the Goose Creek Reservoir present greater potential for flooding impacts due to dam failure. A detailed list of potential hazards is included in this document.

The Disaster Mitigation Act of 2000, which amended the Stafford Act, requires that local jurisdictions and states have a FEMA-approved hazard mitigation plan to receive funding from the Hazard Mitigation Grant Program. This amendment shifts emergency management programs away from the response and recovery role and encourages "the identification of hazards before they occur, preventing future losses, and minimizing the impacts of disasters." FEMA concludes that hazard mitigation planning is "a process of determining how to reduce or eliminate the loss of life and property damage resulting from natural and human-caused hazards" (FEMA How-To Guide – Getting Started). The Act further requires local governments to update their hazard mitigation plans every five years.

The BCDCOG coordinated the Berkeley-Dorchester Counties' Hazard Mitigation Plan in 2010 on behalf of Berkeley and Dorchester Counties and their member local governments. In 2015, the BCDCOG then updated the Hazard Mitigation Plan for Berkeley County to meet the requirements of the Disaster Mitigation Act. The planning process for this 2020 BCHMP update includes a comprehensive identification of the potential hazards faced by Berkeley County, an assessment of the vulnerabilities and risks to life and property, and proposed strategies to mitigate those risks with the goal of making the County and its communities more resilient to hazard impacts.

PURPOSE OF HAZARD MITIGATION PLANNING

Emergency Management has traditionally focused on preparedness through identifying resources, expertise, and deployment procedures in advance of a disaster. However, contemporary models consider an expanded Emergency Management cycle that "begins" with a Mitigation Phase. The cycle starts with Hazard Mitigation which leads to Disaster Preparedness. When a Disaster occurs, Response and then Recovery follow. Then the cycle begins again with improved mitigation techniques. This cycle can be visualized as follows:

The Mitigation Phase of Emergency Management involves efforts to prevent or reduce the damaging effects of Disasters. For municipalities, these efforts may take the form of programs to help residents develop resources and wealth, dangerous tree and building removal, hardened public buildings and infrastructure, increased building code requirements, and overall sound sustainability planning. For businesses and individuals, hazard mitigation may include buying appropriate insurance, using enhanced building construction techniques, evacuation and sheltering-in-place planning, and business continuity preparations. Many hazard mitigation plans may include activities that could arguably fall into other phases of the Emergency Management cycle and all of the factors taken together can be considered a measure of a community's resiliency.

According to FEMA, developing hazard mitigation plans enables state, tribal, and local governments to:

- Increase education and awareness around threats, hazards, and vulnerabilities;
- Build partnerships for risk reduction involving government, organizations, businesses, and the public;
- Identify long-term, broadly-supported strategies for risk reduction;
- Align risk reduction with other state, tribal, or community objectives;
- Identify implementation approaches that focus resources on the greatest risks and vulnerabilities; and,
- Communicate priorities to potential sources of funding.

The BCHMP describes the planning process developed by BCDCOG and Berkeley County, summarizes the results of the hazard identification and vulnerability assessment process, and addresses the current policy basis for hazard management by participating jurisdictions and organizations. The BCHMP also documents structural and non-structural mitigation initiatives proposed by the participating jurisdiction to address the identified vulnerabilities. The purpose of the BCHMP is to:

Provide a Methodical and Substantive Approach

The approach used for the BCHMP update continues to rely on the application of sound planning concepts in a methodical process to identify vulnerabilities to future disasters and to propose the mitigation initiatives necessary to avoid or minimize those vulnerabilities. Each step in the planning process builds upon the previous, providing assurance that the mitigation initiatives proposed have a valid basis for their justification and priority for implementation. The planning process is documented and presented to the community.

Enhance Public Awareness and Understanding

The leadership of Berkeley County seeks ways to make residents more aware of natural and man-made hazards that threaten public health and safety, economic vitality, and operational capabilities of the government. The BCHMP identifies hazards threatening Berkeley County and provides an assessment of the relative level of risk they pose. The plan also includes proposals to avoid or minimize vulnerabilities and to increase resources. This information will be helpful to individuals that wish to understand how the community could become safer from, and more resilient to, the impacts of future disasters.

Create a Decision Making Tool

The BCHMP provides information needed by local government leaders, municipal staff, businesses and industries, community associations, and other key stakeholders to prioritize, allocate resources, and act to address hazard-related risks. The plan also proposes specific projects and programs intended to eliminate or minimize those risks. These Mitigation Action Plans include strategies ranked as high, medium, or low priority.

Promote Compliance with State and Federal Program Requirements

A number of state and federal grant programs, policies, and regulations encourage or mandate local governments to develop and maintain comprehensive hazard mitigation plans. The planning process seeks to assist each participating local government in complying with these requirements and to enable them to more fully and quickly respond to funding opportunities for related projects. The BCHMP defines, justifies, and prioritizes initiatives that have been developed through a valid hazard analysis and vulnerability assessment to assist local jurisdictions with their funding applications.

Influence Local Policies

One component of the planning process is an analysis of existing policies, programs, and regulations for the management of growth and development in Berkeley County. This includes an inventory of current mitigation-related policy and comparison to potential hazards that threaten the jurisdiction and the relative risks they pose to the community. When the risks posed to the community by a specific hazard are not adequately addressed in the community's policy or regulatory framework, the impacts of hazard events can be more severe. Collaborative efforts between the County and jurisdictions can assist in improving community preparedness.

Improve Inter-Jurisdictional Coordination

Proposals for mitigation initiatives are reviewed and coordinated among the participating jurisdictions within the County to develop confidence that mitigation initiatives proposed by one jurisdiction or organization, when implemented, will be compatible and mutually beneficial with the interests of adjacent jurisdictions.

RELATED PLANNING EFFORTS IN THE REGION

South Carolina Emergency Management Division 2019-2021 Multi-Year Training and Exercise Plan (MYTEP)

The SCEMD approved the MYTEP in December of 2018 for the purpose of coordinating exercises with South Carolina Law Enforcement Division (SLED), the South Carolina Department of Health and Environmental Control (DHEC), and the South Carolina Department of Public Safety (DPS), as well as numerous county and local response agencies. MYTEP supports the South Carolina Department of Homeland Security (DHS) and Emergency Management strategies. MYTEP provides training and exercises developed from a state-level Threat and Hazard Identification and Risk Assessment. Within the MYTEP training schedule is a focus on hazard mitigation that includes training regarding community resilience, vulnerability reduction, risk assessment, and hazard identification.

South Carolina Hazard Mitigation Plan October 2018 Update

The South Carolina Hazard Mitigation Plan (SCHMP) outlines the state's strategy for hazard mitigation goals, actions, and initiatives. The SCHMP was adopted in 2004 and updated in 2018. This is the guiding document for hazard mitigation plans throughout South Carolina.

Our Region, Our Plan

"Our Region, Our Plan" is a regional land use planning initiative of the BCDCOG completed in December of 2012. This Vision Plan defined the future of the Berkeley-Charleston-Dorchester (BCD) region to serve as a guide for the next 30 years and set the stage for individual actions which will lead to long-term success in growth management. The regional land-use plan employs a scenario-based approach, wherein several disparate growth scenarios are evaluated; and the strategies were developed so that the region will grow more resilient to hazards and threats. The evaluation and implementation strategies are based on social and economic vulnerabilities. Performance measures include evaluating cost effectiveness, public service efficiency, and environmental sensitivity, among others.

Berkeley County, Charleston County, and Dorchester County Comprehensive Plans

The Counties of Berkeley, Charleston, and Dorchester have Comprehensive Plans that were reviewed for goals and strategies that may impact or complement the BCHMP. Berkeley County's Comprehensive Plan was approved in 2010 with a 2017 update available, Charleston County's Plan was updated in 2018, and Dorchester County's Plan update was adopted in 2019.

Berkeley County Emergency Operations Plan (EOP) – BASIC PLAN

Berkeley County government maintains a plan to aid in the preparation for any emergency or disaster through the Berkeley County Emergency Preparedness Department (BCEPD). The EOP utilizes the National Incident Management System (NIMS) and coordinates efforts to prevent, prepare for, respond to, and recover from

incidents. This method is called the Incident Command System (ICS) and is critical to have in place prior to emergency events. The EOP primarily focuses on aspects and needs for hazard response and recovery.

Community and Regional Resilience Institute (CARRI)

In 2007, the CARRI chose the BCD Region as one of three communities to participate in a resilience study. Investigators studied the history of the region's resiliency and identified the areas of transportation and communications as vulnerabilities. CARRI helped to establish a common framework, including processes and tools, that communities and regions can use to assess their resilience, determine a resilience vision and take concrete actions that will have positive economic and social results.

Francis Marion National Forest Revised Land Management Plan

The Francis Marion National Forest Land Management Plan (Forest Plan) is a 15-year general management plan for the Francis Marion National Forest that became effective May 1, 2017. The Forest Plan focuses on an integrated vision of ecological, economic, and social sustainability using an adaptive management approach. The Forest Plan identifies regional threats to the forest's resource zones that include hazards such as climate change, sea-level rise, salt-water infiltration, and wildfires. The strategies suggested in the Forest Plan can be integrated with the strategies developed in the BCHMP to reduce the overall risks of loss to Berkeley County.

Dam Safety Plan

The South Carolina Dams and Reservoirs Safety Act (DRSA) was passed in 1977 to protect the lives and property of its citizens by reducing the risk of dam failure. The law gives authority to the Department of Health and Environmental Control (DHEC) to regulate dams in South Carolina. This authority grants DHEC the right to issue new regulations, require permitting, perform inspections and monitoring, enforce compliance to the DRSA and public education.

Included in the DRSA is a requirement that all owners of High and Significant Hazard potential dams are required to have and maintain an Emergency Action Plan (EAP). These plans identify potential incidents that could lead to emergency conditions at a dam, pinpoint the areas that may be affected and specify pre-planned actions to minimize property damage, loss of infrastructure and water resources, and loss of life.

HAZARD MITIGATION PLAN SCOPE

The BCHMP has been created and will be maintained to address the hazards determined to affect Berkeley County, South Carolina. Other hazards may be considered and defined, but will not be fully assessed in this plan. The geographic scope of the BCHMP includes participating jurisdictions within Berkeley County as follows:

Table 1: Participating BCHMP Jurisdictions in Berkeley County

PARTICIPATING BERKELEY COUNTY JURISDICTIONS	NAME OF REPRESENTATIVE	TITLE
Town of Bonneau	Rembert Wren	Mayor
City of Goose Creek	Daniel Moore	Assistant City Administrator
City of Hanahan	Mike Cochran	City Administrator
Town of Jamestown	Douglas Guerry	Council Member
Town of Moncks Corner	Doug Polen	Community Development Director
Town of St. Stephen	John Rivers	Mayor

Small areas of the City of North Charleston and the Town of Summerville are also located in Berkeley County. However, because the majority of these municipalities are located in Charleston and Dorchester counties, they are covered by their respective county and were not included in this document. Additionally, a portion of the City of Charleston is located within Berkeley County on Daniel Island. Unlike its counterparts, Daniel Island was specifically considered in the Berkeley County mitigation efforts and plans. There are no new jurisdictions participating in the planning process. All six local jurisdictions continue to participate.

The BCHMP was developed in accordance with the current regulations governing local hazard mitigation and is monitored and updated to ensure continued compliance.

PARTICIPANTS IN THE PLANNING PROCESS

The Berkeley County Council consists of eight district representatives and the County Supervisor who are all elected. The Council is the group that makes the official decisions regarding the planning process. The Berkeley County Council will approve the final BCHMP after the review by the South Carolina Emergency Management Division (SCEMD) and FEMA.

The Berkeley County elected officials are:

NAME	TITLE
Johnny Cribb	County Supervisor
Dan Owens	District 1 Councilmember
Josh Whitley	District 2 Councilmember
Phillip Obie II	District 3 Councilmember
Tommy Newell	District 4 Councilmember
Brandon Cox	District 5 Councilmember
Jack Schurlknight	District 6 Councilmember
Caldwell Pinckney Jr.	District 7 Councilmember
Steve Davis	District 8 Councilmember

The 2020 BCHMP update planning team consisted of professional planners from the BCDCOG and members of the Berkeley County Hazard Mitigation Committee (HMC). The HMC members were selected to represent local governments, agencies, and other organizations to help guide the planning process. As public-sector planners, municipal administrators, and private-sector stakeholders, the HMC members represent a cross-section of Berkeley County regional interests. The HMC coordinated the analyses and planning activities that are fundamental to development of this plan. These activities included conducting the hazard identification and vulnerability assessment and receiving and coordinating the mitigation initiatives from the participating jurisdictions for incorporation into the BCHMP. The HMC was also responsible for updating the mitigation goals and objectives.

Although there were other involved stakeholders from the participating jurisdictions and interests, the core members of the HMC included:

Table 2: HMC Core Members

NAME	TITLE	ORGANIZATION
Benjamin Almquist	Emergency Preparedness Director	Berkeley Co. Government
Penny Ayers	Floodplain Manager	Berkeley Co. Planning and Zoning
Craig Nessel	GIS Analyst	Berkeley Co. GIS
Victoria Marshall	Grants Administrator	Berkeley Co. Grants Administration
Thurman Simmons	Senior Stormwater Compliance Specialist	Berkeley Co. Stormwater Management
Danny Thrower	Director of Infrastructure	Berkeley Co. Supervisors Office

A number of Berkeley County Emergency Responders attended meetings, including representatives from the Berkeley County Amateur Radio Emergency Service (ARES), the South Carolina Department of Health and Environmental Control, and police and fire personnel. However, these attendees were not regular HMC members. Their attendance was documented on the sign-in sheets in Appendix III.

The HMC reviewed input from all stakeholders and analyzed each section of the plan, incorporating elements of prior planning efforts while adding or revising elements that had changed over time or had grown in terms of public awareness or priority.

PUBLIC PARTICIPATION

The BCDCOG and Berkeley County EPD staff conducted outreach for the 2020 update to the BCHMP planning process that included:

- an inclusive planning committee (the HMC);
- a survey open to the public on the internet and at public meetings;
- development and maintenance of a project web page; and,
- public meetings and presentations.

Identifying and assembling stakeholders was an early step in the hazard mitigation planning process. Berkeley County EPD staff contacted those persons and organizations that participated in the 2015 BCHMP update and identified additional stakeholders that were asked to participate based upon their involvement with similar initiatives. Contact was made with other local government staff, including planners, emergency managers, and emergency responders from Berkeley County and all six municipalities located within the County.

Berkeley County meets quarterly with all of the emergency managers (county, municipal, and hospitals) in the Berkeley-Charleston-Dorchester area. The county EMD also has a quarterly Region 5 (Berkeley, Charleston, Clarendon, Dorchester, Georgetown, Orangeburg, Sumter, and Williamsburg counties) meeting with state officials from SCEMD, DHEC, and other partners to discuss preparedness and hazard mitigation.

In addition to the fact that all municipalities within Berkeley County participate in the hazard mitigation planning process, several municipalities have physical borders that extend beyond Berkeley County. The neighboring communities of the City of North Charleston and the Town of Summerville, for instance, are both located within Berkeley County, Charleston County, and Dorchester Counties. Additionally, according to the U.S. Census, residents from Charleston, Dorchester, Georgetown, Orangeburg and Williamsburg counties commute to Berkeley County for work. These cross-jurisdictional boundaries allow for wider audiences at public outreach events.

A nine-question survey was developed by the BCDCOG staff and the HMC. The intent of the survey was to gauge respondents' perceptions of their vulnerability to hazards. The survey allowed for open-ended responses to questions regarding past hazard impacts and recovery assistance, and asked for suggestions on what mitigation or recovery strategies might work best in each community. Responses were gathered on-line and in person at public meetings. The results of survey can be found in Appendix II.

The general public was made aware of the hazard mitigation planning process and how they may participate through the community calendar and public announcements. All meetings and agendas were announced in advance and open to the general public. Meetings of the HMC were conducted in Berkeley County. Meeting times and dates were made available online, posted at the town halls, and/or posted to a BCDCOG web page dedicated to the 2020 BCHMP Update.

Several planning and public meetings were held throughout the hazard mitigation planning process, as detailed in the project timeline in the table below. Berkeley County Hazard Mitigation Planning Committee members who were unable to attend working sessions were contacted by staff, individually interviewed, and made aware of additional online resources.

Table 3: BCHMP Meeting Log

MEETING DATE	PLACE	MEETING PURPOSE	ATTENDING
March 2019	BCDCOG	Initial scoping meeting and formation of the HMC	BCDCOG and Berkeley County Staff
April 2019	Berkeley County Administration Building – Assembly Room	Initiation of Plan Update before Committee and Council	BCDCOG, County Staff, Justice and Public Safety Committee, and County Council
June 7, 2019	Berkeley County Administration Building – Assembly Room	Stakeholder Session #1	BCDCOG Staff, HMC Committee, Jurisdiction Stakeholders
July 25, 2019	Berkeley County Administration Building – Assembly Room	Displays and Public Input	BCDCOG Staff, HMC Committee, General Public
September 10, 2019	City of Hanahan	City Council Meeting	BCDCOG Staff, Hanahan City Council, Staff, and Citizens
October 11, 2019	Berkeley County	Stakeholder Session #2	BCDCOG, County Staff
November 12, 2019	City of Goose Creek	City Council Meeting BCDCOG	BCDCOG Staff, Goose Creek City Council, Staff and Citizens
November 18, 2019	Town of St. Stephen	Town Council Meeting	BCDCOG Staff, Town of St Stephen Council, staff and Citizens
December 3, 2019	Town of Jamestown	Town Council Meeting	BCDCOG Staff, Town of Jamestown, staff and Citizens
December 16, 2019	Town of Bonneau	Town Council Meeting	BCDCOG Staff, Town of Bonneau, staff and Citizens
December 17, 2019	Town of Moncks Corner	Town Council Meeting	BCDCOG Staff, Town of St Moncks Corner, staff and Citizens
December 18, 2019	Berkeley County Council Meeting	Plan update to County Council	BCDCOG Staff, HMC and General Public
March 5, 2020	Daniel Island Public Library	Public input	BCDCOG staff, Daniel Island Citizens
August 2020	Berkeley County Council Meeting	Plan approval by County Council	County Council and General Public

Attendance is documented in Appendix III.

Meeting updates, display materials, and presentations were included on a website page hosted by the BCDCOG at https://bcdcog.com/bchmp/ . The BCHMP 2020 update page provided contact links for key BCDCOG and Berkeley County staff members as well as details on the project.

The BCDCOG staff provided multiple opportunities for public input at committee meetings, town council meetings, county council meetings, and community meetings. The typical features of these meetings included display boards, interaction with the public and officials, presentations, open questions, and input on survey forms.

Copies of the draft plan were available online and at the respective jurisdiction's offices prior to the public hearing and council approval. Notices of public hearings and meetings were posted in accordance with the jurisdiction's public notice requirements. The final draft of the 2020 BCHMP update document will be available online and for public inspection at the Berkeley County Administration Center in Moncks Corner before Berkeley County Council's final approval. Notices of the Public Meetings via media outlets throughout the region are listed in Appendix I: Public Notifications.

PLANNING PROCESS

The BCDCOG, Berkeley County EPD, HMC, and participating jurisdictions followed a hazard mitigation planning process that used these steps:

1. Hazard Identification
2. Vulnerability Assessment
3. Mitigation Capabilities Evaluation
4. Development of Community Goals
5. Establishment of Mitigation Action Plans

Step 1: The ***Hazard Identification*** step considered natural hazards that have occurred in Berkeley County and identified those that may yet occur. This step included a review of prior plans and historical data and established profiles for each type of potential hazard. Representatives of the participating jurisdictions reviewed the data collected and revised the list of hazard events accordingly. Public input was also considered to help identify the impacts of less obvious or previously unknown types of hazards.

Step 2: After identifying existing or potential natural hazards, participating communities assessed the ***Vulnerability*** of their jurisdictions using data from the South Carolina Hazards and Vulnerability Research Institute (HVRI), the South Carolina Emergency Management Division (SCEMD), the South Carolina Forestry Commission (SCFC), the Special Hazard Events and Losses Database (SHELDUS), and the Lowcountry Hazards Lab at the College of Charleston (CofC). Additionally, the Social Vulnerability Index (SoVI) and the Baseline Resilience Indicators for Communities (BRIC) from HVRI were reviewed for overall County-level vulnerability and the United States Center for Disease Control (CDC) Social Vulnerability Index (SVI) was used to assess the potential vulnerable areas at census tract-level within Berkeley County. The SVI assessment uses geographic, economic, and demographic data and trends to determine vulnerability characteristics of the communities and how those characteristics may manifest in the response to hazard events or disasters. Using these data sources provides an objective way to look at hazard preparedness, establishes a basis for hazard mitigation, and provides the existing conditions of hazards and the population and property at-risk.

Step 3: The ***Mitigation Capabilities Evaluation*** examines the existing capability of Berkeley County to address hazard vulnerability and hazard mitigation. The individual communities evaluated their current regulations and plans in terms of suitable mitigation activities. This process, coupled with public input, helped to identify any gaps in local mitigation activities and policies to make the communities more hazard-resistant. Recommendations may include amendment and adoption of local building codes, zoning ordinances, floodplain regulations, comprehensive plans, and capital improvement programs; among other local planning, programming and budgeting tools available to public officials (see Step 5).

The above three assessments form the base of knowledge required to design the hazard mitigation strategies of Berkeley County.

Step 4: ***Community Goals*** were developed and prior plan goals were reviewed by the HMC and individual communities for this BCHMP. Where necessary, goals were updated and reprioritized during this step.

Step 5: The ***Mitigation Action Plans*** were created by each participating jurisdiction. These action plans represent a full spectrum of activities that a jurisdiction could undertake to mitigate loss resulting from a disaster, if funding for the activity becomes available. The activities included in each jurisdiction's action plans achieve one or more of the goals or objectives of the BCHMP. The inclusion of an action plan is one of the requirements for a jurisdiction for satisfactory participation in the BCHMP.

The planning process included a review of all existing local planning documents for the associated jurisdictions. The goals and priorities of existing plans and policies provided guidance for the goals and actions associated with the BCHMP. Documents reviewed included emergency operation plans, comprehensive plans, redevelopment plans (including Tax Increment Financing districts), capital improvement programs, zoning ordinances, land development regulations, and stormwater management ordinances.

PROJECT TIMELINE

Table 4: Project Timeline and Scope of Work for BCHMP Update 2020

DESCRIPTION OF TASK	TIMELINE
Hazard Mitigation Planning Committee Meetings	April 2019
Public Involvement	June-December 2019
Natural Hazards Assessment Update	March- December 2019
HMP Goal Setting with Committee/Staff	June-July 2019
HMP Mitigation Strategies and Activities Update with Communities and Committee	July-December 2019
Draft of HMP Update to Committee	December 2019
Final HMP Update Approved by Committee	January 2020
Berkeley County/City/Town Adoption of Plan	Summer 2020
Project Closeout	Fall 2020

ORGANIZE RESOURCES

BCDCOG staff convened a planning committee, as described in previous sections, and assembled data sets and resources necessary to update the 2020 BCHMP.

- BCDCOG identified stakeholders and called the first meeting of the Berkeley County Hazard Mitigation Planning Committee in March 2019. Prior to this,
  - *Public notice was made in accordance with BCDCOG procedures for notification.*
  - *The first Hazard Mitigation Plan meeting in February entailed a brief review of the 2015 Plan and a discussion of the 2020 Update process.*
- Berkeley County EMD established a web page dedicated to the 2020 BCHMP Update on its website, www.berkeleycountysc.gov/drupal/dept/EPD. The 2015 Plan was posted on this page, as were other resources related to the 2020 BCHMP Update.

ASSESS RISKS AND DEVELOP A MITIGATION PLAN:

April–November 2019

- BCDCOG staff provided an overview of the of 2020 BCHMP Update at the Berkeley County Council meeting. No public comments were received.
- BCDCOG staff presented an overview of the 2020 BCHMP Update at the BCDCOG Board of Directors meeting in June 2019.
  - *Staff explained the purpose of the plan and the type of input sought from stakeholders.*
  - *No comments were made by the Board or the public in attendance.*
- BCDCOG convened the Planning Committee's second meeting in July
  - *Staff advised the group regarding its progress toward updating the risks assessment.*
  - *The Planning Committee revisited goals and objectives of the 2015 Plan for inclusion in the 2020 Plan Update.*
- BCDCOG presented the draft copy of the 2020 BCHMP at municipal City/Town Council meetings for input July-December 2019. Meetings conducted are listed in the previous section.
- BCDCOG provided stakeholders with the project update on December 18, 2019.
  - *BCDCOG staff presented changes incorporated into the plan since the last update*
  - *BCDCOG gave a progress update, provided next steps and discussed a timeline*
  - *Berkeley County EPD staff reviewed the goals and procedures of the plan*
  - *Copies of the draft were provided to the members for review and comment*

- BCDCOG and Berkeley County Emergency Management staff conducted a presentation on the BCHMP process on February 2020 on Daniel Island; the presentation detailed the project planning process including how residents of Berkeley County could become engaged in providing public input. No members of the public attended.
- After the plan was presented and acceptable time for review had passed, the BCDCOG returned to the jurisdiction for plan adoption by council prior to final approval by the county and submission to FEMA. The schedule was as follows:

Table 5: Jurisdictional Review Schedule

JURISDICTION	DATE
Town of St. Stephen	August 2020
Town of Jamestown	August 2020
City of Goose Creek	August 2020
City of Hanahan	August 2020
Town of Bonneau	August 2020
Town of Moncks Corner	August 2020

COMMUNITY GOALS AND OBJECTIVES

This section of the BCHMP includes the review and update of the goals and objectives from the 2010 Plan, updated in 2015, as established by the Berkeley County HMC and individual community representatives. Each goal is a general statement of intent that may only be achieved in part or fully by the implementation of the related objectives and the mitigation activities identified by Berkeley County and each participating jurisdiction.

Goal 1: *The community will strive to minimize the threat from a hazard event in order to protect the health, safety and welfare of the community's residents and visitors.*

Objective 1.1: Adequate warning systems will be put in place and maintained to notify the public at risk and provide emergency instruction during a hazard event.

Objective 1.2: Local governments will effectively administrate building codes as mandated by the State of South Carolina.

Objective 1.3: Local governments will implement land use regulations to minimize vulnerability of temporary recreational structures and vehicles.

Goal 2: *The community will strive to have the capability to initiate and sustain emergency response operations during and after a hazard event.*

Objective 2.1: Utility and communications systems supporting emergency services will be retrofitted or relocated to withstand a hazard event and include Intelligent Transportation System (ITS) infrastructure.

Objective 2.2: Each jurisdiction will continue its participation in the county command and control center.

Objective 2.3: Structures that provide storage and shelter for government equipment and vehicles will be retrofitted or relocated to withstand a hazard event.

Objective 2.4: Post-disaster communication plans will be updated to ensure communication of emergency workers after a hazard event.

Objective 2.5: Primary roads and access roads to emergency facilities will be retrofitted to ensure access after a hazard event.

Goal 3: *The availability and functioning of the community's infrastructure will not be significantly disrupted by a hazard event.*

Objective 3.1: Retrofit or relocate public water and sewer lines and facilities to ensure their reliability during and after a hazard event.

Objective 3.2: Encourage routine maintenance of public facilities to ensure reliability during and after a hazard event.

Objective 3.3: Local governments will collaborate on hazard mitigation programs with private-sector organizations that own or operate key community facilities.

Objective 3.4: Local governments will further develop mutual aid agreements, so they know where help is coming from and how reimbursement will work, including participation in the South Carolina Water/Wastewater Agency Response Network (SC WARN).

Goal 4: *The County will strive to educate the members of the community to understand the hazards threatening local areas and the techniques to minimize vulnerability to those hazards.*

Objective 4.1: Private sector decision makers shall be educated about hazard mitigation techniques and the components of the community's mitigation plan.

Objective 4.2: The public living or working in defined hazard areas will be given awareness and understanding of their vulnerability and know appropriate mitigation techniques.

Objective 4.3: The public will have access to information needed to understand their vulnerability to a hazard event and appropriate hazard mitigation techniques through enhanced relationships with neighborhood and community centers.

Goal 5*: The continuity of local government administration and services will not be significantly disrupted by a hazard event.*

Objective 5.1: Buildings and facilities used for the routine operations of government will be retrofitted or relocated to withstand the impacts of a hazard event.

Objective 5.2: Government texts, records and documents will be backed up, relocated, and/or protected during and after a hazard event.

Objective 5.3: A contingency plan will be created and/or maintained to reestablish local government services after a hazard event in case of facility damage.

Goal 6: *Local government will have the capability to develop, implement and maintain effective hazard loss reduction programs.*

Objective 6.1: Data and information needed, such as watershed studies, for defining hazards, risk areas and vulnerabilities in the community will be obtained and digitized as necessary.

Objective 6.2: Local governments will strive to have the capability to effectively utilize the available data and information related to mitigation planning and program development.

Objective 6.3: There will be a program to revisit the Berkeley County Hazard Mitigation Plan within three years and completely update the Plan in five years.

Objective 6.4: Local governments will guide new land development in a way that does not increase risk to existing developed areas.

Goal 7: *The community will strive to minimize the vulnerability of homes, institutions and places of business and employment to hazard events.*

Objective 7.1: The community will strive to reduce the vulnerability of schools, libraries, museums, critical facilities and other institutions to a hazard event.

Objective 7.2: The community will establish a program for the removal, relocation or retrofitting of vulnerable structures and utilities in hazard areas.

Objective 7.3: New hazardous sites will be located at least 2000 feet from schools and neighborhoods with preference given to locations ten miles from these places.

Goal 8: *The policies and regulations of local government will support effective hazard mitigation programming throughout the community.*

Objective 8.1: Each local jurisdiction will comply with the requirements of participation in the National Flood Insurance Program (NFIP) and the associated Community Rating System, if applicable.

Objective 8.2: Efforts will be made to place all new government facilities outside of hazard prone areas and/or these facilities will be designed to withstand a hazard event.

Objective 8.3: Government officials will strive to give hazard mitigation needs and programs appropriate emphasis in resource allocation and decision-making.

Objective 8.4: The community will strive to have land use policies, plans, and regulations that discourage or prohibit the location of structures and infrastructure components in hazard prone areas.

Goal 9: *The community will continue to ensure minimal impact of a hazard event on the economic stability of the community.*

Objective 9.1: Governmental officials will include the needs of the business and industrial community in emergency response and disaster recovery plans.

Objective 9.2: The community will implement programs to address public awareness and perception of the community condition and functionality after a hazard event.

Goal 10: *All sectors of the community will work together to create a disaster-resistant region.*

Objective 10.1: The local governments will create outreach programs to gain participation in mitigation programs by business, industry, institutions and community groups.

Objective 10.2: Government officials will encourage and assist local businesses in the creation of a business continuity and recovery plan.

Goal 11: *The community will strive to reduce the impact of a hazard event on the natural and cultural resources of the community in order to protect quality of life.*

Objective 11.1: Government officials will encourage the owners or caretakers of cultural resources to develop mitigation and response plans.

Objective 11.2: Local governments will strive to educate private, non-profit organizations about emergency response and hazard mitigation.

Objective 11.3: Local planning commissions will address cultural resources with regard to their jurisdiction's vulnerability in planning.

MITIGATION ACTION PLANS

As part of the BCHMP, each participating jurisdiction, including Berkeley County, provides a Hazard Mitigation Action Plan table worksheet. The resulting table contains proposed mitigation projects or programs that a participating jurisdiction would like to undertake when funding becomes available. To receive Hazard Mitigation Grant Program funding, the project must be generally or specifically included in the BCHMP as one of the jurisdiction's mitigation techniques.

On the following pages is a comprehensive list of the Mitigation Action Plan activities for each participating jurisdiction and Berkeley County. The Mitigation Action Plan table includes the type of activity, the activity and hazard description, the lead agency, the potential funding source, the BCHMP goal addressed, the priority, the status, and the timeframe. The heading of each jurisdiction's Mitigation Action Plan table is color-coded and abbreviations and other information about each entry typology are discussed below.

ACTIVITY TYPES

Each element of the mitigation action plan falls under one or more of the following mitigation type classifications. These classifications include a wide array of activities that can be considered to achieve the goals and objectives of the BCHMP. The technique types and their abbreviations in the table are:

Preventative Activities (PA)

Preventative activities are those activities that are intended to reduce a community's vulnerability to future hazard events. The following is a list of potential preventative activities and measures:

a. Land-use and development regulations
b. Enforced building codes
c. Strengthening building codes
d. Hardened infrastructure
e. Floodplain regulations
f. Water quality regulations
g. Fire prevention codes
h. Drainage system maintenance
i. Coastal erosion regulations
j. Capital improvement programming
k. Shoreline, riparian, fault-zone setbacks
l. Dangerous tree removal
m. Wealth building
n. Sustainability planning

Property Protection (PP)

Property protection activities are intended to protect existing property by retrofitting, relocating, or modifying the structure to withstand a hazard event. The following is a list of potential property protection measures:

a. Property acquisition
b. Property relocation
c. Increased building elevation
d. Critical facilities protection
e. Retrofitting vulnerable properties
f. Insuring buildings, structures, and crops
g. Development of safe rooms

Natural Resource Protection (NR)

Natural resource protection activities reduce the effects of a hazard event on the natural resources and within a region by preserving and/or restoring natural and other areas providing a beneficial function along with mitigation functions. The following is a list of natural resource protection activities:

a. Floodplain protection
b. Riparian buffers
c. Fire resistant landscaping
d. Wetland preservation and restoration
e. Erosion and sediment control

f. Wastewater permitting
g. Open space preservation
h. Tree protection and landscaping ordinances

Structural Projects (SP)

Structural mitigation activities reduce the impacts of a hazard event by modifying the physical environment to withstand the particular hazard. The following is a list of structural mitigation activities:

a. Creation of reservoirs
b. Levees, dikes, floodwalls, seawalls
c. Diversion canals, detention areas, retention areas
d. Storm sewers
e. Dam construction
f. Channel modification/dredging
g. Infrastructure construction, modifications, repairs

Emergency Services (ES)

Emergency service measures minimize the impact of a hazard by preparing these services to respond efficiently and rapidly during and after a hazard event. The following is a list of potential emergency services activities:

a. Warning systems
b. Evacuation planning and management
c. Sandbagging for flood protection
d. Hurricane shutters
e. Debris removal plan
f. Amateur radio communications deployment
g. Emergency shelter preparation

Public Information and Awareness (PI)

Public information and awareness activities advise residents, potential buyers and visitors about hazards, potentially hazardous areas, and mitigation techniques. The following is a list of potential public information and awareness activities:

a. Outreach projects
b. Speaker series and demonstration events
c. Hazard and flood map information
d. Real estate disclosure
e. Library materials
f. Hazard expositions
g. Disaster kits
h. Geographic Information System (GIS) / Mapping
i. Warning system drills
j. Vulnerability inspections for residents and business owners
k. Radio advertisements

Activity

The identified projects and actions that are designed to address the hazards on new and existing buildings and infrastructure. This includes a brief description of the project or program that the jurisdiction proposes to undertake.

Lead Agency

A participating jurisdiction must determine which agency or person has the expertise and responsibility to undertake each of the mitigation activities. This will help make implementation of a Mitigation Action Plan efficient and effective. For this plan, the lead agency is the Berkeley County Emergency Management Department directed by Benjamin J. Almquist.

Funding Source

This category will list possible funding sources that could be utilized to undertake or complete each particular plan action. It is important for each participating jurisdiction to identify and determine any possible funding source which, if excess funds or grants were to become available, could be used to achieve a mitigation action. This determination does not represent a commitment of funds for the activity, but serves as an example of how the activity could be funded.

Goals Addressed

Each jurisdiction's Mitigation Action Plan activities should work to achieve one or more of the goals as identified in the BCHMP. Each goal may be achieved in part or in full by the implementation of the related objectives and the Mitigation Action Plans of each jurisdiction.

Priority

The participating jurisdictions and the County ranked each of their Mitigation Action Plan elements with "1" for a high priority, "2" for a moderate priority, or "3" for a low priority. The priority ranking includes a cost-benefit analysis with officials from the jurisdictions. The results listed in the individual action plans are those that provide the greatest level of protection to public health, safety, and welfare; and that are economically feasible through internal funding (i.e., general fund), grant funds (i.e. FEMA), or a combination of both sources. Priority ranking considers the hazard risk and extent, as well as the impacts on the safety of the population, vulnerable areas, property risks, and funding required to implement the action. This ranking will show the highest priorities for completion and, therefore, the highest priorities for funding.

The priority ranking can be reviewed and modified after hazard events occur and during any update of the BCHMP.

Status

Mitigation Action Plan elements are indicated in the activity tables as "Completed," "Unchanged," "Ongoing," or "Deferred." If the activity has been successfully initiated, executed, and substantially accomplished it is considered "Completed." If an element is unaltered or otherwise remains the same as previous reporting periods, it is considered "Unchanged." If a mitigation activity is a continued effort by the county or a jurisdiction, it is listed as "Ongoing." Finally, if an element has experienced a lack of adequate funding, staff, or other required resource that dictates no immediate, short-term action can be taken, it is listed as "Deferred." Where appropriate, a reason or reasons for the status condition is included.

It should be clarified that there are 2010 or 2015 HMP goals listed as "Completed," but a number of those goals are now listed in the 2020 HMP as "Ongoing." This is a result of the efforts of Berkeley County and the participating jurisdictions in removing actions that no longer could or would be implemented while recognizing that many goals for action require ongoing maintenance and upkeep.

Timeframe

The participating jurisdictions must also identify the timeframe for each project is "Short-term" (1 to 3 years) or a "Long-term" (3 to 5 years) project. Timing is important in the determination of potential funding sources, staffing, and other community resources.

Hazard(s) Addressed

The participating jurisdictions and the County are also required to identify the hazard or hazards that the mitigation action is expected to address. For each hazard type mentioned, the jurisdiction must include at least two related activities and relate to the protection of new or existing buildings and infrastructure.

ACTION PLAN FOR BERKELEY COUNTY, SC

Following are the proposed projects/programs/actions to be undertaken by Berkeley County, South Carolina in an effort to achieve the goals and objectives identified through the Hazard Mitigation Plan:

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PA	Jurisdiction will continue to participate in the National Flood Insurance Program (NFIP)	Planning	General Fund	Minimize future flood damage; reduce existing flood damage; improve water quality; educating citizens regarding steps to take to reduce vulnerabilities; reduce vulnerability of infrastructure to natural and man-made hazards	1	Ongoing	Long Term	Flooding
PA	County adopted and commenced enforcement in January 2004 the International series Building-related and Fire codes and the floodplain management (including the one-foot freeboard and five-year cumulative substantial improvement clause provisions) regulation.	Building & Codes	General Fund	Minimize future flood damage; minimize future earthquake damage; minimize future hurricane damage; protect the lives of our citizens from natural and man-made hazards. Update codes to reflect changes in law.	1	Ongoing	Short Term	Flood Earthquakes Hurricanes
PA	Continue to provide coordination of County stormwater management regulations	Stormwater Management Program and Engineering	General Fund & Stormwater Fee	Minimize future flood damage; reduce existing flood damage; improve water quality; educating citizens regarding steps to take to reduce vulnerabilities, reduce vulnerability of infrastructure to natural and man-made hazards	1	Ongoing	Long Term	Flood
PA	Continue enforcement of zoning regulations, Subdivision and Land Development Regulations such as requiring buffers Review buffer and building within 100 feet of flood area.	Planning	General Fund	Minimize future flood damage; preserve environmental resources; promote long-term economic prosperity; preserve open space; encourage recreational activities; minimize future hurricane damage; minimize future earthquake damage; protecting the lives of our citizens from natural and man-made hazards	1	Ongoing	Short Term	Flood Hurricane Earthquake

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PA	Conduct or co-sponsor training workshops regarding the International Building-related, flood, and Fire Prevention Codes and Regulations if there is interest in these workshops	Building & Codes	General Fund/self-supporting through workshop revenues	Educating citizens regarding vulnerability to natural hazards and steps to reduce vulnerability; minimize future flood damage; minimize future earthquake damage; improve infrastructure's resistance to hazards; minimize hurricane damage	1	Ongoing	Long Term	Flood Hurricane Earthquake
PA	Continue providing information to citizens regarding known structural mitigation actions.	Emergency Preparedness	General Fund/ Grant Funding	Educating citizens regarding vulnerability to natural hazards and steps to reduce vulnerability; minimize future flood damage; minimize future earthquake damage	2	Ongoing	Long Term	Flood Earthquake
PA	Continue enforcing regulations requiring new manufactured homes brought into Berkeley County to be constructed to wind zone 2 requirements as required per State Law	Building & Codes	HUD	Minimize future hurricane damages; protecting lives of citizens from natural and man-made hazards	1	Ongoing	Long Term	Hurricane
PA	Continue prohibiting new manufactured homes to be installed in "V" flood zones and requiring manufacture homes installed in "A" flood zones to be on permanent foundations.	Planning	General Fund	Minimize future flood damage; minimize future earthquake damage; minimize future hurricane damage; protecting lives of citizens from natural and man-made hazards	1	Ongoing	Long Term	Flood Earthquake Hurricane
PP	Promote the use of voluntary standards for single-family residences to exceed minimal building code requirements for wind and seismic design	Building & Codes	General Fund	Minimize future flood damage; minimize future hurricane damage by requiring building be able to withstand 120 mph wind ; preserve environmental resources; educating citizens regarding vulnerability to hazards and steps to reduce vulnerability; use licensed inspectors	2	Ongoing	Short Term	Flood Earthquake Hurricane

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PP	Promote standards for existing homes to be retrofitted to that exceed minimal codes	Building & Codes	General Fund	Reduce existing flood damage; preserve environmental resources; minimize future hurricane damages; minimize future earthquake damages; educating citizens regarding vulnerability to hazards and steps to reduce vulnerability	2	Ongoing	Short Term	Flood Earthquake Hurricane
PP	Work toward eliminating flooding by adding floodplain staff person to insure code enforcement	Planning	General Fund	Minimize future loss.	3	Ongoing	Short Term	Flood
PP	Continue demolishing structures posing a threat to public safety, considering location within the special flood hazard area as a prioritization factor. Require demolition of existing unsafe structures before new structure can be built on same lot.	Building & Codes	General Fund	Reduce existing flood damages; promote long-term economic prosperity; encourage recreational activities; minimize future hurricane damage; minimize future flood damage; reducing vulnerability of infrastructure to hazards; work to update state law as it relates to counties demolishing dangerous structures	3	Ongoing	Short term	Flood Hurricane
PP	Seek funding for retrofitting, demolishing or relocating repetitively flooded properties if suitable candidates can be identified	Planning	Grant Funding and general Fund	Reduce existing flood damage; minimize future flood damage; preserve historic building inventory; reducing vulnerability of built-environment to hazards	1	Ongoing	Long Term	Floods
PP	Distribute a brochure on protecting boats from damages during hurricanes to interested citizens through expos, offices, marinas and boat dealers	Emergency Preparedness	General Fund	Educating citizens regarding steps to take to reduce hazard vulnerability; minimize future hurricane damage; encourage recreational activities	3	Ongoing	Long Term	Hurricane

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
GIS	Develop and maintain storm drainage inventory maps and database.	GIS & Stormwater Management Program	General Fund & Stormwater Fee	Reduce existing flood damage, minimize future flood drainage and improve water quality.	2	Ongoing	Long Term	Floods
NR	Continue working toward an established goal of fifty percent of County preserved as green (open) space.	County Supervisor & County Council	General Fund & partner with local conservation groups	Preserve environmental resources; promote long-term economic prosperity; encourage recreational activities; minimize future flood damages	2	Ongoing	Long Term	Floods
ES	Continue hazardous material training	Emergency Preparedness	General Fund & Grant Funding	Protecting lives of citizens from man-made hazards; minimize future hazardous materials incidents; preserve environmental resources; improve infrastructure's resistance to hazards; assessing vulnerability to man-made hazards; establishing cooperative relationships between public, private and non-profit sectors to enhance response for hazard events.	1	Ongoing	Long Term	Hazardous Material Spills
ES	Continue Terrorist Response Training	Emergency Preparedness	Grant Funding	Protecting lives of our citizens from man-made hazards; minimize future terrorist activity incidents; preserve environmental resources; improve infrastructure resistance to hazards, assessing vulnerability to man-made hazards; establishing cooperative relationship between public, private and non-profit sectors to enhance response for hazard events; promote long-term economic prosperity.	1	Ongoing	Long Term	Terrorism
ES	Continue coordinating Emergency Operations Center activities in the event of a hazard event	Emergency Preparedness	General Fund	Protecting lives of citizens from natural and man-made hazards; establishing cooperative relationships between public, private and non-profit sectors to enhance response for hazard events; educating citizens regarding vulnerability to hazards and steps to reduce vulnerability; preserve environmental resources; promote long-term economic prosperity	1	Ongoing	Long Term	All

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
ES	Continue responding to hazard emergencies	EMS, Fire Departments, Police Department, Haz. Mat Coordinator, Emergency Preparedness	General Fund	Protecting lives of citizens from natural and man-made hazards; establishing cooperative relationships between public, private and non-profit sectors to enhance response for hazard events; educating citizens regarding vulnerability to hazards and steps to reduce vulnerability; preserve environmental resources; preserve historic building inventory; promote long-term economic prosperity	1	Ongoing	Long Term	All
ES	Continue to require construction practices for new County owned critical facilities that are sensitive to flood zone (e.g., avoiding "A" and "V" flood zones where feasible) and seismic considerations.	Capital Projects	General Fund Bond Funding	Protecting lives of citizens from natural and man-made hazards; reducing vulnerability of infrastructure and built environment to hazards; minimize future flood damage; minimize future earthquake damage; minimize future hurricane damage	1	Ongoing	Long Term	Flooding Earthquake Hurricane
ES	Evaluate existing County owned facilities for hazard resistance and retrofit facilities if needed where feasible	Public Buildings & Engineering	General Fund/ Grant Funding/ Bond Funding	Protecting lives of citizens from natural and man-made hazards; reducing vulnerability of infrastructure and built-environment to hazards; minimize future flood damage; minimize future earthquake damage; minimize future hurricane damage	1	Ongoing	Short Term	Flooding Earthquake Hurricane
ES	Sponsor training programs for medical providers on topics of interest such as decontamination procedures, etc. if there is interest in these programs.	Emergency Preparedness; EMS	General Fund & Grant Funding	Protecting the lives of citizens from man-made hazards; Establishing cooperative relationships between the public, private and non-profit sectors to enhance preparedness and response for hazard events; Minimize future hazardous materials incidents; minimize future terrorist activity incidents	2	Ongoing	Short Term	Hazardous Materials, Terrorism

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
ES	Continue working toward the National Weather Service Storm Ready Community designation	Emergency Preparedness	General Fund	Protecting lives of citizens from natural hazards; educating citizens regarding vulnerability to natural hazards and steps to reduce vulnerability; minimize future tornado-related loss of life; minimize future flood damage; reduce existing flood damage; minimize future hurricane damage; reduce existing flood damage	1	Ongoing	Short Term	Tornado Flood Hurricane
ES	Continue coordinating the Anti-Terrorism Task Force of specially trained police, fire and EMS personnel to respond to terrorist acts.	Emergency Preparedness	Grant Funding	Protecting lives of citizens from man-made hazards; minimize future terrorist activity incidents; preserve environmental resources; improve infrastructural resistance to hazards; assessing vulnerability to man-made hazards; establishing cooperative relationships between public, private and non-profit sectors to enhance response for hazard events; promote long-term economic prosperity	1	Ongoing	Long Term	Terrorism
ES	Continue to promote interest in the Community Emergency Response Training (CERT) program	Emergency Preparedness	General Fund/Grant Funding	Protecting lives of citizens from natural and man-made hazards, establishing cooperative relationships between the public, private and non-profit sectors to enhance preparedness and recovery for hazard events; educating citizens regarding vulnerability to hazards and steps to reduce that vulnerability to hazards and steps to reduce that vulnerability; minimize future terrorist activity incidents	1	Ongoing	Long Term	All
PA	Continue the drainage system maintenance and canal cleaning program	Roads & Bridges and Stormwater Management	Stormwater Fees and General Fund	Protect the lives of our citizens from natural hazards; reduce existing flood damage; minimize future flood damage; improve water quality; improve hazard resistance of infrastructure; promote long-term economic prosperity	1	Ongoing	Long Term	Flood

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PA	Continue right of way and drainage easement permitting, considering emergency vehicle access and flood zone related issues in permitting decisions	Engineering and Roads & Bridges	General Fund	Protect the lives of our citizens from natural hazards; reduce existing flood damage; minimize future flood damage, improve hazard resistance of infrastructure; promote long-term economic prosperity	1	Ongoing	Long Term	Flood
SP	Implement an elevation reference mark inspection program	Building Codes	General Fund	Minimize future flood damage; Establishing cooperative relationships between public, private and non-profit sectors to enhance preparedness for hazards	1	Deferred	Short Term	Flood
PA	Continue the road repair/ construction program, considering needs during evacuation and soil liquefaction potential in prioritization decisions	Engineering and Roads & Bridges	General Fund Grant Funding	Protect the lives of our citizens from natural hazards; reduce existing flood damage; minimize future flood damage; minimize future earthquake losses; improve hazard resistance of infrastructure; promote long-term economic prosperity	1	Ongoing	Long Term	Flood Earthquake
SP	Continue to distribute a generator safety brochure to interested generator retail outlets, utility companies and the general public	Emergency Preparedness	Partner donations/ General Fund	Protecting the lives of citizens from natural and man-made hazards; educating citizens regarding vulnerability to natural hazards and steps to reduce vulnerability; improve hazard resistance of infrastructure; minimize future hurricane-related losses	2	Ongoing	Long Term	Hurricane
SP	Continue to promulgate hurricane storm surge information through the Emergency Management Web Site and through community meetings.	Emergency Preparedness	General Fund	Protecting the lives of citizens from natural hazards; reduce existing flood damage; minimize future flood damage; minimize future hurricane damage; educating citizens regarding their vulnerability to natural hazards	2	Ongoing	Long Term	Flood Hurricane
PI	Provide hazard related information to all residents of Berkeley telephone book internet and social media	Emergency Preparedness	General Fund	Protecting the lives of citizens from natural hazards; reduce existing flood damage; minimize future flood damage; minimize future hurricane damage; educating citizens regarding their vulnerability to natural hazards and steps to take to reduce vulnerability	1	Ongoing	Long Term	Flood Hurricane

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PI	Continue providing hazard-related literature/information to citizens at County, Town & City offices	Emergency Preparedness	General Fund	Protecting the lives of citizens from natural hazards; educating citizens regarding their vulnerability to natural hazards and steps to take to reduce vulnerability; minimize future flood damage; minimize future earthquake damage; minimize future tornado-related loss of life; minimize future terrorist activity incidents	2	Ongoing	Long Term	Flood Earthquake Tornado Terrorism
PI	Sponsor "Hazard Awareness Week" and assist other communities in participating in this activity Encourage participation in the "Shake-Out" events sponsored by the state for earthquake safety Encourage use of tools from Ready.gov	Emergency Preparedness	General Fund	Protecting the lives of citizens from natural hazards; educating citizens regarding their vulnerability to natural hazards and steps to take to reduce vulnerability; minimize future flood damage; minimize future earthquake damage; minimize future tornado-related loss of life; minimize future hurricane damage; minimize future terrorist activity incidents	2	Ongoing	Short Term	Flood Earthquake Tornado Terrorism
PI	Recognize "International Building Safety Week" to promote safety in the built environment	Building & Codes	General Fund	Protecting the lives of citizens from natural hazards; educating citizens regarding their vulnerability to natural hazards and steps to take to reduce vulnerability	3	Ongoing	Short Term	Flood Earthquake
PI	Continue providing speakers to civics groups regarding hazard related activities. Update the Speakers Bureau list as needed	Emergency Preparedness	General Fund	Protecting the lives of citizens from natural hazards; educating citizens regarding their vulnerability to natural hazards and steps to take to reduce vulnerability	1	Ongoing	Short Term	All
PI	Install a data information system enabling the public to determine the status of plan reviews and/or inspections, flood hazard information, storm surge information, and other public data currently kept in paper format (e.g. building plans, elevation certificates, zoning information, drainage easement, etc.) via the internet	Building & Codes	General Fund	Protecting the lives of citizens from natural hazards; establishing cooperative relationships between the public, private and non-profit sectors to enhance preparedness and recovery from hazard events; educating citizens regarding their vulnerability to natural hazards and steps to take to reduce vulnerability; minimize future flood damage; minimize future hurricane damage	1	Deferred	Long Term	Flood Hurricane

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PI	Conduct outreach initiatives to the small business community to encourage businesses to prepare for hazard events	Emergency Preparedness	General Fund	Protecting the lives of citizens from natural and man-made hazards; establishing cooperative relationships between the public, private and non-profit sectors to enhance preparedness and recovery for hazard events; reducing vulnerability of built-environment to natural and man-made hazards; promote long-term economic prosperity; preserve historic building inventory	2	Ongoing	Long Term	All
PI	Continue programs aimed towards providing resources to local schools to enhance their ability to educate students regarding hazard events and hazard events preparation	Emergency Preparedness	Grant Funding/ Project Impact Resources	Protecting the lives of citizens from natural hazards; educating citizens regarding their vulnerability to natural hazards and steps to take to reduce vulnerability; establishing cooperative relationships between the public, private and non-profit sectors to enhance preparedness and recovery for hazard events; reducing future flood damage, reducing vulnerability of infrastructure and built environment to natural and man-made hazards	1	Ongoing	Long Term	All
PA	Elevate the ultraviolet disinfection system at the Lower Berkeley WWTP to avoid flooding of the system and making it inoperative	Berkeley County Water and Sanitation	Enterprise fund or grant funding	Reconstruct to a higher elevation and provide pumps to transport treated effluent into the system	1	Deferred	Long Term	Flooding, Hurricanes
PA	Effluent pumping stations for LBWWTP	Berkeley County Water and sanitation	Enterprise fund or grant funding	Constructing new wet wells and appurtenances and reinstall new pumps will minimize hazards.	1	Deferred	Long Term	All
PA	Install pipe and valves for crossover connections for Pump stations 1 AND 2	Berkeley County Water and sanitation	Enterprise fund or grant funding	Near intersection of Pomflant Access Rd and Red Bank Road install 3 valves and necessary appurtenances to be able to utilize either force main if necessary. This proposed project will reduce the community's vulnerability by improving the drainage system.	2	Completed	Long Term	Flooding

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PA	Relocation of 10,700 linear feet of 12" SDR 26 under pavement along 17A	Berkeley County Water and sanitation	Enterprise fund or grant funding	Relocate line out from under paving for easier access. This proposed project will reduce the community's vulnerability by improving the drainage system.	2	Deferred	Long Term	All
PA	6,000 Linear feet of 6" water line to St Stephen WWTP for backup disinfection system	Berkeley County Water and sanitation	Enterprise fund or grant funding	Install line along access road to WWTP. This will reduce plant's reliance on well water	3	Deferred	Long Term	Flooding. Hurricane, Tornado
PA	Pursue a Commodity Flow Study	Emergency Preparedness	Grant Funding/ Project Impact Resources	Evaluating safety risks; Analyzing trends; Forecasting demands for movement of goods; Determining needs for infrastructure	2	Deferred	Short Term	Hazardous Materials
PA	Implement new standards requiring reverse grade to move back towards the property and away from waterways.	Public Works Building Inspection Services	General Fund	Minimize runoff of pesticides and other hazardous materials and pollutants into waterways	2	In the planning stage. Assessing the best avenues to implement these standards.	Long Term	Hazardous Materials
NR	Develop and implement projects to reduce air and water pollution in Berkeley County. Promote conservation of energy resources	Building Inspection Services	Grant Funding	Preserve environmental resources; improve water quality; improve air quality	1	Ongoing	Long Term	Hazardous Materials
PA, PI	Conduct or co-sponsor training workshops regarding the International Building-related, flood, and Fire Prevention Codes and Regulations, and on sustainable construction / landscaping practices, when there is interest in these workshops	Building Inspection Services	General Fund self-supporting through workshop revenues;	Educating citizens regarding vulnerability to natural hazards and steps to reduce vulnerability, minimize future flood damage; minimize future earthquake damage; improve hazard resistance of infrastructure; minimize hurricane damage; preserve environmental resources	1	Ongoing	Long Term	All

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
SP	Design/elevate roadways being constructed or reworked through the one cent sales tax program to minimize flooding potential to the extent feasible. Identify those roads susceptible to flooding	Transportation & Public Works	General Fund/ Sales Tax	Protect the lives of our citizens from natural hazards; reduce existing flood damage; minimize future flood damage; minimize future earthquake losses; improve hazard resistance of infrastructure; promote long-term economic prosperity	2	Ongoing	Long Term	Flooding, Earthquake
PI	Mail an outreach project to floodplain residents to those property owners whose property is located in the special flood hazard area	Building Inspection Services	General Fund	Protecting the lives of citizens from natural hazards; educating citizens regarding their vulnerability to natural hazards and steps to take to reduce vulnerability; minimize future flood damage; minimize future hurricane damage; improve water quality	2	Ongoing	Short Term	Flooding
ES	Provide emergency power to all emergency service buildings in the County.	Emergency Preparedness	General Fund/Grant Funding	Protecting the lives of citizens from natural hazards; improve hazard resistance of infrastructure; improve emergency response during an event	1	Ongoing	Short Term	All

ACTION PLAN FOR THE TOWN OF BONNEAU, SC

Following are the proposed projects/programs/actions to be undertaken by the Town of Bonneau, South Carolina in an effort to achieve the goals and objectives identified through the Hazard Mitigation Plan:

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PA	Town has adopted and enforces the International series Building related and fire codes and floodplain management regulations	Mayor's Office	General Fund	Improve codes, Standards and specifications applicable to repairs, alterations or new construction of structures and facilities to lesson effects of future disasters	1	Ongoing	Long Term	All
PA	Continued enforcement of zoning regulations, Subdivision and Land Development Regulations	Mayor's Office	General Fund	Eliminate the threat of hazard through measures such as relocation or prohibition of construction within an area susceptible to a risk or danger. Through ordinances and zoning, limit or exclude critical infrastructure in identified hazard prone areas. Promote and expand green space acquisition of increase water shed and provide buffer zone between residents and potentially hazardous industry	1	Ongoing	Long Term	All
PA	Conduct or Co-sponsor training workshops regarding the International Building-related flood and Fire and Fire Prevention Codes and Regulations if there is interest in these workshops	Mayor's Office and Berkeley County	Berkeley County	A continuing educational process designed to keep local government and the private sector aware of measures that can be taken to protect themselves and the property before, during and after a disaster	2	Ongoing	Long term	All
PA	Continue providing information to citizens regarding home structural mitigation actions	Mayor's Office-Berkeley County EPD	General Fund	A continuing educational process designed to keep local government and the private sector aware of measures that can be taken to protect themselves and the property before, during and after a disaster	2	Ongoing	Long Term	All

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
SP	Promote standards for existing homes and businesses to be retrofitted to exceed minimal codes	Mayor's Office and Berkeley County	General Fund-Grants sources	Promote retrofitting of buildings main structural support components; columns post; pillars beams girders joists foundations; roof sheathing and wall to foundation connection. Less expensive retrofitting projects include; installation of shingle standards for high winds; installation of gable end bracing; and installation of diagonal bracing on meal buildings.	2	Ongoing	Long Term	Hurricanes Earthquakes
ES	Continue hazardous material training	Police, Fire and Berkeley County	Berkeley County	A continuing educational process designed to keep local government and the private sector aware of measures that can be taken to protect themselves and the property before, during and after a disaster.	1	Ongoing	Long Term	Hazardous Materials Spill
ES	Continue terrorist response training	Mayor's Office, Police, Fire	Berkeley County	A continuing educational process designed to keep local government and the private sector aware of measures that can be taken to protect themselves and the property before, during and after a disaster	1	Ongoing	Long Term	Terrorism
ES	Continue responding to hazard emergencies	Mayor's Office, Police, Fire	Grant funding sources, Berkeley County	Protect citizens from potential harm during a hazard scenario	1	Ongoing	Long Term	All
PI	Provide pamphlets of various topics at Town Hall describing Hurricane and other natural and man-made disaster preparedness.	Berkeley County	Berkeley County	A continuing educational process designed to keep local government and the private sector aware of measures that can be taken to protect themselves and the property before, during and after a disaster (Goal #3)	2	Ongoing	Long Term	All
PA, PI	Attend county sponsored training workshops regarding the International Building-related, flood, and Fire Prevention Codes and Regulations, and on sustainable construction/ landscaping practices.	Building Inspection Services	Grants/ General Fund	Continuing education regarding the town's vulnerability to natural hazards and steps to reduce vulnerability, minimize future flood damage; improve hazard resistance of infrastructure; preserve environmental resources	1	Ongoing	Long Term	All

ACTION PLAN FOR THE CITY OF GOOSE CREEK, SC

Below are the proposed projects/programs/actions to be undertaken by the City of Goose Creek, South Carolina in an effort to achieve the goals and objectives identified through the Hazard Mitigation Plan. Priority rankings ranging from High (1) to Low (4) have been assigned to each activity and a timeframe for completion, either Short-Term (1-3 yrs.) or Long-Term (3-5 yrs.) has been established:

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PA	Continue working with Berkeley County to implement stormwater management plan	Public Works Department	General Fund Stormwater Management Fee	Project addresses preventative activity goals of providing public information about hazards and potential hazards and mitigation activities.	1	Ongoing	Short Term	Flooding
ES	Continue Emergency Debris Removal Plan	Public Works Department	General Fund	City has MOUs with contractors and other contingencies that address goal of minimizing the impacts of a hazard by preparing services to respond effectively to minimize damages.	1	Ongoing	Long Term	Hurricanes, Flooding
PP	Maintain Effective Building and Fire Codes	Building Inspection Department Planning Department	General Fund	Structural mitigation activities reduce the impacts of a hazard by modifying the physical environment to withstand hazards.	1	Ongoing	Long Term	Wildfires
PI	Provide hazard specific checklists to residents and business owners	Public Information Office Planning Department	General Fund	Public information advisories and awareness about hazards can minimize future damages. .	3	Ongoing	Long Term	All
PA. ES	Maintain City of Goose Creek Emergency Preparedness Plan	All City Departments	General Fund Enterprise Fund	Preventative activities such as emergency preparedness planning are intended to reduce vulnerability to hazards.	1	Ongoing	Long Term	All
PA	Develop and Maintain Stormwater and Floodplain Mapping using GPS and GIS Technology	Public Works Department Planning Department	General Fund Stormwater Management Fees	Preventative activities are intended to reduce vulnerability to hazards.	3	Ongoing	Long Term	Flooding
PA	Construct disaster resistant records storage facility	Administration Department	General Fund Bond Funding	Preventative activities are intended to reduce vulnerability to hazards	2	Ongoing	Short Term	All

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PP	Retrofit all municipal facilities to withstand impacts of a disaster	All Departments	General Fund Enterprise Fund Bond Funding	Property protection activities protect existing structures to withstand a hazard event.	2	Ongoing	Long Term	All
SP	Place all existing overhead utilities underground	Appropriate Utility Agencies Administration Department Public Works Department	Inter-agency Agreements General Fund	Structural mitigation activities reduce the impacts of a hazard event by modifying the physical environment to withstand the particular hazard.	2	Ongoing	Long Term	Hurricanes
SP	Construct interconnected stormwater and flood control detention/retention pond system	City Council Administration Department Planning Department Public Works Department	Grant Funding Stormwater Management Fees Bond Funding	Structural mitigation activities reduce the impacts of a hazard event by modifying the physical environment to withstand the particular hazard	3	Ongoing	Long Term	Floods
PA, PI	Attend county sponsored training workshops regarding the International Building-related, flood, and Fire Prevention Codes and Regulations, and sustainable practices.	Building Inspection Services	Grants/ General Fund	Continuing education regarding the town's vulnerability to natural hazards and steps to reduce vulnerability, minimize future flood damage; improve hazard resistance of infrastructure; preserve environmental resources	1	Ongoing	Long Term	All
	Monitor health of city-owned trees lining Highway 52, remove and replace when necessary	Public Works Department	General Fund	Preventative activities such as tree maintenance are intended to reduce vulnerability to hazards.	2	Ongoing	Long Term	Hurricanes, Tornadoes, Severe Storms
	Work with SCDOT to stockpile green traffic signals to be mounted on mast arms if signals are blown off during storms	Public Works Department	General Fund	Preventative activities such as ongoing updates of infrastructure locations are intended to reduce vulnerability to hazards	2	Ongoing	Long Term	Hurricanes, Tornadoes, Severe Storms

ACTION PLAN FOR THE CITY OF HANAHAN

Following are the proposed projects/programs/actions to be undertaken by the City of Hanahan, South Carolina in an effort to achieve the goals and objectives identified through the Hazard Mitigation Plan:

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PA	City has adopted and commenced enforcement January 1, 2004, the International series Building-related and Fire codes and the floodplain management (including the one-foot freeboard and five-year cumulative substantial improvement clause provisions) regulation	Building & Codes	General Fund	Minimize future flood damage; minimize future earthquake damage; minimize future hurricane damage; protect the lives of our citizens from natural and man-made hazards	1	Ongoing	Long Term	All
PA	Continue to provide coordination of County stormwater management regulations as provided by the BC Engineering Department	Building & Codes	General Fund & Berkeley County Stormwater Fee	Minimize future flood damage; reduce existing flood damage; improve water quality; educating citizens regarding steps to take to reduce vulnerabilities; improve hazard resistance of infrastructure; reduce vulnerability of our infrastructure to natural and man-made hazards	1	Ongoing	Long Term	Flooding
PA	Continue enforcement of zoning regulations, Subdivision and Land Development Regulations	Planning	General Fund	Minimize future flood damage; preserve environmental resources; promote long-term economic prosperity; preserve open space; encourage recreational activities; minimize future hurricane damage; minimize future earthquake damage; protecting the lives of our citizens from natural and man-made hazards	1	Ongoing	Long Term	All
PA	Conduct or co-sponsor training workshops regarding the International Building-related, flood, and Fire Prevention Codes and Regulations if there is interest in these workshops	Building & Codes	General Fund/self-supporting through workshop revenues	Educating citizens regarding vulnerability to natural hazards and steps to reduce vulnerability; minimize future flood damage; minimize future earthquake damage; improve hazard resistance of infrastructure; minimize hurricane damage	1	Ongoing	Short Term	All

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PA	Continue providing information to citizens regarding structural mitigation actions.	Emergency Preparedness	General Fund/ Grant Funding	Educating citizens regarding vulnerability to natural hazards and steps to reduce vulnerability; minimize future flood damage; minimize future earthquake damage	2	Ongoing	Long Term	Flood, Earthquake
PA	Continue enforcing regulations requiring new manufactured homes brought into the City of Hanahan to be constructed to wind zone 2 requirements as required per State Law	Building & Codes	General Fund	Minimize future hurricane damages; protecting lives of citizens from natural and man-made hazards	1	Ongoing	Long term	Hurricanes
PA	Continue prohibiting new manufactured homes to be installed in "V" flood zones and requiring manufacture homes installed in "A" flood zones to be on permanent foundations.	Building & Codes	General Fund	Minimize future flood damage; minimize future earthquake damage; minimize future hurricane damage; protecting lives of citizens from natural and man-made hazards	1	Ongoing	Long Term	Flooding
PP	Promote the use of voluntary standards for single-family residences to exceed minimal building code requirements for wind and seismic design	Building & Codes	General Fund	Minimize future flood damage; minimize future damage; minimize future hurricane damage; preserve environmental resources; educating citizens regarding vulnerability to hazards and steps to reduce vulnerability	2	Ongoing	Short Term	Hurricanes, Earthquakes
PP	Promote standards that existing homes should be retrofitted to exceed minimal codes	Building & Codes	General Fund	Reduce existing flood damage; preserve environmental resources; minimize future hurricane damages; minimize future earthquake damages; educating citizens regarding vulnerability to hazards and steps to reduce vulnerability	2	Ongoing	Short Term	All
NR	Work toward the goal of preserving green (open) space by introducing new parks and upgrades to existing facilities	Parks and Recreation Department	Bond Referendum	Preserve environmental resources; promote long-term economic prosperity; encourage recreational activities; minimize future flood damages	1	Ongoing	Long Term	Flooding

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PP	Continue providing information to citizens regarding hazard safe interior rooms	Emergency Preparedness	General Fund	Minimize future tornado-related loss of life; Educating citizens regarding vulnerability to hazards and steps which may reduce vulnerability	2	Ongoing	Short Term	Tornadoes
PP	Work toward eliminating flooding in existing Subdivisions	Building & Codes	General Fund	Minimize future loss	3	Ongoing	Long Term	Flooding
PP	Continue demolishing structures posing a threat to public safety, considering location within the special flood hazard area as a prioritization factor	Building & Codes	Grant Funding	Reduce existing flood damages; promote long-term economic prosperity; encourage recreational activities; minimize future hurricane damage; minimize future flood damage; reducing vulnerability of infrastructure to hazards	3	Ongoing	Short Term	Flooding, Hurricanes
PP	Seek funding for retrofitting, demolishing or relocating repetitively flooded properties if suitable candidates can be identified	Building & Codes	Grant Funding	Reduce existing flood damage; minimize future flood damage; preserve historic building inventory; reducing vulnerability of built-environment to hazards	1	Ongoing	Long Term	Flooding
PP	Distribute a brochure on protecting boats from damages during hurricanes to interested citizens through expos, offices, marinas and boat dealers	Emergency Preparedness	General Fund	Educating citizens regarding steps to take to reduce hazard vulnerability; minimize future hurricane damage; encourage recreational activities	3	Ongoing	Short Term	Hurricanes
ES	Continue hazardous material training	Fire Department	General Fund & Grant Funding	Protecting lives of our citizens from man-made hazards; minimize future hazardous materials incidents; preserve environmental resources; improve infrastructure resistance; assessing vulnerability to man-made hazards; establishing cooperative relationships between public, private and non-profit sectors to enhance response for hazard events.	1	Ongoing	Short Term	Hazardous materials

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
NR	Develop and implement projects to reduce air and water pollution in the city. Promote conservation of energy resources	City Administrator	Grant Funding	Preserve environmental resources; improve water quality; improve air quality	1	Ongoing	Long Term	Hazardous Materials
ES	Continue Terrorist Response Training	Police Department	Grant Funding	Protecting lives of our citizens from man-made hazards; minimize future terrorist activity incidents; preserve environmental resources; improve infrastructure resistance; assessing vulnerability to man-made hazards; establishing cooperative relationship between public, private and non-profit sectors to enhance response for hazard events; promote long-term economic prosperity.	1	Ongoing	Short Term	Terrorism
ES	Review options to have gas stations available to service emergency services vehicles during hazard activity	Police Department	N/A	Prepares services to respond efficiently and rapidly during and after a hazard event.	1	Ongoing	Short Term	All

ACTION PLAN FOR THE TOWN OF JAMESTOWN, SC

The following are proposed projects/ programs/ actions to be undertaken by Jamestown, South Carolina in an effort to achieve the goals and objectives identified through the Hazard Mitigation Plan:

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PA	Town has adopted and commenced enforcement January 1, 2004, the International Building Code–related and fire codes and the floodplain management (including the one-foot freeboard and five-year cumulative substantial improvement clause provisions) regulations	Building & Codes	General fund	Minimize future flood damage; Minimize future earthquake damage; protect the lives of our citizens from natural and man-made Hazards	1	Ongoing	Long Term	All
PA, PI	Attend county sponsored training workshops regarding the International Building-related, flood, and Fire Prevention Codes and Regulations, and on sustainable construction/ landscaping practices.	Building Inspection Services	Grants/	Continuing education regarding the town's vulnerability to natural hazards and steps to reduce vulnerability, minimize future flood damage; improve hazard resistance of infrastructure; preserve environmental resources	1	Ongoing	Long Term	All
PA	Continue to provide coordination of DHEC stormwater management regulations	Engineering	General funds	Minimize future flood damage; reduce existing flood damage; improve water Quality; educating citizens regarding steps to take to reduce vulnerability of our infrastructure to natural and man-made hazards	1	Ongoing	Long Term	Flooding
PA	Continue enforcement of zoning regulations, Subdivision and Land Development Regulations	Planning	General Fund	Minimize future flood damage; preserve environmental resources; promote long-term economic prosperity; preserve open spaces; encourage recreational activities; minimize future hurricane damage; minimize future earthquake damage; protecting the lives of our citizens from natural and man-made hazards	1	Ongoing	Long Term	All

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PI	Secure training for staff and citizens from Berkeley County EPD pertaining to Disaster Preparedness for Hazardous Spills	Planning	General Fund	Minimize damage, injury and loss of life in the event of a hazardous spill from nearby rail and trucking routes	2	Deferred	Short Term	Hazardous Materials

ACTION PLAN FOR THE TOWN OF MONCKS CORNER, SC

The following are proposed projects/ programs/ actions to be undertaken by Moncks Corner, South Carolina in an effort to achieve the goals and objectives identified through the Hazard Mitigation Plan:

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PA	Continue administration of the current edition of the International Building Codes	Building & Codes Enforcement	General Fund	minimize the threat from a hazard event in order to protect the health, safety and welfare of the community's residents and visitors	1	Ongoing	Long Term	All
PA	Continue enforcement of the Land Development Regulations and Flood Management guidelines of the Zoning Ordinance	Community Development	General Fund	Develop, implement and maintain effective hazard loss reduction programs. Strive to minimize the vulnerability of homes, institutions and places of business and employment to hazard events.	1	Ongoing	Long Term	Flooding
PA	Continue enforcement of updating buildings to meet current Codes upon change of occupancy	Building & Codes Enforcement	General Fund	minimize the threat from a hazard event in order to protect the health, safety and welfare of the community's residents and visitors	1	Ongoing	Long Term	All
PP	Manage and when appropriate correct drainage in existing subdivisions	Public Service	General Fund, Grant Funding	Strive to minimize the vulnerability of homes, institutions and places of business and employment to hazard events	2	Ongoing	Long Term	Flooding
GIS	Continue Participation in the GIS Consortium and maintain adequate equipment and education for Town staff to utilize the GIS	Planning/ County GIS	General Fund	Develop, implement and maintain effective hazard loss reduction programs.	1	Ongoing	Long Term	All
PA, PI	Attend county sponsored training workshops regarding the International Building-related, flood, and Fire Prevention Codes and Regulations, and on sustainable construction/ landscaping practices.	Building Inspection Services	General Fund/Grants	Continuing education regarding the town's vulnerability to natural hazards and steps to reduce vulnerability, minimize future flood damage; improve hazard resistance of infrastructure; preserve environmental resources	1	Ongoing	Long Term	All

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PP	Seek funding for continued retrofitting, demolishing or relocating repetitively flooded properties, as identified by the town engineer.	Planning	FEMA Pre-Disaster Mitigation Grant	Reduce existing flood damage; minimize future flood damage; preserve historic building inventory; reducing vulnerability of built-environment to hazards	1	Ongoing	Long Term	Floods
ES	Continue Responding to hazard emergencies	Fire and Police	General Fund	Develop, implement and maintain effective hazard loss reduction programs. Strive to have the capability to initiate /sustain emergency response operations during/after a hazard event. The availability and functioning of the community's infrastructure will not be significantly disrupted by a hazard event.	1	Ongoing	Long Term	All
SP	Evaluate existing Town facilities for hazard resistance and retrofit where needed	Administration	General Fund, Grant Funding	Strive to have the capability to initiate/sustain emergency response operations during and after a hazard event. The availability and functioning of the community's infrastructure will not be significantly disrupted by a hazard event. The continuity of local government administration and services will not be significantly disrupted by a hazard event.	2	Ongoing	Long Term	All
PA	Continue coordination with all applicable agencies in the permitting process for structures and infrastructure	Community Development/ Public Service	General Fund	Strive to minimize the threat from a hazard event in order to protect the health, safety and welfare of the community's residents and visitors. Develop, implement and maintain effective hazard loss reduction programs. Strive to minimize the vulnerability of homes, institutions and places of business and employment to hazard events.	1	Ongoing	Long Term	All

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PA	Develop a Stormwater Management Plan	Community Development/ Public Works Department	General Fund Stormwater Management Fee	Project addresses preventative activity goals of providing public information about hazards and potential hazards and mitigation activities	1	Ongoing	Short Term	Flooding
PI	Provide pamphlets of various topics at Town Hall providing information regarding Hurricane and other natural and man-made disaster preparedness.	Community Development/ Fire /Police	General Fund	A continuing educational process designed to keep local government and the private sector aware of measures that can be taken to protect themselves and the property before, during and after a disaster (Goal #3)	2	Ongoing	Long Term	All
PA	Conduct or Co-sponsor training workshops regarding the International Building-related flood and Fire and Fire Prevention Codes and Regulations for citizens if there is interest in these workshops	Building & Codes Enforcement	General Fund	A continuing educational process designed to keep citizens and private sector businesses aware of measures that can be taken to protect themselves and the property before, during and after a disaster	2	Ongoing	Long Term	Flood/Fire
ES	Continue Emergency Debris Removal Plan	Public Works Department	General Fund	City has MOUs with contractors and other contingencies that address goal of minimizing the impacts of a hazard by preparing services to respond effectively to minimize damages.	1	Ongoing	Long Term	All
PP	Maintain Effective Building and Fire Codes	Building & Codes Enforcement	General Fund	Structural mitigation activities reduce the impacts of a hazard by modifying the physical environment to withstand hazards.	1	Ongoing	Long Term	All
PI	Provide hazard specific checklists to residents and business owners	Fire Department	General Fund	Public information advisories and awareness about hazards can minimize future damages.	3	Ongoing	Long Term	All
PA. ES	Develop Town of Moncks Corner Emergency Preparedness Plan	All City Departments	General Fund Enterprise Fund	Preventative activities such as emergency preparedness planning are intended to reduce vulnerability to hazards.	1	Ongoing	Long Term	All
PA	Develop and Maintain Stormwater and Floodplain Mapping using GPS and GIS Technology	Community Development/ Public Works Department	General Fund Stormwater Management Fees	Preventative activities are intended to reduce vulnerability to hazards.	3	Ongoing	Long Term	Flooding

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PA	Construct disaster resistant records storage facility	Administration Department	General Fund Bond Funding	Preventative activities are intended to reduce vulnerability to hazards	2	Ongoing	Short Term	All
PP	Retrofit all municipal facilities to withstand impacts of a disaster	All Departments	General Fund Enterprise Fund Bond Funding	Property protection activities protect existing structures to withstand a hazard event.	2	Ongoing	Long Term	All

ACTION PLAN FOR THE TOWN OF ST. STEPHEN, SC

The following are proposed projects/ programs/ actions to be undertaken by St. Stephen, South Carolina in an effort to achieve the goals and objectives identified through the Hazard Mitigation Plan:

TYPE	ACTIVITY	LEAD AGENCY	FUNDING SOURCE	GOAL(S) ADDRESSED	PRIORITY	STATUS	TIMEFRAME	HAZARD(S) ADDRESSED
PA	Town has adopted, and commenced enforcement January 1, 2004, the International series Building – related and fire codes and the floodplain management (including a two-foot freeboard and five-year cumulative substantial improvement clause provisions) regulations	Building & Codes	General Fund	Minimize future flood damage; Minimize future earthquake damage; protect the lives of our citizens from natural and man-made Hazards	1	Ongoing	Long Term	Flooding, Earthquake
PA, PI	Attend county sponsored training workshops regarding the International Building-related, flood, and Fire Prevention Codes and Regulations, and on sustainable construction/ landscaping practices.	Building Inspection Services	General Fund/Grants	Continuing education regarding the town's vulnerability to natural hazards and steps to reduce vulnerability, minimize future flood damage; improve hazard resistance of infrastructure; preserve environmental resources	1	Ongoing	Long Term	All
PA	Continue to provide coordination of County and DHEC stormwater management regulations	Engineering	General funds/ Storm Water Fee	Minimize future flood damage; reduce existing flood damage; improve water Quality; educating citizens regarding steps to take to reduce vulnerability of our infrastructure to natural and man-made hazards	1	Ongoing	Long Term	Flooding
ES	Participation in the new radio communication system initiated by the county which will allow for staging and implementation of processes for post event procedures	Building Inspection Services	General Fund	Improved response time, protecting the lives of our citizens from natural and man-made hazards	1	Ongoing	Short Term	All
PA	Continue enforcement of zoning regulations, Subdivision and Land Development Regulations	Planning	General Fund	Minimize future flood damage; preserve environmental resources; promote long-term economic prosperity; preserve open spaces; encourage recreational activities; minimize future hurricane damage; minimize future earthquake damage; protecting the lives of our citizens from natural and man-made hazards	1	Ongoing	Long Term	All

IMPLEMENTATION

PROCESS

The BCHMP will be implemented by assignment as designated in the Mitigation Action Plans for each jurisdiction. For the 2020 BCHMP update, Berkeley County and the participating jurisdictions revised their Local Mitigation Action Plans through a survey of their past action plan activities, and were asked to identify additional activities. All other communities and neighborhoods in Berkeley County rely upon the County for emergency preparedness and management services. As noted, each Mitigation Action Plan activity is assigned implementation measures, a lead agency, a priority, and a timeframe. All actions are dependent on when, or if, the necessary resources are identified and become available and many of the actions rely upon partnerships and/or funding assistance from County, State, or Federal resources. Procedures for the monitoring and updating of the BCHMP are provided in the Evaluation and Updating Section.

LOCAL PLANNING MECHANISMS

The BCHMP language addresses risks to natural hazards as noted in the Natural Resources elements of each respective jurisdiction's adopted Comprehensive Plans. Per South Carolina law, comprehensive plans are updated no less frequently than every five years and adopted by ordinance by local government councils. The strategies identified in the Local Mitigation Action Plans are similar to comprehensive plan implementation strategies. Local emergency management and preparedness staff should work with Berkeley County planners to ensure their inclusion in the County's comprehensive plan. Hazard and risk assessment data from the 2020 BCHMP was reviewed and analyzed by each participating jurisdiction with anticipation that the data could be incorporated into their comprehensive plans.

Since 2015, Berkeley County has experienced significant growth. The chart below displays the largest areas of growth, the number of building permits in each area and the approximate percentage of permits within the 100-year flood zone.

Table 6: Areas of Major Development (2015 – 2019)

AREA	# OF PERMITS (APPROXIMATE)	% IN FLOOD ZONE (APPROXIMATE)
City of Charleston (Daniel Island)	809	79%
Goose Creek / Hanahan	1387	31%
Nexton	356	0%
Cane Bay	1856	0%
Carnes Crossroads	376	3%
Moncks Corner area	1747	17%

In order to support this burgeoning development and maintain compliance with Federal law regarding hazard mitigation plans, the County and its jurisdictions have initiated capital improvements programs and projects. Capital improvements are the construction, rehabilitation, or expansion of fixed infrastructure (roads, sewer lines, etc.), buildings, and in some cases, large vehicles (i.e. fire trucks) in excess of $100,000. Capital improvements differ from operating and maintenance expenses in that they are large, one-time, expenditures focused on expanding municipal services and are typically bond-funded rather than paid for all at once. A five-year schedule of capital improvements is a responsible fiscal management tool employed by local governments. The ongoing maintenance of such a schedule is a capital improvements program (CIP).

Like a comprehensive plan, South Carolina law assigns responsibility for a CIP to the local government's planning commission. Just as the comprehensive plan is an important guide to forecast long-term capital needs, the CIP is equally important to facilitate funding solutions to those needs. County emergency management and preparedness staff must continue to work with county planners and planning commissions to ensure that local mitigation action items of a capital nature not only appear in the comprehensive plan, but also advance to the CIP to be financed and constructed.

FUNDING SOURCES

Because many hazard mitigation activities may be too costly for communities to undertake by themselves, it is important to seek out alternative funding opportunities. This section identifies Federal, State, and non-governmental funding sources that may be utilized to perform hazard mitigation activities. Most grant sources require a match to be made by the community or other funding source. Matches can frequently be made as in-kind services such as technical assistance.

Table 7: Potential Federal Funding Sources

PROGRAM	AGENCY	PURPOSE	MATCH	SUGGESTED PROJECTS
Pre-Disaster Mitigation Program	FEMA	Funding for cost-effective hazard mitigation activities	75% Federal share, 25% non-Federal share, which can be in-kind or cash	Hazard Mitigation Planning, Hazard retrofits, technical assistance, Community outreach
Flood Mitigation Assistance Program	FEMA	Pre-disaster funding to reduce the long-term risk of flood damage to property	75% Federal share, 25% non-Federal share	Building relocation or retrofitting
Hazard Mitigation Grant Program	FEMA	Assists local governments to implement long-term mitigation measures following a disaster declaration	Up to 75% Federal share, non-Federal share may be in-kind services, materials or cash	Building relocation and retrofitting,
Public Assistance (Infrastructure) Program	FEMA	Post-disaster funding for infrastructure repairs	None	Road, bridge, culvert repair
Rehabilitation of High Hazard Potential Dam (HHPD) Grant Program	FEMA	Pre-disaster funding for the rehabilitation of High Hazard Potential Dams	Federal funding is available for up to 65 percent of the eligible activity costs	Dam repairs

Table 7: Potential Federal Funding Sources

PROGRAM	AGENCY	PURPOSE	MATCH	SUGGESTED PROJECTS
Fire Management Assistance Grant Program	FEMA	Mitigation, management, and control of fires	Provides a 75% Federal cost share and the State pays the remaining 25%	Wildfire prevention maintenance, fire management
National Earthquake Hazards Reduction Program (NEHRP)	FEMA	To support the establishment of earthquake hazards reduction programming and the implementation of earthquake safety, mitigation, and resilience activities	required 25% non-Federal cost share	Develop seismic mitigation plans, Prepare inventories and conduct seismic safety inspections of critical structures and Lifeline Infrastructure, Increase earthquake awareness and education
SBA Assistance Program	US Small Business Administration	Low-interest loans for small businesses to repair facilities after a disaster declaration	Loan	Repair on any uninsured equipment
Community Development Block Grants	US Department of Housing and Urban Development	Funding for community and economic development projects	None	Acquisition reconstruction or rehabilitation of damaged property in areas damaged in a disaster.

LOCAL FUNDING SOURCES

Municipal governments in South Carolina depend heavily on local property taxes as a source of revenue. This revenue, along with locally-distributed State allocations, often comprises the majority of a local government's general operating budget for funding day-to-day functions, emergency services, administration, and other baseline public services. Most of the municipalities in Berkeley County would need to identify significant local matching funds within their general operating budgets, or through some other means such as a public/private partnership, in order to participate in the federal funding opportunities noted above.

Berkeley County and some of the jurisdictions within may have access to funding through local mechanisms such as tax increment financing (TIF) districts to raise funds for capital improvements. A TIF district is a public financing tool that leverages future property tax revenues to revitalize an area that has become, or is in danger of becoming, run down or blighted. TIF is adopted in a community by ordinance and a TIF redevelopment plan must be prepared by a planning commission and also adopted by the local government council. A TIF district allows a municipality to incur debt to fund specific legislatively-approved activities and capital projects within the district. The debt obligations issued for projects in a TIF district cannot extend beyond 30 years from its formation, at which time the property tax revenues of the district, and all the incremental development that has been incentivized, will be distributed to the overlapping taxing bodies as normal.

A local government can include and budget those hazard mitigation capital improvements that can be demonstrated to revitalize portions of its jurisdiction within the TIF district in a TIF redevelopment plan. In this way, the local government may assign TIF revenue to an identified activity in its CIP.

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MONITORING, EVALUATION AND UPDATING

This section of the BCHMP describes the formal process to maintain the Plan as a current and effective document. Berkeley County will adhere to the method and scheduling within to reassess the BCHMP at the three-year review and five-year update cycles, and after any disaster declaration, for its efficacy in hazard mitigation actions. The BCHMP general maintenance approach is to:

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

To this end, Berkeley County has created a County Hazard Mitigation Team that will include representatives from each municipal jurisdiction and plans to incorporate the HMP as an annex of the Emergency Operations Plan.

The jurisdictions depend heavily on the county for both guidance and technical support. For this reason, Bonneau, Jamestown, Goose Creek, Hanahan and Moncks Corner will follow the lead of the county in that they will:

- Incorporate hazard mitigations into existing planning mechanisms (specifically Comprehensive Plans and Floodplain Management Plans)
- Hazard mitigation will also be incorporated into building ordinance, permitting and inspection processes
- Participate in the 3 and 5 year update process for the Hazard Mitigation Plan
- Continue to encourage community involvement and public input
- Participate in mitigation and response training provided by the county

TIMEFRAMES

The Berkeley County Emergency Preparedness Department (BCEPD) will perform periodic monitoring and updating of the BCHMP as adopted and amended, and will serve as the lead agency in the three-year review and five-year update. The purpose of each review and update is to improve the effectiveness of the actions in the Plan by incorporating more data as it becomes available. Some actions may be specific to the three or five-year timeframe and may include:

THREE-YEAR PLAN REVIEW

BCEPD will continue to convene members from the Berkeley County Hazard Mitigation Committee (HMC) assembled for the 2020 BCHMP and prior updates. This includes representatives from participating jurisdictions and other municipalities that rely on the County for emergency preparedness and management services. During the three-year review, the status of each Mitigation Action Plan activity will be reviewed by the HMC and County staff and incorporated into a status report to the Berkeley County Council. This report shall include an evaluation of the effectiveness of each action plan activity and a recommendation for any needed changes. The criteria for plan evaluation will include a rating and ranking of performance on each action or project. Results will be compiled into the report, which may include recommended modifications to the BCHMP. The HMC will determine whether or not the recommendations found in the aforementioned report warrant modification of the Plan.

FIVE-YEAR UPDATE

Once in place for five years, the BCHMP will be thoroughly reviewed and revised. This update shall include the latest available data and maps to be published in the Plan. The HMC and each participating jurisdiction will reexamine the overall goals and objectives of the BCHMP and their local Mitigation Action Plan activities. The HMC will again review hazard probabilities, extents, and vulnerabilities and determine appropriate mitigation activities

that can be taken or adjusted. The HMC will also assess and incorporate recommended comments as expressed by FEMA in the initial review, into the plan revision. At the end of the planning cycle, the HMC will resubmit the update to the State Emergency Management Division (SCEMD) and FEMA for review. After FEMA has approved the Berkeley County HMP, the County Council will formally re-adopt the Plan by council action. The following table is an outline of how the 2020 BCHMP will be reviewed in 2023 and updated in 2025:

Table 8: BCHMP Review and Update Schedule

	TIMEFRAME	PARTICIPANTS	EXPECTED OUTCOME
THREE-YEAR REVIEW	2021 - 2023	Berkeley County EPD / HMC, Participating Jurisdictions	Continue meetings to evaluate BCHMP effectiveness
	First Quarter 2023	Berkeley County EPD	Apply for update funding.
	First Quarter 2023	Berkeley Count EPD / HMC, General Public	Propose plan improvements to goals, risks, vulnerabilities and hold public hearing on reevaluation of BCHMP
	Second Quarter 2023	Berkeley County EPD	Submit draft BCHMP changes to SCEMD for review
FIVE-YEAR REVIEW	First and Second Quarters 2024	Berkeley County EPD / HMC, Participating Jurisdictions, and General Public	Reconvene HMC members and participating jurisdictions to begin BCHMP 2025 Update. Review Goals and Hazard Risk & Vulnerability Assessments. Promote and conduct Public Hearing on 2025 BCHMP.
	Fourth Quarter 2024	Berkeley County EPD / HMC	Draft Plan Completed
	First Quarter 2025	Plan Approval by Jurisdictions	
	Second Quarter 2025	Berkeley County EPD / HMC	Submit draft plan update to SCEMD for review and comments.
	Second Quarter 2025	Berkeley County EPD, SCEMD	Submit plan to FEMA for final approval.
	Third Quarter 2025	Berkeley County EPD, Berkeley County Council, participating jurisdictions	Re-adopt the FEMA-approved BCHMP

INCORPORATION OF LOCAL PLANNING MECHANISMS

As part of the local capability assessment conducted during the planning process, current plans, programs, policies/ordinances, and studies/reports that will augment or help support mitigation planning efforts were identified. The Berkeley County EPD, through regular HMC meetings, is tasked with encouraging the local jurisdictions to integrate hazard mitigation into future planning activities. Following the 2020 BCHMP approval and adoption, the HMC will work to incorporate, where applicable, the BCHMP into the planning mechanisms identified in the following table:

Table 9: Planning Mechanisms for 2020 BCHMP Incorporation

JURISDICTION	COMPREHENSIVE PLAN	CAPITAL IMPROVEMENTS PROGRAM	REGIONAL DEVELOPMENT PLAN	TRANSPORTATION IMPROVEMENTS	WATER AND SEWER CONSTRUCTION	BUILDING CODE ENFORCEMENT	ZONING ORDINANCE	FLOODPLAIN ORDINANCE	SUBDIVISION REGULATIONS
Berkeley County	●	●	●	●	●	●	●	●	●
Bonneau	●		●	●		●	●		●
Goose Creek	●	●	●	●	●	●	●	●	●
Hanahan	●	●	●	●		●	●	●	●
Jamestown	●		●	●		●	●	●	●
Moncks Corner	●	●	●	●	●	●	●	●	●
St. Stephen	●		●	●		●	●	●	●

Berkeley County will also coordinate with the City of Charleston for mitigation activities on Daniel Island.

Throughout the plan maintenance cycle, the HMC will work to integrate hazard mitigation goals and actions into the general operations of County and municipal agencies. The HMC will work with agencies to identify opportunities such as:

- Update work plans, policies, or procedures to include hazard mitigation concepts.
- Establish mitigation funding within capital and operational budgets.
- Issue plans, policies, executive orders, regulations, or other directives to carry out mitigation actions.
- Include hazard mitigation action plan elements in proposed comprehensive plans and area redevelopment plans being considered for adoption by local jurisdictions.

Continuing Public Participation

Berkeley County is dedicated to continued public involvement in the hazard mitigation planning and review process. During all phases of plan maintenance, the public will have the opportunity to provide feedback. The BCHMP Plan will be maintained and available for review, posted on the BCDCOG website (www.BCDCOG.com) throughout 2024. Individuals will have an opportunity to submit comments for the Plan update at any time via mail or e-mail. The BCDCOG will compile all comments and present them at an HMC meeting for the members to consider when beginning their 2025 update cycle.

Berkeley County will hold community involvement meetings with representatives from academic institutions, the private sector, community groups, and neighboring jurisdictions as needed. This will provide the public an opportunity to express their concerns, opinions, or ideas about any updates/changes that are proposed to the Plan.

PLAN AMENDMENTS

An amendment to the BCHMP shall be initiated by the HMC, either on their own initiative or upon the recommendation of the Berkeley County Council, a participating jurisdiction, or at the request of a state or federal agency. After an amendment is initiated, Berkeley County staff will contact all interested or affected parties and make them aware of the nature of the amendment. These parties will be given thirty days to provide comment. At the end of this period, county staff shall forward all comments to the HMC for its review in consideration of the final amendment. Should the HMC approve the amendment, staff will notify the Berkeley County Council of the amendment and the local government representative of each participating municipality.

HAZARD IDENTIFICATION AND ANALYSIS

INTRODUCTION

Hazard identification was achieved by analyzing existing sources of data including FEMA floodplain publications, South Carolina Forestry Commission (SCFC) fire events data, National Oceanic Atmospheric Administration (NOAA) storm and hail records and National Climatic Data Center (NCDC) for flood, drought, tornadoes, and winter storm events. Earthquake information was obtained from the University of South Carolina (USC) Seismic Network and the United States Geological Survey (USGS). The majority of the data used to perform the risk assessment was processed by the University of South Carolina Hazards and Vulnerability Research Institute (HVRI). Additional information was obtained from the South Carolina Emergency Management Division (SCEMD), the Special Hazard Events and Losses Database (SHELDUS), and the Lowcountry Hazards Lab at the College of Charleston (CofC). HAZUS, FEMA's loss estimation software, was also used to model and estimate potential cost of damage caused by for flooding, hurricanes, and earthquakes. Additionally, the Social Vulnerability Index (SoVI) and the Baseline Resilience Indicators for Communities (BRIC) from HVRI are reviewed for overall County-level vulnerability. The United States Center for Disease Control (CDC) Social Vulnerability Index (SVI) is used to assess the potential socially vulnerable areas at census tract-level within Berkeley County.

Information from the above sources was also verified with the responses received through the public input process. Potential hazard types were identified and mapped by the Berkeley County EPD, and then the extent and probability were calculated for the BCHMP. The hazard identification process was used to identify those hazards that pose the greatest risk to Berkeley County and to determine the potential vulnerability to those hazards.

POTENTIAL HAZARDS

An important indication of the potential threat to a community is the number of prior disaster events and the level of impact they had on the community.

SHELDUS is a county-level data set for the United States containing information on dates, locations, and direct property losses, crop losses, injuries, and fatalities for hazards from 1960 to present (November 8, 2018). For Berkeley County, SHELDUS reports 495 natural hazard events with descriptions that relate to the categories of coastal, drought, flooding, hail, hurricanes/tropical storms, lightning, severe thunder storms, tornadoes, wildfire, wind, and winter weather. While the SHELDUS descriptions are not standardized, the aggregated information in the data set point to about $153 million (2017 dollars) in property damage, $1.04 billion (2017 dollars) in crop damage, 61 injuries, and 22 deaths. Although the types of flooding recorded in SHELDUS can vary as to cause, as many as 84% of the events recorded could be considered "storm-related." SHELDUS also provides a summary from 1960 to 2012 that calculates an average annual loss for the State of South Carolina at $237.9 million and $20.7 million for Berkeley County.

The National Center for Environmental Information (NCEI) maintained by NOAA has monitored the occurrences of some of Storm Event hazards since 1950 to the present (as of August 30, 2019 or 69 years on record). The NCEI database includes information such as the number of occurrences of the event, days with the event, town location, date and time, number of fatalities and injuries, property damage and crop damage.

The historical data from SHELDUS and NOAA provide a starting point for the historical identification of hazards that pose a major threat to Berkeley County. These hazards can be grouped into Flooding, Hurricanes & Tropical Storms, Tornadoes, Winter Storms, Thunderstorms, Hail, Wildfire, and Drought. Although not reported in SHLEDUS, the HMC identified other threats to Berkeley County from Earthquake (and related impacts), Dam Failure, and Hazardous Materials that are also analyzed. Each of the historical hazard events and their severity are included in the mapping in the Vulnerability Assessment. Where possible, the event severity or magnitude is quantitatively expressed using the typology common to the hazard. The HAZUS modeling program also provides a basis for quantitative analyses by providing estimates of the number of buildings and their types, along with values.

Average annual losses of your state

State	
SC	**$237.9 M**

Most hazardous counties in your state

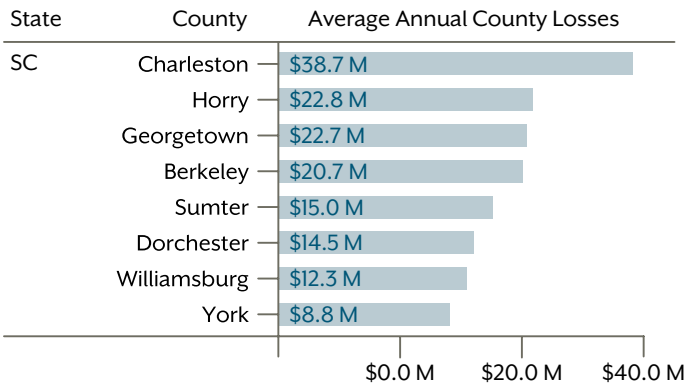
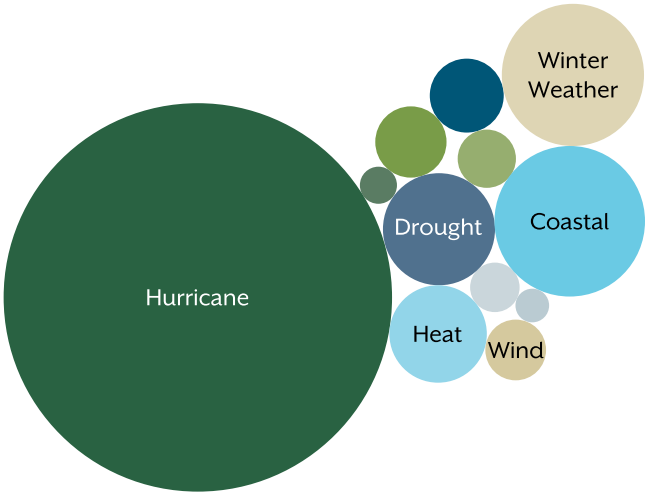


Figure 1: Average annual losses of your state

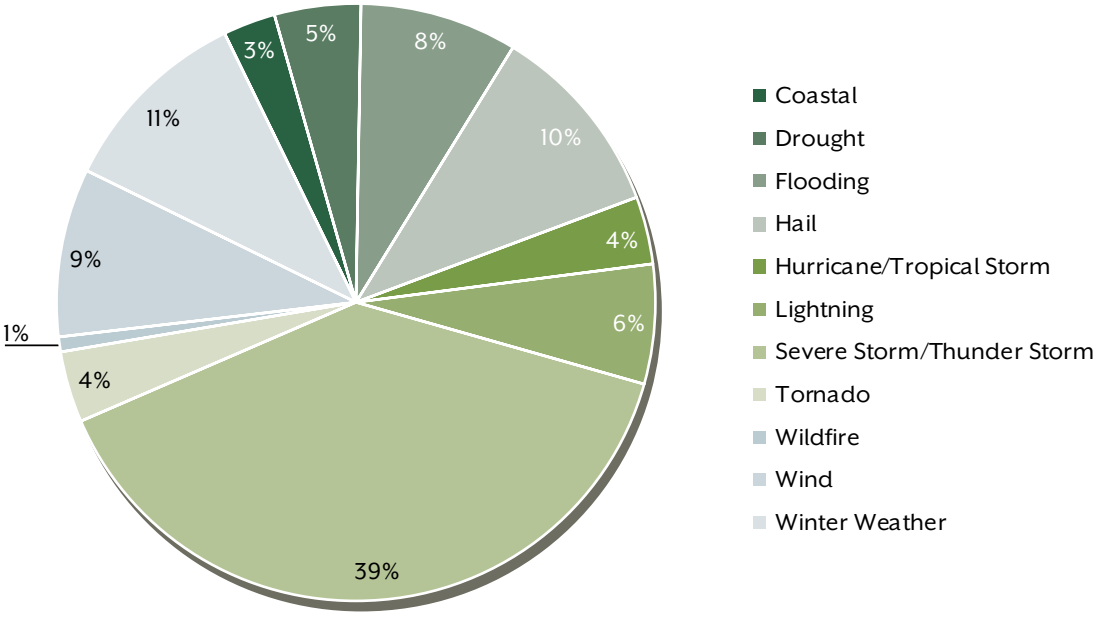
Costliest hazards in your state



Note that loses for 2012, particularly areas affected by Superstorm Sandy, have pending updates and are therefore not final.

Figure 2: Costliest hazards in your state

Berkeley County Damage-Causing Hazards from 1960 - 2017



Source: SHELDUS

Figure 3: Berkeley County Damage-Causing Hazards from 1960 - 2017

HAZARD PROBABILITY

The calculated future hazard probability compares the total number of hazard events (922 from NCEI) to the total number of years on record (69). While this calculation will be made for each hazard category below, the point should be made that Berkeley County has a 100% chance of experiencing a hazard in a given year. Hazard events WILL occur.

The following table presents the hazard events categorized from the 2015 BCHMP and the events in the 5 years since; in which NCEI reports 142 hazards reported in 13 event types. However the number of unique events was 68 due to multiple reporting of hazards during the same disaster event. The United States Geological Survey (USGS) provides estimated information on earthquakes with significant events noted in the hazard description. Probabilities are then calculated from the total 69-year recorded hazard data set.

Table 10: 2015 BCHMP Hazard Events

Hazard Event	2015 BCHMP Number of Events	Last 5 year Number of Events	Total	#deaths	#injuries	$ Property / $ Crops	Probability % chance per year
Flooding	**51**	**5**	**56**	**1**	**0**	**$29.7m**	**81.2%**
Hurricanes and Tropical Storms	**13**	**6**	**19**	**0**	**0**	**$3k**	**27.5%**
Tornados	**30**	**2**	**32**	**3**	**26**	**$8.5m / $1k**	**46.4%**
Winter Storms	**5**	**1**	**6**	**0**	**0**	**$310k**	**8.7%**
Thunderstorms	**296**	**42**	**338**	**1**	**14**	**$1.3m / $7k**	**100%**
Hail	**253**	**11**	**264**	**0**	**0**	**$13.75k / $50k**	**100%**
Wildfire	**6015**	**1**	**6016**	**0**	**0**		**100%**
Drought	**21**	**0**	**21**	**2**	**0**		**30.4%**
Earthquake	**540**	**31**	**571**	**0**	**0**	**$6m**	**100%**
Dam Failure	-	-	-	-	-	-	-
Hazardous Material Spill	**64**	**12**	-	-	-	-	**63%**

The table below summarizes the total number of buildings and assessed value of buildings located within Berkeley County, South Carolina; as reported by the Berkeley County Assessor's Office.

Table 11: Berkeley County Built Structures Value Assessment

Jurisdiction	Number of Single-Family	Value of Single-Family	Number of Multi-Family	Value of Multi-Family	Number of All Residential	Value of All Residential	Number of Commercial	Value of Commercial	Number of Res & Comm Bldgs	Value of Res & Comm Bldgs
Berkeley County:	**66,346**	**$14,113,067,427**	**385**	**$1,268,199,700**	**66,731**	**$15,381,267,127**	**2,889**	**$2,692,452,000**	**69,620**	**$18,073,719,127**
Bonneau	127	$22,747,100	0	$0	127	$22,747,100	156	$12,552,700	283	$35,299,800
Daniel Island (Charleston)	3,604	$1,995,018,200	16	$427,657,000	3,620	$2,422,675,200	208	$547,944,300	3,828	$2,970,619,500
Goose Creek	12,646	$1,938,526,400	27	$255,518,544	12,673	$2,194,044,944	331	$358,551,400	13,004	$2,552,596,344
Hanahan	5,661	$1,116,254,700	90	$155,740,100	5,751	$1,271,994,800	172	$321,891,500	5,923	$1,593,886,300
Jamestown	32	$2,412,100	0	$0	32	$2,412,100	59	$5,632,000	91	$8,044,100
Moncks Corner	3,772	$573,623,000	48	$39,854,100	3,820	$613,477,100	371	$238,900,100	4,191	$852,377,200
North Charleston	0	$0	0	$0	0	$0	1	$4,854,000	1	$4,854,000
St. Stephen	446	$38,826,200	9	$378,100	455	$39,204,300	116	$30,629,300	571	$69,833,600
Summerville	1,021	$180,177,900	8	$79,761,100	1,029	$259,939,000	104	$407,375,500	1,133	$667,314,500

The following sections will provide the hazard events by type and will include mapping of the historical events and any update on events since the 2015 BCHMP update.

Flooding

Berkeley County is part of the Lowcountry Region which is characterized by low topographic relief or flat terrain areas. The region is characterized by poor surface drainage, large marsh areas, and tidal streams. The vulnerability of the County to flooding is heightened by the presence of the adjacent low-lying and estuarine areas. Flooding is prevalent in the County due to small natural channels, flat stream slopes, wide and heavily vegetated floodplains, and inland tidal effects. The low-lying areas near I-26 in the southwest area of the County are experiencing heavy development and are the areas most impacted by flooding hazards. The County is primarily located within the Santee River Basin and watershed, which drains into the Cooper River. However, a small amount of the County is within the Edisto River Basin.

The Santee River Basin encompasses 16 watersheds that extend through the Upper and Lower Coastal Plain and Coastal Zone Regions. Of the Santee River Basin's 1,923,528 acres, approximately 33% is forested land, 31% is forested wetland, 16% is agricultural land, 11% is water, 6% is non-forested wetland, 3% is urban land, and 0.2% is barren land. There are a total of 1,828 stream miles, 73,009 acres of lake waters, and 5,442 acres of estuarine areas. The Santee River is formed by the confluence of the Congaree and Wateree Rivers and flows through Lake Marion, where it is then diverted to the Santee dam or is channeled along a 7.5-mile Diversion Canal to fill Lake Moultrie. The waters flowing through the Santee dam are joined by the re-diversion canal, which connects Lake Moultrie and the lower Santee River to continue flow to the Atlantic Ocean. (Source: DHEC-OCRM)

The Edisto River Basin encompasses 13 watersheds that extend across the Sandhills, Upper and Lower Coastal Plains and Coastal Zone Regions. Of the Edisto River Basin's 2 million acres, approximately 38% is forested land, 34% is agricultural land, 18% is forested wetland, 6% is urban land, 3% is non-forested wetland, 2% is water, and 0.2% is barren land. There are a total of 5,177 stream miles, 11,489 acres of lake waters, and 20,615 acres of estuarine areas (Source: DHEC-OCRM).

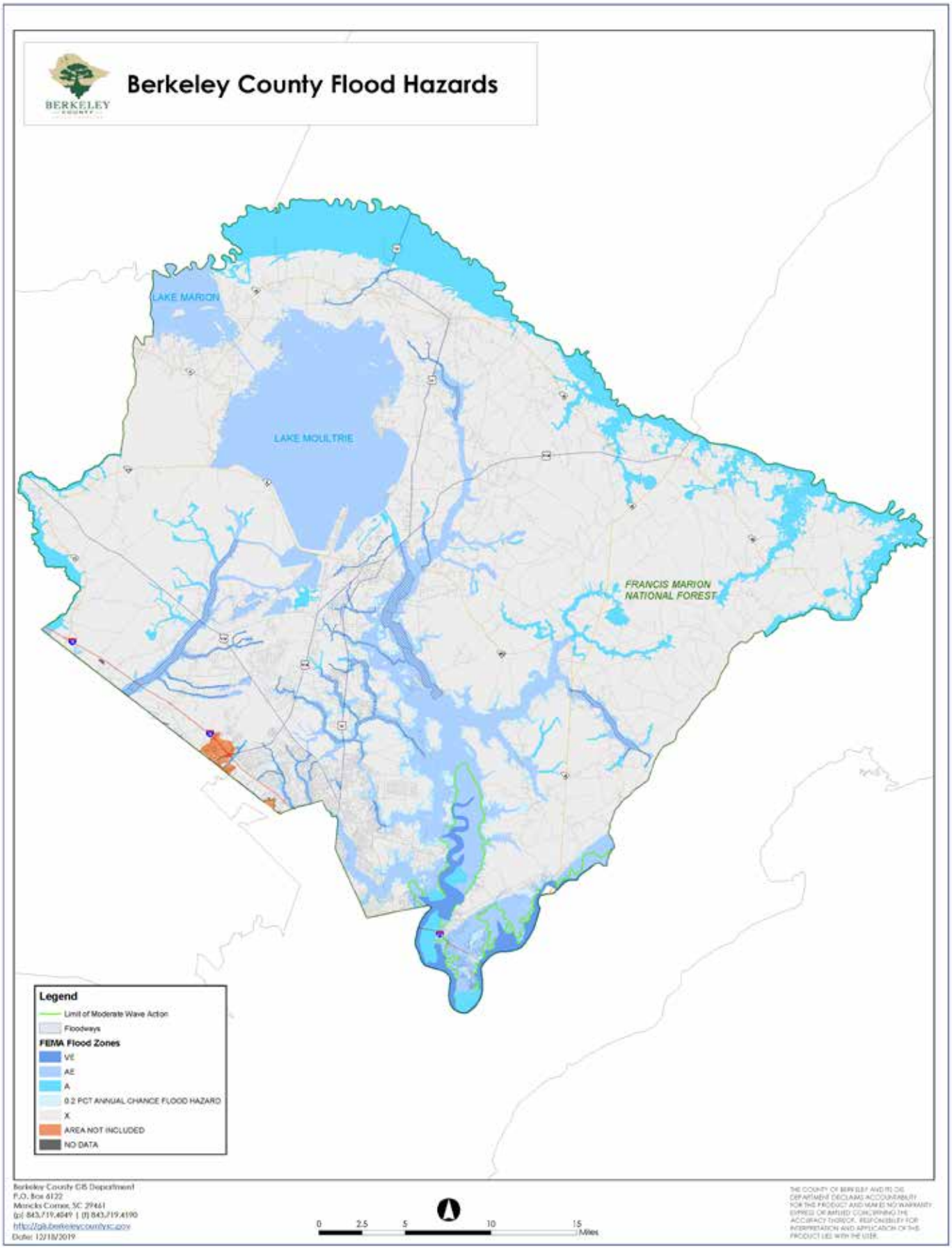
Flooding naturally occurs when a river or stream overflows its banks onto its floodplains during or after an excessive rainfall or storm surge. The impact of flood events is correlated to the type of land use or land cover of the watershed or basin area. For example, heavily developed watersheds, largely covered by impervious surfaces, have higher runoff volumes which may cause intensified flooding.

Berkeley County is susceptible to riverine, urban, and flash flooding. Flooding along rivers is a natural event that may occur seasonally when rain or snowmelt fill river basins too quickly. Torrential rains from weakening hurricanes or tropical systems can also produce river flooding, even if the storm has moved inland. Conversely, urban flooding occurs when land is converted from fields or woodlands to impervious areas such as buildings, parking lots, or roads and loses its ability to absorb rainfall. Urbanization increases runoff two to six times over what would occur on natural terrain.

Flash floods generally develop within six hours of the immediate cause, which can include heavy rain, ice or debris jams, and dam or levee failure. In flash flooding, water rises rapidly over low-lying areas and may occur well away from the source. Most flash flooding is due to heavy rain from thunderstorms over the same area. Sudden downpours can swiftly change river and creek water levels. However, in the Lowcountry, flash flooding can also be caused by tidally influenced water during astronomical high tides. Urban areas are particularly prone to flash flooding because impervious surfaces block rainwater infiltration (Source: NOAA-National Weather Service).

Most of the floodplains in the United States have been mapped by FEMA through the National Flood Insurance Program (NFIP). These maps designate the 100-year flood zone, the Base Flood Elevation, and Special Flood Hazard Areas in an area. A 100-year flood zone area has a one percent chance of flooding in any given year. The base flood elevation relates to the 100-year flood zone and is the elevation of the water surface resulting from a 100-year flood.

Map 1: Berkeley County Flood Hazards



As noted earlier, the NCEI data from 1950-August 30, 2019 (69 years) show a total of 56 flood events resulting in one death were reported for Berkeley County. The extent of recent flooding events is:

7/30/2007: Heavy rain led to a flash flood, resulting in two feet of water reported to be covering side streets in Goose Creek.

8/12/2011: Heavy rain led to flash flooding along Henry E Brown Boulevard near Inness. The road was closed due to ponding on the road. No property damage or injuries were reported.

6/11/2012: Heavy rain led to flash flooding near Goose Creek. Yards were flooded along Hartin Blvd. No property damage or injuries were reported.

2/26/2013: Heavy rain led to flash flooding near Goose Creek. Roads flooded and were impassable in College Park Estates. No property damage or injuries were reported.

7/29/2013: Heavy rain led to flash flooding near Goose Creek. Westview Blvd, Springhall Road, Trinity Road, and Oxford road were closed due to flooding. Several cars were flooded. There was approximately $40,000 in property damage reported. No injuries were reported.

8/20/2013: Heavy rain led to flash flooding near Goose Creek. Jedburg Road, Riley Lane, Haney Branch Road, and Champions Drive were closed. No property damage or injuries were reported.

8/10/2014: A very moist atmosphere within the vicinity of a stationary front supported excessive rainfall amounts and flash flooding as multi-cell thunderstorms merged over the area. This resulted in Yeaman's Hall Road in the City of Hanahan being closed at Murray Drive due to high water.

6/9/2015: A broken line of strong thunderstorms developed within an inland trough of low pressure and moved southward across southeast South Carolina. These storms produced large hail and damaging wind gusts. Berkeley County dispatch reported that Harbour Lake Road was closed between Lighthouse Drive and Pineshadow Drive in Goose Creek. Multiple cars were flooded and water was starting to come up to buildings. Also, several cars were reported flooded near the intersection of Rivers Avenue and Otranto in North Charleston. Other flooded roadways included Henry E Brown Jr Boulevard near Stanhope Road in Goose Creek. Approximately $25,000 in damage was reported.

8/31/2015: A mid-level shortwave trough passed just north and west of the region throughout the day. Forcing associated with this feature interacted with a deep plume of moisture, helping produce widespread rain along and east of Interstate 95. Training of showers and thunderstorms led to precipitation rates as high as 3 to 4 inches per hour and resulted in several areas of flash flooding particularly in the Charleston Tri-County region during the morning rush hour. Many locations reported 4 to 8 inches of rain and an elevated morning high tide exacerbated flooding in coastal locations, including downtown Charleston. The Berkeley County 911 Call Center reported flooding on Lighthouse Drive and Pineshadow Drive in Goose Creek. Three cars were also flooded. Flooding was also reported at the intersection of Howe Hall and Keyes Lane in Goose Creek. One car was also stalled at the intersection. A ham radio operator also relayed a report of car submerged in water and floating at the intersection of Crystal Springs Drive and Tarpon Street in Goose Creek. Approximately $37,500 in damage was reported.

10/3/2015: A historic flooding event affected the Carolinas from October 1-7, 2015. A stalled front offshore combined with deep tropical moisture streaming northwest into the area ahead of a strong upper-level low pressure system to the west and Hurricane Joaquin well to the east. This led to historic 4-day rainfall totals with widespread amounts of 15-20 inches and localized amounts over 25 inches, mainly in the Charleston Tri-County area. In some locations, this rainfall qualified as a 1,000-year flood event. Flash flooding was prevalent for several days and eventually led to Flash Flood Emergencies for Charleston, Berkeley, Dorchester, and Colleton counties during the morning hours of October 4, 2015. Many people had to be rescued by emergency personnel while significant damage occurred to numerous properties and roads. Tides were also historically high due to the recent perigee spring tide and persistent onshore winds, exacerbating and prolonging flooding across the area and along the coast, especially in downtown Charleston. The most significant flooding occurred in areas along and near smaller creeks and streams, especially those that were tributaries to larger rivers such as the Edisto, Ashley, Cooper, and Santee. In addition to impacting thousands of homes and businesses, flood waters also damaged many roads and bridges in the area, causing significant travel disruptions that lasted for multiple days. Furthermore, some roads and bridges were so badly damaged that it took weeks to months to repair. As of 12/31/15, a SCEMD report indicated an estimated total monetary damage of $4,533,337 in Berkeley County, $18,213,860 in Charleston County, $2,030,879 in Colleton County and $6,186,909 in Dorchester County for the flood event. Total costs for each county have been divided equally to each flash flood report within that particular county for this flood event and are considered estimates only. The extent of flooding was county wide and every jurisdiction was at least moderately affected.

10/8/2016: Logged as a flooding event for Berkeley County, hurricane Matthew paralleled much of the Southeast coast in a slowly weakening state in October of 2016. Matthew passed just offshore from Berkeley County and made landfall as a weak Category 1 hurricane near McClellanville, SC on October 8th. Across southeast Georgia and southeast South Carolina, the main impacts from Matthew included heavy rain, wind damage in the form of scattered to widespread trees and power lines blown down, and storm surge, specifically along coastal locations from Tybee Island, GA north to Edisto Beach, SC. Storm total rainfall amounts generally ranged from 4.5 to 7 inches across western areas of Southeast Georgia and extreme western locations of Southeast South Carolina to 8 to 17 inches closer to the coast, highest in coastal counties of Southeast Georgia and the lower Southeast South Carolina coast. A peak storm total rainfall of 17.49 inches was recorded at Hunter Army Airfield in Georgia while a peak storm total rainfall of 16.90 inches was recorded near Edisto Island, SC. These heavy rains led to several instances of flash flooding with damage to roads and homes and helped produce long duration flooding along the Edisto River, Ashley River, and Santee River. Wind damage produced numerous to widespread power outages and damage to homes and other structures throughout, most significantly at locations near the coast where wind gusts occurred with rain bands surrounding the passing eye wall. The most extensive damage came with storm surge during Matthew. The entire Southeast Georgia and Southeast South Carolina coast was impacted by storm surge generally ranging between 2 to 5 feet with some locations as high as 6 to 8 feet. A peak surge of 6.20 feet occurred at the Charleston Harbor tide gauge at 5 AM October 8th. Damage from surge was most notable on the northern ends of Tybee Island in Georgia and on Fripp and Edisto Islands in South Carolina. Locations on Fripp and Edisto Islands saw some of the most significant beach erosion and damage to oceanfront homes in the entire area. Generalized flooding occurred throughout Berkeley County but was most severe in coastal areas and areas adjacent to streams subject to tidal influence.

Although a 1,000-year flood, the historic flooding event of October 2015 is indicative of the probable maximum severity of floods in Berkeley County.

Berkeley County, the Towns of Moncks Corner and St. Stephen and the Cities of Charleston, Goose Creek, and Hanahan all participate in the NFIP. Along with the EPD, Berkeley County has a Stormwater Management Program and a Floodplain Manager in the Planning and Zoning Department.

For continued compliance in the NFIP, each jurisdiction will continue to adopt and enforce floodplain management requirements, regulating new construction in special flood hazard areas (SFHAs) as required by federal law. The jurisdictions will continue to develop floodplain mapping to identify new areas of hazard, and the County will provide mapping assistance to those jurisdictions that do not have the technical ability to produce their own maps. The county provides many resources for community assistance on its Emergency Management Department website. These include training opportunities for local jurisdictions within the county, a large knowledge database for citizen to access, a portal for reporting incidents, and an emergency notification system. Jurisdictions monitor weather and other hazard conditions continuously.

Despite the possible flood risk in their communities, the towns of Bonneau and Jamestown do not participate in the NFIP and remain sanctioned. The Berkeley County Emergency Management Director continues to meet with these communities to discuss the advantages of the program and encourage their participation. However, for these two jurisdictions to receive approval for their flood mitigation strategy one or more of the following may be required:

1. An adopted revised flood mitigation strategy that addresses how the jurisdiction will reduce future flood losses in the areas for new and existing infrastructure, and major improvements to existing structures,
2. An adopted flood damage prevention ordinance that complies with minimum NFIP standards, as contained in 44 CFR 60, and/or;
3. Documentation of acceptance of the jurisdiction into the NFIP.

The Towns of Bonneau and Jamestown will need to individually assess their status as NFIP-sanctioned communities and consider compliance with the above requirements. If any jurisdiction chooses to meet the requirements, documentation of compliance will be provided either as an amendment to this plan or inclusion in future plan updates.

FEMA requires that each jurisdiction include the number and type of NFIP repetitive loss structures as obtained by the County Floodplain Manager. The Berkeley County list is shown below ***(NOTE: all repetitive losses have been residential):***

STREET	CITY	ZIP
McClain St	Goose Creek	29445
French Quarter Creek Rd	Huger	29450
French Quarter Creek Rd	Huger	29450
French Quarter Creek Rd	Huger	29450
French Quarter Creek Rd	Huger	29450
French Quarter Creek Rd	Huger	29450
Ashmont Dr	Wando	29492
Mendel Rivers Rd	St. Stephen	29479
French Quarter Creek Rd	Huger	29450
Oxford Rd	Ladson	29456
French Quarter Creek Rd	Huger	29450
Sanders Farm Ln	Wando	29492

Map 2: Locations of Berkeley County Repetitive Loss Properties

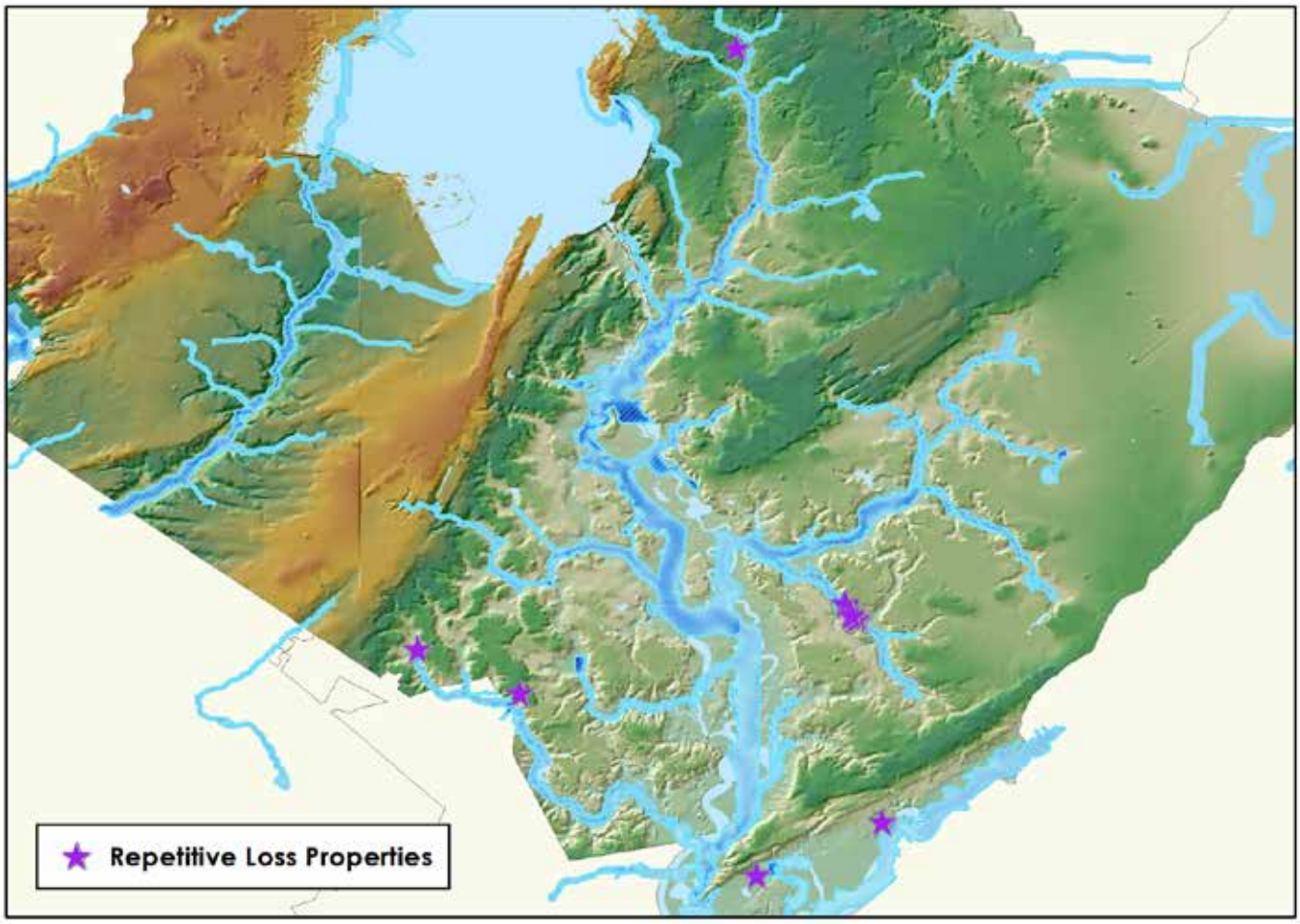


Table 12: FEMA List of NFIP Repetitive Loss Structures by Jurisdiction

Jurisdiction	Repetitive Loss Properties
Berkeley County	13
Town of Bonneau	0
City of Charleston (all counties)	743
City of Goose Creek	3
City Hanahan	35
Town of Jamestown	0
Town of Moncks Corner	3
City of North Charleston (all counties)	92
Town of St. Stephen	0
Town of Summerville (all counties)	4

**Losses include those outside Berkeley County*

Sinkholes

Berkeley County contains limestone deposits. Although the limestone deposit is a positive mineral resource, it creates hazardous soil conditions that are more susceptible to sinkholes and flooding because of poor drainage. Fortunately, the limestone deposits in Berkeley County are in urban areas under less development pressure. While the amount of development along the deposit may not be significant now, the potential exists for human and structural loss and highlights the importance of building code requirements that address varying soil and geologic conditions.

There are reports of sinkholes on a plantation called Buffalo Hole, which is 8 miles from Pinopolis, in a document dated 1939. "Hereabouts are several remarkable sinks in the earth, which were formerly supposed to be Buffalo Licks; afterwards extinct fountains. They are caused, I believe, by the subsidence of the limestone substratum."

According to the South Carolina Department of Natural Resources report in 1978 entitled Review of sinkhole-collapse problems in a carbonate terrane, "In the Jamestown area of Berkeley County, over 50 sinkhole collapses and subsidence depressions have occurred since the fall or winter of 1975."

This plan does not analyze sink holes at this time because no loss data is collected.

Hurricanes and Tropical Storms

Hurricanes, tropical storms, and tropical depressions, are all tropical cyclones which are defined by the National Weather Service's National Hurricane Center (NHC) as a warm-core non-frontal synoptic-scale cyclone, originating over tropical or subtropical water, with organized deep convection and a closed surface wind circulation about a well-defined center. Once formed, the system is fed by extracting heat energy from the ocean at high temperatures and releasing heat at the low temperatures of the upper troposphere. Damage caused by these systems is mainly associated with rainfall, storm surge, and sustained high winds. Storms can last several days depending on the atmospheric factors, causing sustained flooding and erosion conditions for all jurisdictions within the county. The Atlantic hurricane "season" begins roughly on June 1st and ends on November 30th of each year. However, storms have occurred earlier (Anna – May 10th) and later (Alice – December 30th) than the typical season.

Hurricanes/tropical storms are classified using the Saffir-Simpson Scale, which is used by the NHC to predict potential property damage and flooding levels from imminent storms. The scale rates the intensity of hurricanes based on wind speed and barometric pressure measurements. Although the scale assigns a wind speed and surge level to each category of storm, in recent years there has been a recognition that wind speed, storm surge, and inland rainfall are not necessarily of the same intensity for a given storm. The Saffir-Simpson Scale is still the most widely used classification tool for hurricanes. A description of the Saffir-Simpson Scale is presented below (Source: NOAA).

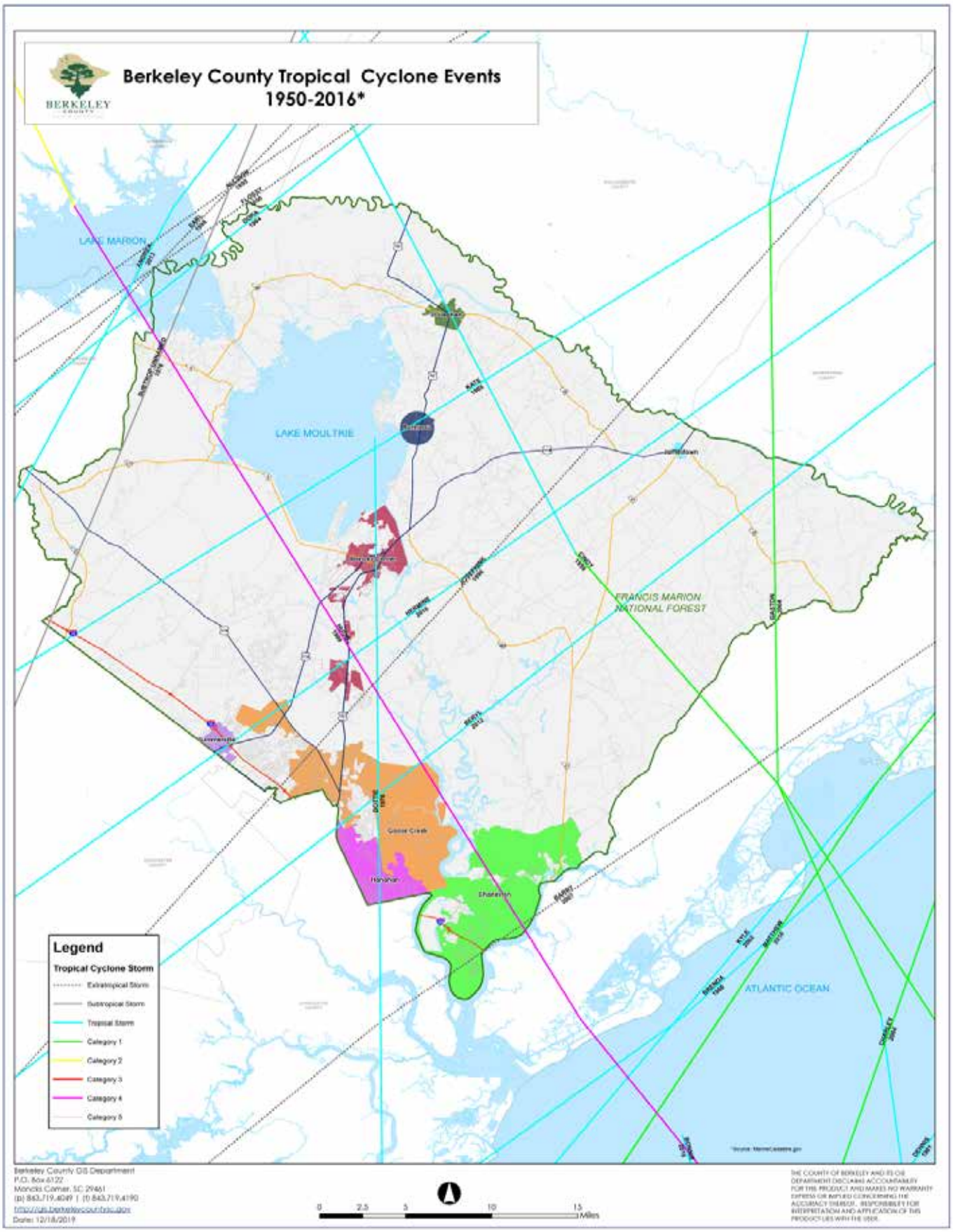
Table 13: Saffir-Simpson Scale Hurricane Classification

CATEGORY	SUSTAINED WS (MPH)	SURGE (FT)	PRESSURE (MB)	TYPICAL DAMAGE
Tropical Depression	<39	----	----	
Tropical Storm	39-73	----	----	
Hurricane 1	74-95	3-5	>980	Minimal- Damage primarily to shrubbery and trees, to unanchored homes, and to poorly constructed signs. Low-lying coastal roads inundated, minor pier damage, some small craft in exposed anchorage torn from moorings.
Hurricane 2	96-110	6-8	979-965	Moderate- Major damage to exposed mobile homes and poorly constructed signs. Some damage to roofing materials of buildings, windows and doors. Coast roads and low-lying escape routes inland cut by rising water 2 to 4 hours before arrival of hurricane center. Considerable damage to piers. Marinas flooded. Evacuation of some shoreline residences and low-lying areas required.
Hurricane 3	111-130	9-12	964-945	Extensive Damage- Large trees are toppled, some structural damage to roofs. Mobile homes destroyed. Structural damage is done to small homes and utility buildings. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Evacuation of low-lying residences possibly required.
Hurricane 4	131-155	13-18	944-920	Extreme Damage- Extensive damage to roofing materials, windows and doors; failure of roofs and walls on many small residences. Complete destruction of mobile homes. Flat terrain 10 feet of less above sea level flooded inland as far as 6 miles. Major damage to lower floors of structures near shore due to flooding Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives.
Hurricane 5	>155	>18	<920	Catastrophic Damage- Very severe and extensive damage to windows and doors. Complete failure of roofs on many residences and industrial buildings. Some complete building failures. Small buildings overturned or blown away. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Massive evacuation of residential areas on low ground within 5 to 10 miles of shore possibly required.

According to the South Carolina Department of Natural Resources Climatology Office, since 1851 there have been 24 hurricanes, nine tropical/subtropical storms, and five tropical depressions that have made landfall on the South Carolina coast. Of these 38 storms, ten were of Category 2-4 intensity. Hurricane track data is available from the NOAA-Coastal Services Center (https://coast.noaa.gov/hurricanes/) and included as part of the South Carolina State Hazard Assessment (performed by SCEMD and in conjunction with the HVRI). This data shows that from 1867 to September 8, 2016, 37 Hurricanes/Tropical Storms (including depressions, subtropical storms, and extra tropical storms) passed through some portion of Berkeley County. SCEMD also includes recent Hurricanes Matthew (October 8, 2016) and Irma (September 11, 2017) that did not track across Berkeley County, but caused significant rainfall and flooding.

Berkeley County GIS has mapped a number of these storms in the following map:

Map 3: Berkeley County Tropical Cyclone Events (1950-2016*)



Hurricane/Tropical Storm Events since the 2015 BCHMP update (damages listed occurred in unincorporated areas of Berkeley County unless otherwise noted):

Aug 29, 2004: GASTON

Landfall near Awendaw, SC as a Category 1 hurricane with maximum sustained winds of 75 mph (121 km/h). Storm surge ranged from 4 to 4.5 ft in Bulls Bay. Widespread wind damage occurred in Charleston County and Berkeley counties. Winds blew down trees and destroyed eight homes. In total, over 3,000 structures incurred minor to significant damage and several vehicles were destroyed by falling trees. Other damages included lamp posts, power lines, mailboxes, signs and fences that were damaged by falling debris. In Berkeley County, 20 structures were severely damaged or destroyed, and dozens of other structures incurred minor flooding damage.

May 9, 2015: ANA

On 5/7/2015, Ana formed as a subtropical storm and gradually developed over the course of the next 24 hours to be classified as a tropical storm. Ana only had peripheral impacts on southeast South Carolina, including gradient winds that knocked down a couple of trees in the area with one tree reported downed on Daniel Island.

May 27, 2016: BONNIE

Bonnie originated as a tropical depression over the Bahamas on May 25, 2016 and moved quickly west-northwestward. The cyclone reached tropical storm strength on May 28, 2016 while centered 195 nautical miles south-southeast of Charleston, South Carolina. Bonnie then weakened back to a tropical depression and made landfall on Isle of Palms, South Carolina. Bonnie then made a slow cyclonic loop over coastal South Carolina as it weakened back into a post-tropical remnant on May 30 and then reemerging into the Atlantic Ocean from North Carolina. Other than heavy rainfall, no damage was reported.

September 2, 2016: HERMINE

Hermine developed as a tropical depression near the north coast of Cuba on August 28, 2016 and then tracked westward into the Gulf of Mexico and strengthened into a tropical storm. Hermine then tracked generally northeastward and strengthened into a Hurricane, making landfall as a Category 1 Hurricane September 2, 2016 along the gulf coast of Florida, just east of St. Marks. Hermine continued on a northeastward track across the Florida panhandle and into southeast Georgia and southeast South Carolina, gradually weakening back to a Tropical Storm. Across southeast Georgia and southeast South Carolina, the main impacts from Hermine included heavy rain and wind damage. Rainfall amounts generally ranged from 2 to 8 inches across the region, including a daily record rainfall of 2.32 inches at Charleston International Airport. The wind damage produced numerous power outages and some damage to homes and other structures. Hermine also spawned 2 tornadoes, and produced a 1.5' to 2.5' storm surge along the coast, although no flooding was reported. Peak wind gusts ranged from 36 to 48 miles per hour. Berkeley County Emergency Management reported several trees down, mainly around Moncks Corner.

October 8, 2016: MATTHEW

Matthew first developed into a tropical storm about 35 miles southeast of St. Lucia on September 28, 2016 before quickly strengthening into a powerful hurricane as it tracked westward across the Caribbean Sea. Matthew reached Category 5 strength near Curacao on September 30th; weakening slightly while turning north. Matthew made landfall on Haiti as a Category 4 hurricane on October 4th and continued north maintaining its strength before making a second landfall in Cuba later that day. Land interaction reduced the strength of Matthew to a Category 3 hurricane, before it re-intensified into a Category 4 hurricane, tracking northwest toward the Bahamas. Matthew then made landfall for a 3rd time over Grand Bahama October 6th. Matthew then continued on a north-northwest track toward Florida before paralleling much of the Southeast coast in a slowly weakening state over the next couple days. Matthew tracked parallel to the northern half of the Southeast Georgia coast as a Category 2 hurricane, before continuing to weaken to a Category 1 hurricane while passing much of the lower Southeast South Carolina coast. Matthew then made its 4th and final landfall as a weak Category 1 hurricane near McClellanville, SC on October 8th. Across southeast Georgia and southeast South Carolina, the main impacts from Matthew included heavy rain, wind damage in the form of scattered to widespread trees and power lines blown down, and storm surge, specifically along coastal locations from Tybee Island, GA north to Edisto Beach, SC. Storm total rainfall amounts generally ranged from 4.5 to 7 inches across western areas of Southeast Georgia and extreme western locations of Southeast South Carolina to 8 to 17 inches closer to the coast, highest in coastal counties of Southeast Georgia and the lower Southeast South Carolina coast. A peak storm total rainfall of 17.49 inches was recorded at Hunter Army Airfield in Georgia while a peak storm total rainfall of 16.90 inches was recorded near Edisto Island, SC. These heavy rains led to several instances of flash flooding with damage to roads and homes and helped produce long duration flooding along the Edisto River, Ashley River, and Santee River. Wind damage produced numerous to widespread power outages and damage to homes and other structures throughout the area, most significantly at locations near the coast where wind gusts occurred with rain bands surrounding the passing eye wall. The most extensive damage came with storm surge during Matthew. The entire Southeast Georgia and Southeast South Carolina coast was impacted by storm surge generally ranging between 2 to 5 feet with some locations as high as 6 to 8 feet. A peak surge of 6.20 feet occurred at the Charleston Harbor tide gauge at 5 AM October 8th. Damage from surge was most notable on the northern ends of Tybee Island in Georgia and on Fripp and Edisto Islands in South Carolina. Locations on Fripp and Edisto Islands saw some of the most significant beach erosion and damage to oceanfront homes in the entire area.
The Berkeley County 911 Call Center reported many trees and power lines down across the county during Hurricane Matthew. Additionally, many roads were covered by water. A county official from Berkeley County reported heavy rain from Hurricane Matthew resulting in flooding in the College Park area, including water entering some homes on Oxford Road. A Twitter report indicated a Marathon gas station awning in Sangaree was blown down. Social media indicated several trees down with at least one on a power line in the Hatchery Wildlife Management area. Law enforcement reported United Road washed out near the intersection with Highway 41. The washout likely occurred near a branch of Hester Canal. A picture on social media indicated the primary road into Overton Subdivision near Moncks Corner was washed out and another picture showed a road to the Joint Base Charleston Short Stay washed out.

September 11, 2017: IRMA

Irma first developed into a tropical storm on August 30th about 420 miles west of the Cabo Verde Islands and within 24 hours strengthened into a hurricane. Irma continued to intensify and became a major hurricane over the eastern Atlantic on September 1st. After undergoing a brief period of weakening on September 2nd, Irma again strengthened into a major hurricane on September 3rd and maintained major hurricane status through September 10th when it made landfall on the southwest Florida coast. During this extended period as a major hurricane, Irma set numerous intensity records for a hurricane in the Atlantic basin. Maximum sustained winds reached 185 mph, making Irma the strongest storm on record to exist in the Atlantic Ocean outside of the Caribbean and Gulf of Mexico. Also, Irma's 185 mph maximum sustained winds are tied for the second strongest maximum winds of all time in an Atlantic hurricane. Irma also maintained a Category 5 status for three consecutive days, which is the longest on record for an Atlantic hurricane. Irma officially made landfall at Marco Island, FL on September 10th as a Category 3 hurricane. Following landfall, Irma tracked to the north-northwest and northwest up the western side of the Florida peninsula. Irma steadily weakened during this time and was downgraded to a tropical storm on September 11th. Though the center of Irma tracked well to the west of the southeast Georgia and southeast South Carolina region, it still caused significant impacts due to heavy rainfall, strong winds, tornadoes, and storm surge. Feeder bands around Irma continuously moved onshore and produced very heavy rainfall rates with rainfall totals generally ranging from 3 to 9 inches. The peak storm total rainfall of 9.07 inches was recorded near Beaufort, SC. On September 11th, daily record totals were recorded of 5.51 inches at Charleston International Airport, 4.53 inches at Downtown Charleston, and 4.74 inches at Savannah-Hilton Head International Airport. The widespread heavy rain resulted in flash flooding with water entering homes and businesses. Wind damage produced numerous power outages across the region with some damage to structures and numerous downed trees. The strongest winds were confined to coastal locations, but frequent gusts into the 40-50 mph range occurred well inland. The maximum sustained wind recorded was 59 mph on the Folly Beach Pier and the maximum wind gust recorded was 76 mph near Beaufort. One fatality and 1 injury occurred from trees falling on homes and across roadways in southeast South Carolina. The entire southeast Georgia and southeast South Carolina coast was impacted by storm surge generally ranging from 3 to 6 feet. The storm surge produced numerous reports of 4 to 6 feet of inundation above ground level, mainly along the southeast South Carolina coast. A peak surge of 4.87 feet occurred at the Charleston Harbor tide gauge while a peak surge of 5.63 feet occurred at the Fort Pulaski tide gauge. Significant beach erosion occurred at area beaches with widespread damage to docks and piers all along the coast, as well as numerous reports of inundated roadways.

Berkeley County Emergency Management reported scattered trees down across the county. Trees were down along Highway 52 at Tom Hill Road and Garbar Lane and at Highway 41 and Tiger Corner Road. Bushy Park Road at Bushy Park Boat Landing was impassable due to storm surge related flooding and the public reported that numerous docks were damaged on the north side of the Wando River

September 14, 2018:

FLORENCE

Florence formed as a tropical depression over the far eastern Atlantic on August 31st, about 70 miles south-southwest of the Cabo Verde Islands. Florence quickly strengthened into a tropical storm and continued on a west-northwestward track for the next several days. Florence then strengthened into a hurricane, but weakened back to a tropical storm a couple of days later. As it weakened, Florence took on a due westward track that persisted for a few days. On September 9th and 10th, Florence underwent rapid intensification and became a Major Hurricane, tracking northwestward toward the North Carolina coast. As it approached, Florence steadily weakened and slowed; making landfall as a Category 1 hurricane on September 14th near Wrightsville Beach, NC. Once inland, Florence weakened to a tropical storm and moved very slowly to the west. The center of Florence stayed just outside of the Charleston, SC forecast area, passing just north of Berkeley County. Despite the center of Florence passing so close to the area, impacts from the storm were minor and limited. Rainfall from Florence was very light for most areas and did not produce any known flooding issues. The greatest amounts were in the 3-6 inch range and were confined to eastern Berkeley and Charleston counties closer to the Santee River. Winds were gusty as Florence made its closest pass with gusts generally topping out in the 40-50 mph range. The peak recorded gust was 53 mph at Charleston International Airport. Wind damage was isolated and mainly occurred across portions of Berkeley, Charleston, Dorchester, and Colleton counties.

Scattered trees were reported down across Berkeley County. South Carolina Highway Patrol reported a tree down at the intersection of Highway 41 and Yellow Jacket Road and another tree blocking the road at the intersection of Highway 17A and Turtle Pond Road in Summerville. A large tree was blown down in the Sedgefield neighborhood of Goose Greek, trees were reported on power lines along Highway 311, a tree was reported down near the intersection of Highway 41 and Bethera Road, and another tree was reported down in the Center Lake neighborhood

October 11, 2018:

MICHAEL

Michael first developed into a tropical depression on October, 7th about 90 miles east of Chetumal, Mexico before gradually strengthening to a tropical storm off the Yucatan Peninsula coast. Michael continued to strengthen to a Category 1 hurricane while tracking north just off the western Cuba coast and then rapidly intensifying to a high-end Category 3 hurricane in the Gulf Of Mexico on October 9th. Michael continued to track north, then north-northeast while strengthening to a Category 4 hurricane with sustained winds of 155 mph; making landfall near Mexico Beach, Florida on the afternoon of the 10th. Michael then weakened while moving inland, but maintained hurricane strength while heading northeast over Florida and south central Georgia. On October 11th, Michael was a tropical storm as it moved over central Georgia and the central Carolinas, before shifting off the southern Virginia coast and transitioning into an extratropical cyclone over the Western Atlantic. Rainfall amounts generally ranged from 1.0 to 3.5 inches with a peak rainfall total of 3.65 inches at Jamestown, SC. Heavy rains led the Santee River at Jamestown, SC to reach minor flood stage on October 12th. Wind damage, mainly in the form of downed trees, produced numerous power outages and damage to a few homes and automobiles. On October 11th, a maximum sustained wind of 43 mph occurred at the Folly Beach Pier in South Carolina. A maximum wind gust of 57 mph occurred at Isle of Palms and the Folly Beach Pier. Storm Surge was minor along the beaches, but isolated damage was reported to a dock along the Charleston County coast. A peak surge of 2.29 feet was recorded at Fort Pulaski and a peak surge of 2.07 feet at Charleston Harbor on October 11th.

Law enforcement and broadcast media reported a tree down near Goose Creek and another near Sangaree. A National Weather Service employee and trained spotter reported two trees down near Daniel Island

September 5, 2019: DORIAN

Dorian developed on August 24 in the Central Atlantic and became a hurricane north of the Greater Antilles on August 28. Dorian underwent rapid intensification over the next few days to a Category 5 hurricane with sustained winds of 185 mph (295 km/h) and pressure of 910 millibars (26.87 inHg) by September 1st . It made landfall in the Bahamas where it remained stationary. Dorian began moving northwestward on September 3, parallel to the east coast of Florida. The weakening hurricane turned to the northeast the next day, and skirted the U.S east coast until finally making landfall on Cape Hatteras at a Category 1 hurricane on September 6. All coastal counties, including Berkeley County, were evacuated on September 1st.

Problems reported in Berkeley County included minor building damages and very minor surge/flooding issues. High winds caused loss of services to some residents due to the downing of utility lines. Clean-up continued for several days due to downed trees and debris scattered throughout the county. Damage was primarily contained in the southern part of the county in the Daniel Island/Cainhoy areas, however there were reports of property damage due falling trees in the Braemoor and Woodland Lakes subdivisions of Goose Creek, fallen trees blocking Marvel Oak Rd. in Ladson and Planters Blvd near Goose Creek as well as numerous downed trees and power lines near Moncks Corner.

Tornadoes

The National Weather Service describes a tornado as a violently rotating column of air extending from a thunderstorm to the ground. This atmospheric event is caused by the development of thunderstorms in a warm and moist environment. A tornado that occurs over water is called a waterspout. Tornadoes may accompany tropical storms and hurricanes that move over land. Tornadoes are considered the most destructive of all atmospheric-generated phenomena, with an average of 1,200 tornadoes reported annually nationwide. In South Carolina, tornado touchdowns tend to occur between the months of March and May. On March 28, 1984 the Carolinas received a total of 22 tornadoes, causing 57 deaths, 1,284 injuries, $200 million in damage and 37% of fatalities in mobile homes.

The Enhanced Fujita Scale or EF Scale is used to assign a rating to a tornado based on estimated wind speeds and damage. The EF Scale was revised from the original Fujita Scale to better show the observed tornado damage and align wind speeds with storm damage to common structures and vegetation.

The Enhanced Fujita Scale is described below (Source: NOAA).

Table 14: Enhanced Fujita Scale

EF RATING	3-SECOND GUST (MPH)	DAMAGE DESCRIPTION
0	65-85	Minor damage to roofs, gutters, or siding. Broken tree branches, shallow-rooted trees may be toppled.
1	86-110	Moderate damage. Roofs stripped, mobile homes overturned or badly damaged. Loss of exterior doors, windows, and other glass.
2	111-135	Considerable damage. Roofs torn-off of well-constructed houses, foundations of frame-built house shifted, mobile homes destroyed, large trees snapped or uprooted, light-object missiles, cars lifted off ground.
3	136-165	Severe damage. Entire stories of well-constructed houses destroyed, severe damage to large buildings, trains overturned, trees debarked, heavy cars lifted off ground and thrown, structures with weak foundations thrown.
4	166-200	Devastating damage. Well-constructed houses and full frame houses leveled. Cars thrown and missiles generated.
5	Over 200	Extreme damage. Strong frame houses leveled and swept away, automobile missiles generated, steel reinforced concrete badly damage, high-rise buildings experience significant structural damage.

From 1950 – April 30, 2019, there have been 32 tornado events with 2 events being recorded since the 2015 BCHMP update, as recorded by NOAA. (Damages listed occurred in unincorporated areas of Berkeley County unless otherwise noted)

5/10/1998: An F2 tornado that damaged 442 homes in the county. There was approximately $5,000,000 in damage reported. There were 7 injuries and 1 fatality reported as a result of the tornado.

9/3/1998: An F2 tornado damaged 73 homes and destroyed 7. The hardest hit area was just southeast of Moncks Corner. There was approximately $2,800,000 in damage reported. There were 9 injuries reported as a result of the tornado.

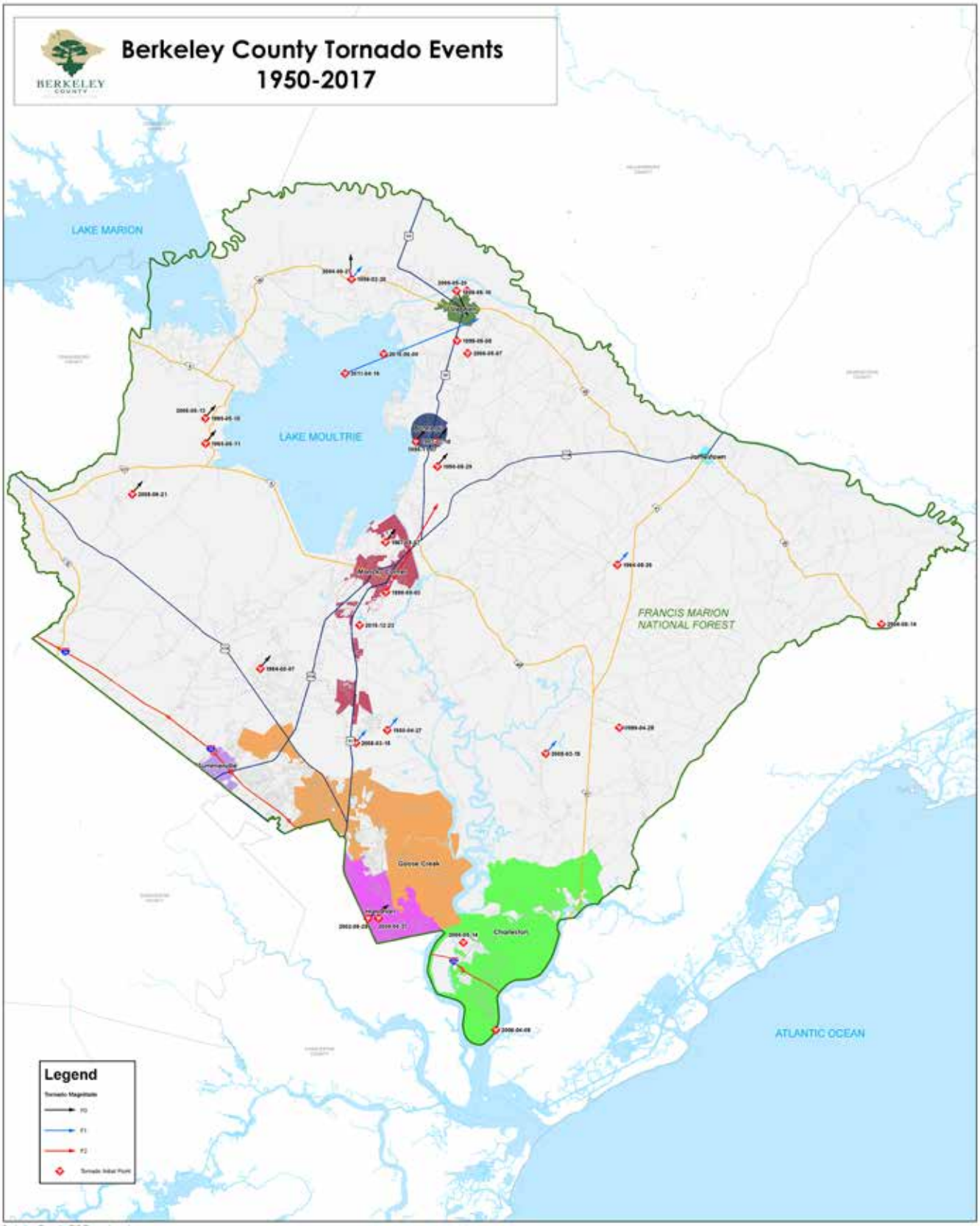
4/16/2011: An EF1 tornado with estimated wind speeds between 105-110mph touched down near Russellville. The tornado was on the ground for nearly 8 miles. The tornado lifted a roof off a church, destroyed a mobile home, and uprooted numerous trees. Property damage totals are not available.

6/9/2015: An EF0 event with a width of 25 yards lasted for .21 miles. A broken line of strong thunderstorms developed within an inland trough of low pressure and moved southward across southeast South Carolina, producing large hail and damaging wind gusts. Several videos and pictures were taken of a waterspout on the northern end of Lake Moultrie. The waterspout did not make landfall.

12/23/2015: An EF0 event with a width of 100 yards lasted for .2 miles causing about $18,000 in damage. A series of shortwaves rounding the southern periphery of a longwave trough along with upper jet divergence helped spawn thunderstorms within an unseasonably warm and moist air mass over southeast South Carolina.

Berkeley County Emergency Management provided the National Weather Service with photographs and drone footage to determine an EF0 tornado with estimated maximum wind speeds of around 70 mph occurred for one minute at Carolina Nurseries; about three miles south-southwest of Moncks Corner. The tornado initially formed near Emerald Isle Drive. Straight-line wind damage included numerous wooden pallets tossed northeast, a telephone pole blown over, a 2x6 piece of wood piercing the east side of a building just north of Emerald Isle Drive, and roofing material missing from a building just north of Emerald Isle Drive. Emergency management personnel reported a 200 square foot shed destroyed with its roof found 300 feet from the original location. Multiple carts weighing 150 pounds each were also tossed away from the shed site. Vegetation revealed a swirling, convergent damage signature produced by a weak tornadic circulation farther north-northeast along the tornado path

Map 4: Berkeley County Tornado Events (1950-2017)



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0 2.5 5 10 15 Miles

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Winter Storms

Winter storms can be very disruptive, particularly in areas where they are not frequent occurrences. While winter storms have had an effect on South Carolina, they occur relatively infrequently compared to areas in the northern United States. These storms can combine different types of precipitation including snowfall and ice storms, as well as high winds, and cold temperatures. They vary in size and intensity and may be accompanied by strong winds that may create blizzard conditions and dangerous wind chills. Heavy snowstorms are those that drop four or more inches of snow within a twelve-hour period. Ice storms may also be dangerous due to the moisture that falls and freezes upon impact causing dangerous conditions for transportation. Notable winter storms in South Carolina history include the most significant snowstorm to occur in South Carolina in February of 1973 with 18 inches of snow in the Lowcountry and 24 inches upstate, a March 1993 storm with high winds that left thousands of residents in the cold and dark, and a pair of ice storms in 2014 that resulted in a South Carolina state of emergency for several days and contributed to an estimated $5.5 million in losses to Berkeley County.

Only two significant winter storms have been logged since the 2015 BCHMP update. Significant storms listed below. (Damages listed occurred in unincorporated areas of Berkeley County unless otherwise noted)

1/28/2014	A strong but shallow arctic cold front pushed through Berkeley and surrounding counties. Temperatures dipped into the lower 30s by early evening and into the 20s overnight. Freezing rain and sleet prompted authorities to close local bridges and many roads were impassable. The weight of the ice downed tree limbs and power lines, leaving many residents of Goose Creek and the surrounding areas without power.
2/12/2014	A quick-moving area of low pressure moved across the Southeast, bringing rain and snow as it interacted with some of the cold air to the north of it. According to weather spotters Cross received an inch of ice while Summerville, Moncks Corner and Knightsville received three-quarters of an inch, and Ladson and St. Stephen saw a half-inch. Ice caused major damage to trees and power lines in Berkeley County. On March 12, 2014 the White House approved Governor Haley's request for federal disaster relief after damage was reported at more than $430 million to the state.
12/29/2017:	A cold wedge of high pressure expanded over the area within a light northerly flow while low pressure developed south of the region and tracked northeast along the coast. The combination of moisture associated with the passing low and cold temperatures associated with the entrenched wedge of high pressure eventually caused light rain to freeze during early morning hours. Several bridges were shut down around the Charleston Metropolitan area as ice accumulated by the Friday morning commute. Peak total ice accumulation of 0.03 inches was recorded at the National Weather Service office in North Charleston, SC. Reports indicated light ice accumulation on cars and trees in the College Park area and on the surface near the Old Santee Canal State Park. The media and trained spotters reported a light glaze of ice on cars and shrubs in the Wando area. The Don Holt Bridge was also reported closed due to icing during the morning commute.

1/3/2018:	Arctic high pressure was in place at the surface ahead of an upper-level disturbance moving east across the Southeast U.S. This caused surface low pressure to develop near the Bahamas, move northward toward the Gulf Stream and spread moisture across southeast Georgia and South Carolina. Precipitation began in the predawn hours and spread north and west across South Carolina. It began as primarily freezing rain with some sleet mixed in. Then, colder air moved into the area causing the precipitation to change to snow. Due to the continued cold air in place even after the storm, the snow/ice remained on the ground in spots for many days causing significant disruptions to travel and commerce. Charleston International Airport recorded snow on the ground for 5 consecutive days which is the most on record. The event resulted in 5-7 inches in Berkeley County, with the highest recorded amounts in the College Park and Sangaree areas.

Thunderstorms

Thunderstorms impact relatively small areas when compared with hurricanes, tornadoes, and winter storms, but occur much more frequently. They can be intense and dangerous, and can spawn or occur in conjunction with other damaging hazards. A typical thunderstorm is about 15 miles in diameter and can last 30 minutes on average (Weather.gov). Thunderstorms form from a combination of moisture and rapidly rising warm air. A force capable of rapidly lifting this moisture-laden air, such as a forceful warm or cold front, sea or mountain breezes, or warm terrain, is also required. Thunderstorms are considered severe if hail of at least 0.75 inch in diameter occurs, wind speeds of 58 mph or stronger are present, and/or a tornado is produced. Other features such as lightning, heavy rain, and strong winds can also occur.

Thunderstorms occur frequently. About 381 events are reported by NOAA for Berkeley County from 1950 to August 30, 2019. Since the 2015 BCHMP plan update, there are 77 events logged as "Thunderstorm Wind" and 4 events logged as "Lightning." There were certainly thunderstorms spawned from higher-level events such as hurricanes that are captured in the hurricane data, rather than individually. These events represent about $31,000 in property damage, primarily due to the lightning strikes.

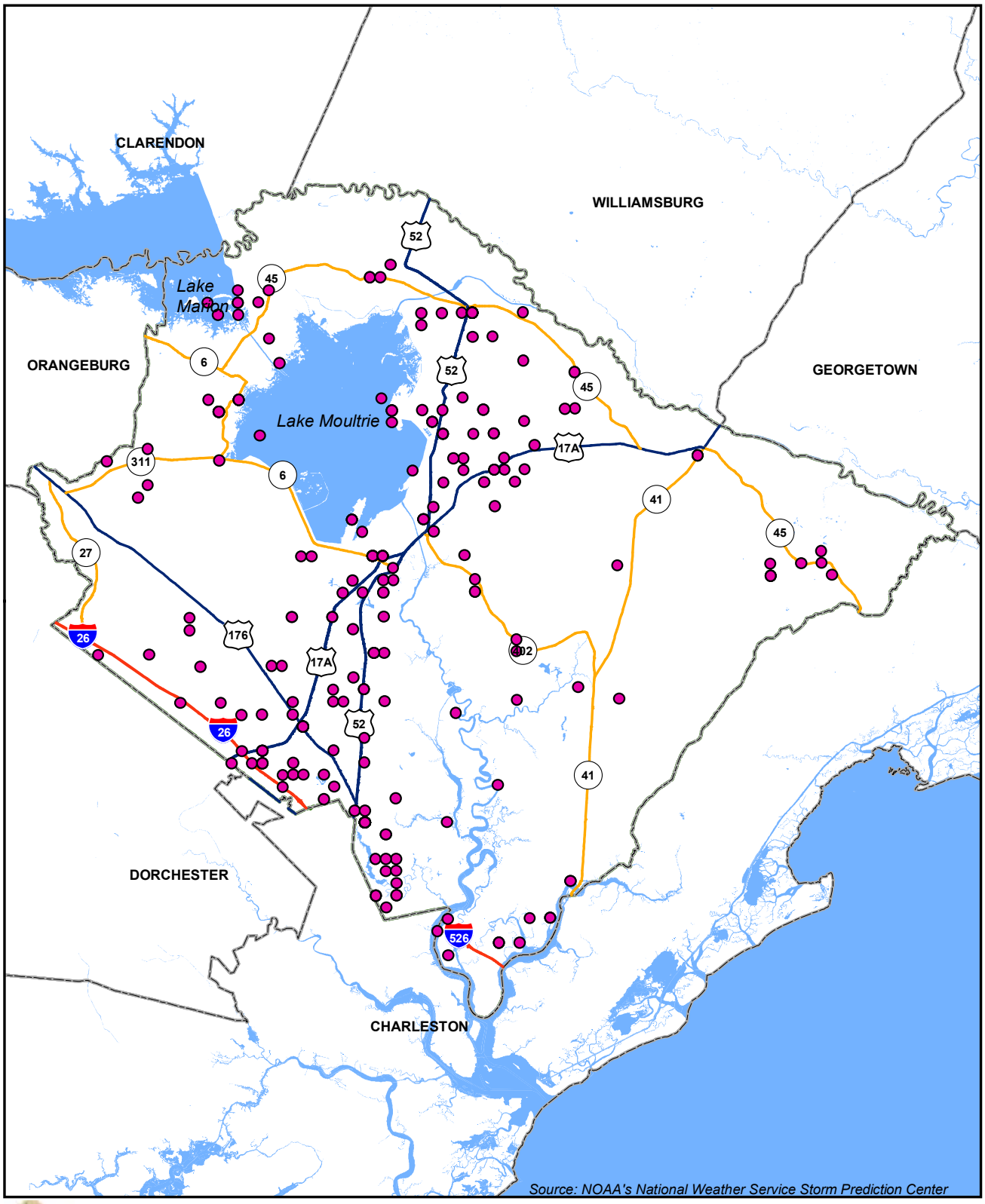
The highest estimated thunderstorm wind gust reported in Berkeley County since the last update was 69 mph recorded on April 3, 2017 at Carnes Crossroad. According to NOAA, a warm front lifted north over the area, increasing instability ahead of a cold front approaching from the west. A mid/upper trough of low pressure over the Central United States took on a negative tilt while tracking east. As this occurred, an embedded H5 shortwave rounded the southern periphery of the longwave trough, shifting over the Southeast United States in a dampening state. The combination of surface based instability advection moving north, strong shear, modest mid-level lapse rates, and forcing associated with the approaching H5 shortwave and entrance region of an upper level jet helped produce an environment capable of damaging straight-line winds, small to moderate size hail, and isolated tornadoes. A Berkeley County fire department reported several trees snapped or uprooted along Farmington Road near Interstate 26 in the Sangaree area.

Hail

Hail forms by the circulation of strong updrafts of warm air and downdrafts of cold air, typically as found in a thunderstorm. In this process, water droplets above freezing temperatures are carried aloft by the storm updrafts, where they freeze at higher elevations in the storm and begin to slowly drop back to lower elevations. With each trip above and below the freezing level, the frozen droplets add another layer of ice. When the updrafts are no longer strong enough to lift the frozen droplets, they fall to the ground as hail.

Since the 2015 BCHMP update, there have been 23 reports of hail logged by NOAA in Berkeley County. While no damage was reported, the largest hail recorded in this time period was related to a thunderstorm on February 15, 2017. Reports from Bonneau, SC identified "ping pong ball" or "quarter-sized" hail (1.5 inch in diameter) and to the south in the Cherry Hill area, a spotter noted "golf ball-sized" hail (1.75 inch in diameter). Hail incidents are shown on the following map.

Berkeley County Hail Event Locations 1968-2018



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Wildfires

According to the U.S. Forest Service (USFS) Wildland Fire Assessment System (WFAS), Berkeley County is located in a low to moderate risk fire danger area. The USFS indicates that in a low classification ***"Fuels do not ignite readily from small firebrands although a more intense heat source, such as lightning, may start fires in duff or punky wood. Fires in open cured grasslands may burn freely a few hours after rain, but woods fires spread slowly by creeping or smoldering, and burn in irregular fingers. There is little danger of spotting."***

While in a moderate classification ***"Fires can start from most accidental causes, but with the exception of lightning fires in some areas, the number of starts is generally low. Fires in open cured grasslands will burn briskly and spread rapidly on windy days. Timber fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel, especially draped fuel, may burn hot. Short-distance spotting may occur, but is not persistent. Fires are not likely to become serious and control is relatively easy."***

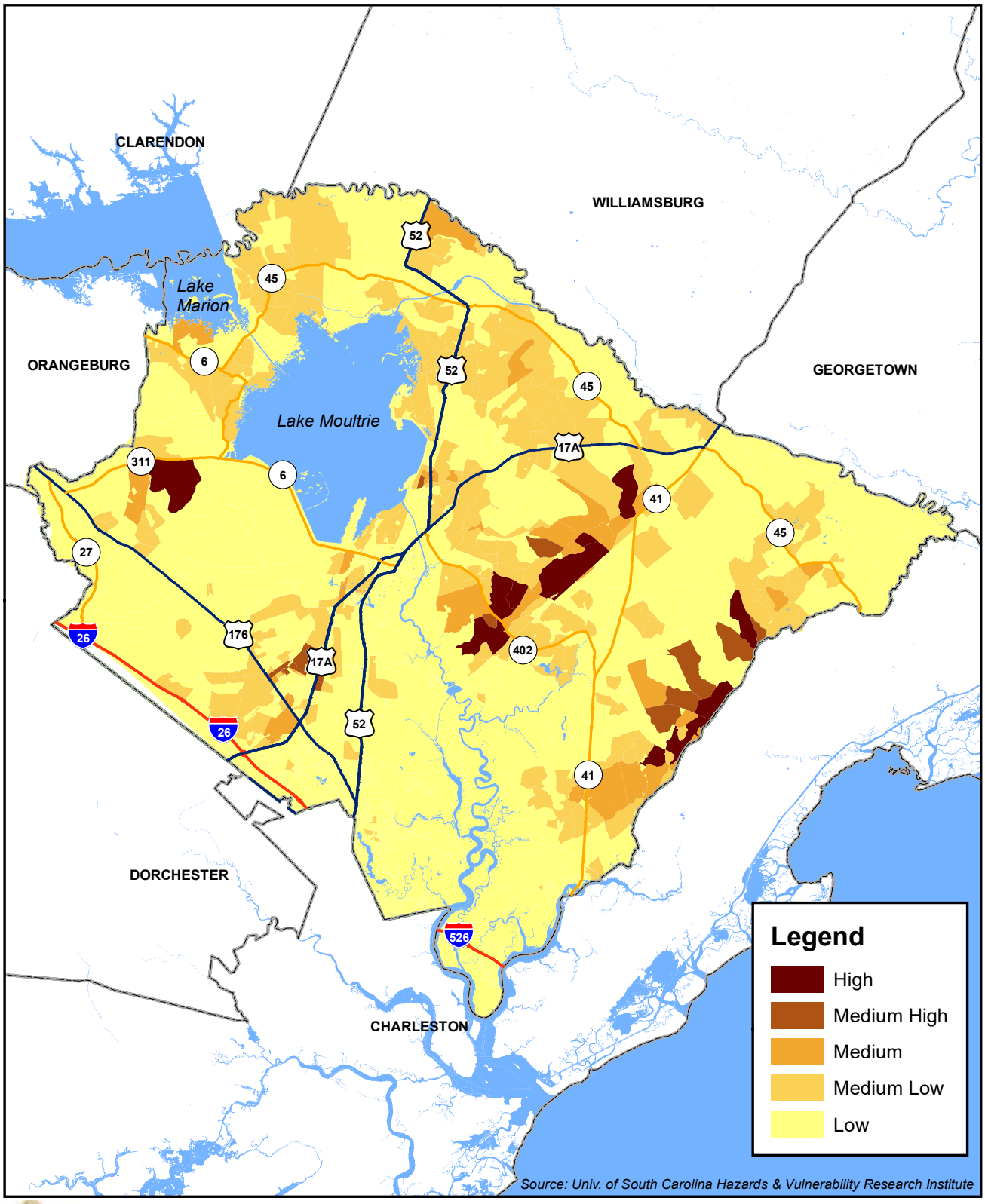
Generally, vegetation, land use and weather are the major factors to consider in assessing the threat of wildfires to this area. Densely forested areas, grasslands, and agricultural crops provide readily accessible fuel and allow wildfire spread more efficiently. The National Fire Danger Rating System (NFDRS) produces fuel models that indicate the types of vegetation and estimated moisture content for non-specific site use across the country. Droughts or dry weather will reduce moisture content and cause vegetation to burn more easily. There are numerous forested areas, grasslands, and croplands in Berkeley County, including the Francis Marion National Forest, which could provide plentiful fuel for wildfires.

The most common cause of wildfires is negligent human behavior, but lightning strikes can also cause wildfires. As indicated, droughts or dry weather will impact vegetation's fire resistance and wildfire risk. Forest fire danger is usually greatest in late winter and early spring. South Carolina's fire season is in the winter because most of the vegetation is dead or drier than in other seasons. The threat of wildfires increases during times of drought. Drought is explored later in this section as a separate hazard.

Berkeley County is considered a subtropical climate with high temperatures during the summer. However, high levels of humidity often accompany these high temperatures, dampening the fire risk.

According to NOAA, there has been one incidence of wildfire since the BCHMP 2015 update. The fire occurred on March 17, 2015 and did cause an injury. A small wildfire developed following a prescribed burn. Conditions were warm and dry and the wildfire developed overnight, spreading toward a residential area. The 25-acre wildfire occurred on Frost Lane in Huger, within the Francis Marion National Forest. The fire threatened multiple homes in the area, but no property damage occurred. One male victim sustained burns over 70 percent of his body while trying to contain the fire using a tractor.

Berkeley County Wildfire Susceptibility Index



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Drought

Drought is a normal climatic variation to the amount of precipitation in a region. However, extended periods of low precipitation can result in water shortages and drought may be exacerbated by other factors such as high temperatures, winds, low relative humidity, and water consumption rates. Droughts develop slowly over weeks, months, or even years and severe droughts can lead to wildfires and significant losses of crops, forests, fisheries, ecosystems, wildlife, and livestock. Drought conditions can also lead to inadequate public water supplies, diminished air and water quality, increased harmful waterborne organisms, and increased public safety risks to health, quality of life, and well-being.

The South Carolina State Climate Office (SCSCO) maintains a South Carolina Drought website at www.scdrought.com. According to the SCSCO, South Carolina experiences a wide variation in the amount of rainfall it receives with a long-term, statewide average of about 47.66 inches. The majority of Berkeley County falls into a range of range of 48 to 50 inches of annual rainfall, with some areas in the south of the county at 50 to as much as 56 inches.

The State of South Carolina has had a drought management plan in effect since 1985 that continues to be updated, along with a State Drought Program Coordinator. Updates are provided continuously by the SCSCO through a Drought Response Committee. A number of indicators are used by the SCSCO to determine the current drought status for South Carolina. However, the top seven indicators are the United States Drought Monitor, the Crop Moisture Index, the Palmer Drought Severity Index, Streamflow Levels, Lake/Reservoir Levels, Groundwater Levels, and the Keetch-Byram Drought Index. These tools are combined to indicate a level of drought status for each county in South Carolina ranging from "normal" to a one of four drought levels of "Incipient," "Moderate," "Severe" or "Extreme." This status is determined by the South Carolina Drought Response Committee using a set of drought indices and provided to the public.

LEVEL OF DROUGHT	DEFINITION
Normal	No threat of drought
Incipient	a threat of a drought as demonstrated by drought indices
Moderate	an increasing threat of a drought as demonstrated by drought indices
Severe	Drought has increased to severe levels as demonstrated by drought indices.
Extreme	drought has increased to extreme levels as demonstrated by drought indices

Since the 2015 BCHMP update, only three instances (7/16/2015, 9/24/2015, and 6/6/2019) of "Incipient"-level of drought was indicated in Berkeley County by these factors. Furthermore, NOAA data indicate only one instance of Excessive Heat, which exacerbates drought, was reported on 8/16/2017.

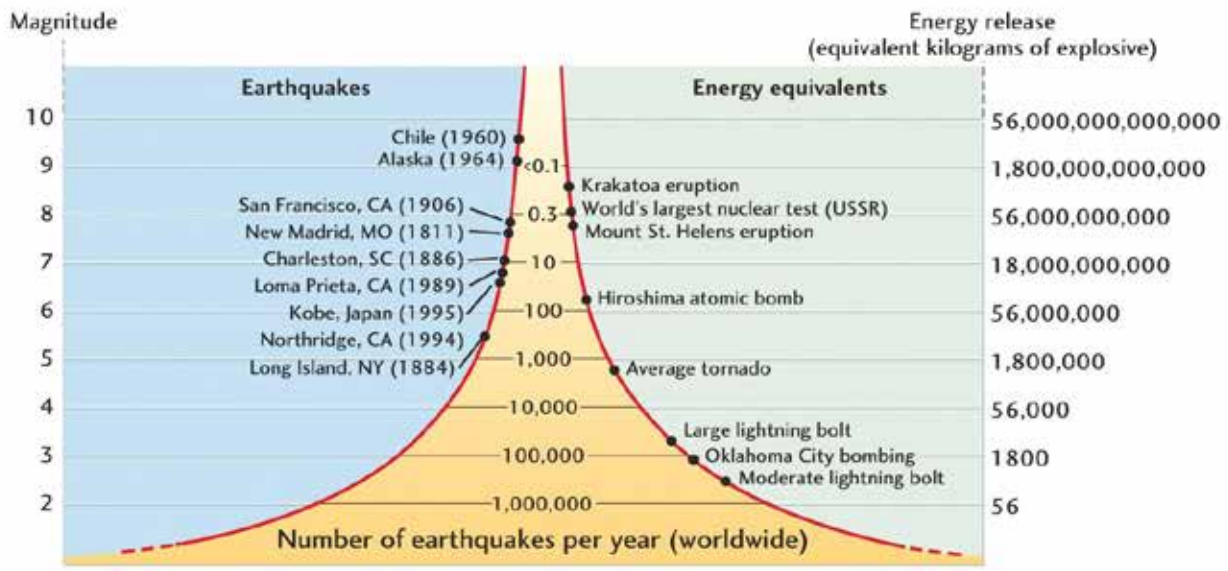
Earthquake

Earthquakes are non-climatic events that are the result of a sudden slip of rock along a fault line, which transfer the energy from this movement to the surface as seismic waves. The bedrock and faults in the Charleston, SC area are buried beneath sand, silt, clay, and sedimentary rocks that may be one to two miles thick, making the identification of many fault lines difficult.

The place at which the earthquake occurs is called the focus. The point directly above the focus on the surface is called the epicenter. In general, the epicenter experiences the most severe shaking, with the severity decreasing as the distance from the epicenter increases. However, other factors such as soil types and building construction can cause varying degrees of severity far from the epicenter of an event. The main seismic hazard that is produced from an earthquake is the shaking of the surface material, but other seismic hazards, such as liquefaction can occur. It is possible for landslides and tsunamis to occur from an earthquake in this region, but highly unlikely.

The severity of an earthquake is defined by the magnitude (strength) and intensity (shaking and damage) of the event. The Moment Magnitude (Mw) is the modern scale used to indicate an earthquake's magnitude based on seismic and geodetic records. The chart below shows the energy released from each magnitude and the frequency of each event worldwide.

Figure 4: Moment Magnitude (Mw) Earthquake Severity Scale



Source: Boston Globe

Moment Magnitude is calculated and converted to be roughly equivalent to the (outdated) Richter Magnitude Scale. The Richter scale indicates earthquake magnitude as a range from 0 to 10 on a logarithmic scale that indicates the amount of energy released from one magnitude to the next.

The Modified Mercalli (MMI) Scale is a measure of the intensity or amount of shaking at a particular location and is based on the subjective observations of damage. The MMI scale ranges from I to XII with adjective driven damage descriptions.

A comparison of the three scales can be seen in the chart below.

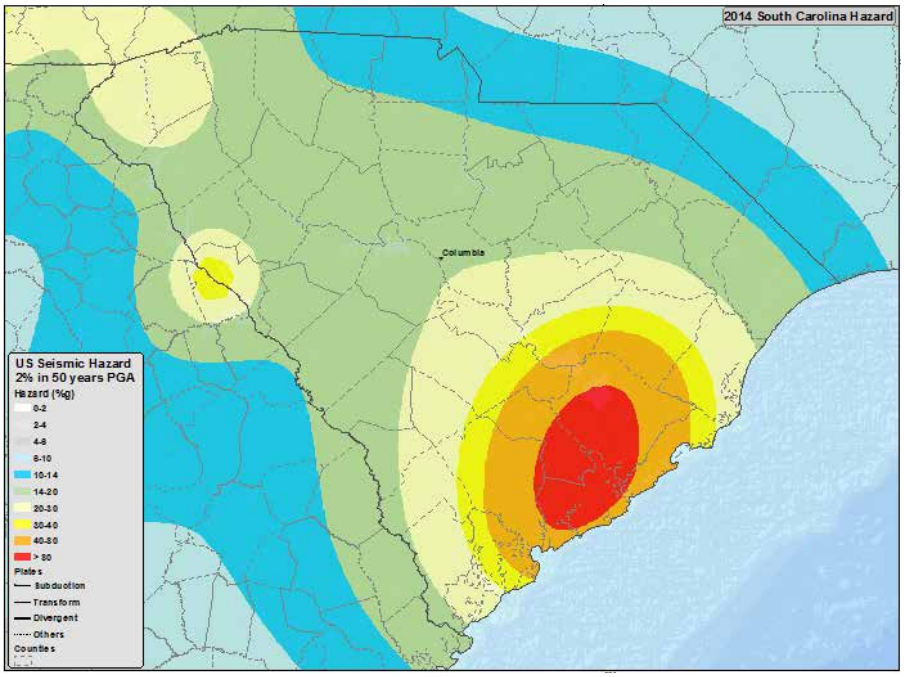
Table 15: Modified Mercalli (MMI) Scale

	Modified Mercalli Scale	Richter Scale	TNT ENERGY	Moment Magnitude
		1.5	2 pounds	
I	Only felt by instruments	2	13 pounds	
II	Felt by few persons at rest, especially on upper floors, delicate suspended objects may swing	2.5	63 pounds	
III	Felt indoors, but may not be recognized as an earthquake, vibrations like a large passing truck		123 pounds	2
		3	397 pounds	
IV	Felt indoors by many, some outdoors, may awaken some sleeping persons; dishes, windows, doors may move, cars rock	3.5	1,000 pounds	
V	Felt by most; some windows, dishes break; tall objects may fall		2 tons	3
VI	Felt by all, falling plaster and chimneys, light damage but some fear.	4	6 tons	
		4.5	32 tons	
VII	Very noticeable, damage to weaker buildings on fill; driving automobiles notice		62 tons	4
		5	199 tons	
		5.5	500 tons	
VIII	Walls, monuments, chimneys, bookcases fall; liquefaction; driving is difficult		2000 tons	5
		6	6,270 tons	
IX	Buildings shifted off foundations, cracked and twisted; ground is cracked, and underground pipes are broken	6.5	31,550 tons	
			61,730 tons	6
X	Most structures severely damaged to destroyed; ground is cracked, rails are bent, landslides on steep slopes	7	199,000 tons	
		7.5	1,000,000 tons	
XI	Few structures standing; bridges and roads severely damaged or destroyed, large fissures in ground	8	6,270,000 tons	
			19,842,000.0	7
XII	Total damage; can see the earthquake wave move through the ground; gravity overcome and objects thrown into the air	8.5	31,550,000 tons	
			61,729,400 tons	8
		9	199,999,000 tons	
			1,984,160,360 tons	9
			61,729,433,410 tons	10

Source: South Carolina Earthquake Education and Preparedness Program (SCEEP)

The USGS rates Peak Ground Acceleration (PGA), or the acceleration experienced by a particle on the ground during an earthquake, as a measure of force and expresses this force in Percent of Gravity (%g). This is a good measure of hazard for a building up to 7 stories tall, but less so for taller buildings. On the map below, the USGS calculates that there is a 2% probability in 50 years of an earthquake event that will cause a PGA of greater than 80%g. This is a quake that may cause intense surface activity. The annual probability calculation of such an event is 0.044% with a return period (or average time span between occurrences) of 227 years.

Historical earthquake epicenter location data from the USC Seismic Network is available for the time period from 1698 to 2007; with the integrity of data varying with age. In 1886, an earthquake with an estimated moment magnitude of 6.9 occurred in Charleston, causing 60 deaths and millions of dollars of damage. About 70% of all seismic activity occurs in the Middleton Place-Summerville seismic zone located on the southwestern edge of Berkeley County. Data indicates that 48 events have had their epicenter in Berkeley County, with only five events having a magnitude great enough to be considered minor or light. Other events are listed due to their proximity to Berkeley County.



Events recorded annually by the USGS in the Charleston region since 2000 include:

2000: In 2000, there were 16 locatable earthquakes in the Charleston seismic region, with magnitudes ranging between 0.6 and 2.4. Only three of these events were in or near Berkeley County, and all three were located near the point where the Berkeley, Charleston and Dorchester county lines meet.

2001: There were three earthquakes in Berkeley County in 2001. On 2/23/2001 there was a magnitude 1.79 near Nexton Parkway and I-26; on 3/11/2001, there was a magnitude 2.41 south of Azalea Square Drive in Summerville; on 12/8/2001 there was a magnitude 1.93 on Dovetail Drive in Summerville.

2002: There were four earthquakes in Berkeley County in 2002. On 7/7/2002, there was a 2.93 magnitude earthquake just north of Turtle Pond Rd; on 7/26/2002 there was a 3.02 magnitude earthquake just north of Trade Center Parkway; on 11/29 and 12/26/2002 there were 2.82 and 2.8 magnitude earthquakes (respectively) in nearly the same location just north of Maple St.

2003: There was one earthquake in Berkeley County on the Dorchester County Line near Burrows Rd. It was a magnitude 3.10.

2004: There were three earthquakes in Berkeley County in 2004: on 5/2/2004 there was a 2.71 magnitude earthquake near Henry Brown and Liberty Hall in Goose Creek; on 11/25/2004 there was a magnitude 2.7 earthquake south of Jedburg Rd near the Dorchester County Line; on 12/10/2004 there was a magnitude 2.36 east of I-26 and south of Jedburg Rd.

2005: There was only one earthquake in Berkeley County in 2005; it occurred just south of Sangaree in Summerville and had a magnitude of 2.6.

2007: There were three earthquakes in Berkeley County in 2007: two near the northern border and one in Hanahan, which was the largest at a magnitude 2.5.

2008: Only one earthquake, a 3.6 magnitude, IV-V intensity quake occurred on 12/16/2008 between Sheep Island Road and Highway 176 in Sangaree in Berkeley County. Although the quake elicited 926 self-reported responses, no damage was reported to USGS.

2009: There were four earthquakes registered, with two occurring in Berkeley County. On 5/6/2009 a 2.5 magnitude quake occurred on the edge of the County in Summerville, South of I-26 and the strongest earthquake of the year was registered on 8/29/2009; a 3.2 magnitude, with III intensity quake (the strongest of the year) occurred just southeast of the May quake with 347 self-reported responses, but no damage reported.

2010: Only one quake was recorded this year in the region which had a magnitude of 2.8 and it was not located in Berkeley County.

2011: Four events were recorded in the region with the strongest at a magnitude of 2.6 and none located in Berkeley County.

2012: Seven events were recorded in the region with the strongest at a magnitude of 2.8 and none located in Berkeley County.

2013: This year there were 14 events recorded in the region with the strongest at a magnitude of 2.5 and none located in Berkeley County.

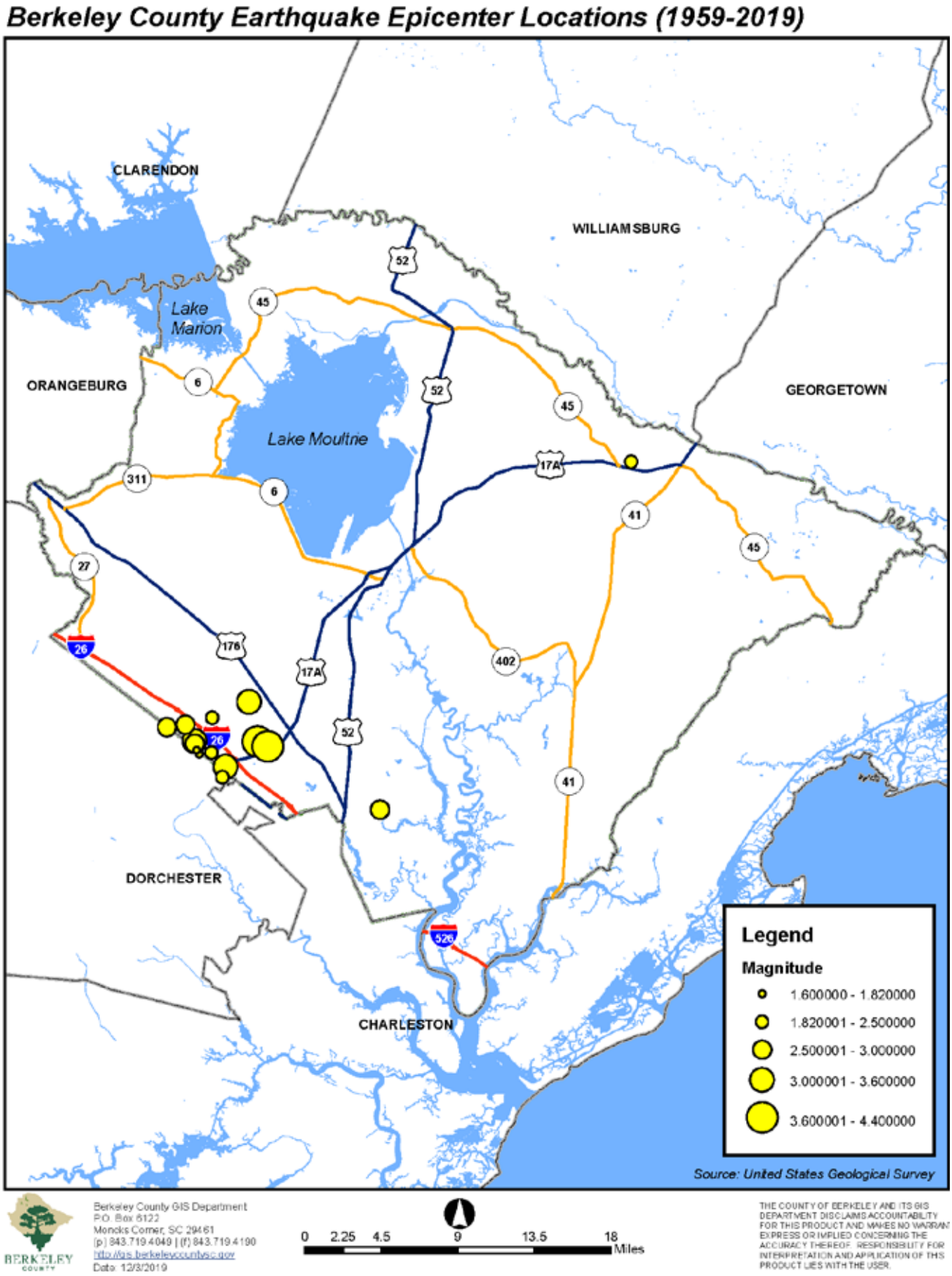
2014: Six events were recorded in the region with the strongest at a magnitude of 3.0 and none located in Berkeley County.

2015: Ten earthquake events were recorded with two occurring in Berkeley County. On 5/22/2015 a 1.7 magnitude quake occurred on the edge of the County in Summerville and a 2.4 magnitude event (the strongest of the year) occurred west of Jamestown north of Highway 17. This 2.4 quake was unusual with its epicenter location being well in the interior of Berkeley County. No damage was reported and there were no self-reported responses to USGS.

2016: Nine events were recorded in the region with the strongest at a magnitude of 1.9 and one located in Berkeley County. On 6/7/2016 a magnitude 1.8 earthquake registered on the edge of the County in Summerville.

2017: Four events were recorded in the region with the strongest at a magnitude of 2.4 and none located in Berkeley County.

2018: Three events were recorded in the region with the strongest at a magnitude of 2.4 and none located in Berkeley County.


Berkeley County Earthquake Epicenter Locations (1959-2019)
CLARENDON
WILLIAMSBURG
Lake Marion
ORANGEBURG
GEORGETOWN
Lake Moultrie
DORCHESTER
CHARLESTON
52
45
6
311
27
26
176
17A
402
41
526
Legend
Magnitude
1.600000 - 1.820000
1.820001 - 2.500000
2.500001 - 3.000000
3.000001 - 3.600000
3.600001 - 4.400000
Source: United States Geological Survey
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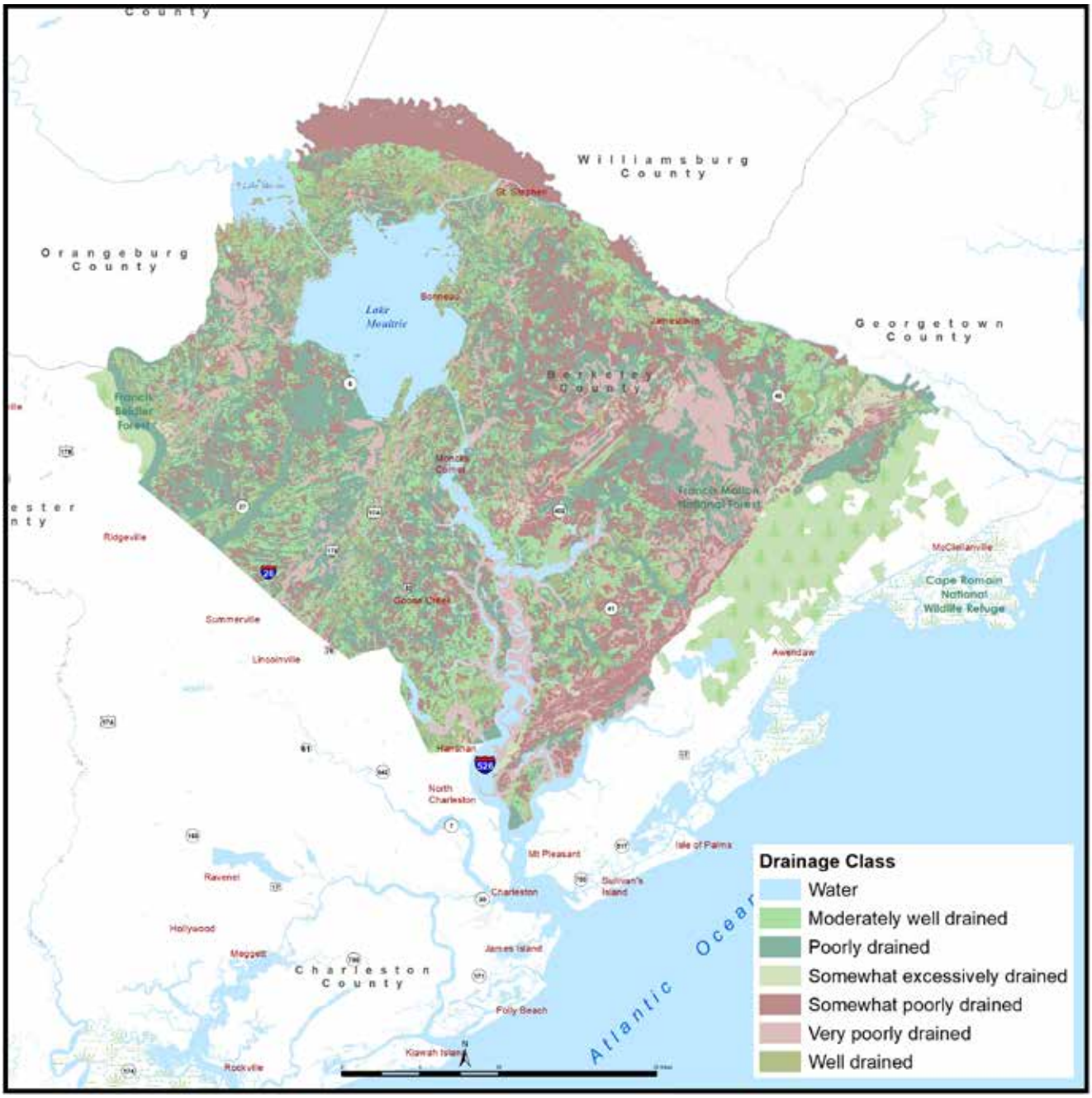
Liquefaction

Liquefaction is the process whereby the strength of the ground is removed by earthquake shaking or other rapid soil loading. This can cause the upper levels of soil to lose its ability to support structure foundations and other objects. Strong and sustained ground motion can cause soil to act as a liquid, amplifying the waves associated with the earthquake and may result in added force on surface structures and natural features. The effect on structures can be devastating, making liquefaction a major contributor to urban seismic risk. Liquefaction occurs primarily in sandy, saturated soft soils that are common to low-lying areas near bodies of water. Relatively young sediment deposited during the quaternary period on top of base rock and clay structures is often susceptible to liquefaction. In many cases, this material can be very deep, worsening the potential impacts of liquefaction.

Much of the Charleston seismic region, including Berkeley County, has a high risk of liquefaction given that most of the soils are sandy soils.

Map 8: U.S. Landslide Incidence and Susceptibility



Berkeley County Earthquake Hazard Zones

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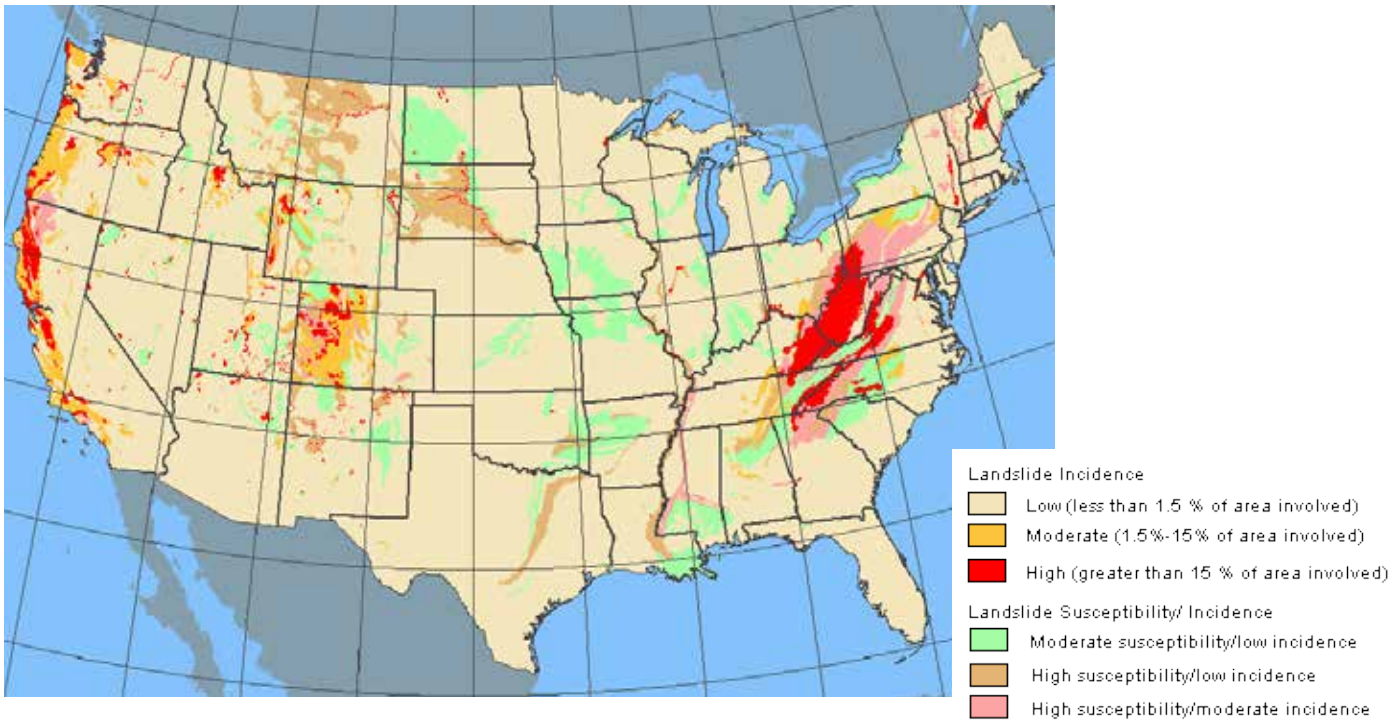
Landslides

Landslides are often prompted by the occurrence of other hazards. An intense and sustained earthquake can cause a landslide, especially in combination with liquefaction. However, long duration precipitation events can also create saturated conditions leading to unstable slopes. These slopes can fail due to the excess weight and the increased force of gravity, causing mass movement. Landslide events can also follow a wildfire event where sizeable amounts of vegetation are damaged, resulting in altered soil stability. Landslide events are more common and significant in mountainous areas due to elevation changes, slopes, and soil composition.

The USGS has a National Landslide Hazards Program and maps the landslide risk for the conterminous United States. Eastern South Carolina is mapped in the "low" landslide incidence area where less than 1.5% of the land area would be involved. Given the relatively flat terrain of Berkeley County, and its low landslide incidence as mapped by the USGS, landslides are not considered a significant threat to the County.

Map 10: U.S. Landslide Incidence and Susceptibility



Tsunamis

A tsunami is one or more large sea waves that can be generated by an offshore earthquake, underwater landslide, underwater volcanic eruption or asteroid impact at sea. Tsunamis can happen on any coastline and can travel 20 to 30 miles per hour with waves 10 to 100 feet high. Tsunamis typically consist of several waves that rush ashore with extremely strong currents that travel much farther inland than normal waves. Tsunami waves can take hours to retreat. When a tsunami is generated and makes its way to the shoreline, it can cause extensive damage to nearby structures and infrastructure and significant inland flooding. Much of the damage inflicted by tsunamis is caused by the initial impact of the wave and the subsequent floating debris. Tsunamis generally occur in the Pacific Ocean, but some occurrences have been reported in Caribbean areas of the Atlantic Ocean. Tsunamis are not considered a major threat along the eastern seaboard of the continental U.S. No historical tsunami events have been reported for Berkeley County. However, a tsunami should be considered as a risk since earthquakes have been recorded offshore of South Carolina.

Dam Failure

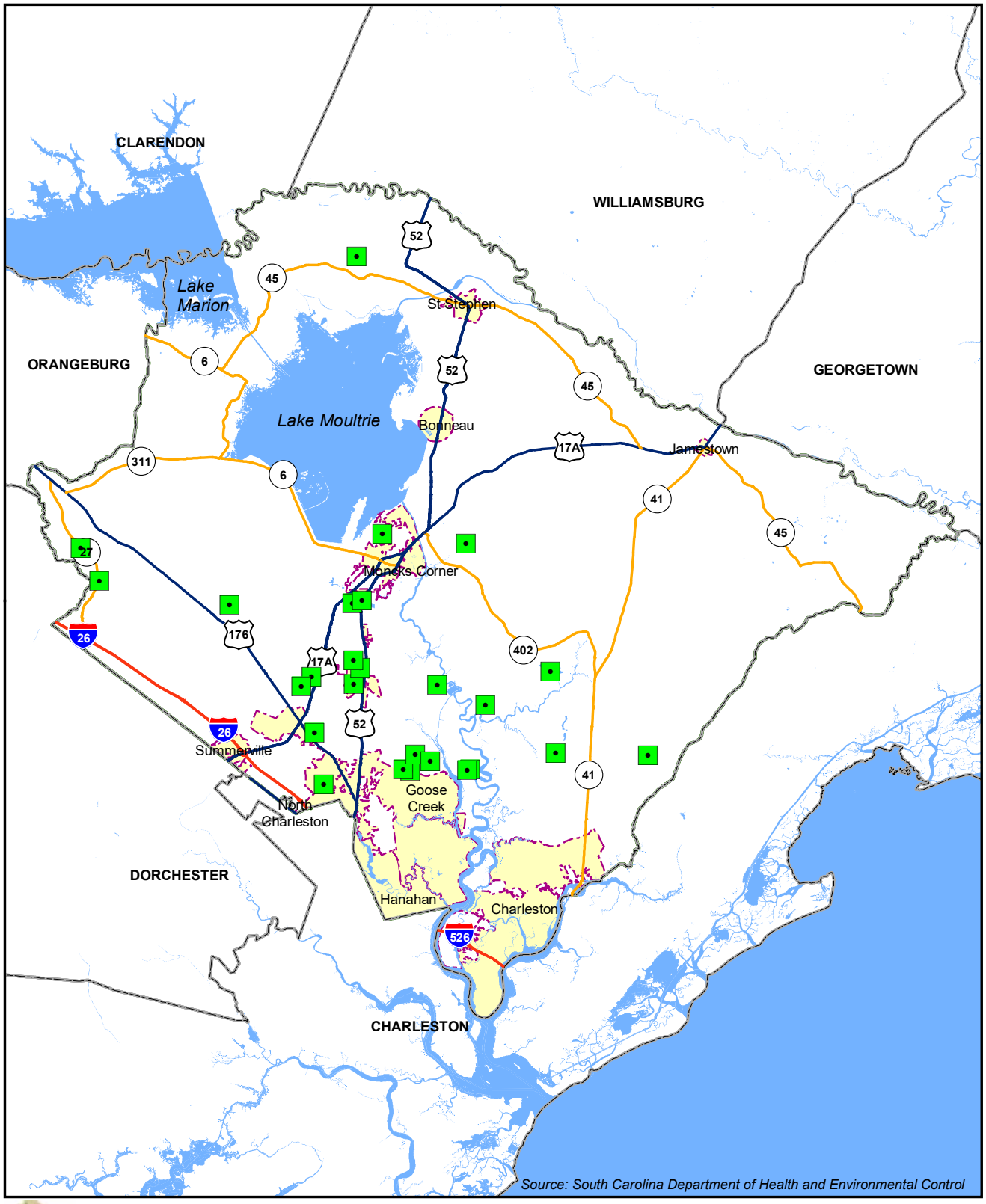
A dam failure is of a collapse or failure of an impoundment. Dam failures may be the result of upstream or localized flooding and heavy rains, erosion of surrounding sediments, or damage from an earthquake. The primary danger associated with a dam failure is swift, unpredictable flooding of those people or structures immediately downstream.

There are more than 2,300 regulated dams in South Carolina, including the dams on Lake Marion and Lake Moultrie that are located within or near Berkeley County. Regulated dams are routinely inspected for safety by the South Carolina Department of Health and Environmental Control (DHEC). Dam hazard classifications have three categories: High-hazard (C1), where failure will likely cause loss of life or serious damage to infrastructure; Significant-hazard (C2), where failure will not likely cause loss of life but may damage infrastructure; and Low-hazard (C3), where failure may cause limited property damage. There is also an S1 classification that indicates a dam does not meet the size criteria to be classified as C1, C2, or C3, but is still deemed a highly significant structure due to potential downstream effects in the event of a failure. DHEC issues all permits for new dams, maintains safety programs, alert systems, and provides dam owner education for regulated dams. However, there are an estimated 20,000 unregulated dams in South Carolina built by private land owners that may or may not be maintained.

The historic rainfall event of October, 2015 resulted in the state-wide failure of 49 state regulated dams, one federally regulated dam, two sections of the levee adjacent to the Columbia Canal, and numerous unregulated dams. FEMA deployed teams in support of recovery efforts to assess dams throughout South Carolina.

There are an estimated 28 regulated dams in Berkeley County, but there were no regulated dam failures in the County during the 2015 event. Having no historical incidents of dam failures in Berkeley County, even with a 1,000-year flooding event, severity and magnitude are not calculated and the risk of dam failure is not considered major.

Berkeley County DHEC State Permitted Dams



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Hazardous Materials

Hazardous materials come in many forms and can cause a wide variety of injuries or health problems if improperly treated, released, stored, or transported. Facilities that store or use these materials are located throughout the state, but many are located in the Lowcountry where they are exposed to flood, earthquake, or hurricane hazards.

In 1980, Congress established the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), which is informally called "Superfund." Once a location is designated as a Superfund site, the EPA can facilitate remediation. The EPA monitors polluters and develops a National Priorities List (NPL) of the nation's most hazardous sites.

There are several facilities that generate or store hazardous materials that are required to be register with the U.S. Environmental Protection Agency (EPA). Some of the common types of facilities that store or generate hazardous materials include the following:

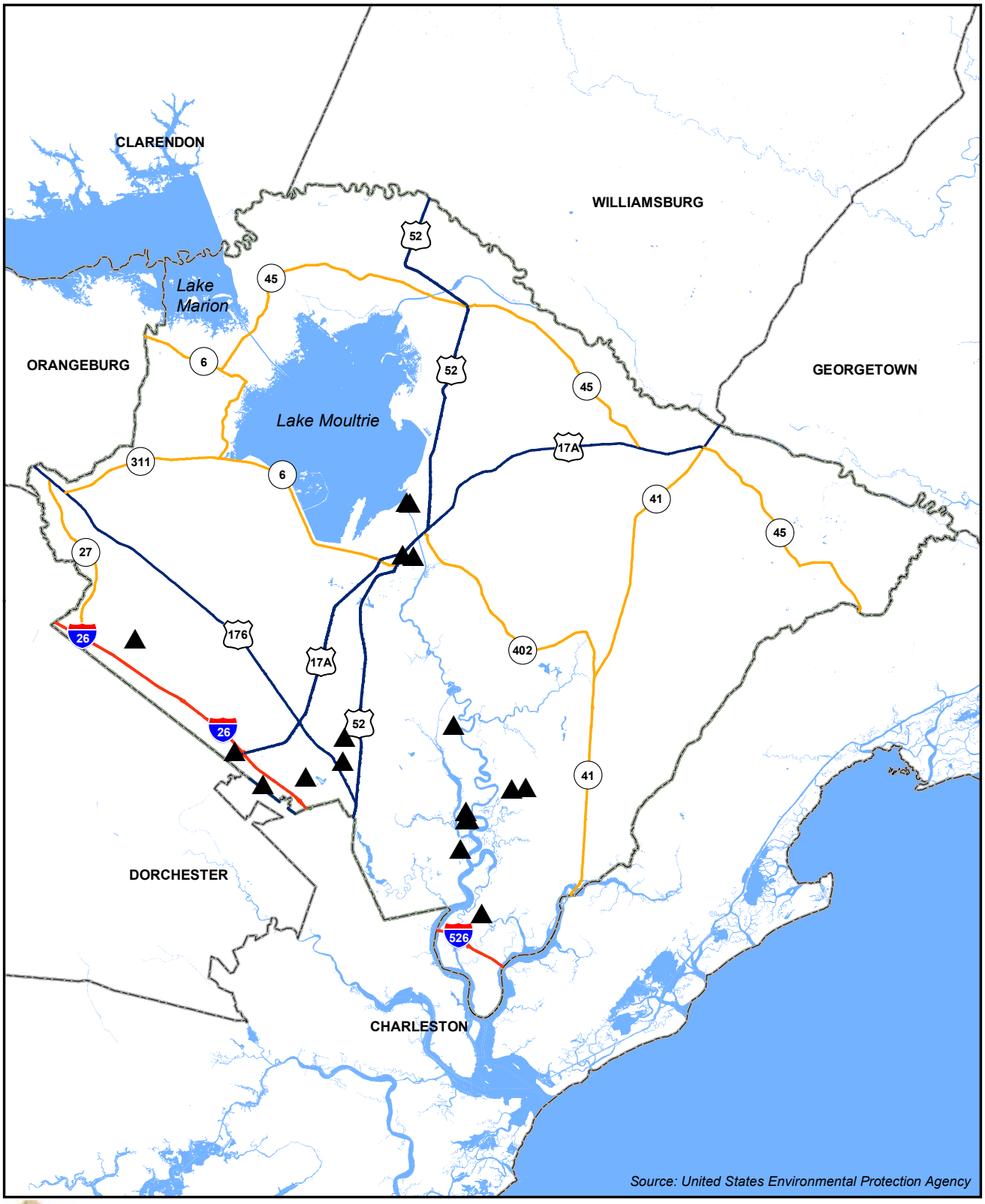
- Municipal Solid Waste Landfills (MSW)
- Hazardous Waste Generators (HAZGEN)
- Radiological Waste Generators (RAD)
- Superfund Sites
- Toxic Release Inventory Sites (TRI)
- Treatment, Storage and Disposal Sites (TSD)

The majority of HAZGEN and TRI facilities in Berkeley County are concentrated in Goose Creek, Hanahan and Moncks Corner. There are two RAD facilities in or around Berkeley County. One is located off I-26 in Summerville and the other is located at the Charleston Naval Weapons Station. Most of the TSD sites are also within the limits of the Charleston Naval Weapons Station.

According to the EPA, there are 749 Superfund sites in South Carolina, with two in Berkeley County. Both are non-NPL sites. The EPA also tracks the sites that are not NPL sites. This database includes Superfund Sites that currently have violations and those that have had violations in the past but have been remediated. According to the EPA, there are six sites in Berkeley County including one active (in violation) Non-NPL site. The currently active non-NPL superfund site is owned by the federal government and located on N. Rhett Avenue in Hanahan. This site was first assessed in 1983 as having a release of harmful materials and was inspected again in 1988, but has not yet been remediated.

Hazardous materials also travel along the major transportation networks in a region and are susceptible to accidental release along these routes. Major roads in Berkeley County include Interstates 26 and 526, U.S. Highways 17A, 52, and 176, and S.C. Highways 6, 27, 41, 45, 311, and 402. Two major CSX rail lines run through the southerly portion of Berkeley County, one parallel to U.S. Highway 52 towards Williamsburg County, and the second one farther southeast towards Georgetown County. There are numerous shorter lines connecting to industrial areas to the north of Lake Moultrie and in the Goose Creek / Hanahan area. These rail lines connect with the east coast corridor railway traffic, which provides access to different areas along the coast and the State of South Carolina.

Berkeley County Large Hazardous Generator Sites



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A spill or release from a truck accident could happen anywhere in Berkeley County. The impact of a release from a train accident is confined primarily to the rail corridor, depending on the material released. The map below shows a one-half mile buffer along the rail lines that can be considered the primary hazard area for a train-borne material release.

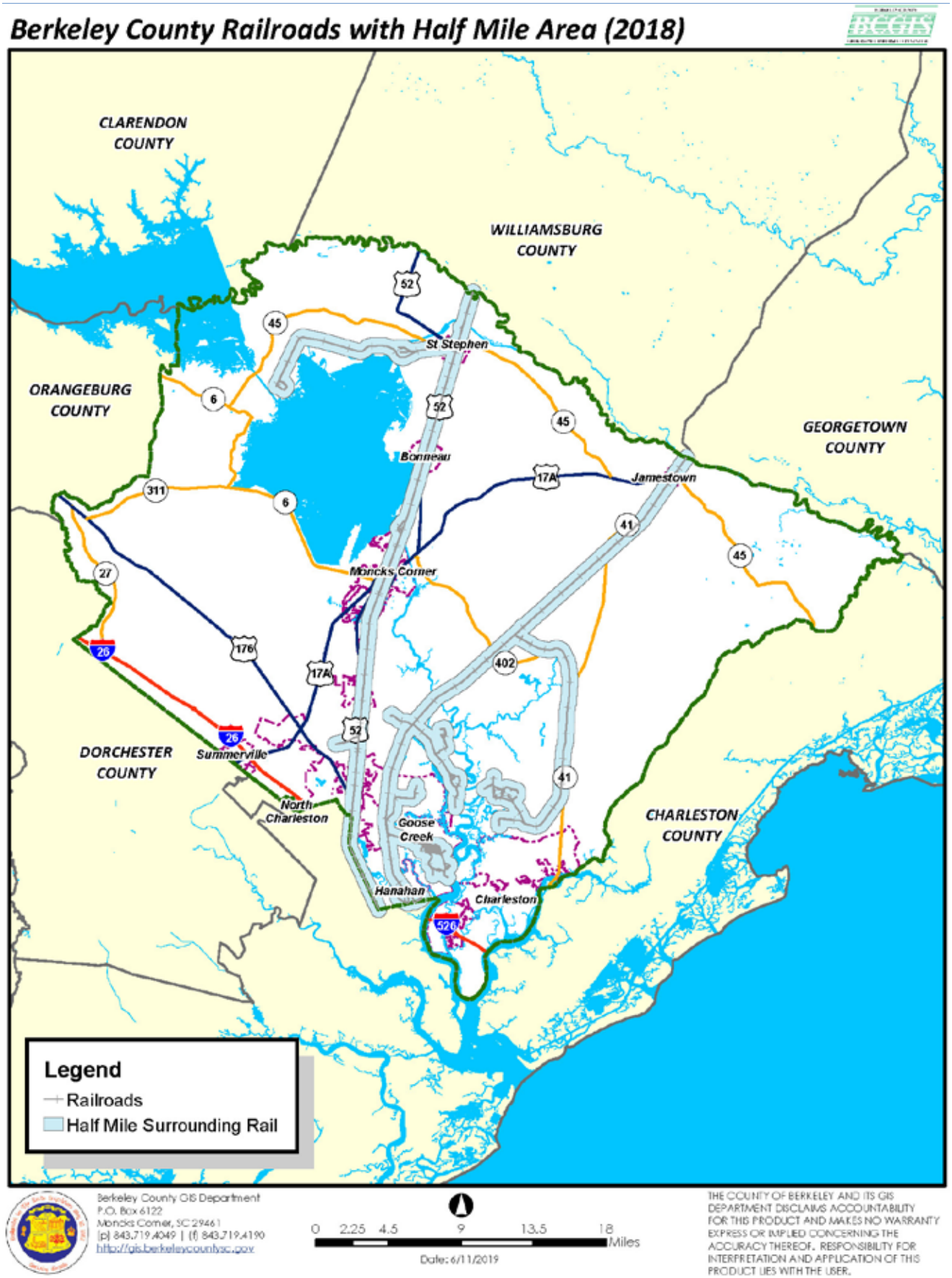
In addition to industrial materials, municipal HAZMAT Departments increasingly have to contend with hazardous conditions from opioids. The United States Drug Enforcement Administration (DEA) has seen availability to opioids increase in the South Carolina region and provides guidance to first responders. When drugs like Fentanyl are present at a response scene, they may be inhaled or transmitted by skin contact.

Therefore, much like a chemical substance release, many drug scenarios will require the use of personal protective equipment to reduce exposure risk.

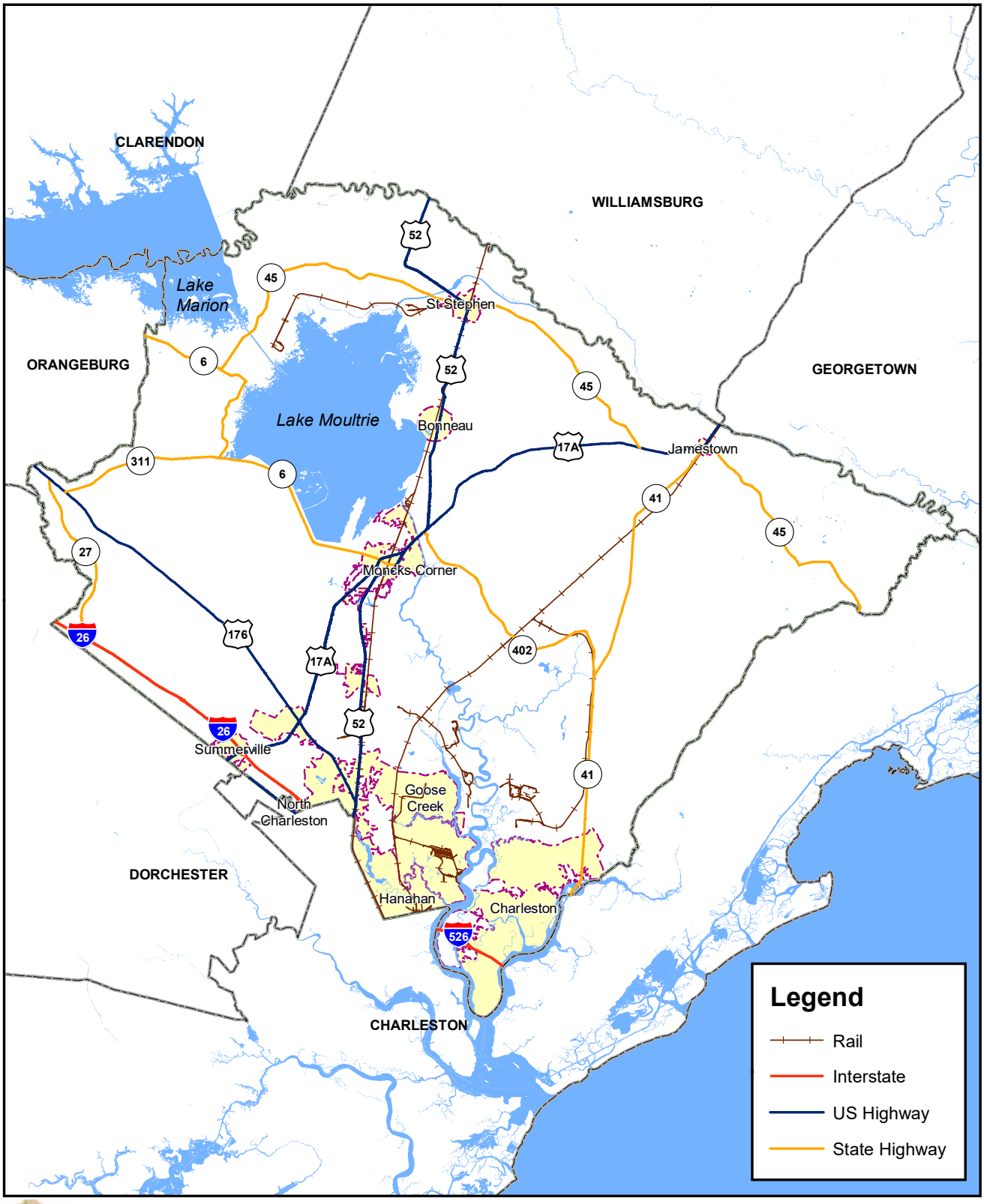
In South Carolina, there were 231 reported hazardous materials incidents since the last plan update; twelve of those were in or near Berkeley County. Of these, seven were chemical spills, two were gas leaks, two were drug related and one was a failed bombing attempt.

With numerous hazardous material sites (such as shuttered gasoline stations) within, and materials that move through the county, the severity and magnitude from hazardous materials is not calculated. However, mitigation goals and planning activities should be included.

Map 13: Berkeley County Railroads with Half Mile Area (2018)



Berkeley County Major Roads and Railroads



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VULNERABILITY ASSESSMENT

INTRODUCTION

While hazard identification is an analysis of existing hazard data, a review of potential damage to property and an assessment of the resiliency of area residents are required for a vulnerability assessment. The vulnerability assessment process examines more specifically how the facilities, systems, and jurisdictions of Berkeley County would be damaged or disrupted by the hazard events identified in the Hazard Identification and Analysis. The Vulnerability Assessment requires the integration of different components such as identification and location of vulnerable populations, with the hazard identification and probability. A review of these elements in a spatial context provides an understanding of which areas are more susceptible to being impacted by the occurrence of hazards. This information is important to implementing mitigation activities aimed at decreasing future impacts and increasing resilience.

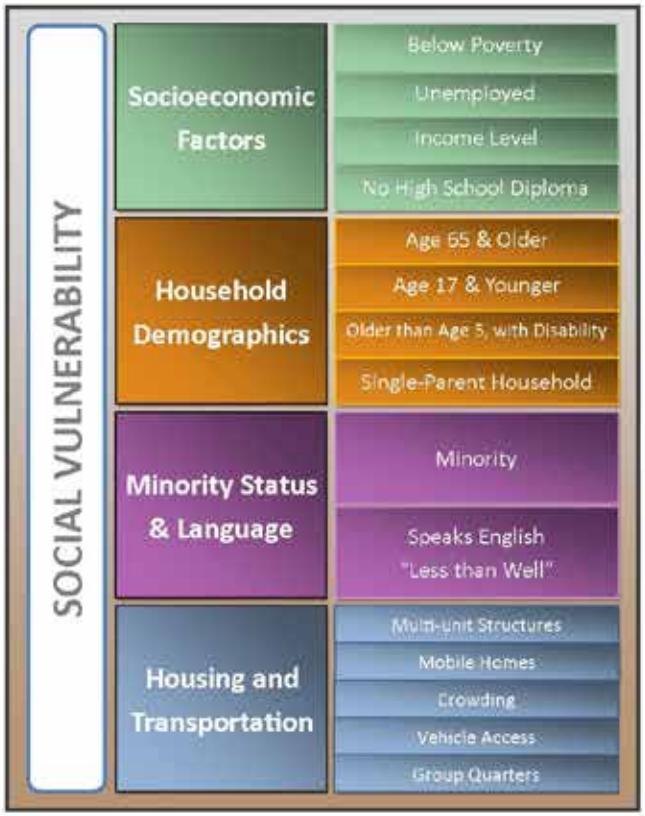
The majority of the data used to perform this risk assessment was processed by the University of South Carolina Hazards and Vulnerability Research Institute (HVRI). Additional information was obtained from the South Carolina Emergency Management Division (SCEMD), the Special Hazard Events and Losses Database (SHELDUS), and the Lowcountry Hazards Lab at the College of Charleston (CofC). HAZUS, FEMA's loss estimation software, was also used to model and estimate potential impacts for flooding, hurricanes, and earthquakes. Additionally, the Social Vulnerability Index (SoVI) and the Baseline Resilience Indicators for Communities (BRIC) from HVRI are reviewed for overall County-level vulnerability and the United States Center for Disease Control (CDC) Social Vulnerability Index (SVI) is used to assess the potential vulnerable areas at census tract-level within Berkeley County. The SVI is primarily used during recovery operations and allows FEMA to direct resources to areas that are the most impacted and in need of assistance after a disaster. Demographic information was obtained from the U.S. Census Bureau.

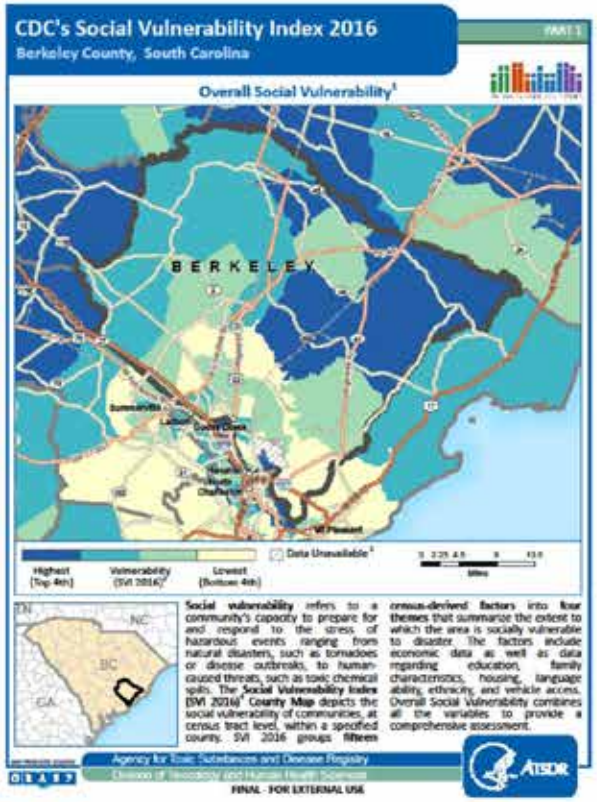
A diagram showing SVI factors for Berkeley County census tracts from the CDC is shown on the following page..

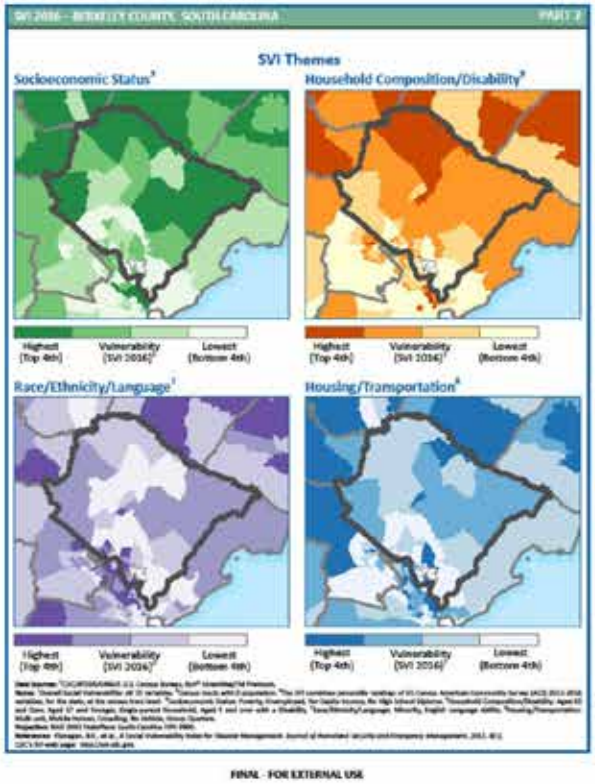
Berkeley County Social Vulnerability Index

Source: Center for Disease Control and Prevention

Risk = Hazard * (VULNERABILITY - Resources)







For information on the
Berkeley County Hazard Mitigation Plan Process
Contact: **Ben Almquist** | *Director*
Berkeley County Emergency Preparedness | (843) 719-4166

BERKELEY COUNTY SOUTH CAROLINA

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PLANNING, PARTNERSHIP & PROSPERITY

BERKELEY COUNTY PROFILE AND RESOURCES

Berkeley County is located in the southeastern part of South Carolina. The County has an area of about 1,230 square miles and includes many natural areas that give it a rural characteristic. Much of the County's land area is agricultural, lake, forest, or swamp. Lake Moultrie and Lake Marion make up a large portion of the County and have a tremendous effect on its economy and quality of life. The County's climate along with clean air, water quality, fertile soils, and minerals make it an attractive place to visit and live. The incorporated areas of Berkeley County include the Cities of Goose Creek, Hanahan, and portions of Summerville, and Charleston (on Daniel Island), along with the Towns of Bonneau, Jamestown, Moncks Corner, and St. Stephen. The historic population and projections of these jurisdictions are indicated in the table below.

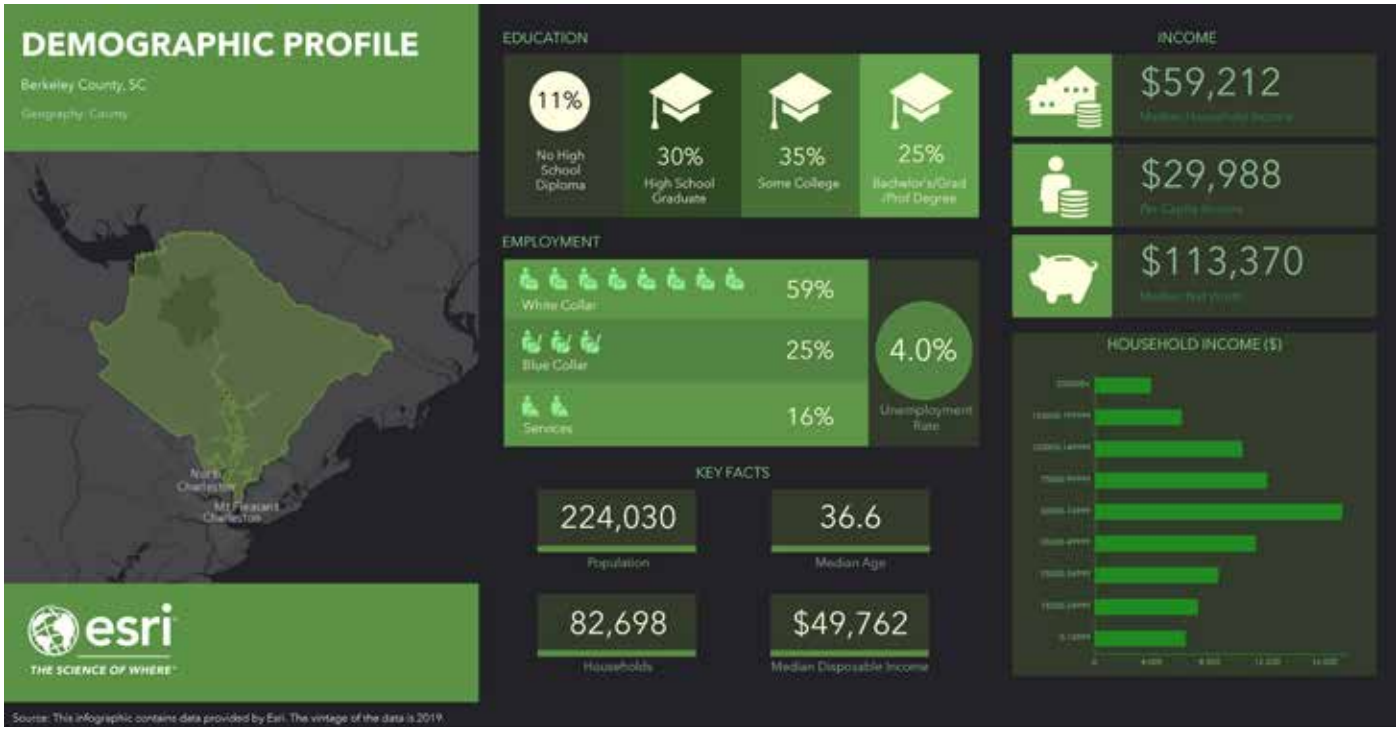
Table 16: Historic Population and Projections

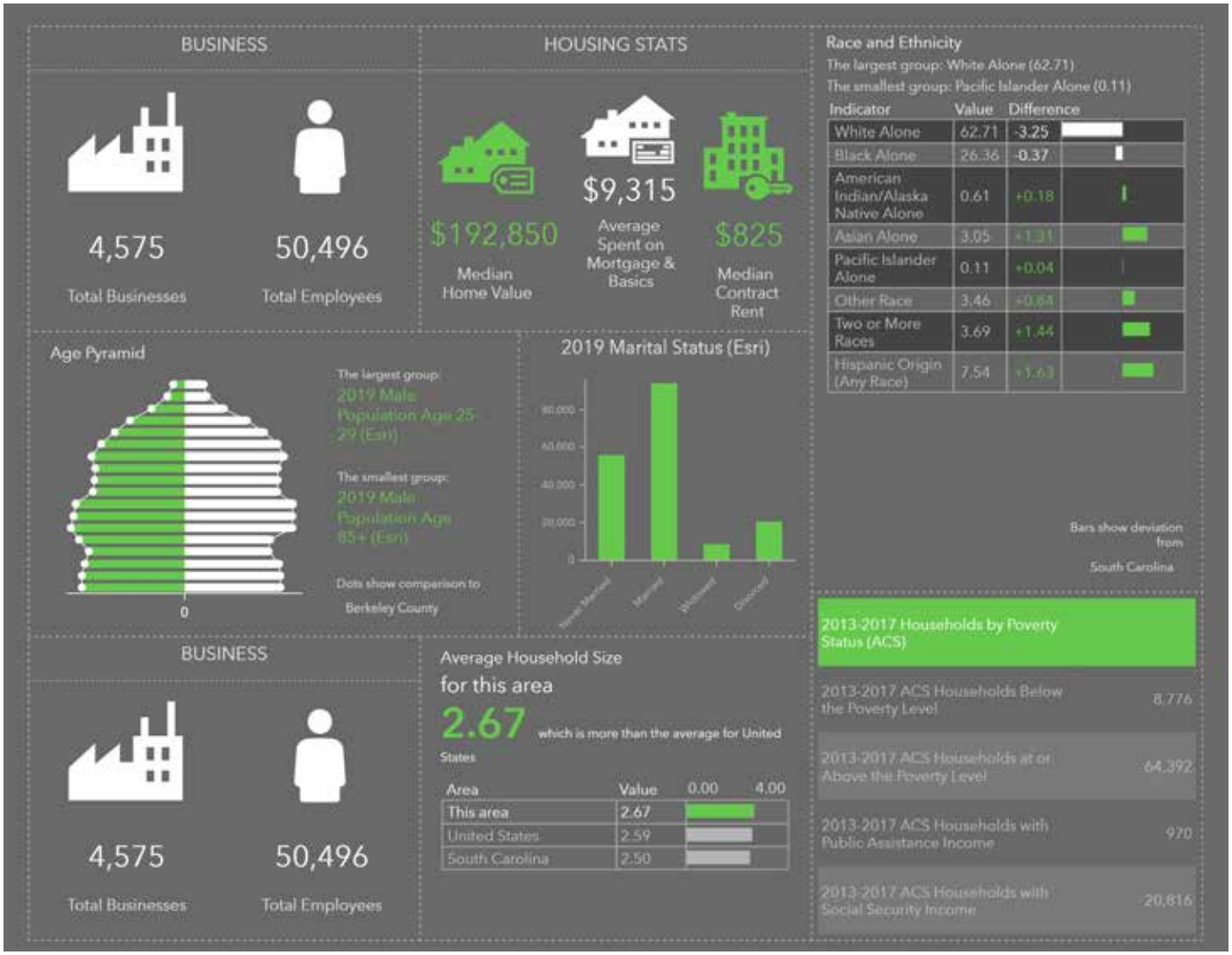
Jurisdiction	Population						Percent Change	
	1980	1990	2000	2010	2019 estimate	2024 estimate	2000-2010	2010-2019
Berkeley County	94,727	128,728	142,651	179,420	224,030	251,376	25.8%	24.9%
Bonneau	401	374	354	487	569	634	37.6%	16.8%
Goose Creek	17,811	24,692	29,208	35,938	43,205	47,408	23.0%	20.2%
Hanahan	13,224	13,176	12,937	17,997	21,539	23,758	39.1%	19.7%
Jamestown	193	84	97	72	81	88	25.8%	12.5%
Moncks Corner	4,179	5,607	5,952	7,885	10,998	12,373	32.5%	39.5%
St. Stephen	1,850	1,697	1,776	1,697	1,805	1,898	4.4%	6.0%

Source: United States Census

Key Berkeley County statistics are included in the diagrams below.

Figure 5: Berkeley County Statistics





The rural character of Berkeley County can be partially attributed to its large number of natural resources, including the Francis Marion National Forest, Lake Moultrie, the Cooper and Wando Rivers, and several swamps. The County is primarily located within the Santee River Basin and watershed. However, a small amount of the County is within the Edisto River Basin. Berkeley County contains several locations that are designated as protected by the SC Department of Natural Resources Heritage Trust Program such as the Bird Island Rookery, Stoney Landing, and Westvaco Eagle Nest. All of these areas contribute to the county's appeal to nature and wildlife enthusiasts.

In addition to its natural resources, Berkeley County contains a number of valuable cultural and historic resources and activities. Within the County, there are a number of designated National Historic Landmarks including three churches, two plantations, and the Robert Smalls House. Another 26 properties are listed on the National Register of Historic Places. There are an estimated 30 properties that are eligible to be included on the National Register and 39 archaeological sites, including Cypress Gardens, Hagan Plantation and Mepkin Abbey.

Vulnerable Locations

As previously provided in the Hazard Identification Section, the table below summarizes the total number of buildings and assessed value of buildings located within the county as reported by the Berkeley County Assessor's Office. This information can be considered as the overall maximum built-up component of Berkeley County. The HAZUS model has slightly different totals that the Assessor's Office, but is quite close.

Table 17: Valuation of Berkeley County Structures

Jurisdiction	Number of Single-Family	Value of Single-Family	Number of Multi-Family	Value of Multi-Family	Number of All Residential	Value of All Residential	Number of Commercial	Value of Commercial	Number of Res & Comm Bldgs	Value of Res & Comm Bldgs
Berkeley County:	**66,346**	**$14,113,067,427**	**385**	**$1,268,199,700**	**66,731**	**$15,381,267,127**	**2,889**	**$2,692,452,000**	**69,620**	**$18,073,719,127**
Bonneau	127	$22,747,100	0	$0	127	$22,747,100	156	$12,552,700	283	$35,299,800
Daniel Island (Charleston)	3,604	$1,995,018,200	16	$427,657,000	3,620	$2,422,675,200	208	$547,944,300	3,828	$2,970,619,500
Goose Creek	12,646	$1,938,526,400	27	$255,518,544	12,673	$2,194,044,944	331	$358,551,400	13,004	$2,552,596,344
Hanahan	5,661	$1,116,254,700	90	$155,740,100	5,751	$1,271,994,800	172	$321,891,500	5,923	$1,593,886,300
Jamestown	32	$2,412,100	0	$0	32	$2,412,100	59	$5,632,000	91	$8,044,100
Moncks Corner	3,772	$573,623,000	48	$39,854,100	3,820	$613,477,100	371	$238,900,100	4,191	$852,377,200
North Charleston	0	$0	0	$0	0	$0	1	$4,854,000	1	$4,854,000
St. Stephen	446	$38,826,200	9	$378,100	455	$39,204,300	116	$30,629,300	571	$69,833,600
Summerville	1,021	$180,177,900	8	$79,761,100	1,029	$259,939,000	104	$407,375,500	1,133	$667,314,500

The HAZUS model provides impacts to an estimated 68,522 buildings with a replacement value of $17.2 billion. Approximately 95% of the buildings and 85% of the value are residential properties.

As previously noted, the County is vulnerable to a wide array of hazards including, but not limited to, flooding, hurricanes, tornadoes, winter storms, thunderstorms, hail, wildfire, drought, earthquake, dam failure, and hazardous material spills. The degree of vulnerability varies from location to location throughout the County, depending on the hazard considered.

Additionally, as noted in the SVI vulnerability diagram, the areas demonstrating the greatest overall social vulnerability tend to be eastern Berkeley County, eastern Hanahan, and St. Stephen.

Critical Facilities

Critical Facilities can be defined by various methods. Generally these are sites, structures, and institutions that, if disrupted or affected by an emergency event, may exaggerate the scope of the event impact, intensify the problem, and/or reduce the capacity for emergency response. These are facilities that are necessary for response and recovery and may include emergency response, medical, schools, emergency shelters, lifelines, transportation, telecommunications, data centers, financial, and major industrial or commercial centers.

Facilities that represent a high risk to the community's response and recovery efforts may also be considered as critical facilities. A high-occupancy facility such as a large school, auditorium, public assembly area, health center, or detention center can represents a significant threat to loss of life and may be considered. A facility containing large amounts of hazardous waste or other toxic materials that if impacted, causes significant impact to emergency response can be considered a critical facility. A facility that may cause an inordinate amount of debris that would hinder response and recovery efforts can be considered a critical facility.

While the HAZUS model is based on data that show "Essential Facilities" such as hospitals (0), schools (50), fire stations (23), police stations (3), an emergency operations center, and hazardous waste sites (523), this data is known to be out of date. As of the writing of this BCHMP update, there have been two hospitals opened in Berkeley County; one is an outpatient facility and the other includes 50 patient beds for overnight procedures. Additionally, another hospital is believed to be in the process of locating in the County.

The HAZUS model also quantifies transportation systems (7) and utility systems (6) as "Lifeline" and values this inventory at over $5.24 billion. The lifeline inventory includes 218 miles of highway, 186 bridges, and 708 miles of pipes.

Flooding

The flood hazard map shows that Berkeley County is generally vulnerable to flooding along the low-lying areas adjacent to rivers, streams, and lakes. However, flash flooding occurs more frequently in urban areas. Generally, the northern portion of the County is vulnerable to flooding due to the presence of Lake Marion, Lake Moultrie, and the Santee River and the southern portion is vulnerable to flooding due to proximity to the Atlantic coastline and impacts from storms and tides.

The HAZUS Flood Risk model for a 100-year flooding scenario resulted in a report that indicates about $2 billion of impacts in building replacement costs to the following types of structures:

Table 18: HAZUS 100-Year Flood Impact for Berkeley County

HAZUS 100-Year Flood impact for Berkeley County

Occupancy	Exposure ($)	Percent of Total
Residential	$1,686,684,000	81.5%
Commercial	$246,919,000	11.9%
Industrial	$73,903,000	3.6%
Agricultural	$10,156,000	0.5%
Religion	$32,711,000	1.6%
Government	$7,781,000	0.4%
Education	$11,478,000	0.6%
TOTAL:	**$2,069,632,000**	**100.0%**

As noted, these flood impacts are expected in the low-lying areas of the County near rivers, streams, and lakes as found in the map on the following page. HAZUS estimates that of the 151 buildings impacted by this flooding scenario, 131 would be at least moderately damaged (greater than 10% damage) and 18 would be completely destroyed (over 50% damage). Only one of the impacted structures is estimated to be commercial, with the rest being residential.

HAZUS also reviews the type of structures expected to be damaged in the flooding event as shown in the table below:

Table 19: HAZUS 100-Year Flood Damages for Berkeley County

HAZUS 100-Year Flood damages for Berkeley County

	Level of Damage					
Building Type	1% to 10%	11% to 20%	21% to 30%	31% to 40%	41% to 50%	Over 50%
Concrete	0	0	0	0	0	0
Manufactured Housing	0	0	0	0	2	0
Masonry	1	3	2	1	0	0
Steel	0	1	0	0	0	0
Wood	19	47	24	26	7	18
TOTAL:	**20**	**51**	**26**	**27**	**9**	**18**

The construction of the buildings that could be damaged is used to estimate the amount of debris that will be generated by, and therefore removed, after the event. HAZUS estimates that 1,476 tons of debris would be generated by this 100-year flood event. That debris estimate is comprised of the following: 51% finishing materials (drywall, insulation, etc.); 20% structural debris (wood, brick, etc.); and 29% foundation debris (concrete, rebar, etc.). An estimated 60 truckloads would be required to remove the debris.

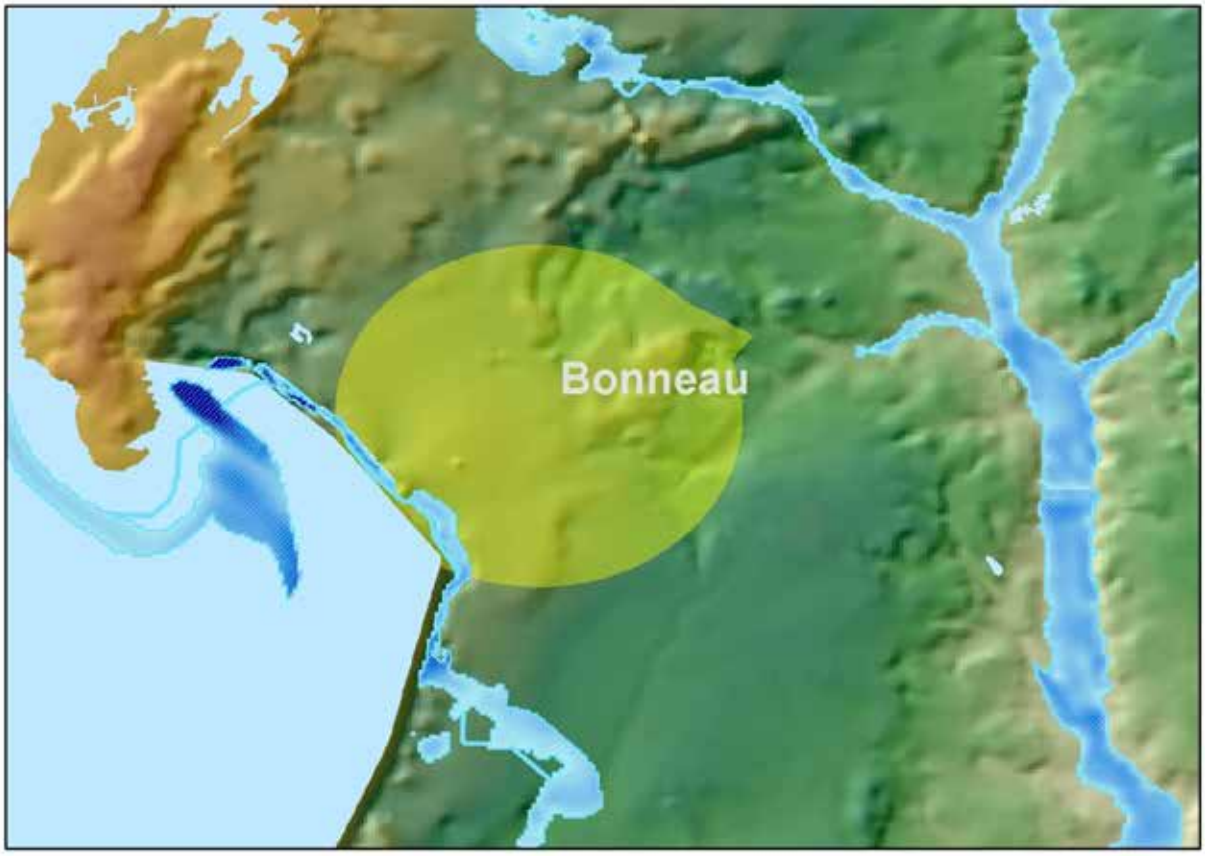
The model estimates that 1,131 people from 377 households will be displaced during this event. This includes 33 people that will require evacuation to temporary shelter. HAZUS estimates that one fire station will see damage and loss of use.

The economic impact of this scenario is estimated by HAZUS at $70.05 million. This includes $42.05 million in direct building costs for repair or replacement and contents and $28 million in business interruption costs related to the inability to operate a business or temporary living expenses for displaced residents.

Map 15: Riverine Flooding Extent

Below is a breakdown of flood hazard by jurisdiction within Berkeley County.

Bonneau



Above: The Town of Bonneau HAZUS Flood Map

The Town of Bonneau is located in the northeastern quadrant of Berkeley County. The town is bordered by Lake Moultrie to the West. Gravel Hill Swamp, zoned AE, lies just over a mile away to the east. Despite this, the Town itself is zoned as an area of minimal flood hazard. The town is not currently a National Flood Insurance Program sanctioned community and has never had any repetitive flooding damages. As shown in the HAZUS map above, the western edge of the town appears to potentially be vulnerable to flooding in a 100-year flood scenario.

Above: The City of Goose Creek HAZUS Flood Map

The City of Goose Creek is located in the southwestern quadrant of Berkeley County. Goose Creek is virtually surrounded by water, with the Cooper River on the east, the Limehouse Branch to the west and Foster Creek running through the middle of the city. A total of 6,700-acres (or 21%) of the city's land is within FEMA's Zone A or Zone AE of the 100-year floodplain. These are categorized as "high risk areas." A total of 268-acres (or 1%) of the city's land is within FEMA's Zone X of the 500-year floodplain, which is categorized as "low or moderate risk areas."

As described in the Hazards Identification and Analysis section, the city has been impacted on several occasions by flooding due to localized hurricanes and strong thunderstorms as well as flash flooding as a result of upstream events. These include hurricanes Joaquin (2015), Matthew (2016) and Irma (2017) which resulted in widespread, historic levels of flooding reaching the 100-year and 500-year floodplain in some places. The City of Goose Creek has identified three repetitive loss properties within city limits due to flooding.

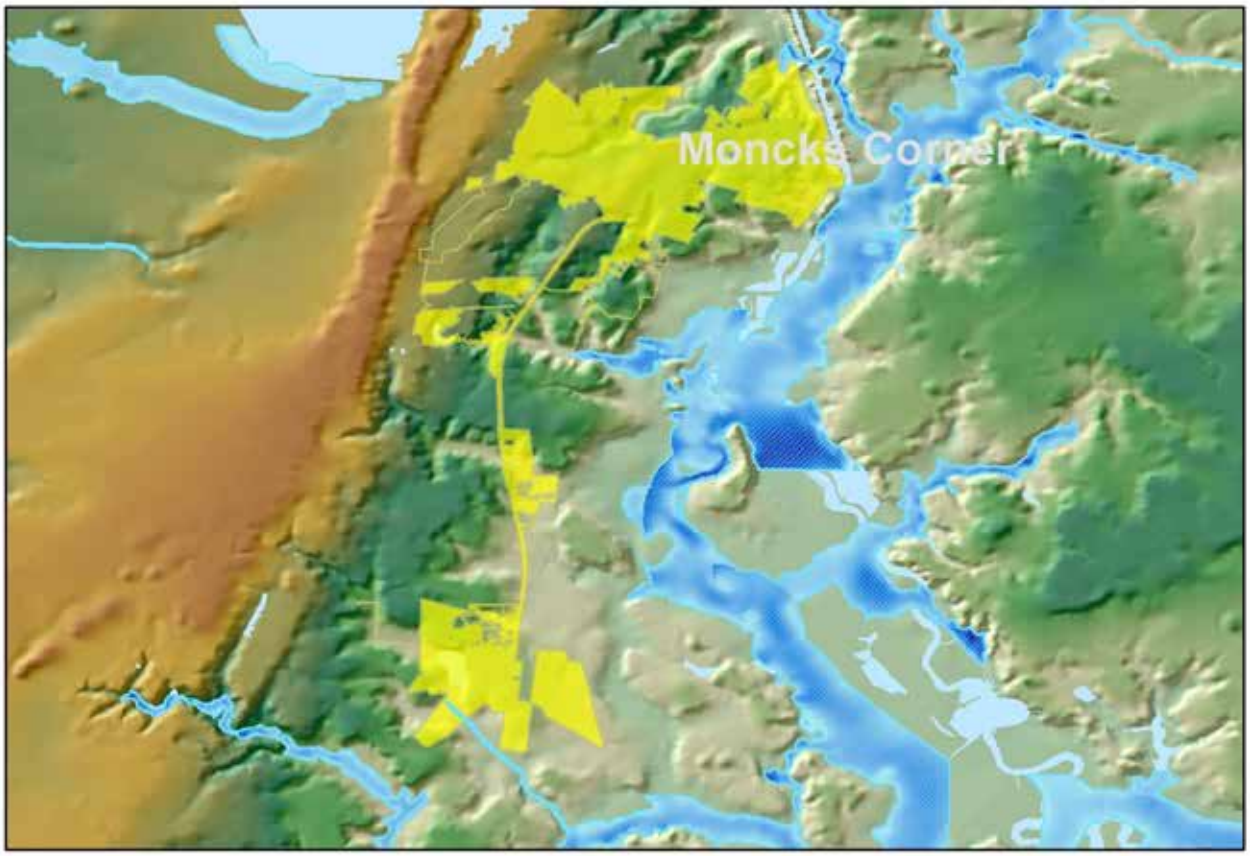
Above: The City of Hanahan HAZUS Flood Map

The City of Hanahan is located directly below the City of Goose Creek, tucked into the southwestern corner of the county. Hanahan encompasses most of the Goose Creek Reservoir and the eastern town boundary coincides with Goose Creek itself until it meets the Cooper River. Turkey Creek bisects the city and is a frequent source of flooding. Tidal influences on these waterways have also contributed to flooding in the city. A total of 2,919 acres (or 39.3%) of the city's land is within FEMA's Zone AE of the 100-year floodplain. These are categorized as "high risk areas." A total of 118 acres (or 1.6%) of the city's land is within FEMA's Zone X of the 500-year floodplain, which is categorized as "low or moderate risk areas."

As noted in the Hazards Identification and Analysis section, the city has been impacted by flooding due to localized hurricanes and strong thunderstorms as well as flash flooding as a result of upstream events. The most noted event was in 2014 when flash flooding occurred as multi-cell thunderstorms merged over the area. This resulted in Yeamans Hall Road in the City of Hanahan being closed at Murray Drive due to high water. The City of Hanahan has identified 35 repetitive loss properties within city limits due to flooding.

Above: The Town of Jamestown HAZUS Flood Map

The Town of Jamestown is located near the southeast quadrant of Berkeley County. Jamestown's east border lies approximately one mile from the Santee River and there are several zone A areas of the Francis Marion National Forest in the immediate vicinity of the town. It is designated as an area of minimal flood hazard by FEMA. The town is not currently a National Flood Insurance Program sanctioned community and has never had any repetitive flooding damages. As shown in the HAZUS map above, the town does not appear to be vulnerable to flooding in a 100-year flood scenario.



Above: The Town of Moncks Corner HAZUS Flood Map

The Town of Moncks Corner is located in central Berkeley County, directly below Lake Moultrie. The town is bordered on the east by the Cooper River, a regulated floodway. It is also intersected by the California Branch (a regulated floodway) in northern Moncks Corner, and the Landfill Branch, Molly Branch and a tributary to the Wapoala Creek in the southern part of the town. A total of 665 acres (or 11.9%) of the city's land is within FEMA's Zone AE of the 100-year floodplain. These are categorized as "high risk areas." A total of 94 acres (or 1.7%) of the city's land is within FEMA's Zone X of the 500-year floodplain, which is categorized as "low or moderate risk areas."

There are several reports of flooding impacting Moncks Corner, mainly along the California Branch during the severe weather events described in the Hazard Identification and Analysis section. Moncks Corner reports three repetitive loss properties due to flooding within the town limits. The town is in the process of purchasing some of these properties and demolishing the structures to prevent additional loss.

Above: The Town of St. Stephen Corner HAZUS Flood Map

St. Stephen is located in the northeast quadrant of Berkeley County. Although the town is less than a mile from the diversion canal that transports water from Lake Moultrie to the Santee River, there is no evidence that the canal has ever caused flooding in the town. St. Stephen is designated as an area of minimal flood hazard by FEMA and had not reported any repetitive loss properties. As shown in the HAZUS map above, the town does not appear to be vulnerable to flooding in a 100-year flood scenario.

Hurricanes

Berkeley County is vulnerable to tropical storms and hurricanes. The southern portion of the County sees a greater impact due to the coastline, but the storm track through the County is the primary factor determining wind and rain impact. The most vulnerable areas are the low-lying coastal areas of Daniel Island. Hanahan, Goose Creek and Jamestown are also areas of vulnerability.

The HAZUS Hurricane Risk model considers a storm scenario with peak wind gusts of 133 mph, similar to that of hurricane Hugo in 1989, which tracked from southeast to northwest directly across Berkeley County. Hugo was devastating for South Carolina and has become a yardstick for future storm scenarios and a catalyst for disaster planning.

The HAZUS model report indicates that a Hugo-like storm would cause about $17.2 billion in damages for building replacement costs alone to the following types of structures:

Map 16: Buildings with Moderate Damage

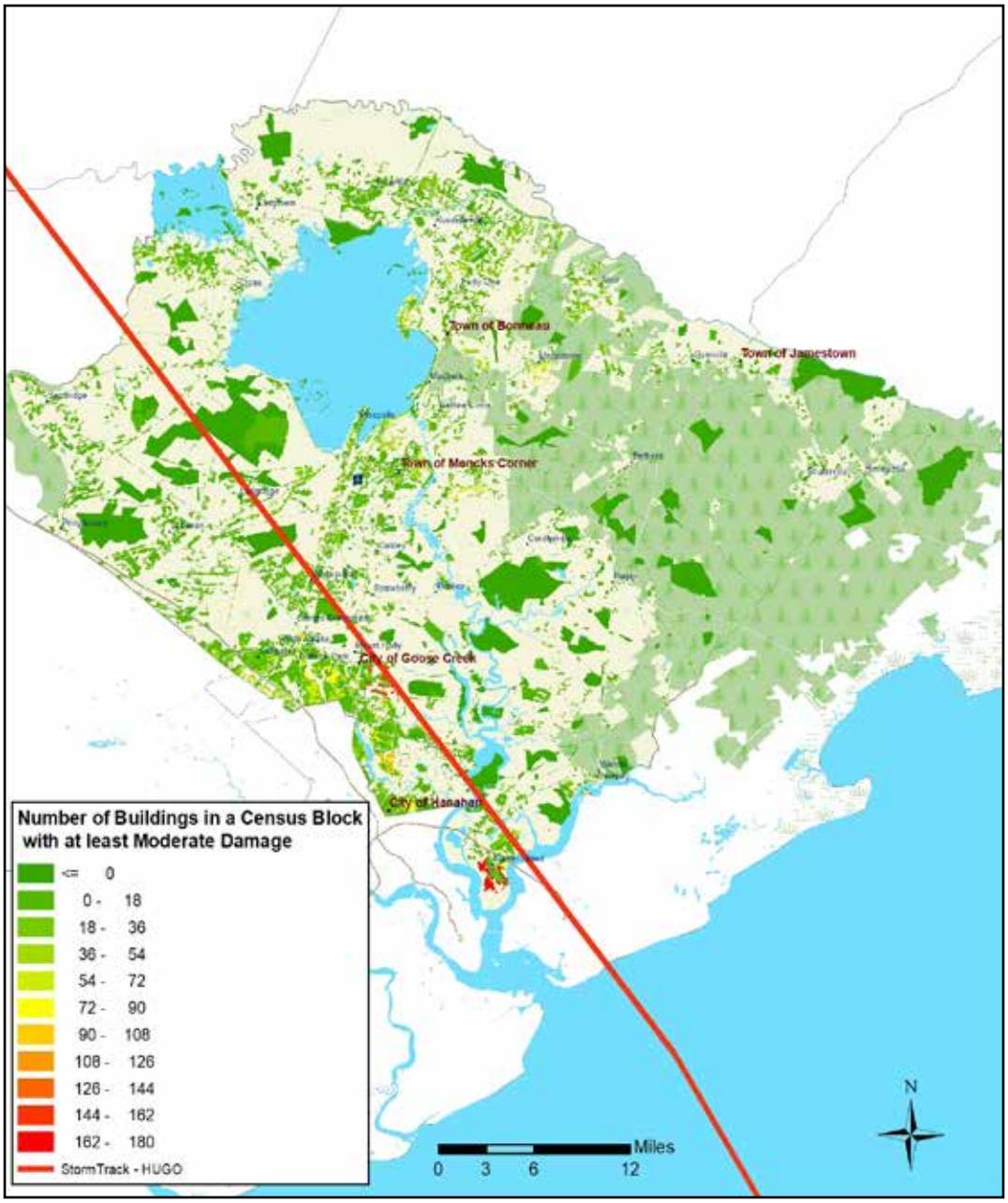


Table 20: HAZUS Hugo Scenario Impact for Berkeley County

HAZUS Hugo Scenario impact for Berkeley County		
Occupancy	Exposure ($)	Percent of Total
Residential	$14,648,982,000	85.1%
Commercial	$1,547,973,000	9.0%
Industrial	$577,131,000	3.4%
Agricultural	$42,916,000	0.2%
Religion	$208,941,000	1.2%
Government	$57,670,000	0.3%
Education	$127,078,000	0.7%
TOTAL:	**$17,210,691,000**	**100.0%**

Assuming the same track as Hugo, the storm impacts are found in the map below. Note that a different track may result in greater or lesser impacts than modelled.

HAZUS estimates that 17,461 buildings would sustain at least moderate damage in this scenario, which equates to slightly more than 25% of all the buildings in Berkeley County. About 16,100 of these buildings are residential. Approximately 2,028 buildings are predicted to be completely destroyed, almost all of which would be residential. An estimated 40% would incur no damage at all.

HAZUS also reviews the type of structures expected to be damaged in the hurricane event as shown in the table below:

Table 21: HAZUS Hugo Scenario Damages for Berkeley County

HAZUS Hugo Scenario damages for Berkeley County					
	Level of Damage				
Building Type	None	Minor	Moderate	Severe	Destruction
Concrete	47	33	54	14	0
Manufactured Housing	8,965	2,029	2,288	329	1,238
Masonry	1,611	1,413	1,036	225	36
Steel	496	269	363	188	4
Wood	16,210	18,508	7,898	1,896	875
TOTAL:	**27,329**	**22,252**	**11,639**	**2,652**	**2,153**

The building type is used to estimate the tons of debris that would be generated and therefore require removal after the event. HAZUS estimates that 2,966,492 tons of debris would be generated by a hurricane event of this magnitude, with about 87% being tree debris, 6% being brick/wood, and less than one percent being concrete/steel. An estimated 7,275 truckloads would be required to remove the building debris alone, with the number of additional loads depending on how the tree debris is removed and/or processed.

The model estimates that people from 2,067 households (out of 65,000) will be displaced during this event. This includes 1,385 people that will require evacuation to temporary shelter.

HAZUS estimates that one fire station and 29 of 50 schools have a greater than 50% probability of seeing moderate damage; however no critical structures have a greater than 50% probability of complete destruction. The Emergency Operations Center and all of the Police and Fire Stations are expected to have a loss of use of less than a day.

The economic impact of this scenario is estimated by HAZUS at $2.58 billion. This includes $2.26 billion in direct building costs for repair or replacement and contents and $319 million in business interruption costs related to the inability to operate a business or temporary living expenses for displaced residents.

Tornadoes

Tornadoes are related to extreme weather such as hurricanes, but can also be spawned during more frequent events such as thunderstorms. Based on a spatial analysis of tornado events, the central and northern portions of Berkeley County tend to be more vulnerable to these storms. The communities of Bonneau, Moncks Corner, St. Stephen, and Goose Creek are included in this area.

Winter Storms

Although rare in the southern coastal plain, the entirety of Berkeley County is vulnerable to winter storms. When they occur, they can bring wide-spread disruption. Impacts are primarily limited to transportation and utilities, but can range in severity due to variances in community preparation.

Thunderstorms and Hail

Thunderstorms are the most frequent type of weather event and may occur in combination with other storm events such as hurricanes Thunderstorms may also be accompanied by other weather phenomena such as tornadoes, hail, lightning strikes, or heavy rainfall. Storm data show a concentration of these events away from the coast and more central to the county, similarly to tornadoes. This includes the jurisdictions of Bonneau, Goose Creek, Hanahan, Moncks Corner, and St. Stephen.

Wildfire

As noted in the wildfire hazard identification, Berkeley County is generally at low to moderate risk for wildfires, depending on the season and the condition of the vegetation. The central northwestern area of the County tends to be more susceptible. Although the Francis Marion National Forest would provide a significant fuel source for wildfires, the Forest is well maintained and monitored.

Drought

Droughts develop slowly but can cause significant potential loss of agricultural production and increase the risk of wildfires. Drought tends to be the costliest naturallyoccurring hazard, causing significant economic damage to crops on an annual basis. High water demand, high temperatures, high winds, and low humidity can exacerbate the impacts of drought conditions.

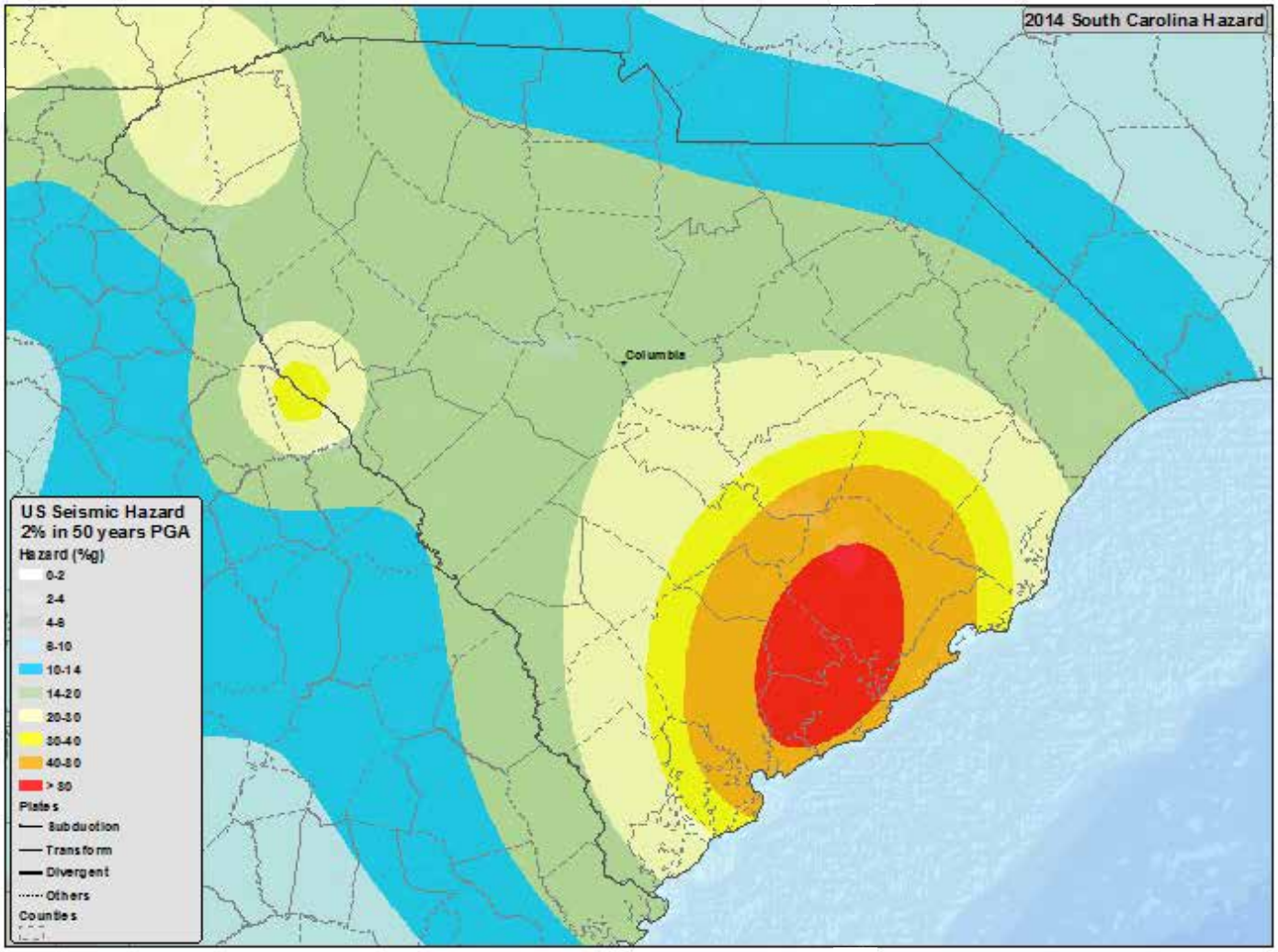
The majority of Berkeley County falls into a range of range of 48 to 50 inches of annual rainfall, with some areas in the south of the county at 50 to as much as 56 inches. These totals are generally above the statewide average of 47.66 inches. Agricultural operations in rural areas of Berkeley County are more susceptible to drought than urban areas.

Earthquake

While detectable seismic events may be rarer in occurrence than storm-related events, they are no less impactful when they do happen and pose significant risk to life and property. The HAZUS Earthquake Risk model is for a 6.9 magnitude earthquake, similar to the 1886 Charleston earthquake. As noted in the Hazard Identification Section, the USGS rates Peak Ground Acceleration (PGA), or the acceleration experienced by a particle on the ground during an earthquake, as a measure of force and expresses this force in Percent of Gravity (%g). This is a measure of hazard for a building of less than 7 stories tall. On the map below, the USGS calculates that there is a 2% probability in 50 years of an earthquake event that will cause a PGA of greater than 80%g. This is a quake that may cause intense surface activity. The annual probability calculation of such an event is 0.044% with a return period (or average time span between occurrences) of 227 years.

As noted, about 70% of all seismic activity occurs in the Middleton Place-Summerville seismic zone located on the southwestern edge of Berkeley County. Data indicate that 48 events have had their epicenter in Berkeley County, with five events having a magnitude great enough to be considered minor or light. This activity means the more urban areas of Berkeley County, specifically Summerville, Goose Creek, Hanahan, and Moncks Corner, are more vulnerable to earthquake events.

Map 17: Seismic Hazard



Additionally, the liquefaction risk of soils during an earthquake is greater in the central and southern portion of the County due to the soil structure. Liquefaction tends to impact wood frame construction less than masonry construction. However, a powerful enough earthquake lasting long enough can cause liquefaction damage on low-lying sediment soils. Daniel Island is particularly vulnerable to liquefaction, along with the urbanized areas that are susceptible to earthquakes noted above.

The report provides damage estimates for transportation and utility system lifelines as well as direct building damage. The scenario resulted in a report that indicates about $2.2 billion of impacts in transportation system replacement costs, to the following types of structures:

Table 22: HAZUS Earthquake Scenario Transportation System Impact for Berkeley County

HAZUS Earthquake Scenario transportation system impact for Berkeley County		
Component	Locations/Segments	Replacement Value ($)
All Highway	**233**	**$1,931,704,400**
Bridges	*186*	*$262,779,900*
Segments	*47*	*$1,668,924,500*
Tunnels	*0*	*$0*
All Railway	**139**	**$217,395,100**
Bridges	*1*	*$1,321,000*
Facilities	*0*	*$0*
Segments	*138*	*$216,074,100*
Tunnels	*0*	*$0*
Light Rail	**0**	**$0**
Bus Facilities	**1**	**$893,800**
Ferry	**0**	**$0**
Port Facilities	**10**	**$19,970,000**
Airport	**2**	**$48,615,000**
Facilities	*1*	*$10,651,000*
Runways	*1*	*$37,964,000*
TOTAL:	**385**	**$2,218,578,300**

The HAZUS model estimates most transportation elements would remain functional, but 148 bridges would sustain at least moderate damage with 43 experiencing complete damage. The model also indicates that all ten of the port facilities would sustain at least moderate damage.

In addition, this model scenario predicts about $3 billion in damages to utility systems to the following types of structures:

Table 23: HAZUS Earthquake Scenario Utility System Impact for Berkeley County

HAZUS Earthquake Scenario utility system impact for Berkeley County		
Component	Locations/Segments	Replacement Value ($)
All Potable Water	**1,147**	**$937,948,800**
Distribution Lines	*-*	*$170,438,800*
Facilities	*34*	*$671,921,100*
Pipelines	*1,113*	*$95,588,900*
All Waste Water	**4,596**	**$465,419,800**
Distribution Lines	*-*	*$102,263,300*
Facilities	*129*	*$17,385,500*
Pipelines	*4,467*	*$345,771,000*
All Natural Gas	**9**	**$99,520,900**
Distribution Lines	*-*	*$68,175,500*
Facilities	*0*	*$0*
Pipelines	*9*	*$31,345,400*
All Oil	**0**	**$0**
Facilities	*0*	*$0*
Pipelines	*0*	*$0*
Electrical Power Facilities	**8**	**$1,513,303,000**
Communication Facilities	**3**	**$246,000**
TOTAL:	**5,763**	**$3,016,438,500**

The HAZUS model estimates how the various utility systems would be impacted in this scenario.

About 119 of the 129 wastewater facilities would experience at least moderate damage and 12 would experience complete damage. Only 68 wastewater facilities are expected to have greater than 50% functionality 7 days after the event. System-wide, about 1,228 leaks are estimated and 507 breaks.

About 24 of the 34 potable water facilities would experience at least moderate damage and one is expected to sustain complete damage. However, most of the potable water facilities (32) are expected to have greater than 50% functionality 7 days after the event. System-wide, about 214 leaks are expected with 87 breaks.

Although just one of the electrical facilities is expected to sustain at least moderate damage, all electrical facilities are expected to have less than 50% functionality beyond the 7 day timeframe.

Two of the communication facilities are expected to sustain at least moderate damage, but all 3 communication facilities are expected to have greater than 50% functionality within 7 days.

There are expected to be 16 natural gas leaks and 7 breaks.

At day 1, an estimated 65,419 households are expected to be without power or potable water, or both. Water is expected to be restored first, but at day 7, an estimated 37,812 households would still be without power. A month after the earthquake, there could still be 13,869 households without power.

HAZUS estimates 11,841 buildings would be completely destroyed; about 84% of which would be residential. An estimated 38,986 buildings would sustain at least moderate damage in this scenario, which is about 57% of all the buildings in Berkeley County. About 35,804 of these buildings are residential. About 15,110 would have slight damage and approximately 14,426 buildings are estimated to sustain no damage at all.

HAZUS also reviews the type of structures expected to be damaged in the earthquake event as shown in the table below:

Table 24: HAZUS Earthquake Scenario Damages for Berkeley County

HAZUS Earthquake Scenario damages for Berkeley County

	Level of Damage				
Building Type	None	Slight	Moderate	Extensive	Complete
Wood	12,696	13,309	12,902	5,303	1,572
Steel	42	49	181	357	1,059
Concrete	7	8	30	58	207
Precast	5	3	12	21	77
Reinforced Masonry	30	16	52	84	274
Unreinforced Masonry	451	420	698	787	2,621
Manufactured Housing	1,196	1,305	2,716	3,944	6,031
TOTAL:	**14,426**	**15,110**	**16,591**	**10,554**	**11,841**

Over half (51%) of the buildings anticipated to be completely destroyed are manufactured housing and another 22% are unreinforced masonry construction. While wood construction buildings are expected to be damaged more frequently, the damage is not expected to be as severe to these buildings. The type of the building is used to estimate the amount of debris that will be generated by, and therefore removed, after the event. HAZUS estimates that 2,351,000 tons of debris would be generated by an earthquake event of this magnitude, with about 42% being brick/wood and the rest being concrete or steel. An estimated 94,040 truckloads would be required to remove the building debris.

HAZUS estimates that seven fire stations, one police station, and 31 of 50 schools have a greater than 50% probability of seeing complete damage. None of the critical structures have a greater than 50% probability of being functional on day 1 after the earthquake. Furthermore, major impacts are expected to the functioning of the transportation and utility lifeline systems.

The model estimates that people from 8,870 households (out of 65,000) will be displaced during this event. This includes 5,591 people that will require temporary shelter.

Additionally, HAZUS estimates casualties at varying severity levels as found below:

- Level 1 indicates injuries need medical attention, but hospitalization is not required
- Level 2 indicates injuries need hospitalization, but are not life-threatening
- Level 3 indicates injuries need hospitalization and could become life-threatening
- Level 4 indicates victims that are killed by the earthquake

Casualties are estimated at three times per day to represent the periods of day that different sectors of the community are at their peak occupancy loads. The table below provides casualty information for this earthquake scenario.

Table 25: HAZUS Earthquake Scenario Casualties for Berkeley County

HAZUS Earthquake Scenario casualities for Berkeley County

		Casualty Level			
Time Period	Type of Occupancy	One	Two	Three	Four
2:00 AM	Commercial	69.74	21.71	3.42	6.74
	Commuting	0.44	0.52	0.96	0.18
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	99.12	31.27	5.02	9.89
	Other-Residential	1,534.58	434.04	53.25	101.03
	Single Family	1,215.33	322.81	43.46	84.54
	TOTAL:	**2,919**	**810**	**106**	**202**
2:00 PM	Commercial	4,000.55	1,244.56	196.67	384.87
	Commuting	3.96	4.68	8.66	1.64
	Educational	1,337.51	429.08	71.65	139.74
	Hotels	0.00	0.00	0.00	0.00
	Industrial	734.98	231.74	37.41	72.90
	Other-Residential	272.57	75.52	8.92	16.31
	Single Family	235.24	63.97	9.12	16.71
	TOTAL:	**6,585**	**2,050**	**332**	**632**
5:00 PM	Commercial	2,912.36	906.77	144.79	278.38
	Commuting	73.11	86.03	159.13	30.11
	Educational	97.76	31.48	5.25	10.26
	Hotels	0.00	0.00	0.00	0.00
	Industrial	459.37	144.84	23.38	45.56
	Other-Residential	577.49	165.17	21.14	39.03
	Single Family	489.41	133.50	19.05	34.91
	TOTAL:	**4,610**	**1,468**	**373**	**438**

Most casualties would occur at the 2:00 pm timeframe, primarily due to increase commercial and educational activity.In addition to the $5.2 billion in transportation and utility lifeline costs, the economic impact of this scenario is estimated by HAZUS at $8.77 billion. This includes $7.6 billion in direct building costs for repair or replacement (primarily to residential properties) and contents and about $1.1 billion in business interruption and income-related costs due to the inability to operate a business or temporary living expenses for displaced residents.

Dam Failure

In 1983, hundreds of people in Berkeley County were evacuated as a precaution after a leak in the Pinopolis Dam was discovered. As noted in the Hazard Identification Section, there was a historic rainfall event in October of 2015 that resulted in the state-wide failure of 49 state regulated dams, one federally regulated dam, two sections of the levee adjacent to the Columbia Canal, and numerous unregulated dams. Of the estimated 28 regulated dams in Berkeley County, there were no regulated dam failures during the 2015 event. Based on the dam locations of Berkeley County, the most vulnerable jurisdictions are Moncks Corner, Goose Creek, parts of Summerville, and Hanahan.

Hazardous Material Spill

An unintended hazardous material release or "spill" occurs on transportation networks or at stationary sites where materials are stored or handled. The following nine classifications are consistent across all agencies who deal with hazardous materials.

Some level of all of these material hazards is likely present on a daily basis somewhere in Berkeley County. There are minor incidences relating to materials that can cause these hazards such as natural gas leaks, chemical spills, and accident clean-ups. Unintended releases could also occur in the County's port facilities. No serious injuries have been reported due to a hazardous materials incident.

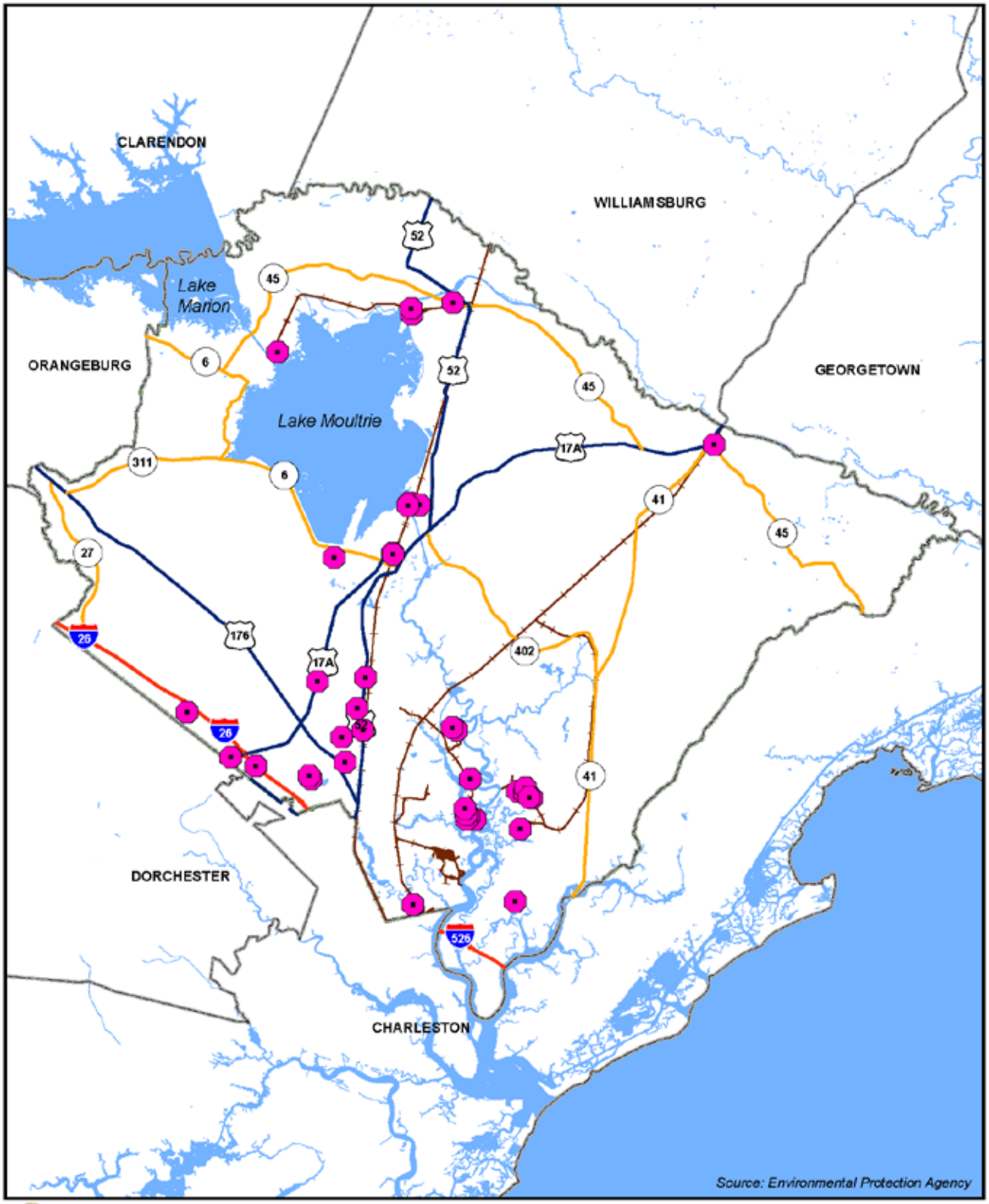
As noted in the Hazard Identification Section, facilities that generate or store hazardous materials that are required to be register with the U.S. Environmental Protection Agency (EPA) and are typically classified as Municipal Solid Waste Landfills (MSW), Hazardous Waste Generators (HAZGEN), Radiological Waste Generators (RAD), Superfund Sites, Toxic Release Inventory Sites (TRI), or Treatment, Storage and Disposal Sites (TSD).

The majority of HAZGEN and TRI facilities are concentrated in areas such as Goose Creek, Hanahan and Moncks Corner.

There are two RAD facilities in or around Berkeley County, with one located off I-26 in Summerville and the other located at the Charleston Naval Weapons Station. Most of the TSD sites are also within the limits of the Charleston Naval Weapons Station. There has been one MSW site located between Goose Creek and Moncks Corner.

Map 18: Berkeley County Toxic Release Inventory Sites

Berkeley County Toxic Release Inventory Sites



Berkeley County GIS Department
P.O. Box 6122
Moncks Corner, SC 29461
(p) 843.719.4049 | (f) 843.719.4190
http://gis.berkeleycountysc.gov
Date: 12/2/2019

0 2.25 4.5 9 13.5 18 Miles

THE COUNTY OF BERKELEY AND ITS GIS DEPARTMENT DISCLAIMS ACCOUNTABILITY FOR THIS PRODUCT AND MAKES NO WARRANT EXPRESS OR IMPLIED CONCERNING THE ACCURACY THEREOF. RESPONSIBILITY FOR INTERPRETATION AND APPLICATION OF THIS PRODUCT LIES WITH THE USER.

SUMMARY

Berkeley County is vulnerable to several natural and man-made hazards. Generally, the degree of vulnerability depends greatly on the proximity to the hazard. For example, coastal Berkeley County is more vulnerable to hurricane related hazards and rural areas within the Francis Marion National Forest are more vulnerable to wildfires. However there are threats, such as hazardous material spills, where the location varies with each incident, and droughts that may affect the entire county.

In order to properly mitigate for these hazards, each area was evaluated using past events and the future probabilities of recurrence for each type of hazard (see table below.)

Table 26: Probability of Hazard Occurrences

JURISDICTION	HAZARDS										
Type	Flood	Hurricane/ Tropical Storm	Tornado	Winter Storm	Thunder storm	Hail	Wildfire	Drought	Earthquake	Dam Failure	Hazardous Material Release
Bonneau	H	S	H	L	M	M	H	L	L	M	L
Daniel Is. (Charleston)	H	H	L	L	S	S	L	L	H	M	S
Goose Creek	H	H	M	L	M	M	S	L	H	M	M
Hanahan	H	H	L	L	M	M	L	L	H	L	M
Jamestown	M	H	L	L	L	L	L	M	L	L	L
Moncks Corner	H	M	M	L	M	M	H	L	M	H	M
St. Stephen	M	S	M	L	M	M	M	M	L	S	L
Summerville	H	H	L	L	M	M	M	L	H	L	M

**Vulnerability Categories: H=High; M=Moderate; S=Somewhat; L=Low*

Subsequently, an action plan was developed or updated for each scenario. The result is a living document meant to be updated as new data becomes available.

In accordance with FEMA regulations under the Stafford Act, this document will be reviewed every three years and updated every five years before submittal to FEMA for approval. Any failure to submit the required documentation could result in loss of eligibility to receive FEMA funding.

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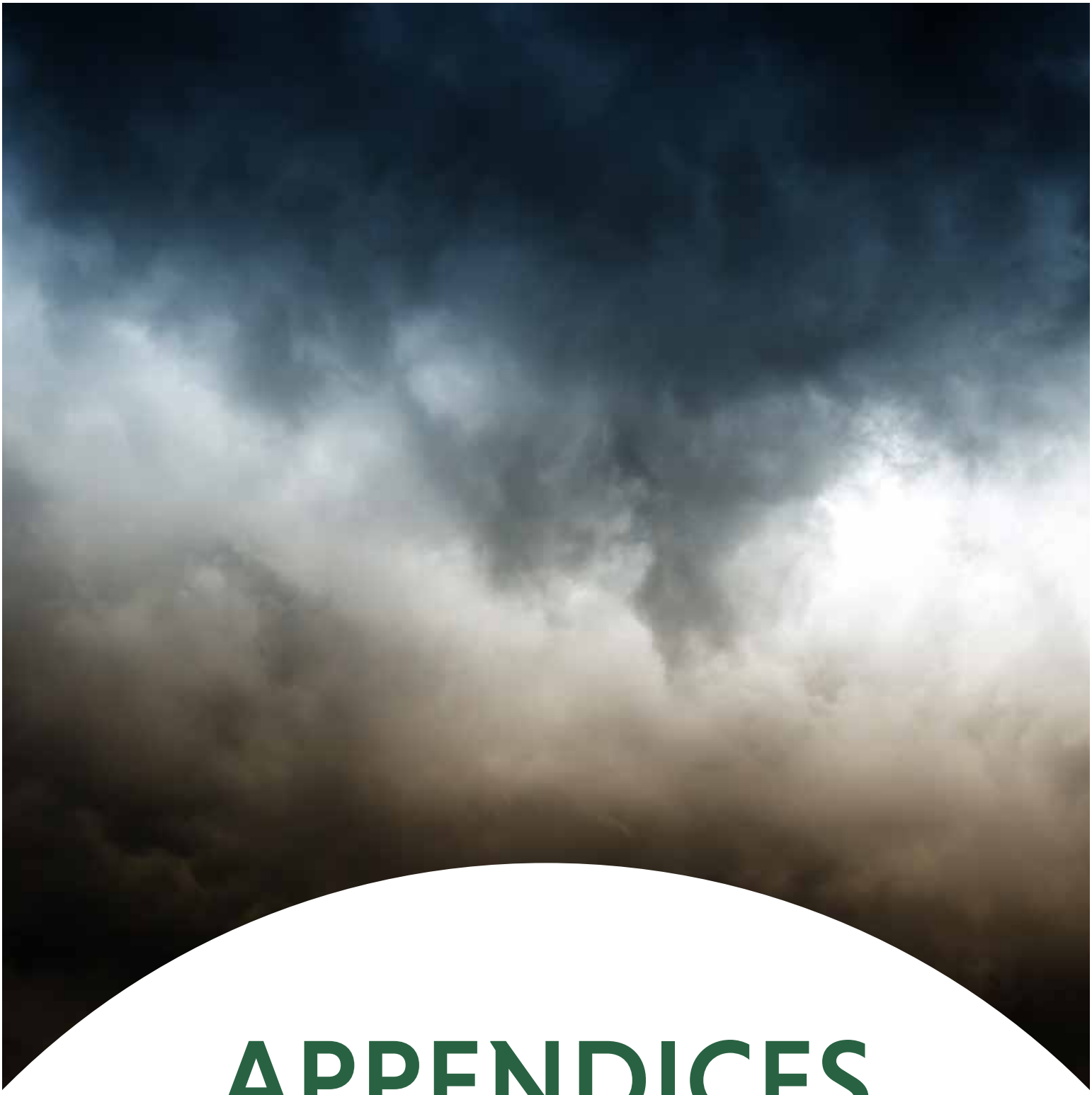

APPENDICES

BERKELEY COUNTY SC

RICH HISTORY.
BRIGHT FUTURE.
One Berkeley

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APPENDIX I: PUBLIC NOTIFICATIONS

The following table includes media outlets notified of Berkeley-Charleston-Dorchester Council of Governments Board of Directors meetings and Berkeley County council meetings. The notification includes an agenda indicating time, place, and opportunity for public comment. Thereafter it appears on the agendas of Berkeley County Council and at which the BCHMP was presented and on county and municipal websites and/or social media.

POST & COURIER 134 COLUMBUS STREET CHARLESTON, SC 29403	BERKELEY INDEPENDENT PO BOX 427 MONCKS CORNER, SC 29461	Journal Scene 104 E. Doty Ave. Summerville, SC
Moultrie News 134 Columbus Street Charleston, SC 29403	Daniel Island News 225 Seven Farms Drive Unit 108 Daniel Island, SC 29492	

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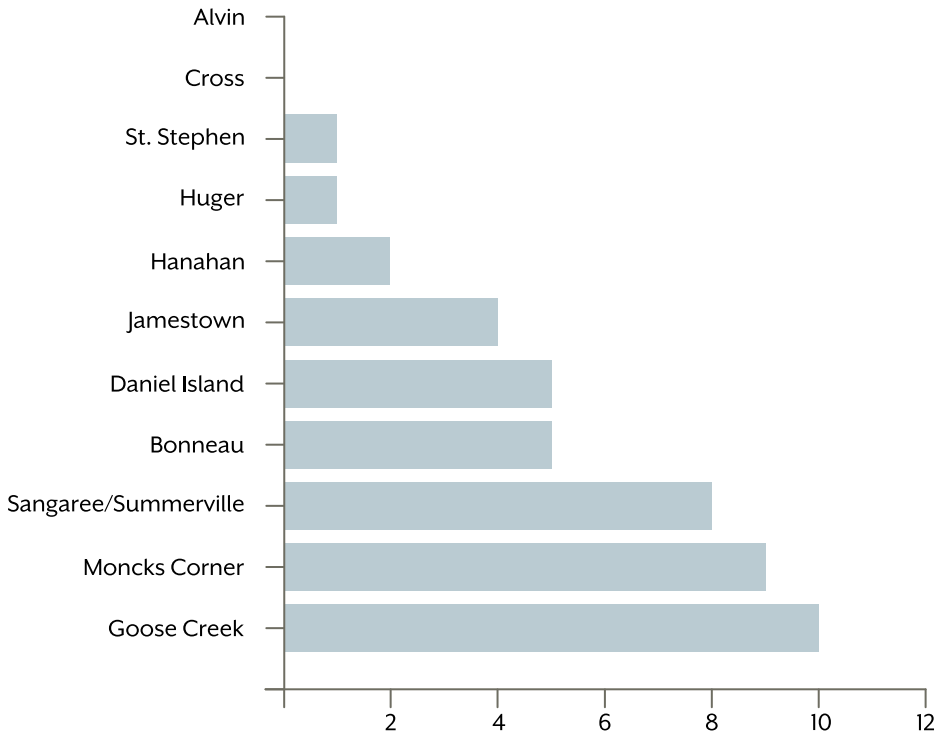
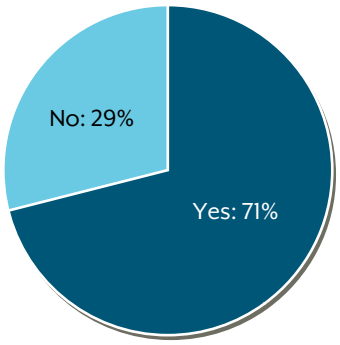
APPENDIX II: PUBLIC RESPONSE

The Hazard Mitigation Plan survey was available online and paper copies were also distributed during town council meetings. A total of 59 Berkeley County residents responded to the survey. The results showed that the primary concerns of residents were flooding and hurricanes/tropical storms, with 86% of respondents citing one of the two categories as the type of hazard event they were "most concerned" about. Forty-two of the 59 respondents (71%) reported to have been impacted by a hazard event in the past. Respondents also offered suggestions on strategies to lessen hazard risks in Berkeley County, with the primary suggestion categories being to improve infrastructure, provide better communication, better maintenance of drainage systems, improving road drainage, and providing better evacuation routes. The results of the survey are summarized in the following charts:

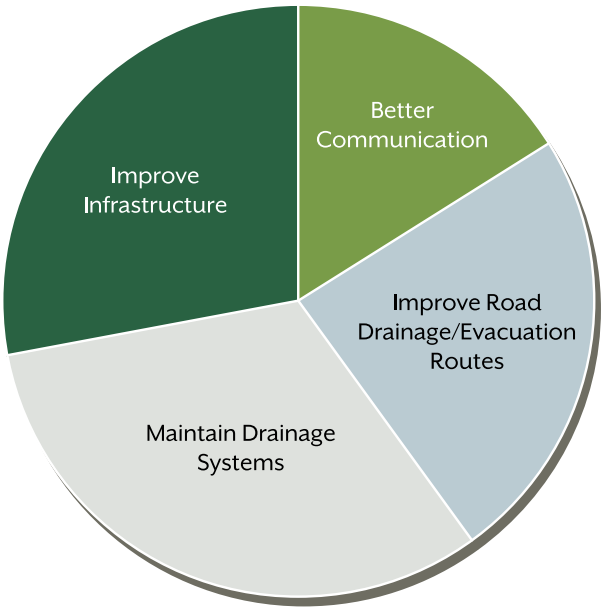
Where do you live in Berkeley County?



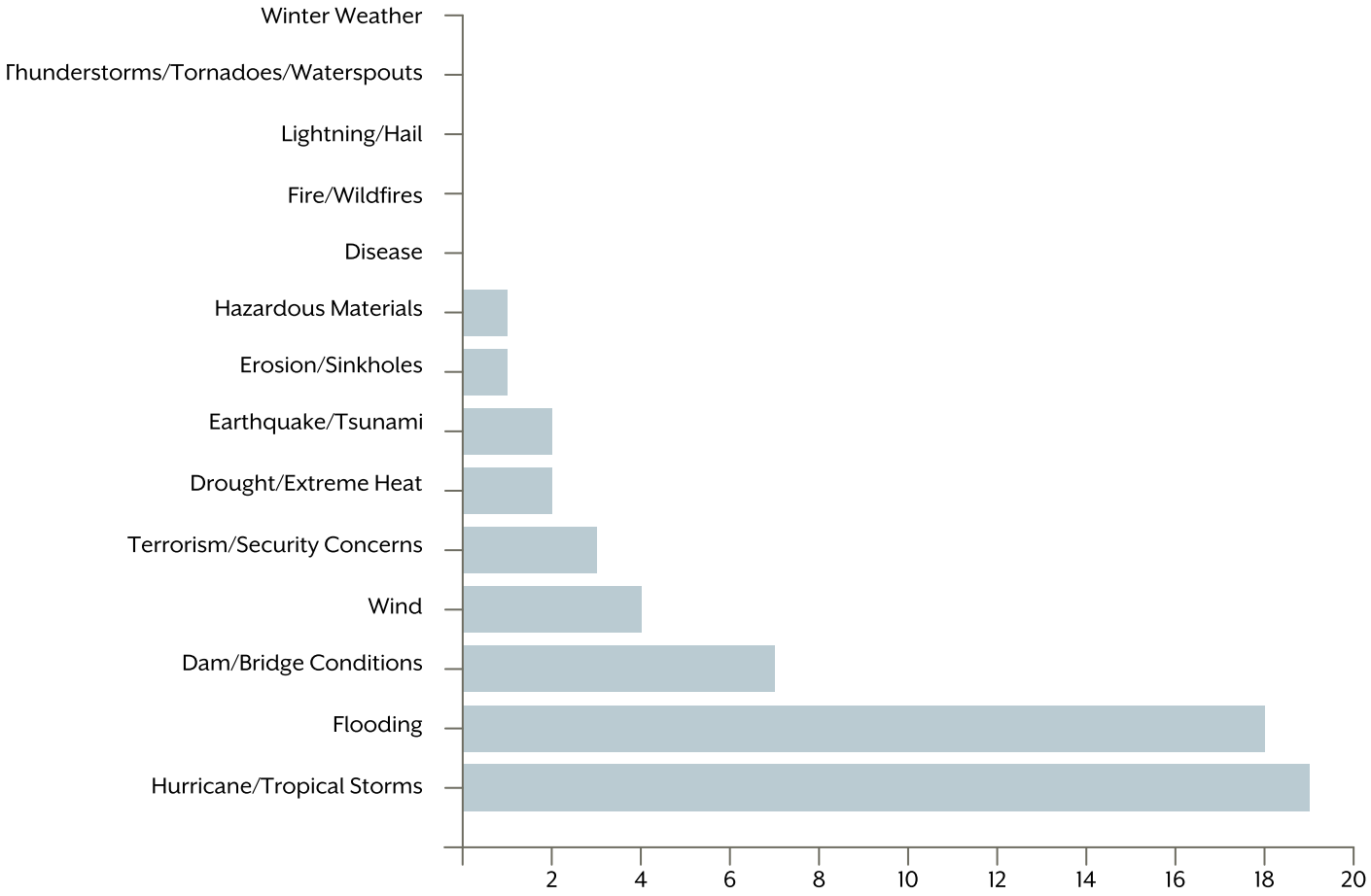
Have you been impacted by a hazard in the past?



Public Input on where improvements should be made?



Which hazard element are you most concerned about?



APPENDIX III: MEETING PARTICIPANTS

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Berkeley County Hazard Mitigation Plan 2020 Public Meeting #1

7/25/2019

Berkeley County Admin Bldg.

Page 1 of 1

Sign In Sheet

Name	Address	Phone	Email
Darrell Moser	119 Pioneer PT	842-851-5590	
Penny Ayers	BC employee	843.719.4266	penny.ayers@berkeleycounty
JAMES Bunda	HANAHAN F.D. 5826 CANDRELL	843-554-4281	jbunda@cityofhanahan.com
LORI W. McFADDEN	129 KENNINGTON DR. GOOSE CREEK	843-729-0152	Lewmc19@yahoo.com
Linda Selleck	115 Ricewood Ln Moncks Corner	843-670-0861	linda.b.selleck@gmail.com
S. Stroud	223 N Live Oak Dr MC	843-719-4412	sammantha.stroud@berkeleycountysc.gov
Mike Hammer	5790 Cosper Pabytt Way	BCDCOG	

SIGN-IN SHEET
CITY COUNCIL MEETING
September 10, 2019 - 6:30 PM

NAME (Please Print)	ADDRESS (Please Print)
Kathi Carr	1107 Smithfield
Dave + Evelyn Pellettieri	Ohio
Pat Edstrom	7472 Shanks Circle
Roy Cantrell	1253 Dickson Ave
Gary Riley	STAFF
Kristy Dubey	Staff
Bo Bowers	Staff
[illegible]	16 Foster Creek Acres
Roman Hedden	115 Plainfield AVE Goose Creek
Ken HANNEMAN	1250 Yeamans Hall Rd
Tyler [illegible]	Employee
Rudy Mwiyunke	STAFF
Rev. LaShana Flagg	1516 Foster Creek Rd (Greater Bethel)
J. G. HARKNESS	1036 Domination Dr
LARRY STURDIVANT	STAFF
Barbara Brown	1118 Woodside Dr. Hanahan
Danielle Reed	52 Monte Sano Dr.
[illegible]	1087 Stoneridge Dr.

*Please return to Emily Huff, Clerk of Council

BERKELEY COUNTY EMERGENCY PREPAREDNESS

HAZARD MITIGATION PLAN

10/11/2019

	NAME	PHONE	ORGANIZATION	EMAIL
1	Jake Broom	797-6220	City of Goose Creek	jbroom@cityofgoosecreek.com
2	James Bunda	344-1246	HFD	jbunda@cityofhanahan.com
3	Doug Polen	715-7513	Moncks Corner	doug.polen@moncksCorner-sc.gov
4	Kathryn Basha	529 0400	BCD COG	
5				
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20				
21				

St. Stephen Council Meeting 11/18/19

Kathryn Basha BCDCOG
John Lambert BCDCOG
Jan Christianson
Shellie Johnson
Bettye Shealy
Eddie Brown
Janice Carr

BCDCOG Hazard Mitigation Plan Meeting
Moncks Corner

December 17, 2019

NAME	JURISDICTION	PHONE	EMAIL
55-60 people were in attendance at the Town Council presentation.			

BCHMP Stakeholder Meeting

December 18, 2019

NAME	BOARD/ COMMISSION	JURISDICTION	PHONE	EMAIL
Penny Ayers		Berk Cty	843.719.4266	pennyayers@ berkeleycounty
Murzette Sherrie Hilton	Communications	Berkeley County	843.719.4825	murzette.hilton @ Berkeley
Douglas Guerry	Town of Jamestown	Jamestown	843-257-2233	douglas.guerry@gmail.c
CRAIG NESSEL		Berkeley County	843 719-4688	CRAIG.NESSEL @ BERKELEYCOUNTY
Daniel Moore	City of Goose Creek		843-826-2642	dmoore@city of goose cre
Frank Carson	B.Co. Engineer	Berkeley Co.	843.719.4179	frank.carson@berkeley...
Victoria Marshall		Berkeley Co	8437190014	Victoria.Marshall
DANNY THROWER	BC Sup. OFFICE	BC	(843)719-4131	DANNY.THROWER "
HANK JACKSON	BC Building Codes	Berkeley County	843-719-4291	Hank.Jackson@berkeley county SC.G
LES BLANCENSHIP	BCG	BC	4022	LES.BLANCENSHIP @ BC
Thurman Simmons	Berkeley County Stormwater	BC	843-719-2691	Thurman.Simmons@berkeley county.s

BCHMP Stakeholder Meeting

December 18, 2019

NAME	BOARD/ COMMISSION	JURISDICTION	PHONE	EMAIL
Will Rochester	EMD	BC	843-826-8031	will.rochester@berkeleycounty.s
Wendy Lee	EMS	Berkeley County	843-312-9547	Wendy.lee@berkeleycountysc.g

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Resolution for Adoption

A RESOLUTION FOR THE ADOPTION OF THE *2019 BERKELEY COUNTY HAZARD MITIGATION PLAN UPDATE* BY THE TOWN OF BONNEAU

Resolution No. 10

WHERAS the Town of Bonneau has experienced the effects of natural and man-made hazard events; and

WHEREAS the Berkeley-Charleston-Dorchester Council of Governments has overseen a federally required update to the previously adopted *2015 Berkeley County Hazard Mitigation Plan Update;* and

WHEREAS the *2019 Berkeley County Hazard Mitigation Plan Update* has been widely circulated for review by residents; federal, regional and local government agencies; and business organizations of the unincorporated and incorporated areas of Berkeley County through public meetings, newspapers, and online advertising; and

WHEREAS the Plan has been approved by these reviewers

NOW THEREFORE be it resolved that:

1. The *2019 Berkley County Hazard Mitigation Plan* is hereby adopted as an official plan of the Town of Bonneau contingent on approval by the South Carolina EMD and FEMA, and
2. The Berkeley County Hazard Mitigation Project Committee is recognized as a continuing entity charged with reviewing, maintaining the plan in accordance with Community Rating System requirements and periodically reporting on the progress towards and revisions of the plan to the Bonneau Town Council

Effective this 21 day of Oct, 2020.

Rembert E. Wrenn

Mayor Rembert Wrenn

Resolution for Adoption

A RESOLUTION FOR THE ADOPTION OF THE *2019 BERKELEY COUNTY HAZARD MITIGATION PLAN UPDATE* BY THE CITY OF HANAHAN

Resolution No. 8-2020

WHERAS the City of Hanahan has experienced the effects of natural and man-made hazard events; and

WHEREAS the Berkeley-Charleston-Dorchester Council of Governments has overseen a federally required update to the previously adopted *2015 Berkeley County Hazard Mitigation Plan Update;* and

WHEREAS the *2019 Berkeley County Hazard Mitigation Plan Update* has been widely circulated for review by residents; federal, regional and local government agencies; and business organizations of the unincorporated and incorporated areas of Berkeley County through public meetings, newspapers, and online advertising; and

WHEREAS the Plan has been approved by these reviewers

NOW THEREFORE be it resolved that:

1. The *2019 Berkley County Hazard Mitigation Plan* is hereby adopted as an official plan of the City of Hanahan contingent on approval by the South Carolina EMD and FEMA, and
2. The Berkeley County Hazard Mitigation Project Committee is recognized as a continuing entity charged with reviewing, maintaining the plan in accordance with Community Rating System requirements and periodically reporting on the progress towards and revisions of the plan to the Hanahan City Council

The *2019 Berkley County Hazard Mitigation Plan Update* is hereby adopted as an official plan of the City of Hanahan, and

Effective this 15 day of September 2020.

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Mayor Christie Rainwater

A RESOLUTION FOR THE ADOPTION OF
THE 2019 BERKELEY COUNTY HAZARD MITIGATION PLAN UPDATE
BY THE TOWN OF ST. STEPHEN

WHEREAS, the Town of St. Stephen has experienced the effects of natural and man-made hazard events; and

WHEREAS, the Berkeley-Charleston-Dorchester Council of Governments has overseen a federally required update to the previously adopted *2015 Berkeley County Hazard Mitigation Plan Update*; and

WHEREAS, the 2019 Berkeley County Hazard Mitigation Plan Update has been widely circulated for review by residents; federal, regional and local government agencies; and business organizations of the unincorporated and incorporated areas of Berkeley County through public meetings, newspapers, and online advertising; and

WHEREAS, the Plan has been approved by these reviewers

NOW THEREFORE be it resolved that

1. The 2019 Berkley County Hazard Mitigation Plan is hereby adopted as an official plan of the Town of St. Stephen contingent on approval by the South Carolina EMD and FEMA, and

2. The Berkeley County Hazard Mitigation Project Committee is recognized as a continuing entity charged with reviewing, maintaining the plan in accordance with Community Rating System requirements and periodically reporting on the progress towards and revisions of the plan to the St Stephen Town Council.

Effective this 17th Day of August, 2020

John Rivers

Mayor John Rivers

Angela J Phillips-Hill

Witness

Resolution for Adoption

A RESOLUTION FOR THE ADOPTION OF THE *2019 BERKELEY COUNTY HAZARD MITIGATION PLAN UPDATE* BY THE TOWN OF JAMESTOWN

Resolution No. 02-20

WHERAS the Town of Jamestown has experienced the effects of natural and man-made hazard events; and

WHEREAS the Berkeley-Charleston-Dorchester Council of Governments has overseen a federally required update to the previously adopted *2015 Berkeley County Hazard Mitigation Plan Update;* and

WHEREAS the *2019 Berkeley County Hazard Mitigation Plan Update* has been widely circulated for review by residents; federal, regional and local government agencies; and business organizations of the unincorporated and incorporated areas of Berkeley County through public meetings, newspapers, and online advertising; and

WHEREAS the Plan has been approved by these reviewers

NOW THEREFORE be it resolved that:

1. The *2019 Berkley County Hazard Mitigation Plan* is hereby adopted as an official plan of the Town of Jamestown contingent on approval by the South Carolina EMD and FEMA, and
2. The Berkeley County Hazard Mitigation Project Committee is recognized as a continuing entity charged with reviewing, maintaining the plan in accordance with Community Rating System requirements and periodically reporting on the progress towards and revisions of the plan to the Jamestown Town Council

Effective this 6 day of October, 2020.

Roy P. Pipkin

Mayor Roy Pipkin

Resolution for Adoption

A RESOLUTION FOR THE ADOPTION OF THE *2019 BERKELEY COUNTY HAZARD MITIGATION PLAN UPDATE* BY THE CITY OF GOOSE CREEK

Resolution No. 20-14

WHERAS the City of Goose Creek has experienced the effects of natural and man-made hazard events; and

WHEREAS the Berkeley-Charleston-Dorchester Council of Governments has overseen a federally required update to the previously adopted *2015 Berkeley County Hazard Mitigation Plan Update;* and

WHEREAS the *2019 Berkeley County Hazard Mitigation Plan Update* has been widely circulated for review by residents; federal, regional and local government agencies; and business organizations of the unincorporated and incorporated areas of Berkeley County through public meetings, newspapers, and online advertising; and

WHEREAS the Plan has been approved by these reviewers

NOW THEREFORE be it resolved that:

1. The *2019 Berkley County Hazard Mitigation Plan* is hereby adopted as an official plan of the City of Goose Creek contingent on approval by the South Carolina EMD and FEMA, and
2. The Berkeley County Hazard Mitigation Project Committee is recognized as a continuing entity charged with reviewing, maintaining the plan in accordance with Community Rating System requirements and periodically reporting on the progress towards and revisions of the plan to the Goose Creek City Council

Effective this 8th day of September, 2020.

Mayor Gregory Habib

Attest:

Kelly J. Lovette, MMC
City Clerk

Resolution No. 2020-R-05

A RESOLUTION FOR THE ADOPTION OF THE 2020 BERKELEY COUNTY HAZARD MITIGATION PLAN UPDATE BY THE TOWN OF MONCKS CORNER

WHEREAS the Town of Moncks Corner has experienced the effects of natural and man-made hazard events; and

WHEREAS the Berkeley-Charleston-Dorchester Council of Governments has overseen a federally required update to the previously adopted 2015 *Berkeley County Hazard Mitigation Plan Update*; and

WHEREAS the 2020 *Berkeley County Hazard Mitigation Plan Update* has been widely circulated for review by residents; federal, regional and local government agencies; and business organizations of the unincorporated and incorporated areas of Berkeley County through public meetings, newspapers, and online advertising; and

WHEREAS the Plan has been approved by these reviewers.

NOW THEREFORE be it resolved that

1. The *2020 Berkley County Hazard Mitigation Plan* is hereby adopted as an official plan of the Town of Moncks Corner contingent on approval by the South Carolina EMD and FEMA, and

2. The Berkeley County Hazard Mitigation Project Committee is recognized as a continuing entity Charged with reviewing, maintaining the plan in accordance with Community Rating System requirements and periodically reporting on the progress towards and revisions of the plan to the Moncks Corner Town Council.

Effective this 20th day of October, 2020.

Michael A. Lockliear, Mayor

Attest:

Marilyn M. Baker, Clerk to Council

RESOLUTION NO. 21-05

A RESOLUTION ADOPTING THE 2020 UPDATE TO THE BERKELEY COUNTY HAZARD MITIGATION PLAN.

WHEREAS, Berkeley County has experienced the effects of natural and man-made hazard events; and

WHEREAS, the Berkeley-Charleston-Dorchester Council of Governments has overseen a federally required update to the previously adopted *2015 Berkeley County Hazard Mitigation Plan Update;* and

WHEREAS, the *2020 Berkeley County Hazard Mitigation Plan Update* has been widely circulated for review by residents; federal, regional and local government agencies; and business organizations of the unincorporated and incorporated areas of Berkeley County through public meetings, newspapers, and online advertising; and

WHEREAS, the Plan has been approved by these reviewers, the South Carolina EMD and FEMA.

NOW THEREFORE, be it resolved that:

1. The *2020 Berkley County Hazard Mitigation Plan* is hereby adopted as an official plan of Berkeley County, and

2. The Berkeley County Hazard Mitigation Project Committee is recognized as a continuing entity charged with reviewing, maintaining the plan in accordance with Community Rating System requirements and periodically reporting on the progress towards and revisions of the plan to the Berkeley County Council.

EFFECTIVE this 10th day of May, 2021.

BERKELEY COUNTY, SOUTH CAROLINA

[SEAL]

John P. Cribb, County Supervisor
Chairman, County Council

Attest:

Shelley R. Forest
Interim Clerk to Council

Approved as to form:

John O. Williams
County Attorney

R21-05

MEMBERS OF COUNTY COUNCIL

THOMAS D. OWENS	Voting Aye	BRANDON COX	Voting Aye
JOSHUA S. WHITLEY	Voting Aye	JACK H. SCHURLKNIGHT	Voting Aye
PHILLIP OBIE, II	Voting Aye	CALDWELL PINCKNEY, JR.	Voting Excused
JOE T. NEWELL	Voting Aye	STEVE C. DAVIS	Voting Excused