MEMA District 9, MS
Regional Hazard Mitigation Plan

FINAL

ATKINS

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SECTION 1
INTRODUCTION

This section provides a general introduction to the Mississippi Emergency Management Agency (MEMA) District 9 Regional Hazard Mitigation Plan. It consists of the following five subsections:

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1.1 BACKGROUND

Natural hazards, such as hurricanes, floods, and tornadoes, are a part of the world around us. Their occurrence is natural and inevitable, and there is little we can do to control their force and intensity. We must consider these hazards to be legitimate and significant threats to human life, safety, and property.

The MEMA District 9 Region is located in southern Mississippi on the Gulf Coast and includes the counties of George, Hancock, Harrison, Jackson, Pearl River, and Stone. This area is vulnerable to a wide range of natural hazards such as floods, drought, hurricanes, severe thunderstorms, and wildfires. It is also vulnerable to human-caused hazards such as hazardous material spills. These hazards threaten the life and safety of residents in the MEMA District 9 Region and have the potential to damage or destroy both public and private property, disrupt the local economy, and impact the overall quality of life of individuals who live, work, and vacation in the MEMA District 9 Region.

While the threat from hazardous events may never be fully eliminated, there is much we can do to lessen their potential impact upon our community and our citizens. By minimizing the impact of hazards upon our built environment, we can prevent such events from resulting in disasters. The concept and practice of reducing risks to people and property from known hazards is generally referred to as *hazard mitigation*.

FEMA Definition of Hazard Mitigation:
"Any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards."

Hazard mitigation techniques include both structural measures (such as strengthening or protecting buildings and infrastructure from the destructive forces of potential hazards) and non-structural measures (such as the adoption of sound land use policies and the creation of public awareness programs). It is widely accepted that the most effective mitigation measures are implemented at the local government level, where decisions on the regulation and control of development are ultimately made. A comprehensive mitigation approach addresses hazard vulnerabilities that exist today and in the foreseeable future. Therefore, it is essential that projected patterns of future development are

evaluated and considered in terms of how that growth will increase or decrease a community's overall hazard vulnerability.

A key component in the formulation of a comprehensive approach to hazard mitigation is to develop, adopt, and update a local hazard mitigation plan. A hazard mitigation plan establishes the broad community vision and guiding principles for reducing hazard risk, and further proposes specific mitigation actions to eliminate or reduce identified vulnerabilities.

Each of the six counties participating in the development of the MEMA District 9 Hazard Mitigation Plan has an existing hazard mitigation plan that has evolved over the years, as described in Section 2: *Planning Process*. Additionally, many of the individual communities within the six counties also have an existing hazard mitigation plan. This regional plan draws from each of the county and municipal plans and documents the region's sustained efforts to incorporate hazard mitigation principles and practices into routine government activities and functions. At its core, the Plan recommends specific actions to minimize hazard vulnerability and protect residents from losses to those hazards that pose the greatest risk.

These mitigation actions go beyond simply recommending structural solutions to reduce existing vulnerability, such as elevation, retrofitting, and acquisition projects. Local policies on community growth and development, incentives for natural resource protection, and public awareness and outreach activities are examples of other actions considered to reduce the MEMA District 9 Region's vulnerability to identified hazards. The Plan remains a living document, with implementation and evaluation procedures established to help achieve meaningful objectives and successful outcomes over time.

1.1.1 The Disaster Mitigation Act and the Flood Insurance Reform Act

In an effort to reduce the Nation's mounting natural disaster losses, the U.S. Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) in order to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Section 322 of DMA 2000 emphasizes the need for state, local, and Tribal government entities to closely coordinate on mitigation planning activities and makes the development of a hazard mitigation plan a specific eligibility requirement for any local or Tribal government applying for federal mitigation grant funds. In short, if a jurisdiction is not covered by an approved mitigation plan, it will not be eligible for mitigation grant funds. These funds include the Hazard Mitigation Grant Program (HMGP) and the Pre-Disaster Mitigation (PDM) program, both of which are administered by the Federal Emergency Management Agency (FEMA) under the Department of Homeland Security. Communities with an adopted and federally-approved hazard mitigation plan thereby become pre-positioned and more apt to receive available mitigation funds before and after the next disaster strikes.

Additionally, the Flood Insurance Reform Act of 2004 (P.L. 108-264) created two new grant programs, Severe Repetitive Loss (SRL) and Repetitive Flood Claim (RFC), and modified the existing Flood Mitigation Assistance (FMA) program. One of the requirements of this Act is that a FEMA-approved Hazard Mitigation Plan is now required if communities wish to be eligible for these FEMA mitigation programs. However, these programs have since been folded into a single Flood Mitigation Assistance (FMA) program.

This change was brought on by new, major federal flood insurance legislation that was passed in 2012 under the Biggert-Waters Flood Insurance Reform Act (P.L. 112-141) and the subsequent Homeowner

Flood Insurance Affordability Act in 2014 which revised Biggert-Waters. These acts made several changes to the way the National Flood Insurance Program is to be run, including raises in rates to reflect true flood risk and changes in how Flood Insurance Rate Map (FIRM) updates impact policyholders. These acts further emphasize Congress' focus on mitigating vulnerable structures.

The MEMA District 9 Regional Hazard Mitigation Plan has been prepared in coordination with FEMA Region IV and the Mississippi Emergency Management Agency (MEMA) to ensure that the Plan meets all applicable FEMA and state requirements for hazard mitigation plans. A *Local Mitigation Plan Review Tool*, found in Appendix C, provides a summary of federal and state minimum standards and notes the location where each requirement is met within the Plan.

1.2 PURPOSE

The purpose of the MEMA District 9 Regional Hazard Mitigation Plan is to:

- ❑ Merge the existing George, Hancock, Harrison, Jackson, Pearl River, and Stone County hazard mitigation plans, as well as any municipal-level plans, into one regional plan
- ❑ Complete update of existing plans to demonstrate progress and reflect current conditions
- ❑ Increase public awareness and education about the plan and planning process
- ❑ Maintain grant eligibility for participating jurisdictions
- ❑ Maintain compliance with state and federal legislative requirements for local hazard mitigation plans

1.3 SCOPE

The focus of the MEMA District 9 Regional Hazard Mitigation Plan is on those hazards determined to be "high" or "moderate" risks to the MEMA District 9 Region, as determined through a detailed hazard risk assessment. Other hazards that pose a "low" or "negligible" risk will also be evaluated, but they may not be fully addressed until they are determined to be of high or moderate risk. This enables the participating jurisdictions to prioritize mitigation actions based on those hazards which are understood to present the greatest risk to lives and property.

The geographic scope (i.e., the planning area) for the Plan includes 6 counties and 16 incorporated jurisdictions. **Table 1.1** lists the participating areas.

TABLE 1.1: PARTICIPATING JURISDICTIONS IN THE MEMA DISTRICT 9 REGIONAL HAZARD MITIGATION PLAN

George County		**Jackson County**	
Lucedale		Gautier	Ocean Springs
Hancock County		Moss Point	Pascagoula
Bay St. Louis	Waveland	**Pearl River County**	
Diamondhead		Picayune	Poplarville
Harrison County		**Stone County**	
Biloxi	Long Beach	Wiggins	
D'Iberville	Pass Christian		
Gulfport			

1.4 AUTHORITY

The MEMA District 9 Regional Hazard Mitigation Plan has been developed in accordance with current state and federal rules and regulations governing local hazard mitigation plans and has been adopted by each participating county and local jurisdiction in accordance with standard local procedures. Copies of the adoption resolutions for each participating jurisdiction are provided in Appendix A. The Plan shall be routinely monitored and revised to maintain compliance with the following provisions, rules, and legislation:

- Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by Section 104 of the Disaster Mitigation Act of 2000 (P.L. 106-390)
- FEMA's Final Rule published in the Federal Register, at 44 CFR Part 201 (201.6 for local mitigation planning requirements and 201.7 for Tribal planning requirements)
- Flood Insurance Reform Act of 2004 (P.L. 108-264), Biggert-Waters Flood Insurance Reform Act of 2012 (P.L. 112-141) and the Homeowner Flood Insurance Affordability Act

1.5 SUMMARY OF PLAN CONTENTS

The contents of this Plan are designed and organized to be as reader-friendly and functional as possible. While significant background information is included on the processes used and studies completed (i.e., risk assessment, capability assessment), this information is separated from the more meaningful planning outcomes or actions (i.e., mitigation strategy, mitigation action plan).

Section 2, ***Planning Process***, provides a complete narrative description of the process used to prepare the Plan. This includes the identification of participants on the hazard mitigation council and describes how the public and other stakeholders were involved. It also includes a detailed summary for each of the key meetings held, along with any associated outcomes.

The ***Community Profile***, located in Section 3, provides a general overview of the MEMA District 9 Region, including prevalent geographic, demographic, and economic characteristics. In addition, building characteristics and land use patterns are discussed. This baseline information provides a snapshot of the

planning area and helps local officials recognize those social, environmental, and economic factors that ultimately play a role in determining the region's vulnerability to hazards.

The Risk Assessment is presented in three sections: Section 4, ***Hazard Identification***; Section 5, ***Hazard Profiles***; and Section 6, ***Vulnerability Assessment***. Together, these sections serve to identify, analyze, and assess hazards that pose a threat to the MEMA District 9 Region. The risk assessment also attempts to define any hazard risks that may uniquely or exclusively affect specific areas of the MEMA District 9 Region.

The Risk Assessment begins by identifying hazards that threaten the MEMA District 9 Region. Next, detailed profiles are established for each hazard, building on available historical data from past hazard occurrences, spatial extent, and probability of future occurrence. This section culminates in a hazard risk ranking based on conclusions regarding the frequency of occurrence, spatial extent, and potential impact highlighted in each of the hazard profiles. In the vulnerability assessment, FEMA's HAZUS®MH loss estimation methodology is used to evaluate known hazard risks by their relative long-term cost in expected damages. In essence, the information generated through the risk assessment serves a critical function as the MEMA District 9 Region seeks to determine the most appropriate mitigation actions to pursue and implement—enabling it to prioritize and focus its efforts on those hazards of greatest concern and those structures or planning areas facing the greatest risk(s).

The ***Capability Assessment***, found in Section 7, provides a comprehensive examination of the MEMA District 9 Region's capacity to implement meaningful mitigation strategies and identifies opportunities to increase and enhance that capacity. Specific capabilities addressed in this section include planning and regulatory capability, staff and organizational (administrative) capability, technical capability, fiscal capability, and political capability. Information was obtained through the use of a detailed survey questionnaire and an inventory and analysis of existing plans, ordinances, and relevant documents. The purpose of this assessment is to identify any existing gaps, weaknesses, or conflicts in programs or activities that may hinder mitigation efforts and to identify those activities that should be built upon in establishing a successful and sustainable local hazard mitigation program.

The *Community Profile*, *Risk Assessment*, and *Capability Assessment* collectively serve as a basis for determining the goals for the MEMA District 9 Regional Hazard Mitigation Plan, each contributing to the development, adoption, and implementation of a meaningful and manageable *Mitigation Strategy* that is based on accurate background information.

The ***Mitigation Strategy***, found in Section 8, consists of broad goal statements as well as an analysis of hazard mitigation techniques for the jurisdictions participating in the MEMA District 9 Regional Hazard Mitigation Plan to consider in reducing hazard vulnerabilities. The strategy provides the foundation for a detailed ***Mitigation Action Plan***, found in Section 9, which links specific mitigation actions for each county and municipal department or agency to locally-assigned implementation mechanisms and target completion dates. Together, these sections are designed to make the Plan both strategic, through the identification of long-term goals, and functional, through the identification of immediate and short-term actions that will guide day-to-day decision-making and project implementation.

In addition to the identification and prioritization of possible mitigation projects, emphasis is placed on the use of program and policy alternatives to help make the MEMA District 9 Region less vulnerable to the damaging forces of hazards while improving the economic, social, and environmental health of the community. The concept of multi-objective planning was emphasized throughout the planning process,

particularly in identifying ways to link, where possible, hazard mitigation policies and programs with complimentary community goals related to disaster recovery, housing, economic development, recreational opportunities, transportation improvements, environmental quality, land development, and public health and safety.

Plan Maintenance, found in Section 10, includes the measures that the jurisdictions participating in the MEMA District 9 Regional plan will take to ensure the Plan's continuous long-term implementation. The procedures also include the manner in which the Plan will be regularly evaluated and updated to remain a current and meaningful planning document.

County-specific **Annexes** have been created for each of the counties participating in this plan. Each Annex contains information relevant to the county and the participating municipal jurisdictions in the county. Information included in each county-level Annex includes Community Profile, Risk Assessment and Capability Assessment information. The Mitigation Actions identified for that county and its municipal jurisdictions are also included in the county's Annex. This allows each county and jurisdiction to quickly locate the information contained in the plan that is most relevant for them.

SECTION 2
PLANNING PROCESS

This section describes the planning process undertaken by the Mississippi Emergency Management Agency (MEMA) District 9 counties and jurisdictions in the development of its 2017 Regional Hazard Mitigation Plan. It consists of the following eight subsections:

- ❑ 2.1 Overview of Hazard Mitigation Planning
- ❑ 2.2 History of Hazard Mitigation Planning in the MEMA District 9 Region
- ❑ 2.3 Preparing the 2017 Plan
- ❑ 2.4 The MEMA District 9 Regional Hazard Mitigation Council
- ❑ 2.5 Community Meetings and Workshops
- ❑ 2.6 Involving the Public
- ❑ 2.7 Involving the Stakeholders
- ❑ 2.8 Documentation of Plan Progress

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44 CFR Requirement
44 CFR Part 201.6(c)(1): The plan shall include documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process and how the public was involved.

2.1 OVERVIEW OF HAZARD MITIGATION PLANNING

Local hazard mitigation planning is the process of organizing community resources, identifying and assessing hazard risks, and determining how to best minimize or manage those risks. This process culminates in a hazard mitigation plan that identifies specific mitigation actions, each designed to achieve both short-term planning objectives and a long-term community vision.

To ensure the functionality of a hazard mitigation plan, responsibility is assigned for each proposed mitigation action to a specific individual, department, or agency along with a schedule or target completion date for its implementation (see Section 10: *Plan Maintenance*). Plan maintenance procedures are established for the routine monitoring of implementation progress, as well as the evaluation and enhancement of the mitigation plan itself. These plan maintenance procedures ensure that the Plan remains a current, dynamic, and effective planning document over time that becomes integrated into the routine local decision making process.

Communities that participate in hazard mitigation planning have the potential to accomplish many benefits, including:

- ❑ Saving lives and property
- ❑ Saving money
- ❑ Speeding up recovery following disasters

- Reducing future vulnerability through wise development and post-disaster recovery and reconstruction
- Expediting the receipt of pre-disaster and post-disaster grant funding
- Demonstrating a firm commitment to improving community health and safety

Typically, communities that participate in mitigation planning are described as having the potential to produce long-term and recurring benefits by breaking the repetitive cycle of disaster loss. A core assumption of hazard mitigation is that the investments made before a hazard event will significantly reduce the demand for post-disaster assistance by lessening the need for emergency response, repair, recovery, and reconstruction. Furthermore, mitigation practices will enable local residents, businesses, and industries to re-establish themselves in the wake of a disaster, getting the community economy back on track sooner and with less interruption.

The benefits of mitigation planning go beyond solely reducing hazard vulnerability. Mitigation measures such as the acquisition or regulation of land in known hazard areas can help achieve multiple community goals, such as preserving open space, maintaining environmental health, and enhancing recreational opportunities. Thus, it is vitally important that any local mitigation planning process be integrated with other concurrent local planning efforts, and any proposed mitigation strategies must take into account other existing community goals or initiatives that will help complement or hinder their future implementation.

2.2 HISTORY OF HAZARD MITIGATION PLANNING IN THE MEMA DISTRICT 9 REGION

Each of the counties and jurisdictions participating in this Plan has a previously adopted hazard mitigation plan. The FEMA approval dates for each of these plans, along with a list of the participating municipalities for each plan, are listed below:

- *George County – George County Hazard Mitigation Plan* (2013)
  - Lucedale
- *Hancock County- Hancock County Hazard Mitigation Plan* (2013)
  - Diamondhead
- *City of Bay St. Louis- Bay St. Louis Hazard Mitigation Plan* (2011)
- *City of Waveland- Waveland Hazard Mitigation Plan* (2013)
- *Harrison County – Harrison County Hazard Mitigation Plan* (2014)
- *City of Biloxi- Biloxi Hazard Mitigation Plan* (2013)
- *City of D'Iberville- D'Iberville Hazard Mitigation Plan* (2011)
- *City of Gulfport- Gulfport Hazard Mitigation Plan* (2014)
- *City of Long Beach- Long Beach Hazard Mitigation Plan* (2013)
- *City of Pass Christian- Pass Christian Hazard Mitigation Plan* (2011)
- *Jackson County- Jackson County Hazard Mitigation Plan* (2012)
  - Gautier
- *City of Moss Point – Moss Point Hazard Mitigation Plan* (2013)

- *City of Ocean Springs– Ocean Springs Hazard Mitigation Plan* (2011)
- *City of Pascagoula – Pascagoula Hazard Mitigation Plan* (2014)
- *Pearl River County – Pearl River County Hazard Mitigation Plan* (2011)
    - Picayune
    - Poplarville
- *Stone County - Stone County Hazard Mitigation Plan* (2011)
    - Wiggins

Each of these plans was developed using the multi-jurisdictional planning process recommended by the Federal Emergency Management Agency (FEMA). For this plan, all of the aforementioned jurisdictions have joined to form a regional plan. No new jurisdictions have joined the process and all of the jurisdictions that participated in previous planning efforts have participated in the development of this regional plan. The process of merging all of the above plans into this regional plan is described in more detail below.

2.3 PREPARING THE 2017 PLAN

Local hazard mitigation plans are required to be updated every five years to remain eligible for federal mitigation funding. To simplify planning efforts for the jurisdictions in the MEMA District 9 Region, MEMA officials worked with each county and municipality to ask them to join together to create the *MEMA District 9 Regional Hazard Mitigation Plan*. This allows resources to be shared amongst the participating jurisdictions and eases the administrative duties of all of the participants by combining the existing plans into one regional plan.

To prepare the 2017 *MEMA District 9 Regional Hazard Mitigation Plan*, MEMA hired Atkins as an outside consultant to provide professional mitigation planning services. Ryan Wiedenman from Atkins served as the lead planner for this project and is a member of the American Institute of Certified Planners (AICP).

Per the contractual scope of work, the Atkins consulting team followed the mitigation planning process recommended by FEMA in the Local Multi-Hazard Mitigation Planning Guidance[1]. The Local Mitigation Plan Review Tool, found in Appendix C, provides a summary of FEMA's current minimum standards of acceptability for compliance with DMA 2000 and notes the location where each requirement is met within this Plan. These standards are based upon FEMA's Final Rule as published in the Federal Register in Part 201 of the Code of Federal Regulations (CFR). The Hazard Mitigation Council used FEMA's Local Mitigation Plan Review Guide (October 2011) for reference as they completed the Plan.

Although each participating jurisdiction had already developed a hazard mitigation plan in the past, the combination of the six county-level plans and ten municipal-level plans into one regional plan still required making some plan update revisions based on FEMA's Local Multi-Hazard Mitigation Planning Guidance. Since all sections of the regional plan are technically new, plan update requirements do not apply. However, since this is the first regional plan among the jurisdictions, key elements from the previous approved plans are referenced throughout the document (e.g., existing actions) and required a discussion of changes made. For example, all of the risk assessment elements needed to be updated to include most recent information. It was also necessary to formulate a single set of goals for the region, but they were based on previously determined goals (Section 8: *Mitigation Strategy*). The Capability

[1] A copy of the negotiated contractual scope of work between MEMA and Atkins is available through MEMA upon request.

Assessment section includes updated information for all of the participating jurisdictions and the Mitigation Action Plan provides implementation status updates for all of the actions identified in the previous plans.

The process used to prepare this Plan included twelve major steps that were completed over the course of approximately ten months beginning in August 2016. Each of these planning steps (illustrated in **Figure 2.1**) resulted in critical work products and outcomes that collectively make up the Plan. Specific plan sections are further described in Section 1: *Introduction*.

Over the past several years, each participating jurisdiction has been actively working to implement their existing plans. This is documented in the Mitigation Action Plan through the implementation status updates for each of the Mitigation Actions. The Capability Assessment also documents changes and improvements in the capabilities of each participating jurisdiction to implement the Mitigation Strategy.

FIGURE 2.1: MITIGATION PLANNING PROCESS FOR THE MEMA DISTRICT 9 REGION

As is further detailed below, the planning process was conducted through Hazard Mitigation Council meetings comprised primarily of local government staff from each of the participating jurisdictions and advisory stakeholders.

2.4 THE MEMA DISTRICT 9 REGIONAL HAZARD MITIGATION COUNCIL

In order to guide the development of this Plan, the counties in MEMA District 9 (George, Hancock, Harrison, Jackson, Pearl River, and Stone) and representatives from their participating municipal jurisdictions created the MEMA District 9 Regional Hazard Mitigation Council (RHMC). The RHMC represents a community-based planning team made up of representatives from various county departments and municipalities and other key stakeholders identified to serve as critical partners in the planning process.

Beginning in August 2016, the RHMC members engaged in regular discussions as well as local planning workshops to discuss and complete tasks associated with preparing the Plan. This working group coordinated on all aspects of plan preparation and provided valuable input to the process. In addition to regular meetings, committee members routinely communicated and were kept informed through an e-mail distribution list.

Specifically, the tasks assigned to the RHMC members included:

- ❑ Participating in RHMC meetings and workshops
- ❑ Providing best available data as required for the Risk Assessment portion of the Plan
- ❑ Helping review the local Capability Assessment information and providing copies of any mitigation or hazard-related documents for review and incorporation into the Plan
- ❑ Supporting the development of the Mitigation Strategy, including the design and adoption of regional goal statements
- ❑ Helping design and propose appropriate mitigation actions for their department/agency for incorporation into the Mitigation Action Plan
- ❑ Reviewing and providing timely comments on all study findings and draft plan deliverables
- ❑ Supporting the adoption of the *2017 MEMA District 9 Hazard Mitigation Plan*

Table 2.1 lists the members of the RHMC who were responsible for participating in the development of the Plan.

TABLE 2.1: MEMBERS OF THE MEMA DISTRICT 9 REGIONAL HAZARD MITIGATION COUNCIL

NAME	TITLE	DEPARTMENT/ AGENCY	COMMUNITY/AGENCY/ COMPANY
Nancy Smith*	Director	EMA	George County
Raven James*	Director	EMA	Stone County
Carolyn Nelson	Area Coordinator	MEMA	MEMA
Donald Langham*	Coordinator	EMA	Jackson County
Craig Tynes	Director	Physical Plant	Pearl River Community College
Mark Dronet	Assistant Fire Chief	Fire Department	Biloxi
Robert Jones	Fire Chief	Fire Department	Gautier
Wayne Miller	Director	Public Works	Gulfport
Shad Jeanfreau	Building Official	Building/Inspections	Pass Christian

NAME	TITLE	DEPARTMENT/ AGENCY	COMMUNITY/AGENCY/ COMPANY
Carolyn Woodcock	Safety Officer	EMA	Harrison County
Christy LeBatard	Director	Engineering	Biloxi
Nate Wilson	Director	EMA	Ocean Springs
Kristyn Gunter	Business Development Manager	SMPDD	Southern MS PDD
Danny Manley*	Director	EMA	Pearl River County
Bruce Wilkerson	Operations Officer	EMA	Harrison County
Loretta Robinson	Planner	MEMA	MEMA
John Evans*	Deputy Director	EMA	Hancock County
Johnathan Head	Fire Chief	Fire Department	Poplarville
Rupert Lacy*	Director	EMA	Harrison County
Vicki Watkins	CRS Coordinator	Building/Inspections	D'Iberville
Teasha Ritchie	Permit Technician	Planning	Pearl River County
Keith Brown	Fire Chief	Fire Department	Picayune
Hank Rogers	Building Official	Building/Inspections	D'Iberville
Matthew Jalufka	Emergency Manager	Keesler AFB	Keesler Air Force Base
Kenneth McDowell	Safety Officer	Memorial Hospital	Memorial Hospital
Dusty Reed	GIS	GIS	Harrison County
John Mcfarland	Executive Director	American Red Cross	American Red Cross
Cathy Garner	Security Director	Schools	Harrison County
Thomas Clifford	Major	Sheriff's Office	Harrison County
Kelvin Jackson	Planner	Zoning	Harrison County
Pat Sullivan	Fire Marshal	Fire Department	Harrison County
Tommy Murphy	Coastal Division Manager	Mississippi Power Company	Mississippi Power Company
Robyn Ladner	Safety Officer	EMA	Harrison County
Jody Spires	Engineer	Engineering	Harrison County
David Kingman	Gaming Agent Director	MS Gaming Commission	MS Gaming Commission
Fred Garguilo	VP Admin	Memorial Hospital	Memorial Hospital
Michelle Watts	Admin Asst/Ops	EMA	Harrison County

* Served as the county's main point of contact

Some of the Regional Hazard Mitigation Council Members listed above were designated to represent more than one jurisdiction at in-person meetings. Specifically:

- ❑ Nancy Smith represented George County and Lucedale.
- ❑ John Evans represented Hancock County, Bay St. Louis, Diamondhead, and Waveland.
- ❑ Rupert Lacy represented Harrison County and Long Beach.
- ❑ Donald Langham represented Jackson County, Moss Point, and Pascagoula.

- ❑ Raven James represented Stone County and Wiggins.

This authorized representation is documented in signed letters that were provided to MEMA from each of these municipalities that designated these persons as their representatives. Copies of these letters can be obtained by contacting MEMA.

In addition, due to travel distance and scheduling conflicts, a number of communities were unable to send a representative directly to the meeting, but did participate in the planning meetings via phone. These members do not appear on sign-in sheets, but **Table 2.2** lists these members below.

TABLE 2.2: DISTANCE MEMBERS OF THE MEMA DISTRICT 9 REGIONAL HAZARD MITIGATION COUNCIL

NAME	TITLE	DEPARTMENT/ AGENCY	COMMUNITY/AGENCY/ COMPANY
Donovan Scruggs	Planner	Planning	Pascagoula
William Dunham	Building Official	Building Department	Pascagoula
Andrew Beamon	Building Official	Building/Inspections	Moss Point
Michelle Crowley	Battalion Chief	Fire Department	Biloxi

Each of the municipalities also participated in the planning process through county-level meetings and calls with their respective county's emergency management agency director, who discussed the risk assessment with them and helped them update their mitigation actions accordingly.

Additional participation and input from other identified stakeholders and the general public was sought by the MEMA District 9 counties during the planning process through phone calls and the distribution of e-mails, advertisements, and public notices aimed at informing people of the development of the Hazard Mitigation Plan (public and stakeholder involvement is further discussed later in this section). It should be noted that many neighboring communities were offered the opportunity to participate in the planning process through phone conversations and in-person discussions. Among those invited to participate were representatives from Emergency Management offices in several of the counties that surround the MEMA District 9 Region including Lamar, Forrest, Perry, and Greene Counties. During these discussions, no major comments or suggestions were received concerning the plan.

2.4.1 Multi-Jurisdictional Participation

The MEMA District 9 Hazard Mitigation Plan includes six counties and sixteen incorporated municipalities. To satisfy multi-jurisdictional participation requirements, each county and its participating jurisdictions were required to perform the following tasks:

- ❑ Participate in mitigation planning workshops or designate a representative to do so
- ❑ Identify completed/new mitigation projects, if applicable
- ❑ Develop and adopt (or update) their local Mitigation Action Plan

Each jurisdiction participated in the planning process and has developed a local Mitigation Action Plan unique to their jurisdiction. Each jurisdiction will adopt their Mitigation Action Plan separately. This provides the means for jurisdictions to monitor and update their Plan on a regular basis.

2.5 COMMUNITY MEETINGS AND WORKSHOPS

The preparation of this Plan required a series of meetings and workshops for facilitating discussion, gaining consensus and initiating data collection efforts with local government staff, community officials, and other identified stakeholders. More importantly, the meetings and workshops prompted continuous input and feedback from relevant participants throughout the drafting stages of the Plan. The following is a summary of the key meetings and community workshops held during the development of the plan update.[2] In many cases, routine discussions and additional meetings were held by local staff to accomplish planning tasks specific to their department or agency, such as the approval of specific mitigation actions for their department or agency to undertake and include in the Mitigation Action Plan.

Project Kickoff Meeting
August 30, 2016
Wiggins, MS

Ryan Wiedenman, Project Manager from the project consulting team, Atkins, started the meeting by welcoming the representatives from each county, participating municipal jurisdictions, and other stakeholders.

August 30, 2016 MEMA District 9 RHMC Meeting

Mr. Wiedenman led the kickoff meeting and began by providing an overview of the items to be discussed at the meeting and briefly reviewed each of the handouts that were distributed in the meeting packets (agenda, project description, and presentation slides). He then provided a brief overview of mitigation and discussed the Disaster Mitigation Act of 2000.

He gave a list of the participating jurisdictions for the regional plan, noting that every local government in the region is participating in an existing county-level or municipal-level hazard mitigation plan. These plans expire at various times over the next several years, so the planning team will plan to develop a draft to submit to FEMA by early 2017.

Mr. Wiedenman then explained the six different categories of mitigation techniques (emergency services; prevention; natural resource protection; structural projects; public education and awareness; and property protection) and gave examples of each. This explanation culminated with an Ice Breaker Exercise for the attendees.

Mr. Wiedenman instructed attendees on how to complete the exercise. Attendees were given an equal amount of fictitious FEMA money and asked to spend it in the various mitigation categories. Money

[2] Copies of agendas, sign-in sheets, and minutes for all meetings and workshops can be found in Appendix D.

could be thought of as grant money that communities received towards mitigation. Attendees were asked to target their money towards areas of mitigation that are of greatest concern for their community. Ideally, the exercise helps pinpoint areas of mitigation that the community may want to focus on when developing mitigation grants. Mr. Wiedenman also presented the Ice Breaker Exercise results which were:

- Prevention- $92
- Property Protection- $66
- Natural Resource Protection- $38
- Structural- $54
- Emergency Services- $52
- Public Education- $18

Mr. Wiedenman then discussed the key objectives and structure of the planning process, explaining the specific tasks to be accomplished for this project, including the planning process, risk assessment, vulnerability assessment, capability assessment, mitigation strategy and action plan, plan maintenance procedures, and documentation. The project schedule was presented along with the project staffing chart, which demonstrates the number of experienced individuals that will be working on this project. The data collection needs and public outreach efforts were also discussed.

Mr. Wiedenman then reviewed the roles and responsibilities of Atkins, participating jurisdictions, and stakeholders. The presentation concluded with a discussion of the next steps to be taken in the project development, which included discussing data collection efforts, public outreach, and the next meeting for the RHMC.

The meeting was opened for questions and comments, but nothing of note was brought up from a technical perspective.

Mr. Wiedenman thanked everyone for attending and identified himself as the point of contact for any questions or issues. The meeting was adjourned.

Mitigation Strategy Meeting
December 13, 2016
Wiggins, MS

Mr. Ryan Wiedenman with Atkins welcomed everyone to the meeting and went over safety and administrative topics. He then went on to discuss the findings and information that Atkins pulled together since the kickoff meeting.

Mr. Wiedenman initiated the meeting with a review of the meeting handouts, which included an agenda, presentation slides, proposed goals for the plan, capability assessment tables, mitigation actions from each community's existing plans, critical facilities, and repetitive loss request letters. Mr. Wiedenman reviewed the project schedule and stated that a draft of the Hazard Mitigation Plan would be presented to the Hazard Mitigation Council in February.

He then presented the findings of the risk assessment, starting with a review of the Presidential Disaster Declarations that have impacted the region. He then explained the process for preparing Hazard Profiles and discussed how each hazard falls into one of five categories: Flood-related, Fire-related, Geologic,

Wind-related, and Other hazards. He indicated that each hazard must be evaluated and then profiled and assessed to determine a relative risk for each hazard.

Mr. Wiedenman reviewed the Hazard Profiles and the following bullets summarize the information presented:

Flood-Related Hazards

- DAM/LEVEE FAILURE. There have been 4 recorded dam failures in the region according to the State HMP. There are 7 high hazard dams in the region. Future occurrences are possible.

- EROSION. There have been significant instances of major erosion reported in the past, especially along the barrier islands, some of which are eroding at a rate of 6 to 8 meters per year.

- FLOOD. There have been 168 flood events recorded in MEMA District 9 since 1996, resulting in over $12.1 million in property damage per NCDC. There have been 71,772 NFIP losses since 1978 and approximately $5.45 million in claims. Future occurrences are highly likely.

- STORM SURGE. The previous occurrences of storm surge coincide with the hazard history for hurricanes/tropical storms. Many areas of coastal Mississippi would be inundated by storm surge, in some cases at depths of over 9 feet.

- TSUNAMI. No history of tsunamis in the Gulf of Mexico, so future occurrences are unlikely. However, there is some possibility that a sub-marine landslide could cause a tsunami.

Fire-Related Hazards

- DROUGHT. There have been nine years (out of the past seventeen, 2000-2016) where drought conditions have been reported as severe to exceptional in the region and future occurrences are likely.

- LIGHTNING. There have been 57 recorded lightning events reported by the National Climatic Data Center (NCDC) since 1996 and coastal Mississippi is in one of the highest risk zones in the country for lightning. Future occurrences are highly likely.

- WILDFIRE. There is an average of 464 fires per year reported in the region. These burn an annual average of 8,297 acres. Future occurrences are highly likely.

Geologic Hazards

- EARTHQUAKES. There have been 7 recorded earthquake events in MEMA District 9 since 1886. The strongest had a recorded magnitude of V MMI. Future occurrences are possible.

Wind-Related Hazards

- EXTREME COLD. There have been 8 recorded extreme cold events reported by the National Climatic Data Center (NCDC) since 1996. Cold spells of 15-20 degrees Fahrenheit indicate that extreme cold could impact the region. Future occurrences are possible.

- EXTREME HEAT. There have been 8 recorded extreme heat events reported by the National Climatic Data Center (NCDC) since 1996. Heat extents of 105 degrees indicate that extreme heat is a hazard of concern for the region. Future occurrences are highly likely.

- HAILSTORM. There have been 310 recorded events since 1950. Future occurrences are highly likely.

- HURRICANES AND TROPICAL STORMS. NOAA data shows that 119 storm tracks have come within 100 miles of the region since 1842, including 12 that caused disaster declarations. Future occurrences are highly likely.

- SEVERE THUNDERSTORM/HIGH WIND. There have been 704 severe thunderstorm/high wind events reported since 1950 with $11.0 million in reported property damages. Two deaths have been reported. Future occurrences are highly likely.

- TORNADOES. There have been 283 recorded tornado events reported in the region since 1950. $383.5 million in property damages. 6 deaths and 170 injuries have been reported. Future occurrences are highly likely.

- WINTER WEATHER. There have been 23 recorded winter weather events in the region since 1996. Future occurrences are likely.

Other Hazards

- CLIMATE CHANGE/SEA LEVEL RISE. Climate change and sea level rise are likely to impact the region going forward. This hazard will exacerbate other hazards such as extreme heat, drought, and flood. It will also likely produce more frequent strong storms. Sea level rise of three feet may occur and would inundate many coastal areas.

- INFECTIOUS DISEASE. Several types of infectious disease may impact the region, but the region is especially susceptible to mosquito-borne illnesses. Communicable diseases such as influenza also pose a threat.

- HAZARDOUS MATERIALS INCIDENT/TRAIN DERAILMENT. There have been 473 hazardous materials incidents reported by the PHMSA since 1971. 41 of these were serious incidents. The largest was a spill of 96,000 LGA in Carriere in 1980.

The results of the hazard identification and profiling process were used to generate a Priority Risk Index (PRI), which categorizes and prioritizes potential hazards as high, moderate or low risk based on probability, impact, spatial extent, warning time, and duration. The highest PRI was assigned to Hurricane/Tropical Storm and Flood followed by Severe Thunderstorm/High Wind, Storm Surge, and Tornado.

In concluding the review of Hazard Profiles, Mr. Wiedenman stated if anyone had additional information for the hazard profiles, or had concerns with any of the data presented, they should call or email him.

Mr. Wiedenman presented the Capability Assessment Findings. Atkins has developed a scoring system that was used to rank the participating jurisdictions in terms of capability in four major areas (Planning

and Regulatory; Administrative and Technical; Fiscal; Political). Important capability indicators include National Flood Insurance Program (NFIP) participation, Building Code Effective Grading Schedule (BCEGS) score, Community Rating System (CRS) participation, and the Local Capability Assessment Survey conducted by Atkins.

Mr. Wiedenman reviewed the Relevant Plans and Ordinances, Relevant Staff/Personnel Resources, and Relevant Fiscal Resources. All of these categories were used to rate the overall capability of the participating counties and jurisdictions. Most jurisdictions are in the moderate range for Planning and Regulatory Capability and in the moderate range for Fiscal Capability. There is variation between the jurisdictions for Administrative and Technical Capability, though a large majority have access to staff with GIS and planning experience. Based upon the scoring methodology developed by Atkins, it was determined that most of the participating jurisdictions have moderate capability to implement hazard mitigation programs and activities.

Mr. Wiedenman also discussed the results of the public participation survey that was posted on several of the participating counties' and municipal websites. As of the meeting date, 485 responses had been received. Mr. Wiedenman explained that the survey would close in February, so the RHMC could make one final push to get the survey out to the public. Based on preliminary survey results, respondents felt that Hurricane/Tropical Storm posed the greatest threat to their neighborhood, followed by Severe Thunderstorm/High Wind and Storm Surge. 88 percent of the respondents were interested in making their homes more resistant to hazards. However, 31 percent don't know who to contact regarding reducing their risks to hazards.

Mr. Wiedenman gave an overview of Mitigation Strategy Development and presented the existing goals for each plan as well as a set of recommended goals that Atkins developed based on the previous plans' goals. The Hazard Mitigation Council accepted the proposed goals for the plan. Mr. Wiedenman then provided an overview and examples of suggested mitigation actions for MEMA District 9 counties and their municipalities. Mr. Wiedenman then asked each county and the municipalities to provide a status update for their existing mitigation actions (completed, deleted, or deferred) by January 18, 2016. Mr. Wiedenman also asked council members to include any new mitigation actions by that date.

Mr. Wiedenman thanked the group for taking the time to attend and explained that if council members had any issues or questions about the planning process or their next steps, they could contact him. The meeting was adjourned.

Harrison County Meeting
February 8, 2017
Gulfport, MS

Mr. Rupert Lacy of Harrison County Emergency Management began the meeting by explaining that, in an effort to enhance local stakeholder involvement, Harrison County requested a county-level meeting as part of the plan development process that was to include the various stakeholder groups from within the county that might have an interest in mitigation, such as the hospital and the air force base. At this meeting, the primary focus would be to gain feedback from these other stakeholder groups on potential mitigation actions and projects that they would like to implement.

Mr. Lacy then turned the meeting over to Mr. Ryan Wiedenman of Atkins who gave the stakeholders a brief overview of the work that had been completed on the plan so far and provided a summary of the

risk assessment and capability assessment information that was presented at the last regional-level meeting of the RHMC. No major comments were received on this information.

Mr. Wiedenman then went on to lead an open discussion of existing actions from each community's existing hazard mitigation plan. Existing actions were provided to all members who reviewed these actions and provided updates on any progress that had been made on the actions.

After this discussion was complete, the remainder of the time was spent developing new actions and projects that could be included in the updated version of the plan. Many stakeholders provided ideas that they would like to have included in the plan and there was significant discussion on the various projects throughout the community that were desired. After recording many of these ideas and updates, Mr. Wiedenman stated that if there were any additional ideas that came up in discussions after the meeting, that they could be emailed to him to include in the mitigation action plan.

Mr. Wiedenman then thanked the group for attending and explained the next steps that would be taken to prepare the draft plan. The meeting was adjourned.

2.6 INVOLVING THE PUBLIC

44 CFR Requirement
44 CFR Part 201.6(b)(1): The planning process shall include an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.

An important component of the mitigation planning process involves public participation. Individual citizen and community-based input provides the entire Council with a greater understanding of local concerns and increases the likelihood of successfully implementing mitigation actions by developing community "buy-in" from those directly affected by the decisions of public officials. As citizens become more involved in decisions that affect their safety, they are more likely to gain a greater appreciation of the hazards present in their community and take the steps necessary to reduce their impact. Public awareness is a key component of any community's overall mitigation strategy aimed at making a home, neighborhood, school, business or entire city safer from the potential effects of hazards.

Public involvement in the development of the *MEMA District 9 Hazard Mitigation Plan* was sought using two methods: (1) public survey instruments (hard copy and web-based) were made available, and (2) copies of draft Plan deliverables were made available for public review on county websites and at government offices. The Public was provided two opportunities to be involved in the actual plan development at two distinct periods during the planning process: (1) during the drafting stage of the Plan; and (2) upon completion of a final draft Plan, but prior to official plan approval and adoption. A public participation survey (discussed in greater detail in Section 2.6.1) was made available during the planning process at various locations throughout the MEMA District 9 Region and at various locations on the internet.

It should be noted that some local officials explained that the best way to reach members of the public in their jurisdiction was often not through the internet and that some local governments may not have official websites on which to advertise an online survey link (although it should be noted that all participating counties posted the link online). Therefore, Atkins provided hard copies of the survey for all local governments and these were distributed to members of the public in the way each community

felt would be most conducive to receiving responses. For instance, some communities brought hard copies to local community events and encouraged citizens to fill out the survey and send it directly to Atkins or to their local Emergency Management office.

Additionally, each of the participating jurisdictions will hold public meetings before the final plan is officially adopted by the local governing bodies. These meetings will occur at different times once FEMA has granted conditional approval of the Plan. Adoption resolutions will be included in Appendix A.

2.6.1 Public Participation Survey

The MEMA District 9 Region was successful in getting citizens to provide input to the mitigation planning process through the use of the *Public Participation Survey*. The *Public Participation Survey* was designed to capture data and information from residents of the Region that might not be able to participate through other means in the mitigation planning process, such as attending a public meeting at a specific time and location.

As mentioned above, hard copies of the *Public Participation Survey* were distributed to the RHMC to be made available for residents to complete at local public offices. A link to an electronic version of the survey was also posted at various locations on the internet.

A total of 538 survey responses were received, which provided valuable input for the RHMC to consider in the development of the plan update. Selected survey results are presented below.

- Approximately 90 percent of survey respondents had been impacted by a disaster, mainly hurricanes (Katrina—2005 and Camille—1969 among others), severe storms, and floods.
- Respondents ranked Hurricane/Tropical Storm as the highest threat to their neighborhood (93 percent), followed by Severe Thunderstorm/High Wind (38 percent), Storm Surge (36 percent), and Tornado (33 percent).
- Approximately 56 percent of respondents have taken actions to make their homes more resistant to hazards and 88 percent are interested in making their homes more resistant to hazards.
- 32 percent of respondents do not know what office to contact regarding reducing their risks to hazards.
- Emergency Services, Public Education and Awareness, and Prevention were ranked as the most important activities for communities to pursue in reducing risks.

Public survey results up through the date of the RHMC meeting on December 13th, were presented at that meeting. A copy of the survey and a detailed summary of the survey results are provided in Appendix B and Appendix D, respectively.

2.7 INVOLVING THE STAKEHOLDERS

44 CFR Requirement
44 CFR Part 201.6(b)(2): The planning process shall include an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other non-profit interests to be involved in the planning process.

At the beginning of the planning process for the development of this plan, the project consultant worked with MEMA mitigation staff, the MEMA District 9 Area Coordinator, and each of the six County Emergency Management leads to initiate outreach to stakeholders to be involved in the planning process. The project consultant sent out a list of recommended stakeholders provided from FEMA Publication 386-1 titled **Getting Started: Building Support for Mitigation Planning**. The list of recommended stakeholders is found in Appendix C of that publication (Worksheet #1: Build the Planning Team) and has been included in **Appendix B** of this plan to demonstrate the wide range of stakeholders that were considered to participate in the development of this plan. Each of the six County Emergency Management leads used that list for reference as they invited stakeholders from their counties to participate in the planning process.

Additionally, the project consultant and the County EM leads contacted Mississippi Automated Resources Information System (MARIS), Mississippi Forestry Commission, Mississippi Department of Environmental Quality, representatives from each of the county-level school districts, and relevant representatives from higher education (universities, community colleges, etc.) to ask them to participate in the planning process and provide data that was used in the development of this plan.

In addition to the efforts described above, the participating jurisdictions in the MEMA District 9 plan went above and beyond the minimum requirements for stakeholder outreach by designing and distributing the *Public Participation Survey* described earlier in this section. In addition to collecting public input for the plan, the survey was generated to allow those stakeholders that could not attend Regional Hazard Mitigation Council meetings the opportunity to provide input to the plan and the planning process. All survey results were shared with the Regional Hazard Mitigation Council and represented input from citizens, local officials, businesses, academia, and other private interests in the Region. Several of these organizations contacted the consultant directly with comments as well. A list of representatives who participated from the aforementioned groups can be found in **Table 2.3**.

TABLE 2.3: OTHER CONTRIBUTING MEMBERS TO THE MEMA DISTRICT 9 REGIONAL HAZARD MITIGATION COUNCIL

NAME	TITLE	DEPARTMENT/AGENCY
William Lewis	President	Pearl River Community College
John Shows	Association Vice President	Mississippi Gulf Coast Community College
Pam Touchard	Superintendent	George County School District
Alan Dedeaux	Superintendent	Hancock County School District
Roy Gill	Superintendent	Harrison County School District
Barry Amacker	Superintendent	Jackson County School District

NAME	TITLE	DEPARTMENT/AGENCY
Alan Lumpkin	Superintendent	Pearl River County School District
Inita Owen	Superintendent	Stone County School District
Rebecca Ladner	Superintendent	Bay St. Louis-Waveland School District
Arthur McMillan	Superintendent	Biloxi Public School District
Glen East	Superintendent	Gulfport School District
Jay Smith	Superintendent	Long Beach School District
Shannon Vincent	Superintendent	Moss Point School District
Bonita Coleman	Superintendent	Ocean Springs School District
Wayne Rodolfich	Superintendent	Pascagoula Municipal Separate School District
Carla J. Evers	Superintendent	Pass Christian School District
Dean Shaw	Superintendent	Picayune School District
Carl Merritt	Superintendent	Poplarville Special Municipal Separate School District

2.8 DOCUMENTATION OF PLAN PROGRESS

Progress in hazard mitigation planning for the participating jurisdictions in the MEMA District 9 Region is documented in this plan update. Since hazard mitigation planning efforts officially began in the participating counties with the development of the initial Hazard Mitigation Plans in the late 1990's/early 2000s, many mitigation actions have been completed and implemented in the participating jurisdictions. These actions will help reduce the overall risk to natural hazards for the people and property in the Region. The actions that have been completed are documented in the Mitigation Action Plan found in Section 9.

In addition, community capability continues to improve with the implementation of new plans, policies, and programs that help to promote hazard mitigation at the local level. The current state of local capabilities for the participating jurisdictions is captured in Section 7: *Capability Assessment*. The participating jurisdictions continue to demonstrate their commitment to hazard mitigation and hazard mitigation planning and have proven this by reconvening the Hazard Mitigation Council to update the Plan and by continuing to involve the public in the hazard mitigation planning process.

SECTION 3
COMMUNITY PROFILE

This section of the Plan provides a general overview of the Mississippi Emergency Management Agency (MEMA) District 9 Region. It consists of the following four subsections:

- ❑ 3.1 Geography and the Environment
- ❑ 3.2 Population and Demographics
- ❑ 3.3 Housing, Infrastructure, and Land Use
- ❑ 3.4 Employment and Industry

The county-specific annexes provide more detailed community profile information about each county.

3.1 GEOGRAPHY AND THE ENVIRONMENT

The MEMA District 9 Region was named based on the Mississippi Emergency Management Agency districts lines and is one of nine MEMA regions throughout the state. The region comprises the Mississippi Gulf Coast. It is bounded by the Mississippi/Alabama State Line to the east, the Mississippi/Louisiana State Line to the west, and the Gulf of Mexico to the south. The MEMA District 9 Region includes the counties of George, Hancock, Harrison, Jackson, Pearl River, and Stone. An orientation map is provided as **Figure 3.1**.

MEMA District 9 is situated in the East Gulf Coastal Plain. It is made up of the gently rolling Pine Belt, also known as the "Piney Woods," and the coastal area called the Coastal Meadows or Terrace. The region has generally low topographic elevations and extensive tracts of marshy land. There are many rivers, creeks, bayous, and other natural drainage networks in the region which empty into the Gulf of Mexico.

The total area of each of the participating counties is presented in **Table 3.1**.

TABLE 3.1: TOTAL AREA OF PARTICIPATING COUNTIES

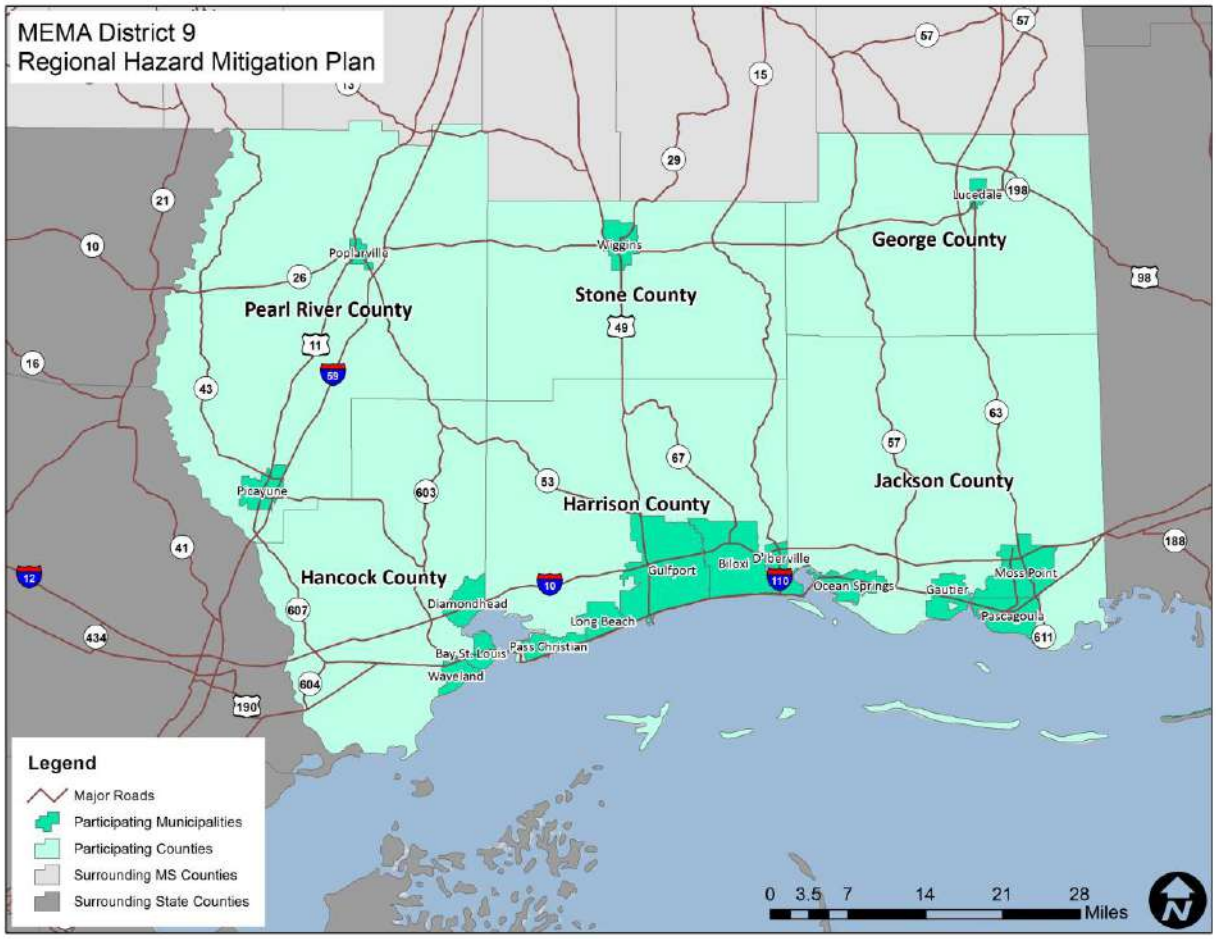
County	Land Area (sq. mi.)	Water Area (sq. mi.)	Total Area (sq. mi.)
George County	478.71	4.94	483.65
Hancock County	473.75	78.75	552.50
Harrison County	573.99	402.18	976.17
Jackson County	722.75	320.64	1,043.40
Pearl River County	810.86	8.05	818.91
Stone County	445.48	2.59	448.08

Source: United States Census Bureau, 2010 Census

The MEMA District 9 Region enjoys four distinct seasons but the climate in the region is generally hot and humid compared to the rest of the United States given its latitude and location along the Gulf Coast. Precipitation is generally highest in winter months when the temperatures are moderately lower, but

the likelihood of precipitation remains relatively constant throughout the year. Snowfall is rare but does occur. Summers in the region can become fairly hot with average highs in the nineties and lows in the seventies. The region is also often susceptible to turbulent weather when warm, wet air from the Gulf of Mexico is pushed up into the region to mix with cooler air coming down from across the continent which can result in severe weather conditions. This is particularly true in the spring when seasons are changing and diverse weather patterns interact. The region is also subject to hurricanes and tropical storms from June to October.

FIGURE 3.1: MEMA DISTRICT 9 REGION ORIENTATION MAP



3.2 POPULATION AND DEMOGRAPHICS

Pearl River County is the largest participating county by land area but Harrison County has the largest population within the MEMA District 9 Region. Between 2000 and 2010, all but one of the participating jurisdictions experienced population growth. Stone County had the largest population growth at 30.6 percent while Harrison County experienced a decline of -1.3 percent. Population counts from the U.S. Census Bureau for 1990, 2000, and 2010 for each of the participating counties and jurisdictions are presented in **Table 3.2**.

TABLE 3.2: POPULATION COUNTS FOR PARTICIPATING COUNTIES

Jurisdiction	1990 Census Population	2000 Census Population	2010 Census Population	% Change 2000-2010
George County	16,673	19,144	22,578	17.9%
Hancock County	31,760	42,967	43,929	2.2%
Harrison County	165,365	189,601	187,105	-1.3%
Jackson County	115,243	131,420	139,668	6.3%
Pearl River County	38,714	48,621	55,834	14.8%
Stone County	10,750	13,622	17,786	30.6%

Source: United States Census Bureau, 1990, 2000, 2010 Census

Based on the 2010 Census, the median age for residents of the participating counties ranges from 35 to 41 years with an average age of 37 years across the region. The racial characteristics of the participating counties are presented in **Table 3.3**. Whites make up the majority of the population in the region; however, there is a substantial black population in most of the counties.

TABLE 3.3: DEMOGRAPHICS OF PARTICIPATING COUNTIES

Jurisdiction	White, Percent (2010)	Black or African American, Percent (2010)	American Indian or Alaska Native, Percent (2010)	Asian, Percent (2010)	Native Hawaiian or Other Pacific Islander, Percent (2010)	Other Race, Percent (2010)	Two or More Races, percent (2010)	Persons of Hispanic Origin, Percent (2010)*
George County	89.8%	8.1%	0.3%	0.2%	0.0%	0.7%	0.9%	2.0%
Hancock County	88.4%	7.1%	0.5%	1.0%	0.0%	0.8%	2.1%	3.3%
Harrison County	69.7%	22.1%	0.5%	2.8%	0.1%	2.1%	2.7%	5.3%
Jackson County	72.1%	21.5%	0.4%	2.2%	0.1%	1.9%	1.9%	4.6%
Pearl River County	84.0%	12.3%	0.6%	0.4%	0.1%	0.9%	1.7%	2.9%
Stone County	78.6%	19.1%	0.5%	0.3%	0.0%	0.3%	1.1%	1.3%

*Hispanics may be of any race, so also are included in applicable race categories
Source: United States Census Bureau, 2010 Census

3.3 HOUSING, INFRASTRUCTURE, AND LAND USE

3.3.1 Housing

According to the 2010 U.S. Census, there are 207,547 housing units in the MEMA District 9 Region, the majority of which are single family or mobile homes. Housing information for the six participating counties is presented in **Table 3.4**. As shown in the table, the region has a low percentage of seasonal housing units but Hancock County has a higher percentage compared to the rest of the region.

TABLE 3.4: HOUSING CHARACTERISTICS OF PARTICIPATING COUNTIES

Jurisdiction	Housing Units (2000)	Housing Units (2010)	Seasonal Units, Percent (2010)	Median Home Value (2011-2015)
George County	7,513	9,330	3.7%	$101,300
Hancock County	21,072	21,840	6.6%	$133,000
Harrison County	79,636	85,181	1.9%	$137,700
Jackson County	51,678	60,067	1.7%	$121,200
Pearl River County	20,610	23,968	3.6%	$114,100
Stone County	5,343	7,161	3.8%	$111,800

Source: United States Census Bureau, 2000 and 2010 Census, 2011-2015 American Community Survey 5-Year Estimates

3.3.2 Infrastructure

TRANSPORTATION

There are several major thoroughfares that traverse the MEMA District 9 Region. Interstate 10 runs east to west through Jackson, Harrison, and Hancock Counties, connecting the region to neighboring Alabama and Louisiana. Interstate 59 runs northeast to southwest through Pearl River County, U.S. 49 runs north to south through Stone and Harrison Counties, and U.S. 98 runs northwest to southwest through George County, all linking the region to central Mississippi.

The Gulfport-Biloxi International Airport, located in Harrison County, serves the region. This airport is served by three major airlines with direct flights to Atlanta, Charlotte, Dallas/Ft. Worth, and Houston as well as connections to hundreds of locations in the U.S. and worldwide. There are also several small general aviation airports within the MEMA District 9 Region, including one in nearly every county.

In terms of other transportation services, Port Bienville, Port of Gulfport, and Port of Pascagoula operate within the region, connecting it to national and global markets. Several Class-I Major and Class-III Local railways also serve the region.

UTILITIES

Electric power in the MEMA District 9 Region is mainly provided by municipal and electric power associations. Mississippi Power Company also provides power to small areas in each county across the region.

There are several private and municipal natural gas suppliers that serve the MEMA District 9 Region. These include CenterPoint Energy Resources and the cities of Waveland, Pascagoula, and Picayune.

Water and sewer service is provided by a number of different sources including many of the participating cities and counties, but unincorporated areas often rely on septic systems and wells in the MEMA District 9 Region.

COMMUNITY FACILITIES

There are a number of public buildings and community facilities located throughout the MEMA District 9 Region. According to the data collected for the vulnerability assessment (Section 6.4.1), there are 21 communications facilities, 10 emergency operations centers (EOCs), 130 fire stations, 27 medical facilities, 37 police stations, 101 power/gas facilities, 53 private/non-profit facilities, 170 public facilities, 175 schools, 20 shelters, 109 special populations facilities, 44 transportation facilities, and 128 water/wastewater facilities located within the study area.

There are 14 hospitals and medical centers located in the MEMA District 9 Region. These include George Regional Hospital – Lucedale in George County; Hancock Medical Center – Bay St. Louis in Hancock County; VA Gulf Coast Veterans Health Care System – Biloxi, Merit Health Biloxi – Biloxi, U.S. Air Force Medical Center Keesler – Biloxi, Garden Park Medical Center – Gulfport, Memorial Hospital – Gulfport, and Select Specialty – Gulfport Hospital in Harrison County; Singing River Hospital – Pascagoula and Ocean Springs Hospital – Ocean Springs in Jackson County; Crosby Memorial Hospital – Picayune, Highland Community Hospital – Picayune, and Pearl River County Hospital – Poplarville in Pearl River County; and Stone County Hospital – Wiggins in Stone County. There are also several additional medical care facilities located throughout the region as outlined in the vulnerability assessment (Section 6.4.1).

The MEMA District 9 Region contains numerous local, state, and national parks and recreation areas, including the Gulf Islands National Seashore, Mississippi Gulf Coast National Heritage Area, DeSoto National Forest, Buccaneer State Park, and Shepard State Park. Golf courses and resorts, recreational and sports fishing, gamming and casinos, and sand beaches are abundant in the region. These facilities and recreational opportunities attract millions of visitors each year.

3.3.3 Land Use

Many areas of the MEMA District 9 Region are undeveloped or sparsely developed. As shown in **Figure 3.1** above, there are several small incorporated municipalities located throughout the study area, with a few larger clusters along the coast. Coastal land use patterns radiate from city centers and commercial land uses are located in central business districts and highway strips, with surrounding housing that becomes progressively large in lot size and floor area with distance from the central business districts. Residential and non-residential densities are generally low, and concentrated mix of uses are infrequent, creating an auto-oriented land use pattern along the coast. Upland land use patterns differ markedly from the coastal plain. There are only a few municipalities and unincorporated rural centers. There is a mix of protected lands, such as the DeSoto National Forest and several National Wildlife Refuges. Private lands are used for exurban housing, agriculture, and forestry. Consistent with its rural character, densities are very low and uses are not mixed, making motor vehicles the only viable mode for virtually all travel.

Local land use and associated regulations are further discussed in *Section 7: Capability Assessment*.

3.4 EMPLOYMENT AND INDUSTRY

Like other areas of the Gulf Coast, the MEMA District 9 Region's economy is dominated by industries related to manufacturing, energy, petrochemicals, fishing, agriculture, and tourism. There have been efforts to diversify the local economies in recent years, especially following Hurricane Katrina when

many residents were temporarily without work. The region has chosen to leverage recovery efforts for greater regional economic renewal.

According to the 2011 to 2015 American Community Survey (ACS) 5-year estimates, in 2015, George County had an average annual employment of 8,260 workers and an average unemployment rate of 9.0 percent (compared to 10.3 percent for the state). In 2015, the Educational Services, and Health Care and Social Assistance industry employed 21.7 percent of the county's workforce followed by Manufacturing (19.2%) and Construction (13.2%); and Retail Trade (10.9%). In 2015, the average annual median household income in George County was $44,258 compared to $39,665 in the state of Mississippi.

In 2015, Hancock County had an average annual employment of 18,482 workers and an average unemployment rate of 10.1 percent. According to the ASC, in 2015, the Educational Services, and Health Care and Social Assistance industry employed the most people, with 16.2 percent of the workforce, followed by Retail Trade (13.0%); Arts, Entertainment, and Recreation, and Accommodation and Food Services (12.7%); and Construction (12.2%). The average annual median household income in Hancock County was $43,355.

Harrison County had an average annual employment of 82,911 workers and an average unemployment rate of 9.7 percent in 2015. According to the ACS, in 2015, the Educational Services, and Health Care and Social Assistance industry employed 19.1 percent of the workforce followed by Arts, Entertainment, and Recreation, and Accommodation and Food Services (17.8%); Retail Trade (12.8%); and Public Administration (9.4%). The average annual median household income in Harrison County was $41,722.

In 2015, Jackson County had an average annual employment of 58,824 workers and an average unemployment rate of 9.1 percent. In 2015, according to the ACS, the Educational Services, and Health Care and Social Assistance industry employed 20.2 percent of the workforce. Manufacturing was the second largest industry, employing 18.8 percent of workers, followed by Arts, Entertainment, and Recreation, and Accommodation and Food Services (15.4%) and Retail Trade (10.6%). The average annual median household income in Jackson County was $48,406.

Pearl River County had an average annual employment of 20,219 workers and an average unemployment rate of 12.1 percent in 2015. According to the ACS, in 2015, the Educational Services, and Health Care and Social Assistance industry employed 21.9 percent of the workforce followed by Retail Trade (13.3%); Construction (10.0%); and Arts, Entertainment, and Recreation, and Accommodation and Food Services (9.5%). The average annual median household income in Pearl River County was $40,976.

In 2015, Stone County had an average annual employment of 6,920 workers and an average unemployment rate of 9.7 percent. According to the ACS, in 2015, the Educational Services, and Health Care and Social Assistance industry employed the most people, with 27.5 percent of the workforce, followed by Manufacturing (12.0%) and Retail Trade (9.8%). The average annual median household income in Stone County was $45,025.

SECTION 4
HAZARD IDENTIFICATION

This section describes how the Regional Hazard Mitigation Council identified the hazard to be included this plan. It consists of the following five subsections:

- ❑ 4.1 Overview
- ❑ 4.2 Description of Full Range of Hazards
- ❑ 4.3 Disaster Declarations
- ❑ 4.4 Hazard Evaluation
- ❑ 4.5 Hazard Identification Results

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

4.1 OVERVIEW

The MEMA District 9 Region is vulnerable to a wide range of natural and human-caused hazards that threaten life and property. Current FEMA regulations and guidance under the Disaster Mitigation Act of 2000 (DMA 2000) require, at a minimum, an evaluation of a full range of natural hazards. An evaluation of human-caused (i.e., terrorism) and technological hazards (i.e., hazardous materials incident) is encouraged, though not required, for plan approval. The MEMA District 9 Region has included both types of hazards, but it should be noted that this list may not be all-inclusive (especially concerning human-caused and technological hazards) and will be revisited with each plan update.

Upon a review of the full range of natural hazards suggested under FEMA planning guidance, the participating jurisdictions in the MEMA District 9 Regional Hazard Mitigation Plan have identified a number of hazards that are to be addressed in this Regional Hazard Mitigation Plan. These hazards were identified through an extensive process that utilized input from the MEMA District 9 Region Hazard Mitigation Council members, research of past disaster declarations in the participating counties, and review of the Mississippi State Hazard Mitigation Plan (2013).[1] Readily available information from reputable sources (such as federal and state agencies) was also evaluated to supplement information from these key sources.

Table 4.1 lists the full range of hazards initially identified for inclusion in the Plan and provides a brief description for each. This table includes 25 individual hazards. Some of these hazards are considered to be interrelated or cascading (one hazard event may cause another, i.e. – hurricanes cause flooding), but for preliminary hazard identification purposes these individual hazards are broken out separately.

Table 4.2 lists the disaster declarations that have impacted the MEMA District 9 Region.

[1] A complete list of disaster declarations for the MEMA District 9 Region can be found below in Section 4.3.

Table 4.3 documents the evaluation process used for determining which of the initially identified hazards are considered significant enough to warrant further evaluation in the risk assessment. For each hazard considered, the table indicates whether or not the hazard was identified as a significant hazard to be further assessed, how this determination was made, and why this determination was made. The table works to summarize not only those hazards that *were* identified (and why) but also those that *were not* identified (and why not). Hazard events not identified for inclusion at this time may be addressed during future evaluations and updates of the risk assessment if deemed necessary by the MEMA District 9 RHMC during the plan update process.

Lastly, **Table 4.4** provides a summary of the hazard identification and evaluation process noting that 18 of the 25 initially identified hazards are considered significant enough for further evaluation through this Plan's risk assessment (marked with a "☑").

4.2 DESCRIPTION OF FULL RANGE OF HAZARDS

In this section, hazards are classified into groups including flood-related hazards, fire-related hazards, geologic hazards, wind-related hazards, and other hazards (a catch-all category of hazards that typically includes human-caused and technological hazards). As noted above, several sources were consulted to determine a list of hazards to be considered by MEMA District 9. These include the MEMA District 9 RHMC members, research of past disaster declarations in the participating counties, review of FEMA's Multi-Hazard Identification and Risk Assessment (1997) and review of the State of Mississippi Hazard Mitigation Plan (2013).[2] Readily available information from reputable sources (such as federal and state agencies) was also evaluated to supplement information from these key sources.

TABLE 4.1: DESCRIPTIONS OF THE FULL RANGE OF INITIALLY IDENTIFIED HAZARDS

Hazard	Description
FLOOD-RELATED HAZARDS	
Dam and Levee Failure	Dam failure is the collapse, breach, or other failure of a dam structure resulting in downstream flooding. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and severe property damage if development exists downstream of the dam. Dam failure can result from natural events, human-induced events, or a combination of the two. The most common cause of dam failure is prolonged rainfall that produces flooding. Failures due to other natural events such as hurricanes, earthquakes, or landslides are significant because there is generally little or no advance warning.
Erosion	Erosion is the gradual breakdown and movement of land due to both physical and chemical processes of water, wind, and general meteorological conditions. Natural, or geologic, erosion has occurred since the Earth's formation and continues at a very slow and uniform rate each year.

[2] A complete list of disaster declarations for the MEMA District 9 Region can be found below in Section 4.3.

Flood	The accumulation of water within a water body which results in the overflow of excess water onto adjacent lands, usually floodplains. The floodplain is the land adjoining the channel of a river, stream ocean, lake, or other watercourse or water body that is susceptible to flooding. Most floods fall into the following three categories: riverine flooding, coastal flooding, or shallow flooding (where shallow flooding refers to sheet flow, ponding, and urban drainage).
Storm Surge	A storm surge is a large dome of water often 50 to 100 miles wide and rising anywhere from four to five feet in a Category 1 hurricane up to more than 30 feet in a Category 5 storm. Storm surge heights and associated waves are also dependent upon the shape of the offshore continental shelf (narrow or wide) and the depth of the ocean bottom (bathymetry). A narrow shelf, or one that drops steeply from the shoreline and subsequently produces deep water close to the shoreline, tends to produce a lower surge but higher and more powerful storm waves. Storm surge arrives ahead of a storm's actual landfall and the more intense the hurricane is, the sooner the surge arrives. Storm surge can be devastating to coastal regions, causing severe beach erosion and property damage along the immediate coast. Further, water rise caused by storm surge can be very rapid, posing a serious threat to those who have not yet evacuated flood-prone areas.
Tsunami	A series of waves generated by an undersea disturbance such as an earthquake. The speed of a tsunami traveling away from its source can range from up to 500 miles per hour in deep water to approximately 20 to 30 miles per hour in shallower areas near coastlines. Tsunamis differ from regular ocean waves in that their currents travel from the water surface all the way down to the sea floor. Wave amplitudes in deep water are typically less than one meter; they are often barely detectable to the human eye. However, as they approach shore, they slow in shallower water, basically causing the waves from behind to effectively "pile up," and wave heights increase dramatically. As opposed to typical waves which crash at the shoreline, tsunamis bring with them a continuously flowing 'wall of water' with the potential to cause devastating damage in coastal areas located immediately along the shore.
FIRE-RELATED HAZARDS	
Drought	A prolonged period of less than normal precipitation such that the lack of water causes a serious hydrologic imbalance. Common effects of drought include crop failure, water supply shortages, and fish and wildlife mortality. High temperatures, high winds, and low humidity can worsen drought conditions and also make areas more susceptible to wildfire. Human demands and actions have the ability to hasten or mitigate drought-related impacts on local communities.
Lightning	Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a "bolt" when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes, but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes thunder. On average, 80 people are killed each year by lightning strikes in the United States.

Wildfire	An uncontrolled wildfire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Heavier fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work to increase risk for people and property located within wildfire hazard areas or along the urban/wildland interface. Wildfires are part of the natural management of forest ecosystems, but most are caused by human factors. Over 80 percent of forest fires are started by negligent human behavior such as smoking in wooded areas or improperly extinguishing campfires. The second most common cause for wildfire is lightning.
GEOLOGIC HAZARDS	
Avalanche	A rapid fall or slide of a large mass of snow down a mountainside.
Earthquake	A sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the surface. This movement forces the gradual building and accumulation of energy. Eventually, strain becomes so great that the energy is abruptly released, causing the shaking at the earth's surface which we know as an earthquake. Roughly 90 percent of all earthquakes occur at the boundaries where plates meet, although it is possible for earthquakes to occur entirely within plates. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured in the tens of billions of dollars, result in loss of life and injury to hundreds of thousands of persons, and disrupt the social and economic functioning of the affected area.
Expansive Soils	Soils that will exhibit some degree of volume change with variations in moisture conditions. The most important properties affecting degree of volume change in a soil are clay mineralogy and the aqueous environment. Expansive soils will exhibit expansion caused by the intake of water and, conversely, will exhibit contraction when moisture is removed by drying. Generally speaking, they often appear sticky when wet and are characterized by surface cracks when dry. Expansive soils become a problem when structures are built upon them without taking proper design precautions into account with regard to soil type. Cracking in walls and floors can be minor or can be severe enough for the home to be structurally unsafe.
Landslide	The movements of a mass of rock, debris, or earth down a slope when the force of gravity pulling down the slope exceeds the strength of the earth materials that comprise to hold it in place. Slopes greater than 10 degrees are more likely to slide, as are slopes where the height from the top of the slope to its toe is greater than 40 feet. Slopes are also more likely to fail if vegetative cover is low and/or soil water content is high.
Land Subsidence/ Sinkhole	The gradual settling or sudden sinking of the Earth's surface due to the subsurface movement of earth materials. Causes of land subsidence include groundwater pumpage, aquifer system compaction, drainage of organic soils, underground mining, hydrocompaction, natural compaction, sinkholes, and thawing permafrost. Sinkholes are a natural and common geologic feature in areas with underlying limestone and other rock types that are soluble in natural water. Most limestone is porous, allowing the acidic water of rain to percolate through their strata, dissolving some limestone and carrying it away in solution. Over time, this persistent erosional process can create extensive underground voids and drainage systems in much of the carbonate rocks. Collapse of overlying sediments into the underground cavities produces sinkholes.

Volcano	A mountain that opens downward to a reservoir of molten rock below the surface of the earth. While most mountains are created by forces pushing up the earth from below, volcanoes are different in that they are built up over time by an accumulation of their own eruptive products: lava, ash flows, and airborne ash and dust. Volcanoes erupt when pressure from gases and the molten rock beneath becomes strong enough to cause an explosion.
WIND-RELATED HAZARDS	
Extreme Cold	Extreme cold is generally considered to occur when the temperature is at or below freezing for a period of time. Often these events are associated with winter storms and other winter weather, but extreme cold events can occur on their own. Dangers associated with extreme cold events include frostbite and hypothermia among other impacts to people and these events can often last for several days or weeks in a row.
Extreme Heat	Extreme heat, or a heat wave, may occur when temperatures hover 10 degrees or more above the average high temperature for the region and last for several weeks. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air near the ground. Excessively dry and hot conditions can provoke dust storms and low visibility. A heat wave combined with a drought can be very dangerous and have severe economic consequences on a community.
Hailstorm	A hailstorm is any storm that produces hailstones that fall to the ground; usually used when the amount or size of the hail is considered significant. Hail is formed when updrafts in thunderstorms carry raindrops into parts of the atmosphere where the temperatures are below freezing.
Hurricane and Tropical Storm	Hurricanes and tropical storms are classified as cyclones and defined as any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and with a diameter averaging 10 to 30 miles across. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. The primary damaging forces associated with these storms are high-level sustained winds, heavy precipitation, and tornadoes. Coastal areas are also vulnerable to the additional forces of storm surge, wind-driven waves, and tidal flooding which can be more destructive than cyclone wind. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico during the official Atlantic hurricane season, which extends from June through November.
Nor'easter	Similar to hurricanes, nor'easters are ocean storms capable of causing substantial damage to coastal areas in the Eastern United States due to their associated strong winds and heavy surf. Nor'easters are named for the winds that blow in from the northeast and drive the storm up the East Coast along the Gulf Stream, a band of warm water that lies off the Atlantic coast. They are caused by the interaction of the jet stream with horizontal temperature gradients and generally occur during the fall and winter months when moisture and cold air are plentiful. Nor'easters are known for dumping heavy amounts of rain and snow, producing hurricane-force winds, and creating high surf that causes severe beach erosion and coastal flooding.

Severe Thunderstorm/High Wind	Thunderstorms are caused by air masses of varying temperatures meeting in the atmosphere. Rapidly rising warm moist air fuels the formation of thunderstorms. Thunderstorms may occur singularly, in lines, or in clusters. They can move through an area very quickly or linger for several hours. Thunderstorms may result in hail, tornadoes, or straight-line winds. Windstorms pose a threat to lives, property, and vital utilities primarily due to the effects of flying debris and can down trees and power lines.
Tornado	A tornado is a violently rotating column of air that has contact with the ground and is often visible as a funnel cloud. Its vortex rotates cyclonically with wind speeds ranging from as low as 40 mph to as high as 300 mph. Tornadoes are most often generated by thunderstorm activity when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The destruction caused by tornadoes ranges from light to catastrophic depending on the intensity, size, and duration of the storm.
Winter Weather	Winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Blizzards, the most dangerous of all winter storms, combine low temperatures, heavy snowfall, and winds of at least 35 miles per hour, reducing visibility to only a few yards. Ice storms occur when moisture falls and freezes immediately upon impact on trees, power lines, communication towers, structures, roads, and other hard surfaces. Winter storms and ice storms can down trees, cause widespread power outages, damage property, and cause fatalities and injuries to human life.
OTHER HAZARDS	
Climate Change/Sea Level Rise	Climate change and sea level rise are hazards that are becoming a larger threat to many communities, especially along the coast. Climate change can have many impacts on a community, including exacerbating sea level rise. Other impacts of climate change include hotter temperatures, more frequent drought, more frequent flooding, and stronger storm events. In many areas, the exact outcomes of climate change will be dependent largely on regional trends and the location of a community. As its name suggests, sea level rise is the rising of the seas above their current levels. Sea level rise can have potentially major impacts by causing inundation of areas not previously inundated with water and exacerbating other hazards such as storm surge. Sea level rise is generally the result of two major causes: thermal expansion of the oceans and loss of land-based ice. Historic records indicate that sea level rise has been an ongoing process over the last several thousand years. However, a major concern is that recent studies show that the rate of sea level rise has been increasing steadily over the past century. This increase in rate will likely have a quicker and potentially more devastating effect on people and property than any sea level rise that has taken place in the past.
Hazardous Materials Incident	Hazardous material (HAZMAT) incidents can apply to fixed facilities as well as mobile, transportation-related accidents in the air, by rail, on the nation's highways and on the water. HAZMAT incidents consist of solid, liquid and/or gaseous contaminants that are released from fixed or mobile containers, whether by accident or by design as with an intentional terrorist attack. A HAZMAT incident can last hours to days, while some chemicals can be corrosive or otherwise damaging over longer periods of time. In addition to the primary release, explosions and/or fires can result from a release, and contaminants can be extended beyond the initial area by persons, vehicles, water, wind and possibly wildlife as well.

Infectious Disease	Public health threats are often defined by an infectious disease that involves a biological agent/disease that may result in mass casualties or an outbreak of symptoms in those affected. Often emerging diseases are the greatest threat because they are new or varied iterations of existing threats and the population may not have built up a collective immunity to the disease.

4.3 DISASTER DECLARATIONS

Disaster declarations provide initial insight into the hazards that may impact the MEMA District 9 Regional planning area. Since 1965, 25 presidential disaster declarations have occurred in the region. This includes 12 events related to hurricanes/tropical storms and all of the remaining related to some combination of severe storms, flooding, and tornadoes.

TABLE 4.2: MEMA DISTRICT 9 REGION DISASTER DECLARATIONS BY COUNTY

Year	Disaster Number	Description	George	Hancock	Harrison	Jackson	Pearl River	Stone
1965	210	HURRICANE BETSY			X	X	X	
1969	271	HURRICANE CAMILLE	X		X	X	X	X
1971	302	STORMS & TORNADOES						X
1974	430	HEAVY RAINS & FLOODING	X	X	X	X	X	
1979	577	STORMS, TORNADOES, FLOODS		X				
1979	599	HURRICANE FREDERIC	X	X	X	X	X	X
1980	618	STORMS, FLOOD, MUDSLIDES & TORNADOES	X		X	X		
1983	678	SEVERE STORMS, FLOODING & TORNADOES					X	
1985	741	HURRICANE ELENA			X	X	X	X
1990	859	SEVERE STORMS, TORNADOES & FLOODING	X		X	X		
1991	888	SEVERE STORMS, TORNADOES & FLOODING			X			
1991	906	SEVERE STORMS, TORNADOES & FLOODING	X	X	X		X	
1995	1051	SEVERE STORMS, TORNADOES, FLOODING		X	X	X	X	
1998	1251	HURRICANE GEORGES	X	X	X	X	X	X
2001	1360	SEVERE STORMS AND TORNADOES					X	
2001	1382	TROPICAL STORM ALLISON	X	X	X	X	X	
2002	1436	TROPICAL STORM ISIDORE	X	X	X	X	X	X
2003	1459	SEVERE STORMS, TORNADOES, FLOODS					X	

Year	Disaster Number	Description	George	Hancock	Harrison	Jackson	Pearl River	Stone
2004	1550	HURRICANE IVAN	X	X	X	X	X	X
2005	1594	HURRICANE DENNIS	X	X	X	X	X	X
2005	1604	HURRICANE KATRINA	X	X	X	X	X	X
2008	1794	HURRICANE GUSTAV	X	X	X	X	X	X
2009	1837	SEVERE STORMS, FLOODING, AND TORNADOES				X		X
2012	4081	HURRICANE ISAAC	X	X	X	X	X	X
2016	4268	SEVERE STORMS AND FLOODING	X				X	
TOTAL NUMBER OF DISASTERS:			**15**	**13**	**18**	**17**	**19**	**12**

4.4 HAZARD EVALUATION

TABLE 4.3: DOCUMENTATION OF THE HAZARD EVALUATION PROCESS

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
FLOOD-RELATED HAZARDS			
Dam and Levee Failure	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of MS Department of Environmental Quality dam inventory	• The National Inventory of Dams shows dams are located in every state. • Dam/levee failure is identified in the state plan as a limited hazard. • Several of the previous MEMA District 9 Region hazard mitigation plans consider dam/levee failure to be a hazard. • 7 dams in the region are classified as high-hazard (high hazard is defined where dam failure may cause loss of life or serious damage).

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Erosion	YES	• Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans	• Coastal erosion was excluded from the State of MS Hazard Mitigation Plan as a hazard, however, it is addressed under the hurricane hazard. Riverine erosion is not addressed in the plan. • Coastal erosion is identified as a hazard in a number of the previous MEMA District 9 Region hazard mitigation plans. • Erosion is a natural process and continuous process that impacts the region.
Flood	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of NOAA NCDC Storm Events Database • Review of historical disaster declarations • Review of FEMA DFIRM data • Review of FEMA's NFIP Community Status Book and Community Rating System (CRS)	• Floods occur in all 50 states and in the U.S. territories. • The flood hazard is thoroughly discussed in the state plan. Much of the state is located in the 100-year floodplain. Further, flash floods are a common occurrence during rain storms. • Each of the previous MEMA District 9 Region hazard mitigation plans addresses the flood hazard. • NCDC reports that MEMA District 9 Region counties have been affected by 168 flood events since 1996. In total, these events caused 1 recorded death and an estimated $12.2 million (2016 dollars) in property damages. • 11 out of 23 disaster declarations were flood-related and an additional 12 were hurricane or tropical storm-related which caused flooding issues. • 22 of the 22 MEMA District 9 jurisdictions participate in the NFIP and 15 also participate in the CRS.

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Storm Surge	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of NOAA NCDC Storm Events Database	• Given the coastal location of the MEMA District 9 Region, storm surge is likely to affect the area. • Storm surge is discussed in the state plan under the hurricane hazard and indicates that the costal shoreline counties are subject to storm surge. • Several of the previous hazard mitigation plans in the MEMA District 9 Region identify storm surge as a potential hazard.
Tsunami	NO	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of USGS Regional Assessment of Tsunami potential in the Gulf of Mexico • Review of FEMA "How-to" mitigation planning guidance (Publication 386-2, "Understanding Your Risks – Identifying Hazards and Estimating Losses)	• No record exists of a catastrophic tsunami impacting the Gulf of Mexico coast. • Tsunami inundation zone maps are not available for communities located along the U.S. Gulf Coast. • The tsunami hazard is excluded from the state plan. There is no historical record of tsunamis in the Gulf of Mexico. • None of the previous MEMA District 9 Region hazard mitigation plans consider tsunami to be a problem for the area. • FEMA mitigation planning guidance suggests that locations along the U.S. Gulf Coast have a relatively low tsunami risk and need not conduct a tsunami risk assessment at this time.

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
FIRE-RELATED HAZARDS			
Drought	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of US Drought Monitor website	• Drought is a normal part of virtually all climatic regimes, including areas with high and low average rainfall. • Droughts are identified in the State of MS Hazard Mitigation Plan as a limited hazard. • Drought is not considered to be major hazards in any of the previous MEMA District 9 Region hazard mitigation plans. • There are reports of the most extreme (exceptional) drought in each of the MEMA District 9 Region counties according to the US Drought Monitor.
Lightning	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of NOAA NCDC Storm Events Database	• Severe thunderstorm/lightning events were not profiled in the State Hazard Mitigation Plan because they do not typically impact the entire state, invoking a state response. However, severe thunderstorms were identified as a significant concern at the local level. • Lighting is addressed directly in many of the previous MEMA District 9 Region hazard mitigation plans and as a sub-hazard in several others. • NCDC reports 57 lightning events in the MEMA District 9 Region counties since 1996. These events have resulted in 6 deaths, 7 injuries, and $1.5 million (2016 dollars) in property damage.

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Wildfire	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of Southern Wildfire Risk Assessment (SWRA) Data • Review of Mississippi Forestry Commission data	• Wildfires occur in virtually all parts of the United States. Wildfire hazard risks will increase as low-density development along the urban/wildland interface increases. • The State of MS Hazard Mitigation Plan identifies wildfire as a significant hazard and regular occurrence. • Each of the previous MEMA District 9 Region hazard mitigation plans addresses wildfire. • A review of SWRA data indicates that there are areas of concern in the MEMA District 9 Region. Wildfire hazard risks will increase as low-density development along the urban/wildland interface increases. • According to the Mississippi Forestry Commission, the MEMA District 9 Region experiences an average of 464 fires each year which burn a combined 8,297 acres annually.
GEOLOGIC HAZARDS			
Avalanche	NO	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of US Forest Service National Avalanche Center website	• The United States avalanche hazard is limited to mountainous western states including Alaska, as well as some areas of low risk in New England. • Avalanche was not considered in the State of MS Hazard Mitigation Plan since it poses no threat to the state. • Avalanche is not included in any of previous MEMA District 9 Region hazard mitigation plans. • There is no risk or history of avalanche events in Mississippi.

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Earthquake	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of National Geophysical Data Center • USGS Earthquake Hazards Program website	• Although the zone of greatest seismic activity in the United States is along the Pacific Coast, eastern and central regions have experienced significant earthquakes. • Earthquake events are identified as a limited hazard in the State of MS Hazard Mitigation Plan, and all counties in MS are considered to be susceptible to the effects of earthquakes. • Earthquakes have occurred in and around the State of Mississippi in the past. The state is affected by the New Madrid (near Missouri) and White River Fault lines which have generated a magnitude 8.0 earthquake in the last 200 years. • Some of the previous MEMA District 9 Region hazard mitigation plans consider earthquake to be a hazard of concern. • 7 events are known to have occurred in the region according to the National Geophysical Data Center. The greatest MMI reported was a 5.
Expansive Soils	NO	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of USGS Swelling Clays Map	• The effects of expansive soils are most prevalent in parts of the Southern, Central, and Western U.S. • Expansive soils are not identified in the state plan, and have not historically been a problem for most areas in Mississippi. • Expansive soils are not addressed in any of the previous MEMA District 9 Region hazard mitigation plans. • According to USGS, the MEMA District 9 Region is predominately located in an area that is underlain by "generally less than 50%" of its soil as clay having high swelling potential.

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Landslide	NO	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of USGS Landslide Incidence and Susceptibility Hazard Map	• Landslides occur in every state in the U.S., and they are most common in the coastal ranges of California, the Colorado Plateau, the Rocky Mountains, and the Appalachian Mountains. • The State of MS Hazard Mitigation Plan excludes the landslide hazard because there is no extensive history of landslides in Mississippi. • None of the previous MEMA District 9 Region hazard mitigation plans consider landslide to be a likely hazard to affect the area. • USGS landslide hazard maps indicate "low incidence" (less than 1.5% of the area is involved in landsliding) across the majority of the region.
Land Subsidence/ Sinkhole	NO	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans	• Land subsidence affects at least 45 states, including Mississippi. However, because of the broad range of causes and impacts, there has been limited national focus on this hazard. • The state plan does not identify land subsidence as a hazard because there is no significant historical record of the hazard in the region. • None of the previous MEMA District 9 Region hazard mitigation plans consider land subsidence to be a likely hazard to affect the area.

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Volcano	NO	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of USGS Volcano Hazards Program website	• More than 65 potentially active volcanoes exist in the United States and most are located in Alaska. The Western states and Hawaii are also potentially affected by volcanic hazards. • There are no active volcanoes in Mississippi. • The volcano hazard is excluded from the state plan. There is no historical record of this hazard in the region.
WIND-RELATED HAZARDS			
Extreme Cold	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of NOAA NCDC Storm Events Database	• Many areas of the United States are susceptible to extreme cold, including Mississippi. • Extreme cold is considered to be a hazard in some of the previous MEMA District 9 Region hazard mitigation plans. • NCDC reports that the MEMA District 9 Region counties have been affected by 8 extreme cold events since 1996.
Extreme Heat/ Heat Wave	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of NOAA NCDC Storm Events Database	• Many areas of the United States are susceptible to heat wave, including Mississippi. • Extreme heat was excluded from the plan even though it was recognized that it can create emergencies in state. • Extreme heat is considered to be a hazard in some of the previous MEMA District 9 Region hazard mitigation plans. • NCDC reports that the MEMA District 9 Region counties have been affected by 8 extreme heat events since 1996.

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Hailstorm	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of NOAA NCDC Storm Events Database	• Severe thunderstorm/hail events were not profiled in the State Hazard Mitigation Plan because they do not typically impact the entire state, invoking a state response. However, severe thunderstorms were identified as a significant concern at the local level. • Hailstorms are addressed in a number of the previous MEMA District 9 Region hazard mitigation plans. • NCDC reports 310 hailstorm events in the MEMA District 9 Region counties since 1950.
Hurricane and Tropical Storm	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Analysis of NOAA historical tropical cyclone tracks and National Hurricane Center Website • Review of NOAA NCDC Storm Events Database • Review of historical presidential disaster declarations	• The Atlantic and Gulf regions are most prone to landfall by hurricanes and tropical storms. • The State Hazard Mitigation Plan profiles the hurricane hazard and identifies it as a significant hazard, noting its devastating impacts on the state. • Each of the previous MEMA District 9 Region hazard mitigation plans addresses hurricanes. • NOAA historical records indicate 119 hurricanes and tropical storms have come within 100 miles of the MEMA District 9 Region since 1842. • 12 disaster declarations in the MEMA District 9 Region are directly related to hurricane and tropical storm events.
Nor'easter	NO	• Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of NOAA NCDC Storm Events Database	• Nor'easters are not profiled or discussed in the state plan. • Nor'easters are not identified in any of the previous MEMA District 9 Region hazard mitigation plans. • NCDC does not report any nor'easter activity for the MEMA District 9 Region counties.

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Severe Thunderstorm/ High Wind	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of NOAA NCDC Storm Events Database • Review of historical presidential disaster declarations	• Over 1,000 thunderstorms are estimated to occur each year or the U.S. mainland, and they are experienced in nearly every region. • Severe thunderstorm events were not profiled in the State Hazard Mitigation Plan because they do not typically impact the entire state, invoking a state response. However, severe thunderstorms were identified as a significant concern at the local level. • Thunderstorms are addressed in many of the previous MEMA District 9 Region hazard mitigation plans. • NCDC reports 704 thunderstorm events in the MEMA District 9 Region counties since 1950. These events have resulted in 2 deaths, 39 injuries, and $11.0 million (2016 dollars) in property damage. • 10 disaster declarations in the MEMA District 9 Region are related to severe storm and high wind events.

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Tornado	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of NOAA NCDC Storm Events Database • Review of historical presidential disaster declarations	• From 1991 to 2010, Mississippi experienced 9.2 tornadoes per 10,000 miles, making it the 5th ranked "tornado state" in the U.S. • Tornado events are listed in the State of MS Hazard Mitigation Plan as a significant hazard and are referenced as a common disaster. • Tornadoes are addressed in all of the previous MEMA District 9 Region hazard mitigation plans. • NCDC reports 283 tornado events in MEMA District 9 Region counties since 1950. These events have resulted in 6 recorded deaths, 170 injuries, and $383.5 million (2016 dollars) in property damage with the most severe being an EF3. • 11 disaster declarations in the MEMA District 9 Region were related to tornado events.
Winter Weather	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of NOAA NCDC Storm Events Database • Review of historical presidential disaster declarations	• Winter storms affect every state in the continental U.S. and Alaska. • Extreme winter weather is identified in the state plan as a limited hazard. • Winter storm events are not considered to be a major hazard in the previous MEMA District 9 Region hazard mitigation plans. • NCDC reports that the MEMA District 9 Region counties have been affected by 23 winter weather events since 1996.

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
OTHER HAZARDS			
Climate Change/ Sea Level Rise	YES	• Review of previous MEMA District 9 Region hazard mitigation plans • Review of National Climate Assessment report • Review of NOAA sea level rise scenario data	• Several of the previous District 9 hazard mitigation plans include climate change and/or sea level rise as a hazard • The National Climate Assessment explains that climate change is already beginning to have impacts on communities across the United States. • NOAA data shows that coastal communities are especially vulnerable to climate change due to the impacts of sea level rise.
Hazardous Materials Incident/Train Derailment	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans • Review of EPA TRI sites inventory • Review of PHMSA HAZMAT Incident Statistics database	• Cities, counties, and towns where hazardous materials fabrication, processing, and storage sites are located, and those where hazardous waste treatment, storage, or disposal facilities operate are at risk for hazardous materials events. • Hazardous materials incidents are not discussed in the state plan, but it does note that the hazard is addressed in 15% of local plans. • Several of the previous MEMA District 9 Region hazard mitigation plans include hazardous materials incident as a hazard. • There are 38 TRI sites located in the MEMA District 9 Region. • According to the PHMSA, there have been 473 reported hazardous materials incidents in the region.

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Infectious Disease	YES	• Review of State of MS Hazard Mitigation Plan • Review of previous MEMA District 9 Region hazard mitigation plans	• Infectious diseases are a worldwide phenomenon and can impact any community. • Infectious disease is not discussed in the state plan. • Infectious disease is included in several of the previous MEMA District 9 Region hazard mitigation plans.

4.5 HAZARD IDENTIFICATION RESULTS

TABLE 4.4: SUMMARY RESULTS OF THE HAZARD IDENTIFICATION AND EVALUATION PROCESS

FLOOD-RELATED HAZARDS	WIND-RELATED HAZARDS
☑ Dam and Levee Failure	☑ Extreme Cold
☑ Erosion	☑ Extreme Heat/Heat Wave
☑ Flood	☑ Hailstorm
☑ Storm Surge	☑ Hurricane and Tropical Storm
☐ Tsunami	☐ Nor'easter
FIRE-RELATED HAZARDS	☑ Severe Thunderstorm/High Wind
☑ Drought	☑ Tornado
☑ Lightning	☑ Winter Weather
☑ Wildfire	**OTHER HAZARDS**
GEOLOGIC HAZARDS	☑ Climate Change/Sea Level Rise
☐ Avalanche	☑ Hazardous Materials Incident/Train Derailment
☑ Earthquake	☑ Infectious Disease
☐ Expansive Soils	
☐ Landslide	
☐ Land Subsidence/Sinkhole	
☐ Volcano	

☑ = Hazard considered significant enough for further evaluation in the MEMA District 9 Region hazard risk assessment.

SECTION 5
HAZARD PROFILES

This section includes detailed hazard profiles for each of the hazards identified in the previous section (*Hazard Identification*) as significant enough for further evaluation in the MEMA District 9 Regional Hazard Mitigation Plan. It contains the following subsections:

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

5.1 OVERVIEW

This section includes detailed hazard profiles for each of the hazards identified in the previous section (*Hazard Identification*) as significant enough for further evaluation in the MEMA District 9 Region hazard risk assessment by creating a hazard profile. Each hazard profile includes a general description of the hazard including its location, extent (or severity), historical occurrences, and probability of future occurrences. Each profile also includes specific items noted by members of the MEMA District 9 Regional Hazard Mitigation Council (RHMC) as it relates to unique historical or anecdotal hazard information for the counties in the MEMA District 9 Region or a participating municipality within them.

The following hazards were identified:

- ❑ **Flood-related Hazards**
  - ❑ Dam and Levee Failure

- ❑ Erosion
- ❑ Flood
- ❑ Storm Surge

- ❑ **Fire-related Hazards**
  - ❑ Drought
  - ❑ Lightning
  - ❑ Wildfire
- ❑ **Geologic Hazards**
  - ❑ Earthquake
- ❑ **Wind-related Hazards**
  - ❑ Extreme Cold
  - ❑ Extreme Heat
  - ❑ Hailstorm
  - ❑ Hurricane and Tropical Storm
  - ❑ Severe Thunderstorm/High Wind
  - ❑ Tornado
  - ❑ Winter Weather
- ❑ **Other Hazards**
  - ❑ Climate Change/Sea Level Rise
  - ❑ Infectious Disease
  - ❑ Hazardous Materials Incident/Train Derailment

5.2 STUDY AREA

The MEMA District 9 Region includes 6 counties and 16 incorporated jurisdictions. **Table 5.1** provides a summary table of the participating jurisdictions within each county. In addition, **Figure 5.1** provides a base map, for reference, of the MEMA District 9 Region.

TABLE 5.1: PARTICIPATING JURISDICTIONS IN THE MEMA DISTRICT 9 REGIONAL HAZARD MITIGATION PLAN

George County		Jackson County	
Lucedale		Gautier	Ocean Springs
Hancock County		Moss Point	Pascagoula
Bay St. Louis	Waveland	**Pearl River County**	
Diamondhead		Picayune	Poplarville
Harrison County		**Stone County**	
Biloxi	Long Beach	Wiggins	
D'Iberville	Pass Christian		
Gulfport			

FIGURE 5.1: MEMA DISTRICT 9 BASE MAP

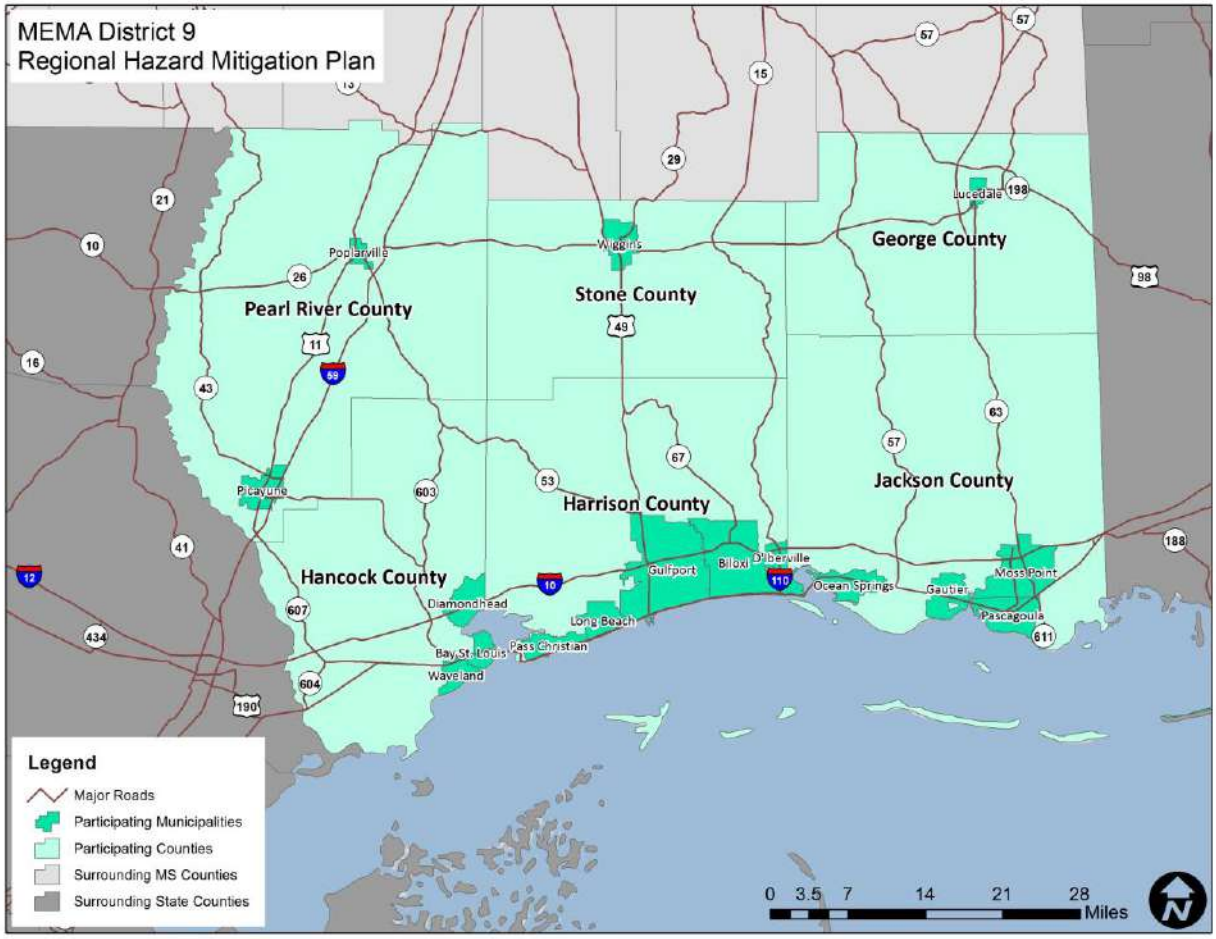


Table 5.2 lists each significant hazard for the MEMA District 9 Region and identifies whether or not it has been determined to be a specific hazard of concern for the municipal jurisdictions and the unincorporated areas of the counties. This is the based on the best available data and information from the MEMA District 9 Regional Hazard Mitigation Council. (● = hazard of concern)

TABLE 5.2 SUMMARY OF IDENTIFIED HAZARD EVENTS IN THE MEMA DISTRICT 9 REGION

	Flood-related				Fire-related			Geo-logic	Wind-related							Other		
Jurisdiction	**Dam/Levee Failure**	**Erosion**	**Flood**	**Storm Surge**	**Drought**	**Lightning**	**Wildfire**	**Earthquake**	**Extreme Cold**	**Extreme Heat**	**Hailstorm**	**Hurricane/Tropical Storm**	**Severe Thunderstorm/High Wind**	**Tornado**	**Winter Weather**	**Climate Change/Sea Level Rise**	**Infectious Disease**	**HAZMAT/Train Derailment**
George County																		
Lucedale	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
Unincorporated Area	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
Hancock County																		
Bay St. Louis	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Diamondhead	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Waveland	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Unincorporated Area	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Harrison County																		
Biloxi	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
D'Iberville	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Gulfport	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Long Beach	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Pass Christian	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Unincorporated Area	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Jackson County																		
Gautier	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Moss Point	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Ocean Springs	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Pascagoula	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Unincorporated Area	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Pearl River County																		
Picayune	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
Poplarville	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
Unincorporated Area	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
Stone County																		
Wiggins	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
Unincorporated Area	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●

FLOOD-RELATED HAZARDS

5.3 DAM AND LEVEE FAILURE

5.3.1 Background

Worldwide interest in dam and levee safety has risen significantly in recent years. Aging infrastructure, new hydrologic information, and population growth in floodplain areas downstream from dams and near levees have resulted in an increased emphasis on safety, operation, and maintenance.

There are approximately 80,000 dams in the United States today, the majority of which are privately owned. Other owners include state and local authorities, public utilities, and federal agencies. The benefits of dams are numerous: they provide water for drinking, navigation, and agricultural irrigation. Dams also provide hydroelectric power, create lakes for fishing and recreation, and save lives by preventing or reducing floods.

Though dams have many benefits, they also can pose a risk to communities if not designed, operated, and maintained properly. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and great property damage if development exists downstream. If a levee breaks, scores of properties may become submerged in floodwaters and residents may become trapped by rapidly rising water. The failure of dams and levees has the potential to place large numbers of people and great amounts of property in harm's way

5.3.2 Location and Spatial Extent

The Mississippi Department of Environmental Quality provides information on dams including a hazard potential classification. There are three hazard classifications—high, significant, and low—that correspond to qualitative descriptions. **Table 5.3** explains these classifications.

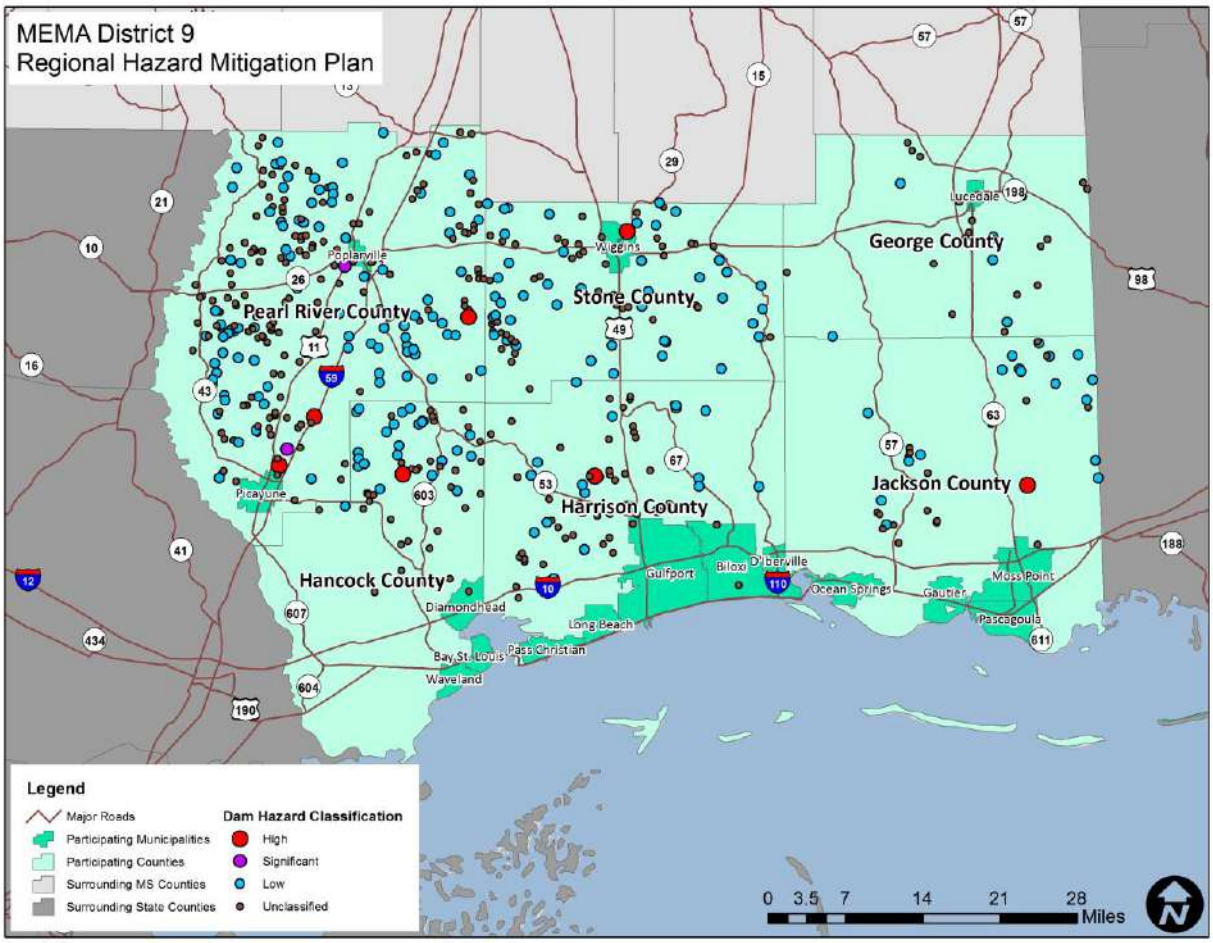
TABLE 5.3: MISSISSIPPI DAM HAZARD CLASSIFICATIONS

Hazard Classification	Description
Low	Dam failure may cause damage to farm buildings (excluding residences), agricultural land, or county or minor roads.
Significant	Dam failure may cause significant damage to main roads, minor railroads, or cause interruption of use or service of relatively important public utilities.
High	Dam failure may cause loss of life, serious damage to homes, industrial or commercial buildings, important public utilities, main highways or railroads. Dams constructed in existing or proposed residential, commercial or industrial areas will be classified as high hazard dams, unless the applicant presents clear and convincing evidence to the contrary.

Source: Mississippi Department of Environmental Quality

According to the Mississippi Department of Environmental Quality, there are seven high hazard dams in the MEMA District 9 Region.[1] **Figure 5.2** and **Figure 5.3** show the location of each of these high hazard dams as well as mapped dam inundation areas, and **Table 5.4** lists them by name.

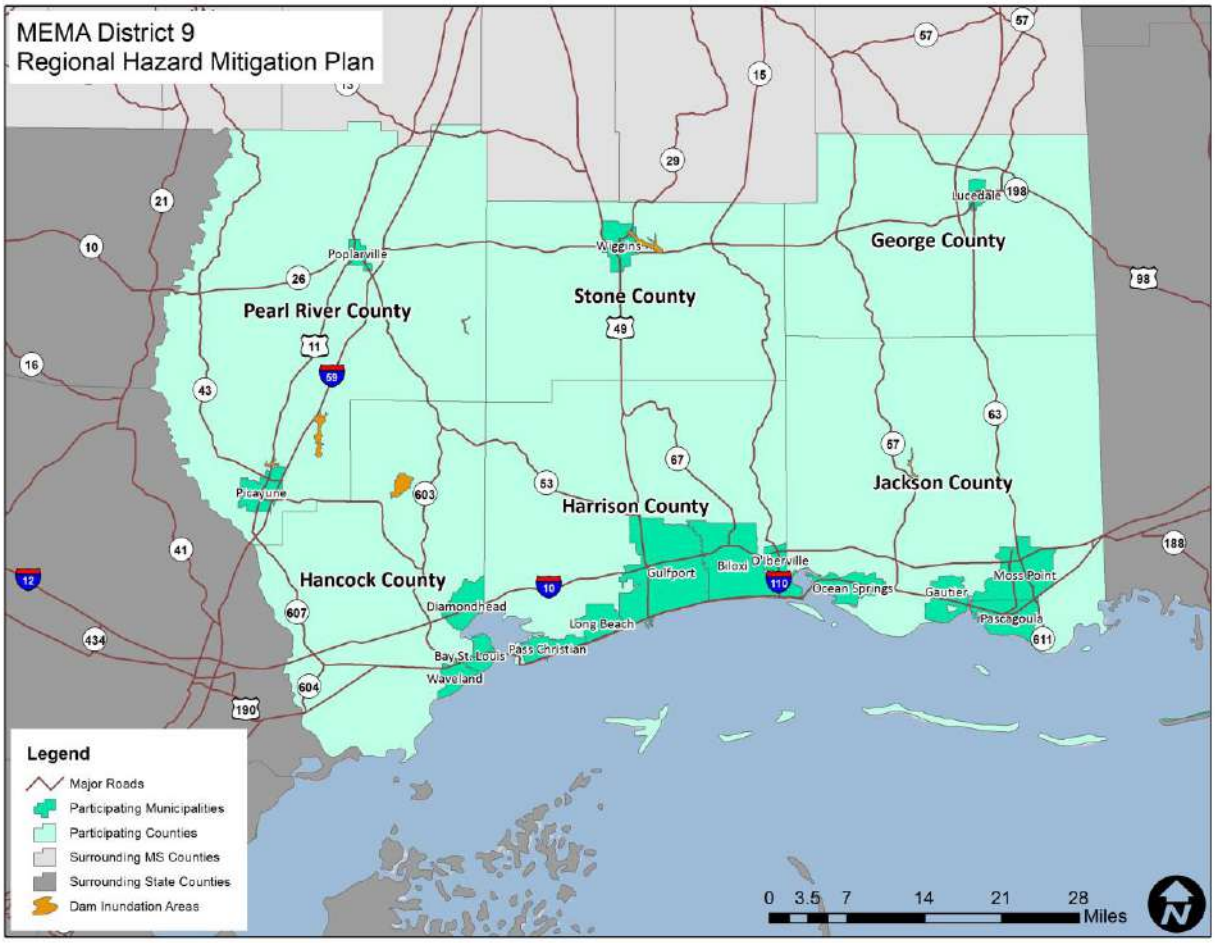
FIGURE 5.2: MEMA DISTRICT 9 HIGH HAZARD DAM LOCATIONS



Source: Mississippi Department of Environmental Quality

[1] The list of high hazard dams obtained from the Mississippi Department of Environmental Quality was reviewed and amended by local officials to the best of their knowledge.

FIGURE 5.3: MEMA DISTRICT 9 DAM INUNDATION AREAS



Source: Mississippi Department of Environmental Quality

TABLE 5.4: MEMA DISTRICT 9 REGION HIGH HAZARD DAMS

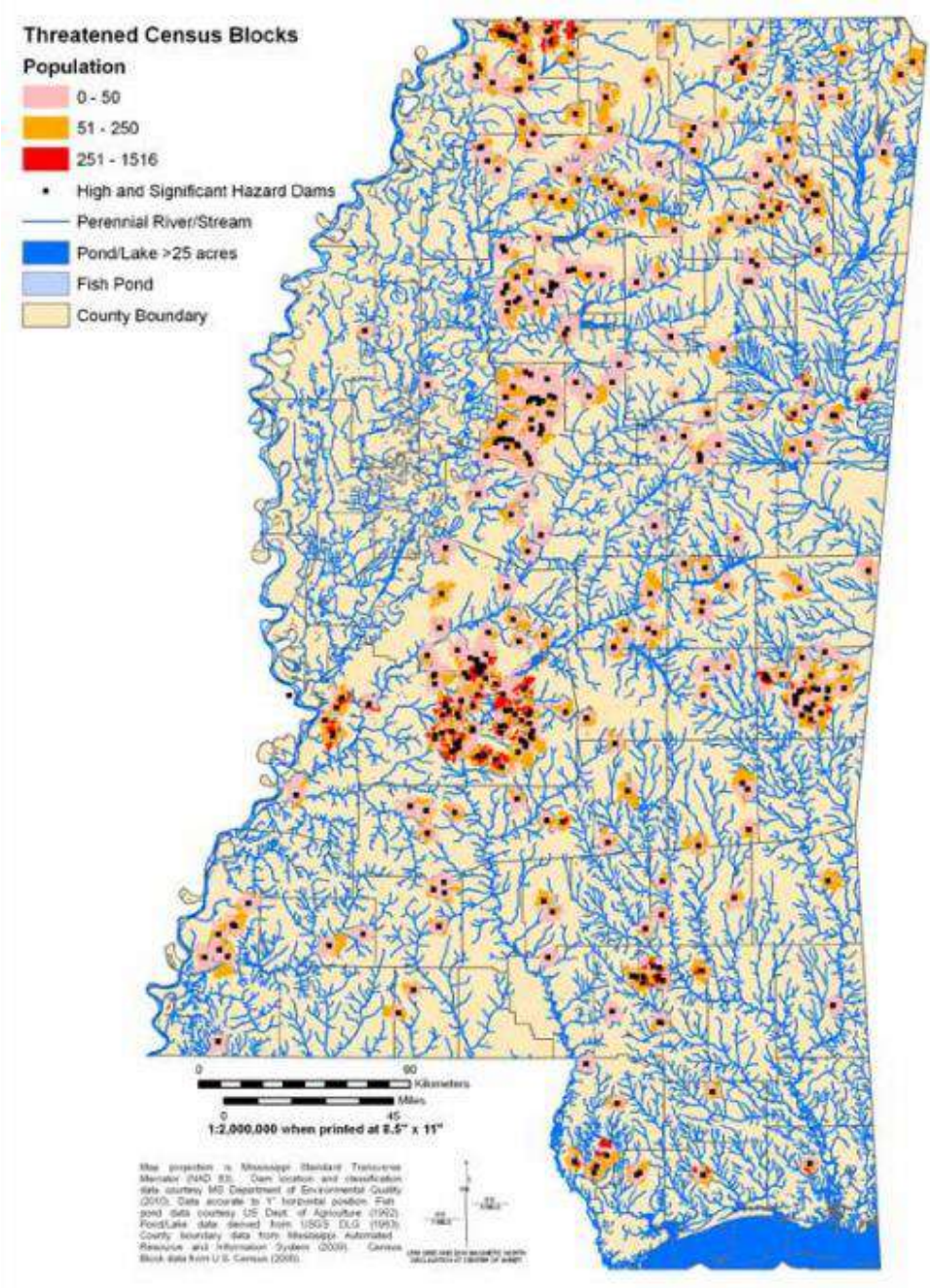
Dam Name	Hazard Potential
George County	
NONE	*N/A*
Hancock County	
WHITE CYPRESS LAKE DAM	High
Harrison County	
LAKE A TWIN LAKES SUBDIVISION DAM	High
Jackson County	
BLACK CREEK COOLING WATER DAM	High
Pearl River County	
ANCHOR LAKE DAM	High
GO GO ROAD LAKE DAM	High
HIDE-A-WAY LAKE DAM	High

Dam Name	Hazard Potential
Stone County	
FLINT CREEK RESERVOIR DAM	High

Source: Mississippi Department of Environmental Quality

Additionally, the Mississippi State Hazard Mitigation Plan provides some additional statewide information regarding populations that are located within two miles of a high or significant class dam and are potentially threatened by a dam failure. These areas are identified in **Figure 5.4.**

FIGURE 5.4: POPULATION LIVING WITHIN TWO MILES AND THREATENED BY A HIGH OR SIGNIFICANT HAZARD DAM FAILURE

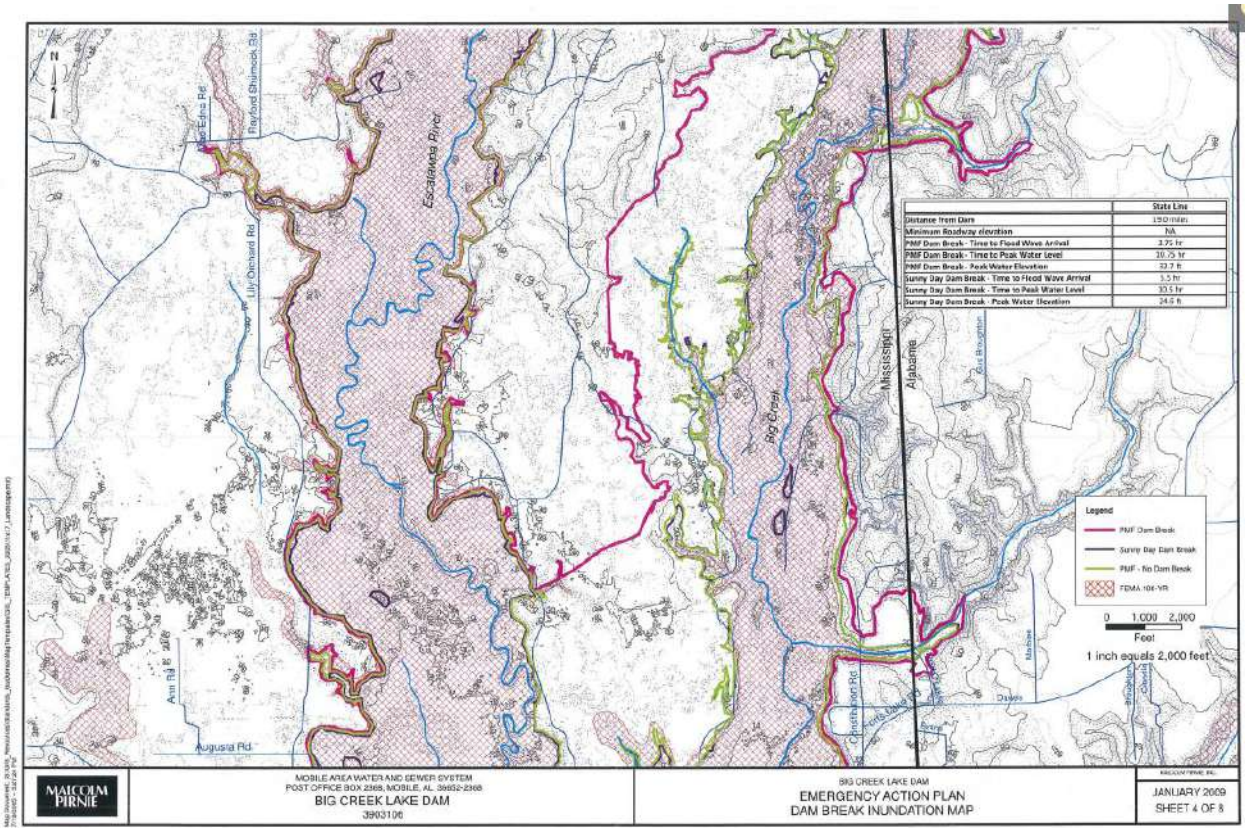


Source: Mississippi State Hazard Mitigation Plan

Finally, although it is technically outside the State of Mississippi, the Big Creek Lake Dam in Alabama poses a potential risk to some areas in eastern Jackson County and has been identified as the greatest threat in terms of dam failure in the county. The Emergency Action Plan for this dam provides probable maximum flood areas in both Alabama and Mississippi, demonstrating potential areas at risk in several scenarios including dam break, sunny day dam break, and no dam break. Part of this mapping is found in

Figure 5.5. Additional maps from the Big Creek Lake Dam Emergency Action Plan can be found in the Jackson County Annex of this plan.

FIGURE 5.5: BIG CREEK LAKE DAM FAILURE SCENARIOS



Source: Big Creek Lake Dam Emergency Action Plan

5.3.3 Historical Occurrences

According to the Mississippi State Hazard Mitigation Plan, there have been four dam failures reported in the MEMA District 9 Region, one in Hancock County, one in Harrison County, and two in Pearl River County. Although no damage was reported with these events, several breach scenarios in the region could be catastrophic.

Table 5.5 below provides a brief description of the four reported dam failures.

TABLE 5.5: MEMA DISTRICT 9 REGION DAM FAILURES (1982-2012)

Date	County	Structure Name	Cause of Failure
April 1983	Hancock	Boy Scout Camp	Breached
April 1983	Pearl River	Anchor Lake	Breached
October 2002	Harrison	Windy Hills Lake	Piping along primary spillway conduit
April 2004	Pearl River	Dove Lake	Piping

Source: Mississippi State Hazard Mitigation Plan

5.3.4 Probability of Future Occurrence

Given the current dam inventory and historic data, a dam breach is possible (between 1 and 10 percent annual probability) in the future. However, as has been demonstrated in the past, regular monitoring is necessary to prevent these events. No further analysis will be completed in Section 6: *Vulnerability Assessment* as more sophisticated dam breach plans (typically completed by the U.S. Army Corp of Engineers) have been completed for dams of concern in the region.

5.4 EROSION

5.4.1 Background

Erosion is the gradual breakdown and movement of land due to both physical and chemical processes of water, wind, and general meteorological conditions. Natural, or geologic, erosion has occurred since the Earth's formation and continues at a very slow and uniform rate each year.

There are two types of soil erosion: wind erosion and water erosion. Wind erosion can cause significant soil loss. Winds blowing across sparsely vegetated or disturbed land can pick up soil particles and carry them through the air, thus displacing them. Water erosion, the hazard of topic here, can occur over land or in streams and channels. Water erosion that takes place over land may result from raindrops, shallow sheets of water flowing off the land, or shallow surface flow, which becomes concentrated in low spots. Stream channel erosion may occur as the volume and velocity of water flow increases enough to cause movement of the streambed and bank soils. Major storms, such hurricanes in coastal areas, may cause significant erosion by combining high winds with heavy surf and storm surge to significantly impact the shoreline.

An area's potential for erosion is determined by four factors: soil characteristics, vegetative cover, topography climate or rainfall, and topography. Soils composed of a large percentage of silt and fine sand are most susceptible to erosion. As the clay and organic content of these soils increases, the potential for erosion decreases. Well-drained and well-graded gravels and gravel-sand mixtures are the least likely to erode. Coarse gravel soils are highly permeable and have a good capacity for absorption, which can prevent or delay the amount of surface runoff. Vegetative cover can be very helpful in controlling erosion by shielding the soil surface from falling rain, absorbing water from the soil, and slowing the velocity of runoff. Runoff is also affected by the topography of the area including size, shape, and slope. The greater the slope length and gradient, the more potential an area has for erosion. Climate can affect the amount of runoff, especially the frequency, intensity, and duration of rainfall and storms. When rainstorms are frequent, intense, or of long duration, erosion risks are high. Seasonal changes in temperature and rainfall amounts define the period of highest erosion risk of the year.

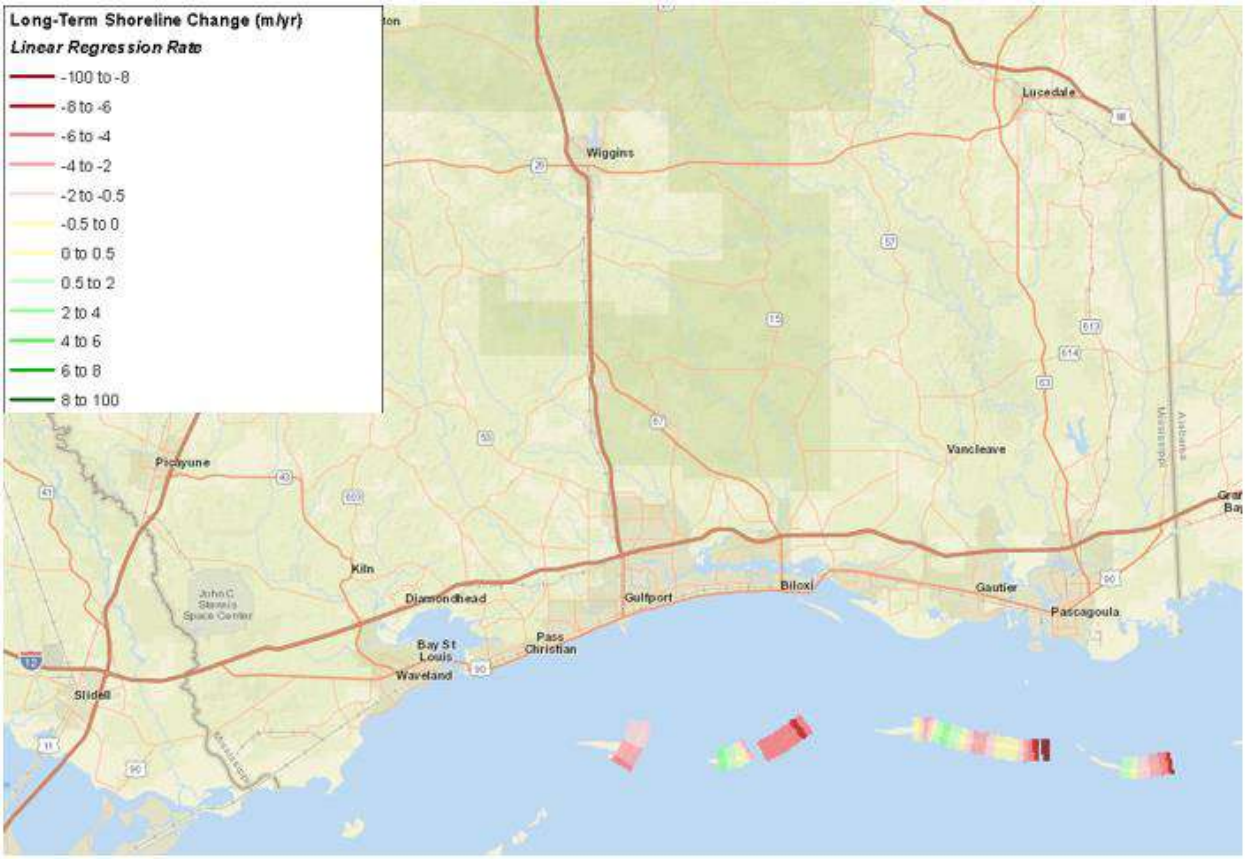
During the past 20 years, the importance of erosion control has gained the increased attention of the public. Implementation of erosion control measures consistent with sound agricultural and construction operations is needed to minimize the adverse effects associated with harmful chemicals run-off due to wind or water events. The increase in government regulatory programs and public concern has resulted in a wide range of erosion control products, techniques, and analytical methodologies in the United States. The preferred method of erosion control in recent years has been the restoration of vegetation.

5.4.2 Location and Spatial Extent

For the most part, major erosion in the MEMA District 9 Region is typically caused by coastal tides, ocean currents, and storm events. Although the region also experiences riverine erosion in many of its inland areas, these are of somewhat less concern than coastal erosion areas which historically have had larger impacts. Unlike inland areas, where the soil has greater organic matter content, coastal soils are mainly composed of fine grained particles such as sand. This makes coastal soils much more susceptible to erosion. Although some areas of the MEMA District 9 Region coast are protected and natural erosion processes are allowed to take place for the most part, many areas near where development has occurred are especially susceptible.

At this time, there is limited data available on localized areas of erosion. Most of the information collected by the United States Geological Survey (USGS) is focused on the barrier islands that are just off the coast of the mainland. The long-term shoreline change for the barrier islands as calculated by the USGS can be found in **Figure 5.6** It should be noted that many areas of the coast are protected through the use of structural techniques. Also, a great deal of renourishment activities are carried out along the mainland coastal communities.

FIGURE 5.6: LONG-TERM SHORELINE CHANGE (M/YR) IN THE MEMA DISTRICT 9 REGION



Source: United States Geological Survey

5.4.3 Historical Occurrences

Several sources were vetted to identify areas of erosion in the MEMA District 9 Region. This includes searching local newspapers, interviewing local officials, and reviewing previous hazard mitigation plans. Because dramatic, short-term erosion tends to take place after major storm events such as hurricanes, flooding, or storm surge, the erosion events often correspond directly with those events. Conversely, with long-term erosion, it is difficult to identify a specific historic occurrence because these events are by nature occurring at all times over a long period at a very gradual rate. Therefore, long-term historic erosion events cannot be confined to a specific timeframe or occurrence.

5.4.4 Probability of Future Occurrences

Erosion remains a natural, dynamic, and continuous process for the MEMA District 9 Region, and it will continue to occur. The annual probability level assigned for erosion is likely (between 10 and 100 percent annually). However, due to the measures taken to combat its effects at a very localized level, no further analysis will be done in Section 6: *Vulnerability Assessment*.

5.5 FLOOD

5.5.1 Background

Flooding is the most frequent and costly natural hazard in the United States and is a hazard that has caused more than 10,000 deaths since 1900. Nearly 90 percent of presidential disaster declarations result from natural events where flooding was a major component.

Floods generally result from excessive precipitation and can be classified under two categories: general floods, precipitation over a given river basin for a long period of time along with storm-induced wave action, and flash floods, the product of heavy localized precipitation in a short time period over a given location. The severity of a flooding event is typically determined by a combination of several major factors, including stream and river basin topography and physiography, precipitation and weather patterns, recent soil moisture conditions, and the degree of vegetative clearing and impervious surface.

General floods are usually long-term events that may last for several days. The primary types of general flooding include riverine, coastal, and urban flooding. Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall produced by hurricanes, tropical storms, and other large coastal storms. Urban flooding occurs where manmade development has obstructed the natural flow of water and decreased the ability of natural groundcover to absorb and retain surface water runoff.

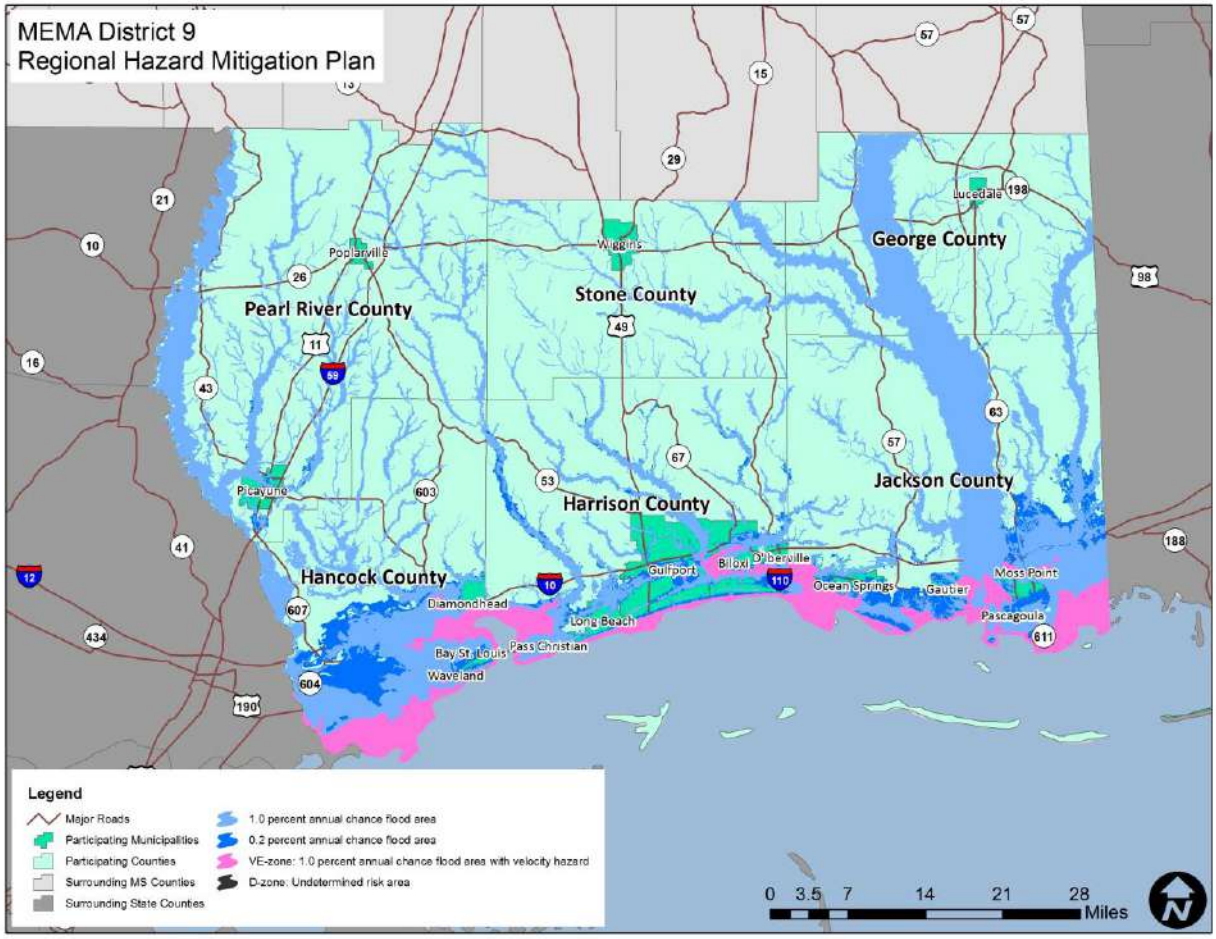
Flash flooding is another type of flooding that can be associated with urban flooding. It is common in urbanized areas where much of the ground is covered by impervious surfaces. Most flash flooding occurs along mountain streams and is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. However, flash-flooding events may also occur from a dam or levee failure within minutes or hours of heavy amounts of rainfall, or from a sudden release of water held by retention basin or other stormwater control facility.

The periodic flooding of lands adjacent to rivers, streams, and shorelines (land known as floodplain) is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. Floodplains are designated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will be covered by the 100-year flood and the 100-year floodplain by the 1,000-year flood. Flood frequencies such as the 100-year flood are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. Another way of expressing the flood frequency is the chance of occurrence in a given year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1-percent annual chance of occurring in any given year, and the 500-year flood has a 0.2-percent annual chance of occurring in any given year.

5.5.2 Location and Spatial Extent

There are areas in the MEMA District 9 Region that are susceptible to flood events. Special flood hazard areas in the region were mapped using Geographic Information System (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM). This includes Zone A (1-percent annual chance floodplain), Zone AE (1-percent annual chance floodplain with elevations), Zone VE (1-percent annual chance floodplain with additional hazards due to storm-induced velocity wave action), Zone X500 (0.2-percent annual chance floodplain), and Zone D (undetermined risk area). **Figure 5.7** illustrates the location and extent of currently mapped special flood hazard areas for the region based on best available FEMA Digital Flood Insurance Rate Map (DFIRM) data.

FIGURE 5.7: SPECIAL FLOOD HAZARD AREAS IN THE MEMA DISTRICT 9 REGION



Source: Federal Emergency Management Agency

Additional, more detailed county-level and jurisdiction-level maps can be found in the annexes.

5.5.3 Historical Occurrences

Floods were at least partially responsible for 11 disaster declarations in the MEMA District 9 Region between 1974 and 2016.[2] Information from the National Climatic Data Center was used to ascertain additional historical flood events. The National Climatic Data Center reported a total of 168 events throughout the MEMA District 9 Region since 1996.[3] These events accounted for $12.2 million (2016 dollars) in property damage and one fatality throughout the region.[4] A summary of these events is presented in **Table 5.6**. Specific information on flood events for each county, including date, type of flooding, and deaths and injuries, can be found in the county-specific annexes.

[2] Not all of the participating counties were declared disaster areas for these storms. A complete listing of historical disaster declarations, including the affected counties, can be found in Section 4: *Hazard Identification*.
[3] These flood events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional occurrences have occurred and have gone unreported. As additional local data becomes available, this hazard profile will be amended.
[4] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE 5.6: SUMMARY OF FLOOD OCCURRENCES IN THE MEMA DISTRICT 9 REGION

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
George County	**25**	**0/0**	**$48,618**	**$3,048**
Lucedale	6	0/0	$5,000	$625
Unincorporated Area	19	0/0	$43,618	$2,423
Hancock County	**29**	**0/0**	**$1,146,578**	**$63,260**
Bay St. Louis	3	0/0	$0	$0
Diamondhead	1	0/0	$0	$0
Waveland	4	0/0	$150,064	$7,898
Unincorporated Area	21	0/0	$996,514	$55,362
Harrison County	**45**	**1/0**	**$3,138,464**	**$286,743**
Biloxi	8	0/0	$103,389	$5,169
D'Iberville	1	0/0	$10,339	$3,446
Gulfport	7	0/0	$0	$0
Long Beach	6	1/0	$1,366,517	$195,217
Pass Christian	3	0/0	$0	$0
Unincorporated Area	20	0/0	$1,658,219	$82,911
Jackson County	**25**	**0/0**	**$4,071,089**	**$234,715**
Gautier	0	0/0	$0	$0
Moss Point	2	0/0	$1,325,787	$94,699
Ocean Springs	2	0/0	$0	$0
Pascagoula	4	0/0	$128,387	$9,171
Unincorporated Area	17	0/0	$2,616,915	$130,846
Pearl River County	**20**	**0/0**	**$3,612,923**	**$191,132**
Picayune	2	0/0	$31,876	$2,656
Poplarville	1	0/0	$0	$0
Unincorporated Area	17	0/0	$3,581,047	$188,476
Stone County	**24**	**0/0**	**$146,318**	**$8,226**
Wiggins	9	0/0	$13,987	$874
Unincorporated Area	15	0/0	$132,331	$7,352
MEMA DISTRICT 9 REGIONAL TOTAL	**168**	**1/0**	**$12,163,990**	**$787,125**

Source: National Climatic Data Center

5.5.4 Historical Summary of Insured Flood Losses

According to FEMA flood insurance policy records as of October 2016, there have been 30,820 flood losses reported in the MEMA District 9 Region through the National Flood Insurance Program (NFIP) since 1978, totaling over $2.7 billion in claims payments. A summary of these figures for each MEMA District 9 county is provided in **Table 5.7**. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP policies, and for losses in which claims were sought and received. It is likely that many additional instances of flood loss in the MEMA District 9 Region were either uninsured, denied claims payment, or not reported.

TABLE 5.7: SUMMARY OF INSURED FLOOD LOSSES IN MEMA DISTRICT 9 REGION

Location	Number of Policies	Flood Losses	Claims Payments
George County	**122**	**43**	**$396,792**
Lucedale	10	1	$385,792
Unincorporated Area	112	42	$11,000
Hancock County	**8,314**	**8,558**	**$737,425,476**
Bay St. Louis	2,240	1,244	$148,880,718
Diamondhead	14	0	$0
Waveland	1,795	1,385	$183,867,798
Unincorporated Area	4,265	5,929	$404,676,960
Harrison County	**18,361**	**12,677**	**$1,278,139,139**
Biloxi	5,206	2,293	$253,008,756
D'Iberville	515	27	$1,939,357
Gulfport	5,267	3,078	$285,499,409
Long Beach	2,640	1,505	$152,511,425
Pass Christian	2,093	2,550	$323,619,220
Unincorporated Area	2,640	3,224	$261,560,972
Jackson County	**16,417**	**8,963**	**$699,279,682**
Gautier	1,724	681	$59,663,535
Moss Point	1,131	886	$28,225,055
Ocean Springs	2,622	823	$86,224,366
Pascagoula	4,944	2,763	$221,292,452
Unincorporated Area	5,996	3,810	$303,874,274
Pearl River County	**989**	**568**	**$13,484,478**
Picayune	255	194	$3,579,193
Poplarville	2	0	$0
Unincorporated Area	732	374	$9,905,285
Stone County	**36**	**11**	**$115,205**
Wiggins	5	0	$0
Unincorporated Area	31	11	$115,205
MEMA DISTRICT 9 REGIONAL TOTAL	**44,239**	**30,820**	**$2,728,840,772**

Source: National Flood Insurance Program

5.5.5 Repetitive Loss Properties

FEMA defines a repetitive loss property as any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling 10-year period, since 1978. A repetitive loss property may or may not be currently insured by the NFIP. Currently there are over 140,000 repetitive loss properties nationwide.

According to the Mississippi Emergency Management Agency, there are 3,693 non-mitigated repetitive loss properties located in the MEMA District 9 Region, which accounted for 9,993 losses and over $497.2 million in claims payments under the NFIP. The average claim amount for these properties is $49,756. Of the 3,693 properties, 3,310 are single family, 47 are 2-4 family, 55 are condominiums, 43 are other residential, 190 are non-residential, and 25 are unknown. Without mitigation, these properties will likely

continue to experience flood losses. **Table 5.8** presents a summary of these figures for the MEMA District 9 Region. Detailed information on repetitive loss properties and NFIP claims and policies can be found in the county-specific annexes.

TABLE 5.8: SUMMARY OF REPETITIVE LOSS PROPERTIES IN THE MEMA DISTRICT 9 REGION

Location	Number of Properties	Number of Losses	Total Payments
George County	**3**	**7**	**$132,581**
Lucedale	0	0	$0
Unincorporated Area	3	7	$132,581
Hancock County	**1,060**	**2,689**	**$121,615,790**
Bay St. Louis	408	1,106	$52,473,189
Diamondhead	23	--	--
Waveland	74	223	$8,268,443
Unincorporated Area	555	1,360	$60,874,158
Harrison County	**1,300**	**3,932**	**$195,461,466**
Biloxi	239	663	$38,868,824
D'Iberville*	25	--	--
Gulfport	493	1,554	$69,452,256
Long Beach	142	540	$15,968,825
Pass Christian	175	493	$32,910,670
Unincorporated Area	226	682	$38,260,891
Jackson County	**1,259**	**3,142**	**$175,609,018**
Gautier	147	335	$22,145,199
Moss Point	186	483	$15,100,411
Ocean Springs	50	135	$15,291,674
Pascagoula	516	1,219	$75,013,407
Unincorporated Area	360	970	$48,058,327
Pearl River County	**69**	**219**	**$4,367,910**
Picayune	30	88	$1,587,927
Poplarville	0	0	$0
Unincorporated Area	39	131	$2,779,983
Stone County	**2**	**4**	**$23,874**
Wiggins	0	0	$0
Unincorporated Area	2	4	$23,874
MEMA DISTRICT 9 REGIONAL TOTAL	**3,693**	**9,993**	**$497,210,639**

*The information provided by D'Iberville and Diamondhead did not include number of losses or total payments information for the city. Therefore, the number of losses and total payments for the city are not included in the regional total.
Source: Federal Emergency Management Agency, National Flood Insurance Program

5.5.6 Probability of Future Occurrences

Flood events will remain a threat in the MEMA District 9 Region, and the probability of future occurrences will remain highly likely (100 percent annual probability). The probability of future flood events based on magnitude and according to best available data is illustrated in the figure above, which indicates those areas susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain). Further, as described in other hazard profiles, it

is highly likely that the MEMA District 9 Region will continue to experience inland and coastal flooding associated with large tropical storms, hurricanes, and storm surge events.

It can be inferred from the floodplain location maps, previous occurrences, and repetitive loss properties that risk varies throughout the region. For example, the southern (coastal) half of the region has more floodplain and thus a higher risk of flood than the northern (inland) half of the region. Flooding will continue to occur and cause damage, therefore mitigation actions may be warranted, particularly for repetitive loss properties.

It should also be noted that anticipated sea level rise will increase the probability and intensity of future tidal flooding events in years to come. Rising sea level over time will shorten the return period (increasing the frequency) of significant flood events. This hazard is discussed elsewhere in this section.

5.6 STORM SURGE

5.6.1 Background

Storm surge occurs when the water level of a tidally influenced body of water increases above the normal astronomical high tide and are most common in conjunction with coastal storms with massive low-pressure systems with cyclonic flows such as hurricanes, tropical storms, and nor'easters. The low barometric pressure associated with these storms cause the water surface to rise and storms landfalling during peak tides have surge heights and more extensive flood inundation limits. Storm surges will inundate coastal floodplains by dune overwash, tidal elevation rise in inland bays and harbors, and backwater flooding through coastal river mouths. The duration of a storm is the most influential factor affecting the severity and impact of storm surges.

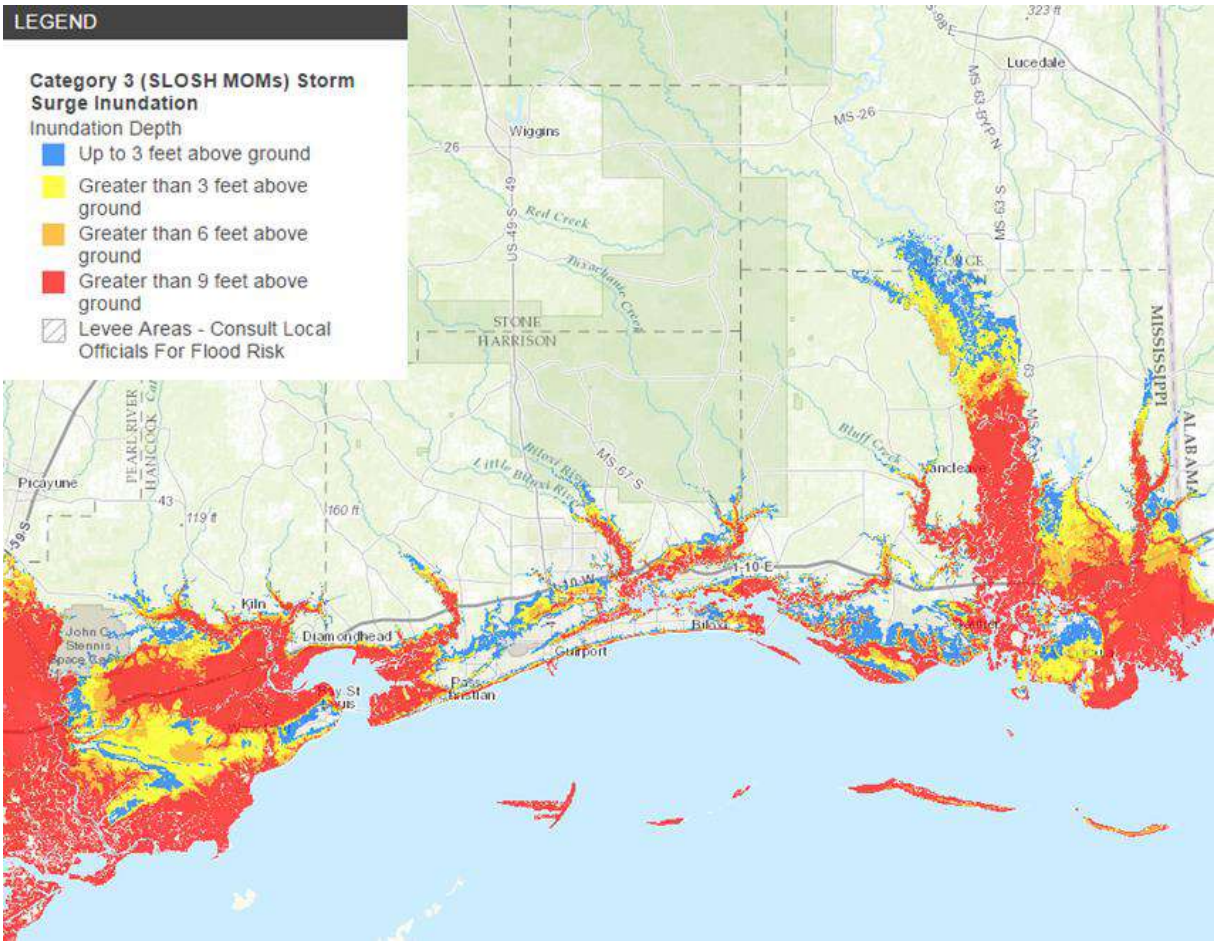
A storm surge is often described as a wave that has outrun its generating source and become a long period swell. It is often recognized as a large dome of water that may be 50 to 100 miles wide and rising anywhere from four to five feet in a Category 1 hurricane up to 20 feet in a Category 5 storm. The storm surge arrives ahead of the storm center's actual landfall and the more intense the storm is, the sooner the surge arrives. Water rise can be very rapid, posing a serious threat to those who have not yet evacuated flood-prone areas. The surge is always highest in the right-front quadrant of the direction in which the storm is moving. As the storm approaches shore, the greatest storm surge will be to the north of the low-pressure system or hurricane eye. Such a surge of high water topped by waves driven by hurricane force winds can be devastating to coastal regions, causing severe beach erosion and property damage along the immediate shoreline.

Storm surge heights and associated waves are dependent on not only the storm's intensity but also upon the shape of the offshore continental shelf (narrow or wide), the depth of the ocean bottom (bathymetry), and astronomical tides. A narrow shelf, or one that drops steeply from the shoreline and subsequently produces deep water close to the shoreline, tends to produce a lower surge but higher and more powerful storm waves. In addition, a storm surge event occurs during high tide will result in increased flooding and inundation of coastal areas. The storms that generate the largest coastal storm surges can develop year-round, but they are most frequent from late summer to early spring.

5.6.2 Location and Spatial Extent

There are many areas in the MEMA District 9 Region that are subject to potential storm surge inundation as modeled and mapped by the National Oceanic and Atmospheric Administration (NOAA). **Figure 5.8** illustrates hurricane storm surge inundation zones based on a Category 3 storm. The illustration is derived from geo-referenced SLOSH (Sea, Lake, and Overland Surge from Hurricanes) data produced by the USACE in coordination with NOAA. SLOSH is a modeling tool used to estimate storm surge for coastal areas resulting from historical, hypothetical, or predicted hurricanes taking into account maximum expected levels for pressure, size, forward speed, track, and winds. Therefore, the SLOSH data is best used for defining the potential maximum surge associated with various storm intensities for any particular location. As shown in the figure, the entire coast of the MEMA District 9 Region is at high risk to storm surge inundation. Inland areas may also experience substantial flooding during a storm event.

FIGURE 5.8: STORM SURGE RISK AREAS IN THE MEMA DISTRICT 9 REGION



Source: NOAA

5.6.3 Historical Occurrences

According to the National Climatic Data Center, 30 storm surge events have been reported for the MEMA District 9 Region since 1998.[5] These events accounted for $13.9 billion (2016 dollars) in property damage.[6] A summary of these events is presented in **Table 5.9**. Detailed information on the recorded storm surge events can be found in the county-specific annexes.

TABLE 5.9: SUMMARY OF STORM SURGE EVENTS IN THE MEMA DISTRICT 9 REGION

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
George County	**0**	**0/0**	**$0**	**$0**
Lucedale	0	0/0	$0	$0
Unincorporated Area	0	0/0	$0	$0
Hancock County	**11**	**0/0**	**$4,174,523,545**	**$231,917,975**
Bay St. Louis	0	0/0	$0	$0
Diamondhead	0	0/0	$0	$0
Waveland	0	0/0	$0	$0
Unincorporated Area	11	0/0	$4,174,523,545	$231,917,975
Harrison County	**10**	**0/0**	**$6,947,825,056**	**$534,440,188**
Biloxi	0	0/0	$0	$0
D'Iberville	0	0/0	$0	$0
Gulfport	0	0/0	$0	$0
Long Beach	0	0/0	$0	$0
Pass Christian	1	0/0	$369,406	$20,523
Unincorporated Area	9	0/0	$6,947,455,650	$534,419,665
Jackson County	**9**	**0/0**	**$2,778,476,950**	**$213,721,103**
Gautier	0	0/0	$0	$0
Moss Point	0	0/0	$0	$0
Ocean Springs	1	0/0	$369,406	$20,523
Pascagoula	0	0/0	$0	$0
Unincorporated Area	8	0/0	$2,778,107,544	$213,721,103
Pearl River County	**0**	**0/0**	**$0**	**$0**
Picayune	0	0/0	$0	$0
Poplarville	0	0/0	$0	$0
Unincorporated Area	0	0/0	$0	$0
Stone County	**0**	**0/0**	**$0**	**$0**
Wiggins	0	0/0	$0	$0
Unincorporated Area	0	0/0	$0	$0
MEMA DISTRICT 9 REGIONAL TOTAL	**30**	**0/0**	**$13,900,825,551**	**$980,079,266**

Source: National Climatic Data Center

[5] These storm surge events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional storm surge conditions have affected the MEMA District 9 Region.
[6] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

5.6.4 Probability of Future Occurrences

It is highly likely (100 percent annual probability) that the MEMA District 9 Region will continue to experience storm surge associated with large tropical storms, hurricanes, and squalls combined with high tides. As noted in the preceding section (under Flood), anticipated sea level rise will increase the probability and intensity of future storm surge events in years to come.[7] This rise in sea level will not only increase the probability and intensity of tidal flooding events, but will also contribute to the loss of coastal wetlands and erosion of sand beaches that act as protective buffers against storm surge events.

FIRE-RELATED HAZARDS

5.7 DROUGHT

5.7.1 Background

Drought is a normal part of virtually all climatic regions, including areas with high and low average rainfall. Drought is the consequence of a natural reduction in the amount of precipitation expected over an extended period of time, usually a season or more in length. High temperatures, high winds, and low humidity can exacerbate drought conditions. In addition, human actions and demands for water resources can hasten drought-related impacts. Droughts may also lead to more severe wildfires.

Droughts are typically classified into one of four types: 1) meteorological, 2) hydrologic, 3) agricultural, or 4) socioeconomic. **Table 5.10** presents definitions for these types of drought.

TABLE 5.10 DROUGHT CLASSIFICATION DEFINITIONS

Meteorological Drought	The degree of dryness or departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
Hydrologic Drought	The effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
Agricultural Drought	Soil moisture deficiencies relative to water demands of plant life, usually crops.
Socioeconomic Drought	The effect of demands for water exceeding the supply as a result of a weather-related supply shortfall.

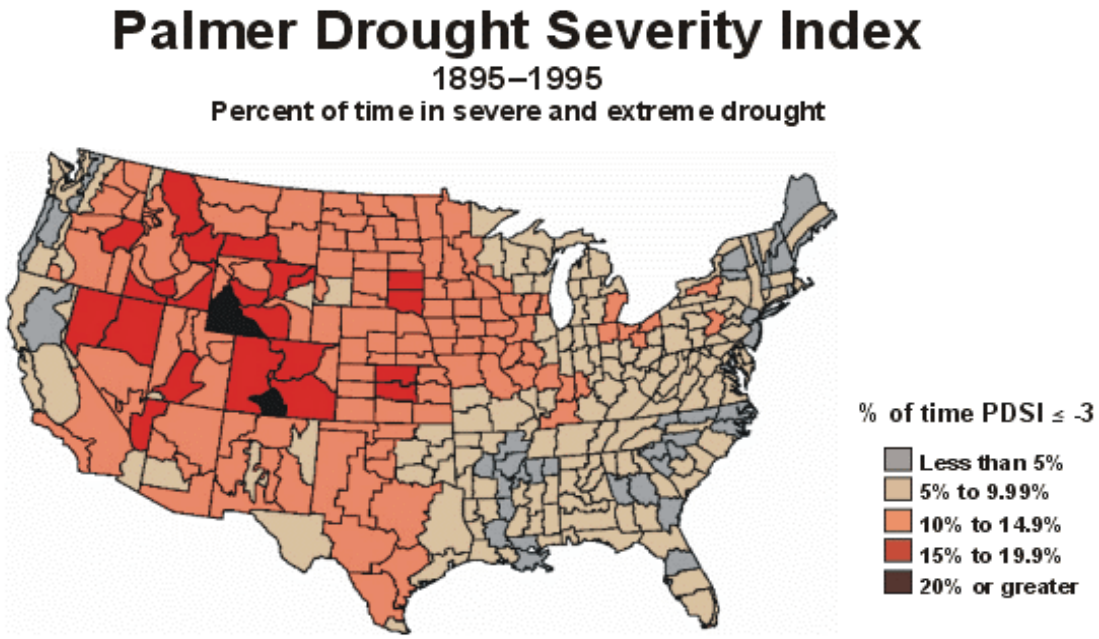
Source: Multi-Hazard Identification and Risk Assessment: A Cornerstone of the National Mitigation Strategy, FEMA

Droughts are slow-onset hazards, but, over time, can have very damaging affects to crops, municipal water supplies, recreational uses, and wildlife. If drought conditions extend over a number of years, the direct and indirect economic impact can be significant.

The Palmer Drought Severity Index (PDSI) is based on observed drought conditions and range from -0.5 (incipient dry spell) to -4.0 (extreme drought). Evident in **Figure 5.9**, the Palmer Drought Severity Index Summary Map for the United Stated, drought affects most areas of the United States, but is less severe in the Eastern and Southeastern United States.

[7] The Sea Level Rise hazard is assessed more extensively under Section 5.18.

FIGURE 5.9: PALMER DROUGHT SEVERITY INDEX SUMMARY MAP FOR THE UNITED STATES



Source: National Drought Mitigation Center

The U.S. Drought Monitor also records information on historical drought occurrence. The U.S. Drought Monitor categorizes drought on a D0-D4 scale as **Table 5.11** presents definitions for these classifications.

TABLE 5.11: U.S. DROUGHT MONITOR

D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies

Source: United States Drought Monitor, http://droughtmonitor.unl.edu/classify.htm

5.7.2 Location and Spatial Extent

Drought typically covers a large area and cannot be confined to any geographic or political boundaries. Furthermore, it is assumed that the MEMA District 9 Region would be uniformly exposed to drought, making the spatial extent potentially widespread. It is also notable that drought conditions typically do not cause significant damage to the built environment but may exacerbate wildfire conditions.

5.7.3 Historical Occurrences

Data from the U.S. Drought Monitor and National Climatic Data Center (NCDC) were used to ascertain historical drought events in the MEMA District 9 Region. The U.S. Drought Monitor reports data at the

county level on a weekly basis throughout the county. It classifies drought conditions on a scale of D0 to D4, as described in the table above.

According to the U.S. Drought Monitor, all of the counties in the MEMA District 9 Region had drought levels of Severe or worse in at least 6 of the last 17 years (January 2000-October 2016) (**Table 5.12**). The most severe drought classification reported for each year, according to U.S. Drought Monitor classifications, is listed in the county-specific annexes. It should be noted that the U.S. Drought Monitor also estimates what percentage of the county is in each classification of drought severity. For example, the most severe classification reported may be exceptional, but a majority of the county may actually be in a less severe condition.

TABLE 5.12: SUMMARY OF DROUGHT OCCURRENCES IN THE MEMA DISTRICT 9 REGION

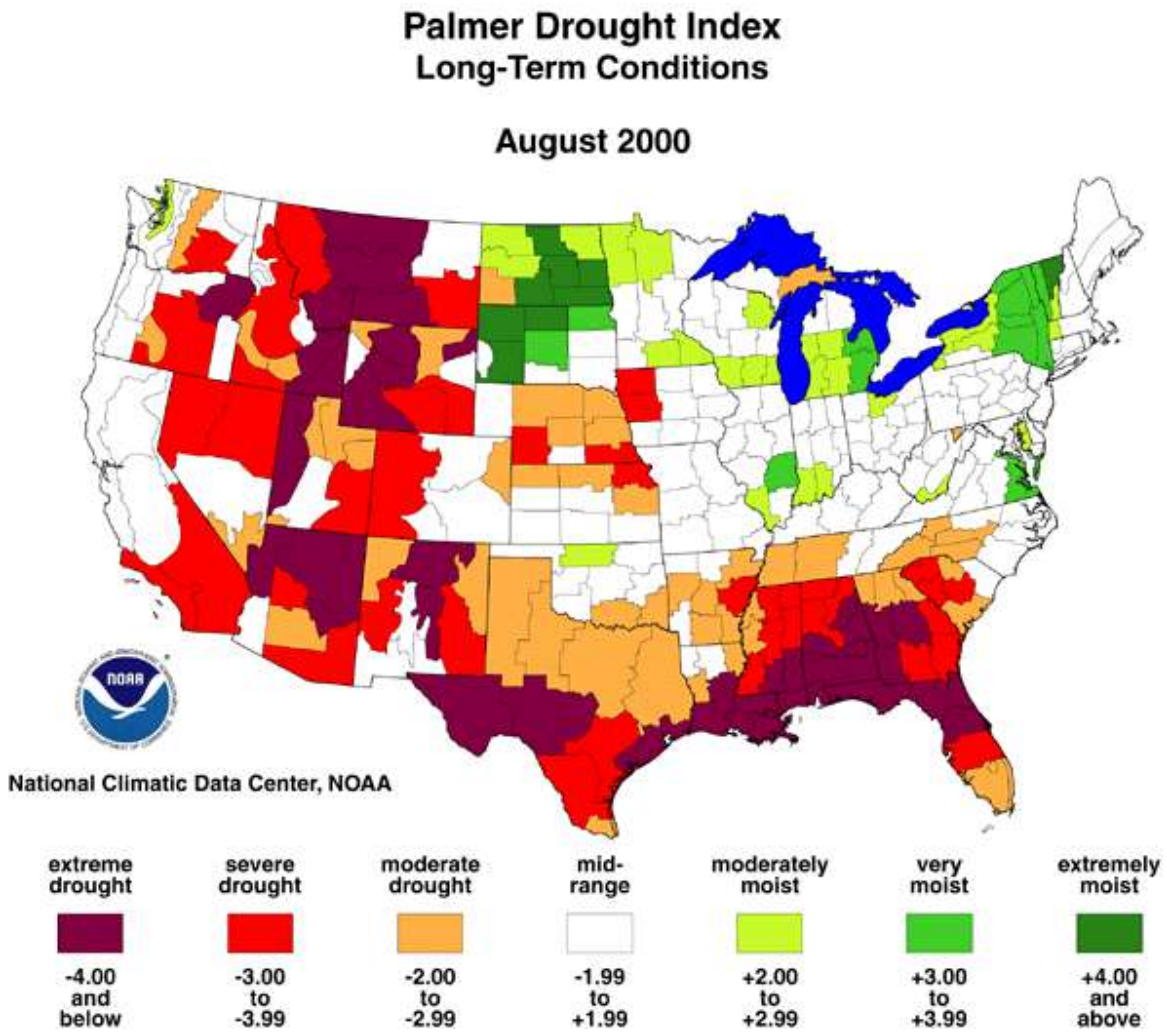
Location	Number Years with at least Severe Drought Occurrences	Number of years with Exceptional Drought Occurrences
George County	**8**	**2**
Hancock County	**6**	**2**
Harrison County	**6**	**2**
Jackson County	**7**	**2**
Pearl River County	**8**	**2**
Stone County	**8**	**2**

Source: United States Drought Monitor

Some additional anecdotal information was provided from the National Climatic Data Center on droughts in the MEMA District 9 Region.

Summer 2000 Drought – As shown in **Figure 5.10** below, drought conditions were pronounced throughout much of the south and western areas of the nation.

FIGURE 5.10: PALMER DROUGHT INDEX FOR AUGUST 2000



5.7.4 Probability of Future Occurrences

According to the Palmer Drought Severity Index (above), MEMA District 9 has a relatively low risk for drought hazard (5 to 9.99%). However, local areas may experience much more severe and/or frequent drought events than what is represented on the Palmer Drought Severity Index map.

Based on historical occurrence information, it is assumed that all of the MEMA District 9 Region has a probability level of likely (between 10 and 100 percent annual probability) for future drought events. However, the extent (or magnitude) of drought and the amount of geographic area covered by drought, varies with each year. Historic information indicates that there is a much lower probability for extreme, long-lasting drought conditions.

5.8 LIGHTNING

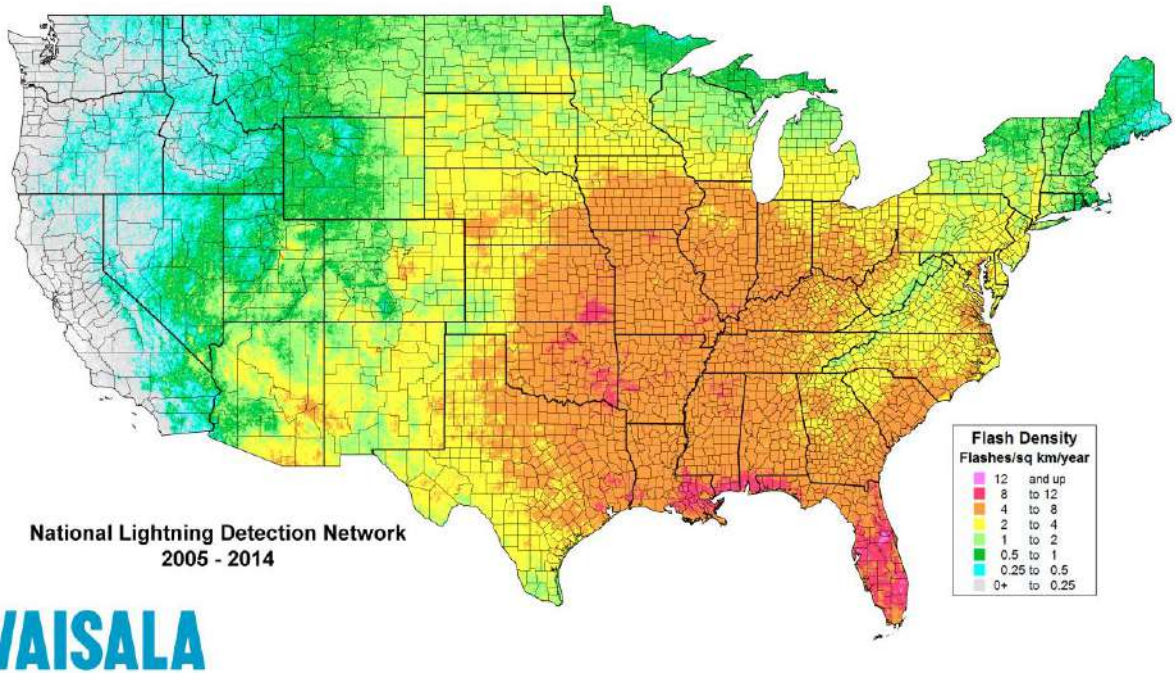
5.8.1 Background

Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a "bolt" when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes the thunder which often accompanies lightning strikes. While most often affiliated with severe thunderstorms, lightning may also strike outside of heavy rain and might occur as far as 10 miles away from any rainfall.

Lightning strikes occur in very small, localized areas. For example, they may strike a building, electrical transformer, or even a person. According to FEMA, lightning injures an average of 300 people and kills 80 people each year in the United States. Direct lightning strikes also have the ability to cause significant damage to buildings, critical facilities, and infrastructure largely by igniting a fire. Lightning is also responsible for igniting wildfires that can result in widespread damages to property.

Figure 5.11 shows the Vaisala's U.S. National Lightning Detection Network which indicates the average flash density per foot per square kilometer per year.

FIGURE 5.11: LIGHTNING FLASH DENSITY IN THE UNITED STATES (2005-2014)



Source: Vaisala United States National Lightning Detection Network

5.8.2 Location and Spatial Extent

Lightning occurs randomly, therefore it is impossible to predict where and with what frequency it will strike. It is assumed that all of the MEMA District 9 Region is uniformly exposed to lightning.

5.8.3 Historical Occurrences

According to the National Climatic Data Center, there have been a total of 57 recorded lightning events in the MEMA District 9 Region since 1996.[8] These events resulted in over $1.5 million (2016 dollars) in damages.[9] Furthermore, lightning has caused six fatalities and seven injuries in the MEMA District 9 Region. A summary of these events is presented in **Table 5.13**. Detailed information on historical lightning events can be found in the county-specific annexes.

It is certain that more than 57 events have impacted the region. Many of the reported events are those that caused damage, and it should be expected that damages are likely much higher for this hazard than what is reported.

TABLE 5.13: SUMMARY OF LIGHTNING OCCURRENCES IN THE MEMA DISTRICT 9 REGION

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
George County	**5**	**1/0**	**$200,760**	**$10,075**
Lucedale	3	0/0	$186,563	$9,328
Unincorporated Area	2	1/0	$14,197	$747
Hancock County	**8**	**2/0**	**$402,512**	**$24,550**
Bay St. Louis	2	0/0	$7,093	$373
Diamondhead	2	0/0	$163,623	$12,586
Waveland	2	0/0	$231,796	$11,590
Unincorporated Area	2	2/0	$0	$0
Harrison County	**15**	**2/1**	**$382,387**	**$22,238**
Biloxi	3	0/0	$76,754	$3,838
D'Iberville	1	1/0	$0	$0
Gulfport	6	1/0	$119,966	$6,665
Long Beach	0	0/0	$0	$0
Pass Christian	2	0/1	$31,471	$2,098
Unincorporated Area	3	0/0	$154,196	$9,637
Jackson County	**18**	**1/3**	**$335,638**	**$17,009**
Gautier	0	0/0	$0	$0
Moss Point	1	0/0	$2,678	$191
Ocean Springs	4	0/0	$89,747	$4,487
Pascagoula	8	1/3	$30,557	$1,698
Unincorporated Area	5	0/0	$212,656	$10,633

[8] These lightning events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is certain that additional lightning events have occurred in the MEMA District 9 Region. As additional local data becomes available, this hazard profile will be amended.
[9] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Pearl River County	**6**	**0/1**	**$132,986**	**$7,388**
Picayune	3	0/0	$0	$0
Poplarville	1	0/0	$132,986	$7,388
Unincorporated Area	2	0/1	$0	$0
Stone County	**5**	**0/2**	**$90,767**	**$6,483**
Wiggins	5	0/2	$90,767	$6,483
Unincorporated Area	0	0/0	$0	$0
MEMA DISTRICT 9 REGIONAL TOTAL	**57**	**6/7**	**$1,545,050**	**$87,743**

Source: National Climatic Data Center

5.8.4 Probability of Future Occurrences

Although there was not a high number of historical lightning events reported throughout the MEMA District 9 Region via NCDC data, it is a regular occurrence accompanied by thunderstorms. In fact, lightning events will assuredly happen on an annual basis, though all events will not cause damage. According to Vaisala's U.S. National Lightning Detection Network (NLDN), the MEMA District 9 Region is located in an area of the country that experienced an average of 4 to 12 and up lightning flashes per square kilometer per year between 2005 and 2014. Therefore, the probability of future events is highly likely (100 percent annual probability). It can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the region.

5.9 WILDFIRE

5.9.1 Background

A wildfire is any outdoor fire (i.e. grassland, forest, brush land) that is not under control, supervised, or prescribed.[10] Wildfires are part of the natural management of forest ecosystems, but may also be caused by human factors.

Nationally, over 80 percent of forest fires are started by negligent human behavior such as smoking in wooded areas or improperly extinguishing campfires. The second most common cause for wildfire is lightning. In Mississippi, a majority of fires are caused by debris burning.

There are three classes of wildland fires: surface fire, ground fire, and crown fire. A surface fire is the most common of these three classes and burns along the floor of a forest, moving slowly and killing or damaging trees. A ground fire (muck fire) is usually started by lightning or human carelessness and burns on or below the forest floor. Crown fires spread rapidly by wind and move quickly by jumping along the tops of trees. Wildfires are usually signaled by dense smoke that fills the area for miles around.

Wildfire probability depends on local weather conditions, outdoor activities such as camping, debris burning, and construction, and the degree of public cooperation with fire prevention measures. Drought

[10] Prescription burning, or "controlled burn," undertaken by land management agencies is the process of igniting fires under selected conditions, in accordance with strict parameters.

conditions and other natural hazards (such as tornadoes, hurricanes, etc.) increase the probability of wildfires by producing fuel in both urban and rural settings.

Many individual homes and cabins, subdivisions, resorts, recreational areas, organizational camps, businesses, and industries are located within high wildfire hazard areas. Furthermore, the increasing demand for outdoor recreation places more people in wildlands during holidays, weekends, and vacation periods. Unfortunately, wildland residents and visitors are rarely educated or prepared for wildfire events that can sweep through the brush and timber and destroy property within minutes.

Wildfires can result in severe economic losses as well. Businesses that depend on timber, such as paper mills and lumber companies, experience losses that are often passed along to consumers through higher prices and sometimes jobs are lost. The high cost of responding to and recovering from wildfires can deplete state resources and increase insurance rates. The economic impact of wildfires can also be felt in the tourism industry if roads and tourist attractions are closed due to health and safety concerns.

State and local governments can impose fire safety regulations on home sites and developments to help curb wildfire. Land treatment measures such as fire access roads, water storage, helipads, safety zones, buffers, firebreaks, fuel breaks, and fuel management can be designed as part of an overall fire defense system to aid in fire control. Fuel management, prescribed burning, and cooperative land management planning can also be encouraged to reduce fire hazards.

5.9.2 Location and Spatial Extent

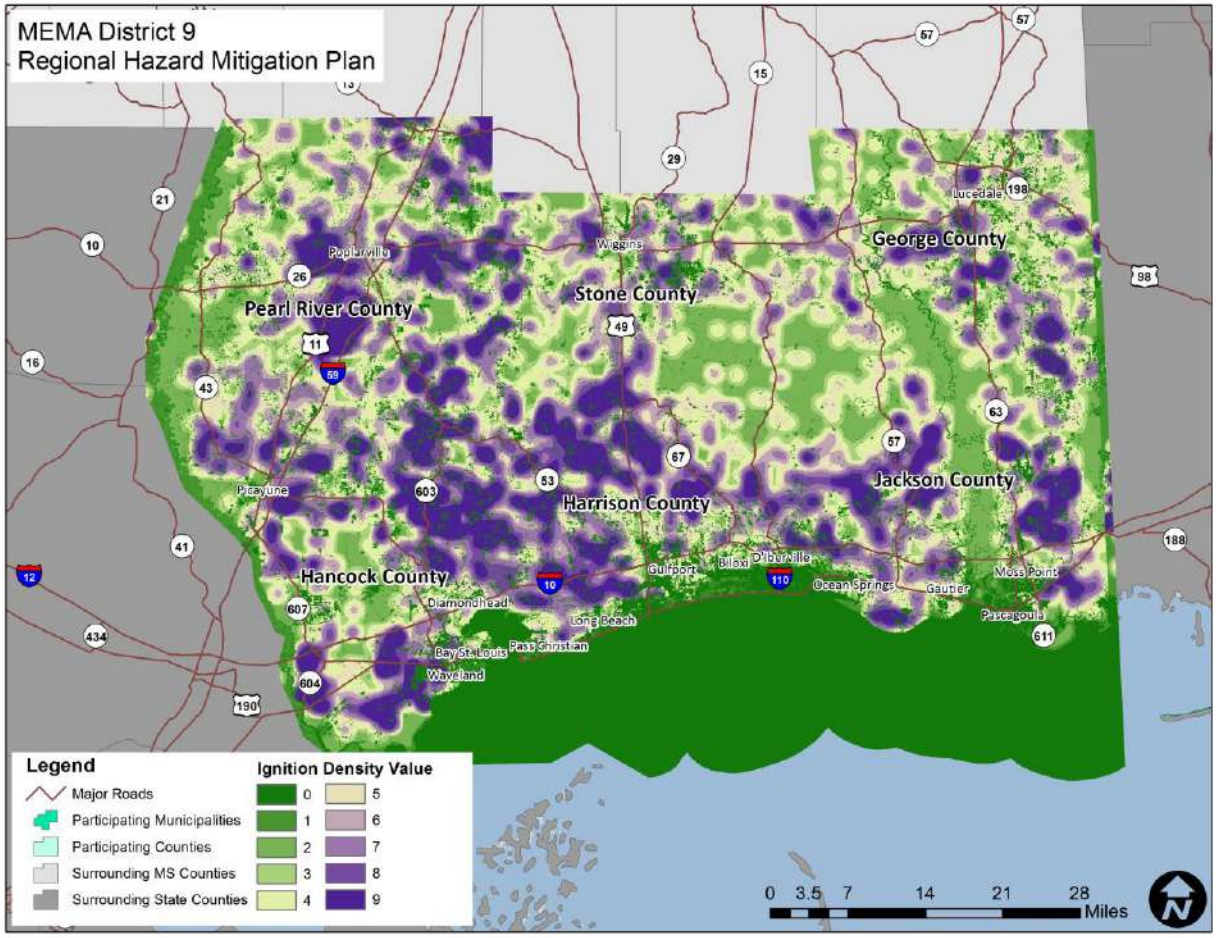
The entire region is at risk to a wildfire occurrence. However, several factors such as drought conditions or high levels of fuel on the forest floor, may make a wildfire more likely. Furthermore, areas in the urban-wildland interface are particularly susceptible to fire hazard as populations abut formerly undeveloped areas. The Wildfire Ignition Density data shown in the figure below give an indication of historic location.

5.9.3 Historical Occurrences

Figure 5.12 shows the Wildfire Ignition Density in the MEMA District 9 Region based on data from the Southern Wildfire Risk Assessment. This data is based on historical fire ignitions and the likelihood of a wildfire igniting in an area. Occurrence is derived by modeling historic wildfire ignition locations to create an average ignition rate map. This is measured in the number of fires per year per 1,000 acres.[11]

[11] Southern Wildfire Risk Assessment, 2014.

FIGURE 5.12: WILDFIRE IGNITION DENSITY IN THE MEMA DISTRICT 9 REGION



Source: Southern Wildfire Risk Assessment

Based on data from the Mississippi Forestry Commission from 2007 to 2016, the MEMA District 9 Region experiences an average of 464 wildfires annually which burn a combined 8,298 acres, on average per year. The data indicates that most of these fires are small, averaging about 18 acres per fire. **Table 5.14** provides a summary table for wildfire occurrences in the MEMA District 9 Region. The number of reported wildfire occurrences in the participating counties between the years 2007 and 2016 is listed in the county-specific annexes to this plan.

TABLE 5.14: SUMMARY TABLE OF ANNUAL WILDFIRE OCCURRENCES (2007 -2016)*

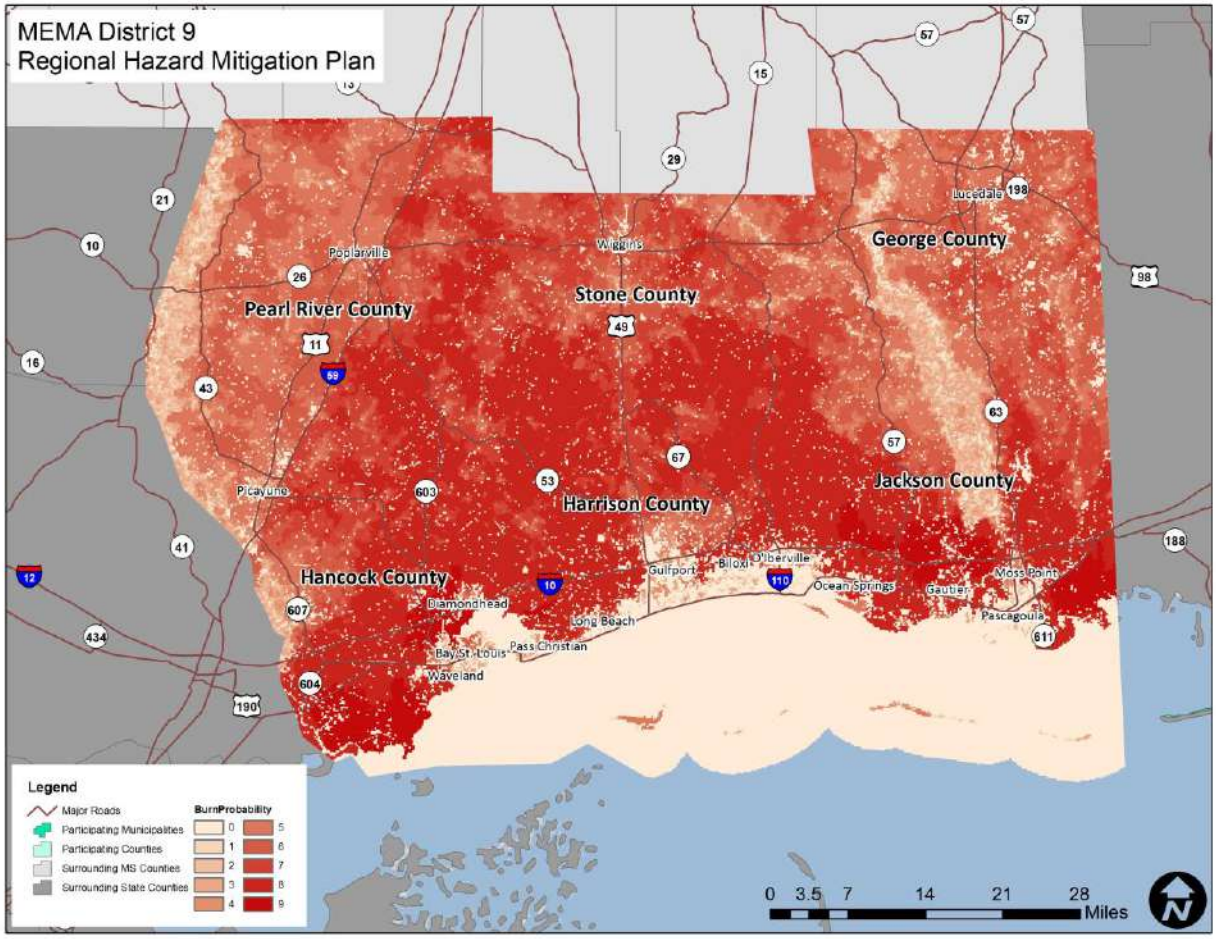
	George County	Hancock County	Harrison County	Jackson County	Pearl River County	Stone County	MEMA D9 Region Total
Average Number of Fires per year	46.7	91.6	87.5	78.7	119.0	40.9	464.4
Average Number of Acres Burned per year	428.5	2,107.4	1,585.0	1,856.7	1,956.2	363.7	8,297.5
Average Number of Acres Burned per fire	9.2	23.0	18.1	23.6	16.4	8.9	17.9

*These values reflect averages over a 10-year period.
Source: Mississippi Forestry Commission

5.9.4 Probability of Future Occurrences

Wildfire events will be an ongoing occurrence in the MEMA District 9 Region. **Figure 5.13** shows that there is some probability a wildfire will occur throughout the region. However, the likelihood of wildfires increases during drought cycles and abnormally dry conditions. Fires are likely to stay small in size but could increase due to local climate and ground conditions. Dry, windy conditions with an accumulation of forest floor fuel (potentially due to ice storms or lack of fire) could create conditions for a large fire that spreads quickly. It should also be noted that some areas do vary somewhat in risk. For example, highly developed areas are less susceptible unless they are located near the urban-wildland boundary. The risk will also vary due to assets. Areas in the urban-wildland interface will have much more property at risk, resulting in increased vulnerability and need to mitigate compared to rural, mainly forested areas. The probability assigned to the MEMA District 9 Region for future wildfire events is highly likely (100 percent annual probability).

FIGURE 5.13: BURN PROBABILITY IN THE MEMA DISTRICT 9 REGION



Source: Southern Wildfire Risk Assessment

GEOLOGIC HAZARDS

5.10 EARTHQUAKE

5.10.1 Background

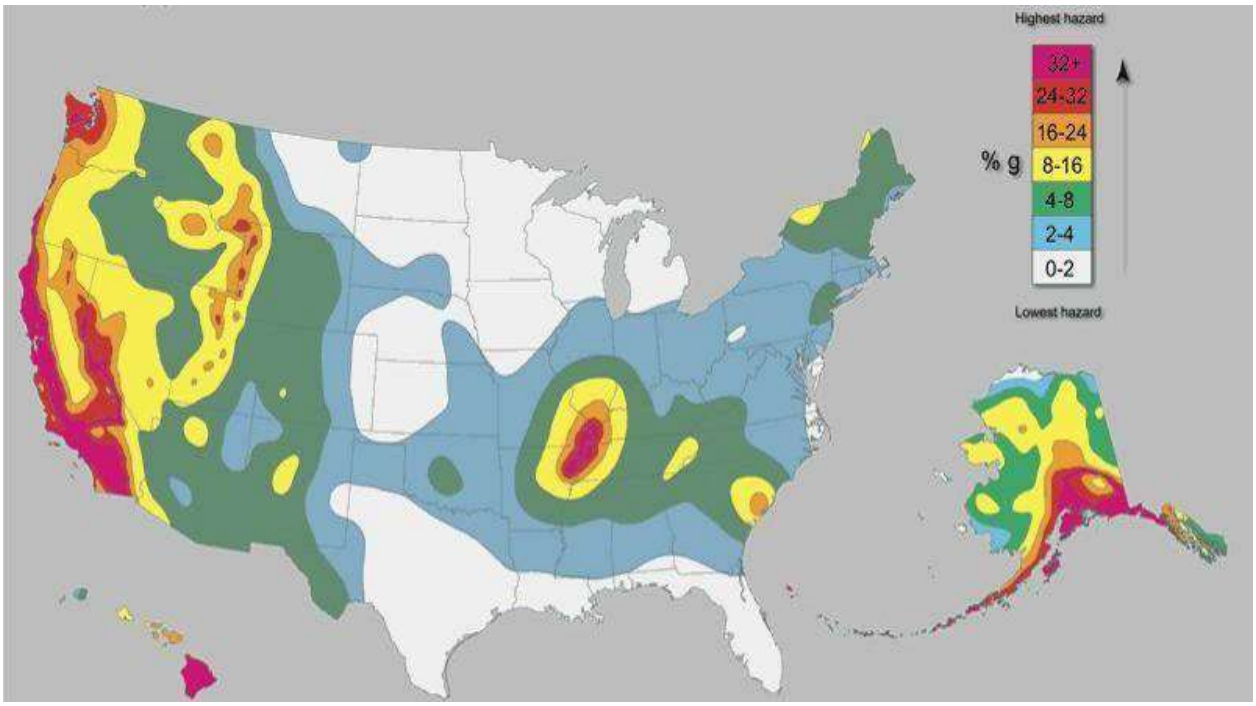
An earthquake is movement or trembling of the ground produced by sudden displacement of rock in the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of caverns. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured in the tens of billions of dollars, result in loss of life and injury to hundreds of thousands of persons, and disrupt the social and economic functioning of the affected area.

Most property damage and earthquake-related deaths are caused by the failure and collapse of structures due to ground shaking. The level of damage depends upon the amplitude and duration of the shaking, which are directly related to the earthquake size, distance from the fault, site, and regional geology. Other damaging earthquake effects include landslides, the down-slope movement of soil and rock (mountain regions and along hillsides), and liquefaction, in which ground soil loses the ability to resist shear and flows much like quick sand. In the case of liquefaction, anything relying on the substrata for support can shift, tilt, rupture, or collapse.

Most earthquakes are caused by the release of stresses accumulated as a result of the rupture of rocks along opposing fault planes in the Earth’s outer crust. These fault planes are typically found along borders of the Earth's 10 tectonic plates. The areas of greatest tectonic instability occur at the perimeters of the slowly moving plates, as these locations are subjected to the greatest strains from plates traveling in opposite directions and at different speeds. Deformation along plate boundaries causes strain in the rock and the consequent buildup of stored energy. When the built-up stress exceeds the rocks' strength a rupture occurs. The rock on both sides of the fracture is snapped, releasing the stored energy and producing seismic waves, generating an earthquake.

The greatest earthquake threat in the United States is along tectonic plate boundaries and seismic fault lines located in the central and western states; however, the Eastern United State does face moderate risk to less frequent, less intense earthquake events. **Figure 5.14** shows relative seismic risk for the United States.

FIGURE 5.14: UNITED STATES EARTHQUAKE HAZARD MAP



Source: United States Geological Survey

Earthquakes are measured in terms of their magnitude and intensity. Magnitude is measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude (**Table 5.15**). Each unit increase in magnitude on the Richter Scale corresponds to a 10-fold increase in wave amplitude, or a 32-fold increase in energy. Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale based on direct and indirect measurements of seismic effects. The scale levels are typically described using roman numerals, ranging from "I" corresponding to imperceptible (instrumental) events to "XII" for catastrophic (total destruction). A detailed description of the Modified Mercalli Intensity Scale of earthquake intensity and its correspondence to the Richter Scale is given in **Table 5.16**.

TABLE 5.15: RICHTER SCALE

RICHTER MAGNITUDES	EARTHQUAKE EFFECTS
< 3.5	Generally not felt, but recorded.
3.5 - 5.4	Often felt, but rarely causes damage.
5.4 - 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1 - 6.9	Can be destructive in areas up to about 100 kilometers across where people live.
7.0 - 7.9	Major earthquake. Can cause serious damage over larger areas.
8 or >	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

Source: Federal Emergency Management Agency

TABLE 5.16: MODIFIED MERCALLI INTENSITY SCALE FOR EARTHQUAKES

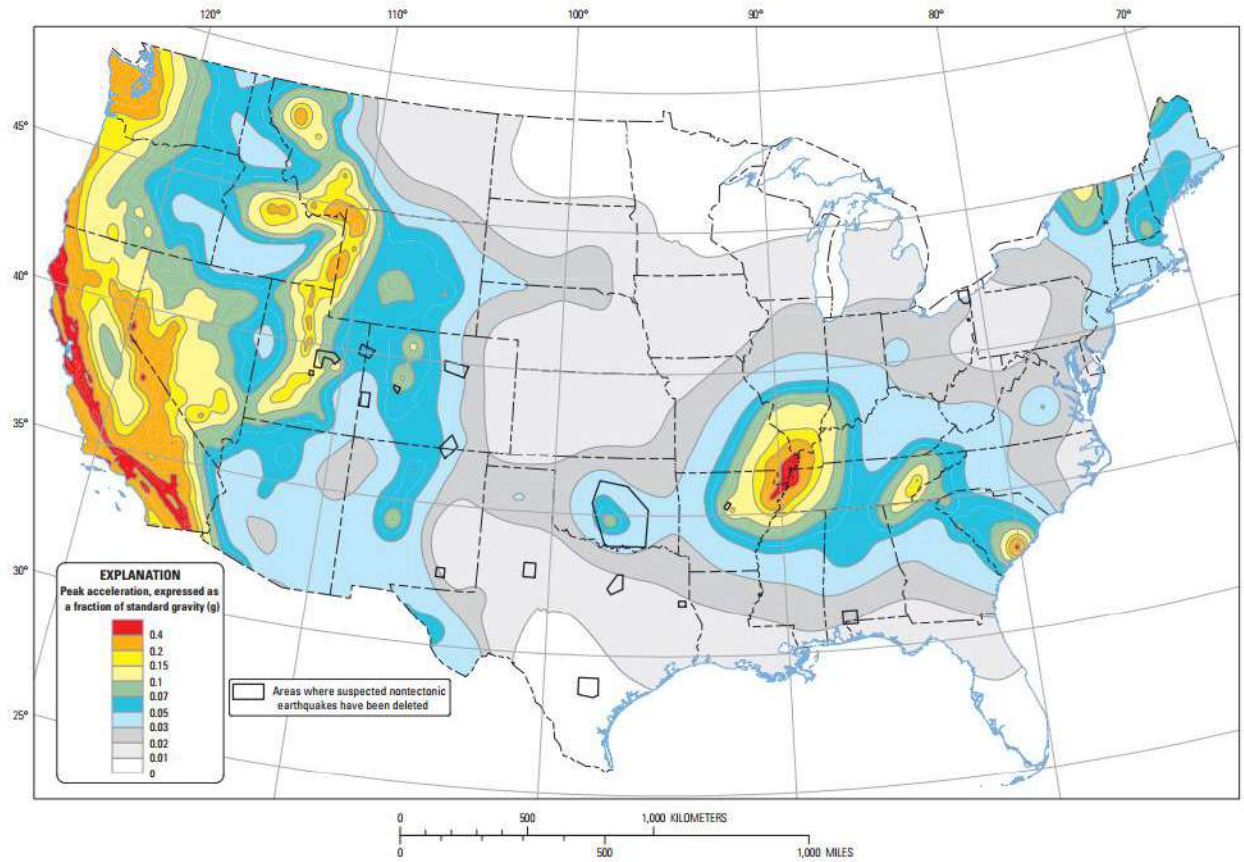
SCALE	INTENSITY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER SCALE MAGNITUDE
I	INSTRUMENTAL	Detected only on seismographs.	
II	FEEBLE	Some people feel it.	< 4.2
III	SLIGHT	Felt by people resting; like a truck rumbling by.	
IV	MODERATE	Felt by people walking.	
V	SLIGHTLY STRONG	Sleepers awake; church bells ring.	< 4.8
VI	STRONG	Trees sway; suspended objects swing, objects fall off shelves.	< 5.4
VII	VERY STRONG	Mild alarm; walls crack; plaster falls.	< 6.1
VIII	DESTRUCTIVE	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged.	
IX	RUINOUS	Some houses collapse; ground cracks; pipes break open.	< 6.9
X	DISASTROUS	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread.	< 7.3
XI	VERY DISASTROUS	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards.	< 8.1
XII	CATASTROPHIC	Total destruction; trees fall; ground rises and falls in waves.	> 8.1

Source: Federal Emergency Management Agency

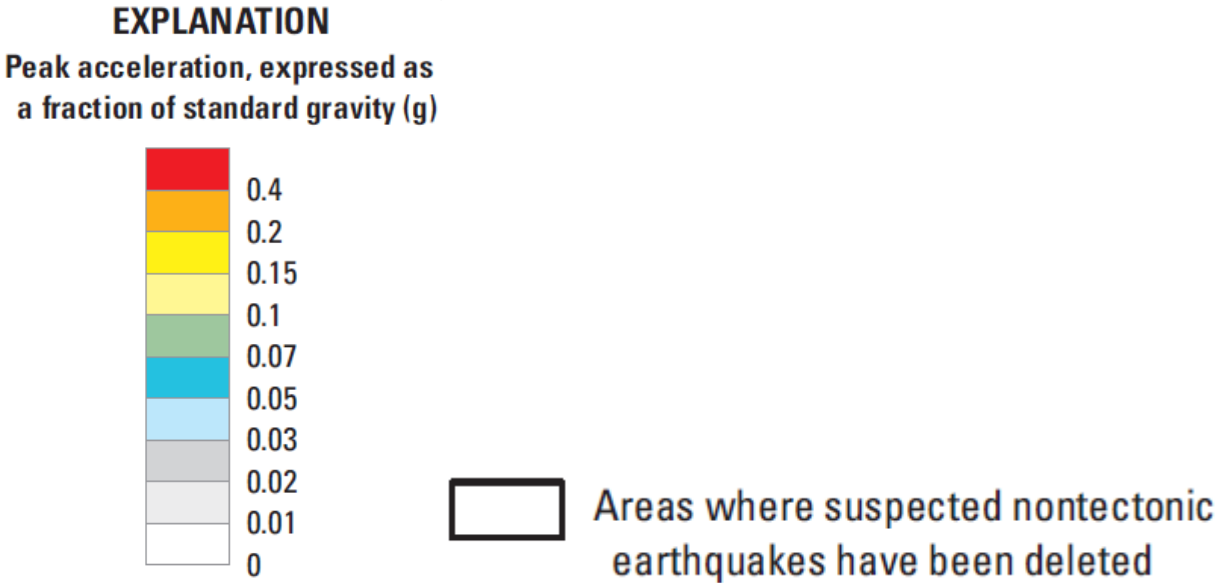
5.10.2 Location and Spatial Extent

Figure 5.15 shows the intensity level associated with the MEMA District 9 Region, based on the national USGS map of peak acceleration with 10 percent probability of exceedance in 50 years. It is the probability that ground motion will reach a certain level during an earthquake. The data show peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10 percent probability of exceedance in 50 years. The map was compiled by the U.S. Geological Survey (USGS) Geologic Hazards Team, which conducts global investigations of earthquake, geomagnetic, and landslide hazards. According to this map, all of the MEMA District 9 Region lies within an approximate zone of level “1” to “3” ground acceleration. This indicates that the region as a whole exists within an area of low seismic risk.

FIGURE 5.15: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS



Ten-percent probability of exceedance in 50 years map of peak ground acceleration



Source: United States Geological Survey, 2014

The primary source of potential damage to the MEMA District 9 Region from an earthquake is the New Madrid Seismic Zone (NMSZ). Historically, a series of earthquakes in 1811 and 1812 demonstrated that this fault zone can produce high magnitude seismic events, sometimes on the scale of a 7.5-8.0 on the Richter scale. The biggest challenge with earthquakes that occur in this area of seismic activity is predicting the recurrence of earthquakes emanating from this zone. Although the magnitude of earthquakes from the NMSZ can be large, they occur very irregularly and fairly infrequently. This makes it extremely difficult to project when they will occur.

It should also be noted that the State of Mississippi Hazard Mitigation Plan identifies certain areas of concern for liquefaction and lists the counties and corresponding zones within those counties that have the highest liquefaction potential. The MEMA District 9 counties do not have any identified liquefaction potential risk.

5.10.3 Historical Occurrences

At least seven earthquakes are known to have affected the MEMA District 9 Region since 1955. The strongest of these measured a V on the Modified Mercalli Intensity (MMI) scale. **Table 5.17** provides a summary of earthquake events reported by the National Centers for Environmental Information (formerly National Geophysical Data Center) between 1638 and 1985, and **Figure 5.16** presents a map showing earthquakes whose epicenters have occurred near the region between 1985 and 2015 (no earthquakes occurred within the region boundaries during this period). A detailed occurrence of each event including the date, distance from the epicenter, magnitude, and Modified Mercalli Intensity (if known) can be found in the county-specific annexes.[12]

TABLE 5.17: SUMMARY OF SEISMIC ACTIVITY IN THE MEMA DISTRICT 9 REGION

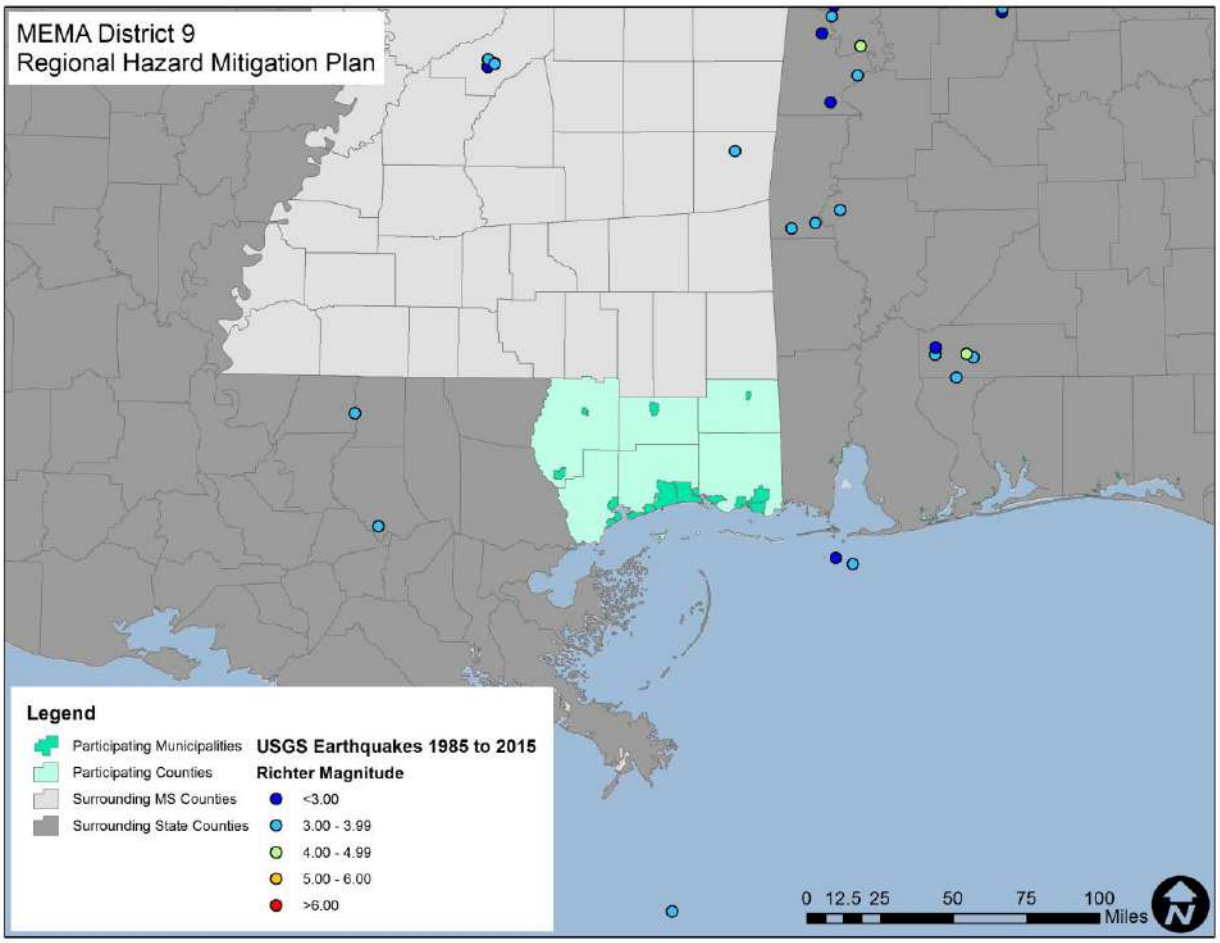
Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
George County	**0**	**--**	**--**
Lucedale	0	--	--
Unincorporated Area	0	--	--
Hancock County	**3**	**IV**	**< 4.8**
Bay St. Louis	2	III	< 4.8
Diamondhead	0	--	--
Waveland	0	--	--
Unincorporated Area	1	IV	< 4.8
Harrison County	**4**	**V**	**< 4.8**
Biloxi	1	IV	< 4.8
D'Iberville	0	--	--
Gulfport	1	V	< 4.8
Long Beach	0	--	--
Pass Christian	1	IV	< 4.8
Unincorporated Area	1	IV	< 4.8
Jackson County	**0**	**--**	**--**
Gautier	0	--	--

[12] Due to reporting mechanisms, not all earthquakes events were recorded during this time. Furthermore, some are missing data, such as the epicenter location, due to a lack of widely used technology. In these instances, a value of "unknown" is reported.

Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
Moss Point	0	--	--
Ocean Springs	0	--	--
Pascagoula	0	--	--
Unincorporated Area	0	--	--
Pearl River County	**0**	**--**	**--**
Picayune	0	--	--
Poplarville	0	--	--
Unincorporated Area	0	--	--
Stone County	**0**	**--**	**--**
Wiggins	0	--	--
Unincorporated Area	0	--	--
MEMA DISTRICT 9 REGIONAL TOTAL	**7**	**V**	**< 4.8**

Source: National Centers for Environmental Information (formerly National Geophysical Data Center)

FIGURE 5.16: HISTORIC EARTHQUAKES WITH EPICENTERS NEAR THE MEMA DISTRICT 9 REGION (1985-2015)



Source: United States Geological Survey

In addition to those earthquakes specifically affecting the MEMA District 9 Region, a list of earthquakes that have affected Mississippi is presented below in **Table 5.18.**

TABLE 5.18: EARTHQUAKES WHICH HAVE AFFECTED MISSISSIPPI

Date	Origin	Richter Scale (Magnitude)	MMI (Intensity)	MMI in Mississippi	MEMA District 9 Counties Affected
1811-1812	New Madrid Seismic Zone	7.8-8.1	XI	Not available	Affected counties as far as the Gulf Coast
3/29/1972	New Madrid Seismic Zone	Not available	IV	I, II, III, IV	--
4/29/2003	8 miles ENE of Ft. Payne, AL	4.6	V	I, II, III, IV	Hancock and Harrison
11/7/2004	25 miles SW of Tuscaloosa, AL	4.0	V	I, II, III, IV	--
2/10/2005	22 miles WSW of Blytheville, AR	4.1	V	I, II, III	--
5/1/2005	15 miles WSW of Blytheville, AR	4.1	IV	I, II, III	--
6/2/2005	10 miles NNW of Dyersburg, TN	4.0	III	I	--
9/10/2006	253 miles SSW of Apalachicola, FL	6.0	VI	I, II, III, IV	George, Hancock, Harrison, Jackson, and Pearl River

Source: State of Mississippi Standard Mitigation Plan (2013 Update)

5.10.4 Probability of Future Occurrences

The probability of significant, damaging earthquake events affecting the MEMA District 9 Region is unlikely. However, it is possible that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light will affect the region. The annual probability level for the region is estimated to be between 1 and 10 percent (possible).

WIND-RELATED HAZARDS

5.11 EXTREME COLD

5.11.1 Background

What constitutes extreme cold and its effect varies across different regions of the United States, according to the NWS. In the South and other areas relatively unaccustomed to winter weather, temperatures near or below freezing (32°F) are considered extreme cold. Freezing temperatures in these areas may cause damage to citrus fruit crops and other vegetation and may cause pipes to freeze and burst in homes that are poorly insulated or without heat. However, in the North, temperatures well below 0°F are considered extreme cold, and long cold spells can cause rivers to freeze, which can disrupt shipping, and ice jams to form, which can lead to flooding.

According to NOAA, frigid winter temperatures are the number two weather-related killer among natural hazards, following heat. Prolonged exposure to extreme cold temperatures can lead to serious health problems, including hypothermia, cold stress, frostbite, or freezing, and infants and the elderly are most susceptible to these conditions. Extreme cold events are most likely to occur during January and February, and even areas that normally experience mild winters can be hit with extreme cold.

Extreme cold conditions can be the result of cold temperatures and high winds, a combination known as "wind chill." The Wind Chill Temperature index, in **Figure 5.17**, shows the apparent temperature combining the effect of wind and air temperatures on exposed skin.

FIGURE 5.17: WIND CHILL TEMPERATURE INDEX

Wind Chill Chart

Wind (mph)	Temperature (°F)																	
Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph) *Effective 11/01/01*

Source: National Weather Service, National Oceanic and Atmospheric Administration

The NWS issues wind chill advisories when wind chill hazards are potentially hazardous. Wind chill warnings are issued when wind chill temperatures are life threatening. Criteria for issuing wind chill warnings and advisories are set locally. For example, in Rochester, New York, wind chill advisories are issued when the wind chill temperature is expected to fall between -15°F to -24°F, and wind chill warnings are issued when wind chill temperature is expected to fall at or below -25°F. Again, this warning system should not be mistaken as describing the extent or magnitude of extreme cold; rather, it is intended to provide advanced notice of excessive cold conditions for the protection of life and property.

5.11.2 Location and Spatial Extent

Extreme cold typically impacts a large area and cannot be confined to any geographic or political boundaries. The entire region is susceptible to extreme cold conditions.

5.11.3 Historical Occurrences

Data from the National Climatic Data Center was used to determine historical extreme cold events in the MEMA District 9 Region. Two events were reported:

February 2, 1996 – *Cold/Wind Chill* – An arctic airmass overspread much of south Mississippi bringing the longest extended period of cold weather since 1989. In Amite County, 4SW Gillsburg, a 67 year old man died from hypothermia on the 4th after the fire in a wood burning heater went out. Considerable property damage resulted from broken pipes due to the extended period of subfreezing temperatures. In Jackson County, Moss Point and Gautier had broken pipes in 100 and 147 houses, respectively.

December 18, 1996 – *Cold/Wind Chill* – An arctic airmass overspread south Mississippi resulting in three consecutive nights with subfreezing minimum temperatures. Temperatures lowered into the mid-teens over the southwest section of the state and near 20 degrees along the Gulf Coast.

5.11.4 Probability of Future Occurrences

Based on historical occurrence information, it is assumed that all of the MEMA District 9 Region has a probability level of possible (between 1 and 10 percent annual probability) for future extreme cold events to impact the region.

5.12 EXTREME HEAT

5.12.1 Background

Extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and that last for an extended period of time. A heat wave may occur when temperatures hover 10 degrees or more above the average high temperature for the region and last for a prolonged number of days or several weeks. Humid conditions may also add to the discomfort of high temperatures.

While extreme heat does not typically affect buildings, the impact to the population can have grave effects. Health risks from extreme heat include heat cramps, heat fainting, heat exhaustion and heat stroke. According to the National Weather Service (which compiles data from the National Climatic Data Center), heat is the leading weather-related killer in the United States. During the ten-year period between 2000 and 2009 heat events killed 162 people - more people than lightning, tornado, flood, cold, winter storm, wind and hurricane hazards. However, most deaths are attributed to prolonged heat waves in large cities that rarely experience hot weather. The elderly and the ill are most at-risk, along with those who exercise outdoors in hot, humid weather.

The National Weather Service devised the Heat Index as a mechanism to better inform the public of heat dangers. The Heat Index Chart, shown in **Figure 5.18**, uses air temperature and humidity to determine the heat index or apparent temperature. **Table 5.19** shows the dangers associated with different heat index temperatures. Some populations, such as the elderly and young, are more susceptible to heat danger than other segments of the population.

FIGURE 5.18: HEAT INDEX CHART

Air Temp (in F)	Relative Humidity (in percent)																				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
140	125																				
135	120	128																			
130	117	122	131																		
125	111	116	123	131	141																
120	107	111	116	123	130	139	148														
115	103	107	111	115	120	127	135	143	151												
110	99	102	105	108	112	117	123	130	137	143	150										
105	95	97	100	102	105	109	113	118	123	129	135	142	149								
100	91	93	95	97	99	101	104	107	110	115	120	126	132	138	144						
95	87	88	90	91	93	94	96	98	101	104	107	110	114	119	124	130	136				
90	83	84	85	86	87	88	90	91	93	95	96	98	100	102	106	109	113	117	122		
85	78	79	80	81	82	83	84	85	86	87	88	89	90	91	93	95	97	99	102	105	108
80	73	74	75	76	77	77	78	79	79	80	81	81	82	83	85	86	86	87	88	89	91
75	69	69	70	71	72	72	73	73	74	74	75	75	76	76	77	77	78	78	79	79	80
70	64	64	65	65	66	66	67	67	68	68	69	69	70	70	70	70	71	71	71	71	72

Source: National Oceanic and Atmospheric Administration

TABLE 5.19: HEAT DISORDERS ASSOCIATED WITH HEAT INDEX TEMPERATURE

Heat Index Temperature (Fahrenheit)	Description of Risks
80°- 90°	Fatigue possible with prolonged exposure and/or physical activity
90°- 105°	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure and/or physical activity
105°- 130°	Sunstroke, heat cramps, and heat exhaustion likely, and heatstroke possible with prolonged exposure and/or physical activity
130° or higher	Heatstroke or sunstroke is highly likely with continued exposure

Source: National Weather Service, National Oceanic and Atmospheric Administration

5.12.2 Location and Spatial Extent

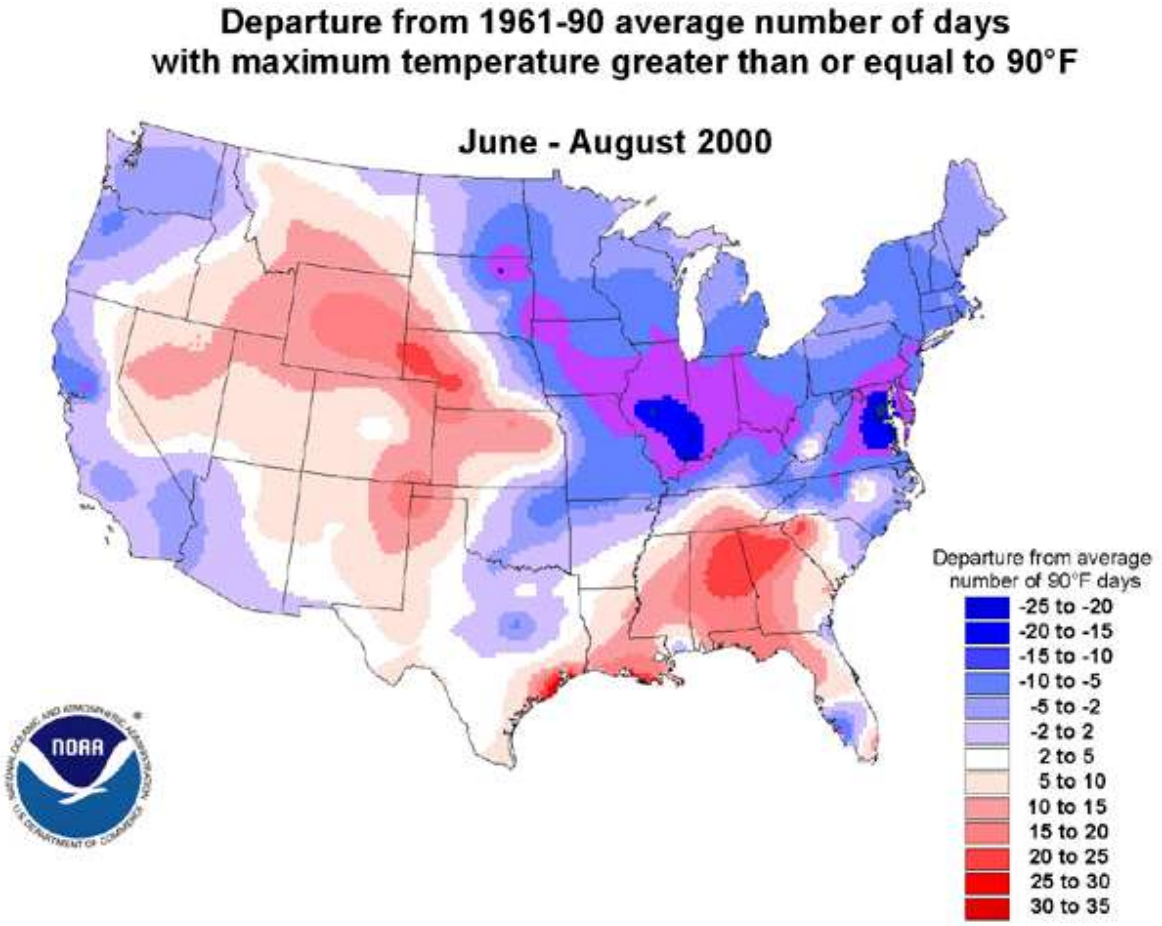
Heat waves typically impact a large area and cannot be confined to any geographic or political boundaries. The entire region is susceptible to extreme heat conditions.

5.12.3 Historical Occurrences

The National Climatic Data Center was used to determine historical heat wave occurrences in the region.

Summer of 2000 Heat Wave – Hot temperatures persisted from July to September across the South and Plains. Known as the Summer of 2000 Heat Wave, high temperatures commonly peaked over 100 degrees. As shown in **Figure 5.19** below, there were several days over 90 degree than the typical average. This was the fourth warmest July-August on record.

FIGURE 5.19: DEPARTURE FROM AVERAGE NUMBER OF 90 DEGREE DAYS



Source: http://www.ncdc.noaa.gov/sotc/drought/2000/16#Heat

July 2000 – July was a hot and dry month in Southeast Mississippi. In Beaumont the temperature was 100 degrees or higher eleven days during the month with the hottest being 105 degrees. In Richton the temperature was 100 degrees or higher three days during the month with the hottest being 102 degrees. In Waynesboro the temperature was 100 degrees or higher four days during the month with the hottest being 103 degrees. In Wiggins the temperature was 100 degrees or higher nine days during the month with 105 degrees being the hottest. In addition to being hot is was also a dry month across the area. Most stations ended up with below normal rainfall totals for the month. In Jackson County, a 68 year old man died from heat exhaustion while sitting in his pickup truck in a parking lot with the windows rolled up, and 10 days later, a 58 year old male was found dead from heat exhaustion while sitting in his truck in the driveway of his home with the windows rolled up.

August 2007 – Heat advisories were issued for a combination of high temperatures and high humidities. Heat index vales were between 110 and 115 degrees. Several public buildings and churches allowed people to come in and cool off during the heat of the day.

July 2010 – Several days of temperatures near 100 degrees contributed to two deaths from heat stroke in the Gulfport area. The Harrison County Coroner stated that two deaths in a mobile home on Smith Road near Canal Road were caused by heat stroke. High temperatures at Gulfport Airport,

approximately 3 miles away, were between 98 and 102 degrees from July 29 through August 2. Bodies were discovered on August 4, but deaths occurred several days prior to that. Date of deaths was estimated.

August 2010 – Hot and humid conditions produced heat index values between 110 and 115 degrees over coastal Mississippi. A 48 year old construction worker collapsed and died while working on a highway construction project. Jackson County coroner classified the fatality as heat related with the cause of death as hyperthermia.

5.12.4 Probability of Future Occurrences

Based on historical occurrence information, it is assumed that all of the MEMA District 9 Region has a probability level of highly likely (100 percent annual probability) for future heat wave events.

5.13 HAILSTORM

5.13.1 Background

Hailstorms are a potentially damaging outgrowth of severe thunderstorms. Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until they develop to a sufficient weight and fall as precipitation. Hail typically takes the form of spheres or irregularly-shaped masses greater than 0.75 inches in diameter. The size of hailstones is a direct function of the size and severity of the storm. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a function of the intensity of heating at the Earth's surface. Higher temperature gradients relative to elevation above the surface result in increased suspension time and hailstone size. **Table 5.20** shows the TORRO Hailstorm Intensity Scale which is a way of measuring hail severity.

TABLE 5.20: TORRO HAILSTORM INTENSITY SCALE

	Intensity Category	Typical Hail Diameter (mm)*	Probable Kinetic Energy, J-m^2	mm to inch conversion (inches)	Typical Damage Impacts
H0	Hard Hail	5	0-20	0 - 0.2	No damage
H1	Potentially Damaging	5-**15**	>20	0.2 - 0.6	Slight general damage to plants, crops
H2	Significant	10-**20**	>100	0.4 - 0.8	Significant damage to fruit, crops, vegetation
H3	Severe	20-**30**	>300	0.8 - 1.2	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	25-**40**	>500	1.0 - 1.6	Widespread glass damage, vehicle bodywork damage
H5	Destructive	30-**50**	>800	1.2 - 2.0	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries

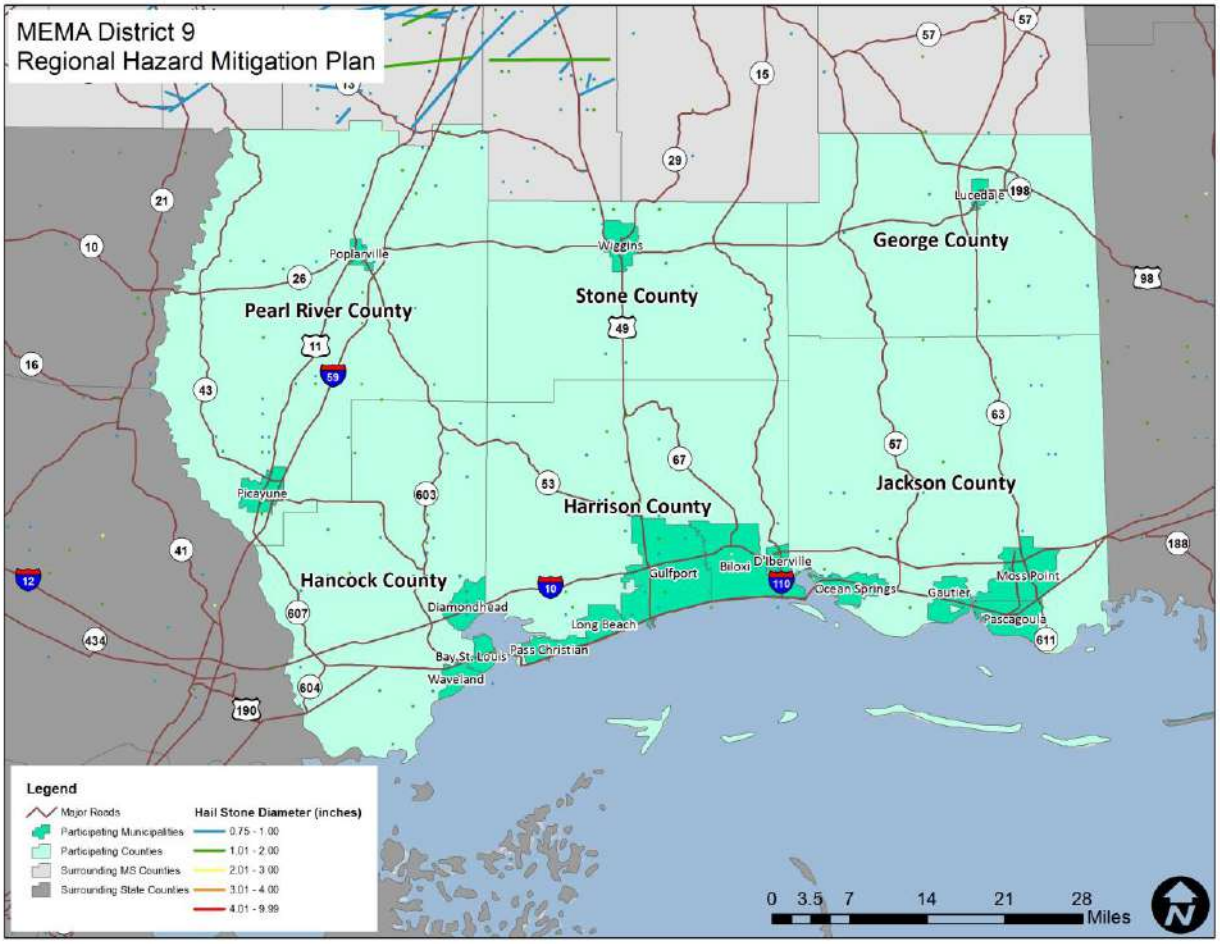
	Intensity Category	Typical Hail Diameter (mm)*	Probable Kinetic Energy, J-m^2	mm to inch conversion (inches)	Typical Damage Impacts
H6	Destructive	40-**60**		1.6 - 2.4	Bodywork of grounded aircraft dented, brick walls pitted
H7	Destructive	50-**75**		2.0 - 3.0	Severe roof damage, risk of serious injuries
H8	Destructive	60-**90**		1.6 - 3.5	(Severest recorded in the British Isles) Severe damage to aircraft bodywork
H9	Super Hailstorms	75-**100**		3.0 - 3.9	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	>100			Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Source: http://www.torro.org.uk/site/hscale.php

5.13.2 Location and Spatial Extent

Hailstorms frequently accompany thunderstorms, so their locations and spatial extents coincide. It is assumed that the MEMA District 9 Region is uniformly exposed to severe thunderstorms; therefore, all areas of the region are equally exposed to hail which may be produced by such storms. With that in mind, **Figure 5.20** shows the location of hail events that have impacted the region between 1955 and 2015.

FIGURE 5.20: HAILSTORM TRACKS IN MEMA DISTRICT 9 REGION



Source: National Weather Service Storm Prediction Center

5.13.3 Historical Occurrences

According to the National Climatic Data Center, 310 recorded hailstorm events have affected the MEMA District 9 Region since 1959.[13] In all, hail occurrences resulted in over $1,000 (2016 dollars) in property damages.[14] Hail ranged in diameter from 0.25 inches to 3.0 inches. **Table 5.21** provides a summary of the hail events in the MEMA District 9 Region. Detailed information about each event that occurred in the region is provided in the county-specific annexes.

It should be noted that hail is notorious for causing substantial damage to cars, roofs, and other areas of the built environment that may not be reported to the National Climatic Data Center. Therefore, it is likely that damages are greater than the reported value. Additionally, a single storm event may have affected multiple counties.

[13] These hail events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through June 2016. It is likely that additional hail events have affected the MEMA District 9 Region. As additional local data becomes available, this hazard profile will be amended.

[14] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE 5.21: SUMMARY OF HAIL OCCURRENCES IN THE MEMA DISTRICT 9 REGION

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
George County	**33**	**0/0**	**$790**	**$36**
Lucedale	17	0/0	$790	$36
Unincorporated Area	16	0/0	$0	$0
Hancock County	**55**	**0/0**	**$0**	**$0**
Bay St. Louis	2	0/0	$0	$0
Diamondhead	8	0/0	$0	$0
Waveland	6	0/0	$0	$0
Unincorporated Area	39	0/0	$0	$0
Harrison County	**73**	**0/0**	**$0**	**$0**
Biloxi	7	0/0	$0	$0
D'Iberville	4	0/0	$0	$0
Gulfport	13	0/0	$0	$0
Long Beach	3	0/0	$0	$0
Pass Christian	4	0/0	$0	$0
Unincorporated Area	42	0/0	$0	$0
Jackson County	**64**	**0/0**	**$289**	**$17**
Gautier	4	0/0	$289	$17
Moss Point	3	0/0	$0	$0
Ocean Springs	9	0/0	$0	$0
Pascagoula	6	0/0	$0	$0
Unincorporated Area	42	0/0	$0	$0
Pearl River County	**61**	**0/0**	**$0**	**$0**
Picayune	11	0/0	$0	$0
Poplarville	16	0/0	$0	$0
Unincorporated Area	34	0/0	$0	$0
Stone County	**24**	**0/0**	**$0**	**$0**
Wiggins	8	0/0	$0	$0
Unincorporated Area	16	0/0	$0	$0
MEMA DISTRICT 9 REGIONAL TOTAL	**310**	**0/0**	**$1,079**	**$53**

Source: National Climatic Data Center

5.13.4 Probability of Future Occurrences

Based on historical occurrence information, it is assumed that the probability of future hail occurrences is highly likely (100 percent annual probability). Since hail is an atmospheric hazard, it is assumed that the entire MEMA District 9 Region has equal exposure to this hazard. It can be expected that future hail events will continue to cause minor damage to property and vehicles throughout the region.

5.14 HURRICANE AND TROPICAL STORM

5.14.1 Background

Hurricanes and tropical storms are classified as cyclones and defined as any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and whose diameter averages 10 to 30 miles across. A tropical cyclone refers to any such circulation that develops over tropical waters. Tropical cyclones act as a "safety-valve," limiting the continued build-up of heat and energy in tropical regions by maintaining the atmospheric heat and moisture balance between the tropics and the pole-ward latitudes. The primary damaging forces associated with these storms are high-level sustained winds, heavy precipitation, and tornadoes.

The key energy source for a tropical cyclone is the release of latent heat from the condensation of warm water. Their formation requires a low-pressure disturbance, warm sea surface temperature, rotational force from the spinning of the earth, and the absence of wind shear in the lowest 50,000 feet of the atmosphere. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico during the official Atlantic hurricane season, which encompasses the months of June through November. The peak of the Atlantic hurricane season is in early to mid-September and the average number of storms that reach hurricane intensity per year in the Atlantic basin is about six.

As an incipient hurricane develops, barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. Hurricane intensity is further classified by the Saffir-Simpson Scale (**Table 5.22**), which rates hurricane intensity on a scale of 1 to 5, with 5 being the most intense.

TABLE 5.22: SAFFIR-SIMPSON SCALE

Category	Maximum Sustained Wind Speed (MPH)
1	74–95
2	96–110
3	111–129
4	130–156
5	157 +

Source: National Hurricane Center

The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure and storm surge potential, which are combined to estimate potential damage. Categories 3, 4, and 5 are classified as "major" hurricanes and, while hurricanes within this range comprise only 20 percent of total tropical cyclone landfalls, they account for over 70 percent of the damage in the United States. **Table 5.23** describes the damage that could be expected for each category of hurricane. Damage during hurricanes may also result from spawned tornadoes, storm surge, and inland flooding associated with heavy rainfall that usually accompanies these storms.

TABLE 5.23: HURRICANE DAMAGE CLASSIFICATIONS

Storm Category	Damage Level	Description of Damages	Photo Example
1	MINIMAL	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage.	
2	MODERATE	Some roofing material, door, and window damage. Considerable damage to vegetation, mobile homes, etc. Flooding damages piers and small craft in unprotected moorings may break their moorings.	
3	EXTENSIVE	Some structural damage to small residences and utility buildings, with a minor amount of curtainwall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures, with larger structures damaged by floating debris. Terrain may be flooded well inland.	
4	EXTREME	More extensive curtainwall failures with some complete roof structure failure on small residences. Major erosion of beach areas. Terrain may be flooded well inland.	
5	CATASTROPHIC	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas may be required.	

Source: National Hurricane Center; Federal Emergency Management Agency

5.14.2 Location and Spatial Extent

Hurricanes and tropical storms threaten the entire Atlantic and Gulf seaboard of the United States, and while coastal areas are most directly exposed to the brunt of landfalling storms, their impact is often felt hundreds of miles inland. The MEMA District 9 Region is located in a region of the country that is susceptible to all of the hazards wrought by hurricanes and tropical storms. All areas throughout the MEMA District 9 Region are susceptible to the accompanying hazard effects of extreme wind, flooding, and tornadoes, and coastal areas are also extremely susceptible to the added effects of storm surge, wave action, coastal erosion, and tidal flooding.[15]

5.14.3 Historical Occurrences

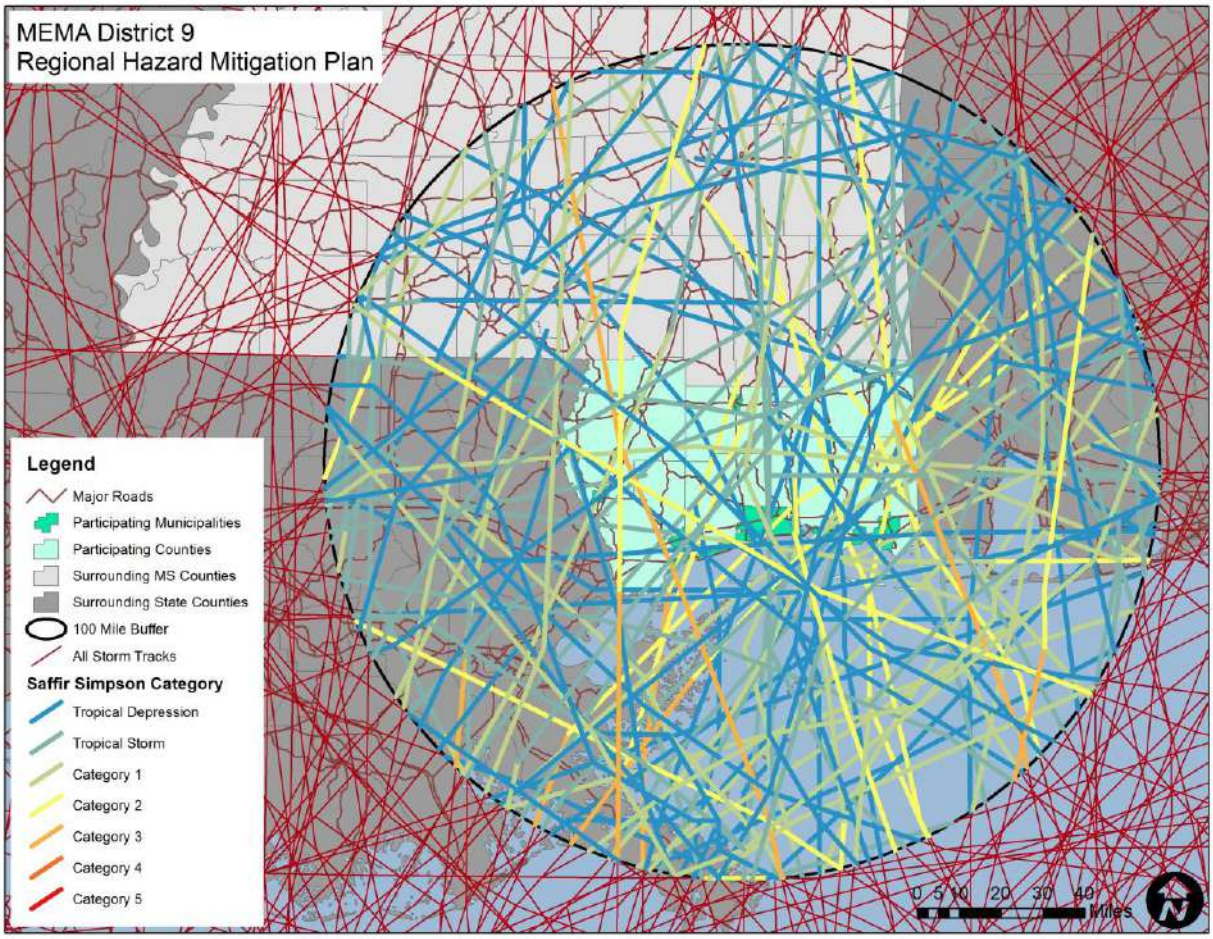
According to the National Hurricane Center's historical storm track records, 119 hurricane or tropical storm/depression tracks have passed within 100 miles of the MEMA District 9 Region since 1852.[16] This includes: 4 Category 3 hurricanes, 15 Category 2 hurricanes, 28 Category 1 hurricanes, 29 tropical storms, and 43 tropical depressions. Additionally, four other major storms had large-scale impacts on the region and are not included in these totals. These storms are listed below and range in Category from 1 to 4.

[15] Distinct hazard area locations for flooding, storm surge, wave action, and coastal erosion are discussed elsewhere in this section.

[16] These storm track statistics include tropical depressions, tropical storms, and hurricanes. Lesser events may still cause significant local impact in terms of rainfall and high winds.

Of the recorded storm events, 58 hurricane or tropical storm/depression events traversed directly through the region as shown in **Figure 5.21**. Notable storms include Hurricane Camille (1969), Hurricane Frederic (1979), and Hurricane Katrina (2005). **Table 5.24** provides for each event the date of occurrence, name (if applicable), maximum wind speed (as recorded within 100 miles of the MEMA District 9 Region) and category of the storm based on the Saffir-Simpson Scale.

FIGURE 5.21: HISTORICAL HURRICANE STORM TRACKS WITHIN 100 MILES OF THE MEMA DISTRICT 9 REGION



Source: National Oceanic and Atmospheric Administration, National Hurricane Center

TABLE 5.24: HISTORICAL STORM TRACKS WITHIN 100 MILES OF THE MEMA 9 DISTRICT REGION (1842–2016)

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
8/25/1852	UNNAMED	93	Category 2
8/3/1855	NOT NAMED	--	Tropical Depression
9/16/1855	UNNAMED	96	Category 2
6/24/1857	NOT NAMED	--	Tropical Depression
9/15/1859	UNNAMED	79	Category 1
8/11/1860	UNNAMED	96	Category 2

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
9/15/1860	UNNAMED	89	Category 2
8/17/1861	NOT NAMED	--	Tropical Depression
11/1/1861	NOT NAMED	--	Tropical Depression
9/15/1862	NOT NAMED	--	Tropical Depression
9/16/1862	NOT NAMED	--	Tropical Depression
10/1/1863	UNNAMED	43	Tropical Storm
6/3/1866	NOT NAMED	--	Tropical Depression
9/16/1867	NOT NAMED	--	Tropical Depression
10/5/1867	UNNAMED	89	Category 2
10/3/1868	NOT NAMED	--	Tropical Depression
9/5/1869	UNNAMED	79	Category 1
7/30/1870	NOT NAMED	--	Tropical Depression
7/11/1872	UNNAMED	59	Tropical Storm
9/18/1875	UNNAMED	18	Tropical Depression
9/18/1877	UNNAMED	79	Category 1
9/1/1879	UNNAMED	89	Category 2
10/7/1879	UNNAMED	59	Tropical Storm
8/31/1880	UNNAMED	70	Category 1
8/2/1881	NOT NAMED	--	Tropical Depression
8/3/1881	UNNAMED	59	Tropical Storm
8/30/1885	UNNAMED	59	Tropical Storm
9/26/1885	UNNAMED	70	Category 1
6/15/1886	UNNAMED	50	Tropical Storm
6/14/1887	UNNAMED	33	Tropical Depression
10/19/1887	UNNAMED	82	Category 1
6/27/1888	NOT NAMED	--	Tropical Depression
9/23/1889	UNNAMED	79	Category 1
8/27/1890	UNNAMED	43	Tropical Storm
9/21/1891	NOT NAMED	--	Tropical Depression
9/12/1892	UNNAMED	59	Tropical Storm
9/7/1893	UNNAMED	79	Category 1
10/2/1893	UNNAMED	97	Category 3
8/7/1894	UNNAMED	59	Tropical Storm
8/15/1895	UNNAMED	59	Tropical Storm
9/13/1900	UNNAMED	43	Tropical Storm
8/14/1901	UNNAMED	82	Category 1
10/9/1905	UNNAMED	43	Tropical Storm
9/27/1906	UNNAMED	93	Category 2
9/21/1907	UNNAMED	43	Tropical Storm
8/11/1911	UNNAMED	79	Category 1
6/13/1912	UNNAMED	59	Tropical Storm
7/17/1912	UNNAMED	5	Tropical Depression
9/13/1912	UNNAMED	82	Category 1
9/18/1914	UNNAMED	33	Tropical Depression
9/29/1915	UNNAMED	96	Category 2
7/5/1916	UNNAMED	95	Category 2

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
10/17/1922	UNNAMED	18	Tropical Depression
6/26/1923	UNNAMED	43	Tropical Storm
10/17/1923	UNNAMED	59	Tropical Storm
9/20/1926	UNNAMED	93	Category 2
9/1/1932	UNNAMED	82	Category 1
10/15/1932	UNNAMED	59	Tropical Storm
7/27/1936	UNNAMED	43	Tropical Storm
8/22/1936	UNNAMED	5	Tropical Depression
6/16/1939	UNNAMED	59	Tropical Storm
9/26/1939	UNNAMED	50	Tropical Storm
9/24/1940	UNNAMED	18	Tropical Depression
9/10/1944	UNNAMED	64	Category 1
9/5/1945	UNNAMED	18	Tropical Depression
9/19/1947	UNNAMED	92	Category 2
9/4/1948	UNNAMED	79	Category 1
9/4/1949	UNNAMED	43	Tropical Storm
8/31/1950	BAKER	82	Category 1
8/1/1955	BRENDA	70	Category 1
8/27/1955	UNNAMED	50	Tropical Storm
9/24/1956	FLOSSY	82	Category 1
9/18/1957	ESTHER	64	Category 1
10/8/1959	IRENE	43	Tropical Storm
9/15/1960	ETHEL	85	Category 2
9/26/1960	FLORENCE	1	Tropical Depression
10/4/1964	HILDA	70	Category 1
9/10/1965	BETSY*	117	Category 4
9/29/1965	DEBBIE	33	Tropical Depression
8/18/1969	CAMILLE	100	Category 3
8/8/1971	UNNAMED	5	Tropical Depression
9/4/1971	FERN	5	Tropical Depression
9/16/1971	EDITH	70	Category 1
7/29/1975	UNNAMED	18	Tropical Depression
10/17/1975	UNNAMED	5	Tropical Depression
9/24/1976	UNNAMED	5	Tropical Depression
7/19/1977	UNNAMED	18	Tropical Depression
9/6/1977	BABE	18	Tropical Depression
10/25/1977	UNNAMED	18	Tropical Depression
8/10/1978	UNNAMED	5	Tropical Depression
7/11/1979	BOB	74	Category 1
9/12/1979	FREDERIC	97	Category 3
7/20/1980	UNNAMED	5	Tropical Depression
10/27/1984	UNNAMED	18	Tropical Depression
9/2/1985	ELENA	95	Category 2
10/31/1985	JUAN	64	Category 1
8/12/1987	UNNAMED	5	Tropical Depression
8/8/1988	BERYL	5	Tropical Depression

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
8/9/1988	BERYL	50	Tropical Storm
9/10/1988	FLORENCE	79	Category 1
8/3/1995	ERIN	82	Category 1
7/19/1997	DANNY	79	Category 1
9/27/1998	GEORGES	92	Category 2
9/20/1998	HERMINE	33	Tropical Depression
6/11/2001	ALLISON	43	Tropical Storm
8/5/2002	BERTHA	33	Tropical Depression
9/14/2002	HANNA	59	Tropical Storm
9/26/2002	ISIDORE	64	Category 1
6/30/2003	BILL	59	Tropical Storm
7/1/2003	BILL	18	Tropical Depression
9/16/2004	IVAN	96	Category 2
6/11/2005	ARLENE	59	Tropical Storm
7/6/2005	CINDY	74	Category 1
7/10/2005	DENNIS*	100	Category 3
8/29/2005	KATRINA	98	Category 3
9/22/2007	TEN	5	Tropical Depression
8/24/2008	FAY	18	Tropical Depression
9/1/2008	GUSTAV*	87	Category 2
11/10/2009	IDA	70	Category 1
7/25/2010	BONNIE	5	Tropical Depression
8/12/2010	FIVE	5	Tropical Depression
9/5/2011	LEE	43	Tropical Storm
8/28/2012	ISAAC*	70	Category 1

*It should be noted that the track of several major hurricanes that impacted the region fell outside of the 100-mile buffer. These storms were included in the table due to their significant impact (Betsy, 1965; Dennis, 2005; Gustav, 2008; and Isaac, 2012), but it should be noted that wind speed and storm category are estimated based on anecdotal information.
Source: National Hurricane Center

Federal records indicate that 12 disaster declarations were made in 1965 (Hurricane Betsy), 1969 (Hurricane Camille), 1979 (Hurricane Frederic), 1985 (Hurricane Elena), 1998 (Hurricane Georges), 2001 (Tropical Storm Allison), 2002 (Tropical Storm Isidore), 2004 (Hurricane Ivan), 2005 (Hurricane Dennis and Hurricane Katrina), 2008 (Hurricane Gustav), and 2012 (Hurricane Isaac).[17] Hurricane and tropical storm events can cause substantial damage in the area due to high winds and flooding.

Flooding and high winds from hurricanes and tropical storms can cause damage throughout the region. Anecdotes are available from NCDC for the major storms that have impacted the area as found below:

Hurricane Georges – September 25-29, 1998
Hurricane Georges, a strong Category 2 hurricane moved slowly northwest across the Gulf of Mexico toward southeast Louisiana and coastal Mississippi on the September 25 and September 26. As the hurricane approached the mouth of the Mississippi River on September 27, it slowly turned toward the north making landfall along the Mississippi Coast just to the east of Biloxi, MS at 0400 CST on September

[17] Not all of the participating counties were declared disaster areas for these storms. A complete listing of historical disaster declarations, including the affected counties, can be found in Section 4: *Hazard Identification*.

28. The hurricane moved only slowly north during the morning hours, at times becoming nearly stationary. The hurricane finally was downgraded to a tropical storm at 1500CST on September 28 when it was located north of Biloxi. The tropical storm then moved very slowly eastward into southern Alabama on September 29.

Most of the inland counties in Southeast Mississippi had damage from heavy rains and from trees and power lines being blown down by the persistent winds. One of the hardest hit areas by the high winds was in Stone County Mississippi near where the center of the hurricane moved. Eighty five homes were damaged in Stone County by the wind. Fifty four homes had minor damage, twenty six had major damage and five were destroyed. Most of the damage was along and east of U. S. Highway 49.

Throughout the area, agriculture took a beating with the cotton, soybean and pecan crop almost totally destroyed.

The greatest affect from the hurricane occurred over Jackson County which experienced the intense eastern portion of the hurricanes eyewall and highest storm surge.

Due to the slow forward speed of the hurricane very heavy rainfall occurred over eastern Harrison County and Jackson County leading to record flooding on streams and rivers. The barrier islands in the Mississippi Sound were also heavily damaged by wind and storm surge. A new three quarter mile cut developed in the east portion of Ship Island. Total insured property damage in Mississippi was estimated at near 310 million dollars by insurance industry sources. When uninsured losses and public property damage considered, total damages in Mississippi will likely approach $620 million.

Hancock County - Wind damage in Hancock County was mostly confined to large tree limbs snapped off, trees downed, and minor roof damage to houses and businesses, and damage to commercial signs. Storm surge was of minimal impact with the county remaining on the west side of the hurricane. Storm surge was 4 to 5 feet above normal with only minor coastal flooding and beach erosion occurring. Approximately 2,000 people were housed in public shelters.

Harrison County - Moderate wind damage occurred throughout the parish. Many commercial signs were damaged or destroyed, large trees limbs and trees downed, and wind damaged roofs or houses and businesses. At the Gulfport Harbor, a wind gage recorded a maximum gust of 80 mph at 0415CST on September 28. At approximately the same time period, a gust to 117 mph was recorded in Gulfport, one mile north of the beach. Storm surge flooding was generally 6 to 7 feet above normal across the coast. Storm surge flooding crossed US Highway 90 in several locations, but storm surge flooding to property was not considered major. A maximum stage of 8.1 feet was recorded at the Gulfport Harbor.

Due to the slow movement of the hurricane, heavy rain occurred over the east portion of the county and adjacent areas. Significant river flooding occurred on the Biloxi and Tchoutacabouffa Rivers on the September 28 and September 29. Wortham, on the Biloxi River reached its second highest stage of record with a reading of 25.47 feet on September 29.

Many county residents evacuated low lying areas in advance of the hurricane with approximately 3700 seeking refuge in public evacuation shelters within the county.

Jackson County - Jackson County bore the brunt of Hurricane Georges with the area experiencing the strong right front quadrant of the hurricane's circulation. A storm surge of 8 to 11 feet caused storm

surge flooding along low lying coastal areas. This was the greatest storm surge flooding in Jackson County in nearly 30 years. In the east beach section of the Bellefontaine area, 23 of 27 homes were heavily damaged or destroyed by storm surge. Many businesses and industries located in low lying coastal areas were flooded causing considerable property damage and loss of revenue. The U.S. Navy facility at Pascagoula suffered $2.2 million in property damage, primarily roof and water damage.

Several unofficial anemometers recorded gusts between 85 and 100 mph in the Pascagoula area. Moderate wind damage was reported across the parish. Numerous commercial signs were destroyed, trees downed, roofs damaged, and power lines and poles downed.

Approximately 4600 people sought refuge in public hurricane evacuation shelters in Jackson County. Two shelters, one in Gautier and one in Pascagoula, suffered wind damage to the roof at the height of the storm.

Due to the slow forward speed of Hurricane Georges, widespread heavy rainfall occurred over Jackson County and over the watershed of the Pascagoula and Escatawpa Rivers. Rainfall of 10 to 15 inches was common over Jackson County. River flooding developed over much of the county by September 28. A record flood crest of 20.82 feet was established on Red Creek at Vestry. On the Escatawpa River, a record flood crest of 22.70 feet was established at Agricola. Approximately 3,000 people were evacuated from flooded areas, primarily in the Escatawpa River basin, with hundreds of structures flooded in the county.

Pearl River County - Damage was mainly confined to downed tree limbs and trees, minor to moderate roof damage to homes and businesses, and power outages from downed power lines. Several secondary highways and roadways in the county were blocked by fallen trees. Storm total rainfall was fairly light with amounts of 2 to 4 inches common. About 200 people were sheltered in public hurricane evacuations shelters in the county.

Hurricane Katrina – August 24-30, 2005
Hurricane Katrina was one of the strongest and most destructive hurricanes on record to impact the coast of the United States. It will likely be recorded as one the worst natural disaster in the history of the United States to date resulting in catastrophic damage and numerous casualties in southeast Louisiana and along the Mississippi coast. Damage and casualties resulting from Hurricane Katrina extended as far east as Alabama and the panhandle of Florida. Katrina developed from a tropical depression southeast of the Bahamas on August 24th. After moving through the Bahamas as a tropical storm, Katrina strengthened to a category 1 hurricane prior to landfall in south Florida around the Miami area on the 25th of August. Katrina crossed south Florida and entered the Gulf of Mexico and began to strengthen. Hurricane Katrina strengthened to a category 5 storm on August 28th about 250 miles south southeast of the mouth of the Mississippi River with winds reaching their peak intensity of 175 mph and a central pressure of 902 mb. Post event analysis by the National Hurricane Center indicates that Katrina weakened slightly before making landfall as a strong category 3 storm in initial landfall in lower Plaquemines Parish. Maximum sustained winds were estimated at 110 knots or 127 mph and a central pressure of 920 mb around 610 AM CDT on August 29th in southeast Louisiana just south of Buras in Plaquemines Parish. The storm continued on a north northeast track with the center passing about 40 miles southeast of New Orleans with a second landfall occurring near the Louisiana and Mississippi border around 945 AM CDT as a category 3 storm with maximum sustained winds estimated around 105 knots or 121 mph. Katrina continued to weaken as it moved north northeast across Mississippi during

the day, but remained at hurricane strength 100 miles inland near Laurel, Mississippi. Katrina weakened to a tropical depression near Clarksville, Tennessee on August 30th.

Damage across coastal Mississippi was catastrophic. The storm surge associated with Hurricane Katrina approached or exceeded the surge associated with Hurricane Camille and impacted a much more extensive area. Almost total destruction was observed along the immediate coast in Hancock and Harrison Counties with storm surge damage extending north along bays and bayous to Interstate 10. Thousands of homes and businesses were destroyed by the storm surge. Hurricane force winds also caused damage to roofs, power lines, signage, downed trees, and some windows were broken by wind and wind driven debris in areas away from storm surge flooding, wind damage was widespread with fallen trees taking a heavy toll on houses and power lines. Damage was less extensive in southwest Mississippi. Excluding losses covered by the Federal Flood Insurance Program, insured property losses in Mississippi were estimated at 9.8 billion dollars. Uninsured and insured losses combined were estimated to exceed 100 billion dollars across the Gulf Coast.

As of late October, the following fatality figures were reported in the Mississippi coastal counties; Hancock- 52, Harrison - 83, Jackson - 17. Additional details on fatalities will be given in later updates to storm data.

Due to the failure of power and equipment prior to the peak of the storm, data for wind, storm surge, pressure, and rainfall are incomplete. The lowest pressure on the Mississippi coast was estimated to be 928 mb where the hurricane made landfall near the Louisiana Mississippi border. A pressure of 976 mb was recorded at 0951 CDT by a university weather station deployed in Pascagoula, well east of the landfall location. At approximately the same time, the pressure at the NWS office in Slidell, just to the west of landfall location, recorded a pressure of 934.1 mb at 0938 AM CDT.

The highest wind gusts recorded in Mississippi and the adjacent coastal waters were 117 knots (134 mph) at the Pearl River County EOC office in Poplarville and 102 knots (118 mph) at 1000AM CDT by a university wind tower deployed at the Stennis Space Center in Hancock County. Maximum sustained winds in Mississippi were estimated around 105 knots (121 mph) near the storm's second landfall along the Mississippi and Louisiana border. Unofficial wind observations before the gage failed included a wind gust of 106 kt, (122 mph) at 0615 CDT by an amateur radio operator in Long Beach and a wind gust of 108 kt (124 mph) at the EOC in Pascagoula.

High winds from Katrina caused significant tree and power line damage to the counties that border the Mississippi and Alabama state line. Wind gusts of 80-100 mph were estimated across Stone County and 70-90 mph across George County. Many of the fallen trees fell on structures and caused damage. Stone County received the most damage.

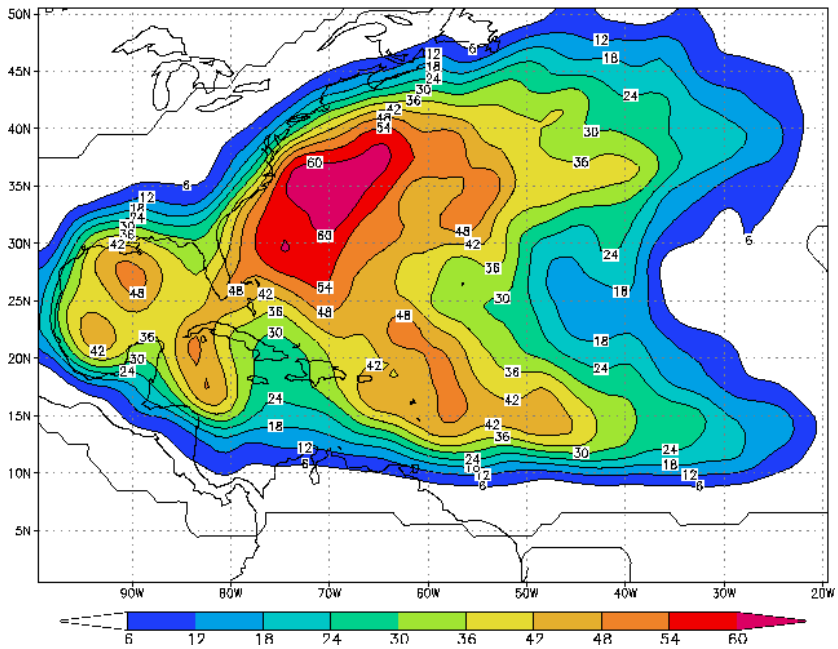
Most tide gages were destroyed by the storm surge so storm surge was determined primarily by post storm high water mark surveys conducted by FEMA. An estimated storm surge of approximately 23.0 feet occurred at the Hancock County EOC operations area in Waveland, and the high water mark measured on the Jackson County EOC building in Pascagoula was 16.1 feet. Preliminary estimates of storm surge along the Mississippi Coast include Hancock County 19-25 feet, Harrison County 19-25 feet, Jackson County 17-21 ft. All storm surge heights are still water elevations referenced to NAVD88 datum.

Storm total rainfall amounts generally ranged from 10 to 16 inches across coastal and south Mississippi with much lower amounts observed over southwest Mississippi. The highest observed storm total rainfall was 11 inches at Stennis Space Center and near Picayune.

5.14.4 Probability of Future Occurrences

According to NOAA statistical data, the region is located in an area with an annual probability of a named storm between 30 and 42 percent as presented in **Figure 5.22**. This illustration was created by the National Oceanic and Atmospheric Administration's Hurricane Research Division using data from 1944 to 1999 and counting hits when a storm or hurricane was within approximately 100 miles (165 km) of each location. As a reference point, the tip of Florida's outline can be found near the 25N, 80W intersection, and the MEMA District 9 Region is near the 30N, 90W intersection. This empirical probability is fairly consistent with other scientific studies and observed historical data made available through a variety of federal, state, and local sources.

FIGURE 5.22: EMPIRICAL PROBABILITY OF A NAMED HURRICANE OR TROPICAL STORM



Source: National Oceanic and Atmospheric Administration

The probability of storm occurrences will vary significantly based on the return interval for different categories of magnitude. The probability of less intense storms (lower return periods) is higher than more intense storms (higher return periods). **Table 5.25** profiles the potential peak gust wind speeds that can be expected in the MEMA District 9 Region during a hurricane event for various return periods according to FEMA's HAZUS-MH®.

TABLE 5.25: POTENTIAL PEAK GUST WIND SPEEDS PER RETURN PERIOD

50-Year	100-Year	500-Year	1,000-Year
119.4 mph	133.9 mph	160.3 mph	170.0

Source: Federal Emergency Management Agency (Hazus-MH 3.2)

Overall, the probability level of future hurricane and tropical storm occurrence for the MEMA District 9 Region is highly likely (100 percent annual probability).

5.15 SEVERE THUNDERSTORM/HIGH WIND

5.15.1 Background

Thunderstorms can produce a variety of accompanying hazards including wind (discussed here), hail, and lightning. Although thunderstorms generally affect a small area, they are very dangerous may cause substantial property damage.

Three conditions need to occur for a thunderstorm to form. First, it needs moisture to form clouds and rain. Second, it needs unstable air, such as warm air that can rise rapidly (this often referred to as the "engine" of the storm). Third, thunderstorms need lift, which comes in the form of cold or warm fronts, sea breezes, mountains, or the sun's heat. When these conditions occur simultaneously, air masses of varying temperatures meet, and a thunderstorm is formed. These storm events can occur singularly, in lines, or in clusters. Furthermore, they can move through an area very quickly or linger for several hours.

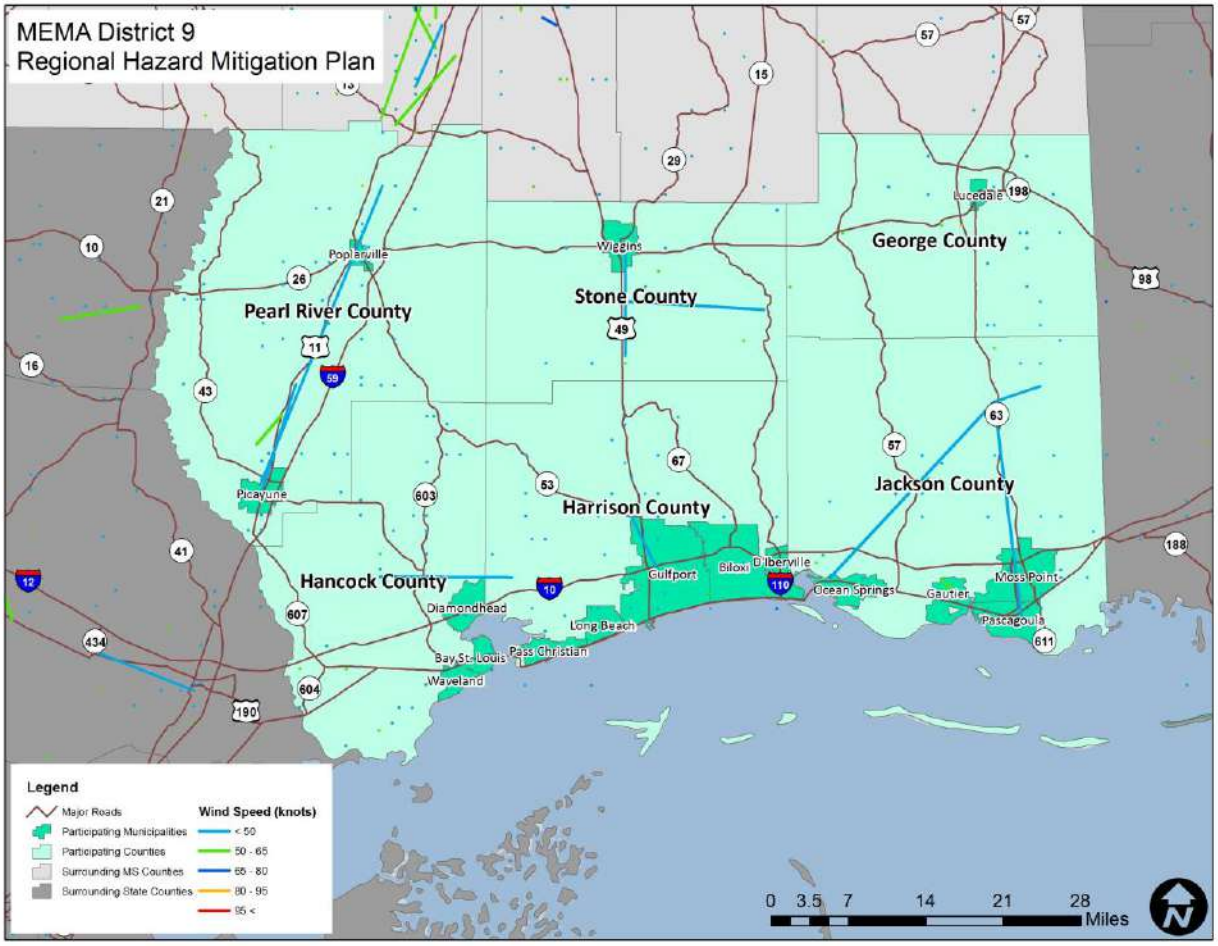
According to the National Weather Service, more than 100,000 thunderstorms occur each year, though only about 10 percent of these storms are classified as "severe." A severe thunderstorm occurs when the storm produces at least one of these three elements: 1) hail of three-quarters of an inch, 2) a tornado, or 3) winds of at least 58 miles per hour.

Downbursts are also possible with thunderstorm events. Such events are an excessive burst of wind in excess of 125 miles per hour. They are often confused with tornadoes. Downbursts are caused by down drafts from the base of a convective thunderstorm cloud. It occurs when rain-cooled air within the cloud becomes heavier than its surroundings. Thus, air rushes towards the ground in a destructive yet isolated manner. There are two types of downbursts. Downbursts less than 2.5 miles wide, duration less than 5 minutes, and winds up to 168 miles per hour are called "microbursts." Larger events greater than 2.5 miles at the surface and longer than 5 minutes with winds up to 130 miles per hour are referred to as "macrobursts."

5.15.2 Location and Spatial Extent

A thunderstorm event is an atmospheric hazard, and thus has no geographic boundaries. It is typically a widespread event that can occur in all regions of the United States. However, thunderstorms are most common in the central and southern states because atmospheric conditions in those regions are favorable for generating these powerful storms. It is assumed that the MEMA District 9 Region has uniform exposure to an event and the spatial extent of an impact could be large. With that in mind, **Figure 5.23** shows the location of wind events that have impacted the region between 1955 and 2015.

FIGURE 5.23: SEVERE THUNDERSTORM TRACKS IN MEMA DISTRICT 9 REGION



Source: National Weather Service Storm Prediction Center

5.15.3 Historical Occurrences

Severe storms were at least partially responsible for 12 disaster declarations in the MEMA District 9 Region in between 1971 and 2016.[18] According to NCDC, there have been 704 reported thunderstorm and high wind events since 1959 in the MEMA District 9 Region.[19] These events caused almost $11.1 million (2016 dollars) in damages.[20] There were also reports of 2 fatalities and 39 injuries. **Table 5.26** summarizes this information. Detailed thunderstorm and high wind event reports including date, magnitude, and associated damages for each event are presented in the county-specific annexes.

[18] Not all of the participating counties were declared disaster areas for these storms. A complete listing of historical disaster declarations, including the affected counties, can be found in Section 4: *Hazard Identification*.

[19] These thunderstorm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through June 2016 and these high wind events are only inclusive of those reported by NCDC from 1996 through June 2016. It is likely that additional thunderstorm and high wind events have occurred in the MEMA District 9 Region. As additional local data becomes available, this hazard profile will be amended.

[20] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE 5.26: SUMMARY OF THUNDERSTORM/HIGH WIND OCCURRENCES IN THE MEMA DISTRICT 9 REGION

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
George County	**73**	**0/16**	**$955,002**	**$33,394**
Lucedale	22	0/6	$548,223	$24,919
Unincorporated Area	51	0/10	$406,779	$8,475
Hancock County	**102**	**0/4**	**$428,553**	**$11,182**
Bay St. Louis	6	0/0	$1,981	$99
Diamondhead	3	0/0	$17,584	$1,099
Waveland	14	0/0	$59,427	$2,701
Unincorporated Area	79	0/4	$349,561	$7,283
Harrison County	**185**	**1/8**	**$1,027,677**	**$38,753**
Biloxi	19	0/0	$350,990	$16,714
D'Iberville	10	0/0	$95,625	$4,554
Gulfport	24	0/0	$241,992	$10,521
Long Beach	5	0/0	$5,684	$284
Pass Christian	6	0/0	$15,825	$688
Unincorporated Area	121	1/8	$317,561	$5,992
Jackson County	**127**	**0/3**	**$459,368**	**$20,249**
Gautier	3	0/2	$109,389	$9,116
Moss Point	3	0/0	$7,226	$602
Ocean Springs	12	0/0	$29,120	$1,456
Pascagoula	15	0/0	$118,805	$5,657
Unincorporated Area	94	0/1	$194,828	$3,418
Pearl River County	**145**	**0/3**	**$7,302,402**	**$373,483**
Picayune	22	0/2	$6,844,811	$360,253
Poplarville	38	0/1	$183,304	$8,332
Unincorporated Area	85	0/0	$274,287	$4,898
Stone County	**72**	**1/5**	**$907,929**	**$35,155**
Wiggins	39	1/5	$589,788	$28,085
Unincorporated Area	33	0/0	$318,141	$7,070
MEMA DISTRICT 9 REGIONAL TOTAL	**704**	**2/39**	**$11,080,931**	**$512,216**

Source: National Climatic Data Center

5.15.4 Probability of Future Occurrences

Given the high number of previous events, it is certain that thunderstorm events, including straight-line wind events, will occur in the future. This results in a probability level of highly likely (100 percent annual probability) for the entire planning area.

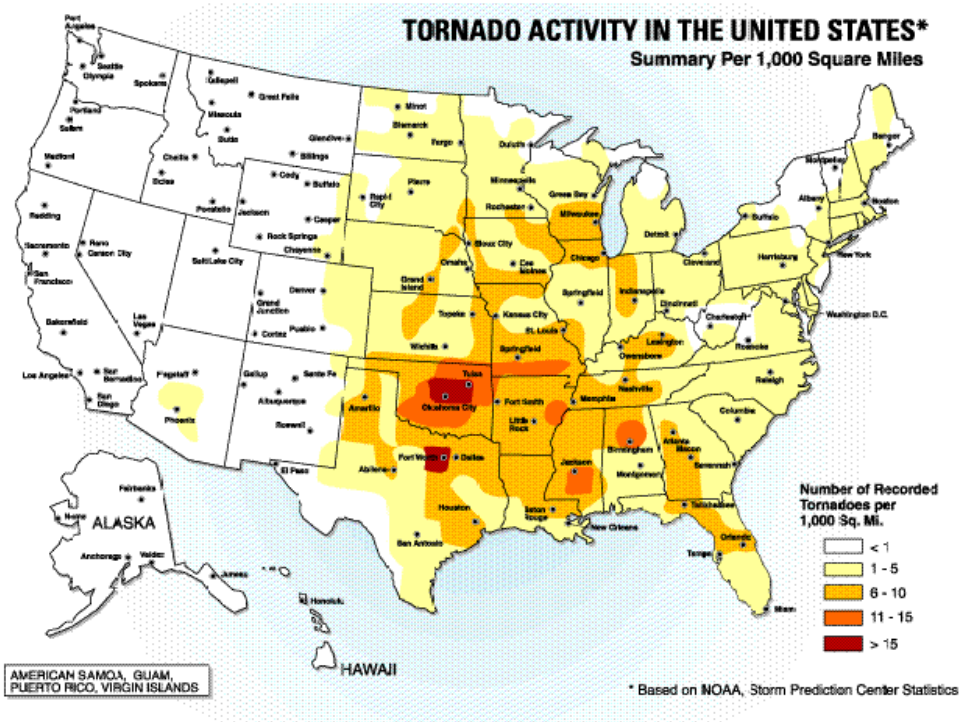
5.16 TORNADO

5.16.1 Background

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. Tornadoes are most often generated by thunderstorm activity (but sometimes result from hurricanes and other tropical storms) when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The damage caused by a tornado is a result of the high wind velocity and wind-blown debris, also accompanied by lightning or large hail. According to the National Weather Service, tornado wind speeds normally range from 40 miles per hour to more than 300 miles per hour. The most violent tornadoes have rotating winds of 250 miles per hour or more and are capable of causing extreme destruction and turning normally harmless objects into deadly missiles.

Each year, an average of over 800 tornadoes is reported nationwide, resulting in an average of 80 deaths and 1,500 injuries.[21] According to the NOAA Storm Prediction Center (SPC), the highest concentration of tornadoes in the United States has been in Oklahoma, Texas, Kansas, and Florida respectively. Although the Great Plains region of the Central United States does favor the development of the largest and most dangerous tornadoes (earning the designation of "tornado alley"), Florida experiences the greatest number of tornadoes per square mile of all U.S. states (SPC, 2002). **Figure 5.24** shows tornado activity in the United States based on the number of recorded tornadoes per 1,000 square miles.

FIGURE 5.24: TORNADO ACTIVITY IN THE UNITED STATES



Source: Federal Emergency Management Agency

[21] NOAA, 2009.

Tornadoes are more likely to occur during the months of March through May and are most likely to form in the late afternoon and early evening. Most tornadoes are a few dozen yards wide and touch down briefly, but even small short-lived tornadoes can inflict tremendous damage. Highly destructive tornadoes may carve out a path over a mile wide and several miles long.

The destruction caused by tornadoes ranges from light to inconceivable depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damage to structures of light construction, including residential dwellings (particularly mobile homes). Tornadic magnitude is reported according to the Fujita and Enhanced Fujita Scales. Tornado magnitudes prior to 2005 were determined using the traditional version of the Fujita Scale (**Table 5.27**). Tornado magnitudes that were determined in 2005 and later were determined using the Enhanced Fujita Scale (**Table 5.28**).

TABLE 5.27: THE FUJITA SCALE (EFFECTIVE PRIOR TO 2005)

F-SCALE NUMBER	INTENSITY	WIND SPEED	TYPE OF DAMAGE DONE
F0	GALE TORNADO	40–72 MPH	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.
F1	MODERATE TORNADO	73–112 MPH	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
F2	SIGNIFICANT TORNADO	113–157 MPH	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
F3	SEVERE TORNADO	158–206 MPH	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
F4	DEVASTATING TORNADO	207–260 MPH	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
F5	INCREDIBLE TORNADO	261–318 MPH	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.
F6	INCONCEIVABLE TORNADO	319–379 MPH	These winds are very unlikely. The small area of damage they might produce would probably not be recognizable along with the mess produced by F4 and F5 wind that would surround the F6 winds. Missiles, such as cars and refrigerators would do serious secondary damage that could not be directly identified as F6 damage. If this level is ever achieved, evidence for it might only be found in some manner of ground swirl pattern, for it may never be identifiable through engineering studies.

Source: National Weather Service

TABLE 5.28 THE ENHANCED FUJITA SCALE (EFFECTIVE 2005 AND LATER)

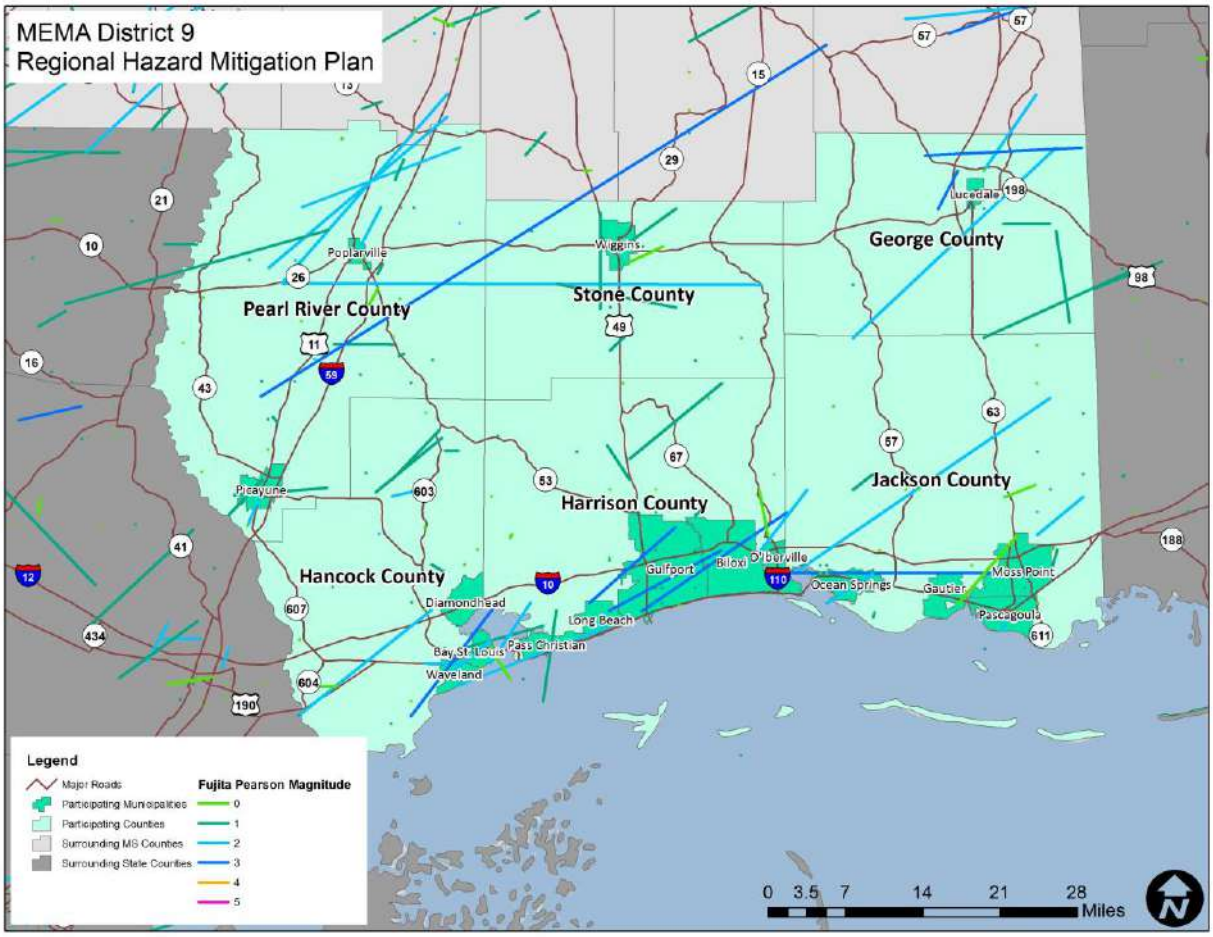
EF-SCALE NUMBER	INTENSITY PHRASE	3 SECOND GUST (MPH)	TYPE OF DAMAGE DONE
EF0	GALE	65–85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.
EF1	MODERATE	86–110	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
EF2	SIGNIFICANT	111–135	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
EF3	SEVERE	136–165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
EF4	DEVASTATING	166–200	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
EF5	INCREDIBLE	Over 200	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged.

Source: National Weather Service

5.16.2 Location and Spatial Extent

Tornadoes occur throughout the state of Mississippi, and thus in the MEMA District 9 Region. Tornadoes typically impact a relatively small area, but damage may be extensive. Event locations are completely random and it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that the MEMA District 9 Region is uniformly exposed to this hazard. With that in mind, **Figure 5.25** shows tornado track data for many of the major tornado events that have impacted the region between 1950 and 2015. While no definitive pattern emerges from this data, some areas that have been impacted in the past may be potentially more susceptible in the future.

FIGURE 5.25: HISTORICAL TORNADO TRACKS IN THE MEMA DISTRICT 9 REGION



Source: National Weather Service Storm Prediction Center

5.16.3 Historical Occurrences

Tornadoes were at least partially responsible for 11 disaster declarations in the MEMA District 9 Region between 1965 and 2016.[22] According to the National Climatic Data Center, there have been a total of 283 recorded tornado events in the MEMA District 9 Region since 1952, resulting in more than $383.5 million (2016 dollars) in property damages.[23] [24] In addition, 6 fatalities and 170 injuries were reported. The magnitude of these tornadoes ranged from F0 to F3 and EF0 to EF3 in intensity. A summary of these events is presented in **Table 5.29**. Detailed information on historical tornado events can be found in the county-specific annexes.

[22] Not all of the participating counties were declared disaster areas for these storms. A complete listing of historical disaster declarations, including the affected counties, can be found in Section 4: *Hazard Identification*.
[23] These tornado events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1950 through June 2016. It is likely that additional tornadoes have occurred in the MEMA District 9 Region. As additional local data becomes available, this hazard profile will be amended.
[24] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE 5.29: SUMMARY OF TORNADO OCCURRENCES IN THE MEMA DISTRICT 9 REGION

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
George County	**13**	**0/14**	**$4,884,598**	**$100,488**
Lucedale	1	0/0	$12,750	$1,063
Unincorporated Area	12	0/14	$4,871,848	$99,425
Hancock County	**55**	**0/14**	**$78,614,561**	**$1,232,052**
Bay St. Louis	9	0/0	$14,776	$739
Diamondhead	2	0/0	$14,437	$902
Waveland	6	0/0	$62,971	$3,498
Unincorporated Area	38	0/14	$78,522,377	$1,226,912
Harrison County	**77**	**6/81**	**$280,858,851**	**$4,472,901**
Biloxi	6	0/0	$127,157	$7,947
D'Iberville	2	0/0	$10,490	$954
Gulfport	11	0/0	$205,720	$10,286
Long Beach	2	0/0	$21,415	$1,428
Pass Christian	2	0/0	$0	$0
Unincorporated Area	54	6/81	$280,494,069	$4,452,287
Jackson County	**60**	**0/19**	**$7,916,013**	**$150,650**
Gautier	2	0/0	$153,507	$7,675
Moss Point	5	0/0	$0	$0
Ocean Springs	6	0/0	$118,939	$5,664
Pascagoula	4	0/0	$132,885	$7,817
Unincorporated Area	43	0/19	$7,510,682	$129,495
Pearl River County	**56**	**0/37**	**$9,450,431**	**$173,388**
Picayune	3	0/0	$139,531	$9,302
Poplarville	14	0/1	$287,680	$13,699
Unincorporated Area	39	0/36	$9,023,220	$150,387
Stone County	**22**	**0/5**	**$1,799,664**	**$33,495**
Wiggins	7	0/0	$134,091	$7,057
Unincorporated Area	15	0/5	$1,665,573	$26,438
MEMA DISTRICT 9 REGIONAL TOTAL	**283**	**6/170**	**$383,524,118**	**$6,162,975**

Source: National Climatic Data Center

5.16.4 Probability of Future Occurrences

According to historical information, tornado events pose a significant threat to the MEMA District 9 Region. The probability of future tornado occurrences affecting MEMA District 9 Region is highly likely (100 percent annual probability).

5.17 WINTER WEATHER

5.17.1 Background

A winter storm can range from a moderate snow over a period of a few hours to blizzard conditions with blinding wind-driven snow that lasts for several days. Events may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Some winter storms might be large enough to affect several states, while others might affect only localized areas. Occasionally, heavy snow might also cause significant property damages, such as roof collapses on older buildings.

All winter storm events have the potential to present dangerous conditions to the affected area. Larger snowfalls pose a greater risk, reducing visibility due to blowing snow and making driving conditions treacherous. A heavy snow event is defined by the National Weather Service as an accumulation of 4 of more inches in 12 hours or less. A blizzard is the most severe form of winter storm. It combines low temperatures, heavy snow, and winds of 35 miles per hour or more, which reduces visibility to a quarter mile or less for at least 3 hours. Winter storms are often accompanied by sleet, freezing rain, or an ice storm. Such freeze events are particularly hazardous as they create treacherous surfaces.

Ice storms are defined as storms with significant amounts of freezing rain and are a result of cold air damming (CAD). CAD is a shallow, surface-based layer of relatively cold, stably-stratified air entrenched against the eastern slopes of the Appalachian Mountains. With warmer air above, falling precipitation in the form of snow melts, then becomes either super-cooled (liquid below the melting point of water) or re-freezes. In the former case, super-cooled droplets can freeze on impact (freezing rain), while in the latter case, the re-frozen water particles are ice pellets (or sleet). Sleet is defined as partially frozen raindrops or refrozen snowflakes that form into small ice pellets before reaching the ground. They typically bounce when they hit the ground and do not stick to the surface. However, it does accumulate like snow, posing similar problems and has the potential to accumulate into a layer of ice on surfaces. Freezing rain, conversely, usually sticks to the ground, creating a sheet of ice on the roadways and other surfaces. All of the winter storm elements – snow, low temperatures, sleet, ice, etcetera – have the potential to cause significant hazard to a community. Even small accumulations can down power lines and trees limbs and create hazardous driving conditions. Furthermore, communication and power may be disrupted for days.

5.17.2 Location and Spatial Extent

Nearly the entire continental United States is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. The MEMA District 9 Region is not accustomed to severe winter weather conditions and rarely receives severe winter weather, even during the winter months. Events tend to be mild in nature; however, even relatively small accumulations of snow, ice, or other wintery precipitation can lead to losses and damage due to the fact that these events are not commonplace. Given the atmospheric nature of the hazard, the entire region has uniform exposure to a winter storm.

5.17.3 Historical Occurrences

According to the National Climatic Data Center, there have been a total of 23 recorded winter storm events in the MEMA District 9 Region since 1996.[25] These events did not result in any property damage (2016 dollars).[26] A summary of these events is presented in **Table 5.30**. Detailed information on the recorded winter storm events can be found in the county-specific annexes.

TABLE 5.30: SUMMARY OF WINTER STORM EVENTS IN THE MEMA DISTRICT 9 REGION

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
George County	4	0/0	$0	$0
Hancock County	4	0/0	$0	$0
Harrison County	4	0/0	$0	$0
Jackson County	4	0/0	$0	$0
Pearl River County	4	0/0	$0	$0
Stone County	3	0/0	$0	$0
MEMA DISTRICT 9 REGION TOTAL	**23**	**0/0**	**$0**	**$0**

Source: National Climatic Data Center

There have been several severe winter weather events in the MEMA District 9 Region. The text below describes three of the major events and associated impacts on the region. Similar impacts can be expected with severe winter weather.

December 2004
A mixture of sleet and snow fell off and on during much of Christmas day resulting in a dusting to one half inch of accumulation across much of southwest, south, and coastal Mississippi. Although not heavy, accumulation of ice and snow in coastal Mississippi is unusual and the winter weather impacted transportation. The mixture of sleet and snow caused a number of bridges and overpasses to become icy which resulted in some traffic accidents and closure of some the elevated roadways.

December 2008
A rare and widespread snowfall occurred across much of south Mississippi, beginning early in the morning of December 11th and continuing until around the noon hour, as an unusually strong and cold upper level storm system moved across the region. The snow, which was occasionally heavy, affected all but the coastal areas of south Mississippi. Snowfall amounts of 2 to 3 inches were common in this area; however, up to 6 inches of snow was reported in western Pearl River County.

February 2010
An area of low pressure moved across the north central Gulf. Heavy rain changed over to snow across portions of the central gulf coast as the low moved to the east. Snowfall accumulations ranged from a dusting to as much as 4 inches across interior southeast Mississippi. Broadcast media reported 3 inches

[25] These ice and winter storm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional winter storm conditions have affected the MEMA District 9 Region.
[26] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

of snow on cars in Lucedale. The emergency manager reported 1 inch of snow across Stone County. Some power outages were also reported.

Winter storms throughout the planning area have several negative externalities including hypothermia, cost of snow and debris cleanup, business and government service interruption, traffic accidents, and power outages. Furthermore, citizens may resort to using inappropriate heating devices that could to fire or an accumulation of toxic fumes.

5.17.4 Probability of Future Occurrences

Winter storm events will continue to occur in the MEMA District 9 Region. Based on historical information, the probability is likely (between 10 and 100 percent annual probability).

OTHER HAZARDS

5.18 CLIMATE CHANGE/SEA LEVEL RISE

5.18.1 Background

CLIMATE CHANGE

According to the Environmental Protection Agency (EPA), climate change refers to any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer.

The *National Climate Assessment (2014)* is a report on climate change in the United States that has been developed to increase understanding of the impacts of climate change throughout the country, with specific focus on regional effects and outcomes. The report is based on a wealth of information and data analysis, evaluating both past trends and future projections related to changes in our climate.[27] Much of the data indicates that the primary factor in altering the global climate is greenhouse gas emissions from human activities.

The MEMA District 9 Region appears to be fundamentally changing due to climate change which has resulted in more violent storms, higher temperatures, and changes in precipitation leading to increased drought and/or flood risk. These changes are expected to continue in the foreseeable future for the region at-large. Primary public health concerns as a result of climate change impacts in the Southeast include a number of potential impacts such as the urban heat island effect upon city residents and outdoor workers, heat-related issues for rural workers (primarily farmworkers), increased health risks to the elderly and other vulnerable populations in both rural and urban communities, and impacts to local ecosystems that can have widespread effects on human health.

[27] http://nca2014.globalchange.gov/

SEA LEVEL RISE

Sea Level Rise is defined as the mean rise in sea level. It is caused by two factors: 1) as the ocean warms, sea water expands in volume and 2) continental ice shelves melt, increasing the amount of water in the oceans. This leads to a greater area of land being inundated by sea water.

Rising sea level contributes to the loss of coastal wetlands (which provide protective buffers from flood events), beach erosion, impacts on population and property in low areas, and disruption of coastal habitats and species. Further, flooding and hurricane events are more severe and affect a greater area.

Given that 600 million people live in an area that is less than 10 meters or 33 feet above sea level and the coastal population has doubled in the last 50 years, there is a great vulnerability to sea level rise.

5.18.2 Location and Spatial Extent

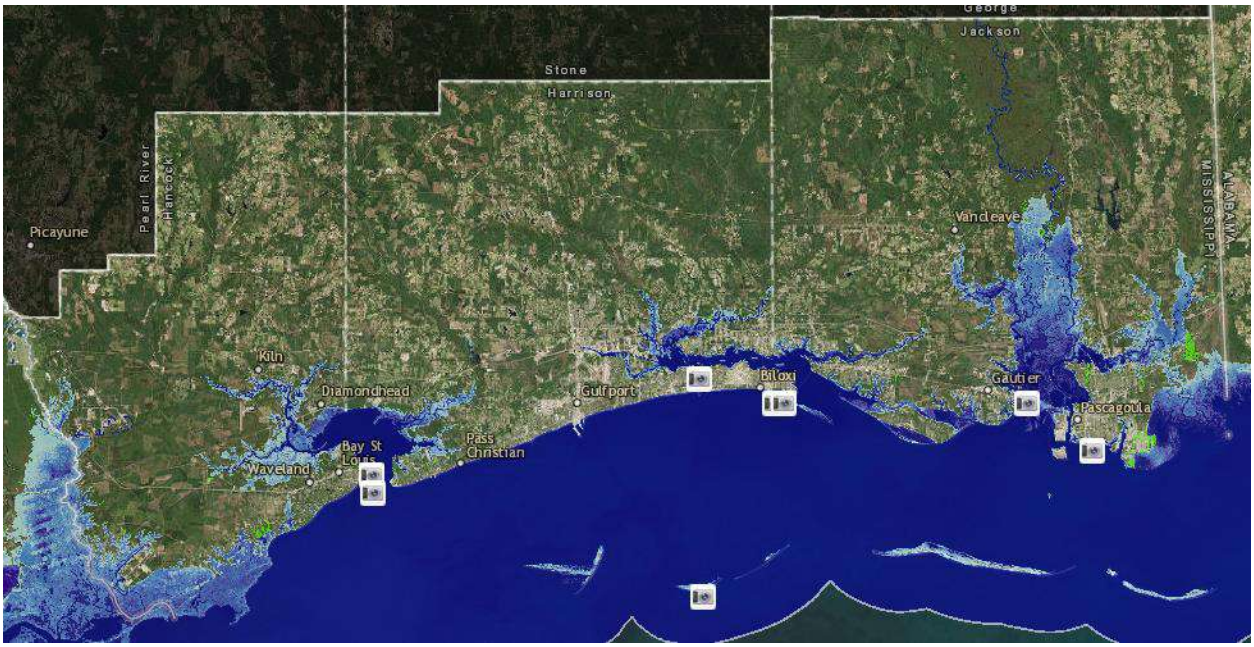
CLIMATE CHANGE

Climate change can have direct implications on many of the other hazards addressed in this plan since it has the potential to alter the nature and frequency of hazards, including increasing temperature (extreme heat), changes in precipitation (drought, flooding), and more frequent, strong storms (wind, hurricane). Therefore, it is assumed that the MEMA District 9 Region is uniformly exposed to this hazard.

SEA LEVEL RISE

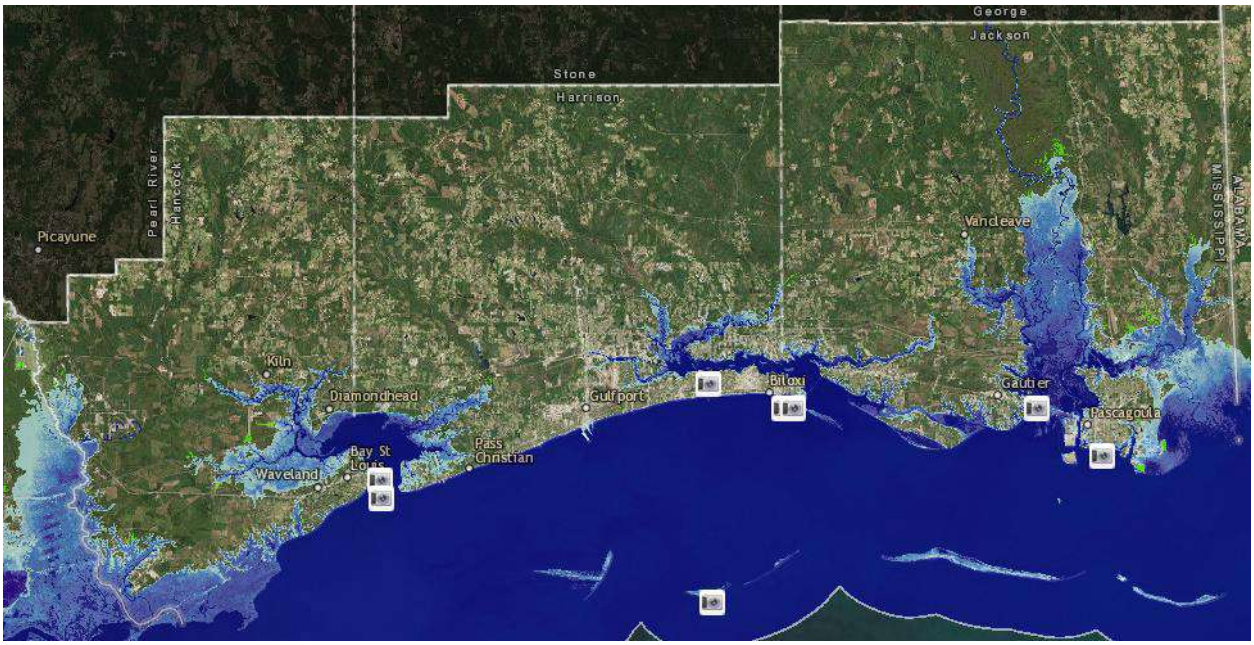
Sea level rise is occurring at a global scale. However, it does not affect areas uniformly and will be more severe in some places. **Figure 5.26** identifies areas in MEMA District 9 that would be inundated by water as a result of three feet in sea level rise as per projections by NOAA. The highest level of sea level rise projected by NOAA is shown in **Figure 5.27**. This figure shows the inundation areas in the case of six feet of sea level rise. This demonstrates the additional areas that would be impacted beyond the three feet scenario.

FIGURE 5.26: THREE FEET SEA LEVEL RISE IN MEMA DISTRICT 9



Source: NOAA

FIGURE 5.27: SIX FEET SEA LEVEL RISE IN MEMA DISTRICT 9



Source: NOAA

5.18.3 Historical Occurrences

CLIMATE CHANGE

According to the *National Climate Assessment*, there have been increasing numbers of days above 95°F and nights above 75°F, and decreasing numbers of extremely cold days since 1970 in the Southeast. Daily and five-day rainfall intensities have also increased and summers have been either increasingly dry or extremely wet. The number of Category 4 and 5 hurricanes in the Atlantic basin has increased substantially since the early 1980s compared to the historic record that dates back to the mid-1880s. This can be attributed to both natural variability and climate change.

SEA LEVEL RISE

Sea level rise is a slow-onset hazard and specific events/occurrences are not possible to determine.

5.18.4 Probability of Future Occurrences

CLIMATE CHANGE

According to the *National Climate Assessment*, temperatures across the Southeast are expected to increase during this century, with shorter-term (year-to-year and decade-to-decade) fluctuations over time due to natural climate variability. Major consequences of warming include significant increases in the number of hot days (95°F or above) and decreases in freezing events. Regional average increases are in the range of 4°F to 8°F by the year 2100.

Projections of future precipitation patterns are less certain than projections for temperature increases. Because the Southeast is located in the transition zone between projected wetter conditions to the north and drier conditions to the southwest, many of the model projections show only small changes relative to natural variations. Additionally, projections further suggest that warming will cause tropical storms to be fewer in number globally, but stronger in force, with more Category 4 and 5 storms, and substantial further increases in extreme precipitation are projected as this century progresses.

Overall, future climate change is considered likely (between 10 and 100 percent annual probability).

SEA LEVEL RISE

There is still much debate regarding the probability of future occurrence of sea level rise. This section will be updated as more information becomes available. Future sea level rise is considered likely (between 10 and 100 percent annual probability).

5.19 HAZARDOUS MATERIALS INCIDENT/TRAIN DERAILMENT

5.19.1 Background

Hazardous materials can be found in many forms and quantities that can potentially cause death; serious injury; long-lasting health effects; and damage to buildings, homes, and other property in varying degrees. Such materials are routinely used and stored in many homes and businesses and are

also shipped daily on the nation's highways, railroads, waterways, and pipelines. This subsection on the hazardous material hazard is intended to provide a general overview of the hazard, and the threshold for identifying fixed and mobile sources of hazardous materials is limited to general information on rail, highway, and fixed HAZMAT sites determined to be of greatest significance as appropriate for the purposes of this plan.

Hazardous material (HAZMAT) incidents can apply to fixed facilities as well as mobile, transportation-related accidents in the air, by rail, on the nation's highways, and on the water. Approximately 6,774 HAZMAT events occur each year, 5,517 of which are highway incidents, 991 are railroad incidents, and 266 are due to other causes.[28] In essence, HAZMAT incidents consist of solid, liquid, and/or gaseous contaminants that are released from fixed or mobile containers, whether by accident or by design as with an intentional terrorist attack. A HAZMAT incident can last hours to days, while some chemicals can be corrosive or otherwise damaging over longer periods of time. In addition to the primary release, explosions and/or fires can result from a release, and contaminants can be extended beyond the initial area by persons, vehicles, water, wind, and possibly wildlife as well.

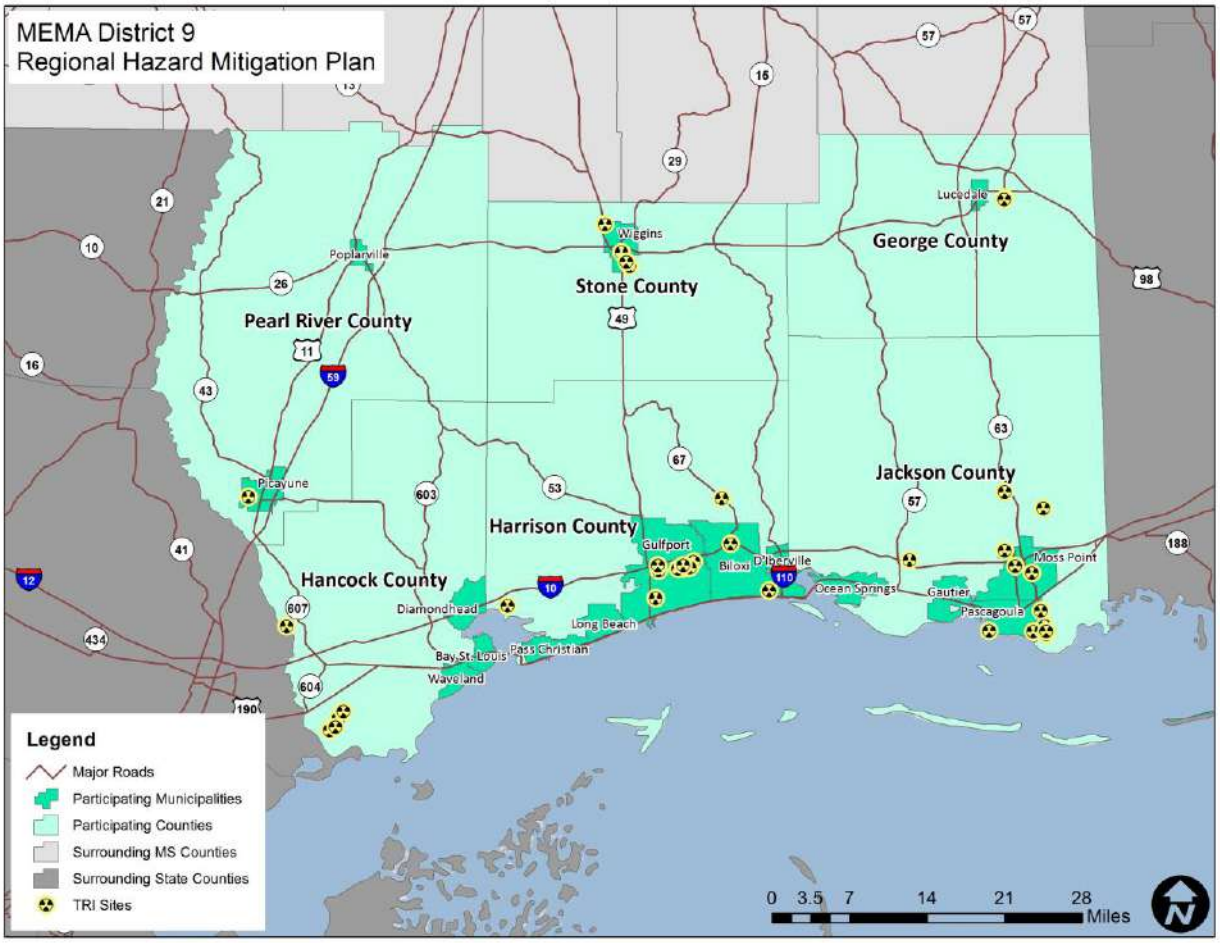
Hazardous material incidents can include the spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment of a hazardous material, but exclude: (1) any release which results in exposure to poisons solely within the workplace with respect to claims which such persons may assert against the employer of such persons; (2) emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel or pipeline pumping station engine; (3) release of source, byproduct, or special nuclear material from a nuclear incident; and (4) the normal application of fertilizer.

5.19.2 Location and Spatial Extent

As a result of the 1986 Emergency Planning and Community Right to Know Act (EPCRA), the Environmental Protection Agency provides public information on hazardous materials. One facet of this program is to collection information from industrial facilities on the releases and transfers of certain toxic agents. This information is then reported in the Toxic Release Inventory (TRI). TRI sites indicate where such activity is occurring. The MEMA District 9 Region has 38 TRI sites. These sites are shown in **Figure 5.28**.

[28] FEMA, 1997.

FIGURE 5.28: TOXIC RELEASE INVENTORY (TRI) SITES IN THE MEMA DISTRICT 9 REGION



Source: Environmental Protection Agency

In addition to "fixed" hazardous materials locations, hazardous materials may also impact the region via roadways and railways. Many roads and railways in the region are subject to hazardous materials transport and all roads and railways that permit hazardous material transport are considered potentially at risk to an incident.

5.19.3 Historical Occurrences

The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) lists historical occurrences throughout the nation. A "serious incident" is a hazardous materials incident that involves:

- a fatality or major injury caused by the release of a hazardous material,
- the evacuation of 25 or more persons as a result of release of a hazardous material or exposure to fire,
- a release or exposure to fire which results in the closure of a major transportation artery,
- the alteration of an aircraft flight plan or operation,
- the release of radioactive materials from Type B packaging,

- the release of over 11.9 galls or 88.2 pounds of a severe marine pollutant, or
- the release of a bulk quantity (over 199 gallons or 882 pounds) of a hazardous material.

However, prior to 2002, a hazardous materials "serious incident" was defined as follows:

- a fatality or major injury due to a hazardous material,
- closure of a major transportation artery or facility or evacuation of six or more persons due to the presence of hazardous material, or
- a vehicle accident or derailment resulting in the release of a hazardous material.

There have been a total of 473 recorded HAZMAT incidents in the MEMA District 9 Region since 1971. These events resulted in over $2.1 million (2016 dollars) in property damage as well as 5 fatalities and 21 injuries.[29] **Table 5.31** summarizes the HAZMAT incidents in the MEMA District 9 Region as reported by PHMSA. Detailed information on these events is presented in the county-specific annexes.

TABLE 5.31: SUMMARY OF HAZMAT INCIDENTS IN THE MEMA DISTRICT 9 REGION

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
George County	**11**	**0/0**	**$101,050**	**$3,866**
Lucedale	6	0/0	$10,174	$231
Unincorporated Area	5	0/0	$90,876	$3,635
Hancock County	**25**	**0/4**	**$274,757**	**$8,313**
Bay St. Louis	6	0/0	$101,364	$2,599
Diamondhead	2	0/0	$57	$2
Waveland	6	0/1	$131,053	$4,680
Unincorporated Area	11	0/3	$42,283	$1,031
Harrison County	**226**	**5/1**	**$327,215**	**$11,489**
Biloxi	28	5/0	$53,210	$1,182
D'Iberville	0	0/0	$0	$0
Gulfport	182	0/1	$94,524	$2,148
Long Beach	7	0/0	$0	$0
Pass Christian	4	0/0	$179,481	$8,158
Unincorporated Area	5	0/0	$0	$0
Jackson County	**176**	**0/15**	**$1,032,007**	**$25,777**
Gautier	10	0/0	$5,556	$142
Moss Point	31	0/3	$509,186	$13,762
Ocean Springs	13	0/5	$231,373	$5,509
Pascagoula	119	0/7	$284,357	$6,319
Unincorporated Area	3	0/0	$1,535	$45
Pearl River County	**25**	**0/1**	**$315,368**	**$7,961**
Picayune	11	0/1	$142,745	$3,660
Poplarville	1	0/0	$14,168	$616
Unincorporated Area	13	0/0	$158,455	$3,685

[29] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Stone County	**10**	**0/0**	**$83,926**	**$2,997**
Wiggins	8	0/0	$26	$1
Unincorporated Area	2	0/0	$83,900	$2,996
MEMA DISTRICT 9 REGIONAL TOTAL	**473**	**5/21**	**$2,134,323**	**$60,403**

Source: United States Department of Transportation Pipeline and Hazardous Materials Safety Administration

5.19.4 Probability of Future Occurrence

Given the location of almost 40 toxic release inventory sites in the MEMA District 9 Region and prior roadway and railway incidents, it is highly likely (100 percent annual probability) that a hazardous material incident may occur in the region. County and city officials are mindful of this possibility and take precautions to prevent such an event from occurring. Furthermore, there are detailed plans in place to respond to an occurrence.

5.20 INFECTIOUS DISEASE

5.20.1 Background

Communicable, or infectious, diseases are conditions that result in clinically evident illness which are transmissible directly from one person to another or indirectly through vectors such as insects, air, water, blood, or other objects. The impact of communicable disease can range from the mild effects of the common cold to the extreme lethality of pneumonic plague or anthrax. The public health system in the United States was developed in large part as a response to the often urgent need to respond to or prevent outbreaks of communicable diseases. Through public health methods of disease reporting, vaccinations, vector control, and effective treatments, most communicable diseases are well controlled in the United States and the MEMA District 9 Region. However, control systems can fail and when people come together from locations outside of the county, state, and the country, outbreaks can occur, even in the most modern of communities. In this section, some of the more significant potential communicable disease concerns are described.

The threats discussed in this section usually do not occur on a regular basis, though some are more frequent. The diseases described herein do not originate from intentional exposure (such as through terrorist actions) but do present significant issues and concerns for the public health community. There are numerous infectious diseases that rarely, if ever, occur in the MEMA District 9 Region, such as botulism or bubonic plague. Some highly dangerous diseases which could potentially be used as biological weapons, such as anthrax, pneumonic plague, and smallpox, are safely housed and controlled in laboratory settings such as at the Center for Disease Control and Prevention (CDC). Other diseases have not (yet) mutated into a form that can infect humans, or otherwise lie dormant in nature.

There have been several significant viral outbreaks from emerging diseases in recent years of both national and international importance. The Zika virus and West Nile virus are viruses that are typically passed to humans or animals by mosquitoes and made major news as emergent disease threats. Meanwhile, diseases that are spread directly between human beings such as Severe Acute Respiratory Syndrome (SARS) and Ebola have also been identified as serious threats. While each of these conditions

caused a great deal of public health concern when they were first identified, SARS has virtually disappeared, West Nile virus occurs with low frequency and causes serious disease in only a very small percentage of cases, Ebola has been more or less contained and a vaccine is in development, and many people infected with Zika will not experience symptoms from the disease.

Other communicable diseases pose a much more frequent threat to the residents of the MEMA District 9 Region. Some of the infectious diseases of greatest concern include influenza, particularly in a pandemic form, as well as norovirus, and multiple antibiotic-resistant tuberculosis. Even in one of its normal year-to-year variants, influenza (commonly referred to as “flu”) can result in serious illness and even death in young children, the elderly and immune-compromised persons. But there is always the potential risk of the emergence of influenza in one of the pandemic H1N1 forms, such as in the “Spanish Flu” outbreak of 1918-19, which killed over 50 million people worldwide. Every year, the MEMA District 9 Region sees hundreds of cases of influenza, leading to hundreds of hours of lost productivity in businesses due to sick employees. Of note, a vaccine for influenza is produced every year and, according to the CDC, is highly effective in preventing the disease.

Norovirus is recognized as the leading cause of foodborne-disease outbreaks in the United States. The virus can cause diarrhea, vomiting, and stomach pain, and is easily spread from person to person through contaminated food or water and by surface to surface contact. Especially vulnerable populations to this virus include those living or staying in nursing homes and assisted living facilities and other healthcare facilities such as hospitals. Norovirus could also be a threat in the event of large public gatherings such as sporting events, concerts, festivals, and so forth. The MEMA District 9 Region and the State of Mississippi often experience norovirus outbreaks on an annual basis. No vaccine or treatment exists for the Norovirus, making it especially dangerous for the public in the event of an outbreak.

Public health threats can occur at any time and can have varying impacts. Discussions between public health professionals, planning officials, and first response agencies are essential in order to facilitate safe, effective, and collaborative efforts toward outbreaks.

5.20.2 Location and Spatial Extent

Due to the nature of a public health/emerging disease threat, it is difficult to identify a precise location where this type of event would occur. Moreover, a large-scale event would have impacts that spread throughout the region. Therefore, all areas in the MEMA District 9 Region are considered equally susceptible to infectious diseases.

5.20.3 Historical Occurrences

Mosquito-borne illness in Mississippi include West Nile virus, Chikungunya virus, and Zika virus. These illnesses affect birds, animals, and humans, causing flu-like symptoms in people who are bitten by infected mosquitoes. Occasionally illness can be severe, leading to meningitis or encephalitis. According to the Mississippi State Department of Health (MSDH), there have been two reported cases of West Nile Virus and two reported cases of Zika in the MEMA District 9 Region as of November 2016 but none of these cases resulted in death. **Table 5.32** summarizes the mosquito-borne illnesses in humans reported in the region.

TABLE 5.32: SUMMARY OF MOSQUITO-BORNE ILLNESSES IN THE MEMA DISTRICT 9 REGION

Location	West Nile Virus	Chikungunya	Zika	Other*	Deaths
George County	1	0	0	0	0
Hancock County	0	0	0	0	0
Harrison County	0	0	2	0	0
Jackson County	1	0	0	0	0
Pearl River County	0	0	0	0	0
Stone County	0	0	0	0	0
MEMA DISTRICT 9 REGION TOTAL	**2**	**0**	**2**	**0**	**0**

*Other mosquito-borne illnesses include La Crosse encephalitis, St. Louis encephalitis, and Eastern Equine encephalitis.
Source: Mississippi State Department of Health

As stated previously, diseases like influenza and norovirus are regularly occurring health issues in the MEMA District 9 Region. These conditions are not legally reportable to county or state public health agencies, so data on disease incidence is not readily available. MSDH relies upon selected sentinel health practitioners across the state to report the percentage and total patient visits consistent with an influenza-like illness (ILI): fever of 100°F or higher and cough or sore throat. Reports are used to estimate the state's ILI rate and the magnitude of state's influenza activity on a weekly basis. Reports represent only the distribution of flu in the state, not an actual count of all flu cases statewide.

5.20.4 Probability of Future Occurrences

Due to some recent incidents that have been recorded across the State of Mississippi and in the MEMA District 9 Region, future occurrences are considered possible (between 1 and 10 percent annual probability).

5.21 CONCLUSIONS ON HAZARD RISK

The hazard profiles presented in this section were developed using best available data and result in what may be considered principally a qualitative assessment as recommended by FEMA in its "How-to" guidance document titled *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA Publication 386-2). It relies heavily on historical and anecdotal data, stakeholder input, and professional and experienced judgment regarding observed and/or anticipated hazard impacts. It also carefully considers the findings in other relevant plans, studies, and technical reports.

5.21.1 Hazard Extent

Table 5.33 describes the extent of each hazard identified for the MEMA District 9 Region. The extent of a hazard is defined as its severity or magnitude, as it relates to the planning area.

TABLE 5.33: EXTENT OF MEMA DISTRICT 9 REGION HAZARDS

Flood-related Hazards	
Dam and	Dam failure extent is defined using the Mississippi Division of Environmental Quality

Levee Failure	classifications which include Low, Significant, and High. Seven dams are classified as high-hazard in the MEMA District 9 Region. • George County: 0 high hazard dams • Hancock County: 1 high hazard dam • Harrison County: 1 high hazard dam • Jackson County: 1 high hazard dam • Pearl River County: 3 high hazard dams • Stone County: 1 high hazard dam
Erosion	The extent of erosion can be defined by the measurable rate of erosion that occurs. Some areas of the barrier islands are eroding at 6 to 8 meters per year in the MEMA District 9 Region according to the USGS Coastal and Marine Geology Program's U.S. Gulf of Mexico Interactive Map.
Flood	Flood depth and velocity are recorded via United States Geological Survey stream gages throughout the region. While a gage does not exist for each participating jurisdiction, there is one at or near many areas. The greatest flood recorded for the region was at Jourdan River near Kiln in Hancock County. The maximum historic crest was recorded at 19.97 feet, or 9.97 feet above the major flood stage (reported on August 29, 2005). Additional historic crest heights and the corresponding flood categories are in the table below.

Location/ Jurisdiction	Date	Maximum Historic Crest (ft)	Flood categories			
			Action Stage (ft)	Flood Stage (ft)	Moderate Flood Stage (ft)	Major Flood Stage (ft)
George County						
PASCAGOULA RIVER AT MERRILL	April 1, 1900	32.50	12.5	22	25	32
ESCATAWPA RIVER NEAR AGRICOLA	n/a	n/a	16	18	n/a	n/a
Hancock County						
JOURDAN RIVER AT KILN	8/29/2005	19.97	5	6	8	10
Harrison County						
BILOXI RIVER NEAR WORTHAM	5/9/1995	28.94	16	16	18	23
WOLF RIVER NEAR LANDON	8/31/2012	31.31	26	27	28	30
BILOXI RIVER NEAR LYMAN	5/10/1995	20.95	10	12	16	18
TCHOUTACABOUFFA RIVER NEAR D IBERVILLE	9/30/1998	19.00	8	8	15	18
WOLF RIVER ABOVE GULFPORT	9/1/2012	16.50	7	8	12	15
Jackson County						
PASCAGOULA RIVER AT GRAHAM FERRY	2/28/1961	20.10	15	16	18	20
ESCATAWPA RIVER ABOVE ORANGE GROVE	9/28/1998	11.90	6	8	12	15

Pearl River County						
WEST HOBOLOCHITTO CREEK NEAR MCNEILL	7/5/1916	29.96	12	15	18	20
EAST HOBOLOCHITTO CREEK NEAR CAESAR	9/2/2012	21.53	12	15	17	20
Stone County						
n/a	n/a	n/a	n/a	n/a	n/a	n/a

Storm Surge	Storm surge can be defined by the depth of inundation which is defined by the category of hurricane/tropical storm. Since the MEMA District 9 Region could easily be impacted by a Category 3 storm, depth of inundation could be at least 9 feet in many areas.
Fire-related Hazards	
Drought	Drought extent is defined by the U.S. Drought Monitor classifications which include Abnormally Dry, Moderate Drought, Severe Drought, Extreme Drought, and Exceptional Drought. According to the U.S. Drought Monitor classifications, the most severe drought condition is Exceptional. All of the participating counties have received this ranking twice over the 17-year reporting period.
Lightning	According to the Vaisala's flash density map, the MEMA District 9 Region is located in an area that experiences 4 to 12 and up lightning flashes per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures.
Wildfire	Wildfire data was provided by the Mississippi Forestry Commission and is reported annually by county from 2007-2016. The greatest number of fires in one year occurred in Pearl River County and the greatest number of acres burned in year occurred in Jackson County. Information on specific occurrences of wildfire and the most severe fires in each jurisdiction is not available. Analyzing the data by county indicates the following wildfire hazard extent for each county. Although this data lists the extent that has occurred, larger and more frequent wildfires are possible. ***George County*** • The greatest number of fires to occur in any year was 79 in 2007. • The great number of acres to burn in a single year occurred in 2007 when 789 acres were burned. ***Hancock County*** • The greatest number of fires to occur in any year was 181 in 2009. • The great number of acres to burn in a single year occurred in 2011 when 3,921 acres were burned. ***Harrison County*** • The greatest number of fires to occur in any year was 185 in 2011. • The great number of acres to burn in a single year occurred in 2011 when 4,744 acres were burned. ***Jackson County*** • The greatest number of fires to occur in any year was 161 in 2011. • The great number of acres to burn in a single year occurred in 2016 when 5,020 acres were burned.

	Pearl River County • The greatest number of fires to occur in any year was 199 in 2011. • The great number of acres to burn in a single year occurred in 2011 when 4,118 acres were burned. ***Stone County*** • The greatest number of fires to occur in any year was 58 in 2011 and 2015. • The great number of acres to burn in a single year occurred in 2016 when 690 acres were burned.
Geologic Hazards	
Earthquake	Earthquake extent can be measured by the Richter Scale, the Modified Mercalli Intensity (MMI) scale, and the distance of the epicenter from the MEMA District 9 Region. According to data provided by the National Centers for Environmental Information, the greatest earthquake to impact the region had an MMI of V (slightly strong) and a correlating Richter Scale magnitude estimated at less than 4.8 (reported on February 2, 1955). The epicenter of this earthquake was located 2.0 km away. • George County: None reported • Hancock County: MMI of IV; estimated magnitude less than 4.8; 57.0 km to epicenter • Harrison County: MMI of V; estimated magnitude less than 4.8; 2.0 km to epicenter • Jackson County: None reported • Pearl River County: None reported • Stone County: None reported
Wind-related Hazards	
Extreme Cold	The extent of extreme cold can be defined by the minimum temperature reached. Official long term temperature records are not kept for any locations in the MEMA District 9 Region. However, the temperature has previously ranged from 15 to 20 degrees Fahrenheit in southwest and coastal Mississippi (reported on December 18, 1996).
Extreme Heat	The extent of extreme heat can be measured by the record high temperature recorded. Official long term temperature records are not kept for any locations in the MEMA District 9 Region. However, the highest recorded temperature in Beaumont (north of the region) was 105°F and heat index values were recorded as high as 115°F (reported in July 2000).
Hailstorm	Hail extent can be defined by the size of the hail stone. The largest hail stone reported in the MEMA District 9 Region was 3.00 inches (reported on April 19, 1965). It should be noted that future events may exceed this. • George County: 2.00 inches • Hancock County: 1.75 inches • Harrison County: 2.75 inches • Jackson County: 3.00 inches • Pearl River County: 1.75 inches • Stone County: 2.00 inches
Hurricane and Tropical Storm	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5. The greatest classification of hurricane to traverse directly through the MEMA District 9 Region was Hurricane Camille, which was a Category 3 hurricane when it passed through the region. • George County: Hurricane Frederic, Category 3 (97 knots) • Hancock County: Hurricane Camille, Category 3 (100 knots) • Harrison County: Hurricane Elena, Category 2 (93 knots) • Jackson County: Hurricane Frederic, Category 3 (97 knots) • Pearl River County: Hurricane Camille, Category 3 (100 knots)

	• Stone County: Unnamed 1855 Storm, Category 2 (93 knots)
Severe Thunderstorm/ High Wind	Thunderstorm extent is defined by the wind speeds reported. The strongest recorded wind event in the MEMA District 9 Region was 85 knots (reported on June 11, 2001). It should be noted that future events may exceed these historical occurrences. • George County: 85 knots • Hancock County: 61 knots • Harrison County: 80 knots • Jackson County: 65 knots • Pearl River County: 84 knots • Stone County: 78 knots
Tornado	Tornado hazard extent is measured by the Fujita/Enhanced Fujita Scale. The greatest magnitude reported was an F3 (last reported on May 19, 1980). • George County: F3 • Hancock County: F3 • Harrison County: F3 • Jackson County: EF2 • Pearl River County: EF3 • Stone County: EF2
Winter Weather	The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest snowfall reported in the MEMA District 9 Region was 6 inches (reported on December 11, 2008). • George County: 3 inches • Hancock County: 1-2 inches • Harrison County: 1-2 inches • Jackson County: 1-2 inches • Pearl River County: 6 inches • Stone County: 1 inch
Other Hazards	
Climate Change/Sea Level Rise	It is still uncertain what the extent of climate change will be in the future. However, increasing temperature (extreme heat), changes in precipitation (drought, flooding), and more frequent, stronger storms (wind, hurricanes) can be expected. Sea level rise is defined by the areas impacted, but is more often associated with the amount of sea level rise that is expected to take place. Although it is difficult to predict an exact amount of rise, the Climate Change Surging Seas Report intermediate high sea level rise scenario projects 1 foot of rise locally by 2050 and 3.7 feet by 2100.
Hazardous Materials Incident/Train Derailment	According to USDOT PHMSA, the largest hazardous materials incident reported in the region was 96,000 LGA released on the railway (reported on April 13, 1980). It should be noted that larger events are possible. • George County: 100 LGA • Hancock County: 4,800 LGA • Harrison County: 750 LGA • Jackson County: 12,692 GCF • Pearl River County: 96,000 LGA • Stone County: 300 LGA
Infectious Disease	An infectious disease threat could have large-scale effects throughout the region and may cause illness in many people. Possible impacts from a disease threat depend largely on the impacted population, but might include anything from absenteeism and loss of productivity in the workplace to death or serious illness to humans or livestock. A serious disease threat could affect many thousands of people.

5.21.2 Priority Risk Index

In order to draw some meaningful planning conclusions on hazard risk for the MEMA District 9 Region, the results of the hazard profiling process were used to generate region-wide hazard classifications according to a "Priority Risk Index" (PRI). The purpose of the PRI is to categorize and prioritize all potential hazards for the MEMA District 9 Region as high, moderate, or low risk. Combined with the asset inventory and quantitative vulnerability assessment provided in the next section, the summary hazard classifications generated through the use of the PRI allows for the prioritization of those high hazard risks for mitigation planning purposes and, more specifically, the identification of hazard mitigation opportunities for the MEMA District 9 Region to consider as part of their proposed mitigation strategy.

The prioritization and categorization of identified hazards for the MEMA District 9 Region is based principally on the PRI, a tool used to measure the degree of risk for identified hazards in a particular planning area. The PRI is used to assist the MEMA District 9 Regional Hazard Mitigation Council in gaining consensus on the determination of those hazards that pose the most significant threat to the MEMA District 9 counties based on a variety of factors. The PRI is not scientifically based, but is rather meant to be utilized as an objective planning tool for classifying and prioritizing hazard risks in the MEMA District 9 Region based on standardized criteria.

The application of the PRI results in numerical values that allow identified hazards to be ranked against one another (the higher the PRI value, the greater the hazard risk). PRI values are obtained by assigning varying degrees of risk to five categories for each hazard (probability, impact, spatial extent, warning time, and duration). Each degree of risk has been assigned a value (1 to 4) and an agreed upon weighting factor,[30] as summarized in **Table 5.34**. To calculate the PRI value for a given hazard, the assigned risk value for each category is multiplied by the weighting factor. The sum of all five categories equals the final PRI value, as demonstrated in the example equation below:

PRI VALUE = [(PROBABILITY x .30) + (IMPACT x .30) + (SPATIAL EXTENT x .20) + (WARNING TIME x .10) + (DURATION x .10)]

According to the weighting scheme and point system applied, the highest possible value for any hazard is 4.0. When the scheme is applied for the MEMA District 9 Region, the highest PRI value is 3.2 (flood and hurricane/tropical storm). Prior to being finalized, PRI values for each identified hazard were reviewed and accepted by the members of the MEMA District 9 Regional Hazard Mitigation Council.

[30] The MEMA District 9 Regional Hazard Mitigation Council, based upon any unique concerns or factors for the planning area, may adjust the PRI weighting scheme during future plan updates.

TABLE 5.34: PRIORITY RISK INDEX FOR THE MEMA DISTRICT 9 REGION

PRI Category	Degree of Risk			Assigned Weighting Factor
	Level	Criteria	Index Value	
Probability	Unlikely	Less than 1% annual probability	1	30%
	Possible	Between 1 and 10% annual probability	2	
	Likely	Between 10 and 100% annual probability	3	
	Highly Likely	100% annual probability	4	
Impact	Minor	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of critical facilities.	1	30%
	Limited	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one day.	2	
	Critical	Multiple deaths/injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one week.	3	
	Catastrophic	High number of deaths/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.	4	
Spatial Extent	Negligible	Less than 1% of area affected	1	20%
	Small	Between 1 and 10% of area affected	2	
	Moderate	Between 10 and 50% of area affected	3	
	Large	Between 50 and 100% of area affected	4	
Warning Time	More than 24 hours	Self explanatory	1	10%
	12 to 24 hours	Self explanatory	2	
	6 to 12 hours	Self explanatory	3	
	Less than 6 hours	Self explanatory	4	
Duration	Less than 6 hours	Self explanatory	1	10%
	Less than 24 hours	Self explanatory	2	
	Less than one week	Self explanatory	3	
	More than one week	Self explanatory	4	

5.21.3 Priority Risk Index Results

Table 5.35 summarizes the degree of risk assigned to each category for all initially identified hazards based on the application of the PRI. Assigned risk levels were based on the detailed hazard profiles developed for this section, as well as input from the Regional Hazard Mitigation Council. The results were then used in calculating PRI values and making final determinations for the risk assessment.

TABLE 5.35: SUMMARY OF PRI RESULTS FOR THE MEMA DISTRICT 9 REGION

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Flood-related Hazards						
Dam and Levee Failure	Possible	Critical	Small	Less than 6 hours	Less than 6 hours	**2.4**
Erosion	Likely	Limited	Small	More than 24 hours	More than 1 week	**2.4**
Flood	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 24 hours	**3.2**
Storm Surge	Highly Likely	Critical	Moderate	More than 24 hours	Less than 24 hours	**3.0**
Fire-related Hazards						
Drought	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Lightning	Highly Likely	Limited	Negligible	6 to 12 hours	Less than 6 hours	**2.4**
Wildfire	Highly Likely	Minor	Small	Less than 6 hours	Less than 1 week	**2.6**
Geologic Hazards						
Earthquake	Possible	Minor	Moderate	Less than 6 hours	Less than 6 hours	**2.0**
Wind-related Hazards						
Extreme Cold	Possible	Minor	Large	More than 24 hours	Less than 1 week	**2.1**
Extreme Heat	Highly Likely	Minor	Large	More than 24 hours	More than 1 week	**2.8**
Hailstorm	Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours	**2.8**
Hurricane and Tropical Storm	Highly Likely	Critical	Large	More than 24 hours	Less than 24 hours	**3.2**
Severe Thunderstorm/ High Wind	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 6 hours	**3.1**
Tornado	Highly Likely	Critical	Small	Less than 6 hours	Less than 6 hours	**3.0**
Winter Weather	Likely	Minor	Moderate	More than 24 hours	Less than 24 hours	**2.1**
Other Hazards						
Climate Change/Sea Level Rise	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Hazardous Materials Incident/ Train Derailment	Highly Likely	Limited	Small	Less than 6 hours	Less than 24 hours	**2.8**
Infectious Disease	Possible	Limited	Large	More than 24 hours	More than 1 week	**2.5**

5.22 FINAL DETERMINATIONS

The conclusions drawn from the hazard profiling process for the MEMA District 9 Region, including the PRI results and input from the Regional Hazard Mitigation Council, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk, and Low Risk (**Table**

5.36). For purposes of these classifications, risk is expressed in relative terms according to the estimated impact that a hazard will have on human life and property throughout all of the MEMA District 9 Region. A more quantitative analysis to estimate potential dollar losses for each hazard has been performed separately and is described in Section 6: *Vulnerability Assessment*. It should be noted that although some hazards are classified below as posing low risk, their occurrence of varying or unprecedented magnitudes is still possible in some cases and their assigned classification will continue to be evaluated during future plan updates.

Some priorities have changed since the previous plans were adopted due to the merging of multiple local plans to form this regional plan; however, most priorities remain the same.

TABLE 5.36: CONCLUSIONS ON HAZARD RISK FOR THE MEMA DISTRICT 9 REGION

HIGH RISK	Hurricane and Tropical Storm Flood Severe Thunderstorm/High Wind Storm Surge Tornado
MODERATE RISK	Hailstorm Hazardous Materials Incident/Train Derailment Extreme Heat Wildfire Drought Climate Change/Sea Level Rise Infectious Disease
LOW RISK	Lightning Dam and Levee Failure Erosion Winter Weather Extreme Cold Earthquake

SECTION 6
VULNERABILITY ASSESSMENT

This section identifies and quantifies the vulnerability of the MEMA District 9 Region to the significant hazards identified in the previous sections (*Hazard Identification and Profiles*). It consists of the following subsections:

- ❑ 6.1 Overview
- ❑ 6.2 Methodology
- ❑ 6.3 Explanation of Data Sources
- ❑ 6.4 Asset Inventory
- ❑ 6.5 Vulnerability Assessment Results
- ❑ 6.6 Conclusions on Hazard Vulnerability

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44 CFR Requirement
44 CFR Part 201.6(c)(2)(ii): The risk assessment shall include a description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. The description shall include an overall summary of each hazard and its impact on the community. The plan should describe vulnerability in terms of: (A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; (B) An estimate of the potential losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate; (C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

6.1 OVERVIEW

This section builds upon the information provided in Section 4: *Hazard Identification and* Section 5*: Hazard Profiles* by identifying and characterizing an inventory of assets in the MEMA District 9 Region. In addition, the potential impact and expected amount of damages caused to these assets by each identified hazard event is assessed. The primary objective of the vulnerability assessment is to quantify exposure and the potential loss estimates for each hazard. In doing so, the MEMA District 9 counties and their participating jurisdictions may better understand their unique risks to identified hazards and be better prepared to evaluate and prioritize specific hazard mitigation actions.

This section begins with an explanation of the methodology applied to complete the vulnerability assessment, followed by a summary description of the asset inventory as compiled for the MEMA District 9 Region. The remainder of this section focuses on the results of the assessment conducted.

6.2 METHODOLOGY

This vulnerability assessment was conducted using three distinct methodologies: (1) A stochastic risk assessment; (2) a geographic information system (GIS)-based analysis; and (3) a risk modeling software analysis. Each approach provides estimates for the potential impact of hazards by using a common, systematic framework for evaluation, including historical occurrence information provided in the *Hazard*

Identification and *Analysis* sections. A brief description of the three different approaches is provided on the following pages.

6.2.1 Stochastic Risk Assessment

The stochastic risk assessment methodology was applied to analyze hazards of concern that were outside the scope of hazard risk models and the GIS-based risk assessment. This includes hazards that do not have geographically-definable boundaries and are therefore excluded from spatial analysis through GIS. A stochastic risk methodology was used for the following hazards:

- ❑ Erosion
- ❑ Drought
- ❑ Lightning
- ❑ Extreme Cold
- ❑ Extreme Heat
- ❑ Hailstorm
- ❑ Severe Thunderstorm/High Wind
- ❑ Tornado
- ❑ Winter Weather
- ❑ Infectious Disease

Many of the hazards listed above are considered atmospheric and thus have the potential to affect all buildings and all populations. For many of the hazards listed above, no additional analysis was performed due to an inability to differentiate particular buildings or populations that would be more vulnerable to that particular hazard. When possible, annualized loss estimates for these hazards were determined using the best available data on historical losses from sources including NOAA's National Climatic Data Center records, previous MEMA District 9 county-level hazard mitigation plans, and local knowledge. Annualized loss is the estimated long-term weighted average value of losses to property in any single year in a specified geographic area (i.e., municipal jurisdiction or county). Annualized loss estimates were generated by totaling the amount of property damage over the period of time for which records were available, and calculating the average annual loss. Given the standard weighting analysis, losses can be readily compared across hazards providing an objective approach for evaluating mitigation alternatives.

For the erosion, drought, extreme cold, extreme heat, and infectious disease hazards no data with historical property damages was available. Therefore, annualized potential losses for these hazards are presumed to be negligible. All of the above hazards have the potential to impact the entire MEMA District 9 Region and generally cannot be well-defined geographically in terms of their impact areas. The results for these hazards are found near the end of this section in **Table 6.17**.

6.2.2 GIS-Based Analysis

Other hazards have specified geographic boundaries that permit additional using Geographic Information Systems (GIS). These hazards include:

- ❑ Dam and Levee Failure
- ❑ Flood

- ❑ Wildfire
- ❑ Climate Change/Sea Level Rise
- ❑ Hazardous Material Incident/Train Derailment

The objective of the GIS-based analysis was to determine the estimated vulnerability of critical facilities and populations for the identified hazards in the MEMA District 9 Region using best available geospatial data. Digital data was collected from local, regional, state, and national sources for hazards and buildings. Jurisdictions in the MEMA District 9 Region generally had readily available geospatial parcel or building footprint data. Despite the availability of this data for most communities, others lacked this detailed data. In these cases, the RHMC wanted to have some estimate of potential building and dollar losses, so Census block data was extracted from Hazus MH 3.2 that included building counts and estimated dollar values of property in the region. Additionally, geo-referenced point locations for identified assets (critical facilities and infrastructure, special populations, etc.) were identified from previous plans and updated by local officials. This information was used in the vulnerability analysis by overlaying spatial hazard risk data in ESRI® ArcGIS™ 10.3.1 to assess hazard vulnerability in terms of the local building data and critical assets described above.

Using these data layers, hazard vulnerability can be quantified by estimating the number and dollar value of buildings determined to be located in identified hazard areas. To estimate vulnerable populations in hazard areas, digital Census 2010 data by census tract was obtained. This was intersected with hazard areas to determine exposed. The results of the analysis provided an estimate of the amount of property and critical facilities determined to be potentially at risk to those hazards with delineable geographic hazard boundaries.

6.2.3 Risk Modeling Software Analysis

A risk modeling software was used for the following hazards:

- ❑ Earthquake
- ❑ Hurricane and Tropical Storm
- ❑ Storm Surge

There are several models that exist to model hazard risk. Hazus-MH was used in this vulnerability assessment to address the aforementioned hazards.

HAZUS-MH

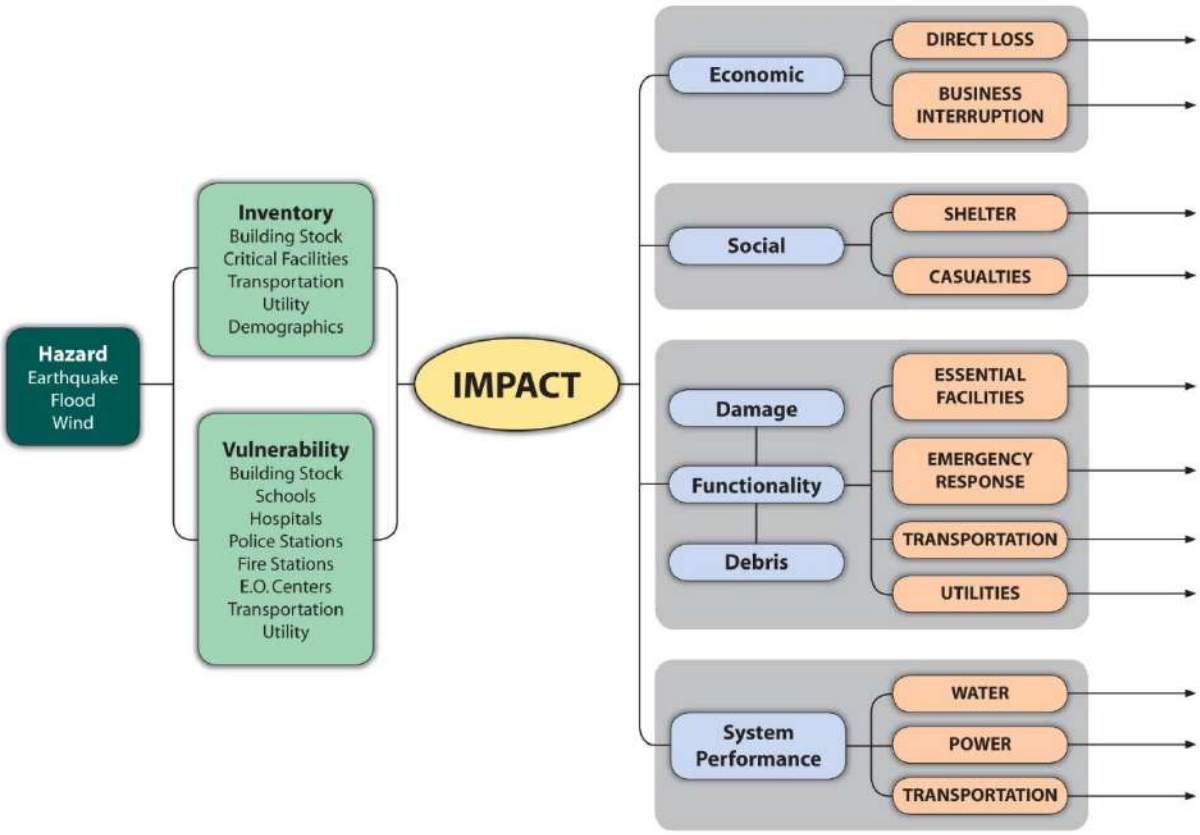
Hazus-MH ("Hazus") is a standardized loss estimation software program developed by FEMA. It is built upon an integrated GIS platform to conduct analysis at a regional level (i.e., not on a structure-by-structure basis). The Hazus risk assessment methodology is parametric, in that distinct hazard and inventory parameters (e.g., wind speed and building types) can be modeled using the software to determine the impact (i.e., damages and losses) on the built environment.

The MEMA District 9 Regional Risk Assessment utilized Hazus-MH to produce hazard damage loss estimations for hazards for the planning area. At the time this analysis was completed, Hazus-MH 3.2

was used to estimate potential damages from the hurricane winds, storm surge, and earthquake hazards using Hazus-MH methodology. Although the program can also model losses for flood, it was not used in this Risk Assessment due to availability of flood map data.

Figure 6.1 illustrates the conceptual model of the Hazus-MH methodology.

FIGURE 6.1: CONCEPTUAL MODEL OF HAZUS-MH METHODOLOGY



Hazus-MH is capable of providing a variety of loss estimation results. In order to be consistent with other hazard assessments, annualized losses are presented when possible. Some additional results based on location-specific scenarios may also be presented to provide a complete picture of hazard vulnerability.

Loss estimates provided in this vulnerability assessment are based on best available data and methodologies. The results are an approximation of risk. These estimates should be used to understand relative risk from hazards and potential losses. Uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning natural hazards and their effects on the built environment. Uncertainties also result from approximations and simplifications that are necessary for a comprehensive analysis (e.g., incomplete inventories, non-specific locations, demographics, or economic parameters).

All conclusions are presented in "Conclusions on Hazard Vulnerability" at the end of this section.

6.3 EXPLANATION OF DATA SOURCES

FLOOD

FEMA Digital Flood Rate Insurance Maps (DFIRM) flood data was used to determine flood vulnerability. DFIRM data can be used in ArcGIS for mapping purposes, and they identify several features including floodplain boundaries and, in many cases, base flood elevations. Identified areas on the DFIRM represent some features of a Flood Insurance Rate Map including the 100-year flood areas (1.0-percent annual chance flood), the 500-year flood areas (0.2-percent annual chance flood). For the vulnerability assessment, local improved property data and critical facilities were overlaid on the 1.0-percent annual chance floodplains (ACF), 0.2-percent annual chance floodplains, and coastal VE zones for counties. It should be noted that such an analysis does not account for building elevation.

WILDFIRE

The data used to determine vulnerability to wildfire in the MEMA District 9 Region is based on GIS data called the Southern Wildfire Risk Assessment (SWRA). This data is available on the Southern Wildfire Risk Assessment website and can be downloaded and imported into ArcGIS. A specific layer, known as "Wildland Urban Interface Risk Index" (WUIRI) was used to determine vulnerability of people and property. The WUIRI is presented on a scale of 0 to -9. It combines data on housing density with the data on the impact and likelihood of a wildfire occurring in a specific area. The primary purpose of the data is to highlight areas of concern that may be conducive to wildfire impacting property. Due to assumptions made, it is not true probability. However, it does provide a comparison of risk throughout the region.

EARTHQUAKE

Hazus-MH 3.2 (as described above) was used to assess earthquake vulnerability. A level 1, probabilistic scenario to estimate average annualized loss was utilized. In this scenario, several return periods (events of varying intensities) are run to determine annualized loss. Default Hazus earthquake damage functions and methodology were used to determine the probability of damage. Results are calculated at the 2010 U.S. Census tract level in Hazus and presented at the county level.

HURRICANE AND TROPICAL STORM WIND

Hazus-MH 3.2 (as described above) was used to assess wind vulnerability. For the hurricane wind analysis, a probabilistic scenario was created to estimate the annualized loss damage in the MEMA District 9 Region. Default Hazus wind speed data, damage functions, and methodology were used in to determine the probability of damage for 100-, 500-, and 1,000-year frequency events (also known as a return period) in the scenario. Results are calculated in Hazus at the 2010 U.S. Census tract level and presented at the county level.

STORM SURGE

Hazus-MH 3.2 also allows for the modeling of impacts from storm surge on coastal communities along the Atlantic and Gulf Coasts. However, it should be noted that the storm surge model can only be run

with a historic hurricane track model and cannot be run with the annualized loss tool. Therefore, the dollar damage estimates from storm surge modeling will not be consistent with estimates for other hazards (which are presented in terms of annualized loss). Additionally, losses from storm surge are presented by the model at an aggregate level with all other losses that are estimated for the historic event. That is to say, losses are a combination of hurricane winds and storm surge losses and could not be separated into how those losses were caused.

HAZARDOUS MATERIALS INCIDENT/TRAIN DERAILMENT

For the fixed hazardous materials incident analysis, Toxic Release Inventory (TRI) data was used. The Toxics Release Inventory is a publicly available database from the federal Environmental Protection Agency (EPA) that contains information on toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and expanded by the Pollution Prevention Act of 1990. Each year, facilities that meet certain activity thresholds must report their releases and other waste management activities for listed toxic chemicals to EPA and to their state or tribal entity. A facility must report if it meets the following three criteria:

- ❑ The facility falls within one of the following industrial categories: manufacturing; metal mining; coal mining; electric generating facilities that combust coal and/or oil; chemical wholesale distributors; petroleum terminals and bulk storage facilities; RCRA Subtitle C treatment, storage, and disposal (TSD) facilities; and solvent recovery services;
- ❑ Has 10 or more full-time employee equivalents; and
- ❑ Manufactures or processes more than 25,000 pounds or otherwise uses more than 10,000 pounds of any listed chemical during the calendar year. Persistent, bioaccumulative, and toxic (PBT) chemicals are subject to different thresholds of 10 pounds, 100 pounds, or 0.1 grams depending on the chemical.

For the mobile hazardous materials incident analysis, transportation data including major highways and railroads were obtained from the Federal Highway Administration's National Highway Planning Network and the United States Department of Transportation's Federal Railroad Administration, respectively. This data is ArcGIS compatible, lending itself to buffer analysis to determine risk.

DAM/LEVEE FAILURE

Dam inundation data was available in GIS format for several of the major dams in the region from the Mississippi Department of Environmental Quality. Although not all high hazard dams have inundation mapping, several of the major dams in the region are included in this data. With that in mind, analysis with this data should not be considered inclusive of every critical facility or structure that may be at risk to a dam or levee failure as the data is far from being complete.

CLIMATE CHANGE/SEA LEVEL RISE

The National Oceanic and Atmospheric Administration has produced sea level rise data that is available for download and which can be used for planning purposes to determine the inundation of areas along the coast based on various levels of sea level rise. These different scenarios can be used to visualize community-level impacts from coastal flooding or sea level rise (up to 6 feet above average high tides).

6.4 ASSET INVENTORY

An inventory of geo-referenced assets within the MEMA District 9 counties and jurisdictions was compiled in order to identify and characterize those properties potentially at risk to the identified hazards.[1] By understanding the type and number of assets that exist and where they are located in relation to known hazard areas, the relative risk and vulnerability for such assets can be assessed. Under this assessment, two categories of physical assets were created and then further assessed through GIS analysis. Additionally, social assets are addressed to determine population at risk to the identified hazards. These are presented below in Section 6.4.1.

6.4.1 Physical and Improved Assets

The two categories of physical assets consist of:

1. Improved Property: Includes all improved properties in the MEMA District 9 Region according to parcel and building footprint data provided by the Mississippi Department of Environmental Quality through the Mississippi Digital Earth Model. The information has been expressed in terms of the number of parcels and total improved value that may be exposed to the identified hazards.

   However, it should be noted that parcel data was not available for George County. As a result, parcel counts and improved values at the Census Block level were pulled from Hazus 3.2 to estimate exposure in George County. Similarly, although parcel data was available in Pearl River County, it did not include improvement values for the parcels, so Census Block level dollar values were used to estimate exposure in Pearl River County. Further, it should be noted that these estimates often over-estimate the dollar value of properties.

   In addition, building footprint data was available for all of the counties and it was used to improve the overall assessment by providing a more accurate assessment of how many buildings are located in hazard areas. However, it should be noted that building footprint data has not been updated since 2007 and the parcel data has not been updated since 2009, so these datasets likely underestimate current building counts/parcel data.

2. Critical Facilities: Critical facilities vary by jurisdiction. For this Vulnerability Assessment, identified facilities from past plans were updated by local governments including fire stations, police stations, medical care facilities, schools, and emergency operation centers. It should be noted that this listing is not necessarily all-inclusive for assets located in the region, but it is anticipated that it will be expanded during future plan updates as more geo-referenced data becomes available for use in GIS analysis.

The following tables provide a detailed listing of the geo-referenced assets that have been identified for inclusion in the vulnerability assessment for the MEMA District 9 Region.

[1] While potentially not all-inclusive for MEMA District 9, "georeferenced" assets include those assets for which specific location data is readily available for connecting the asset to a specific geographic location for purposes of GIS analysis.

Table 6.1 lists the estimated number of buildings, parcels, and the total value of improvements for participating areas of the MEMA District 9 Region (study area of vulnerability assessment). Because digital parcel data was not available for every community, data obtained from Hazus-MH 3.2 inventory was utilized to supplement the analysis where gaps existed.

TABLE 6.1: IMPROVED PROPERTY IN THE MEMA DISTRICT 9 REGION

Location	Counts of Buildings	Counts of Parcels	Total Value of Improvements
George County*	**10,321**	**--**	**$1,799,918,000**
Lucedale	1,538	--	$335,976,000
Unincorporated Area	8,783	--	$1,463,942,000
Hancock County	**41,036**	**52,302**	**$991,751,035**
Bay St. Louis	5,699	5,313	$128,600,369
Diamondhead	4,682	7,368	$389,782,736
Waveland	4,707	5,443	$94,730,326
Unincorporated Area	41,573	34,178	$378,637,604
Harrison County	**123,848**	**96,568**	**$6,470,813,817**
Biloxi	23,001	16,807	$1,542,665,202
D'Iberville	4,751	3,122	$234,845,437
Gulfport	41,641	32,328	$397,918,520
Long Beach	9,188	7,175	$464,548,692
Pass Christian	3,694	6,224	$183,434,546
Unincorporated Area	41,573	30,912	$3,647,401,420
Jackson County	**100,298**	**80,635**	**$4,993,387,650**
Gautier	7,194	5,573	$397,918,520
Moss Point	10,825	8,690	$405,337,190
Ocean Springs	10,325	8,072	$905,620,110
Pascagoula	14,967	9,886	$852,583,870
Unincorporated Area	56,987	48,414	$2,431,927,960
Pearl River County†	**50,721**	**44,125**	**$4,750,724,000**
Picayune	7,020	6,411	$1,406,763,000
Poplarville	1,964	1,538	$344,167,000
Unincorporated Area	41,737	36,176	$2,999,794,000
Stone County	**15,770**	**13,235**	**$419,179,006**
Wiggins	3,187	2,416	$132,113,728
Unincorporated Area	12,583	10,819	$287,065,278
MEMA DISTRICT 9 REGION TOTAL	**341,994**	**286,865**	**$19,425,773,508**

*Parcel counts and improvement values for George County are based on Hazus 3.2 estimates at the Census Block level
†Improvement values for Pearl River County are based on Hazus 3.2 estimates at the Census Block level
Source: MDEQ, Hazus-MH 3.2

Table 6.2 lists the critical facilities located in the MEMA District 9 Region by type according to data provided by local government officials.

In addition, **Figure 6.2** shows the locations of critical facilities in the MEMA District 9 Region. **Table 6.14**, at the end of this section, shows a complete list of the critical facilities by name, as well as the hazards

that affect each facility. As noted previously, this list is not all-inclusive and only includes readily available information. Further, it should be noted that the table below may show that some counties or communities do not have any critical facilities of in certain type, when in reality, that particular type of facility may actually be located within the community. This may occur because spatial data for that facility type was not available or because the facility may have been classified under a different category type for that particular community.

TABLE 6.2: CRITICAL FACILITY INVENTORY IN THE MEMA DISTRICT 9 REGION

Location	Communications	EOC	Fire Stations	Medical	Police Station	Power/ Gas	Private/Non-Profit
George County	**2**	**1**	**15**	**2**	**1**	**2**	**1**
Lucedale	0	0	1	0	1	0	0
Unincorporated Area	2	1	14	2	0	2	1
Hancock County	**4**	**1**	**8**	**3**	**6**	**3**	**3**
Bay St. Louis	2	0	2	0	1	1	0
Diamondhead	0	0	1	0	1	0	0
Waveland	0	0	2	0	2	0	1
Unincorporated Area	2	1	3	3	2	2	2
Harrison County	**4**	**3**	**32**	**13**	**17**	**92**	**29**
Biloxi	3	1	9	6	3	1	24
D'Iberville	1	0	1	2	1	3	0
Gulfport	0	0	12	4	11	1	5
Long Beach	0	0	3	0	1	0	0
Pass Christian	0	1	2	1	1	0	0
Unincorporated Area	0	1	5	0	0	87	0
Jackson County	**5**	**3**	**45**	**4**	**8**	**1**	**20**
Gautier	0	0	3	0	1	0	0
Moss Point	0	0	4	0	1	0	0
Ocean Springs	0	1	4	2	3	0	2
Pascagoula	1	1	3	2	2	1	17
Unincorporated Area	4	1	31	0	1	0	1
Pearl River County	**5**	**1**	**29**	**4**	**3**	**0**	**0**
Picayune	1	0	8	3	2	0	0
Poplarville	4	1	11	1	1	0	0
Unincorporated Area	0	0	10	0	0	0	0
Stone County	**1**	**1**	**1**	**1**	**2**	**3**	**0**
Wiggins	1	1	0	0	1	0	0
Unincorporated Area	0	0	1	1	1	3	0
MEMA DISTRICT 9 REGION TOTAL	**21**	**10**	**130**	**27**	**37**	**101**	**53**

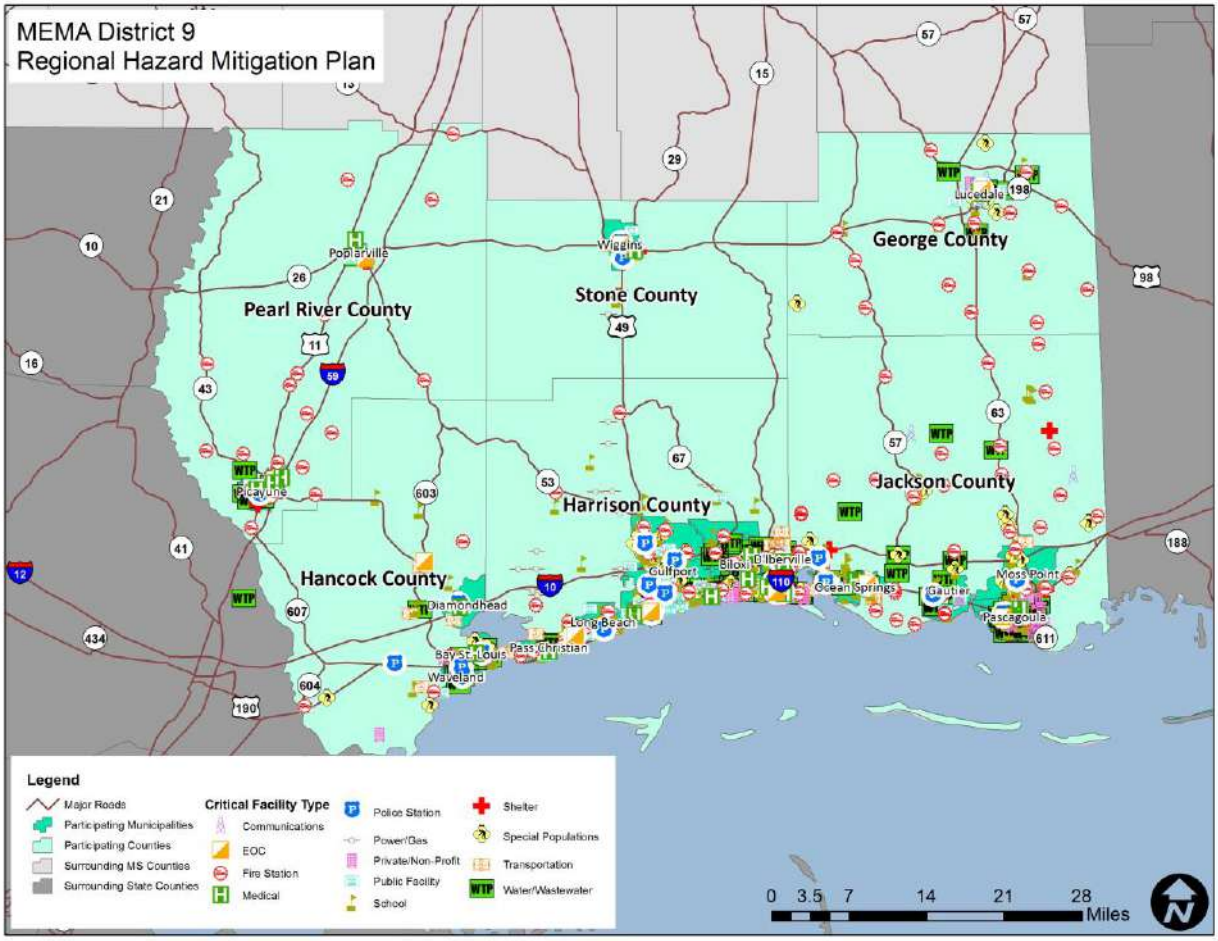
Source: Local Governments

TABLE 6.2: CRITICAL FACILITY INVENTORY IN THE MEMA DISTRICT 9 REGION (CONT.)

Location	Public Facility	School	Shelter	Special Populations	Transportation	Water/ Wastewater
George County	**8**	**9**	**0**	**5**	**0**	**5**
Lucedale	1	0	0	0	0	1
Unincorporated Area	7	9	0	5	0	4
Hancock County	**22**	**18**	**1**	**8**	**12**	**16**
Bay St. Louis	3	3	0	1	1	4
Diamondhead	3	0	0	0	0	0
Waveland	6	0	0	0	0	5
Unincorporated Area	10	15	1	7	11	7
Harrison County	**75**	**68**	**3**	**69**	**26**	**42**
Biloxi	18	9	0	13	2	28
D'Iberville	14	4	0	2	20	4
Gulfport	35	28	3	51	0	4
Long Beach	4	5	0	1	0	3
Pass Christian	3	3	0	2	3	3
Unincorporated Area	1	19	0	0	1	0
Jackson County	**50**	**75**	**7**	**27**	**3**	**56**
Gautier	1	6	0	0	0	0
Moss Point	2	13	4	7	0	1
Ocean Springs	13	13	0	5	1	8
Pascagoula	6	24	0	5	0	33
Unincorporated Area	28	19	3	10	2	14
Pearl River County	**8**	**0**	**5**	**0**	**1**	**9**
Picayune	4	0	3	0	0	7
Poplarville	3	0	2	0	0	1
Unincorporated Area	1	0	0	0	1	1
Stone County	**7**	**5**	**4**	**0**	**2**	**0**
Wiggins	1	0	0	0	0	0
Unincorporated Area	6	5	4	0	2	0
MEMA DISTRICT 9 REGION TOTAL	**170**	**175**	**20**	**109**	**44**	**128**

Source: Local Governments

FIGURE 6.2: CRITICAL FACILITY LOCATIONS IN THE MEMA DISTRICT 9 REGION



Source: Local Governments

6.4.2 Social Vulnerability

In addition to identifying those assets potentially at risk to identified hazards, it is important to identify and assess those particular segments of the resident population in the MEMA District 9 Region that are potentially at risk to these hazards.

Table 6.3 lists the population by county according to American Community Survey 2015 population estimates. The total population in the MEMA District 9 Region according to Census data is 478,849 persons. Additional population estimates are presented in Section 3: *Community Profile*.

TABLE 6.3: TOTAL POPULATION IN THE MEMA DISTRICT 9 REGION

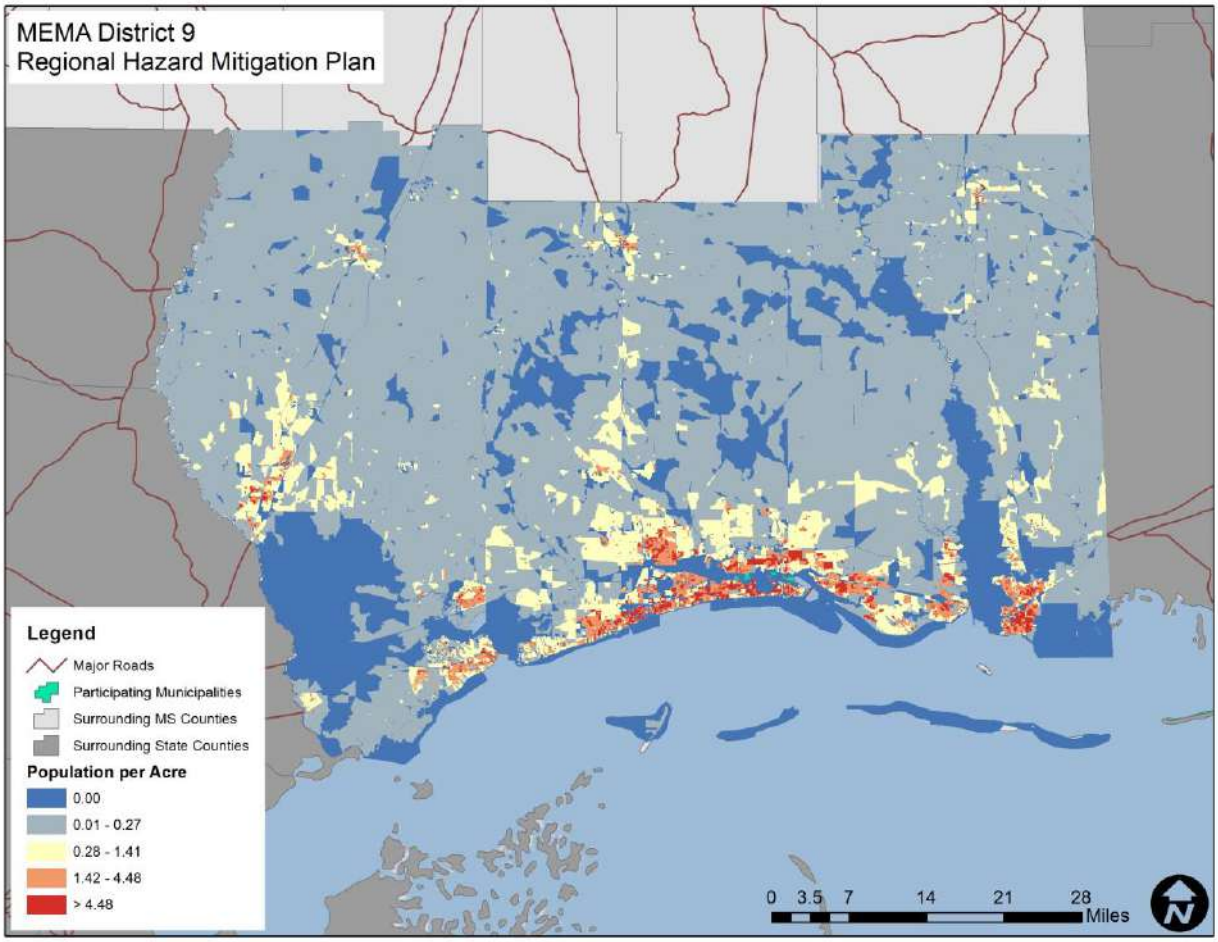
Location	Total 2015 Population
George County	23,104
Hancock County	45,627
Harrison County	196,268
Jackson County	140,676

Location	Total 2015 Population
Pearl River County	55,196
Stone County	17,978
MEMA DISTRICT 9 REGION TOTAL	**478,849**

Source: United States Census Bureau, 2011-2015 American Community Survey 5-Year Estimates

In addition, **Figure 6.3** illustrates the population density per acre by census block as it was reported by the U.S. Census Bureau in 2010. As can be seen in the figure, the population is spread out through most of the region, with heavy concentrations in coastal communities like Gulfport, Biloxi, and Pascagoula.

FIGURE 6.3: POPULATION DENSITY IN THE MEMA DISTRICT 9 REGION



Source: United States Census Bureau, 2010 Census

6.4.3 Development Trends and Changes in Vulnerability

Since the previous local-level hazard mitigation plans were approved, the MEMA District 9 Region has experienced moderate growth and development. **Table 6.4** shows the number of building units constructed since 2010 according to the U.S. Census American Community Survey.

TABLE 6.4: BUILDING COUNTS FOR THE MEMA DISTRICT 9 REGION

Location	2010	2011	2012	2013	2014	2015	% Building Stock Built Post-2010
George County	**9,073**	**9,215**	**9,273**	**9,298**	**9,342**	**9,355**	**3.1%**
Lucedale	1,174	1,264	1,250	1,236	1,126	1,113	-5.2%
Unincorporated Area	7,899	7,951	8,023	8,062	8,216	8,242	4.3%
Hancock County	**19,756**	**20,869**	**21,639**	**22,237**	**22,787**	**23,196**	**3.1%**
Bay St. Louis	5,171	5,511	5,860	5,741	5,868	6,373	23.2%
Diamondhead*	--	--	--	4,330	4,113	4,104	-5.2%
Waveland	3,349	3,311	3,195	3,270	3,306	3,007	-10.2%
Unincorporated Area	15,172	15,055	15,013	10,794	10,995	10,939	-27.9%
Harrison County	**80,275**	**83,011**	**85,048**	**86,438**	**87,824**	**88,821**	**10.6%**
Biloxi	21,250	21,675	22,094	21,871	21,537	21,506	1.2%
D'Iberville	3,548	3,814	4,051	4,370	4,620	4,836	36.3%
Gulfport	29,619	30,293	31,556	32,092	32,878	33,421	12.8%
Long Beach	6,504	6,755	6,740	6,734	6,696	6,628	1.9%
Pass Christian	2,299	2,549	2,448	2,642	2,698	2,744	19.4%
Unincorporated Area	17,055	17,925	18,159	18,729	19,395	19,686	15.4%
Jackson County	**57,995**	**59,216**	**59,811**	**60,237**	**60,649**	**60,889**	**5.0%**
Gautier	7,507	7,748	7,886	8,034	8,113	8,180	9.0%
Moss Point	6,305	6,488	6,555	6,435	6,505	6,476	2.7%
Ocean Springs	7,246	7,482	7,628	7,892	7,880	7,625	5.2%
Pascagoula	10,803	10,935	10,696	10,813	10,574	10,891	0.8%
Unincorporated Area	26,134	26,563	27,046	27,063	27,577	27,717	6.1%
Pearl River County	**23,692**	**23,877**	**24,068**	**24,135**	**24,282**	**24,423**	**3.1%**
Picayune	5,106	4,901	4,864	4,850	4,785	4,854	-4.9%
Poplarville	937	1,108	1,095	1,063	1,021	1,006	7.4%
Unincorporated Area	17,649	17,868	18,109	18,222	18,476	18,563	5.2%
Stone County	**6,881**	**7,048**	**7,087**	**7,144**	**7,192**	**7,216**	**4.9%**
Wiggins	1,437	1,660	1,460	1,439	1,459	1,513	5.3%
Unincorporated Area	5,444	5,388	5,627	5,705	5,733	5,703	4.8%
MEMA DISTRICT 9 REGION TOTAL	**197,672**	**203,236**	**206,926**	**209,489**	**212,076**	**213,900**	**8.2%**

*Diamondhead officially incorporated into a city in 2012, so the city's first housing estimate was not available until 2013. Percent change in population is calculated from 2013 to 2015.
Source: United States Census Bureau, American Community Survey

Table 6.5 shows population growth estimates for the region from 2010 to 2015 based on the American Community Survey's annual population estimates.

TABLE 6.5: POPULATION GROWTH FOR THE MEMA DISTRICT 9 REGION

Location	Population Estimates						% Change 2010-2015
	2010	2011	2012	2013	2014	2015	
George County	**22,061**	**22,361**	**22,579**	**22,757**	**22,960**	**23,104**	**4.7%**
Lucedale	2,934	2,936	2,943	2,959	2,978	2,993	2.0%

Location	Population Estimates						% Change 2010-2015
	2010	2011	2012	2013	2014	2015	
Unincorporated Area	19,127	19,425	19,636	19,798	19,982	20,111	5.1%
Hancock County	**42,408**	**43,322**	**44,044**	**44,597**	**45,136**	**45,627**	**7.6%**
Bay St. Louis	9,349	9,385	9,614	9,899	10,313	10,861	16.2%
Diamondhead*	--	--	--	8,777	8,275	8,246	-6.0%
Waveland	6,490	6,504	6,492	6,487	6,463	6,449	-0.6%
Unincorporated Area	26,569	27,433	27,938	19,434	20,085	20,071	-24.5%
Harrison County	**181,791**	**185,120**	**188,110**	**190,756**	**193,642**	**196,268**	**8.0%**
Biloxi	43,921	44,256	44,223	44,354	44,527	44,825	2.1%
D'Iberville	8,905	9,211	9,539	9,819	10,161	10,532	18.3%
Gulfport	66,286	67,322	68,158	69,004	69,913	70,462	6.3%
Long Beach	14,769	14,872	14,981	15,102	15,224	15,369	4.1%
Pass Christian	4,809	4,756	4,773	4,848	4,957	5,130	6.7%
Unincorporated Area	43,101	44,703	46,436	47,629	48,860	49,950	15.9%
Jackson County	**137,082**	**138,511**	**139,430**	**139,906**	**140,194**	**140,676**	**2.6%**
Gautier	18,088	18,344	18,502	18,539	18,581	18,563	2.6%
Moss Point	13,963	13,885	13,807	13,749	13,690	13,685	-2.0%
Ocean Springs	17,258	17,379	17,420	17,474	17,446	17,528	1.6%
Pascagoula	22,947	22,765	22,523	22,372	22,239	22,230	-3.1%
Unincorporated Area	64,826	66,138	67,178	67,772	68,238	68,670	5.9%
Pearl River County	**55,923**	**56,042**	**55,886**	**55,569**	**55,293**	**55,196**	**-1.3%**
Picayune	11,087	11,023	10,982	10,901	10,838	10,784	-2.7%
Poplarville	3,016	2,977	2,923	2,852	2,874	2,919	-3.2%
Unincorporated Area	41,820	42,042	41,981	41,816	41,581	41,493	-0.8%
Stone County	**16,923**	**17,294**	**17,657**	**17,854**	**17,941**	**17,978**	**6.2%**
Wiggins	4,281	4,237	4,399	4,446	4,463	4,487	4.8%
Unincorporated Area	12,642	13,057	13,258	13,408	13,478	13,491	6.7%
MEMA DISTRICT 9 REGION TOTAL	**456,188**	**462,650**	**467,706**	**471,439**	**475,166**	**478,849**	**5.0%**

*Diamondhead officially incorporated into a city in 2012, so the city's first population estimate was not available until 2013. Percent change in population is calculated from 2013 to 2015.
Source: United States Census Bureau, American Community Survey

Based on the data above, there has been a moderate rate of residential development and population growth in the region since 2010, and the majority of incorporated jurisdictions have experienced slight increases in population and housing development, resulting in an increased number of structures and people that are vulnerable to the potential impacts of the identified hazards. However, Diamondhead, Moss Point, Pascagoula, Picayune, and Poplarville have all experienced a slight decline in population since 2010 according to estimates. Additionally, there has been a slight decline in housing development since 2010 in Lucedale, Diamondhead, Waveland, and Picayune. Therefore, development and population growth have impacted the region's vulnerability since the previous local hazard mitigation plans were approved and there has been an increase in the overall vulnerability.

It is also important to note that as development increases in the future, greater populations and more structures and infrastructure will be exposed to potential hazards if development occurs in the floodplains or other identified areas of high risk.

6.5 VULNERABILITY ASSESSMENT RESULTS

As noted earlier, only hazards with a specific geographic boundary, available modeling tool, or sufficient historical data allow for further analysis in this section. All other hazards are assumed to impact the entire planning region (e.g., drought) or, due to lack of data, analysis would not lead to credible results (e.g., infectious disease). The total region exposure, and thus risk to these hazards, was presented in **Table 6.1**.

The hazards to be further analyzed in this section include: flood, wildfire, earthquake, hurricane and tropical storm winds and storm surge, hazardous materials incident, dam and levee failure, and sea level rise.

The annualized loss estimate for all hazards is presented near the end of this section in **Table 6.17.**

6.5.1 Flood

Historical evidence indicates that the MEMA District 9 Region is susceptible to flood events. A total of 168 flood events have been reported by the National Climatic Data Center resulting in around $12.2 million (2016 dollars) in property damage as well as 1 fatality. On an annualized level, these damages amounted to $787,125 for the MEMA District 9 Region.

In order to assess flood risk, a GIS-based analysis was used to estimate exposure to flood events using Digital Flood Insurance Rate Map (DFIRM) data in combination with improved property records for each of the MEMA District 9 Counties. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within an identified floodplain.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones.

Table 6.6 shows the results of the analysis.

TABLE 6.6: ESTIMATED EXPOSURE OF PARCELS TO THE FLOOD HAZARD

Location	1.0-percent ACF		0.2-percent ACF		VE Zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
George County*	**6,339**	**$1,033,054,000**	**88**	**$16,456,000**	**0**	**$0**
Lucedale	316	$69,124,000	0	$0	0	$0
Unincorporated Area	6,023	$963,930,000	88	$16,456,000	0	$0
Hancock County	**15,299**	**$253,871,546**	**6,346**	**$162,854,221**	**1,160**	**$16,819,674**

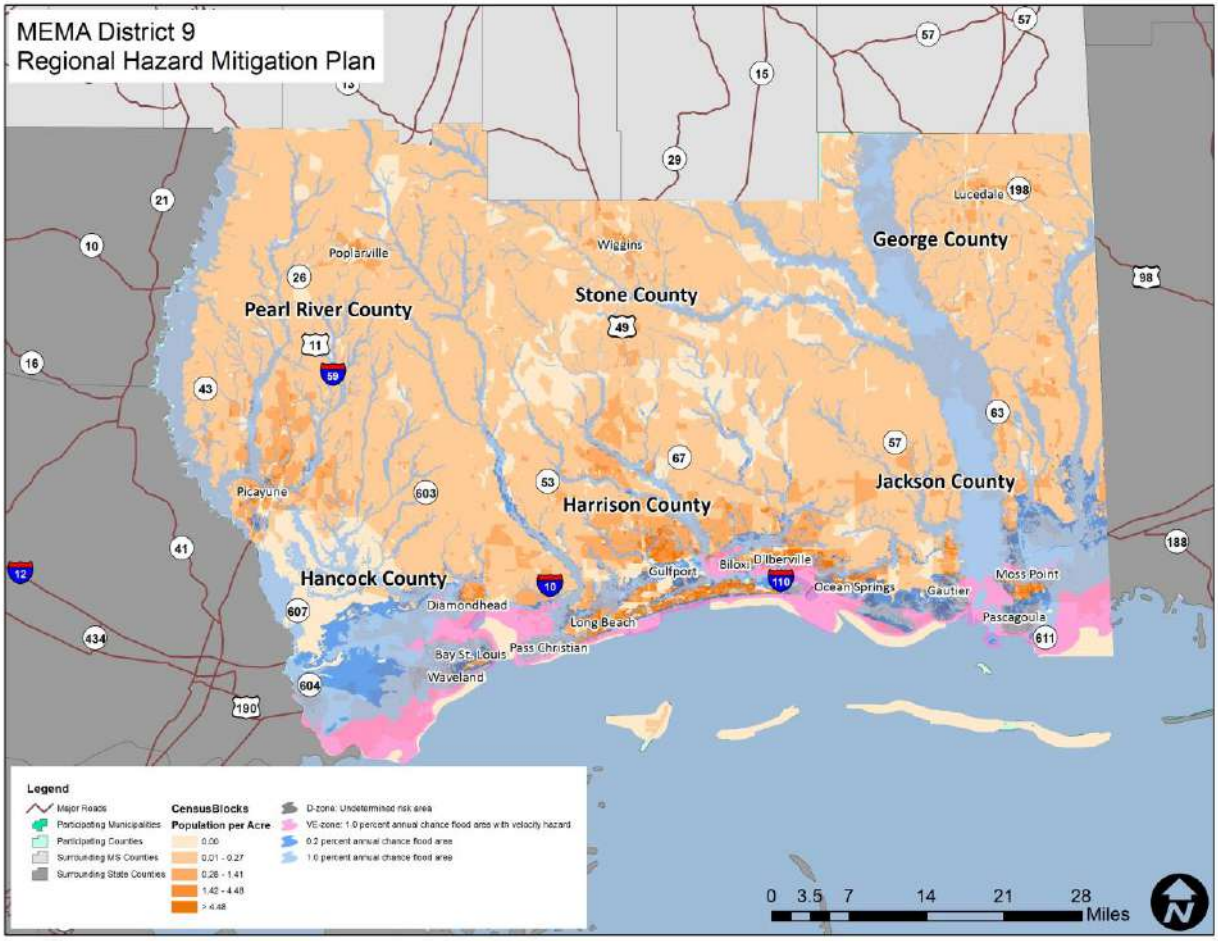
Location	1.0-percent ACF		0.2-percent ACF		VE Zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Bay St. Louis	1,047	$30,854,870	3,527	$77,458,001	123	$2,438,213
Diamondhead	676	$47,769,318	410	$36,591,925	39	$1,809,468
Waveland	2,698	$51,863,509	1,653	$38,060,990	200	$2,741,359
Unincorporated Area	10,878	$123,383,849	756	$10,743,305	798	$9,830,634
Harrison County	**18,616**	**$1,079,262,581**	**17,040**	**$1,379,486,361**	**1,024**	**$716,263,348**
Biloxi	6,417	$365,510,696	4,539	$407,939,146	222	$116,507,908
D'Iberville	1,230	$49,867,008	1,343	$116,368,166	52	$2,113,769
Gulfport	5,127	$379,135,841	7,802	$658,083,931	117	$82,687,105
Long Beach	863	$64,152,921	1,383	$92,278,737	40	$1,523,995
Pass Christian	2,534	$108,363,854	452	$22,954,189	199	$13,772,487
Unincorporated Area	2,445	$112,232,261	1,521	$81,862,192	394	$499,658,084
Jackson County	**29,696**	**$1,529,616,550**	**24,391**	**$1,765,432,520**	**1,033**	**$84,580,080**
Gautier	2,316	$118,332,200	4,728	$281,124,330	84	$7,279,640
Moss Point	3,119	$130,471,550	2,572	$132,822,500	55	$5,563,840
Ocean Springs	1,226	$154,955,040	5,987	$571,123,770	94	$12,202,880
Pascagoula	12,248	$644,004,050	2,804	$243,751,930	171	$13,956,290
Unincorporated Area	10,787	$481,853,710	8,300	$536,609,990	629	$45,577,430
Pearl River County*	**3,856**	**$1,689,761,000**	**1,407**	**$603,178,000**	**0**	**$0**
Picayune	576	$549,169,000	629	$394,185,000	0	$0
Poplarville	0	$0	0	$0	0	$0
Unincorporated Area	3,280	$1,140,592,000	778	$208,993,000	0	$0
Stone County	**211**	**$4,120,088**	**0**	**$0**	**0**	**$0**
Wiggins	12	$873,286	0	$0	0	$0
Unincorporated Area	199	$3,246,802	0	$0	0	$0
MEMA DISTRICT 9 REGION TOTAL	**74,017**	**$5,589,685,765**	**49,272**	**$3,927,407,102**	**3,217**	**$817,663,102**

** As noted above, building footprints and parcel data were not available for George County and parcel value data was not available for Pearl River County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: Federal Emergency Management Agency DFIRM, MDEQ, Hazus MH 3.2 Data

SOCIAL VULNERABILITY

Figure 6.4 is presented to gain a better understanding of at-risk population by evaluating census block level population data against mapped floodplains. There are areas of concern in several of the municipal population centers in this region including all of the coastal communities. Indeed, nearly every incorporated municipality is potentially at risk of being impacted by flooding in some areas of its jurisdiction. Therefore, there is significant population vulnerability to flooding.

FIGURE 6.4 : POPULATION DENSITY NEAR FLOODPLAINS IN THE MEMA DISTRICT 9 REGION



Source: Federal Emergency Management Agency DFIRM, United States Census 2010

CRITICAL FACILITIES

The critical facility analysis revealed that there are 225 facilities located in one of the identified floodplain zones. (Please note, as previously indicated, this analysis does not consider building elevation, which may negate risk.) Of these facilities, 196 are located in the 1.0 percent annual chance flood zone, 205 are located in the 0.2 percent annual chance flood zone, and 24 are located in a VE-zone. A list of specific critical facilities and their associated risk can be found in **Table 6.18** at the end of this section.

In conclusion, a flood has the potential to impact many existing and future buildings, facilities, and populations in the MEMA District 9 Region, though some areas are at a higher risk than others. All types of structures in a floodplain are at-risk, though elevated structures will have a reduced risk. Such site-specific vulnerability determinations are outside the scope of this assessment but may be considered during future plan updates. Furthermore, areas subject to repetitive flooding should be analyzed for potential mitigation actions.

6.5.2 Wildfire

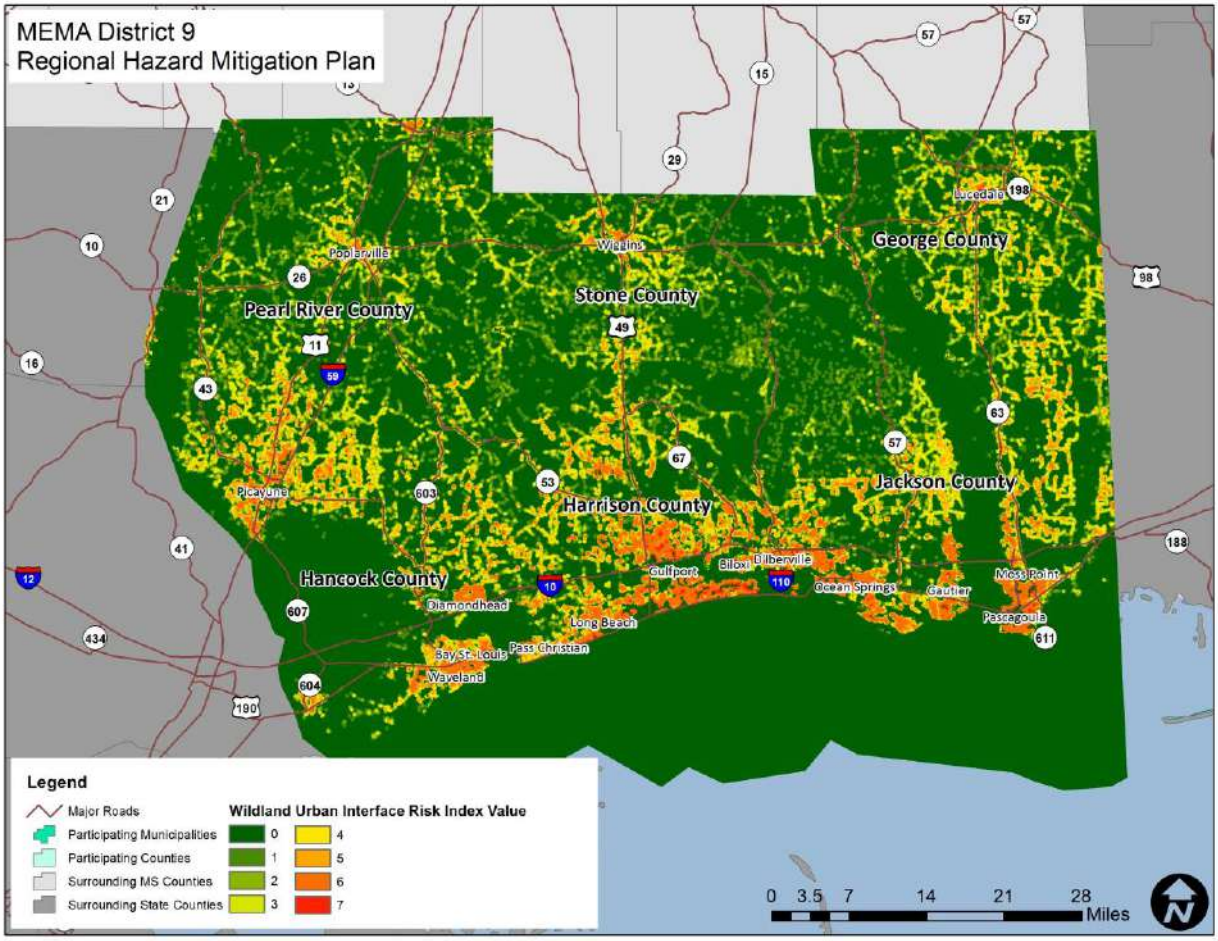
Although historical evidence indicates that the MEMA District 9 Region is susceptible to wildfire events, there are few reports which include information on historic dollar losses. Therefore, it is difficult to calculate a reliable annualized loss figure. Annualized loss is considered relatively low, though it should be noted that a single event could result in significant damages throughout the region.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones. For the critical facility analysis, areas of concern were intersected with critical facility locations.

Figure 6.5 shows the Wildland Urban Interface Risk Index (WUIRI) data, which is a data layer that shows a rating of the potential impact of a wildfire on people and their homes. The key input, Wildland Urban Interface (WUI), reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the WUI and rural areas is key information for defining potential wildfire impacts to people and homes. Initially provided as raster data, it was converted to a polygon to allow for analysis. The Wildland Urban Interface Risk Index data ranges from 0 to 7 with higher values being most severe (as noted previously, this is only a measure of relative risk). **Figure 6.6** shows the areas of analysis where any grid cell is less than 3. Areas with a value below 3 were chosen to be displayed as areas of risk because this showed the upper echelon of the scale and the areas at highest risk.

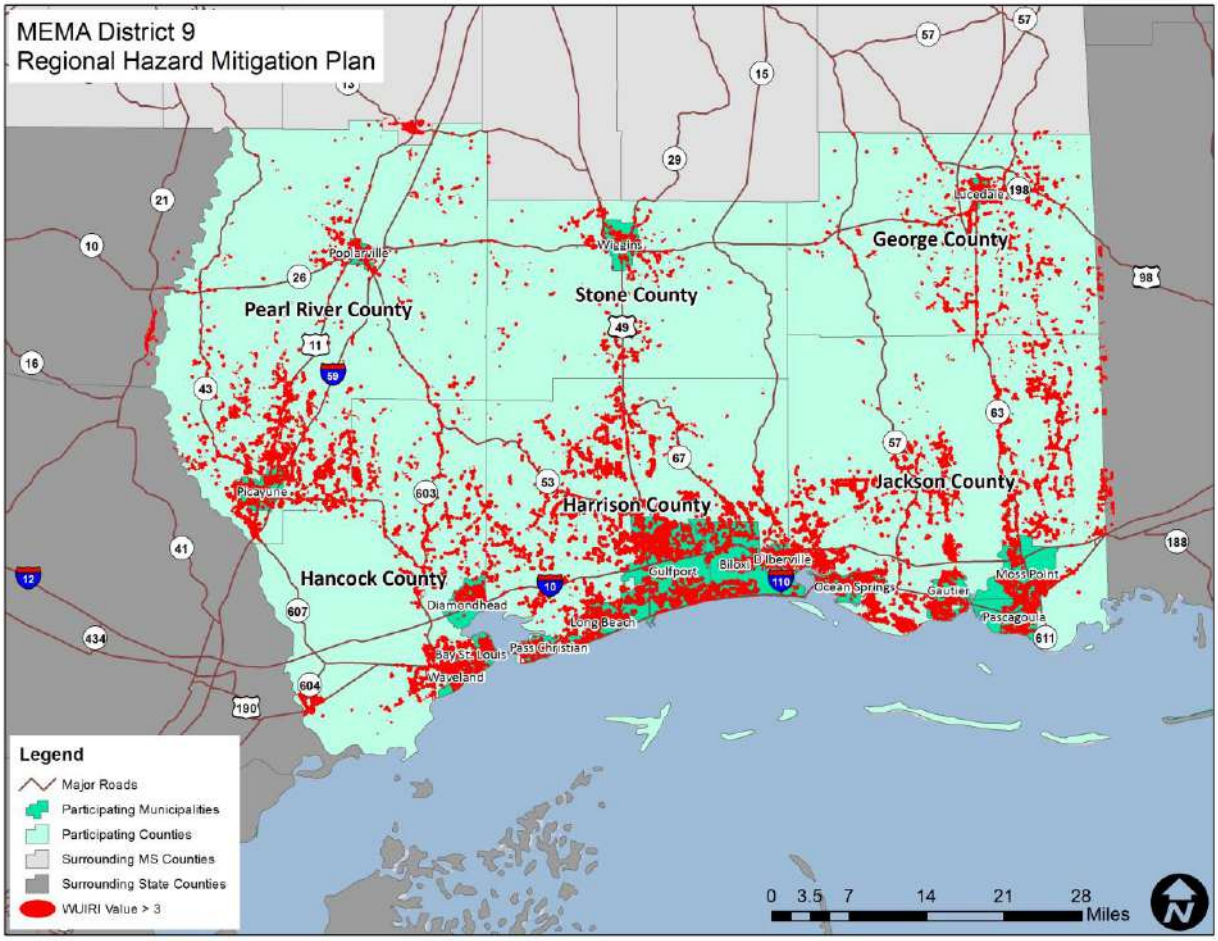
Table 6.7 shows the results of the analysis.

FIGURE 6.5: WUI RISK INDEX AREAS IN THE MEMA DISTRICT 9 REGION



Source: Southern Wildfire Risk Assessment Data

FIGURE 6.6: WILDFIRE RISK AREAS IN THE MEMA DISTRICT 9 REGION



Source: Southern Wildfire Risk Assessment Data

TABLE 6.7: EXPOSURE OF IMPROVED PROPERTY TO WILDFIRE RISK AREAS

Location	Wildfire Risk	
	Approx. Number of Buildings	Approx. Improved Value
George County*	**9,548**	**$1,664,239,000**
Lucedale	1,538	$335,976,000
Unincorporated Area	8,010	$1,328,263,000
Hancock County	**29,075**	**$793,624,454**
Bay St. Louis	4,266	$104,713,588
Diamondhead	4,438	$376,562,919
Waveland	4,601	$91,012,766
Unincorporated Area	15,770	$221,335,181
Harrison County	**87,586**	**$4,359,508,991**
Biloxi	14,782	$990,187,787
D'Iberville	4,036	$173,907,350
Gulfport	30,805	$1,630,516,790

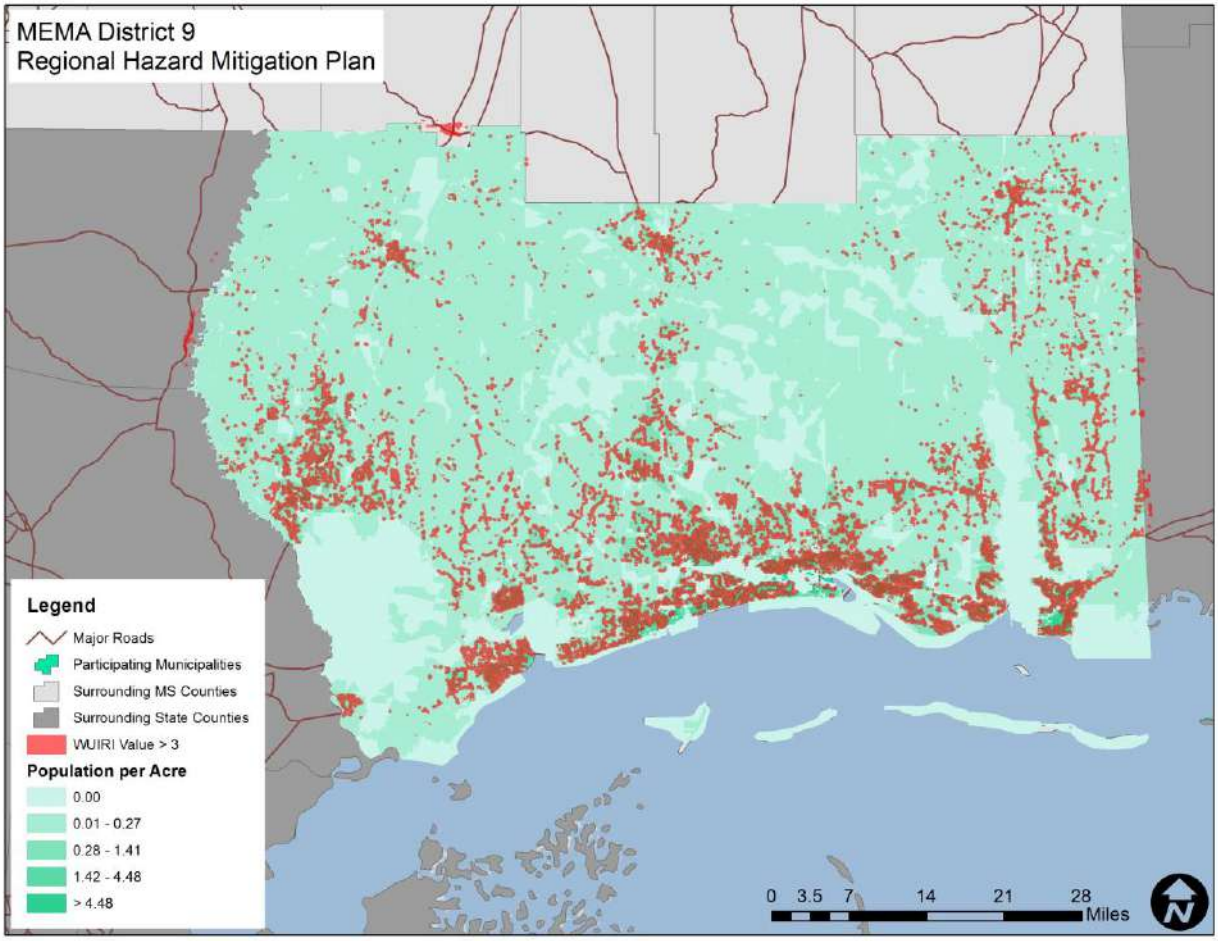
Location	Wildfire Risk	
	Approx. Number of Buildings	Approx. Improved Value
Long Beach	7,348	$392,572,180
Pass Christian	3,413	$164,858,285
Unincorporated Area	27,202	$1,007,466,599
Jackson County	**75,257**	**$3,977,525,960**
Gautier	6,767	$362,594,440
Moss Point	9,227	$342,127,140
Ocean Springs	9,622	$850,642,070
Pascagoula	9,231	$541,505,990
Unincorporated Area	40,410	$1,880,656,320
Pearl River County*	**29,749**	**$4,352,141,000**
Picayune	6,411	$1,357,763,000
Poplarville	1,846	$319,907,000
Unincorporated Area	21,492	$2,674,471,000
Stone County	**6,746**	**$192,683,090**
Wiggins	2,664	$104,838,031
Unincorporated Area	4,082	$87,845,059
MEMA DISTRICT 9 REGION TOTAL	**237,961**	**$15,339,722,495**

** As noted above, building footprints and parcel data were not available for George County and parcel value data was not available for Pearl River County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: SWRA, MDEQ, Hazus MH 3.2 Data

SOCIAL VULNERABILITY

Given some level of susceptibility across the entire MEMA District 9 Region, it is assumed that the total population is at risk to the wildfire hazard. **Figure 6.7** shows an overlay of the wildfire risk areas identified above with the population density by census block. This shows that many of the areas of high population concentration are susceptible to wildfire because of their proximity to the wildland urban interface.

FIGURE 6.7: WILDFIRE RISK AREAS IN THE MEMA DISTRICT 9 REGION



Source: Southern Wildfire Risk Assessment Data; United States Census

CRITICAL FACILITIES

The critical facility analysis revealed that there are 586 critical facilities located in wildfire areas of concern, including 9 communications, 6 EOCs, 99 fire stations, 15 medical, 25 police stations, 31 power/gas, 17 private/non-profit, 98 public facilities, 110 schools, 16 shelters, 68 special populations, 8 transportation, 84 water/wastewater. It should be noted, that several factors could impact the spread of a wildfire putting all facilities at risk. A list of specific critical facilities and their associated risk can be found in **Table 6.18** at the end of this section.

In conclusion, a wildfire event has the potential to impact many existing and future buildings, critical facilities, and populations in the MEMA District 9 Region.

6.5.3 Earthquake

As the Hazus-MH model suggests below, and historical occurrences confirm, any earthquake activity in the area is likely to inflict only minor to moderate damage to the planning area. Hazus-MH 3.2 estimates

a total annualized loss of $187,000 which includes buildings, contents, and inventory throughout the planning area.

For the earthquake hazard vulnerability assessment, a probabilistic scenario was created to estimate the average annualized loss[2] for the region on a county by county basis. The results of the analysis are generated at the Census Tract level within Hazus-MH and then aggregated to the county level. Since the scenario is annualized, no building counts are provided. Losses reported included losses due to structure failure, building loss, contents damage, and inventory loss. They do not include losses to business interruption, lost income, or relocation. **Table 6.8** summarizes the findings with results rounded to the nearest thousand.

TABLE 6.8: AVERAGE ANNUALIZED LOSS ESTIMATIONS FOR EARTHQUAKE HAZARD

Location	Structural Damage	Non-Structural Damage	Contents Damage	Inventory Loss	Total Annualized Loss
George County	$2,000	$5,000	$1,000	$0	$8,000
Hancock County	$4,000	$9,000	$2,000	$0	$15,000
Harrison County	$21,000	$51,000	$15,000	$0	$87,000
Jackson County	$12,000	$29,000	$8,000	$0	$49,000
Pearl River County	$5,000	$12,000	$3,000	$0	$20,000
Stone County	$2,000	$5,000	$1,000	$0	$8,000
MEMA D9 REGION TOTAL	**$46,000**	**$111,000**	**$30,000**	**$0**	**$187,000**

Source: Hazus-MH 3.2

SOCIAL VULNERABILITY

It can be assumed that all existing and future populations are at risk to the earthquake hazard.

CRITICAL FACILITIES

The Hazus-MH probabilistic analysis indicated that no critical facilities would sustain measurable damage in an earthquake event. However, all critical facilities should be considered at-risk to minor damage, should an event occur. Specific vulnerabilities for these assets will be greatly dependent on their individual design and the mitigation measures in place. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates.

In conclusion, an earthquake has the potential to impact all existing and future buildings, facilities, and populations in the MEMA District 9 Region. The Hazus-MH scenario indicates that minimal to moderate damage is expected from an earthquake occurrence. While the MEMA District 9 Region may not experience a large earthquake, localized damage is possible with an occurrence. A list of specific critical facilities and their associated risk can be found in **Table 6.18** at the end of this section.

[2] Annualized loss is defined by Hazus-MH as the expected value of loss in any one year.

6.5.4 Hurricane and Tropical Storm

Historical evidence indicates that the MEMA District 9 Region has very significant risk to the hurricane and tropical storm hazard. There have been 12 disaster declarations due to hurricanes or tropical storms (Hurricanes Betsy, Camille, Frederic, Elena, Georges, Ivan, Dennis, Katrina, Gustav, and Isaac, as well as Tropical Storms Allison and Isidore). A large number tracks have come near or traversed through the MEMA District 9 Region, as shown and discussed in Section 5: *Hazard Profiles*. Hazus-MH 3.2 estimates a total annualized loss of $307,250,000 which includes buildings, contents, and inventory throughout the planning area.

HURRICANE WINDS

Hurricanes and tropical storms can cause damage through numerous additional hazards such as flooding, erosion, tornadoes, and high winds, thus it is difficult to estimate total potential losses from these cumulative effects. The current Hazus-MH hurricane model only analyzes hurricane winds and storm surge and is not capable of modeling and estimating cumulative losses from all hazards associated with hurricanes; therefore, only these two aspects of hurricane losses are analyzed in this section. It can be assumed that all existing and future buildings and populations are at risk to hurricane and tropical storm wind hazard. Hazus-MH 3.2 was used to determine average annualized losses[3] for the region as shown below in **Table 6.9.** Only losses to buildings, inventory, and contents are included in the results.

TABLE 6.9: AVERAGE ANNUALIZED LOSS ESTIMATIONS FOR HURRICANE WIND HAZARD

Location	Building Damage	Contents Damage	Inventory Loss	Total Annualized Loss
George County	$4,776,000	$1,959,000	$16,000	$6,751,000
Hancock County	$13,931,000	$5,455,000	$37,000	$19,423,000
Harrison County	$111,346,000	$50,844,000	$461,000	$162,651,000
Jackson County	$70,481,000	$31,767,000	$307,000	$102,555,000
Pearl River County	$7,495,000	$3,020,000	$26,000	$10,541,000
Stone County	$3,629,000	$1,683,000	$17,000	$5,329,000
MEMA D9 REGION TOTAL	**$211,658,000**	**$94,728,000**	**$864,000**	**$307,250,000**

Source: Hazus-MH 3.2

STORM SURGE

In addition, although it was treated as a separate hazard throughout this plan, storm surge is most often associated with hurricanes and tropical storms. Indeed, Hazus incorporates the storm surge model for estimating damage from storm surge as part of the hurricane model. The storm surge model can only be run as part of a historic hurricane model run and not as part of an annualized loss model. Unfortunately, in this model, storm surge impacts are calculated as part of the total damage from the historic event and thus could not be separated out and evaluated solely in terms of storm surge loss. As such, the estimated losses presented below are combined losses from hurricane winds and storm surge. The historic Hurricane Katrina model was utilized as this was certainly one of the most impactful storms in

[3] Annualized loss is defined by Hazus-MH as the expected value of loss in any one year.

the region and therefore estimates the potential losses that are possible from a large hurricane event. **Table 6.10** presents the losses from this modeled event.

TABLE 6.10: POTENTIAL LOSS ESTIMATIONS FOR LARGE HURRICANE EVENT

Location	Building Damage	Contents Damage	Inventory Loss	Total Annualized Loss
George County	$33,209,000	$10,744,000	$73,000	$44,026,000
Hancock County	$279,895,000	$95,284,000	$600,000	$375,779,000
Harrison County	$2,064,136,000	$862,483,000	$7,187,000	$2,933,806,000
Jackson County	$381,792,000	$142,547,000	$605,000	$524,944,000
Pearl River County	$205,561,000	$75,831,000	$628,000	$282,020,000
Stone County	$88,416,000	$39,047,000	$495,000	$127,958,000
MEMA D9 REGION TOTAL	**$3,053,009,000**	**$1,225,936,000**	**$9,588,000**	**$4,288,533,000**

Source: Hazus-MH 3.2

SOCIAL VULNERABILITY

Given equal susceptibility across the entire MEMA District 9 Region, it is assumed that the total population, both current and future, is at risk to the hurricane and tropical storm wind hazard. In terms of social vulnerability to storm surge, coastal populations are at much higher risk than inland populations. Since large concentrations of population are located along the coast of the MEMA District 9 Region, there is significant social vulnerability to storm surge in the region.

CRITICAL FACILITIES

Given equal vulnerability across the MEMA District 9 Region, all critical facilities are considered to be at risk. Some buildings may perform better than others in the face of such an event due to construction and age, among factors. Determining individual building response to wind and storm surge is beyond the scope of this plan. However, this plan will consider mitigation action for especially vulnerable structures and/or critical facilities to mitigate against the effects of the hurricane hazard. A list of specific critical facilities can be found in **Table 6.18** at the end of this section.

In conclusion, a hurricane event has the potential to impact many existing and future buildings, critical facilities, and populations in the MEMA District 9 Region.

6.5.5 Hazardous Materials Incident

Historical evidence indicates that the MEMA District 9 Region is susceptible to hazardous materials events. A total of 473 HAZMAT incidents have been reported by the Pipeline and Hazardous Materials Safety Administration, resulting in $2,134,323 (2016 dollars) in property damage as well as 5 deaths and 21 injuries. On an annualized level, these damages amount to $47,429 for the region.

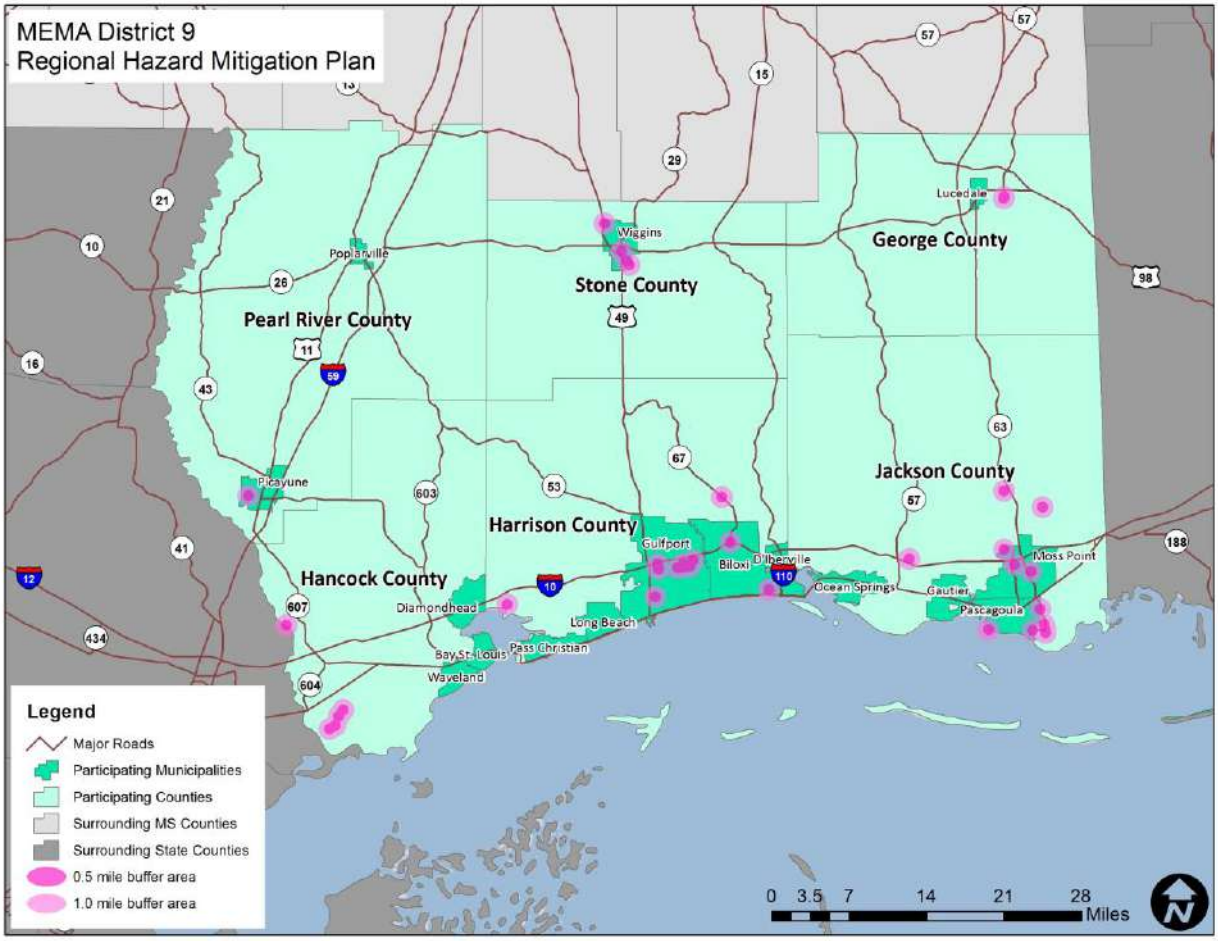
Most hazardous materials incidents that occur are contained and suppressed before destroying any property or threatening lives. However, they can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities, and cause affected properties to be destroyed or

suffer major damage. In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. Certain chemicals may travel through the air or water, affecting a much larger area than the point of the incidence itself. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features, can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

In order to conduct the vulnerability assessment for this hazard, GIS intersection analysis was used for fixed and mobile areas and building footprints/parcels where available and Census block data where footprints/parcels were not available.[4] In both scenarios, two sizes of buffers—0.5-mile and 1.0-mile—were used. These areas are assumed to represent the different levels of effect: immediate (primary) and secondary. Primary and secondary impact zones were selected based on guidance from the PHMSA Emergency Response Guidebook. For the fixed site analysis, geo-referenced TRI sites in the region, along with buffers, were used for analysis as shown in **Figure 6.8.** For the mobile analysis, the major roads (Interstate highway, U.S. highway, and State highway) and railroads, where hazardous materials are primarily transported that could adversely impact people and buildings, were used for the GIS buffer analysis. **Figure 6.9** shows the areas used for mobile road toxic release buffer analysis and **Figure 6.10** shows the areas used for the mobile railroad toxic release buffer analysis. The results indicate the approximate number of improved properties and improved value, as shown in **Table 6.11** (fixed sites), **Table 6.12** (mobile roads), and **Table 6.13** (mobile railroads).[5]

[4] This type of analysis will likely yield inflated results (generally higher than what is actually reported after an actual event).
[5] Note that improved properties included in the 1.0-mile analysis are also included in the 0.5-mile analysis.

FIGURE 6.8 : TRI SITES WITH BUFFERS IN THE MEMA DISTRICT 9 REGION



Source: Environmental Protection Agency

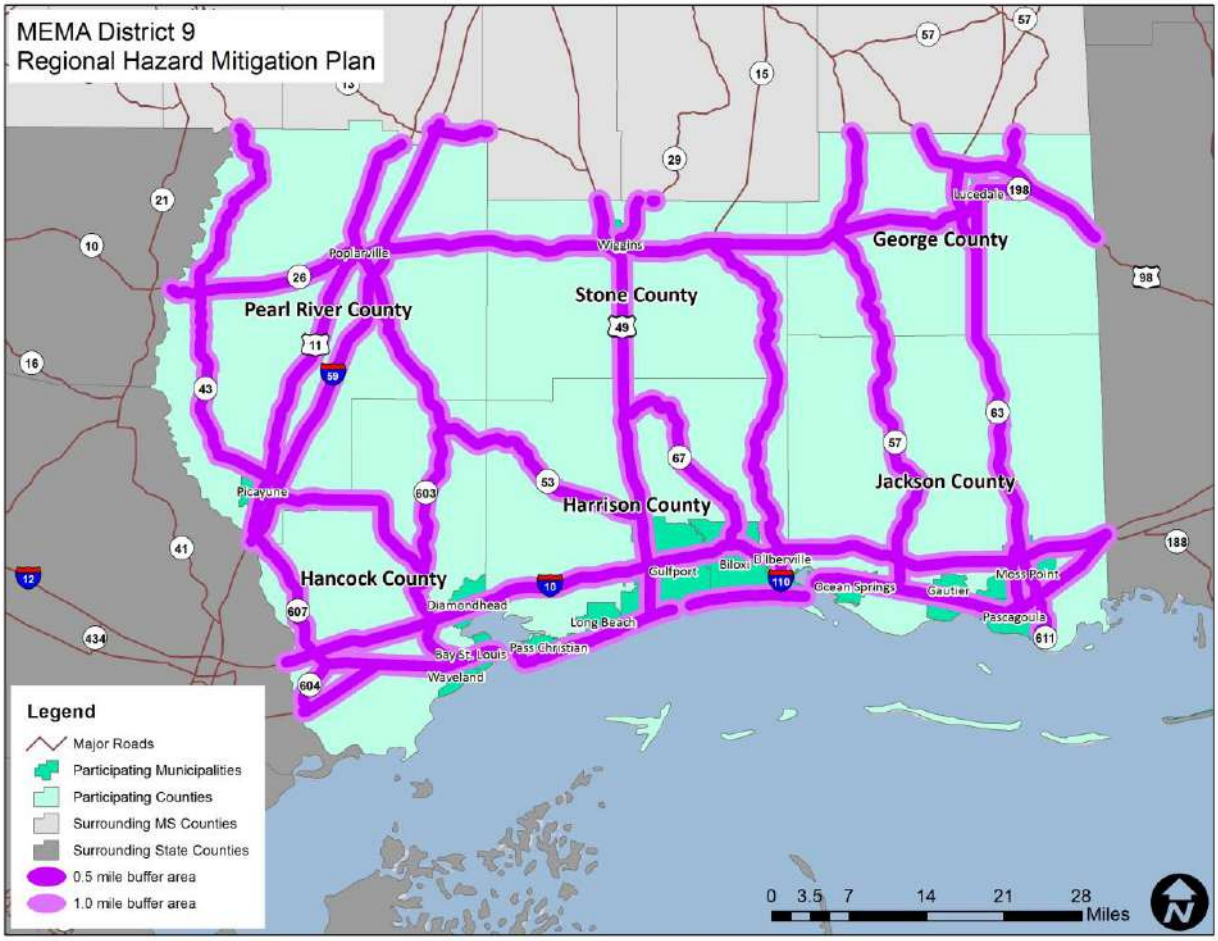
TABLE 6.11: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS (FIXED SITES)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
George County*	**83**	**$22,552,000**	**361**	**$72,153,000**
Lucedale	0	$0	99	$18,341,000
Unincorporated Area	83	$22,552,000	262	$53,812,000
Hancock County†	**209**	**$2,679,000**	**351**	**$21,265,000**
Bay St. Louis	0	$0	0	$0
Diamondhead	0	$0	0	$0
Waveland	0	$0	0	$0
Unincorporated Area	209	$2,679,000	351	$21,265,000
Harrison County	**3,184**	**$181,369,604**	**12,319**	**$703,940,495**
Biloxi	921	$26,148,977	3,512	$110,705,101
D'Iberville	0	$0	0	$0
Gulfport	1,901	$110,382,535	8,125	$531,451,341

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Long Beach	0	$0	0	$0
Pass Christian	0	$0	0	$0
Unincorporated Area	362	$44,838,092	682	$61,784,053
Jackson County	**2,554**	**$89,327,840**	**8,251**	**$322,232,380**
Gautier	0	$0	0	$0
Moss Point	583	$19,614,990	1,818	$74,425,480
Ocean Springs	0	$0	0	$0
Pascagoula	1,003	$39,815,600	3,902	$180,770,120
Unincorporated Area	968	$29,897,250	2,531	$67,036,780
Pearl River County*	**489**	**$106,765,000**	**2,265**	**$412,547,000**
Picayune	489	$106,765,000	2,196	$399,979,343
Poplarville	0	$0	0	$0
Unincorporated Area	0	$0	69	$12,567,657
Stone County	**467**	**$21,538,732**	**1,859**	**$70,803,546**
Wiggins	387	$17,016,665	1,349	$56,455,906
Unincorporated Area	80	$4,522,067	510	$14,347,640
MEMA DISTRICT 9 REGION TOTAL	**6,986**	**$424,232,176**	**25,406**	**$1,602,941,421**

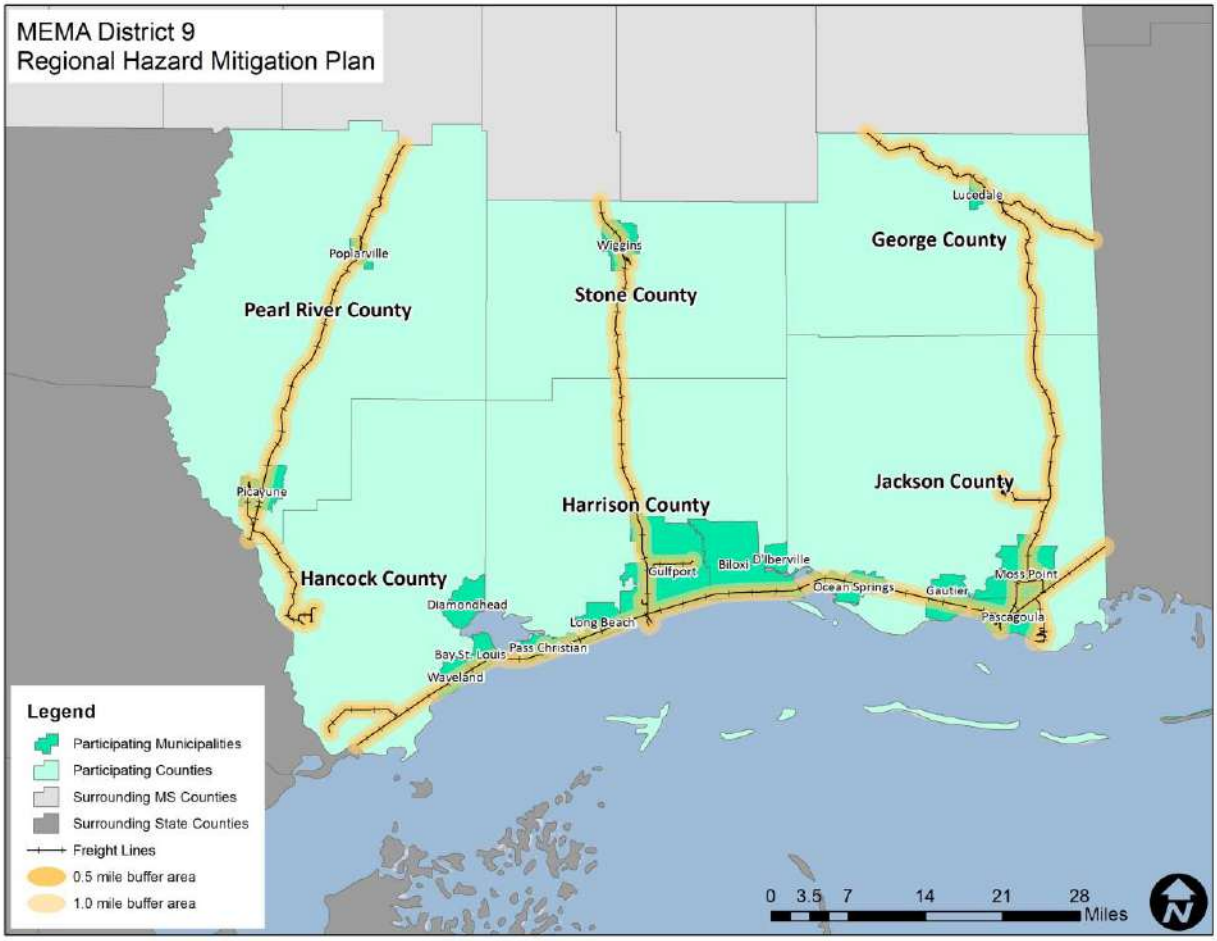
** As noted above, building footprints and parcel data were not available for George County and parcel value data was not available for Pearl River County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
†A small area of the Hancock County parcel data does not contain dollar values. Upon examination of the data, these parcels do have structures located on them. As such, Census Block estimates for values were used in this case.
Source: EPA, MDEQ, Hazus MH 3.2 Data

FIGURE 6.9 : MOBILE (ROAD) HAZMAT BUFFERS IN THE MEMA DISTRICT 9 REGION



Source: Federal Highway Administration National Highway Planning Network

FIGURE 6.10 : MOBILE (RAIL) HAZMAT BUFFERS IN THE MEMA DISTRICT 9 REGION



Source: U.S. Department of Transportation Federal Railroad Administration

TABLE 6.12: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - ROAD)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
George County*	**5,153**	**$987,684,000**	**6,279**	**$1,175,140,000**
Lucedale	1,351	$306,348,000	1,538	$335,976,000
Unincorporated Area	3,802	$681,336,000	4,741	$839,164,000
Hancock County	**14,905**	**$316,655,664**	**24,394**	**$593,991,975**
Bay St. Louis	3,091	$73,331,871	5,153	$115,765,377
Diamondhead	1,144	$94,088,219	2,515	$232,470,277
Waveland	1,553	$26,881,381	2,902	$57,568,580
Unincorporated Area	9,117	$122,354,193	13,824	$188,187,741
Harrison County	**39,552**	**$2,649,073,410**	**71,896**	**$4,093,838,350**
Biloxi	8,799	$682,254,259	15,629	$1,016,578,586

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
D'Iberville	3,119	$166,129,238	4,714	$228,825,255
Gulfport	14,873	$858,010,293	27,596	$1,412,706,984
Long Beach	2,056	$104,404,162	4,838	$226,495,377
Pass Christian	1,761	$78,050,457	3,009	$128,363,439
Unincorporated Area	8,944	$760,225,001	16,110	$1,080,868,709
Jackson County	**30,471**	**$1,710,795,370**	**53,653**	**$2,859,260,310**
Gautier	2,038	$128,322,620	3,973	$231,157,040
Moss Point	6,704	$250,007,730	10,082	$360,729,220
Ocean Springs	6,109	$560,929,950	9,412	$825,611,110
Pascagoula	4,913	$365,649,400	9,604	$599,308,610
Unincorporated Area	10,707	$405,885,670	20,582	$842,454,330
Pearl River County*	**20,861**	**$3,111,426,000**	**30,502**	**$3,632,518,000**
Picayune	4,438	$1,133,195,000	5,927	$1,244,649,000
Poplarville	1,941	$315,740,000	1,964	$321,992,000
Unincorporated Area	14,482	$1,662,491,000	22,611	$2,065,877,000
Stone County	**6,348**	**$178,594,920**	**8,927**	**$243,035,752**
Wiggins	2,630	$106,292,189	3,183	$126,862,624
Unincorporated Area	3,718	$72,302,731	5,744	$116,173,128
MEMA DISTRICT 9 REGION TOTAL	**117,290**	**$8,954,229,364**	**195,651**	**$12,597,784,387**

** As noted above, building footprints and parcel data were not available for George County and parcel value data was not available for Pearl River County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: NHPN, MDEQ, Hazus MH 3.2 Data

TABLE 6.13: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - RAILROAD)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
George County*	**2,497**	**$464,854,000**	**3,409**	**$646,775,000**
Lucedale	457	$115,711,000	864	$210,193,000
Unincorporated Area	2,040	$349,143,000	2,545	$436,582,000
Hancock County	**5,779**	**$97,328,276**	**9,363**	**$165,995,878**
Bay St. Louis	2,602	$50,395,193	4,125	$81,202,156
Diamondhead	0	$0	0	$0
Waveland	2,093	$41,357,755	3,346	$70,790,946
Unincorporated Area	1,084	$5,575,328	1,892	$14,002,776

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Harrison County	**32,551**	**$2,011,623,453**	**52,255**	**$2,011,623,453**
Biloxi	8,278	$464,061,769	12,404	$464,061,769
D'Iberville	0	$0	0	$0
Gulfport	15,657	$873,267,174	26,556	$873,267,174
Long Beach	4,006	$183,255,865	5,514	$183,255,865
Pass Christian	2,484	$96,055,588	3,079	$96,055,588
Unincorporated Area	2,126	$394,983,057	4,702	$394,983,057
Jackson County	**22,962**	**$1,317,989,340**	**41,658**	**$2,279,194,530**
Gautier	2,105	$96,599,920	4,241	$229,056,300
Moss Point	4,380	$143,660,210	8,047	$285,876,040
Ocean Springs	5,349	$502,955,290	9,255	$811,896,650
Pascagoula	5,903	$415,698,900	11,166	$649,874,460
Unincorporated Area	5,225	$159,075,020	8,949	$302,491,080
Pearl River County*	**10,128**	**$1,651,755,000**	**15,569**	**$2,253,555,000**
Picayune	3,863	$855,158,000	5,742	$1,159,817,000
Poplarville	1,163	$189,638,000	1,704	$287,734,000
Unincorporated Area	5,102	$606,959,000	8,123	$806,004,000
Stone County	**3,396**	**$98,682,350**	**5,074**	**$154,641,393**
Wiggins	1,729	$62,551,284	2,535	$102,100,359
Unincorporated Area	1,667	$36,131,066	2,539	$52,541,034
MEMA DISTRICT 9 REGION TOTAL	**77,313**	**$5,642,232,419**	**127,328**	**$7,511,785,254**

** As noted above, building footprints and parcel data were not available for George County and parcel value data was not available for Pearl River County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: USDOT FRA, MDEQ, Hazus MH 3.2 Data

SOCIAL VULNERABILITY

Given high susceptibility across the entire MEMA District 9 Region, it is assumed that the total population is at risk to a hazardous materials incident. It should be noted that areas of population concentration may be at an elevated risk due to a greater burden to evacuate population quickly.

CRITICAL FACILITIES

Fixed Site Analysis:
The critical facility analysis for fixed TRI sites revealed that there are 103 facilities located in a fixed HAZMAT risk zone. Of these, 28 facilities are in the primary (0.5 mile) risk area including 1 fire station, 1 medical, 1 police station, 5 power/gas, 4 private/non-profit, 3 public facilities, 4 schools, 3 special populations, and 6 water/wastewater. A list of specific critical facilities and their associated risk can be found in **Table 6.18** at the end of this section.

Mobile Analysis:
The critical facility analysis for transportation corridors revealed that there are 707 facilities located in the primary and secondary road HAZMAT buffer areas. There were 514 critical facilities located in the primary risk zone.

For the rail line buffer areas, there were a total of 560 critical facilities located in primary and secondary buffer areas. Of these, 371 facilities are located within the primary buffer area.

A list of specific critical facilities and their associated risk can be found in **Table 6.18** at the end of this section.

In conclusion, a hazardous material incident has the potential to impact many existing and future buildings, critical facilities, and populations in the MEMA District 9 Region. Those areas in a primary buffer are at the highest risk, though all areas carry some vulnerability due to variations in condition that could alter the impact area (i.e., direction and speed of wind, volume of release, etc.).

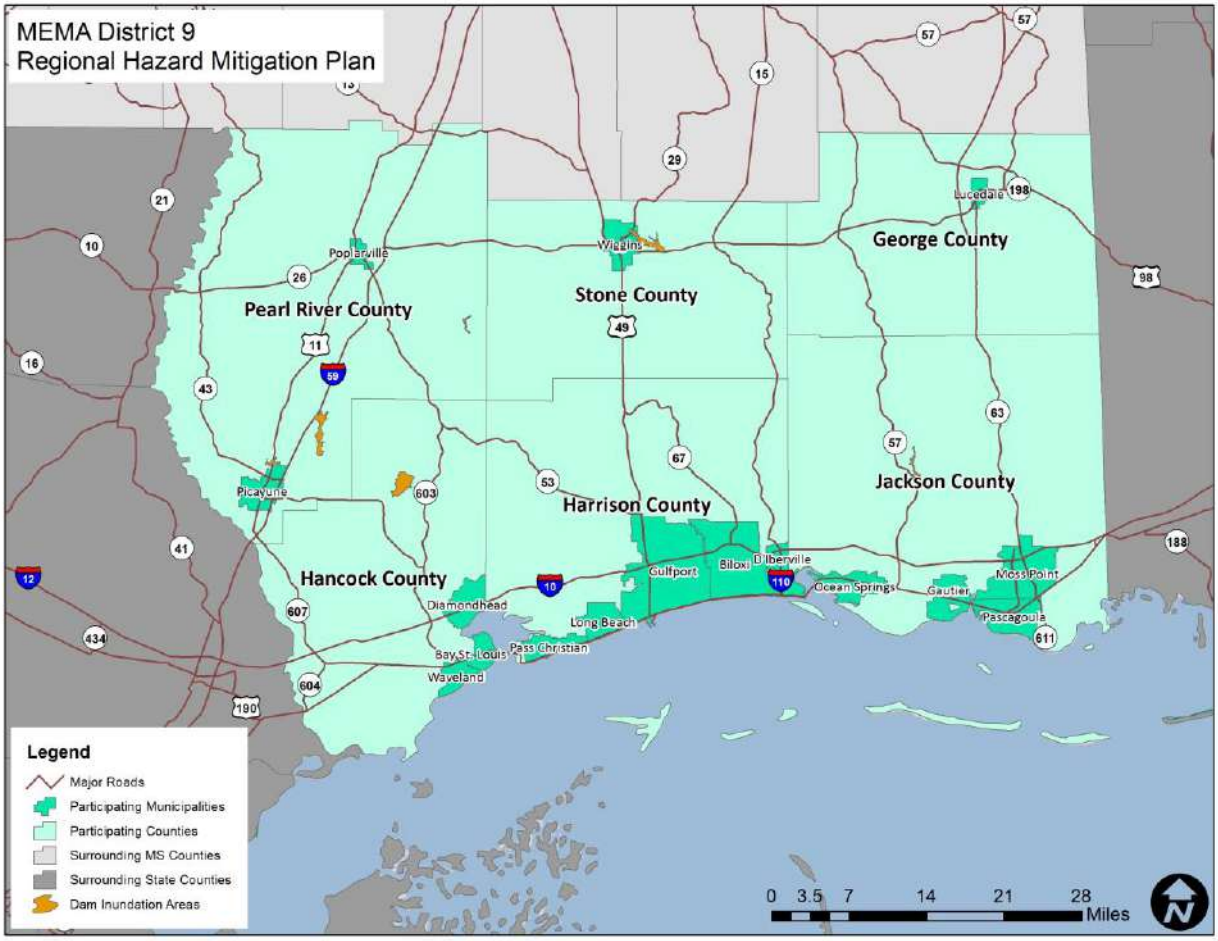
6.5.6 Dam/Levee Failure

In order to assess risk to a dam or levee failure, a GIS-based analysis was used to estimate exposure to one of the areas delineated by the Mississippi Department of Environmental Quality as a potential inundation area in the event of a failure. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within an identified inundation area. As mentioned previously, this type of inundation mapping has not been completed for every dam/levee in the region, so the results of this analysis likely underestimate the overall vulnerability to a dam or levee failure. However, the analysis is still useful as a sort of baseline minimum of property that is potentially at-risk. The identified inundation areas can be found in **Figure 6.11.**

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones.

Table 6.14 presents the potential at-risk property. Both the number of buildings and the approximate improved value are presented.

FIGURE 6.11: DAM INUNDATION AREAS IN THE MEMA DISTRICT 9 REGION



Source: Mississippi Department of Environmental Quality

TABLE 6.14: ESTIMATED EXPOSURE OF IMPROVEMENTS TO THE DAM/LEVEE FAILURE HAZARD

Location	Dam Inundation Area	
	Approx. Number of Buildings	Approx. Improved Value
George County*	**0**	**$0**
Lucedale	0	$0
Unincorporated Area	0	$0
Hancock County	**92**	**$1,852,055**
Bay St. Louis	0	$0
Diamondhead	0	$0
Waveland	0	$0
Unincorporated Area	92	$1,852,055
Harrison County	**0**	**$0**
Biloxi	0	$0
D'Iberville	0	$0
Gulfport	0	$0

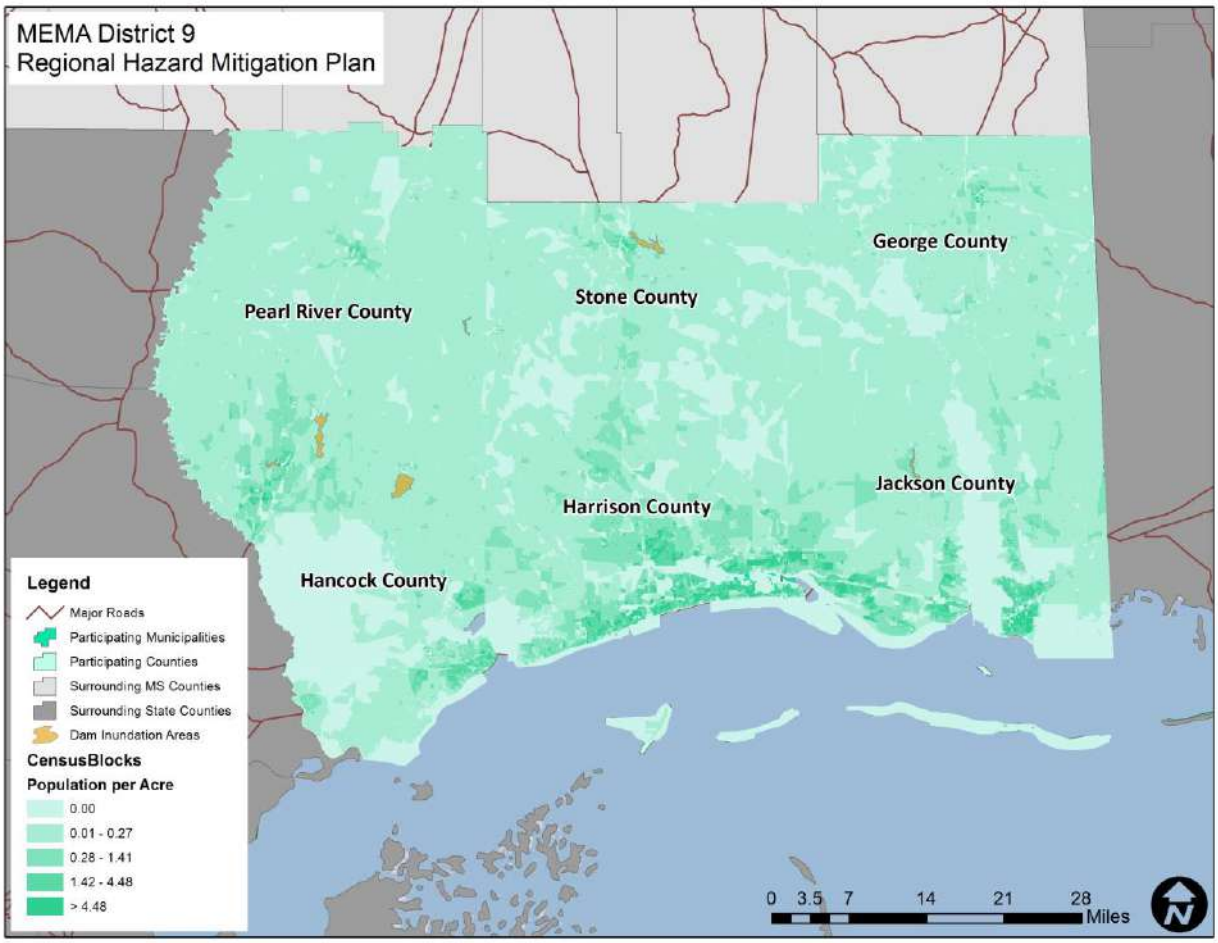
Location	Dam Inundation Area	
	Approx. Number of Buildings	Approx. Improved Value
Long Beach	0	$0
Pass Christian	0	$0
Unincorporated Area	0	$0
Jackson County†	**1**	**$0**
Gautier	0	$0
Moss Point	0	$0
Ocean Springs	0	$0
Pascagoula	0	$0
Unincorporated Area	1	$0
Pearl River County*	**86**	**$70,289,000**
Picayune	0	$0
Poplarville	0	$0
Unincorporated Area	86	$70,289,000
Stone County	**29**	**$1,150,188**
Wiggins	18	$808,698
Unincorporated Area	11	$341,490
MEMA DISTRICT 9 REGION TOTAL	**208**	**$73,291,243**

** As noted above, building footprints and parcel data were not available for George County and parcel value data was not available for Pearl River County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
†This does not include areas that would be inundated by the Big Creek Lake Dam, located in Alabama as geospatial data for the inundation area was not available.
Source: MDEQ, Hazus 3.2

SOCIAL VULNERABILITY

Figure 6.12 is presented to gain a better understanding of at-risk population by evaluating census block level population data against dam inundation areas. There are areas of concern in several of the counties in this region, although it should be noted that most of the population of the region is not at risk to a dam/levee failure.

FIGURE 6.12: POPULATION DENSITY NEAR DAM INUNDATION AREAS IN THE MEMA DISTRICT 9 REGION



Source: MDEQ, United States Census 2010

CRITICAL FACILITIES

The critical facility analysis revealed that there are 2 facilities located in dam inundation areas. One of these facilities is a dam itself in Stone County, so it is not surprising that it is located in the inundation area. The other facility is a fire station in Pearl River County. A list of specific critical facilities and their associated risk can be found in **Table 6.18** at the end of this section.

In conclusion, a dam has the potential to impact a number of existing and future buildings, facilities, and populations in the MEMA District 9 Region, though this analysis is not all-encompassing in terms of risk to a dam or levee failure because inundation mapping is not available for all dams in the region.

6.5.7 Climate Change/Sea Level Rise

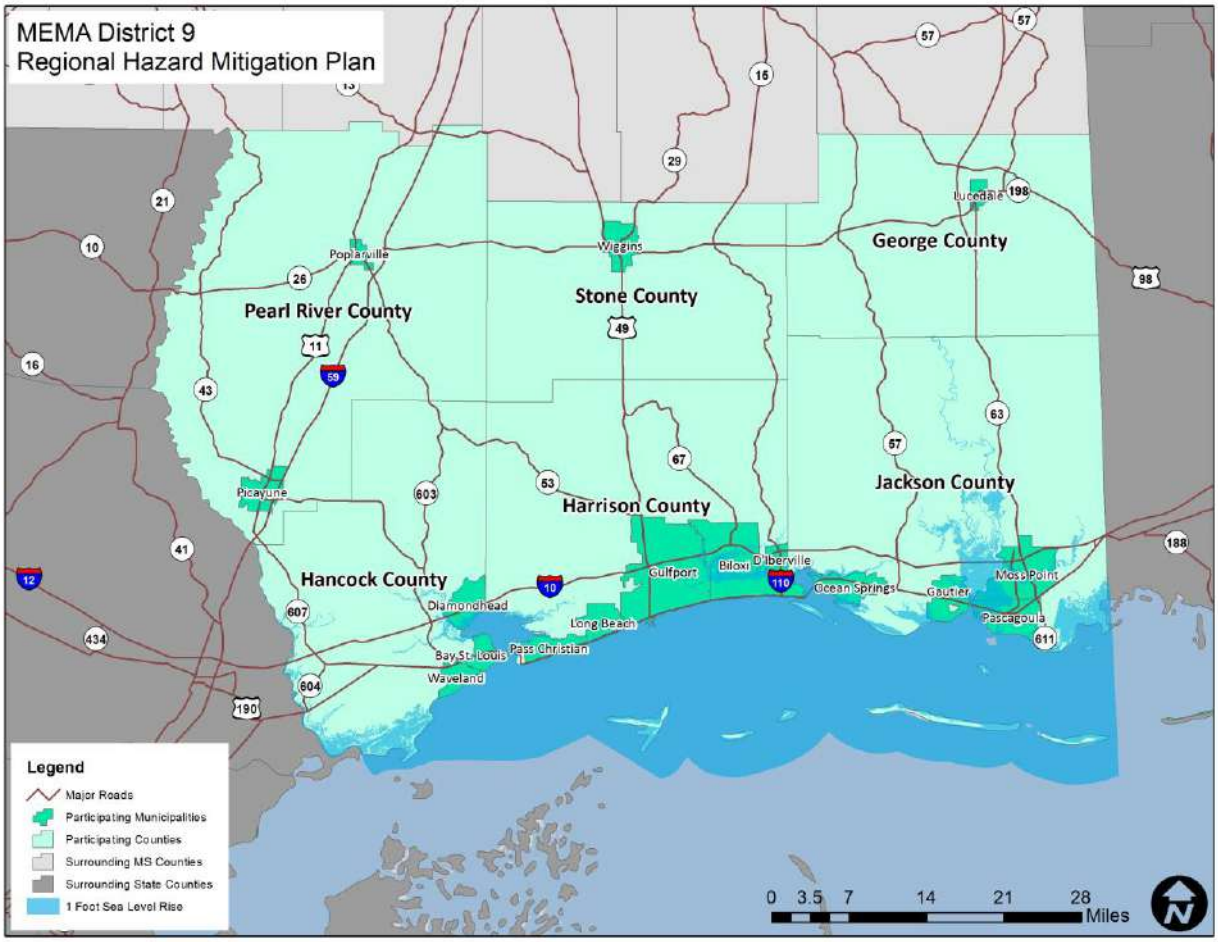
Most assessments carried out across the globe have concluded that climate change is a phenomenon that will impact our planet in the foreseeable future. Among others, the National Climate Assessment, International Panel on Climate Change, and National Oceanic and Atmospheric Administration all project

that climate change will impact the United States and will have a major impact on coastal communities due to the effects of sea level rise. As such, projections concerning sea level rise are important to incorporate into planning efforts in order to identify people and property that may be impacted.

In order to assess sea level rise risk, a GIS-based analysis was used to estimate exposure to future projections of sea level rise using data produced by the National Oceanic and Atmospheric Administration in combination with improved property records for each of the MEMA District 9 Counties. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within the inundation zone that would be created in the event of 1 foot, 3 feet, and 6 feet of sea level rise. A number of different sea level rise scenarios were available via NOAA (from 1 foot to 6 feet, at 1 foot intervals), however these scenarios were selected to demonstrate a range of potential sea level rise scenarios from low to moderate to high projections. These scenarios can be found in **Figure 6.13, Figure 6.14,** and **Figure 6.15.**

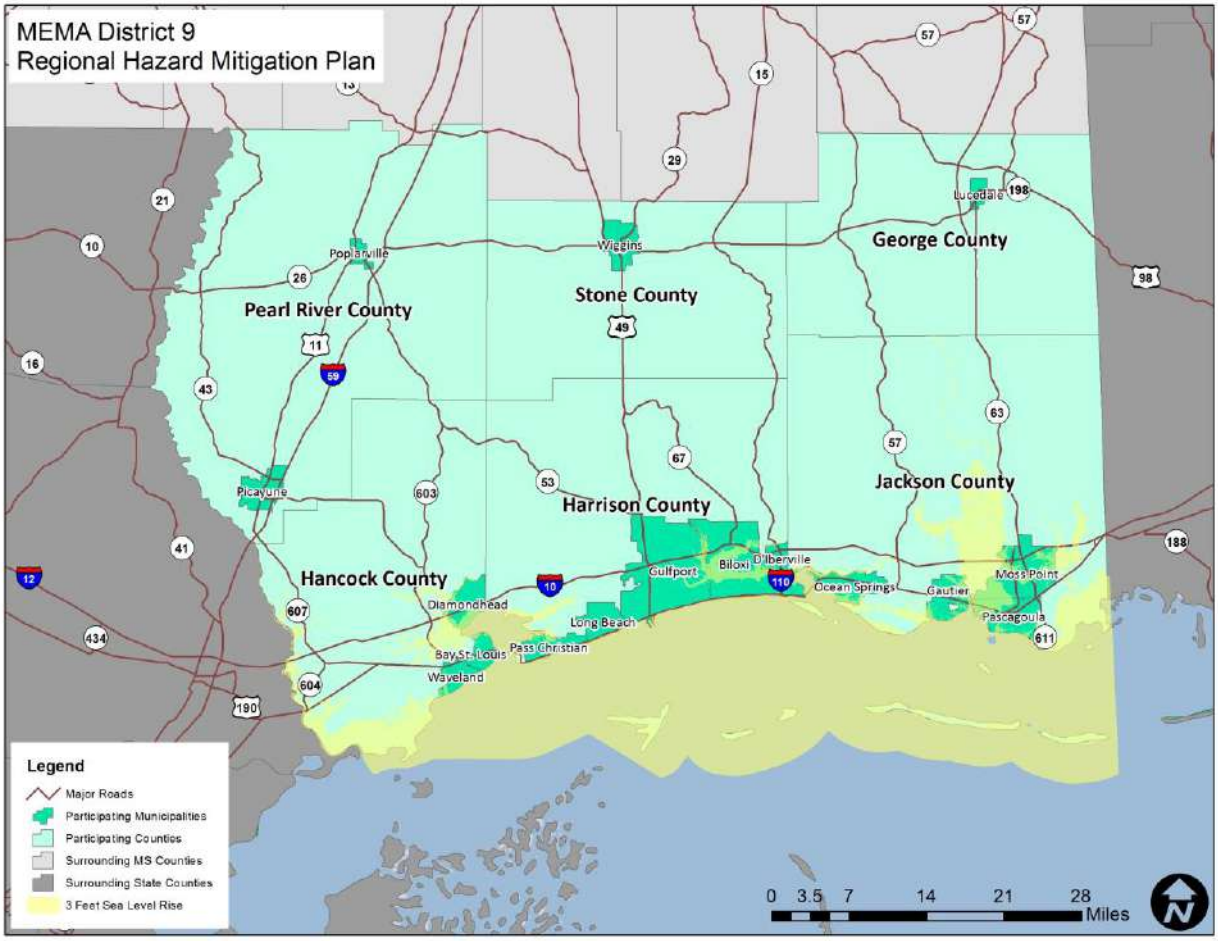
Table 6.15 presents the potential at-risk property. Both the number of parcels and the approximate value are presented.

FIGURE 6.13: 1 FOOT SEA LEVEL RISE SCENARIO IN THE MEMA DISTRICT 9 REGION



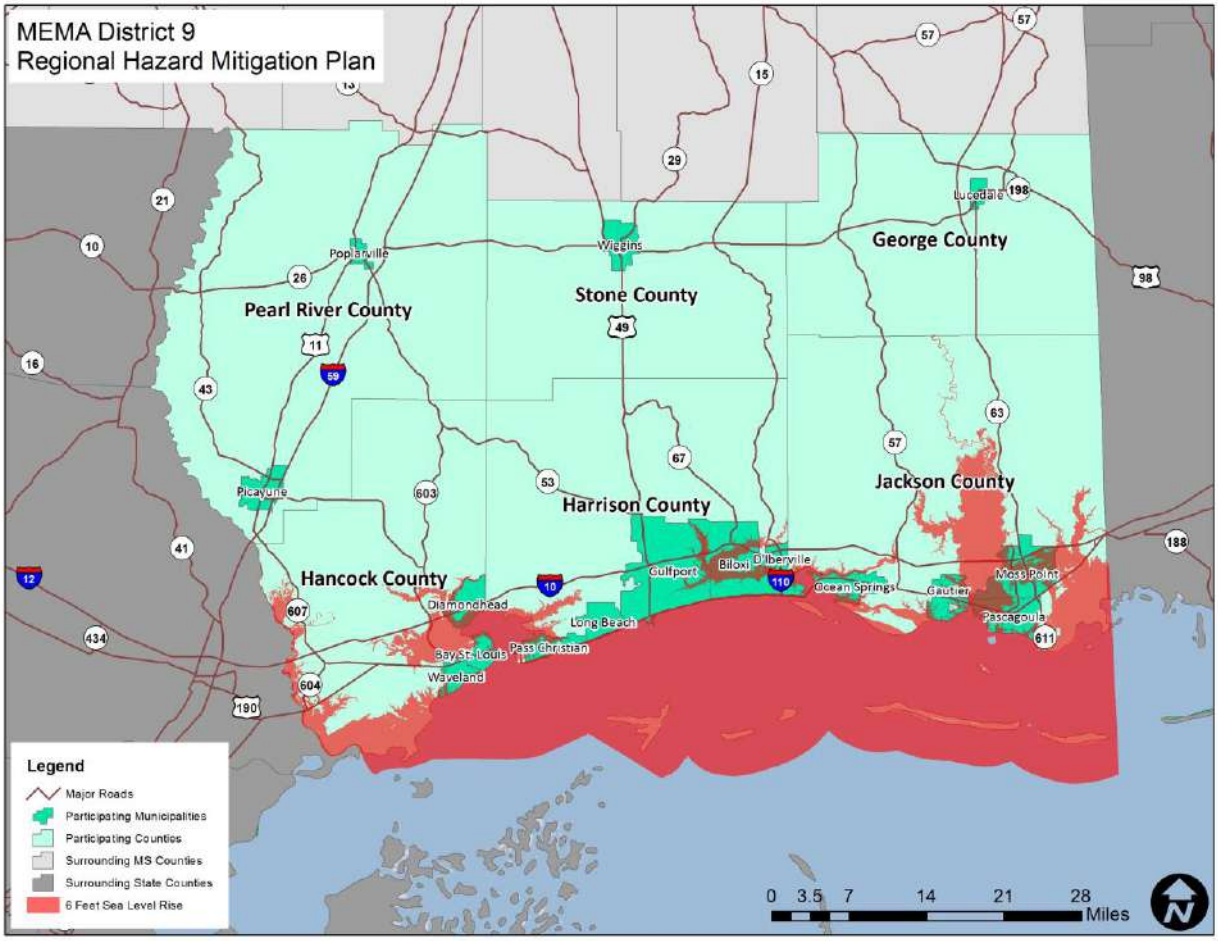
Source: NOAA

FIGURE 6.14: 3 FEET SEA LEVEL RISE SCENARIO IN THE MEMA DISTRICT 9 REGION



Source: NOAA

FIGURE 6.15: 6 FEET SEA LEVEL RISE SCENARIO IN THE MEMA DISTRICT 9 REGION



Source: NOAA

TABLE 6.15: ESTIMATED EXPOSURE OF PARCELS TO THE SEA LEVEL RISE HAZARD

Location	1.0 foot		3.0 feet		6.0 feet	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
George County*	**11**	**$2,708,000**	**11**	**$2,708,000**	**11**	**$2,708,000**
Lucedale	0	0	0	0	0	0
Unincorporated Area	11	$2,708,000	11	$2,708,000	11	$2,708,000
Hancock County	**248**	**$6,391,403**	**2,755**	**$43,175,392**	**5,357**	**$78,630,485**
Bay St. Louis	0	$0	7	$282,410	61	$1,200,443
Diamondhead	30	$2,087,223	52	$3,752,217	115	$8,691,488
Waveland	0	$0	0	$0	36	$264,371
Unincorporated Area	248	$6,391,403	2,748	$42,892,982	5,296	$77,430,042
Harrison County	**406**	**$628,588,092**	**740**	**$658,601,989**	**2,446**	**$838,354,843**
Biloxi	141	$152,875,152	217	$160,571,178	574	$253,581,853

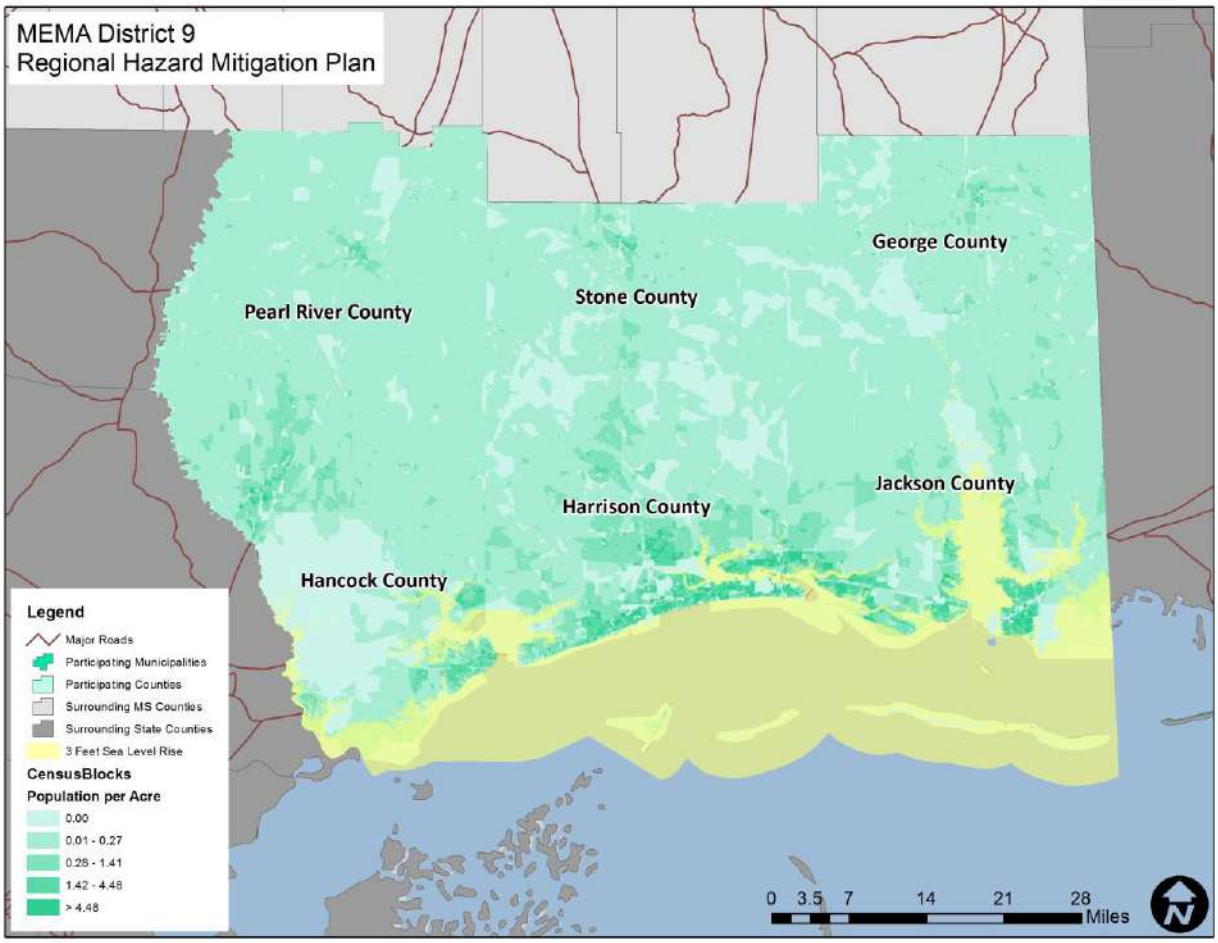
Location	1.0 foot		3.0 feet		6.0 feet	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
D'Iberville	3	$88,805	3	$88,805	37	$3,062,657
Gulfport	104	$13,795,779	202	$20,682,997	542	$52,554,190
Long Beach	0	$0	0	$0	0	$0
Pass Christian	36	$3,060,166	122	$11,788,951	701	$46,934,462
Unincorporated Area	265	$475,712,940	523	$498,030,811	1,872	$584,772,990
Jackson County	**919**	**$63,575,980**	**2,417**	**$174,291,150**	**7,501**	**$374,562,550**
Gautier	110	$8,651,090	371	$29,086,520	773	$49,712,830
Moss Point	71	$5,883,400	244	$17,686,870	1,550	$56,765,010
Ocean Springs	49	$12,727,870	118	$24,058,690	278	$47,884,160
Pascagoula	65	$6,319,600	245	$28,427,260	1,102	$73,423,870
Unincorporated Area	809	$54,924,890	2,046	$145,204,630	6,728	$324,849,720
Pearl River County*	**0**	**$0**	**0**	**$0**	**0**	**$0**
Picayune	0	$0	0	$0	0	$0
Poplarville	0	$0	0	$0	0	$0
Unincorporated Area	0	$0	0	$0	0	$0
Stone County	**0**	**$0**	**0**	**$0**	**0**	**$0**
Wiggins	0	$0	0	$0	0	$0
Unincorporated Area	0	$0	0	$0	0	$0
MEMA DISTRICT 9 REGION TOTAL	**1,584**	**$701,263,475**	**5,923**	**$878,776,531**	**$15,315**	**$1,294,255,878**

** As noted above, building footprints and parcel data were not available for George County and parcel value data was not available for Pearl River County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: NOAA, MDEQ, Hazus MH 3.2 Data

SOCIAL VULNERABILITY

Figure 6.16 is presented to gain a better understanding of at-risk population by evaluating census block level population data against the 3 feet sea level rise scenario. The three feet scenario was selected since this is a moderate level projection. Based on this analysis, a significant part of the coastal population in the region is vulnerable to sea level rise.

FIGURE 6.16: POPULATION DENSITY WITH 3 FEET SEA LEVEL RISE IN THE MEMA DISTRICT 9 REGION



Source: NOAA, United States Census 2010

CRITICAL FACILITIES

The critical facility analysis revealed that there are 23 facilities located in the 3 feet of sea level rise scenario inundation area. As mentioned above, this scenario was selected as it is a mid-range projection for sea level rise based on a number of studies. The 23 facilities include 3 private/non-profit, 4 public facilities, 1 special population, 10 transportation, and 5 water/wastewater. A list of specific critical facilities and their associated risk can be found in **Table 6.18** at the end of this section.

6.6 CONCLUSIONS ON HAZARD VULNERABILITY

The results of this vulnerability assessment are useful in at least three ways:

- Improving our understanding of the risk associated with the hazards in the MEMA District 9 Region through better understanding of the complexities and dynamics of risk, how levels of risk can be measured and compared, and the myriad of factors that influence risk. An understanding

of these relationships is critical in making balanced and informed decisions on managing the risk.

- Providing a baseline for policy development and comparison of mitigation alternatives. The data used for this analysis presents a current picture of risk in the MEMA District 9 Region. Updating this risk "snapshot" with future data will enable comparison of the changes in risk with time. Baselines of this type can support the objective analysis of policy and program options for risk reduction in the region.
- Comparing the risk among the hazards addressed. The ability to quantify the risk to all these hazards relative to one another helps in a balanced, multi-hazard approach to risk management at each level of governing authority. This ranking provides a systematic framework to compare and prioritize the very disparate hazards that are present in the MEMA District 9 Region. This final step in the risk assessment provides the necessary information for local officials to craft a mitigation strategy to focus resources on only those hazards that pose the most threat to the MEMA District 9 counties.

Exposure to hazards can be an indicator of vulnerability. Economic exposure can be identified through values for improvements (buildings), and social exposure can be identified by estimating the population exposed to each hazard. This information is especially important for decision-makers to use in planning for evacuation or other public safety related needs.

The types of assets included in these analyses include all building types in the participating jurisdictions. Specific information about the types of assets that are vulnerable to the identified hazards is included in each hazard subsection (for example all building types are considered at risk to the winter weather hazard).

Table 6.16 presents an overall summary of the community's vulnerability for each jurisdiction. This summary provides key problem statements and identifies the community's greatest vulnerabilities that will be addressed in the mitigation strategy.

TABLE 6.16: SUMMARY OF VULNERABILITY FOR THE MEMA DISTRICT 9 REGION

	Key Problem Statements
George County	George County and Lucedale have a large amount of timber, open, and agriculture land, creating an enhanced risk to wildfires across the county. The county is also more vulnerable to drought which can damage crop yields or reduce stock and crop production in the agricultural sector, resulting in economic loss.
Hancock County	Hancock County, Bay St. Louis, Diamondhead, and Waveland have many low-lying neighborhoods and streets that are especially vulnerable to coastal flooding and storm surge. Vulnerable and at-risk populations including low-income, minority, elderly, or disabled persons disproportionately live in flood prone areas. Additionally, many employers like casinos, resorts, and hotels are located in these vulnerable locations. Disruption or loss of these employers and facilities can result in significant unemployment, economic loss, and migration from the county and cities.

	Key Problem Statements
Harrison County	Harrison County, Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian have many low-lying neighborhoods and streets that are especially vulnerable to coastal flooding and storm surge. Vulnerable and at-risk populations including low-income, minority, elderly, or disabled persons disproportionately live in flood prone areas. Additionally, many employers like casinos, resorts, and hotels are located in these vulnerable locations. Disruption or loss of these employers and facilities can result in significant unemployment, economic loss, and migration from the county and cities.
Jackson County	Jackson County, Gautier, Moss Point, Ocean Springs, and Pascagoula have many low-lying neighborhoods and streets that are especially vulnerable to coastal flooding and storm surge. Vulnerable and at-risk populations including low-income, minority, elderly, or disabled persons disproportionately live in flood prone areas. Additionally, many employers like casinos, resorts, and hotels are located in these vulnerable locations. Disruption or loss of these employers and facilities can result in significant unemployment, economic loss, and migration from the county and cities.
Pearl River County	Pearl River, Picayune, and Poplarville have a large amount of timber, open, and agriculture land, creating an enhanced risk to wildfires across the county. The county is also more vulnerable to drought which can damage crop yields or reduce stock and crop production in the agricultural sector, resulting in economic loss.
Stone County	Stone County and Wiggins have a large amount of timber, open, and agriculture land, creating an enhanced risk to wildfires across the county. The county is also more vulnerable to drought which can damage crop yields or reduce stock and crop production in the agricultural sector, resulting in economic loss.

Table 6.17 presents a summary of annualized loss for each hazard in the MEMA District 9 Region. Due to the reporting of hazard damages primarily at the county level, it was difficult to determine an accurate annualized loss estimate for each municipality. Therefore, an annualized loss was determined through the damage reported from historical occurrences at the county level. These values should be used as an additional planning tool or measure of risk for determining hazard mitigation strategies throughout the region.

It should also be noted that many of these estimates are based on incomplete data and likely underestimate the historic dollar damage sustained in each county. Especially for hazards such as extreme cold, extreme heat, hail, lightning, and winter weather, it is very likely that more damage occurred historically than has been identified.

TABLE 6.17: ANNUALIZED LOSS FOR THE MEMA DISTRICT 9 REGION

Hazard	George County	Hancock County	Harrison County	Jackson County	Pearl River County	Stone County
Flood-related Hazards						
Dam and Levee Failure	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*
Erosion	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*
Flood	$3,048	$63,260	$286,743	$234,715	$191,132	$8,226
Storm Surge	$0	$231,917,975	$534,440,188	$213,721,103	$0	$0
Fire-related Hazards						
Drought	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*
Lightning	$10,075	$24,550	$22,238	$17,009	$7,388	$6,483
Wildfire	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*
Geologic Hazards						
Earthquake†	$2,000	$4,000	$21,000	$12,000	$5,000	$2,000
Wind-related Hazards						
Extreme Cold	$0	$0	$0	$7,675	$0	$0
Extreme Heat/Heat Wave	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*
Hailstorm	$36	$0	$0	$17	$0	$0
Hurricane and Tropical Storm	$2,476,877	$97,894,098	$208,420,678	$101,235,648	$76,274,291	$19,180,679
Severe Thunderstorm/ High Wind	$33,394	$11,182	$38,753	$20,249	$373,483	$35,155
Tornado	$100,488	$1,232,052	$4,472,901	$150,650	$173,388	$33,495
Winter Weather	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*
Other Hazards						
Climate Change/Sea Level Rise	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*
Hazardous Materials Incident/Train Derailment	$3,866	$8,313	$11,489	$25,777	$7,961	$2,997
Infectious Disease	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*	*Not Available*

†Historic dollar damage was not available for this hazard, but since estimated annualized losses from Hazus were available, those numbers were used in this table.
*In this table, the term "Not Available" is used to indicate that no records of dollar losses for the particular hazard were recorded. This could be the case either because there were no events that caused dollar damage or because documentation of that particular type of event is not well kept.

As noted previously, all existing and future buildings and populations (including critical facilities) are vulnerable to impacts from atmospheric hazards such as drought and hailstorm. Some buildings may be more vulnerable to some of these hazards based on locations, construction, and building type. In

addition, all populations are vulnerable to hazards like infectious disease which could presumably impact any segment of the population without regard to geographic location. **Table 6.18** shows the critical facilities vulnerable to additional hazards analyzed in this section. The table lists those assets that are determined to be exposed to each of the identified hazards (marked with an "**X**").

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TABLE 6.18: AT-RISK CRITICAL FACILITIES

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
GEORGE COUNTY																										
AT&T		Comm		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
C-Spire Communications Tower		Comm		X				X	X		X	X	X	X	X	X	X	X					X		X	X
Emergency Operations Center		EOC		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Agricola VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
Barton VFD		Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Basin VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Benndale VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Bexley VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Broome VFD		Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Central VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Howell VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Movella VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
Rocky Creek VFD		Fire Station		X				X	X		X	X	X	X	X	X	X	X					X			X
Salem VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Shipman VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Twin Creek VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Ward VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
Davita Dialysis Health Center		Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
George Regional Hospital		Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Mississippi Power Company		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Singing River Electric Power Company		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
WRBE Radio Station		Private/Non-Profit		X				X	X	X	X	X	X	X	X	X	X	X							X	X
George County Administrative Building		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
George County Regional Correctional Facility		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
George County Senior Citizens Building		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X		X	X
Lucedale-George County Public Library		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Mississippi Forestry Commission		Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Mississippi National Guard Armory		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
United States Postal Service		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Agricola Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
Benndale Elementary School		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Cental Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
George County High School		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
George County Middle School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
L C Hatcher Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
L T Taylor Intermediate		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
MS Gulf Coast Community College		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Rocky Creek Elementary School		School		X				X	X		X	X	X	X	X	X	X	X					X			X
Amelias Garden Personal Care		Special Populations		X				X	X		X	X	X	X	X	X	X	X							X	X
Evas Place Personal Care		Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Glen Oaks Nursing Home		Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Smith Manor Personal Care		Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Sparrow Hills Personal Care		Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Bexley Utilities		Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X					X		X	X
Combined Utilities		Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Multi Mart Water Association		Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X		X	X
Rocky Creek Utilities		Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Lucedale Fire Department	Lucedale	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Lucedale Police Department	Lucedale	Police Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
City Hall	Lucedale	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Lucedale Sewer & Water Department	Lucedale	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
HANCOCK COUNTY																										
Bell South Switching Station		Comm		X				X	X		X	X	X	X	X	X	X	X								X
Cell phone Towers		Comm		X				X	X		X	X	X	X	X	X	X	X								X
Hancock County EMA		EOC		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Clermont Harbor VFD		Fire Station		X			X	X	X	X	X	X	X	X	X	X	X	X						X	X	X
Fenton VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
West Hancock VFD		Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
Diamondhead Dialysis Center		Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Hancock Medical Center		Medical		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Hancock Medical Center Clinics and Offices		Medical		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Hancock County Dispatch Office		Police Station		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
Hancock County Sheriff's Office		Police Station		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
Coast Electric Power Association office and distribution lines		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Mississippi Power Company, office and distribution lines		Power/Gas		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
La Frances Fish Camp		Private/Non-Profit		X			X	X	X		X	X	X	X	X	X	X	X						X	X	X
WQRZ Radio Station		Private/Non-Profit		X	X			X	X	X	X	X	X	X	X	X	X	X	X			X	X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Buccaneer State Park		Public Facility		X	X			X	X		X	X	X	X	X	X	X	X						X	X	X
Hancock County Courthouse		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
Hancock County Health Department		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Hancock County Jail		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
Hancock County Senior Center		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Kiln Public Library		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Pearlington Public Library		Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
Sand Beach		Public Facility		X				X	X		X	X	X	X	X	X	X	X								X
Scenic Trails		Public Facility		X				X	X		X	X	X	X	X	X	X	X								X
Seawall		Public Facility		X				X	X		X	X	X	X	X	X	X	X								X
Bay Catholic Elementary School		School		X				X	X		X	X	X	X	X	X	X	X								X
Bay High School		School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Bay Waveland Child Development Center		School		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Central Christian Academy		School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
East Hancock Elementary School		School		X				X	X		X	X	X	X	X	X	X	X								X

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Hancock County Child Development Center		School		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
Hancock County High School		School		X		X		X	X		X	X	X	X	X	X	X	X					X			X
Hancock County Middle School		School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Hancock County North Central Elementary School		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
North Bay Elementary School		School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Our Lady of the Gulf High School		School		X		X		X	X		X	X	X	X	X	X	X	X					X	X	X	X
South Hancock Elementary School		School		X	X			X	X	X	X	X	X	X	X	X	X	X								X
St. Stanislaus College and Dorms		School		X		X		X	X		X	X	X	X	X	X	X	X					X	X	X	X
Waveland Elementary School		School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
West Hancock Elementary School		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Hancock County Evacuation Shelters		Shelter		X				X	X		X	X	X	X	X	X	X	X								X
Aloha RV Park		Special Populations		X				X	X		X	X	X	X	X	X	X	X								X

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Dunbar Village Terrace and Courtyard		Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
Hancock RV Park		Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Hollywood Casino and RV Park		Special Populations		X	X			X	X		X	X	X	X	X	X	X	X								X
Silver Slipper RV Park		Special Populations		X			X	X	X		X	X	X	X	X	X	X	X	X						X	X
Sunrise RV Park		Special Populations		X	X			X	X		X	X	X	X	X	X	X	X				X	X			X
Woodland Village Nursing Center		Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Bridges on all highways and major roads		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
CSX Railroad and Bridge		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Diamondhead Airport		Transportation		X	X			X	X		X	X	X	X	X	X	X	X					X			X
Interstate Highway 10		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Kiln-Delisle Road		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Port Bienville lead line		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Road Department North County Barn		Transportation		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X

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Road Department South County Barn		Transportation		X	X			X	X	X	X	X	X	X	X	X	X	X								X
State Highways 603,603 and 43		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Stennis International Airport		Transportation		X	X			X	X		X	X	X	X	X	X	X	X								X
U. S. Highway 90		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Diamondhead Regional Wastewater Treatment Plant		Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Hancock County Utility Authority Offices		Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X				X	X			X
Northern Regional Wastewater Treatment Plant		Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Sewer Lift Stations		Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Southern Regional Wastewater Treatment Plant		Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Water Wells		Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X

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Western Regional Wastewater Treatment Plant		Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Bell South	Bay St Louis	Comm		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Cell phone Towers	Bay St Louis	Comm		X		X		X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Bay St. Louis Fire Department #1	Bay St Louis	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Bay St. Louis Fire Department #2	Bay St Louis	Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
Bay St. Louis Police Department	Bay St Louis	Police Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Natural Gas Regulator	Bay St Louis	Power/Gas		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Bay St. Louis-Hancock County Library	Bay St Louis	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Bay St. Louis City Hall	Bay St Louis	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Bay St. Louis Public Works Yard	Bay St Louis	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Bay-Waveland Middle School	Bay St Louis	School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Second Street Elementary	Bay St Louis	School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
St. Rose De Lima School	Bay St Louis	School		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X

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Notre Dame De La Mer Senior Housing	Bay St Louis	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
CSX Railroad Bay Bridge	Bay St Louis	Transportation		X				X	X		X	X	X	X	X	X	X	X	X				X		X	X
Water Well- 10th	Bay St Louis	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
Water Well- Esterbrook	Bay St Louis	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Water Well- Harry	Bay St Louis	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Water Well- St Charles	Bay St Louis	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Diamondhead Fire Station	Diamondhead	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Diamondhead Proposed Police Station	Diamondhead	Police Station		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Diamondhead City Offices	Diamondhead	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Diamondhead POA	Diamondhead	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X			X
East Hancock County Library	Diamondhead	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Waveland Central Fire Station	Waveland	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Waveland Fire Station #1	Waveland	Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X

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Waveland Police Department- New	Waveland	Police Station		X		X		X	X	X	X	X	X	X	X	X	X	X					X		X	X
Waveland Police Department- Temporary	Waveland	Police Station		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Hope Haven	Waveland	Private/Non-Profit		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Waveland City Hall	Waveland	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Waveland City Hall Annex	Waveland	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Waveland Civic Center	Waveland	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Waveland Public Library	Waveland	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Waveland Public Library	Waveland	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Waveland Public Works Yard	Waveland	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X					X		X	X
Davis Ave Water Well	Waveland	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Faith Street Water Well	Waveland	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Gulfside Street Water Well	Waveland	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X					X		X	X
Tide Street Water Well	Waveland	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X							X	X

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Waveland Wastewater Treatment Plant	Waveland	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X					X		X	X
HARRISON COUNTY																										
Harrison County EOC		EOC		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Cuevas VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Henderson Point VFD		Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Lizana VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Saucier VFD		Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
West Harrison VFD		Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Arizona Chemicals		Power/Gas		X			X	X	X		X	X	X	X	X	X	X	X								X
Canal Road- Electric Substation		Power/Gas		X				X	X		X	X	X	X	X	X	X	X				X	X			X
CE Lizana- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Cedar Lake CE- Electric Substation		Power/Gas		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
CenterPoint Entex- Gulfport		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
CenterPoint Entex- Long Beach		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
CenterPoint Entex- Pass Christian		Power/Gas		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X

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Dedeaux- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Diamond Head- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X								X
Dupont- Electric Substation		Power/Gas		X	X			X	X		X	X	X	X	X	X	X	X				X	X			X
East Biloxi- Electric Substation		Power/Gas		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Fernwood- Electric Substation		Power/Gas		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Gay Road- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Gulf South Pipeline Company LP		Power/Gas		X	X			X	X	X	X	X	X	X	X	X	X	X							X	X
Gulfport 29th Ave- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Highway 53- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Jack Watson- Electric Substation		Power/Gas		X		X		X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Keesler- Electric Substation		Power/Gas		X				X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Lamey- Electric Substation		Power/Gas		X		X		X	X	X	X	X	X	X	X	X	X	X					X			X
Landon- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Long Beach- Electric Substation		Power/Gas		X	X			X	X	X	X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
MG Ind.- Electric Substation		Power/Gas		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Mississipppi Power Company Power Plant		Power/Gas		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Munro Petroleum and Terminal Corp.		Power/Gas		X			X	X	X		X	X	X	X	X	X	X	X				X	X			X
O'Neal Road- Electric Substation		Power/Gas		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Olsen- Electric Substation		Power/Gas		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Pass Christian- Electric Substation		Power/Gas		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Percy Street- Electric Substation		Power/Gas		X	X			X	X		X	X	X	X	X	X	X	X			X	X	X		X	X
Rodensberg- Electric Substation		Power/Gas		X				X	X		X	X	X	X	X	X	X	X					X		X	X
Saucier- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X								X
Saucier CEPA- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X								X
Steely Drive- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Sunkist- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X								X
Tap- Electric Substation		Power/Gas		X	X			X	X		X	X	X	X	X	X	X	X					X			X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Tap- Electric Substation		Power/Gas		X		X		X	X		X	X	X	X	X	X	X	X								X
Tap- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Tap- Electric Substation		Power/Gas		X				X	X		X	X	X	X	X	X	X	X					X			X
Tap- Electric Substation		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Texas Ave.- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Transmission Line- CE Lizana to Tap		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line- Dedeaux to Jack Watson		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line- Diamond Head to Kiln		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line- East Biloxi to Percy Street		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line- Fernwood to Jack Watson		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line- Fernwood to Texas Ave.		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Transmission Line-Gay Road to Cedar Lake CE		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Gay Road to Cedar Lake CE		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Gulfport 29th Ave to Long Beach		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Highway 53 to Landon		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Jack Watson to Gay Road		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Jack Watson to Hickory Hills		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Jack Watson to Hurricane Creek		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Jack Watson to Kiln		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Jack Watson to Wade		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Transmission Line-Jack Watson to Woolmarket		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Keesler to Rodensberg		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Kiln to Dupont		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Lamey to Gay Road		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Landon to Dedeaux		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Landon to Diamond Head		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Landon to Jack Watson		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Landon to Long Beach		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Landon to O'Neal Road		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Landon to Tap		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Long Beach to Olsen		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Transmission Line-O'Neal Road to Jack Watson		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Olsen to Pass Christian		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Pass Christian to Dupont		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Percy Street to Keesler		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Plant - Jack Watson to Sub - Jack Watson		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Rodensberg to Steely Drive		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Rodensberg to Sunkist		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Saucier CEPA to Highway 53		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Saucier to Saucier CEPA		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Transmission Line-St. Martin to Cedar Lake CE		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Steely Drive to Fernwood		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Sunkist to Cedar Lake CE		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Tap to Canal Road		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Tap to MG Ind.		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Tap to O'Neal Road		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Tap to Watts		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Texas Ave. to Gulfport 29th Ave		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Victor J Daniel Jr to McKnight		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Wiggins to Saucier		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Woolmarket to Lamey		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Watts- Electric Substation		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Woolmarket-Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X		X	X	X	X			X
Harrison County Courthouse		Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
DIberville Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Diberville Senior High School		School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
East Harrison High School		School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Harrison Central 9th Grade School		School		X				X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Harrison Central Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Harrison Central High School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Harrison County Alternative School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Harrison County Child Development Center		School		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Harrison County Vocational Complex		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Lizana Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X								X

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Lyman Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
North Gulfport Seventh and Eighth School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
North Woolmarket Elementary School		School		X				X	X		X	X	X	X	X	X	X	X		X	X	X	X			X
Orange Grove Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Pineville Elementary School		School		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Three Rivers Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X								X
West Harrison High School		School		X				X	X		X	X	X	X	X	X	X	X								X
West Wortham Elementary and Middle School		School		X				X	X	X	X	X	X	X	X	X	X	X								X
Woolmarket Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X								X
Gulfport-Biloxi Regional Airport		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Biloxi Communications Center	Biloxi	Comm		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Communications Tower	Biloxi	Comm		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X

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WLOX TV-13	Biloxi	Comm		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Biloxi Emergency Operations	Biloxi	EOC		X				X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Back Bay-Fire Station #3	Biloxi	Fire Station		X	X			X	X		X	X	X	X	X	X	X	X				X	X		X	X
Bay Vista-Fire Station #5	Biloxi	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Cedar Lake/Popps Ferry-Fire Station #7	Biloxi	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Central-Fire Station #1	Biloxi	Fire Station		X				X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
East End-Fire Station #2	Biloxi	Fire Station		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Oaklawn Rd-Fire Station #9	Biloxi	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Popps Ferry-Fire Station #6	Biloxi	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Veterans-Fire Station #4	Biloxi	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Woolmarket- Fire Station #8	Biloxi	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X			X		X			X
Cedar Lake Medical Center	Biloxi	Medical		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Gulf Coast Medical Center	Biloxi	Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Gulf Oak Hospital	Biloxi	Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

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Keesler Medical Center	Biloxi	Medical		X		X		X	X		X	X	X	X	X	X	X	X		X	X		X		X	X
Merit Hospital	Biloxi	Medical		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Veterans Administration Hospital	Biloxi	Medical		X				X	X		X	X	X	X	X	X	X	X								X
Harrison County Sheriff	Biloxi	Police Station		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Mississippi Marine Patrol Dispatch	Biloxi	Police Station		X		X		X	X		X	X	X	X	X	X	X	X			X		X		X	X
Police Station-Lopez/Quave	Biloxi	Police Station		X				X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Natural Gas Pipeline	Biloxi	Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Beau Rivage	Biloxi	Private/Non-Profit		X			X	X	X		X	X	X	X	X	X	X	X				X	X		X	X
Beauvoir Jeff Davis Home & Library	Biloxi	Private/Non-Profit		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Bond House	Biloxi	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Boomtown Casino	Biloxi	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X	X				X			X
Cadet Point	Biloxi	Private/Non-Profit		X			X	X	X		X	X	X	X	X	X	X	X				X	X			X
Creole Cottage	Biloxi	Private/Non-Profit		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Edgewater Mall	Biloxi	Private/Non-Profit		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Golden Nugget Casino	Biloxi	Private/Non-Profit		X			X	X	X		X	X	X	X	X	X	X	X				X	X			X
Gray-Slay House	Biloxi	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X								X
Hard Rock Casino	Biloxi	Private/Non-Profit		X			X	X	X		X	X	X	X	X	X	X	X				X	X		X	X
Harrah's Gulf Coast Casino	Biloxi	Private/Non-Profit		X			X	X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Home Depot	Biloxi	Private/Non-Profit		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Imperial Palace Resort & Casino	Biloxi	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X				X	X			X
Magnolia Hotel	Biloxi	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Margaritaville Casino	Biloxi	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X								X
Margaritaville Resort	Biloxi	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X	X			X	X		X	X
Old Brick House	Biloxi	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X					X			X
Palace Casino	Biloxi	Private/Non-Profit		X			X	X	X		X	X	X	X	X	X	X	X				X	X		X	X
Saenger Theatre	Biloxi	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Treasure Bay Casino	Biloxi	Private/Non-Profit		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Walmart – Neighborhood- 2050 Pass Road	Biloxi	Private/Non-Profit		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Walmart – Neighborhood- 1820-A Popps Ferry Road	Biloxi	Private/Non-Profit		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Walmart Supercenter	Biloxi	Private/Non-Profit		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
West End Hose Co #3	Biloxi	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Biloxi Port Commission & Small Craft Harbour	Biloxi	Public Facility		X			X	X	X		X	X	X	X	X	X	X	X	X			X	X		X	X
Biloxi Visitors Center	Biloxi	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
City Hall	Biloxi	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Coast Transit Authority	Biloxi	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Community Development	Biloxi	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Donal Snyder Community Center	Biloxi	Public Facility		X				X	X		X	X	X	X	X	X	X	X					X		X	X
Dr Eldon Bolton State Office Bldg	Biloxi	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X			X		X		X	X
Dr. Frank Gruich, Sr. Community Center	Biloxi	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
East Biloxi Library and Civic Center	Biloxi	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Juvenile Detention Center	Biloxi	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Margaret Sherry Library	Biloxi	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X								X
MGM Park	Biloxi	Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Mississippi Coast Coliseum & Convention Center	Biloxi	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Public Safety Garage	Biloxi	Public Facility		X				X	X		X	X	X	X	X	X	X	X								X
Public Works	Biloxi	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Swetman House	Biloxi	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
West Biloxi Public Library	Biloxi	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Woolmarket Civic Center	Biloxi	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X		X	X	X	X			X
Beauvoir Elementary	Biloxi	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Biloxi High School	Biloxi	School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Biloxi Jr High School	Biloxi	School		X				X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Gorenflo Elementary School	Biloxi	School		X	X			X	X		X	X	X	X	X	X	X	X				X	X		X	X
Jeff Davis Elementary	Biloxi	School		X				X	X		X	X	X	X	X	X	X	X					X		X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Michel 7th Grade School	Biloxi	School		X				X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
North Bay Elementary	Biloxi	School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Popps Ferry Elementary	Biloxi	School		X				X	X		X	X	X	X	X	X	X	X					X		X	X
Woolmarket Elementary	Biloxi	School		X				X	X	X	X	X	X	X	X	X	X	X								X
Bay Cove Assisted Living Center	Biloxi	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Biloxi Industries	Biloxi	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Biloxi Veterans Administration & Hospital& Retirement Home	Biloxi	Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Cadet Point Senior Village	Biloxi	Special Populations		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Cottage Memory Care @ Bay Cove	Biloxi	Special Populations		X	X			X	X		X	X	X	X	X	X	X	X								X
Emeritus at Biloxi	Biloxi	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Gabriel Manor Retirement Community	Biloxi	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Gulf Shore Villas	Biloxi	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Pillars of Biloxi	Biloxi	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X								X
Precious Care Home	Biloxi	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X								X
Santa Maria Senior Community Center	Biloxi	Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Seashore Development Group	Biloxi	Special Populations		X		X		X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
South Mississippi Regional Center	Biloxi	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
CSX Railroad	Biloxi	Transportation		X			X	X	X		X	X	X	X	X	X	X	X	X				X		X	X
Keesler Air Force Base	Biloxi	Transportation		X		X		X	X		X	X	X	X	X	X	X	X			X				X	X
67 & Oaklawn Well	Biloxi	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X			X
Bradford St Well	Biloxi	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Cedar Lake Well	Biloxi	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Debuys Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Father Ryan Well	Biloxi	Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Greater Ave Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

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Harrison County Wastewater And Solid Waste	Biloxi	Water/ Wastewater		X		X		X	X		X	X	X	X	X	X	X	X	X		X					X
Harrison County Wastewater And Solid Waste	Biloxi	Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X				X	X			X
Hospital Well	Biloxi	Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X			X		X			X
Iberville Well	Biloxi	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Kuhn St Well	Biloxi	Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Lakeview Well	Biloxi	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X							X	X
Lift Stations throughout City	Biloxi	Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Maple St Well	Biloxi	Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
New Bay Vista Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
North Biloxi #1 Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X								X
North Rivervue Well	Biloxi	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Oaklawn Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Old Bay Vista Well	Biloxi	Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X							X	X

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Park Dr Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Pine St Well	Biloxi	Water/ Wastewater		X			X	X	X		X	X	X	X	X	X	X	X				X	X		X	X
Porter Ave Well	Biloxi	Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Rustwood Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X								X
South Hill Well	Biloxi	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Sports Complex Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X								X
Tullis Manor Well	Biloxi	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Vee St Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X								X
West Biloxi Wastewater Treatment Plant	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X							X	X
AT&T Communication Center	DIberville	Comm		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
D'Iberville Fire Department	DIberville	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Ocean Springs Hospital	DIberville	Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
South Mississippi Kidney Center	DIberville	Medical		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X

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D'Iberville Police Department	DIberville	Police Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Blossman Propane Gas	DIberville	Power/Gas		X				X	X		X	X	X	X	X	X	X	X				X	X			X
D'Iberville Electric Substation- 10224 Rodriguez Street	DIberville	Power/Gas		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
D'Iberville Electric Substation- 11281 Clinton Lane	DIberville	Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Central Avenue Overlook	DIberville	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X	X			X	X			X
D'Iberville City Hall	DIberville	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
D'Iberville Civic Center	DIberville	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
D'Iberville Public Works Center	DIberville	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
D'Iberville Senior Citizen Center	DIberville	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Fountain Beach Complex	DIberville	Public Facility		X			X	X	X		X	X	X	X	X	X	X	X					X			X
Harrison Co. District 1 Work Center	DIberville	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
Harrison County Public Library	DIberville	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
Marina Complex	DIberville	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X				X	X			X

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MS Driver's License Facility	DIberville	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
Parks and Recreation Bulding/ D'Iberville Recreation Center	DIberville	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Rudy Moran Park	DIberville	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Town Green	DIberville	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X				X	X			X
US Post Office	DIberville	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
D'Iberville Elementary School	DIberville	School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
D'Iberville High School	DIberville	School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
D'Iberville Middle School	DIberville	School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Sacred Heart School	DIberville	School		X	X			X	X	X	X	X	X	X	X	X	X	X					X			X
Boys & Girls Club: IP Center at North Bay	DIberville	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Gilbert R. Mason Sr. Head Start Center	DIberville	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Automall Parkway	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Bayshore Drive Bridge	DIberville	Transportation		X			X	X	X		X	X	X	X	X	X	X	X	X			X	X			X
Central Avenue	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Corso's Bridge	DIberville	Transportation		X	X			X	X		X	X	X	X	X	X	X	X	X			X	X			X
Cypress Creek Bridge	DIberville	Transportation		X	X			X	X	X	X	X	X	X	X	X	X	X	X				X			X
D'Iberville Boulevard	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
HWY 67 Bridge	DIberville	Transportation		X	X			X	X	X	X	X	X	X	X	X	X	X	X			X	X			X
I-110 Bridge/ Drawbridge	DIberville	Transportation		X			X	X	X		X	X	X	X	X	X	X	X	X			X	X			X
Interstate 10	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Interstate 110	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Lamey Bridge	DIberville	Transportation		X	X			X	X		X	X	X	X	X	X	X	X	X				X			X
Lamey Bridge Road	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Lemoyne Boulevard	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
MS Highway 15	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
MS Highway 67	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Old Highway 67	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Popps Ferry Road	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Promenade Parkway	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Rodriguez Street	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Sangani Boulevard	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
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D'Iberville Wastewater Plant	DIberville	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
D'Iberville Water Tower- 10085 1st Avenue W	DIberville	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
D'Iberville Water Tower- 11288 Lamey Bridge Road	DIberville	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
HC/D'Iberville POTW	DIberville	Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X					X			X
Central Fire Station	Gulfport	Fire Station		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Fire Station 10	Gulfport	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X			X
Fire Station 11	Gulfport	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Fire Station 12	Gulfport	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Fire Station 2	Gulfport	Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Fire Station 3	Gulfport	Fire Station		X		X		X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Fire Station 4	Gulfport	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Fire Station 5	Gulfport	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Fire Station 6	Gulfport	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Fire Station 7	Gulfport	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Fire Station 8	Gulfport	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Fire Station 9	Gulfport	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
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Dialysis Centers	Gulfport	Medical		X				X	X		X	X	X	X	X	X	X	X								X
Garden Park Community Hospital	Gulfport	Medical		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Medical Supply Stores	Gulfport	Medical		X				X	X		X	X	X	X	X	X	X	X								X
Memorial Hospital at Gulfport	Gulfport	Medical		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Harrison County Sheriff's Info	Gulfport	Police Station		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Harrison County Sheriff's Office	Gulfport	Police Station		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
North Gulfport Police Complex	Gulfport	Police Station		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Orange Grove Police Sub	Gulfport	Police Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Police Complex Fleet Maintenance Center	Gulfport	Police Station		X				X	X	X	X	X	X	X	X	X	X	X			X					X
Police Complex Motorcycle Storage/General	Gulfport	Police Station		X				X	X	X	X	X	X	X	X	X	X	X			X					X
Police Complex Technical Service Center	Gulfport	Police Station		X				X	X	X	X	X	X	X	X	X	X	X			X					X
Police Department Old Electronic Shop	Gulfport	Police Station		X				X	X	X	X	X	X	X	X	X	X	X			X					X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Police Department Pistol Range	Gulfport	Police Station		X				X	X	X	X	X	X	X	X	X	X	X			X					X
Police Training Building	Gulfport	Police Station		X				X	X	X	X	X	X	X	X	X	X	X			X					X
Robert J. Curry Public Safety Center	Gulfport	Police Station		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Fuel Centers	Gulfport	Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Building Supply Centers	Gulfport	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X								X
Grocery Stores	Gulfport	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X								X
Humane Society	Gulfport	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Media Outlets	Gulfport	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X								X
Pharmacies	Gulfport	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X								X
19th St Recreation Center	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X					X	X	X	X
Armory Building	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X					X	X	X	X
Building Maintenance Parks Facility	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X					X	X	X	X
Carnegie Library	Gulfport	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Cemetery Admin Office	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X

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Charles L Walker Senior Center	Gulfport	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
City Hall	Gulfport	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Feed My Sheep	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Gaston Hewes Rec Center	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Gaston Point Community Center	Gulfport	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Goldin Park - Maintenance Facility	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X								X
Grasslawn Museum Support Building	Gulfport	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Handsboro Community Center	Gulfport	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Harbor Services Facility	Gulfport	Public Facility		X			X	X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Herbert Wilson Rec Center	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Horticulture Building	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Joseph T Jones Building	Gulfport	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Katie Patterson Booth Rec Center	Gulfport	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Leisure Service Admin Building	Gulfport	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X					X	X	X	X

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Lyman Community Center	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
National Guard Complex	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X								X
Naval Battalion Construction Center Gulfport	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Orange Grove Community Center	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Public Works Building	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X								X
Public Works Building 2	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X								X
Public Works Warehouse	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X								X
Records Storage Facility	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X								X
Social Security Office	Gulfport	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Sportsplex Maintenance Shop 1 (West)	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Sportsplex Maintenance Shop 2 (East)	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X			X
U.S. Coast Guard	Gulfport	Public Facility		X			X	X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
U.S. Customs	Gulfport	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X			X					X

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U.S. Postal Service	Gulfport	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Westside Community Center	Gulfport	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
William H Hardy Building	Gulfport	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Anniston Avenue Elementary	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Bayou View Elementary	Gulfport	School		X		X		X	X		X	X	X	X	X	X	X	X								X
Bayou View Middle School	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X								X
Bel Aire Elementary School	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X			X	X	X		X	X
Blue Cliff College	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X			X	X	X		X	X
Central Elementary	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X			X		X		X	X
Christian Collegiate Academy	Gulfport	School		X	X			X	X	X	X	X	X	X	X	X	X	X					X			X
Gaston Point Elementary	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X					X		X	X
Gulfport Central Middle School	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X					X	X	X	X
Gulfport High School	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Gulfport Schools	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X			X	X	X		X	X
Gulfport Special Education	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X			X	X	X		X	X

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Harrison County Magnet School	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X								X
Harrison County School Support	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X								X
Harrison County Special Ed	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Learning Center	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
MGCCC	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
MGCCC Jefferson Davis Campus	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Northwood Christian Academy	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X								X
Pass Road Elementary School	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X							X	X
St James School	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
St John Catholic Schools	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Temple Christian Academy	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X			X		X			X
Turkey Creek School	Gulfport	School		X	X			X	X	X	X	X	X	X	X	X	X	X		X			X		X	X
Twenty-Eighth Street Elementary	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X							X	X
USM Gulf Coast Campus	Gulfport	School		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
West Elementary School	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X					X	X	X	X

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Westminster Academy School	Gulfport	School		X		X		X	X		X	X	X	X	X	X	X	X								X
Central Elementary School- Red Cross Shelter	Gulfport	Shelter		X				X	X	X	X	X	X	X	X	X	X	X			X		X		X	X
Central Middle School- Secondary Shelter	Gulfport	Shelter		X				X	X		X	X	X	X	X	X	X	X					X	X	X	X
Orange Grove Community Center- FEMA Shelter	Gulfport	Shelter		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Advanced Psychotherapy Association	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X					X	X	X	X
All My Children	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Alpha Personal Care	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Aunt Donna's Day Care	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Aunt Donna's Daycare & Learning	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X		X	X	X	X		X	X
Boyington Pro Care	Gulfport	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Carey Jane	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Center-Prevention-Child Abuse	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Childhood Wonders	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X			X		X		X	X
Christian Collegiate Academy	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Crises Stabilization Unit	Gulfport	Special Populations		X		X		X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Dickson Rishel Dorothy	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Divine Preschool Academy	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X			X		X		X	X
Driftwood Nursing Home	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Good Shepard Christian Academy	Gulfport	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Gulf Coast Mental Health Center	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Gulf Coast Missionary Baptist	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Gulfport Academy Child Care	Gulfport	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Gulfport Mental Health	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Happy Times Child Care Inc	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Harrison County Head Start	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson Personal Care Home	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Kare-It Patch Day Care	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X			X		X		X	X
Kid Academy Preschool	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Kids Connection	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Kids First Child Development	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Kinder Care Learning Center	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X		X	X
Lakeview Nursing Center	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Lil-Tots Day Care Center	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Memorial Behavioral Health-11150 US 49	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Memorial Behavioral Health-12266 Ashley Dr	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Northwood Christian Academy	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X								X
Nugent Child Development Center	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ovation Learning Center	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Pine Grove Coastal Care Center	Gulfport	Special Populations		X		X		X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Renaissance Counseling Center	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X		X	X
Seasons Senior Behavioral Health	Gulfport	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Simone & Association PLLC	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X		X	X
Smith, Kelly - Crossroads Counseling	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X			X		X		X	X
Staley Teresa	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Sullivan Teresa	Gulfport	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X			X		X		X	X
Tate, Vivian - T & T Association LLC	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X					X	X	X	X
Temple Christian Academy	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Three Rivers Academy	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X								X
Trinity United Methodist School	Gulfport	Special Populations		X		X		X	X		X	X	X	X	X	X	X	X								X
Turkey Creek Head Start Program	Gulfport	Special Populations		X	X			X	X		X	X	X	X	X	X	X	X		X	X		X		X	X
Twin Oaks Child Development	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X							X	X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Watch Me Grow Learning Center	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Wee Ones Child Care Inc	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Wesley Academy	Gulfport	Special Populations		X		X		X	X		X	X	X	X	X	X	X	X					X	X	X	X
Westminster Academy School	Gulfport	Special Populations		X		X		X	X		X	X	X	X	X	X	X	X								X
Bernard Bayou Industrial District	Gulfport	Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X	X							X
Harrison County Wastewater And Solid Waste	Gulfport	Water/ Wastewater		X		X		X	X		X	X	X	X	X	X	X	X								X
HC/Delisle Wastewater Treatment	Gulfport	Water/ Wastewater		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
South Gulfport Wastewater Treatment Plan	Gulfport	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X			X					X
Fire Station #1	Long Beach	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Fire Station #2	Long Beach	Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Fire Station #3	Long Beach	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Police Department	Long Beach	Police Station		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
City Hall Building	Long Beach	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Public Works Center	Long Beach	Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Senior/Rec Center	Long Beach	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X								X
South Mississippi Regional Center	Long Beach	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Harper McCaughn Elementary	Long Beach	School		X				X	X	X	X	X	X	X	X	X	X	X								X
High School	Long Beach	School		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Middle School	Long Beach	School		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Quarles Elementary	Long Beach	School		X				X	X	X	X	X	X	X	X	X	X	X								X
Reeves Elementary	Long Beach	School		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Chapman Oaks, Inc.	Long Beach	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X								X
Long Beach Industrial District Park	Long Beach	Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Sewage Collection System: Lift Stations, Water Treatment Facility	Long Beach	Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Water Distribution System: Wells, Tanks, Treatment Facilities	Long Beach	Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Emergency Operations Center	Pass Christian	EOC		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Fire Station 1	Pass Christian	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

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Fire Station 2	Pass Christian	Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Coastal Family Health Clinic	Pass Christian	Medical		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Police Station	Pass Christian	Police Station		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
City Hall	Pass Christian	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Pass Christian Library	Pass Christian	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Public Works Department	Pass Christian	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
High School	Pass Christian	School		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Middle School	Pass Christian	School		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Pass Christian Elementary School	Pass Christian	School		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Boys and Girls Club Gymnasium	Pass Christian	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Dixie White House	Pass Christian	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Henderson Avenue Bridges	Pass Christian	Transportation		X			X	X	X		X	X	X	X	X	X	X	X	X							X
Highway 90, Bay St. Louis Bridge	Pass Christian	Transportation		X				X	X		X	X	X	X	X	X	X	X	X				X		X	X
Menge Avenue Bridges	Pass Christian	Transportation		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X

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Harrison County Wastewater And Solid Waste Management Authority, Long Beach And Pass Christian	Pass Christian	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Long Beach Pass Christian Wastewater Treatment	Pass Christian	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Water System	Pass Christian	Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
JACKSON COUNTY																										
EOC Radio Communication Tower		Comm		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Fontainebleau Radio Communication Tower		Comm		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Lily Orchard Radio Communication Tower		Comm		X		X		X	X		X	X	X	X	X	X	X	X								X
Vancleave Radio Communication Tower		Comm		X				X	X		X	X	X	X	X	X	X	X						X		X
County EOC		EOC		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
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Central Jackson County Fire Dept - Fontainebleau		Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X		X	X
Central Jackson County Fire Dept - Vancleave		Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X			X
East Central Nutbank Sub Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
East Central Sub Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
East Central Sub Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Escatawpa Central Fire Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X	X		X
Fontainebleau Main Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Fontainebleau Sub Sta.		Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Fort Bayou Volunteer Fire Dept - Station 1		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Fort Bayou Volunteer Fire Dept - Station 2		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Fort Bayou Volunteer Fire Dept - Station 3		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Fort Ramsay Fire Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X

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Forts Lake Main Sta.		Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Forts Lake Orange Grove Sub Sta.		Fire Station		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Gulf Park Est. Fire Sta.		Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Helena Fire Sat.		Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Latimer Main Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Latimer Sub Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
North East Jackson County Fire Dept - East Central Station		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
North East Jackson County Fire Dept - Three Rivers Station		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
North Fire Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X			X
South Fire Sta.		Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X								X
St. Andrews Fire Sta.		Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Three Rivers North Sub Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Three Rivers Sub Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Vancleave May Lane Sta.		Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X			X

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Vancleave Mt Pleasant Sub Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Vancleave River Rd Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Vancleave Waltman Rd. Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
West Jackson Co. Big Ridge Rd Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
West Jackson Co. Sub		Fire Station		X			X	X	X	X	X	X	X	X	X	X	X	X					X			X
Jackson County Sheriff Dept Substation - St. Martin		Police Station		X		X		X	X	X	X	X	X	X	X	X	X	X					X			X
Old School House		Private/Non-Profit		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Aluminum Bleachers		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Baseball Concesion		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Batting Cage		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Boat Ramp - Wood		Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X	X			X	X		X	X
City Hall Annex S		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
City Park Pavillion D		Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
City Park Pavillion E		Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
City Park Restroom		Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
City Park Storage		Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
County Health Department		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Football Concession		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Football Pressbox - N		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Football Pressbox - S		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Jackson County Complex		Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson County Complex - Jefferson Street		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Jackson County Fairgrounds (Primary POD site)		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson County Main Road Office		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X								X
Outside Property		Public Facility		X				X	X		X	X	X	X	X	X	X	X								X
Park Restrooms		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
PW Storage Barn		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X		X	X
PW Warehouse		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Recreation Dept.		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
School Hse Storage		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Senior Bldg		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Storage Bldg		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Storage Warehouse		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X		X	X
Vancleave Arena (Secondary POD site)		Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Warehouse (Maint)		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X		X	X
Alternative School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
East Central High School		School		X				X	X	X	X	X	X	X	X	X	X	X								X
East Central Lower Elementary		School		X				X	X	X	X	X	X	X	X	X	X	X								X
East Central Middle School		School		X				X	X	X	X	X	X	X	X	X	X	X								X
East Central Upper Elementary		School		X				X	X	X	X	X	X	X	X	X	X	X								X
Jackson County Alternative School - Vancleave		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Jackson County Technology Center - Vancleave		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X

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Mississippi Gulf Coast Community College Gautier Campus		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Orange Lake Elementary		School		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
St. Martin East Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
St. Martin High School		School		X				X	X	X	X	X	X	X	X	X	X	X								X
St. Martin Middle School		School		X				X	X		X	X	X	X	X	X	X	X								X
St. Martin North Elementary School		School		X		X		X	X	X	X	X	X	X	X	X	X	X					X			X
St. Martin Upper Elementary School		School		X				X	X		X	X	X	X	X	X	X	X								X
Vancleave High School		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Vancleave Lower Elementary		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Vancleave Middle School		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Vancleave Upper Elementary		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Vocational Technical Center		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Central Jackson County Shelter		Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X

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East Jackson County Shelter		Shelter		X				X	X	X	X	X	X	X	X	X	X	X							X	X
West Jackson County Shelter		Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Big Oaks Trailer Park - Moss Point		Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Bluff Creek Campground		Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Camp Journey's End Campground		Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Martin Lake Resort		Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Presley's Outing		Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X								X
River Oaks Trailer Park - Moss Point		Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Riverbend Park Resort		Special Populations		X				X	X	X	X	X	X	X	X	X	X	X								X
Santa Maria Campground		Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
White Sands Campground		Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Woodland Park Mobile Home Village - Moss Point		Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson County Airport		Transportation		X		X		X	X		X	X	X	X	X	X	X	X					X		X	X

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Ocean Springs Airport (private)		Transportation		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Jackson County Utility Authority WWTP - Moss Point		Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Jackson County Utility Authority WWTP - Pascagoula		Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Jackson County Utility Authority WWTP - Vancleave		Water/ wastewater		X				X	X		X	X	X	X	X	X	X	X								X
River Pump Station		Water/ wastewater		X	X			X	X		X	X	X	X	X	X	X	X				X	X			X
Water Tower-Rear of 2502 College Circle		Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Water Tower-Next to 1416 Lark Dr.		Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Water Tower (Mall)- W of 290 Dolphin Dr.		Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X	X				X		X	X
Water Well #1 & #6		Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Water Well #10		Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Water Well #11		Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X

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Water Well #4		Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X								X
Water Well #7		Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X	X				X		X	X
Water Well #8		Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Water Well #9		Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Central Fire Sta.	Gautier	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Martin Bluff Fire Sta.	Gautier	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Willie Ladnnier Fire Sta.	Gautier	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Gautier Police Dept.	Gautier	Police Station		X		X		X	X		X	X	X	X	X	X	X	X				X	X		X	X
City Hall North	Gautier	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X		X	X
College Park Elementary	Gautier	School		X		X		X	X		X	X	X	X	X	X	X	X					X	X	X	X
Gautier Elementary School	Gautier	School		X		X		X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Gautier High School	Gautier	School		X				X	X		X	X	X	X	X	X	X	X					X			X
Gautier Middle School	Gautier	School		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Martin Bluff Elementary School	Gautier	School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Singing River Elementary School	Gautier	School		X				X	X		X	X	X	X	X	X	X	X								X

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Moss Point Central Fire Station	Moss Point	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Moss Point Dr. M. L. K. Fire Station	Moss Point	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Moss Point Kreole Fire Station	Moss Point	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Moss Point North Fire Station	Moss Point	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X			X	X	X	X		X
City of Moss Point Police Dept.	Moss Point	Police Station		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
City of Moss Point (City Hall)	Moss Point	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
City of Moss Point (Public Works)	Moss Point	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Alternative Learning Center	Moss Point	School		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Charlotte Hyatt Elementary School	Moss Point	School		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
East Park Elementary School	Moss Point	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Escatawpa Elementary	Moss Point	School		X		X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X			X
God's LIttle Angels	Moss Point	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Kidde Kollege	Moss Point	School		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Kreole Elementary School	Moss Point	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X

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Little People Learning Center	Moss Point	School		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Magnolia Junior High School	Moss Point	School		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Moss Point High School	Moss Point	School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
The Punkin Patch	Moss Point	School		X	X			X	X	X	X	X	X	X	X	X	X	X			X	X	X			X
University of Lil' Tots	Moss Point	School		X		X		X	X	X	X	X	X	X	X	X	X	X			X	X	X			X
West Elementary School	Moss Point	School		X		X		X	X	X	X	X	X	X	X	X	X	X					X		X	X
1st Missionary Baptist Church	Moss Point	Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
2nd Missionary Baptist Church	Moss Point	Shelter		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
East Park School	Moss Point	Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Emergency Shelter	Moss Point	Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Johnson House Personal Care Home	Moss Point	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X			X	X	X		X	X
Pathway Personal Care Home	Moss Point	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Providence Home Care	Moss Point	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Rehabilitation Centers	Moss Point	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X			X	X	X			X

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Serenity Assisted Living Manor	Moss Point	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Singing River Rehab & Nursing	Moss Point	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
We Care Hospice	Moss Point	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Lift stations, wells, and pumping stations in the City	Moss Point	Water/ wastewater		X				X	X		X	X	X	X	X	X	X	X								X
EOC	Ocean Springs	EOC		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Fire Station 1--Central	Ocean Springs	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Fire Station 2--Bernard Beaugez	Ocean Springs	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Fire Station 3--Champ Gay	Ocean Springs	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Fire Station 4--Main/EOC	Ocean Springs	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Hospital	Ocean Springs	Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
On Call Urgent Care Center	Ocean Springs	Medical		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Police Station	Ocean Springs	Police Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Police Station	Ocean Springs	Police Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Ocean Springs Police Station/Jail/Court-Under Construction	Ocean Springs	Police Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Mary C. O'Keefe Cultural Center for Arts and Education	Ocean Springs	Private/Non-Profit		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Walter Anderson Museum	Ocean Springs	Private/Non-Profit		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Armory Building	Ocean Springs	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Fort Maurepas	Ocean Springs	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Ocean Springs City Hall	Ocean Springs	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Civic Center	Ocean Springs	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Community Center	Ocean Springs	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Harbor--County Building	Ocean Springs	Public Facility		X			X	X	X		X	X	X	X	X	X	X	X	X				X		X	X
Ocean Springs Human Resources	Ocean Springs	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Library	Ocean Springs	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Parks & Recreation	Ocean Springs	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Ocean Springs Planning Dept.	Ocean Springs	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Public Works	Ocean Springs	Public Facility		X				X	X		X	X	X	X	X	X	X	X								X
Ocean Springs Public Works Maintenance Bldg	Ocean Springs	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Senior Center	Ocean Springs	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Alternative Education Center	Ocean Springs	School		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Elizabeth H. Keys Technology Center	Ocean Springs	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Grace Baptist Academy	Ocean Springs	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Greyhound Stadium Fieldhouse	Ocean Springs	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Magnolia Park Elementary	Ocean Springs	School		X		X		X	X	X	X	X	X	X	X	X	X	X					X		X	X
Oak Park Elementary	Ocean Springs	School		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs High School	Ocean Springs	School		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Middle School	Ocean Springs	School		X		X		X	X	X	X	X	X	X	X	X	X	X					X		X	X

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Ocean Springs School District Administration Bldg	Ocean Springs	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Pecan Park Elementary	Ocean Springs	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
St. Alphonsus Catholic School	Ocean Springs	School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Taconi School	Ocean Springs	School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
University of Southern Mississippi – Gulf Coast Research	Ocean Springs	School		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Dorchester Arms	Ocean Springs	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Nursing Center	Ocean Springs	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Samaritan House Retirement Apartments	Ocean Springs	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
The Gardens	Ocean Springs	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Villa Maria Retirement Apartments	Ocean Springs	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Airport	Ocean Springs	Transportation		X		X		X	X	X	X	X	X	X	X	X	X	X								X

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Water Tower- 405 Halstead Drive	Ocean Springs	Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Water Tower- 828 Handy Road	Ocean Springs	Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Water Tower- 514 Washington Avenue	Ocean Springs	Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Water Tower- 602 Pine Drive	Ocean Springs	Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Water Tower- (Civic Center) 3706 Highway 90	Ocean Springs	Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Water Tower and Well- Sunplex Industrial Park	Ocean Springs	Water/ wastewater		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Water Well- 3044 Pabst Rd	Ocean Springs	Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Water Well- 1501 Deana Road	Ocean Springs	Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Bell South Switching Station	Pascagoula	Comm		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Jackson County Emergency Management Agency	Pascagoula	EOC		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Bayou Cassette Fire Station	Pascagoula	Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X					X			X
Central Fire Station	Pascagoula	Fire Station		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

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Lake Fire Station	Pascagoula	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Acadian Ambulance Service	Pascagoula	Medical		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Singing River Hospital	Pascagoula	Medical		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson County Sheriff's Department	Pascagoula	Police Station		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Pascagoula Police Department	Pascagoula	Police Station		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Mississippi Power Company Work Yard	Pascagoula	Power/Gas		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
American Red Cross	Pascagoula	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Blossman Propane	Pascagoula	Private/Non-Profit		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Central Appliance	Pascagoula	Private/Non-Profit		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Chevron Products	Pascagoula	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
First Chemical	Pascagoula	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Gulf Concrete	Pascagoula	Private/Non-Profit		X		X		X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Gulf Sales and Supply	Pascagoula	Private/Non-Profit		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

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Jerry Lee's Grocery and Market	Pascagoula	Private/Non-Profit		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Lowe's Building Supply	Pascagoula	Private/Non-Profit		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Midstream Fuel Service	Pascagoula	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X			X		X	X	X	X
Pandle Incorporated	Pascagoula	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X			X		X		X	X
Rolls Royce Naval Marine 3	Pascagoula	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Sav-A-Lot Grocery	Pascagoula	Private/Non-Profit		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Signal International	Pascagoula	Private/Non-Profit		X		X		X	X		X	X	X	X	X	X	X	X		X	X		X	X	X	X
The Salvation Army	Pascagoula	Private/Non-Profit		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Wal-Mart	Pascagoula	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Wayne Lee's Grocery and Market	Pascagoula	Private/Non-Profit		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson County Board of Supervisors	Pascagoula	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson County Jail	Pascagoula	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Pascagoula City Hall	Pascagoula	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Pascagoula Public Housing Authority	Pascagoula	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

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Pascagoula Public Works Dept - Yard and Building Department	Pascagoula	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
U.S. Coast Guard Facility	Pascagoula	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Applied Technology Center	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Arlington Heights Elementary School	Pascagoula	School		X	X			X	X	X	X	X	X	X	X	X	X	X			X		X		X	X
Beach Elementary School	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X							X	X
Bethel Academy	Pascagoula	School		X	X			X	X	X	X	X	X	X	X	X	X	X			X					X
Central Elementary School	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Cherokee Elementary School	Pascagoula	School		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Colmer Middle School	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X		X	X
Eastlawn Elementary School	Pascagoula	School		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Fair Elementary School	Pascagoula	School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Family Interactive Center	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X

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Instructional Administrative Service Center	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Jackson County School for Exceptional Children	Pascagoula	School		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson Elementary School	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X		X	X
Lake Elementary School	Pascagoula	School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Opportunity Center	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Pascagoula High School	Pascagoula	School		X		X		X	X		X	X	X	X	X	X	X	X					X	X	X	X
Pascagoula Opportunity Center	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Pascagoula Vocational Technical Center	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Resurrection Catholic Elementary School	Pascagoula	School		X	X			X	X	X	X	X	X	X	X	X	X	X			X					X
Resurrection Middle/High School	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
St. Peter the Apostle Catholic School	Pascagoula	School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Sugar Bear's Daycare	Pascagoula	School		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

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Trent Lott Middle School	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X		X	X
William H. Colmer Jr. High	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X		X	X
Bay Tower Assisted Living	Pascagoula	Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Chateau Deville Nursing Home	Pascagoula	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Plaza Community Living Center	Pascagoula	Special Populations		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Restoration Adult Home Care Center	Pascagoula	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Willow Creek Senior Housing	Pascagoula	Special Populations		X	X			X	X		X	X	X	X	X	X	X	X					X		X	X
14th Street Well	Pascagoula	Water/ wastewater		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
A Blue Lake LiftStation	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
A North Market Well	Pascagoula	Water/ wastewater		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Bayou Cassotte Water Purification Plant and Well 3	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X					X			X
Beach Well	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Belair/Monclair Lift Station	Pascagoula	Water/ wastewater		X	X			X	X		X	X	X	X	X	X	X	X					X		X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Belair/Washington Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Briarwood Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Chicot and Ingalls Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X			X					X
Communy Water Purification Plant and Well #1, #2 & #3	Pascagoula	Water/ wastewater		X	X			X	X		X	X	X	X	X	X	X	X					X		X	X
Criswell Water Purification Plant	Pascagoula	Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Delmas Lift Station	Pascagoula	Water/ wastewater		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Douglas Well	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X			X					X
Emerson Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Ford Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Hospital! Old Mobile Lift Station	Pascagoula	Water/ wastewater		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson County Utility Authority Wastewater Treatment Facility	Pascagoula	Water/ wastewater		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Kenneth Lift Station	Pascagoula	Water/ wastewater		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Live Oak Lift Station	Pascagoula	Water/ wastewater		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Louise Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X			X		X		X	X
Magnolia Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Market/Parsley Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X							X	X
Moreland Lift Station	Pascagoula	Water/ wastewater		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
North River Road Lift Station	Pascagoula	Water/ wastewater		X			X	X	X		X	X	X	X	X	X	X	X	X				X	X	X	X
Orchard Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Pine Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Poitevin Lift Station	Pascagoula	Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X								X
Searstown Lift Station	Pascagoula	Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Searstown Well	Pascagoula	Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Sherwood Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
South River Road Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Telephone Well	Pascagoula	Water/ wastewater		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Washington Bayou Lift Station	Pascagoula	Water/ wastewater		X			X	X	X	X	X	X	X	X	X	X	X	X			X					X
PEARL RIVER COUNTY																										
Carriere Volunteer Fire Department 1		Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Carriere Volunteer Fire Department 2 (Hide-A-Way Lake)		Fire Station	X	X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Carriere Volunteer Fire Department 3		Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Carriere Volunteer Fire Department 4 (Anchor Lake)		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Henleyfield Volunteer Fire Department 1		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Leetown Volunteer Fire Department		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
McNeill Volunteer Fire Department 1		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
North Central Volunteer Fire Department 2		Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Northeast Volunteer Fire Department 1		Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Northeast Volunteer Fire Department 2		Fire Station		X				X	X		X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Pearl River County Courthouse		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Pearl River County Road Department		Transportation		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Sewer Lift Station		Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
South Repeater	Picayune	Comm		X				X	X		X	X	X	X	X	X	X	X								X
Nicholson Volunteer Fire Department 1	Picayune	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Picayune Fire Department Central Station	Picayune	Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
Picayune Fire Station No. 1	Picayune	Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Picayune Fire Station No. 3	Picayune	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X		X	X			X	X	X
Pine Grove Volunteer Fire Department 1	Picayune	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Pine Grove Volunteer Fire Department 2	Picayune	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Southeast Volunteer Fire Department 1	Picayune	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Southeast Volunteer Fire Department 2	Picayune	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Covenant Health and Rehab	Picayune	Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Highland Community Hospital	Picayune	Medical		X				X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Pearl River Dialysis Unit	Picayune	Medical		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Picayune Criminal Justice Center	Picayune	Police Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Picayune Police Department	Picayune	Police Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
County Office Building	Picayune	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
National Guard Amory	Picayune	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Picayune City Hall	Picayune	Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Picayune Public Works	Picayune	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
Pearl River County Resource Center/Manna Ministries	Picayune	Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Picayune 1st Baptist Church	Picayune	Shelter		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Roseland Park Elementary	Picayune	Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Sewer Lift Station- 203 Memorial Blvd.	Picayune	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Sewer Lift Station-703 Hwy. 11 North	Picayune	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Sewer Lift Station-Read Road	Picayune	Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X				X	X		X	X
Sewer Lift Station-South Beech	Picayune	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X		X	X			X	X	X
Sewer Lift Station-900 S. Beech	Picayune	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X
Sewer Treatment Plant-Airport Road	Picayune	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X		X	X			X	X	X
Sewer Treatment Plant-Neal Road	Picayune	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
Central Repeater	Poplarville	Comm		X				X	X		X	X	X	X	X	X	X	X								X
Emergency Communication's Tower	Poplarville	Comm		X				X	X		X	X	X	X	X	X	X	X								X
Poplarville Repeater	Poplarville	Comm		X				X	X		X	X	X	X	X	X	X	X								X
West Repeater	Poplarville	Comm		X				X	X		X	X	X	X	X	X	X	X								X
Pearl River County Emergency Management	Poplarville	EOC		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Amackertown Volunteer Fire Department Station 1	Poplarville	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Amackertown Volunteer Fire Department Station 2	Poplarville	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Crossroads Fire Department 1	Poplarville	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Derby/Whitesand Volunteer Fire Department 1	Poplarville	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Derby/Whitesand Volunteer Fire Department 2	Poplarville	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
North Central Volunteer Fire Department 1	Poplarville	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Poplarville Fire Department	Poplarville	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Steephollow Volunteer Fire Department 1	Poplarville	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Steephollow Volunteer Fire Department 2	Poplarville	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Steephollow Volunteer Fire Department 3	Poplarville	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
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Steephollow Volunteer Fire Department 4	Poplarville	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Pearl River County Hospital & Nursing Home	Poplarville	Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Poplarville Police Department	Poplarville	Police Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
National Guard Amory	Poplarville	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Poplarville City Hall	Poplarville	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Poplarville Public Works	Poplarville	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Poplarville 1st Baptist Church	Poplarville	Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Poplarville Middle School	Poplarville	Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Sewer Treatment Plant	Poplarville	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
STONE COUNTY																										
Wiggins Fire Department		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Stone County Hospital		Medical		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Stone Co. Sheriff Department		Police Station		X				X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
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MS Power Main Sub-Station		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
MS Power Sub-Station		Power/Gas		X				X	X		X	X	X	X	X	X	X	X							X	X
MS Power Sub-Station		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Flint Creek Reservoir Dam		Public Facility	X	X				X	X		X	X	X	X	X	X	X	X				X	X			X
Regional Correctional Facility		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Stone County Courthouse		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Stone County Health Department		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
US Postal Perkinston		Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
US Postal Wiggins		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
MS Gulf Coast Community College		School		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Perkinston Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Stone Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Stone High School		School		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Stone Middle School		School		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Perkinston Elementary School/Shelter		Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Stone Elementary School/Shelter		Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Stone High School/Shelter		Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Stone Middle School/Shelter		Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
MS Hwy 26/ Hwy 49 Intersection		Transportation		X				X	X		X	X	X	X	X	X	X	X				X	X			X
US Highway 49		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Stone County 911 Center	Wiggins	Comm		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Stone Co. Emergency Operation/Communication Center	Wiggins	EOC		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Wiggins Police Department	Wiggins	Police Station		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Wiggins City Hall	Wiggins	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

SECTION 7
CAPABILITY ASSESSMENT

This section of the Plan discusses the capability of the MEMA District 9 Region to implement hazard mitigation activities. It consists of the following four subsections:

- ❑ 7.1 What is a Capability Assessment?
- ❑ 7.2 Conducting the Capability Assessment
- ❑ 7.3 Capability Assessment Findings
- ❑ 7.4 Conclusions on Local Capability

7.1 WHAT IS A CAPABILITY ASSESSMENT?

The purpose of conducting a capability assessment is to determine the ability of a local jurisdiction to implement a comprehensive mitigation strategy and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs, or projects.[1] As in any planning process, it is important to try to establish which goals, objectives, and/or actions are feasible based on an understanding of the organizational capacity of those agencies or departments tasked with their implementation. A capability assessment helps to determine which mitigation actions are practical, and likely to be implemented over time, given a local government's planning and regulatory framework, level of administrative and technical support, amount of fiscal resources, and current political climate.

A capability assessment has two primary components: 1) an inventory of a local jurisdiction's relevant plans, ordinances, or programs already in place and 2) an analysis of its capacity to carry them out. Careful examination of local capabilities will detect any existing gaps, shortfalls, or weaknesses with ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. A capability assessment also highlights the positive mitigation measures already in place or being implemented at the local government level, which should continue to be supported and enhanced through future mitigation efforts.

The capability assessment completed for the MEMA District 9 Region serves as a critical planning step and an integral part of the foundation for designing an effective hazard mitigation strategy. Coupled with the Risk Assessment, the Capability Assessment helps identify and target meaningful mitigation actions for incorporation in the Mitigation Strategy portion of the Hazard Mitigation Plan. It not only helps establish the goals and objectives for the region to pursue under this Plan, but it also ensures that those goals and objectives are realistically achievable under given local conditions.

[1] While the Final Rule for implementing the Disaster Mitigation Act of 2000 does not require a local capability assessment to be completed for local hazard mitigation plans, it is a critical step in developing a mitigation strategy that meets the needs of the region while taking into account their own unique abilities. The Rule does state that a community's mitigation strategy should be "based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools" (44 CFR, Part 201.6(c)(3)).

7.2 CONDUCTING THE CAPABILITY ASSESSMENT

In order to facilitate the inventory and analysis of local government capabilities within the MEMA District 9 counties, a detailed Capability Assessment Survey was completed for each of the participating jurisdictions based on the information found in existing hazard mitigation plans and local government websites. The survey questionnaire compiled information on a variety of "capability indicators" such as existing local plans, policies, programs, or ordinances that contribute to and/or hinder the region's ability to implement hazard mitigation actions. Other indicators included information related to the region's fiscal, administrative, and technical capabilities, such as access to local budgetary and personnel resources for mitigation purposes. The current political climate, an important consideration for any local planning or decision making process, was also evaluated with respect to hazard mitigation.

At a minimum, survey results provide an extensive inventory of existing local plans, ordinances, programs, and resources that are in place or under development in addition to their overall effect on hazard loss reduction. However, the survey instrument can also serve to identify gaps, weaknesses, or conflicts that counties and local jurisdictions can recast as opportunities for specific actions to be proposed as part of the hazard mitigation strategy.

The information collected in the survey questionnaire was incorporated into a database for further analysis. A general scoring methodology was then applied to quantify each jurisdiction's overall capability.[2] According to the scoring system, each capability indicator was assigned a point value based on its relevance to hazard mitigation.

Using this scoring methodology, a total score and an overall capability rating of "high," "moderate," or "limited" could be determined according to the total number of points received. These classifications are designed to provide nothing more than a general assessment of local government capability. The results of this capability assessment provide critical information for developing an effective and meaningful mitigation strategy.

7.3 CAPABILITY ASSESSMENT FINDINGS

The findings of the capability assessment are summarized in this Plan to provide insight into the relevant capacity of the MEMA District 9 Region to implement hazard mitigation activities. All information is based upon the review of existing hazard mitigation plans and local government websites through the Capability Assessment Survey and input provided by local government officials during meetings of the MEMA District 9 Region Hazard Mitigation Council.

7.3.1 Planning and Regulatory Capability

Planning and regulatory capability is based on the implementation of plans, ordinances, and programs that demonstrate a local jurisdiction's commitment to guiding and managing growth, development, and redevelopment in a responsible manner while maintaining the general welfare of the community. It includes emergency response and mitigation planning, comprehensive land use planning, and transportation planning; the enforcement of zoning or subdivision ordinances and building codes that regulate how land is developed and structures are built; as well as protecting environmental, historic, and cultural resources in the community. Although some conflicts can arise, these planning initiatives

[2] The scoring methodology used to quantify and rank the region's capability can be found in Appendix B.

generally present significant opportunities to integrate hazard mitigation principles and practices into the local decision making process.

This assessment is designed to provide a general overview of the key planning and regulatory tools and programs that are in place or under development for the MEMA District 9 Region along with their potential effect on loss reduction. This information will help identify opportunities to address existing gaps, weaknesses, or conflicts with other initiatives in addition to integrating the implementation of this Plan with existing planning mechanisms where appropriate.

Table 7.1 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for the MEMA District 9 Region. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. A dagger (†) indicates that the given item is administered for that municipality by the county. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the MEMA District 9 Regional Hazard Mitigation Plan.

TABLE 7.1: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Planning/Regulatory Tool	GEORGE COUNTY	Lucedale	HANCOCK COUNTY	Bay St. Louis	Diamondhead	Waveland	HARRISON COUNTY	Biloxi	D'Iberville	Gulfport	Long Beach	Pass Christian	JACKSON COUNTY	Gautier	Moss Point	Ocean Springs	Pascagoula	PEARL RIVER COUNTY	Picayune	Poplarville	STONE COUNTY	Wiggins
Hazard Mitigation Plan	✓	✓	✓	✓	†	✓	✓	✓	✓	✓	✓	✓	✓	†	✓	✓	✓	✓	†	†	✓	†
Threat and Hazard Identification and Risk Assessment (THIRA)																						
Comprehensive Land Use Plan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Floodplain Management Plan/Flood Mitigation Plan			✓		†		✓	✓		✓	✓	✓										
Open Space Management Plan (Parks & Rec/Greenway Plan)			✓				✓							✓			✓					
Stormwater Management Plan/Ordinance			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓					
Natural Resource Protection Plan			✓	†		†	✓	†		†	†	†										
Flood Response Plan							✓															
Emergency Operations Plan	✓	†	✓	†	†	†	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	†	✓	†
Emergency Management Accreditation Program (EMAP Accreditation)																						
Continuity of Operations Plan									✓													
Evacuation Plan			✓	†	†	†	✓	†	†	†	†	†	✓	†	†	†	†					

Planning/Regulatory Tool	GEORGE COUNTY	Lucedale	HANCOCK COUNTY	Bay St. Louis	Diamondhead	Waveland	HARRISON COUNTY	Biloxi	D'Iberville	Gulfport	Long Beach	Pass Christian	JACKSON COUNTY	Gautier	Moss Point	Ocean Springs	Pascagoula	PEARL RIVER COUNTY	Picayune	Poplarville	STONE COUNTY	Wiggins
Disaster Recovery Plan							✓														✓	✓
Capital Improvements Plan					✓	✓					✓	✓		✓					✓		✓	
Economic Development Plan	✓	†	✓	†	†	†	✓	†	†	†	†	†	✓	†	†	†	†	✓	†	†	✓	†
Historic Preservation Plan																						
Flood Damage Prevention Ordinance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Zoning Ordinance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
Subdivision Ordinance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unified Development Ordinance								✓						✓		✓	✓					✓
Post-Disaster Redevelopment/ Reconstruction Plan/Ordinance																						
Building Code		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fire Code	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
National Flood Insurance Program (NFIP)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NFIP Community Rating System (CRS Program)				✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	

A more detailed discussion on the region's planning and regulatory capability follows.

7.3.2 Emergency Management

Hazard mitigation is widely recognized as one of the four primary phases of emergency management. The three other phases include preparedness, response, and recovery. In reality, each phase is interconnected with hazard mitigation, as **Figure 7.1** suggests. Opportunities to reduce potential losses through mitigation practices are most often implemented before disaster strikes, such as the elevation of flood prone structures or the continuous enforcement of policies that prevent and regulate development that is vulnerable to hazards due to its location, design, or other characteristics. Mitigation opportunities will also be presented during immediate preparedness or response activities, such as installing storm shutters in advance of a hurricane, and certainly during the long-term recovery and redevelopment process following a hazard event.

FIGURE 7.1: THE FOUR PHASES OF EMERGENCY MANAGEMENT

Planning for each phase is a critical part of a comprehensive emergency management program and a key to the successful implementation of hazard mitigation actions. As a result, the Capability Assessment Survey asked several questions across a range of emergency management plans in order to assess the MEMA District 9 Region's willingness to plan and their level of technical planning proficiency.

Hazard Mitigation Plan: A hazard mitigation plan represents a community's blueprint for how it intends to reduce the impact of natural and human-caused hazards on people and the built environment. The essential elements of a hazard mitigation plan include a risk assessment, capability assessment, and mitigation strategy.

- ❑ Each of the 6 counties participating in this multi-jurisdictional plan has previously adopted a hazard mitigation plan. Several participating municipalities were included in their respective county's plan, including the cities of Diamondhead, Gautier, Picayune, Poplarville, and Wiggins. Each of the remaining participating municipalities has previously adopted a municipal-level hazard mitigation plan.

Threat and Hazard Identification and Risk Assessment (THIRA): A THIRA is a comprehensive risk assessment process that helps a community understand its risks and estimate capability requirements. Outputs of the THIRA process can inform a variety of disaster preparedness and emergency management efforts, including emergency operations planning, mutual aid agreements, and hazard mitigation planning.

- ❑ None of the counties or municipalities participating in this multi-jurisdictional plan has completed a THIRA process. The counties should consider conducting a THIRA process to improve their understanding of risks and the resources required to prepare for those risks.

Disaster Recovery Plan: A disaster recovery plan serves to guide the physical, social, environmental, and economic recovery and reconstruction process following a disaster. In many instances, hazard mitigation principles and practices are incorporated into local disaster recovery plans with the intent of capitalizing on opportunities to break the cycle of repetitive disaster losses. Disaster recovery plans can also lead to

the preparation of disaster redevelopment policies and ordinances to be enacted following a hazard event.

- ❑ Harrison County and Stone County are the only two counties participating in this multi-jurisdictional plan that have adopted a disaster recovery plan. The City of Wiggins is included in the Stone County plan.

Emergency Operations Plan: An emergency operations plan outlines responsibilities and the means by which resources are deployed during and following an emergency or disaster.

- ❑ Each of the six counties participating in this multi-jurisdictional plan maintains an emergency operations plan through their respective County Emergency Management Agency. Each participating municipality in George County, Hancock County, Pearl River County (with the exception of the City of Picayune), and Stone County is also covered by its respective county's plan.
- ❑ Each of the remaining participating municipalities that is not included in a county plan has adopted a municipal-level emergency operations plan.

Continuity of Operations Plan: A continuity of operations plan establishes a chain of command, line of succession, and plans for backup or alternate emergency facilities in case of an extreme emergency or disaster event.

- ❑ The City of D'Iberville is the only participating jurisdiction that has adopted a continuity of operations plan.

Flood Response Plan: A flood response plan establishes procedures for responding to a flood emergency including coordinating and facilitating resources to minimize the impacts of flood.

- ❑ Harrison County is the only participating jurisdiction that has adopted a flood response plan.

Emergency Management Accreditation Program (EMAP): EMAP is the voluntary standards, assessment, and accreditation program for disaster preparedness programs. It provides emergency management programs the opportunity to be recognized for compliance with industry standards, to demonstrate accountability, and to focus attention on areas and issues where resources are needed.

- ❑ None of the counties or municipalities participating in this multi-jurisdictional plan has earned EMAP accreditation.

7.3.3 General Planning

The implementation of hazard mitigation activities often involves agencies and individuals beyond the emergency management profession. Stakeholders may include local planners, public works officials, economic development specialists, and others. In many instances, concurrent local planning efforts will help to achieve or complement hazard mitigation goals, even though they are not designed as such. Therefore, the Capability Assessment Survey also asked questions regarding general planning capabilities and the degree to which hazard mitigation is integrated into other on-going planning efforts in the MEMA District 9 Region.

Comprehensive Land Use Plan: A comprehensive land use plan establishes the overall vision for what a community wants to be and serves as a guide for future governmental decision making. Typically, a comprehensive plan contains sections on demographic conditions, land use, transportation elements, and community facilities. Given the broad nature of the plan and its regulatory standing in many communities, the integration of hazard mitigation measures into the comprehensive plan can enhance the likelihood of achieving risk reduction goals, objectives, and actions.

- ❑ Each of the six counties participating in this multi-jurisdictional plan has adopted a county comprehensive land use plan.
- ❑ All of the participating municipalities have also adopted a municipal-level comprehensive plan.

Capital Improvements Plan: A capital improvements plan guides the scheduling of spending on public improvements. A capital improvements plan can serve as an important mechanism for guiding future development away from identified hazard areas. Limiting public spending in hazardous areas is one of the most effective long-term mitigation actions available to local governments.

- ❑ Stone County is the only county participating in this multi-jurisdictional plan that has adopted a capital improvements plan.
- ❑ Several of the municipalities participating in this multi-jurisdictional plan have adopted capital improvements plans, including the cities of Diamondhead, Waveland, Long Beach, Pass Christian, Gautier, and Picayune.

Historic Preservation Plan: A historic preservation plan is intended to preserve historic structures or districts within a community. An often overlooked aspect of the historic preservation plan is the assessment of buildings and sites located in areas subject to natural hazards and the identification of ways to reduce future damages. This may involve retrofitting or relocation techniques that account for the need to protect buildings that do not meet current building standards or are within a historic district that cannot easily be relocated out of harm's way.

- ❑ None of the counties or municipalities participating in this multi-jurisdictional plan has a historic preservation plan. However, the cities of Bay St. Louis, Biloxi, Gulfport, Pass Christian, Gautier, Ocean Springs, and Pascagoula have adopted historic preservation ordinances.

Zoning Ordinance: Zoning represents the primary means by which land use is controlled by local governments. As part of a community's police power, zoning is used to protect the public health, safety, and welfare of those in a given jurisdiction that maintains zoning authority. A zoning ordinance is the mechanism through which zoning is typically implemented. Since zoning regulations enable municipal governments to limit the type and density of development, a zoning ordinance can serve as a powerful tool when applied in identified hazard areas.

- ❑ George County, Hancock County, Harrison County, and Jackson County have each adopted a zoning ordinance.
- ❑ All of the participating municipalities have also adopted zoning ordinances. The cities of Biloxi, Gautier, Ocean Springs, Pascagoula, and Wiggins include zoning regulations as part of their local unified development ordinance. The remaining municipalities have adopted stand-alone zoning ordinances.

Subdivision Ordinance: A subdivision ordinance is intended to regulate the development of residential, commercial, industrial, or other uses, including associated public infrastructure, as land is subdivided into buildable lots for sale or future development. Subdivision design that accounts for natural hazards can dramatically reduce the exposure of future development.

- ❑ Each of the counties participating in this multi-jurisdictional plan has adopted a subdivision ordinance.
- ❑ All of the participating municipalities have also adopted subdivision ordinances. The cities of Biloxi, Gautier, Ocean Springs, Pascagoula, and Wiggins include subdivision regulations as part of their local unified development ordinance. The remaining municipalities have adopted stand-alone subdivision ordinances.

Building Codes, Permitting, and Inspections: Building codes regulate construction standards. In many communities, permits, and inspections are required for new construction. Decisions regarding the adoption of building codes (that account for hazard risk), the type of permitting process required both before and after a disaster, and the enforcement of inspection protocols all affect the level of hazard risk faced by a community.

- ❑ Effective August 1, 2014, the State of Mississippi has adopted as a minimum any of the last three editions (2009, 2012, 2015) of the International Building Code and any additional codes as adopted by the Mississippi Building Code Council. Jurisdictions had 120 days to opt out of adoptions. Additionally, all state buildings, leased or owned, must meet the requirements set forth in the 2012 International Building Code.
- ❑ After Hurricane Katrina, Mississippi Legislature mandated the adoption of the International Building Code and International Residential Code in five coastal counties: Hancock County, Harrison County, Jackson County, Pearl River County, and Stone County. As a result, George County is the only participating county that has not adopted a building code.
- ❑ All of the participating municipalities have also adopted building codes.

The adoption and enforcement of building codes by local jurisdictions is routinely assessed through the Building Code Effectiveness Grading Schedule (BCEGS) program developed by the Insurance Services Office, Inc. (ISO).[3] In Mississippi, the Mississippi State Rating Bureau assesses the building codes in effect in a particular community and how the community enforces its building codes *with special emphasis on mitigation of losses from natural hazards*. The results of BCEGS assessments are routinely provided to ISO's member private insurance companies, which in turn may offer ratings credits for new buildings constructed in communities with strong BCEGS classifications. The concept is that communities with well-enforced, up-to-date codes should experience fewer disaster-related losses and, as a result, should have lower insurance rates.

In conducting the assessment, ISO collects information related to personnel qualification and continuing education as well as the number of inspections performed per day. This type of information combined with local building codes is used to determine a grade for that jurisdiction. The grades range from 1 to 10 with a BCEGS grade of 1 representing exemplary commitment to building code enforcement and a grade of 10 indicating less than minimum recognized protection.

[3] Participation in BCEGS is voluntary and may be declined by local governments if they do not wish to have their local building codes evaluated.

Specific BCEGS rating for the participating jurisdictions can be obtained by contacting the department for building inspections within that jurisdiction.

7.3.4 Floodplain Management

Flooding represents the greatest natural hazard facing the nation. At the same time, the tools available to reduce the impacts associated with flooding are among the most developed when compared to other hazard-specific mitigation techniques. In addition to approaches that cut across hazards such as education, outreach, and the training of local officials, the *National Flood Insurance Program* (NFIP) contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to flood hazards. Participation in the NFIP is voluntary for local governments; however, program participation is strongly encouraged by FEMA as a first step for implementing and sustaining an effective hazard mitigation program. It is therefore used as part of this assessment as a key indicator for measuring local capability.

In order for a county or municipality to participate in the NFIP, they must adopt a local flood damage prevention ordinance that requires jurisdictions to follow established minimum building standards in the floodplain. These standards require that all new buildings and substantial improvements to existing buildings will be protected from damage by a 100-year flood event and that new development in the floodplain will not exacerbate existing flood problems or increase damage to other properties.

A key service provided by the NFIP is the mapping of identified flood hazard areas. Once completed, the Flood Insurance Rate Maps (FIRMs) are used to assess flood hazard risk, regulate construction practices, and set flood insurance rates. FIRMs are an important source of information to educate residents, government officials, and the private sector about the likelihood of flooding in their community.

Table 7.2 provides NFIP policy and claim information for each participating jurisdiction in the MEMA District 9 Region. Each of the jurisdictions that are participating in the development of this plan that also participate in the NFIP are committed to maintaining and enforcing their floodplain management ordinances and regulating new development in floodplains.

TABLE 7.2: NFIP POLICY AND CLAIM INFORMATION

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
GEORGE COUNTY†	08/16/88	09/19/12	112	$14,459,000	42	$385,792
Lucedale	04/15/86	09/19/12	10	$2,430,500	1	$11,000
HANCOCK COUNTY†	09/09/70	10/16/09	4,265	$1,097,650,600	5,929	$404,676,960
Bay St. Louis	09/11/70	10/16/09	2,240	$647,565,200	1,244	$148,880,718
Diamondhead	05/22/12		14	$3,275,000	0	$0
Waveland	09/11/70	10/16/09	1,795	$489,605,500	1,385	$183,867,798
HARRISON COUNTY†	06/15/78	06/16/09	2,640	$729,495,100	3,224	$261,560,972

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
Biloxi	09/11/70	06/16/09	5,206	$1,397,946,300	2,293	$253,008,756
D'Iberville	11/14/88	06/16/09	515	$146,053,100	27	$1,939,357
Gulfport	09/11/70	06/16/09	5,267	$1,410,675,000	3,078	$285,499,409
Long Beach	09/11/70	06/16/09	1,735	$482,745,600	1,505	$152,511,425
Pass Christian	05/26/70	06/16/09	2,093	$541,527,600	2,550	$323,619,220
JACKSON COUNTY†	04/03/78	03/16/09	5,996	$1,507,783,300	3,810	$303,874,274
Gautier	11/13/86	03/16/09	1,724	$434,030,100	681	$59,663,535
Moss Point	09/18/70	03/16/09	1,131	$238,909,100	886	$28,225,055
Ocean Springs	09/18/70	03/16/09	2,622	$749,420,700	823	$86,224,366
Pascagoula	09/18/70	03/16/09	4,944	$1,164,782,600	2,763	$221,292,452
PEARL RIVER COUNTY†	05/17/90	06/03/08	732	$154,033,900	374	$9,905,285
Picayune	03/04/80	06/03/08	255	$56,011,200	194	$3,579,193
Poplarville	11/08/07	(NSFHA)	2	$700,000	0	$0
STONE COUNTY†	09/01/87	06/16/11	31	$7,553,000	11	$115,205
Wiggins	06/16/11	06/16/11	5	$939,600	0	$0

†Includes unincorporated areas of county only
(NSFHA) – No Special Flood Hazard Area – All Zone C
Source: NFIP Community Status information as of 1/10/2017; NFIP claims and policy information as of 10/31/2016

All jurisdictions listed above that are participants in the NFIP will continue to comply with all required provisions of the program and will work to adequately comply in the future utilizing a number of strategies. For example, the jurisdictions will coordinate with NCEM and FEMA to develop maps and regulations related to special flood hazard areas within their jurisdictional boundaries and, through a consistent monitoring process, will design and improve their floodplain management program in a way that reduces the risk of flooding to people and property.

Community Rating System: An additional indicator of floodplain management capability is the active participation of local jurisdictions in the Community Rating System (CRS). The CRS is an incentive-based program that encourages counties and municipalities to undertake defined flood mitigation activities that go beyond the minimum requirements of the NFIP by adding extra local measures to provide protection from flooding. All of the 18 creditable CRS mitigation activities are assigned a range of point values. As points are accumulated and reach identified thresholds, communities can apply for an improved CRS class rating. Class ratings, which range from 10 to 1, are tied to flood insurance premium reductions as shown in **Table 7.3**. As class rating improves (the lower the number the better), the percent reduction in flood insurance premiums for NFIP policyholders in that community increases.

TABLE 7.3: CRS PREMIUM DISCOUNTS, BY CLASS

CRS Class	Premium Reduction
1	45%
2	40%
3	35%
4	30%
5	25%
6	20%
7	15%
8	10%
9	5%
10	0

Source: *Federal Emergency Management Agency*

Community participation in the CRS is voluntary. Any community that is in full compliance with the rules and regulations of the NFIP may apply to FEMA for a CRS classification better than class 10. The CRS application process has been greatly simplified over the past several years based on community comments. Changes were made with the intent to make the CRS more user-friendly and make extensive technical assistance available for communities who request it.

- ❑ Harrison County (Class 6), Jackson County (Class 9), Pearl River County (Class 8), and Stone County (Class 9) as well as the cities of Bay St. Louis (Class 7), Waveland (Class 5), Biloxi (Class 5), D'Iberville (Class 6), Gulfport (Class 7), Long Beach (Class 8), Pass Christian (Class 7), Gautier (Class 7), Ocean Springs (Class 6), Pascagoula (Class 7), and Picayune (Class 8) participate in the CRS. Participation in the CRS program should be considered as a mitigation action by the other counties and municipalities. The program would be most beneficial to Hancock County and the City of Moss Point which have 4,265 and 1,131 NFIP policies in force, respectively.

Flood Damage Prevention Ordinance: A flood damage prevention ordinance establishes minimum building standards in the floodplain with the intent to minimize public and private losses due to flood conditions.

- ❑ All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. All counties and municipalities participating in this multi-jurisdictional plan also participate in the NFIP and they all have adopted flood damage prevention regulations

Floodplain Management Plan: A floodplain management plan (or a flood mitigation plan) provides a framework for action regarding corrective and preventative measures to reduce flood-related impacts.

- ❑ Hancock County and Harrison County have both adopted floodplain management plans to help prevent damages associated with flooding and flood loss. The City of Diamond is also included in the Hancock County plan.
- ❑ Several of the municipalities participating in this multi-jurisdictional plan have adopted floodplain management plans, including the cities of Biloxi, Gulfport, Long Beach, and Pass Christian.

***Open Space Management Plan**:* An open space management plan is designed to preserve, protect, and restore largely undeveloped lands in their natural state and to expand or connect areas in the public domain such as parks, greenways, and other outdoor recreation areas. In many instances, open space management practices are consistent with the goals of reducing hazard losses, such as the preservation of wetlands or other flood-prone areas in their natural state in perpetuity.

- ❑ Hancock County has adopted a county greenways plan and Harrison County has adopted a county parks and recreation master plan as well as a heritage trails blueways/greenways plan.
- ❑ The cities of Gautier and Pascagoula each have a municipal parks and recreation master plan in place.

Stormwater Management Plan: A stormwater management plan is designed to address flooding associated with stormwater runoff. The stormwater management plan is typically focused on design and construction measures that are intended to reduce the impact of more frequently occurring minor urban flooding.

- ❑ Jackson County and the cities of Diamondhead, Waveland, D'Iberville, Gulfport, Long Beach, and Gautier have adopted a stormwater management plan.
- ❑ Hancock County and Harrison County and the cities of Bay of St. Louis, Biloxi, D'Iberville, Long Beach, Pass Christian, Gautier, Ocean Springs, and Pascagoula have adopted local stormwater management ordinances.

7.3.6 Administrative and Technical Capability

The ability of a local government to develop and implement mitigation projects, policies, and programs is directly tied to its ability to direct staff time and resources for that purpose. Administrative capability can be evaluated by determining how mitigation-related activities are assigned to local departments and if there are adequate personnel resources to complete these activities. The degree of intergovernmental coordination among departments will also affect administrative capability for the implementation and success of proposed mitigation activities.

Technical capability can generally be evaluated by assessing the level of knowledge and technical expertise of local government employees, such as personnel skilled in using Geographic Information Systems (GIS) to analyze and assess community hazard vulnerability. The Capability Assessment Survey was used to capture information on administrative and technical capability through the identification of available staff and personnel resources.

Table 7.4 provides a summary of the Capability Assessment Survey results for the MEMA District 9 Region with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill. A dagger (†) indicates a county-level staff member(s) provides the specified knowledge or skill to that municipality.

TABLE 7.4: RELEVANT STAFF/PERSONNEL RESOURCES

Staff/Personnel Resource	GEORGE COUNTY	Lucedale	HANCOCK COUNTY	Bay St. Louis	Diamondhead	Waveland	HARRISON COUNTY	Biloxi	D'Iberville	Gulfport	Long Beach	Pass Christian	JACKSON COUNTY	Gautier	Moss Point	Ocean Springs	Pascagoula	PEARL RIVER COUNTY	Picayune	Poplarville	STONE COUNTY	Wiggins
Planners with knowledge of land development/land management practices			✓		✓		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	†	✓	✓
Engineers or professionals trained in construction practices related to buildings and/or infrastructure	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Planners or engineers with an understanding of natural and/or human-caused hazards		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Emergency Manager	✓	†	✓	†	✓	✓	✓	✓	†	✓	✓	†	✓	†	†	†	✓	✓	†	†	✓	†
Floodplain Manager	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Land Surveyors							✓															
Scientists familiar with the hazards of the community	✓	†	✓	†	†	†	✓	†	†	†	†	†	✓	†	†	†	†	✓	†	†	✓	†
Staff with education or expertise to assess the community's vulnerability to hazards	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Personnel skilled in GIS and/or Hazus			✓	✓	✓	✓	✓	✓	✓	✓	†	†	✓	✓	†		✓	✓	†	†	✓	
Resource development staff or grant writers			✓	✓	✓	✓					✓		✓	✓		✓	✓	✓	✓	✓		

Credit for having a floodplain manager was given to those jurisdictions that have a flood damage prevention ordinance, and therefore an appointed floodplain administrator, regardless of whether the appointee was dedicated solely to floodplain management. Credit was given for having a scientist familiar with the hazards of the community if a jurisdiction has a Cooperative Extension Service or Soil and Water Conservation Department. Credit was also given for having staff with education or expertise to assess the community's vulnerability to hazards if a staff member from the jurisdiction was a participant on the existing hazard mitigation plan's planning committee.

7.3.7 Fiscal Capability

The ability of a local government to take action is often closely associated with the amount of money available to implement policies and projects. This may take the form of outside grant funding awards or locally-based revenue and financing. The costs associated with mitigation policy and project implementation vary widely. In some cases, policies are tied primarily to staff time or administrative costs associated with the creation and monitoring of a given program. In other cases, direct expenses are linked to an actual project, such as the acquisition of flood-prone homes, which can require a substantial commitment from local, state, and federal funding sources.

The Capability Assessment Survey was used to capture information on the region's fiscal capability through the identification of locally available financial resources.

Table 7.5 provides a summary of the results for the MEMA District 9 Region with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource has previously been used to implement hazard mitigation actions. A dagger (†) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds).

TABLE 7.5: RELEVANT FISCAL RESOURCES

Fiscal Tool/Resource	GEORGE COUNTY	Lucedale	HANCOCK COUNTY	Bay St. Louis	Diamondhead	Waveland	HARRISON COUNTY	Biloxi	D'Iberville	Gulfport	Long Beach	Pass Christian	JACKSON COUNTY	Gautier	Moss Point	Ocean Springs	Pascagoula	PEARL RIVER COUNTY	Picayune	Poplarville	STONE COUNTY	Wiggins
Capital Improvement Programming			†	†	†	†	†	†		†			†	†	†		†	†	†			
Community Development Block Grants (CDBG)	†		†	†	†	†	†			†	†				✓	✓	†	✓	✓	✓	†	†
Special Purpose Taxes (or taxing districts)			†		†	†	†			†	†				†			†	†	†		
Gas/Electric Utility Fees			†		†	†	†								†		†	†	†			
Water/Sewer Fees			†		†	†						†			†	†	†	†	†	†		
Stormwater Utility Fees																						
Development Impact Fees																						
General Obligation, Revenue, and/or Special Tax Bonds			†		†	†	†								†		†	†	†	†		
Partnering Arrangements or Intergovernmental Agreements	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†
Other: HMGP and other federal, state, and private grants/resources	†	✓	✓	†	†	✓	✓	✓	†	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	†	†

7.3.8 Political Capability

One of the most difficult capabilities to evaluate involves the political will of a jurisdiction to enact meaningful policies and projects designed to reduce the impact of future hazard events. Hazard mitigation may not be a local priority or may conflict with or be seen as an impediment to other goals of the community, such as growth and economic development. Therefore, the local political climate must be considered in designing mitigation strategies as it could be the most difficult hurdle to overcome in accomplishing their adoption and implementation.

The Capability Assessment Survey was used to capture information on political capability of the MEMA District 9 Region. Previous hazard mitigation plans were reviewed for general examples of local political

capability, such as guiding development away from identified hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum state or federal requirements (i.e., building codes, floodplain management, etc.).

- ❑ The previous hazard mitigation plans identified existing ordinances that address natural hazards or are related to hazard mitigation, such as stormwater management, drainage, erosion and sediment control, zoning, subdivision regulations, and flood damage prevention ordinances.
- ❑ During the months immediately following a disaster, local public opinion in the region is more likely to shift in support of hazard mitigation efforts.

Table 7.6 provides a summary of the results for the MEMA District 9 Region with regard to political capability. A checkmark (✓) indicates the expected degree of political support by local elected officials in terms of adopting/funding information.

TABLE 7.6: LOCAL POLITICAL SUPPORT

Political Support	GEORGE COUNTY	Lucedale	HANCOCK COUNTY	Bay St. Louis	Diamondhead	Waveland	HARRISON COUNTY	Biloxi	D'Iberville	Gulfport	Long Beach	Pass Christian	JACKSON COUNTY	Gautier	Moss Point	Ocean Springs	Pascagoula	PEARL RIVER COUNTY	Picayune	Poplarville	STONE COUNTY	Wiggins
Limited																						
Moderate	✓	✓			✓										✓					✓		✓
High			✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	

7.4 CONCLUSIONS ON LOCAL CAPABILITY

In order to form meaningful conclusions on the assessment of local capability, a quantitative scoring methodology was designed and applied to the results of the Capability Assessment Survey. The maximum number of points possible (one, two, or three) was assigned to each plan, ordinance, program, or resource based on its relevance to hazard mitigation. If a plan, ordinance, program, or resource was under development or administered for a municipality at the county-level, one point became the highest score possible. The maximum total number of points possible under the scoring methodology is 86, and three categories were established to classify capability level as limited (0-24 points), moderate (25-49 points), or high (50-86 points). This methodology, further described in Appendix B, attempts to assess the overall level of capability of the MEMA District 9 Region to implement hazard mitigation actions.

The overall capability to implement hazard mitigation actions varies among the participating jurisdictions. For planning and regulatory capability, the jurisdictions range from limited to moderate to high. The administrative and technical capabilities vary among the jurisdictions with larger jurisdictions generally having greater staff and technical resources. All of the jurisdictions are in the limited to moderate range for fiscal capability.

Table 7.7 shows the results of the capability assessment using the designed scoring methodology. The capability score is based solely on the information found in existing hazard mitigation plans and readily available on the jurisdictions' government websites. This information was reviewed by all jurisdictions and each jurisdiction provided feedback on the information included in the capability assessment. Local government input was vital to identifying capabilities. According to the assessment, the average local capability score for all jurisdictions is 44.9, which falls into the moderate capability ranking.

TABLE 7.7: CAPABILITY ASSESSMENT RESULTS

Jurisdiction	Overall Capability Score	Overall Capability Rating
GEORGE COUNTY	30	Moderate
Lucedale	31	Moderate
HANCOCK COUNTY	55	High
Bay St. Louis	42	Moderate
Diamondhead	44	Moderate
Waveland	49	Moderate
HARRISON COUNTY	61	High
Biloxi	49	Moderate
D'Iberville	43	Moderate
Gulfport	50	High
Long Beach	51	High
Pass Christian	48	Moderate
JACKSON COUNTY	46	Moderate
Gautier	46	Moderate
Moss Point	41	Moderate
Ocean Springs	46	Moderate
Pascagoula	52	High
PEARL RIVER COUNTY	47	Moderate
Picayune	46	Moderate
Poplarville	35	Moderate
STONE COUNTY	42	Moderate
Wiggins	34	Moderate

As previously discussed, one of the reasons for conducting a Capability Assessment is to examine local capabilities to detect any existing gaps or weaknesses within ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. These gaps or weaknesses have been identified for each jurisdiction in the tables found throughout this section. The participating jurisdictions used the Capability Assessment as part of the basis for the Mitigation Actions that are identified in Section 9; therefore, each jurisdiction addresses their ability to expand on and improve their existing capabilities through the identification of their Mitigation Actions.

7.4.1 Linking the Capability Assessment with the Risk Assessment and the Mitigation Strategy

The conclusions of the Risk Assessment and Capability Assessment serve as the foundation for the development of a meaningful hazard mitigation strategy. During the process of identifying specific mitigation actions to pursue, the RHMC considered not only each jurisdiction's level of hazard risk, but also their existing capability to minimize or eliminate that risk.

SECTION 8
MITIGATION STRATEGY

This section of the Plan provides the blueprint for the participating jurisdictions in the MEMA District 9 Region to follow in order to become less vulnerable to its identified hazards. It is based on general consensus of the Regional Hazard Mitigation Council (RHMC) and the findings and conclusions of the *Capability Assessment* and *Risk Assessment*. It consists of the following five subsections:

- 8.1 Introduction
- 8.2 Mitigation Goals
- 8.3 Identification and Analysis of Mitigation Techniques
- 8.4 Selection of Mitigation Techniques for the MEMA District 9 Region
- 8.5 Plan Update Requirement

8.1 INTRODUCTION

The intent of the Mitigation Strategy is to provide the communities in the MEMA District 9 Region with the goals that will serve as guiding principles for future mitigation policy and project administration, along with an analysis of mitigation techniques deemed available to meet those goals and reduce the impact of identified hazards. It is designed to be comprehensive, strategic, and functional in nature:

- In being *comprehensive*, the development of the strategy includes a thorough review of all hazards and identifies extensive mitigation measures intended to not only reduce the future impacts of high risk hazards, but also to help the region achieve compatible economic, environmental, and social goals.
- In being *strategic*, the development of the strategy ensures that all policies and projects proposed for implementation are consistent with pre-identified, long-term planning goals.
- In being *functional,* each proposed mitigation action is linked to established priorities and assigned to specific departments or individuals responsible for their implementation with target completion deadlines. When necessary, funding sources are identified that can be used to assist in project implementation.

The first step in designing the Mitigation Strategy includes the identification of mitigation goals. Mitigation goals represent broad statements that are achieved through the implementation of more specific mitigation actions. These actions include both hazard mitigation policies (such as the regulation of land in known hazard areas through a local ordinance) and hazard mitigation projects that seek to address specifically targeted hazard risks (such as the acquisition and relocation of a repetitive loss structure).

The second step involves the identification, consideration, and analysis of available mitigation measures to help achieve the identified mitigation goals. This is a long-term, continuous process sustained through the development and maintenance of this Plan. Alternative mitigation measures will continue to be

considered as future mitigation opportunities are identified, as data and technology improve, as mitigation funding becomes available, and as this Plan is maintained over time.

The third and last step in designing the Mitigation Strategy is the selection and prioritization of specific mitigation actions for the communities in the MEMA District 9 Region (provided separately in Section 9: *Mitigation Action Plan*). Each county and participating jurisdiction has its own Mitigation Action Plan (MAP) that reflects the needs and concerns of that jurisdiction. The MAP represents an unambiguous and functional plan for action and is considered to be the most essential outcome of the mitigation planning process.

The MAP includes a prioritized listing of proposed hazard mitigation actions (policies and projects) for the MEMA District 9 counties and jurisdictions to complete. Each action has accompanying information, such as those departments or individuals assigned responsibility for implementation, potential funding sources, and an estimated target date for completion. The MAP provides those departments or individuals responsible for implementing mitigation actions with a clear roadmap that also serves as an important tool for monitoring success or progress over time. The cohesive collection of actions listed in the MAP can also serve as an easily understood menu of mitigation policies and projects for those local decision makers who want to quickly review the recommendations and proposed actions of the Regional Hazard Mitigation Plan.

In preparing each Mitigation Action Plan for the MEMA District 9 Region, officials considered the overall hazard risk and capability to mitigate the effects of hazards as recorded through the risk and capability assessment process in addition to meeting the adopted mitigation goals and unique needs of the community.

8.1.1 Mitigation Action Prioritization

Prioritization of the proposed mitigation actions was based on the following six factors:

- ❑ Effect on overall risk to life and property
- ❑ Ease of implementation
- ❑ Political and community support
- ❑ A general economic cost/benefit review[1]
- ❑ Funding availability
- ❑ Continued compliance with the NFIP

[1] Only a general economic cost/benefit review was considered by the Regional Hazard Mitigation Council through the process of selecting and prioritizing mitigation actions. Mitigation actions with “high” priority were determined to be the most cost effective and most compatible with the participating jurisdictions’ unique needs. Actions with a “moderate” priority were determined to be cost-effective and compatible with jurisdictional needs, but may be more challenging to complete administratively or fiscally than “high” priority actions. Actions with a “low” priority were determined to be important community needs, but the community likely identified several potential challenges in terms of implementation (e.g. lack of funding, technical obstacles). A more detailed cost/benefit analysis will be applied to particular projects prior to the application for or obligation of funding, as appropriate.

The point of contact for each county helped coordinate the prioritization process by reviewing each action and working with the lead agency/department responsible to determine a priority for each action using the six factors listed above.

Using these criteria, actions were classified as high, moderate, or low priority by the participating jurisdiction officials.

8.2 MITIGATION GOALS

44 CFR Requirement
44 CFR Part 201.6(c)(3)(i): The mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

The primary goal of all local governments is to promote the public health, safety, and welfare of its citizens. In keeping with this standard, the MEMA District 9 counties and the participating municipalities have developed nine goal statements for local hazard mitigation planning in the region. In developing these goals, the previous county and municipal hazard mitigation plans were reviewed to determine areas of consistency. The project consultant reviewed the goals from each of the existing plans that were combined to form this regional plan. Many of the goals were similar and, therefore, regional goals were formulated based on commonalities found between the goals in each plan. The overarching themes identified in the previous goals included loss of life and property damage, critical facilities and infrastructure, public education and awareness, mitigation capabilities, emergency services, and economic development, quality of life, and the environment.

As a result of reviewing the existing goals, nine proposed regional goals were presented to the Hazard Mitigation Council for their consideration. The proposed goals were reviewed, voted on, and accepted by the RHMC at their second meeting. This process of combining goals from the previous plans served to highlight the planning process that had occurred in each county and municipality prior to joining this regional planning effort. Each goal, purposefully broad in nature, serves to establish parameters that were used in developing more mitigation actions. The MEMA District 9 Regional Mitigation Goals are presented in **Table 8.1**. Consistent implementation of actions over time will ensure that community goals are achieved.

TABLE 8.1: MEMA DISTRICT 9 REGIONAL MITIGATION GOALS

	Goal
Goal #1	Minimize risk and vulnerability of the community to hazards.
Goal #2	Minimize loss of life, injury, and damages to property, the economy, and the environment.
Goal #3	Minimize loss to critical facilities and infrastructure, utilities, and services.
Goal #4	Improve, expand, and enhance public education, awareness, and preparedness.
Goal #5	Build and enhance local mitigation capabilities to improve the region's ability to prepare for, respond to, and recover.
Goal #6	Enter into partnerships with neighboring jurisdictions, federal and state agencies, and others to share information and develop a more hazard resistant community.
Goal #7	Enhance response procedures and emergency management capabilities.
Goal #8	Reduce economic losses, minimize social disruptions, and maintain quality of life.
Goal #9	Protect the environment and natural resources.

8.3 IDENTIFICATION AND ANALYSIS OF MITIGATION TECHNIQUES

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

In formulating the Mitigation Strategy for the MEMA District 9 Region, a wide range of activities were considered in order to help achieve the established mitigation goals, in addition to addressing any specific hazard concerns. These activities were discussed during the MEMA District 9 Regional Hazard Mitigation Planning meetings. In general, all activities considered by the RHMC can be classified under one of the following six (6) broad categories of mitigation techniques: Prevention, Property Protection, Natural Resource Protection, Structural Projects, Emergency Services, and Public Awareness and Education. These are discussed in detail below.

8.3.1 Prevention

Preventative activities are intended to keep hazard problems from getting worse, and are typically administered through government programs or regulatory actions that influence the way land is developed and buildings are built. They are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred or capital improvements have not been substantial. Examples of preventative activities include:

- ❑ Planning and zoning
- ❑ Building codes
- ❑ Open space preservation
- ❑ Floodplain regulations
- ❑ Stormwater management regulations
- ❑ Drainage system maintenance
- ❑ Capital improvements programming
- ❑ Riverine/fault zone setbacks

8.3.2 Property Protection

Property protection measures involve the modification of existing buildings and structures to help them better withstand the forces of a hazard, or removal of the structures from hazardous locations. Examples include:

- ❑ Acquisition
- ❑ Relocation
- ❑ Building elevation
- ❑ Critical facilities protection
- ❑ Retrofitting (e.g., windproofing, floodproofing, seismic design techniques, etc.)

- ❑ Safe rooms, shutters, shatter-resistant glass
- ❑ Insurance

8.3.3 Natural Resource Protection

Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas and their protective functions. Such areas include floodplains, wetlands, steep slopes, and sand dunes. Parks, recreation, or conservation agencies and organizations often implement these protective measures. Examples include:

- ❑ Floodplain protection
- ❑ Watershed management
- ❑ Riparian buffers
- ❑ Forest and vegetation management (e.g., fire resistant landscaping, fuel breaks, etc.)
- ❑ Erosion and sediment control
- ❑ Wetland preservation and restoration
- ❑ Habitat preservation
- ❑ Slope stabilization

8.3.4 Structural Projects

Structural mitigation projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard event through construction. They are usually designed by engineers and managed or maintained by public works staff. Examples include:

- ❑ Reservoirs
- ❑ Dams/levees/dikes/floodwalls
- ❑ Diversions/detention/retention
- ❑ Channel modification
- ❑ Storm sewers

8.3.5 Emergency Services

Although not typically considered a “mitigation” technique, emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. Examples include:

- ❑ Warning systems
- ❑ Evacuation planning and management
- ❑ Emergency response training and exercises
- ❑ Sandbagging for flood protection
- ❑ Installing temporary shutters for wind protection

8.3.6 Public Education and Awareness

Public education and awareness activities are used to advise residents, elected officials, business owners, potential property buyers, and visitors about hazards, hazardous areas, and mitigation techniques they can use to protect themselves and their property. Examples of measures to educate and inform the public include:

- Outreach projects
- Speaker series/demonstration events
- Hazard map information
- Real estate disclosure
- Library materials
- School children educational programs
- Hazard expositions

8.4 SELECTION OF MITIGATION TECHNIQUES FOR THE MEMA DISTRICT 9 REGION

In order to determine the most appropriate mitigation techniques for the communities in the MEMA District 9 Region, the RHMC members thoroughly reviewed and considered the findings of the *Capability Assessment* and *Risk Assessment* to determine the best activities for their respective communities. Other considerations included the effect of each mitigation action on overall risk to life and property, its ease of implementation, its degree of political and community support, its general cost-effectiveness, and funding availability (if necessary).

8.5 PLAN UPDATE REQUIREMENT

In keeping with FEMA requirements for plan updates, the Mitigation Actions identified in the previous MEMA District 9 county and municipal hazard mitigation plans were evaluated to determine their 2017 implementation status. Updates on the implementation status of each action are provided. The mitigation actions provided in Section 9*: Mitigation Action Plan* include the mitigation actions from the previous plans as well as any new mitigation actions proposed through the 2017 planning process.

SECTION 9
MITIGATION ACTION PLAN

This section includes the listing of the mitigation actions proposed by the participating jurisdictions in MEMA District 9. It consists of the following two subsections:

- ❑ 9.1 Overview
- ❑ 9.2 Mitigation Action Plans

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44 CFR Requirement
44 CFR Part 201.6(c)(3)(iii): The mitigation strategy shall include an action plan describing how the actions identified in paragraph (c)(2)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction.

9.1 OVERVIEW

As described in the previous section, the Mitigation Action Plan, or MAP, provides a functional plan of action for each jurisdiction. It is designed to achieve the mitigation goals established in Section 8: *Mitigation Strategy* and will be maintained on a regular basis according to the plan maintenance procedures established in Section 10: *Plan Maintenance*.

Each proposed mitigation action has been identified as an effective measure (policy or project) to reduce hazard risk for the communities in the MEMA District 9 Region. Each action is listed in the MAP in conjunction with background information such as hazard(s) addressed and relative priority. Other information provided in the MAP includes potential funding sources to implement the action should funding be required (not all proposed actions are contingent upon funding). Most importantly, implementation mechanisms are provided for each action, including the designation of a lead agency or department responsible for carrying the action out as well as a timeframe for its completion. These implementation mechanisms ensure that the MEMA District 9 Regional Hazard Mitigation Plan remains a functional document that can be monitored for progress over time. The proposed actions are not listed in priority order, though each has been assigned a priority level of “high,” “moderate,” or “low” as described below and in Section 8 (page 8.2).

The Mitigation Action Plan is organized by mitigation strategy category (Prevention, Property Protection, Natural Resource Protection, Structural Projects, Emergency Services, or Public Education and Awareness). The following are the key elements described in the Mitigation Action Plan:

- ❑ Hazard(s) Addressed—Hazard which the action addresses.
- ❑ Relative Priority—High, moderate, or low priority as assigned by the jurisdiction.
- ❑ Lead Agency/Department—Department responsible for undertaking the action.
- ❑ Potential Funding Sources—Local, State, or Federal sources of funds are noted here, where applicable.

- Implementation Schedule—Date by which the action the action should be completed. More information is provided when possible.
- Implementation Status (2017)—Indication of completion, progress, deferment, or no change since the previous plan. If the action is new, that will be noted here.

9.2 MITIGATION ACTION PLANS

The mitigation actions proposed by each of the participating jurisdictions are listed in 22 individual MAPs on the following pages. **Table 9.1** shows the location of each jurisdiction's MAP within this section as well as the number of mitigation actions proposed by each jurisdiction.

TABLE 9.1: INDIVIDUAL MAP LOCATIONS

Location	Page	Number of Mitigation Actions
George County	**9:3**	**19**
Lucedale	9:9	20
Hancock County	**9:15**	**84**
Bay St. Louis	9:36	29
Diamondhead	9:44	13
Waveland	9:48	53
Harrison County	**9:64**	**63**
Biloxi	9:83	38
D'Iberville	9:95	29
Gulfport	9:105	52
Long Beach	9:122	20
Pass Christian	9:127	21
Jackson County	**9:133**	**58**
Gautier	9:152	58
Moss Point	9:170	15
Ocean Springs	9:174	47
Pascagoula	9:188	21
Pearl River County	**9:195**	**27**
Picayune	9:204	31
Poplarville	9:214	28
Stone County	**9:223**	**27**
Wiggins	9:232	27

George County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Ensure strict enforcement of subdivision order.	All	High	George County	Local	2022	Adopted in 2002 This ordinance was amended in 2006 and 2014. The county will continue to evaluate this ordinance and update again in the future.
P-2	Ensure strict enforcement of regulations against structures in the floodplain.	Flooding	High	Floodplain Administrator; George County	Local	2022	This ordinance was updated in 2016 and the county will continue to evaluate and update this ordinance to ensure floodplains are well-regulated.
P-3	Ensure continuity of services through an enhanced government services continuity plan.	All	Low to Moderate	George County	Local	2022	At this time, no funding has been allocated to prepare a formal plan. However, the county would still like to pursue this action going forward, so this will remain in the plan.
P-4	Incorporate the Hazard Mitigation Plan into the George County Comprehensive Plan.	All	High	George County	Local	Completed	After evaluation, local officials feel that the plans will continue to work together to help the County without having a formal action in this plan, so this action is considered complete.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-5	Enhance stormwater management activities.	Hurricane and Tropical Storm, Flooding	High	George County Supervisors and Road Crews	Local	2022	(Action 4.5 in previous plan) The county has taken a number of steps to improve stormwater management throughout its jurisdiction and will continue to try to improve its stormwater management practices in the future so this action will remain in the plan.
Property Protection							
PP-1	Promote the building of "safe rooms" in new construction and when remodeling existing structures.	Severe Thunderstorm, Tornado, Hurricane and Tropical Storm	Moderate to High	George County	Local, MEMA, FEMA	2022	(Action 1.4 in previous plan) Although some independent homeowners have included safe rooms as part of redesign construction, the county would like to take a more active role in promoting safe rooms and would like to consider grants to fund these projects if available.
PP-2	Ensure continuity of services by retrofitting public buildings.	All	High	George County	Local, MEMA, FEMA	2022	The county has looked at retrofitting critical buildings but funding has been lacking. The county will continue to pursue this action contingent upon the availability of funding.
PP-3	Ensure that new public buildings are designed and built to hurricane resistant building codes.	Hurricane and Tropical Storm, Tornado, Severe Thunderstorm/ High Winds	High	George County	Local	2022	(Action 2.2 in previous plan) New buildings have been generally built to code, but the county will need to continue to be vigilant in monitoring this going forward so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Natural Resource Protection							
NRP-1							
Structural Projects							
SP-1							
Emergency Services							
ES-1	Ensure that communication systems are adequate during disasters.	All	High	George County Emergency Management; George County	Local	2022	(Action 1.3 in previous plan) In the past several years, the county has worked to ensure adequate communication systems, but there are many improvements that could still be made so the county will continue to pursue these alternatives.
ES-2	Monitor the current status of generators for maintenance of critical facilities	All	High	George County	Local	2022	There is a maintenance agreement and schedule in place for generators owned by the county. The county will continue to monitor this and try to improve the number/quality of generators available for use during disasters.
ES-3	Ensure the adequacy of emergency shelters.	All	High	George County Emergency Management Agency; George County	Local	2021	(Action 4.1 in previous plan) The county has identified and ensured that locations for shelters in the event of an emergency are available. However, shelter locations need to be constantly evaluated for quality so the county will continue to pursue this action in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-4	Explore potential sites for a new special needs shelter.	Tornado, Hurricane and Tropical Storm, Flooding	Moderate	George County Emergency Management Agency	Local	Completed	In discussions with Stone County, they have completed a special needs shelter which could be used by George County residents if needed so this action will be considered complete.
ES-5	Enhance emergency response capabilities.	All	Moderate	George County	Local	2022	(Action 4.6 in previous plan) The county has worked to improve its response operations through planning and training, but since these tasks require constant vigilance and evaluation, this action will remain in the plan going forward as the county works to continue to improve its capabilities.
Public Education and Awareness							
PEA-1	Expand public awareness through education and outreach materials to citizens and visitors.	All	High	George County Emergency Management Agency	Local	2022	(Action 3.1 in previous plan) The city has done a great deal to develop materials for distribution to citizens and improve public awareness, but these materials will require updates over the next 5 years, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Develop and/or expand outreach strategies for vulnerable populations.	All	Moderate to High	George County; George County Emergency Management Agency; George County Sheriff's Department; George County VFDs	Local	2022	(Action 3.2 in previous plan) Although some outreach to vulnerable populations has taken place, the county sees this as an area where constant contact is required so this action will be retained.
PEA-3	Host a hurricane expo for outreach and education.	Hurricane and Tropical Storm	High	George County Emergency Management Agency; George County	Local	Deleted	Funding is not available for an event like this at this time. The county will continue to educate citizens on preparedness in other ways.
PEA-4	Provide and/or expand outreach information on hazard-resistant structures.	All	Moderate to High	George County Emergency Management Agency; George County	Local	2022	(Action 3.4 in previous plan) The county has done some outreach on constructing hazard resistant structures, but this is an area where more outreach is required so the county will continue to pursue this action.
PEA-5	Encourage the development of family disaster plans through the Masters of Disaster Program.	All	Moderate to High	George County First Responders (Sheriff, Fire, etc.)	Local	Deleted	George County will continue to educate citizens on family disaster plans but not through the Masters of Disaster Program, so this action is assumed to be rolled up into PEA-1.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-6	Enhance disaster preparedness of local government.	Flooding, Severe Thunderstorm, Hurricane and Tropical Storm	Moderate to High	George County	Local	2022	(Action 4.4 in previous plan) The county has taken a number of steps to improve its own disaster preparedness and will continue to try to improve this through outreach and interactions with citizens in the future.

City of Lucedale Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Maintain elevation certificates for all post-FIRM structures.	Flooding, Hurricane and Tropical Storm	High	City Building Department	Local	2022	The city updated its Floodplain Ordinance in 2016 and has maintained elevation certificates for all post-FIRM structures, but this action will require continual effort to maintain
P-2	Ensure continuity of city services through an enhanced government services continuity plan.	All	Low to Moderate	City of Lucedale	Local	2022	At this time, no funding has been allocated to prepare a formal plan. However, the city would still like to pursue this action going forward, so this will remain in the plan.
P-3	Ensure strict enforcement of regulations against structures in the floodplain.	Flooding, Hurricane and Tropical Storm	High	City Planning Commission	Local	2022	This ordinance was updated in 2016 and the city will continue to evaluate and update this ordinance to ensure floodplains are well-regulated.
P-4	Incorporate the Lucedale Hazard Mitigation Plan into the city's Comprehensive Plan.	All	High	City of Lucedale	Local	Completed	After evaluation, local officials feel that the plans will continue to work together to help the city without having a formal action in this plan, so this action is considered complete.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-5	Enhance stormwater management activities.	Hurricane and Tropical Storm, Flooding	High	City Public Works Department	Local	2022	(Action 4.5 in previous plan) The city has taken a number of steps to improve stormwater management throughout its jurisdiction and will continue to try to improve its stormwater management practices in the future so this action will remain in the plan.
Property Protection							
PP-1	Promote the building of "safe rooms" in new construction and when remodeling existing structures.	Hurricane and Tropical Storm, Tornado, Severe Thunderstorm	Moderate to High	City Building Department	Local, MEMA, FEMA	2022	(Action 1.3 in previous plan) Although some independent homeowners have included safe rooms as part of redesign construction, the city would like to take a more active role in promoting safe rooms and would like to consider grants to fund these projects if available
PP-2	Ensure continuity of city services by retrofitting public buildings.	All	High	City of Lucedale	Local, MEMA, FEMA	2022	(Action 2.2 in previous plan) The county has looked at retrofitting critical buildings but funding has been lacking. The county will continue to pursue this action contingent upon the availability of funding.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-3	Ensure that new city buildings are designed and built to hurricane resistant building codes.	Hurricane and Tropical Storm, Tornado	High	City of Lucedale; City Building Department	Local	2022	(Action 2.5 in previous plan) New buildings have been generally built to code, but the city will need to continue to be vigilant in monitoring this going forward so this action will remain in the plan.
Natural Resource Protection							
NRP-1	Ensure that environmental resources are protected and preserved through open spaces and green spaces.	All	Moderate	City Building Department and Planning Commission	Local	2022	(Action 2.6 in previous plan) The city has made significant efforts to preserve open/green spaces over the past several years, but these efforts will need to be continued as development and construction continues to take place in the city
NRP-2	Ensure that environmental resources are protect and preserved through conservation easements in natural wetlands and riparian areas.	Hurricane and Tropical Storm, Flooding	Moderate	Land Trust for the Mississippi Coastal Plain, City of Lucedale, George County	Local	2022	(Action 2.7 in previous plan) Conservation easements have been used in some cases in the past, but this action is not complete as the city would like to continue to have this tool available to maintain areas for water storage/overflow.
Structural Projects							
SP-1							

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Emergency Services							
ES-1	Ensure that communication systems are adequate during disasters.	All	High	City of Lucedale; George County Emergency Management	Local	2022	(Action 2.1 in previous plan) In the past several years, the city has worked to ensure adequate communication systems, but there are many improvements that could still be made so the city will continue to pursue these alternatives.
ES-2	Assess the current status of generators for maintenance of critical facilities.	All	High	City of Lucedale	Local	2022	There is a maintenance agreement and schedule in place for generators owned by the city/county. The city and county will continue to monitor this and try to improve the number/quality of generators available for use during disasters.
ES-3	Explore potential sites for a new special needs shelter.	Hurricane and Tropical Storm, Flooding	Moderate	City of Lucedale; George County Emergency Management	Local	Completed	In discussions with Stone County, they have completed a special needs shelter which could be used by George County residents if needed so this action will be considered complete.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-4	Enhance emergency response capabilities.	All	Low to Moderate	City Police Department; City Fire Department	Local	2022	(Action 4.6 in previous plan) The city has worked to improve its response operations through planning and training, but since these tasks require constant vigilance and evaluation, this action will remain in the plan going forward as the city works to continue to improve its capabilities.
Public Education and Awareness							
PEA-1	Enhance the city's elevation awareness program.	Flooding, Hurricane and Tropical Storm	Moderate	City Building and Public Works Departments	Local	2022	(Action 1.2 in previous plan) The city has made some efforts to make citizens aware of its elevation program, however, this information has certainly not reached every citizen so the city will continue to reach out and try to improve citizen understanding of this program.
PEA-2	Expand public awareness through education and outreach materials to citizens and visitors.	All	High	City of Lucedale	Local	2022	(Action 3.1 in previous plan) The county has done a great deal to develop materials for distribution to citizens and improve public awareness, but these materials will require updates over the next 5 years, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-3	Encourage families to develop family disaster plans through the Masters of Disaster Curriculum Program.	All	Moderate to High	City First Responders (Police, Fire, etc.)	Local	2022	The City will continue to educate citizens on family disaster plans but not through the Masters of Disaster Program
PEA-4	Develop and/or expand outreach strategies for vulnerable populations.	All	Moderate to High	City of Lucedale staff and officials; Lucedale Police Department; Lucedale Fire Department	Local	2022	(Action 3.3 in previous plan) Although some outreach to vulnerable populations has taken place, the city sees this as an area where constant contact is required so this action will be retained.
PEA-5	Provide and/or expand outreach information on hazard-resistant structures.	Al	High	Lucedale Building Department	Local	2022	(Action 3.4 in previous plan) The city has done some outreach on constructing hazard resistant structures, but this is an area where more outreach is required so the city will continue to pursue this action.
PEA-6	Enhance disaster preparedness of local government.	All	Moderate to High	City of Lucedale	Local	2022	(Action 4.4 in previous plan) The city has taken a number of steps to improve its own disaster preparedness and will continue to try to improve this through outreach and interactions with citizens in the future.

Hancock County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Join the Community Rating System Program.	Hurricane, Flooding, Climate Change	High	Building and Zoning Department	Local	2019	(Action 2012-5.B in previous plan) The county is not currently in the CRS but it would like to continue its efforts to join the program going forward.
P-2	Develop a Repetitive Loss Plan.	Hurricane, Flooding	High	Building and Zoning Department	FEMA-Flood Loss Planning	2021	(Action 2012-5.C in previous plan) Although the county has made significant efforts to reduce its number of repetitive loss properties, it has not developed a formal plan yet
P-3	Encourage household hazardous waste collection days to collect hazardous chemicals.	Hurricane, Flooding	Moderate	Hancock County Board of Supervisors	MS DEQ	2022	(Action 2012-5.D in previous plan) The county has held a household hazardous waste collection day in the past but would like to continue to this program more frequently in the future, so this action will remain in place.
P-4	Require proof of insurance for boats in public marinas as part of the slip contract.	Hurricane, Flooding	Low	Port Director	Local funds	Completed	(Action 2012-5.F in previous plan) The county has started requiring proof of insurance for boats in the public marina as part of the slip contract so this action is complete.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-5	Encourage the Hancock County Solid Waste Authority to contract for a monthly household hazardous waste collection.	Hurricane, Flooding	Low	Hancock County Solid Waste Authority	MS DEQ	2022	(Action 2012-5.G) The HCSWA has not begun monthly collection of household hazardous waste, so this action will remain an action in the plan.
P-6	Update typographic information to 1 foot contours to assist with planning for sea level rise.	Climate Change, Flooding	Low	Building and Zoning Office	Local funds	2017	(Action 2012-11.A) The county has not updated typographic information to 1 foot contours but has made some progress in that direction, so this action will remain in place.
P-7	Consider setbacks from canals and natural waterways to protect structures from sea level rise.	Climate Change, Flooding	Low	Building and Zoning Department	Local funds	2017	(Action 2012-11.B) The county is working to implement setbacks from canals and waterways, however these have not been implemented to the degree the county would like so this action will remain in place.
P-8	Assess and develop continuity plans for Volunteer Fire Departments.	All	High	Hancock County Emergency Management Agency	Local funds	2019	(Action 2006-1.1 in previous plan) Continuity plans for VFDs have been developed and assessed but these plans will need to be reviewed and updated again in the coming years.
P-9	Adopt and implement updates to the International Building Code as the updates become available.	Hurricane, Earthquake, Severe Weather	High	Building Office	Local funds	2022	(Action R2006-4.1 in previous plan) The county has adopted and implemented updates to the IBC as they have come out. However, it is likely that there will be future updates that will need to be adopted going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-10	Continue to implement recommendations of the Drainage Master Plan and continue to upgrade drainage facilities throughout the community to protect private and public property.	Hurricane, Flooding, Dam Failure	Low	Hancock County Road Dept.	Local funds, FEMA-HMGP	2022	(Action R2006-4.8 in previous plan) The county has begun implementing recommendations of the DMP and implemented some projects, but there are still many elements of the plan that need to be implemented going forward.
P-11	Continue to implement the county's substantial damage and cumulative impact requirements.	Hurricane, Flooding	High	Hancock County Building and Zoning Office	Local funds	2022	(Action R2006-4.9 in previous plan) The county has enforced its substantial/cumulative damage requirements, but these will need to be reviewed and evaluated as implementation continues in the future.
P-12	Continue to maintain FEMA Elevation certificates on each building in the floodplain in Hancock County.	Hurricane, Flooding	High	Hancock County and Diamondhead Building Office	Local funds	2022	(Action 2006-4.12 in previous plan) The county has maintained ECs for all buildings in the floodplain and will continue to implement its efforts to this effect going forward.
P-13	Continue to enforce the county's Erosion Control Ordinance to include erosion and sediment control BMPs as required by NPDES Phase II Program.	Hurricane, Flooding	Moderate	Hancock County Building Official; Diamondhead Building Official	Local funds	2022	(Action 2006-4.15 in previous plan) The county's ECO has been implemented using BMPs as required by the Phase II Program. The county will continue its implementation of this program and look for ways to improve practices.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-14	Continue to implement drainage standard operating procedure.	Hurricane, Flooding	Moderate	Hancock County Road Manager	Local funds	2022	(Action 2006-4.20 in previous plan) The county has implemented drainage standard operating procedures over the past several years, but it will plan to review and update these in the coming years as needed to implement properly.
P-15	Draft and adopt a Stream Dumping Ordinance to prohibit deposition of debris in the drainage systems.	Hurricane, Flooding	Low	Hancock County Road Manager	Local funds	2018	(Action R2006-4.21 in previous plan) The county has not implemented a SDO, so this action will need to continue to be pursued going forward.
P-16	Purchase, install, and use the STAMP software program to make flood elevations available for review by building and zoning officials.	Hurricane, Flooding	Moderate	Hancock County Building Office	Local funds	2018	(Action R2006-4.22 in previous plan) The county has not started utilizing the STAMP program but will continue to evaluate the usefulness and implementation of this program.
P-17	Continue to enforce tie down requirements for mobile homes.	All Severe Weather	Moderate	Hancock County Building and Zoning	Local funds	2022	(Action R2006-5.6 in previous plan) The county has been enforcing tie-down requirements for mobile homes but these may need to be evaluated for improvement in the future so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-18	Hancock County Board of Supervisors should require a maintenance plan and an emergency operations plan for dams built as infrastructure within a subdivision. These plans should be required and recorded as part of the subdivision plan.	Dam Failure	Low	Building and Zoning Dept.	Local funds	2017	(Action R2006-8.5 in previous plan) The county has not required maintenance plans or EOPs for dams in subdivisions, but it would like to start implementing this in the future.
P-19	Continue to implement a plan to conserve green spaces.	Erosion, Climate Change, Flooding	Low	Hancock County Board of Supervisors	CIAP, Tidelands	2022	(Action R2006-10.2 in previous plan) The county has worked to conserve green space in many areas of the county, but as development continues, the county will need to remain active in this endeavor.
P-20	Require subdivisions and community development projects to be submitted by a professional engineering and reviewed by a professional engineer employed by the county.	Flooding	Moderate	Hancock County Board of Supervisors; Building and Zoning Department	Local funds	2022	(Action 2006-11.6 in previous plan) County engineers have worked to review all subdivision and community development projects, but additional resources in this task would help improve the processing.
P-21	Keep drainage channels open.	Flooding	Moderate	Road Department	Local funds	2022	(Action 2006-11.10 in previous plan) The county has a maintenance program that aims to keep channels open but there are certainly improvements that could be made and to ensure channels flow freely.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-22	Update drainage study to include areas beyond the surge areas identified with Hurricane Katrina.	Flooding	Moderate	Hancock County Board of Supervisors	Corps of Engineers	2019	(Action 2006-11.11 in previous plan) Although this plan has not been updated beyond surge areas identified during Katrina, these studies have proved useful and the county would like to continue to try to expand these study areas.
Property Protection							
PP-1	Elevate section of Highway 604 to ensure a safe evacuation route.	Hurricane, Flooding	Moderate	Hancock County Board of Supervisors; Gulf Regional Planning Commission	FHWA	2017	(Action 2012-5.I in previous plan) The county has been working with the FHWA to elevate this section of road, but it has not been completed yet, so the action will remain.
PP-2	Relocate Diamondhead Sewer System treatment facilities and other new treatment facilities in Hancock County to areas located outside of the floodplain and elevated above BFE.	Hurricane, Flooding	High	Diamondhead Water and Sewer District	CDBG, CWA-RLF, EPA, FEMA-HMGP	2019	(Action 2006-1.2 in previous plan) These facilities have not been relocated but plans are still in place to implement this action so it will stay in the plan.
PP-3	Continue to harden key lift stations to ensure safe operation during times of no power.	Hurricane, Flooding	High	Hancock County Sewer Organizations	CWA-RLF, FEMA-HMGP	2022	(Action 2006-1.3 in previous plan) The county has hardened a number of key lift stations to ensure continuity of operations, but there are still several vulnerable stations that the county would like to harden.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-4	Retrofit existing sewer systems: equip grinder pumps with surge protectors and provide back-up generators.	All	High	Hancock County Utility Authority Sewer Districts	CWA-RLF, FEMA-HMGP	2022	(Action R2006-1.13 in previous plan) Some existing sewer systems have been equipped, but there are a number that would still benefit from this so the action will remain in place.
PP-5	Build new public buildings above base flood elevation and provide protection from hurricane force winds.	Hurricane, Flooding	High	Hancock County Board of Supervisors; Diamondhead City Council	FEMA-HMGP	2018	(Action R2006-1.14 in previous plan) The county has made great efforts to ensure new public buildings are built above the BFE, but this action will stay in the plan to ensure continual implementation going forward.
PP-6	Establish back-up emergency operations locations throughout the county by strengthening new buildings as they are developed and by hardening existing suitable structures.	Hurricane, Flooding, Tornado, Earthquake	Moderate	Hancock County Emergency Management Agency	FEMA-HMGP	2018	(Action 2006-1.20 in previous plan) The county has attempted to build stronger and harden existing structures, but there are many existing structures especially that could be improved through retrofitting so the county will continue to pursue.
PP-7	Mitigate the library system structures to ensure these buildings are functional after a natural hazard event.	All	High	Hancock County Library System; Hancock County Board of Supervisors	FEMA-HMGP	2019	(Action R2006-3.1 in previous plan) A number of library branches have been addressed through mitigation measures, but there are still several that would benefit from hardening, elevation, or relocation.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-8	Retrofit existing public buildings for wind and water.	Hurricane, Flooding, Tornado, Hailstorm, Severe Thunderstorm/ High Wind	High	Hancock County Board of Supervisors	FEMA-HMGP	2019	(Action 2006-4.10 in previous plan) Many existing public buildings have been retrofit for wind and water, but there are still many public facilities that the county would like to retrofit so this action will be retained.
PP-9	Encourage people to protect property by insuring, floodproofing, and elevating their homes	Hurricane, Flooding, Dam Failure	High	Hancock County Emergency Management Agency, Hancock County Building and Zoning Office, Diamondhead Building Office	Local funds	2022	(Action 2006-4.11 in previous plan) Many efforts have been made to encourage citizens to protect their personal property, but there are still many citizens whose homes/property are not well-protected so the county will continue encouraging personal property protection
PP-10	Seek funding to assist property owners located in Special Flood Hazard Areas in mitigating their homes from flooding through elevation and acquisition, and identify programs to help property owners mitigate their structures from wind damage.	Hurricane, Flooding	High	Hancock County Board of Supervisors	Local funds, FEMA-HMGP	2022	(Action 2006-4.25 in previous plan) The county has used grant funding through HMGP and other grant programs in the past to help citizens mitigate their property, but there are still many areas where mitigation actions could be implemented and the county will continue to pursue funding to help implement.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-11	Encourage the development of safe rooms in homes and businesses in Hancock County.	Tornado	Moderate	Hancock County Building and Zoning	Local funds	2022	(Action 2006-5.9 in previous plan) Many citizens have safe rooms and the county has encouraged these historically, but given the many recent tornado events in the state, the county will need to continue encouraging this even more.
PP-12	Promote the purchase of earthquake insurance by homeowners and business owners.	Earthquake	Low	Building and Zoning Dept.	Local funds	2022	(Action 2006-9.1 in previous plan) The county has promoted purchasing earthquake insurance for homeowners, but many have not purchased this so the county will continue to provide information on this as much as possible.
Natural Resource Protection							
NRP-1	Adopt the "Beneficial Use of Dredge Material" Plan for placement of all new erosion control and reef development activities in near shore water.	Hurricane, Erosion, Climate Change	Moderate	Corps of Engineers	Private funds	2017	(Action 2006-10.1 in previous plan) This plan was updated in 2011, but it will need to be reevaluated in the future and the county will continue to work with the state and private interests in this regard.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
NRP-2	Continue to renourish the beach and adopt beach protection measures.	Hurricane, Climate Change, Coastal Erosion	High	Hancock County Board of Supervisors	Seawall Tax	2022	(Action 2006-10.3 in previous plan) The county has continually renourished the beach in critical areas to try to reduce the impacts of erosion, but this process requires continual action over time so this action will remain in place.
NRP-3	Support marsh re-nourishment and restoration by participating with coastal states to protect wetlands and marshes as protective barriers from storms. Actions may minimize storm surge.	Hurricane	High	Hancock County Board of Supervisors	Restore Act	2022	(Action 2006-10.5 in previous plan) The county has supported restoration of wetlands and marshes when areas have been identified and the county will continue to support these projects where feasible in the future.
NRP-4	Restore barrier islands.	Hurricane, Climate Change, Erosion	Moderate	MS Secretary of State	National Park Service	2022	(Action 2006-10.7 in previous plan) Many of the barrier islands are being quickly depleted and so this action has not been accomplished. The county will continue to pursue this action.
Structural Projects							
SP-1	Determine feasibility to construct levee system to protect southern Hancock County including the areas of Pearlington, Ansley, Clermont Harbor, Waveland, and Bay St. Louis as well as the Port Bienville Industrial Park.	Hurricane, Climate Change	Moderate	Hancock County Board of Supervisors	US Army Corps of Engineers	2017	(Action 2012-5.A in previous plan) The county has coordinated with USACE, but this action has not been accomplished. The county will continue to pursue this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-2	Request that the US Army Corps of Engineers study the impact on southern Hancock County of existing structural flood protection impacts undertaken in southern Louisiana and project structural improvements in southern Louisiana.	Hurricane, Flooding	High	Hancock County Board of Supervisors	Corps of Engineers	2017	(Action 2012-5.H in previous plan) The county has coordinated with USACE, but this action has not been accomplished. The county will continue to pursue this action.
SP-3	Investigate the need for a second north-south roadway in Hancock County.	Hurricane, Flooding	Moderate	Hancock County Board of Supervisors; Gulf Regional Planning Commission	FWHA	2018	(Action R2006-2.6 in previous plan) The county has coordinated with FHWA, but this action has not been accomplished. The county will continue to pursue this action.
SP-4	Increase the capacity of Highway 603 between Highway 43 and Highway 53, and Highway 53 between Highway 603 and Interstate 59, to four lanes.	Hurricane, Flooding	Moderate	Hancock County Board of Supervisors; Gulf Regional Planning Commission	FHWA	2018	(Action R2006-1.18 in previous plan) The county has coordinated with FHWA, but this action has not been accomplished. The county will continue to pursue this action.
SP-5	Increase the capacity of Highway 43 to Interstate 59 from two lanes to four lanes.	Hurricane, Flooding	Moderate	Hancock County Board of Supervisors; Gulf Regional Planning Commission	FHWA	2018	(Action 2006-1.19 in previous plan) The county has coordinated with FHWA, but this action has not been accomplished. The county will continue to pursue this action.
SP-6	Continue to develop centralized water and sewer systems to serve flood-prone areas to assist with recovery by protecting drinking water.	Flooding, Hurricane	High	Hancock County Board of Supervisors; Hancock County Utility Authority	USDA, CIAP, CWA, RLF, CDBG	2020	(Action 2006-11.1 in previous plan) The county has taken a number of steps to develop a centralized, protected water and sewer system, but there are still vulnerable areas to drinking water loss, so the county will continue to work with partners to accomplish this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-7	Modify storm drainage system to implement structural projects that relive existing and projected flood conditions.	Flooding	Moderate	Hancock County Board of Supervisors	NRCS, FEMA-HMGP, CDBG	2022	(Action R2006-11.2 in previous plan) The county has implemented a number of structural projects to improve flood conditions, but there are still many projects that could be implemented to improve this system so the action will remain in place.
SP-8	Continue county culvert replacement program.	Flooding	High	Road Department	Local funds	2022	(Action 2006-11.4 in previous plan) Many culverts have been replaced through this program, but there is a need to continually evaluate culverts for replacement so the action will remain in the plan.
Emergency Services							
ES-1	Where possible and legal, continue to pre-select and negotiate contracts for emergency response and recovery.	All	High	Hancock County Board of Supervisors; Diamondhead City Council	Local	2022	(Action 2012-14.A in previous plan) The county has pre-selected many contracts for response/recovery services and as these contracts expire or the need for new contracts is established, the county will negotiate in advance as much as possible.
ES-2	Complete and maintain a new EOC that provides a safe area for sheltering, staging of equipment, response supplies, and emergency responders after a natural hazard event.	All	High	Hancock County Emergency Management Agency; Hancock County Board of Supervisors	Insurance, FEMA-HMGP	2020	(Action 2006-1.15 in previous plan) The county is working on completing a new EOC with additional capabilities, but this has not been completed yet so the action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-3	Secure and utilize effective new technologies to communicate with residents before, during, and after a hazardous event.	All	High	E-911 Commission	Local funds, FEMA	2022	(Action R2006-2.5 in previous plan) The county has implemented a number of new technologies to communicate with residents, but because technology improves quickly the county will continue to be vigilant about new ways to improve communication.
ES-4	Continue to use the E-911 call out system to alert people living in evacuation zones of the need to evacuate.	Hurricane, Flooding	High	E-911 Commission	Local funds	2022	(Action 2006-2.6) The county has implemented an E-911 system and has made several improvements to the system recently. This action will remain in place as the county continues to make improvements to the system.
ES-5	Investigate incentives to help mobile home parks establish tornado shelters for their residents.	Tornado, All Severe Weather	Moderate	Hancock County Emergency Management Agency	Private Funding	2017	(Action 2006-2.8 in previous plan) The county has attempted to work with park owners to establish tornado shelters, but there are still many that do not have adequate facilities for this so the county will continue to try to find ways to incentivize this.
ES-6	Maintain a special needs only shelter and establish partnerships for operations.	Hurricane, Flooding, Tornado, Earthquake	High	Hancock County Emergency Management Agency; Hancock Medical Center	Local funds	2020	(Action 2006-2.10) The county has established a special needs only shelter, but it is possible additional shelters may be needed as more special needs populations are identified.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-7	Maintain shelter standards.	Hurricane. Flooding, Tornado, Earthquake	Moderate	Hancock County Emergency Management Agency; Hancock County Board of Supervisors	Local funds, FEMA-HMGP	2022	(Action 2006-2.11 in previous plan) The county has established a number of new shelters recently and standards at these have been maintained. This action requires constant vigilance so the county will need to monitor these shelters to ensure standards are met.
ES-8	Support regional pet friendly shelters.	Hurricane, Flooding, Earthquake	Moderate	Hancock County Animal Shelter; Friends of the Animal Shelter	Local funds	2022	(Action 2006-2.12 in previous plan) The county has supported pet-friendly shelters in the past and will plan to do so in the future as well so this action will stay in the plan.
ES-9	Establish a program to micro-chip pets. Pets that have a micro-chip are more likely to be returned to their owners after any hazardous event.	All	Low	Hancock County Animal Shelter; Friends of the Animal Shelter	Foundation/non-profit grants	2019	(Action 2006-2.17 in previous plan) Many pets across the county have been micro-chipped but there are also many that have not so the county will need to continue to encourage this alternative for residents.
ES-10	Maintain shelters in Hancock County.	Hurricane, Flooding, Tornado, Earthquake	High	Hancock County Emergency Management Agency; Hancock County Board of Supervisors	Local funds	2022	(Action R2006-2.18 in previous plan) The county has established a number of new shelters recently and standards at these have been maintained. This action requires constant vigilance so the county will need to monitor these shelters to ensure standards are met.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-11	Establish telecommunications links with Stennis Space Center, Pearl River County, Harrison County, MEMA, and FEMA, and increase reliability of the communications system and interoperability between emergency services responders. Improve public safety internal communications and ensure reliability in any type of disaster.	All	High	E-911 Commission	Local funds, FEMA-HMGP	2020	(Action 2006-3.2 and R2006-3.6 in previous plan) The county has worked with many agencies and neighboring communities to establish interconnected communications systems, but there are always more agencies that may integrated, so the county will work to improve its network in the future.
ES-12	Request cellular phone companies to provide HCEMA with an emergency operations plan for cellular communications during emergency situations.	All	Moderate	Hancock County Emergency Management Agency; Hancock County Building Office	Local funds to review and file plans	2022	(Action 2006-3.5 in previous plan) In the past, the county has worked with cell companies to plan for cellular communications during an event. The county will continue to work with these companies to try to establish the best possible service post-disaster.
ES-13	Enhance E-911 call system to recognize the location of cell phone calls received at the dispatch center.	All	High	E-911 Commission	Local funds, FEMA	2018	(Action 2006-3.10 in previous plan) The county has not been able to accomplish this task due to lack of funding. Will continue to pursue.
ES-14	Join the NOAA Storm Ready Community Alert Program.	All	High	Hancock County Emergency Management Agency	Local funds	2020	(Action 2006-4.3 in previous plan) The county is working to join this program as it had been lacking a secure location previously but that has now been established.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-15	Provide pre-hurricane season exercise.	Hurricane, Flooding	High	Hancock County Emergency Management Agency	Local funds	2018	(Action 2006-4.4 in previous plan) There have been pre-hurricane exercises previously, but the county will need to hold additional exercises each year and ensure that staff is prepared and trained.
ES-16	Augment warning systems throughout Hancock County.	All Severe Weather	High	Hancock County Emergency Management Agency	FEMA-HMGP	2022	(Action 2006-5.3 in previous plan) Although many steps have been taken to augment the warning systems in the county, there are still additional actions that could be taken to improve these systems in the future so the action will remain in place.
ES-17	Purchase brush trucks or quick attack trucks and strategically place the trucks throughout the county for use by multiple stations.	Wildfire	Moderate	Fire Protection Districts	FEMA-AFG, CDBG, RDA	2018	(Action R2006-6.2 in previous plan) Although brush trucks have been established as a good idea, they have not been fully implemented throughout the county.
ES-18	Encourage joint exercises among departments to train together for large wildfires.	Wildfire	High	Hancock County Emergency Management Agency; Fire Protection Districts	Local funds	2018	(Action R2006-6.3 in previous plan) The county has participated in joint exercises previously, but the county will need to hold additional exercises each year and ensure that staff is prepared and trained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-19	Purchase a marine fire fighting vehicle.	Wildfire	Low	Hancock County Board of Supervisors	FEMA-AFG, Coast Restore Act Funds	2020	(Action 2006-6.6 in previous plan) The county has not purchased a marine fire fighting vehicle so this action will remain in place.
ES-20	Diamondhead Property Owners Association will continue to use a warning system to alert golfers of threatening lightning.	All Severe Weather	Moderate	Diamondhead Property Owner's Association	Property dues	2022	(Action R2006-7.1 in previous plan) The DPOA has utilized its warning system in the past and will continue to look for ways to improve this system going forward.
ES-21	Subscribe to the Lightning Detection Network, which alerts subscribers when dangerous lightning is within the region.	All Severe Weather	Low	Hancock County Emergency Management Agency	Local funds	2017	(Action 2006-7.3 in previous plan) Although the county has not subscribed, it will work on this action in the near future.
ES-22	Program emergency warning system to warn for lightning.	All Severe Weather	Low	Hancock County Emergency Management Agency; E-911	FEMA-HMGP	2022	(Action 2006-7.4 in previous plan) Although there are many methods for receiving warning for lightning, the emergency warning system has not been programmed as such. The county will continue to evaluate the efficacy of this action going forward.
ES-23	Spread sand on bridges that may ice during cold weather storms.	Extreme Cold, Winter Weather	Low	Road Department	Local funds	2022	(Action 2006-9.3 in previous plan) The county has spread sand on bridges in the past, but the county will need to continually evaluate best practices for implementation of this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-24	Post signs on all bridges in the county which state "may ice in cold weather."	Extreme Cold, Winter Weather	Low	Road Department	Local funds	2017	(Action 2006-9.4 in previous plan) Most DOT bridges have these signs, however, most county bridges do not. The county will work to improve this in the future.
ES-25	Establish a sheltering plan for people without homes.	Extreme Cold, Winter Weather	Moderate	Hancock County Emergency Management Agency; Human Services	Gulf Coast Continuum of Care	2015	(Action R2006-9.5 in previous plan) Although some private/non-profit entities have assisted in this action, there is no formal plan for this action so the county will continue working to establish a more formalized plan.
ES-26	Provide EMC training for Volunteer Fire Departments and continue to participate in exercises to sharpen emergency response skills.	All	High	Hancock County Emergency Management Agency	Local funds	2017	(Action 2006-13.2 in previous plan) Trainings have been provided on an annual basis in the past and this action will need to be continually implemented going forward so it will remain in place.
ES-27	Establish a fuel reserve for emergency situations.	All	Moderate	Hancock County Emergency Management Agency	Local funds	2022	(Action 2006-13.6 in previous plan) The county has established a fuel reserve in the North Barn. It will continue to maintain this stock and evaluate the need for further reserves in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-28	Continue badging program to ensure that essential county personnel can respond within disaster area to contain damages quickly.	All	High	Hancock County Emergency Management Agency	Local funds	2022	(Action 2006-13.8 in previous plan) A badging program has been established but there is a need for consistently updating badged personnel to ensure they are well-trained and prepared in an emergency.
Public Education and Awareness							
PEA-1	Support mitigation library in the Hancock County Library branches that provides materials on flood proofing and retrofitting and direct county residents to use these resources.	Hurricane, Flooding, Tornado	High	Building and Zoning Department	Local funds	2022	(Action 2012-5.E in previous plan) The county has established education materials in many of its libraries but will need to ensure these materials are up to date by evaluating consistently.
PEA-2	Establish training and outreach programs to prepare local businesses to be competitive in the disaster recovery and rebuilding economics.	All	Moderate	Chamber of Commerce; Pearl River Community College	MDA	2022	(Action 2012-14.B in previous plan) Training and outreach programs to businesses have been established, but these efforts will need to be continued and updated as the economic climate changes.
PEA-3	Publicize evacuation routes and locations of regional shelters.	Hurricane, Flooding, Tornado, Earthquake	Moderate	Hancock County Emergency Management Agency, American Red Cross	Local funds	2022	(Action 2006-2.2 in previous plan) Evacuation routes and shelter locations have been publicized in the past, but it is likely that many citizens still are not aware of the location, so additional efforts at outreach are needed.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-4	Promote the development of personal protection plans.	All	Moderate	Hancock County Emergency Management Agency; American Red Cross	Local funds, private donations, foundation funding	2022	(Action R2006-2.3 in previous plan) The county has promoted personal protection plans for individual citizens, but there are still a great number of citizens without these plans so the county will continue its efforts to promote these.
PEA-5	Establish continuity training workshops for businesses.	All	Low	Hancock County Chamber of Commerce	Local funds, foundations	2022	(Action 2006-3.3 in previous plan) Training and outreach programs to businesses have been established, but these efforts will need to be continued and updated as the economic climate changes.
PEA-6	Mail out a brochure to owners of property located in Special Flood Hazard Areas, suggesting methods for floodproofing.	Hurricane, Flooding, Dam Failure	High	Hancock County Building Official and Diamondhead Building Official	Local funds	2022	(Action 2006-4.18 in previous plan) The county has mailed out information to property owners in the SFHA, but since there are many unmitigated properties still in the SFHA, this action will need to be continued.
PEA-7	The Fire Coordinator and partners will provide homeowner education about protecting homes from wildfires.	Wildfire	High	Mississippi Forestry Commission	State-MFC	2018	(Action R2006-6.4 in previous plan) The Fire Coordinator has provided homeowners with protection information in the past, but many homes are still at risk and homeowners will need to be reminded of the need for them to take action on a regular basis.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-8	Seek partners to educate residents and business owners about invasive species that may contribute to the loss of wetlands	Climate Change, Erosion	Low	MDMR, Land Trust for MS Coastal Plain	EPA Five Star Program, USFWS Focus Funds, CIAP, Tidelands	2022	(Action 2006-10.8 in previous plan) Efforts have been made to educate residents on invasive species, but this is not at the forefront of the mind of many citizens so additional efforts will be required.
PEA-9	Maintain a partnership with the American Red Cross to provide mitigation and prevention education in Hancock County.	All	High	Hancock County Emergency Management Agency; American Red Cross	Local	2022	(Action R2006-12.2 in previous plan) A strong partnership with the Red Cross exists and they have provided education in the past, but there is room for improvement so this action will be evaluated.
PEA-10	Promote public information of prevention actions that can be taken by families and individuals.	All	High	Hancock County Emergency Management Agency	Local	2022	(Action R2006-12.3 in previous plan) The county has promulgated public information for individual citizens, but there are still a great number of citizens who remain uninformed so the county will continue its efforts to promote public awareness.

City of Bay St. Louis Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Apply to Insurance Services Office (ISO) to further lower the NFIP Flood Insurance Rating.	Flooding	High	CRS Administrator; Floodplain Insurance Administrator	Local funds	2018	(Action 2011-01 in previous plan) The city has worked to improve its rating in the CRS and will continue to try to improve that rating by implementing programs to reduce flood risk.
P-2	Develop a Repetitive Loss Plan for the recently annexed area of the city.	Flooding	High	City of Bay St. Louis Flood Insurance Administrator; City Council, CRS Coordinator	MEMA Planning funds, local funds	2021	(Action 2011-02 in previous plan) Although the city has made significant efforts to reduce its number of repetitive loss properties, it has not developed a formal plan yet
P-3	As development occurs in the annexed area, require that green space be set aside.	Flooding	High	City Council	FEMA, local funds	2022	(Action 2011-03 in previous plan) The city has had some development occur in the annexed area, but there will likely be more in the future and the city will need to make sure green space is set aside.
P-4	Participate in the development of the County Hazard Mitigation Plan.	Hurricane, Flooding, Wind	High	Bay St. Louis Building Department; Public Safety Departments	Local funds	2017	(Action 2005-48 in previous plan) The city has worked with the county and several neighboring counties to develop and update a regional hazard mitigation plan this year.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-5	Continue to maintain FEMA elevation certificates on each building in Bay St. Louis.	Flooding	High	Building Official; CRS Coordinator	Local funds	2022	(Action 2000-01 in previous plan) The city has maintained elevation certificates for all buildings, but will need to continue to collect this information going forward so this action will remain in place.
P-6	Continue to enforce City Ordinance No. 285 to protect natural drainage from development.	Flooding	High	Building Official	Local funds	2022	(Action 2000-03a in previous plan) The city has enforced this ordinance, but will continue to enforce it and look for any ways to improve its execution in the future.
P-7	Continue to enforce City Ordinance No. 285 to include erosion and sediment control Best Management Practices (BMP's) as required by NPDES Phase II Program.	Flooding	High	Building Official	Local funds	2022	(Action 2000-03b in previous plan) The city has enforced this ordinance, but will continue to enforce it and look for any ways to improve its execution in the future.
P-8	Continue to enforce the city's Subdivision Regulations to require that streets in subdivisions are located above flood elevation to prevent isolation.	Flooding	High	Building Official	Local funds	2022	(Action 2000-04 in previous plan) The city has enforced Subdivision regulations related to requiring elevated streets, but as new subdivisions are constructed the city will need to remain vigilant in terms of review and enforcement.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-9	Continue to implement the city's Substantial Damage Rule.	Flooding, Hurricane and Tropical Storm	High	Building Official	Local funds	2022	(Action 2000-06 in previous plan) The city has implemented its substantial damage rule with structures impacted by disasters, but it will need to continue to remain vigilant in terms of review and enforcement.
P-10	Continue to implement Drainage Standard Operating Procedure (SOP).	Flooding	High	Public Works Director	Local funds	2022	(Action 2000-07 in previous plan) The city has implemented a Drainage SOP, but it will need to continue to remain vigilant in terms of review and enforcement.
P-11	Continue to enforce the Stream Dumping Ordinance to prohibit depositing of debris in the drainage system.	Flooding	High	Public Works Director	Local funds	2018	(Action 2000-08 in previous plan) The city has enforced the SDO, but will need to continue to work towards ensuring depositing of debris does not take place in the drainage system.
P-12	Continue to enforce standards for hurricane resistant construction.	Hurricane, Tornado, Severe Thunderstorm/ High Wind	High	Building Official	Local funds	2022	(Action 2000-09 in previous plan) The city currently enforces standards for hurricane resistant construction, but as standards change, these standards may need to be updated.
P-13	Continue to enforce the city's Tree Ordinance.	Flooding, Storm Surge, Hurricane	High	City Tree Officer	Local funds	2022	(Action 2000-13 in previous plan) The city has enforced its Tree Ordinance, but it will keep this action in the plan as it continues to attempt to improve implementation of the ordinance.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-14	Digitize property maps to include base flood elevations and flood hazard information.	Flooding	High	Hancock County Tax Assessor	Local funds	2019	(Action 2000-15 in previous plan) The city has begun work on digitizing flood maps and flood hazard information, but there is still some progress to be made in terms of completing this action.
P-15	Partner with NASA's Commercial Remote Sensing Department for additional map based information.	All	Moderate	Planning Department	Local funds	2020	(Action 2000-22 in previous plan) The city has coordinated with NASA on collecting some additional data, but this action will remain in place as additional data will likely become available and continued coordination will be useful.
P-16	Develop a five year capital improvement program and continue to upgrade drainage facilities throughout the city to protect private and public property.	Flooding	High	City Council	Local funds, grant funds for implementation	2022	(Action 2000-23 in previous plan) The city has developed a CIP and has implemented a number of drainage projects throughout its jurisdiction, but as a new five-year period begins, this program's projects will need to be evaluated.
P-17	Coordinate with adjacent communities to assure that actions taken within one community will not contribute to a great impact by hazards within the floodplain and neighboring communities.	Flooding	High	City Council	Staff time	2022	(Action 2000-36 in previous plan) The city has coordinated with the county and neighboring communities to ensure that its actions will not adversely impact those communities. This coordination should be continuous going forward so the city will keep this action in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Property Protection							
PP-1	Seek funding to assist homeowners located in the Special Flood Hazard Areas to mitigate their homes from flooding through elevation and acquisition.	Flooding	High	City Council	FEMA HMGP, FMA, SRL funding, CDBG, and other programs as available	2022	(Action 2005-46 in previous plan) The city has used grant funding through HMGP and other grant programs in the past to help citizens mitigate their property, but there are still many areas where mitigation actions could be implemented and the city will continue to pursue funding to help implement.
Natural Resource Protection							
NRP-1							
Structural Projects							
SP-1							
Emergency Services							
ES-1							
Public Education and Awareness							
PEA-1	Establish a program to offer CEUs to real estate and insurance professionals on hazard mitigation.	Flooding, Severe Thunderstorm/ High Wind	High	Building Official	MEMA, local funds	2020	(Action 2005-40 in previous plan) The city has worked with real estate and insurance professionals to improve their understanding of mitigation but there is still room to improve this understanding further so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	The Building Office should continue to offer site specific information to property owners and update the data available as it is made available by the Tax Assessor, FEMA, and MEMA.	Flooding, Hurricane	High	Building Official	Local funds	2022	(Action 2005-43 in previous plan) The Building Office has offered recommendations to property owners in many cases and has attempted to keep them up to date on their property's risk. However, continued outreach on this is necessary as information is updated and released.
PEA-3	Market the Hazard Mitigation Loan Program to home and business owners.	All	Low	Hancock County Board of Supervisors	FEMA Disaster Resistant Community Funds	2022	(Action 2005-47 in previous plan) The city has worked to improve home/business owners' understanding of the HMLP, but there is still significant education that could take place so the action will stay in the plan.
PEA-4	Continue to mail out a brochure to owners of property located in Special Flood Hazard Areas which suggests methods for flood proofing properties.	Flooding, Hurricane and Tropical Storm, Tornado, Sever Thunderstorm/ High Wind	High	Building Official; CRS Coordinator	Local funds	2022	(Action 2000-05 in previous plan) The city has mailed out information to property owners in the SFHA, but since there are many unmitigated properties still in the SFHA, this action will need to be continued.
PEA-5	Post awareness posters in city offices.	Hurricane, Flooding, Tornado, High Wind, Severe Thunderstorm, Lightning, Heat	High	Building Official	Local funds	2022	(Action 2000-10 in previous plan) Awareness posters have been placed in many city offices to help increase public awareness of risks. However, posters need to be updated and posted in new locations where possible, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-6	Continue an internet website to make hazard mitigation information and programs and requirements in Bay St. Louis available to the public.	All	High	Building Official	Local funds	2022	(Action 2000-16 in previous plan) The city has information about hazard mitigation posted to its website but this information needs to be updated as better information becomes available. This action will remain in plan.
PEA-7	Participate in Hurricane Awareness Week by adopting a proclamation.	Hurricane	Moderate	Community Development Director	Local funds	2017, Annually	(Action 2000-17 in previous plan) The city has annually adopted a proclamation to participate in Hurricane Awareness Week and will continue to do so to improve citizen awareness of hurricane risk.
PEA-8	Participate in the Annual Mississippi Homebuilders Association Fair and Exposition, providing hazard mitigation information and related city programs and regulations.	All	Moderate	Building Official; CRS Coordinator; Fire Department	Local funds	2022	(Action 2000-18 in previous plan) The city has participated in the AMHAFE annually and has provided information on mitigation and regulations to the public at this event. The city will continue its participation in this event going forward.
PEA-9	Continue hurricane and storm safety curriculum in the Bay St. Louis High School.	Hurricane	Moderate	Bay St. Louis Fire and Police Department	Local funds	2022	(Action 2000-20 in previous plan) The city has worked with schools on a hurricane and storm safety curriculum and will plan to continue to participate in this endeavor going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-10	Implement flood awareness/storm surge markers in Special Flood Hazard Areas.	Flooding	Moderate	Building Official	Staff time	2019	(Action 2000-21 in previous plan) Although some storm surge markers have been placed, the city would like to add additional markers and improve overall awareness of the potential risk of this hazard.
PEA-11	Continue to update floodproofing, retrofitting, and construction technology resources in the Hancock County Library located in Bay St. Louis.	Flooding	High	CRS Coordinator	FEMA, staff time	2022	(Action 2000-35 in previous plan) The city has established education materials in its library but will need to ensure these materials are up to date by evaluating consistently.

City of Diamondhead Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Continue to implement a Floodplain Management Ordinance which includes substantial damage and cumulative impact requirements.	Hurricane, Flooding	High	City Building Official	Local funds	2022	(Action 2012-DHB in previous plan) The city has implemented a FDPO with substantial and cumulative damage requirements. The city will continue to review and implement this ordinance and so this action will stay in the plan.
P-2	Develop a Master Stormwater Plan for the City of Diamondhead and implement the recommendations included in the plan.	Hurricane and Flooding	High	City Council and Diamondhead Property Owners Association	USDA-NRCS, USACOE, MDEQ, FEMA-HMGP	2020	(Action 2012-DHE in previous plan) The city has not yet developed a MSP, but it is working to put this together and will maintain this action in the plan as a result.
P-3	Establish natural gas supply in Diamondhead.	All	Low	City Council	CDBG, FEMA-HMGP	2018	(Action 2012-DHG in previous plan) The city has not established a natural gas supply, but it is still planning to achieve this action so it will remain in the plan.
P-4	Establish and maintain fire breaks through Diamondhead.	Wildfire	Low	City Council, Fire Dept.	FEMA-HMGP, MFC	2018	(Action 2012-DHH in previous plan) Although natural fire breaks have not been established in all areas, some have been and the city will continue to establish these in areas where it will be useful.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-5	Establish a dam maintenance program and emergency operations plan for dam failure.	Dam Failure	Low	Public Works Office, Diamondhead Property Owners Association	Local funds	2020	(Action 2012-DHJ in previous plan) Although the city has looked at establishing a dam maintenance program, much work is still left to ensure safety during a dam failure. The city will continue to work towards developing an EOP and improve its dam program.
Property Protection							
PP-1	Reconstruct and elevate Kapalama Drive and the bridge north of Diamondhead to provide an adequate evacuation route.	Hurricane and Flooding	Moderate	City Council	FHWA, FEMA-HMGP	2017	(Action 2012-DHC in previous plan) The city has not elevated this road, but this remains on the list of projects the city would like to implement so this action will remain in the plan.
PP-2	Place power lines underground along city roadways.	All	Moderate	Coast Electric Power Association	CEPA	2017	(Action 2012-DHD in previous plan) Some power lines have been buried to reduce risk of damage during an event, but there are still some above ground lines along with power-related equipment. The city will attempt to implement this action further in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-3	Mitigate City Hall and Public Safety Building for hurricanes.	Hurricane	High	City Council	FEMA-HMGP	2020	(Action 2012-DHM in previous plan) The City Hall and Public Safety buildings have not been mitigated for hurricanes. Both of these facilities will be evaluated to determine if funding can be set aside for this task.
Natural Resource Protection							
NRP-1							
Structural Projects							
SP-1	Construct berm or levee and floodgate with pump to protect a Diamondhead neighborhood from flooding due to an existing drainage outlet that drains to St. Louis Bay.	Hurricane, Flooding	Moderate	City Council	USACOE, FEMA-HMGP, MDOT	2017	(Action 2012-DHF in previous plan) A berm/levee has not been constructed due to lack of available funding but the city will continue to see funding to implement this task in the future.
Emergency Services							
ES-1	Secure and utilize effective outreach methods to communicate with residents before a hazardous event.	All	Moderate	City Council; Fire Protection District	FEMA-HMGP	2022	(Action 2012-DHA in previous plan) The city has utilized various outreach methods to communicate with residents, but as technology has changed the city will continue to evaluate the best means of reaching out to the public prior to hazardous events.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-2	Establish an audible and an electronic warning system for areas susceptible due to flash flooding.	Dam Failure, Flooding	High	City Council; Diamondhead Property Owners Association	Local funds	2020	(Action 2012-DHK in previous plan) The city has established some systems to give warning for areas susceptible to flash flooding. The city will evaluate both audible and electronic systems to determine the best possible ways to provide this warning in the future.
ES-3	Establish warning signage and/or barriers for roads in Diamondhead that are susceptible to flash flooding.	Dam Failure, Flooding	Moderate	City Council; Diamondhead Property Owners Association	FWHA, FEMA-HMGP, Local funds	2022	(Action 2012-DHL in previous plan) Some warning signage has been established in the city in areas that are susceptible to flash flooding, but more signage and information is likely necessary, so the city will look to improve on this action in the future.
Public Education and Awareness							
PEA-1	Establish a public information program to alert residents of mitigation actions to reduce damage from natural disasters.	All	Moderate	City Building Office	Local Funds	2022	(Action 2012-DHI in previous plan) Although a public information program exists, there is significant room for improving outreach to citizens to help inform them of actions they can take to reduce their own risk. This action will stay in the plan.

City of Waveland Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Designate an offsite storage facility for public records north of Interstate 10 or implement a system to protect all public records from flood or hurricanes.	Hurricane and Flooding	High	CRS Coordinator	FEMA grant funds	2020	(Action 11 in previous plan) The city has been working to designate an offsite storage facility for public records as well as backing up some systems online. However, this has not been completed so the action will remain in the plan.
P-2	Update the City of Waveland Master Drainage Plan and implement new drainage improvement projects.	Flood	Moderate	Public Works Director	HMGP, CDBG, PA, MDOT, etc. grant funds	2022	(Action 18 in previous plan) A number of projects from the MDP have been implemented to improve drainage in the city, but there are still many drainage projects that the city would like to implement so this action will remain in the plan.
P-3	Use the eight acres the city has located on Waveland Avenue to develop football fields and create green space which will help reduce flooding within the surrounding area.	Flood	Moderate	Mayor's Office; CRS Coordinator; Public Works Director	BP settlement funds, FEMA grant funds	2020	(Action 19 in previous plan) The city has been working to develop a green space area to reduce flood risk, but this project is still in progress so the action will remain in the plan.
P-4	Develop and implement an automated database/GIS system for elevation certificates.	Flood	Moderate	CRS Coordinator	FEMA funding	2022	(Action 21 in previous plan) The city has not fully automated its database of elevation certificates, but it will continue to move to an electronic format and so will retain this action in the plan until that is complete.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-5	Establish programs to cleanout drainage canals throughout the city on an annual basis.	Erosion	High	Public Works Director	FEMA grant program	2017, Annually	(Action 23 in previous plan) The city has a program in place to clean out drainage canals on an annual basis, but it would like to retain this action in the plan as it looks for ways to improve this program.
P-6	Continue to control construction site runoff through requirement of clearing and grading permits erosion and sediment control regulations.	Flooding, Erosion	High	Planning/Code Office	To be determined	2020	(Action 27 in previous plan) The city has implemented regulations to reduce runoff on construction sites, but it would like to work on improving enforcement of these regulations going forward.
P-7	Continue to control post-construction site runoff so it does not exceed pre-development site runoff through enforcement of best management practices.	Flooding, Erosion	High	Planning	To be determined	2020	(Action 28 in previous plan) The city has implemented regulations to reduce runoff on construction sites, but it would like to work on improving enforcement of these regulations going forward.
P-8	Continue to strengthen floodplain regulations as appropriate.	Flooding	High	Floodplain Manager	Existing budget	2020	(Action 29 in previous plan) The city has strong floodplain regulations in place currently, but the city would also like to review these regulations going forward and look at ways to improve them and their enforcement so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-9	Work with flood insurance agents and lending institutions to ensure that mandatory flood insurance requirements are being met in area annexed in 2006 and throughout Waveland when new maps are adopted.	Flooding	High	Floodplain Manager	State, HMGP, FEMA	2020	(Action 33 in previous plan) The city has tried to work with insurance agents and lending institutions to ensure all flood insurance requirements are being met. In general, this has been achieved, but the city will need to continue to be proactive in this, especially as new construction takes place, so this action will remain in place.
P-10	Promote business continuity planning for small business and government.	All	Moderate	Civil Defense Director/Fire Chief	Local	2022	(Action 38 in previous plan) The city has attempted to promote business continuity planning, but many businesses still do not have plans in place so this action will stay in the plan.
P-11	Continue to update information about hazardous materials facilities in Waveland upon receiving Tier II Forms from the facilities.	Hazardous Materials	Moderate	Fire; Civil Defense	Local	2022	(Action 51 in previous plan) The city has collected information on Tier II facilities within the jurisdiction, but as facilities change function over time, this information will need to continue to be collected to ensure the city is aware of potential risk areas. This action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Property Protection							
PP-1	Protect external A/C equipment in the Central Fire Station and install underground storage tanks.	All	High	Fire Department (Chief)	HMGP	2020	(Action 1 in previous plan) The Central Fire Station is still in need of additional retrofitting so this action will be retained in the plan.
PP-2	Elevate residential structures on existing property located in the flood zones to comply with the current flood ordinance.	Flood	High	Fire Chief; Civil Defense; CRS Coordinator	HMGP, FMA	2022	(Action 3 in previous plan) Although many residential properties have been elevated to protect against flooding, there are still a number of structures within the city that are not protected so the city will continue to pursue this action.
PP-3	Acquisition and demolition of repetitive loss and severe repetitive loss properties.	Flood	Moderate	CRS Coordinator	HMGP and FMA grant funds	2022	(Action 17 in previous plan) Although many repetitive loss and severe repetitive loss properties have been mitigated in the city, there are still a number of these types of properties that require mitigation so the action will remain in place.
PP-4	Reconstruction and floodproofing of structure following hurricanes and/or other disasters.	Hurricane, Flooding	Moderate	CRS Coordinator	HMGP or FMA grant programs	2022	(Action 24 in previous plan) After past events, the city has attempted to help rebuild structures in more resilient ways, but given that it is likely that more disasters are likely to impact the city going forward, this action will be retained to continue to focus on building back stronger.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-5	Retrofit city-owned facilities and privately-owned residential structures to help protect these structures from damage during hurricanes and other natural disasters.	Hurricane, Flooding	Moderate	CRS Coordinator	HMGP, CDBG, PA, or FMA grant programs	2022	(Action 25 in previous plan) Several city-owned facilities have been retrofit to better protect them in the even to a disaster, but there are also still a number of facilities that have not been retrofit so the city will keep this action in the plan.
PP-6	Update list of city's repetitive flood loss properties to include properties in area annexed in 2006, and encourage owners of repetitive and severe repetitive loss properties citywide to participate in mitigation activities such as floodproofing, elevation, or buyout programs.	Flooding	High	Floodplain Manager; Planning; CRS Coordinator; Building Official	HMGP, FMA, RFC, SRL	2022	(Action 30 in previous plan) During this plan update, the city has acquired a current list of repetitive loss and severe repetitive loss properties. However, as the city continues to try to reduce this list, it will also continue to work to keep it updated.
PP-7	Acquire or otherwise remove repetitive and severe repetitive loss properties from the floodplain.	Flooding	High	CRS Coordinator	HMGP, FMA	2022	(Action 31 in previous plan) A number of repetitive loss and severe repetitive loss properties have been removed from the list over the years, but there are still a number of properties left on the list that need mitigation.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-8	Encourage business owners to protect vulnerable structures through floodproofing, elevation, shutters, and other mitigation activities.	Hurricane, Flooding	Moderate	Building Official, Planning, Mayor's Office, Floodplain Manager	HMGP	2022	(Action 32 in previous plan) The city has coordinated with business owners to try to encourage them to protect their property and some action has been taken, but there is still additional action that can be taken to improve the safety of businesses throughout the city so this action will remain in the plan.
Natural Resource Protection							
NRP-1	Evaluate and implement the best option for beach front erosion protection. Alternatives include fences, concrete barriers, create dune/vegetative areas.	Erosion	High	Harrison County Sand Beach Authority	Harrison County Beach Authority	2020	(Action 14 in previous plan) There are many areas where beach front erosion is taking place and each area may require different solutions. Some of these have been implemented in different cases, but there will need to be consistent re-evaluation of the shoreline to determine which strategy is best for each area.
NRP-2	Develop and implement a plan in an effort to protect and maintain the natural marshes and other barriers.	Erosion	High	Public Works Director	Local, Regional	2022	(Action 15 in previous plan) The city has tried to be aware of and participate in any efforts to protect and maintain natural barriers to erosion, but there has not been a formal plan to protect these areas so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
NRP-3	Dredge Jackson Marsh to restore wetlands and help reduce flooding.	Erosion	High	Public Works Director	FEMA grant programs	2022	(Action 22 in previous plan) The Jackson Marsh has not been dredged, but the city will continue to evaluate the efficacy of this action going forward so it will remain in the plan.
Structural Projects							
SP-1	Build access road from Sarah Lane north to Adams Lane to allow citizens on Sarah Lane to evacuate during storms.	Hurricane	High	Civil Defense	HMGP, CDBG	2020	(Action 4 in previous plan) An access road from Sarah Lane to Adams Lane has not been constructed but the city would still like to achieve this action so it will remain in the plan.
SP-2	Install barrier (check valve) in culvert under Highway 603 to prevent storm surge from entering the city and flooding homes.	Flood	High	CRS Coordinator; Civil Defense	HMGP, FMA, CDBG	2020	(Action 5 in previous plan) The city has not been able to build a check valve under Highway 603, but this is still an action the city would like to complete so it will remain in the plan.
SP-3	Install barrier (check valve) in culvert under railroad track on South Street to prevent storm surge from entering the city and flooding homes.	Flood	High	CRS Coordinator; Civil Defense	HMGP, FMA, CDBG	2020	(Action 6 in previous plan) The city has not been able to build a check valve under the railroad track on South Street, but this is still an action the city would like to complete so it will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-4	Coordinate with and support the US Army Corps of Engineering on projects in the MsCIP relating to the City of Waveland.	Hurricane, Flooding, Storm Surge, Sea Level Rise	High	All City Departments; Board of Alderman	To be determined	Corps of Engineers to determine schedule	(Action 7 in previous plan) The city has been in coordination with the USACE on projects related to Waveland, but there are still a number of incomplete projects that the city will need to continue to coordinate on.
SP-5	Extend stormwater drainage pipes into gulf to help eliminate sand from filling drainage pipes during storm events.	Erosion	Moderate	Public Works Director	Grant funds	2022	(Action 16 in previous plan) Stormwater drainage pipes have not been extended into gulf, but the city would still like to look into enacting this action to reduce sand buildup during storm events. This action will remain in the plan.
SP-6	Install bypass valves at all City of Waveland sewer lift station pumps to reduce or eliminate the loss of sewer service and cost of vacuum trucks.	Hurricane, Flooding	High	Public Works Director	FEMA grant funds	2022	(Action 26 in previous plan) Bypass valves have been installed at some lift stations, but not at all lift stations. Therefore, the city will retain this action and continue to pursue it.
Emergency Services							
ES-1	Install two warning sirens in the north and northeast areas of the city at a public park and a community center.	All	High	Fire Chief; Civil Defense	HMGP	2020	(Action 2 in previous plan) The city is still looking to acquire funding to install these warning sirens, so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-2	Review current evacuation plan and access to evacuation routes throughout the city.	All	High	CRS Coordinator	FEMA grant programs	2022	(Action 10 in previous plan) The city has reviewed its evacuation plan and routes on a regular basis over the past several years, but this action requires continual attention and evaluation so the city will retain this action.
ES-3	Develop a communication system utilizing LED boards along high traffic areas to warn citizens about the threat of potential hazards affecting the City of Waveland.	All	High	Fire Chief	FEMA grants	2022	(Action 12 in previous plan) The city has utilized signage along high traffic areas to warn citizens of potential hazards, but the city would like to improve its tools and warning systems overall so this action will remain in place.
ES-4	Consider establishing a program to train and verify neighborhoods in first response actions after hazards.	All	Moderate	Civil Defense Director	To be determined	2022	(Action 37 in previous plan) The city has not established a formal program to train neighborhoods in first response actions, but many citizens are trained in these actions. The city will continue to consider establishing a more formalized training program going forward.
ES-5	Establish a facility north of Interstate 10 that can be used as a command center in the event of a major hurricane that can also serve as a shelter for essential city personnel and equipment and house a critical records vault.	All	Moderate	Board of Alderman; Mayor's Office	HMGP, CDBG	2022	(Action 42 in previous plan) The city is still working on trying to establish a facility north of Interstate 10 to serve as a shelter and storage facility. Therefore, this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-6	Develop a generator plan for all critical facilities.	All	Moderate	Fire Chief; Civil Defense Coordinator	HMGP, CDBG	2022	(Action 43 in previous plan) The city has not established a generator plan for all facilities as many critical facilities are still lacking a generator. The city will continue to pursue funding to rectify these gaps.
ES-7	Use the Reverse 911 system to issue evacuation warning and advisories, especially for special needs residents.	All	Moderate	Fire Chief	Local	2022	(Action 44 in previous plan) The city is prepared to use the Reverse 911 system to issue evacuations but the system has yet to be implemented during a large-scale event such as a Katrina, so the city will retain this action to continue to test and refine the system.
ES-8	Use existing data from the monitoring and warning gauges on waterways to predict hazardous situations. Use Hurrevac and other existing computer programs and data to predict hazardous situations.	Flooding	Moderate	Fire Department	USGS, Local	2022	(Action 45 in previous plan) Although city officials have monitored gauges during past events, there is still much room for improving the automation of this system to provide useful information to the city during flood events. The city will continue working to improve this system in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-9	Maintain NOAA StormReady Designation.	All	Low	Fire Chief; Civil Defense Director	NOAA, Local	2022	(Action 46 in previous plan) The city is designated as NOAA StormReady, but maintaining this designation requires a great deal of effort and constant evaluation of its program so the action will remain in place.
ES-10	Enhance the communications system in a coordinated fashion between appropriate departments in the county, city, and the state.	All	Moderate	Civil Defense Coordinator; Fire Chief; Police Chief	Local, State	2022	(Action 48 in previous plan) The city has worked with the county and state to coordinate in improving its overall communication system to maintain consistency across levels of government, but the system is imperfect and the city will work with other agencies to continue to improve communication in the future.
ES-11	The City of Waveland will continue to train its personnel in weapons of mass destruction and hazardous materials response through education programs such as HazMat Level I and II and incident response to terrorist bombing.	Hazardous Materials	Low	Police; Fire; Civil Defense	Local	2022	(Action 49 in previous plan) The city has implemented training on technological/man-made hazards but as new employees are hired and time passes, additional training will be required to maintain an up to date program, so the city will keep this action in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-12	Continue to update CAMEO, MARPLT, and ALOHA software where available and install in all response vehicles.	All	Moderate	Fire; Civil Defense	Local	2022	(Action 50 in previous plan) The city has installed updates to these software programs and installed in many response vehicles, but response personnel need additional training in this software to remain up to date. This action will be retained.
ES-13	Continue to update the Pre-plan Emergency Response Books for hazardous materials locations within Waveland.	Hazardous Materials	Moderate	Fire; Civil Defense	Local	2022	(Action 52 in previous plan) The city has kept the Pre-plan Emergency Response Books updated for locations that house hazardous materials, but as these books are often subject to change based on materials, the city will need to retain this action to ensure up to date information is present.
ES-14	Continue to seek grant funding through FEMA Fire Act Grants and Homeland Security Grants for terrorist and HAZMAT equipment to enable its emergency response personnel to prepare and respond to acts of terrorism and hazardous materials incidents.	Hazardous Materials	Moderate	Police; Fire; Civil Defense	Local	2022	(Action 53 in previous plan) The city has sought grant funding in the past for emergency response personnel, but has not received all of the tools and equipment that it would like to have to ensure it is prepared for a HazMat incident. Therefore, the city will continue to pursue grant funding from these programs.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Public Education and Awareness							
PEA-1	Educate citizens of Waveland about preparedness for all hazards affecting the city.	All	High	CRS Coordinator	City funds	2022	(Action 8 in previous plan) The city has pushed to help educate citizens on preparedness activities they can take to protect themselves. However, since many citizens are still not properly prepared, the city will need to continue to engage citizens to help improve individual preparedness.
PEA-2	Educate homeowners regarding structural upgrades that can be made to residential homes for added protection against damage during hurricanes and flooding and can also help save citizens money on their annual homeowners insurance premiums.	Hurricane and Flooding	Moderate	CRS Coordinator; Planning Department	FEMA grant funds	2022	(Action 9 in previous plan) The city has made efforts to educate homeowners on mitigation techniques they can use to protect their homes against disasters, but many homeowners are still at risk and may need additional education, so this action will remain in place.
PEA-3	Enhance the usability and functionality of the city's website with an updated section to notify citizens about emergency services and hazards threatening the City of Waveland as well as emergency procedures for different types of hazards and evacuation routes.	All	Moderate	CRS Coordinator	City funds	2022	(Action 13 in previous plan) The city has updated its website to include a section that relates to emergency services and hazards. However, it should be noted that this is a work in progress and that many improvements may be made to the site in the future so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-4	Develop a plan to educate and promote flood insurance to the citizens of Waveland.	Flood	High	CRS Coordinator	Local	2022	(Action 20 in previous plan) Although the city has promoted flood insurance purchase for its citizens, a formal program to promote its purchase has not been established. The city will continue its outreach efforts to citizens in this regard, especially those located in the floodplain.
PEA-5	Continue to publicize evacuation routes and approximate travel times to evacuate the area.	Flooding, Hurricane	High	Floodplain Manager; CRS Coordinator	Local	2022	(Action 34 in previous plan) The city has publicized evacuation routes and travel times to evacuate, but some citizens may still not be aware of these routes so the city will push to improve the overall percentage of citizens who know their evacuation route.
PEA-6	Continue to mail flood safety information, including evacuation zones and routes, to every address in Waveland every year.	Flooding	High	Floodplain Manager; Civil Defense Coordinator	Local	2022	(Action 35 in previous plan) In the past, the city has mailed out flood information and evacuation route information to all addresses in the city. This has been a successful program and the city would like to continue to implement it going forward so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-7	Continue to publicize how families can prepare and plan for disaster.	All	High	Civil Defense Coordinator; American Red Cross	Local	2022	(Action 36 in previous plan) The city has promulgated public information for individual citizens, but there are still a great number of citizens who remain uninformed so the city will continue its efforts to promote public awareness.
PEA-8	Publicize information about the special needs registry maintained by the Hancock County Emergency Management Agency and how residents with special needs can register themselves.	All	Moderate	Civil Defense Director	Local	2022	(Action 39 in previous plan) The city has worked to identify special needs citizens and tried to direct them to the special needs services available through the county, but it is likely that there are some citizens with special needs who need to be integrated into this process, so the city will keep this action in place.
PEA-9	Provide information on model construction techniques, such as storm shutters, in public places so people can learn about these mitigation techniques and adopt them for their own homes.	Severe Thunderstorm/ High Wind, Hurricane, Flooding	Moderate	Building Official; CRS Coordinator	Local	2022	(Action 40 in previous plan) The city has developed and promulgated information on construction techniques that can protect homes and businesses, but there are many citizens who have not implemented these measures or who may not know about them, so the city will continue its efforts in this regard.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-10	Encourage residents to acquire and monitor NOAA weather radios.	All	Moderate	Civil Defense Coordinator	Local	2022	(Action 41 in previous plan) A number of citizens have NOAA weather radios, but there are definitively many who do not. The city will continue to encourage more residents to acquire these in the future.
PEA-11	Provide an annual pre-hurricane season workshop and exercise for elected officials and emergency operations staff.	Hurricane	High	Civil Defense	Local	2022	(Action 47 in previous plan) A pre-hurricane season workshop has been held in the city in the past and the city will need to continue to prepare this workshop and host it to ensure any new elected officials and staff are up to date on procedures and that existing personnel remain up to date.

Harrison County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Identify resources that are available to be shared between municipalities and the county.	Hurricane, Flood, Thunderstorm, Tornado, All Severe Weather	High	Harrison County Emergency Management	N/A	2021	(Action 2008-7 in previous plan) The county has been working with the municipalities on resource sharing and has identified a number of ways to combine forces. Still, there are many ways in which all communities in the county could increase efficiencies through sharing of resources, so this action will remain in place.
P-2	Build partnerships to share resources.	All	High	Harrison County Emergency Management	N/A	2021	(Action 2008-8 in previous plan) The county has worked with a number of different organizations at the local and regional level to share resources, but there are still many organizations that the county would like to partner with to share resources.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-3	Identify cross ownership and multi-jurisdictional issues related to flood hazards.	Flood	High	Harrison County Planning and Zoning Department	N/!	2021	(Action 2008-9 in previous plan) The county has worked with neighboring communities and with municipalities to try to identify cross ownership issues related to flooding. Although this has been worked on to some degree, there is still additional work to be done on this action, so this will remain in the plan.
P-4	Continue support of the U.S. Army Corps of Engineers study of the Turkey Creek Drainage area and implement recommendations made in the study.	Flood	Moderate	Harrison County Board of Supervisors	U.S. Army Corps of Engineers	2019	(Action 2008-10 in previous plan) This action is currently under review as this is part of the county's Building Program. As this study continues to move forward, the county will work with USACE to implement any recommendations from it.
P-5	Develop a data network that provides "real-time" information from data generated through the county building permit program.	Hurricane, Flood	Moderate	Harrison County Data center	Department of Transportation, general revenues	2018	(Action 2008-11 in previous plan) This action is also being implemented as part of the county's Building Permit Program. There are some data networks that are in place, but the county would like to continue to work on this action going forward.
P-6	Encourage planned development.	Flood	Moderate	Planning Commission of Harrison County, Biloxi, Gulfport	N/A	Completed	(Action 2008-14 in previous plan) The county is currently using planned development so this action is complete.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Adopt Smart Growth policies.	All	Low	Harrison County Board of Supervisors	N/A	2018	(Action 2008-15 in previous plan) The adoption of Smart Growth policies has not taken place, but the county is reviewing these types of policies, so this action will remain in place.
P-8	Develop regulatory standards for floodplain management that go beyond the minimum standards of the NFIP.	Flood, Hurricane	Moderate	Harrison County Building Code Administration and Building Official	N/A	2021	(Action 2008-18 in previous plan) The county has implemented a number of regulatory standards that go above the minimum standards set by the NFIP, but there are other measures the county could implement going forward and so this action will remain in place.
P-9	Develop local, city, and county wetlands regulations that provide the "intent" of the regulations for flood storage (available for CRS credit).	Flood	High	Harrison County Planning and Zoning Department; Planning Departments and Planning Commissions of Biloxi, Gulfport, Long Beach, D'Iberville, and Pass Christian	N/A	2021	(Action 2008-19 in previous plan) The county has developed some wetlands regulations in conjunction with the municipalities related to flood storage, although it should be noted that these are under review and additional measures are being considered so this action will remain in place.
P-10	Continue enforcement of the Zoning Ordinance and amend the ordinance as necessary.	Flood	High	Harrison County Zoning Department and Planning Commission	N/A	2021	(Action 2008-20 in previous plan) The county has enforced the Zoning Ordinance, but it will also need to look into amending this Ordinance going forward, so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-11	Develop subdivision regulations that require a lower number of lots in order to be reviewed.	Flood	Low	Harrison County Planning Commission; Zoning Department; Engineering Department	N/A	2021	(Action 2008-21 in previous plan) The county has not developed additional subdivision regulations related to number of lots, so this action will remain in place.
P-12	Adopt the current International Building Code.	Hurricane, Tornado, Thunderstorm, High Wind, Lightning	Moderate	Harrison County Code Administration	N/A	2021	(Action 2008-22 in previous plan) The county has adopted the IBC, but there will likely be an update of this code in the future that the county will need to review and evaluate, so this action will remain in place.
P-13	Encourage plantings of live oak trees on public and private properties.	Hurricane, Flood	Moderate	Harrison County Beautification Department; Municipal Beautification Departments	MS Department of Transportation, general revenues, private funding	2021	(Action 2008-23 in previous plan) The county has encourage the plantings of live oaks and has even implemented requirements that some streets/areas of the county plant and maintain live oaks. However, there are other areas where the county would like to implement this initiative, so this action will remain in place.
P-14	Develop a county-wide Stormwater Plan.	Flood	Moderate	Harrison County Wastewater District	Coastal Impact Assistance Program, general revenues	2019	(Action 2008-24 in previous plan) The county has developed a stormwater plan, but this plan will need to be updated in the coming years, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-15	Require final inspection by a qualified engineer on behalf of the local government for stormwater conveyances.	Flood	Moderate	Harrison County Board of Supervisors; Cities of Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian	N/A	2021	(Action 2008-26 in previous plan) The county does not currently require final inspection by a qualified engineer on behalf of the local government for stormwater conveyances, so this action will remain in place as the county continues to pursue this.
P-16	Request authority for the Health Department to issue final approval of installed individual onsite wastewater disposal systems.	Flood	Moderate	Mississippi State Department of Health	N/A	2021	(Action 2008-27 in previous plan) Currently there is no authority for the Health Department to issue final approval of installed wastewater disposal systems, so this action will remain in place.
P-17	Encourage and keep record of the elevations of homes, bridges, roads, and reference marks.	Flood	High	Harrison County Engineer; CRS Coordinator	General revenues	2021	(Action 2008-31 in previous plan) The county has been working on keeping records of all elevations that take place on homes, bridges, roads, and reference marks. This is part of the Building Permit Program. However, this will need to continue to be reviewed in the future to ensure proper records are being kept.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-18	Continue to assist FEMA in mapping floodplains by requesting map updates as needed.	Flood	Moderate	Harrison County Emergency Management; Harrison County Board of Supervisors	General revenues, Hazard Mitigation funding	2021	(Action 2008-48 in previous plan) The county has worked with FEMA in its effort to map floodplains on a regular basis and update these maps as necessary. These maps were fairly recently updated, but it is anticipated that future updates will be needed going forward, so this action will remain in place.
P-19	Develop cross platform mobile device accessible web mapping applications to be used for post-disaster reconnaissance, asset inventory, and damage assessments.	All	Moderate	Harrison County GIS Department	Capital budget, Harrison County GIS Coalition	2018	(Action 2014-11 in previous plan) The county has worked on developing cross platform mobile device applications for post-disaster use and has some in place, but this is a constantly evolving process, so new applications will undoubtedly need to be developed in the future.
P-20	Develop and maintain GIS database to track county and city vulnerability (exposure to known hazard areas) through coordination with subject-matter experts and the Harrison County GIS Coalition (HCGISC).	All	Moderate	Harrison County GIS Department; Harrison County Emergency Management Agency	Capital budget, Harrison County GIS Coalition	2018	(Action 2014-14 in previous plan) The county has developed and maintained a GIS database on hazard risks and recently updated that information through the recent plan update. However, as additional data is collected, the county will need to update this information and ensure the best data is available.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-21	Implement a county-wide database of utility infrastructure showing geographic location of underground and surface level water and sewer assets. This database will include municipalities. This will enhance the ability during a declared emergency to determine affected assets during surge/flood events.	All	Moderate	Harrison County GIS Department; Harrison County Emergency Management Agency	Capital budget, Harrison County GIS Coalition	2018	(Action 2014-15 in previous plan) The county has worked to develop a county-wide utility infrastructure database and has done so to some degree, but this database is still under construction and is being worked on to add new utilities as they are installed. This action will remain in place.
P-22	Implement a county-wide database of physical address locations and structures types for rapid spatial analysis of disaster affected properties to determine damage assessments for number of structures by type and estimated values.	All	Moderate	Harrison County GIS Department; Harrison County Emergency Management Agency	Capital budget, Harrison County GIS Coalition	2018	(Action 2014-16 in previous plan) The county has worked to develop a county-wide address database and has done so to some degree, but this database is still under construction and is being worked on to add new properties/structures as they are constructed. This action will remain in place.
Property Protection							
PP-1	Replace exterior skin of main tower of Memorial Hospital.	All	Low	Memorial Hospital	Mitigation Grant, Capital Budget monies	Completed	(Action 2008-6 in previous plan) The exterior skin of the main tower of Memorial Hospital was replaced.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-2	Continue to participate in the Hazard Mitigation Grant Program to purchase and elevation structures that are repeatedly flooded.	Flood, Hurricane	Moderate	Harrison County Board of Supervisors, Cities of Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian	Hazard Mitigation Grant funds, Flood Mitigation Assistant Program funds, Pre-disaster Mitigation Grant Program	2022	(Action 2008-43 in previous plan) The county has participated in the HMGP buyout and elevations programs previously, but there are many properties that may still be eligible for this program and so the county will continue to work to implement this where citizens voluntarily decide they would like to participate.
PP-3	Encourage safe room construction in all new structures or substantially improved structures. To include a new EOC/EMA Office (Safe Room) outside the Historic Flood Zone of Downtown Gulfport.	Hurricane, Tornado, Flood, Thunderstorm, High Wind, Lightning, Hail	Moderate	Harrison County Emergency Management	Local, State, Federal	2021	(Action 2008-44 in previous plan) The county has encouraged safe rooms for all citizens and has constructed safe rooms in many areas that have large populations or vulnerable populations. However, there are still a number of locations where the county would like to add additional safe rooms such as a new EOC/EMA Office.
PP-4	Install storm shutters to protect exterior of ambulance service headquarters, dispatch, and personnel area.	Hurricane, Tornado	Moderate	Harrison County American Medical Response	Grant, state funds	2018	(Action 2008-50 in previous plan) Storm shutters have been installed in some of these ambulance service areas, but there are still areas where the county would like to install shutters, so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-5	Build out a functional Sheriff's Work Center by installing a 125 kw generator to power inmate housing, kitchen, vehicle maintenance center	All	High	Harrison County Inmate Work Center	Local	2018	New Action
PP-6	Construct a new county Emergency Operations Center that is located in a non-flood impact area and which incorporates protection from wind and other hazards to the greatest extent possible	All	High	Harrison County Emergency Management	Hazard Mitigation Grant Funds, Pre-disaster Mitigation Grant Program, Capital Budget	2021	New Action
Natural Resource Protection							
NRP-1	Continue to maintain the sand beach.	Hurricane, Flood, High Wind	High	Harrison County Sand Beach Authority	General revenues, USACE	2022	(Action 2008-13 in previous plan) The county has worked to maintain the sand beach as much as possible and since this action will require constant vigilance and evaluation over time, it will remain in place.
NRP-2	Petition the Secretary of State for tax delinquent properties that lie in the floodplain that may contribute to flood storage, stormwater control, and linked green space. Establish a cooperative maintenance agreement among the communities for the maintenance of these properties.	Flood	Moderate	Community Development; Planning and Recreation Departments of Harrison County and the Cities of Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian	N/A	2020	(Action 2008-28 in previous plan) The county has made some effort to petition the Secretary of State on these properties, but there has not been as much progress as would be hoped so this action will remain in place as the county continues to pursue.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
NRP-3	Encourage acquisition or donation of conservation easements and properties in environmentally sensitive areas.	Flood	Moderate	Harrison County Board of Supervisors	N/A	2022	(Action 2008-29 in previous plan) The county has acquired some conservations easements recently including new areas for Wolf River that have been donated. However, additional conservation space will be beneficial and the county will continue to try to acquire more in the future.
NRP-4	Encourage dune propagation in areas where the seawall is below 10 feet (NGVD).	Hurricane, Flood, High Wind	High	Harrison County Sand Beach Authority	N/A	2022	(Action 2008-30 in previous plan) The county has worked to encourage dune propagation in areas where the seawall is below 10 feet, but this constantly changing landscape requires evaluation to ensure the proper steps are taken to protect dunes. Therefore, this action will remain in place.
Structural Projects							
SP-1	Improve East-West Corridor transportation infrastructure to ensure adequate evacuation clearance times.	Hurricane	Moderate	Harrison County Transportation Authority	Department of Transportation, general revenues	2018	(Action 2008-17a in previous plan) The county has worked on improving the East-West Corridor to ensure adequate evacuations. Many improvements have been made, but as growth continues in the county, these routes will need to be reviewed and evaluated, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-2	Improve North-South Connector in Biloxi transportation infrastructure to ensure adequate evacuation clearance times.	Hurricane	Moderate	Mississippi Department of Transportation	Federal Highway Funds, MS Department of Transportation Funds	2018	(Action 2008-17b in previous plan) The county has worked on improving the North-South Connector in Biloxi to ensure adequate evacuations. Many improvements have been made, but as growth continues in the county, these routes will need to be reviewed and evaluated, so this action will remain in place.
SP-3	Improve North-South Connector in western Harrison County transportation infrastructure to ensure adequate evacuation clearance times.	Hurricane	Moderate	Harrison County Board of Supervisors	Federal Highway Funds, MS Department of Transportation Funds	2018	(Action 2008-17c in previous plan) The county has worked on improving the North-South Connector in the western county to ensure adequate evacuations. Many improvements have been made, but as growth continues in the county, these routes will need to be reviewed and evaluated, so this action will remain in place.
Emergency Services							
ES-1	Increase above ground fuel storage capacity by at least 12,000 gallons for generators at Memorial Hospital. This would allow fuel capacity operation for 96 hours without replenishment.	All	High	Memorial Hospital	Mitigation Grant, Capital Budget monies	2020	(Action 2008-4 in previous plan) The above ground fuel storage capacity has been increased, but the hospital is still looking to install additional generator capacity going forward so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-2	Increase generator capacity at Memorial Hospital to provide sustained uninterrupted patient care before, during, and after an emergency event.	All	High	Memorial Hospital	Mitigation Grant, Capital Budget monies	2022	(Action 2008-5 in previous plan) The generator capacity has been increased, but the hospital is still looking to install additional generator capacity going forward so this action will remain in place.
ES-3	Continue to participate in Hazard Mitigation Grant Program to build 361 community shelters (shelters that meet the requirements of FEMA Publication 361: Design and Construction Guidance for Community Shelters) and stand alone within Harrison County for shelter up to 45% of population.	All	Moderate	Harrison County Emergency Management Agency; Harrison County Board of Supervisors; Harrison County School District	General revenues, federal match, grants	2020	(Action 2008-46 in previous plan) Harrison County School District has partnered with MEMA to harden campuses to the FEMA 361 Standards. From 2011 to 2015, 19 campuses were hardened by installation of protective screens, shutters, and doors. The efforts are being continued by hardening the roofing of the same campuses. To date, the roof hardening just began on the 8th of 19 campuses.
ES-4	Seek Hazard Mitigation funds to provide generator power back up systems, and retrofit county and city-owned critical facilities to meet extreme wind standards.	All	High	Harrison County Emergency Management Agency; Harrison County Board of Supervisors; Harrison County School District	General revenues, Hazard Mitigation funding	2022	(Action 2008-47 in previous plan) The county has used mitigation funds to provide generator backup to many county-owned critical facilities. However, there are still a number of critical facilities that need generators, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-5	Implement a county-wide database of emergency response inventory showing geographic location and emergency point of contact that includes equipment, supplies, and personnel.	All	High	Harrison County GIS Department, Emergency Management Agency, Board of Supervisors	Capital budget, Harrison County GIS Coalition	2019	(Action 2014-1 in previous plan) The county has implemented a number of databases that are meant to show emergency response inventory, but these databases are in need of being updated and new display data may be needed as well.
ES-6	Enhance Reverse 911 and cell phone registration with web applications and emergency alerts as part of the multiple pre-working systems and expand to cover high risk areas not covered.	All	High	Harrison County Board of Supervisors, Emergency Management Agency, IT	MEMA, private donations from cellular companies	2022	(Action 2014-2 in previous plan) The county has worked hard to enhance the Reverse 911 registry by providing ways to register that are diverse. However, there are still many areas/people that may not be covered, so the county will continue to pursue this action.
ES-7	Establish evacuation routes to include a north-south transportation evacuation corridor in west Harrison County.	Hurricane, Tropical Storm, Flood	Moderate	Harrison County Transportation Authority, Planning Commission	MS Dept. of Transportation	2020	(Action 2014-4 in previous plan) The county has established evacuation routes, but will need to re-evaluate these routes on a regular basis and make changes based on new information that has been collected. This action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-8	Develop a plan that defines and clarifies Special Needs as it relates to evacuation and sheltering throughout Emergency Management Services.	All	High	Emergency Management Agency, Dept. of Health, local hospitals, Red Cross	MEMA	2018	(Action 2014-7 in previous plan) The county has done significant planning to define and clarify special needs for evacuation and sheltering. However, there are likely many populations that have not been identified in these planning efforts so this action will remain in place.
ES-9	Expand the use of weather radios as part of the multiple pre-working systems and expand to cover high risk areas not covered.	All	High	Emergency Management Agency, Board of Supervisors	MEMA, private donations	2022	(Action 2014-8 in previous plan) Many citizens throughout the county have weather radios, but there is a need to increase this number as there are still many people in areas where they may not be able to access weather warnings any other way.
ES-10	Continue development of water supply in rural areas in order to service wildfires to protect homes, large timberland, and schools located in rural areas.	Wildfire	Moderate	Harrison County Board of Supervisors, Waterwise, Utility Authority District; MS Development Authority	WaterSMART Water and Energy Efficient Grant funding, Alliance Grants	2022	(Action 2014-9 in previous plan) Much of the county has water supplies available for fighting wildfires, but there are still some areas where this needs to be extended so the county will continue to work on addressing these areas going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-11	Expand the current Flood Warning System to include: GIS mapping of developments and inundation areas to inform warning system and ability to access data through online viewer; further define special needs and include in warning system as a separate criterion for warning; provide public education and outreach for how the system works and who will be informed and criteria for implementing system; and broaden warning mechanisms to include TV messages and social media outlets, include school districts as agency for dismissal or holding during a flood hazard.	All	Moderate	Harrison County Emergency Management Agency, Code Enforcement	Capital budget, in-house	2022	(Action 2014-12 in previous plan) The current Flood Warning System has been updated in many ways, but there are still many features that can be improved and added such as inundation areas. Therefore this action will be retained in the plan as the county continues to pursue these improvements.
ES-12	Construct a 10,000 square foot Emergency Operations Center that will be strategically located within the county to assist in preparing for and responding to future natural hazards.	All	High	Board of Supervisors, Emergency Management Agency	TBS	2022	(Action 2014-13 in previous plan) The county is working on this project to construct an EOC but the project is not complete, so this action will remain in place.
ES-13	Add bi-fuel capability for existing hospital generators to utilize natural gas as an alternate fuel source.	All	High	Memorial Hospital	Mitigation Grant, Capital Budget monies	2021	New Action
Public Education and Awareness							
PEA-1	Establish an education program to promote the CRS program.	Flood	Moderate	Harrison County Building Department	General revenues	2018	(Action 2008-12 in previous plan) The county has implemented an education program to promote the CRS, but there are many citizens who still do not recognize the benefits of this program, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Create an education outreach program to encourage better design.	Flood	Low	Mississippi Department of Marine Resources	DEQ, EPA, Conference Fees	2017, Annually	(Action 2008-16 in previous plan) The county has created an education program to encourage better design, but many developers and citizens would still benefit from additional programs, so this action will be retained.
PEA-3	Set up booths/displays for mitigation activities at Homeowners Show and building suppliers. Initiate an annual county-wide hurricane fair.	Hurricane, Flood, High Wind	Moderate	Harrison County Emergency Management	General revenues	2020	(Action 2008-32 in previous plan) The county has been involved in a number of public events to try to promote awareness regarding mitigation and hazards and these programs have been successful, but there is still a need to improve and carry out these programs going forward.
PEA-4	Prepare and implement construction workshops with builders.	Hurricane, Tornado, Flood, High Wind	Low	Building Officials from Harrison County and Cities of Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian	N/A	2022	(Action 2008-33 in previous plan) Some construction workshops have been carried out for builders, but there is still significant work to be done on this action, so this will be kept in place.
PEA-5	Find funds to develop a model project that contractors and individuals can view.	Hurricane, Tornado, High Wind, Flood	Low	Harrison County Board of Supervisors	FEMA/MEMA, general revenues	2018	(Action 2008-34 in previous plan) The county has not been able to implement a model project, but it will continue to try to find the necessary funding to implement and build.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-6	Continue support of Hurricane Museum.	Hurricane, High Wind, Tornado, Flood	Low	Harrison County Board of Supervisors; Mississippi Maritime and Seafood Industry Museum	General revenues	2022	(Action 2008-39 in previous plan) The county has been supportive of the Hurricane Museum and it is critical that this support be retained. As such, the county will keep this action in place as it continues to support the Museum.
PEA-7	Continue tourist outreach and education about potential hazards and evacuation.	Hurricane, High Wind, Flood	Low	Harrison County Emergency Management; Casino Operators	General revenues	2022	(Action 2008-40 in previous plan) The county has worked on tourist outreach and has done a good job so far of trying to reach this population, but since this population is constantly turning over, there will always be a need for outreach and improving this program.
PEA-8	Continue distribution of military orientation package on hazard preparedness.	Hurricane, Tornado, Flood, High Wind	Moderate	Harrison County Emergency Management	General revenues	2022	(Action 2008-41 in previous plan) The county has distributed military orientation packages on hazard preparedness in the past, but this will need to be retained going forward as information that should be passed along changes.
PEA-9	Prepare an insert on hurricane, tropical storm, and flood preparedness for the Chamber's newcomer packages.	Hurricane, Tornado, Flood, High Wind	Moderate	Harrison County Emergency Management	General revenues	2022	(Action 2008-42 in previous plan) In the past, the county has used inserts in newcomer packages as a way to increase awareness. Since this will need to continue to be carried out as new newcomers arrive, this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-10	Encourage individual residents to purchase and monitor NOAA weather radio broadcasts.	Hurricane, Tornado, Flood, Thunderstorm, High Wind, Lightning, Hail	Moderate	Harrison County Emergency Management Director; local media outlets	N/A	2022	(Action 2008-45 in previous plan) The county has encouraged residents to purchase and monitor radio broadcasts on weather radios, but many citizens do not have these devices that should, so this action will remain in place.
PEA-11	Distribute current stock of disaster preparedness brochures. Print additional brochures. Schedule sessions with local civic groups to discuss preparedness. Provide printed training materials to least EMS agency for employees regarding special needs patients.	All	Moderate	Harrison County Emergency Management Agency	Grant, state funds	2022	(Action 2008-49 in previous plan) The county has made a number of disaster brochures to hand out and has been working to update the materials on these brochures, but this action is not complete so the county will keep it in place going forward.
PEA-12	Develop a public education outreach program to the public for wildfires procedures and protection. The first step in wildfire prevention education is to raise awareness of the responsibilities of living in a fire-prone environment, individual and community action can ensure that homes and neighborhoods are prepared for wildfire.	Wildfire	Moderate	Harrison County Fire Services; MS Forestry Commission	Firewise.org	2022	(Action 2014-3 in previous plan) The county has done some public outreach and awareness work on wildfires, but there are many individuals living in high risk areas that may not be aware of what action they can take to reduce risk. Therefore, this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-13	Educate the public on warning system, 911 reverse system, and the importance of having a weather radio. Coordinate with non-profit organizations and VOAD.	All	High	Harrison County Board of Supervisors, Emergency Management Agency	MEMA, private donations from cellular companies	2018	(Action 2014-5 in previous plan) The county has worked to try to get more citizens to register for the reverse 911 system and this has been successful to some degree, but there are still many citizens who would benefit from signing up and so the county will continue to pursue this action.
PEA-14	Develop a Public Education Outreach program for education to the public for special needs evacuation and sheltering procedures.	All	High	Emergency Management Agency, Dept. of Health, local hospitals, Red Cross	MEMA	2019	(Action 2014-6 in previous plan) The county has developed a public education outreach program for special needs and sheltering, but the groups who require this program may need to have additional focus when it comes to education, so this action will remain in place.
PEA-15	Community education and outreach to develop and provide CEO multi-media services and material to inform residents and absentee property owners in Harrison County about community redevelopment and long-term recovery; natural hazard impacts and risks; hazard mitigation for homeowners and businesses; improved building codes, materials, and techniques; public safety; and property insurance and insurance incentives.	All	Moderate	Emergency Management Agency, Board of Supervisors	FEMA/MEMA, Home Builders Association	2022	(Action 2014-10 in previous plan) The county has worked on developing some long-term public education programs, but these programs require a great deal of effort to implement successfully and a lot of time to see results so this action will be retained as the county continues to work on implementation.

City of Biloxi Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Strictly enforce building and related codes to insure design and construction of new structures (building/infrastructure) will provide maximum protection against all hazards.	All	High	City of Biloxi Community Development, Public Works	Existing budget	2022	(Action 2.2.1 in previous plan) The city has worked to strictly enforce building codes to protect structures against hazards, however, some improvements can still be made to the implementation of these codes so the city will review and update enforcement practices as needed in the future.
P-2	Continue to integrate mitigation strategies into the city's planning initiatives including their Comprehensive Plan, Ordinances, Capital Improvement Plans, etc. for all hazards.	All	High	City of Biloxi Community Development, Public Works	Existing budget	2022	(Action 2.2.2 in previous plan) The city has worked to integrate mitigation efforts into local planning and has done so successfully. However, as this plan has just been updated and new projects are on the horizon, the city will need to keep this action in place and integrate new elements.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-3	Maintain or improve the status of the City of Biloxi in the Community Rating System and the National Flood Insurance Program.	Flood	High	Community Development, Floodplain Manager	HMGP, existing budget	2022	(Action 2.3.4 in previous plan) The city currently participates in the CRS program and has made many improvements to score more points, but there are many actions the city could take to improve its standing in the program, and it will look into taking those actions to enhance its rating going forward.
P-4	Prevent unprotected and improper development in flood hazard areas through the improvement of existing regulations governing building and land development in Biloxi.	Flood	High	Community Development, Floodplain Manager	Existing budget	2022	(Action 2.3.5 in previous plan) The city has worked to improve the type of development that is allowed in known flood areas, but there are many modifications that could be made to these standards and the city will work to improve these standards going forward.
P-5	Research the potential effects of sea level rise, coastal erosion, and salt water intrusion.	Tropical Storm, Erosion, Hurricane	Low	Public Works	To be determined	2022	(Action 2.4.1 in previous plan) The city has invested some time and effort into researching the potential effects of sea level rise, erosion, and salt water intrusion, but there is a need for more and better information concerning these events, so the city will keep this action in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-6	Develop regulation and educational materials for water preservation addressing potential issues that could be caused by drought conditions.	Drought	Moderate	Public Works	Existing budget	2022	(Action 2.4.3 in previous plan) The city has developed a regulation and educational materials for water preservation caused by drought issues. However, this regulation will need to be reviewed and updated in the coming years to ensure it still meets the community's needs. This action will be retained.
P-7	Encourage private and public entities to develop and share Emergency Response Plans/Procedures with the city to improve preparedness and recovery procedures.	All	High	Community Development	Existing budget	2022	(Action 3.3.3 in previous plan) The city has encouraged both private and public entities to develop ERPs to try to improve preparedness at a site/organizational level. This has been successful to some degree, but there is still a need to increase the number of ERPs in the community so this action will remain in place
P-8	Develop Continuity of Operation Plan for city departments to address health and manmade-related incidents.	Manmade Hazards	High	All departments	EMGP, Homeland Security, existing budget	2018	(Action B.2.1 in previous plan) The city has developed procedures to maintain continuity, but there is not a formal plan in place due to staff time commitments. Therefore, the city will continue to pursue this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-9	Conduct a Commodity Flow Study to identify hazards transported into and around the city or stored at fixed site locations.	Hazardous Materials	Moderate	Biloxi Fire Department	EMGP	2020	(Action B.2.2 in previous plan) The city has not yet developed a CFS due to lack of funding, but the city will continue to work towards implementing this action.
P-10	Update and/or develop SOPs for preparedness and response procedures for applicable health and man-made incidents.	Manmade Hazards	High	Biloxi Fire, Police, Public Works, Emergency Management	General budget	2022	(Action B.2.3 in previous plan) The city relatively recently updated its SOP for preparedness and response procedures, but these will likely need to be updated again in the next 5 years so this action will remain in place.
P-11	Continue to enforce building codes, fire prevention codes, and other codes and ordinances that help reduce risks to the health, safety, and welfare of citizens and visitors.	Manmade Hazards	High	Biloxi Fire Department; Biloxi Community Development	General budget	2022	(Action C.1.1 in previous plan) The city has worked to enforce building/fire codes over the past several years, but there will be a need to update the codes in the future, so this action will be retained in the plan.
Property Protection							
PP-1	Storm proof and/or retrofit existing and new critical facilities and infrastructure.	All	High	City of Biloxi	HMGP, existing budget	2022	(Action 2.1.1 in previous plan) The city has made some efforts to retrofit critical facilities, but there are still a number of facilities that would benefit from retrofitting, so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-2	Replace existing traffic signals at major intersections with more durable weather resistant mast arm poles. Install mast arm poles for future traffic improvement projects.	All	High	City of Biloxi Public Works	HMGP	2022	(Action 2.1.2 in previous plan) The city has made some replacements of existing traffic signals with mast arm poles, but there are still some signals that are on traditional hangings, so the city will keep this action in place as it continues to make these replacements.
PP-3	Encourage home/business owners affected by flooding to protect existing and new properties with mitigation strategies such as flood insurance, elevation, floodproofing, structural protection, etc.	Flood	Moderate	City of Biloxi Community Development, Floodplain Manager	Existing budget	2022	(Action 2.3.1 in previous plan) The city has worked to try to ensure that all properties that have been or could be affected by flooding have some form of protection, but there are still many properties that do not, so the city will continue to try to push for more property owners to protect their property.
PP-4	Reduce the number of repetitive losses and severity of flooding for residents of Biloxi with corresponding reduction in costs to federal, state, and local governments.	Flood	High	City of Biloxi Community Development	HMGP	2022	(Action 2.3.2 in previous plan) The city has made significant efforts to try to reduce the number of repetitive loss properties in the community by implementing mitigation projects such as elevation, but there are still a number of repetitive loss properties in the community that the city would like to address if possible, so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-5	Retrofit public piers with improved building materials.	Tropical Storm, Hurricane	High		HMGP, existing budget	2022	(Action 2.5.1 in previous plan) In many cases, city-owned piers/pavilions have been retrofit to ensure stability, but there will be a constant need to make upgrades, so the city will keep this action in the plan going forward.
PP-6	Retrofit/improve bridges.	Hurricane	Moderate	Biloxi Public Works	HMGP	2022	(Action 3.1.4 in previous plan) Although the city has retrofit/improved some bridges, there are still several bridges that have not been addressed, so the city will attempt to address these in the future.
PP-7	Fortification/hardening of the new building for Station 7 on Popps Ferry Road. This will be to establish an improved municipal EOC in this building.	All	High	Biloxi Fire Department and Biloxi Emergency Management	HMGP, existing budget	2018	New Action. The city is working with the architect now to make this building hardened according to FEMA 361 standards for a municipal EOC only, not a dispatch center.
Natural Resource Protection							
NRP-1							
Structural Projects							
SP-1	Continue to improve and upgrade drainage to reduce flooding.	Flood	High	Biloxi Department of Public Works	HMGP, existing budget	2022	(Action 2.3.3 in previous plan) Many drainage improvements have been made throughout the city to try to reduce flooding, but there are still a number of drainage projects the city would like to implement, so this action will be kept in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-2	Explore road materials/signage for areas prone to limited visibility.	All Severe Weather	Moderate	Public Works	Existing budget	2022	(Action 2.4.2 in previous plan) The city has explored road materials/signage for areas prone to limited visibility and has implemented some changes in signage, but there are still places where improved signage would be beneficial, so this action has been retained.
Emergency Services							
ES-1	Evaluate the effectiveness of the outdoor siren system and track maintenance/performance issues.	All	High	Biloxi Emergency Management	Existing budget	2022	(Action 3.1.1 in previous plan) The city has an outdoor siren system in place the provides good coverage for the area, but the city would like to look at ways it can improve this system with potentially more sirens or other ways to communicate to the public.
ES-2	Enhance evacuation routes throughout the city including appropriate signage designating evacuation corridors.	Hurricane, Costal Storm	Moderate	Biloxi Public Works	HMGP	2022	(Action 3.1.2 in previous plan) The city has identified evacuation routes throughout the city boundaries, but there are additional steps the city could take to further identify/label these routes, so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-3	Continue to implement the Reverse 911 notification system and research new technology to improve notification procedures.	All	High	Biloxi Emergency Management	HMGP	2022	(Action 3.1.3 in previous plan) The city has worked hard to enhance the Reverse 911 registry by providing ways to register that are diverse. However, there are still many ways that the system could be improved so the city will continue to pursue this action.
ES-4	Research and pursue alternative communication devices improving communication before, during, and after a disaster.	All	High	Biloxi Emergency Management	HMGP	2022	(Action 3.2.1 in previous plan) The city has some backup communication devices that it can use before, during, and after a disaster, but as technology improves, the city will need to reevaluate and upgrade its devices, so this action will remain in the plan.
ES-5	Continue annual National Incident Management System training for first responders, city officials, and critical employees.	All	High	Biloxi Emergency Management	Existing budget	2022	(Action 3.3.1 in previous plan) Some of the city's employees, officials, and first responders have received NIMS training, but there are still a number who would benefit from this training and as new employees are hired, they will also need this training so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-6	Continue to maintain and update the city's Comprehensive Emergency Management Plan (CEMP) and Standard Operating Procedures (SOP) for applicable departments. Provide overview for new employees and inform existing employees of changes.	All	High	Biloxi Fire and Police Departments	Existing budget	2022	(Action 3.3.2 in previous plan) The city has updated its CEMP and SOP relatively recently, but there will be a need to update these plans again in the next 5 years, so this action will remain in place.
ES-7	Purchase a 5-ton truck.	All	High	Biloxi Emergency Management	To be determined	2022	(Action 3.4.1 in previous plan) The city has not purchased a 5-ton truck yet due to lack of available funds, so this action will be retained in the plan going forward.
ES-8	Secure generators ensuring continuous operation for existing and new critical facilities and infrastructure.	All	High	Biloxi Public Works	HMGP	2022	(Action 4.2.1 in previous plan) The city has acquired some generators to ensure continuity of operations in some critical facilities, but there are still many critical facilities without backup power, so this action will need to continue to be pursued.
ES-9	Conduct annual training exercise for potential manmade hazards.	Manmade Hazards	High	Biloxi Fire, Police, Emergency Management	Existing budget	2022	(Action B.1.1 in previous plan) The city has conducted and participated in a number of training exercises to increase preparedness to man-made events. However, as facilities change and new facilities are added, the city will need to continue these efforts and make sure that the proper communication is in place with these sites.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-10	Continue to explore ways to enhance and improve training and equipment needs for the Biloxi Fire, Police, and Emergency Management Departments.	Manmade Hazards	High	Biloxi Fire and Police	Homeland Security, existing budget	2022	(Action B.1.2 in previous plan) The city has implemented a number of strategies for training for fire, police and EM personnel. However, these personnel will need to be kept up to date on their training and new personnel that is hired will need training as well so this action will be retained in the plan.
ES-11	Upgrade and improvements to the tornado/hurricane siren warning system located throughout the City of Biloxi.	Tornado, Severe Thunderstorm, Hurricane	High	Biloxi Fire Department and Biloxi Emergency Management	HMGP, existing budget	2019	New Action. The city is working on either an upgrade to the existing system or changing the system entirely to include voice notifications.
Public Education and Awareness							
PEA-1	Continue outreach efforts to educate the public about the dangers of all hazards.	All	High	City of Biloxi Public Affairs	Current budget	2022	(Action 1.1.1 in previous plan) The city has reached out to the public on a large scale to try to provide the best possible information about the dangers of hazards, but there is still much work to be done to keep the public well-informed, so this action will be kept in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Promote the Firewise awareness program.	Wildfire	High	City of Biloxi Public Affairs	Current budget	2022	(Action 1.1.2 in previous plan) The city is not currently a Firewise community as there has not been staff time to develop this program, but this action will remain in place as the city continues to pursue this program.
PEA-3	Provide all-hazard education and outreach to vulnerable populations.	All	High	City of Biloxi Public Affairs	Existing budget	2022	(Action 1.1.3 in previous plan) The city has reached out to many vulnerable populations, but since these are critical groups to reach prior to hazard events taking place, there is still significant work that needs to be done to identify and educate these populations.
PEA-4	Work with the Chamber of Commerce and local civic groups to establish continuity in training workshops and distribute education information to new existing businesses.	All	High	Coastal Chamber of Commerce, Biloxi Bay Chamber	Existing budget	2022	(Action 4.1.1 in previous plan) The city has worked with many local civic groups to prepare education and workshops for these groups to improve their knowledge of hazard risk. These efforts have been successful, but there are still many groups that could be targeted for this outreach, so the city will retain this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-5	Work with appropriate agencies to identify high risk areas and distribute educational information to residents and business owners.	Manmade Hazards	High	Biloxi Public Affairs	Existing budget	2022	(Action A.1.1 in previous plan) The city has worked with a number of agencies to identify high risk areas to man-made hazards and to inform citizens of these risks. However, this information has been somewhat limited in the past and so the city will continue its efforts to collect this information and push it out to citizens where needed.
PEA-6	Promote a mosquito control and West Nile Virus Prevention program.	Infectious Disease	High	City of Biloxi Public Affairs	Current budget	2022	(Action A.1.2 in previous plan) The city has attempted to implement a number of mosquito control procedures to reduce infectious diseases, but since the outbreak of several recent mosquito borne illnesses, the city may need to reevaluate its policy, so this action will be retained.
PEA-7	Increase the number of hurricane preparedness outreach meetings for the community. This will be established to increase the points to our CRS program and to provide the community with flood insurance program and emergency preparedness information	Hurricane, Flood	High	Biloxi Fire Department and Community Development	Existing budget, outside sources	2017	The city is working on 3 new community outreach meetings in June 2017 to include emergency preparedness agencies including the American Red Cross, Salvation Army, MEMA, and Floodplain manager, and the CRS coordinator.

City of D'Iberville Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Continue to maintain and update the city's internal Hurricane Action Plan. Provide overview for new employees and inform existing employees of changes.	All	Moderate	City of D'Iberville	Existing budget	2022	(Action 1.1.3 in previous plan) The city has maintained an internal Hurricane Action Plan, but this plan will need to be updated going forward and continue to be used to train new and existing employees. Therefore, this action will remain in place.
P-2	Strictly enforce building and related codes to insure that design and construction of structures will provide maximum protection against hurricanes, floods, and other natural hazards.	All	High	FEMA	Existing budget	2022	(Action 2.3.1 in previous plan) The city has worked to strictly enforce building codes to protect structures against hazards, however, some improvements can still be made to the implementation of these codes so the city will review and update enforcement practices as needed in the future.
P-3	Prevent unprotected and improper development in flood hazard areas and prohibit development in floodways through the improvement of existing regulations, ordinances, and plans governing building and land development in D'Iberville.	Flood	High	D'Iberville Floodplain Manager	Existing budget	2022	(Action 2.3.2 in previous plan) The city has worked to improve the type of development that is allowed in known flood areas, but there are many modifications that could be made to these standards and the city will work to improve these standards going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-4	Continue to maintain elevation certificates for all post-FIRM structures.	Flood, Hurricane	High	D'Iberville Floodplain Manager, CRS Coordinator	Existing budget	2022	(Action 2.3.3 in previous plan) The city has maintained elevation certificates for all post-FIRM structures, but as additional elevations are implemented and development continues in the city, this action will need to be continually addressed and thus will remain in the plan.
P-5	Insure that all properties affected by flooding have some form of protection i.e., flood insurance, elevation, floodproofing, structural protection. etc.	Flood, Hurricane, Storm Surge	High	D'Iberville Floodplain Manager	Existing budget	2022	(Action 2.4.1 in previous plan) The city has worked to try to ensure that all properties that have been or could be affected by flooding have some form of protection, but there are still many properties that do not, so the city will continue to try to push for more property owners to protect their property.
P-6	Maintain or improve the status of the City of D'Iberville in the Community Rating System and the National Flood Insurance Program.	Flood, Hurricane	High	D'Iberville Floodplain Manager, CRS Coordinator	Existing budget	2022	(Action 2.4.3 in previous plan) The city currently participates in the CRS program and has made many improvements to score more points, but there are many actions the city could take to improve its standing in the program, and it will look into taking those actions to enhance its rating going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Enhance the city's government services continuity plan to ensure that emergency operations within the city can function and that day-to-day operations can resume as soon as possible after an emergency.	All	High	D'Iberville City Manager, Mayor, Council	Existing budget	2022	(Action 4.1.1 in previous plan) The city has developed a continuity plan to ensure day to day operations can be resumed after a disaster quickly, but this plan will need to be updated over the next 5 years, so this action will remain in place.
P-8	Enhance the city's regulatory framework to reduce the risk of manmade hazards.	Man-made Hazards	High	City of D'Iberville	Existing budget	2017, Annual	(Action 3.1.1-M in previous plan) The city has made many changes to its regulatory framework to reduce the risk of man-made hazards, but there are still many steps the city could take to further improve this framework. Therefore, the city will keep this action in place.
Property Protection							
PP-1	Storm proof and retrofit critical facilities.	Hurricane, Flood	High	City of D'Iberville	HMGP, existing budget, other	2020	(Action 2.1.1 in previous plan) The city has made some efforts to retrofit critical facilities, but there are still a number of facilities that would benefit from retrofitting, so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-2	Replace existing traffic signals at major intersections with more durable and weather resistant mast arm poles.	Hurricane, Thunderstorm, Tornado	Moderate	City of D'Iberville	HMGP, existing budget, other	2020	(Action 2.1.2 in previous plan) The city has made some replacements of existing traffic signals with mast arm poles, but there are still some signals that are on traditional hangings, so the city will keep this action in place as it continues to make these replacements.
PP-3	Continue to encourage the retrofitting of repetitive loss structures within the city.	Hurricane, Tropical Storm, Tornado, Flood	High	City of D'Iberville Building Department	Existing budget	2022	(Action 2.2.1 in previous plan) A number of repetitive loss properties have been addressed through retrofitting and other means, but there are still many rep loss properties in the city, so this action will remain in place.
PP-4	Promote the building of "safe rooms" in new construction and when remodeling existing structures.	Tornado	Low	FEMA	FEMA	2022	(Action 2.2.4 in previous plan) The city has promoted safe rooms in new construction and in remodels, but there are still a number of structures that need to have safe rooms constructed, so this action will be retained in the plan.
Natural Resource Protection							
NRP-1							

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Structural Projects							
SP-1	Continue to improve and upgrade drainage to reduce flooding.	Flood, Hurricane	High	D'Iberville Public Works	Existing budget, HMGP	2017, Annual review	(Action 2.4.2 in previous plan) Many drainage improvements have been made throughout the city to try to reduce flooding, but there are still a number of drainage projects the city would like to implement, so this action will be kept in the plan.
Emergency Services							
ES-1	Continue annual National Incident Management System training for first responders, city officials, and critical employees.	All	Moderate	City of D'Iberville	Existing budget	2022	(Action 1.1.2 in previous plan) Some of the city's employees, officials, and first responders have received NIMS training, but there are still a number who would benefit from this training and as new employees are hired, they will also need this training so this action will remain in place.
ES-2	Acquire an outdoor siren system.	Tornado, Hurricane, Thunderstorm, Man-made Hazards	High	MEMA, City of D'Iberville	Existing budget	2020	(Action 3.1.1 in previous plan) The city has not acquired an outdoor siren due to lack of funding, so this action will be kept in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-3	Continue to enhance evacuation routes throughout the city through placement and maintenance of appropriate signage.	Hurricane	Moderate	City of D'Iberville	Existing budget	2022	(Action 3.1.2 in previous plan) The city has identified evacuation routes throughout the city boundaries, but there are additional steps the city could take to further identify/label these routes, so this action will be retained.
ES-4	Coordinate with the City of Biloxi to ensure consistency of evacuation plans for Interstate 10 through D'Iberville.	Hurricane	Moderate	City of D'Iberville	Existing budget	2022	(Action 3.2.1 in previous plan) The city has coordinated with Biloxi in the past to ensure consistency of evacuation routes along the Interstate. However, the city will need to remain in close contact and coordination with Biloxi on this and make changes as needed in the future so this action will remain in place.
ES-5	Continue to support and encourage Harrison County's effort to build multiple 361 shelters.	Hurricane	Moderate	Harrison County Emergency Management, Board of Supervisors	Existing budget	2022	(Action 3.3.1 in previous plan) The city has coordinated with the county as it has built a number of 361 shelters to increase capacity, but as the city/county grows, there will be a continual need to increase capacity so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-6	Secure generators to insure continuous operation for critical city facilities and utilities.	Hurricane, Thunderstorm, Winter Storm, Tornado	High	D'Iberville, MEMA	Existing budget	2022	(Action 4.1.2 in previous plan) The city has acquired some generators to ensure continuity of operations in some critical facilities, but there are still many critical facilities without backup power, so this action will need to continue to be pursued.
ES-7	Conduct and participate in annual training exercise at major technological sites to increase preparedness in the event of an incident.	Man-made Hazards	Moderate	City of D'Iberville; American Medical Response; Keesler; others	Existing budget	2017, Annual	(Action 2.1.1-M in previous plan) The city has conducted and participated in a number of training exercises at major technological sites to increase preparedness to man-made events. However, as facilities change and new facilities are added, the city will need to continue these efforts and make sure that the proper communication is in place with these sites.
Public Education and Awareness							
PEA-1	Explore continuing education programs/opportunities for city staff and elected officials.	All	Moderate	City of D'Iberville	Existing budget	2022	(Action 1.1.1 in previous plan) The city has implemented a number of continuing education programs for staff and officials, but these programs likely need to be updated and re-implemented as city staff turns over. Therefore, this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Display hazard outreach materials in lobby of City Hall. Provide outreach materials at city functions and through city mailings.	Hurricane, Thunderstorm, Flood, River Erosion	Moderate	City of D'Iberville, CRS Coordinator	Existing budget	2017, Annual review	(Action 1.2.1 in previous plan) Hazard outreach materials have been displayed in city hall and many mailings have also been sent out to citizens to inform them of hazard risk. However, these materials will need to be reviewed and updated annually and outreach efforts will need to be continued going forward, so this action will remain in place.
PEA-3	Provide hazard education and outreach to vulnerable populations.	All	Moderate	City of D'Iberville	Existing budget	2018	(Action 1.2.2 in previous plan) The city has reached out to many vulnerable populations, but since these are critical groups to reach prior to hazard events taking place, there is still significant work that needs to be done to identify and educate these populations.
PEA-4	Develop and promote a wildfire awareness program.	Wildfire	Moderate	City of D'Iberville	Existing budget	2019	(Action 1.2.3 in previous plan) The city has done some outreach on wildfire awareness, but this program will likely need to be reviewed and updated, so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-5	Work with American Medical Response and Harrison County Emergency Management to educate senior citizens, disabled citizens, and special needs patients about the importance of having a personal evacuation plan.	Hurricane	Moderate	American Medical Response; Harrison County Emergency Management Agency	Existing budget	2022	(Action 1.2.4 in previous plan) The city has worked with AMR and the county to try to educate many vulnerable groups such as seniors and disabled citizens on developing a personal evacuation plan. However, there are still many from these groups who do not have such a plan in place, so this action will need to be retained.
PEA-6	Enhance the city's elevation awareness program, posting flood elevation markers in flood-prone areas.	Tropical Storm, Flood, Storm Surge, Wave Action	High	City of D'Iberville Floodplain Manager, Building Department	Existing budget	2022	(Action 2.2.2 in previous plan) The city has placed a number of high water markers throughout its boundaries and has worked to increase awareness of the available elevation programs. However, there are still many citizens who are unaware of the potential benefits of elevating property, so this action will be retained.
PEA-7	Expand outreach information to property owners regarding retrofitting and floodproofing techniques through community workshops, brochures, and newspaper articles.	Flood	High	City of D'Iberville Floodplain Manager, Building Department	Existing budget	2022	(Action 2.2.3 in previous plan) The city has reached out to many property owners through workshops and brochures, but there is a need to try to expand these efforts and reach citizens in new ways, so the city will review its current efforts and try to make improvements going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-8	Encourage local civic groups to establish continuity training workshops and education information to be distributed to new and existing businesses.	Hurricane	Moderate	Coast Chamber, Civic Organizations	Existing budget	2022	(Action 4.1.3 in previous plan) The city has worked with many local civic groups to prepare education and workshops for these groups to improve their knowledge of hazard risk. These efforts have been successful, but there are still many groups that could be targeted for this outreach, so the city will retain this action.
PEA-9	Work with appropriate agencies to identify high risk areas and distribute education information to residents and business owners.	Man-made Hazards	Moderate	City of D'Iberville	Existing budget	2022	(Action 1.1.1-M in previous plan) The city has worked with a number of agencies to identify high risk areas to man-made hazards and to inform citizens of these risks. However, this information has been somewhat limited in the past and so the city will continue its efforts to collect this information and push it out to citizens where needed.

City of Gulfport Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Continue participation in C-HOST Program.	Flood, Hurricane	High	Building Department	General budget	2022	(Action 4 in previous plan) The city has participated in CHOST to work with other communities in the region on cross-jurisdictional flood issues. The city would like to continue to participate in this program and so it will retain this action in the plan.
P-2	Conduct a feasibility study to mitigate sewer and water lines that cross streams.	Hurricane, Flood	Low	Public Works, Engineering	General funds	2018	(Action 12 in previous plan) The city has not had staff time to conduct a feasibility study to mitigate sewer and water lines that cross streams, but this is still something the city would like to do, so this action will be retained in the plan.
P-3	Require concurrence from all departments on projects through site plan.	All	High	Gulfport Building Department	General funds	2022	(Action 15 in previous plan) Although the city has worked on a number of projects where there has been concurrence from all departments, this has not been a requirement for implementation, so this action will be retained as the city continues to evaluate and pursue.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-4	Partner with the Land Trust for the Coastal Mississippi Plain to preserve open space.	Flood and Erosion	High	Land Trust for the Coastal Mississippi Plain	Land Trust secures grants and private funding	2022	(Action 22 in previous plan) The city has worked with the LTCMP on a number of open space preservation issues, but as development continues to take place, the city would like to continue its efforts to preserve open space in conjunction with the Trust.
P-5	Continue to implement drainage standard operating procedure.	Flood	High	Public Works Director	General funds	2022	(Action 25 in previous plan) The city has implemented its standard operating procedures for drainage over the past several years, but these standards will likely need to be reviewed in the coming years, so this action will be kept in the plan.
P-6	Implement maintenance program for storm water conveyance and detention structures dedicated to the city.	Flood	High	City Public Works Department	CDBG, CIAP	2022	(Action 26 in previous plan) The city has implemented a maintenance program for stormwater conveyance and detention structures, but this program will need to be reviewed and updated in the coming years, so this action will be kept in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Work with county to determine long-term solutions to flooding along the Flat Branch, Turkey Creek, and Brickyard Bayou.	Flood	High	Building Office	US Army Corps of Engineers, US Environmental Protection Agency, HMGP	2022	(Action 27 in previous plan) The city has been in coordination with the county on determining the best solution to these flooding issues, but these have not been fully addressed as there are still potential flooding issues, so the city will keep this action in the plan as it continues to pursue.
P-8	Improve/maintain CRS rating and the NFIP Program.	Flood	High	Building Official	General budget	2022	(Action 28 in previous plan) The city is a current participant in the CRS and has taken a number of actions to improve its rating in the program. However, there are still a number of actions the city could take to further improve its rating, so this action will be retained.
P-9	Become a Firewise Community.	Wildfire	High	Fire Department	MFC, general budget	2020	(Action 29 in previous plan) The city is not currently a Firewise community as there has not been staff time to develop this program, but this action will remain in place as the city continues to pursue this program.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-10	Continue to enforce the city burn ban.	Wildfire	High	City Fire Chief	Currently funds staff to implement	2022	(Action 30 in previous plan) The city has a burn ban ordinance that it enforces and it will continue to enforce this ban when needed. This burn ban may need to be reviewed going forward, so this action will remain in place.
P-11	Participate in local and statewide studies, workshops, and committees that address the all hazards prone to the Mississippi Coast.	All	High	Planning Department, Building Official, Emergency Manager	General budget	2022	(Action 33 in previous plan) The city has participated in a number of workshops over the past several years related to the Mississippi Coast, but as additional workshops and collaborative efforts come to light, there will be a continual need to participate in these activities, so this action will be retained.
P-12	Monitor water supply and establish conservation regulations.	Drought	Moderate	Public Works	General budget	2022	(Action 34 in previous plan) The city has monitored the water supply and established some conservation regulations, but there are still additional regulations that could be enacted and the city will look into these and review for viability going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-13	Update the city's Comprehensive Emergency Management Plan (CEMP).	All	High	Police/Fire Departments	Homeland Security, EMPG	2022	(Action 35 in previous plan) The city has updated its CEMP relatively recently, but there will be a need to update this plan again in the next 5 years, so this action will remain in place.
P-14	Update and implement the Master Drainage Plan.	Flood	High	City Engineer	General budget	2022	(Action 36 in previous plan) The city is currently working towards implementing many elements of the MDP, but this plan will need to be updated in the future, so this action will be kept in place.
P-15	Continue to enforce/improve, as needed, the city's ordinances and regulations for all hazards.	All	High	Gulfport Building Office	General funds	2022	(Action 37 in previous plan) The city has a number of ordinances in place to regulate related to hazards. However, a major focus is on flooding and the city would like to expand that focus, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-16	Enforce the city's substantial damage and substantial improvement rule.	Flood and Hurricane	High	Building Official	General funds	2022	(Action 38 in previous plan) The city has a substantial damage and substantial improvement rule that it has enforced. There are some ways that the city might improve these ordinances, possibly through cumulative approaches, and the city will evaluate the efficacy of these kind of improvements going forward. This action will remain in place.
P-17	Require non-conversion agreements for enclosures below the base flood elevation.	Hurricane and Flood	High	Building Official	General funds	2022	(Action 39 in previous plan) The city has not required non-conversion agreements for enclosures below the BFE due to lack of staff time to implement. This action will be retained as the city continues to pursue.
P-18	Integrate mitigation in to local planning.	All	High	Planning and Zoning	General budget	2019	(Action 40 in previous plan) The city has worked to integrate mitigation efforts into local planning and has done so successfully. However, as this plan has just been updated and new projects are on the horizon, the city will need to keep this action in place and integrate new elements.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-19	Conduct post-disaster Hazard Mitigation Committee meetings for declared events to assess the city's impacts to people and property.	All	High	Deputy Building Official and City Emergency Manager	General funds	2022	(Action 43 in previous plan) In the past, the city has conducted post-disaster HMC meetings to assess impacts to people and property. These meetings will need to be continually implemented post-disaster, so this action will remain in place.
P-20	Conduct annual reviews of the hazard mitigation and flood protection plan.	All	High	Deputy Building Office and City Emergency Manager	General funds	2017, Annually	(Action 44 in previous plan) The city has conducted annual reviews of the hazard mitigation and flood protection plans, but now that the plan has been recently updated, the city will need to continue to perform these reviews.
P-21	Pursue funding for mitigation actions.	All	High	Comptroller	General budget	2022	(Action 45 in previous plan) The city has pursued mitigation action funding through its local budget in several cases, but there are many potential projects that have not been funded yet, so the city will keep this action in place as it attempts to set aside more funding for mitigation projects in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-22	Continue to mitigate educate mosquito control procedures.	Infectious Disease	High	Public Affairs, Public Works	General budget	2022	(Action D in previous plan) The city has attempted to implement a number of mosquito control procedures to reduce the infectious diseases, but since the outbreak of several recent mosquito borne illnesses, the city may need to reevaluate its policy, so this action will be retained.
P-23	Develop a Commodity Flow Study.	Technological/ Man-made Hazards	High	Fire Department	HMGP	2018	(Action E in previous plan) The city has not yet developed a CFS due to lack of funding, but the city will continue to work towards implementing this action.
Property Protection							
PP-1	Storm proof new critical facilities and infrastructure.	All	High	Mayor and City Council	HMGP, CDBG	2022	(Action 5 in previous plan) The city has worked hard to try to storm proof new critical facilities and infrastructure as they are constructed, but this action will require vigilance to ensure it is implemented going forward so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-2	Retrofit existing critical facilities and infrastructure to be more resistant to all hazards.	All	High	City of Gulfport Comptroller	HMGP, CDBG	2022	(Action 6 in previous plan) Although many critical facilities and infrastructure have been retrofit to be more hazard resistant, there are still a number of critical facilities in the city that need to be retrofit, so this action will remain in the plan.
PP-3	Replace cable hung traffic signals with mast arm signals along major highways.	Hurricane, Severe Storm, Tornado	High	MDOT, FHWA	FHWA, CDBG	2022	(Action 7 in previous plan) There have been many places where cable hung traffic signals have been replaced by mast arms on major highways, but there are still a number of locations the city would like to make this change so this action will be retained in the plan.
PP-4	Relocate/retrofit Gulfport's south wastewater treatment plant.	Hurricane, Flood	High	City of Gulfport	HMGP, MDEQ, CDBG, restore/recovery programs	2019	(Action 8 in previous plan) The city has not had funding available to relocate/retrofit its south wastewater treatment plant to the degree that it would like, so this action will remain in the plan going forward.
PP-5	Complete the installation of Supervisory Control and Data Acquisition (SCADA) units.	All	High	Public Works Department	General funds	2018	(Action 9 in previous plan) The city is still working on installing the SCADA units, so this action will remain in the plan as the city tries to complete this project.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-6	Elevate/relocate bridges that provide access to neighborhoods to protect residents.	Flood, Hurricane	Moderate	Engineering	406, HMA, other federal/state transportation programs	2020	(Action 10 in previous plan) The city has elevate and relocated some bridges that provide access to neighborhoods, but there are still some areas where bridge improvements would help ensure better access in the event of a flood, so the city will continue to pursue this action going forward.
PP-7	Armor bridge approaches and abutments to prevent washouts.	Hurricane and Flood	Moderate	Mayor and City Council	406, HMA, other federal/state transportation programs	2022	(Action 11 in previous plan) Although the city has armored some bridge approaches and abutments, there are still several bridges that have not been addressed, so the city will attempt to address these in the future.
PP-8	Upgrade the North Wastewater Treatment Plan to eliminate need for the South Plant.	All	High	Public Works, Engineering; Harrison County Wastewater	HMGP, MDEQ, restore program	2022	(Action 13 in previous plan) The city has not made upgrades to the North Wastewater Treatment Plant to the degree that it will no longer need the South Plan due to lack of funding. As such, this action will remain in the plan.
PP-9	Retrofit city-owned piers/pavilions.	Hurricane, Flood, Severe Weather	Low	Public Works	HMGP, general funds	2022	(Action 14 in previous plan) In many cases, city-owned piers/pavilions have been retrofit to ensure stability, but there will be a constant need to make upgrades, so the city will keep this action in the plan going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-10	Promote elevation/acquisition activities to residents/commercial owners located in the Special Flood Hazard Area.	Hurricane and Flood	High	City of Gulfport Planning Department	FMA	2022	(Action 23 in previous plan) The city has worked with local property owners to implement elevation and acquisition projects in the SFHA, but there are still many potential properties that are located in these areas that have not been mitigated, so this action will remain in the plan.
PP-11	Create defensible space around structures and infrastructure.	Wildfire	High	Public Works	General funds	2022	(Action 31 in previous plan) The city has used defensible space strategies in a number of locations to try to protect structures and infrastructure, but the city would like to employ this strategy in several other locations as well, so this action will be retained in the plan.
PP-12	Install lightning grounding systems and lighting protection devices on critical sewer and water systems and city buildings.	Hurricane and All Severe Weather	Moderate	Public Works Department	General funds	2022	(Action 32 in previous plan) In some cases, the city has installed lightning grounding systems and lightning protection devices to protect critical infrastructure, but there are still many places where infrastructure is not protected with these systems, so this action will be retained in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Natural Resource Protection							
NRP-1	Support Harrison County's efforts to re-nourish the beach and implement beach protection measures.	Hurricane, Erosion, Flood	High	Harrison County Sand Beach Department and Board of Supervisors	Seawall Tax, local funds, funding through NOAA	2022	(Action 18 in previous plan) The city has worked with the county over the past several years to maintain and renourish the beach through beach protection measures. However, these efforts will need to be reviewed and evaluated to ensure proper actions are taking place going forward so this action will stay in place.
NRP-2	Support marsh restoration efforts.	Hurricane and Erosion	High	Harrison County Sand Beach	Tidelands funds, foundation funds, funding from NOAA, EPA, CIAP	2022	(Action 19 in previous plan) The city has been involved in and supportive of marsh restoration efforts to act as sinks for water. These efforts are important and the city will need to continue to find new areas to preserve marshes, so this action will remain in place.
NRP-3	Support the restoration of the barrier islands.	Hurricane, Erosion	High	Department of Marine Resources	Coastal Impact Assistance Program, Tidelands Funds	2022	(Action 20 in previous plan) The city has worked with county and state officials to support the restoration of barrier islands off the coast to act as protective buffers to storm surge and erosion. However, further efforts are likely needed to continue to protect these features, so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
NRP-4	Continue to enforce no wake zones and water speed limits.	Flood and Erosion	High	MDMR, Harrison County Sherriff, MDWFP	Not applicable	2022	(Action 21 in previous plan) The city currently works to enforce "no wake" zones and water speed limits which can help reduce erosion rates. These policies may need to be evaluated over the next 5 years to ensure they are still meeting an adequate standard, so this action will be retained.
Structural Projects							
SP-1	Promote/build detention ponds when appropriate.	Flood	High	Engineering Department	CDBG, included in new development funding	2022	(Action 16 in previous plan) In many cases when new construction is built, detention ponds have been constructed as part of these projects, but there is likely to still be further need to implement detention ponds in other locations in the city, so this action will remain in place.
SP-2	Upgrade drainage systems and culverts.	Flood	High	Engineering Department	HMGP, CDBG, CIAP funding, or as part of developer agreement	2022	(Action 24 in previous plan) Many drainage systems and culverts have been constructed throughout the city, but there is likely to still be further need to implement these projects in other locations in the city, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Emergency Services							
ES-1	Install severe weather warning systems across the city.	All Severe Weather, Tornado	Moderate	Mayor, City Council, Engineering	HMGP	2018	(Action 1 in previous plan) Although the city does have some severe weather warning systems in place, there is a need to enhance these systems to provide better warning of severe weather. This action will remain in the plan.
ES-2	Install electronic information alert signs over major evacuation routes to alert residents and travelers of threat conditions.	All	High	Mississippi Department of Transportation	FHWA	2018	(Action 2 in previous plan) The city has historically used electronic signs over evacuation routes to warn residents of impending threats. However, the city would also like to have additional sign capacity over more routes in order to increase the audience that receives these messages.
ES-3	Continue to work with CTA and other transportation providers to evacuate people that do not have transportation.	Hurricane and Flood	High	Harrison County, MEMA	FEMA	2022	(Action 3 in previous plan) The city has worked with CTA and other transportation providers to set up means of evacuation for those who do not have transportation. However, the city will need to continue to foster these and other new relationships to ensure there is adequate availability of transportation in the event of a disaster. This event will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-4	Secure generators for existing and new critical facilities and infrastructure.	All	High	City of Gulfport Comptroller, Public Works Director	HMGP	2022	(Action 17 in previous plan) A number of critical facilities and infrastructure have been set up with generators to maintain backup power, but there are many facilities that would benefit from backup power that do not have it, so this action will remain in the plan.
ES-5	Conduct annual first responder training for all hazards.	All	High	Emergency Manager	General funds	2017, Annual	(Action 41 in previous plan) The city has tried to ensure that annual first responder trainings for hazards take place regularly. The city would like to continue to try to implement this program and update/refine it where necessary so that all first responders are properly trained and up to date.
ES-6	Conduct annual NIMS training for first responders, city officials, and critical employees.	All	High	Fire and Police Departments	General budget	2017, Annual	(Action 42 in previous plan) Some of the city's employees, officials, and first responders have received NIMS training, but there are still a number who would benefit from this training and as new employees are hired, they will also need this training so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-7	Continue to participate with state and federal agencies in training and educational programs for technological, man-made, and health-related hazards.	Hazardous Materials, Infectious Disease	High	City Emergency Manager, key staff	General budget	2022	(Action B in previous plan) The city has participated in training with officials at a number of different levels of government to be involved in training and educational programs. There will be a constant need as conditions change to stay up to date by participating in these programs, so the city will keep this action in place.
Public Education and Awareness							
PEA-1	Establish and maintain a hazard preparedness link on the city's web page.	All	High	Public Affairs	General funds	2022	(Action 46 in previous plan) There is a hazard preparedness area on the city's web page, but this information will likely need to be updated during the next 5 years, so this action will be retained.
PEA-2	Promote workshops for emergency preparedness plans.	All	High	Emergency Manager	Undetermined	2022	(Action 47 in previous plan) The city has held some workshops for emergency preparedness plans, but the city has not reached as many people as it would like, so it will look towards enhancing ways to encourage citizens to develop these plans.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-3	Work with applicable agencies to identify high risk areas and distribute educational information.	Infectious Disease, Hazardous Materials	High	Emergency Manager, Public Affairs	MSDH, EMPG, Homeland Security, city general funds	2022	(Action A in previous plan) Although the city has worked with a number of agencies to use as repositories for information on hazard risk for citizens, the city would like to determine if there are other agencies that might also provide a good outlet for this and improve relations with those agencies that the city already works with. This action will remain in place.
PEA-4	Encourage the development of training and emergency planning for private companies that handle hazardous materials.	Hazardous Materials	High	Emergency Manager, Police and Fire Officials	General budget	2022	(Action C in previous plan) The city has not done a substantial amount of training and planning for private companies that handle hazardous materials due to staff time limitations, but the city would like to improve in this area, so this action will be retained.

City of Long Beach Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Implement a residential water metering program to monitor water usage and promote conservation and limit water usage during periods of severe drought.	Drought	Moderate	Public Works and Board of Alderman	CDBG	2022	(Action 2 in previous plan) The city has implemented a residential water metering program, but this policy/program may need to be re-evaluated going forward to ensure that it is being used as effectively as possible. This action will be retained.
P-2	Develop and enhance building codes.	All	Moderate	Building Official	General fund	2019	(Action 19 in previous plan) The city has developed and adopted a set of building codes to try to ensure people and property are protected in the face of hazards, however, there are many enhancements the city could make to ensure better protection and the city will review these codes in the future.
P-3	Participate as a member of CHOST to meet and discuss issues and solutions to flooding problems with neighboring jurisdictions.	Flood, Hurricane	Moderate	Building Official	General fund	2022	(Action 20 in previous plan) The city has worked with neighboring communities to try to solve multi-jurisdictional flood issues, but there are still a number of cross-jurisdictional issues that could be addressed to reduce flood problems, so the city will keep this action in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Property Protection							
PP-1	Acquisition of several repetitive loss properties located within the city limits of Long Beach.	Flood, Hurricane, Thunderstorm	Low	Civil Defense Coordinator and Building Official	HMGP or FMA	2022	(Action 3 in previous plan) The city has acquired some rep loss properties in the past, but there are still a number of properties that are repetitive loss in the city that the city will look at in terms of voluntary buyouts.
PP-2	Elevation projects including several residential structures located within the city limits of Long Beach that are below the current BFE requirements.	Flood, Hurricane, Thunderstorm	Moderate	Civil Defense Coordinator and Building Official	HMGP or FMA	2022	(Action 4 in previous plan) The city has implemented a number of elevation projects, but there are still many homes that need to be elevated above BFE and possibly above that level to provide additional protection, so this action will be retained.
PP-3	Reconstruction/rebuild of homes through grant funding and public assistance following flooding, tropical storms, and hurricanes.	Flood, Hurricane, Thunderstorm	Moderate	Civil Defense Coordinator and Building Official	HMGP and general fund	2022	(Action 5 in previous plan) The city has experienced a number of disasters that require rebuild of homes and have done so in a way that attempts to mitigate future losses. However, there are still many homes at risk and the city will continue to focus on addressing these homes through construction techniques going forward.
Natural Resource Protection							
NRP-1							

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Structural Projects							
SP-1	Gandy Circle drainage improvements.	Flood	Moderate	Board of Alderman	HMGP, PA, CDBG	2022	(Action 6 in previous plan) The Gandy Circle drainage improvements have not been constructed due to lack of funding, so this action will be retained in the plan.
SP-2	Royal Drive drainage improvements	Flood	Moderate	Board of Alderman	HMGP, PA, CDBG	2022	(Action 7 in previous plan) The Royal Drive drainage improvements have not been constructed due to lack of funding, so this action will be retained in the plan.
SP-3	Bear Creek drainage canal improvements from Douglas to USM to reshape and stabilize drainage channel.	Flood	Moderate	Board of Alderman	CDBG, PDM, HMGP	2022	(Action 8 in previous plan) Bear Creek drainage canal improvements have not been constructed due to lack of funding, so this action will be retained in the plan.
SP-4	Canal #1 drainage improvements to reshape and stabilize drainage canal.	Flood	Low	Board of Alderman and County Board of Supervisors	CDBG, PDM, HMGP	2022	(Action 9 in previous plan) Canal #1 drainage improvements have not been constructed due to lack of funding, so this action will be retained in the plan.
SP-5	Canal #1 bridge replacement. Commission Road Bridge is in poor condition. Timber piling and caps are deteriorating. Bridge should be replaced and channel widened to improve stormwater flow.	Erosion	Moderate	Board of Alderman	CDBG, HMGP	2022	(Action 10 in previous plan) Canal #1 bridge replacement and channel widening have not been constructed due to lack of funding, so this action will be retained in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-6	Gates Avenue drainage outfall needs small, inadequate culverts to be improved.	Flood	Moderate	Board of Alderman	CDBG, PDM, HMGP	2022	(Action 11 in previous plan) Gates Avenue culverts have not been improved due to lack of funding, so this action will be retained in the plan.
SP-7	Long Beach Harbor "issues" improvements including bank stabilization and bulkhead replacement.	Erosion	Moderate	Board of Alderman and Port Commission	CDBG, Tidelands, PA, HMGP	2022	(Action 12 in previous plan) Long Beach Harbor improvements have not been constructed due to lack of funding, so this action will be retained in the plan.
SP-8	Turkey Creek drainage reservoir to retain flood waters and eliminate flooding.	Flood	Low	Board of Alderman and neighboring jurisdictions	FEMA	2022	(Action 13 in previous plan) Turkey Creek drainage reservoir has not been constructed due to lack of funding, so this action will be retained in the plan.
SP-9	Commission Road drainage improvements.	Flood	Low	Board of Alderman	CDBG, PDM, PA, HMGP	2022	(Action 14 in previous plan) Commission Road drainage improvements have not been constructed due to lack of funding, so this action will be retained in the plan.
SP-10	Citywide drainage canal improvements including reshaping and stabilizing drainage canals throughout the city. (St. Augustine, Green Acres Ditch). Install rip rap/reslope and stabilize.	Flood	Moderate	Board of Alderman	CDBG, PDM, PA, HMGP	2022	(Action 15 in previous plan) Citywide canal drainage improvements have not been constructed due to lack of funding, so this action will be retained in the plan.
SP-11	Construct new water tower and tank to eliminate low water pressure issues and poor water quality during periods of Drought.	Drought	Low	Board of Alderman	FEMA	2022	(Action 16 in previous plan) A new water tower and tank have not been constructed due to lack of funding, so this action will be retained in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-12	Construct new water well to eliminate low water pressure issues and poor water quality during periods of drought.	Drought	Low	Board of Alderman	FEMA	2022	(Action 17 in previous plan) A new water well has not been constructed due to lack of funding, so this action will be retained in the plan.
Emergency Services							
ES-1	Install warning sirens to notify citizens of threatening weather or man-made hazards.	All	High	Fire and Police Departments	HMGP	2022	(Action 1 in previous plan) Warning sirens have not been installed due to lack of funding, so this action will remain in the plan.
Public Education and Awareness							
PEA-1	Maintain and enhance website to inform residents of hazards and preparation.	All	Moderate	Building Code Office	General fund	2020	(Action 18 in previous plan) The city has developed a website to enhance public education and awareness of hazards. However, this will need to be reviewed and updated in the coming years to ensure information is up to date, so this action will be retained.

City of Pass Christian Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Enhance the city's Continuity Plan to ensure that emergency operations can function and that day-to-day management of the city can be back on track as soon as possible after an emergency.	All	High	Fire and Police Departments	Emergency operations budget	2022	The city has developed a Continuity Plan, but there are many ways that it may be enhanced that have not been implemented yet, so the city will keep this action in place.
P-2	Incorporate the Pass Christian hazard Mitigation Plan into the city's Comprehensive Plan and other strategic planning processes.	All	High	Board of Alderman, Planning Commission	City budget	2022	The city has worked over the past several years to incorporate the hazard mitigation plan into the city's comprehensive plan, but since there has been a recent update to this plan, the city will need to update the comprehensive plan accordingly.
P-3	Develop and implement a Capital Improvement Plan (CIP) for the City of Pass Christian.	All	Moderate	Public Works Department	PDM Grant, FEMA	2022	The city has not implemented a formal CIP, but it has implemented a number of capital improvement projects. The city will keep this action in place as it continues to try to develop a more formal plan.
Property Protection							
PP-1							

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Natural Resource Protection							
NRP-1	Work with the Harrison County Sand Beach Authority to continue maintaining the beach and seawall to allow them to continue to serve their function of mitigating wave and flooding action to protect U.S. Highway 90.	Flood, Hurricane	Moderate	Harrison County Sand Beach Authority	Mississippi Coastal Improvement Program, U.S. Army Corps of Engineers	2022	The city has worked with the county to ensure the protection of the beach and seawall to provide protection to the community and mitigate flooding. The city will continue to work with the county going forward on this action, so this will remain in the plan.
NRP-2	Preserve and protect trees and vegetation on uninhabited properties to improve natural stormwater management and flood control processes.	Flood	Moderate	Public Works Department	City budget	2022	The city has preserved and protected trees and other forms of vegetation to attempt to improve natural stormwater infiltration and recycle. However, as development continues to occur in the city, this action will take further importance, so this action will remain in the plan.
NRP-3	Work with the Harrison County Sand Beach Authority to continue dune propagation in areas along the beach where the seawall is below 10 foot in elevation.	Hurricane, Flood	Low	Harrison County Sand Beach Authority	Harrison County Sand Beach Authority	2022	The city has worked with the county to use dune propagation in areas along the beach where the seawall is below 10 feet. However, this action requires consistent evaluation to ensure the proper steps are being taken, so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Structural Projects							
SP-1	Build a new drinking water well in area less prone to flooding.	Flood	High	Water Department	Water Department, water usage fees	2022	The city has not yet built a new drinking water well, but it will continue to look into implementing this action in the future.
SP-2	Continue the city's efforts to upgrade drainage facilities.	Flood	High	Fire and Police Departments	PDM Grant, FEMA	2022	The city has updated a number of drainage facilities, but there are still many drainage projects that the city is looking to implement, so it will retain this action in the plan.
SP-3	Develop a new east/west roadway connecting Menge and Easpy Avenues.	All	Moderate	Public Works Department, Harrison County	Public Works Department, Harrison County	2022	The city has not yet developed a new east/west roadway connecting these roads, so this action will be retained going forward.
SP-4	Improve the north/south roadway access in western Pass Christian.	All	Moderate	Public Works Department, Harrison County	Public Works Department, Harrison County	2022	Improvements to the north/south roadway access have not been made, so this action will be retained going forward.
SP-5	Improve drainage through incorporating additional storm sewer improvements on roads that were not upgraded after the storm.	Flood	Moderate	Public Works Department, Harrison County	Public Works Department, Harrison County	2022	A number of roads still have not been upgraded through drainage improvements to stormwater management so the city will keep this action in the plan as it continues to pursue.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Emergency Services							
ES-1	Implement an early warning network to alert citizens to oncoming hazards.	All	High	Fire and Police Departments	PDM Grant, FEMA	2022	Although there is a network in place to provide early warning to citizens, there are many technologies and systems that could be implemented to improve the current system, so this action will be retained.
ES-2	Upgrade fire protection through acquisition of a new fire truck capable of reaching new elevated buildings and construct a fire station large enough to accommodate it.	Wildfire	High	Fire and Police Department	PDM Grant, FEMA	2022	The city has not purchased a new fire truck with these capabilities nor constructed a corresponding fire station. Therefore, this action will be retained in the plan.
Public Education and Awareness							
PEA-1	Create a partnership to assist with development of Family Disaster Plans.	All	High	Fire and Police Departments	Emergency operations budget	2022	The city has worked to encourage the development of Family Disaster Plans, but there are still many families without these plans, so the city will continue to pursue this action.
PEA-2	Establish and implement a public education and outreach program focused on hurricane evacuation procedures.	All	High	Fire and Police Departments	Emergency operations budget	2022	The city has done a good bit of outreach related to hurricane evacuation procedures, but there are still many citizens who are not fully aware of the steps they need to take and so further education is needed.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-3	Reach out to at-risk and vulnerable families through programs aimed at local schools and youth programs.	All	Moderate	Pass Christian Schools	Pass Christian Schools	2022	The city has done some outreach to vulnerable families through local school programs, but these programs have not reached as many families as the city would like, so this action will be retained in the plan.
PEA-4	Educate residents on their part in managing stormwater and reducing flooding through better disposal practices.	Flood	Moderate	Buildings Department	City budget	2022	Many residents are aware of stormwater management and disposal techniques, but this is still an issue many others are not as informed about, so the city will continue to try to push for more education of citizens.
PEA-5	Continue to teach floodplain management curriculum in Pass Christian High School science classes.	Flood	Low	Pass Christian Schools	Pass Christian Schools	2022	There is a floodplain management curriculum at the high school, but this program will need to be reviewed and updated according to the latest information that is available about floodplain management. The city will look into this program and work with the school to make improvements.
PEA-6	Provide education and outreach materials at local public functions and through direct mail-outs.	All	Low	Buildings Department	Buildings Department	2022	Education materials have been sent out in direct mailings to address many issues, but these mailings will still need to be sent out to keep new residents informed and to keep existing residents up to date on hazard risk. This action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-7	Work with the Gulf Coast Community Action Agency to provide one-to-one outreach on preparedness and risk to low-income residents.	All	Low	Buildings Department	Buildings Department	2022	The city has worked with GCCAA to help provide one on one outreach to low income residents where possible. However, this program has not reached all of its target audience so this action will remain in the plan as the city continues to pursue.
PEA-8	Continue participation in the Gulf Coast Homeowner's Show and other "trade" shows to provide mitigation and preparedness information to the public.	All	Low	Buildings Department	Building Departments	2022	The city has participated in a number of trade shows and public events to try to get information out to citizens and builders in the community. This program has been successful in many ways and will need to be continued to get maximum effect. This action will be retained in the plan.

Jackson County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Enforce building codes.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 14 in previous plan) The county has maintained its practice of enforcing building codes over the past several years. It will evaluate these codes in the coming years and ensure that they are still being enforced properly so this action will remain in place.
P-2	Maintain debris program to clean drainage ways from existing properties and critical facilities.	Flood	High	Gautier Street Division; Jackson County Road Department	Internal	2022	(Action 16 in previous plan) The county has developed and maintained a debris program that has been successful, but there are likely some areas where the county can improve this program in the future, so this action will remain in place.
P-3	Maintain debris program to clear roadside ditches and culverts.	Flood	High	Gautier Street Division; Jackson County Road Department	Internal	2022	(Action 17 in previous plan) The county has developed and maintained a debris program that has been successful, but there are likely some areas where the county can improve this program in the future, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-4	Develop/enforce landscaping requirements to provide absorption of average volumes of rainfall on property.	Flood	Moderate	Gautier and Jackson County Planning Departments	Internal	2022	(Action 18 in previous plan) The county has developed some requirements related to landscaping, but these may need to be revised and reviewed for improving enforcement so the county will keep this plan in place.
P-5	Enforce storm water ordinances and encourage use of pervious surfaces and natural absorption of rainwater.	Flood	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 20 in previous plan) The county has worked to enforce its stormwater ordinances and encourage use of pervious surfaces in construction, but there are still many areas where there is room for improvement in this regard so the county will maintain this action.
P-6	Enforce the revised Digital Flood Insurance Rate Map (DFIRM).	Flood	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 21 in previous plan) The county has reviewed the DFIRM and is currently enforcing all regulations that pertain to areas located in flood zones. The county will evaluate its regulations related to floodplains to ensure that they are up to the highest possible standard feasible.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Control vegetation growth around critical facilities.	Wildfire	High	Gautier Street Division; Jackson County Road Department	Internal	2022	(Action 23 in previous plan) The county has monitored vegetation growth around most critical facilities, but there is still additional work to be done related to managing this growth around critical facilities so the county will keep this action in place.
P-8	Coordinate prescribed burns in heavily forested areas with state and federal agencies.	Wildfire	High	Gautier and Jackson County Fire Departments	Internal	2022	(Action 24 in previous plan) When necessary, the county has worked with state and federal agencies to initiate prescribed burns. This practice will need to be continually evaluated and coordination with the proper agencies is also needed so the action will stay in place.
P-9	Conduct a study of the effects of sea level rise and develop mitigation strategies to minimize those effects.	Sea Level Rise	Low	Gautier and Jackson County Planning Departments	Internal	2022	(Action 26 in previous plan) No localized study of the effects of sea level rise has been carried out, though there have been some national level studies. The county will continue to pursue a more localized evaluation of the impacts of sea level rise in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-10	Encourage private land owners on waterfronts to implement erosion control measures.	Erosion	Low	Gautier and Jackson County Planning Departments	Internal	2022	(Action 27 in previous plan) Some efforts have been made to encourage private land owners to implement erosion control measures on their property, but many have still not taken the necessary steps, so the county will continue to encourage these actions going forward.
P-11	Develop/enforce water use ordinance to address drought condition procedures.	Drought	High	Gautier and Jackson County Planning Departments	Internal	2020	(Action 28 in previous plan) The county has not developed a specific ordinance to address drought condition procedures, but it has enacted some restrictions in the past. The county will continue to look at adopting a specific ordinance to this effect.
P-12	Conduct study on aquifers to determine impacts on public and private wells.	Drought	Moderate	Jackson County Utility Authority	Jackson County Utility Authority	2022	(Action 29 in previous plan) The county has not conducted a study of aquifers due to a lack of funding, but this is still a priority action that must be coordinated with the utility authority, so the action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-13	Implement dredging program for the Bayou areas to improve effects of sediment buildup caused by storm surge.	Storm Surge	Moderate	Gautier Public Works; Jackson County Public Works	MDMR, USACE, NRCS, CIAP, Tideland	2022	(Action 33 in previous plan) Some dredging has been done in the Bayou areas, but an official program has not been implemented to the scale necessary to prevent all impacts from storm surge so the county will continue to work on improving the implementation of this action in the future.
P-14	Develop continuity of operations plans.	All	High	Jackson County and City of Gautier	Internal	2020	(Action 49 in previous plan) The county has not developed a formal continuity of operations plan, but does have some strategies in place to ensure continuity of operations. The county will work to develop a formal plan going forward.
P-15	Develop Emergency response plans.	All	High	Jackson County and City of Gautier	Internal	2022	(Action 50 in previous plan) The county has developed an emergency operations plan, but it will need to be reviewed in the coming years to ensure it still identifies proper protocols. This action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-16	Develop capital improvement plans.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 52 in previous plan) The county does not have a formal CIP, but it does have a program in place for spending on infrastructure. The county will continue to work on implementing this program and evaluating the development of a formal CIP.
P-17	Develop/enhance asset inventories (e.g., critical facilities, infrastructure, equipment) into GIS.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 55 in previous plan) During this plan update, a number of additional critical facilities were digitized into GIS. However, some facilities were still not included in this digitization so the county will continue to work on this.
P-18	Upgrade devices used for damage assessments and communication as technology improves/changes.	All	High	Jackson County Emergency Management Agency	Internal	2022	(Action 56 in previous plan) The county has devices it uses for damage assessments, but these devices are indeed getting out of date so it will look for ways to improve its assets in this area where possible going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-19	Seek opportunities to continue to lower the CRS rating (and insurance rate).	Flood	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 57 in previous plan) The county participates in the CRS, but it has not reached a level 1 yet, so there are certainly ways in which the county can improve its program and score more points. The county will continue to evaluate the best steps it can take to do this.
P-20	Incorporate the goals and objectives of the hazard mitigation plan into all planning documents and ordinances.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 58 in previous plan) The goals of the hazard mitigation plan have been incorporated into other planning documents, but as this plan and those documents are updated, additional effort to ensure up to date information will be needed.
P-21	Conduct annual review of the hazard mitigation plan.	All	High	Hazard Mitigation Council; Gautier and Jackson County Planning Departments	Internal	2017, Annually	(Action 59 in previous plan) The county has conducted annual reviews of its hazard mitigation plan, but this action will need to be kept in place as the county plans to continue this practice.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-22	Conduct evaluation of mitigation strategies and projects following a hazard impact.	All	High	Hazard Mitigation Council; Jackson County Emergency Management Agency	Internal	2022	(Action 60 in previous plan) The county has evaluated mitigation actions after hazards have impacted the community and generally tried to update the mitigation plan accordingly, but this has not always been the case so the county will work on improving its implementation of this action.
P-23	Document damages/losses sustained from natural hazards.	All	High	Jackson County Emergency Management Agency	Internal	2022	(Action 61 in previous plan) For the most part, the county has documented damage caused by natural hazards, especially after very large events. However, the county would like to improve its documentation techniques for accuracy, so it will continue to work on this action.
P-24	Conduct After Action Reviews (AAR) following events to capture lessons learned, reassess damages incurred, and complete damage assessment forms with accurate information.	All	High	Hazard Mitigation Council	Internal	2022	(Action 62 in previous plan) The county has conducted AARs following many of its major disaster events, but there are certainly ways in which the county can improve its review process and so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Property Protection							
PP-1	Upgrade/harden water and wastewater facilities. (Gautier water towers/wells, Shell landing Wastewater Collection Systems, Jackson County motor control centers, Jackson County sanitary generators)	All	High	City of Gautier; Jackson County Utility Authority	HMA	2022	(Action 3 in previous plan) Although some efforts have been made to harden water/wastewater facilities in the county, there are still many that are unprotected and vulnerable so the county will retain this action.
PP-2	Harden existing critical facilities. (Gautier Police Dept., Gautier Public Works, Gautier Maintenance Shop, Singing River Hospital and Ocean Springs Hospital, Gautier Fire Dept., Pascagoula/Moss Point Wastewater Treatment Facility, and Escatawpa Wastewater Reclamation Facility).	All	High	City of Gautier; Jackson Count; Singing River Health	HMA	2022	(Action 4 in previous plan) Although some efforts have been made to harden critical facilities in the county, there are still many that are unprotected and vulnerable so the county will retain this action.
PP-3	Elevate/improve roads and bridges that are below base flood elevation.	Flood	High	Jackson County Road Dept.; Gautier Public Works	Local, State, Federal	2022	(Action 5 in previous plan) Many roads have been elevated above BFE in the county, but there are certainly some that have not and the county would like to work towards addressing those roads that are vulnerable to flooding.
PP-4	Relocate Jackson County Emergency Operation Center to county-owned property on Jim Ramsey Road.	All	High	Jackson County	HMA	2017	(Action 8 in previous plan) The county has not yet relocated its EOC to the property on Jim Ramsey Road but this is still in the works and the county will continue to push forward with this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-5	Relocate Jackson County Sheriff Dispatch/E-911 with EOC on Jim Ramsey Road or to existing EOC on Convent Avenue.	All	High	Jackson County	HMA	2017	(Action 9 in previous plan) The county has not yet relocated its EOC to the property on Jim Ramsey Road but this is still in the works and the county will continue to push forward with this action.
PP-6	Encourage use of underground utilities in higher elevation areas.	All	Moderate	Gautier and Jackson County Planning Departments	Internal	2022	(Action 11 in previous plan) The county has evaluated the use of underground utilities in areas that are high enough that those utilities will not be flooded. This is very location dependent, so the county will continue to implement where it makes the most sense in the future.
PP-7	Construct all new critical facilities and infrastructure with materials designed to minimize impacts from all hazards.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 12 in previous plan) The county has attempted to build all new critical facilities up to a standard that will protect them as best as possible from hazard impacts. As new facilities are constructed, the county will continue to try to build to the best possible standard.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-8	Identify location for community safe rooms in Gautier and Jackson County to accommodate the remaining population not covered in the existing safe rooms.	All	High	Gautier City Council; Jackson County Board of Supervisors	HMA	2022	(Action 13 in previous plan) Several safe rooms have been identified across the county but these do not cover the entirety of the county population, so additional safe rooms will need to be identified.
PP-9	Acquisition/demolition of Severe Repetitive Loss Properties (SRL) and Repetitive Flood Claim (RFC) properties by continuing to apply for FMA to mitigate when practical.	Flood	High	Gautier and Jackson County Planning Departments	FMA	2022	(Action 19 in previous plan) The county has mitigated a number of repetitive/severe repetitive loss properties, but there are still a number of these types of properties that need to be mitigated so the county will keep this action in place.
PP-10	Raise lift stations and other critical infrastructure above base floodplain where feasible.	Flood	High	Jackson County Utility Authority; City of Gautier	Local	2022	(Action 22 in previous plan) Some lift stations have been raised above the BFE, but others have not and there is still significant critical infrastructure located in the floodplain. The county will look at ways to mitigate the impacts to this infrastructure in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-11	Encourage existing and new developments to include surge and lightning protectors and use of enhanced construction materials.	Lightning	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 30 in previous plan) The county has encouraged developers to include surge and lightning protectors in new construction, but this has not always been implemented so the county will retain this action and continue to encourage this going forward.
PP-12	Implement mast arm traffic signal improvements.	All	High	Gautier Street Division; Jackson County Road Department	Local	2022	(Action 31 in previous plan) The county has implemented mast arms at several intersections, but there are many where mast arms are still not in place so the county will continue to pursue this action going forward.
PP-13	Mount street signs to existing mast arm traffic signals.	All	High	Gautier Street Division; Jackson County Road Department	Local	2022	(Action 32 in previous plan) In many cases where mast arms are in place, street signs have been mounted to the mast arms, but as many intersections do not have mast arms, this action will need to be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Natural Resource Protection							
NRP-1	Develop/maintain a beach erosion and renourishment program.	Erosion	Moderate	Gautier and Jackson County Public Works	Internal	2022	(Action 25 in previous plan) The county has implemented beach renourishment in many locations to reduce the effects of erosion, but since erosion is a continual process, this action will need to be retained going forward.
Structural Projects							
SP-1	Coordinate with applicable agencies on constructing new roadways and bridges above the base flood elevation.	Flood	High	Gautier Public Works, Jackson County Road Department	Local	2022	(Action 15 in previous plan) The county has worked with state and federal DOTs to try to ensure that new roadways and bridges are constructed above BFE, but this will need to be addressed as more roads are constructed in the future.
Emergency Services							
ES-1	Identify and prioritize portable generator hook ups or permanent mount units for wells, lift stations, and facilities.	All	High	Jackson County; City of Gautier; Jackson County Utility	HMA	2020	(Action 1 in previous plan) The county has identified a number of locations for portable generator hookup and has generally prioritized those locations. However, there are still additional locations where the county would like to make hookups available so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-2	Explore options for back up water supply system/service for Ocean Springs and Singing River Hospitals.	All	High	Singing River Health Systems	Local	2017	(Action 6 in previous plan) The hospitals have worked to identify alternative sources of water supply and service, but these will need to be checked on a regular basis to ensure these supplies are maintained. The county will keep this action in place.
ES-3	Develop agreements/reprocess for providing tie-ins and back up water service for Jackson County Utility Authority and Gautier.	All	High	Jackson County Utility Authority; Gautier Public Works	Local	2017	(Action 7 in previous plan) The county has developed some agreements for backup water supply service, but will need to continue to manage those agreements and ensure that backup water supplies remain available in the event of a disaster.
ES-4	Improve notification procedures of impending hazards and evacuation procedures.	All	High	Jackson County Emergency Management Agency	Local	2018	(Action 40 in previous plan) The county is consistently working on improving notification procedures for impending disasters, but there is still room for improvement and so the county will keep this action in place.
ES-5	Develop/update and conduct exercises on response procedures.	All	High	Jackson County and City of Gautier	Internal	2019	(Action 51 in previous plan) The county has developed and conducted a number of exercises on response procedures, but in order to remain on top of this sort of training, the county will plan to conduct additional exercises going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-6	Increase evacuation route options and coordination of activation by working with state/federal agencies.	All	High	Jackson County Emergency Management Agency	Local	2020	(Action 53 in previous plan) Evacuation routes are identified for the county, but the county would like to identify additional routes that citizens can use to evacuate to speed the evacuation process overall.
ES-7	Improve signage/traffic control devices for evacuations.	All	High	Jackson County Emergency Management Agency	Local	2020	(Action 54 in previous plan) The county has experienced evacuations before and have provided both signage and traffic control. However, the county would like to improve both of these aspects of evacuations so this action will remain in the plan.
Public Education and Awareness							
PEA-1	Educate the public on all hazard preparedness.	All	High	Jackson County Emergency Management Agency	Local	2022	(Action 36 in previous plan) The county has put in extensive efforts to educate the public on all hazard preparedness, but this is a continuous process that needs to be constantly evaluated to ensure the public is aware of risks and actions they can take to reduce risk.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Educate the public on all hazard mitigation programs (safe rooms, wind retrofit, etc.).	All	High	Jackson County Emergency Management Agency	Local	2022	(Action 37 in previous plan) The county has worked on educating the public about hazard mitigation programs and successfully encouraged many citizens to mitigate their homes/businesses. Nevertheless, many citizens are still not fully aware of programs available to assist them, so the county will keep this action in place.
PEA-3	Educate the public about the benefits of flood mitigation of homes and businesses.	Flood	High	Jackson County Emergency Management Agency	Local	2022	(Action 38 in previous plan) The county has focused on flood mitigation education with many home and business owners as this is a major threat to the community. Given that flood programs, funding, and insurance are constantly changing, this action will stay in place.
PEA-4	Continue to deliver programs to residents, business owners, and developers regarding best management practices for storm water control and household hazardous waste.	Flood, Hazardous Materials Incident	High	Gautier and Jackson County Planning Departments	Local	2022	(Action 39 in previous plan) The county has enacted several programs to help promote best practices for storm water control and household hazardous waste. However, many residents/businesses do not implement these practices so more education is likely required.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-5	Develop education materials for water conservation.	Drought	High	Gautier and Jackson County Planning Departments	Local	2022	(Action 41 in previous plan) The county has some information for the public on water conservation, but overall there needs to be more emphasis on getting citizens to implement these measures in the future.
PEA-6	Promote Firewise program to homeowners, builders/contractors, and developers.	Wildfire	High	Gautier and Jackson County Fire Departments	Local	2022	(Action 42 in previous plan) The county has encouraged the use of the Firewise program on many stakeholder groups, but there are still many areas that would benefit from implementing more elements of the Firewise program so this action will be retained.
PEA-7	Develop outreach strategies for non-English communities.	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 43 in previous plan) The county has generally focused on English language outreach strategies, but with a growing population of non-English speakers, the county would like to put more emphasis on reaching those groups so it will focus on this action going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-8	Develop outreach strategies for tourists (i.e., part-time residents, RV campers, vacationers, etc.)	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 44 in previous plan) The county has tried to incorporate tourists into much of its planning, but outreach/education strategies aimed towards tourists are not as prevalent. This is an action the county will try to focus on in the future.
PEA-9	Develop outreach strategies for elderly and low-income residents.	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 45 in previous plan) Outreach towards these vulnerable populations has been carried out in the past, but because these populations may need additional assistance in the event of a disaster, the county will retain this action and try to provide extra focus on these populations.
PEA-10	Develop outreach strategies for the physically challenged.	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 46 in previous plan) Outreach towards these vulnerable populations has been carried out in the past, but because these populations may need additional assistance in the event of a disaster, the county will retain this action and try to provide extra focus on these populations.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-11	Develop outreach strategies for those with mental health disabilities.	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 47 in previous plan) Outreach towards these vulnerable populations has been carried out in the past, but because these populations may need additional assistance in the event of a disaster, the county will retain this action and try to provide extra focus on these populations.
PEA-12	Develop outreach strategies and implement school programs for children.	All	High	All school districts and daycare providers within the county	Local	2022	(Action 48 in previous plan) Outreach towards these vulnerable populations has been carried out in the past, but because these populations may need additional assistance in the event of a disaster, the county will retain this action and try to provide extra focus on these populations.

City of Gautier Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Enforce building codes.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 14 in previous plan) The city has maintained its practice of enforcing building codes over the past several years. It will evaluate these codes in the coming years and ensure that they are still being enforced properly so this action will remain in place.
P-2	Maintain debris program to clean drainage ways from existing properties and critical facilities.	Flood	High	Gautier Street Division; Jackson County Road Department	Internal	2022	(Action 16 in previous plan) The city has developed and maintained a debris program that has been successful, but there are likely some areas where the city can improve this program in the future, so this action will remain in place.
P-3	Maintain debris program to clear roadside ditches and culverts.	Flood	High	Gautier Street Division; Jackson County Road Department	Internal	2022	(Action 17 in previous plan) The city has developed and maintained a debris program that has been successful, but there are likely some areas where the city can improve this program in the future, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-4	Develop/enforce landscaping requirements to provide absorption of average volumes of rainfall on property.	Flood	Moderate	Gautier and Jackson County Planning Departments	Internal	2022	(Action 18 in previous plan) The city has developed some requirements related to landscaping, but these may need to be revised and reviewed for improving enforcement so the city will keep this plan in place.
P-5	Enforce storm water ordinances and encourage use of pervious surfaces and natural absorption of rainwater.	Flood	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 20 in previous plan) The city has worked to enforce its stormwater ordinances and encourage use of pervious surfaces in construction, but there are still many areas where there is room for improvement in this regard so the city will maintain this action.
P-6	Enforce the revised Digital Flood Insurance Rate Map (DFIRM).	Flood	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 21 in previous plan) The city has reviewed the DFIRM and is currently enforcing all regulations that pertain to areas located in flood zones. The city will evaluate its regulations related to floodplains to ensure that they are up to the highest possible standard feasible.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Control vegetation growth around critical facilities.	Wildfire	High	Gautier Street Division; Jackson County Road Department	Internal	2022	(Action 23 in previous plan) The city has monitored vegetation growth around most critical facilities, but there is still additional work to be done related to managing this growth around critical facilities so the city will keep this action in place.
P-8	Coordinate prescribed burns in heavily forested areas with state and federal agencies.	Wildfire	High	Gautier and Jackson County Fire Departments	Internal	2022	(Action 24 in previous plan) When necessary, the city has worked with state and federal agencies to initiate prescribed burns. This practice will need to be continually evaluated and coordination with the proper agencies is also needed so the action will stay in place.
P-9	Conduct a study of the effects of sea level rise and develop mitigation strategies to minimize those effects.	Sea Level Rise	Low		Internal	2022	(Action 26 in previous plan) No localized study of the effects of sea level rise has been carried out, though there have been some national level studies. The city will continue to pursue a more localized evaluation of the impacts of sea level rise in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-10	Encourage private land owners on waterfronts to implement erosion control measures.	Erosion	Low	Gautier and Jackson County Planning Departments	Internal	2022	(Action 27 in previous plan) Some efforts have been made to encourage private land owners to implement erosion control measures on their property, but many have still not taken the necessary steps, so the city will continue to encourage these actions going forward.
P-11	Develop/enforce water use ordinance to address drought condition procedures.	Drought	High	Gautier and Jackson County Planning Departments	Internal	2020	(Action 28 in previous plan) The city has not developed a specific ordinance to address drought condition procedures, but it has enacted some restrictions in the past. The city will continue to look at adopting a specific ordinance to this effect.
P-12	Implement dredging program for the Bayou areas to improve effects of sediment buildup caused by storm surge.	Storm Surge	Moderate	Gautier Public Works; Jackson County Public Works	Jackson County Utility Authority	2022	(Action 29 in previous plan) The city has not conducted a study of aquifers due to a lack of funding, but this is still a priority action that must be coordinated with the utility authority, so the action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-13	Develop continuity of operations plans.	All	High	Jackson County and City of Gautier	MDMR, USACE, NRCS, CIAP, Tideland	2022	(Action 33 in previous plan) Some dredging has been done in the Bayou areas, but an official program has not been implemented to the scale necessary to prevent all impacts from storm surge so the city will continue to work on improving the implementation of this action in the future.
P-14	Emergency response plans.	All	High	Jackson County and City of Gautier	Internal	2020	(Action 49 in previous plan) The city has not developed a formal continuity of operations plan, but does have some strategies in place to ensure continuity of operations. The city will work to develop a formal plan going forward.
P-15	Develop capital improvement plans.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 50 in previous plan) The city has developed an emergency operations plan, but it will need to be reviewed in the coming years to ensure it still identifies proper protocols. This action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-16	Develop/enhance asset inventories (e.g., critical facilities, infrastructure, equipment) into GIS.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 52 in previous plan) The city does not have a formal CIP, but it does have a program in place for spending on infrastructure. The city will continue to work on implementing this program and evaluating the development of a formal CIP.
P-17	Upgrade decides used for damage assessments and communication as technology improves/changes.	All	High	Jackson County Emergency Management Agency	Internal	2022	(Action 55 in previous plan) During this plan update, a number of additional critical facilities were digitized into GIS. However, some facilities were still not included in this digitization so the city will continue to work on this.
P-18	Seek opportunities to continue to lower the CRS rating (and insurance rate).	Flood	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 56 in previous plan) The city has devices it uses for damage assessments, but these devices are indeed getting out of date so it will look for ways to improve its assets in this area where possible going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-19	Incorporate the goals and objectives of the hazard mitigation plan into all planning documents and ordinances.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 57 in previous plan) The city participates in the CRS, but it has not reached a level 1 yet, so there are certainly ways in which the city can improve its program and score more points. The city will continue to evaluate the best steps it can take to do this.
P-20	Conduct annual review of the hazard mitigation plan.	All	High	Hazard Mitigation Council; Gautier and Jackson County Planning Departments	Internal	2022	(Action 58 in previous plan) The goals of the hazard mitigation plan have been incorporated into other planning documents, but as this plan and those documents are updated, additional effort to ensure up to date information will be needed.
P-21	Conduct evaluation of mitigation strategies and projects following a hazard impact.	All	High	Hazard Mitigation Council; Jackson County Emergency Management Agency	Internal	2017, Annually	(Action 59 in previous plan) The city has conducted annual reviews of its hazard mitigation plan, but this action will need to be kept in place as the city plans to continue this practice.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-22	Document damages/losses sustained from natural hazards.	All	High	Jackson County Emergency Management Agency	Internal	2022	(Action 60 in previous plan) The city has evaluated mitigation actions after hazards have impacted the community and generally tried to update the mitigation plan accordingly, but this has not always been the case so the city will work on improving its implementation of this action.
P-23	Conduct After Action Reviews (AAR) following events to capture lessons learned, reassess damages incurred, and complete damage assessment forms with accurate information.	All	High	Hazard Mitigation Council	Internal	2022	(Action 61 in previous plan) For the most part, the city has documented damage caused by natural hazards, especially after very large events. However, the city would like to improve its documentation techniques for accuracy, so it will continue to work on this action.
Property Protection							
PP-1	Retrofit critical facilities with safe rooms, including the Fire, Police, Public Works, and City Hall facilities.	All	Moderate	City of Gautier	HMA	2022	(Action 2 in previous plan) Although some efforts have been made to harden critical facilities in the city, there are still many that are unprotected and vulnerable so the city will retain this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-2	Upgrade/harden water and wastewater facilities. (Gautier water towers/wells, Shell landing Wastewater Collection Systems, Jackson County motor control centers, Jackson County sanitary generators)	All	High	City of Gautier; Jackson County Utility Authority	HMA	2022	(Action 3 in previous plan) Although some efforts have been made to harden water/wastewater facilities in the city, there are still many that are unprotected and vulnerable so the city will retain this action.
PP-3	Harden existing critical facilities. (Gautier Police Dept., Gautier Public Works, Gautier Maintenance Shop, Singing River Hospital and Ocean Springs Hospital, Gautier Fire Dept., Pascagoula/Moss Point Wastewater Treatment Facility, and Escatawpa Wastewater Reclamation Facility).	All	High	City of Gautier; Jackson Count; Singing River Health	HMA	2022	(Action 4 in previous plan) Although some efforts have been made to harden critical facilities in the city, there are still many that are unprotected and vulnerable so the city will retain this action.
PP-4	Elevate/improve roads and bridges that are below base flood elevation.	Flood	High	Jackson County Road Dept.; Gautier Public Works	Local, State, Federal	2022	(Action 5 in previous plan) Many roads have been elevated above BFE in the city, but there are certainly some that have not and the city would like to work towards addressing those roads that are vulnerable to flooding.
PP-5	Relocate Emergency Operation Center for Gautier.	All	High	City of Gautier	HMA	2017	(Action 10 in previous plan) The city has not yet relocated its but this is still in the works and the city will continue to push forward with this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-6	Encourage use of underground utilities in higher elevation areas.	All	Moderate	Gautier and Jackson County Planning Departments	Internal	2022	(Action 11 in previous plan) The city has evaluated the use of underground utilities in areas that are high enough that those utilities will not be flooded. This is very location dependent, so the city will continue to implement where it makes the most sense in the future.
PP-7	Construct all new critical facilities and infrastructure with materials designed to minimize impacts from all hazards.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 12 in previous plan) The city has attempted to build all new critical facilities up to a standard that will protect them as best as possible from hazard impacts. As new facilities are constructed, the city will continue to try to build to the best possible standard.
PP-8	Identify location for community safe rooms in Gautier and Jackson County to accommodate the remaining population not covered in the existing safe rooms.	All	High	Gautier City Council; Jackson County Board of Supervisors	HMA	2022	(Action 13 in previous plan) Several safe rooms have been identified across the city but these do not cover the entirety of the city population, so additional safe rooms will need to be identified.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-9	Acquisition/demolition of Severe Repetitive Loss Properties (SRL) and Repetitive Flood Claim (RFC) properties by continuing to apply for FMA to mitigate when practical.	Flood	High	Gautier and Jackson County Planning Departments	FMA	2022	(Action 19 in previous plan) The city has mitigated a number of repetitive/severe repetitive loss properties, but there are still a number of these types of properties that need to be mitigated so the city will keep this action in place.
PP-10	Raise lift stations and other critical infrastructure above base floodplain where feasible.	Flood	High	Jackson County Utility Authority; City of Gautier	Local	2022	(Action 22 in previous plan) Some lift stations have been raised above the BFE, but others have not and there is still significant critical infrastructure located in the floodplain. The city will look at ways to mitigate the impacts to this infrastructure in the future.
PP-11	Encourage existing and new developments to include surge and lightning protectors and use of enhanced construction materials.	Lightning	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 30 in previous plan) The city has encouraged developers to include surge and lightning protectors in new construction, but this has not always been implemented so the city will retain this action and continue to encourage this going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-12	Implement mast arm traffic signal improvements.	All	High	Gautier Street Division; Jackson County Road Department	Local	2022	(Action 31 in previous plan) The city has implemented mast arms at several intersections, but there are many where mast arms are still not in place so the city will continue to pursue this action going forward.
PP-13	Mount street signs to existing mast arm traffic signals.	All	High	Gautier Street Division; Jackson County Road Department	Local	2022	(Action 32 in previous plan) In many cases where mast arms are in place, street signs have been mounted to the mast arms, but as many intersections do not have mast arms, this action will need to be retained.
Natural Resource Protection							
NRP-1	Develop/maintain a beach erosion and renourishment program.	Erosion	Moderate	Gautier and Jackson County Public Works	Internal	2022	(Action 25 in previous plan) The city has implemented beach renourishment in many locations to reduce the effects of erosion, but since erosion is a continual process, this action will need to be retained going forward.
NRP-2	Acquisition of natural wetlands for City of Gautier land conservation. 32 acre parcel north of Singing River Mall to be used as Town Green)	Flood	Low	Gautier Planning Department	CIAP	Completed	(Action 34 in previous plan) The city has acquired the land north of Singing River Mall to be used as Town Green.
NRP-3	Land acquisition for City of Gautier City Park Community Center-Phase 1. Improvements to City Park along Mary Walker Bayou.	Flood	Low	Gautier Planning Department	Tideland Funding FY2010	Completed	(Action 35 in previous plan) The city has acquired the land for the City Park Community Center.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Structural Projects							
SP-1	Coordinate with applicable agencies on constructing new roadways and bridges above the base flood elevation.	Flood	High	Gautier Public Works, Jackson County Road Department	Local	2022	(Action 15 in previous plan) The city has worked with state and federal DOTs to try to ensure that new roadways and bridges are constructed above BFE, but this will need to be addressed as more roads are constructed in the future.
Emergency Services							
ES-1	Identify and prioritize portable generator hook ups or permanent mount units for wells, lift stations, and facilities.	All	High	Jackson County; City of Gautier; Jackson County Utility	HMA	2020	(Action 1 in previous plan) The city has identified a number of locations for portable generator hookup and has generally prioritized those locations. However, there are still additional locations where the city would like to make hookups available so this action will remain in the plan.
ES-2	Develop agreements/reprocess for providing tie-ins and back up water service for Jackson County Utility Authority and Gautier.	All	High	Jackson County Utility Authority; Gautier Public Works	Local	2017	(Action 7 in previous plan) The city has developed some agreements for backup water supply service, but will need to continue to manage those agreements and ensure that backup water supplies remain available in the event of a disaster.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-3	Improve notification procedures of impending hazards and evacuation procedures.	All	High	Jackson County Emergency Management Agency	Local	2018	(Action 40 in previous plan) The city is consistently working on improving notification procedures for impending disasters, but there is still room for improvement and so the city will keep this action in place.
ES-4	Develop/update and conduct exercises on response procedures.	All	High	Jackson County and City of Gautier	Internal	2019	(Action 51 in previous plan) The city has developed and conducted a number of exercises on response procedures, but in order to remain on top of this sort of training, the city will plan to conduct additional exercises going forward.
ES-5	Increase evacuation route options and coordination of activation by working with state/federal agencies.	All	High	Jackson County Emergency Management Agency	Local	2020	(Action 53 in previous plan) Evacuation routes are identified for the city, but the city would like to identify additional routes that citizens can use to evacuate to speed the evacuation process overall.
ES-6	Improve signage/traffic control devices for evacuations.	All	High	Jackson County Emergency Management Agency	Local	2020	(Action 54 in previous plan) The city has experienced evacuations before and have provided both signage and traffic control. However, the city would like to improve both of these aspects of evacuations so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Public Education and Awareness							
PEA-1	Educate the public on all hazard preparedness.	All	High	Jackson County Emergency Management Agency	Local	2022	(Action 36 in previous plan) The city has put in extensive efforts to educate the public on all hazard preparedness, but this is a continuous process that needs to be constantly evaluated to ensure the public is aware of risks and actions they can take to reduce risk.
PEA-2	Educate the public on all hazard mitigation programs (safe rooms, wind retrofit, etc.).	All	High	Jackson County Emergency Management Agency	Local	2022	(Action 37 in previous plan) The city has worked on educating the public about hazard mitigation programs and successfully encouraged many citizens to mitigate their homes/businesses. Nevertheless, many citizens are still not fully aware of programs available to assist them, so the city will keep this action in place.
PEA-3	Educate the public about the benefits of flood mitigation of homes and businesses.	Flood	High	Jackson County Emergency Management Agency	Local	2022	(Action 38 in previous plan) The city has focused on flood mitigation education with many home and business owners as this is a major threat to the community. Given that flood programs, funding, and insurance are constantly changing, this action will stay in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-4	Continue to deliver programs to residents, business owners, and developers regarding best management practices for storm water control and household hazardous waste.	Flood, Hazardous Materials Incident	High	Gautier and Jackson County Planning Departments	Local	2022	(Action 39 in previous plan) The city has enacted several programs to help promote best practices for storm water control and household hazardous waste. However, many residents/businesses do not implement these practices so more education is likely required.
PEA-5	Develop education materials for water conservation.	Drought	High	Gautier and Jackson County Planning Departments	Local	2022	(Action 41 in previous plan) The city has some information for the public on water conservation, but overall there needs to be more emphasis on getting citizens to implement these measures in the future.
PEA-6	Promote Firewise program to homeowners, builders/contractors, and developers.	Wildfire	High	Gautier and Jackson County Fire Departments	Local	2022	(Action 42 in previous plan) The city has encouraged the use of the Firewise program on many stakeholder groups, but there are still many areas that would benefit from implementing more elements of the Firewise program so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-7	Develop outreach strategies for non-English communities.	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 43 in previous plan) The city has generally focused on English language outreach strategies, but with a growing population of non-English speakers, the city would like to put more emphasis on reaching those groups so it will focus on this action going forward.
PEA-8	Develop outreach strategies for tourists (i.e., part-time residents, RV campers, vacationers, etc.)	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 44 in previous plan) The city has tried to incorporate tourists into much of its planning, but outreach/education strategies aimed towards tourists are not as prevalent. This is an action the city will try to focus on in the future.
PEA-9	Develop outreach strategies for elderly and low-income residents.	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 45 in previous plan) Outreach towards these vulnerable populations has been carried out in the past, but because these populations may need additional assistance in the event of a disaster, the city will retain this action and try to provide extra focus on these populations.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-10	Develop outreach strategies for the physically challenged.	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 46 in previous plan) Outreach towards these vulnerable populations has been carried out in the past, but because these populations may need additional assistance in the event of a disaster, the city will retain this action and try to provide extra focus on these populations.
PEA-11	Develop outreach strategies for those with mental health disabilities.	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 47 in previous plan) Outreach towards these vulnerable populations has been carried out in the past, but because these populations may need additional assistance in the event of a disaster, the city will retain this action and try to provide extra focus on these populations.
PEA-12	Develop outreach strategies and implement school programs for children.	All	High	All school districts and daycare providers within the county	Local	2022	(Action 48 in previous plan) Outreach towards these vulnerable populations has been carried out in the past, but because these populations may need additional assistance in the event of a disaster, the city will retain this action and try to provide extra focus on these populations.

City of Moss Point Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Update Emergency Operation Plan.	All	High	Fire and Human Resources Departments	Budget	2018	(Action 2 in previous plan) The city's EOP has been updated in the past, but it is likely that a new update will be needed over the next 5 years, so this action will remain in place.
P-2	New water supply tank.	Drought	Moderate	Public Works Department	Budget as capital outlay project for Public Works	2020	(Action 5 in previous plan) The city has not acquired a new water supply tank due to lack of funding, so this action will remain in place.
P-3	Develop no burn ordinance.	Drought, Wildfire	Moderate	Fire Department	N/A or minimal	2018	(Action 6 in previous plan) The city has implemented a no burn restriction at several points when needed, but this action may need to be reviewed in the future to ensure that it is up to date.
P-4	Promote and implement conservation program (in coordination with developing emergency drought ordinance).	Drought	High	Fire Department and Building Inspection	N/A or minimal	2018	(Action 7 in previous plan) The city has promoted and implemented a conservation program, but this program will need to be updated so the action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Property Protection							
PP-1	Retrofit/361.	Hurricane	Low	Community Development	CDBG grant funding, city funding	2019	(Action 8 in previous plan) The city has worked to try to retrofit a number of structures to provide protection against wind and flood related hazards, but many structures are still vulnerable and would benefit from retrofitting, so this action will remain in the plan.
PP-2	Elevation of streets.	Flood, Hurricane, Severe Thunderstorm	Moderate	Public Works and Governing Body	Local	2022	(Action 10 in previous plan) Some streets in the city have been protected through elevations, but there are still many that have not, so this action will need to remain in the plan.
PP-3	Bridge replacement.	Flood, Hurricane, Severe Thunderstorm	Moderate	Public Works and Governing Body	Local	2022	(Action 11 in previous plan) Some bridge replacements have been carried out to provide less at-risk crossing in the city. However, the city still has some identified bridges that it would like to replace.
PP-4	Acquisition projects.	Flood, Hurricane, Severe Thunderstorm	Low	Community Development	HMGP, CDBG	2022	(Action 12 in previous plan) The city has participated in acquisition projects in the past, but there are still many properties could be acquired through voluntary programs to reduce overall hazard risk.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-5	Home elevation projects.	Flood, Hurricane, Severe Thunderstorm	Moderate	Community Development	CDBG Hazard Mitigation funding, city and county funding	2022	(Action 13 in previous plan) The city has participated in elevation projects in the past, but there are still many properties could be elevated through voluntary programs to reduce overall hazard risk.
Natural Resource Protection							
NRP-1							
Structural Projects							
SP-1	Drainage improvement projects.	Flood, Hurricane, Severe Thunderstorm	High	Community Development and Public Works	CDBG Hazard Mitigation funding, city and county funding	2018	(Action 14 in previous plan) The city has implemented some drainage improvement projects, but there are still a number of drainage related projects that the city would like to implement going forward so this action will remain in the plan.
SP-2	Scaling system.	Flood, Hurricane, Severe Thunderstorm	High	Public Works	CIAP Grant funding, city and county funding	2020	(Action 15 in previous plan) The city has not developed a scaling system, but it would still like to pursue this action going forward so it will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Emergency Services							
ES-1	Evacuation routing and planning.	All	Moderate	Police Department	Seek/secure grant opportunities with MDOT, MS Public Safety Commission, etc.	2018	(Action 3 in previous plan) Evacuation routes have been identified by the city, but there is more planning for an evacuation scenario that needs to be completed to be fully prepared so the city will keep this action in place.
ES-2	Establish an effective early warning audio system (sirens).	All	Low	Police and Fire Department	Seek grant opportunities with MDOT, MS Public Safety Commission, etc.	2019	(Action 4 in previous plan) The city is still working to solidify its early warning system. Therefore, this action will be left in the plan to be pursued further going forward.
ES-3	Generator	Hurricane	High	Community Development Department	Budget and/or secure CDBG grant funding	2019	(Action 9 in previous plan) The city has some backup power generation capabilities, but the city feels it would still benefit greatly from extra generators if funding is available, so this action will remain in place.
Public Education and Awareness							
PEA-1	Public outreach: education and preparedness for all hazards.	All	High	Fire and Human Resources Department	Existing budget	2022	(Action 1 in previous plan) The city has made an effort to reach out to the public and provide education on the risks the community faces in terms of hazards. However, many citizens remain under-informed, so this action will remain in place.

City of Ocean Springs Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Coordinate with the Ocean Springs participants on Jackson County's Haz-Mat team to ensure the adequacy of the regional response strategy.	Hazardous Materials Incident	High	Fire Department	MS Dept. of Public Safety Planning	2022	The city has continuously coordinated with participants on the Jackson County HazMat team to ensure a regional response strategy to HazMat incidents. However, the need for continual support and coordination exists, so the city will leave this action in place.
P-2	Buildings above a certain elevation must have sprinklers for fire protection.	Wildfire	High	Buildings Department	Individual home and building owners	2022	The city has been working to implement a regulation to ensure that buildings above a certain elevation have sprinklers. The work of implementing this action is not complete, so the county will continue to work towards this goal going forward.
P-3	Include structural design, elevation, and location standards in the Unified Development Code to mitigate effects of natural hazards.	All	High	Planning and Community Development	Administrative – not revenue dependent	2020	To the best of its ability, the city has implemented structural design and location standards in its UDC. However, the city believes there are still improvements that could be made so this action will remain in place as the city will review its UDC in the coming years.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-4	Continue to require that development exceeds FEMA's require base elevations by a measure of one foot.	Flood	High	Buildings Department	Administrative – not revenue dependent	2022	The city has implemented a plus one foot of BFE requirement for elevation of buildings in the floodplain and in order to continue implementing this higher standard, the city will retain this action in the plan.
P-5	Continue to require lot elevation determination for structures in new subdivision through site plan review.	Flood	High	Buildings Department	Administrative – not revenue dependent	2022	The city has required lot elevation determination in the past for structures in a new subdivision and since this regulation has worked effectively, the county will retain this action in the plan as it continues to implement and review the status of the regulation.
P-6	Continue to enforce city's subdivision regulations for developments in flood hazard areas by enforcing flood ordinance and restricting development in floodplain.	Flood	High	Planning and Community Development; Buildings Department	Administrative – not revenue dependent	2022	The city has implemented subdivision regulations to ensure enforcement of the flood ordinance and ensure development in the floodplain takes place within a reasonable level of regulation. The city will continue to build on its existing subdivision regulations by implementing and working to improve them going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Undertake an annual review of the Hazard Mitigation Plan with the assistance of the floodplain manager, building official, city planner, and EOC coordinator.	All	High	Planning and Community Development	Administrative – not revenue dependent	2017, Annually	The city has attempted to carry out annual reviews of the hazard mitigation plan and has been generally successful. Going forward, the city will keep this action in place as it aims to continue to undertake annual reviews of the plan.
P-8	Incorporated the Ocean Springs Hazard Mitigation Plan into the city's Comprehensive Plan.	All	High	Planning and Community Development; Planning Commission; Board of Alderman	Administrative – not revenue dependent	2022	The goals of the hazard mitigation plan have been incorporated into the city's Comprehensive Plan, but as this plan and the Comprehensive Plan are updated, additional effort to ensure up to date information will be needed.
P-9	Develop a Capital Improvements Plan (CIP) for the City of Ocean Springs.	All	High	Planning and Community Development; Public Works	MDA – Economic Development	2020	The city does not have a formal CIP, but it does have a program in place for spending on infrastructure. The city will continue to work on implementing this program and evaluating the development of a formal CIP.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-10	Maintain elevation certificates on all structures built after the adoption of new FIRM maps.	Flood	High	Buildings Department	Administrative – not revenue dependent	2022	Thus far, the city has maintained a database of elevation certificates for structures built after the adoption of new FIRM maps. However, as development continues, any structures located in the floodplain will need to have this data collected so this action will remain in place.
P-11	Continue to promote storm smart coasts through the Coastal Hazard Outreach Strategy Team (C-HOST) which brings together local officials, community stakeholders, private businesses, and major employers to coordinate messages and develop new projects with the guidance of building officials and floodplain managers from Ocean Springs, Pascagoula, Gautier, Bay St. Louise, Biloxi, D'Iberville, Gulfport, Harrison County, Long Beach, Pass Christian, and Waveland.	Hurricane, Storm Surge, Flood	Moderate	Buildings Department	FEMA, Sea Grant	2022	The city has participated with other local stakeholders and community officials on the C-HOST in the past and the city would like to continue to participate in this going forward, so this action will remain in the plan.
P-12	Enhance the city's Continuity Plan to ensure that emergency operations can function and that day-to-day management of the city can be back on track as soon as possible after an emergency.	All	Moderate	Fire Department	MS Dept. of Public Safety	2022	The city has developed a Continuity Plan to help ensure restoration of daily functions quickly after a disaster. However, there are many efficiencies that the city would like to build into its future iterations of the Continuity Plan, so this action will be carried forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-13	Maintain flood elevation certificates in the Buildings Department.	Flood	Moderate	Buildings Department	Administrative – not revenue dependent	2022	Thus far, the city has maintained a database of elevation certificates for structures built in identified flood zones. However, as development continues, any structures located in the floodplain will need to have this data collected so this action will remain in place.
P-14	Conduct regional beach clean-up programs to reduce the potential of damage from flooding and free-floating debris.	Flood	Moderate	MS Power	DMR, Sea Grant	2017, Annually	The city has participated in regional beach cleanup efforts to try to reduce damage from debris during a storm. These efforts must be carried out regularly, so this action will be kept in the plan.
P-15	Provide buffers between natural forest and urban development to protect against wildfire.	Wildfire	Moderate	Planning and Community Development	MS Dept. of Forestry, Gulf Islands National Seashore	2020	The city has worked in some areas to provide a buffer area between developed and undeveloped areas, but there are still areas of wildland urban interface that create risk for homes and businesses, so this action will be retained.
P-16	Study potential effects of sea level rise on near shore structures and infrastructure and prepare to adopt mitigation measures to minimize its effects.	Sea Level Rise	Low	Mayor's Office; Planning and Community Development	MS AL Sea Grant, COE	2022	Although some study of sea level rise inundation areas has been prepared to give an idea of risk areas, there is still additional study that needs to take place to fully understand the risk of sea level rise so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-17	Mandate larger setbacks from bayous and streams.	Flood	Low	Planning and Community Development	Administrative – not revenue dependent	2022	The city currently has some regulations in place regarding setbacks from bayous and streams, but by mandating larger setbacks, citizens would be more likely to be protected from flood events. Therefore, this action will remain in the plan.
P-18	Conduct regular controlled burns to limit fuel for forest fires in wet pine savanna habitats.	Wildfire	Low	Fire Department; MS Department of Forestry	MS Dept. of Forestry	2018	The city has worked with MS Forestry to conduct controlled burns on a regular basis to reduce fuel loads that contribute to forest fires. Although this has been successful, there is a continual need to monitor fuel loads and implement controlled burns so this action will remain in the plan.
Property Protection							
PP-1	Encourage the underground placement of electric, telephone, and cable TV lines by developers working outside of the coastal zone to improve aesthetics, prevent disfigurement of trees, and provide protection form high winds and other hazards.	Hurricane, Tornado, Severe Thunderstorm	High	Public Works Department; MS Power; Singing River Electric	MEMA - HMGP	2022	In some areas, the city has worked with utility companies to place utilities underground in areas where it is appropriate and these lines won't likely be affected by flooding. However, there are still areas where underground utilities would be appropriate and have not been placed, so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-2	New construction of city buildings should meet the 2012 IBC.	All	High	Buildings Department; Board of Alderman	MDA – Energy Efficiency Programs	2022	The city has worked hard to ensure compliance with the IBC in areas where new construction is taking place. As growth continues to take place within the city, officials will need to continue to implement this action so it will remain in the plan going forward.
PP-3	Inspect water wells and towers to ensure they are sufficiently strong to withstand high winds and storm surge.	Hurricane, Storm Surge, Tornado, Severe Thunderstorm	High	Water Department	DEQ, EPA	2022	The city has undertaken fairly frequent inspection of water wells and towers to ensure they are strong enough to withstand high winds and storm surge, but this inspection process needs to occur consistently as infrastructure may be aging or damaged after storm events. As such, this action will remain in place.
PP-4	Prepare lift stations for inundation and power outages by raising electrical equipment above the BFE in the event of storm surge and long-term power outages.	Hurricane, Storm Surge, Flood	High	MS Power; Public Works	Utility fees	2022	Some of the lift stations in the city have been raised above the BFE, but there are still a number of lift stations that need to be elevated to a higher level to be protected, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-5	Mitigate properties in V and AE zones through acquisition.	Flood	Moderate	Mayor's Office; Parks Department	COE, MEMA-HMGP, MCIAP/ Army Corps of Engineers	2022	The city has utilized acquisition as a means of mitigation on properties in flood zones in the past, but there are still a number of properties located in flood areas that may be eligible for voluntary acquisition pending property owner interest. This action will remain in place.
PP-6	Protect transformers after a tropical storm or hurricane by washing down salt spray before power supply is re-engaged.	Hurricane	Low	MS Power; Singing River Electric; Fire Department	MS Power, Singing River Electric, Fire Department	2022	After storm events, the city has sprayed down transformers before re-engaging power supply. However, as this is an action that will need to be implemented again in the future, this action will remain in the plan.
Natural Resource Protection							
NRP-1	Preserve trees and vegetation on uninhabited properties to improve stormwater management/flood control.	Flood	Low	Parks and Public Works Departments	MDOT (MS Dept. of Forestry)	2022	The city has generally tried to preserve trees and vegetation on uninhabited properties to improve stormwater management, but there are still some significant steps the city could take to try to use trees/vegetation to its advantage and the city will continue to look at those options going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
NRP-2	Preserve natural/wetlands and riparian areas through acquisition or conservation easements.	Flood	Low	Mayor's Office; Grants Department	FEMA, Army Corps of Engineers/ MCIAP, MEMA-HMGP	2022	The city has used conservation easements and acquisition to preserve riparian areas and wetlands in the past, but it may look to use this tool in the future to expand areas or identify new areas for preservation. This action will remain in place.
NRP-3	Extend sand beach additional 100 feet to the east and stabilize with plantings.	Storm Surge, Erosion	Low	Planning and Community Development; Jackson County	FEMA Grant, DMR, COE	2020	Although efforts have been made to extend the sand beach already, the city will continue to evaluate extending the sand beach and stabilizing it with plantings to try to preserve the beach from eroding.
NRP-4	Request that Jackson County continue dune propagation in areas along East Beach and Front Beach.	Storm Surge, Erosion	Low	Jackson County	Jackson County Seawall Tax	2022	The city has worked with the county to propagate dunes to serve as a buffer along several beaches. Although this action has been undertaken in the past, it will need constant evaluation and review as the city continues to implement it going forward.
Structural Projects							
SP-1	Maintain the Jackson County seawall tax.	Storm Surge, Erosion	Moderate	Jackson County	Jackson County	2022	The city/county have implemented a seawall tax to help ensure the integrity of the seawall. This tax must be reviewed consistently so the action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-2	Continue the city's efforts to upgrade drainage facilities along coastal roadways.	Flood	Moderate	Public Works and Streets	COE, MEMA-HMGP, MCIAP	2022	A number of drainage projects have been implemented along coastal roadways, but the city must continue to evaluate more potential projects and implement those to ensure proper drainage and avoid flooded roads. This action will remain in place.
Emergency Services							
ES-1	Maintain a hazardous materials, oil spill, and natural gas response force to address immediate aftermath of a material release.	Hazardous Materials Incident	High	Fire Department	AFG, SAFER	2022	The city currently has a HazMat response force in place, but to maintain this force, the city will need to provide proper training and staffing going forward. As such, this action will remain in place.
ES-2	Update the city's Hazard Mitigation and Emergency Response Plan and its Hurricane Response Plan to ensure emergency service and evacuation routes are adequate for demand, well-marked, and accessible to individuals with special needs during inclement weather.	All	High	Planning and Community Development Department; Fire Department	MEMA - HMGP	2018	The city is currently updating its HMP through this effort and will need to correspondingly update its ERP and HRP to ensure data is up to date. This action will remain in the plan.
ES-3	Maintain a reverse 911 call-back system for railroad derailments and other hazardous material spills.	Hazardous Materials Incident	High	Fire Department	MS Dept. of Public Safety Planning	2022	Currently the city works with MS DPS to ensure that a reverse 911 call-back system is in place. The city will review this system and continue to make sure that a reverse 911 call-back system is maintained to alert citizens of a HazMat incident.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-4	Increase the number of fire department and police personnel trained to respond to hazardous waste releases on the railroad, highways, hospital, and other critical facilities.	Hazardous Materials Incident	Moderate	Buildings Department	FEMA, AFG	2012	Although a number of fire and police personnel in the city are trained in responding to HazMat incidents, the city would like to aim to have even more personnel trained in responding to these incidents as redundancy. Therefore, this action will remain in place.
ES-5	Complete Fire Station 4/EOC to shelter emergency personnel in place during a natural disaster.	All	Moderate	Fire Department	CDBG - Complete	Completed	The city has completed Fire Station 4/EOC, so this action is complete.
ES-6	Finish construction of shelter and multipurpose center at Gay Lemon property.	All	Moderate	Mayor's Office; Parks Department	MEMA - HMGP	Completed	The city has finished construction on the shelter and multipurpose center so this action is complete.
ES-7	Implement an early warning network to alert citizens to oncoming hazards.	All	Moderate	Fire and Police Departments	MS Dept. of Public Safety Planning, AFG	2022	The city has an early warning network in place to alert citizens of potential hazards, however, there are several ways that the city could improve its current warning system, so the city will retain this action.
ES-8	Establish high ground staging area for emergency vehicles that provides added protection from wind-blown debris.	All	Moderate	Fire and Police Departments	FEMA	2020	The city has not established a high ground staging area for emergency vehicles to protect from wind-blown debris, so this action will remain in the plan going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-9	As population grows to the east, southeast, and northeast, plan for the expansion of the city's firefighting capacity through an additional facility, possible on the Highway 57 corridor, including new fire trucks, personnel, and equipment.	All	Low	Fire Department	AFG	2022	The city is continuing to expand and may need a new facility in the future. This action has not been carried out but the city will continue to monitor population growth and act on this once it is required.
ES-10	Plan for the construction of an underpass to the railroad tracks at Halstead for emergency evacuation with a water pump to prevent groundwater flooding.	All	Low	Public Works Department	MS Dept. of Public Safety Planning, MDOT, DEQ, EPA	2022	This action has not been completed and so the city will continue to evaluate the situation on Halstead Road to determine if an underpass would be necessary.
ES-11	Upgrade fire protection through acquisition of a new fire truck capable of reaching new elevated buildings and construct a fire station large enough to accommodate it.	Wildfire	Low	Fire Department	AFG	2022	The city has not acquired a new fire truck of this capacity nor constructed an additional station. This action is not complete and will be carried over in the plan.
Public Education and Awareness							
PEA-1	Create partnership to assist with development of Family Disaster Plans.	All	High	Fire Department	Administrative – not revenue dependent	2022	The city has worked on providing citizens with information on its website to assist with creating Family Disaster Plans. However, there are ways that the city could be more proactive in promoting these plans, so the city will retain this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Educate residents on how better waste disposal can reduce flooding.	Flood	Moderate	Public Works; Planning and Community Development	FEMA, Sea Grant	2022	The city has promulgated information to citizens about how better waste disposal can reduce flooding, but many citizens are still disposing of waste in inappropriate ways so additional outreach and strategies to improve disposal are required.
PEA-3	Provide outreach materials about mitigating the impact of a hazard through city mailings and raise the awareness of home and business owners.	All	Moderate	Mayor's Office; Buildings and Water Departments	FEMA, Sea Grant	2017, Annually	The city has provided outreach materials about mitigating personal property using mailings, but public outreach requires constant attention as new property owners move in and because many property owners need reminders about these activities.
PEA-4	Encourage small businesses to develop business continuity plans.	All	Moderate	Mayor's Office	MDA – Economic Development, FEMA	2018	The city has encouraged continuity plans for small businesses, but not all businesses have these developed so the city will continue to pursue this action.
PEA-5	Launch a coordinated education effort on hurricane evacuation procedures to teach people who should evacuate, when evacuation should begin, and routes available through Ocean Springs and the surrounding areas.	Hurricane	Low	Fire and Police Departments	FEMA, Sea Grant	2019	The city has worked on educating the public on evacuation procedures, but these efforts have not reached all residents and so the city will retain this action and continue to try to improve the education of citizens in this matter overall.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-6	Participate in Gulf Coast Homeowner's Show and building supply store shows to provide mitigation information to the public.	All	Low	Buildings Department	FEMA, Sea Grant	2022	The city has participated in the Gulf Coast Homeowner's Show in the past and this is a critical event to continue to participate in going forward so the city will retain this action in the plan.

City of Pascagoula Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Update Emergency Response Plan.	All	Moderate	Fire	General Fund	2017, Annually	(Action 4 in previous plan) The city has updated its ERP on an annual basis in the past and would like to continue to do so going forward, so this action will be retained in the plan.
P-2	Adopt Local Hazard Mitigation Plan as part of Comprehensive Plan.	All	Moderate	Community and Economic Development Department	General Fund	2018	(Action 6 in previous plan) Once the HMP has been approved and adopted by the city, it will integrate it into the local comprehensive plan and adopt it as part of that plan.
P-3	Enhance enforcement of existing codes, ordinances, etc.	All	Moderate	Planning and Building	General Fund	2022	(Action 7 in previous plan) Currently, the city is enforcing its existing codes and ordinances, but there are certainly aspects of the code that could be enforced in better ways, so the city will continue to evaluate code enforcement going forward and work to improve it.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-4	Continued compliance with the NFIP/implementation of CRS Activities.	Flood, Hurricane, Severe Thunderstorm	Moderate	Planning and Building	General Fund	2022	(Action 11 in previous plan) The city is currently in compliance with all NFIP activities and is a participant in the CRS. However, as the city moves forward, it may try to improve its flood management/insurance activities to try to gain more points in the CRS.
P-5	Continue to participate in the Jackson County Stormwater Taskforce.	Flood, Hurricane, Tropical Storm, Severe Thunderstorm	Moderate	Planning and Building; Public Works	General Fund	2017, Annually	(Action 13 in previous plan) The city has participated in the Jackson County Stormwater Taskforce over the past several years and is planning to continue that participation in order to improve stormwater management in the city. Therefore, this action will remain in the plan.
P-6	Maintenance of existing drainage facilities.	Flood, Hurricane, Tropical Storm, Severe Thunderstorm	High	Public Works; Engineering	General Fund	2022	(Action 15 in previous plan) The city has put in great efforts to maintain its existing drainage facilities, but it will be looking for ways to improve those facilities going forward, so the action will be retained in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Continue implementation of open space preservation.	Flood, Hurricane, Tropical Storm, Severe Thunderstorm	Moderate	Planning and Building	General Fund	2022	(Action 16 in previous plan) The city has taken many strides to retain areas of open space to improve overall stormwater management. However, as the city grows, there will be increasing demand for development and the need to consistently try to implement this action and retain open space in the community.
P-8	Continue citizens' hotline for drainage issues.	Flood, Hurricane, Thunderstorm, Erosion	High	Planning and Building; Public Relations	General Fund, HMGP grants	2022	(Action 18 in previous plan) The city created a citizens' hotline for drainage issues and it is still active. The city will look at ways to improve the hotline going forward and will continue this action.
Property Protection							
PP-1	Protect water wells, sewer systems, and ensure backup power.	All	High	Public Works	City Budget Utility Fund, Hazard Mitigation Grant funding	2020	(Action 5 in previous plan) The city has taken action to protect a number of water/wastewater/power facilities, but there are many that remain unprotected and so the city will keep this action in place as it attempts to address these facilities.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-2	Residential elevation.	Flood	High	Planning and Building; CRS Coordinator	HMGP, FMA	2022	(Action 8 in previous plan) The city has used elevation as a mitigation strategy on a number of properties in the past, but there are still many properties in the city that could benefit from this mitigation technique if found to be cost-beneficial. This action will remain in place.
PP-3	Property acquisition project.	Flood	Moderate	CRS Coordinator	HMGP and FMA Grant funds	2022	(Action 9 in previous plan) The city has used acquisition as a mitigation strategy on a number of properties in the past, but there are still many properties in the city that could benefit from this mitigation technique if found to be cost-beneficial. This action will remain in place.
PP-4	Mitigation reconstruction/ floodproofing.	Hurricane, Flood	Moderate	CRS Coordinator	HMGP or FMA Grant programs	2022	(Action 10 in previous plan) The city has used reconstruction and floodproofing as a mitigation strategy on a number of properties in the past, but there are still many properties in the city that could benefit from this mitigation technique if found to be cost-beneficial. This action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-5	Structure hardening: upgrade roof systems/windows to meet current code requirements to ensure continuity of emergency services – Pascagoula Police Dept., Lake Avenue Fire Station, City Hall, and others.	Hurricane, Severe Thunderstorm/ High Wind, Hailstorm, Tornado	High	Planning and Building Department; Economic Development	General Fund; Hazard Mitigation Grants	2022	(Action 14 in previous plan) The city has used structure hardening as a mitigation strategy on certain critical facilities, but there are still many critical facilities in the city that could benefit from this mitigation technique if found to be cost-beneficial. This action will remain in place.
PP-6	Relocation and placement of utilities.	Flood, Hurricane, Tropical Storm, Severe Thunderstorm	High	Planning and Building; Economic Development; Public Works	HMGP funding, City of Pascagoula Utility Fund, state and federal grants, JCUA budget funding	2022	(Action 19 in previous plan) The city has tried to relocated existing utilities and place new utilities in low-risk areas, but there are still a number of utilities that are in higher risk areas, so the city will continue to try to identify those and implement relocation where feasible.
PP-7	Critical facilities inventory and mitigation opportunities.	All	Moderate	Public Works; Police; Fire; Parks and Recreation; Economic Development; Building and Planning; City Hall	HMGP and PDM Grants	2018	(Action 20 in previous plan) The city has included a critical facilities inventory in this plan, but there are still some facilities that have not been identified in geospatial format, so the city will continue to try to identify those facilities and mitigation opportunities for all facilities.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Natural Resource Protection							
NRP-1	Natural resource protection – wetlands, others.	Flood, Hurricane, Severe Thunderstorm, Erosion	High	Planning and Building; Public Relations	General Fund, Hazard Mitigation grants, and other funded activities	2022	(Action 17 in previous plan) The city has worked with regional partners to try to increase the protection of natural resources such as wetlands, but the demand for development is likely to increase and so the city will retain this action to attempt to continue preserving natural resources.
Structural Projects							
SP-1	Implement projects from Master Drainage Plan.	Flood, Hurricane, Tropical Storm, Severe Thunderstorm	High	Public Works; Engineering	General Fund	2022	(Action 12 in previous plan) Some of the projects for the MDP have been implemented, but there are still many that have not so the action will remain in place.
Emergency Services							
ES-1	Coordination of evacuation planning and sheltering	All	Moderate	Pascagoula Police/Fire	General Fund, CDBG, HMGP funding	2017, Annually	(Action 2 in previous plan) On an annual basis, the city discusses evacuation plans with regional partners and sheltering areas. These plans will be reviewed in the coming years so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-2	NIMS certification.	All	High	Fire/Police	Federal grant	2022	(Action 3 in previous plan) Many employees have taken NIMS courses and have helped enhance the capacity of the city overall. However, more training will be needed by new employees and to keep current employees up to date, so this action will remain in place.
Public Education and Awareness							
PEA-1	Public/stakeholder outreach: education and preparedness for all hazards.	All	High	Planning and Building; Public Relations	General Fund; Hazard Mitigation Grants	Mailing biannually, web and media constant	(Action 1 in previous plan) The city has used mailings as the primary means for reaching out to the public and educating them on hazard risk, but the city will want to look to provide information through new and different technological formats going forward. Therefore, the city will retain this action as it evaluates the best methods for outreach.
PEA-2	Provide post-disaster guidance materials.	All	Moderate	Planning and Building	Existing budget	2022	(Action 21 in previous plan) The city has developed post-disaster guidance materials that it has available to the public and has distributed to some degree, but there are areas where improvement could be made to the material so this will likely be updated going forward.

Pearl River County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Develop a Stormwater Management Plan for Pearl River County.	Flood	High	County Planning and Development; Board of Supervisors; Picayune City Council	U.S. Army Corps of Engineers; Hazard Mitigation Grant Program	2022	(Action 1.1 in previous plan) The county has not developed a formal Stormwater Management Plan. Although stormwater management regulations are in place and being enforced, the county will keep this action in place as it works towards an official plan.
P-2	Develop a capital improvement program that includes drainage.	Flood	Moderate	Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Local funding	2022	(Action 1.2 in previous plan) The county has developed a capital improvement program and some drainage projects have been included in this program in the past. However, there are a number of drainage projects the county would like to implement that are not part of the program currently, so the county will continue to attempt to include these in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-3	Establish a policy of extra-territorial review of subdivisions adjacent to jurisdictional boundaries to insure a comprehensive review of cumulative impacts within the watershed.	All	High	Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Local budget	2022	(Action 1.5 in previous plan) The county has worked with the cities to allow extra-territorial review of subdivisions outside jurisdictional boundaries, but as development continues within the county, this action will need to be retained to ensure comprehensive watershed impacts are addressed.
P-4	Establish a comprehensive drainage model.	Flood	Moderate	Pearl River County Department of Planning and Development; City of Picayune Engineering Department; City of Poplarville Public Works; Pearl River County Tax Office	Dues to regional planning agency (SMPDD)	2022	(Action 2.1 in previous plan) The county and cities have worked with the regional planning agency to establish a comprehensive drainage model, however, as conditions change in the watershed and development takes place, this model will need to be updated, so this action will stay in the plan.
P-5	Provide updated information to the U.S. Army Corps of Engineers through a grant program entitle planning assistance to states.	Flood	Moderate	Pearl River County Department of Planning and Development; Pearl River County Mapping Office; U.S. Army Corps of Engineers	USA Planning Assistance to States	2022	(Action 2.3 in previous plan) The county has worked with USACE and provided local information when needed. The county will continue to work with the USACE to try to help with this program and future planning efforts so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-6	Establish pre-disaster maintenance procedures for right of way along county roadways.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Road Department; Pearl River County Engineer	Local budgets	2022	(Action 2.4 in previous plan) The county has established some pre-disaster maintenance procedures, but these procedures will need to be reviewed and updated and new procedures may need to be added. Therefore, the action will be kept in place.
P-7	The county will establish and adopt a policy on maintaining drainage ways. This policy will include regularly scheduled maintenance and the establishment of written tracking policy.	Flood	High	Pearl River County Road Manager	Local budgets	2022	(Action 2.5 in previous plan) The county has established a policy on maintaining drainage ways, but these policies will need to be reviewed and updated in the coming years, so this action will be retained.
P-8	Continue an ordinance and policy to determine and require the correct size culverts.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Department of Planning and Development	Local funds	2022	(Action 2.6 in previous plan) The county has established an ordinance/policy to determine and require the correct size culverts, but this program will need to be re-evaluated in the coming years, so this action will be retained.
P-9	Establish a policy of extra-territorial review of subdivisions adjacent to jurisdictional boundaries to insure a comprehensive review of cumulative impacts within the watershed.	Flood	High	Pearl River County Board of Supervisors; City of Picayune Mayor and City Council; City of Poplarville Mayor and Board of Alderman	Local funding	Deleted	(Action 2.7 in previous plan) This action was combined with P-3.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-10	Minimize damage to structure through code enforcement.	All	Moderate	Pearl River County Board of Supervisors; City of Picayune Mayor and City Council; City of Poplarville Mayor and Board of Alderman	Local funds and revenues	2022	(Action 2.10 in previous plan) The county has worked to minimize damage to structures through code enforcement, but implementation of this action likely needs to be more vigorous, so this action will be retained.
P-11	Adopt and implement a regulation requiring building owners to retrofit their structures for flood damage if the structure's insured loss exceeds 50% or more of the structure's value.	Flood	Moderate	Pearl River County Department of Planning and Development; City of Picayune Planning Department	Local funding	2022	(Action 2.11 in previous plan) The county has implemented a regulation requiring building owners to retrofit structures if their losses exceed the structure's value by more than 50%.
P-12	Establish a formal policy to invite countywide staff to attend site plan review for projects that are immediately adjacent to the jurisdiction or will impact the jurisdiction.	All	Moderate	Pearl River County Board of Supervisors; City Council of Picayune; Poplarville Board of Alderman	Local revenues	2020	(Action 3.1 in previous plan) A formal policy has not been established to invite countywide staff to attend site plan reviews, but the county will work with the cities to develop and implement this action going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Property Protection							
PP-1	Reduce the number of repetitive loss properties within the county by elevating and where elevation is not an option, purchase properties at owner's request.	Flood	High	Pearl River County Board of Supervisors; Picayune Board of Alderman; Pearl River County Department of Planning and Development; Picayune Planning and Development Department	Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance Grants (FMA), Severe Repetitive Loss Grants (SRL), MEMA Planning Funds	2022	(Action 2.9 in previous plan) The county has implemented mitigation projects to address a number of repetitive loss properties, but there are still a number of these properties throughout the county so this action will be retained as the county attempts to further reduce its number of repetitive loss properties.
Natural Resource Protection							
NRP-1	Continue and expand stream protection and preservation programs to secure easements to protect riparian areas.	Flood	High	Mississippi Department of Wildfire and Parks; Pearl River County Department of Planning and Development	Department of Interior; Soil and Water Conservation	2022	(Action 1.3 in previous plan) The county has worked to secure easements to protect many riparian areas in the county, but going forward, the county will want to continue this program and expand riparian protection in other areas, so this action will remain in place.
NRP-2	Continue to preserve green spaces.	Flood	High	Pearl River County Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Private	2022	(Action 1.4 in previous plan) The county has worked to preserve green spaces in many areas, but as continual growth and development take place, the county will need to continue to work towards preserving green spaces, so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Structural Projects							
SP-1	Follow through with Alligator Branch improvements.	Flood	Moderate	Pearl River County Board of Supervisors	Hazard Mitigation Grant Program	2022	(Action 2.8 in previous plan) The county has not carried out the Alligator Branch improvements, so this action will be retained in the plan.
Emergency Services							
ES-1	Through a Mississippi/Louisiana Partnership, establish a first responders shelter to house personnel and parking space for necessary equipment until the emergency has passed and personnel and equipment can be returned to Louisiana. Also, establish and man an information center to pass on critical information to returning evacuees where evacuees can temporarily remain until it is safe to return to their homes.	Hurricane	Moderate	Pearl River County Civil Defense Agency; Pearl River County Board of Supervisors; Louisiana Emergency Management Agency; Mississippi Emergency Management Agency	FEMA Grants, local emergency management funding	2022	(Action 3.2 in previous plan) The county has worked with surrounding states and counties to establish partnerships for sheltering responders and an information center for returning evacuees. This action will need to be reviewed in the coming years to ensure that these operations are ready for disaster implementation so this action will be kept in the plan.
Public Education and Awareness							
PEA-1	Provide easily accessible tax map information to the municipalities in the county, insurance agents, realtors, banking interest, and individuals.	Flood	High	Pearl River Mapping Office; Pearl River County Tax Office	Local funds	2022	(Action 2.2 in previous plan) The county has provided tax map information that is easily available to the public via its online tax map viewer. This information will need to be continually updated as changes are made to the tax map, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Establish monthly educational programs for local government and staff.	All	High	Pearl River County Department of Planning and Development; Picayune Planning and Development Office	Salaries	2022	(Action 4.1 in previous plan) The county has carried out educational programs for local governments and staff, but these programs have not always been held on a monthly basis so the county will work on improving this program so it is more consistent and will retain this action.
PEA-3	Continue outreach to the community, including local officials, about the Hazard Mitigation Grant Program and requirements of elevation and purchase programs.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Department of Planning and Development	HMGP	2022	(Action 4.2 in previous plan) The county has reached out to the public and city officials to keep them informed about HMGP and other grant programs, but there will likely be a need for continued output of information as officials change and as many officials may need refreshers on the subject. As such, this program will be kept in place.
PEA-4	Establish a hazard mitigation library at the public library.	All	High	Picayune CRS Coordinator; Pearl River County Library System; Pearl River County Department of Planning and Development	Local funding	2020	(Action 4.3 in previous plan) The county has established a hazard mitigation library at the public library, but these materials are in need of updating, so this action will be left in place to ensure materials are current.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-5	Develop a brochure "Hazards in Pearl River County" that will detail hazards within the county.	Flood, Hurricane, Tornado, Wind	High	Pearl River County Emergency Management	Local funding	2020	(Action 4.4 in previous plan) The county has developed a number of materials for public outreach, but these materials will need to be updated in the coming years, so this action will remain in place.
PEA-6	Develop three programs for "Focus on Pearl River County" on WRJW.	Hurricane, Flood, Tornado, Wind	High	Pearl River County Emergency Management; Pearl River County Planning and Development; WRJW	Local funds	2022	(Action 4.5 in previous plan) The county has developed some programs for WRJW in the past, but during the next several years, additional programs may need to be developed to provide more current data, so this action will remain in place.
PEA-7	Establish a speaker's forum.	Hurricane, Tornado, Flood, Wind Storm	High	Pearl River Emergency Management	Local funds	2022	(Action 4.6 in previous plan) The county will need to work on establishing a speaker's forum as this has not yet been consistently established yet. This action will remain in place.
PEA-8	Establish a hazard mitigation and disaster preparedness booth at the Blueberry Festival and the Picayune Street Fair.	Flood, Hurricane, Tornado, Wind Storm	High	Pearl River County Emergency Management; Picayune CRS Coordinator	Local funding	2022	(Action 4.7 in previous plan) In the past, the county has had a hazard mitigation and disaster preparedness booth at these festivals and this has been a successful public outreach event, so this action will be kept in place as the county continues to implement this action and consider other public events for outreach.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-9	Encourage the Chambers of Commerce, PRCDA, and Civil Defense to develop a program on business continuity planning for businesses.	Hurricane, Flood, Tornado	Low	Picayune and Poplarville Chamber of Commerce	Local	2022	(Action 4.8 in previous plan) The county has encouraged the development of a program on business continuity planning and some outreach has been done to try to get local businesses to think about continuity plans, but these is still a great deal of work to be done as many businesses do not have this in place. This action will remain in the plan.
PEA-10	Advise school officials and teachers of availability of education materials for children.	Hurricane, Flood, Tornado, High Wind, Thunderstorm	Moderate	Pearl River Emergency Management; Picayune CRS Coordinator	Local revenues	2022	(Action 4.9 in previous plan) The county has reached out to many school officials to try to promulgate educational materials to children and this has been successful, but additional efforts are needed to continue and improve the program's reach going forward so this action will remain in place.

City of Picayune Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Develop a Stormwater Management Plan for Pearl River County.	Flood	High	County Planning and Development; Board of Supervisors; Picayune City Council	U.S. Army Corps of Engineers; Hazard Mitigation Grant Program	2022	(Action 1.1 in previous plan) The county has not developed a formal Stormwater Management Plan. Although stormwater management regulations are in place and being enforced, the county will keep this action in place as it works towards an official plan.
P-2	Develop a capital improvement program that includes drainage.	Flood	Moderate	Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Local funding	2022	(Action 1.2 in previous plan) The county has developed a capital improvement program and some drainage projects have been included in this program in the past. However, there are a number of drainage projects the county would like to implement that are not part of the program currently, so the county will continue to attempt to include these in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-3	Establish a policy of extra-territorial review of subdivisions adjacent to jurisdictional boundaries to insure a comprehensive review of cumulative impacts within the watershed.	All	High	Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Local budget	2022	(Action 1.5 in previous plan) The county has worked with the cities to allow extra-territorial review of subdivisions outside jurisdictional boundaries, but as development continues within the county, this action will need to be retained to ensure comprehensive watershed impacts are addressed.
P-4	Establish a comprehensive drainage model.	Flood	Moderate	Pearl River County Department of Planning and Development; City of Picayune Engineering Department; City of Poplarville Public Works; Pearl River County Tax Office	Dues to regional planning agency (SMPDD)	2022	(Action 2.1 in previous plan) The county and cities have worked with the regional planning agency to establish a comprehensive drainage model, however, as conditions change in the watershed and development takes place, this model will need to be updated, so this action will stay in the plan.
P-5	Provide updated information to the U.S. Army Corps of Engineers through a grant program entitle planning assistance to states.	Flood	Moderate	Pearl River County Department of Planning and Development; Pearl River County Mapping Office; U.S. Army Corps of Engineers	USA Planning Assistance to States	2022	(Action 2.3 in previous plan) The city has worked with USACE and provided local information when needed. The city will continue to work with the USACE to try to help with this program and future planning efforts so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-6	Establish pre-disaster maintenance procedures for right of way along county roadways.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Road Department; Pearl River County Engineer	Local budgets	2022	(Action 2.4 in previous plan) The county has established some pre-disaster maintenance procedures, but these procedures will need to be reviewed and updated and new procedures may need to be added. Therefore, the action will be kept in place.
P-7	The county will establish and adopt a policy on maintaining drainage ways. This policy will include regularly scheduled maintenance and the establishment of written tracking policy.	Flood	High	Pearl River County Road Manager	Local budgets	2022	(Action 2.5 in previous plan) The county has established a policy on maintaining drainage ways, but these policies will need to be reviewed and updated in the coming years, so this action will be retained.
P-8	Continue an ordinance and policy to determine and require the correct size culverts.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Department of Planning and Development	Local funds	2022	(Action 2.6 in previous plan) The county has established an ordinance/policy to determine and require the correct size culverts, but this program will need to be re-evaluated in the coming years, so this action will be retained.
P-9	Establish a policy of extra-territorial review of subdivisions adjacent to jurisdictional boundaries to insure a comprehensive review of cumulative impacts within the watershed.	Flood	High	Pearl River County Board of Supervisors; City of Picayune Mayor and City Council; City of Poplarville Mayor and Board of Alderman	Local funding	Deleted	(Action 2.7 in previous plan) This action was combined with P-3.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-10	Minimize damage to structure through code enforcement.	All	Moderate	Pearl River County Board of Supervisors; City of Picayune Mayor and City Council; City of Poplarville Mayor and Board of Alderman	Local funds and revenues	2022	(Action 2.10 in previous plan) The county has worked to minimize damage to structures through code enforcement, but implementation of this action likely needs to be more vigorous, so this action will be retained.
P-11	Adopt and implement a regulation requiring building owners to retrofit their structures for flood damage if the structure's insured loss exceeds 50% or more of the structure's value.	Flood	Moderate	Pearl River County Department of Planning and Development; City of Picayune Planning Department	Local funding	2022	(Action 2.11 in previous plan) The county has implemented a regulation requiring building owners to retrofit structures if their losses exceed the structure's value by more than 50%.
P-12	Establish a formal policy to invite countywide staff to attend site plan review for projects that are immediately adjacent to the jurisdiction or will impact the jurisdiction.	All	Moderate	Pearl River County Board of Supervisors; City Council of Picayune; Poplarville Board of Alderman	Local revenues	2020	(Action 3.1 in previous plan) A formal policy has not been established to invite countywide staff to attend site plan reviews, but the county will work with the cities to develop and implement this action going forward.
P-13	File an amendment to the Community Rating System application requesting additional CRS credit to further lower the city's NFIP CRS application.	Flood	High	Picayune Planning and Building Code	FEMA/MEMA HMGP Planning Grant	2020	(Action A.1 in previous plan) The city has been participating in the CRS, but it would like to continue to lower its rating and so will continue to address items to gain more credits and improve its score.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-14	Request funding to prepare a repetitive loss plan for the city, identifying and cataloging all repetitive loss properties, ownership, and whether or not owner is interested in mitigation activities.	Flood	High	Picayune Planning and Building Code	FEMA/MEMA HMGP Planning Grant	2022	(Action A.2 in previous plan) The city has taken a number of steps to plan for and implement a program that will reduce the number of repetitive loss properties in the city. This plan is still being enacted, so this action will remain in place.
P-15	Adopt the International Building Codes.	Wind, Flood, Earthquake, Tornado	High	Picayune Planning and Building	Local General Funds	2022	(Action A.4 in previous plan) The city has adopted the IBC and will continue to enforce this code, although it will also want to continue to improve enforcement of this code going forward, so this action will remain in place.
Property Protection							
PP-1	Reduce the number of repetitive loss properties within the county by elevating and where elevation is not an option, purchase properties at owner's request.	Flood	High	Pearl River County Board of Supervisors; Picayune Board of Alderman; Pearl River County Department of Planning and Development; Picayune Planning and Development Department	Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance Grants (FMA), Severe Repetitive Loss Grants (SRL), MEMA Planning Funds	2022	(Action 2.9 in previous plan) The county has implemented mitigation projects to address a number of repetitive loss properties, but there are still a number of these properties throughout the county so this action will be retained as the county attempts to further reduce its number of repetitive loss properties.
PP-2	Reduce the number of repetitive loss properties by requesting grant funding to acquire or to mitigate additional repetitive loss structures.	Flood	High	Picayune Planning and Building Code	FEMA/MEMA HMGP Planning Grant	Deleted	(Action A.3 in previous plan) This action was combined with PP-1.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Natural Resource Protection							
NRP-1	Continue and expand stream protection and preservation programs to secure easements to protect riparian areas.	Flood	High	Mississippi Department of Wildfire and Parks; Pearl River County Department of Planning and Development	Department of Interior; Soil and Water Conservation	2022	(Action 1.3 in previous plan) The county has worked to secure easements to protect many riparian areas in the county, but going forward, the county will want to continue this program and expand riparian protection in other areas, so this action will remain in place.
NRP-2	Continue to preserve green spaces.	Flood	High	Pearl River County Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Private	2022	(Action 1.4 in previous plan) The county has worked to preserve green spaces in many areas, but as continual growth and development take place, the county will need to continue to work towards preserving green spaces, so this action will be retained.
Structural Projects							
SP-1	Follow through with Alligator Branch improvements.	Flood	Moderate	Pearl River County Board of Supervisors	Hazard Mitigation Grant Program	2022	(Action 2.8 in previous plan) The county has not carried out the Alligator Branch improvements, so this action will be retained in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Emergency Services							
ES-1	Through a Mississippi/Louisiana Partnership, establish a first responders shelter to house personnel and parking space for necessary equipment until the emergency has passed and personnel and equipment can be returned to Louisiana. Also, establish and man an information center to pass on critical information to returning evacuees where evacuees can temporarily remain until it is safe to return to their homes.	Hurricane	Moderate	Pearl River County Civil Defense Agency; Pearl River County Board of Supervisors; Louisiana Emergency Management Agency; Mississippi Emergency Management Agency	FEMA Grants, local emergency management funding	2022	(Action 3.2 in previous plan) The county has worked with surrounding states and counties to establish partnerships for sheltering responders and an information center for returning evacuees. This action will need to be reviewed in the coming years to ensure that these operations are ready for disaster implementation so this action will be kept in the plan.
Public Education and Awareness							
PEA-1	Provide easily accessible tax map information to the municipalities in the county, insurance agents, realtors, banking interest, and individuals.	Flood	High	Pearl River Mapping Office; Pearl River County Tax Office	Local funds	2022	(Action 2.2 in previous plan) The county has provided tax map information that is easily available to the public via its online tax map viewer. This information will need to be continually updated as changes are made to the tax map, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Establish monthly educational programs for local government and staff.	All	High	Pearl River County Department of Planning and Development; Picayune Planning and Development Office	Salaries	2022	(Action 4.1 in previous plan) The county has carried out educational programs for local governments and staff, but these programs have not always been held on a monthly basis so the county will work on improving this program so it is more consistent and will retain this action.
PEA-3	Continue outreach to the community, including local officials, about the Hazard Mitigation Grant Program and requirements of elevation and purchase programs.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Department of Planning and Development	HMGP	2022	(Action 4.2 in previous plan) The county has reached out to the public and city officials to keep them informed about HMGP and other grant programs, but there will likely be a need for continued output of information as officials change and as many officials may need refreshers on the subject. As such, this program will be kept in place.
PEA-4	Establish a hazard mitigation library at the public library.	All	High	Picayune CRS Coordinator; Pearl River County Library System; Pearl River County Department of Planning and Development	Local funding	2020	(Action 4.3 in previous plan) The county has established a hazard mitigation library at the public library, but these materials are in need of updating, so this action will be left in place to ensure materials are current.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-5	Develop a brochure "Hazards in Pearl River County" that will detail hazards within the county.	Flood, Hurricane, Tornado, Wind	High	Pearl River County Emergency Management	Local funding	2020	(Action 4.4 in previous plan) The county has developed a number of materials for public outreach, but these materials will need to be updated in the coming years, so this action will remain in place.
PEA-6	Develop three programs for "Focus on Pearl River County" on WRJW.	Hurricane, Flood, Tornado, Wind	High	Pearl River County Emergency Management; Pearl River County Planning and Development; WRJW	Local funds	2022	(Action 4.5 in previous plan) The county has developed some programs for WRJW in the past, but during the next several years, additional programs may need to be developed to provide more current data, so this action will remain in place.
PEA-7	Establish a speaker's forum.	Hurricane, Tornado, Flood, Wind Storm	High	Pearl River Emergency Management	Local funds	2022	(Action 4.6 in previous plan) The county will need to work on establishing a speaker's forum as this has not yet been consistently established yet. This action will remain in place.
PEA-8	Establish a hazard mitigation and disaster preparedness booth at the Blueberry Festival and the Picayune Street Fair.	Flood, Hurricane, Tornado, Wind Storm	High	Pearl River County Emergency Management; Picayune CRS Coordinator	Local funding	2022	(Action 4.7 in previous plan) In the past, the county has had a hazard mitigation and disaster preparedness booth at these festivals and this has been a successful public outreach event, so this action will be kept in place as the county continues to implement this action and consider other public events for outreach.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-9	Encourage the Chambers of Commerce, PRCDA, and Civil Defense to develop a program on business continuity planning for businesses.	Hurricane, Flood, Tornado	Low	Picayune and Poplarville Chamber of Commerce	Local	2022	(Action 4.8 in previous plan) The county has encouraged the development of a program on business continuity planning and some outreach has been done to try to get local businesses to think about continuity plans, but these is still a great deal of work to be done as many businesses do not have this in place. This action will remain in the plan.
PEA-10	Advise school officials and teachers of availability of education materials for children.	Hurricane, Flood, Tornado, High Wind, Thunderstorm	Moderate	Pearl River Emergency Management; Picayune CRS Coordinator	Local revenues	2022	(Action 4.9 in previous plan) The county has reached out to many school officials to try to promulgate educational materials to children and this has been successful, but additional efforts are needed to continue and improve the program's reach going forward so this action will remain in place.

City of Poplarville Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Develop a Stormwater Management Plan for Pearl River County.	Flood	High	County Planning and Development; Board of Supervisors; Picayune City Council	U.S. Army Corps of Engineers; Hazard Mitigation Grant Program	2022	(Action 1.1 in previous plan) The county has not developed a formal Stormwater Management Plan. Although stormwater management regulations are in place and being enforced, the county will keep this action in place as it works towards an official plan.
P-2	Develop a capital improvement program that includes drainage.	Flood	Moderate	Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Local funding	2022	(Action 1.2 in previous plan) The county has developed a capital improvement program and some drainage projects have been included in this program in the past. However, there are a number of drainage projects the county would like to implement that are not part of the program currently, so the county will continue to attempt to include these in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-3	Establish a policy of extra-territorial review of subdivisions adjacent to jurisdictional boundaries to insure a comprehensive review of cumulative impacts within the watershed.	All	High	Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Local budget	2022	(Action 1.5 in previous plan) The county has worked with the cities to allow extra-territorial review of subdivisions outside jurisdictional boundaries, but as development continues within the county, this action will need to be retained to ensure comprehensive watershed impacts are addressed.
P-4	Establish a comprehensive drainage model.	Flood	Moderate	Pearl River County Department of Planning and Development; City of Picayune Engineering Department; City of Poplarville Public Works; Pearl River County Tax Office	Dues to regional planning agency (SMPDD)	2022	(Action 2.1 in previous plan) The county and cities have worked with the regional planning agency to establish a comprehensive drainage model, however, as conditions change in the watershed and development takes place, this model will need to be updated, so this action will stay in the plan.
P-5	Provide updated information to the U.S. Army Corps of Engineers through a grant program entitle planning assistance to states.	Flood	Moderate	Pearl River County Department of Planning and Development; Pearl River County Mapping Office; U.S. Army Corps of Engineers	USA Planning Assistance to States	2022	(Action 2.3 in previous plan) The city has worked with USACE and provided local information when needed. The city will continue to work with the USACE to try to help with this program and future planning efforts so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-6	Establish pre-disaster maintenance procedures for right of way along county roadways.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Road Department; Pearl River County Engineer	Local budgets	2022	(Action 2.4 in previous plan) The county has established some pre-disaster maintenance procedures, but these procedures will need to be reviewed and updated and new procedures may need to be added. Therefore, the action will be kept in place.
P-7	The county will establish and adopt a policy on maintaining drainage ways. This policy will include regularly scheduled maintenance and the establishment of written tracking policy.	Flood	High	Pearl River County Road Manager	Local budgets	2022	(Action 2.5 in previous plan) The county has established a policy on maintaining drainage ways, but these policies will need to be reviewed and updated in the coming years, so this action will be retained.
P-8	Continue an ordinance and policy to determine and require the correct size culverts.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Department of Planning and Development	Local funds	2022	(Action 2.6 in previous plan) The county has established an ordinance/policy to determine and require the correct size culverts, but this program will need to be re-evaluated in the coming years, so this action will be retained.
P-9	Establish a policy of extra-territorial review of subdivisions adjacent to jurisdictional boundaries to insure a comprehensive review of cumulative impacts within the watershed.	Flood	High	Pearl River County Board of Supervisors; City of Picayune Mayor and City Council; City of Poplarville Mayor and Board of Alderman	Local funding	Deleted	(Action 2.7 in previous plan) This action was combined with P-3.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-10	Minimize damage to structure through code enforcement.	All	Moderate	Pearl River County Board of Supervisors; City of Picayune Mayor and City Council; City of Poplarville Mayor and Board of Alderman	Local funds and revenues	2022	(Action 2.10 in previous plan) The county has worked to minimize damage to structures through code enforcement, but implementation of this action likely needs to be more vigorous, so this action will be retained.
P-11	Adopt and implement a regulation requiring building owners to retrofit their structures for flood damage if the structure's insured loss exceeds 50% or more of the structure's value.	Flood	Moderate	Pearl River County Department of Planning and Development; City of Picayune Planning Department	Local funding	2022	(Action 2.11 in previous plan) The county has implemented a regulation requiring building owners to retrofit structures if their losses exceed the structure's value by more than 50%.
P-12	Establish a formal policy to invite countywide staff to attend site plan review for projects that are immediately adjacent to the jurisdiction or will impact the jurisdiction.	All	Moderate	Pearl River County Board of Supervisors; City Council of Picayune; Poplarville Board of Alderman	Local revenues	2020	(Action 3.1 in previous plan) A formal policy has not been established to invite countywide staff to attend site plan reviews, but the county will work with the cities to develop and implement this action going forward.
P-13	Develop and adopt a flood ordinance for the City of Poplarville.	Flood	High	Poplarville Board of Alderman	Local budgets	2022	(Action B.3 in previous plan) The city has developed a flood ordinance and will continue to work on implementation and enforcement of the ordinance going forward, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Property Protection							
PP-1	Reduce the number of repetitive loss properties within the county by elevating and where elevation is not an option, purchase properties at owner's request.	Flood	High	Pearl River County Board of Supervisors; Picayune Board of Alderman; Pearl River County Department of Planning and Development; Picayune Planning and Development Department	Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance Grants (FMA), Severe Repetitive Loss Grants (SRL), MEMA Planning Funds	2022	(Action 2.9 in previous plan) The county has implemented mitigation projects to address a number of repetitive loss properties, but there are still a number of these properties throughout the county so this action will be retained as the county attempts to further reduce its number of repetitive loss properties.
Natural Resource Protection							
NRP-1	Continue and expand stream protection and preservation programs to secure easements to protect riparian areas.	Flood	High	Mississippi Department of Wildfire and Parks; Pearl River County Department of Planning and Development	Department of Interior; Soil and Water Conservation	2022	(Action 1.3 in previous plan) The county has worked to secure easements to protect many riparian areas in the county, but going forward, the county will want to continue this program and expand riparian protection in other areas, so this action will remain in place.
NRP-2	Continue to preserve green spaces.	Flood	High	Pearl River County Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Private	2022	(Action 1.4 in previous plan) The county has worked to preserve green spaces in many areas, but as continual growth and development take place, the county will need to continue to work towards preserving green spaces, so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Structural Projects							
SP-1	Follow through with Alligator Branch improvements.	Flood	Moderate	Pearl River County Board of Supervisors	Hazard Mitigation Grant Program	2022	(Action 2.8 in previous plan) The county has not carried out the Alligator Branch improvements, so this action will be retained in the plan.
Emergency Services							
ES-1	Through a Mississippi/Louisiana Partnership, establish a first responders shelter to house personnel and parking space for necessary equipment until the emergency has passed and personnel and equipment can be returned to Louisiana. Also, establish and man an information center to pass on critical information to returning evacuees where evacuees can temporarily remain until it is safe to return to their homes.	Hurricane	Moderate	Pearl River County Civil Defense Agency; Pearl River County Board of Supervisors; Louisiana Emergency Management Agency; Mississippi Emergency Management Agency	FEMA Grants, local emergency management funding	2022	(Action 3.2 in previous plan) The county has worked with surrounding states and counties to establish partnerships for sheltering responders and an information center for returning evacuees. This action will need to be reviewed in the coming years to ensure that these operations are ready for disaster implementation so this action will be kept in the plan.
Public Education and Awareness							
PEA-1	Provide easily accessible tax map information to the municipalities in the county, insurance agents, realtors, banking interest, and individuals.	Flood	High	Pearl River Mapping Office; Pearl River County Tax Office	Local funds	2022	(Action 2.2 in previous plan) The county has provided tax map information that is easily available to the public via its online tax map viewer. This information will need to be continually updated as changes are made to the tax map, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Establish monthly educational programs for local government and staff.	All	High	Pearl River County Department of Planning and Development; Picayune Planning and Development Office	Salaries	2022	(Action 4.1 in previous plan) The county has carried out educational programs for local governments and staff, but these programs have not always been held on a monthly basis so the county will work on improving this program so it is more consistent and will retain this action.
PEA-3	Continue outreach to the community, including local officials, about the Hazard Mitigation Grant Program and requirements of elevation and purchase programs.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Department of Planning and Development	HMGP	2022	(Action 4.2 in previous plan) The county has reached out to the public and city officials to keep them informed about HMGP and other grant programs, but there will likely be a need for continued output of information as officials change and as many officials may need refreshers on the subject. As such, this program will be kept in place.
PEA-4	Establish a hazard mitigation library at the public library.	All	High	Picayune CRS Coordinator; Pearl River County Library System; Pearl River County Department of Planning and Development	Local funding	2020	(Action 4.3 in previous plan) The county has established a hazard mitigation library at the public library, but these materials are in need of updating, so this action will be left in place to ensure materials are current.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-5	Develop a brochure "Hazards in Pearl River County" that will detail hazards within the county.	Flood, Hurricane, Tornado, Wind	High	Pearl River County Emergency Management	Local funding	2020	(Action 4.4 in previous plan) The county has developed a number of materials for public outreach, but these materials will need to be updated in the coming years, so this action will remain in place.
PEA-6	Develop three programs for "Focus on Pearl River County" on WRJW.	Hurricane, Flood, Tornado, Wind	High	Pearl River County Emergency Management; Pearl River County Planning and Development; WRJW	Local funds	2022	(Action 4.5 in previous plan) The county has developed some programs for WRJW in the past, but during the next several years, additional programs may need to be developed to provide more current data, so this action will remain in place.
PEA-7	Establish a speaker's forum.	Hurricane, Tornado, Flood, Wind Storm	High	Pearl River Emergency Management	Local funds	2022	(Action 4.6 in previous plan) The county will need to work on establishing a speaker's forum as this has not yet been consistently established yet. This action will remain in place.
PEA-8	Establish a hazard mitigation and disaster preparedness booth at the Blueberry Festival and the Picayune Street Fair.	Flood, Hurricane, Tornado, Wind Storm	High	Pearl River County Emergency Management; Picayune CRS Coordinator	Local funding	2022	(Action 4.7 in previous plan) In the past, the county has had a hazard mitigation and disaster preparedness booth at these festivals and this has been a successful public outreach event, so this action will be kept in place as the county continues to implement this action and consider other public events for outreach.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-9	Encourage the Chambers of Commerce, PRCDA, and Civil Defense to develop a program on business continuity planning for businesses.	Hurricane, Flood, Tornado	Low	Picayune and Poplarville Chamber of Commerce	Local	2022	(Action 4.8 in previous plan) The county has encouraged the development of a program on business continuity planning and some outreach has been done to try to get local businesses to think about continuity plans, but these is still a great deal of work to be done as many businesses do not have this in place. This action will remain in the plan.
PEA-10	Advise school officials and teachers of availability of education materials for children.	Hurricane, Flood, Tornado, High Wind, Thunderstorm	Moderate	Pearl River Emergency Management; Picayune CRS Coordinator	Local revenues	2022	(Action 4.9 in previous plan) The county has reached out to many school officials to try to promulgate educational materials to children and this has been successful, but additional efforts are needed to continue and improve the program's reach going forward so this action will remain in place.

Stone County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Provide flood monitors along Red Creek to monitor flood levels to inform/warn people of dangerous water levels.	Flood	High	Emergency Operations Director; Stone County Board of Supervisors; U.S. Geological Survey	MEMA, Environmental Protection Agency, South Mississippi Land Trust	2022	(Action 1.4.A in previous plan) There are some flood gauges set up along Red Creek, but the county would be interested supplementing these with additional monitors to provide more comprehensive data. This action will be kept in the plan.
P-2	Study ways to provide property value protection for residents from encroachment but limiting restraints on property owners. (Study, plan, and implement selected land use ordinances.)	All	High	Stone County Board of Supervisors; City of Wiggins	MDA, Coastal Impact Assistance Program (CIAP)	2021	(Action 2.1.A in previous plan) The county has implemented some regulations intended to provide protection to property owners, but as development continues, the county will need to continually evaluate actions that could be taken in terms of land use practices. This action will be retained in the plan.
P-3	Update and enhance Geographic Information System (GIS) and connect EOC building in order to improve the county/city capacity to respond to disasters; to create and manage spatial data; and to enhance the tax assessment, environmental preservation, mapping, and other county functions that rely on detailed geographic information.	All	Moderate	Stone County Tax Assessor's Office; Emergency Operations	MEMA/FEMA, local, GORR	2022	(Action 2.1.B in previous plan) The county has made improvements to its GIS system and collected additional data that is connected in the EOC. However, overall, the county would still like to work on increasing its capacity in this area, so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-4	Conduct a comprehensive study to determine the best possible location for new schools and district lines to accommodate future growth in Stone County School System.	Coastal Storms	Moderate	Stone County School Board; Stone County; City of Wiggins	Local, private foundations	2020	(Action 2.2.A in previous plan) The county has attempted to collect data on future growth and risk areas and to use that information to determine where schools should be located. However, a comprehensive study has not yet been completed, so this action will remain in place.
P-5	Secure and preserve county records to digitized format and develop and maintain electronic data storage.	Hurricane, Tornado	High	Stone County Chancery Clerk	MEMA, USDA Rural Development, state funding, local	2018	(Action 2.2.A in previous plan) The county has begun preserving many of its records in electronic format, however, this transition is not complete and so the county will retain this action in the plan.
P-6	Promote economic development in Wiggins by continuing to revitalize the downtown area, thereby increasing its attractiveness to new businesses, the growing population, and visitors.	All	Moderate	City of Wiggins; Stone County Economic Development Partnership; Stone County	CDBG, USDA, local	2022	(Action 3.1.A in previous plan) The county has taken a number of steps to try to promote economic development in downtown Wiggins while also taking into account mitigation strategies. However, there is still significant work that can be accomplished to build the downtown both economically and resiliently, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Develop a retail targeting strategy for City of Wiggins and Stone County.	All	Moderate	City of Wiggins; Stone County Economic Development Partnership	CDBG, USDA, local	2022	(Action 3.1.B in previous plan) The county and city have been working to develop a retail targeting strategy that takes into account resilient growth strategies. However, this work is not complete and so this action will remain in place.
P-8	Provide an entrepreneurial initiative for developing small businesses in Stone County and City of Wiggins.	All	Moderate	Stone County Economic Development Partnership; Mississippi Gulf Coast Community College; Stone County Board of Supervisors; private partners	MDA, private foundations, MGCCC, Stone County EDP	2022	(Action 3.1.C in previous plan) The county and city have worked to develop entrepreneurial initiatives for small businesses and have done so with an eye towards making businesses more resilient to hazards. However, there are still more businesses that the county would like to work with going forward so this action will remain in place.
P-9	Expand technology infrastructure (Broadband telecommunication) to support small business development in Stone County.	All	Moderate	Stone County Economic Development Partnership; Stone County	USDA Rural Development, AT&T	2022	(Action 3.1.D in previous plan) The county has expanded technology infrastructure and has attempted to do so in resilient ways so that it will be protected going forward. As this infrastructure continues to expand in the county, additional measures will need to be taken to ensure safe expansion.
Property Protection							
PP-1							

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Natural Resource Protection							
NRP-1							
Structural Projects							
SP-1	Expand sewer service and enhance potable water service in county and City of Wiggins; provide additional fire plugs in city and unincorporated areas of county.	All	Moderate	Stone County Utility Authority; rural water systems; City of Wiggins	USDA, local, CDBG	2022	(Action 1.2.A in previous plan) The county and city have worked together with the Utility Authority when expansion of utility service is required. As these expansions continue to take place in the future, it will be important to retain this action in the plan.
SP-2	Widen Highway 26 to encourage safer, more efficient traffic flow through Wiggins and across Stone County.	All	Moderate	MDOT; City of Wiggins	MDOT	2022	(Action 1.3.A in previous plan) This has not been completed yet, but it is anticipated that this project will help with evacuation of citizens in the event of an impending disaster, so this action will be retained.
SP-3	Build safer access roads from U.S. Highway 49 into Perkinston Elementary School and Mississippi Gulf Coast Community College.	All	Moderate	MDOT; Stone County Board of Supervisors; MGCCC	MDOT, CDBG, MDA	2022	(Action 1.3.B in previous plan) These access roads have not been completed, so this action will be retained in the plan.
SP-4	Upgrade major artery roads and bridges throughout high growth areas of county (roads: East McHenry, West McHenry, East Wire Road, West Wire Road, King Bee, New Hope Road, Perkinston-Silver Run, City Road, and City Bridge Road; bridges: Inda Road Bridge).	All	Moderate	Stone County board of Supervisors	State Aid Roads, local MDA	2022	(Action 1.3.C in previous plan) Although some upgrades have been made to a number of roads in the county, there are still several major roadway projects that the county would like to see completed to prevent flooding and improve evacuation.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-5	Implement erosion protection procedures/projects on Red Creek at City Bridge, Highway 49/Perkinston, and Ramsey Springs infrastructure.	Erosion	Low	Stone County Board of Supervisors; Land Trust of South Mississippi; MDEQ	Mississippi Game and Fish, local, Land Trust of South Mississippi	2020	(Action 1.3.D in previous plan) Some erosion protection activities have been implemented along Red Creek, but erosion is a consistent force that needs to be re-evaluated and addressed constantly, so this action will remain in place.
SP-6	Upgrade railroad crossings with safety cross arms and warning lights.	Hazardous Materials/ Railroad Incidents	High	MDOT and KCS Railroad	MDOT and KCS Railroad	2020	(Action 1.3.E in previous plan) Some railroad crossings in the county are still lacking safety cross arms and warning lights, so the county will continue to work with MDOT and the railroad to address deficient crossings where possible.
SP-7	Improve drainage throughout the county at identified flood prone areas as delineated by county flood maps.	Flood	High	Stone County Board of Supervisors, U.S. Geological Survey	Pat Harrison Waterway District, local, MEMA/FEMA	2022	(Action 1.4.B in previous plan) The county has implemented a number of drainage projects to try to reduce flood impacts, but there are still many that have been identified that have not been completed so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Emergency Services							
ES-1	Improve county-wide emergency communications to include radios, base stations, satellite phones, warning systems, and enhanced CAD system and staffing for 911.	All	High	Emergency Operations Director	Homeland Security, MEMA/FEMA	2022	(Action 1.1.A in previous plan) The county's existing communications systems are adequate, but there are many ways in which these systems could be improved, so the county will continue to evaluate possible ways to enhance the system overall with both tactics and technology.
ES-2	Provide sufficient evacuation routes and notify public of evacuation routes and procedures and shelter locations in a timely manner.	Hurricane, Coastal Storm	Moderate	MEMA; MDOT; Stone County Emergency Operations	MEMA/FEMA	2022	(Action 1.1.D in previous plan) The county has worked with other agencies to identify evacuation routes and shelter locations. However, these evacuation routes need to be more widely publicized and shelter locations will need to be re-evaluated in the coming years.
ES-3	Prepare fire stations on east, west, and south areas of county with safe rooms and in-place generators to allow fire personnel to stay on site during hazard event such as hurricane force winds.	Hurricane, Tornado	Moderate	Stone County Fire Coordinator; Stone County	MEMA/FEMA	2022	(Action 1.1.E in previous plan) Fire stations have been retrofit to some degree to provide safe areas, but additional protection levels would be welcome so the action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-4	Provide personnel to improve the firefighting delivery system, insurance ratings, and assist in coordinating efforts of volunteer fire departments.	All	Moderate	City of Wiggins; Stone County Fire Coordinator	Local	2022	(Action 1.1.F in previous plan) The county has personnel on hand that are able to implement these activities, but the county would like to enhance its available personnel, so this action will be retained.
ES-5	Provide firefighting capability for multi-story buildings and commercial/industrial facilities.	All	Moderate	City of Wiggins; Stone County Board of Supervisors	U.S. Fire Administration, FEMA, CDBG	2022	(Action 1.1.G in previous plan) The county has personnel on hand that are able to implement these activities, but the county would like to enhance its available personnel, so this action will be retained.
ES-6	Provide mobile alternate emergency service site for serving remote areas and as a backup for the Emergency Operations Center if out of commission.	All	High	City of Wiggins; Stone County Board of Supervisors; Emergency Operations Director	FEMA/MEMA, Homeland Security	2020	(Action 1.1.H in previous plan) The county has this capability available, but it may look at expanding its capabilities so that better service can be provided if the EOC is out of commission. This action will be retained.
ES-7	Upgrade emergency operations 911 system equipment/software and add personnel to support emergency services.	All	High	Stone County Board of Supervisors; Emergency Operations	Homeland Security, FEMA/MEMA, local	2022	(Action 2.1.C in previous plan) The county has upgraded its equipment and software, but another upgrade will likely be necessary and additional support personnel will be needed as this has not yet been attained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-8	Provide community centers in areas of concentrated population that can be used for emergency service centers in recovery phase of disasters.	All	High	Stone County Board of Supervisors	CDBG, local	2022	(Action 2.2.B in previous plan) Some community centers are available throughout the county, but the county may need to expand and provide additional centers in the future, so it will retain this action and look to improve this service.
Public Education and Awareness							
PEA-1	Provide disaster preparedness and recovery education/training to residents, pre-school, and school children/youth/college students to include hurricane/tornadoes, chemical spills, flooding, fire, and railroad crossings.	All	High	Emergency Operations Director	MEMA, Red Cross	2022	(Action 1.1.B in previous plan) The county is involved in a number of outreach activities to different groups throughout the county, but there is certainly a need to try to reach more groups and provide updated information to groups that have already been reached so this action will be retained.
PEA-2	Provide fire and emergency preparedness and response education to children/youth/college students and other residents of the county/city.	Wildfire	Low	Stone County Fire Coordinator; City of Wiggins Fire Chief; American Red Cross	MEMA, U.S. Fire Administration, county/city, private sources	2022	(Action 1.1.C in previous plan) The county has specifically targeted wildfire preparedness in the past and will continue with this program in the future so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-3	Conduct safety awareness programming alerting residents of Stone County and Wiggins of the increased train activity, speed, and capacity to include dangers at railroad crossing brought forth from the KCS rail upgrade from Gulfport to Hattiesburg, MS.	Hazardous Materials/ Railroad Incident	Moderate	Emergency Operations Director; Stone County Board of Supervisors; City of Wiggins; KCS Railroad	Local and KCS railroad	2022	(Action 1.1.I in previous plan) Safety awareness programs on train incidents have been carried out for residents throughout the county, but it is likely that there are still groups that have not been reached so this action will be retained.

City of Wiggins Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Provide flood monitors along Red Creek to monitor flood levels to inform/warn people of dangerous water levels.	Flood	High	Emergency Operations Director; Stone County Board of Supervisors; U.S. Geological Survey	MEMA, Environmental Protection Agency, South Mississippi Land Trust	2022	(Action 1.4.A in previous plan) There are some flood gauges set up along Red Creek, but the county/city would be interested supplementing these with additional monitors to provide more comprehensive data. This action will be kept in the plan.
P-2	Study ways to provide property value protection for residents from encroachment but limiting restraints on property owners. (Study, plan, and implement selected land use ordinances.)	All	High	Stone County Board of Supervisors; City of Wiggins	MDA, Coastal Impact Assistance Program (CIAP)	2021	(Action 2.1.A in previous plan) The county has implemented some regulations intended to provide protection to property owners, but as development continues, the county will need to continually evaluate actions that could be taken in terms of land use practices. This action will be retained in the plan.
P-3	Update and enhance Geographic Information System (GIS) and connect EOC building in order to improve the county/city capacity to respond to disasters; to create and manage spatial data; and to enhance the tax assessment, environmental preservation, mapping, and other county functions that rely on detailed geographic information.	All	Moderate	Stone County Tax Assessor's Office; Emergency Operations	MEMA/FEMA, local, GORR	2022	(Action 2.1.B in previous plan) The county has made improvements to its GIS system and collected additional data that is connected in the EOC. However, overall, the county would still like to work on increasing its capacity in this area, so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-4	Conduct a comprehensive study to determine the best possible location for new schools and district lines to accommodate future growth in Stone County School System.	Coastal Storms	Moderate	Stone County School Board; Stone County; City of Wiggins	Local, private foundations	2020	(Action 2.2.A in previous plan) The county has attempted to collect data on future growth and risk areas and to use that information to determine where schools should be located. However, a comprehensive study has not yet been completed, so this action will remain in place.
P-5	Secure and preserve county records to digitized format and develop and maintain electronic data storage.	Hurricane, Tornado	High	Stone County Chancery Clerk	MEMA, USDA Rural Development, state funding, local	2018	(Action 2.2.A in previous plan) The county has begun preserving many of its records in electronic format, however, this transition is not complete and so the county will retain this action in the plan.
P-6	Promote economic development in Wiggins by continuing to revitalize the downtown area, thereby increasing its attractiveness to new businesses, the growing population, and visitors.	All	Moderate	City of Wiggins; Stone County Economic Development Partnership; Stone County	CDBG, USDA, local	2022	(Action 3.1.A in previous plan) The county has taken a number of steps to try to promote economic development in downtown Wiggins while also taking into account mitigation strategies. However, there is still significant work that can be accomplished to build the downtown both economically and resiliently, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Develop a retail targeting strategy for City of Wiggins and Stone County.	All	Moderate	City of Wiggins; Stone County Economic Development Partnership	CDBG, USDA, local	2022	(Action 3.1.B in previous plan) The county and city have been working to develop a retail targeting strategy that takes into account resilient growth strategies. However, this work is not complete and so this action will remain in place.
P-8	Provide an entrepreneurial initiative for developing small businesses in Stone County and City of Wiggins.	All	Moderate	Stone County Economic Development Partnership; Mississippi Gulf Coast Community College; Stone County Board of Supervisors; private partners	MDA, private foundations, MGCCC, Stone County EDP	2022	(Action 3.1.C in previous plan) The county and city have worked to develop entrepreneurial initiatives for small businesses and have done so with an eye towards making businesses more resilient to hazards. However, there are still more businesses that the county would like to work with going forward so this action will remain in place.
P-9	Expand technology infrastructure (Broadband telecommunication) to support small business development in Stone County.	All	Moderate	Stone County Economic Development Partnership; Stone County	USDA Rural Development, AT&T	2022	(Action 3.1.D in previous plan) The county has expanded technology infrastructure and has attempted to do so in resilient ways so that it will be protected going forward. As this infrastructure continues to expand in the county, additional measures will need to be taken to ensure safe expansion.
Property Protection							
PP-1							

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Natural Resource Protection							
NRP-1							
Structural Projects							
SP-1	Expand sewer service and enhance potable water service in county and City of Wiggins; provide additional fire plugs in city and unincorporated areas of county.	All	Moderate	Stone County Utility Authority; rural water systems; City of Wiggins	USDA, local, CDBG	2022	(Action 1.2.A in previous plan) The county and city have worked together with the Utility Authority when expansion of utility service is required. As these expansions continue to take place in the future, it will be important to retain this action in the plan.
SP-2	Widen Highway 26 to encourage safer, more efficient traffic flow through Wiggins and across Stone County.	All	Moderate	MDOT; City of Wiggins	MDOT	2022	(Action 1.3.A in previous plan) This has not been completed yet, but it is anticipated that this project will help with evacuation of citizens in the event of an impending disaster, so this action will be retained.
SP-3	Build safer access roads from U.S. Highway 49 into Perkinston Elementary School and Mississippi Gulf Coast Community College.	All	Moderate	MDOT; Stone County Board of Supervisors; MGCCC	MDOT, CDBG, MDA	2022	(Action 1.3.B in previous plan) These access roads have not been completed, so this action will be retained in the plan.
SP-4	Upgrade major artery roads and bridges throughout high growth areas of county (roads: East McHenry, West McHenry, East Wire Road, West Wire Road, King Bee, New Hope Road, Perkinston-Silver Run, City Road, and City Bridge Road; bridges: Inda Road Bridge).	All	Moderate	Stone County board of Supervisors	State Aid Roads, local MDA	2022	(Action 1.3.C in previous plan) Although some upgrades have been made to a number of roads in the county, there are still several major roadway projects that the county would like to see completed to prevent flooding and improve evacuation.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-5	Implement erosion protection procedures/projects on Red Creek at City Bridge, Highway 49/Perkinston, and Ramsey Springs infrastructure.	Erosion	Low	Stone County Board of Supervisors; Land Trust of South Mississippi; MDEQ	Mississippi Game and Fish, local, Land Trust of South Mississippi	2020	(Action 1.3.D in previous plan) Some erosion protection activities have been implemented along Red Creek, but erosion is a consistent force that needs to be re-evaluated and addressed constantly, so this action will remain in place.
SP-6	Upgrade railroad crossings with safety cross arms and warning lights.	Hazardous Materials/ Railroad Incidents	High	MDOT and KCS Railroad	MDOT and KCS Railroad	2020	(Action 1.3.E in previous plan) Some railroad crossings in the county are still lacking safety cross arms and warning lights, so the county will continue to work with MDOT and the railroad to address deficient crossings where possible.
SP-7	Improve drainage throughout the county at identified flood prone areas as delineated by county flood maps.	Flood	High	Stone County Board of Supervisors, U.S. Geological Survey	Pat Harrison Waterway District, local, MEMA/FEMA	2022	(Action 1.4.B in previous plan) The county has implemented a number of drainage projects to try to reduce flood impacts, but there are still many that have been identified that have not been completed so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Emergency Services							
ES-1	Improve county-wide emergency communications to include radios, base stations, satellite phones, warning systems, and enhanced CAD system and staffing for 911.	All	High	Emergency Operations Director	Homeland Security, MEMA/FEMA	2022	(Action 1.1.A in previous plan) The county's existing communications systems are adequate, but there are many ways in which these systems could be improved, so the county will continue to evaluate possible ways to enhance the system overall with both tactics and technology.
ES-2	Provide sufficient evacuation routes and notify public of evacuation routes and procedures and shelter locations in a timely manner.	Hurricane, Coastal Storm	Moderate	MEMA; MDOT; Stone County Emergency Operations	MEMA/FEMA	2022	(Action 1.1.D in previous plan) The county has worked with other agencies to identify evacuation routes and shelter locations. However, these evacuation routes need to be more widely publicized and shelter locations will need to be re-evaluated in the coming years.
ES-3	Prepare fire stations on east, west, and south areas of county with safe rooms and in-place generators to allow fire personnel to stay on site during hazard event such as hurricane force winds.	Hurricane, Tornado	Moderate	Stone County Fire Coordinator; Stone County	MEMA/FEMA	2022	(Action 1.1.E in previous plan) Fire stations have been retrofit to some degree to provide safe areas, but additional protection levels would be welcome so the action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-4	Provide personnel to improve the firefighting delivery system, insurance ratings, and assist in coordinating efforts of volunteer fire departments.	All	Moderate	City of Wiggins; Stone County Fire Coordinator	Local	2022	(Action 1.1.F in previous plan) The county has personnel on hand that are able to implement these activities, but the county would like to enhance its available personnel, so this action will be retained.
ES-5	Provide firefighting capability for multi-story buildings and commercial/industrial facilities.	All	Moderate	City of Wiggins; Stone County Board of Supervisors	U.S. Fire Administration, FEMA, CDBG	2022	(Action 1.1.G in previous plan) The county has personnel on hand that are able to implement these activities, but the county would like to enhance its available personnel, so this action will be retained.
ES-6	Provide mobile alternate emergency service site for serving remote areas and as a backup for the Emergency Operations Center if out of commission.	All	High	City of Wiggins; Stone County Board of Supervisors; Emergency Operations Director	FEMA/MEMA, Homeland Security	2020	(Action 1.1.H in previous plan) The county has this capability available, but it may look at expanding its capabilities so that better service can be provided if the EOC is out of commission. This action will be retained.
ES-7	Upgrade emergency operations 911 system equipment/software and add personnel to support emergency services.	All	High	Stone County Board of Supervisors; Emergency Operations	Homeland Security, FEMA/MEMA, local	2022	(Action 2.1.C in previous plan) The county has upgraded its equipment and software, but another upgrade will likely be necessary and additional support personnel will be needed as this has not yet been attained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-8	Provide community centers in areas of concentrated population that can be used for emergency service centers in recovery phase of disasters.	All	High	Stone County Board of Supervisors	CDBG, local	2022	(Action 2.2.B in previous plan) Some community centers are available throughout the county, but the county may need to expand and provide additional centers in the future, so it will retain this action and look to improve this service.
Public Education and Awareness							
PEA-1	Provide disaster preparedness and recovery education/training to residents, pre-school, and school children/youth/college students to include hurricane/tornadoes, chemical spills, flooding, fire, and railroad crossings.	All	High	Emergency Operations Director	MEMA, Red Cross	2022	(Action 1.1.B in previous plan) The county is involved in a number of outreach activities to different groups throughout the county, but there is certainly a need to try to reach more groups and provide updated information to groups that have already been reached so this action will be retained.
PEA-2	Provide fire and emergency preparedness and response education to children/youth/college students and other residents of the county/city.	Wildfire	Low	Stone County Fire Coordinator; City of Wiggins Fire Chief; American Red Cross	MEMA, U.S. Fire Administration, county/city, private sources	2022	(Action 1.1.C in previous plan) The county has specifically targeted wildfire preparedness in the past and will continue with this program in the future so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-3	Conduct safety awareness programming alerting residents of Stone County and Wiggins of the increased train activity, speed, and capacity to include dangers at railroad crossing brought forth from the KCS rail upgrade from Gulfport to Hattiesburg, MS.	Railroad Incident	Moderate	Emergency Operations Director; Stone County Board of Supervisors; City of Wiggins; KCS Railroad	Local and KCS railroad	2022	(Action 1.1.I in previous plan) Safety awareness programs on train incidents have been carried out for residents throughout the county, but it is likely that there are still groups that have not been reached so this action will be retained.

SECTION 10
PLAN MAINTENANCE

This section discusses how the MEMA District 9 Mitigation Strategy and Mitigation Action Plan will be implemented and how the Regional Hazard Mitigation Plan will be evaluated and enhanced over time. This section also discusses how the public will continue to be involved in a sustained hazard mitigation planning process. It consists of the following four subsections:

- ❑ 10.1 Monitoring and Evaluating the Previous Plan
- ❑ 10.2 Implementation and Integration
- ❑ 10.3 Monitoring, Evaluation, and Enhancement
- ❑ 10.4 Continued Public Involvement

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44 CFR Requirement
44 CFR Part201.6(c)(4)(i): The plan shall include a plan maintenance process that includes a section describing the method and schedule of monitoring, evaluating and updating the mitigation plan within a five-year cycle. ***44 CFR Part 201.6(c)(4)(ii):*** The plan maintenance process shall include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate

10.1 MONITORING AND EVALUATING THE PREVIOUS PLAN

Since the previous county and municipal level plans were adopted, each community has worked to ensure that mitigation was integrated into local activities and that the mitigation plan was appropriately implemented. Each of the communities outlined a process in their previous mitigation plan for monitoring and evaluating the plan throughout the interim period between plan updates.

Each community was ultimately successful in implementing the monitoring and evaluation processes that were outlined in previous plans as all communities held annual meetings to discuss the mitigation plan and the priorities that were outlined in it. Each county's specific process is outlined below with an explanation of how the monitoring and evaluating process was carried out as well as any changes that were identified by the county or its jurisdictions that would be useful to implement during the next update.

George County
The George County Hazard Mitigation Plan (2013) included an annual review process and progress report on mitigation strategies, focusing on those expected to be initiated or completed in that year. This review process was carried out by the Advisory Council every year since the previous plan was approved. During this annual review process, the Advisory Council developed a report on the plan to detail mitigation activities undertaken over the course of the year for the Board of Supervisors. The report also evaluated the plan why certain actions succeeded or failed.

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during these annual reviews and the Advisory Council generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

Hancock County

The Hancock County Hazard Mitigation Plan (2013) included an annual review process in June of each year. This review process was carried out by the Hazard Mitigation Planning Committee every year since the previous plan was approved. During this annual review process, the information that came out of the meeting were used to update the Risk Assessment section of the plan and modify the Action Plan.

Additionally, the county's Emergency Management Director required semi-annual reviews of the progress towards implementing in the plan. This review was coordinated to review both the plan and coordinate actions defined within the activities of the county's CRS Program Report and NPDES Phase II Stormwater Program Report. These meetings were held in June and December

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during these annual reviews and the Hazard Mitigation Planning Committee generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

Bay St. Louis

The Bay St. Louis Hazard Mitigation Plan (2011) included an annual review process and reviews following a hazard event. This review process was carried out by the Bay St. Louis CRS Coordinator every year since the previous plan was approved. During this annual review process, review of changes in vulnerability were especially the focus. Moreover, the city will document where mitigation actions were not effective and where additional data or capabilities could be incorporated.

A representative from the responsible office identified in each mitigation measure was responsible for tracking the action status and reporting on it during the annual review. If the action did not meet identified objectives, the jurisdictional lead determined what additional measures might be implemented to lead to success. Updating of the plan will be by written changes and submissions as approved by the City Council

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during these annual reviews and the CRS Coordinator and Committee generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

Waveland

The Waveland Hazard Mitigation Plan (2013) included an annual review process and progress report on the plan. This review process was carried out by the Fire Chief every year since the previous plan was approved. During this annual review process, review of changes in vulnerability were especially the focus. Moreover, the city will document where mitigation actions were not effective and where additional data or capabilities could be incorporated.

A representative from the responsible office identified in each mitigation measure was responsible for tracking the action status and reporting on it during the annual review. If the action did not meet identified objectives, the jurisdictional lead determined what additional measures might be implemented to lead to success. Updating of the plan will be by written changes and submissions as approved by the City Council.

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during these annual reviews and the Fire Chief and Committee generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

Harrison County

The Harrison County Hazard Mitigation Plan (2014) included a bi-annual review process in January and June and progress report on the plan, as well as reviews after any disaster events. This review process was carried out by the Harrison County LHMPC every year since the previous plan was approved. During this annual review process, the County LHMPC developed an end-of-year report on the plan, when requested, to detail mitigation activities undertaken over the course of the year as well as any mitigation projects that have been completed. This was presented to the Harrison County Board of Supervisors. The agenda for each review meeting was determined by the Office of Emergency Management and LHMPC, but always included a review of high and medium priority actions.

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during these annual reviews and the LHMPC generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

Biloxi

The Biloxi Hazard Mitigation Plan (2013) included an annual review process and progress report on the plan. This review process was carried out by the Biloxi Emergency Management Director every year since the previous plan was approved. During this annual review process, the EM Director was responsible for general upkeep and oversight of the plan and collecting relevant information from other city departments for use in the plan. The EM Director developed meeting agendas, invitations, and scheduled the annual meetings in coordination with the Public Affairs Manager when applicable.

During the meetings, the Committee discussed a number of issues including the impacts of past events on the Gulf Coast and an evaluation of project implementation and timeline. Suggestions on improvements were made to the Director and incorporated as needed.

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during these annual reviews and the Committee generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

D'Iberville

The D'Iberville Hazard Mitigation Plan (2011) included an annual review process that took place in June at the beginning of hurricane season. This review process was carried out by the Community Development Director in conjunction with the Hazard Mitigation Planning Committee every year since the previous plan was approved. During this annual review process, the Hazard Mitigation Planning

Committee developed an end-of-year report on the plan to highlight accomplishments, shortfalls and areas of concern to the Mayor and City Council. Any suggestions for written changes were then incorporated and the Committee determined whether or not to incorporate these suggestions.

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during these annual reviews and the Committee generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

Gulfport

The Gulfport Hazard Mitigation Plan (2013) included an annual review process that was carried out in February of each year. This review process was carried out by the Deputy Building Official and Hazard Mitigation Committee every year since the previous plan was approved. During this annual review process, the Hazard Mitigation Committee reviewed any issues that occurred since the last plan update and made suggestions on improving the plan and any changes that might be required. There were also discussions with the city's Public Information Officer on what information may need to be shared with the public.

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during these annual reviews and the Hazard Mitigation Committee generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

Long Beach

The Long Beach Hazard Mitigation Plan (2013) included an annual review process and progress report on the plan. This review process was carried out by the Fire Chief every year since the previous plan was approved. During this annual review process, review of changes in vulnerability were especially the focus. Moreover, the city will document where mitigation actions were not effective and where additional data or capabilities could be incorporated.

A representative from the responsible office identified in each mitigation measure was responsible for tracking the action status and reporting on it during the annual review. If the action did not meet identified objectives, the jurisdictional lead determined what additional measures might be implemented to lead to success. Updating of the plan will be by written changes and submissions as approved by the City Council.

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during these annual reviews and the Fire Chief and Committee generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

Pass Christian

The Pass Christian Hazard Mitigation Plan (2011) included a bi-annual review process with meetings to take place in the spring and fall. This review process was carried out by the Hazard Mitigation Planning Committee every year since the previous plan was approved. During the spring review process, the Hazard Mitigation Planning Committee reviewed the overall functionality of the plan and relevance to current conditions. This included a review of new construction and/or planed construction, additional risks and vulnerabilities, and any new actions that might be added to the plan. During the fall review

process, the discussions focused on major components of the plan including implementation of activities and nay hazards that occurred since the previous meeting.

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during these annual reviews and the Hazard Mitigation Planning Committee generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

Jackson County

The Jackson County Hazard Mitigation Plan (2012) included an annual review process that was focused on the mitigation actions in the plan. This review process was carried out by the Jackson County Hazard Mitigation Committee every year since the previous plan was approved. During this annual review process, the County Hazard Mitigation Committee also addressed issues not identified during the past plan update, assessed events that impacted the participating jurisdictions, and evaluated the effectiveness of the planning team. This was also complemented by an annual report that detailed the status of the plan review.

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during these annual reviews and the Hazard Mitigation Committee generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

Moss Point

The Long Beach Hazard Mitigation Plan (2013) included an annual review process and progress report on the plan. This review process was carried out by the Building Department every year since the previous plan was approved. During this annual review process, review of changes in vulnerability were especially the focus. Moreover, the city will document where mitigation actions were not effective and where additional data or capabilities could be incorporated.

A representative from the responsible office identified in each mitigation measure was responsible for tracking the action status and reporting on it during the annual review. If the action did not meet identified objectives, the jurisdictional lead determined what additional measures might be implemented to lead to success. Updating of the plan will be by written changes and submissions as approved by the City Council.

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during these annual reviews and the Building Department and Committee generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

Ocean Springs

The Pass Christian Hazard Mitigation Plan (2011) included a bi-annual review process with meetings to take place in the spring and fall. This review process was carried out by the Hazard Mitigation Planning Committee every year since the previous plan was approved. During the spring review process, the Hazard Mitigation Planning Committee reviewed the overall functionality of the plan and relevance to current conditions. This included a review of new construction and/or planed construction, additional risks and vulnerabilities, and any new actions that might be added to the plan. During the fall review

process, the discussions focused on major components of the plan including implementation of activities and nay hazards that occurred since the previous meeting.

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during these annual reviews and the Hazard Mitigation Planning Committee generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

Pascagoula

The Pascagoula Hazard Mitigation Plan (2014) included a bi-annual review process with meetings to take place in the spring and fall. This review process was carried out by the Hazard Mitigation Planning Committee every year since the previous plan was approved. During the spring review process, the Hazard Mitigation Planning Committee reviewed the overall functionality of the plan and relevance to current conditions. This included a review of new construction and/or planed construction, additional risks and vulnerabilities, and any new actions that might be added to the plan. During the fall review process, the discussions focused on major components of the plan including implementation of activities and nay hazards that occurred since the previous meeting.

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during these annual reviews and the Hazard Mitigation Planning Committee generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

Pearl River County

The Pearl River County Hazard Mitigation Plan (2011) included a bi-annual review process with meetings to take place in the spring and fall. This review process was carried out by the Hazard Mitigation Planning Committee every year since the previous plan was approved. During the spring review process, the Hazard Mitigation Planning Committee reviewed the overall functionality of the plan and relevance to current conditions. This included a review of new construction and/or planed construction, additional risks and vulnerabilities, and any new actions that might be added to the plan. During the fall review process, the discussions focused on major components of the plan including implementation of activities and nay hazards that occurred since the previous meeting.

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during these annual reviews and the Hazard Mitigation Planning Committee generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

Stone County

The Stone County Hazard Mitigation Plan (2011) included an annual review process with a yearly meeting. This review process was carried out by the Director of Emergency Operations every year since the previous plan was approved. During the review process, the county reviewed potential hazards and met with county/city department heads. This included a review of severity of area impacted, probability of occurring, impact to life/property, vulnerability of structures, and overall risk assessment. This review then led to an annual report that was presented to the Board of Supervisors and the Mayor/Board of Alderman.

Although there were some minor revisions made to the plan during the interim update period, there were few major revisions identified during these annual reviews and the Emergency Operations Director generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

10.2 IMPLEMENTATION AND INTEGRATION

Each agency, department, or other partner participating under the MEMA District 9 Regional Hazard Mitigation Plan is responsible for implementing specific mitigation actions as prescribed in the Mitigation Action Plan. Every proposed action listed in the Mitigation Action Plan is assigned to a specific "lead" agency or department in order to assign responsibility and accountability and increase the likelihood of subsequent implementation.

In addition to the assignment of a local lead department or agency, an implementation time period or a specific implementation date has been assigned in order to assess whether actions are being implemented in a timely fashion. The counties in the MEMA District 9 Region will seek outside funding sources to implement mitigation projects in both the pre-disaster and post-disaster environments. When applicable, potential funding sources have been identified for proposed actions listed in the Mitigation Action Plan.

The participating jurisdictions will integrate this Hazard Mitigation Plan into relevant city and county government decision-making processes or mechanisms, where feasible. This includes integrating the requirements of the Hazard Mitigation Plan into other local planning documents, processes, or mechanisms, such as comprehensive or capital improvement plans, when appropriate. The members of the MEMA District 9 Regional Hazard Mitigation Council (RHMC) will remain charged with ensuring that the goals and mitigation actions of new and updated local planning documents for their agencies or departments are consistent, or do not conflict with, the goals and actions of the Hazard Mitigation Plan, and will not contribute to increased hazard vulnerability in the MEMA District 9 Region.

Since the previous plans were adopted, each county and participating jurisdiction has worked to integrate the hazard mitigation plan into other planning mechanisms where applicable/feasible. Examples of how this integration has occurred have been documented in the Implementation Status discussion provided for each of the mitigation actions found in Section 9. Specific examples of how integration has occurred include:

- ❑ Integrating the mitigation plan into reviews and updates of floodplain management ordinances
- ❑ Integrating the mitigation plan into reviews and updates of emergency operations plans
- ❑ Integrating the mitigation plan into review and updates of building codes
- ❑ Integrating the mitigation plan into the capital improvements plans/programs through identification of mitigation actions that require local funding

Opportunities to further integrate the requirements of this Plan into other local planning mechanisms shall continue to be identified through future meetings of the RHMC, individual county meetings, and the annual review process described herein. Although it is recognized that there are many possible benefits to integrating components of this Plan into other local planning mechanisms, the development and maintenance of this stand-alone Regional Hazard Mitigation Plan is deemed by the MEMA District 9

RHMC to be the most effective and appropriate method to implement local hazard mitigation actions at this time.

10.3 MONITORING, EVALUATION, AND ENHANCEMENT

Periodic revisions and updates of the Hazard Mitigation Plan are required to ensure that the goals of the Plan are kept current, taking into account potential changes in hazard vulnerability and mitigation priorities. In addition, revisions may be necessary to ensure that the Plan is in full compliance with applicable federal and state regulations. Periodic evaluation of the Plan will also ensure that specific mitigation actions are being reviewed and carried out according to the Mitigation Action Plan.

The MEMA District 9 RHMC shall meet every year to evaluate the progress attained and to revise, where needed, the activities set forth in the Plan. The findings and recommendations of the RHMC shall be shared with interested municipal and county Board/Council members. The RHMC will also meet following any disaster events warranting a reexamination of the mitigation actions being implemented or proposed for future implementation. This will ensure that the Plan is continuously updated to reflect changing conditions and needs within the region. MEMA will be responsible for reconvening the RHMC for these reviews.[1]

FIVE YEAR PLAN REVIEW

The Plan will be thoroughly reviewed by the RHMC every five years to determine whether there have been any significant changes in the region that may, in turn, necessitate changes in the types of mitigation actions proposed. New development in identified hazard areas, an increased exposure to hazards, an increase or decrease in capability to address hazards, and changes to federal or state legislation are examples of factors that may affect the necessary content of the Plan.

The plan review provides MEMA District 9 county officials with an opportunity to evaluate those actions that have been successful and to explore the possibility of documenting potential losses avoided due to the implementation of specific mitigation measures. The plan review also provides the opportunity to address mitigation actions that may not have been successfully implemented as assigned. MEMA will be responsible for reconvening the RHMC and helping conduct the five-year review.

During the five-year plan review process, the following questions will be considered as criteria for assessing the effectiveness and appropriateness of the Plan:

- ❑ Do the goals address current and expected conditions?
- ❑ Has the nature or magnitude of risks changed?
- ❑ Are the current resources appropriate for implementing the Plan?
- ❑ Are there implementation problems, such as technical, political, legal or coordination issues with other agencies?
- ❑ Have the outcomes occurred as expected?
- ❑ Did County departments participate in the plan implementation process as assigned?

[1] A sample Mitigation Action Progress Form and Plan Update Evaluation Worksheet (from FEMA's *Local Mitigation Planning Handbook*) are included in Appendix B. These documents can be used to guide the evaluation of mitigation actions and future plan updates.

Following the five-year review, any revisions deemed necessary will be summarized and implemented according to the reporting procedures and plan amendment process outlined herein. Upon completion of the review and update/amendment process, the MEMA District 9 Regional Hazard Mitigation Plan will be submitted to the State Hazard Mitigation Officer at MEMA for final review and approval in coordination with the Federal Emergency Management Agency (FEMA).

Because the plan update process can take several months to complete, and because Federal funding may be needed to update the plan, it is recommended that the five-year review process begin at the beginning of the third year after the plan was last approved. This will allow the participants in the MEMA District 9 Regional Hazard Mitigation Plan to organize in order to seek Federal funding if necessary and complete required plan update documentation before the plan expires at the end of the fifth year.

DISASTER DECLARATION

Following a disaster declaration, the MEMA District 9 Regional Hazard Mitigation Plan will be revised as necessary to reflect lessons learned, or to address specific issues and circumstances arising from the event. It will be the responsibility of MEMA to reconvene the RHMC and ensure the appropriate stakeholders are invited to participate in the plan revision and update process following declared disaster events.

REPORTING PROCEDURES

The results of the five-year review will be summarized by the RHMC in the plan update and will include an evaluation of the effectiveness of the Plan and any required or recommended changes or amendments. The results will also include an evaluation of implementation progress for each of the proposed mitigation actions, identifying reasons for delays or obstacles to their completion along with recommendations as to whether and how to continue to pursue the action.

PLAN AMENDMENT PROCESS

In general, the RHMC agreed that any minor amendments suggested by a county or participating municipality would be automatically accepted into the plan as long as the amendment only impacted that jurisdiction. However, if the amendment proposed a large-scale change to the structure of the plan or impacted other jurisdictions, the following amendment process would need to be followed.

Upon the initiation of the amendment process, the MEMA District 9 counties will forward information on the proposed change(s) to all interested parties including, but not limited to, all directly affected County departments, residents, and businesses. Information will also be forwarded to MEMA. This information will be disseminated in order to seek input on the proposed amendment(s) for no less than a 45-day review and comment period.

At the end of the 45-day review and comment period, the proposed amendment(s) and all comments will be forwarded to the RHMC for final consideration. The RHMC will review the proposed amendment along with the comments received from other parties, and if acceptable, the committee will submit a recommendation for the approval and adoption of changes to the Plan.

In determining whether to recommend approval or denial of a Plan amendment request, the following factors will be considered by the RHMC:

- ❑ There are errors, inaccuracies, or omissions made in the identification of issues or needs in the Plan.
- ❑ New issues or needs have been identified which are not adequately addressed in the Plan.
- ❑ There has been a change in information, data, or assumptions from those on which the Plan is based.

Upon receiving the recommendation from the RHMC, and prior to adoption of the Plan Amendment, the participating jurisdictions may hold a public hearing, if deemed necessary. The governing bodies of each participating jurisdiction will review the recommendation from the RHMC (including the factors listed above) and any oral or written comments received at the public hearing. Following that review, the governing bodies will take one of the following actions:

- ❑ Adopt the proposed amendments as presented
- ❑ Adopt the proposed amendments with modifications
- ❑ Refer the amendments request back to the RHMC for further revision
- ❑ Defer the amendment request back to the RHMC for further consideration and/or additional hearings

10.4 CONTINUED PUBLIC INVOLVEMENT

44 CFR Requirement
44 CFR Part 201.6(c)(4)(iii): The plan maintenance process shall include a discussion on how the community will continue public participation in the plan maintenance process

Public participation is an integral component to the mitigation planning process and will continue to be essential as this Plan evolves over time. As described above, significant changes or amendments to the Plan shall require a public hearing prior to any adoption procedures.

Other efforts to involve the public in the maintenance, evaluation, and revision process will be made as necessary. These efforts may include:

- ❑ Advertising meetings of the RHMC in local newspapers, public bulletin boards and/or County office buildings
- ❑ Designating willing and voluntary citizens and private sector representatives as official members of the RHMC
- ❑ Utilizing local media to update the public on any maintenance and/or periodic review activities taking place
- ❑ Utilizing the MEMA District 9 county websites to advertise any maintenance and/or periodic review activities taking place
- ❑ Keeping copies of the Plan in public libraries

Overall, the RHMC and participating counties will continue to provide outreach concerning mitigation through TV and other media as well as through outreach events such as local fairs or public events. In this way, the public will have continual interaction with the mitigation process and the efforts taken by local officials to implement mitigation.

ANNEX A
GEORGE COUNTY

This annex includes jurisdiction-specific information for George County and its participating municipalities. It consists of the following five subsections:

- ❑ A.1 George County Community Profile
- ❑ A.2 George County Risk Assessment
- ❑ A.3 George County Vulnerability Assessment
- ❑ A.4 George County Capability Assessment
- ❑ A.5 George County Mitigation Strategy

A.1 GEORGE COUNTY COMMUNITY PROFILE

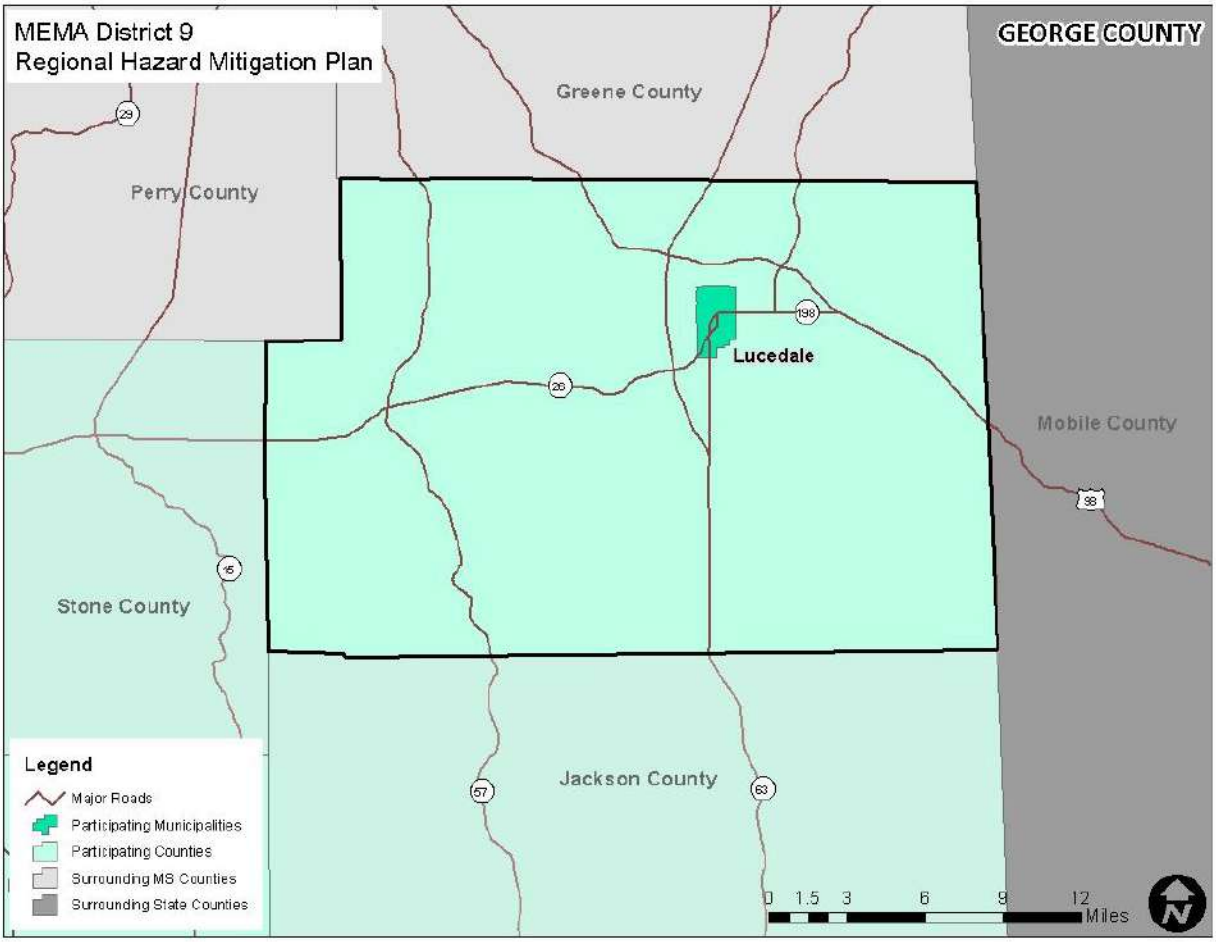
A.1.1 Geography and the Environment

George County is located in southern Mississippi. It comprises one city, Lucedale, as well as many small unincorporated communities. An orientation map is provided as **Figure A.1**.

George County is situated in the East Gulf Coastal Plain. It is made up of the gently rolling Pine Belt, also known as the "Piney Woods," and the coastal area called the Coastal Meadows or Terrace. The region has generally low topographic elevations and extensive tracts of marshy land. There are many rivers, creeks, bayous, and other natural drainage networks in the region which empty into the Gulf of Mexico. The total area of the county is 484 square miles, 5 square miles of which is water area.

George County enjoys four distinct seasons but the climate in the region is generally hot and humid compared to the rest of the United States given its latitude and location along the Gulf Coast. Precipitation is generally highest in winter months when the temperatures are moderately lower, but the likelihood of precipitation remains relatively constant throughout the year. Snowfall is rare but does occur. Summers in the region can become fairly hot with average highs in the nineties and lows in the seventies. The region is also often susceptible to turbulent weather when warm, wet air from the Gulf of Mexico is pushed up into the region to mix with cooler air coming down from across the continent which can result in severe weather conditions. This is particularly true in the spring when seasons are changing and diverse weather patterns interact. The region is also subject to hurricanes and tropical storms from June to October.

FIGURE A.1: GEORGE COUNTY ORIENTATION MAP



A.1.2 Population and Demographics

According to the 2010 Census, George County has a population of 22,578 people. The county has seen an increase in population between 2000 and 2010. The population density is 47 people per square mile. Population counts from the U.S. Census Bureau for 1990, 2000, and 2010 for the county and participating jurisdictions are presented in **Table A.1**.

TABLE A.1: POPULATION COUNTS FOR GEORGE COUNTY

Jurisdiction	1990 Census Population	2000 Census Population	2010 Census Population	% Change 2000-2010
George County	**16,673**	**19,144**	**22,578**	**17.9%**
Lucedale	2,592	2,458	2,923	18.9%

Source: United States Census Bureau, 1990, 2000, 2010 Census

Based on the 2010 Census, the median age of residents of George County is 36.4 years. The racial characteristics of the county are presented in **Table A.2**. Whites make up the majority of the population

in the county, accounting for almost 90 percent of the population; however, there is a larger percentage of blacks in the City of Lucedale.

TABLE A.2: DEMOGRAPHICS OF GEORGE COUNTY

Jurisdiction	White, Percent (2010)	Black or African American, Percent (2010)	American Indian or Alaska Native, Percent (2010)	Asian, Percent (2010)	Native Hawaiian or Other Pacific Islander, Percent (2010)	Other Race, Percent (2010)	Two or More Races, percent (2010)	Persons of Hispanic Origin, Percent (2010)*
George County	**89.8%**	**8.1%**	**0.3%**	**0.2%**	**0.0%**	**0.7%**	**0.9%**	**2.0%**
Lucedale	68.7%	29.6%	0.1%	0.5%	0.0%	0.6%	0.5%	1.7%

*Hispanics may be of any race, so also are included in applicable race categories
Source: United States Census Bureau, 2010 Census

A.1.3 Housing

According to the 2010 US Census, there are 9,330 housing units in George County, the majority of which are single family homes or mobile homes. Housing information for the county and one municipality is presented in **Table A.3**. As shown in the table, the county has a low percentage of seasonal housing units.

TABLE A.3: HOUSING CHARACTERISTICS OF GEORGE COUNTY

Jurisdiction	Housing Units (2000)	Housing Units (2010)	Seasonal Units, Percent (2010)	Median Home Value (2011-2015)
George County	**7,513**	**9,330**	**3.7%**	**$101,300**
Lucedale	1,052	1,130	1.1%	$97,400

Source: United States Census Bureau, 2000 and 2010 Census, 2011-2015 American Community Survey 5-Year Estimates

A.1.4 Infrastructure

TRANSPORTATION

In George County, U.S. Highway 98 runs roughly northwest to southeast across allowing transportation in the northeastern part of the county. Mississippi Highway 57 and 63 both run north-south through the county and Mississippi 26 runs east-west.

There are no public-use airports in George County. The Gulfport-Biloxi International Airport, located in Harrison County, serves the county. This airport is served by three major airlines with direct flights to Atlanta, Charlotte, Dallas/Ft. Worth, and Houston as well as connections to hundreds of locations in the U.S. and worldwide.

In terms of other transportation services, one Class-I Major and one Class-III Local railway also serve the county.

UTILITIES

Electrical power in George County is mainly provided by electric power associations. Mississippi Power Company also provides power to some parts of the county.

CenterPoint Energy Resources is the natural gas supplier that serves George County.

Water and sewer service is provided by a number of different sources, but unincorporated areas often rely on septic systems and wells in George County.

COMMUNITY FACILITIES

There are a number of buildings and community facilities located throughout George County. According to the data collected for the vulnerability assessment (Section 6.4.1), there are 2 communications facilities, 1 emergency operations center (EOC), 15 fire stations, 2 medical facilities, 1 police station, 2 power/gas facilities, 1 private/non-profit facility, 8 public facilities, 9 schools, 5 special populations facilities, and 5 water/wastewater facilities located within the county.

There is one hospital located in George County. It is the George Regional Hospital in the City of Lucedale. There is also an additional medical care facility located in the county as outlined in the vulnerability assessment (Section 6.4.1).

George County contains numerous local, state, and national parks and recreation areas, including the Mississippi Gulf Coast National Heritage Area and DeSoto National Forest. Golf courses and other recreational opportunities are also available in the county.

A.1.5 Land Use

Many areas of George County are undeveloped or sparsely developed. There is one small incorporated municipality located in the county and a few unincorporated rural centers. There is a mix of protected lands, such as the DeSoto National Forest. Private lands are used for exurban housing, agriculture, and forestry. Consistent with its rural character, densities are very low and uses are not mixed, making motor vehicles the only viable mode for virtually all travel.

Local land use and associated regulations are further discussed in *Section 7: Capability Assessment.*

A.1.6 Employment and Industry

According to the 2011 to 2015 American Community Survey (ACS) 5-year estimates, in 2015, George County had an average annual employment of 8,260 workers and an average unemployment rate of 9.0 percent (compared to 10.3 percent for the state). In 2015, the Educational Services, and Health Care and Social Assistance industry employed 21.7 percent of the county's workforce followed by Manufacturing (19.2%) and Construction (13.2%); and Retail Trade (10.9%). In 2015, the average annual median household income in George County was $44,258 compared to $39,665 in the state of Mississippi.

A.2 GEORGE COUNTY RISK ASSESSMENT

This subsection includes hazard profiles for each of the significant hazards identified in Section 4: *Hazard Identification* as they pertain to George County. Each hazard profile includes a description of the hazard's location and extent, notable historical occurrences, and the probability of future occurrences. Additional information can be found in Section 5: *Hazard Profiles*.

FLOOD-RELATED HAZARDS

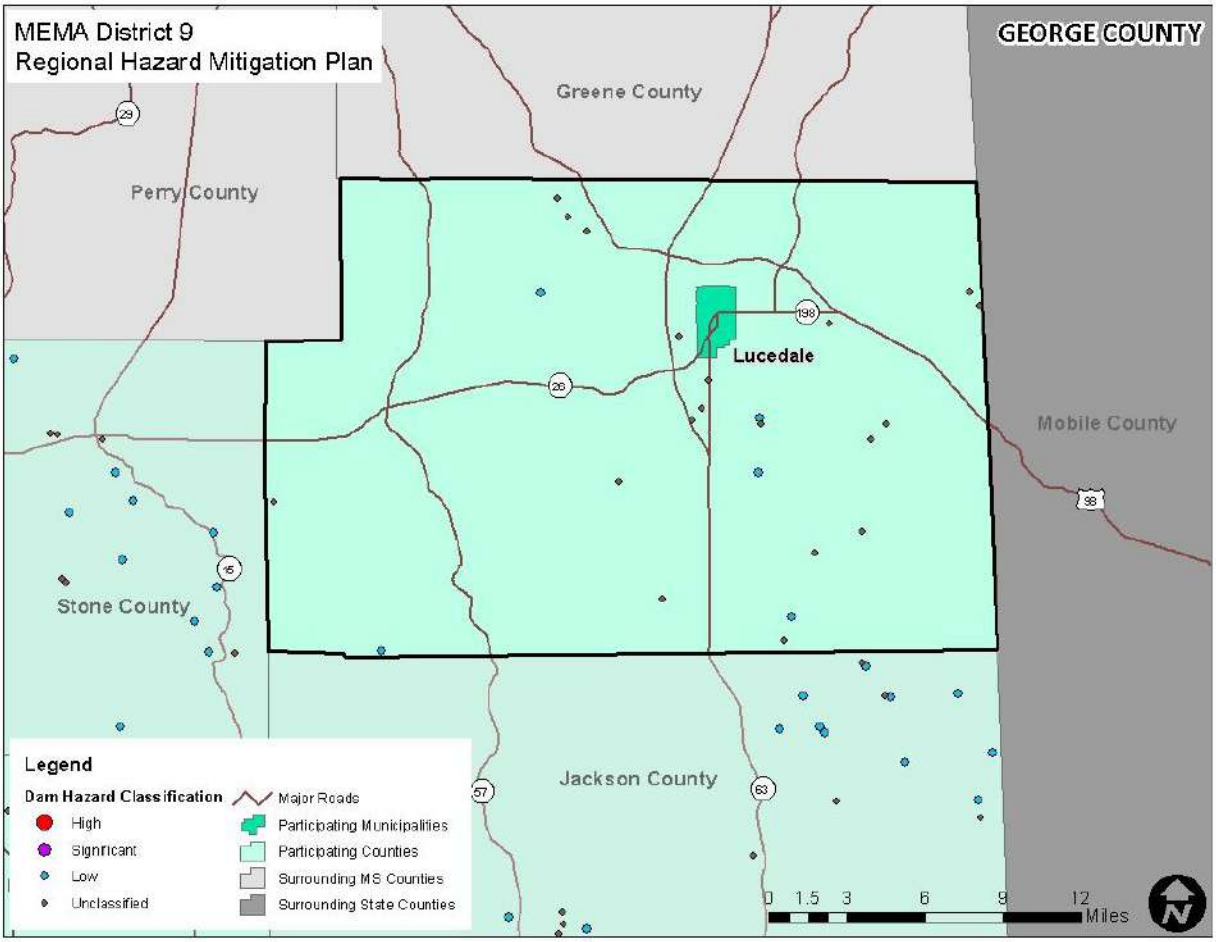
A.2.1 Dam and Levee Failure

LOCATION AND SPATIAL EXTENT

According to the Mississippi Department of Environmental Quality, there are no high hazard dams in George County (**Table A.4**).[1] **Figure A.2** and **Figure A.3** show the location of high hazard dams as well as mapped dam inundation areas located nearby.

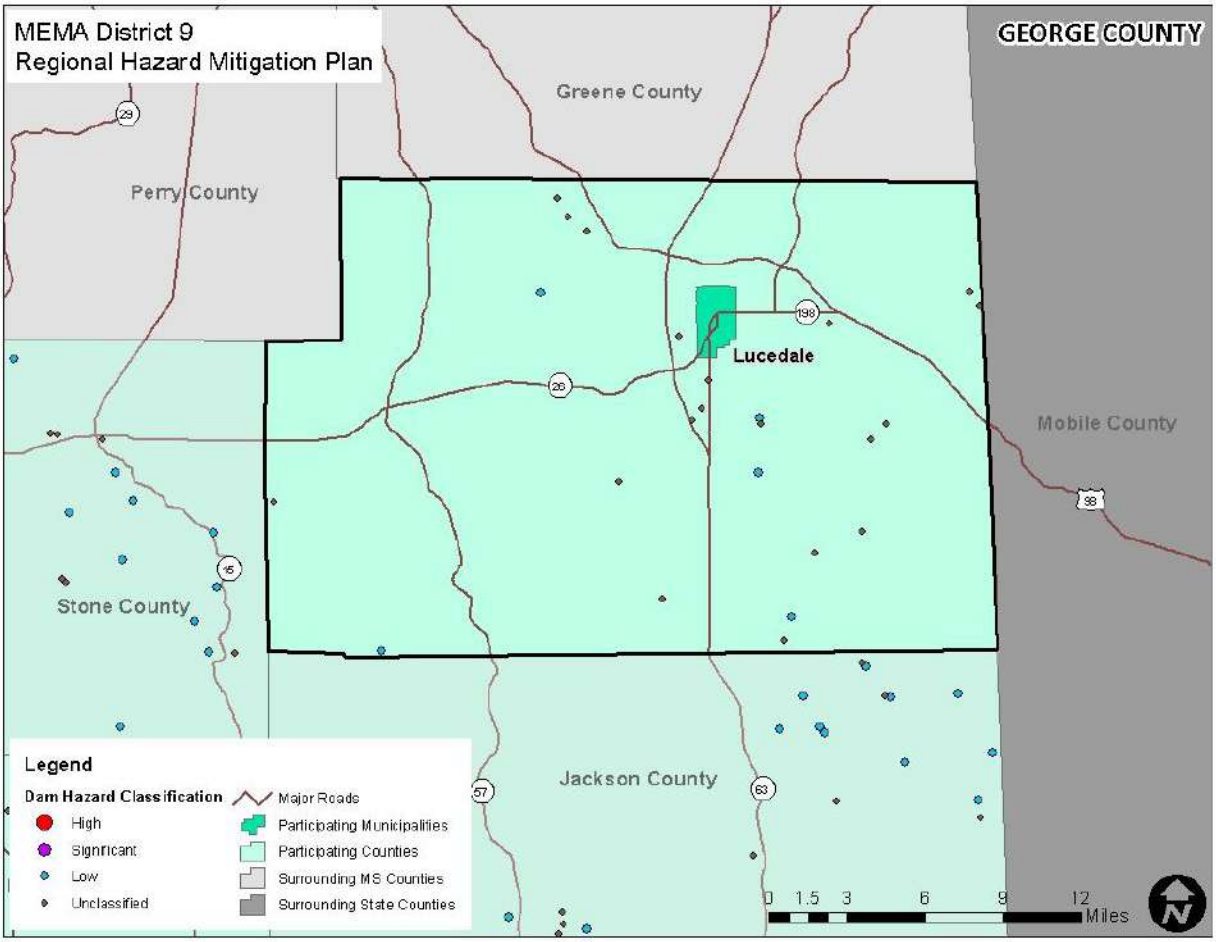
[1] The list of high hazard dams obtained from the Mississippi Department of Environmental Quality was reviewed and amended by local officials to the best of their knowledge.

FIGURE A.2: GEORGE COUNTY HIGH HAZARD DAM LOCATIONS



Source: Mississippi Department of Environmental Quality

FIGURE A.3: GEORGE COUNTY DAM INUNDATION AREAS



Source: Mississippi Department of Environmental Quality

TABLE A.4: GEORGE COUNTY HIGH HAZARD DAMS

Dam Name	Hazard Potential
George County	
NONE	*N/A*

Source: Mississippi Department of Environmental Quality

HISTORICAL OCCURRENCES

According to the Mississippi State Hazard Mitigation Plan, there have been no dam failures reported in George County (**Table A.5**). However, several breach scenarios in the region could be catastrophic.

TABLE A.5: GEORGE COUNTY DAM FAILURES (1982-2012)

Date	County	Structure Name	Cause of Failure
None reported	George	--	--

Source: Mississippi State Hazard Mitigation Plan

PROBABILITY OF FUTURE OCCURRENCES

Given the current dam inventory and historic data, a dam breach is possible (between 1 and 10 percent annual probability) in the future. However, as has been demonstrated in the past, regular monitoring is necessary to prevent these events.

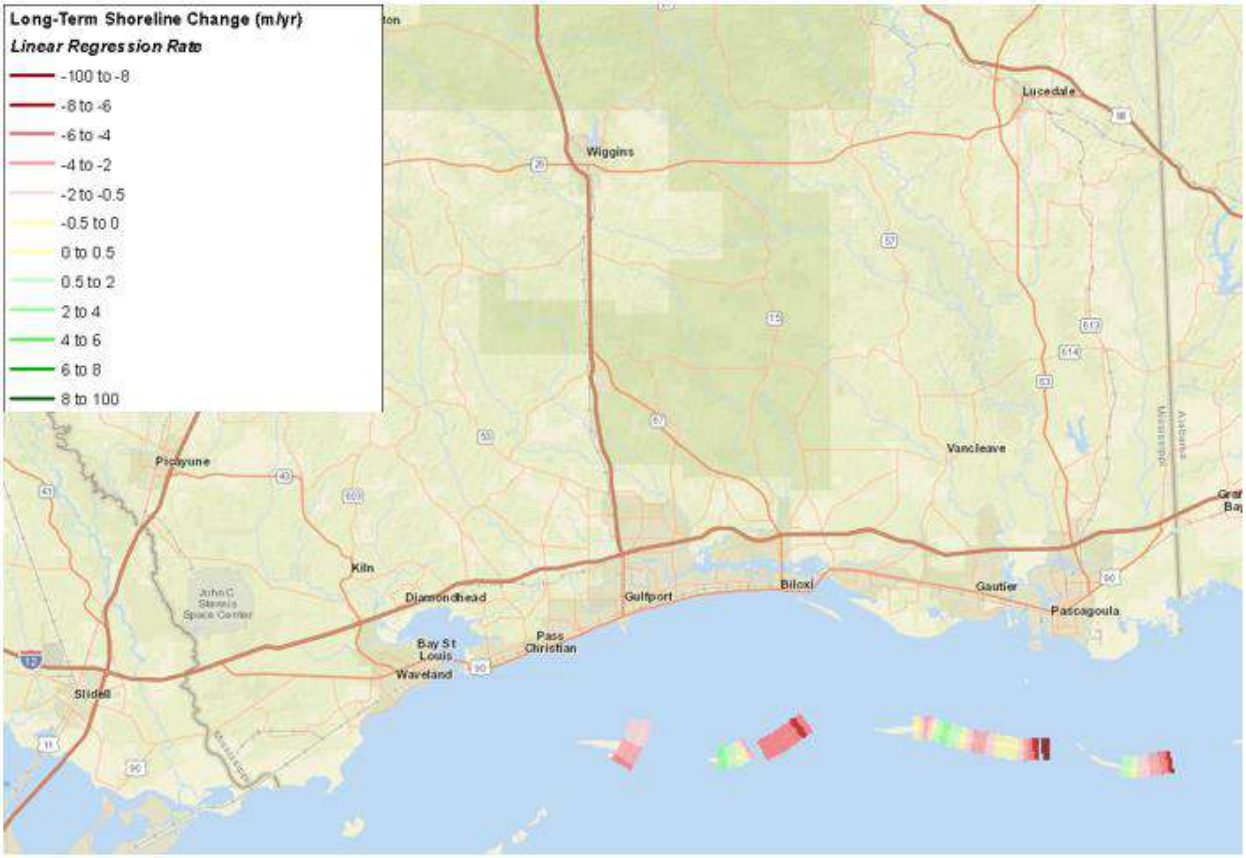
A.2.2 Erosion

LOCATION AND SPATIAL EXTENT

For the most part, major erosion in the MEMA District 9 Region is typically caused by coastal tides, ocean currents, and storm events. Although the region also experiences riverine erosion in many of its inland areas, including George County, these are of somewhat less concern than coastal erosion areas which historically have had larger impacts. Unlike inland areas, where the soil has greater organic matter content, coastal soils are mainly composed of fine grained particles such as sand. This makes coastal soils much more susceptible to erosion. Although some areas of the MEMA District 9 Region coast are protected and natural erosion processes are allowed to take place for the most part, many areas near where development has occurred are especially susceptible.

At this time, there is limited data available on localized areas of erosion. Most of the information collected by the United States Geological Survey (USGS) is focused on the barrier islands that are just off the coast of the mainland. The long-term shoreline change for the barrier islands as calculated by the USGS can be found in **Figure A.4** It should be noted that many areas of the coast are protected through the use of structural techniques. Also, a great deal of renourishment activities are carried out along the mainland coastal communities.

FIGURE A.4: LONG-TERM SHORELINE CHANGE (M/YR) IN THE MEMA DISTRICT 9 REGION



Source: United States Geological Survey

HISTORICAL OCCURRENCES

Several sources were vetted to identify areas of erosion in George County. This includes searching local newspapers, interviewing local officials, and reviewing previous hazard mitigation plans. Because dramatic, short-term erosion tends to take place after major storm events such as hurricanes, flooding, or storm surge, the erosion events often correspond directly with those events. Conversely, with long-term erosion, it is difficult to identify a specific historic occurrence because these events are by nature occurring at all times over a long period at a very gradual rate. Therefore, long-term historic erosion events cannot be confined to a specific timeframe or occurrence.

PROBABILITY OF FUTURE OCCURRENCES

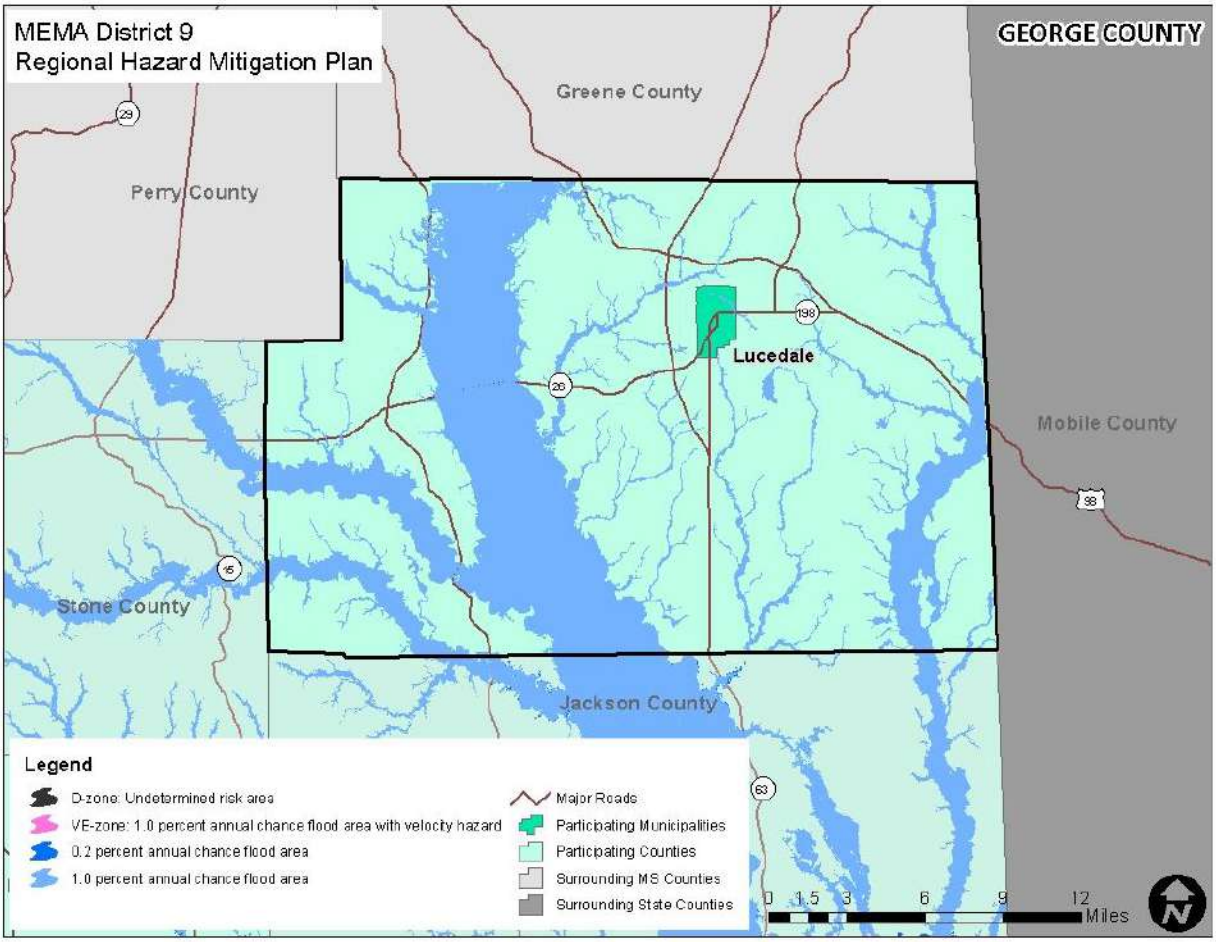
Erosion remains a natural, dynamic, and continuous process for George County, and it will continue to occur. The annual probability level assigned for erosion is likely (between 10 and 100 percent annually).

A.2.3 Flood

LOCATION AND SPATIAL EXTENT

There are areas in George County that are susceptible to flood events. Special flood hazard areas in the county were mapped using Geographic Information System (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM). This includes Zone A (1-percent annual chance floodplain), Zone AE (1-percent annual chance floodplain with elevations), Zone VE (1-percent annual chance floodplain with additional hazards due to storm-induced velocity wave action), Zone X500 (0.2-percent annual chance floodplain), and Zone D (undetermined risk area). **Figure A.5** illustrates the location and extent of currently mapped special flood hazard areas for the county based on best available FEMA Digital Flood Insurance Rate Map (DFIRM) data.

FIGURE A.5: SPECIAL FLOOD HAZARD AREAS IN GEORGE COUNTY



Source: Federal Emergency Management Agency

HISTORICAL OCCURRENCES

Floods were at least partially responsible for five disaster declarations in George County in 1974, 1980, 1990, 1991, and 2016.[2] Information from the National Climatic Data Center was used to ascertain additional historical flood events. The National Climatic Data Center reported a total of 25 events in George County since 1998.[3] These events accounted for almost $49,000 (2016 dollars) in property damage in the county.[4] A summary of these events is presented in **Table A.6**. Specific information on flood events, including date, type of flooding, and deaths and injuries, can be found in **Table A.7**.

TABLE A.6: SUMMARY OF FLOOD OCCURRENCES IN GEORGE COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Lucedale	6	0/0	$5,000	$625
Unincorporated Area	19	0/0	$43,618	$2,423
GEORGE COUNTY TOTAL	**25**	**0/0**	**$48,618**	**$3,048**

Source: National Climatic Data Center

TABLE A.7: HISTORICAL FLOOD EVENTS IN GEORGE COUNTY

Location	Date	Type	Deaths/Injuries	Property Damage*
Lucedale				
LUCEDALE	1/31/2008	Flash Flood	0/0	$0
LUCEDALE	3/28/2009	Flash Flood	0/0	$0
LUCEDALE	2/4/2010	Flash Flood	0/0	$0
LUCEDALE	5/1/2013	Flash Flood	0/0	$0
LUCEDALE	5/1/2013	Flash Flood	0/0	$0
LUCEDALE	3/11/2016	Flash Flood	0/0	$5,000
Unincorporated Area				
COUNTYWIDE	9/28/1998	Flash Flood	0/0	$0
COUNTYWIDE	3/3/2001	Flash Flood	0/0	$20,400
CENTRAL PORTION	10/27/2002	Flash Flood	0/0	$0
COUNTYWIDE	10/28/2002	Flash Flood	0/0	$0
COUNTYWIDE	10/28/2002	Flash Flood	0/0	$0
COUNTYWIDE	12/31/2002	Flash Flood	0/0	$0
COUNTYWIDE	6/30/2003	Flash Flood	0/0	$0
SOUTHWEST PORTION	5/12/2004	Flash Flood	0/0	$0
SOUTH PORTION	4/1/2005	Flash Flood	0/0	$0
COUNTYWIDE	7/6/2005	Flash Flood	0/0	$0
COUNTYWIDE	8/29/2005	Flash Flood	0/0	$0
BENNDALE	10/22/2007	Flash Flood	0/0	$0
MERRILL	4/5/2008	Flash Flood	0/0	$0

[2] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.
[3] These flood events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional occurrences have occurred and have gone unreported. As additional local data becomes available, this hazard profile will be amended.
[4] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Type	Deaths/Injuries	Property Damage*
LATONIA	9/1/2008	Flash Flood	0/0	$2,237
AGRICOLA	8/10/2010	Flash Flood	0/0	$0
BENNDALE	3/9/2011	Flash Flood	0/0	$0
BASIN	8/29/2012	Flood	0/0	$0
AGRICOLA	8/29/2012	Flash Flood	0/0	$10,490
LATONIA	8/29/2012	Flash Flood	0/0	$10,490

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

HISTORICAL SUMMARY OF INSURED FLOOD LOSSES

According to FEMA flood insurance policy records as of October 2016, there have been 43 flood losses reported in George County through the National Flood Insurance Program (NFIP) since 1978, totaling almost $397,000 in claims payments. A summary of these figures for the county is provided in **Table A.8**. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP policies, and for losses in which claims were sought and received. It is likely that many additional instances of flood loss in George County were either uninsured, denied claims payment, or not reported.

TABLE A.8: SUMMARY OF INSURED FLOOD LOSSES IN GEORGE COUNTY

Location	Number of Policies	Flood Losses	Claims Payments
Lucedale	10	1	$385,792
Unincorporated Area	112	42	$11,000
GEORGE COUNTY TOTAL	**122**	**43**	**$396,792**

Source: National Flood Insurance Program

REPETITIVE LOSS PROPERTIES

According to the Mississippi Emergency Management Agency, there are three non-mitigated repetitive loss properties located in George County, which accounted for seven losses and almost $133,000 in claims payments under the NFIP. The average claim amount for these properties is $18,940. All three properties are single family. Without mitigation, these properties will likely continue to experience flood losses. **Table A.9** presents detailed information on repetitive loss properties and NFIP claims and policies for George County.

TABLE A.9: REPETITIVE LOSS PROPERTIES IN GEORGE COUNTY

Location	Number of Properties	Types of Properties	Number of Losses	Building Payments	Content Payments	Total Payments	Average Payment
Lucedale	0	--	0	$0	$0	$0	$0
Unincorporated Area	3	3 single family	7	$101,381	$31,200	$132,581	$18,940
GEORGE COUNTY TOTAL	**3**		**7**	**$101,381**	**$31,200**	**$132,581**	**$18,940**

Source: Federal Emergency Management Agency, National Flood Insurance Program

PROBABILITY OF FUTURE OCCURRENCES

Flood events will remain a threat in George County, and the probability of future occurrences will remain highly likely (100 percent annual probability). The probability of future flood events based on magnitude and according to best available data is illustrated in the figure above**,** which indicates those areas susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain). Further, as described in other hazard profiles, it is highly likely that George County will continue to experience inland flooding associated with large tropical storms and hurricanes.

It can be inferred from the floodplain location maps, previous occurrences, and repetitive loss properties that risk varies throughout the county. For example, the western half of the county has more floodplain and thus a higher risk of flood than the rest of the county. Flood is not the greatest hazard of concern but will continue to occur and cause damage. Therefore, mitigation actions may be warranted, particularly for repetitive loss properties.

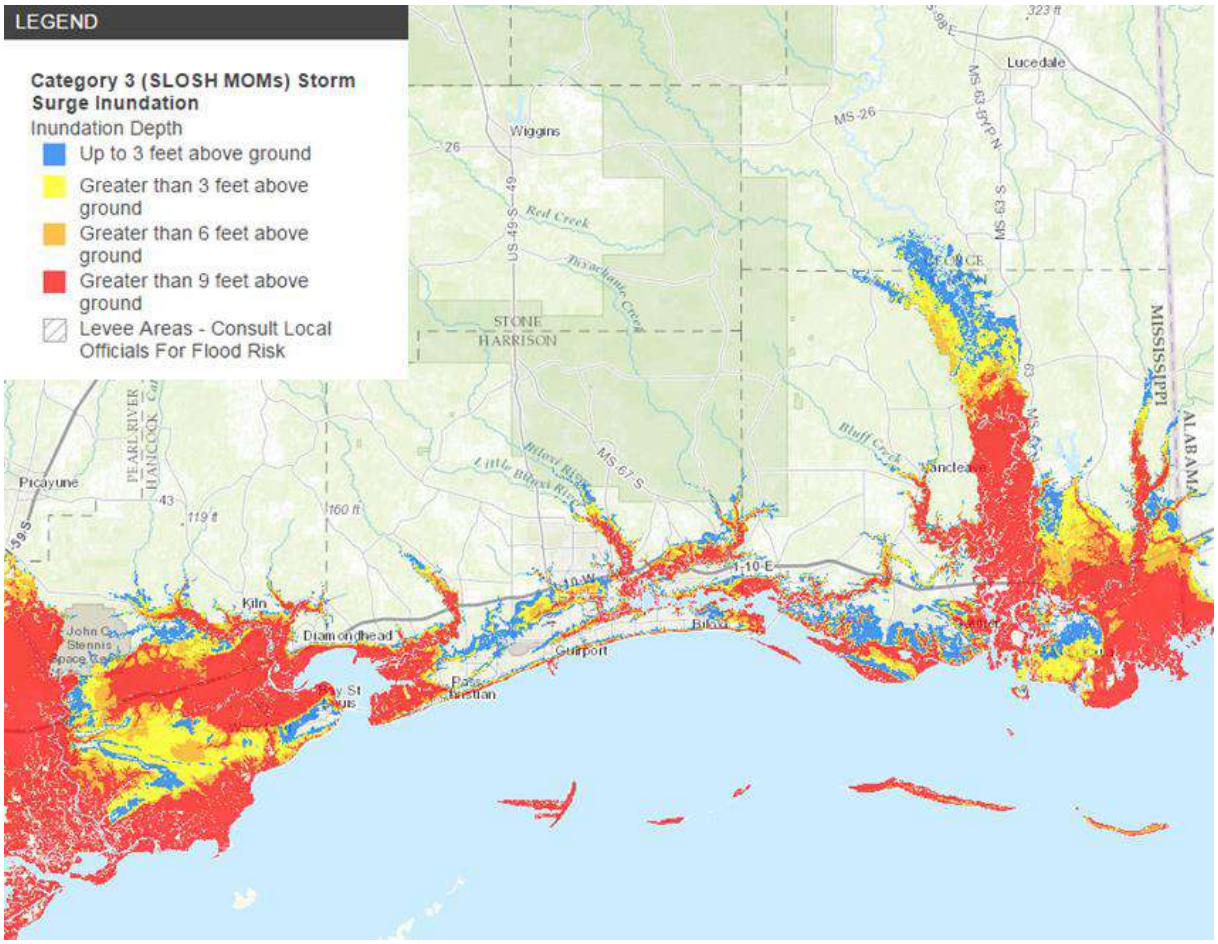
It should also be noted that anticipated sea level rise will increase the probability and intensity of future tidal flooding events in years to come. Rising sea level over time will shorten the return period (increasing the frequency) of significant flood events. This hazard is discussed elsewhere in this section.

A.2.4 Storm Surge

LOCATION AND SPATIAL EXTENT

There are is a small area in George County that is subject to potential storm surge inundation as modeled and mapped by the National Oceanic and Atmospheric Administration (NOAA). **Figure A.6** illustrates hurricane storm surge inundation zones based on a Category 3 storm. The illustration is derived from geo-referenced SLOSH (Sea, Lake, and Overland Surge from Hurricanes) data produced by the USACE in coordination with NOAA. SLOSH is a modeling tool used to estimate storm surge for coastal areas resulting from historical, hypothetical, or predicted hurricanes taking into account maximum expected levels for pressure, size, forward speed, track, and winds. Therefore, the SLOSH data is best used for defining the potential maximum surge associated with various storm intensities for any particular location. As shown in the figure, a small area in southern George County is at risk to storm surge inundation. Inland areas may also experience substantial flooding during a storm event.

FIGURE A.6: STORM SURGE RISK AREAS IN THE MEMA DISTRICT 9 REGION



Source: NOAA

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, no storm surge events have been reported for George County since 1996.[5] [6] A summary of these events is presented in **Table A.10**. Detailed information on the recorded storm surge events can be found in **Table A.11**.

TABLE A.10: SUMMARY OF STORM SURGE EVENTS IN GEORGE COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Lucedale	0	0/0	$0	$0
Unincorporated Area	0	0/0	$0	$0
GEORGE COUNTY TOTAL	**0**	**0/0**	**$0**	**$0**

Source: National Climatic Data Center

[5] These storm surge events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016.

[6] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE A.11: HISTORICAL STORM SURGE EVENTS IN GEORGE COUNTY

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
Lucedale				
None reported	--	--	--	--
Unincorporated Area				
None reported	--	--	--	--

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

It is possible (between 1 and 10 percent annual probability) that George County will experience storm surge associated with large tropical storms, hurricanes, and squalls combined with high tides. As noted in the preceding section (under Flood), anticipated sea level rise will increase the probability and intensity of future storm surge events in years to come.[7] This rise in sea level will not only increase the probability and intensity of tidal flooding events, but will also contribute to the loss of coastal wetlands and erosion of sand beaches that act as protective buffers against storm surge events.

FIRE-RELATED HAZARDS

A.2.5 Drought

Drought typically covers a large area and cannot be confined to any geographic or political boundaries. Furthermore, it is assumed that George County would be uniformly exposed to drought, making the spatial extent potentially widespread. It is also notable that drought conditions typically do not cause significant damage to the built environment but may exacerbate wildfire conditions.

HISTORICAL OCCURRENCES

According to the U.S. Drought Monitor, George County had drought levels of Severe or worse in 8 of the last 17 years (January 2000-October 2016). **Table A.12** shows the most severe drought classification for each year, according to U.S. Drought Monitor classifications. It should be noted that the U.S. Drought Monitor also estimates what percentage of the county is in each classification of drought severity. For example, the most severe classification reported may be exceptional but a majority of the county may actually be in a less severe condition.

TABLE A.12: HISTORICAL DROUGHT OCCURRENCES IN GEORGE COUNTY

Abnormally Dry (D0) **Moderate Drought (D1)** **Severe Drought (D2)** **Extreme Drought (D3)** **Exceptional Drought (D4)**

	George County
2000	**EXCEPTIONAL**
2001	**MODERATE**
2002	**SEVERE**

[7] The Sea Level Rise hazard is assessed more extensively under Section A.2.16.

	George County
2003	ABNORMAL
2004	MODERATE
2005	ABNORMAL
2006	EXTREME
2007	SEVERE
2008	ABNORMAL
2009	MODERATE
2010	EXTREME
2011	EXCEPTIONAL
2012	SEVERE
2013	MODERATE
2014	SEVERE
2015	MODERATE
2016	MODERATE

Source: United States Drought Monitor

No anecdotal information was available from the National Climatic Data Center on droughts in George County.

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that George County has a probability level of likely (between 10 and 100 percent annual probability) for future drought events. However, the extent (or magnitude) of drought and the amount of geographic area covered by drought, varies with each year. Historic information indicates that there is a much lower probability for extreme, long-lasting drought conditions.

A.2.6 Lightning

LOCATION AND SPATIAL EXTENT

Lightning occurs randomly, therefore it is impossible to predict where and with what frequency it will strike. It is assumed that all of George County is uniformly exposed to lightning.

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, there have been five recorded lightning events in George County since 1996.[8] These events resulted in almost $201,000 (2016 dollars) in damages.[9] Furthermore, lightning has caused one fatality in the county. A summary of these events is presented in **Table A.13**. Detailed information on historical lightning events can be found in **Table A.14**.

[8] These lightning events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is certain that additional lightning events have occurred in George County. As additional local data becomes available, this hazard profile will be amended.

[9] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

It is certain that more than five events have impacted the county. Many of the reported events are those that caused damage, and it should be expected that damages are likely much higher for this hazard than what is reported.

TABLE A.13: SUMMARY OF LIGHTNING OCCURRENCES IN GEORGE COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Lucedale	3	0/0	$186,563	$9,328
Unincorporated Area	2	1/0	$14,197	$747
GEORGE COUNTY TOTAL	**5**	**1/0**	**$200,760**	**$10,075**

Source: National Climatic Data Center

TABLE A.14: HISTORICAL LIGHTNING OCCURRENCES IN GEORGE COUNTY

Location	Date	Deaths/ Injuries	Property Damage*	Details
Lucedale				
LUCEDALE	7/3/1996	0/0	$76,754	Lightning struck the Crossroads United Methodist Church. The church was the oldest in George county. The lightning strike caused a fire to start and the church burned. The church is located on State Hwy 26 about 10 miles west of Lucedale.
LUCEDALE	6/5/1998	0/0	$103,434	Lightning struck an apartment building and the residence burned to the ground. No one was injured.
LUCEDALE	6/21/2004	0/0	$6,375	Lightning struck a home near Lucedale. The strike caused a fire in the home which was quickly extinguished.
Unincorporated Area				
AGRICOLA	7/28/1997	0/0	$7,503	Lightning struck a pecan tree during the afternoon and killed nine cattle huddled beneath it. Eight of the nine cows were due to give birth in a month and one had a two week old calf. The calf was not injured by the lightning strike.
BEXLEY	8/19/2002	1/0	$6,694	A 31 year old female was struck and killed by lightning near Bexley. The woman was going to her automobile to roll up the windows during a thunderstorm. She had just rolled the windows up and was returning to her home when lightning struck a nearby tree. The strike ran through the root system of the tree and into puddles of water that she was standing barefoot in and killed her. She was taken to a local hospital where she was DOA. Around the same time and near the same place, lightning struck and killed a cow. A home also was struck with several electrical appliances damaged.

*Property damage is reported in 2016 dollars; All damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

Although there was not a high number of historical lightning events reported in George County via NCDC data, it is a regular occurrence accompanied by thunderstorms. In fact, lightning events will assuredly happen on an annual basis, though not all events will cause damage. According to Vaisala's U.S. National Lightning Detection Network (NLDN), George County is located in an area of the country that experienced an average of 4 to 12 lightning flashes per square kilometer per year between 2005 and 2014. Therefore, the probability of future events is highly likely (100 percent annual probability). It can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the county.

A.2.7 Wildfire

LOCATION AND SPATIAL EXTENT

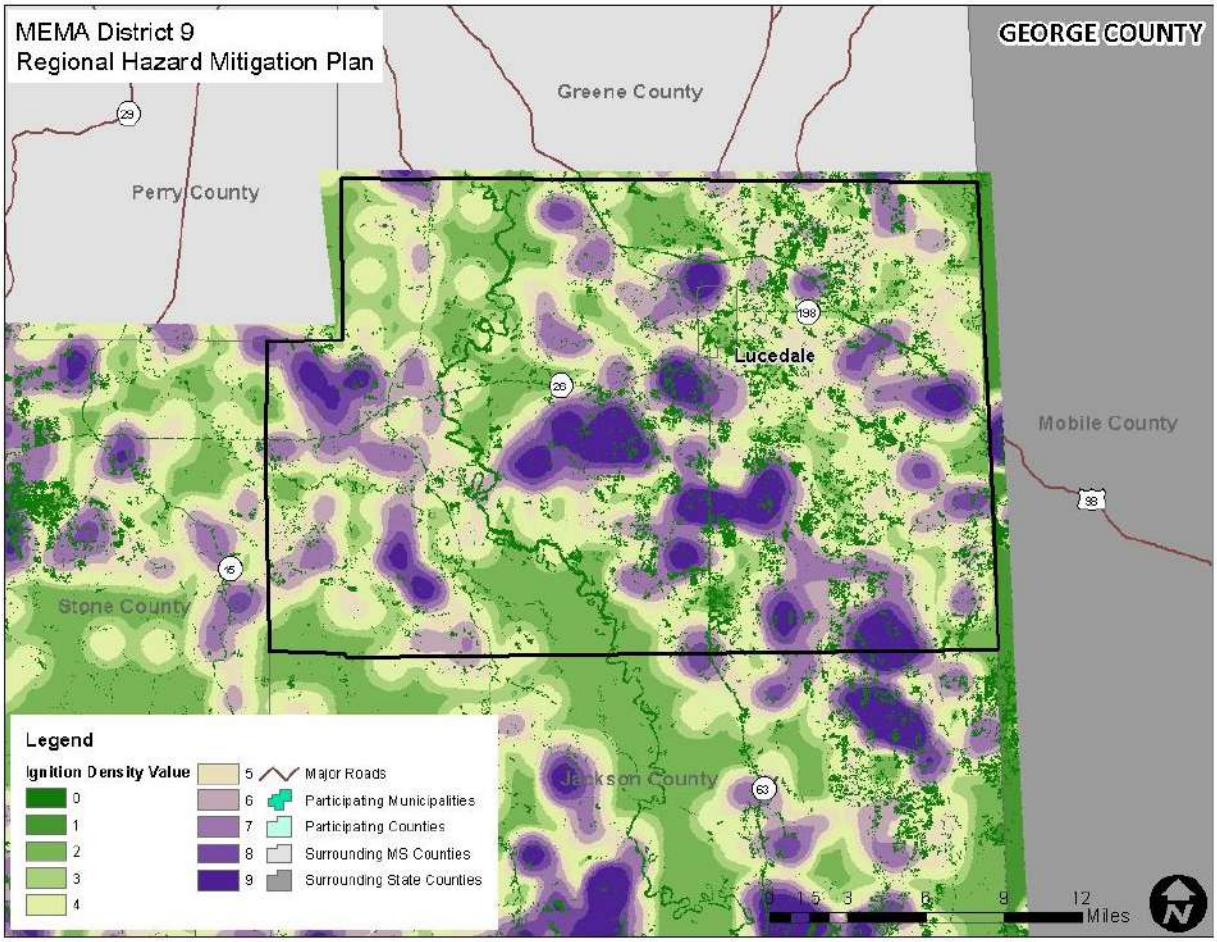
The entire county is at risk to a wildfire occurrence. However, several factors such as drought conditions or high levels of fuel on the forest floor, may make a wildfire more likely. Furthermore, areas in the urban-wildland interface are particularly susceptible to fire hazard as populations abut formerly undeveloped areas. The Wildfire Ignition Density data shown in the figure below give an indication of historic location.

HISTORICAL OCCURRENCES

Figure A.7 shows the Wildfire Ignition Density in George County based on data from the Southern Wildfire Risk Assessment. This data is based on historical fire ignitions and the likelihood of a wildfire igniting in an area. Occurrence is derived by modeling historic wildfire ignition locations to create an average ignition rate map. This is measured in the number of fires per year per 1,000 acres.[10]

[10] Southern Wildfire Risk Assessment, 2014.

FIGURE A.7: WILDFIRE IGNITION DENSITY IN GEORGE COUNTY



Source: Southern Wildfire Risk Assessment

Based on data from the Mississippi Forestry Commission from 2007 to 2016, George County experiences an average of 47 wildfires annually which burn a combined 429 acres, on average per year. The data indicates that most of these fires are small, averaging nine acres per fire. **Table A.15** provides a summary of wildfire occurrences in George County and **Table A.16** lists the number of reported wildfire occurrences in the county between the years 2007 and 2016.

TABLE A.15: SUMMARY TABLE OF ANNUAL WILDFIRE OCCURRENCES (2007 -2016)*

	George County
Average Number of Fires per year	46.7
Average Number of Acres Burned per year	428.5
Average Number of Acres Burned per fire	9.2

*These values reflect averages over a 10-year period.
Source: Mississippi Forestry Commission

TABLE A.16: HISTORICAL WILDFIRE OCCURRENCES IN GEORGE COUNTY

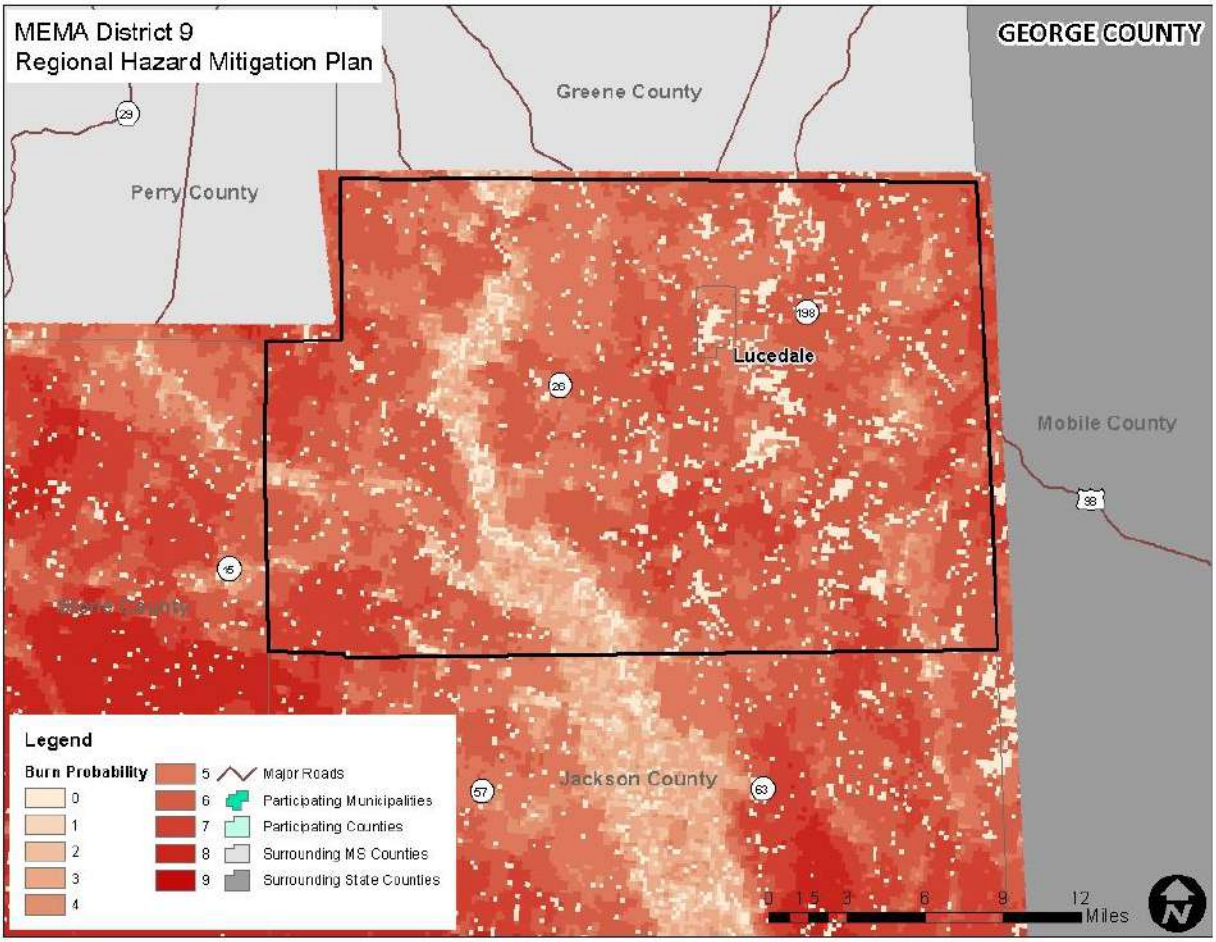
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
George County										
Number of Fires	79	39	60	40	78	35	36	33	43	24
Number of Acres Burned	789	264	777	266	718	218	439	313	325	176

Source: Mississippi Forestry Commission

PROBABILITY OF FUTURE OCCURRENCES

Wildfire events will be an ongoing occurrence in George County. **Figure A.8** shows that there is some probability a wildfire will occur throughout the county. However, the likelihood of wildfires increases during drought cycles and abnormally dry conditions. Fires are likely to stay small in size but could increase due to local climate and ground conditions. Dry, windy conditions with an accumulation of forest floor fuel (potentially due to ice storms or lack of fire) could create conditions for a large fire that spreads quickly. It should also be noted that some areas do vary somewhat in risk. For example, highly developed areas are less susceptible unless they are located near the urban-wildland boundary. The risk will also vary due to assets. Areas in the urban-wildland interface will have much more property at risk, resulting in increased vulnerability and need to mitigate compared to rural, mainly forested areas. The probability assigned to George County for future wildfire events is highly likely (100 percent annual probability).

FIGURE A.8: BURN PROBABILITY IN GEORGE COUNTY



Source: Southern Wildfire Risk Assessment

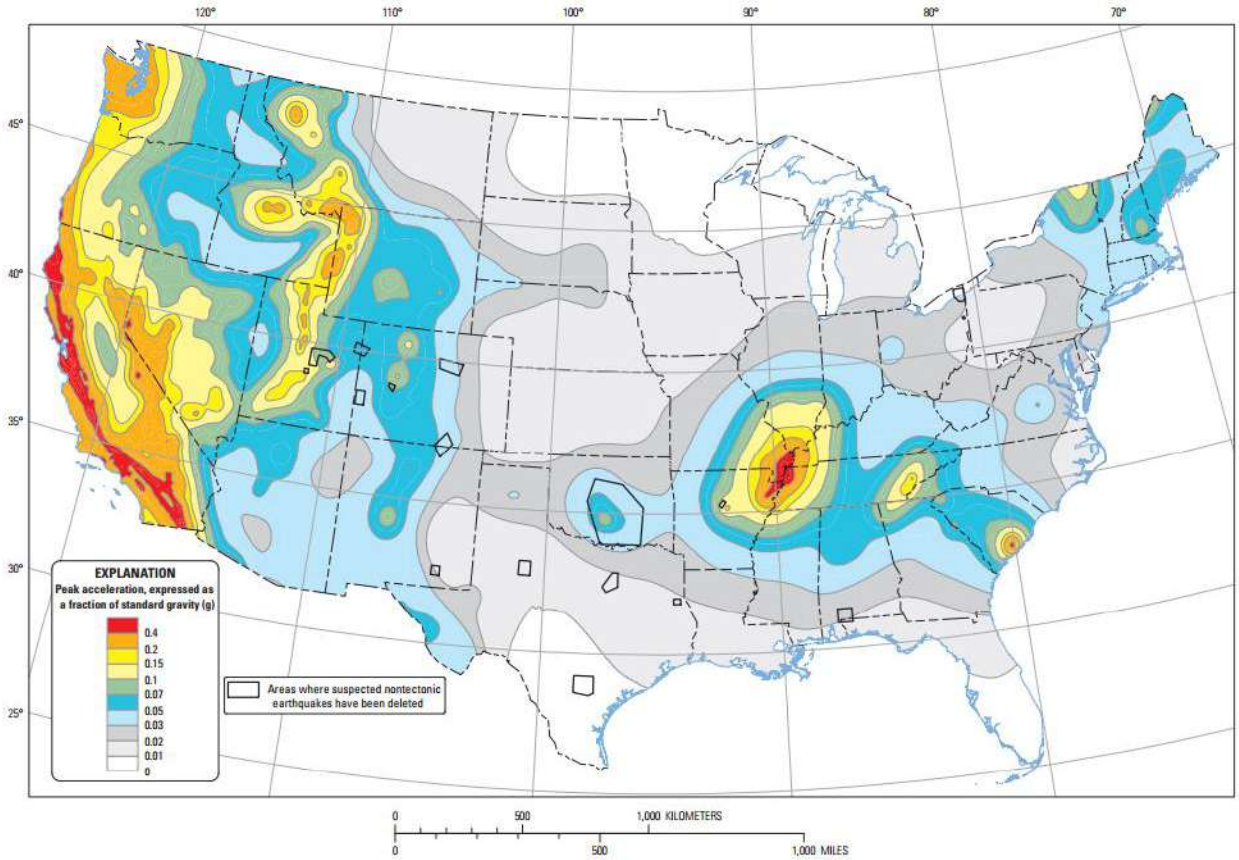
GEOLOGIC HAZARDS

A.2.8 Earthquake

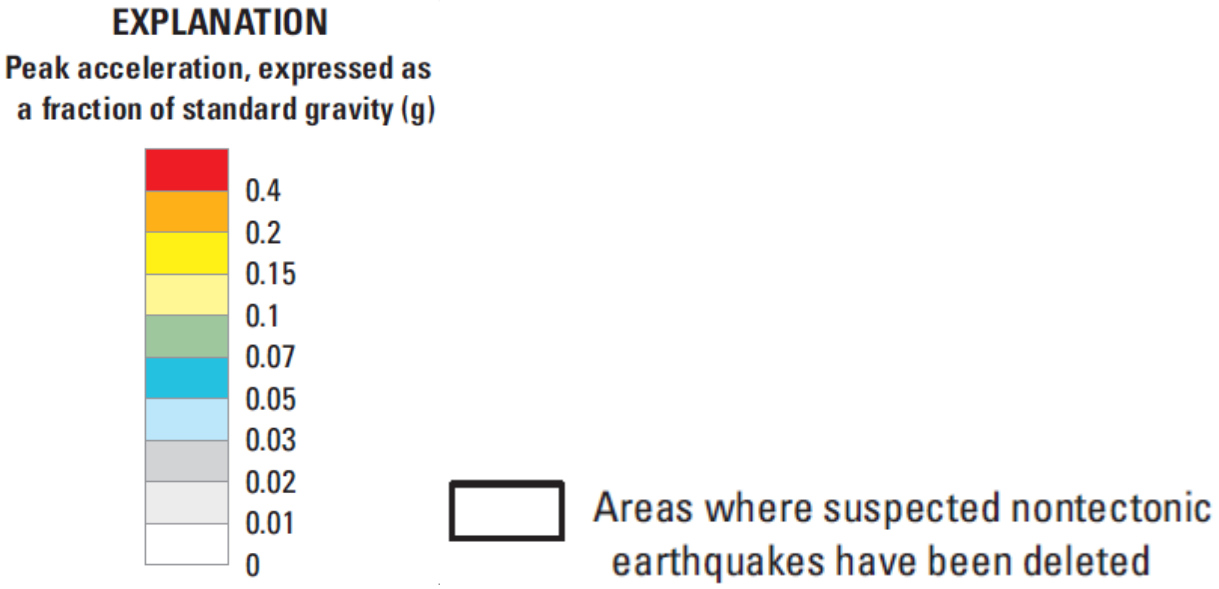
LOCATION AND SPATIAL EXTENT

Figure A.9 shows the intensity level associated with George County, based on the national USGS map of peak acceleration with 10 percent probability of exceedance in 50 years. It is the probability that ground motion will reach a certain level during an earthquake. The data show peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10 percent probability of exceedance in 50 years. The map was compiled by the U.S. Geological Survey (USGS) Geologic Hazards Team, which conducts global investigations of earthquake, geomagnetic, and landslide hazards. According to this map, George County lies within an approximate zone of level "1" to "3" ground acceleration. This indicates that the county exists within an area of low seismic risk.

FIGURE A.9: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS



Ten-percent probability of exceedance in 50 years map of peak ground acceleration



Source: United States Geological Survey, 2014

The primary source of potential damage to George County from an earthquake is the New Madrid Seismic Zone (NMSZ). Historically, a series of earthquakes in 1811 and 1812 demonstrated that this fault zone can produce high magnitude seismic events, sometimes on the scale of a 7.5-8.0 on the Richter scale. The biggest challenge with earthquakes that occur in this area of seismic activity is predicting the recurrence of earthquakes emanating from this zone. Although the magnitude of earthquakes from the NMSZ can be large, they occur very irregularly and fairly infrequently. This makes it extremely difficult to project when they will occur.

It should also be noted that the State of Mississippi Hazard Mitigation Plan identifies certain areas of concern for liquefaction and lists the counties and corresponding zones within those counties that have the highest liquefaction potential. George County does not have any identified liquefaction potential risk.

HISTORICAL OCCURRENCES

No earthquakes are known to have affected George County since 1638. **Table A.17** provides a summary of earthquake events reported by the National Centers for Environmental Information (formerly National Geophysical Data Center) between 1638 and 1985, and **Figure A.10** presents a map showing earthquakes whose epicenters have occurred near the county between 1985 and 2015 (no earthquakes occurred within the county boundaries during this period). A detailed occurrence of each event including the date, distance from the epicenter, magnitude, and Modified Mercalli Intensity (if known) can be found in **Table A.18**.[11]

TABLE A.17: SUMMARY OF SEISMIC ACTIVITY IN GEORGE COUNTY

Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
Lucedale	0	--	--
Unincorporated Area	0	--	--
GEORGE COUNTY TOTAL	**0**	**--**	**--**

Source: National Geophysical Data Center

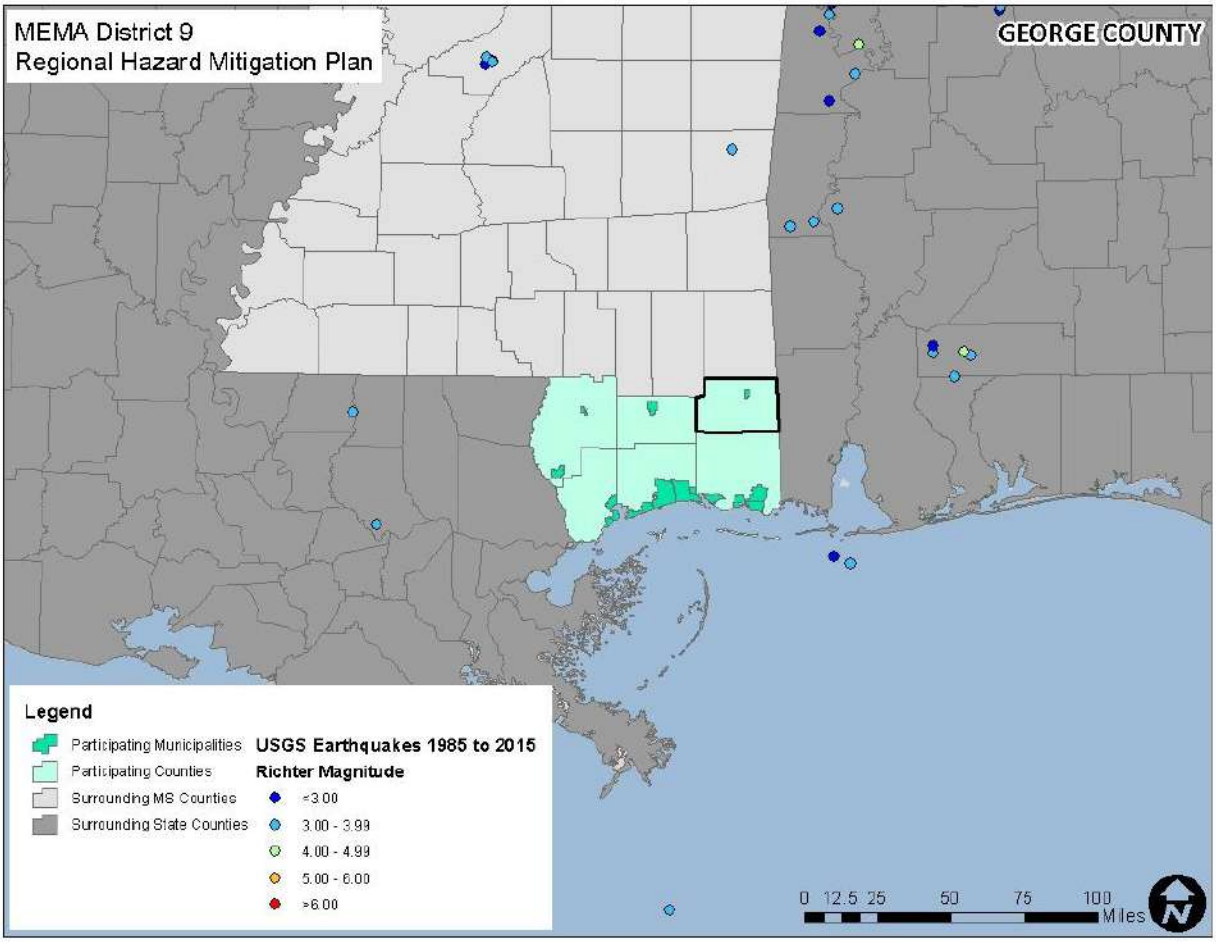
TABLE A.18: SIGNIFICANT SEISMIC EVENTS IN GEORGE COUNTY (1638 -1985)

Location	Date	Epicentral Distance	Magnitude	MMI
Lucedale				
None reported	--	--	--	--
Unincorporated Area				
None reported	--	--	--	--

Source: National Geophysical Data Center

[11] Due to reporting mechanisms, not all earthquakes events were recorded during this time. Furthermore, some are missing data, such as the epicenter location, due to a lack of widely used technology. In these instances, a value of "unknown" is reported.

FIGURE A.10: HISTORIC EARTHQUAKES WITH EPICENTERS NEAR GEORGE COUNTY (1985-2015)



Source: United States Geological Survey

PROBABILITY OF FUTURE OCCURRENCES

The probability of significant, damaging earthquake events affecting George County is unlikely. However, it is possible that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light will affect the county. The annual probability level for the county is estimated to be between 1 and 10 percent (possible).

WIND-RELATED HAZARDS

A.2.9 Extreme Cold

Extreme cold typically impacts a large area and cannot be confined to any geographic or political boundaries. The entire county is susceptible to extreme cold conditions.

HISTORICAL OCCURRENCES

Data from the National Climatic Data Center was used to determine historical extreme cold events in George County. No events specific to the county were reported, however, two events were reported elsewhere in the region. Similar events and impacts can be expected in George County.

February 2, 1996 – *Cold/Wind Chill* – An arctic airmass overspread much of south Mississippi bringing the longest extended period of cold weather since 1989. In Amite County, 4SW Gillsburg, a 67 year old man died from hypothermia on the 4th after the fire in a wood burning heater went out. Considerable property damage resulted from broken pipes due to the extended period of subfreezing temperatures. In Jackson County, Moss Point and Gautier had broken pipes in 100 and 147 houses, respectively.

December 18, 1996 – *Cold/Wind Chill* – An arctic airmass overspread south Mississippi resulting in three consecutive nights with subfreezing minimum temperatures. Temperatures lowered into the mid-teens over the southwest section of the state and near 20 degrees along the Gulf Coast.

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that all of George County has a probability level of possible (between 1 and 10 percent annual probability) for future extreme cold events to impact the county.

A.2.10 Extreme Heat

Heat waves typically impact a large area and cannot be confined to any geographic or political boundaries. The entire county is susceptible to extreme heat conditions.

HISTORICAL OCCURRENCES

The National Climatic Data Center was used to determine historical heat wave occurrences in the county.

July 2000 – July was a hot and dry month in Southeast Mississippi. In Beaumont the temperature was 100 degrees or higher eleven days during the month with the hottest being 105 degrees. In Richton the temperature was 100 degrees or higher three days during the month with the hottest being 102 degrees. In Waynesboro the temperature was 100 degrees or higher four days during the month with the hottest being 103 degrees. In Wiggins the temperature was 100 degrees or higher nine days during the month with 105 degrees being the hottest. In addition to being hot is was also a dry month across the area. Most stations ended up with below normal rainfall totals for the month. In Jackson County, a 68 year old man died from heat exhaustion while sitting in his pickup truck in a parking lot with the windows rolled up, and 10 days later, a 58 year old male was found dead from heat exhaustion while sitting in his truck in the driveway of his home with the windows rolled up.

August 2007 – Heat advisories were issued for a combination of high temperatures and high humidities. Heat index vales were between 110 and 115 degrees. Several public buildings and churches allowed people to come in and cool off during the heat of the day.

PROBABILITY OF FUTURE OCCURRENCES

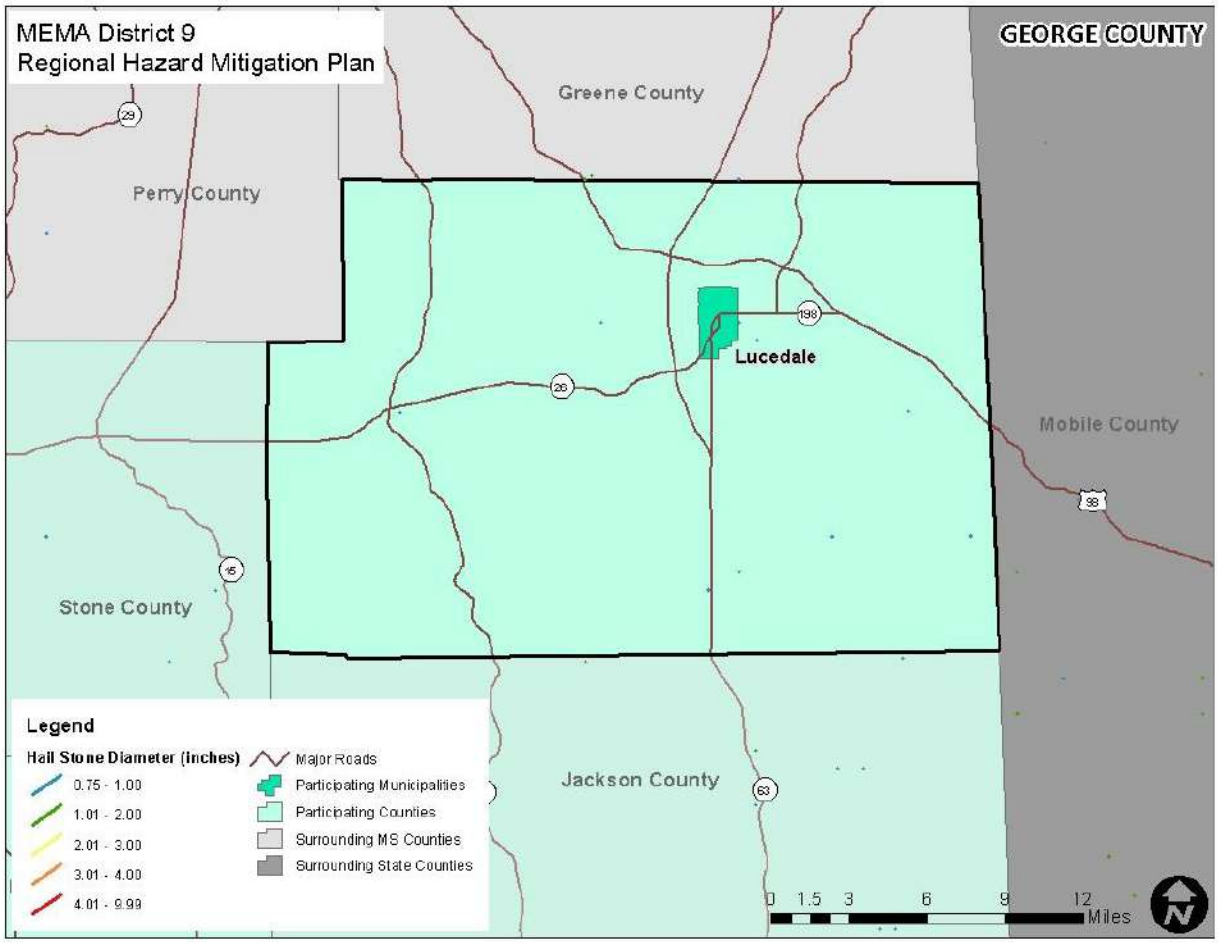
Based on historical occurrence information, it is assumed that all of George County has a probability level of highly likely (100 percent annual probability) for future heat wave events.

A.2.11 Hailstorm

LOCATION AND SPATIAL EXTENT

Hailstorms frequently accompany thunderstorms, so their locations and spatial extents coincide. It is assumed that George County is uniformly exposed to severe thunderstorms; therefore, all areas of the county are equally exposed to hail which may be produced by such storms. With that in mind, **Figure A.11** shows the location of hail events that have impacted the county between 1955 and 2015.

FIGURE A.11: HAILSTORM TRACKS IN GEORGE COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, 33 recorded hailstorm events have affected George County since 1959.[12] In all, hail occurrences resulted in approximately $800 (2016 dollars) in property damages.[13] Hail ranged in diameter from 0.5 inches to 2.0 inches. **Table A.19** provides a summary of the hail events in George County. Detailed information about each event that occurred in the county is provided in **Table A.20**.

It should be noted that hail is notorious for causing substantial damage to cars, roofs, and other areas of the built environment that may not be reported to the National Climatic Data Center. Therefore, it is likely that damages are greater than the reported value.

TABLE A.19: SUMMARY OF HAIL OCCURRENCES IN GEORGE COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Lucedale	17	0/0	$790	$36
Unincorporated Area	16	0/0	$0	$0
GEORGE COUNTY TOTAL	**33**	**0/0**	**$790**	**$36**

Source: National Climatic Data Center

TABLE A.20: HISTORICAL HAIL OCCURRENCES IN GEORGE COUNTY

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
Lucedale				
Lucedale	3/25/1994	0.88 in.	0/0	$0
Lucedale	3/15/1995	0.50 in.	0/0	$0
Lucedale	5/12/1995	0.75 in.	0/0	$790
LUCEDALE	2/19/1996	0.75 in.	0/0	$0
LUCEDALE	4/22/1997	0.75 in.	0/0	$0
LUCEDALE	3/7/1998	0.75 in.	0/0	$0
LUCEDALE	6/8/1999	0.75 in.	0/0	$0
LUCEDALE	7/30/1999	1.00 in.	0/0	$0
LUCEDALE	3/11/2000	1.75 in.	0/0	$0
LUCEDALE	8/30/2000	0.75 in.	0/0	$0
LUCEDALE	3/9/2003	0.75 in.	0/0	$0
LUCEDALE	5/3/2003	1.00 in.	0/0	$0
LUCEDALE	3/29/2008	1.75 in.	0/0	$0
LUCEDALE	4/24/2010	0.75 in.	0/0	$0
LUCEDALE	4/24/2010	1.00 in.	0/0	$0
LUCEDALE	6/3/2011	1.00 in.	0/0	$0
LUCEDALE	3/17/2016	1.00 in.	0/0	$0

[12] These hail events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through June 2016. It is likely that additional hail events have affected George County. As additional local data becomes available, this hazard profile will be amended.

[13] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
Unincorporated Area				
GEORGE CO.	4/29/1959	1.00 in.	0/0	$0
GEORGE CO.	5/5/1960	1.75 in.	0/0	$0
GEORGE CO.	3/11/1968	2.00 in.	0/0	$0
GEORGE CO.	4/18/1988	0.75 in.	0/0	$0
Agricola	3/28/1995	0.88 in.	0/0	$0
BARTON	3/30/1996	0.75 in.	0/0	$0
AGRICOLA	1/8/1997	0.75 in.	0/0	$0
BENNDALE	7/30/1999	0.75 in.	0/0	$0
AGRICOLA	4/24/2000	0.75 in.	0/0	$0
BENNDALE	1/19/2001	0.75 in.	0/0	$0
BENNDALE	3/31/2002	0.75 in.	0/0	$0
AGRICOLA	7/7/2002	1.00 in.	0/0	$0
SHIPMAN	4/25/2003	0.75 in.	0/0	$0
AGRICOLA	2/24/2004	0.75 in.	0/0	$0
AGRICOLA	4/29/2004	0.75 in.	0/0	$0
BEXLEY	3/17/2016	1.00 in.	0/0	$0

*Property damage is reported in 2016 dollars; All damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that the probability of future hail occurrences is highly likely (100 percent annual probability). Since hail is an atmospheric hazard, it is assumed that George County has equal exposure to this hazard. It can be expected that future hail events will continue to cause minor damage to property and vehicles throughout the county.

A.2.12 Hurricane and Tropical Storm

LOCATION AND SPATIAL EXTENT

Hurricanes and tropical storms threaten the entire Atlantic and Gulf seaboard of the United States, and while coastal areas are most directly exposed to the brunt of landfalling storms, their impact is often felt hundreds of miles inland. George County is located in a region of the country that is susceptible to all of the hazards wrought by hurricanes and tropical storms. All areas throughout George County are susceptible to the accompanying hazard effects of extreme wind, flooding, and tornadoes.[14]

HISTORICAL OCCURRENCES

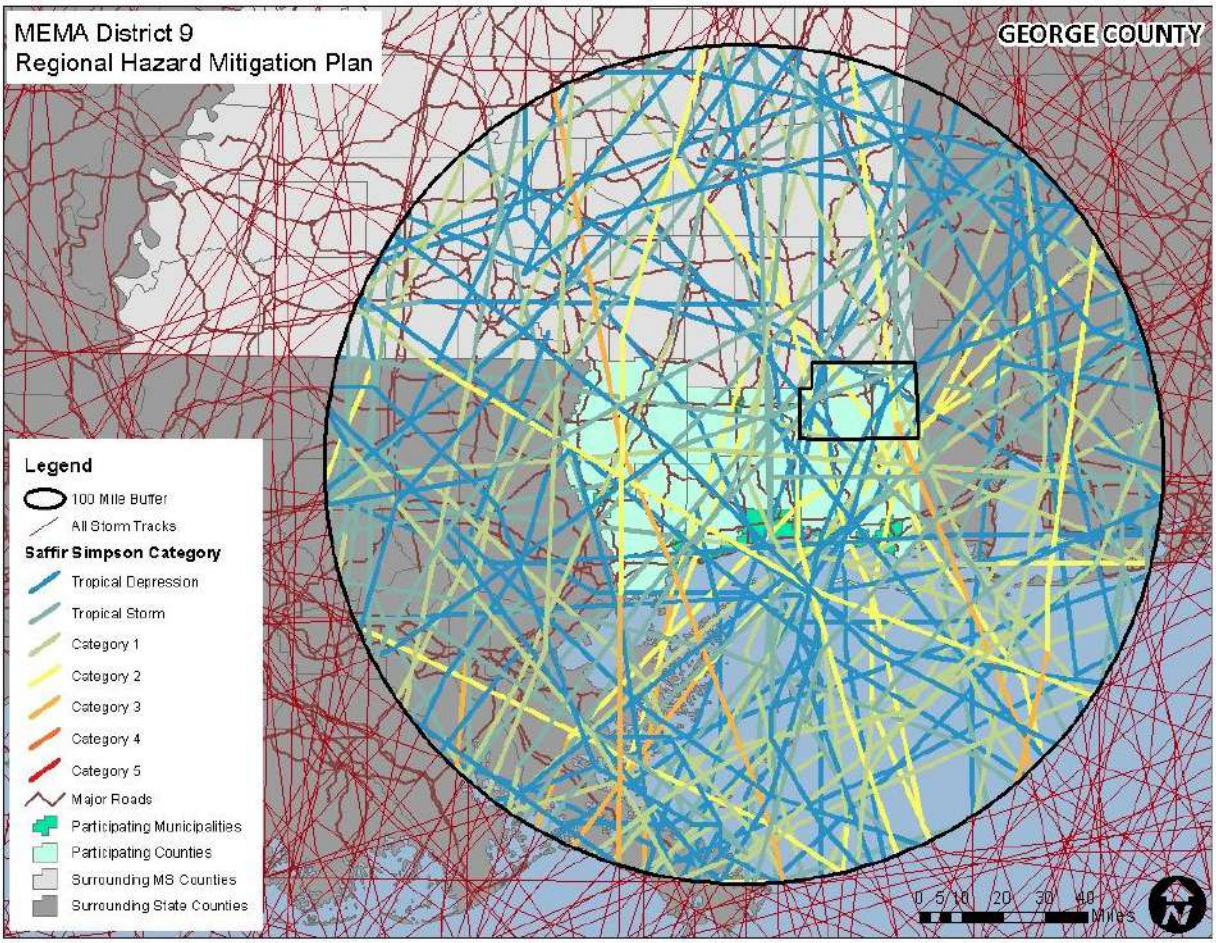
According to the National Hurricane Center's historical storm track records, 119 hurricane or tropical storm/depression tracks have passed within 100 miles of the MEMA District 9 Region since 1855.[15] This includes: 4 Category 3 hurricanes, 15 Category 2 hurricanes, 28 Category 1 hurricanes, 29 tropical storms,

[14] Distinct hazard area locations for flooding is discussed elsewhere in this subsection.
[15] These storm track statistics include tropical depressions, tropical storms, and hurricanes. Lesser events may still cause significant local impact in terms of rainfall and high winds.

and 43 tropical depressions. Additionally, four other major storms had large-scale impacts on the region and are not included in these totals. These storms are listed below and range in Category from 1 to 4.

Of the recorded storm events, 58 hurricane or tropical storm/depression events traversed directly through the region as shown in **Figure A.12**. Notable storms include Hurricane Camille (1969), Hurricane Frederic (1979), and Hurricane Katrina (2005). **Table A.21** provides for each event the date of occurrence, name (if applicable), maximum wind speed (as recorded within 100 miles of the MEMA District 9 Region) and category of the storm based on the Saffir-Simpson Scale.

FIGURE A.12: HISTORICAL HURRICANE STORM TRACKS WITHIN 100 MILES OF THE MEMA DISTRICT 9 REGION



Source: National Oceanic and Atmospheric Administration, National Hurricane Center

TABLE A.21: HISTORICAL STORM TRACKS WITHIN 100 MILES OF THE MEMA 9 DISTRICT REGION (1842–2016)

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
8/25/1852	UNNAMED	93	Category 2
8/3/1855	NOT NAMED	--	Tropical Depression
9/16/1855	UNNAMED	96	Category 2

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
6/24/1857	NOT NAMED	--	Tropical Depression
9/15/1859	UNNAMED	79	Category 1
8/11/1860	UNNAMED	96	Category 2
9/15/1860	UNNAMED	89	Category 2
8/17/1861	NOT NAMED	--	Tropical Depression
11/1/1861	NOT NAMED	--	Tropical Depression
9/15/1862	NOT NAMED	--	Tropical Depression
9/16/1862	NOT NAMED	--	Tropical Depression
10/1/1863	UNNAMED	43	Tropical Storm
6/3/1866	NOT NAMED	--	Tropical Depression
9/16/1867	NOT NAMED	--	Tropical Depression
10/5/1867	UNNAMED	89	Category 2
10/3/1868	NOT NAMED	--	Tropical Depression
9/5/1869	UNNAMED	79	Category 1
7/30/1870	NOT NAMED	--	Tropical Depression
7/11/1872	UNNAMED	59	Tropical Storm
9/18/1875	UNNAMED	18	Tropical Depression
9/18/1877	UNNAMED	79	Category 1
9/1/1879	UNNAMED	89	Category 2
10/7/1879	UNNAMED	59	Tropical Storm
8/31/1880	UNNAMED	70	Category 1
8/2/1881	NOT NAMED	--	Tropical Depression
8/3/1881	UNNAMED	59	Tropical Storm
8/30/1885	UNNAMED	59	Tropical Storm
9/26/1885	UNNAMED	70	Category 1
6/15/1886	UNNAMED	50	Tropical Storm
6/14/1887	UNNAMED	33	Tropical Depression
10/19/1887	UNNAMED	82	Category 1
6/27/1888	NOT NAMED	--	Tropical Depression
9/23/1889	UNNAMED	79	Category 1
8/27/1890	UNNAMED	43	Tropical Storm
9/21/1891	NOT NAMED	--	Tropical Depression
9/12/1892	UNNAMED	59	Tropical Storm
9/7/1893	UNNAMED	79	Category 1
10/2/1893	UNNAMED	97	Category 3
8/7/1894	UNNAMED	59	Tropical Storm
8/15/1895	UNNAMED	59	Tropical Storm
9/13/1900	UNNAMED	43	Tropical Storm
8/14/1901	UNNAMED	82	Category 1
10/9/1905	UNNAMED	43	Tropical Storm
9/27/1906	UNNAMED	93	Category 2
9/21/1907	UNNAMED	43	Tropical Storm
8/11/1911	UNNAMED	79	Category 1
6/13/1912	UNNAMED	59	Tropical Storm
7/17/1912	UNNAMED	5	Tropical Depression
9/13/1912	UNNAMED	82	Category 1

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
9/18/1914	UNNAMED	33	Tropical Depression
9/29/1915	UNNAMED	96	Category 2
7/5/1916	UNNAMED	95	Category 2
10/17/1922	UNNAMED	18	Tropical Depression
6/26/1923	UNNAMED	43	Tropical Storm
10/17/1923	UNNAMED	59	Tropical Storm
9/20/1926	UNNAMED	93	Category 2
9/1/1932	UNNAMED	82	Category 1
10/15/1932	UNNAMED	59	Tropical Storm
7/27/1936	UNNAMED	43	Tropical Storm
8/22/1936	UNNAMED	5	Tropical Depression
6/16/1939	UNNAMED	59	Tropical Storm
9/26/1939	UNNAMED	50	Tropical Storm
9/24/1940	UNNAMED	18	Tropical Depression
9/10/1944	UNNAMED	64	Category 1
9/5/1945	UNNAMED	18	Tropical Depression
9/19/1947	UNNAMED	92	Category 2
9/4/1948	UNNAMED	79	Category 1
9/4/1949	UNNAMED	43	Tropical Storm
8/31/1950	BAKER	82	Category 1
8/1/1955	BRENDA	70	Category 1
8/27/1955	UNNAMED	50	Tropical Storm
9/24/1956	FLOSSY	82	Category 1
9/18/1957	ESTHER	64	Category 1
10/8/1959	IRENE	43	Tropical Storm
9/15/1960	ETHEL	85	Category 2
9/26/1960	FLORENCE	1	Tropical Depression
10/4/1964	HILDA	70	Category 1
9/10/1965	BETSY*	117	Category 4
9/29/1965	DEBBIE	33	Tropical Depression
8/18/1969	CAMILLE	100	Category 3
8/8/1971	UNNAMED	5	Tropical Depression
9/4/1971	FERN	5	Tropical Depression
9/16/1971	EDITH	70	Category 1
7/29/1975	UNNAMED	18	Tropical Depression
10/17/1975	UNNAMED	5	Tropical Depression
9/24/1976	UNNAMED	5	Tropical Depression
7/19/1977	UNNAMED	18	Tropical Depression
9/6/1977	BABE	18	Tropical Depression
10/25/1977	UNNAMED	18	Tropical Depression
8/10/1978	UNNAMED	5	Tropical Depression
7/11/1979	BOB	74	Category 1
9/12/1979	FREDERIC	97	Category 3
7/20/1980	UNNAMED	5	Tropical Depression
10/27/1984	UNNAMED	18	Tropical Depression
9/2/1985	ELENA	95	Category 2

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
10/31/1985	JUAN	64	Category 1
8/12/1987	UNNAMED	5	Tropical Depression
8/8/1988	BERYL	5	Tropical Depression
8/9/1988	BERYL	50	Tropical Storm
9/10/1988	FLORENCE	79	Category 1
8/3/1995	ERIN	82	Category 1
7/19/1997	DANNY	79	Category 1
9/27/1998	GEORGES	92	Category 2
9/20/1998	HERMINE	33	Tropical Depression
6/11/2001	ALLISON	43	Tropical Storm
8/5/2002	BERTHA	33	Tropical Depression
9/14/2002	HANNA	59	Tropical Storm
9/26/2002	ISIDORE	64	Category 1
6/30/2003	BILL	59	Tropical Storm
7/1/2003	BILL	18	Tropical Depression
9/16/2004	IVAN	96	Category 2
6/11/2005	ARLENE	59	Tropical Storm
7/6/2005	CINDY	74	Category 1
7/10/2005	DENNIS*	100	Category 3
8/29/2005	KATRINA	98	Category 3
9/22/2007	TEN	5	Tropical Depression
8/24/2008	FAY	18	Tropical Depression
9/1/2008	GUSTAV*	87	Category 2
11/10/2009	IDA	70	Category 1
7/25/2010	BONNIE	5	Tropical Depression
8/12/2010	FIVE	5	Tropical Depression
9/5/2011	LEE	43	Tropical Storm
8/28/2012	ISAAC*	70	Category 1

*It should be noted that the track of several major hurricanes that impacted the region fell outside of the 100-mile buffer. These storms were included in the table due to their significant impact (Betsy, 1965; Dennis, 2005; Gustav, 2008; and Isaac, 2012), but it should be noted that wind speed and storm category are estimated based on anecdotal information.
Source: National Hurricane Center

Federal records indicate that 10 disaster declarations were made in 1969 (Hurricane Camille), 1979 (Hurricane Frederic), 1998 (Hurricane Georges), 2001 (Tropical Storm Allison), 2002 (Tropical Storm Isidore), 2004 (Hurricane Ivan), 2005 (Hurricane Dennis and Hurricane Katrina), 2008 (Hurricane Gustav), and 2012 (Hurricane Isaac).[16] Hurricane and tropical storm events can cause substantial damage in the area due to high winds and flooding.

Flooding and high winds from hurricanes and tropical storms can cause damage throughout the county. Anecdotes are available from NCDC for the major storms that have impacted the county as found below:

Hurricane Georges – September 25-29, 1998
Hurricane Georges, a strong Category 2 hurricane moved slowly northwest across the Gulf of Mexico toward southeast Louisiana and coastal Mississippi on the September 25 and September 26. As the

[16] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

hurricane approached the mouth of the Mississippi River on September 27, it slowly turned toward the north making landfall along the Mississippi Coast just to the east of Biloxi, MS at 0400 CST on September 28. The hurricane moved only slowly north during the morning hours, at times becoming nearly stationary. The hurricane finally was downgraded to a tropical storm at 1500CST on September 28 when it was located north of Biloxi. The tropical storm then moved very slowly eastward into southern Alabama on September 29.

Most of the inland counties in Southeast Mississippi had damage from heavy rains and from trees and power lines being blown down by the persistent winds. One of the hardest hit areas by the high winds was in Stone County Mississippi near where the center of the hurricane moved. Eighty five homes were damaged in Stone County by the wind. Fifty four homes had minor damage, twenty six had major damage and five were destroyed. Most of the damage was along and east of U. S. Highway 49.

Throughout the area, agriculture took a beating with the cotton, soybean and pecan crop almost totally destroyed.

Hurricane Katrina – August 24-30, 2005
Hurricane Katrina was one of the strongest and most destructive hurricanes on record to impact the coast of the United States. It will likely be recorded as one the worst natural disaster in the history of the United States to date resulting in catastrophic damage and numerous casualties in southeast Louisiana and along the Mississippi coast. Damage and casualties resulting from Hurricane Katrina extended as far east as Alabama and the panhandle of Florida. Katrina developed from a tropical depression southeast of the Bahamas on August 24th. After moving through the Bahamas as a tropical storm, Katrina strengthened to a category 1 hurricane prior to landfall in south Florida around the Miami area on the 25th of August. Katrina crossed south Florida and entered the Gulf of Mexico and began to strengthen. Hurricane Katrina strengthened to a category 5 storm on August 28th about 250 miles south southeast of the mouth of the Mississippi River with winds reaching their peak intensity of 175 mph and a central pressure of 902 mb. Post event analysis by the National Hurricane Center indicates that Katrina weakened slightly before making landfall as a strong category 3 storm in initial landfall in lower Plaquemines Parish. Maximum sustained winds were estimated at 110 knots or 127 mph and a central pressure of 920 mb around 610 AM CDT on August 29th in southeast Louisiana just south of Buras in Plaquemines Parish. The storm continued on a north northeast track with the center passing about 40 miles southeast of New Orleans with a second landfall occurring near the Louisiana and Mississippi border around 945 AM CDT as a category 3 storm with maximum sustained winds estimated around 105 knots or 121 mph. Katrina continued to weaken as it moved north northeast across Mississippi during the day, but remained at hurricane strength 100 miles inland near Laurel, Mississippi. Katrina weakened to a tropical depression near Clarksville, Tennessee on August 30th.

Due to the failure of power and equipment prior to the peak of the storm, data for wind, storm surge, pressure, and rainfall are incomplete. The lowest pressure on the Mississippi coast was estimated to be 928 mb where the hurricane made landfall near the Louisiana Mississippi border. A pressure of 976 mb was recorded at 0951 CDT by a university weather station deployed in Pascagoula, well east of the landfall location. At approximately the same time, the pressure at the NWS office in Slidell, just to the west of landfall location, recorded a pressure of 934.1 mb at 0938 AM CDT.

The highest wind gusts recorded in Mississippi and the adjacent coastal waters were 117 knots (134 mph) at the Pearl River County EOC office in Poplarville and 102 knots (118 mph) at 1000AM CDT by a university wind tower deployed at the Stennis Space Center in Hancock County. Maximum sustained winds in

Mississippi were estimated around 105 knots (121 mph) near the storm's second landfall along the Mississippi and Louisiana border. Unofficial wind observations before the gage failed included a wind gust of 106 kt, (122 mph) at 0615 CDT by an amateur radio operator in Long Beach and a wind gust of 108 kt (124 mph) at the EOC in Pascagoula.

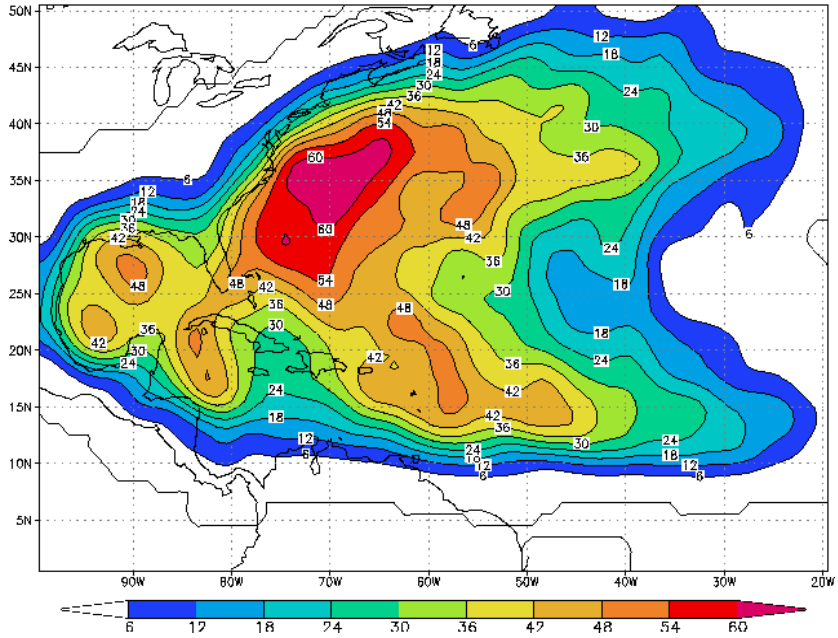
High winds from Katrina caused significant tree and power line damage to the counties that border the Mississippi and Alabama state line. Wind gusts of 80-100 mph were estimated across Stone County and 70-90 mph across George County. Many of the fallen trees fell on structures and caused damage. Stone County received the most damage.

Storm total rainfall amounts generally ranged from 10 to 16 inches across coastal and south Mississippi with much lower amounts observed over southwest Mississippi. The highest observed storm total rainfall was 11 inches at Stennis Space Center and near Picayune.

PROBABILITY OF FUTURE OCCURRENCES

According to NOAA statistical data, the region is located in an area with an annual probability of a named storm between 30 and 42 percent as presented in **Figure A.13**. This illustration was created by the National Oceanic and Atmospheric Administration's Hurricane Research Division using data from 1944 to 1999 and counting hits when a storm or hurricane was within approximately 100 miles (165 km) of each location. As a reference point, the tip of Florida's outline can be found near the 25N, 80W intersection, and the MEMA District 9 Region is near the 30N, 90W intersection. This empirical probability is fairly consistent with other scientific studies and observed historical data made available through a variety of federal, state, and local sources.

FIGURE A.13: EMPIRICAL PROBABILITY OF A NAMED HURRICANE OR TROPICAL STORM



Source: National Oceanic and Atmospheric Administration

The probability of storm occurrences will vary significantly based on the return interval for different categories of magnitude. The probability of less intense storms (lower return periods) is higher than more

intense storms (higher return periods). **Table A.22** profiles the potential peak gust wind speeds that can be expected in the MEMA District 9 Region during a hurricane event for various return periods according to FEMA's HAZUS-MH®.

TABLE A.22: POTENTIAL PEAK GUST WIND SPEEDS PER RETURN PERIOD

50-Year	100-Year	500-Year	1,000-Year
119.4 mph	133.9 mph	160.3 mph	170.0

Source: Federal Emergency Management Agency (Hazus-MH 3.2)

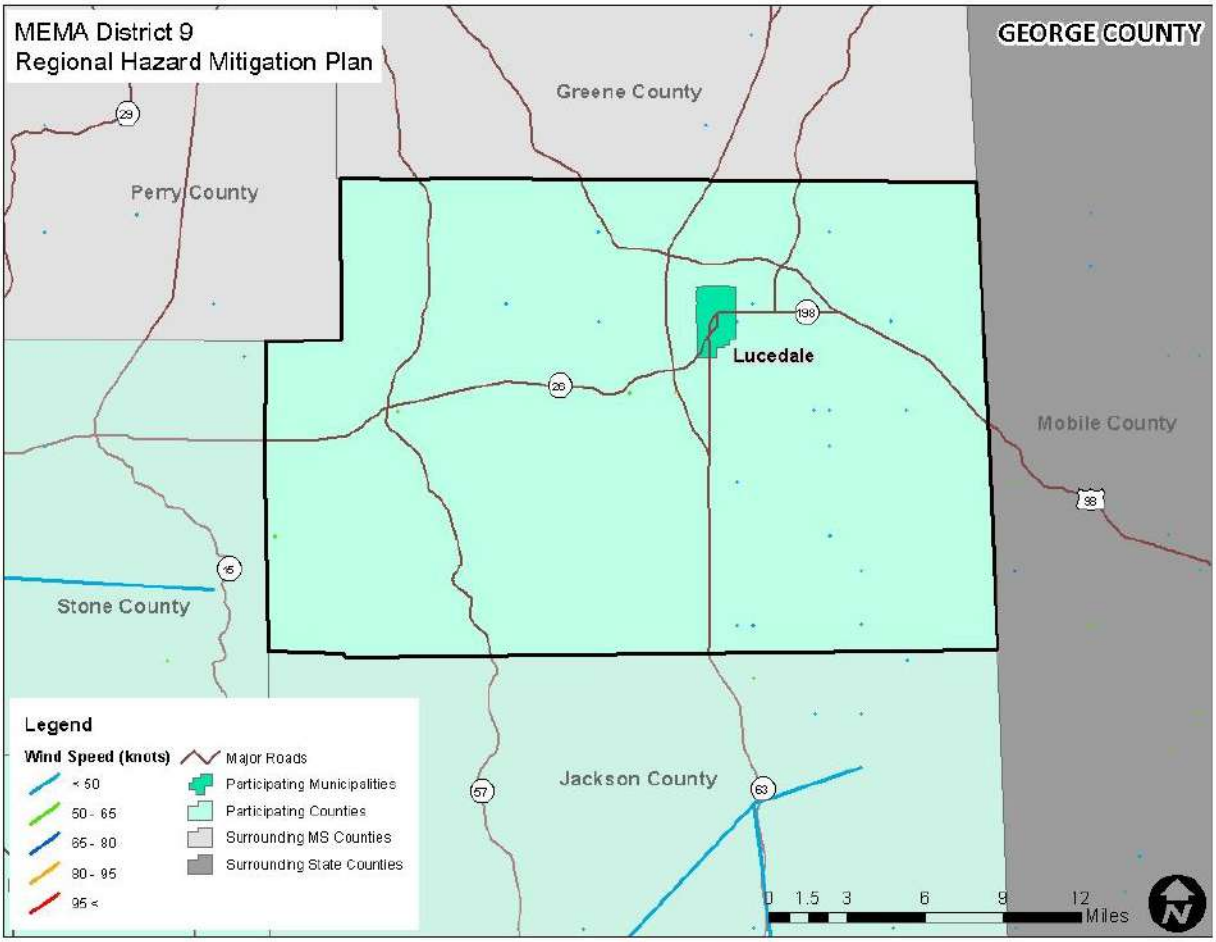
Overall, the probability level of future hurricane and tropical storm occurrence for George County is highly likely (100 percent annual probability).

A.2.13 Severe Thunderstorm/High Wind

LOCATION AND SPATIAL EXTENT

A thunderstorm event is an atmospheric hazard, and thus has no geographic boundaries. It is typically a widespread event that can occur in all regions of the United States. However, thunderstorms are most common in the central and southern states because atmospheric conditions in those regions are favorable for generating these powerful storms. It is assumed that George County has uniform exposure to an event and the spatial extent of an impact could be large. With that in mind, **Figure A.14** shows the location of wind events that have impacted the county between 1955 and 2015.

FIGURE A.14: SEVERE THUNDERSTORM TRACKS IN GEORGE COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

Severe storms were at least partially responsible for four disaster declarations in George County in 1980, 1990, 1991, and 2016.[17] According to NCDC, there have been 73 reported thunderstorm and high wind events since 1968 in George County.[18] These events caused over $955,000 (2016 dollars) in damages.[19] There were also reports of 16 injuries. **Table A.23** summarizes this information. Detailed thunderstorm and high wind event reports including date, magnitude, and associated damages for each event are presented in **Table A.24**.

[17] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.
[18] These thunderstorm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through June 2016 and these high wind events are only inclusive of those reported by NCDC from 1996 through June 2016. It is likely that additional thunderstorm and high wind events have occurred in George County. As additional local data becomes available, this hazard profile will be amended.
[19] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE A.23: SUMMARY OF THUNDERSTORM/HIGH WIND OCCURRENCES IN GEORGE COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Lucedale	22	0/6	$548,223	$24,919
Unincorporated Area	51	0/10	$406,779	$8,475
GEORGE COUNTY TOTAL	**73**	**0/16**	**$955,002**	**$33,394**

Source: National Climatic Data Center

TABLE A.24: HISTORICAL THUNDERSTORM/HIGH WIND OCCURRENCES IN GEORGE COUNTY

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
Lucedale					
Lucedale	3/25/1994	Thunderstorm Wind	0 kts.	0/0	$8,126
Lucedale	3/25/1994	Thunderstorm Wind	0 kts.	0/1	$81,259
Lucedale	6/28/1995	Thunderstorm Wind	0 kts.	0/0	$158
Lucedale	7/9/1995	Thunderstorm Wind	0 kts.	0/0	$2,371
LUCEDALE	1/26/1996	Thunderstorm Wind	50 kts.	0/0	$3,070
LUCEDALE	7/3/1996	Thunderstorm Wind	55 kts.	0/0	$3,070
LUCEDALE	1/24/1997	Thunderstorm Wind	50 kts.	0/0	$4,502
LUCEDALE	5/28/1997	Thunderstorm Wind	50 kts.	0/0	$1,501
LUCEDALE	6/20/1997	Thunderstorm Wind	50 kts.	0/0	$1,501
LUCEDALE	11/1/1997	Thunderstorm Wind	50 kts.	0/0	$0
LUCEDALE	7/22/2000	Thunderstorm Wind	55 kts. E	0/0	$6,993
LUCEDALE	9/1/2000	Thunderstorm Wind	55 kts. E	0/0	$6,993
LUCEDALE	3/12/2001	Thunderstorm Wind	70 kts. E	0/0	$27,200
LUCEDALE	6/11/2001	Thunderstorm Wind	85 kts. E	0/5	$339,996
LUCEDALE	12/19/2002	Thunderstorm Wind	50 kts. E	0/0	$6,694
LUCEDALE	12/31/2002	Thunderstorm Wind	50 kts. E	0/0	$10,711
LUCEDALE	6/30/2003	Thunderstorm Wind	50 kts. EG	0/0	$6,545
LUCEDALE	1/31/2008	Thunderstorm Wind	50 kts. EG	0/0	$13,424
LUCEDALE	3/9/2011	Thunderstorm Wind	61 kts. EG	0/0	$10,707
LUCEDALE	6/3/2011	Thunderstorm Wind	52 kts. EG	0/0	$5,354
LUCEDALE	12/28/2015	Thunderstorm Wind	52 kts. EG	0/0	$3,049
LUCEDALE	3/17/2016	Thunderstorm Wind	52 kts. EG	0/0	$5,000
Unincorporated Area					
GEORGE CO.	11/3/1968	Thunderstorm Wind	0 kts.	0/0	$0
GEORGE CO.	2/26/1971	Thunderstorm Wind	0 kts.	0/0	$0
GEORGE CO.	2/21/1974	Thunderstorm Wind	0 kts.	0/0	$0
GEORGE CO.	8/1/1976	Thunderstorm Wind	0 kts.	0/0	$0
GEORGE CO.	3/7/1980	Thunderstorm Wind	0 kts.	0/0	$0
GEORGE CO.	2/10/1981	Thunderstorm Wind	0 kts.	0/0	$0
GEORGE CO.	9/23/1985	Thunderstorm Wind	0 kts.	0/0	$0
GEORGE CO.	3/17/1987	Thunderstorm Wind	0 kts.	0/0	$0
GEORGE CO.	5/24/1988	Thunderstorm Wind	0 kts.	0/0	$0
GEORGE CO.	7/3/1988	Thunderstorm Wind	0 kts.	0/0	$0
GEORGE CO.	3/15/1990	Thunderstorm Wind	0 kts.	0/5	$0

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
GEORGE CO.	5/21/1990	Thunderstorm Wind	0 kts.	0/0	$0
GEORGE CO.	6/3/1990	Thunderstorm Wind	0 kts.	0/0	$0
GEORGE CO.	12/3/1990	Thunderstorm Wind	0 kts.	0/1	$0
GEORGE CO.	12/3/1990	Thunderstorm Wind	0 kts.	0/1	$0
GEORGE CO.	12/3/1990	Thunderstorm Wind	0 kts.	0/3	$0
GEORGE CO.	6/5/1991	Thunderstorm Wind	0 kts.	0/0	$0
GEORGE CO.	6/5/1991	Thunderstorm Wind	0 kts.	0/0	$0
Benndale	3/7/1995	Thunderstorm Wind	0 kts.	0/0	$0
Agricola	3/7/1995	Thunderstorm Wind	0 kts.	0/0	$3,161
Benndale	4/21/1995	Thunderstorm Wind	0 kts.	0/0	$2,371
Benndale	5/9/1995	Thunderstorm Wind	0 kts.	0/0	$790
Agricola	5/9/1995	Thunderstorm Wind	0 kts.	0/0	$1,580
Shipman	5/12/1995	Thunderstorm Wind	0 kts.	0/0	$790
GEORGE CO.	7/8/1995	Thunderstorm Wind	0 kts.	0/0	$3,161
Lucedale to Benndale	12/18/1995	Thunderstorm Wind	0 kts.	0/0	$4,741
RUBLE	2/19/1996	Thunderstorm Wind	65 kts.	0/0	$15,351
BENNDALE	1/22/1998	Thunderstorm Wind	50 kts.	0/0	$4,433
COUNTYWIDE	6/5/1998	Thunderstorm Wind	60 kts.	0/0	$147,763
AGRICOLA	1/2/1999	Thunderstorm Wind	50 kts.	0/0	$7,228
BENNDALE	6/8/1999	Thunderstorm Wind	50 kts.	0/0	$5,783
AGRICOLA	7/20/2000	Thunderstorm Wind	55 kts. E	0/0	$9,791
BENNDALE	10/13/2001	Thunderstorm Wind	60 kts. E	0/0	$20,400
MOVELLA	10/13/2001	Thunderstorm Wind	60 kts. E	0/0	$13,600
AGRICOLA	4/8/2002	Thunderstorm Wind	50 kts. E	0/0	$9,372
MOVELLA	6/30/2003	Thunderstorm Wind	50 kts. EG	0/0	$6,545
AGRICOLA	11/15/2006	Thunderstorm Wind	50 kts. EG	0/0	$17,921
MERRILL	1/31/2008	Thunderstorm Wind	50 kts. EG	0/0	$16,780
BEXLEY	1/31/2008	Thunderstorm Wind	50 kts. EG	0/0	$13,424
BENNDALE	3/9/2011	Thunderstorm Wind	52 kts. EG	0/0	$1,071
BASIN	4/4/2011	Thunderstorm Wind	50 kts. EG	0/0	$53,537
AGRICOLA	6/10/2011	Thunderstorm Wind	52 kts. EG	0/0	$5,354
BENNDALE	12/20/2012	Thunderstorm Wind	61 kts. EG	0/0	$7,343
AGRICOLA	12/25/2012	Thunderstorm Wind	70 kts. EG	0/0	$10,490
LATONIA	2/15/2016	Thunderstorm Wind	52 kts. EG	0/0	$6,000
BENNDALE	5/19/2016	Thunderstorm Wind	52 kts. EG	0/0	$3,000
BASIN	5/19/2016	Thunderstorm Wind	52 kts. EG	0/0	$3,000
EVANSTON	5/19/2016	Thunderstorm Wind	52 kts. EG	0/0	$3,000
BEXLEY	5/19/2016	Thunderstorm Wind	52 kts. EG	0/0	$3,000
EVANSTON	5/19/2016	Thunderstorm Wind	52 kts. EG	0/0	$3,000
MOVELLA	5/20/2016	Thunderstorm Wind	52 kts. EG	0/0	$3,000

*Property damage is reported in 2016 dollars; all damage may not have been reported.
†E = estimated; EG = estimated gust; ES = estimated sustained; MG = measured gust; MS = measured sustained
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

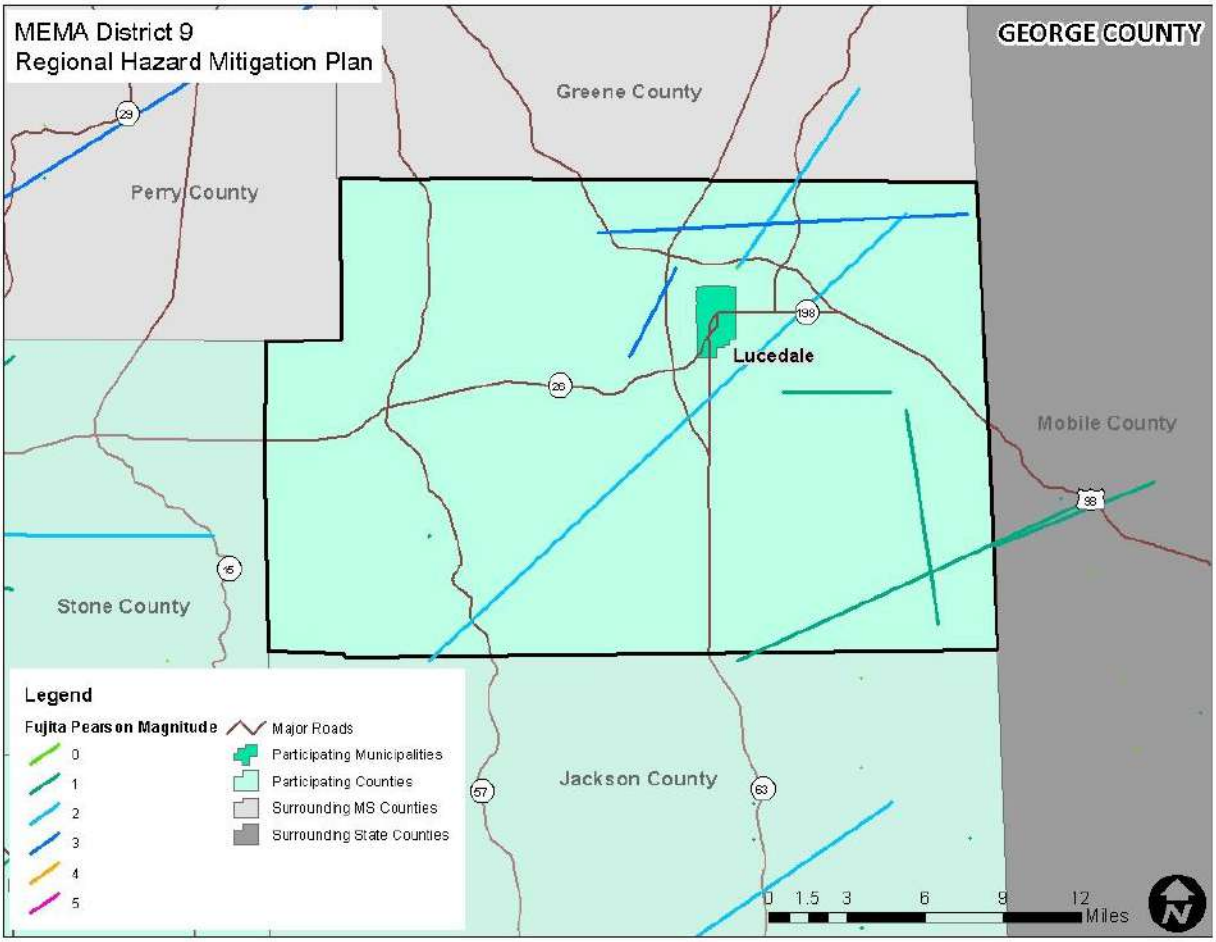
Given the high number of previous events, it is certain that thunderstorm events, including straight-line wind events, will occur in the future. This results in a probability level of highly likely (100 percent annual probability) for the entire county.

A.2.14 Tornado

LOCATION AND SPATIAL EXTENT

Tornadoes occur throughout the state of Mississippi, and thus in George County. Tornadoes typically impact a relatively small area, but damage may be extensive. Event locations are completely random and it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that George County is uniformly exposed to this hazard. With that in mind, **Figure A.15** shows tornado track data for many of the major tornado events that have impacted the county between 1950 and 2015. While no definitive pattern emerges from this data, some areas that have been impacted in the past may be potentially more susceptible in the future.

FIGURE A.15: HISTORICAL TORNADO TRACKS IN GEORGE COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

Tornadoes were at least partially responsible for three disaster declarations in George County in 1980, 1990, and 1991.[20] According to the National Climatic Data Center, there have been a total of 13 recorded tornado events in George County since 1967, resulting in almost $4.9 million (2016 dollars) in property damages.[21] [22] In addition, 14 injuries were reported. The magnitude of these tornadoes ranged from F0 to F3 in intensity. A summary of these events is presented in **Table A.25**. Detailed information on historic tornado events can be found in **Table A.26**.

TABLE A.25: SUMMARY OF TORNADO OCCURRENCES IN GEORGE COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Lucedale	1	0/0	$12,750	$1,063
Unincorporated Area	12	0/14	$4,871,848	$99,425
GEORGE COUNTY TOTAL	**13**	**0/14**	**$4,884,598**	**$100,488**

Source: National Climatic Data Center

TABLE A.26: HISTORICAL TORNADO IMPACTS IN GEORGE COUNTY

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
Lucedale					
LUCEDALE	10/19/2004	F0	0/0	$12,750	A weak tornado briefly touched down just north of Lucedale. The tornado damaged several storage buildings at a nursery. Several trees and power lines were also blown down.
Unincorporated Area					
GEORGE CO.	5/2/1967	F2	0/0	$0	--
GEORGE CO.	2/12/1971	F2	0/1	$148,675	--
GEORGE CO.	2/12/1971	F2	0/2	$1,486,747	Tornado dipped down irregularly for about 25 miles with varying amounts of damage, first west of Pascagoula River near Old Wilkerson Ferry crossing, then through Central community, to just S of Lucedale and leaving its last trace at the Hall residence, Brushy Creek (near U.S. Hwy. 98). At 2 S Lucedale on Highway 613 a mobile home lurched forward onto a car and the trailer was badly damaged, mother and 5-year old girl received bruises. Total damage estimated about $74,000.
GEORGE CO.	2/12/1971	F1	0/0	$0	Tornado reported in Broome community at approximately 9:40 a.m. Two trailers said to

[20] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.
[21] These tornado events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1950 through June 2016. It is likely that additional tornadoes have occurred in George County. As additional local data becomes available, this hazard profile will be amended.
[22] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					have been toppled and 1 house unroofed. Newspaper noted, "Telephone communications were knocked out in the Broome community…." Area located near George and Jackson County line, north of Vestry.
GEORGE CO.	4/7/1973	F2	0/0	$13,562	--
GEORGE CO.	9/13/1973	F1	0/0	$135,615	Tornado touched down briefly and destroyed 2 barns and unroofed two houses. FPP 1??
GEORGE CO.	3/27/1976	F3	0/0	$1,058,229	The tornado leveled one acre of trees near Bexley 6 NW of Lucedale. Moving E the gym and teachers' home at the Rocky Creek School was damaged to the tune of $100,000 - roof and window damage. A nearby Baptist church had $75,000 damage to the roof, steeple, and heating/cooling system. Near Hwy 63 a barn was damaged. In Brushy Creek Community, a frame house was lifted off its foundation, the porch and part of the roof was blown off, 1 chicken house damaged and one mobile home overturned. "Lightning was a steady quiver." Damage $200,000.
GEORGE CO.	5/19/1980	F3	0/0	$730,743	A tornado touched down about 4 miles WSW of Lucedale, moving NNE across HWY 98 before lifting. Two houses were destroyed, 11 damaged, and 5 trailers and several barns and vehicles were damaged. Property damage estimated at $350,000.
GEORGE CO.	3/29/1987	F1	0/0	$530,046	A tornado touched down 3 miles southeast of Lucedale and traveled 3 miles eastward before dissipating. Several barns were damaged and fences laid flat. Although the tornado moved through a sparsely populated area, several homes and outbuildings were damaged.
GEORGE CO.	1/13/1992	F1	0/2	$429,175	Two homes and one mobile home were totally destroyed. Two people in the homes were injured and had to be taken to the hospital. The local fire station was severely damaged. Numerous other homes and businesses had minor damage. Numerous trees were also blown down.
AGRICOLA	10/25/1997	F1	0/7	$135,058	A mesocyclone intermittently produced a weak tornado as the storm tracked northeast across George county. The tornado first briefly touched down along River Road near the Barton community where trees were blown down. The tornado touched down again near Grain Elevator Road blowing down several century old Live Oak trees. The oak trees fell around a home which sustained only minor damage. The tornado touched down again just west of State Road 63 where it destroyed two mobile homes and caused major damage to another. Trees and some outbuildings were

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					also damaged. The tornado again briefly touched down along Barton Agricola Road where trees were blown down. The tornado then touched down in the Howell community on the edge of George county. Trees were blown down along County Road 612 where a mobile home was completely destroyed and another damaged. Six persons in the destroyed mobile home were injured. Most of the damage from the tornado was in the F0 range with F1 damage occurring with the destruction of the mobile homes in the Barton and Howell communities. A total of seven people were injured with two admitted to a hospital where they were later released. The tornado then moved into Mobile county just west of Wilmer.
MOVELLA	6/11/2001	F1	0/2	$203,997	A severe thunderstorm produced an F1 tornado in the southeast part of the county, first touching down near the Howell community about 3 miles east of Movella. The tornado first touched down just inside the George county line near Red Edwards Lane and Howell Road and moved north from there. Initially the tornado just produced tree damage, with some minor roof damage to a couple of homes. As the tornado moved north, it crossed Griffin Lane and totally destroyed a newer model manufactured home. The mobile home tie downs were pulled out of the ground and the home turned over and was torn apart as it rolled. The female occupant of the home was in the house at the time the tornado struck, and was injured, suffering a broken collarbone. The tornado then crossed Appaloosa Road and caused major damage to a two-story home. The family that lived at the home was upstairs when the tornado struck. They saw the tornado approaching and took shelter downstairs. They were not injured, but part of the roof of the house was ripped off, and the upstairs room that they were previously in was heavily damaged. The occupants said the tornado made very little noise as it approached. The tornado continued moving through a wooded area, crossing State Highway 612 just west of Walt Tanner Road. Here trees were blown down and a home received roof damage. The tornado continued moving north and destroyed four manufactured homes and blew down several trees near Sandy Hill Drive. The tornado then moved across a forested area and then did considerable damage along Lucas Road.

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					Several homes were damaged and numerous trees were blown down in this area. The tornado then crossed U. S. Highway 98 and went back into the clouds near Moody Road. Damage to this area was mostly to trees.

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

According to historical information, tornado events pose a significant threat to George County. The probability of future tornado occurrences affecting George County is highly likely (100 percent annual probability).

A.2.15 Winter Weather

LOCATION AND SPATIAL EXTENT

Nearly the entire continental United States is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. George County is not accustomed to severe winter weather conditions and rarely receives severe winter weather, even during the winter months. Events tend to be mild in nature; however, even relatively small accumulations of snow, ice, or other wintery precipitation can lead to losses and damage due to the fact that these events are not commonplace. Given the atmospheric nature of the hazard, the entire county has uniform exposure to a winter storm.

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, there have been a total of four recorded winter storm events in George County since 2002.[23] These events did not result in any property damage.[24] A summary of these events is presented in **Table A.27**. Detailed information on the recorded winter storm events can be found in **Table A.28**.

TABLE A.27: SUMMARY OF WINTER STORM EVENTS IN GEORGE COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
George County	4	0/0	$0	$0

Source: National Climatic Data Center

[23] These ice and winter storm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional winter storm conditions have affected George County.
[24] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE A.28: HISTORICAL WINTER STORM IMPACTS IN GEORGE COUNTY

Location	Date	Type	Deaths/Injuries	Property Damage*
Lucedale				
None reported	--	--	--	--
Unincorporated Area				
GEORGE (ZONE)	1/1/2002	Winter Storm	0/0	$0
GEORGE (ZONE)	12/11/2008	Winter Weather	0/0	$0
GEORGE (ZONE)	2/12/2010	Winter Storm	0/0	$0
GEORGE (ZONE)	2/3/2011	Winter Weather	0/0	$0

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

There have been several severe winter weather events in George County. The text below describes one of the major events and associated impacts on the county. Similar impacts can be expected with severe winter weather.

February 2010
An area of low pressure moved across the north central Gulf. Heavy rain changed over to snow across portions of the central gulf coast as the low moved to the east. Snowfall accumulations ranged from a dusting to as much as 4 inches across interior southeast Mississippi. Broadcast media reported 3 inches of snow on cars in Lucedale. The emergency manager reported 1 inch of snow across Stone County. Some power outages were also reported.

Winter storms throughout the planning area have several negative externalities including hypothermia, cost of snow and debris cleanup, business and government service interruption, traffic accidents, and power outages. Furthermore, citizens may resort to using inappropriate heating devices that could to fire or an accumulation of toxic fumes.

PROBABILITY OF FUTURE OCCURRENCES

Winter storm events will continue to occur in George County. Based on historical information, the probability is likely (between 10 and 100 percent annual probability).

OTHER HAZARDS

A.2.16 Climate Change/Sea Level Rise

LOCATION AND SPATIAL EXTENT

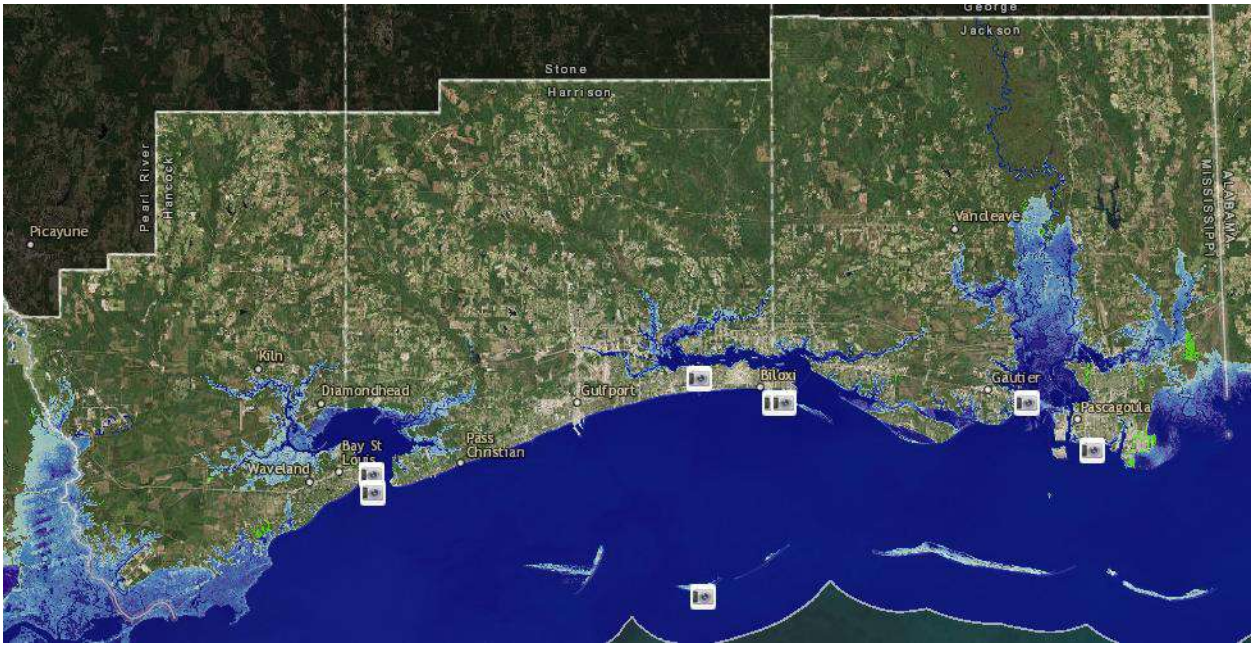
Climate Change
Climate change can have direct implications on many of the other hazards addressed in this plan since it has the potential to alter the nature and frequency of hazards, including increasing temperature (extreme heat), changes in precipitation (drought, flooding), and more frequent, strong storms (wind, hurricane). Therefore, it is assumed that George County is uniformly exposed to this hazard.

Sea Level Rise

Sea level rise is occurring at a global scale. However, it does not affect areas uniformly and will be more severe in some places. **Figure A.16** identifies areas in MEMA District 9 that would be inundated by water as a result of three feet in sea level rise as per projections by NOAA. The highest level of sea level rise projected by NOAA is shown in **Figure A.17**. This figure shows the inundation areas in the case of six feet of sea level rise. This demonstrates the additional areas that would be impacted beyond the three feet scenario.

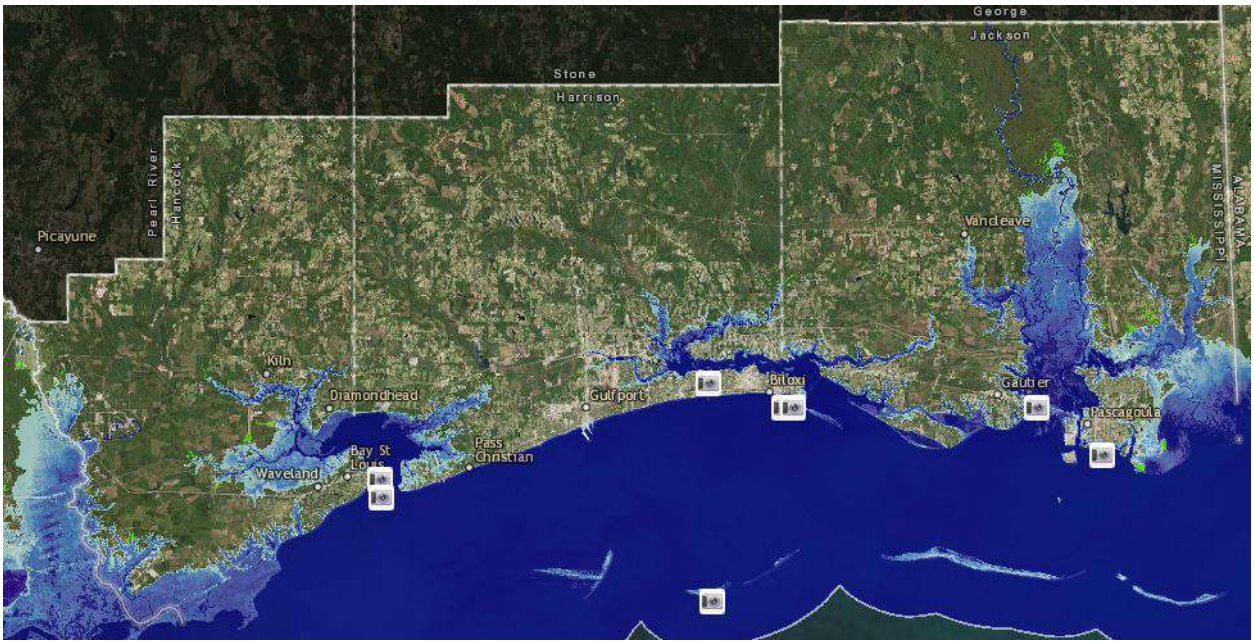
There are no areas in George County that would be impacted by projected sea level rise.

FIGURE A.16: THREE FEET SEA LEVEL RISE IN MEMA DISTRICT 9



Source: NOAA

FIGURE A.17: SIX FEET SEA LEVEL RISE IN MEMA DISTRICT 9



Source: NOAA

HISTORICAL OCCURRENCES

Climate Change

According to the *National Climate Assessment*, there have been increasing numbers of days above 95°F and nights above 75°F, and decreasing numbers of extremely cold days since 1970 in the Southeast. Daily and five-day rainfall intensities have also increased and summers have been either increasingly dry or extremely wet. The number of Category 4 and 5 hurricanes in the Atlantic basin has increased substantially since the early 1980s compared to the historic record that dates back to the mid-1880s. This can be attributed to both natural variability and climate change.

Sea Level Rise

Sea level rise is a slow-onset hazard and specific events/occurrences are not possible to determine.

PROBABILITY OF FUTURE OCCURRENCES

Climate Change

According to the *National Climate Assessment*, temperatures across the Southeast are expected to increase during this century, with shorter-term (year-to-year and decade-to-decade) fluctuations over time due to natural climate variability. Major consequences of warming include significant increases in the number of hot days (95°F or above) and decreases in freezing events. Regional average increases are in the range of 4°F to 8°F by the year 2100.

Projections of future precipitation patterns are less certain than projections for temperature increases. Because the Southeast is located in the transition zone between projected wetter conditions to the north and drier conditions to the southwest, many of the model projections show only small changes relative to natural variations. Additionally, projections further suggest that warming will cause tropical storms to be

fewer in number globally, but stronger in force, with more Category 4 and 5 storms, and substantial further increases in extreme precipitation are projected as this century progresses.

Overall, future climate change is considered likely (between 10 and 100 percent annual probability).

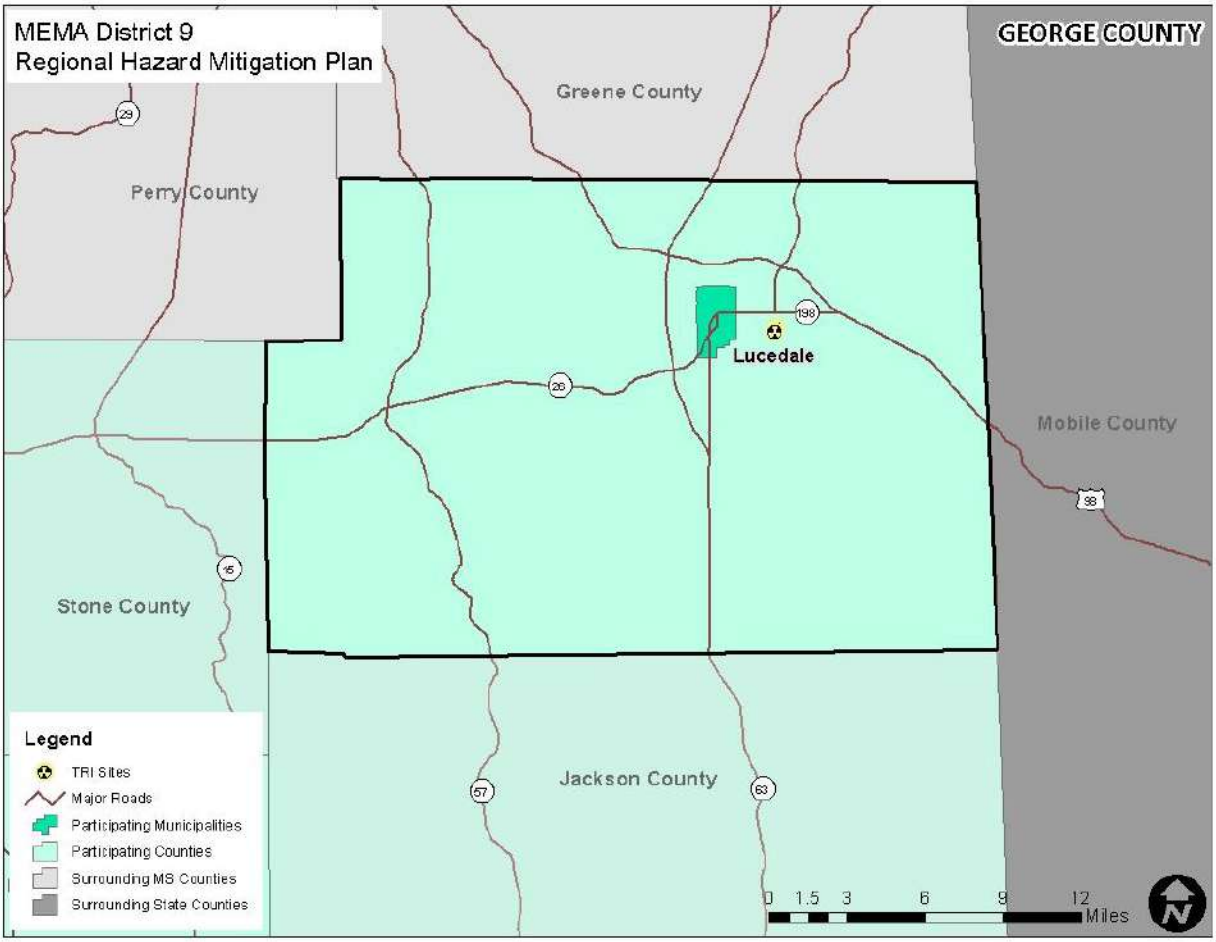
Sea Level Rise
There is still much debate regarding the probability of future occurrence of sea level rise. This section will be updated as more information becomes available. Future sea level rise is considered likely (between 10 and 100 percent annual probability).

A.2.17 Hazardous Materials Incident/Train Derailment

LOCATION AND SPATIAL EXTENT

George County has two TRI sites. These sites are shown in **Figure A.18.**

FIGURE A.18: TOXIC RELEASE INVENTORY (TRI) SITES IN GEORGE COUNTY



Source: Environmental Protection Agency

In addition to "fixed" hazardous materials locations, hazardous materials may also impact the county via roadways and railways. Many roads and railways in the county are subject to hazardous materials transport and all roads and railways that permit hazardous material transport are considered potentially at risk to an incident.

HISTORICAL OCCURRENCES

There have been a total of 11 recorded HAZMAT incidents in George County since 1972. These events resulted in more than $101,000 (2016 dollars) in property damage.[25] **Table A.29** summarizes the HAZMAT incidents in George County as reported by PHMSA. Detailed information on these events is presented in **Table A.30.**

TABLE A.29: SUMMARY OF HAZMAT INCIDENTS IN GEORGE COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Lucedale	6	0/0	$10,174	$231
Unincorporated Area	5	0/0	$90,876	$3,635
GEORGE COUNTY TOTAL	**11**	**0/0**	**$101,050**	**$3,866**

Source: United States Department of Transportation Pipeline and Hazardous Materials Safety Administration

TABLE A.30: HAZMAT INCIDENTS IN GEORGE COUNTY

Report Number	Date	City	Mode	Serious Incident?	Deaths/ Injuries	Damages ($)*	Quantity Released
Lucedale							
I-1973010274	12/20/1972	LUCEDALE	Highway	No	0/0	$0	0
I-1978060180	5/15/1978	LUCEDALE	Highway	No	0/0	$0	53 LGA
I-1984040054	3/22/1984	LUCEDALE	Highway	No	0/0	$0	100 LGA
I-1984040054	3/22/1984	LUCEDALE	Highway	No	0/0	$0	0
I-1995101092	10/11/1995	LUCEDALE	Highway	No	0/0	$0	3 LGA
E-2005090312	8/24/2005	LUCEDALE	Highway	No	0/0	$10,174	100 LGA
Unincorporated Area							
I-1991090732	8/26/1991	EVANSTON	Rail	No	0/0	$0	0
I-1996120803	12/4/1996	EVANSTON	Rail	No	0/0	$45,438	0
I-1996120803	12/4/1996	EVANSTON	Rail	No	0/0	$45,438	0
X-2009030224	3/9/2009	Crossroads	Highway	No	0/0	$0	0.0625 SLB
I-2012060438	5/27/2012	EVANSTON	Rail	No	0/0	$0	6.0156 GCF

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: United States Department of Transportation Pipeline and Hazardous Materials Safety Administration

PROBABILITY OF FUTURE OCCURRENCES

Given the location of two toxic release inventory sites in George County and prior roadway and railway incidents, it is highly likely (100 percent annual probability) that a hazardous material incident may occur

[25] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

in the county. County and city officials are mindful of this possibility and take precautions to prevent such an event from occurring. Furthermore, there are detailed plans in place to respond to an occurrence.

A.2.18 Infectious Disease

LOCATION AND SPATIAL EXTENT

Due to the nature of a public health/emerging disease threat, it is difficult to identify a precise location where this type of event would occur. Moreover, a large-scale event would have impacts that spread throughout the county. Therefore, all areas in George County are considered equally susceptible to infectious diseases.

HISTORICAL OCCURRENCES

Mosquito-borne illness in Mississippi include West Nile virus, Chikungunya virus, and Zika virus. These illnesses affect birds, animals, and humans, causing flu-like symptoms in people who are bitten by infected mosquitoes. Occasionally illness can be severe, leading to meningitis or encephalitis. According to the Mississippi State Department of Health (MSDH), there has been one reported case of West Nile Virus in George County as of November 2016 but this case did not result in death. **Table A.31** summarizes the mosquito-borne illnesses in humans reported in the county.

TABLE A.31: SUMMARY OF MOSQUITO-BORNE ILLNESSES IN GEORGE COUNTY

Location	West Nile Virus	Chikungunya	Zika	Other*	Deaths
George County	1	0	0	0	0

*Other mosquito-borne illnesses include La Crosse encephalitis, St. Louis encephalitis, and Eastern Equine encephalitis.
Source: Mississippi State Department of Health

Diseases like influenza and norovirus are regularly occurring health issues in George County. These conditions are not legally reportable to county or state public health agencies, so data on disease incidence is not readily available. MSDH relies upon selected sentinel health practitioners across the state to report the percentage and total patient visits consistent with an influenza-like illness (ILI): fever of 100°F or higher and cough or sore throat. Reports are used to estimate the state's ILI rate and the magnitude of state's influenza activity on a weekly basis. Reports represent only the distribution of flu in the state, not an actual count of all flu cases statewide.

PROBABILITY OF FUTURE OCCURRENCES

Due to some recent incidents that have been recorded across the State of Mississippi and in George County, future occurrences are considered possible (between 1 and 10 percent annual probability).

A.2.19 Conclusions on Hazard Risk

The hazard profiles presented in this section were developed using best available data and result in what may be considered principally a qualitative assessment as recommended by FEMA in its "How-to" guidance document titled *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA Publication 386-2). It relies heavily on historical and anecdotal data, stakeholder input, and professional

and experienced judgment regarding observed and/or anticipated hazard impacts. It also carefully considers the findings in other relevant plans, studies, and technical reports.

HAZARD EXTENT

Table A.32 describes the extent of each hazard identified for George County. The extent of a hazard is defined as its severity or magnitude, as it relates to the planning area.

TABLE A.32: EXTENT OF GEORGE COUNTY HAZARDS

<table>
<tr><th colspan="2">Flood-related Hazards</th></tr>
<tr><td>Dam and Levee Failure</td><td>Dam failure extent is defined using the Mississippi Division of Environmental Quality classifications which include Low, Significant, and High. No dams are classified as high-hazard in George County.</td></tr>
<tr><td>Erosion</td><td>The extent of erosion can be defined by the measurable rate of erosion that occurs. There are no erosion rate records located in George County.</td></tr>
<tr><td>Flood</td><td>Flood depth and velocity are recorded via United States Geological Survey stream gages throughout the region. While a gage does not exist for each participating jurisdiction, there is one at or near many areas. The greatest flood recorded for the county was at Pascagoula River at Merrill. The maximum historic crest was recorded at 32.5 feet, or 0.5 feet above the major flood stage (reported on April 1, 1900). Additional historic crest heights and the corresponding flood categories are in the table below.
<table>
<tr><th rowspan="2">Location/ Jurisdiction</th><th rowspan="2">Date</th><th rowspan="2">Maximum Historic Crest (ft)</th><th colspan="4">Flood categories</th></tr>
<tr><th>Action Stage (ft)</th><th>Flood Stage (ft)</th><th>Moderate Flood Stage (ft)</th><th>Major Flood Stage (ft)</th></tr>
<tr><td colspan="7">George County</td></tr>
<tr><td>PASCAGOULA RIVER AT MERRILL</td><td>April 1, 1900</td><td>32.50</td><td>12.5</td><td>22</td><td>25</td><td>32</td></tr>
<tr><td>ESCATAWPA RIVER NEAR AGRICOLA</td><td>n/a</td><td>n/a</td><td>16</td><td>18</td><td>n/a</td><td>n/a</td></tr>
</table></td></tr>
<tr><td>Storm Surge</td><td>Storm surge can be defined by the depth of inundation which is defined by the category of hurricane/tropical storm. Since the MEMA District 9 Region could easily be impacted by a Category 3 storm, depth of inundation could be at least 9 feet in many areas. However, there is only a small area in George County that could potentially be impacted.</td></tr>
<tr><th colspan="2">Fire-related Hazards</th></tr>
<tr><td>Drought</td><td>Drought extent is defined by the U.S. Drought Monitor classifications which include Abnormally Dry, Moderate Drought, Severe Drought, Extreme Drought, and Exceptional Drought. According to the U.S. Drought Monitor classifications, the most severe drought condition is Exceptional. George County has received this ranking twice over the 17-year reporting period.</td></tr>
<tr><td>Lightning</td><td>According to the Vaisala’s flash density map, George County is located in an area that experiences 4 to 12 lightning flashes per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures.</td></tr>
<tr><td>Wildfire</td><td>Wildfire data was provided by the Mississippi Forestry Commission and is reported annually by county from 2007-2016. The greatest number of fires to occur in George County in any year 79 in 2007. The greatest number of acres to burn in the county in a single year occurred in</td></tr>
</table>

	2007 when 789 acres were burned. Information on specific occurrences of wildfire and the most severe fires in each jurisdiction is not available. Although this data lists the extent that has occurred, larger and more frequent wildfires are possible throughout the county.
Geologic Hazards	
Earthquake	Earthquake extent can be measured by the Richter Scale, the Modified Mercalli Intensity (MMI) scale, and the distance of the epicenter from George County. According to data provided by the National Centers for Environmental Information, no earthquakes were reported in George County.
Wind-related Hazards	
Extreme Cold	The extent of extreme cold can be defined by the minimum temperature reached. Official long term temperature records are not kept for any areas in George County. However, the temperature has previously ranged from 15 to 20 degrees Fahrenheit in southwest and coastal Mississippi (reported on December 18, 1996).
Extreme Heat	The extent of extreme heat can be measured by the record high temperature recorded. Official long term temperature records are not kept for any areas in George County. However, the highest recorded temperature in Beaumont (northwest of the county) was 105°F and heat index values were recorded as high as 115°F (reported in July 2000).
Hailstorm	Hail extent can be defined by the size of the hail stone. The largest hail stone reported in George County was 2.00 inches (reported on March 11, 1968). It should be noted that future events may exceed this.
Hurricane and Tropical Storm	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5. The greatest classification of hurricane to traverse directly through George County was Hurricane Frederic, a Category 3 storm which carried tropical force winds of 97 knots upon arrival in the county.
Severe Thunderstorm/High Wind	Thunderstorm extent is defined by wind speeds reported. The strongest recorded wind event in George County was 85 knots (reported on June 11, 2001). It should be noted that future events may exceed these historical occurrences.
Tornado	Tornado hazard extent is measured by the Fujita/Enhanced Fujita. The greatest magnitude reported in George County was an F3 (last reported on May 19, 1980).
Winter Weather	The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest snowfall reported in George County was 3 inches (reported on February 12, 2010).
Other Hazards	
Climate Change/Sea Level Rise	It is still uncertain what the extent of climate change will be in the future. However, increasing temperature (extreme heat), changes in precipitation (drought, flooding), and more frequent, stronger storms (wind, hurricanes) can be expected. Sea level rise is defined by the areas impacted, but is more often associated with the amount of sea level rise that is expected to take place. Although it is difficult to predict an exact amount of rise, the Climate Change Surging Seas Report intermediate high sea level rise scenario projects 1 foot of rise locally by 2050 and 3.7 feet by 2100.
Hazardous Materials Incident/Train Derailment	According to USDOT PHMSA, the largest hazardous materials incident reported in George County was 100 LGA released on the highway (reported on March 22, 1984). It should be noted that larger events are possible.
Infectious Disease	An infectious disease threat could have large-scale effects throughout the county and may cause illness in many people. Possible impacts from a disease threat depend largely on the impacted population, but might include anything from absenteeism and loss of productivity in

	the workplace to death or serious illness to humans or livestock. A serious disease threat could affect many thousands of people.

PRIORITY RISK INDEX RESULTS

In order to draw some meaningful planning conclusions on hazard risk for George County, the results of the hazard profiling process were used to generate countywide hazard classifications according to a "Priority Risk Index" (PRI). More information on the PRI and how it was calculated can be found in Section 5.21.2.

Table A.33 summarizes the degree of risk assigned to each category for all initially identified hazards based on the application of the PRI. Assigned risk levels were based on the detailed hazard profiles developed for this subsection, as well as input from the Regional Hazard Mitigation Council. The results were then used in calculating PRI values and making final determinations for the risk assessment.

TABLE A.33: SUMMARY OF PRI RESULTS FOR GEORGE COUNTY

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Flood-related Hazards						
Dam and Levee Failure	Possible	Critical	Small	Less than 6 hours	Less than 6 hours	**2.4**
Erosion	Likely	Minor	Small	More than 24 hours	More than 1 week	**2.1**
Flood	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 24 hours	**3.2**
Storm Surge	Possible	Limited	Small	More than 24 hours	Less than 24 hours	**1.9**
Fire-related Hazards						
Drought	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Lightning	Highly Likely	Limited	Negligible	6 to 12 hours	Less than 6 hours	**2.4**
Wildfire	Highly Likely	Minor	Small	Less than 6 hours	Less than 1 week	**2.6**
Geologic Hazards						
Earthquake	Possible	Minor	Moderate	Less than 6 hours	Less than 6 hours	**2.0**
Wind-related Hazards						
Extreme Cold	Possible	Minor	Large	More than 24 hours	Less than 1 week	**2.1**
Extreme Heat	Highly Likely	Minor	Large	More than 24 hours	More than 1 week	**2.8**
Hailstorm	Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours	**2.8**
Hurricane and Tropical Storm	Highly Likely	Critical	Large	More than 24 hours	Less than 24 hours	**3.2**
Severe Thunderstorm/ High Wind	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 6 hours	**3.1**
Tornado	Highly Likely	Critical	Small	Less than 6 hours	Less than 6 hours	**3.0**
Winter Weather	Likely	Minor	Moderate	More than 24 hours	Less than 24 hours	**2.1**
Other Hazards						
Climate Change/Sea Level Rise	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Hazardous Materials Incident/ Train Derailment	Highly Likely	Limited	Small	Less than 6 hours	Less than 24 hours	**2.8**
Infectious Disease	Possible	Limited	Large	More than 24 hours	More than 1 week	**2.5**

A.2.20 Final Determinations on Hazard Risk

The conclusions drawn from the hazard profiling process for George County, including the PRI results and input from the Regional Hazard Mitigation Council, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk, and Low Risk (**Table A.34**). For purposes of these classifications, risk is expressed in relative terms according to the estimated impact that a hazard will have on human life and property throughout all of George County. A more quantitative analysis to estimate potential dollar losses for each hazard has been performed separately, and is described in Section 6: *Vulnerability Assessment* and below in Section A.3. It should be noted that although some hazards are classified below as posing low risk, their occurrence of varying or unprecedented magnitudes is still possible in some cases and their assigned classification will continue to be evaluated during future plan updates.

Some priorities have changed since the previous plans were adopted due to the merging of multiple local plans to form this regional plan; however, most priorities remain the same.

TABLE A.34: CONCLUSIONS ON HAZARD RISK FOR GEORGE COUNTY

HIGH RISK	Hurricane and Tropical Storm Flood Severe Thunderstorm/High Wind Tornado
MODERATE RISK	Hailstorm Hazardous Materials Incident/Train Derailment Extreme Heat Wildfire Drought Climate Change/Sea Level Rise Infectious Disease
LOW RISK	Lightning Dam and Levee Failure Erosion Winter Weather Extreme Cold Earthquake Storm Surge

A.3 GEORGE COUNTY VULNERABILITY ASSESSMENT

This subsection identifies and quantifies the vulnerability of George County to the significant hazards previously identified. This includes identifying and characterizing an inventory of assets in the county and assessing the potential impact and expected amount of damages caused to these assets by each identified hazard event. More information on the methodology and data sources used to conduct this assessment can be found in Section 6: *Vulnerability Assessment*.

A.3.1 Asset Inventory

Table A.35 lists the estimated number of buildings, parcels, and the total value of improvements for George County and its participating jurisdictions (study area of vulnerability assessment). Because digital parcel data was not available for every community, data obtained from Hazus-MH 3.2 inventory was utilized to supplement the analysis where gaps existed.

TABLE A.35: IMPROVED PROPERTY IN GEORGE COUNTY

Location	Counts of Buildings	Counts of Parcels	Total Value of Improvements
Lucedale	1,538	--	$335,976,000

Location	Counts of Buildings	Counts of Parcels	Total Value of Improvements
Unincorporated Area	8,783	--	$1,463,942,000
GEORGE COUNTY TOTAL*	**10,321**	**--**	**$1,799,918,000**

*Parcel counts and improvement values for George County are based on Hazus 3.2 estimates at the Census Block level
Source: MDEQ, Hazus-MH 3.2

Table A.36 lists the critical facilities located in George County by type according to data provided by local government officials.

In addition, **Figure A.19** shows the locations of critical facilities in George County. **Table A.52**, at the end of this subsection, shows a complete list of the critical facilities by name, as well as the hazards that affect each facility. Further, it should be noted that the table below may show that some communities do not have any critical facilities of in certain type, when in reality, that particular type of facility may actually be located within the community. This may occur because spatial data for that facility type was not available or because the facility may have been classified under a different category type for that particular community.

TABLE A.36: CRITICAL FACILITY INVENTORY IN GEORGE COUNTY

Location	Communications	EOC	Fire Stations	Medical	Police Station	Power/ Gas	Private/Non-Profit
Lucedale	0	0	1	0	1	0	0
Unincorporated Area	2	1	14	2	0	2	1
GEORGE COUNTY TOTAL	**2**	**1**	**15**	**2**	**1**	**2**	**1**

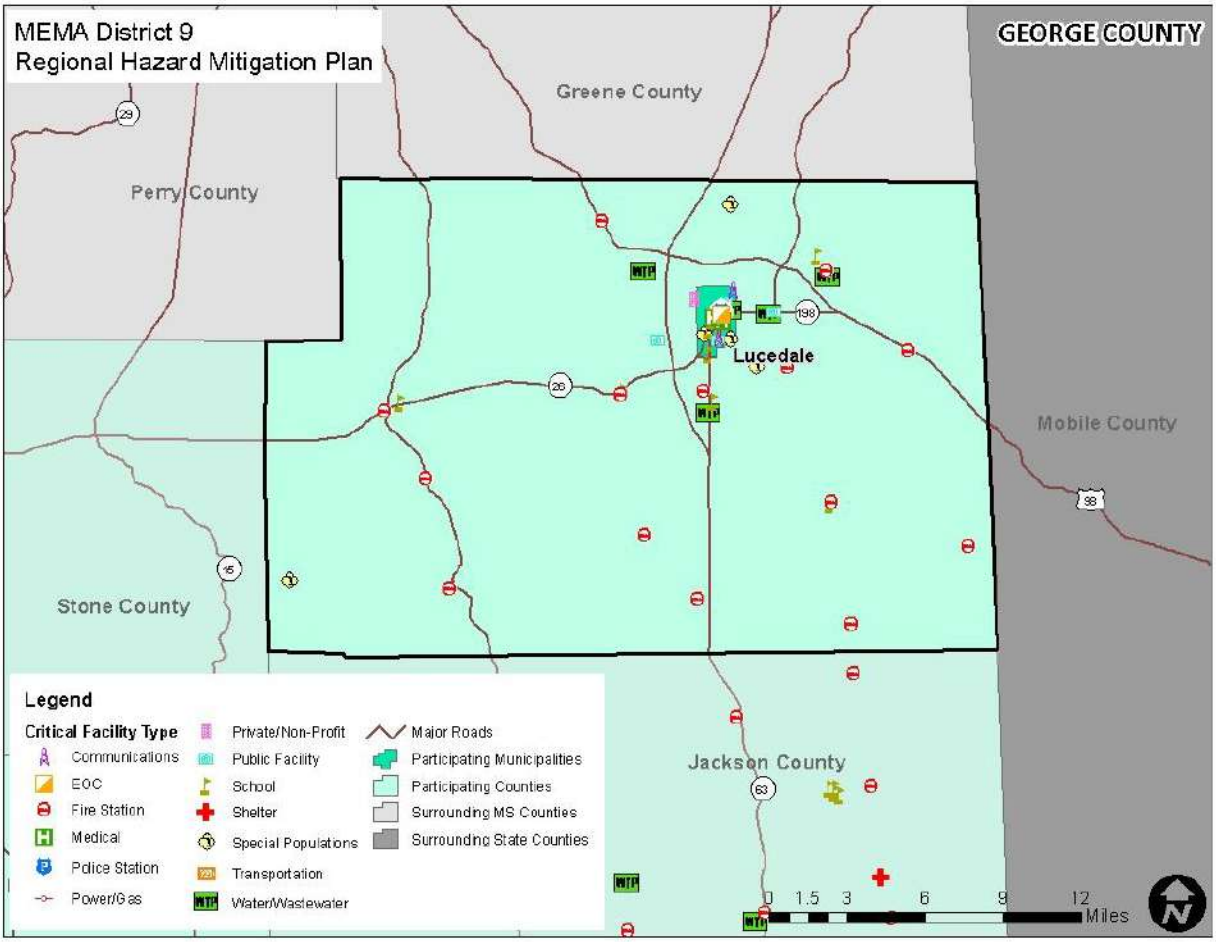
Source: Local Governments

TABLE A.36: CRITICAL FACILITY INVENTORY IN GEORGE COUNTY (CONT.)

Location	Public Facility	School	Shelter	Special Populations	Transportation	Water/ Wastewater
Lucedale	1	0	0	0	0	1
Unincorporated Area	7	9	0	5	0	4
GEORGE COUNTY TOTAL	**8**	**9**	**0**	**5**	**0**	**5**

Source: Local Governments

FIGURE A.19: CRITICAL FACILITY LOCATIONS IN GEORGE COUNTY



Source: Local Governments

A.3.2 Social Vulnerability

In addition to identifying those assets potentially at risk to identified hazards, it is important to identify and assess those particular segments of the resident population in George County that are potentially at risk to these hazards.

Table A.37 lists the population by jurisdiction according to American Community Survey 2015 population estimates. The total population in George County according to Census data is 23,104 persons. Additional population estimates are presented above in Section A.1.

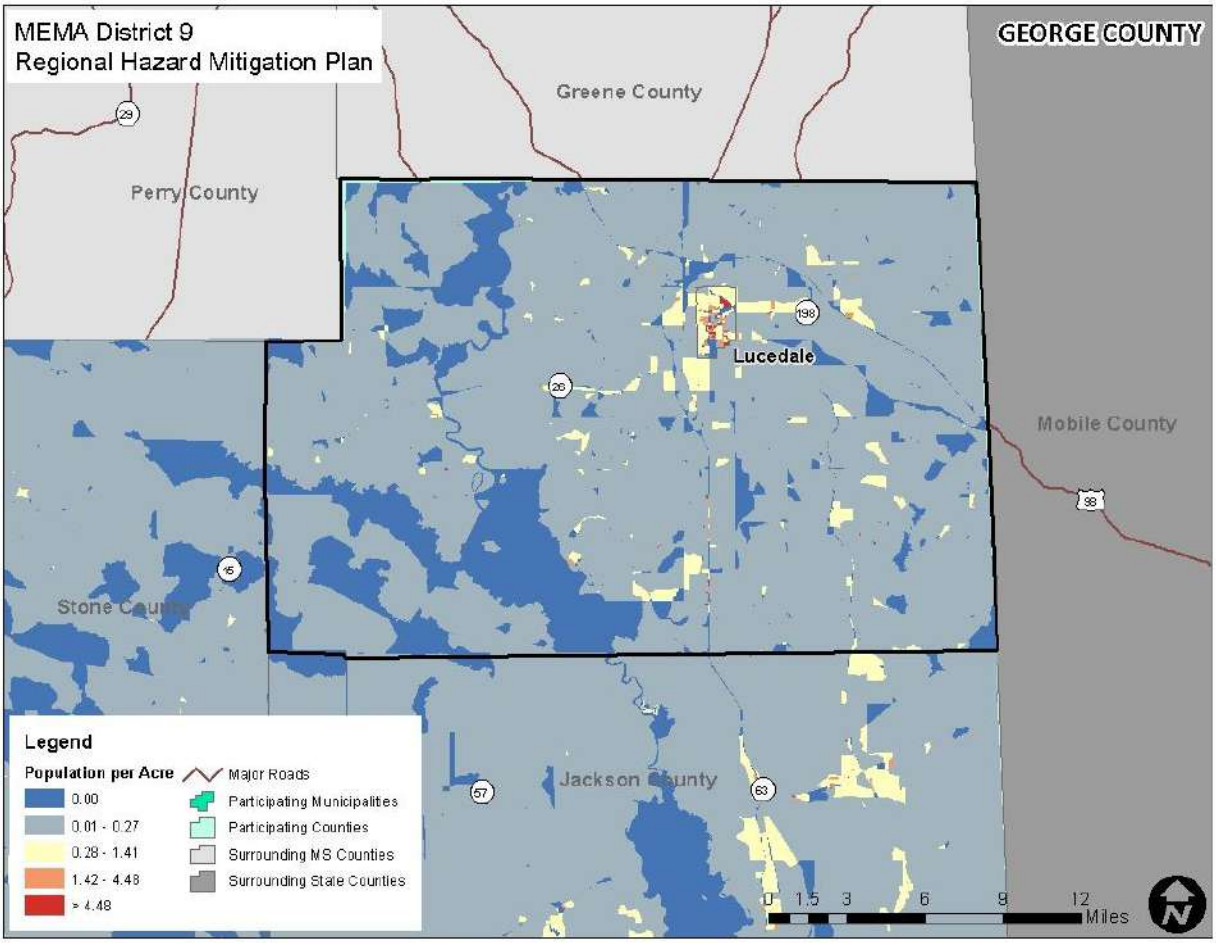
TABLE A.37: TOTAL POPULATION IN GEORGE COUNTY

Location	Total 2015 Population
Lucedale	2,993
Unincorporated Area	20,111
GEORGE COUNTY TOTAL	**23,104**

Source: United States Census Bureau, 2011-2015 American Community Survey 5-Year Estimates

In addition, **Figure A.20** illustrates the population density per acre by census block as it was reported by the U.S. Census Bureau in 2010. As can be seen in the figure, the population is spread out through most of the county, with a heavier concentration in Lucedale.

FIGURE A.20: POPULATION DENSITY IN GEORGE COUNTY



Source: United States Census Bureau, 2010 Census

A.3.3 Development Trends and Changes in Vulnerability

Since the previous local-level hazard mitigation plans were approved, George County has experienced moderate growth and development. **Table A.38** shows the number of building units constructed since 2010 according to the U.S. Census American Community Survey.

TABLE A.38: BUILDING COUNTS FOR GEORGE COUNTY

Location	2010	2011	2012	2013	2014	2015	% Building Stock Built Post-2010
Lucedale	1,174	1,264	1,250	1,236	1,126	1,113	-5.2%

Location	2010	2011	2012	2013	2014	2015	% Building Stock Built Post-2010
Unincorporated Area	7,899	7,951	8,023	8,062	8,216	8,242	4.3%
GEORGE COUNTY TOTAL	**9,073**	**9,215**	**9,273**	**9,298**	**9,342**	**9,355**	**3.1%**

Source: United States Census Bureau, American Community Survey

Table A.39 shows population growth estimates for the county from 2010 to 2015 based on the based on the American Community Survey's annual population estimates.

TABLE A.39: POPULATION GROWTH FOR GEORGE COUNTY

Location	Population Estimates						% Change 2010-2015
	2010	2011	2012	2013	2014	2015	
Lucedale	2,934	2,936	2,943	2,959	2,978	2,993	2.0%
Unincorporated Area	19,127	19,425	19,636	19,798	19,982	20,111	5.1%
GEORGE COUNTY TOTAL	**22,061**	**22,361**	**22,579**	**22,757**	**22,960**	**23,104**	**4.7%**

Source: United States Census Bureau, American Community Survey

Based on the data above, there has been a moderate rate of residential development and population growth in the county since 2010, and the some of the county has experienced slight increases in population and housing development, resulting in an increased number of structures and people that are vulnerable to the potential impacts of the identified hazards. However, the City of Lucedale has experienced a slight decline in housing development since 2010 according to estimates. Therefore, development and population growth have impacted the county's vulnerability since the previous local hazard mitigation plans were approved and there has been an increase in the overall vulnerability.

It is also important to note that as development increases in the future, greater populations and more structures and infrastructure will be exposed to potential hazards if development occurs in the floodplains or other identified areas of high risk.

A.3.4 Vulnerability Assessment Results

As noted in Section 6: *Vulnerability Assessment*, only hazards with a specific geographic boundary, available modeling tool, or sufficient historical data allow for further analysis. Those results, specific to George County, are presented here. All other hazards are assumed to impact the entire planning region (e.g., drought) or, due to lack of data, analysis would not lead to credible results (e.g., infectious disease). The total county exposure, and thus risk to these hazards, was presented in **Table A.35**.

The hazards to be further analyzed in this subsection include: flood, wildfire, earthquake, hurricane and tropical storm winds and storm surge, hazardous materials incident, dam and levee failure, and sea level rise.

The annualized loss estimate for all hazards is presented near the end of this subsection in **Table A.51.**

FLOOD

Historical evidence indicates that George County is susceptible to flood events. A total of 25 flood events have been reported by the National Climatic Data Center resulting in $48,618 (2016 dollars) in property damage. On an annualized level, these damages amounted to $3,048 for George County.

In order to assess flood risk, a GIS-based analysis was used to estimate exposure to flood events using Digital Flood Insurance Rate Map (DFIRM) data in combination with improved property records for George County. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within an identified floodplain.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones.

Table A.40 shows the results of the analysis.

TABLE A.40: ESTIMATED EXPOSURE OF PROPERTY TO THE FLOOD HAZARD

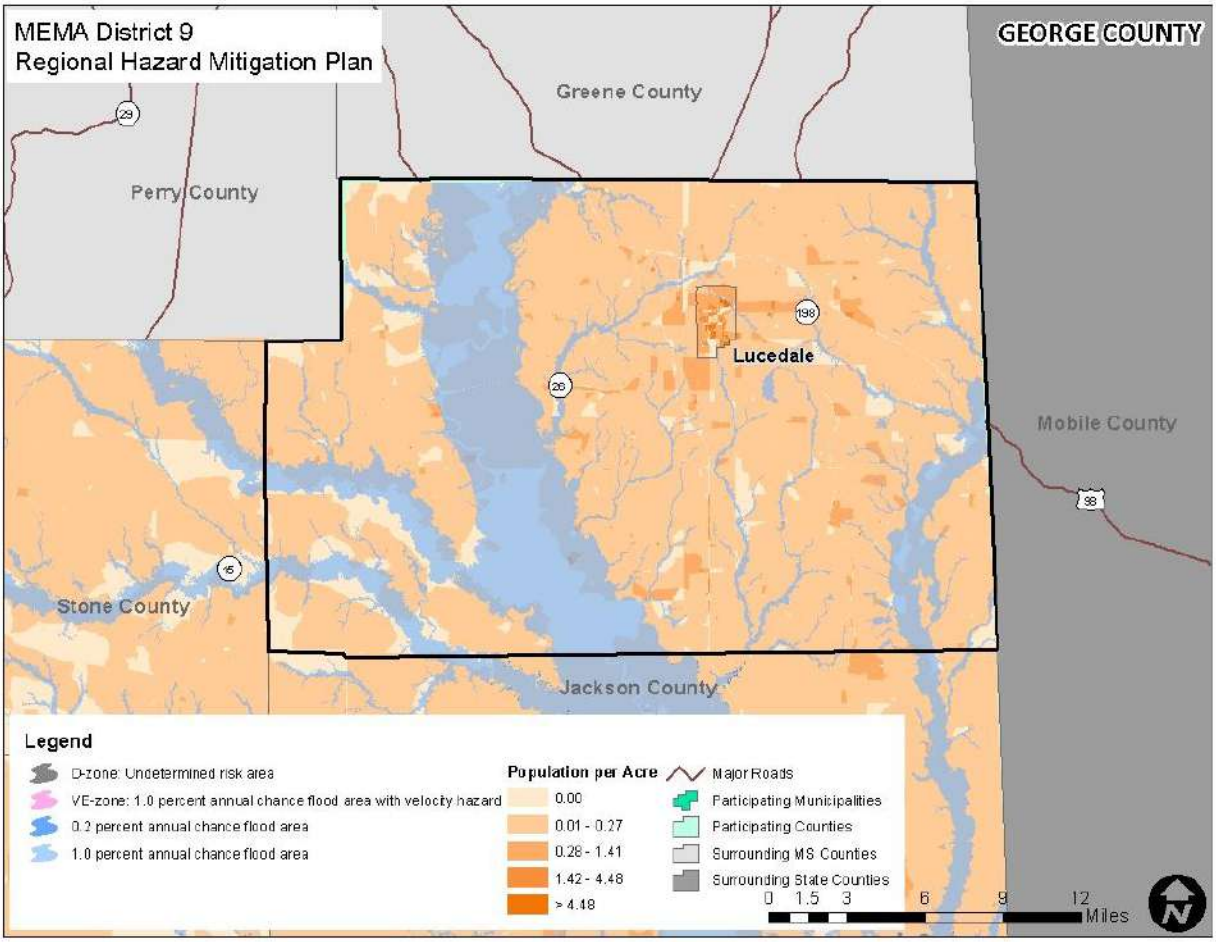
Location	1.0-percent ACF		0.2-percent ACF		VE Zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Lucedale	316	$69,124,000	0	$0	0	$0
Unincorporated Area	6,023	$963,930,000	88	$16,456,000	0	$0
GEORGE COUNTY TOTAL*	**6,339**	**$1,033,054,000**	**88**	**$16,456,000**	**0**	**$0**

** As noted above, building footprints and parcel data were not available for George County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: Federal Emergency Management Agency DFIRM, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Figure A.21 is presented to gain a better understanding of at-risk population by evaluating census block level population data against mapped floodplains. There are areas of concern in several of the population centers in the county. Therefore, there is significant population vulnerability to flooding.

FIGURE A.21 : POPULATION DENSITY NEAR FLOODPLAINS IN GEORGE COUNTY



Source: Federal Emergency Management Agency DFIRM, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are no facilities located in one of the identified floodplain zones. A list of specific critical facilities and their associated risk can be found in **Table A.52** at the end of this subsection.

In conclusion, a flood has the potential to impact many existing and future buildings, facilities, and populations in George County, though some areas are at a higher risk than others. All types of structures in a floodplain are at-risk, though elevated structures will have a reduced risk. Such site-specific vulnerability determinations are outside the scope of this assessment but may be considered during future plan updates. Furthermore, areas subject to repetitive flooding should be analyzed for potential mitigation actions.

WILDFIRE

Although historical evidence indicates that George County is susceptible to wildfire events, there are few reports which include information on historic dollar losses. Therefore, it is difficult to calculate a reliable

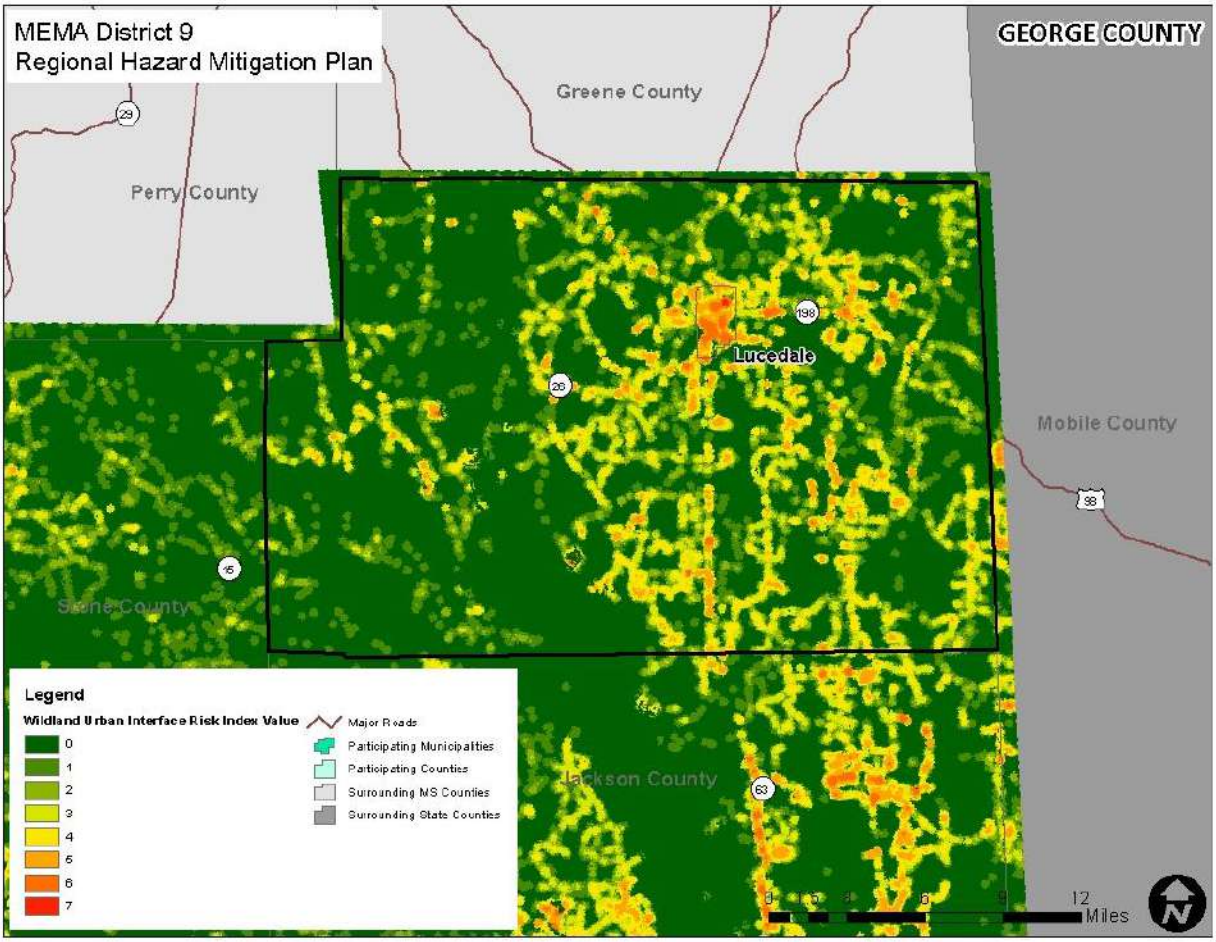
annualized loss figure. Annualized loss is considered relatively low, though it should be noted that a single event could result in significant damages throughout the county.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones. For the critical facility analysis, areas of concern were intersected with critical facility locations.

Figure A.22 shows the Wildland Urban Interface Risk Index (WUIRI) data, which is a data layer that shows a rating of the potential impact of a wildfire on people and their homes. The key input, Wildland Urban Interface (WUI), reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the WUI and rural areas is key information for defining potential wildfire impacts to people and homes. Initially provided as raster data, it was converted to a polygon to allow for analysis. The Wildland Urban Interface Risk Index data ranges from 0 to 7 with higher values being most severe (as noted previously, this is only a measure of relative risk). **Figure A.23** shows the areas of analysis where any grid cell is less than 3. Areas with a value below 3 were chosen to be displayed as areas of risk because this showed the upper echelon of the scale and the areas at highest risk.

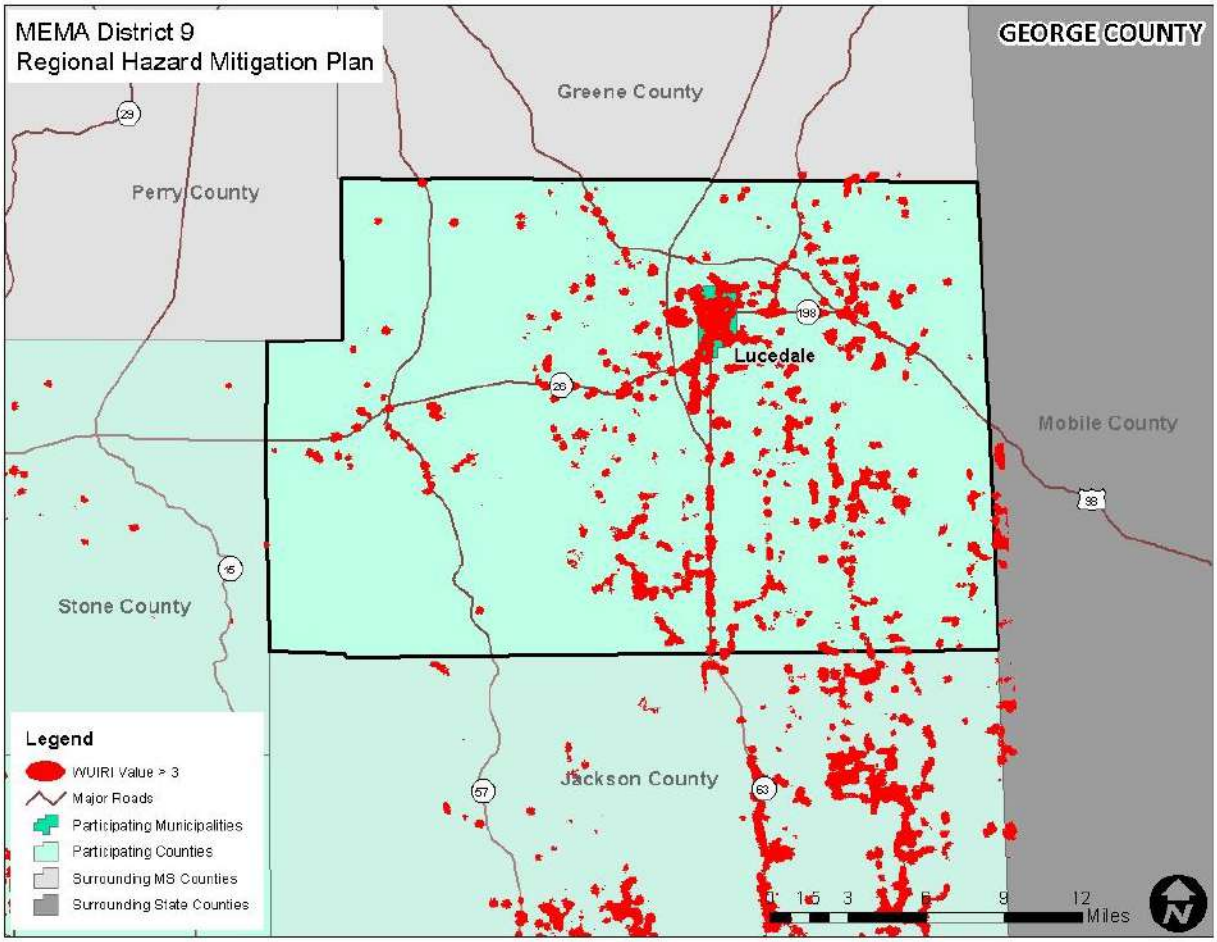
Table A.41 shows the results of the analysis.

FIGURE A.22: WUI RISK INDEX AREAS IN GEORGE COUNTY



Source: Southern Wildfire Risk Assessment Data

FIGURE A.23: WILDFIRE RISK AREAS IN GEORGE COUNTY



Source: Southern Wildfire Risk Assessment Data

TABLE A.41: EXPOSURE OF IMPROVED PROPERTY TO WILDFIRE RISK AREAS

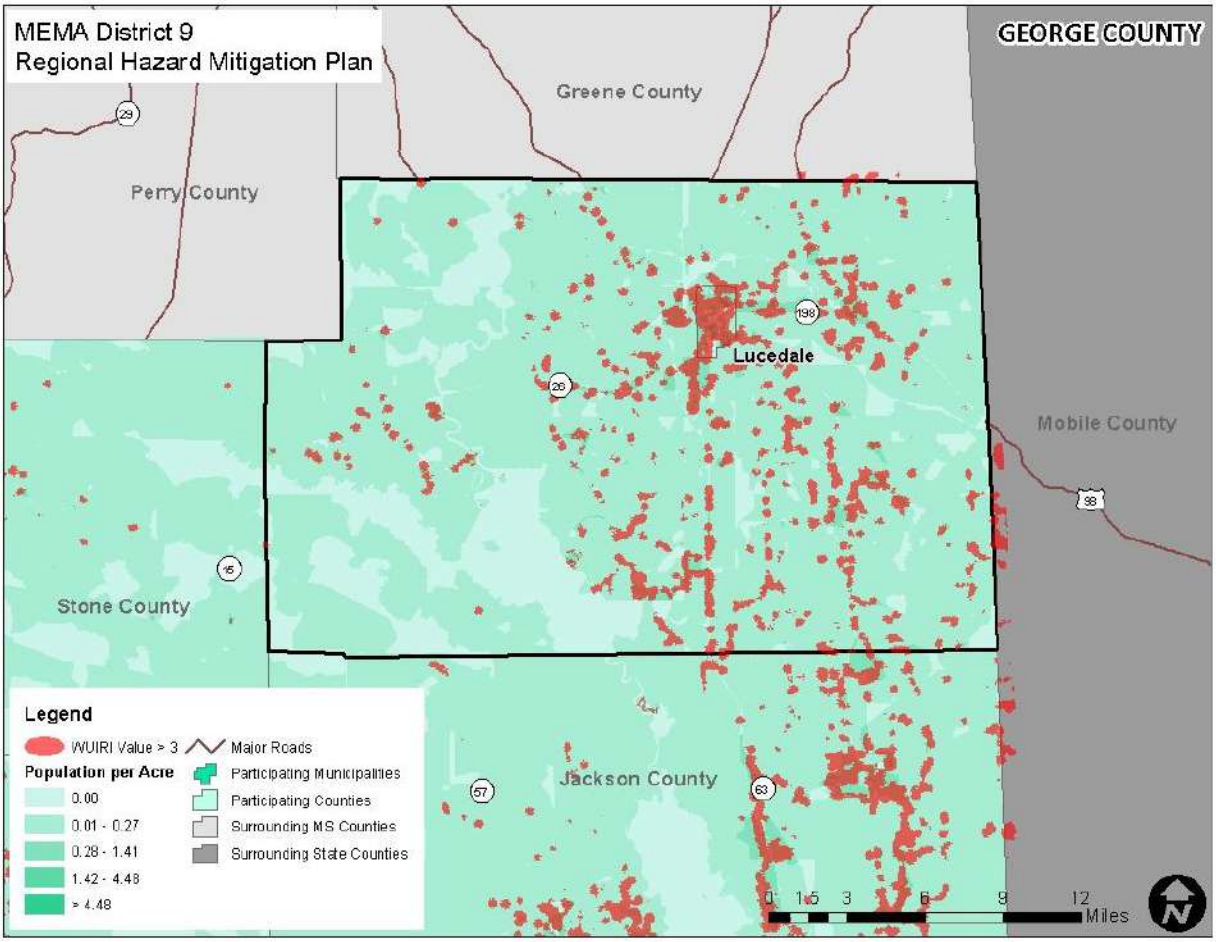
Location	Wildfire Risk	
	Approx. Number of Buildings	Approx. Improved Value
Lucedale	1,538	$335,976,000
Unincorporated Area	8,010	$1,328,263,000
GEORGE COUNTY TOTAL*	**9,548**	**$1,664,239,000**

** As noted above, building footprints and parcel data were not available for George County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: SWRA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Given some level of susceptibility across the entire county, it is assumed that the total population is at risk to the wildfire hazard. **Figure A.24** shows an overlay of the wildfire risk areas identified above with the population density by census block. This shows that many of the areas of high population concentration are susceptible to wildfire because of their proximity to the wildland urban interface.

FIGURE A.24: WILDFIRE RISK AREAS IN GEORGE COUNTY



Source: Southern Wildfire Risk Assessment Data; United States Census

Critical Facilities

The critical facility analysis revealed that there are 37 critical facilities located in wildfire areas of concern, including 1 communications, 1 EOC, 12 fire stations, 2 medical, 1 police station, 2 power/gas, 1 private/non-profit, 7 public facilities, 6 schools, 1 special population, and 3 water/wastewater. It should be noted, that several factors could impact the spread of a wildfire putting all facilities at risk. A list of specific critical facilities and their associated risk can be found in **Table A.52** at the end of this subsection.

In conclusion, a wildfire event has the potential to impact many existing and future buildings, critical facilities, and populations in George County.

EARTHQUAKE

As the Hazus-MH model suggests below, and historical occurrences confirm, any earthquake activity in the area is likely to inflict only minor to moderate damage to the county. Hazus-MH 3.2 estimates a total annualized loss of $8,000 which includes buildings, contents, and inventory throughout the county.

For the earthquake hazard vulnerability assessment, a probabilistic scenario was created to estimate the average annualized loss[26] for the county. The results of the analysis are generated at the Census Tract level within Hazus-MH and then aggregated to the county level. Since the scenario is annualized, no building counts are provided. Losses reported included losses due to structure failure, building loss, contents damage, and inventory loss. They do not include losses to business interruption, lost income, or relocation. **Table A.42** summarizes the findings with results rounded to the nearest thousand.

TABLE A.42: AVERAGE ANNUALIZED LOSS ESTIMATIONS FOR EARTHQUAKE HAZARD

Location	Structural Damage	Non-Structural Damage	Contents Damage	Inventory Loss	Total Annualized Loss
George County	$2,000	$5,000	$1,000	$0	$8,000

Source: Hazus-MH 3.2

Social Vulnerability
It can be assumed that all existing and future populations are at risk to the earthquake hazard.

Critical Facilities
The Hazus-MH probabilistic analysis indicated that no critical facilities would sustain measurable damage in an earthquake event. However, all critical facilities should be considered at-risk to minor damage, should an event occur. Specific vulnerabilities for these assets will be greatly dependent on their individual design and the mitigation measures in place. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates.

In conclusion, an earthquake has the potential to impact all existing and future buildings, facilities, and populations in George County. The Hazus-MH scenario indicates that minimal to moderate damage is expected from an earthquake occurrence. While George County may not experience a large earthquake, localized damage is possible with an occurrence. A list of specific critical facilities and their associated risk can be found in **Table A.52** at the end of this subsection.

HURRICANE AND TROPICAL STORM

Historical evidence indicates that George County has very significant risk to the hurricane and tropical storm hazard. There have been 10 disaster declarations due to hurricanes or tropical storms (Hurricanes Camille, Frederic, Georges, Ivan, Dennis, Katrina, Gustav, and Isaac, as well as Tropical Storms Allison and Isidore). A large number tracks have come near or traversed through the county, as shown and discussed in Section A.2.12. Hazus-MH 3.2 estimates a total annualized loss of $6,751,000 which includes buildings, contents, and inventory throughout the county.

Hurricane Winds
Hurricanes and tropical storms can cause damage through numerous additional hazards such as flooding, erosion, tornadoes, and high winds, thus it is difficult to estimate total potential losses from these cumulative effects. The current Hazus-MH hurricane model only analyzes hurricane winds and storm surge and is not capable of modeling and estimating cumulative losses from all hazards associated with hurricanes; therefore, only these two aspects of hurricane losses are analyzed in this section. It can be assumed that all existing and future buildings and populations are at risk to hurricane and tropical storm

[26] Annualized loss is defined by Hazus-MH as the expected value of loss in any one year.

wind hazard. Hazus-MH 3.2 was used to determine average annualized losses[27] for the county as shown below in **Table A.43.** Only losses to buildings, inventory, and contents are included in the results.

TABLE A.43: AVERAGE ANNUALIZED LOSS ESTIMATIONS FOR HURRICANE WIND HAZARD

Location	Building Damage	Contents Damage	Inventory Loss	Total Annualized Loss
George County	$4,776,000	$1,959,000	$16,000	$6,751,000

Source: Hazus-MH 3.2

Storm Surge

In addition, although it was treated as a separate hazard throughout this plan, storm surge is most often associated with hurricanes and tropical storms. Indeed, Hazus incorporates the storm surge model for estimating damage from storm surge as part of the hurricane model. The storm surge model can only be run as part of a historic hurricane model run and not as part of an annualized loss model. Unfortunately, in this model, storm surge impacts are calculated as part of the total damage from the historic event and thus could not be separated out and evaluated solely in terms of storm surge loss. As such, the estimated losses presented below are combined losses from hurricane winds and storm surge. The historic Hurricane Katrina model was utilized as this was certainly one of the most impactful storms in the region and therefore estimates the potential losses that are possible from a large hurricane event. **Table A.44** presents the losses from this modeled event.

TABLE A.44: POTENTIAL LOSS ESTIMATIONS FOR LARGE HURRICANE EVENT

Location	Building Damage	Contents Damage	Inventory Loss	Total Annualized Loss
George County	$33,209,000	$10,744,000	$73,000	$44,026,000

Source: Hazus-MH 3.2

Social Vulnerability

Given equal susceptibility across the county, it is assumed that the total population, both current and future, is at risk to the hurricane and tropical storm wind hazard. In terms of social vulnerability to storm surge, coastal populations are at much higher risk than inland populations. Since George County is not located on the coast, there is lower social vulnerability to storm surge compared to the rest of the region.

Critical Facilities

Given equal vulnerability across George County, all critical facilities are considered to be at risk. Some buildings may perform better than others in the face of such an event due to construction and age, among factors. Determining individual building response to wind and storm surge is beyond the scope of this plan. However, this plan will consider mitigation action for especially vulnerable structures and/or critical facilities to mitigate against the effects of the hurricane hazard. A list of specific critical facilities can be found in **Table A.52** at the end of this subsection.

In conclusion, a hurricane event has the potential to impact many existing and future buildings, critical facilities, and populations in George County.

[27] Annualized loss is defined by Hazus-MH as the expected value of loss in any one year.

HAZARDOUS MATERIALS INCIDENT

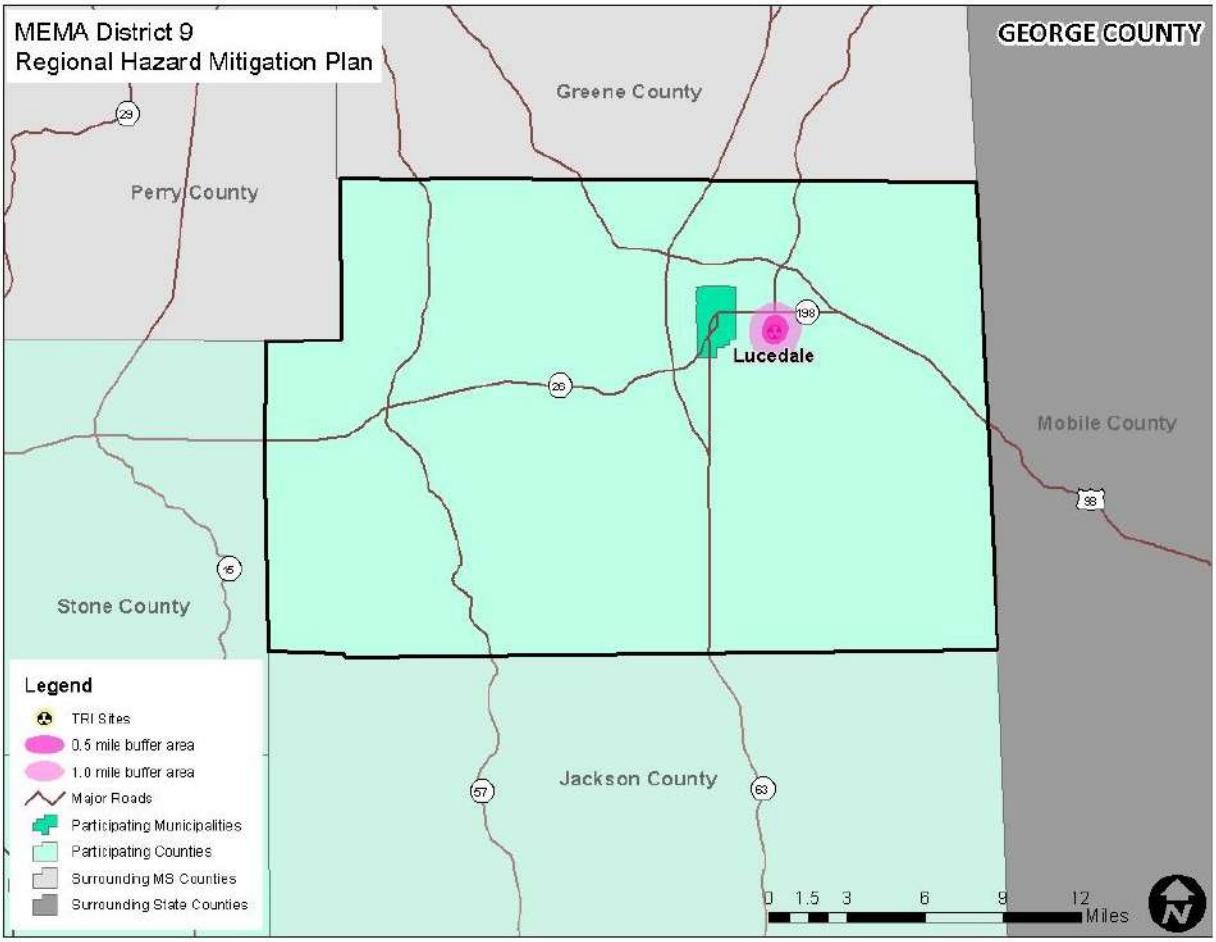
Historical evidence indicates that George County is susceptible to hazardous materials events. A total of 11 HAZMAT incidents have been reported by the Pipeline and Hazardous Materials Safety Administration, resulting in $101,050 (2016 dollars) in property damage. On an annualized level, these damages amount to $3,866 for the county.

Most hazardous materials incidents that occur are contained and suppressed before destroying any property or threatening lives. However, they can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities, and cause affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. Certain chemicals may travel through the air or water, affecting a much larger area than the point of the incidence itself. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features, can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

In order to conduct the vulnerability assessment for this hazard, GIS intersection analysis was used for fixed and mobile areas and building footprints/parcels where available and Census block data where footprints/parcels were not available.[28] In both scenarios, two sizes of buffers—0.5-mile and 1.0-mile—were used. These areas are assumed to represent the different levels of effect: immediate (primary) and secondary. Primary and secondary impact zones were selected based on guidance from the PHMSA Emergency Response Guidebook. For the fixed site analysis, geo-referenced TRI sites in the region, along with buffers, were used for analysis as shown in **Figure A.25.** For the mobile analysis, the major roads (Interstate highway, U.S. highway, and State highway) and railroads, where hazardous materials are primarily transported that could adversely impact people and buildings, were used for the GIS buffer analysis. **Figure A.26** shows the areas used for mobile road toxic release buffer analysis and **Figure A.27** shows the areas used for the mobile railroad toxic release buffer analysis. The results indicate the approximate number of improved properties and improved value, as shown in **Table A.45** (fixed sites), **Table A.46** (mobile roads), and **Table A.47** (mobile railroad sites).[29]

[28] This type of analysis will likely yield inflated results (generally higher than what is actually reported after an actual event).
[29] Note that improved properties included in the 1.0-mile analysis are also included in the 0.5-mile analysis.

FIGURE A.25 : TRI SITES WITH BUFFERS IN GEORGE COUNTY



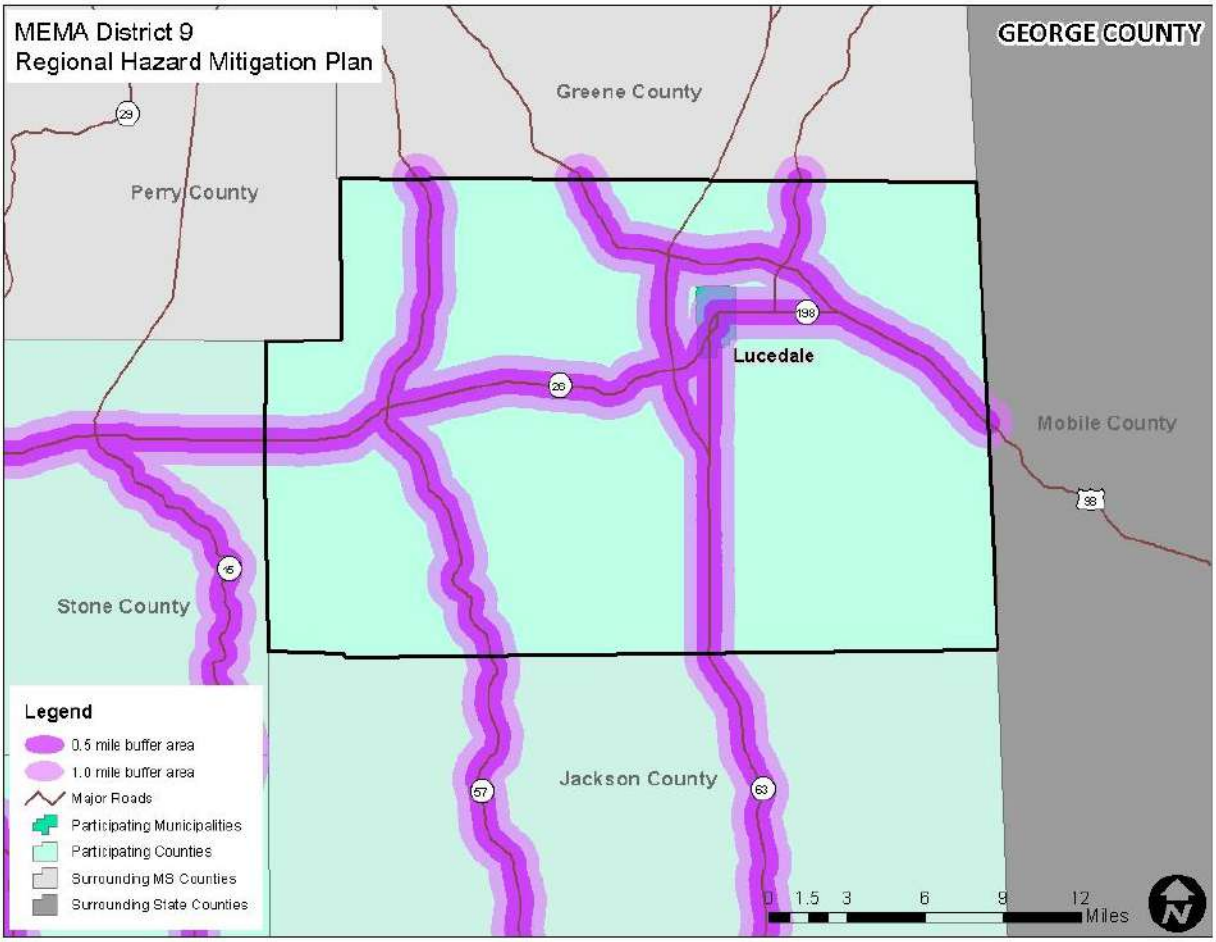
Source: Environmental Protection Agency

TABLE A.45: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS (FIXED SITES)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Lucedale	0	$0	99	$18,341,000
Unincorporated Area	83	$22,552,000	262	$53,812,000
GEORGE COUNTY TOTAL*	**83**	**$22,552,000**	**361**	**$72,153,000**

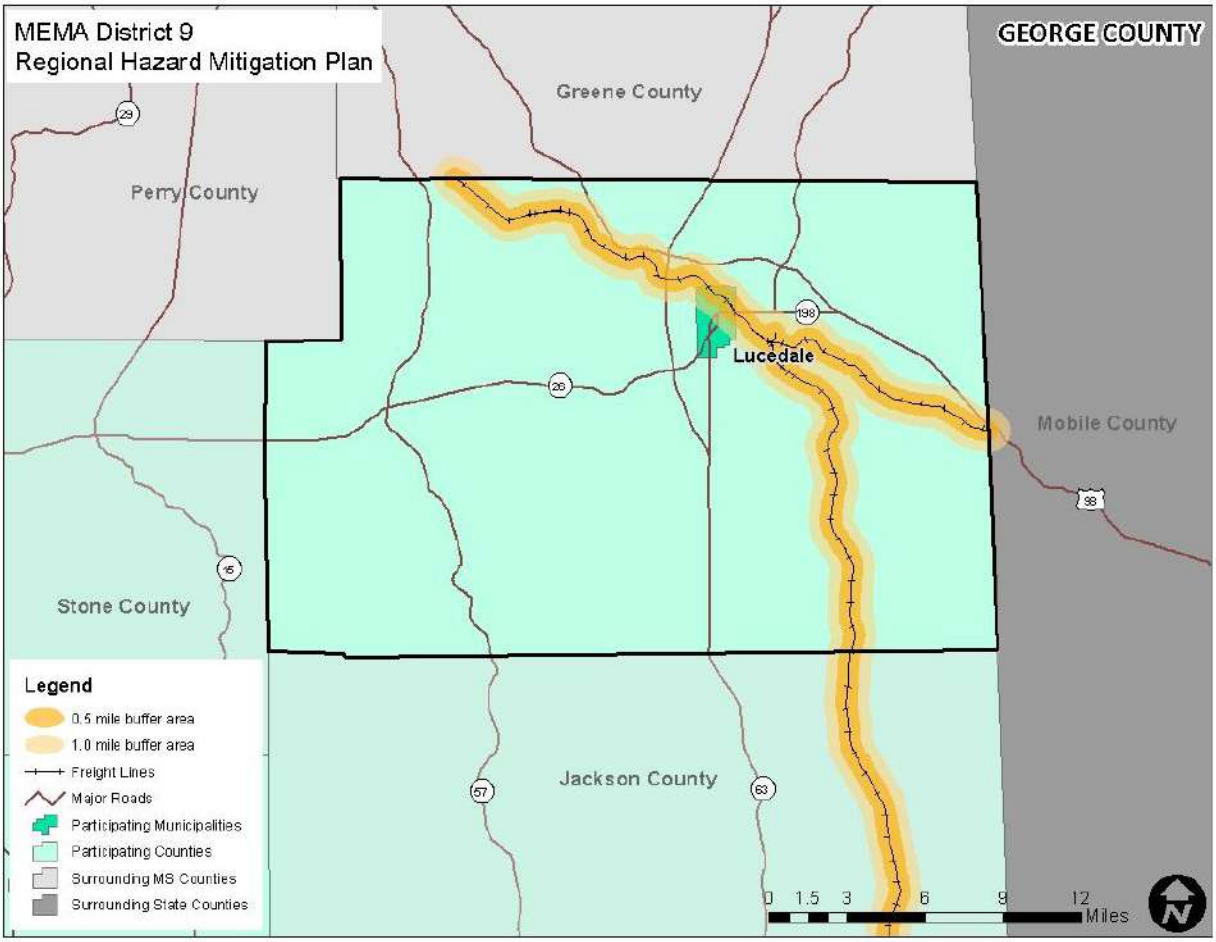
** As noted above, building footprints and parcel data were not available for George County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: EPA, MDEQ, Hazus MH 3.2 Data

FIGURE A.26 : MOBILE (ROAD) HAZMAT BUFFERS IN GEORGE COUNTY



Source: Federal Highway Administration National Highway Planning Network

FIGURE A.27 : MOBILE (RAIL) HAZMAT BUFFERS IN GEORGE COUNTY



Source: U.S. Department of Transportation Federal Railroad Administration

TABLE A.46: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - ROAD)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Lucedale	1,351	$306,348,000	1,538	$335,976,000
Unincorporated Area	3,802	$681,336,000	4,741	$839,164,000
GEORGE COUNTY TOTAL*	**5,153**	**$987,684,000**	**6,279**	**$1,175,140,000**

** As noted above, building footprints and parcel data were not available for George County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: NHPN, MDEQ, Hazus MH 3.2 Data

TABLE A.47: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - RAILROAD)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Lucedale	457	$115,711,000	864	$210,193,000
Unincorporated Area	2,040	$349,143,000	2,545	$436,582,000
GEORGE COUNTY TOTAL*	**2,497**	**$464,854,000**	**3,409**	**$646,775,000**

** As noted above, building footprints and parcel data were not available for George County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: USDOT FRA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability
Given high susceptibility across the entire county, it is assumed that the total population is at risk to a hazardous materials incident. It should be noted that areas of population concentration may be at an elevated risk due to a greater burden to evacuate population quickly.

Critical Facilities
Fixed Site Analysis:
The critical facility analysis for fixed TRI sites revealed that there are 2 facilities located in a fixed HAZMAT risk zone. Neither of these facilities are in the primary (0.5 mile) risk area. A list of specific critical facilities and their associated risk can be found in **Table A.52** at the end of this subsection.

Mobile Analysis:
The critical facility analysis for transportation corridors revealed that there are 41 facilities located in the primary and secondary road HAZMAT buffer areas. Of these, there were 35 critical facilities located in the primary risk zone including 1 communications, 1 EOC, 9 fire stations, 2 medical, 1 police station, 2 power/gas, 8 public facilities, 7 schools, 1 special population, and 3 water/wastewater.

For the rail line buffer areas, there were a total of 24 critical facilities located in primary and secondary buffer areas. Of these, 10 facilities are located within the primary buffer area including 4 fire stations, 1 police station, 3 public facilities, 1 school, and 1 water/wastewater.

A list of specific critical facilities and their associated risk can be found in **Table A.52** at the end of this subsection.

In conclusion, a hazardous material incident has the potential to impact many existing and future buildings, critical facilities, and populations in George County. Those areas in a primary buffer are at the highest risk, though all areas carry some vulnerability due to variations in condition that could alter the impact area (i.e., direction and speed of wind, volume of release, etc.).

DAM/LEVEE FAILURE

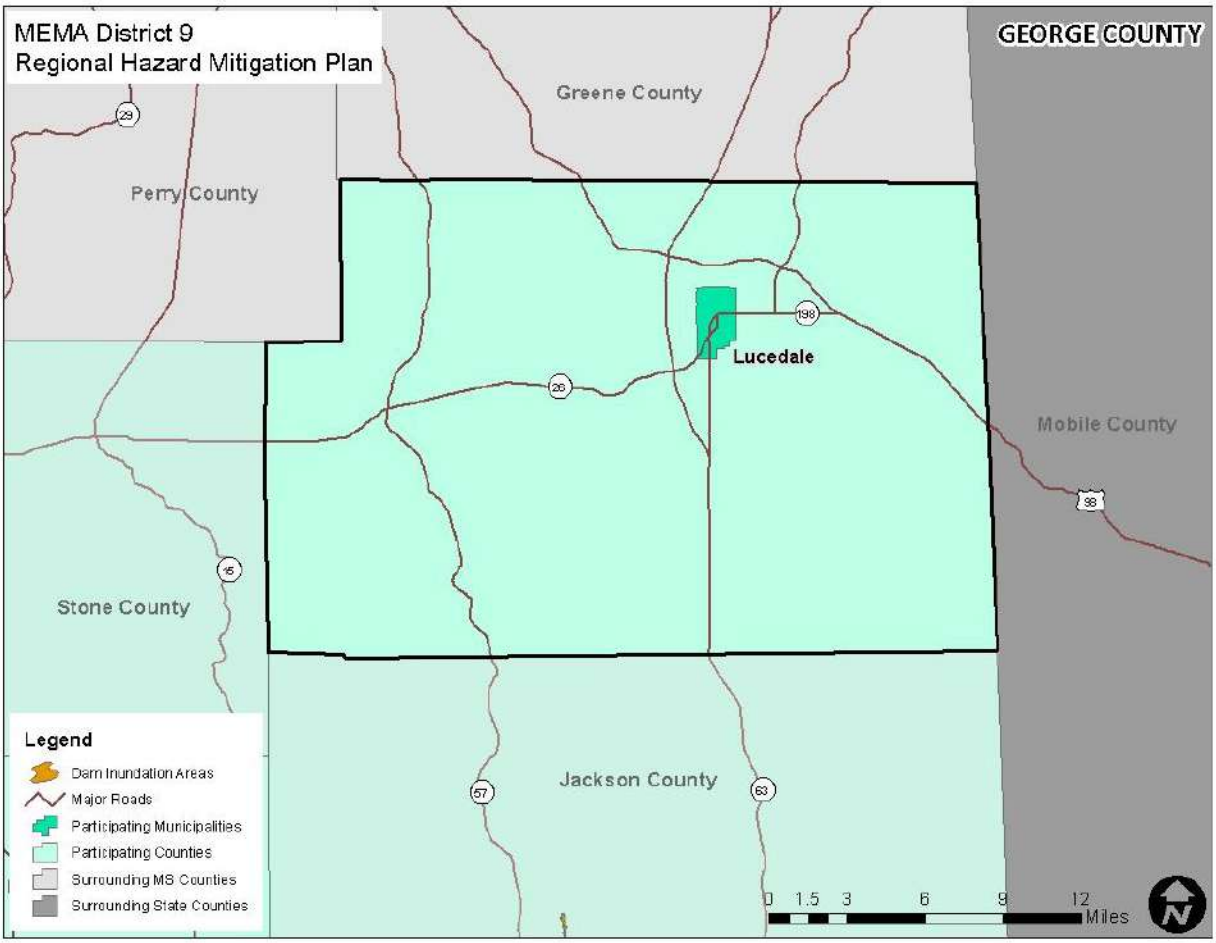
In order to assess risk to a dam or levee failure, a GIS-based analysis was used to estimate exposure to one of the areas delineated by the Mississippi Department of Environmental Quality as a potential

inundation area in the event of a failure. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within an identified inundation area. As mentioned previously, this type of inundation mapping has not been completed for every dam/levee in the region, so the results of this analysis likely underestimate the overall vulnerability to a dam or levee failure. However, the analysis is still useful as a sort of baseline minimum of property that is potentially at-risk. The identified inundation areas can be found in **Figure A.28**.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones.

Table A.48 presents the potential at-risk property. Both the number of buildings and the approximate improved value are presented

FIGURE A.28: DAM INUNDATION AREAS IN GEORGE COUNTY



Source: Mississippi Department of Environmental Quality

TABLE A.48: ESTIMATED EXPOSURE OF IMPROVEMENTS TO THE DAM/LEVEE FAILURE HAZARD

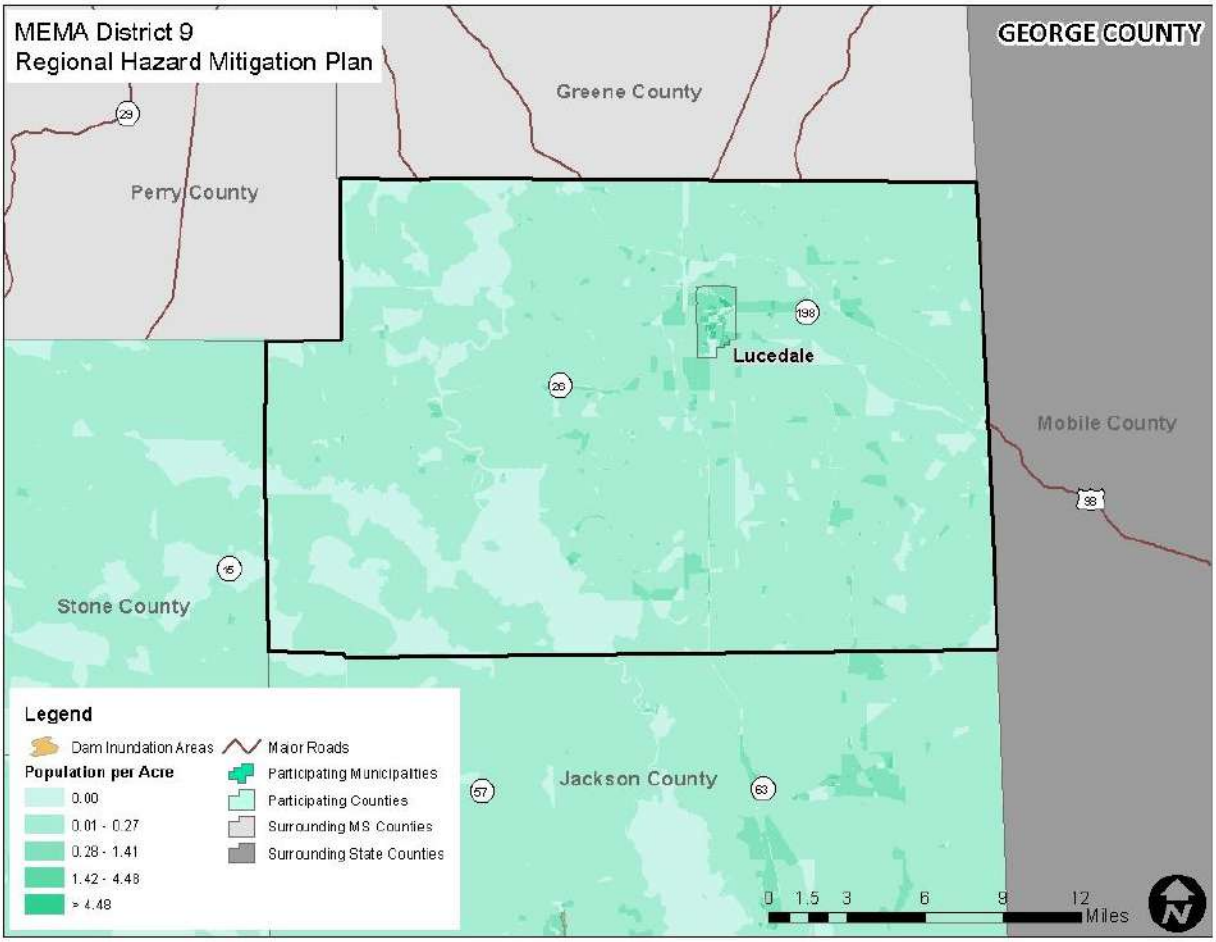
Location	Dam Inundation Area	
	Approx. Number of Buildings	Approx. Improved Value
Lucedale	0	$0
Unincorporated Area	0	$0
GEORGE COUNTY TOTAL*	**0**	**$0**

** As noted above, building footprints and parcel data were not available for George County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: MDEQ, Hazus 3.2

Social Vulnerability

Figure A.29 is presented to gain a better understanding of at-risk population by evaluating census block level population data against dam inundation areas. There are no areas of concern in the county and it should be noted that most of the population of the region is not at risk to a dam/levee failure.

FIGURE A.29: POPULATION DENSITY NEAR DAM INUNDATION AREAS IN GEORGE COUNTY



Source: MDEQ, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are no facilities located in dam inundation areas. A list of specific critical facilities and their associated risk can be found in **Table A.52** at the end of this subsection.

In conclusion, a dam does not have the potential to impact existing and future buildings, facilities, and populations in George County, though this analysis is not all-encompassing in terms of risk to a dam or levee failure because inundation mapping is not available for all dams in the region.

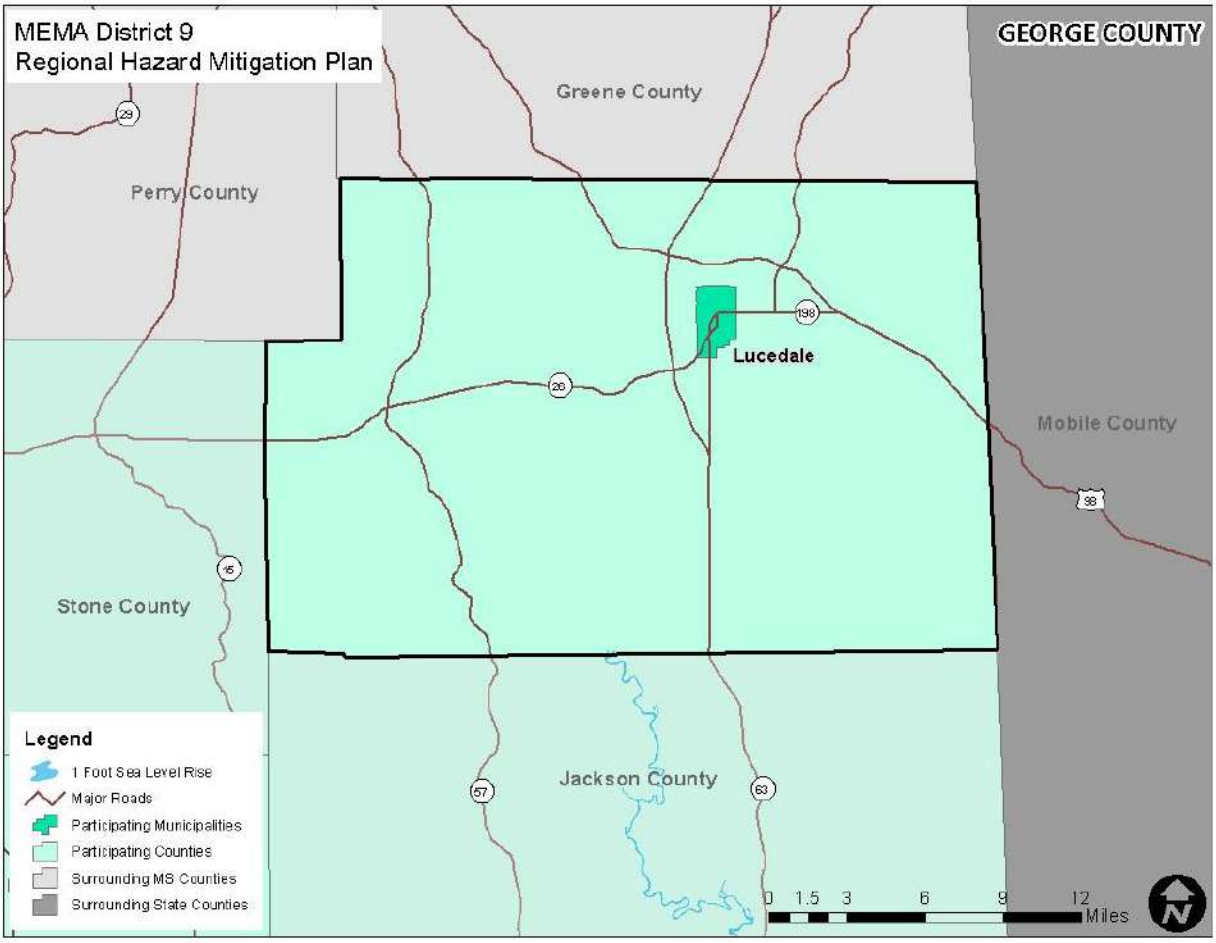
CLIMATE CHANGE/SEA LEVEL RISE

Most assessments carried out across the globe have concluded that climate change is a phenomenon that will impact our planet in the foreseeable future. Among others, the National Climate Assessment, International Panel on Climate Change, and National Oceanic and Atmospheric Administration all project that climate change will impact the United States and will have a major impact on coastal communities due to the effects of sea level rise. As such, projections concerning sea level rise are important to incorporate into planning efforts in order to identify people and property that may be impacted.

In order to assess sea level rise risk, a GIS-based analysis was used to estimate exposure to future projections of sea level rise using data produced by the National Oceanic and Atmospheric Administration in combination with improved property records for the county. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within the inundation zone that would be created in the event of 1 foot, 3 feet, and 6 feet of sea level rise. A number of different sea level rise scenarios were available via NOAA (from 1 foot to 6 feet, at 1 foot intervals), however these scenarios were selected to demonstrate a range of potential sea level rise scenarios from low to moderate to high projections. These scenarios can be found in **Figure A.30**, **Figure A.31**, and **Figure A.32**.

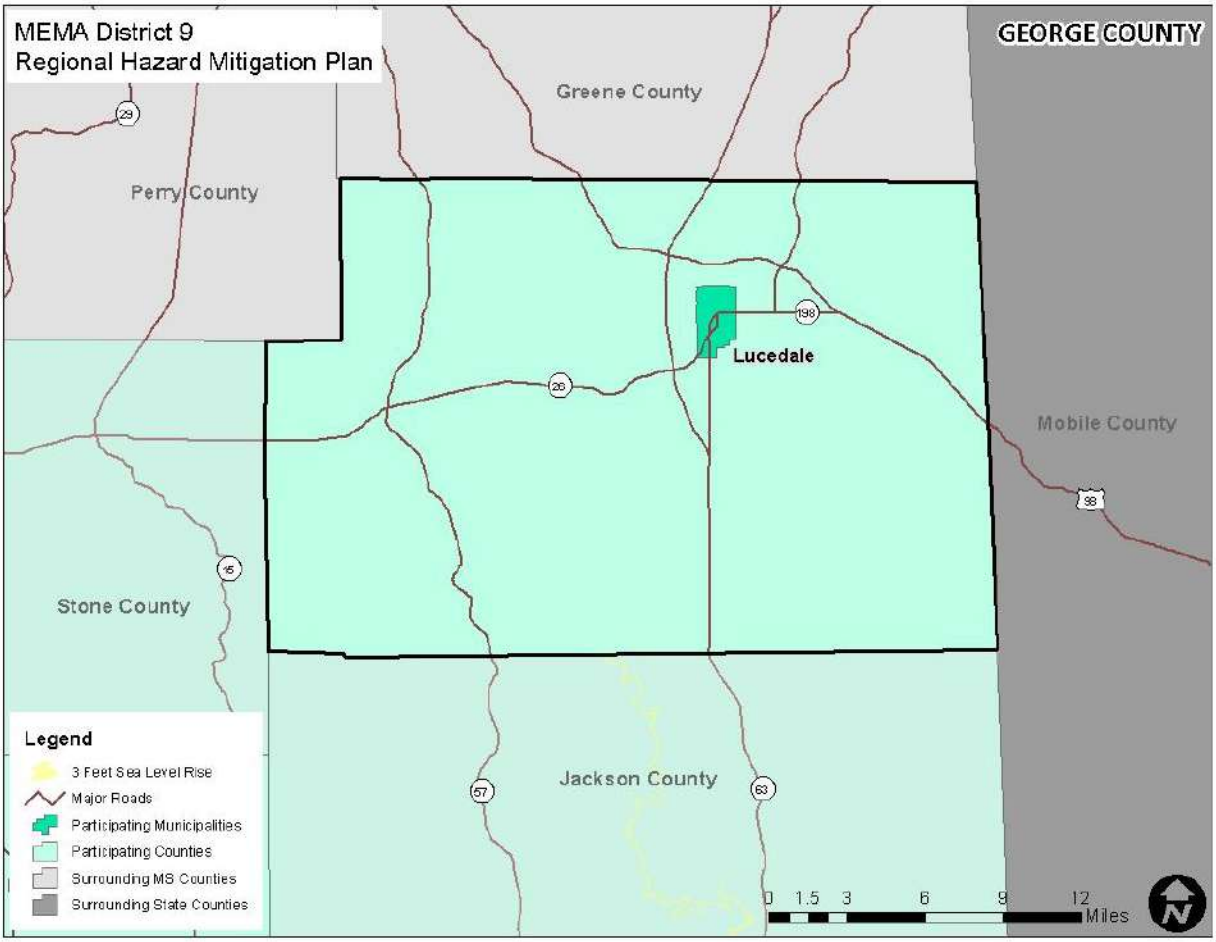
Table A.49 presents the potential at-risk property. Both the number of parcels and the approximate value are presented.

FIGURE A.30: 1 FOOT SEA LEVEL RISE SCENARIO IN GEORGE COUNTY



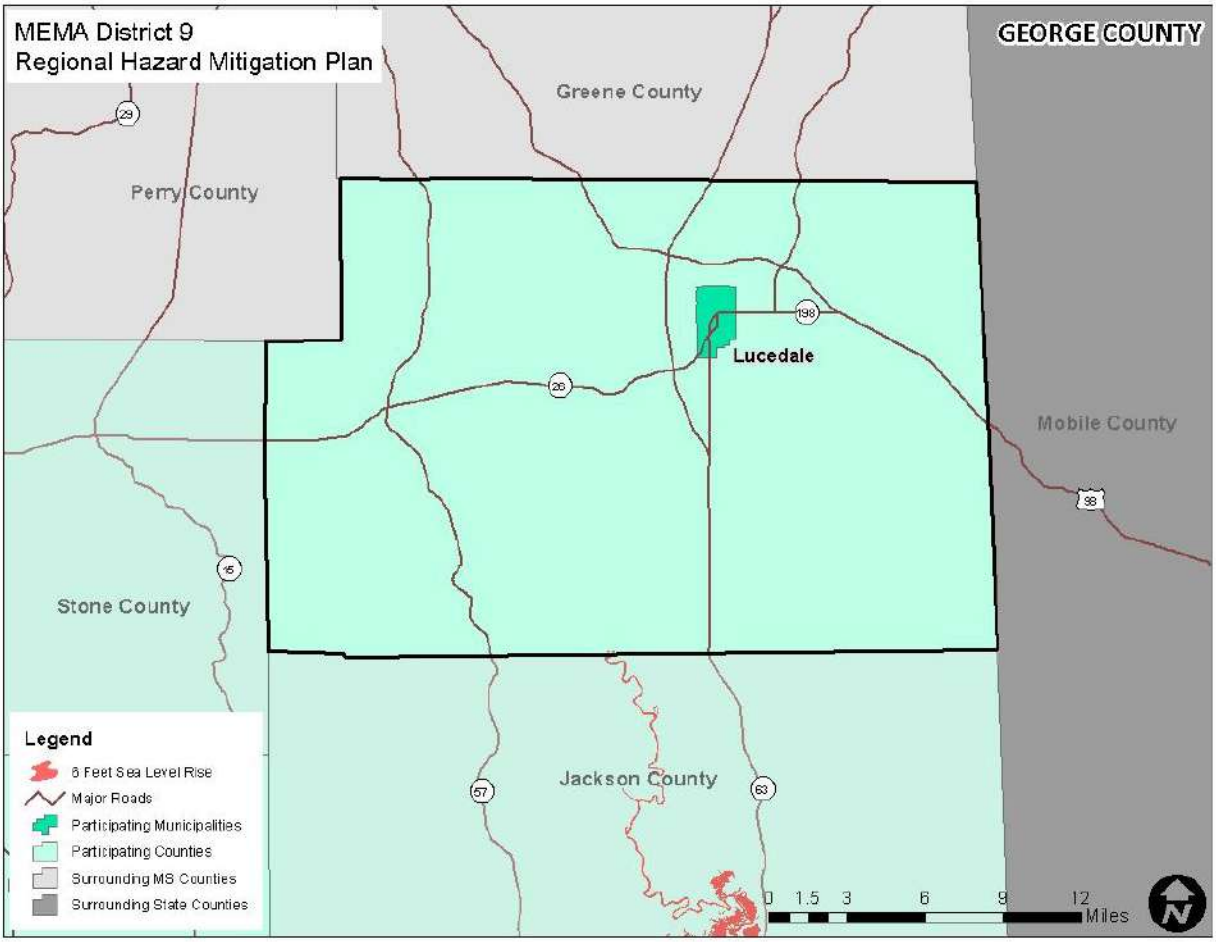
Source: NOAA

FIGURE A.31: 3 FEET SEA LEVEL RISE SCENARIO IN GEORGE COUNTY



Source: NOAA

FIGURE A.32: 6 FEET SEA LEVEL RISE SCENARIO IN GEORGE COUNTY



Source: NOAA

TABLE A.49: ESTIMATED EXPOSURE OF PARCELS TO THE SEA LEVEL RISE HAZARD

Location	1.0 foot		3.0 feet		6.0 feet	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Lucedale	0	0	0	0	0	0
Unincorporated Area	11	$2,708,000	11	$2,708,000	11	$2,708,000
GEORGE COUNTY TOTAL*	**11**	**$2,708,000**	**11**	**$2,708,000**	**11**	**$2,708,000**

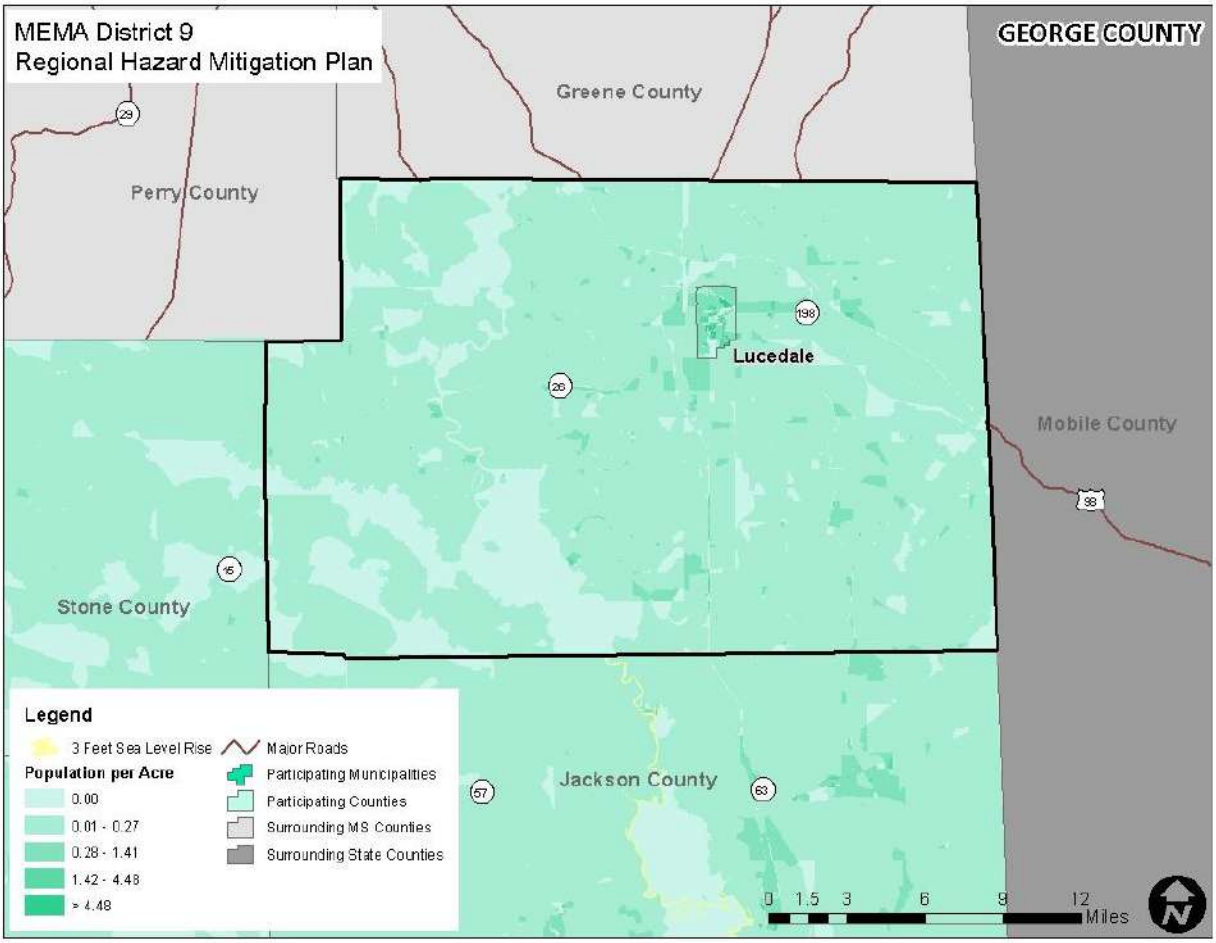
** As noted above, building footprints and parcel data were not available for George County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: NOAA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Figure A.33 is presented to gain a better understanding of at-risk population by evaluating census block level population data against the 3 feet sea level rise scenario. The three feet scenario was selected since

this is a moderate level projection. Based on this analysis, there is no significant part of the population in the county that is vulnerable to sea level rise.

FIGURE A.33: POPULATION DENSITY WITH 3 FEET SEA LEVEL RISE IN GEORGE COUNTY



Source: NOAA, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are no facilities located in the 3 feet of sea level rise scenario inundation area. As mentioned above, this scenario was selected as it is a mid-range projection for sea level rise based on a number of studies. A list of specific critical facilities and their associated risk can be found in **Table A.52** at the end of this subsection.

CONCLUSIONS ON HAZARD VULNERABILITY

Table A.50 presents an overall summary of the community's vulnerability for each jurisdiction. This summary provides key problem statements and identifies the community's greatest vulnerabilities that will be addressed in the mitigation strategy.

TABLE A.50: SUMMARY OF VULNERABILITY FOR GEORGE COUNTY

	Key Problem Statements
George County	George County and Lucedale have a large amount of timber, open, and agriculture land, creating an enhanced risk to wildfires across the county. The county is also more vulnerable to drought which can damage crop yields or reduce stock and crop production in the agricultural sector, resulting in economic loss.

Table A.51 presents a summary of annualized loss for each hazard in George County. Due to the reporting of hazard damages primarily at the county level, it was difficult to determine an accurate annualized loss estimate for each municipality. Therefore, an annualized loss was determined through the damage reported through historical occurrences at the county level. These values should be used as an additional planning tool or measure risk for determining hazard mitigation strategies throughout the county.

It should also be noted that many of these estimates are based on incomplete data and likely underestimate the historic dollar damage sustained in each county. Especially for hazards such as extreme cold, extreme heat, hail, lightning, and winter weather, it is very likely that more damage occurred historically than has been identified.

TABLE A.51: ANNUALIZED LOSS FOR GEORGE COUNTY

Hazard	George County
Flood-related Hazards	
Dam and Levee Failure	*Not Available*
Erosion	*Not Available*
Flood	$3,048
Storm Surge	$0
Fire-related Hazards	
Drought	*Not Available*
Lightning	$10,075
Wildfire	*Not Available*
Geologic Hazards	
Earthquake†	$2,000
Wind-related Hazards	
Extreme Cold	$0
Extreme Heat/Heat Wave	*Not Available*
Hailstorm	$36
Hurricane and Tropical Storm	$2,476,877
Severe Thunderstorm/High Wind	$33,394
Tornado	$100,488
Winter Weather	*Not Available*

Hazard	George County
Other Hazards	
Climate Change/Sea Level Rise	*Not Available*
Hazardous Materials Incident/Train Derailment	$3,866
Infectious Disease	*Not Available*

†Historic dollar damage was not available for this hazard, but since estimated annualized losses from Hazus were available, those numbers were used in this table.
*In this table, the term "Not Available" is used to indicate that no records of dollar losses for the particular hazard were recorded. This could be the case either because there were no events that caused dollar damage or because documentation of that particular type of event is not well kept.

As noted previously, all existing and future buildings and populations (including critical facilities) are vulnerable to impacts from atmospheric hazards such as drought and hailstorm. Some buildings may be more vulnerable to some of these hazards based on locations, construction, and building type. In addition, all populations are vulnerable to hazards like infectious disease which could presumably impact any segment of the population without regard to geographic location. **Table A.52** shows the critical facilities vulnerable to additional hazards analyzed in this section. The table lists those assets that are determined to be exposed to each of the identified hazards (marked with an "**X**").

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TABLE A.52: AT-RISK CRITICAL FACILITIES IN GEORGE COUNTY

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
GEORGE COUNTY																										
AT&T		Comm		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
C-Spire Communications Tower		Comm		X				X	X		X	X	X	X	X	X	X	X					X		X	X
Emergency Operations Center		EOC		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Agricola VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
Barton VFD		Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Basin VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Benndale VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Bexley VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Broome VFD		Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Central VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Howell VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Movella VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
Rocky Creek VFD		Fire Station		X				X	X		X	X	X	X	X	X	X	X					X			X
Salem VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Shipman VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Twin Creek VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Ward VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
Davita Dialysis Health Center		Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
George Regional Hospital		Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Mississippi Power Company		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Singing River Electric Power Company		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
WRBE Radio Station		Private/Non-Profit		X				X	X	X	X	X	X	X	X	X	X	X							X	X
George County Administrative Building		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
George County Regional Correctional Facility		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
George County Senior Citizens Building		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X		X	X
Lucedale-George County Public Library		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Mississippi Forestry Commission		Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Mississippi National Guard Armory		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
United States Postal Service		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Agricola Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
Benndale Elementary School		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Cental Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
George County High School		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
George County Middle School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
L C Hatcher Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
L T Taylor Intermediate		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
MS Gulf Coast Community College		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Rocky Creek Elementary School		School		X				X	X		X	X	X	X	X	X	X	X					X			X
Amelias Garden Personal Care		Special Populations		X				X	X		X	X	X	X	X	X	X	X							X	X
Evas Place Personal Care		Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Glen Oaks Nursing Home		Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Smith Manor Personal Care		Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Sparrow Hills Personal Care		Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Bexley Utilities		Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X					X		X	X
Combined Utilities		Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Multi Mart Water Association		Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X		X	X
Rocky Creek Utilities		Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Lucedale Fire Department	Lucedale	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Lucedale Police Department	Lucedale	Police Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
City Hall	Lucedale	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Lucedale Sewer & Water Department	Lucedale	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

A.4 GEORGE COUNTY CAPABILITY ASSESSMENT

This subsection discusses the capability of George County to implement hazard mitigation activities. More information on the purpose and methodology used to conduct the assessment can be found in Section 7: *Capability Assessment*.

A.4.1 Planning and Regulatory Capability

Table A.53 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for George County. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. A dagger (†) indicates that the given item is administered for that municipality by the county. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the MEMA District 9 Regional Hazard Mitigation Plan.

TABLE A.53: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Planning Tool/Regulatory Tool	Hazard Mitigation Plan	Threat and Hazard Identification and Risk Assessment (THIRA)	Comprehensive Land Use Plan	Floodplain Management Plan/Flood Mitigation Plan	Open Space Management Plan (Parks & Rec/Greenway Plan	Stormwater Management Plan/Ordinance	Natural Resource Protection Plan	Flood Response Plan	Emergency Operations Plan	Emergency Management Accreditation Program (EMAP Accreditation)	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Unified Development Ordinance	Post-Disaster Redevelopment/ Reconstruction Plan/ Ordinance	Building Code	Fire Code	National Flood Insurance Program (NFIP)	NFIP Community Rating System (CRS Program)
GEORGE COUNTY	✓		✓						✓						✓		✓	✓	✓				✓	✓	
Lucedale	✓		✓						†						†		✓	✓	✓			✓	✓	✓	

A more detailed discussion on the county's planning and regulatory capabilities follows.

EMERGENCY MANAGEMENT

Hazard Mitigation Plan
George County has previously adopted a hazard mitigation plan. The City of Lucedale has also previously adopted a municipal-level hazard mitigation plan.

Emergency Operations Plan
George County maintains an emergency operations plan through its Emergency Management Agency. The City of Lucedale has formally adopted this plan.

GENERAL PLANNING

Comprehensive Land Use Plan
George County has adopted a county comprehensive plan. The City of Lucedale has also adopted a municipal comprehensive plan.

Zoning Ordinance
George County has adopted a zoning ordinance as part of its county comprehensive plan. The City of Lucedale has also adopted a zoning ordinance.

Subdivision Ordinance
George County has adopted a subdivision ordinance. The City of Lucedale has also adopted subdivision regulations as part of its municipal comprehensive plan.

Building Codes, Permitting, and Inspections
George County has not adopted a building code. However, the City of Lucedale has adopted a building code through its code enforcement ordinance.

FLOODPLAIN MANAGEMENT

Table A.54 provides NFIP policy and claim information for each participating jurisdiction in George County.

TABLE A.54: NFIP POLICY AND CLAIM INFORMATION

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
GEORGE COUNTY†	08/16/88	09/19/12	112	$14,459,000	42	$385,792
Lucedale	04/15/86	09/19/12	10	$2,430,500	1	$11,000

†Includes unincorporated areas of county only
Source: NFIP Community Status information as of 1/10/2017; NFIP claims and policy information as of 10/31/2016

Flood Damage Prevention Ordinance
All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. George County and the City of Lucedale both participate in the NFIP and have adopted flood damage prevention ordinances.

A.4.2 Administrative and Technical Capability

Table A.55 provides a summary of the capability assessment results for George County with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill. A dagger (†) indicates a county-level staff member(s) provides the specified knowledge or skill to that municipality.

TABLE A.55: RELEVANT STAFF/PERSONNEL RESOURCES

Staff/Personnel Resource	Planners with knowledge of land development/land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Emergency Manager	Floodplain Manager	Land Surveyors	Scientists familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in GIS and/or Hazus	Resource development staff or grant writers
GEORGE COUNTY		✓		✓	✓		✓	✓		
Lucedale		✓	✓	†	✓		†	✓		

Credit for having a floodplain manager was given to those jurisdictions that have a flood damage prevention ordinance, and therefore an appointed floodplain administrator, regardless of whether the appointee was dedicated solely to floodplain management. Credit was given for having a scientist familiar with the hazards of the community if a jurisdiction has a Cooperative Extension Service or Soil and Water Conservation Department. Credit was also given for having staff with education or expertise to assess the community's vulnerability to hazards if a staff member from the jurisdiction was a participant on the existing hazard mitigation plan's planning committee.

A.4.3 Fiscal Capability

Table A.56 provides a summary of the results for George County with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource has previously been used to implement hazard mitigation actions. A dagger (†) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds).

TABLE A.56: RELEVANT FISCAL RESOURCES

Fiscal Tool/Resource	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes (or taxing districts)	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation, Revenue, and/or Special Tax Bonds	Partnering Arrangements or Intergovernmental Agreements	Other: HMGP and other federal, state, and private grants/resources
GEORGE COUNTY		†							†	†
Lucedale									†	✓

A.4.4 Political Capability

During the months immediately following a disaster, local public opinion in George County is more likely to shift in support of hazard mitigation efforts.

Table A.57 provides a summary of the results for George County with regard to political capability. A checkmark (✓) indicates the expected degree of political support by local elected officials in terms of adopting/funding information.

TABLE A.57: LOCAL POLITICAL SUPPORT

Political Support	Limited	Moderate	High
GEORGE COUNTY		✓	
Lucedale		✓	

A.4.5 Conclusions on Local Capability

Table A.58 shows the results of the capability assessment using the designed scoring methodology described in Section 7: *Capability Assessment*. The capability score is based solely on the information found in existing hazard mitigation plans and readily available on the jurisdictions' government websites. This information was reviewed by all jurisdictions and each jurisdiction provided feedback on the information included in the capability assessment. Local government input was vital to identifying capabilities. According to the assessment, the average local capability score for the county and its jurisdictions is 30.5, which falls into the moderate capability ranking.

TABLE A.58: CAPABILITY ASSESSMENT RESULTS

Jurisdiction	Overall Capability Score	Overall Capability Rating
GEORGE COUNTY	30	Moderate
Lucedale	31	Moderate

A.5 GEORGE COUNTY MITIGATION STRATEGY

This subsection provides the blueprint for George County to follow in order to become less vulnerable to its identified hazards. It is based on general consensus of the Regional Hazard Mitigation Council and the findings and conclusions of the capability assessment and risk assessment. Additional Information can be found in Section 8: *Mitigation Strategy* and Section 9: *Mitigation Action Plan*.

A.5.1 Mitigation Goals

George County developed nine mitigation goals in coordination with the other participating MEMA District 9 Region jurisdictions. The regional mitigation goals are presented in **Table A.59**.

TABLE A.59: MEMA DISTRICT 9 REGIONAL MITIGATION GOALS

	Goal
Goal #1	Minimize risk and vulnerability of the community to hazards.
Goal #2	Minimize loss of life, injury, and damages to property, the economy, and the environment.
Goal #3	Minimize loss to critical facilities and infrastructure, utilities, and services.
Goal #4	Improve, expand, and enhance public education, awareness, and preparedness.
Goal #5	Build and enhance local mitigation capabilities to improve the region's ability to prepare for, respond to, and recover.
Goal #6	Enter into partnerships with neighboring jurisdictions, federal and state agencies, and others to share information and develop a more hazard resistant community.
Goal #7	Enhance response procedures and emergency management capabilities.
Goal #8	Reduce economic losses, minimize social disruptions, and maintain quality of life.
Goal #9	Protect the environment and natural resources.

A.5.2 Mitigation Action Plan

The mitigation actions proposed by George County and the City of Lucedale are listed in the following individual Mitigation Action Plans.

George County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Ensure strict enforcement of subdivision order.	All	High	George County	Local	2022	Adopted in 2002 This ordinance was amended in 2006 and 2014. The county will continue to evaluate this ordinance and update again in the future.
P-2	Ensure strict enforcement of regulations against structures in the floodplain.	Flooding	High	Floodplain Administrator; George County	Local	2022	This ordinance was updated in 2016 and the county will continue to evaluate and update this ordinance to ensure floodplains are well-regulated.
P-3	Ensure continuity of services through an enhanced government services continuity plan.	All	Low to Moderate	George County	Local	2022	At this time, no funding has been allocated to prepare a formal plan. However, the county would still like to pursue this action going forward, so this will remain in the plan.
P-4	Incorporate the Hazard Mitigation Plan into the George County Comprehensive Plan.	All	High	George County	Local	Completed	After evaluation, local officials feel that the plans will continue to work together to help the County without having a formal action in this plan, so this action is considered complete.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-5	Enhance stormwater management activities.	Hurricane and Tropical Storm, Flooding	High	George County Supervisors and Road Crews	Local	2022	(Action 4.5 in previous plan) The county has taken a number of steps to improve stormwater management throughout its jurisdiction and will continue to try to improve its stormwater management practices in the future so this action will remain in the plan.
Property Protection							
PP-1	Promote the building of "safe rooms" in new construction and when remodeling existing structures.	Severe Thunderstorm, Tornado, Hurricane and Tropical Storm	Moderate to High	George County	Local, MEMA, FEMA	2022	(Action 1.4 in previous plan) Although some independent homeowners have included safe rooms as part of redesign construction, the county would like to take a more active role in promoting safe rooms and would like to consider grants to fund these projects if available.
PP-2	Ensure continuity of services by retrofitting public buildings.	All	High	George County	Local, MEMA, FEMA	2022	The county has looked at retrofitting critical buildings but funding has been lacking. The county will continue to pursue this action contingent upon the availability of funding.
PP-3	Ensure that new public buildings are designed and built to hurricane resistant building codes.	Hurricane and Tropical Storm, Tornado, Severe Thunderstorm/ High Winds	High	George County	Local	2022	(Action 2.2 in previous plan) New buildings have been generally built to code, but the county will need to continue to be vigilant in monitoring this going forward so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Natural Resource Protection							
NRP-1							
Structural Projects							
SP-1							
Emergency Services							
ES-1	Ensure that communication systems are adequate during disasters.	All	High	George County Emergency Management; George County	Local	2022	(Action 1.3 in previous plan) In the past several years, the county has worked to ensure adequate communication systems, but there are many improvements that could still be made so the county will continue to pursue these alternatives.
ES-2	Monitor the current status of generators for maintenance of critical facilities	All	High	George County	Local	2022	There is a maintenance agreement and schedule in place for generators owned by the county. The county will continue to monitor this and try to improve the number/quality of generators available for use during disasters.
ES-3	Ensure the adequacy of emergency shelters.	All	High	George County Emergency Management Agency; George County	Local	2021	(Action 4.1 in previous plan) The county has identified and ensured that locations for shelters in the event of an emergency are available. However, shelter locations need to be constantly evaluated for quality so the county will continue to pursue this action in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-4	Explore potential sites for a new special needs shelter.	Tornado, Hurricane and Tropical Storm, Flooding	Moderate	George County Emergency Management Agency	Local	Completed	In discussions with Stone County, they have completed a special needs shelter which could be used by George County residents if needed so this action will be considered complete.
ES-5	Enhance emergency response capabilities.	All	Moderate	George County	Local	2022	(Action 4.6 in previous plan) The county has worked to improve its response operations through planning and training, but since these tasks require constant vigilance and evaluation, this action will remain in the plan going forward as the county works to continue to improve its capabilities.
Public Education and Awareness							
PEA-1	Expand public awareness through education and outreach materials to citizens and visitors.	All	High	George County Emergency Management Agency	Local	2022	(Action 3.1 in previous plan) The city has done a great deal to develop materials for distribution to citizens and improve public awareness, but these materials will require updates over the next 5 years, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Develop and/or expand outreach strategies for vulnerable populations.	All	Moderate to High	George County; George County Emergency Management Agency; George County Sheriff's Department; George County VFDs	Local	2022	(Action 3.2 in previous plan) Although some outreach to vulnerable populations has taken place, the county sees this as an area where constant contact is required so this action will be retained.
PEA-3	Host a hurricane expo for outreach and education.	Hurricane and Tropical Storm	High	George County Emergency Management Agency; George County	Local	Deleted	Funding is not available for an event like this at this time. The county will continue to educate citizens on preparedness in other ways.
PEA-4	Provide and/or expand outreach information on hazard-resistant structures.	All	Moderate to High	George County Emergency Management Agency; George County	Local	2022	(Action 3.4 in previous plan) The county has done some outreach on constructing hazard resistant structures, but this is an area where more outreach is required so the county will continue to pursue this action.
PEA-5	Encourage the development of family disaster plans through the Masters of Disaster Program.	All	Moderate to High	George County First Responders (Sheriff, Fire, etc.)	Local	Deleted	George County will continue to educate citizens on family disaster plans but not through the Masters of Disaster Program, so this action is assumed to be rolled up into PEA-1.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-6	Enhance disaster preparedness of local government.	Flooding, Severe Thunderstorm, Hurricane and Tropical Storm	Moderate to High	George County	Local	2022	(Action 4.4 in previous plan) The county has taken a number of steps to improve its own disaster preparedness and will continue to try to improve this through outreach and interactions with citizens in the future.

City of Lucedale Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Maintain elevation certificates for all post-FIRM structures.	Flooding, Hurricane and Tropical Storm	High	City Building Department	Local	2022	The city updated its Floodplain Ordinance in 2016 and has maintained elevation certificates for all post-FIRM structures, but this action will require continual effort to maintain
P-2	Ensure continuity of city services through an enhanced government services continuity plan.	All	Low to Moderate	City of Lucedale	Local	2022	At this time, no funding has been allocated to prepare a formal plan. However, the city would still like to pursue this action going forward, so this will remain in the plan.
P-3	Ensure strict enforcement of regulations against structures in the floodplain.	Flooding, Hurricane and Tropical Storm	High	City Planning Commission	Local	2022	This ordinance was updated in 2016 and the city will continue to evaluate and update this ordinance to ensure floodplains are well-regulated.
P-4	Incorporate the Lucedale Hazard Mitigation Plan into the city's Comprehensive Plan.	All	High	City of Lucedale	Local	Completed	After evaluation, local officials feel that the plans will continue to work together to help the city without having a formal action in this plan, so this action is considered complete.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-5	Enhance stormwater management activities.	Hurricane and Tropical Storm, Flooding	High	City Public Works Department	Local	2022	(Action 4.5 in previous plan) The city has taken a number of steps to improve stormwater management throughout its jurisdiction and will continue to try to improve its stormwater management practices in the future so this action will remain in the plan.
Property Protection							
PP-1	Promote the building of "safe rooms" in new construction and when remodeling existing structures.	Hurricane and Tropical Storm, Tornado, Severe Thunderstorm	Moderate to High	City Building Department	Local, MEMA, FEMA	2022	(Action 1.3 in previous plan) Although some independent homeowners have included safe rooms as part of redesign construction, the city would like to take a more active role in promoting safe rooms and would like to consider grants to fund these projects if available
PP-2	Ensure continuity of city services by retrofitting public buildings.	All	High	City of Lucedale	Local, MEMA, FEMA	2022	(Action 2.2 in previous plan) The county has looked at retrofitting critical buildings but funding has been lacking. The county will continue to pursue this action contingent upon the availability of funding.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-3	Ensure that new city buildings are designed and built to hurricane resistant building codes.	Hurricane and Tropical Storm, Tornado	High	City of Lucedale; City Building Department	Local	2022	(Action 2.5 in previous plan) New buildings have been generally built to code, but the city will need to continue to be vigilant in monitoring this going forward so this action will remain in the plan.
Natural Resource Protection							
NRP-1	Ensure that environmental resources are protected and preserved through open spaces and green spaces.	All	Moderate	City Building Department and Planning Commission	Local	2022	(Action 2.6 in previous plan) The city has made significant efforts to preserve open/green spaces over the past several years, but these efforts will need to be continued as development and construction continues to take place in the city
NRP-2	Ensure that environmental resources are protect and preserved through conservation easements in natural wetlands and riparian areas.	Hurricane and Tropical Storm, Flooding	Moderate	Land Trust for the Mississippi Coastal Plain, City of Lucedale, George County	Local	2022	(Action 2.7 in previous plan) Conservation easements have been used in some cases in the past, but this action is not complete as the city would like to continue to have this tool available to maintain areas for water storage/overflow.
Structural Projects							
SP-1							

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Emergency Services							
ES-1	Ensure that communication systems are adequate during disasters.	All	High	City of Lucedale; George County Emergency Management	Local	2022	(Action 2.1 in previous plan) In the past several years, the city has worked to ensure adequate communication systems, but there are many improvements that could still be made so the city will continue to pursue these alternatives.
ES-2	Assess the current status of generators for maintenance of critical facilities.	All	High	City of Lucedale	Local	2022	There is a maintenance agreement and schedule in place for generators owned by the city/county. The city and county will continue to monitor this and try to improve the number/quality of generators available for use during disasters.
ES-3	Explore potential sites for a new special needs shelter.	Hurricane and Tropical Storm, Flooding	Moderate	City of Lucedale; George County Emergency Management	Local	Completed	In discussions with Stone County, they have completed a special needs shelter which could be used by George County residents if needed so this action will be considered complete.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-4	Enhance emergency response capabilities.	All	Low to Moderate	City Police Department; City Fire Department	Local	2022	(Action 4.6 in previous plan) The city has worked to improve its response operations through planning and training, but since these tasks require constant vigilance and evaluation, this action will remain in the plan going forward as the city works to continue to improve its capabilities.
Public Education and Awareness							
PEA-1	Enhance the city's elevation awareness program.	Flooding, Hurricane and Tropical Storm	Moderate	City Building and Public Works Departments	Local	2022	(Action 1.2 in previous plan) The city has made some efforts to make citizens aware of its elevation program, however, this information has certainly not reached every citizen so the city will continue to reach out and try to improve citizen understanding of this program.
PEA-2	Expand public awareness through education and outreach materials to citizens and visitors.	All	High	City of Lucedale	Local	2022	(Action 3.1 in previous plan) The county has done a great deal to develop materials for distribution to citizens and improve public awareness, but these materials will require updates over the next 5 years, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-3	Encourage families to develop family disaster plans through the Masters of Disaster Curriculum Program.	All	Moderate to High	City First Responders (Police, Fire, etc.)	Local	2022	The City will continue to educate citizens on family disaster plans but not through the Masters of Disaster Program
PEA-4	Develop and/or expand outreach strategies for vulnerable populations.	All	Moderate to High	City of Lucedale staff and officials; Lucedale Police Department; Lucedale Fire Department	Local	2022	(Action 3.3 in previous plan) Although some outreach to vulnerable populations has taken place, the city sees this as an area where constant contact is required so this action will be retained.
PEA-5	Provide and/or expand outreach information on hazard-resistant structures.	Al	High	Lucedale Building Department	Local	2022	(Action 3.4 in previous plan) The city has done some outreach on constructing hazard resistant structures, but this is an area where more outreach is required so the city will continue to pursue this action.
PEA-6	Enhance disaster preparedness of local government.	All	Moderate to High	City of Lucedale	Local	2022	(Action 4.4 in previous plan) The city has taken a number of steps to improve its own disaster preparedness and will continue to try to improve this through outreach and interactions with citizens in the future.

ANNEX B
HANCOCK COUNTY

This annex includes jurisdiction-specific information for Hancock County and its participating municipalities. It consists of the following five subsections:

- ❑ B.1 Hancock County Community Profile
- ❑ B.2 Hancock County Risk Assessment
- ❑ B.3 Hancock County Vulnerability Assessment
- ❑ B.4 Hancock County Capability Assessment
- ❑ B.5 Hancock County Mitigation Strategy

B.1 HANCOCK COUNTY COMMUNITY PROFILE

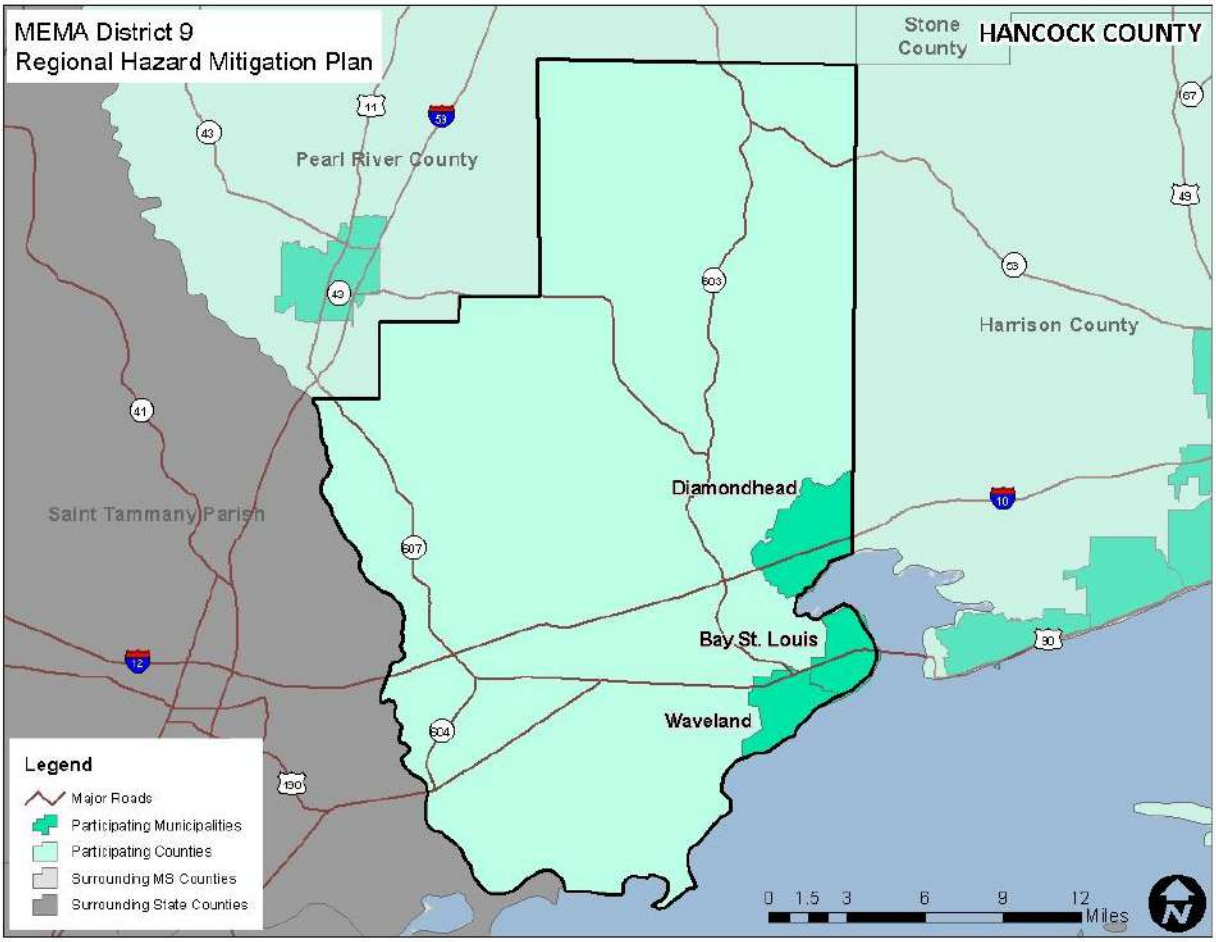
B.1.1 Geography and the Environment

Hancock County is located on the Mississippi coast. It comprises three cities, Bay St. Louis, Diamondhead, and Waveland, as well as many small unincorporated communities. An orientation map is provided as **Figure B.1**.

Hancock County is situated in the East Gulf Coastal Plain. It is made up of the gently rolling Pine Belt, also known as the "Piney Woods," and the coastal area called the Coastal Meadows or Terrace. The region has generally low topographic elevations and extensive tracts of marshy land. There are many rivers, creeks, bayous, and other natural drainage networks in the region which empty into the Gulf of Mexico. The total area of the county is 553 square miles, 79 square miles of which is water area.

Hancock County enjoys four distinct seasons but the climate in the region is generally hot and humid compared to the rest of the United States given its latitude and location along the Gulf Coast. Precipitation is generally highest in winter months when the temperatures are moderately lower, but the likelihood of precipitation remains relatively constant throughout the year. Snowfall is rare but does occur. Summers in the region can become fairly hot with average highs in the nineties and lows in the seventies. The region is also often susceptible to turbulent weather when warm, wet air from the Gulf of Mexico is pushed up into the region to mix with cooler air coming down from across the continent which can result in severe weather conditions. This is particularly true in the spring when seasons are changing and diverse weather patterns interact. The region is also subject to hurricanes and tropical storms from June to October.

FIGURE B.1: HANCOCK COUNTY ORIENTATION MAP



B.1.2 Population and Demographics

According to the 2010 Census, Hancock County has a population of 43,929 people. The county has seen an increase in population between 2000 and 2010, however one municipality has experienced a decline. The population density is 93 people per square mile. Population counts from the U.S. Census Bureau for 1990, 2000, and 2010 for the county and participating jurisdictions are presented in **Table B.1**.

TABLE B.1: POPULATION COUNTS FOR HANCOCK COUNTY

Jurisdiction	1990 Census Population	2000 Census Population	2010 Census Population	% Change 2000-2010
Hancock County	**31,760**	**42,967**	**43,929**	**2.2%**
Bay St. Louis	8,063	8,209	9,260	12.8%
Diamondhead CDP†	2,661	5,912	8,425	42.5%
Waveland	5,369	6,674	6,435	-3.6%

†Diamondhead was not incorporated until 2012, therefore population counts for the city were not available in 1990, 2000, or 2010. Instead, population counts for the Diamondhead Census Designated Place (CDP) were provided for reference.
Source: United States Census Bureau, 1990, 2000, 2010 Census

Based on the 2010 Census, the median age of residents of Hancock County is 40.7 years. The racial characteristics of the county are presented in **Table B.2**. Whites make up the majority of the population in the county, accounting for about 88 percent of the population, however there are larger black populations in the City of Bay St. Louis and City of Waveland.

TABLE B.2: DEMOGRAPHICS OF HANCOCK COUNTY

Jurisdiction	White, Percent (2010)	Black or African American, Percent (2010)	American Indian or Alaska Native, Percent (2010)	Asian, Percent (2010)	Native Hawaiian or Other Pacific Islander, Percent (2010)	Other Race, Percent (2010)	Two or More Races, percent (2010)	Persons of Hispanic Origin, Percent (2010)*
Hancock County	88.4%	7.1%	0.5%	1.0%	0.0%	0.8%	2.1%	3.3%
Bay St. Louis	82.7%	12.7%	0.3%	1.2%	0.1%	0.9%	2.1%	3.6%
Diamondhead CDP†	93.9%	2.9%	0.4%	1.1%	0.1%	0.3%	1.2%	3.3%
Waveland	80.5%	13.3%	0.6%	1.5%	0.0%	1.1%	2.9%	30.8%

*Hispanics may be of any race, so also are included in applicable race categories

†Diamondhead was not incorporated until 2012, therefore demographics of the city were not available in 2010. Instead, demographics for the Diamondhead Census Designated Place (CDP) were provided for reference

Source: United States Census Bureau, 2010 Census

B.1.3 Housing

According to the 2010 US Census, there are 21,840 housing units in Hancock County, the majority of which are single family homes. Housing information for the county and three municipalities is presented in **Table B.3**. As shown in the table, all but one of the municipalities have lower percentages of seasonal housing units compared to the unincorporated county.

TABLE B.3: HOUSING CHARACTERISTICS OF HANCOCK COUNTY

Jurisdiction	Housing Units (2000)	Housing Units (2010)	Seasonal Units, Percent (2010)	Median Home Value (2011-2015)
Hancock County	21,072	21,840	6.6%	$133,000
Bay St. Louis	3,817	5,241	10.7%	$161,300
Diamondhead CDP†	3,084	4,308	6.2%	$157,500
Waveland	3,442	3,286	3.8%	$127,500

†Diamondhead was not incorporated until 2012, therefore housing counts for the city were not available in 2000 or 2010. Instead, housing counts for the Diamondhead Census Designated Place (CDP) were provided for reference. However, the median home value presented is for the City of Diamondhead.

Source: United States Census Bureau, 2000 and 2010 Census, 2011-2015 American Community Survey 5-Year Estimates

B.1.4 Infrastructure

TRANSPORTATION

In Hancock County, Interstate 10 and U.S. Highway 90 run roughly east to west allowing transportation in the southern half of the county. Mississippi Highway 43 runs and Highway 603 run north-south through Hancock County.

The Stennis International Airport and the Diamondhead Airport are a general aviation and public-use airport, respectively, which are located in Hancock County. The Gulfport-Biloxi International Airport, located in Harrison County, also serves the county. This airport is served by three major airlines with direct flights to Atlanta, Charlotte, Dallas/Ft. Worth, and Houston as well as connections to hundreds of locations in the U.S. and worldwide.

In terms of other transportation services, Port Bienville operates within the county, connecting it to national and global markets. One Class-I Major and one Class-III Local railways also serve the county.

UTILITIES

Electrical power in Hancock County is mainly provided by electric power associations. Mississippi Power Company also provides power to some parts of the county.

There are two private and municipal natural gas suppliers that serve Hancock County. These include CenterPoint Energy Resources and the City of Waveland.

Water and sewer service is provided by a number of different sources including one of the participating cities and the county, but unincorporated areas often rely on septic systems and wells in Hancock County.

COMMUNITY FACILITIES

There are a number of buildings and community facilities located throughout Hancock County. According to the data collected for the vulnerability assessment (Section 6.4.1), there are 4 communications facilities, 1 emergency operations center (EOC), 8 fire stations, 3 medical facilities, 6 police stations, 3 power/gas facilities, 3 private/non-profit facilities, 22 public facilities, 18 schools, 1 shelter, 8 special populations facilities, 12 transportation facilities, and 16 water/wastewater facilities located within the county.

There is one hospital located in Hancock County. It is the Hancock Medical Center in the City of Bay St. Louis. There are also additional medical care facilities located in the county as outlined in the vulnerability assessment (Section 6.4.1).

Hancock County contains numerous local, state, and national parks and recreation areas, including the Mississippi Gulf Coast National Heritage Area and Buccaneer State Park. Golf courses and resorts, recreational and sports fishing, gamming and casinos, and sand beaches are abundant in the county.

B.1.5 Land Use

Many areas of Hancock County are undeveloped or sparsely developed. There are several incorporated municipalities located along the coast. Coastal land use patterns radiate from city centers and commercial land uses are located in central business districts and highway strips, with surrounding housing that becomes progressively large in lot size and floor area with distance from the central business districts. Residential and non-residential densities are generally low, and concentrated mix of uses are infrequent, creating an auto-oriented land use pattern along the coast. Upland land use patterns differ markedly from the coastal plain. There are only a few municipalities and unincorporated rural centers. There is a mix of

protected lands, such as the DeSoto National Forest. Private lands are used for exurban housing, agriculture, and forestry. Consistent with its rural character, densities are very low and uses are not mixed, making motor vehicles the only viable mode for virtually all travel.

Local land use and associated regulations are further discussed in *Section 7: Capability Assessment.*

B.1.6 Employment and Industry

According to the 2011 to 2015 American Community Survey (ACS) 5-year estimates, in 2015, Hancock County had an average annual employment of 18,482 workers and an average unemployment rate of 10.1 percent (compared to 10.3 percent for the state). In 2015, the Educational Services, and Health Care and Social Assistance industry employed the most people, with 16.2 percent of the workforce, followed by Retail Trade (13.0%); Arts, Entertainment, and Recreation, and Accommodation and Food Services (12.7%); and Construction (12.2%). In 2015, the average annual median household income in Hancock County was $43,355 compared to $39,665 in the state of Mississippi.

B.2 HANCOCK COUNTY RISK ASSESSMENT

This subsection includes hazard profiles for each of the significant hazards identified in Section 4: *Hazard Identification* as they pertain to Hancock County. Each hazard profile includes a description of the hazard's location and extent, notable historical occurrences, and the probability of future occurrences. Additional information can be found in Section 5: *Hazard Profiles*.

FLOOD-RELATED HAZARDS

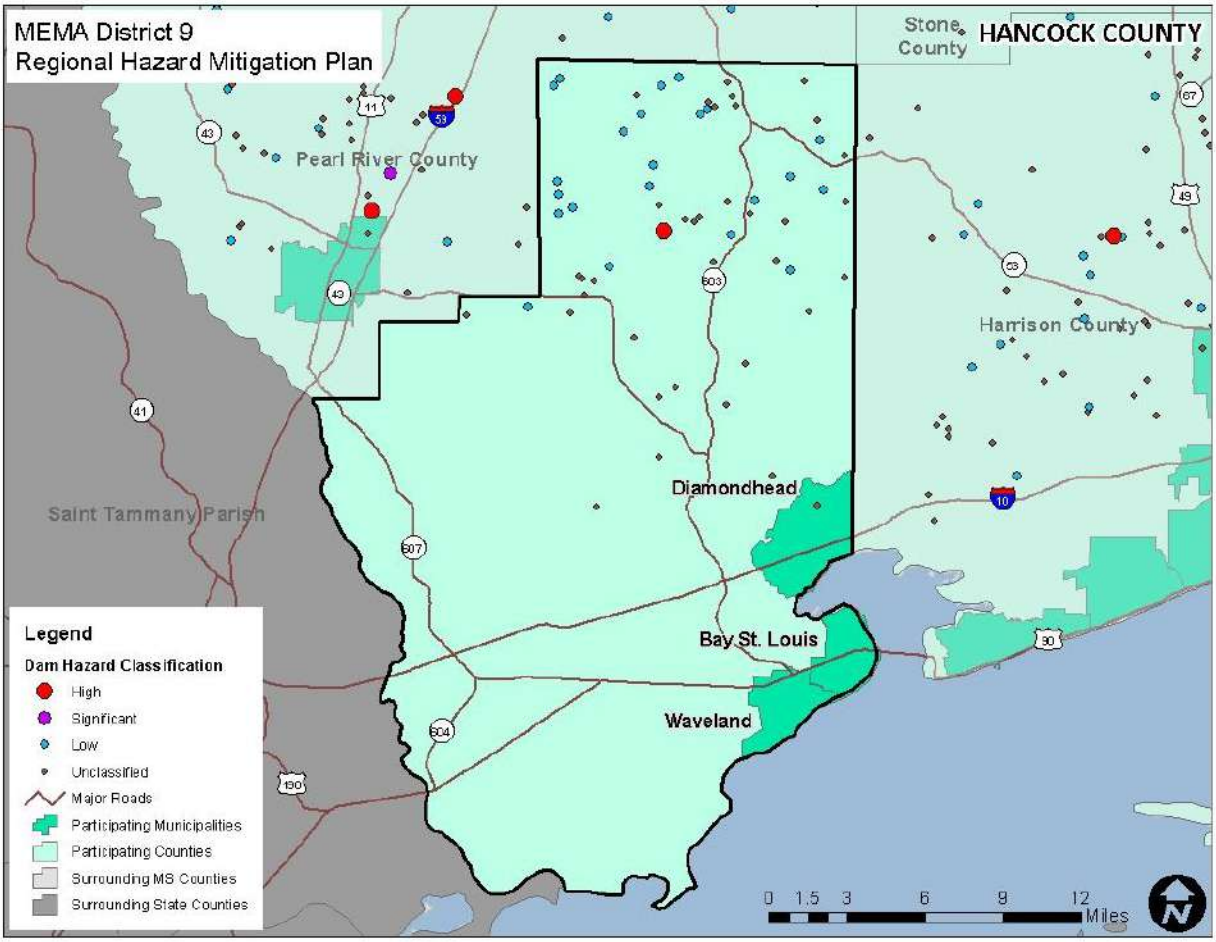
B.2.1 Dam and Levee Failure

LOCATION AND SPATIAL EXTENT

According to the Mississippi Department of Environmental Quality, there is one high hazard dam in Hancock County.[1] **Figure B.2** and **Figure B.3** show the location of this high hazard dam as well as mapped dam inundation areas, and **Table B.4** lists it by name.

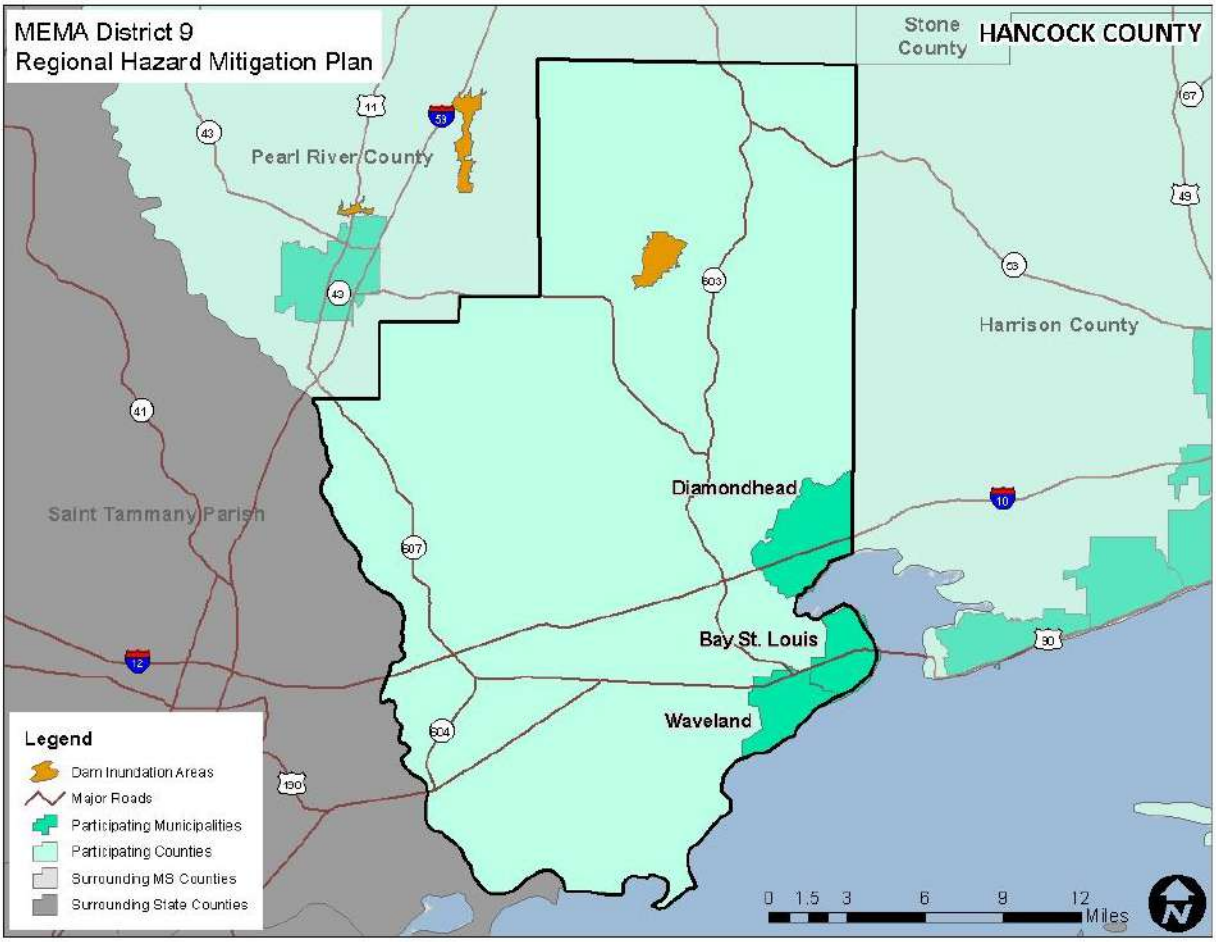
[1] The list of high hazard dams obtained from the Mississippi Department of Environmental Quality was reviewed and amended by local officials to the best of their knowledge.

FIGURE B.2: HANCOCK COUNTY HIGH HAZARD DAM LOCATIONS



Source: Mississippi Department of Environmental Quality

FIGURE B.3: HANCOCK COUNTY DAM INUNDATION AREAS



Source: Mississippi Department of Environmental Quality

TABLE B.4: HANCOCK COUNTY HIGH HAZARD DAMS

Dam Name	Hazard Potential
Hancock County	
WHITE CYPRESS LAKE DAM	High

Source: Mississippi Department of Environmental Quality

HISTORICAL OCCURRENCES

According to the Mississippi State Hazard Mitigation Plan, there has been one dam failure reported in Hancock County. Although no damage was reported with this event, several breach scenarios in the region could be catastrophic.

Table B.5 below provides a brief description of the one reported dam failure.

TABLE B.5: HANCOCK COUNTY DAM FAILURES (1982-2012)

Date	County	Structure Name	Cause of Failure
April 1983	Hancock	Boy Scout Camp	Breached

Source: Mississippi State Hazard Mitigation Plan

PROBABILITY OF FUTURE OCCURRENCES

Given the current dam inventory and historic data, a dam breach is possible (between 1 and 10 percent annual probability) in the future. However, as has been demonstrated in the past, regular monitoring is necessary to prevent these events.

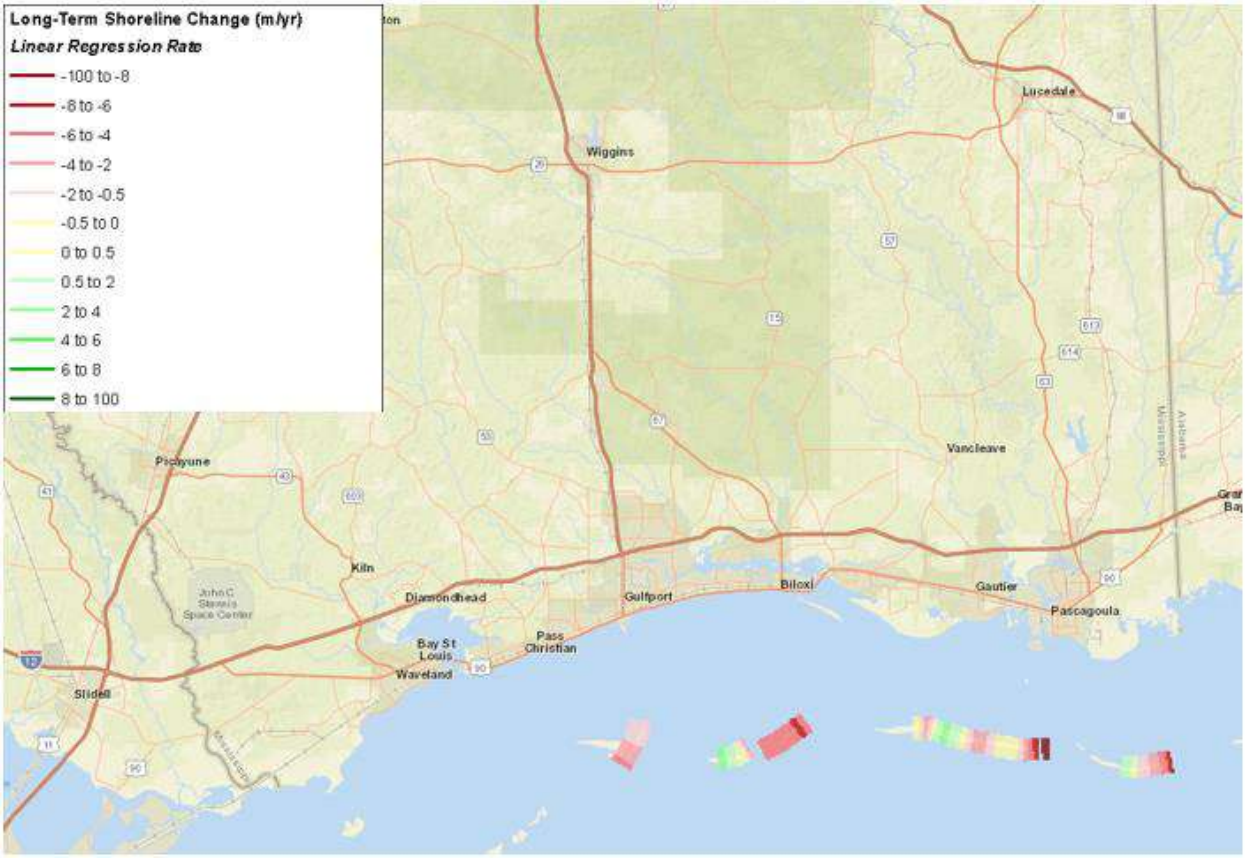
B.2.2 Erosion

LOCATION AND SPATIAL EXTENT

For the most part, major erosion in Hancock County is typically caused by coastal tides, ocean currents, and storm events. Although the county also experiences riverine erosion in many of its inland areas, these are of somewhat less concern than coastal erosion areas which historically have had larger impacts. Unlike inland areas, where the soil has greater organic matter content, coastal soils are mainly composed of fine grained particles such as sand. This makes coastal soils much more susceptible to erosion. Although some areas of the Hancock County coast are protected and natural erosion processes are allowed to take place for the most part, many areas near where development has occurred are especially susceptible.

At this time, there is limited data available on localized areas of erosion. Most of the information collected by the United States Geological Survey (USGS) is focused on the barrier islands that are just off the coast of the mainland. The long-term shoreline change for the barrier islands as calculated by the USGS can be found in **Figure B.4** It should be noted that many areas of the coast are protected through the use of structural techniques. Also, a great deal of renourishment activities are carried out along the mainland coastal communities.

FIGURE B.4: LONG-TERM SHORELINE CHANGE (M/YR) IN THE MEMA DISTRICT 9 REGION



Source: United States Geological Survey

HISTORICAL OCCURRENCES

Several sources were vetted to identify areas of erosion in Hancock County. This includes searching local newspapers, interviewing local officials, and reviewing previous hazard mitigation plans. Because dramatic, short-term erosion tends to take place after major storm events such as hurricanes, flooding, or storm surge, the erosion events often correspond directly with those events. Conversely, with long-term erosion, it is difficult to identify a specific historic occurrence because these events are by nature occurring at all times over a long period at a very gradual rate. Therefore, long-term historic erosion events cannot be confined to a specific timeframe or occurrence.

PROBABILITY OF FUTURE OCCURRENCES

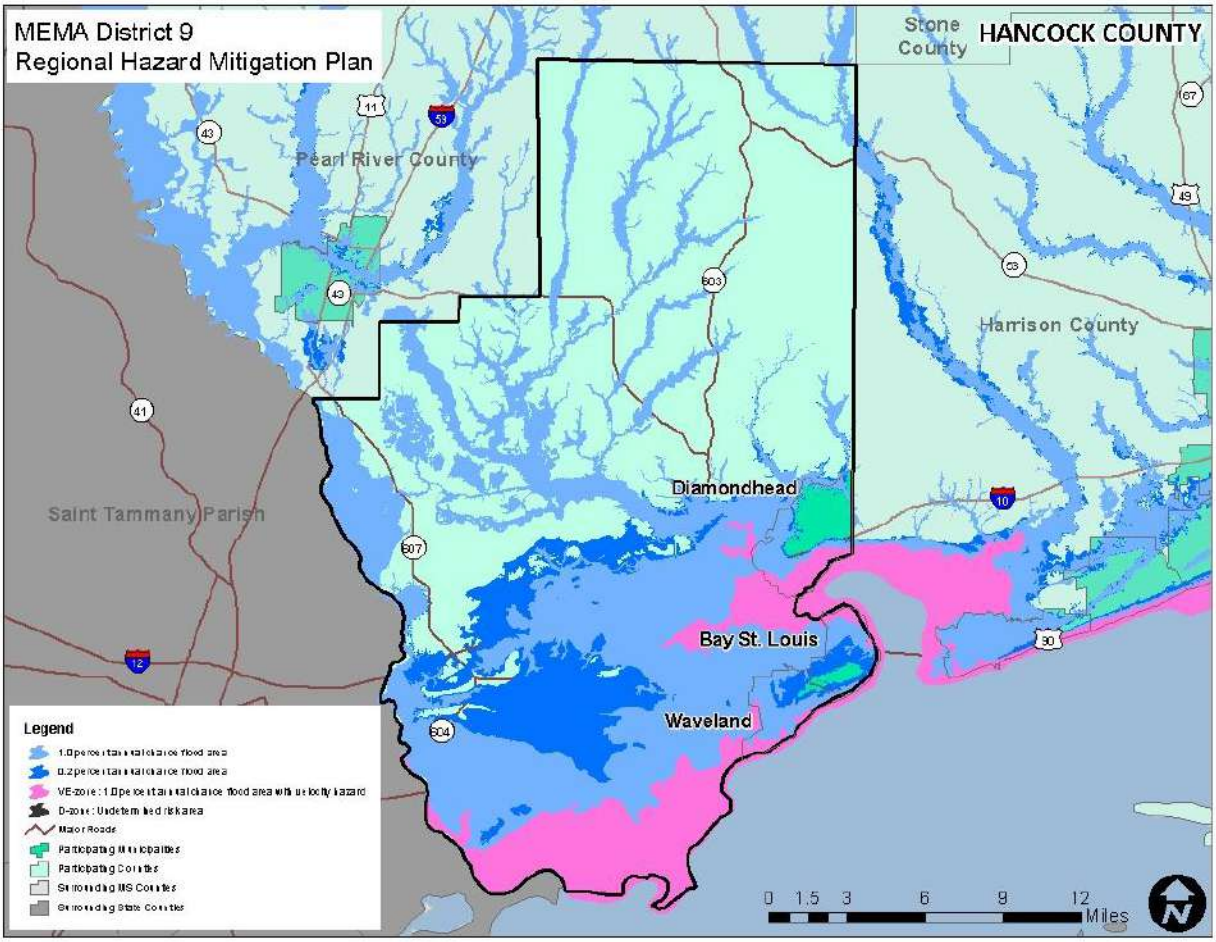
Erosion remains a natural, dynamic, and continuous process for Hancock County, and it will continue to occur. The annual probability level assigned for erosion is likely (between 10 and 100 percent annually).

B.2.3 Flood

LOCATION AND SPATIAL EXTENT

There are areas in Hancock County that are susceptible to flood events. Special flood hazard areas in the county were mapped using Geographic Information System (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM). This includes Zone A (1-percent annual chance floodplain), Zone AE (1-percent annual chance floodplain with elevations), Zone VE (1-percent annual chance floodplain with additional hazards due to storm-induced velocity wave action), Zone X500 (0.2-percent annual chance floodplain), and Zone D (undetermined risk area). **Figure B.5** illustrates the location and extent of currently mapped special flood hazard areas for the county based on best available FEMA Digital Flood Insurance Rate Map (DFIRM) data.

FIGURE B.5: SPECIAL FLOOD HAZARD AREAS IN HANCOCK COUNTY



Source: Federal Emergency Management Agency

HISTORICAL OCCURRENCES

Floods were at least partially responsible for four disaster declarations in Hancock County in 1974, 1979, 1991, and 1995.[2] Information from the National Climatic Data Center was used to ascertain additional historical flood events. The National Climatic Data Center reported a total of 29 events in Hancock County since 1997.[3] These events accounted for over $1.1 million (2016 dollars) in property damage in the county.[4] A summary of these events is presented in **Table B.6**. Specific information on flood events, including date, type of flooding, and deaths and injuries, can be found in **Table B.7**.

TABLE B.6: SUMMARY OF FLOOD OCCURRENCES IN HANCOCK COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Bay St. Louis	3	0/0	$0	$0
Diamondhead	1	0/0	$0	$0
Waveland	4	0/0	$150,064	$7,898
Unincorporated Area	21	0/0	$996,514	$55,362
HANCOCK COUNTY TOTAL	**29**	**0/0**	**$1,146,578**	**$63,260**

Source: National Climatic Data Center

TABLE B.7: HISTORICAL FLOOD EVENTS IN HANCOCK COUNTY

Location	Date	Type	Deaths/Injuries	Property Damage*
Bay St. Louis				
BAY ST LOUIS	12/21/2006	Heavy Rain	0/0	$0
BAY ST LOUIS	10/22/2007	Flash Flood	0/0	$0
BAY ST LOUIS	3/28/2009	Flash Flood	0/0	$0
Diamondhead				
DIAMONDHEAD ARPT	3/21/2012	Flash Flood	0/0	$0
Waveland				
WAVELAND	5/19/1997	Flash Flood	0/0	$150,064
WAVELAND	12/12/2009	Flash Flood	0/0	$0
WAVELAND	3/9/2011	Flash Flood	0/0	$0
WAVELAND	4/14/2015	Flash Flood	0/0	$0
Unincorporated Area				
COUNTYWIDE	1/7/1998	Flash Flood	0/0	$14,776
COUNTYWIDE	3/7/1998	Flash Flood	0/0	$0
COUNTYWIDE	6/11/2001	Flood	0/0	$0
COUNTYWIDE	9/26/2002	Flash Flood	0/0	$0
COUNTYWIDE	6/30/2003	Flash Flood	0/0	$654,492
HANCOCK (ZONE)	7/1/2003	Flood	0/0	$327,246

[2] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.
[3] These flood events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional occurrences have occurred and have gone unreported. As additional local data becomes available, this hazard profile will be amended.
[4] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Type	Deaths/Injuries	Property Damage*
COUNTYWIDE	7/5/2003	Heavy Rain	0/0	$0
SOUTH PORTION	5/29/2005	Flash Flood	0/0	$0
HANCOCK (ZONE)	10/16/2006	Coastal Flood	0/0	$0
HANCOCK (ZONE)	4/10/2008	Coastal Flood	0/0	$0
HANCOCK (ZONE)	3/27/2009	Coastal Flood	0/0	$0
HANCOCK (ZONE)	12/1/2009	Coastal Flood	0/0	$0
HANCOCK (ZONE)	2/4/2010	Coastal Flood	0/0	$0
HANCOCK (ZONE)	5/1/2010	Coastal Flood	0/0	$0
HANCOCK (ZONE)	5/2/2010	Coastal Flood	0/0	$0
HANCOCK (ZONE)	6/30/2010	Coastal Flood	0/0	$0
KILN	6/30/2010	Flash Flood	0/0	$0
KILN	4/14/2014	Flash Flood	0/0	$0
KILN	5/16/2015	Flash Flood	0/0	$0
HANCOCK (ZONE)	6/15/2015	Coastal Flood	0/0	$0
HANCOCK (ZONE)	10/25/2015	Coastal Flood	0/0	$0

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

HISTORICAL SUMMARY OF INSURED FLOOD LOSSES

According to FEMA flood insurance policy records as of October 2016, there have been 8,558 flood losses reported in Hancock County through the National Flood Insurance Program (NFIP) since 1978, totaling over $737.4 million in claims payments. A summary of these figures for the county is provided in **Table B.8**. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP policies, and for losses in which claims were sought and received. It is likely that many additional instances of flood loss in Hancock County were either uninsured, denied claims payment, or not reported.

TABLE B.8: SUMMARY OF INSURED FLOOD LOSSES IN HANCOCK COUNTY

Location	Number of Policies	Flood Losses	Claims Payments
Bay St. Louis	2,240	1,244	$148,880,718
Diamondhead	14	0	$0
Waveland	1,795	1,385	$183,867,798
Unincorporated Area	4,265	5,929	$404,676,960
HANCOCK COUNTY TOTAL	**8,314**	**8,558**	**$737,425,476**

Source: National Flood Insurance Program

REPETITIVE LOSS PROPERTIES

According to the Mississippi Emergency Management Agency, there are 1,060 non-mitigated repetitive loss properties located in Hancock County, which accounted for 2,689 losses and over $121.6 million in claims payments under the NFIP. The average claim amount for these properties is $43,094. Of the 1,060 properties, 982 are single family, 9 are 2-4 family, 10 are assumed condominium, 6 are other residential, and 30 are non-residential. Without mitigation, these properties will likely continue to experience flood

losses. **Table B.9** presents detailed information on repetitive loss properties and NFIP claims and policies for Hancock County.

TABLE B.9: REPETITIVE LOSS PROPERTIES IN HANCOCK COUNTY

Location	Number of Properties	Types of Properties	Number of Losses	Building Payments	Content Payments	Total Payments	Average Payment
Bay St. Louis	408	389 single family; 4 2-4 family; 4 assumed condo; 1 other residential; 10 other non-residential	1,106	$40,169,698	$12,303,491	$52,473,189	$47,444
Diamondhead	23	23 single family	--	--	--	--	--
Waveland	74	69 single family; 1 2-4 family; 4 other residential	223	$6,295,197	$1,973,246	$8,268,443	$37,078
Unincorporated Area	555	524 single family; 4 2-4 family; 6 assumed condo; 1 other residential; 20 other non-residential	1,360	$47,689,291	$13,184,868	$60,874,158	$44,760
HANCOCK COUNTY TOTAL	**1,060**		**2,689**	**$94,154,186**	**$27,461,605**	**$121,615,790**	**$43,094**

*The information provided by Diamondhead did not include number of losses or total payments information for the city. Therefore, the number of losses and total payments for the city are not included in the regional total.
Source: Federal Emergency Management Agency, National Flood Insurance Program

PROBABILITY OF FUTURE OCCURRENCES

Flood events will remain a threat in Hancock County, and the probability of future occurrences will remain highly likely (100 percent annual probability). The probability of future flood events based on magnitude and according to best available data is illustrated in the figure above**,** which indicates those areas susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain). Further, as described in other hazard profiles, it is highly likely that Hancock County will continue to experience inland flooding associated with large tropical storms and hurricanes.

It can be inferred from the floodplain location maps, previous occurrences, and repetitive loss properties that risk varies throughout the county. For example, the southern half of the county has more floodplain and thus a higher risk of flood than the rest of the county. Flood is not the greatest hazard of concern but will continue to occur and cause damage. Therefore, mitigation actions may be warranted, particularly for

repetitive loss properties.

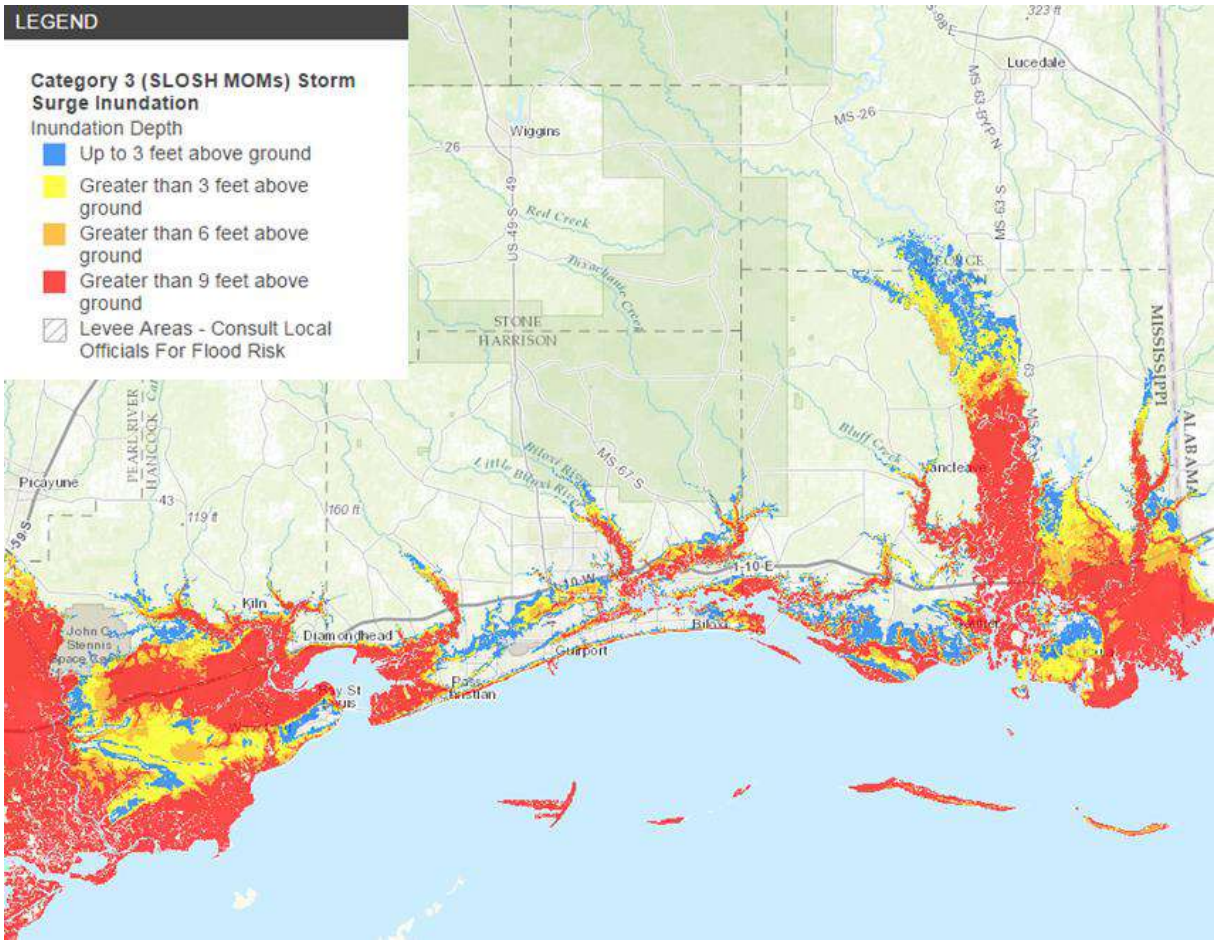
It should also be noted that anticipated sea level rise will increase the probability and intensity of future tidal flooding events in years to come. Rising sea level over time will shorten the return period (increasing the frequency) of significant flood events. This hazard is discussed elsewhere in this section.

B.2.4 Storm Surge

LOCATION AND SPATIAL EXTENT

There are many areas in Hancock County that are subject to potential storm surge inundation as modeled and mapped by the National Oceanic and Atmospheric Administration (NOAA). **Figure B.6** illustrates hurricane storm surge inundation zones based on a Category 3 storm. The illustration is derived from geo-referenced SLOSH (Sea, Lake, and Overland Surge from Hurricanes) data produced by the USACE in coordination with NOAA. SLOSH is a modeling tool used to estimate storm surge for coastal areas resulting from historical, hypothetical, or predicted hurricanes taking into account maximum expected levels for pressure, size, forward speed, track, and winds. Therefore, the SLOSH data is best used for defining the potential maximum surge associated with various storm intensities for any particular location. As shown in the figure, the entire coast of Hancock County is at high risk to storm surge inundation. Inland areas may also experience substantial flooding during a storm event.

FIGURE B.6: STORM SURGE RISK AREAS IN THE MEMA DISTRICT 9 REGION



Source: NOAA

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, 11 storm surge events have been reported for Hancock County since 1998.[5] These events accounted for almost $4.2 billion (2016 dollars) in property damage.[6] A summary of these events is presented in **Table B.10**. Detailed information on the recorded storm surge events can be found in **Table B.11**.

TABLE B.10: SUMMARY OF STORM SURGE EVENTS IN HANCOCK COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Bay St. Louis	0	0/0	$0	$0
Diamondhead	0	0/0	$0	$0
Waveland	0	0/0	$0	$0
Unincorporated Area	11	0/0	$4,174,523,545	$231,917,975

[5] These storm surge events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional storm surge conditions have affected Hancock County.
[6] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
HANCOCK COUNTY TOTAL	11	0/0	$4,174,523,545	$231,917,975

Source: National Climatic Data Center

TABLE B.11: HISTORICAL STORM SURGE EVENTS IN HANCOCK COUNTY

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
Bay St. Louis				
None reported	--	--	--	--
Diamondhead				
None reported	--	--	--	--
Waveland				
None reported	--	--	--	--
Unincorporated Area				
LAKESHORE	2/15/1998	2-4 feet above normal	0/0	$738,813
PEARLINGTON	10/13/2001	--	0/0	$0
HANCOCK (ZONE)	6/30/2003	3-5 feet above normal	0/0	$654,492
HANCOCK (ZONE)	9/15/2004	3-5 feet above normal	0/0	$510,012
HANCOCK (ZONE)	10/9/2004	2-4 feet above normal	0/0	$19,125
HANCOCK (ZONE)	7/5/2005	3-5 feet above normal	0/0	$616,623
HANCOCK (ZONE)	8/29/2005	19-25 feet	0/0	$4,168,372,453
HANCOCK (ZONE)	9/1/2008	8-11 feet	0/0	$1,398,337
HANCOCK (ZONE)	9/11/2008	4-6 feet above normal	0/0	$0
HANCOCK (ZONE)	9/2/2011	2-4 feet above normal	0/0	$10,707
HANCOCK (ZONE)	8/28/2012	10 feet	0/0	$2,202,981

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

It is highly likely (100 percent annual probability) that Hancock County will continue to experience storm surge associated with large tropical storms, hurricanes, and squalls combined with high tides. As noted in the preceding section (under Flood), anticipated sea level rise will increase the probability and intensity of future storm surge events in years to come.[7] This rise in sea level will not only increase the probability and intensity of tidal flooding events, but will also contribute to the loss of coastal wetlands and erosion of sand beaches that act as protective buffers against storm surge events.

FIRE-RELATED HAZARDS

B.2.5 Drought

Drought typically covers a large area and cannot be confined to any geographic or political boundaries. Furthermore, it is assumed that Hancock County would be uniformly exposed to drought, making the

[7] The Sea Level Rise hazard is assessed more extensively under Section B.2.16.

spatial extent potentially widespread. It is also notable that drought conditions typically do not cause significant damage to the built environment but may exacerbate wildfire conditions.

HISTORICAL OCCURRENCES

According to the U.S. Drought Monitor, Hancock County had drought levels of Severe or worse in 6 of the last 17 years (January 2000-October 2016). **Table B.12** shows the most severe drought classification for each year, according to U.S. Drought Monitor classifications. It should be noted that the U.S. Drought Monitor also estimates what percentage of the county is in each classification of drought severity. For example, the most severe classification reported may be exceptional but a majority of the county may actually be in a less severe condition.

TABLE B.12: HISTORICAL DROUGHT OCCURRENCES IN HANCOCK COUNTY

Abnormally Dry (D0) Moderate Drought (D1) Severe Drought (D2) Extreme Drought (D3) Exceptional Drought (D4)

	Hancock County
2000	EXCEPTIONAL
2001	MODERATE
2002	SEVERE
2003	ABNORMAL
2004	ABNORMAL
2005	ABNORMAL
2006	EXTREME
2007	MODERATE
2008	ABNORMAL
2009	MODERATE
2010	MODERATE
2011	EXCEPTIONAL
2012	EXTREME
2013	ABNORMAL
2014	SEVERE
2015	MODERATE
2016	ABNORMAL

Source: United States Drought Monitor

No anecdotal information was available from the National Climatic Data Center on droughts in Hancock County.

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that Hancock County has a probability level of likely (between 10 and 100 percent annual probability) for future drought events. However, the extent (or magnitude) of drought and the amount of geographic area covered by drought, varies with each year. Historic information indicates that there is a much lower probability for extreme, long-lasting drought conditions.

B.2.6 Lightning

LOCATION AND SPATIAL EXTENT

Lightning occurs randomly, therefore it is impossible to predict where and with what frequency it will strike. It is assumed that all of Hancock County is uniformly exposed to lightning.

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, there have been eight recorded lightning events in Hancock County since 1996.[8] These events resulted in almost $403,000 (2016 dollars) in damages.[9] Furthermore, lightning has caused two fatalities in the county. A summary of these events is presented in **Table B.13**. Detailed information on historical lightning events can be found in **Table B.14**.

It is certain that more than eight events have impacted the county. Many of the reported events are those that caused damage, and it should be expected that damages are likely much higher for this hazard than what is reported.

TABLE B.13: SUMMARY OF LIGHTNING OCCURRENCES IN HANCOCK COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Bay St. Louis	2	0/0	$7,093	$373
Diamondhead	2	0/0	$163,623	$12,586
Waveland	2	0/0	$231,796	$11,590
Unincorporated Area	2	2/0	$0	$0
HANCOCK COUNTY TOTAL	**8**	**2/0**	**$402,512**	**$24,550**

Source: National Climatic Data Center

TABLE B.14: HISTORICAL LIGHTNING OCCURRENCES IN HANCOCK COUNTY

Location	Date	Deaths/ Injuries	Property Damage*	Details
Bay St. Louis				
BAY ST LOUIS	6/26/1997	0/0	$4,202	Lightning struck the Sheriff's Office communication center causing extensive damage to equipment.
BAY ST LOUIS	7/26/1999	0/0	$2,891	Lightning strikes caused fires at a house and business resulting in minor damage to each structure.
Diamondhead				
DIAMONDHEAD ARPT	7/17/2003	0/0	$163,623	Lightning caused a fire that destroyed a house.
DIAMONDHEAD ARPT	5/29/2005	0/0	$0	A lightning strike caused a fire in some trees which spread to a house in the Glen Eagle subdivision of

[8] These lightning events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is certain that additional lightning events have occurred in Hancock County. As additional local data becomes available, this hazard profile will be amended.
[9] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Deaths/ Injuries	Property Damage*	Details
				Diamondhead. The house was nearly destroyed by the fire.
Waveland				
WAVELAND	1/18/1996	0/0	$1,535	Lightning struck a transformer and interrupted electric service to several customers.
WAVELAND	9/16/1996	0/0	$230,261	Lightning caused a fire that damaged a restaurant and several motel suites.
Unincorporated Area				
LAKESHORE	8/8/1998	1/0	$0	Lightning killed a man as he attempted to run for cover from the thunderstorm.
LAKESHORE	8/15/2005	1/0	$0	Lightning struck and killed a 26 year old man while he was working outside.

*Property damage is reported in 2016 dollars; All damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

Although there was not a high number of historical lightning events reported in Hancock County via NCDC data, it is a regular occurrence accompanied by thunderstorms. In fact, lightning events will assuredly happen on an annual basis, though not all events will cause damage. According to Vaisala's U.S. National Lightning Detection Network (NLDN), Hancock County is located in an area of the country that experienced an average of 4 to 12 lightning flashes per square kilometer per year between 2005 and 2014. Therefore, the probability of future events is highly likely (100 percent annual probability). It can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the county.

B.2.7 Wildfire

LOCATION AND SPATIAL EXTENT

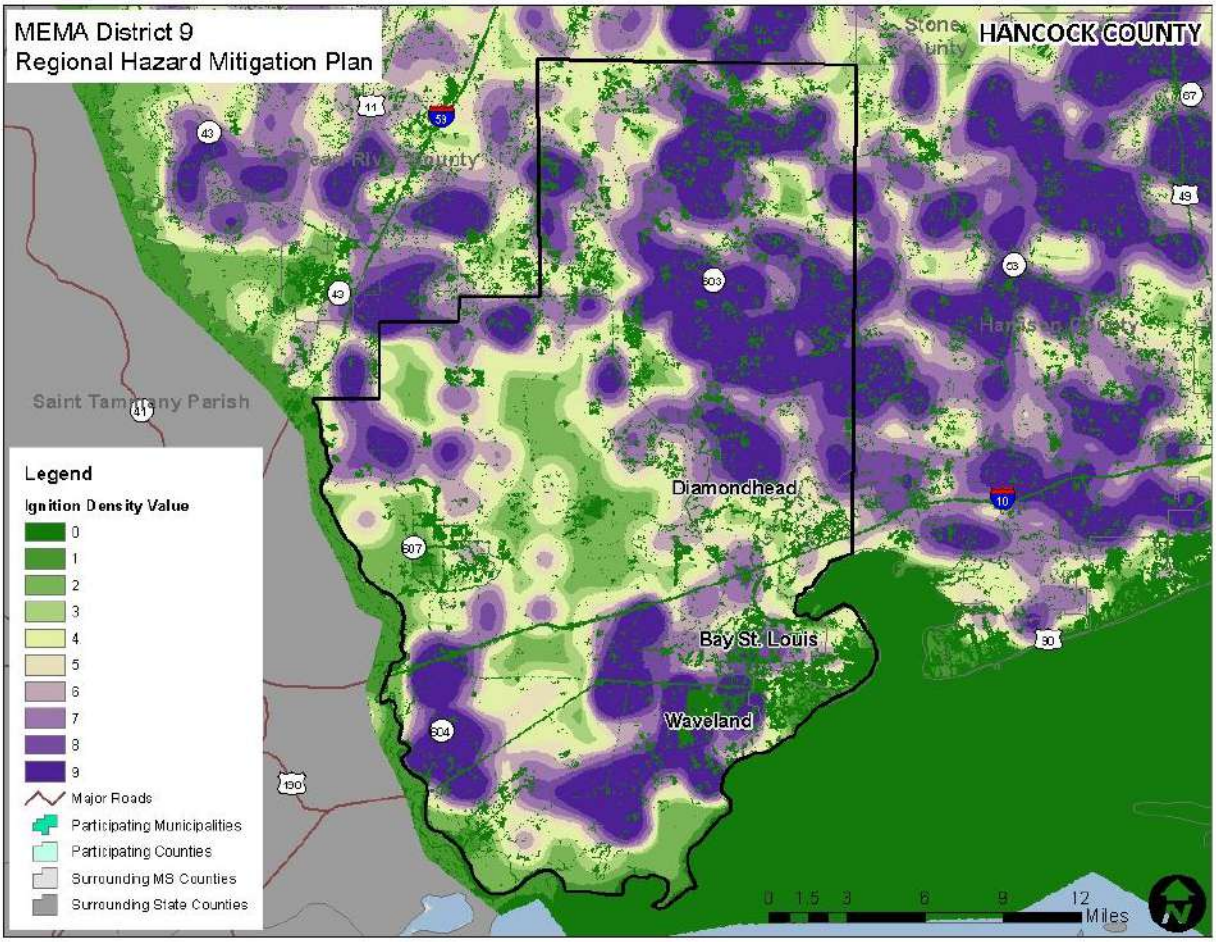
The entire county is at risk to a wildfire occurrence. However, several factors such as drought conditions or high levels of fuel on the forest floor, may make a wildfire more likely. Furthermore, areas in the urban-wildland interface are particularly susceptible to fire hazard as populations abut formerly undeveloped areas. The Wildfire Ignition Density data shown in the figure below give an indication of historic location.

HISTORICAL OCCURRENCES

Figure B.7 shows the Wildfire Ignition Density in Hancock County based on data from the Southern Wildfire Risk Assessment. This data is based on historical fire ignitions and the likelihood of a wildfire igniting in an area. Occurrence is derived by modeling historic wildfire ignition locations to create an average ignition rate map. This is measured in the number of fires per year per 1,000 acres.[10]

[10] Southern Wildfire Risk Assessment, 2014.

FIGURE B.7: WILDFIRE IGNITION DENSITY IN HANCOCK COUNTY



Source: Southern Wildfire Risk Assessment

Based on data from the Mississippi Forestry Commission from 2007 to 2016, Hancock County experiences an average of 92 wildfires annually which burn a combined 2,107 acres, on average per year. The data indicates that most of these fires are small, averaging 23 acres per fire. **Table B.15** provides a summary of wildfire occurrences in Hancock County and **Table B.16** lists the number of reported wildfire occurrences in the county between the years 2007 and 2016.

TABLE B.15: SUMMARY TABLE OF ANNUAL WILDFIRE OCCURRENCES (2007 -2016)*

	Hancock County
Average Number of Fires per year	91.6
Average Number of Acres Burned per year	2,107.4
Average Number of Acres Burned per fire	23.0

*These values reflect averages over a 10-year period.
Source: Mississippi Forestry Commission

TABLE B.16: HISTORICAL WILDFIRE OCCURRENCES IN HANCOCK COUNTY

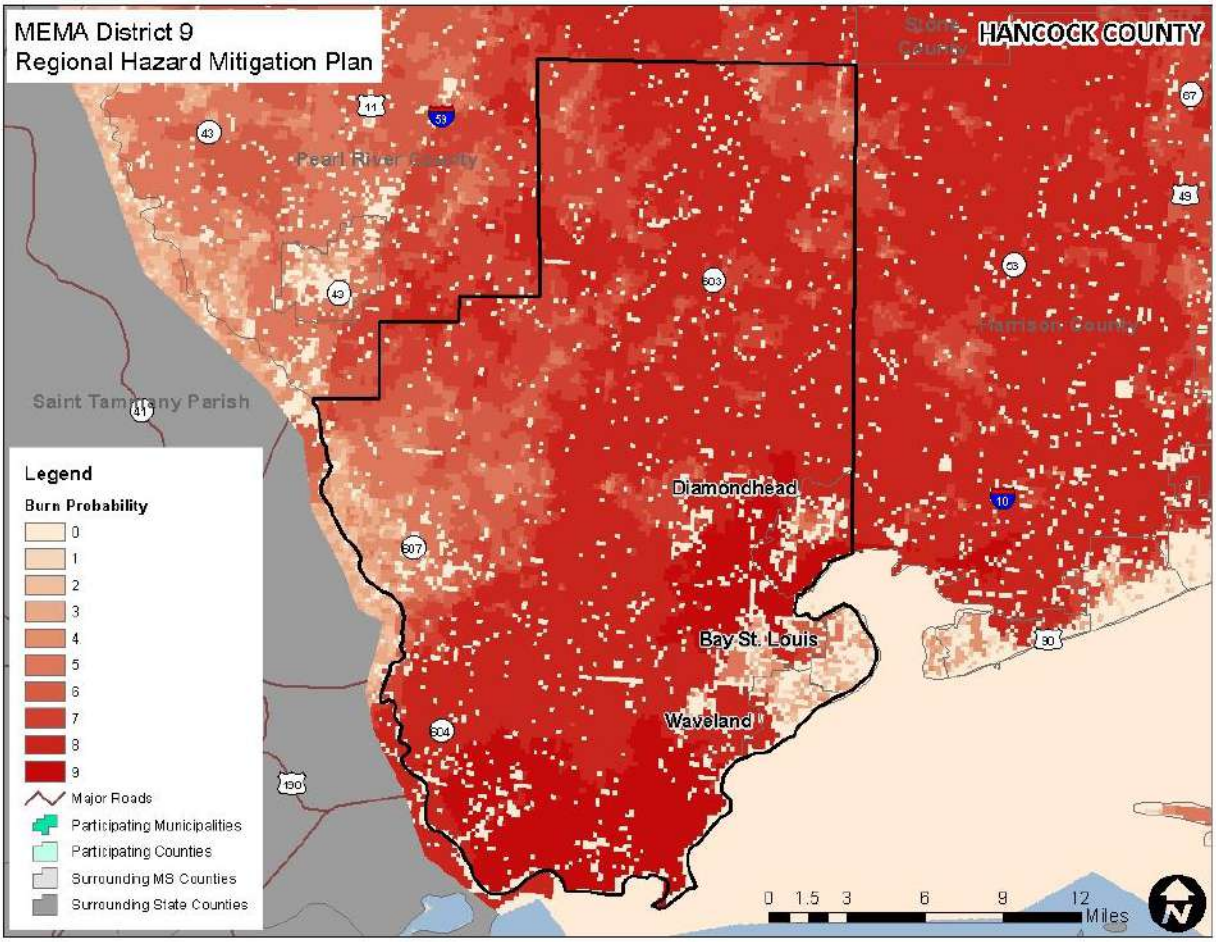
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Hancock County										
Number of Fires	139	106	181	74	156	63	62	46	38	51
Number of Acres Burned	3,242	1,803	3,416	1,001	3,921	1,154	980	925	1,906	2,726

Source: Mississippi Forestry Commission

PROBABILITY OF FUTURE OCCURRENCES

Wildfire events will be an ongoing occurrence in Hancock County. **Figure B.8** shows that there is some probability a wildfire will occur throughout the county. However, the likelihood of wildfires increases during drought cycles and abnormally dry conditions. Fires are likely to stay small in size but could increase due to local climate and ground conditions. Dry, windy conditions with an accumulation of forest floor fuel (potentially due to ice storms or lack of fire) could create conditions for a large fire that spreads quickly. It should also be noted that some areas do vary somewhat in risk. For example, highly developed areas are less susceptible unless they are located near the urban-wildland boundary. The risk will also vary due to assets. Areas in the urban-wildland interface will have much more property at risk, resulting in increased vulnerability and need to mitigate compared to rural, mainly forested areas. The probability assigned to Hancock County for future wildfire events is highly likely (100 percent annual probability).

FIGURE B.8: BURN PROBABILITY IN HANCOCK COUNTY



Source: Southern Wildfire Risk Assessment

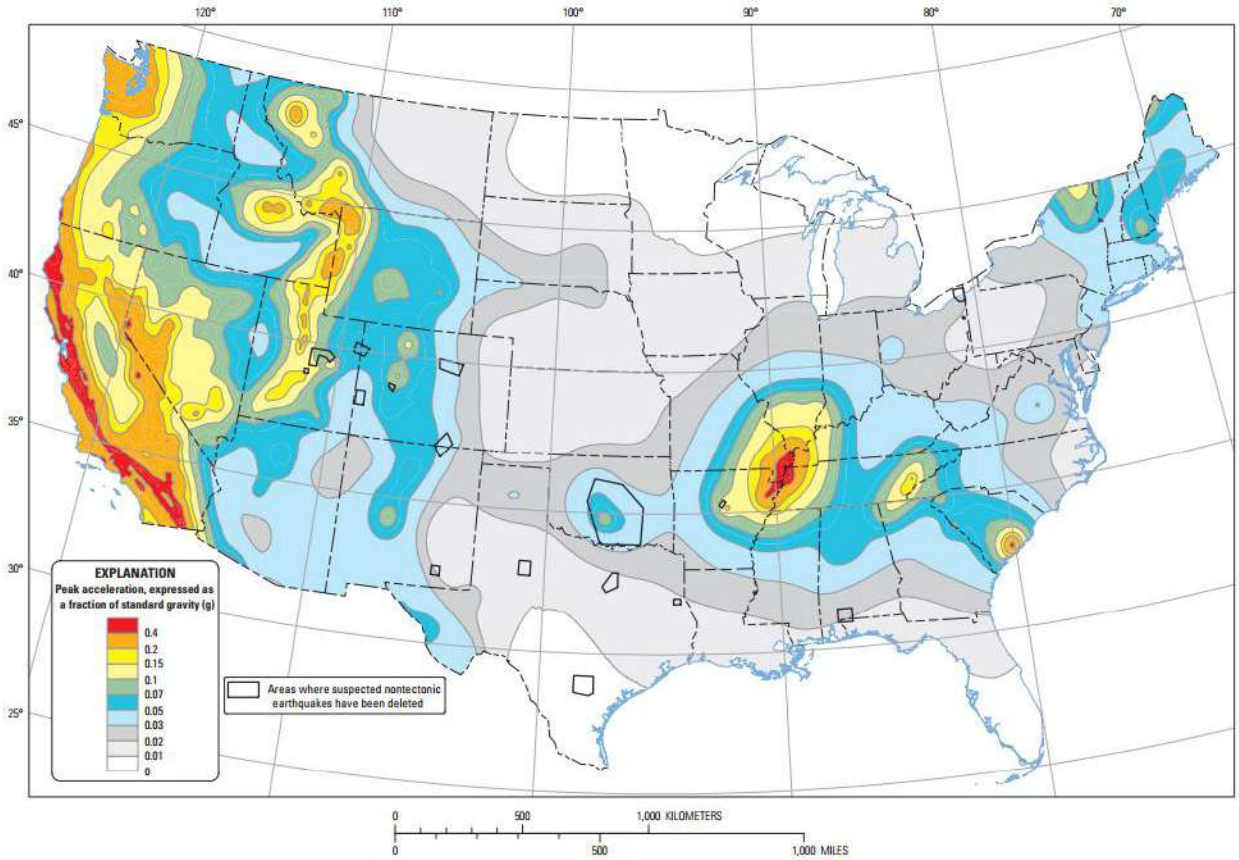
GEOLOGIC HAZARDS

B.2.8 Earthquake

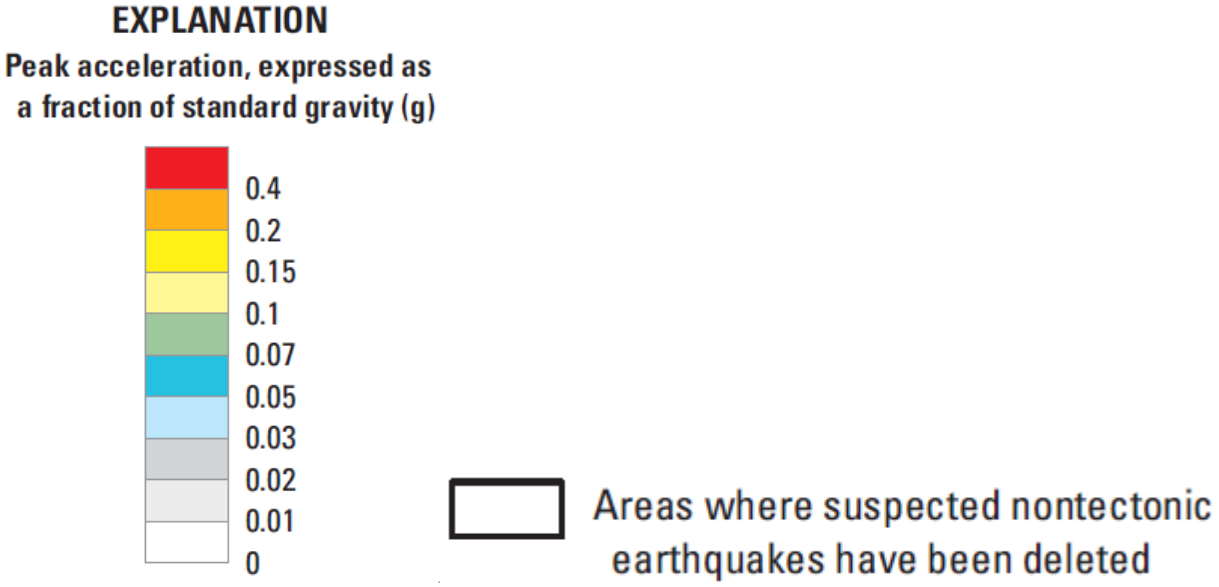
LOCATION AND SPATIAL EXTENT

Figure B.9 shows the intensity level associated with Hancock County, based on the national USGS map of peak acceleration with 10 percent probability of exceedance in 50 years. It is the probability that ground motion will reach a certain level during an earthquake. The data show peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10 percent probability of exceedance in 50 years. The map was compiled by the U.S. Geological Survey (USGS) Geologic Hazards Team, which conducts global investigations of earthquake, geomagnetic, and landslide hazards. According to this map, Hancock County lies within an approximate zone of level "1" to "2" ground acceleration. This indicates that the county exists within an area of low seismic risk.

FIGURE B.9: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS



Ten-percent probability of exceedance in 50 years map of peak ground acceleration



Source: United States Geological Survey, 2014

The primary source of potential damage to Hancock County from an earthquake is the New Madrid Seismic Zone (NMSZ). Historically, a series of earthquakes in 1811 and 1812 demonstrated that this fault zone can produce high magnitude seismic events, sometimes on the scale of a 7.5-8.0 on the Richter scale. The biggest challenge with earthquakes that occur in this area of seismic activity is predicting the recurrence of earthquakes emanating from this zone. Although the magnitude of earthquakes from the NMSZ can be large, they occur very irregularly and fairly infrequently. This makes it extremely difficult to project when they will occur.

It should also be noted that the State of Mississippi Hazard Mitigation Plan identifies certain areas of concern for liquefaction and lists the counties and corresponding zones within those counties that have the highest liquefaction potential. Hancock County does not have any identified liquefaction potential risk.

HISTORICAL OCCURRENCES

At least three earthquakes are known to have affected Hancock County since 1955. **Table B.17** provides a summary of earthquake events reported by the National Centers for Environmental Information (formerly National Geophysical Data Center) between 1638 and 1985, and **Figure B.10** presents a map showing earthquakes whose epicenters have occurred near the county between 1985 and 2015 (no earthquakes occurred within the county boundaries during this period). A detailed occurrence of each event including the date, distance from the epicenter, magnitude, and Modified Mercalli Intensity (if known) can be found in **Table B.18**.[11]

TABLE B.17: SUMMARY OF SEISMIC ACTIVITY IN HANCOCK COUNTY

Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
Bay St. Louis	2	III	< 4.8
Diamondhead	0	--	--
Waveland	0	--	--
Unincorporated Area	1	IV	< 4.8
HANCOCK COUNTY TOTAL	**3**	**IV**	**< 4.8**

Source: National Geophysical Data Center

TABLE B.18: SIGNIFICANT SEISMIC EVENTS IN HANCOCK COUNTY (1638 -1985)

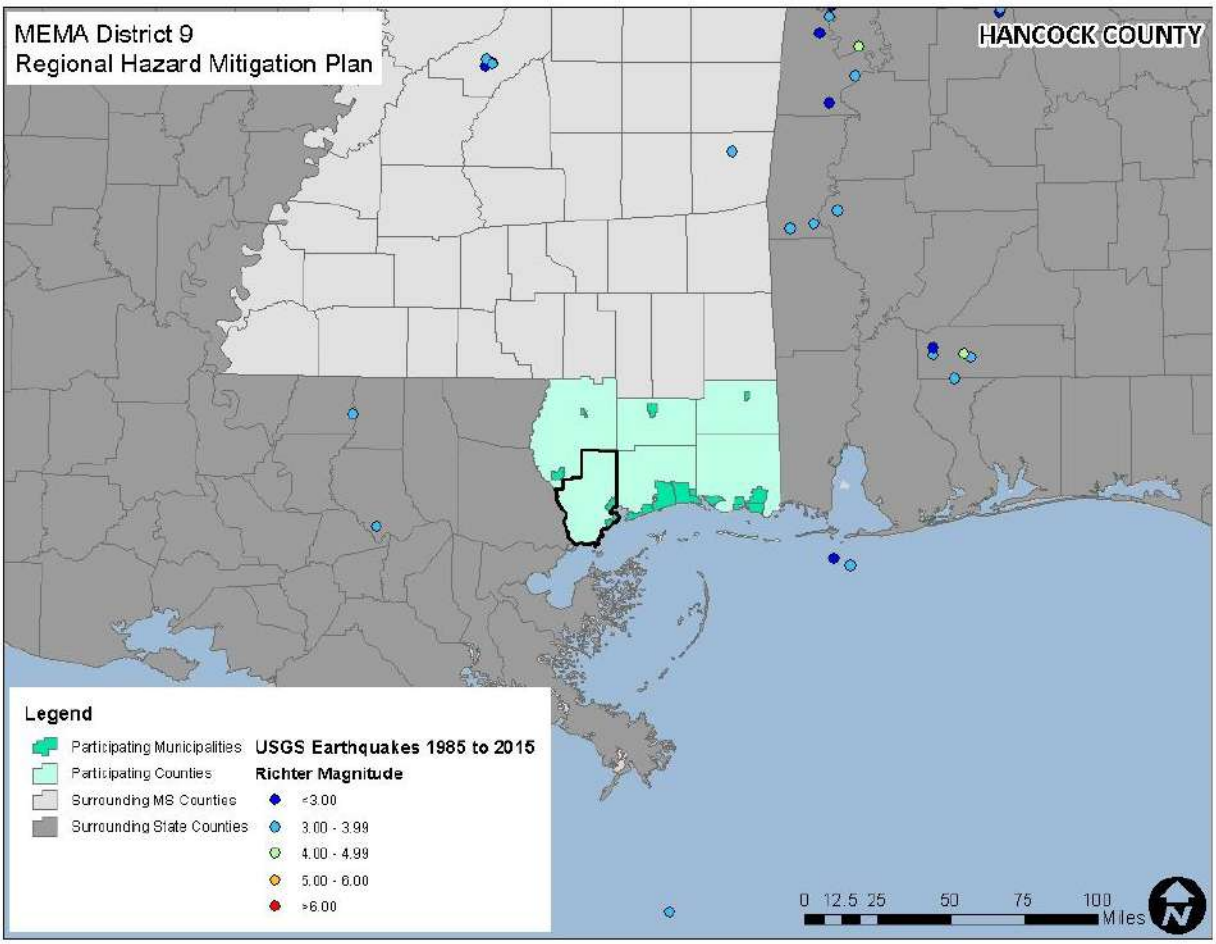
Location	Date	Epicentral Distance	Magnitude	MMI
Bay St. Louis				
BAY ST. LOUIS	2/1/1955	24.0 km	*Unknown*	III
BAY ST. LOUIS	9/9/1975	39.0 km	*Unknown*	II
Diamondhead				
None reported	--	--	--	--
Waveland				
None reported	--	--	--	--

[11] Due to reporting mechanisms, not all earthquakes events were recorded during this time. Furthermore, some are missing data, such as the epicenter location, due to a lack of widely used technology. In these instances, a value of "unknown" is reported.

Location	Date	Epicentral Distance	Magnitude	MMI
Unincorporated Area				
PEARLINGTON	9/9/1975	57.0 km	*Unknown*	IV

Source: National Geophysical Data Center

FIGURE B.10: HISTORIC EARTHQUAKES WITH EPICENTERS NEAR HANCOCK COUNTY (1985-2015)



Source: United States Geological Survey

PROBABILITY OF FUTURE OCCURRENCES

The probability of significant, damaging earthquake events affecting Hancock County is unlikely. However, it is possible that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light will affect the county. The annual probability level for the county is estimated to be between 1 and 10 percent (possible).

WIND-RELATED HAZARDS

B.2.9 Extreme Cold

Extreme cold typically impacts a large area and cannot be confined to any geographic or political boundaries. The entire county is susceptible to extreme cold conditions.

HISTORICAL OCCURRENCES

Data from the National Climatic Data Center was used to determine historical extreme cold events in Hancock County. Two events were reported:

February 2, 1996 – *Cold/Wind Chill* – An arctic airmass overspread much of south Mississippi bringing the longest extended period of cold weather since 1989. In Amite County, 4SW Gillsburg, a 67 year old man died from hypothermia on the 4th after the fire in a wood burning heater went out. Considerable property damage resulted from broken pipes due to the extended period of subfreezing temperatures. In Jackson County, Moss Point and Gautier had broken pipes in 100 and 147 houses, respectively.

December 18, 1996 – *Cold/Wind Chill* – An arctic airmass overspread south Mississippi resulting in three consecutive nights with subfreezing minimum temperatures. Temperatures lowered into the mid-teens over the southwest section of the state and near 20 degrees along the Gulf Coast.

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that all of Hancock County has a probability level of possible (between 1 and 10 percent annual probability) for future extreme cold events to impact the county.

B.2.10 Extreme Heat

Heat waves typically impact a large area and cannot be confined to any geographic or political boundaries. The entire county is susceptible to extreme heat conditions.

HISTORICAL OCCURRENCES

The National Climatic Data Center was used to determine historical heat wave occurrences in the county. No events specific to Hancock County were reported, however, several events were reported elsewhere in the region. Similar events and impacts can be expected in Hancock County.

July 2000 – July was a hot and dry month in Southeast Mississippi. In Beaumont the temperature was 100 degrees or higher eleven days during the month with the hottest being 105 degrees. In Richton the temperature was 100 degrees or higher three days during the month with the hottest being 102 degrees. In Waynesboro the temperature was 100 degrees or higher four days during the month with the hottest being 103 degrees. In Wiggins the temperature was 100 degrees or higher nine days during the month with 105 degrees being the hottest. In addition to being hot is was also a dry month across the area. Most stations ended up with below normal rainfall totals for the month. In Jackson County, a 68 year old man died from heat exhaustion while sitting in his pickup truck in a parking lot with the windows rolled up, and

10 days later, a 58 year old male was found dead from heat exhaustion while sitting in his truck in the driveway of his home with the windows rolled up.

August 2007 – Heat advisories were issued for a combination of high temperatures and high humidities. Heat index vales were between 110 and 115 degrees. Several public buildings and churches allowed people to come in and cool off during the heat of the day.

July 2010 – Several days of temperatures near 100 degrees contributed to two deaths from heat stroke in the Gulfport area. The Harrison County Coroner stated that two deaths in a mobile home on Smith Road near Canal Road were caused by heat stroke. High temperatures at Gulfport Airport, approximately 3 miles away, were between 98 and 102 degrees from July 29 through August 2. Bodies were discovered on August 4, but deaths occurred several days prior to that. Date of deaths was estimated.

August 2010 – Hot and humid conditions produced heat index values between 110 and 115 degrees over coastal Mississippi. A 48 year old construction worker collapsed and died while working on a highway construction project. Jackson County coroner classified the fatality as heat related with the cause of death as hyperthermia.

PROBABILITY OF FUTURE OCCURRENCES

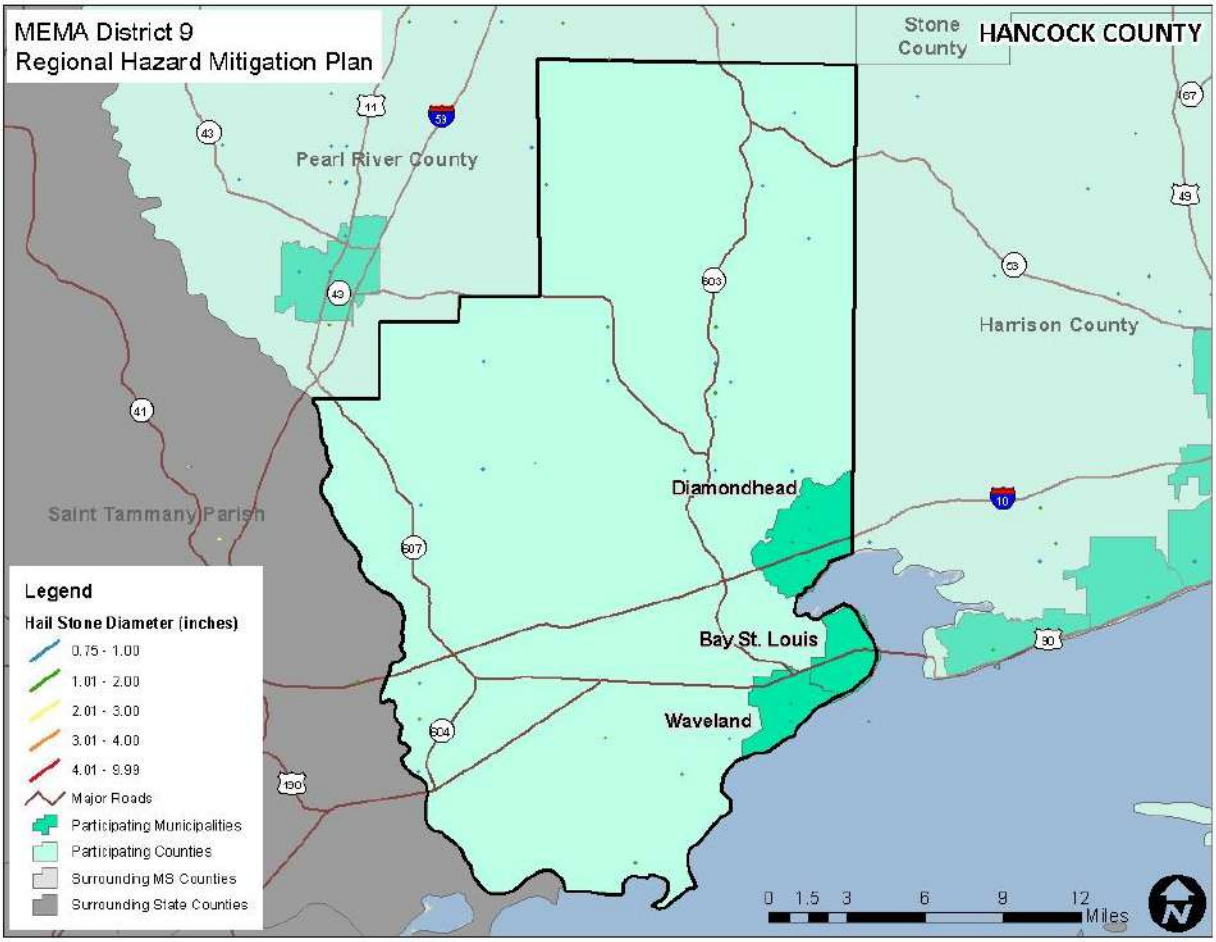
Based on historical occurrence information, it is assumed that all of Hancock County has a probability level of highly likely (100 percent annual probability) for future heat wave events.

B.2.11 Hailstorm

LOCATION AND SPATIAL EXTENT

Hailstorms frequently accompany thunderstorms, so their locations and spatial extents coincide. It is assumed that Hancock County is uniformly exposed to severe thunderstorms; therefore, all areas of the county are equally exposed to hail which may be produced by such storms. With that in mind, **Figure B.11** shows the location of hail events that have impacted the county between 1955 and 2015.

FIGURE B.11: HAILSTORM TRACKS IN HANCOCK COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, 55 recorded hailstorm events have affected Hancock County since 1971.[12] In all, hail occurrences did not result in any property damages.[13] Hail ranged in diameter from 0.75 inches to 1.75 inches. **Table B.19** provides a summary of the hail events in Hancock County. Detailed information about each event that occurred in the county is provided in **Table B.20**.

It should be noted that hail is notorious for causing substantial damage to cars, roofs, and other areas of the built environment that may not be reported to the National Climatic Data Center. Therefore, it is likely that damages are greater than the reported value.

[12] These hail events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through June 2016. It is likely that additional hail events have affected Hancock County. As additional local data becomes available, this hazard profile will be amended.

[13] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE B.19: SUMMARY OF HAIL OCCURRENCES IN HANCOCK COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Bay St. Louis	2	0/0	$0	$0
Diamondhead	8	0/0	$0	$0
Waveland	6	0/0	$0	$0
Unincorporated Area	39	0/0	$0	$0
HANCOCK COUNTY TOTAL	**55**	**0/0**	**$0**	**$0**

Source: National Climatic Data Center

TABLE B.20: HISTORICAL HAIL OCCURRENCES IN HANCOCK COUNTY

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
Bay St. Louis				
BAY ST LOUIS	3/7/1998	1.75 in.	0/0	$0
BAY ST LOUIS	7/2/2009	1.75 in.	0/0	$0
Diamondhead				
DIAMONDHEAD	6/19/1997	1.75 in.	0/0	$0
DIAMONDHEAD ARPT	3/12/2001	0.75 in.	0/0	$0
DIAMONDHEAD ARPT	7/29/2003	1.00 in.	0/0	$0
DIAMONDHEAD ARPT	7/26/2009	1.75 in.	0/0	$0
DIAMONDHEAD ARPT	5/25/2010	1.75 in.	0/0	$0
DIAMONDHEAD ARPT	5/26/2011	1.00 in.	0/0	$0
DIAMONDHEAD ARPT	4/4/2012	1.00 in.	0/0	$0
DIAMONDHEAD ARPT	2/15/2016	1.00 in.	0/0	$0
Waveland				
Waveland	2/17/1995	0.75 in.	0/0	$0
Waveland	7/9/1995	0.75 in.	0/0	$0
WAVELAND	3/2/1999	0.75 in.	0/0	$0
WAVELAND	5/25/2010	1.00 in.	0/0	$0
WAVELAND	5/25/2010	1.75 in.	0/0	$0
WAVELAND	4/25/2015	1.50 in.	0/0	$0
Unincorporated Area				
HANCOCK CO.	6/26/1971	1.75 in.	0/0	$0
HANCOCK CO.	11/19/1974	1.75 in.	0/0	$0
HANCOCK CO.	5/24/1976	1.75 in.	0/0	$0
HANCOCK CO.	7/7/1980	1.75 in.	0/0	$0
HANCOCK CO.	4/18/1988	0.75 in.	0/0	$0
HANCOCK CO.	5/24/1988	1.75 in.	0/0	$0
HANCOCK CO.	6/14/1989	0.75 in.	0/0	$0
HANCOCK CO.	9/4/1990	0.75 in.	0/0	$0
HANCOCK CO.	9/4/1990	0.75 in.	0/0	$0
HANCOCK CO.	4/20/1992	0.75 in.	0/0	$0
Kiln	3/7/1995	1.00 in.	0/0	$0
Pearlington	7/9/1995	1.75 in.	0/0	$0
KILN	4/13/1996	0.75 in.	0/0	$0

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
SANTA ROSA	6/12/1996	1.00 in.	0/0	$0
LAKESHORE	1/24/1997	1.75 in.	0/0	$0
PEARLINGTON	3/6/1998	1.75 in.	0/0	$0
KILN	3/7/1998	1.00 in.	0/0	$0
LOGTOWN	3/7/1998	1.75 in.	0/0	$0
PEARLINGTON	3/7/1998	1.75 in.	0/0	$0
KILN	5/13/2000	1.00 in.	0/0	$0
KILN	7/22/2000	1.00 in.	0/0	$0
SELLERS	8/20/2000	0.75 in.	0/0	$0
PEARLINGTON	9/1/2000	0.75 in.	0/0	$0
FENTON	3/12/2002	0.75 in.	0/0	$0
CLERMONT HARBOR	3/31/2002	0.75 in.	0/0	$0
PEARLINGTON	7/29/2003	0.88 in.	0/0	$0
KILN	6/21/2004	1.75 in.	0/0	$0
KILN	3/26/2005	1.75 in.	0/0	$0
KILN	3/31/2005	0.75 in.	0/0	$0
KILN	3/31/2005	1.00 in.	0/0	$0
KILN	4/21/2006	0.75 in.	0/0	$0
KILN	6/23/2006	0.75 in.	0/0	$0
KILN	5/11/2007	1.25 in.	0/0	$0
KILN	6/13/2007	0.75 in.	0/0	$0
KILN	7/13/2007	0.88 in.	0/0	$0
KILN	6/25/2008	1.75 in.	0/0	$0
PEARLINGTON	4/2/2009	0.75 in.	0/0	$0
KILN	7/26/2009	1.00 in.	0/0	$0
KILN	4/4/2012	1.00 in.	0/0	$0

*Property damage is reported in 2016 dollars; All damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that the probability of future hail occurrences is highly likely (100 percent annual probability). Since hail is an atmospheric hazard, it is assumed that Hancock County has equal exposure to this hazard. It can be expected that future hail events will continue to cause minor damage to property and vehicles throughout the county.

B.2.12 Hurricane and Tropical Storm

LOCATION AND SPATIAL EXTENT

Hurricanes and tropical storms threaten the entire Atlantic and Gulf seaboard of the United States, and while coastal areas are most directly exposed to the brunt of landfalling storms, their impact is often felt hundreds of miles inland. Hancock County is located in a region of the country that is susceptible to all of the hazards wrought by hurricanes and tropical storms. All areas throughout Hancock County are susceptible to the accompanying hazard effects of extreme wind, flooding, and tornadoes, and coastal

areas are also extremely susceptible to the added effects of storm surge, wave action, coastal erosion, and tidal flooding.[14]

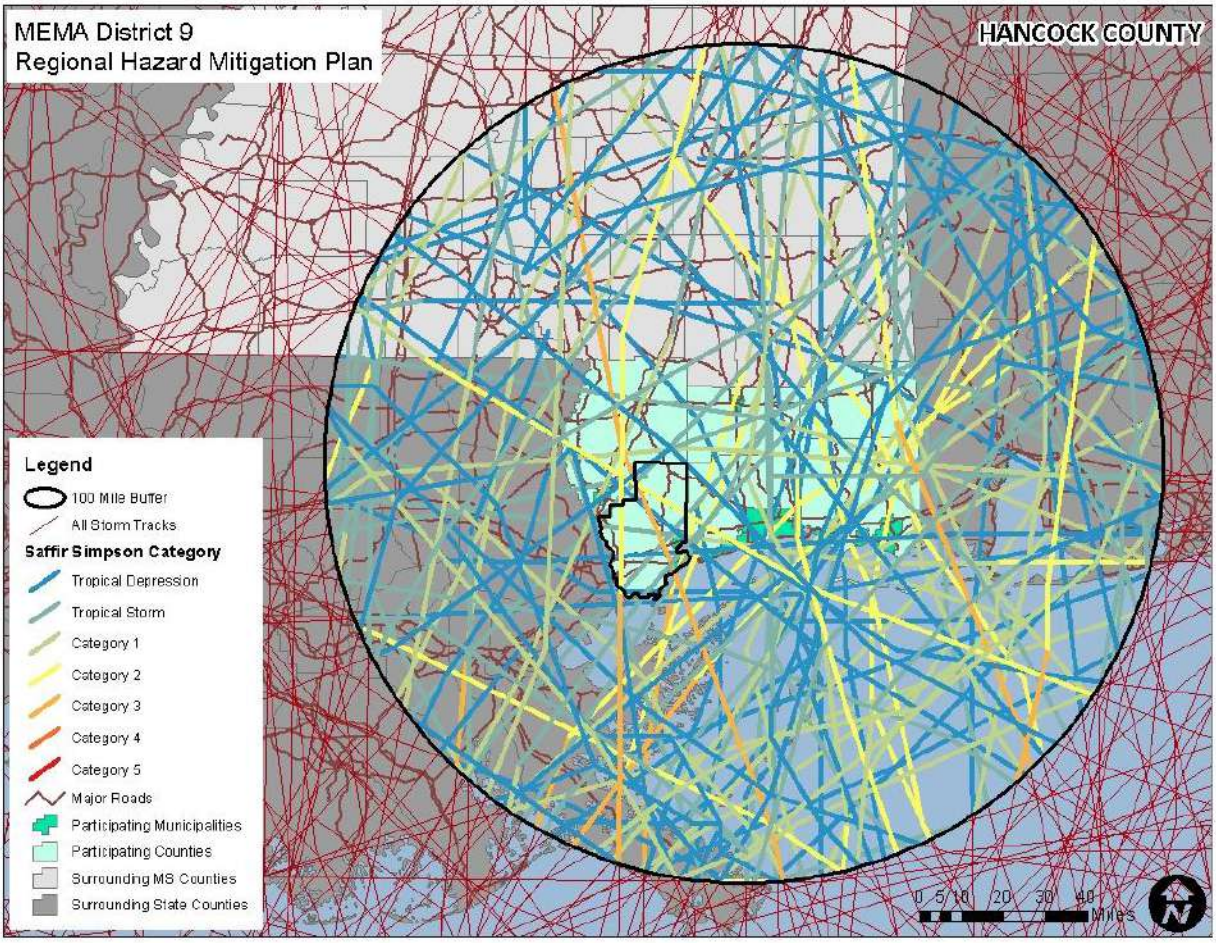
HISTORICAL OCCURRENCES

According to the National Hurricane Center's historical storm track records, 119 hurricane or tropical storm/depression tracks have passed within 100 miles of the MEMA District 9 Region since 1855.[15] This includes: 4 Category 3 hurricanes, 15 Category 2 hurricanes, 28 Category 1 hurricanes, 29 tropical storms, and 43 tropical depressions. Additionally, four other major storms had large-scale impacts on the region and are not included in these totals. These storms are listed below and range in Category from 1 to 4.

Of the recorded storm events, 58 hurricane or tropical storm/depression events traversed directly through the region as shown in **Figure B.12**. Notable storms include Hurricane Camille (1969), Hurricane Frederic (1979), and Hurricane Katrina (2005). **Table B.21** provides for each event the date of occurrence, name (if applicable), maximum wind speed (as recorded within 100 miles of the MEMA District 9 Region) and category of the storm based on the Saffir-Simpson Scale.

[14] Distinct hazard area locations for flooding, storm surge, wave action, and coastal erosion are discussed elsewhere in this subsection.
[15] These storm track statistics include tropical depressions, tropical storms, and hurricanes. Lesser events may still cause significant local impact in terms of rainfall and high winds.

FIGURE B.12: HISTORICAL HURRICANE STORM TRACKS WITHIN 100 MILES OF THE MEMA DISTRICT 9 REGION



Source: National Oceanic and Atmospheric Administration, National Hurricane Center

TABLE B.21: HISTORICAL STORM TRACKS WITHIN 100 MILES OF THE MEMA 9 DISTRICT REGION (1842–2016)

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
8/25/1852	UNNAMED	93	Category 2
8/3/1855	NOT NAMED	--	Tropical Depression
9/16/1855	UNNAMED	96	Category 2
6/24/1857	NOT NAMED	--	Tropical Depression
9/15/1859	UNNAMED	79	Category 1
8/11/1860	UNNAMED	96	Category 2
9/15/1860	UNNAMED	89	Category 2
8/17/1861	NOT NAMED	--	Tropical Depression
11/1/1861	NOT NAMED	--	Tropical Depression
9/15/1862	NOT NAMED	--	Tropical Depression
9/16/1862	NOT NAMED	--	Tropical Depression
10/1/1863	UNNAMED	43	Tropical Storm

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
6/3/1866	NOT NAMED	--	Tropical Depression
9/16/1867	NOT NAMED	--	Tropical Depression
10/5/1867	UNNAMED	89	Category 2
10/3/1868	NOT NAMED	--	Tropical Depression
9/5/1869	UNNAMED	79	Category 1
7/30/1870	NOT NAMED	--	Tropical Depression
7/11/1872	UNNAMED	59	Tropical Storm
9/18/1875	UNNAMED	18	Tropical Depression
9/18/1877	UNNAMED	79	Category 1
9/1/1879	UNNAMED	89	Category 2
10/7/1879	UNNAMED	59	Tropical Storm
8/31/1880	UNNAMED	70	Category 1
8/2/1881	NOT NAMED	--	Tropical Depression
8/3/1881	UNNAMED	59	Tropical Storm
8/30/1885	UNNAMED	59	Tropical Storm
9/26/1885	UNNAMED	70	Category 1
6/15/1886	UNNAMED	50	Tropical Storm
6/14/1887	UNNAMED	33	Tropical Depression
10/19/1887	UNNAMED	82	Category 1
6/27/1888	NOT NAMED	--	Tropical Depression
9/23/1889	UNNAMED	79	Category 1
8/27/1890	UNNAMED	43	Tropical Storm
9/21/1891	NOT NAMED	--	Tropical Depression
9/12/1892	UNNAMED	59	Tropical Storm
9/7/1893	UNNAMED	79	Category 1
10/2/1893	UNNAMED	97	Category 3
8/7/1894	UNNAMED	59	Tropical Storm
8/15/1895	UNNAMED	59	Tropical Storm
9/13/1900	UNNAMED	43	Tropical Storm
8/14/1901	UNNAMED	82	Category 1
10/9/1905	UNNAMED	43	Tropical Storm
9/27/1906	UNNAMED	93	Category 2
9/21/1907	UNNAMED	43	Tropical Storm
8/11/1911	UNNAMED	79	Category 1
6/13/1912	UNNAMED	59	Tropical Storm
7/17/1912	UNNAMED	5	Tropical Depression
9/13/1912	UNNAMED	82	Category 1
9/18/1914	UNNAMED	33	Tropical Depression
9/29/1915	UNNAMED	96	Category 2
7/5/1916	UNNAMED	95	Category 2
10/17/1922	UNNAMED	18	Tropical Depression
6/26/1923	UNNAMED	43	Tropical Storm
10/17/1923	UNNAMED	59	Tropical Storm
9/20/1926	UNNAMED	93	Category 2
9/1/1932	UNNAMED	82	Category 1
10/15/1932	UNNAMED	59	Tropical Storm

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
7/27/1936	UNNAMED	43	Tropical Storm
8/22/1936	UNNAMED	5	Tropical Depression
6/16/1939	UNNAMED	59	Tropical Storm
9/26/1939	UNNAMED	50	Tropical Storm
9/24/1940	UNNAMED	18	Tropical Depression
9/10/1944	UNNAMED	64	Category 1
9/5/1945	UNNAMED	18	Tropical Depression
9/19/1947	UNNAMED	92	Category 2
9/4/1948	UNNAMED	79	Category 1
9/4/1949	UNNAMED	43	Tropical Storm
8/31/1950	BAKER	82	Category 1
8/1/1955	BRENDA	70	Category 1
8/27/1955	UNNAMED	50	Tropical Storm
9/24/1956	FLOSSY	82	Category 1
9/18/1957	ESTHER	64	Category 1
10/8/1959	IRENE	43	Tropical Storm
9/15/1960	ETHEL	85	Category 2
9/26/1960	FLORENCE	1	Tropical Depression
10/4/1964	HILDA	70	Category 1
9/10/1965	BETSY*	117	Category 4
9/29/1965	DEBBIE	33	Tropical Depression
8/18/1969	CAMILLE	100	Category 3
8/8/1971	UNNAMED	5	Tropical Depression
9/4/1971	FERN	5	Tropical Depression
9/16/1971	EDITH	70	Category 1
7/29/1975	UNNAMED	18	Tropical Depression
10/17/1975	UNNAMED	5	Tropical Depression
9/24/1976	UNNAMED	5	Tropical Depression
7/19/1977	UNNAMED	18	Tropical Depression
9/6/1977	BABE	18	Tropical Depression
10/25/1977	UNNAMED	18	Tropical Depression
8/10/1978	UNNAMED	5	Tropical Depression
7/11/1979	BOB	74	Category 1
9/12/1979	FREDERIC	97	Category 3
7/20/1980	UNNAMED	5	Tropical Depression
10/27/1984	UNNAMED	18	Tropical Depression
9/2/1985	ELENA	95	Category 2
10/31/1985	JUAN	64	Category 1
8/12/1987	UNNAMED	5	Tropical Depression
8/8/1988	BERYL	5	Tropical Depression
8/9/1988	BERYL	50	Tropical Storm
9/10/1988	FLORENCE	79	Category 1
8/3/1995	ERIN	82	Category 1
7/19/1997	DANNY	79	Category 1
9/27/1998	GEORGES	92	Category 2
9/20/1998	HERMINE	33	Tropical Depression

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
6/11/2001	ALLISON	43	Tropical Storm
8/5/2002	BERTHA	33	Tropical Depression
9/14/2002	HANNA	59	Tropical Storm
9/26/2002	ISIDORE	64	Category 1
6/30/2003	BILL	59	Tropical Storm
7/1/2003	BILL	18	Tropical Depression
9/16/2004	IVAN	96	Category 2
6/11/2005	ARLENE	59	Tropical Storm
7/6/2005	CINDY	74	Category 1
7/10/2005	DENNIS*	100	Category 3
8/29/2005	KATRINA	98	Category 3
9/22/2007	TEN	5	Tropical Depression
8/24/2008	FAY	18	Tropical Depression
9/1/2008	GUSTAV*	87	Category 2
11/10/2009	IDA	70	Category 1
7/25/2010	BONNIE	5	Tropical Depression
8/12/2010	FIVE	5	Tropical Depression
9/5/2011	LEE	43	Tropical Storm
8/28/2012	ISAAC*	70	Category 1

*It should be noted that the track of several major hurricanes that impacted the region fell outside of the 100-mile buffer. These storms were included in the table due to their significant impact (Betsy, 1965; Dennis, 2005; Gustav, 2008; and Isaac, 2012), but it should be noted that wind speed and storm category are estimated based on anecdotal information.
Source: National Hurricane Center

Federal records indicate that nine disaster declarations were made in 1979 (Hurricane Frederic), 1998 (Hurricane Georges), 2001 (Tropical Storm Allison), 2002 (Tropical Storm Isidore), 2004 (Hurricane Ivan), 2005 (Hurricane Dennis and Hurricane Katrina), 2008 (Hurricane Gustav), and 2012 (Hurricane Isaac).[16] Hurricane and tropical storm events can cause substantial damage in the area due to high winds and flooding.

Flooding and high winds from hurricanes and tropical storms can cause damage throughout the county. Anecdotes are available from NCDC for the major storms that have impacted the county as found below:

Hurricane Georges – September 25-29, 1998
Hurricane Georges, a strong Category 2 hurricane moved slowly northwest across the Gulf of Mexico toward southeast Louisiana and coastal Mississippi on the September 25 and September 26. As the hurricane approached the mouth of the Mississippi River on September 27, it slowly turned toward the north making landfall along the Mississippi Coast just to the east of Biloxi, MS at 0400 CST on September 28. The hurricane moved only slowly north during the morning hours, at times becoming nearly stationary. The hurricane finally was downgraded to a tropical storm at 1500CST on September 28 when it was located north of Biloxi. The tropical storm then moved very slowly eastward into southern Alabama on September 29.

The greatest affect from the hurricane occurred over Jackson County which experienced the intense eastern portion of the hurricanes eyewall and highest storm surge.

[16] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

Due to the slow forward speed of the hurricane very heavy rainfall occurred over eastern Harrison County and Jackson County leading to record flooding on streams and rivers. The barrier islands in the Mississippi Sound were also heavily damaged by wind and storm surge. A new three quarter mile cut developed in the east portion of Ship Island. Total insured property damage in Mississippi was estimated at near 310 million dollars by insurance industry sources. When uninsured losses and public property damage considered, total damages in Mississippi will likely approach $620 million.

Hancock County - Wind damage in Hancock County was mostly confined to large tree limbs snapped off, trees downed, and minor roof damage to houses and businesses, and damage to commercial signs. Storm surge was of minimal impact with the county remaining on the west side of the hurricane. Storm surge was 4 to 5 feet above normal with only minor coastal flooding and beach erosion occurring. Approximately 2,000 people were housed in public shelters.

Hurricane Katrina – August 24-30, 2005
Hurricane Katrina was one of the strongest and most destructive hurricanes on record to impact the coast of the United States. It will likely be recorded as one the worst natural disaster in the history of the United States to date resulting in catastrophic damage and numerous casualties in southeast Louisiana and along the Mississippi coast. Damage and casualties resulting from Hurricane Katrina extended as far east as Alabama and the panhandle of Florida. Katrina developed from a tropical depression southeast of the Bahamas on August 24th. After moving through the Bahamas as a tropical storm, Katrina strengthened to a category 1 hurricane prior to landfall in south Florida around the Miami area on the 25th of August. Katrina crossed south Florida and entered the Gulf of Mexico and began to strengthen. Hurricane Katrina strengthened to a category 5 storm on August 28th about 250 miles south southeast of the mouth of the Mississippi River with winds reaching their peak intensity of 175 mph and a central pressure of 902 mb. Post event analysis by the National Hurricane Center indicates that Katrina weakened slightly before making landfall as a strong category 3 storm in initial landfall in lower Plaquemines Parish. Maximum sustained winds were estimated at 110 knots or 127 mph and a central pressure of 920 mb around 610 AM CDT on August 29th in southeast Louisiana just south of Buras in Plaquemines Parish. The storm continued on a north northeast track with the center passing about 40 miles southeast of New Orleans with a second landfall occurring near the Louisiana and Mississippi border around 945 AM CDT as a category 3 storm with maximum sustained winds estimated around 105 knots or 121 mph. Katrina continued to weaken as it moved north northeast across Mississippi during the day, but remained at hurricane strength 100 miles inland near Laurel, Mississippi. Katrina weakened to a tropical depression near Clarksville, Tennessee on August 30th.

Damage across coastal Mississippi was catastrophic. The storm surge associated with Hurricane Katrina approached or exceeded the surge associated with Hurricane Camille and impacted a much more extensive area. Almost total destruction was observed along the immediate coast in Hancock and Harrison Counties with storm surge damage extending north along bays and bayous to Interstate 10. Thousands of homes and businesses were destroyed by the storm surge. Hurricane force winds also caused damage to roofs, power lines, signage, downed trees, and some windows were broken by wind and wind driven debris in areas away from storm surge flooding, wind damage was widespread with fallen trees taking a heavy toll on houses and power lines. Damage was less extensive in southwest Mississippi. Excluding losses covered by the Federal Flood Insurance Program, insured property losses in Mississippi were estimated at 9.8 billion dollars. Uninsured and insured losses combined were estimated to exceed 100 billion dollars across the Gulf Coast.

As of late October, the following fatality figures were reported in the Mississippi coastal counties; Hancock- 52, Harrison - 83, Jackson - 17. Additional details on fatalities will be given in later updates to storm data.

Due to the failure of power and equipment prior to the peak of the storm, data for wind, storm surge, pressure, and rainfall are incomplete. The lowest pressure on the Mississippi coast was estimated to be 928 mb where the hurricane made landfall near the Louisiana Mississippi border. A pressure of 976 mb was recorded at 0951 CDT by a university weather station deployed in Pascagoula, well east of the landfall location. At approximately the same time, the pressure at the NWS office in Slidell, just to the west of landfall location, recorded a pressure of 934.1 mb at 0938 AM CDT.

The highest wind gusts recorded in Mississippi and the adjacent coastal waters were 117 knots (134 mph) at the Pearl River County EOC office in Poplarville and 102 knots (118 mph) at 1000AM CDT by a university wind tower deployed at the Stennis Space Center in Hancock County. Maximum sustained winds in Mississippi were estimated around 105 knots (121 mph) near the storm's second landfall along the Mississippi and Louisiana border. Unofficial wind observations before the gage failed included a wind gust of 106 kt, (122 mph) at 0615 CDT by an amateur radio operator in Long Beach and a wind gust of 108 kt (124 mph) at the EOC in Pascagoula.

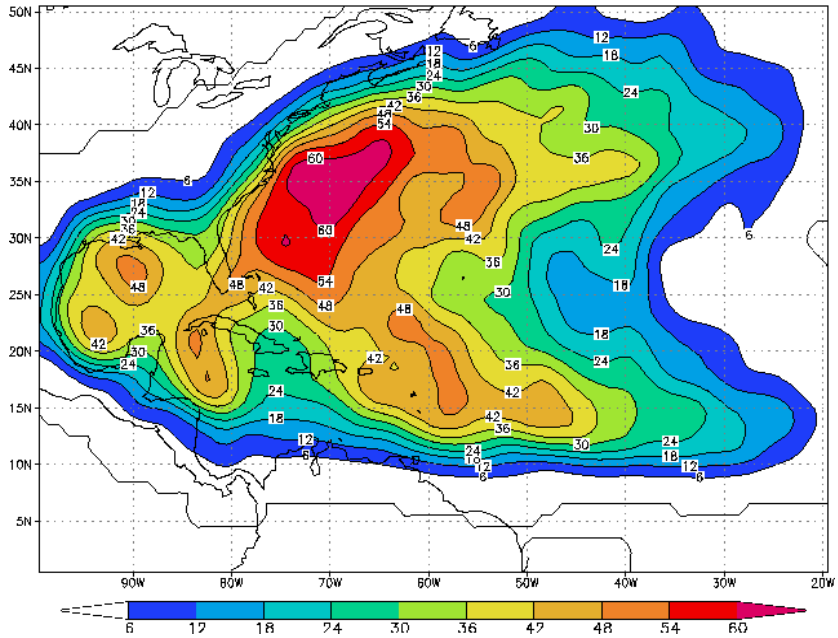
Most tide gages were destroyed by the storm surge so storm surge was determined primarily by post storm high water mark surveys conducted by FEMA. An estimated storm surge of approximately 23.0 feet occurred at the Hancock County EOC operations area in Waveland, and the high water mark measured on the Jackson County EOC building in Pascagoula was 16.1 feet. Preliminary estimates of storm surge along the Mississippi Coast include Hancock County 19-25 feet, Harrison County 19-25 feet, Jackson County 17-21 ft. All storm surge heights are still water elevations referenced to NAVD88 datum.

Storm total rainfall amounts generally ranged from 10 to 16 inches across coastal and south Mississippi with much lower amounts observed over southwest Mississippi. The highest observed storm total rainfall was 11 inches at Stennis Space Center and near Picayune.

PROBABILITY OF FUTURE OCCURRENCES

According to NOAA statistical data, the region is located in an area with an annual probability of a named storm between 30 and 42 percent as presented in **Figure B.13**. This illustration was created by the National Oceanic and Atmospheric Administration's Hurricane Research Division using data from 1944 to 1999 and counting hits when a storm or hurricane was within approximately 100 miles (165 km) of each location. As a reference point, the tip of Florida's outline can be found near the 25N, 80W intersection, and the MEMA District 9 Region is near the 30N, 90W intersection. This empirical probability is fairly consistent with other scientific studies and observed historical data made available through a variety of federal, state, and local sources.

FIGURE B.13: EMPIRICAL PROBABILITY OF A NAMED HURRICANE OR TROPICAL STORM



Source: National Oceanic and Atmospheric Administration

The probability of storm occurrences will vary significantly based on the return interval for different categories of magnitude. The probability of less intense storms (lower return periods) is higher than more intense storms (higher return periods). **Table B.22** profiles the potential peak gust wind speeds that can be expected in the MEMA District 9 Region during a hurricane event for various return periods according to FEMA's HAZUS-MH®.

TABLE B.22: POTENTIAL PEAK GUST WIND SPEEDS PER RETURN PERIOD

50-Year	100-Year	500-Year	1,000-Year
119.4 mph	133.9 mph	160.3 mph	170.0

Source: Federal Emergency Management Agency (Hazus-MH 3.2)

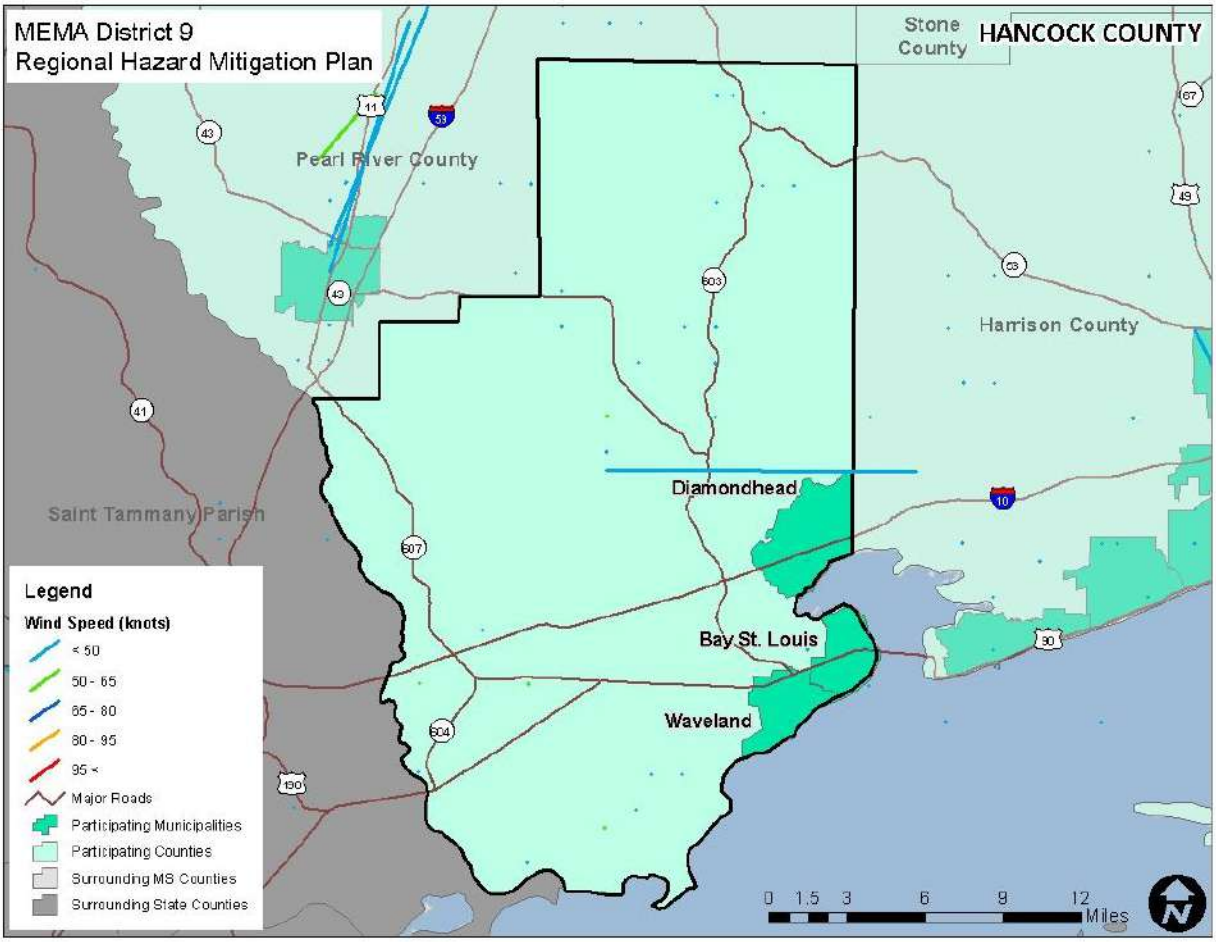
Overall, the probability level of future hurricane and tropical storm occurrence for Hancock County is highly likely (100 percent annual probability).

B.2.13 Severe Thunderstorm/High Wind

LOCATION AND SPATIAL EXTENT

A thunderstorm event is an atmospheric hazard, and thus has no geographic boundaries. It is typically a widespread event that can occur in all regions of the United States. However, thunderstorms are most common in the central and southern states because atmospheric conditions in those regions are favorable for generating these powerful storms. It is assumed that Hancock County has uniform exposure to an event and the spatial extent of an impact could be large. With that in mind, **Figure B.14** shows the location of wind events that have impacted the county between 1955 and 2015.

FIGURE B.14: SEVERE THUNDERSTORM TRACKS IN HANCOCK COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

Severe storms were at least partially responsible for three disaster declarations in Hancock County in 1979, 1991, and 1995.[17] According to NCDC, there have been 102 reported thunderstorm and high wind events since 1968 in Hancock County.[18] These events caused almost $429,000 (2016 dollars) in damages.[19] There were also reports of four injuries. **Table B.23** summarizes this information. Detailed thunderstorm and high wind event reports including date, magnitude, and associated damages for each event are presented in **Table B.24**.

[17] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.
[18] These thunderstorm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through June 2016 and these high wind events are only inclusive of those reported by NCDC from 1996 through June 2016. It is likely that additional thunderstorm and high wind events have occurred in Hancock County. As additional local data becomes available, this hazard profile will be amended.
[19] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE B.23: SUMMARY OF THUNDERSTORM/HIGH WIND OCCURRENCES IN HANCOCK COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Bay St. Louis	6	0/0	$1,981	$99
Diamondhead	3	0/0	$17,584	$1,099
Waveland	14	0/0	$59,427	$2,701
Unincorporated Area	79	0/4	$349,561	$7,283
HANCOCK COUNTY TOTAL	**102**	**0/4**	**$428,553**	**$11,182**

Source: National Climatic Data Center

TABLE B.24: HISTORICAL THUNDERSTORM/HIGH WIND OCCURRENCES IN HANCOCK COUNTY

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
Bay St. Louis					
BAY ST LOUIS	11/7/1996	Thunderstorm Wind	--	0/0	$768
BAY ST LOUIS	7/14/1998	Thunderstorm Wind	--	0/0	$739
BAY ST LOUIS	8/10/2000	Thunderstorm Wind	--	0/0	$140
BAY ST LOUIS	7/21/2002	Thunderstorm Wind	--	0/0	$335
BAY ST LOUIS	8/8/2015	Thunderstorm Wind	54 kts. MG	0/0	$0
BAY ST LOUIS	8/8/2015	Thunderstorm Wind	52 kts. EG	0/0	$0
Diamondhead					
DIAMONDHEAD ARPT	6/24/2000	Thunderstorm Wind	--	0/0	$1,399
DIAMONDHEAD ARPT	9/5/2000	Thunderstorm Wind	--	0/0	$2,797
DIAMONDHEAD ARPT	4/8/2002	Thunderstorm Wind	--	0/0	$13,388
Waveland					
Waveland	9/9/1994	Thunderstorm Wind	0 kts.	0/0	$8,126
WAVELAND	7/26/1999	Thunderstorm Wind	--	0/0	$723
WAVELAND	9/29/1999	Thunderstorm Wind	--	0/0	$145
WAVELAND	8/10/2000	Thunderstorm Wind	--	0/0	$1,399
WAVELAND	3/14/2001	Thunderstorm Wind	--	0/0	$680
WAVELAND	6/11/2001	Thunderstorm Wind	--	0/0	$20,400
WAVELAND	8/2/2002	Thunderstorm Wind	--	0/0	$1,339
WAVELAND	7/17/2003	Thunderstorm Wind	50 kts. EG	0/0	$13,090
WAVELAND	11/18/2003	Thunderstorm Wind	50 kts. EG	0/0	$6,545
WAVELAND	6/24/2004	Thunderstorm Wind	50 kts. EG	0/0	$638
WAVELAND	4/11/2005	Thunderstorm Wind	50 kts. EG	0/0	$2,466
WAVELAND	3/26/2009	Thunderstorm Wind	50 kts. EG	0/0	$1,123
WAVELAND	7/2/2009	Thunderstorm Wind	50 kts. EG	0/0	$1,684
WAVELAND	4/4/2011	Thunderstorm Wind	55 kts. EG	0/0	$1,071
Unincorporated Area					
HANCOCK CO.	6/11/1968	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	6/11/1968	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	1/10/1975	Thunderstorm Wind	0 kts.	0/0	$0

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
HANCOCK CO.	5/3/1978	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	4/13/1980	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	7/15/1980	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	9/15/1982	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	8/5/1983	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	2/12/1984	Thunderstorm Wind	0 kts.	0/4	$0
HANCOCK CO.	7/23/1984	Thunderstorm Wind	50 kts.	0/0	$0
HANCOCK CO.	5/21/1985	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	5/21/1985	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	5/26/1986	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	8/17/1986	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	8/17/1986	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	3/17/1987	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	2/15/1988	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	5/21/1988	Thunderstorm Wind	52 kts.	0/0	$0
HANCOCK CO.	6/9/1988	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	6/7/1989	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	1/25/1990	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	8/30/1990	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	4/25/1991	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	6/5/1991	Thunderstorm Wind	0 kts.	0/0	$0
HANCOCK CO.	6/29/1992	Thunderstorm Wind	0 kts.	0/0	$0
Pearlington	5/8/1995	Thunderstorm Wind	0 kts.	0/0	$0
Kiln	5/9/1995	Thunderstorm Wind	0 kts.	0/0	$0
PEARLINGTON	1/18/1996	Thunderstorm Wind	--	0/0	$13,048
KILN	1/24/1996	Thunderstorm Wind	--	0/0	$1,535
KILN	1/24/1996	Thunderstorm Wind	--	0/0	$4,605
PEARLINGTON	3/18/1996	Thunderstorm Wind	52 kts.	0/0	$0
LAKESHORE	11/7/1996	Thunderstorm Wind	--	0/0	$38,377
KILN	12/29/1996	Thunderstorm Wind	52 kts.	0/0	$0
KILN	5/3/1997	Thunderstorm Wind	--	0/0	$15,006
LAKESHORE	1/7/1998	Thunderstorm Wind	--	0/0	$1,478
SELLERS	6/5/1998	Thunderstorm Wind	--	0/0	$1,478
KILN	6/21/1998	Thunderstorm Wind	--	0/0	$739
VIDALIA	3/27/2000	Thunderstorm Wind	--	0/0	$140
SELLERS	6/25/2000	Thunderstorm Wind	--	0/0	$699
PEARLINGTON	7/14/2000	Thunderstorm Wind	--	0/0	$350
COUNTYWIDE	7/16/2000	Thunderstorm Wind	--	0/0	$2,797
PEARLINGTON	9/1/2000	Thunderstorm Wind	52 kts. E	0/0	$0
ANSLEY	6/11/2001	Thunderstorm Wind	--	0/0	$34,000
KILN	8/2/2002	Thunderstorm Wind	--	0/0	$1,339
KILN	10/29/2002	Thunderstorm Wind	--	0/0	$2,678
KILN	3/13/2003	Thunderstorm Wind	50 kts. EG	0/0	$13,090
COUNTYWIDE	4/7/2003	Thunderstorm Wind	52 kts. EG	0/0	$65,449
KILN	5/31/2004	Thunderstorm Wind	50 kts. EG	0/0	$0
PEARLINGTON	6/2/2004	Thunderstorm Wind	50 kts. EG	0/0	$1,913

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
KILN	6/6/2004	Thunderstorm Wind	50 kts. EG	0/0	$1,913
KILN	6/21/2004	Thunderstorm Wind	50 kts. EG	0/0	$6,375
KILN	6/23/2004	Thunderstorm Wind	50 kts. EG	0/0	$1,275
KILN	6/24/2004	Thunderstorm Wind	52 kts. EG	0/0	$1,913
KILN	10/19/2004	Thunderstorm Wind	50 kts. EG	0/0	$1,913
KILN	11/6/2006	Thunderstorm Wind	50 kts. EG	0/0	$2,389
KILN	11/15/2006	Thunderstorm Wind	50 kts. EG	0/0	$5,974
HANCOCK (ZONE)	6/9/2007	Strong Wind	45 kts. EG	0/0	$5,808
PEARLINGTON	4/2/2009	Thunderstorm Wind	50 kts. EG	0/0	$1,684
HANCOCK (ZONE)	3/1/2010	Strong Wind	45 kts. EG	0/0	$5,523
KILN	5/25/2010	Thunderstorm Wind	52 kts. EG	0/0	$5,523
PEARLINGTON	11/30/2010	Thunderstorm Wind	50 kts. MG	0/0	$0
KILN	3/9/2011	Thunderstorm Wind	61 kts. EG	0/0	$10,707
KILN	4/4/2011	Thunderstorm Wind	52 kts. EG	0/0	$5,354
KILN	4/4/2011	Thunderstorm Wind	52 kts. EG	0/0	$1,071
KILN	8/24/2011	Thunderstorm Wind	56 kts. EG	0/0	$5,354
SELLERS	2/18/2012	Thunderstorm Wind	52 kts. EG	0/0	$1,049
SELLERS	2/18/2012	Thunderstorm Wind	56 kts. EG	0/0	$5,245
SELLERS	2/18/2012	Thunderstorm Wind	52 kts. EG	0/0	$5,245
SELLERS	2/18/2012	Thunderstorm Wind	52 kts. EG	0/0	$15,736
CRANE CREEK	2/18/2012	Thunderstorm Wind	61 kts. EG	0/0	$10,490
CRANE CREEK	2/18/2012	Thunderstorm Wind	52 kts. EG	0/0	$2,098
KILN	3/21/2012	Thunderstorm Wind	55 kts. EG	0/0	$2,098
PEARLINGTON	3/21/2012	Thunderstorm Wind	55 kts. EG	0/0	$3,147
GAINESVILLE	7/6/2012	Thunderstorm Wind	55 kts. EG	0/0	$2,098
HANCOCK (ZONE)	4/3/2013	High Wind	52 kts. MG	0/0	$10,339
KILN	4/8/2014	Thunderstorm Wind	56 kts. EG	0/0	$30,522
PEARLINGTON	1/3/2015	Thunderstorm Wind	52 kts. EG	0/0	$0
KILN	9/5/2015	Thunderstorm Wind	60 kts. EG	0/0	$0
CRANE CREEK	5/19/2016	Thunderstorm Wind	60 kts. EG	0/0	$0

*Property damage is reported in 2016 dollars; all damage may not have been reported.
†E = estimated; EG = estimated gust; ES = estimated sustained; MG = measured gust; MS = measured sustained
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

Given the high number of previous events, it is certain that thunderstorm events, including straight-line wind events, will occur in the future. This results in a probability level of highly likely (100 percent annual probability) for the entire county.

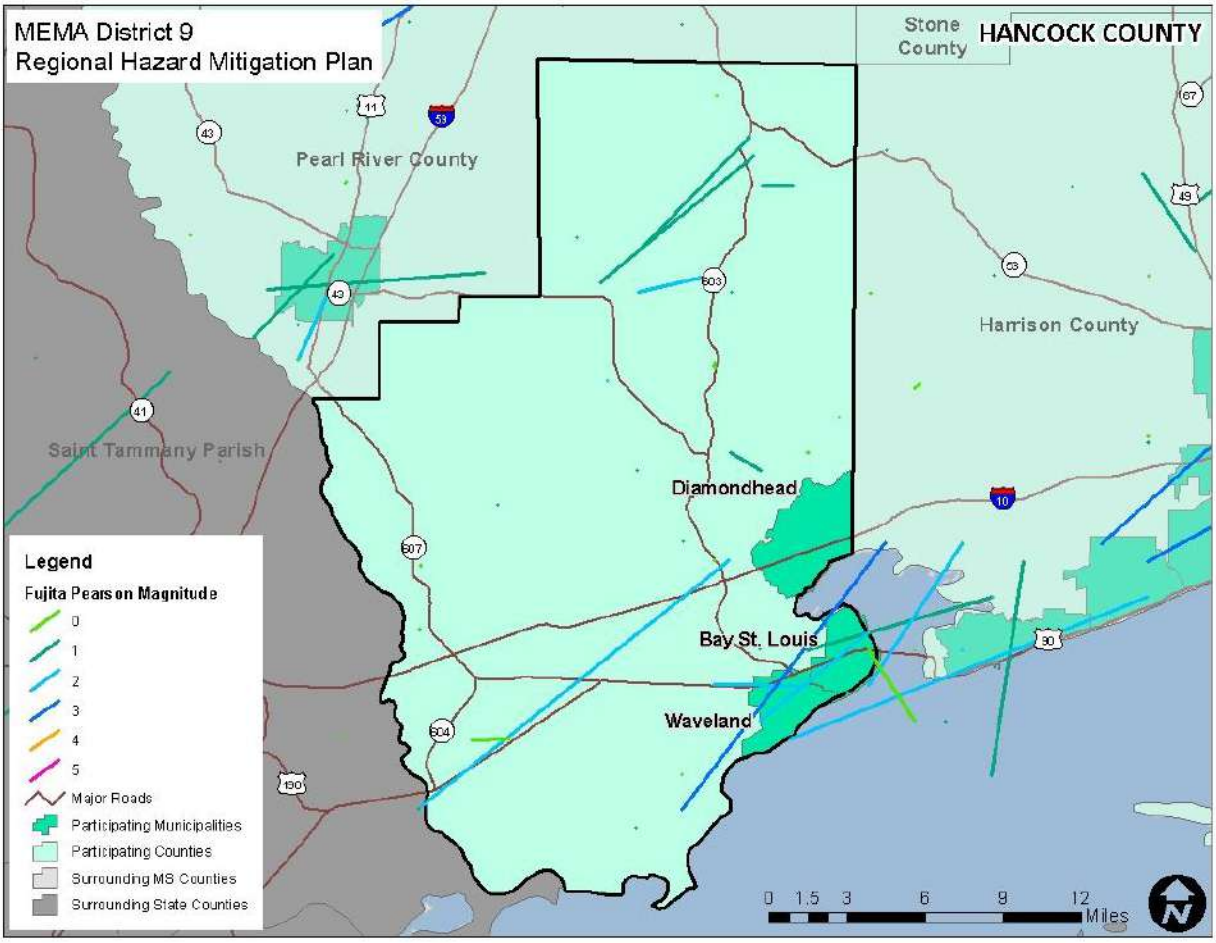
B.2.14 Tornado

LOCATION AND SPATIAL EXTENT

Tornadoes occur throughout the state of Mississippi, and thus in Hancock County. Tornadoes typically impact a relatively small area, but damage may be extensive. Event locations are completely random and

it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that Hancock County is uniformly exposed to this hazard. With that in mind, **Figure B.15** shows tornado track data for many of the major tornado events that have impacted the county between 1950 and 2015. While no definitive pattern emerges from this data, some areas that have been impacted in the past may be potentially more susceptible in the future.

FIGURE B.15: HISTORICAL TORNADO TRACKS IN HANCOCK COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

Tornadoes were at least partially responsible for three disaster declarations in Hancock County in 1979, 1991, and 1995.[20] According to the National Climatic Data Center, there have been a total of 55 recorded tornado events in Hancock County since 1952, resulting in over $78.6 million (2016 dollars) in property damages.[21] [22] In addition, 14 injuries were reported. The magnitude of these tornadoes ranged from F0 to

[20] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.
[21] These tornado events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1950 through June 2016. It is likely that additional tornadoes have occurred in Hancock County. As additional local data becomes available, this hazard profile will be amended.
[22] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

F3 and EF0 to EF1 in intensity. A summary of these events is presented in **Table B.25**. Detailed information on historic tornado events can be found in **Table B.26**.

TABLE B.25: SUMMARY OF TORNADO OCCURRENCES IN HANCOCK COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Bay St. Louis	9	0/0	$14,776	$739
Diamondhead	2	0/0	$14,437	$902
Waveland	6	0/0	$62,971	$3,498
Unincorporated Area	38	0/14	$78,522,377	$1,226,912
HANCOCK COUNTY TOTAL	**55**	**0/14**	**$78,614,561**	**$1,232,052**

Source: National Climatic Data Center

TABLE B.26: HISTORICAL TORNADO IMPACTS IN HANCOCK COUNTY

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
Bay St. Louis					
BAY ST LOUIS	4/29/1996	Waterspout	0/0	$0	Sheriff's Office reported a waterspout one mile offshore.
BAY ST LOUIS	9/20/1998	F0	0/0	$14,776	A tropical depression that formed in the central Gulf of Mexico on September 17th strengthened to a minimal tropical storm named Hermine on the morning of the 18th. Tropical Storm Hermine meandered in the Gulf of Mexico for a period of time before beginning a slow north northeast motion that brought it ashore in the early morning hours of the 20th near Cocodrie, LA in Terrebonne Parish. Tropical Storm Hermine then drifted north over southeast Louisiana and was downgraded to a tropical depression 50 miles northwest of New Orleans during the evening of the 20th. Winds associated with Hermine were of minimal tropical storm force and were mainly contained in squalls. A peak wind gust of 46 mph in a squall was measured just off the southeast coast of Louisiana at the Burrwood NOAA C-MAN station near the mouth of the Mississippi River at 1139 CST on September 19th. Two tornadoes developed in rainbands associated with Tropical Storm Hermine on September 20th. The first tornado occurred around 0730 CST 10 miles south of Poplarville, MS and destroyed two mobile homes, damaged seven cars, and caused one injury. A second weak tornado briefly touched down near Bay St. Louis, MS around 0850 CST resulting in only minor damage.

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					Isolated flash flooding also occurred with Tropical Storm Hermine on September 20th when 4 to 5 inches of rain fell on areas of Walthall county. Sections of a few roadways in southern Walthall county were briefly under water including Mississippi Highway 27 which was covered by up to a foot of water in places.
BAY ST LOUIS	7/1/1999	Waterspout	0/0	$0	Two waterspouts were observed off the Hancock County coast.
BAY ST LOUIS	10/6/2000	Funnel Cloud	0/0	$0	A funnel cloud was observed just south of the Bay St. Louis bridge.
BAY ST LOUIS	7/2/2001	Waterspout	0/0	$0	Several waterspouts were sighted south of Bay St. Louis and Point Henderson.
BAY ST LOUIS	7/2/2001	Waterspout	0/0	$0	Several waterspouts were sighted south of Bay St. Louis and Point Henderson.
BAY ST LOUIS	8/12/2003	F0	0/0	$0	A waterspout developed just southeast of Bay St. Louis and moved onshore briefly as a weak tornado before dissipating. No significant damage was reported.
BAY ST LOUIS	1/13/2005	Funnel Cloud	0/0	$0	A funnel cloud was observed.
BAY ST LOUIS	4/2/2009	EF0	0/0	$0	A weak tornado was briefly observed near the coast between Bay St. Louis and Waveland.
Diamondhead					
DIAMONDHEAD ARPT	7/22/2000	F0	0/0	$1,049	A small tornado briefly touched down near Diamondhead knocking down trees and power lines.
DIAMONDHEAD ARPT	10/3/2002	F0	0/0	$13,388	A weak tornado touched down briefly downing several trees.
Waveland					
WAVELAND	8/13/1998	F0	0/0	$0	Mississippi Highway Patrol reported a brief touchdown of a weak tornado near the Interstate Highway 10 and Mississippi Highway 603 interchange. No damage was reported.
WAVELAND	8/27/2001	Waterspout	0/0	$0	A waterspout was observed by police officers just of the off the coast south of Waveland.
WAVELAND	6/30/2003	F0	0/0	$1,309	A weak tornado in the outer rainbands of Tropical Storm Bill touched down briefly, blowing down several trees resulting in minor damage to house roofs.
WAVELAND	6/6/2004	Funnel Cloud	0/0	$0	A funnel cloud was observed just west of Waveland.
WAVELAND	4/6/2005	F1	0/0	$61,662	A tornado moved through the community of Bayside Park damaging around 30 houses and 8 mobile homes. Some of the homes received severe damage. The tornado also knocked down numerous trees and damaged several vehicles. Most of the damage was produced by trees falling on structures and automobiles.
WAVELAND	4/2/2009	Funnel Cloud	0/0	$0	A funnel cloud was observed.

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
Unincorporated Area					
HANCOCK CO.	2/13/1952	F1	0/2	$0	--
HANCOCK CO.	4/13/1969	F1	0/0	$164,069	--
HANCOCK CO.	7/14/1969	--	0/0		At 1:18 p.m. radar indicated a thunderstorm 22 W Biloxi with tops 62,000 ft. Highway Patrol reported funnel cloud touched down at Bay St. Louis Bridge at 1:30 p.m. (lat. 30.4° N, long. 89.6° W); also reported another funnel cloud west of area approaching at 1:32 p.m. Afterwards a Highway Department spokesman indicated an inspection showed no structural damage to the bridge. Newspaper noted "The only apparent damage sustained was to the auto guard rail used for stopping traffic." The end of this traffic draw gate arm was broken off and tossed into the bay's waters. At 1:45 p.m. radar showed heavy thunderstorms increasing along the Mississippi Coast with the strongest in the Pass Christian area moving to the E.
HANCOCK CO.	2/1/1970	F1	0/0	$0	--
HANCOCK CO.	12/29/1970	F1	0/0	$155,189	A low-pressure trough and a nearly stationary front spawned numerous thundershowers. A tornado was first reported in Bay St. Louis, then lifted to make several touchdowns between there and north of Gulfport. HANCOCK COUNTY: County Civil Defense Director estimated $20,000 damages in an area 1/20 mile long and 50 yards wide, north of U.S. 90 and east of Highway 603, Bay St. Louis. About 9:55 a.m. to 9:58 a.m., five buildings were heavily damaged during severe thunderstorm; County sheriff reported a house trailer flipped over in area to rear of Stuckey's Gift Shop, U.S. 90, Bay St. Louis. A few hundred feet away, at least 3 residences along U.S. 90 had roof damage; an unoccupied house in the neighborhood lost its roof and received other damage. Newspaper noted, "About the same time, a small trailer...was damaged and a concrete block wall...in the same area was blown over. The sheriff's office said there were also trees and utility poles knocked about." HARRISON COUNTY: County Civil Defense Director reported 1 funnel with spotty touchdowns causing damages of $20,000 to property and $3,000 to timber within 20 minutes along path from WSW towards ENE. Tornado struck Grayson Avenue near Pass Christian business section: leveled 2 sheds, destroyed 1 garage, ripped roof off 1 home. At Condike Avenue, north of Long Beach: hit in wooded area. At Gulfport Municipal Airport, air traffic control tower

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					operator saw 1 funnel briefly touch ground (3 WSW Airport) 10:14 a.m. and go back up in cloud. Near junction U.S. 49 and Old Highway 49, on Arkansas Street in Gulfport (lat. 30.4° N, long. 89.1° W), 4 persons in paint supply shop escaped injury as roof was torn off concrete building. Highway Patrol at Gulfport received public reports of 3 funnels, 2 of which remained aloft; 1 sighted about 300 yards north of Holloway Transfer Co. on Highway 49 with no extensive wind damage but several utility poles were knocked down about 10:20 a.m.
HANCOCK CO.	3/2/1972	F2	0/2	$1,440,508	High first on Highway 90 at Holiday Sands Motel, about 5 1/2 W Bay St. Louis (lat. 30.3° N, long. 89.5° W); the motel, being expanded, sustained about $10,000 damage when one wing and part of another were destroyed. About a mile SE of the motel, the funnel hit again, causing about $30,000 damage to the home of Dr. Laton Weinberg on the Lower Bay Road. Touching down again in Spanish Acres, the tornado destroyed a brick home occupied by Mr. and Mrs. E. J. Vicknair and their two children; Mrs. Vicknair sustained a leg laceration. About 150 feet away an unoccupied small frame dwelling was leveled. About a block away a large pine tree was blown down on to a house causing rood and structural damage. Roof damage also occurred to 2 to 3 other homes in the neighborhood. There also was moderate flooding in several streets in the Spanish Acres area. Before hitting the subdivision, the high winds caused damage to the Aloha Trailer Park on Old Spanish Trail at Highway 90, where one unoccupied trailer was splintered and another partially damaged when a portion of the first was blown on it. Other damage was a tree on the trailer home of Mr. and Mrs. Will Nicholson on Old Spanish Trail behind the subdivision, shattered billboards along Highway 90, strong wind damage to trees and a boat blown from its trailer on Chantilly Terrace in Waveland; one home in Waveland had roofing blown off it. Street flooding and power failure were also experienced in Bay St. Louis.
HANCOCK CO.	5/7/1972	F2	0/1	$144,051	--
HANCOCK CO.	4/7/1973	F2	0/0	$135,615	Public reported tornado damaged 2 trailer houses in Dedeaux Community and extensive damage to Hancock North Central School.
HANCOCK CO.	5/2/1977	F2	0/0	$99,362	--

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
HANCOCK CO.	8/1/1977	F1	0/0	$9,936	A tiny twister touched down momentarily in the Ansley community southwest of Lakeshore in coastal Hancock County. One utility shed was lifted, tossed a hundred feet, and destroyed. Damage less than $5,000.
HANCOCK CO.	4/13/1980	F2	0/0	$730,743	--
HANCOCK CO.	5/15/1980	F1	0/0	$7,307	A small tornado touched down briefly just north of Stennis Airport in a wooded area inside the buffer zone of the National Space Technology Laboratories, or 10 miles NW of Bay St. Louis. Airport personnel watched the tornado touch down and reported seeing "a pine tree fall out of the sky." A sheriff's deputy described the tornado as "a little bitty one."
HANCOCK CO.	5/19/1980	F3	0/8	$73,074,333	The tornado first touched down at the Gulfview School near Waveland. Damage to the school totaled half a million dollars, but relatively little damage was done to the gymnasium where 8th grade graduation ceremonies were in progress. No injuries occurred at the school. The tornado then moved NE and struck the Garden Isles subdivision, destroyed 23 houses and heavily damaging at least 30 others. The Bay marina was demolished and numerous boats and vehicles were destroyed. Property damage was estimated at $5,000,000.
HANCOCK CO.	4/20/1982	F2	0/0	$623,972	--
HANCOCK CO.	5/21/1985	F1	0/0	$55,960	--
HANCOCK CO.	5/21/1985	F1	0/0	$55,960	--
HANCOCK CO.	5/21/1985	F1	0/0	$5,596	--
HANCOCK CO.	11/16/1987	F2	0/0	$530,046	A tornado moved through a sparsely inhabited portion of Hancock County. The tornado, however, passed across Mississippi Highway 603 destroying a brick home and a barn. The house was valued at 80,000 dollars.
HANCOCK CO.	9/16/1988	F1	0/0	$50,899	A small tornado north of Waveland unroofed a home.
Santa Rosa	4/12/1994	F1	0/1	$812,594	Two mobile homes were totally destroyed in the Benville community. One person was injured in one of these mobile homes. Several trees and power lines were blown down.
Kiln	5/3/1994	F0	0/0	$81,259	This weak tornado touched down in the Diamondhead community and did minor damage to a couple of homes and blew down a few trees.
Pearlington	4/22/1995	F0	0/0	$0	A tornado touched down briefly north of Pearlington. No significant damage reported.
Lakeshore	5/9/1995	F0	0/0	$0	A tornado touched down briefly in Lakeshore with no significant damage. Path length and width were estimated. Several trees were blown down near Kiln.

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
KILN	11/7/1996	F0	0/0	$0	Several motorists reported a north moving tornado touched down briefly near the Interstate Highway 10 exit at Kiln.
SELLERS	10/25/1997	F1	0/0	$112,548	A tornado destroyed two mobile homes and damaged a house. The tornado was sighted by Sheriff's Office personnel when it touched down.
SELLERS	11/21/1997	F1	0/0	$75,032	A severe thunderstorm moved out of St. Tammany Parish, Louisiana into extreme south Mississippi. Several short-lived tornadoes touched down as it crossed Pearl River, Hancock, and Harrison Counties. Near Nicholson, a tornado touched down near Nicholson, moving through a mobile home park and also passing across the Mississippi Visitors Center on Interstate Highway 59. Damage path was estimated at approximately four miles, due to lack of ground access in Pearl River drainage area to the west of Nicholson. Preliminary reports from Pearl River County and state officials indicated that 3 single family homes were destroyed and 18 others heavily damaged; and 21 mobile homes were destroyed and 8 others heavily damaged. Several car windows were blown out when the tornado passed through the Visitors Center. One person was injured in the mobile home park and another person suffered minor injuries in a nearby subdivision when their auto was hit by falling trees and limbs. Large hail was also reported by the Sheriff's Office in McNeil. Two additional tornado touch-downs were reported in north Hancock County and north Harrison County as the severe thunderstorm moved northeast. In north Hancock County, civil defense reported two homes were damaged along with two mobile homes when a tornado touched down in a rural area. In north Harrison County, a tornado damaged a convenience store along with heavily damaging a couple of mobile homes. The tornado path lengths in Hancock and Harrison Counties were estimated from damage reports.
KILN	7/16/2000	F0	0/0	$0	A small tornado briefly touched down near Kiln-Delisle Road causing no damage.
KILN	7/22/2000	F0	0/0	$0	A weak tornado briefly touched down resulting in no damage.
KILN	6/11/2001	F1	0/0	$67,999	A tornado touched down on intermittent patch in rural Hancock County. Several houses suffered minor damage, several large trees

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					were blown down as well as large tree branches. A barn was also damaged
CLERMONT HARBOR	3/31/2002	Funnel Cloud	0/0	$0	--
KILN	6/22/2004	F0	0/0	$0	A weak tornado briefly touched down causing no damage in rural northern Hancock County.
KILN	5/29/2005	F0	0/0	$0	A weak tornado touched down briefly causing no damage.
KILN	4/21/2006	Funnel Cloud	0/0	$0	A funnel cloud sighted near mile marker 20 on Interstate 10.
SELLERS	3/27/2009	EF1	0/0	$22,453	A National Weather Service storm survey indicated that a tornado traveled along a 7 mile long path in Hancock County. The tornado caused substantial damage to the roof of a church on Highway 603 and to a large outbuilding south of Necaise. The debris from large trees blocked Highway 603, Highway 43, and Highway 53.
LOGTOWN	4/2/2009	EF0	0/0	$2,245	A weak tornado with estimated winds of 70 to 80 mph touched down near the intersection of Whites Road and Whipple Road. The tornado snapped trees in half in this area. The tornado then moved to the east through forested areas approximately 1.5 miles before ending near the intersection of Whites Road and U.S. Highway 90 where tree damage was again observed.
PEARLINGTON	11/30/2010	EF0	0/0	$1,105	Delayed report from Stennis security of a sighted waterspout on the service canal. The waterspout moved onshore briefly before lifting. Minor shingle damage was done to one structure.
KILN	9/3/2011	EF0	0/0	$32,122	A weak tornado moving southeast to northwest touched down for a short distance. A mobile home was turned on its side, the tops of trees were snapped, and a few small trees snapped. Estimated strength was upper end EF0. Path length was 0.1 mile and the path width 30 yards.
SELLERS	9/30/2012	EF1	0/0	$31,471	A weak tornado touched down along an intermittent track from the Cypress Lake area northeastward to just southwest of the community of Necaise. A few homes had minor roof damage, one home was shifted off its foundation. One home had a portion of siding roof peeled off, and a few trees were snapped or blown down. Most of the damage path was rated as WF0 with an isolated area of EF1 damage. Path length was 6 miles, path width 40 yards. Maximum winds were approximately 100 mph. Time of event was based on radar.

*Property damage is reported in 2016 dollars; all damage may not have been reported.

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details

Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

According to historical information, tornado events pose a significant threat to Hancock County. The probability of future tornado occurrences affecting Hancock County is highly likely (100 percent annual probability).

B.2.15 Winter Weather

LOCATION AND SPATIAL EXTENT

Nearly the entire continental United States is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. Hancock County is not accustomed to severe winter weather conditions and rarely receives severe winter weather, even during the winter months. Events tend to be mild in nature; however, even relatively small accumulations of snow, ice, or other wintery precipitation can lead to losses and damage due to the fact that these events are not commonplace. Given the atmospheric nature of the hazard, the entire county has uniform exposure to a winter storm.

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, there have been a total of four recorded winter storm events in Hancock County since 1996.[23] These events did not result in any property damage.[24] A summary of these events is presented in **Table B.27**. Detailed information on the recorded winter storm events can be found in **Table B.28**.

TABLE B.27: SUMMARY OF WINTER STORM EVENTS IN HANCOCK COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Hancock County	4	0/0	$0	$0

Source: National Climatic Data Center

TABLE B.28: HISTORICAL WINTER STORM IMPACTS IN HANCOCK COUNTY

Location	Date	Type	Deaths/Injuries	Property Damage*
Bay St. Louis				
None reported	--	--	--	--

[23] These ice and winter storm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional winter storm conditions have affected Hancock County.
[24] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Type	Deaths/Injuries	Property Damage*
Diamondhead				
None reported	--	--	--	--
Waveland				
None reported	--	--	--	--
Unincorporated Area				
HANCOCK (ZONE)	12/18/1996	Heavy Snow	0/0	$0
HANCOCK (ZONE)	12/25/2004	Winter Storm	0/0	$0
HANCOCK (ZONE)	1/24/2014	Winter Weather	0/0	$0
HANCOCK (ZONE)	1/28/2014	Sleet	0/0	$0

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

There have been several severe winter weather events in Hancock County. The text below describes one of the major events and associated impacts on the county. Similar impacts can be expected with severe winter weather.

December 2004
A mixture of sleet and snow fell off and on during much of Christmas day resulting in a dusting to one half inch of accumulation across much of southwest, south, and coastal Mississippi. Although not heavy, accumulation of ice and snow in coastal Mississippi is unusual and the winter weather impacted transportation. The mixture of sleet and snow caused a number of bridges and overpasses to become icy which resulted in some traffic accidents and closure of some the elevated roadways.

Winter storms throughout the planning area have several negative externalities including hypothermia, cost of snow and debris cleanup, business and government service interruption, traffic accidents, and power outages. Furthermore, citizens may resort to using inappropriate heating devices that could to fire or an accumulation of toxic fumes.

PROBABILITY OF FUTURE OCCURRENCES

Winter storm events will continue to occur in Hancock County. Based on historical information, the probability is likely (between 10 and 100 percent annual probability).

OTHER HAZARDS

B.2.16 Climate Change/Sea Level Rise

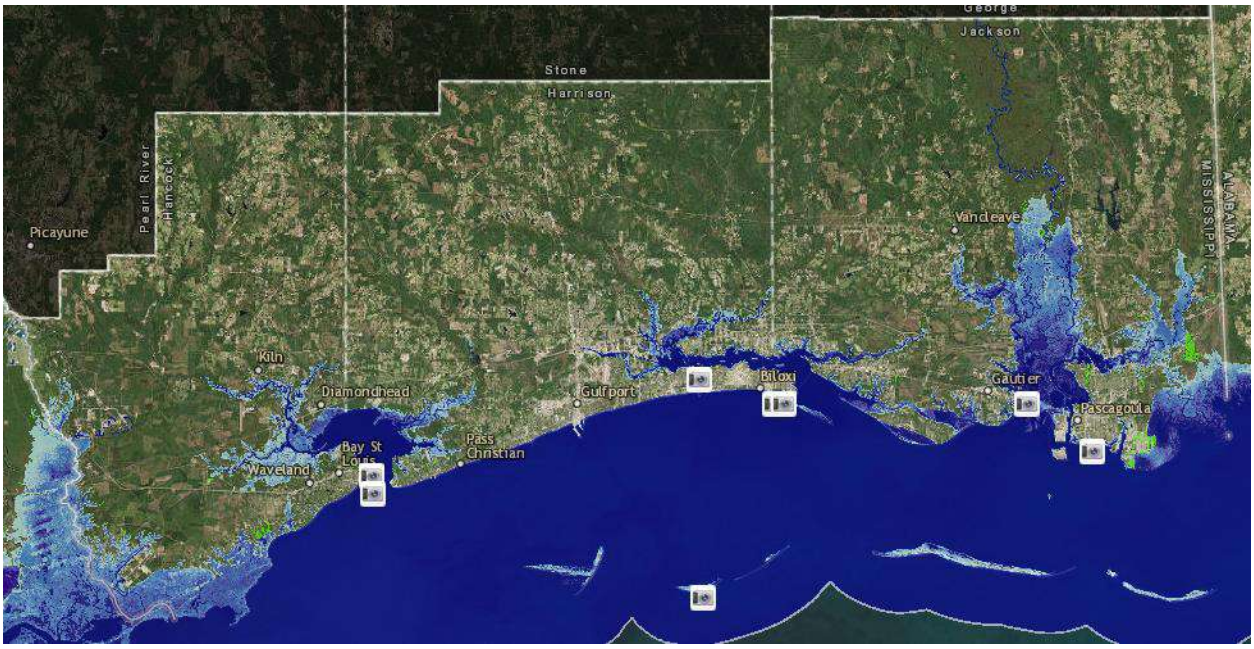
LOCATION AND SPATIAL EXTENT

Climate Change
Climate change can have direct implications on many of the other hazards addressed in this plan since it has the potential to alter the nature and frequency of hazards, including increasing temperature (extreme heat), changes in precipitation (drought, flooding), and more frequent, strong storms (wind, hurricane). Therefore, it is assumed that Hancock County is uniformly exposed to this hazard.

Sea Level Rise

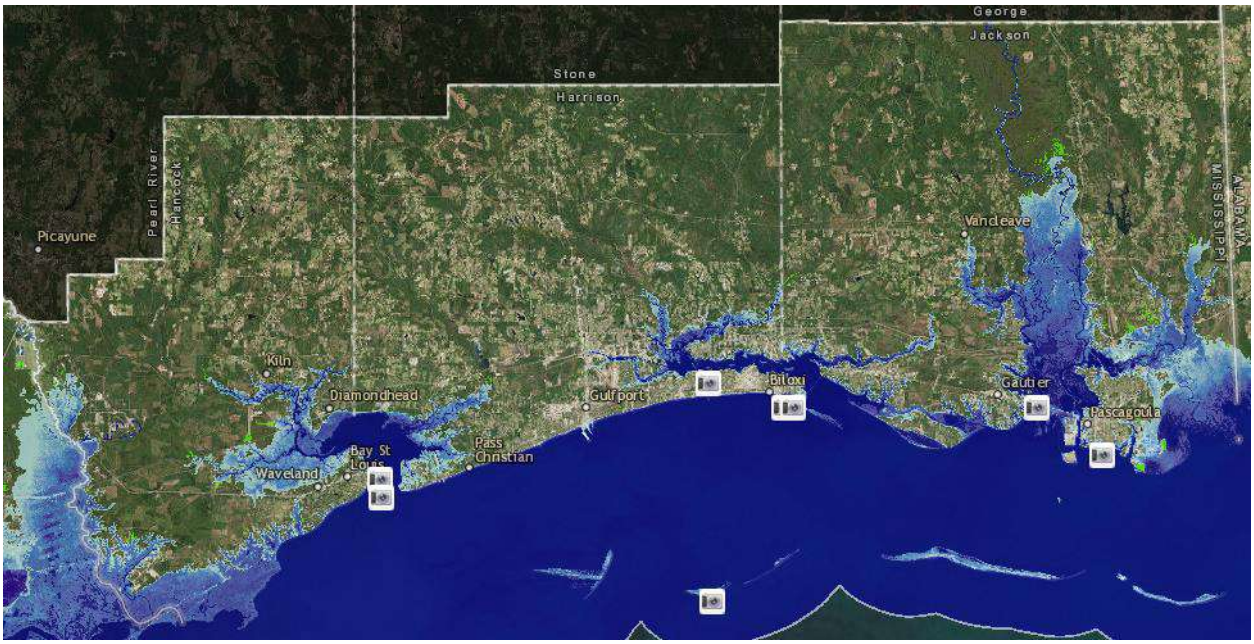
Sea level rise is occurring at a global scale. However, it does not affect areas uniformly and will be more severe in some places. **Figure B.16** identifies areas in MEMA District 9 that would be inundated by water as a result of three feet in sea level rise as per projections by NOAA. The highest level of sea level rise projected by NOAA is shown in **Figure B.17**. This figure shows the inundation areas in the case of six feet of sea level rise. This demonstrates the additional areas that would be impacted beyond the three feet scenario.

FIGURE B.16: THREE FEET SEA LEVEL RISE IN MEMA DISTRICT 9



Source: NOAA

FIGURE B.17: SIX FEET SEA LEVEL RISE IN MEMA DISTRICT 9



Source: NOAA

HISTORICAL OCCURRENCES

Climate Change

According to the *National Climate Assessment*, there have been increasing numbers of days above 95°F and nights above 75°F, and decreasing numbers of extremely cold days since 1970 in the Southeast. Daily and five-day rainfall intensities have also increased and summers have been either increasingly dry or extremely wet. The number of Category 4 and 5 hurricanes in the Atlantic basin has increased substantially since the early 1980s compared to the historic record that dates back to the mid-1880s. This can be attributed to both natural variability and climate change.

Sea Level Rise

Sea level rise is a slow-onset hazard and specific events/occurrences are not possible to determine.

PROBABILITY OF FUTURE OCCURRENCES

Climate Change

According to the *National Climate Assessment*, temperatures across the Southeast are expected to increase during this century, with shorter-term (year-to-year and decade-to-decade) fluctuations over time due to natural climate variability. Major consequences of warming include significant increases in the number of hot days (95°F or above) and decreases in freezing events. Regional average increases are in the range of 4°F to 8°F by the year 2100.

Projections of future precipitation patterns are less certain than projections for temperature increases. Because the Southeast is located in the transition zone between projected wetter conditions to the north and drier conditions to the southwest, many of the model projections show only small changes relative to natural variations. Additionally, projections further suggest that warming will cause tropical storms to be

fewer in number globally, but stronger in force, with more Category 4 and 5 storms, and substantial further increases in extreme precipitation are projected as this century progresses.

Overall, future climate change is considered likely (between 10 and 100 percent annual probability).

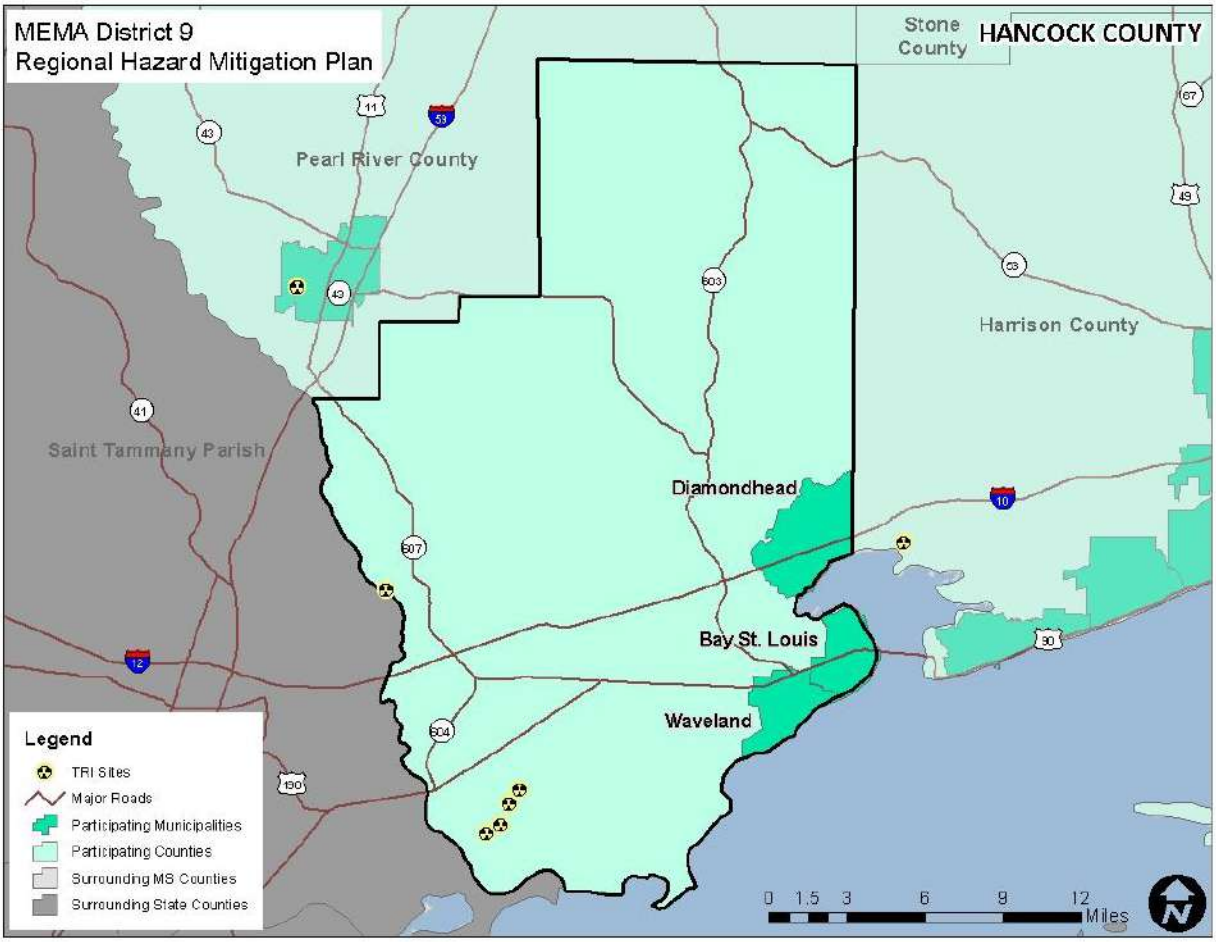
Sea Level Rise
There is still much debate regarding the probability of future occurrence of sea level rise. This section will be updated as more information becomes available. Future sea level rise is considered likely (between 10 and 100 percent annual probability).

B.2.17 Hazardous Materials Incident/Train Derailment

LOCATION AND SPATIAL EXTENT

Hancock County has five TRI sites. These sites are shown in **Figure B.18.**

FIGURE B.18: TOXIC RELEASE INVENTORY (TRI) SITES IN HANCOCK COUNTY



Source: Environmental Protection Agency

In addition to "fixed" hazardous materials locations, hazardous materials may also impact the county via roadways and railways. Many roads and railways in the county are subject to hazardous materials transport and all roads and railways that permit hazardous material transport are considered potentially at risk to an incident.

HISTORICAL OCCURRENCES

There have been a total of 25 recorded HAZMAT incidents in Hancock County since 1975. These events resulted in almost $275,000 (2016 dollars) in property damage as well as four injuries.[25] **Table B.29** summarizes the HAZMAT incidents in Hancock County as reported by PHMSA. Detailed information on these events is presented in **Table B.30.**

TABLE B.29: SUMMARY OF HAZMAT INCIDENTS IN HANCOCK COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Bay St. Louis	6	0/0	$101,364	$2,599
Diamondhead	2	0/0	$57	$2
Waveland	6	0/1	$131,053	$4,680
Unincorporated Area	11	0/3	$42,283	$1,031
HANCOCK COUNTY TOTAL	**25**	**0/4**	**$274,757**	**$8,313**

Source: United States Department of Transportation Pipeline and Hazardous Materials Safety Administration

TABLE B.30: HAZMAT INCIDENTS IN HANCOCK COUNTY

Report Number	Date	City	Mode	Serious Incident?	Deaths/ Injuries	Damages ($)*	Quantity Released
Bay St. Louis							
I-1977120573	11/30/1977	BAY ST LOUIS	Highway	Yes	0/0	$0	4,800 LGA
I-1978110459	10/30/1978	BAY ST LOUIS	Rail	No	0/0	$0	10 LGA
X-2008020013	1/22/2008	BAY ST LOUIS	Highway	No	0/0	$0	0.046875 LGA
X-2008020011	1/22/2008	BAY ST LOUIS	Highway	No	0/0	$0	0.046875 LGA
E-2008020320	1/31/2008	BAY SAINT LOUIS	Highway	Yes	0/0	$96,206	896 LGA
E-2012070481	6/26/2012	BAY SAINT LOUIS	Highway	No	0/0	$5,158	3 LGA
Diamondhead							
I-1986070411	7/21/1986	DIAMONDHEAD	Highway	No	0/0	$0	40 LGA
I-1991050589	5/14/1991	DIAMONDHEAD	Highway	No	0/0	$57	0
Waveland							
I-1988050379	4/13/1988	WAVELAND	Highway	No	0/0	$0	2 LGA
I-1994080853	7/21/1994	WAVELAND	Highway	No	0/0	$5,545	12 LGA
I-1995020660	12/25/1994	WAVELAND	Highway	No	0/0	$121,889	0
I-2003050247	10/6/2002	WAVELAND	Rail	Yes	0/0	$0	0
I-2007030565	5/6/2006	WAVELAND	Highway	No	0/0	$0	20 LGA
E-2013050227	5/8/2013	WAVELAND	Highway	No	0/1	$3,619	2 LGA

[25] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Report Number	Date	City	Mode	Serious Incident?	Deaths/ Injuries	Damages ($)*	Quantity Released
Unincorporated Area							
I-1975020425	1/13/1975	ANSLEY	Rail	No	0/3	$0	0
I-1977020157	1/26/1977	KILN	Highway	No	0/0	$0	8 SLB
I-1991100100	9/15/1991	HANCOCK	Highway	No	0/0	$0	0
I-1996031040	1/17/1996	PEARLINGTON	Highway	No	0/0	$154	1.5 LGA
I-1998090553	8/10/1998	LAKESHORE	Highway	No	0/0	$0	0
I-1999070283	6/21/1999	PEARLINGTON	Highway	No	0/0	$7,445	0
I-2001060933	5/31/2001	PEARLINGTON	Highway	No	0/0	$25,335	100 LGA
I-2008010207	1/7/2008	PEARLINGTON	Rail	No	0/0	$0	10 LGA
X-2008100105	9/25/2008	PEARLINGTON	Highway	Yes	0/0	$0	0.015625 LGA
I-2015110501	9/29/2015	KILN	Highway	No	0/0	$4,674	50 LGA
I-2016010044	9/29/2015	KILN	Highway	No	0/0	$4,674	50 LGA

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: United States Department of Transportation Pipeline and Hazardous Materials Safety Administration

PROBABILITY OF FUTURE OCCURRENCES

Given the location of five toxic release inventory sites in Hancock County and prior roadway and railway incidents, it is highly likely (100 percent annual probability) that a hazardous material incident may occur in the county. County and city officials are mindful of this possibility and take precautions to prevent such an event from occurring. Furthermore, there are detailed plans in place to respond to an occurrence.

B.2.18 Infectious Disease

LOCATION AND SPATIAL EXTENT

Due to the nature of a public health/emerging disease threat, it is difficult to identify a precise location where this type of event would occur. Moreover, a large-scale event would have impacts that spread throughout the county. Therefore, all areas in Hancock County are considered equally susceptible to infectious diseases.

HISTORICAL OCCURRENCES

Mosquito-borne illness in Mississippi include West Nile virus, Chikungunya virus, and Zika virus. These illnesses affect birds, animals, and humans, causing flu-like symptoms in people who are bitten by infected mosquitoes. Occasionally illness can be severe, leading to meningitis or encephalitis. According to the Mississippi State Department of Health (MSDH), there have been no reported cases of mosquito-borne illnesses in Hancock County as of November 2016. **Table B.31** summarizes the mosquito-borne illnesses in humans reported in the county.

TABLE B.31: SUMMARY OF MOSQUITO-BORNE ILLNESSES IN HANCOCK COUNTY

Location	West Nile Virus	Chikungunya	Zika	Other*	Deaths
Hancock County	0	0	0	0	0

*Other mosquito-borne illnesses include La Crosse encephalitis, St. Louis encephalitis, and Eastern Equine encephalitis.
Source: Mississippi State Department of Health

Diseases like influenza and norovirus are regularly occurring health issues in Hancock County. These conditions are not legally reportable to county or state public health agencies, so data on disease incidence is not readily available. MSDH relies upon selected sentinel health practitioners across the state to report the percentage and total patient visits consistent with an influenza-like illness (ILI): fever of 100°F or higher and cough or sore throat. Reports are used to estimate the state's ILI rate and the magnitude of state's influenza activity on a weekly basis. Reports represent only the distribution of flu in the state, not an actual count of all flu cases statewide.

PROBABILITY OF FUTURE OCCURRENCES

Due to some recent incidents that have been recorded across the State of Mississippi and in counties neighboring Hancock County, future occurrences are considered possible (between 1 and 10 percent annual probability).

B.2.19 Conclusions on Hazard Risk

The hazard profiles presented in this section were developed using best available data and result in what may be considered principally a qualitative assessment as recommended by FEMA in its "How-to" guidance document titled *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA Publication 386-2). It relies heavily on historical and anecdotal data, stakeholder input, and professional and experienced judgment regarding observed and/or anticipated hazard impacts. It also carefully considers the findings in other relevant plans, studies, and technical reports.

HAZARD EXTENT

Table B.32 describes the extent of each hazard identified for Hancock County. The extent of a hazard is defined as its severity or magnitude, as it relates to the planning area.

TABLE B.32: EXTENT OF HANCOCK COUNTY HAZARDS

Flood-related Hazards	
Dam and Levee Failure	Dam failure extent is defined using the Mississippi Division of Environmental Quality classifications which include Low, Significant, and High. One dam is classified as high-hazard in Hancock County.
Erosion	The extent of erosion can be defined by the measurable rate of erosion that occurs. Some areas of the barrier islands are eroding at 6 to 8 meters per year near Hancock County according to the USGS Coastal and Marine Geology Program's U.S. Gulf of Mexico Interactive Map.
Flood	Flood depth and velocity are recorded via United States Geological Survey stream gages throughout the region. While a gage does not exist for each participating jurisdiction, there is one at or near many areas. The greatest flood recorded for the county was at Jourdan River at

Kiln. The maximum historic crest was recorded at 19.97 feet, or 9.97 feet above the major flood stage (reported on August 29, 2005). Additional historic crest heights and the corresponding flood categories are in the table below.

Location/ Jurisdiction	Date	Maximum Historic Crest (ft)	Flood categories			
			Action Stage (ft)	Flood Stage (ft)	Moderate Flood Stage (ft)	Major Flood Stage (ft)
Hancock County						
JOURDAN RIVER AT KILN	8/29/2005	19.97	5	6	8	10

Storm Surge	Storm surge can be defined by the depth of inundation which is defined by the category of hurricane/tropical storm. Since Hancock County could easily be impacted by a Category 3 storm, depth of inundation could be at least 9 feet in many areas.
Fire-related Hazards	
Drought	Drought extent is defined by the U.S. Drought Monitor classifications which include Abnormally Dry, Moderate Drought, Severe Drought, Extreme Drought, and Exceptional Drought. According to the U.S. Drought Monitor classifications, the most severe drought condition is Exceptional. Hancock County has received this ranking twice over the 17-year reporting period.
Lightning	According to the Vaisala's flash density map, Hancock County is located in an area that experiences 4 to 12 lightning flashes per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures.
Wildfire	Wildfire data was provided by the Mississippi Forestry Commission and is reported annually by county from 2007-2016. The greatest number of fires to occur in Hancock County in any year 181 in 2009. The greatest number of acres to burn in the county in a single year occurred in 2011 when 3,921 acres were burned. Information on specific occurrences of wildfire and the most severe fires in each jurisdiction is not available. Although this data lists the extent that has occurred, larger and more frequent wildfires are possible throughout the county.
Geologic Hazards	
Earthquake	Earthquake extent can be measured by the Richter Scale, the Modified Mercalli Intensity (MMI) scale, and the distance of the epicenter from Hancock County. According to data provided by the National Centers for Environmental Information, the greatest earthquake to impact the county had an MMI of IV (moderate) and a correlating Richter Scale magnitude estimated at less than 4.8 (reported on September 9, 1975). The epicenter of this earthquake was located 57.0 km away.
Wind-related Hazards	
Extreme Cold	The extent of extreme cold can be defined by the minimum temperature reached. Official long term temperature records are not kept for any areas in Hancock County. However, the temperature has previously ranged from 15 to 20 degrees Fahrenheit in southwest and coastal Mississippi (reported on December 18, 1996).
Extreme Heat	The extent of extreme heat can be measured by the record high temperature recorded. Official long term temperature records are not kept for any areas in Hancock County. However, the highest recorded temperature in Beaumont (northeast of the county) was 105°F and heat index values were recorded as high as 115°F (reported in July 2000).
Hailstorm	Hail extent can be defined by the size of the hail stone. The largest hail stone reported in Hancock County was 1.75 inches (last reported on May 25, 2010). It should be noted that future events may exceed this.

Hurricane and Tropical Storm	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5. The greatest classification of hurricane to traverse directly through Hancock County was Hurricane Camille, a Category 3 storm which carried tropical force winds of 100 knots upon arrival in the county.
Severe Thunderstorm/High Wind	Thunderstorm extent is defined by wind speeds reported. The strongest recorded wind event in Hancock County was 61 knots (last reported on February 18, 2012). It should be noted that future events may exceed these historical occurrences.
Tornado	Tornado hazard extent is measured by the Fujita/Enhanced Fujita. The greatest magnitude reported in Hancock County was an F3 (reported on May 19, 1980).
Winter Weather	The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest snowfall reported in Hancock County was 1-2 inches (reported on December 18, 1996).
Other Hazards	
Climate Change/Sea Level Rise	It is still uncertain what the extent of climate change will be in the future. However, increasing temperature (extreme heat), changes in precipitation (drought, flooding), and more frequent, stronger storms (wind, hurricanes) can be expected. Sea level rise is defined by the areas impacted, but is more often associated with the amount of sea level rise that is expected to take place. Although it is difficult to predict an exact amount of rise, the Climate Change Surging Seas Report intermediate high sea level rise scenario projects 1 foot of rise locally by 2050 and 3.7 feet by 2100.
Hazardous Materials Incident/Train Derailment	According to USDOT PHMSA, the largest hazardous materials incident reported in Hancock County was 4,800 LGA released on the highway (reported on November 30, 1977). It should be noted that larger events are possible.
Infectious Disease	An infectious disease threat could have large-scale effects throughout the county and may cause illness in many people. Possible impacts from a disease threat depend largely on the impacted population, but might include anything from absenteeism and loss of productivity in the workplace to death or serious illness to humans or livestock. A serious disease threat could affect many thousands of people.

PRIORITY RISK INDEX RESULTS

In order to draw some meaningful planning conclusions on hazard risk for Hancock County, the results of the hazard profiling process were used to generate countywide hazard classifications according to a "Priority Risk Index" (PRI). More information on the PRI and how it was calculated can be found in Section 5.21.2.

Table B.33 summarizes the degree of risk assigned to each category for all initially identified hazards based on the application of the PRI. Assigned risk levels were based on the detailed hazard profiles developed for this subsection, as well as input from the Regional Hazard Mitigation Council. The results were then used in calculating PRI values and making final determinations for the risk assessment.

TABLE B.33: SUMMARY OF PRI RESULTS FOR HANCOCK COUNTY

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Flood-related Hazards						
Dam and Levee Failure	Possible	Critical	Small	Less than 6 hours	Less than 6 hours	**2.4**
Erosion	Likely	Limited	Small	More than 24 hours	More than 1 week	**2.4**
Flood	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 24 hours	**3.2**
Storm Surge	Highly Likely	Critical	Moderate	More than 24 hours	Less than 24 hours	**3.0**
Fire-related Hazards						
Drought	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Lightning	Highly Likely	Limited	Negligible	6 to 12 hours	Less than 6 hours	**2.4**
Wildfire	Highly Likely	Minor	Small	Less than 6 hours	Less than 1 week	**2.6**
Geologic Hazards						
Earthquake	Possible	Minor	Moderate	Less than 6 hours	Less than 6 hours	**2.0**
Wind-related Hazards						
Extreme Cold	Possible	Minor	Large	More than 24 hours	Less than 1 week	**2.1**
Extreme Heat	Highly Likely	Minor	Large	More than 24 hours	More than 1 week	**2.8**
Hailstorm	Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours	**2.8**
Hurricane and Tropical Storm	Highly Likely	Critical	Large	More than 24 hours	Less than 24 hours	**3.2**
Severe Thunderstorm/ High Wind	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 6 hours	**3.1**
Tornado	Highly Likely	Critical	Small	Less than 6 hours	Less than 6 hours	**3.0**
Winter Weather	Likely	Minor	Moderate	More than 24 hours	Less than 24 hours	**2.1**
Other Hazards						
Climate Change/Sea Level Rise	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Hazardous Materials Incident/ Train Derailment	Highly Likely	Limited	Small	Less than 6 hours	Less than 24 hours	**2.8**
Infectious Disease	Possible	Limited	Large	More than 24 hours	More than 1 week	**2.5**

B.2.20 Final Determinations on Hazard Risk

The conclusions drawn from the hazard profiling process for Hancock County, including the PRI results and input from the Regional Hazard Mitigation Council, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk, and Low Risk (**Table B.34**). For purposes of these classifications, risk is expressed in relative terms according to the estimated impact that a hazard will have on human life and property throughout all of Hancock County. A more quantitative analysis to estimate potential dollar losses for each hazard has been performed separately, and is described in Section 6: *Vulnerability Assessment* and below in Section B.3. It should be noted that although some hazards are classified below as posing low risk, their occurrence of varying or unprecedented magnitudes is still possible in some cases and their assigned classification will continue to be evaluated during future plan updates.

Some priorities have changed since the previous plans were adopted due to the merging of multiple local plans to form this regional plan; however, most priorities remain the same.

TABLE B.34: CONCLUSIONS ON HAZARD RISK FOR HANCOCK COUNTY

HIGH RISK	Hurricane and Tropical Storm Flood Severe Thunderstorm/High Wind Storm Surge Tornado
MODERATE RISK	Hailstorm Hazardous Materials Incident/Train Derailment Extreme Heat Wildfire Drought Climate Change/Sea Level Rise Infectious Disease
LOW RISK	Lightning Dam and Levee Failure Erosion Winter Weather Extreme Cold Earthquake

B.3 HANCOCK COUNTY VULNERABILITY ASSESSMENT

This subsection identifies and quantifies the vulnerability of Hancock County to the significant hazards previously identified. This includes identifying and characterizing an inventory of assets in the county and assessing the potential impact and expected amount of damages caused to these assets by each identified hazard event. More information on the methodology and data sources used to conduct this assessment can be found in Section 6: *Vulnerability Assessment*.

B.3.1 Asset Inventory

Table B.35 lists the estimated number of buildings, parcels, and the total value of improvements for Hancock County and its participating jurisdictions (study area of vulnerability assessment). Because digital parcel data was not available for every community, data obtained from Hazus-MH 3.2 inventory was utilized to supplement the analysis where gaps existed.

TABLE B.35: IMPROVED PROPERTY IN HANCOCK COUNTY

Location	Counts of Buildings	Counts of Parcels	Total Value of Improvements
Bay St. Louis	5,699	5,313	$128,600,369
Diamondhead	4,682	7,368	$389,782,736
Waveland	4,707	5,443	$94,730,326
Unincorporated Area	41,573	34,178	$378,637,604
HANCOCK COUNTY TOTAL	**41,036**	**52,302**	**$991,751,035**

Source: MDEQ, Hazus-MH 3.2

Table B.36 lists the critical facilities located in Hancock County by type according to data provided by local government officials.

In addition, **Figure B.19** shows the locations of critical facilities in Hancock County. **Table B.52**, at the end of this subsection, shows a complete list of the critical facilities by name, as well as the hazards that affect each facility. Further, it should be noted that the table below may show that some communities do not have any critical facilities of in certain type, when in reality, that particular type of facility may actually be located within the community. This may occur because spatial data for that facility type was not available or because the facility may have been classified under a different category type for that particular community.

TABLE B.36: CRITICAL FACILITY INVENTORY IN HANCOCK COUNTY

Location	Communications	EOC	Fire Stations	Medical	Police Station	Power/ Gas	Private/Non-Profit
Bay St. Louis	2	0	2	0	1	1	0
Diamondhead	0	0	1	0	1	0	0
Waveland	0	0	2	0	2	0	1
Unincorporated Area	2	1	3	3	2	2	2
HANCOCK COUNTY TOTAL	**4**	**1**	**8**	**3**	**6**	**3**	**3**

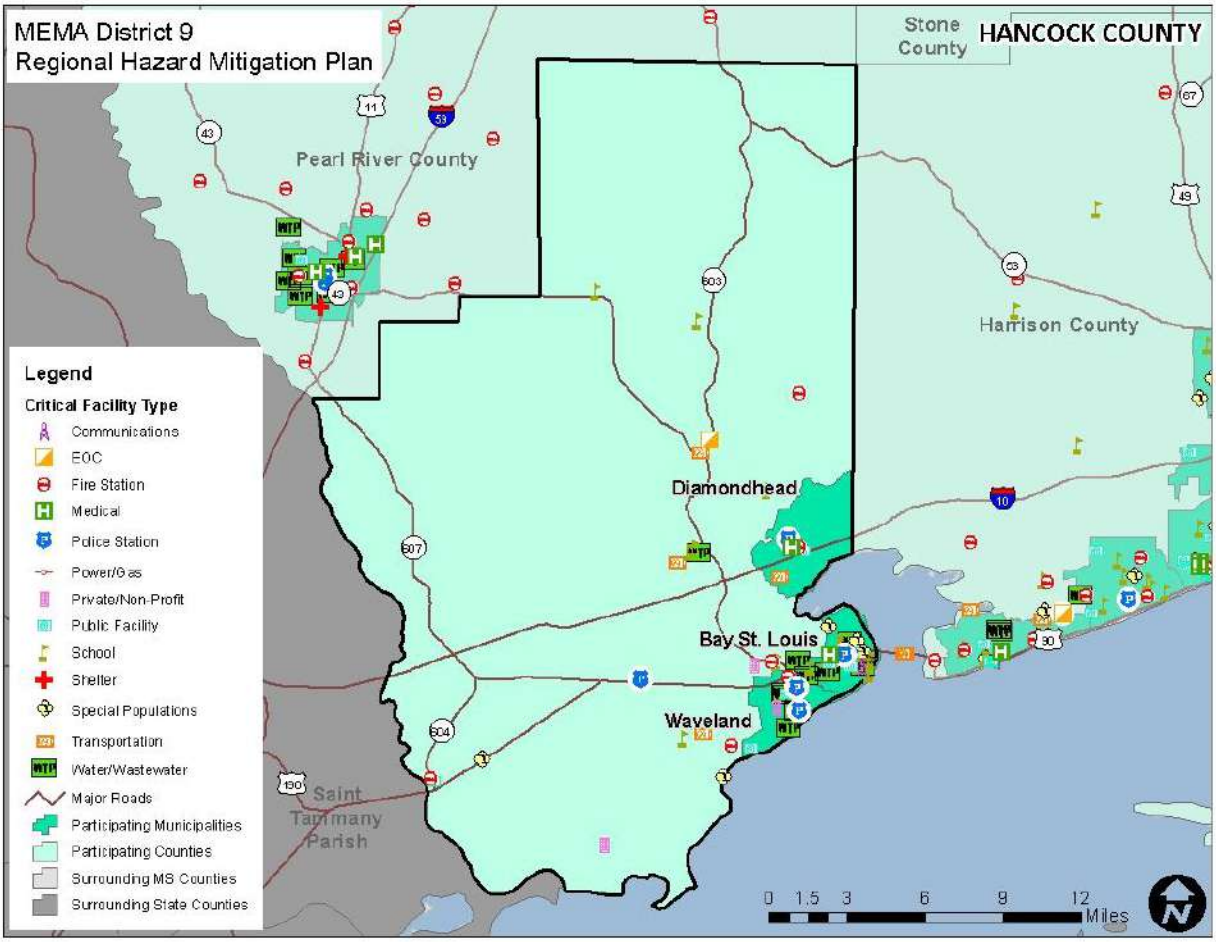
Source: Local Governments

TABLE B.36: CRITICAL FACILITY INVENTORY IN HANCOCK COUNTY (CONT.)

Location	Public Facility	School	Shelter	Special Populations	Transportation	Water/ Wastewater
Bay St. Louis	3	3	0	1	1	4
Diamondhead	3	0	0	0	0	0
Waveland	6	0	0	0	0	5
Unincorporated Area	10	15	1	7	11	7
HANCOCK COUNTY TOTAL	**22**	**18**	**1**	**8**	**12**	**16**

Source: Local Governments

FIGURE B.19: CRITICAL FACILITY LOCATIONS IN HANCOCK COUNTY



Source: Local Governments

B.3.2 Social Vulnerability

In addition to identifying those assets potentially at risk to identified hazards, it is important to identify and assess those particular segments of the resident population in Hancock County that are potentially at risk to these hazards.

Table B.37 lists the population by jurisdiction according to American Community Survey 2015 population estimates. The total population in Hancock County according to Census data is 45,627 persons. Additional population estimates are presented above in Section B.1.

TABLE B.37: TOTAL POPULATION IN HANCOCK COUNTY

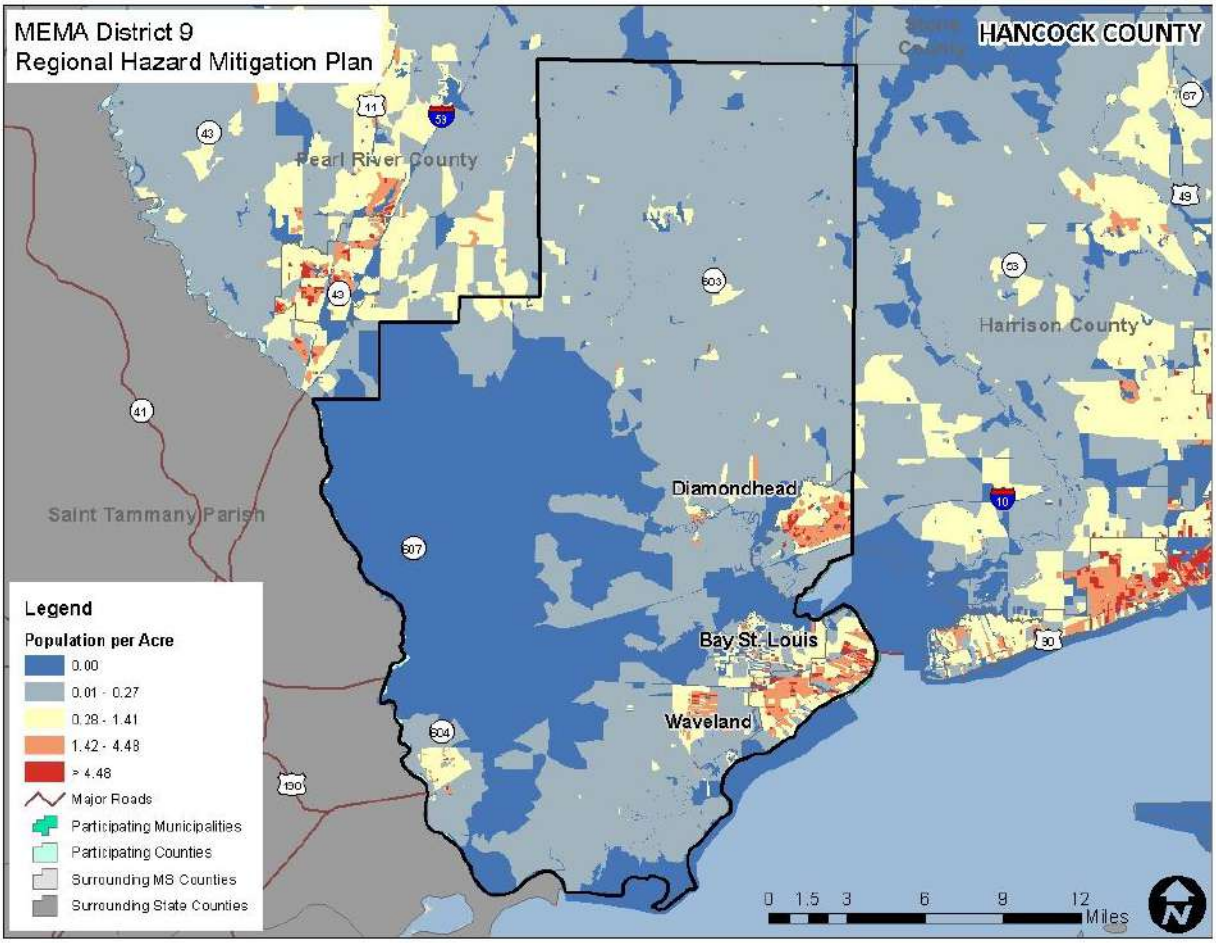
Location	Total 2015 Population
Bay St. Louis	10,861
Diamondhead	8,246
Waveland	6,449

Location	Total 2015 Population
Unincorporated Area	20,071
HANCOCK COUNTY TOTAL	**45,627**

Source: United States Census Bureau, 2011-2015 American Community Survey 5-Year Estimates

In addition, **Figure B.20** illustrates the population density per acre by census block as it was reported by the U.S. Census Bureau in 2010. As can be seen in the figure, the population is spread out through most of the county, with heavy concentrations in Bay St. Louis, Diamondhead, and Waveland.

FIGURE B.20: POPULATION DENSITY IN HANCOCK COUNTY



Source: United States Census Bureau, 2010 Census

B.3.3 Development Trends and Changes in Vulnerability

Since the previous local-level hazard mitigation plans were approved, Hancock County has experienced moderate growth and development. **Table B.38** shows the number of building units constructed since 2010 according to the U.S. Census American Community Survey.

TABLE B.38: BUILDING COUNTS FOR HANCOCK COUNTY

Location	2010	2011	2012	2013	2014	2015	% Building Stock Built Post-2010
Bay St. Louis	5,171	5,511	5,860	5,741	5,868	6,373	23.2%
Diamondhead*	--	--	--	4,330	4,113	4,104	-5.2%
Waveland	3,349	3,311	3,195	3,270	3,306	3,007	-10.2%
Unincorporated Area	15,172	15,055	15,013	10,794	10,995	10,939	-27.9%
HANCOCK COUNTY TOTAL	**19,756**	**20,869**	**21,639**	**22,237**	**22,787**	**23,196**	**3.1%**

*Diamondhead officially incorporated into a city in 2012, so the city's first housing estimate was not available until 2013. Percent change in population is calculated from 2013 to 2015.
Source: United States Census Bureau, American Community Survey

Table B.39 shows population growth estimates for the county from 2010 to 2015 based on the based on the American Community Survey's annual population estimates.

TABLE B.39: POPULATION GROWTH FOR HANCOCK COUNTY

Location	Population Estimates						% Change 2010-2015
	2010	2011	2012	2013	2014	2015	
Bay St. Louis	9,349	9,385	9,614	9,899	10,313	10,861	16.2%
Diamondhead*	--	--	--	8,777	8,275	8,246	-6.0%
Waveland	6,490	6,504	6,492	6,487	6,463	6,449	-0.6%
Unincorporated Area	26,569	27,433	27,938	19,434	20,085	20,071	-24.5%
HANCOCK COUNTY TOTAL	**42,408**	**43,322**	**44,044**	**44,597**	**45,136**	**45,627**	**7.6%**

*Diamondhead officially incorporated into a city in 2012, so the city's first population estimate was not available until 2013. Percent change in population is calculated from 2013 to 2015.
Source: United States Census Bureau, American Community Survey

Based on the data above, there has been a moderate rate of residential development and population growth in the county since 2010, and the City of Bay St. Louis has experienced a significant increase in population and housing development, resulting in an increased number of structures and people that are vulnerable to the potential impacts of the identified hazards. However, the cities of Diamondhead and Waveland as well as the unincorporated area have all experienced a decline in both population and housing development since 2010 according to estimates. Therefore, development and population growth have impacted the county's vulnerability since the previous local hazard mitigation plans were approved and there has been an increase in the overall vulnerability.

It is also important to note that as development increases in the future, greater populations and more structures and infrastructure will be exposed to potential hazards if development occurs in the floodplains or other identified areas of high risk.

B.3.4 Vulnerability Assessment Results

As noted in Section 6: *Vulnerability Assessment*, only hazards with a specific geographic boundary, available modeling tool, or sufficient historical data allow for further analysis. Those results, specific to Hancock County, are presented here. All other hazards are assumed to impact the entire planning region (e.g., drought) or, due to lack of data, analysis would not lead to credible results (e.g., infectious disease). The total county exposure, and thus risk to these hazards, was presented in **Table B.35**.

The hazards to be further analyzed in this subsection include: flood, wildfire, earthquake, hurricane and tropical storm winds and storm surge, hazardous materials incident, dam and levee failure, and sea level rise.

The annualized loss estimate for all hazards is presented near the end of this subsection in **Table B.51.**

FLOOD

Historical evidence indicates that Hancock County is susceptible to flood events. A total of 29 flood events have been reported by the National Climatic Data Center resulting in around $1.1 million (2016 dollars) in property damage. On an annualized level, these damages amounted to $63,260 for Hancock County.

In order to assess flood risk, a GIS-based analysis was used to estimate exposure to flood events using Digital Flood Insurance Rate Map (DFIRM) data in combination with improved property records for Hancock County. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within an identified floodplain.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones.

Table B.40 shows the results of the analysis.

TABLE B.40: ESTIMATED EXPOSURE OF PROPERTY TO THE FLOOD HAZARD

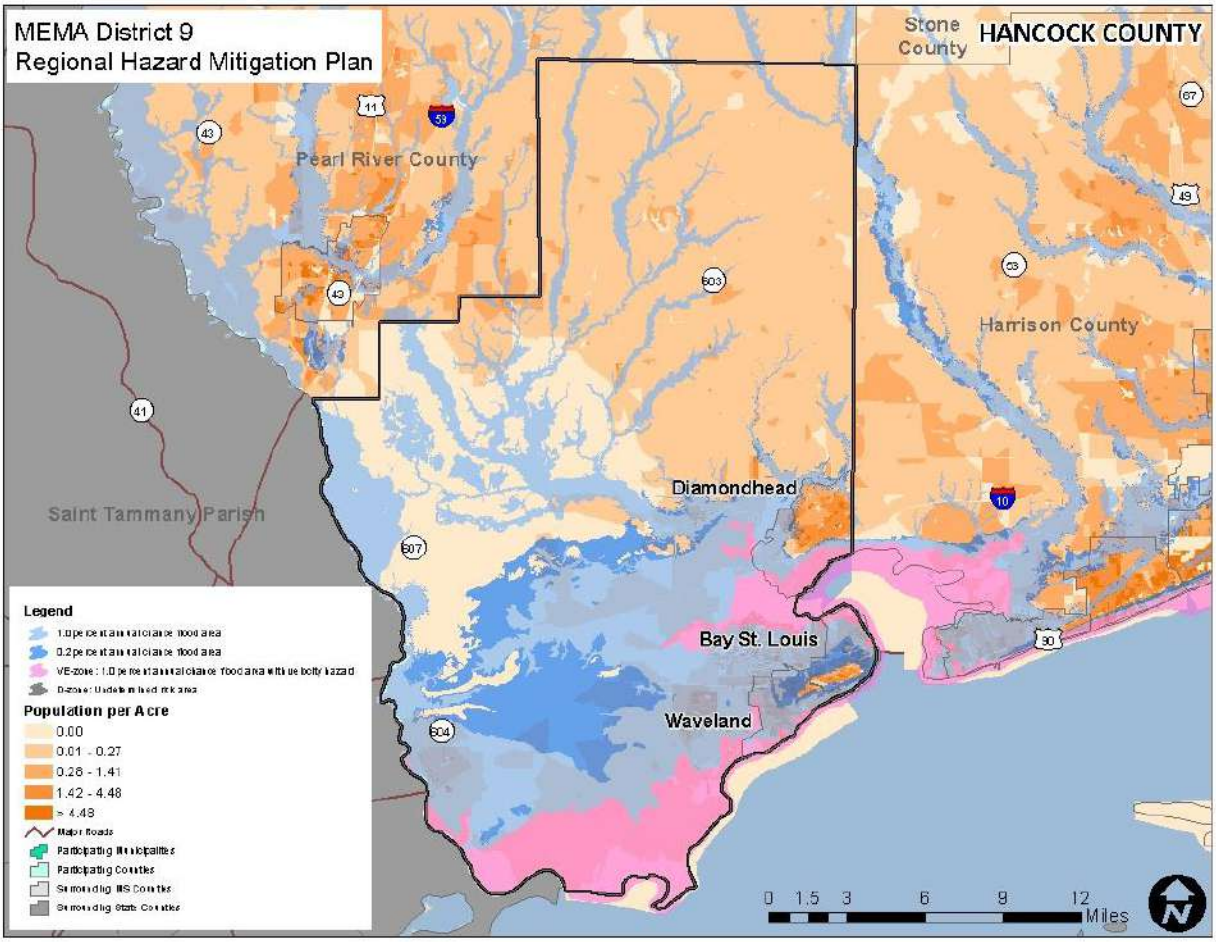
Location	1.0-percent ACF		0.2-percent ACF		VE Zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Bay St. Louis	1,047	$30,854,870	3,527	$77,458,001	123	$2,438,213
Diamondhead	676	$47,769,318	410	$36,591,925	39	$1,809,468
Waveland	2,698	$51,863,509	1,653	$38,060,990	200	$2,741,359
Unincorporated Area	10,878	$123,383,849	756	$10,743,305	798	$9,830,634
HANCOCK COUNTY TOTAL	**15,299**	**$253,871,546**	**6,346**	**$162,854,221**	**1,160**	**$16,819,674**

Source: Federal Emergency Management Agency DFIRM, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Figure B.21 is presented to gain a better understanding of at-risk population by evaluating census block level population data against mapped floodplains. There are areas of concern in most of the population centers in the county. Indeed, each of the incorporated municipalities is potentially at risk of being impacted by flooding in some areas of its jurisdiction. Therefore, there is significant population vulnerability to flooding.

FIGURE B.21 : POPULATION DENSITY NEAR FLOODPLAINS IN HANCOCK COUNTY



Source: Federal Emergency Management Agency DFIRM, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are 64 facilities located in one of the identified floodplain zones. (Please note, as previously indicated, this analysis does not consider building elevation, which may negate risk.) Of these facilities, 26 are located in the 1.0 percent annual chance flood zone, 35 are located in the 0.2 percent annual chance flood zone, and 3 are located in a VE-zone. A list of specific critical facilities and their associated risk can be found in **Table B.52** at the end of this subsection.

In conclusion, a flood has the potential to impact many existing and future buildings, facilities, and populations in Hancock County, though some areas are at a higher risk than others. All types of structures in a floodplain are at-risk, though elevated structures will have a reduced risk. Such site-specific vulnerability determinations are outside the scope of this assessment but may be considered during

future plan updates. Furthermore, areas subject to repetitive flooding should be analyzed for potential mitigation actions.

WILDFIRE

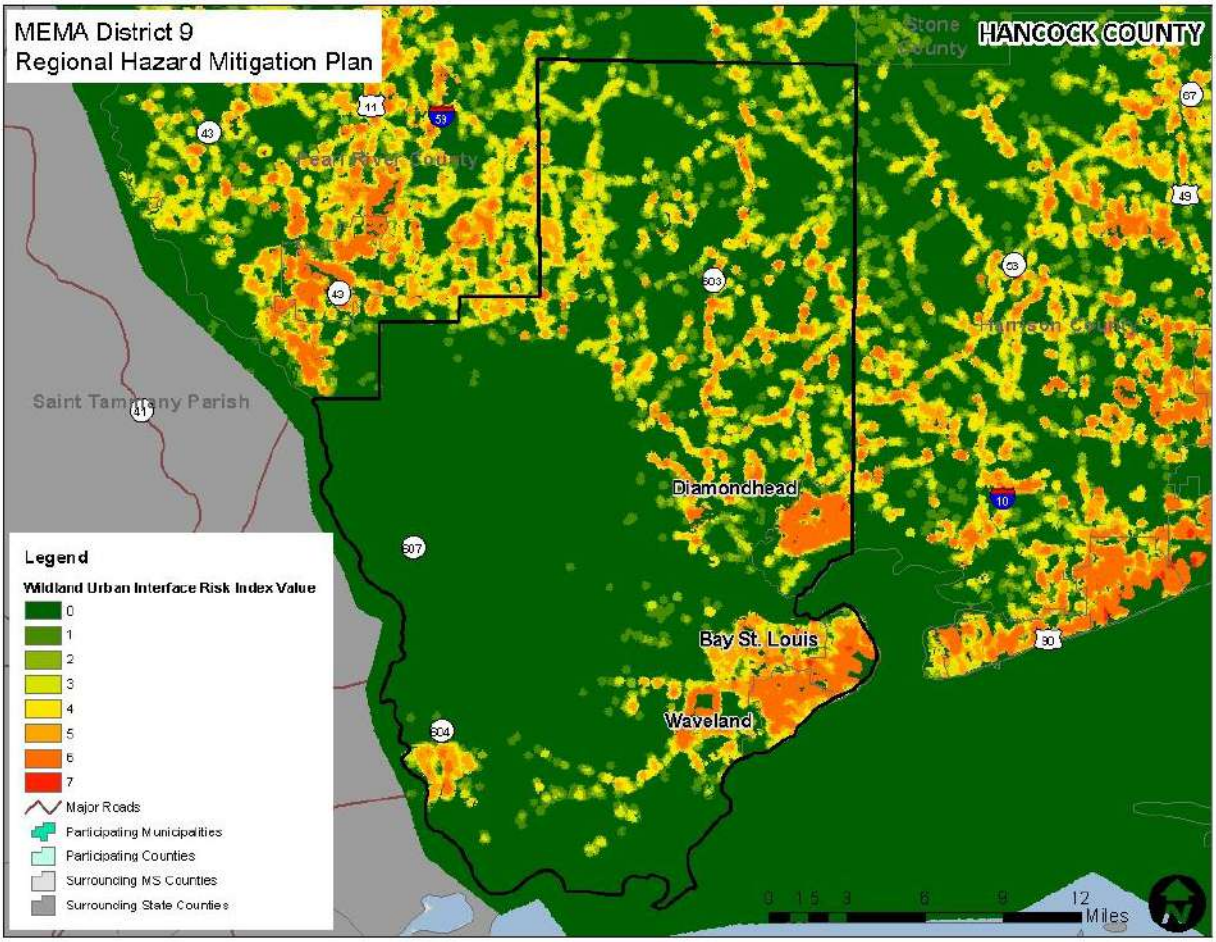
Although historical evidence indicates that Hancock County is susceptible to wildfire events, there are few reports which include information on historic dollar losses. Therefore, it is difficult to calculate a reliable annualized loss figure. Annualized loss is considered relatively low, though it should be noted that a single event could result in significant damages throughout the county.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones. For the critical facility analysis, areas of concern were intersected with critical facility locations.

Figure B.22 shows the Wildland Urban Interface Risk Index (WUIRI) data, which is a data layer that shows a rating of the potential impact of a wildfire on people and their homes. The key input, Wildland Urban Interface (WUI), reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the WUI and rural areas is key information for defining potential wildfire impacts to people and homes. Initially provided as raster data, it was converted to a polygon to allow for analysis. The Wildland Urban Interface Risk Index data ranges from 0 to 7 with higher values being most severe (as noted previously, this is only a measure of relative risk). **Figure B.23** shows the areas of analysis where any grid cell is less than 3. Areas with a value below 3 were chosen to be displayed as areas of risk because this showed the upper echelon of the scale and the areas at highest risk.

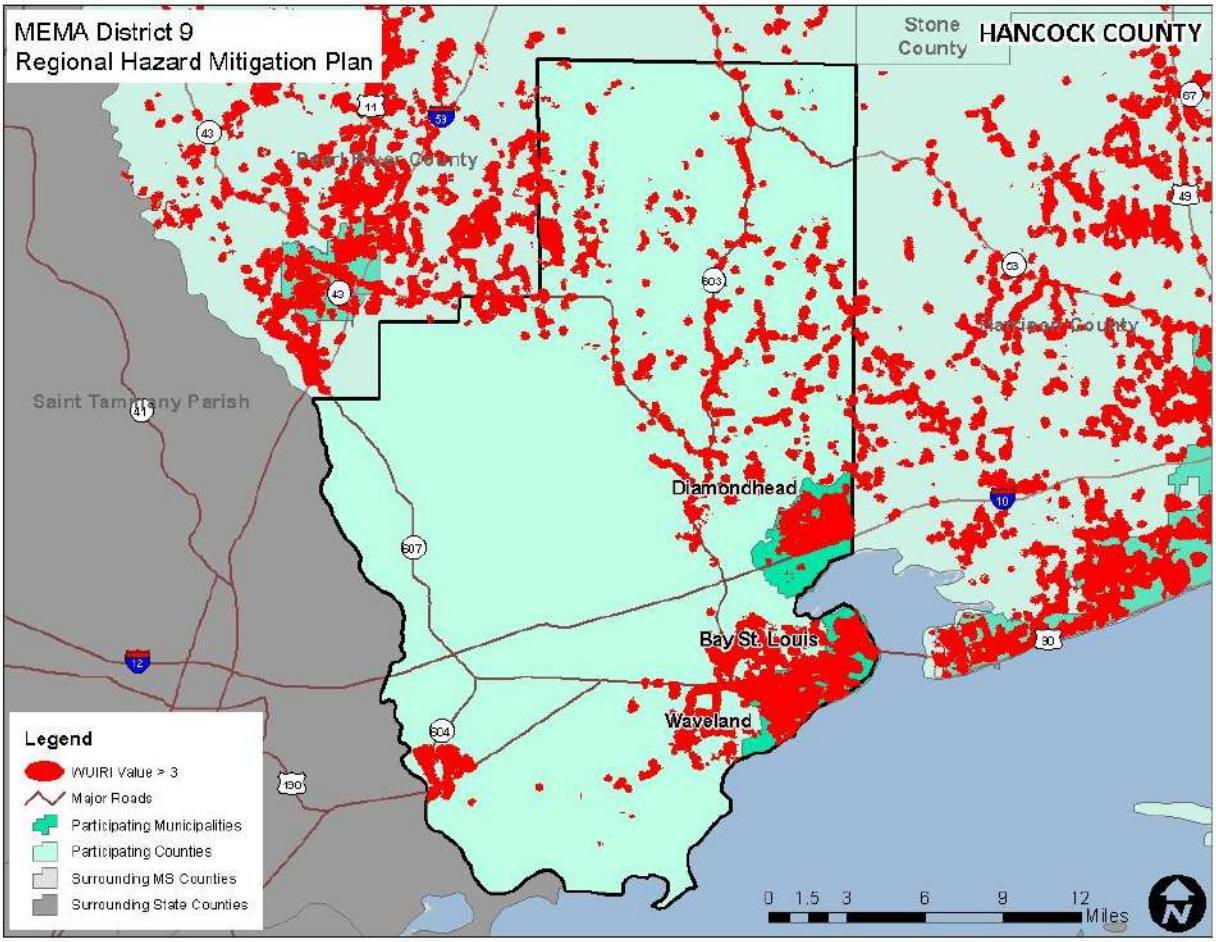
Table B.41 shows the results of the analysis.

FIGURE B.22: WUI RISK INDEX AREAS IN HANCOCK COUNTY



Source: Southern Wildfire Risk Assessment Data

FIGURE B.23: WILDFIRE RISK AREAS IN HANCOCK COUNTY



Source: Southern Wildfire Risk Assessment Data

TABLE B.41: EXPOSURE OF IMPROVED PROPERTY TO WILDFIRE RISK AREAS

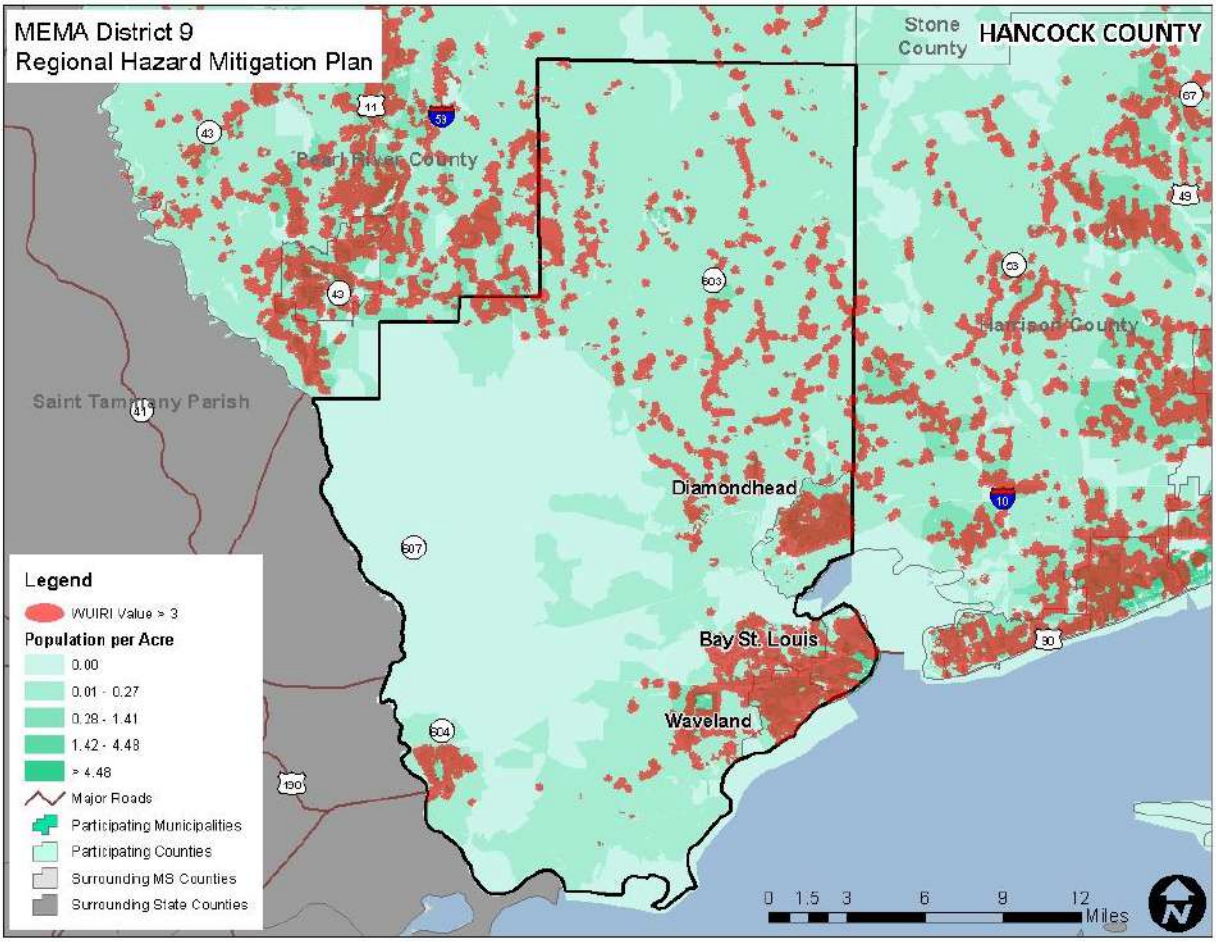
Location	Wildfire Risk	
	Approx. Number of Buildings	Approx. Improved Value
Bay St. Louis	4,266	$104,713,588
Diamondhead	4,438	$376,562,919
Waveland	4,601	$91,012,766
Unincorporated Area	15,770	$221,335,181
HANCOCK COUNTY TOTAL	**29,075**	**$793,624,454**

Source: SWRA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Given some level of susceptibility across the county, it is assumed that the total population is at risk to the wildfire hazard. **Figure B.24** shows an overlay of the wildfire risk areas identified above with the population density by census block. This shows that many of the areas of high population concentration are susceptible to wildfire because of their proximity to the wildland urban interface.

FIGURE B.24: WILDFIRE RISK AREAS IN HANCOCK COUNTY



Source: Southern Wildfire Risk Assessment Data; United States Census

Critical Facilities

The critical facility analysis revealed that there are 63 critical facilities located in wildfire areas of concern, including 2 communications, 1 EOC, 8 fire stations, 3 medical, 4 police stations, 2 power/gas, 2 private/non-profits, 16 public facilities, 11 schools, 3 special populations, 2 transportation, and 9 water/wastewater. It should be noted, that several factors could impact the spread of a wildfire putting all facilities at risk. A list of specific critical facilities and their associated risk can be found in **Table B.52** at the end of this subsection.

In conclusion, a wildfire event has the potential to impact many existing and future buildings, critical facilities, and populations in Hancock County.

EARTHQUAKE

As the Hazus-MH model suggests below, and historical occurrences confirm, any earthquake activity in the area is likely to inflict only minor to moderate damage to the county. Hazus-MH 3.2 estimates a total annualized loss of $15,000 which includes buildings, contents, and inventory throughout the county.

For the earthquake hazard vulnerability assessment, a probabilistic scenario was created to estimate the average annualized loss[26] for the county. The results of the analysis are generated at the Census Tract level within Hazus-MH and then aggregated to the county level. Since the scenario is annualized, no building counts are provided. Losses reported included losses due to structure failure, building loss, contents damage, and inventory loss. They do not include losses to business interruption, lost income, or relocation. **Table B.42** summarizes the findings with results rounded to the nearest thousand.

TABLE B.42: AVERAGE ANNUALIZED LOSS ESTIMATIONS FOR EARTHQUAKE HAZARD

Location	Structural Damage	Non-Structural Damage	Contents Damage	Inventory Loss	Total Annualized Loss
Hancock County	$4,000	$9,000	$2,000	$0	$15,000

Source: Hazus-MH 3.2

Social Vulnerability
It can be assumed that all existing and future populations are at risk to the earthquake hazard.

Critical Facilities
The Hazus-MH probabilistic analysis indicated that no critical facilities would sustain measurable damage in an earthquake event. However, all critical facilities should be considered at-risk to minor damage, should an event occur. Specific vulnerabilities for these assets will be greatly dependent on their individual design and the mitigation measures in place. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates.

In conclusion, an earthquake has the potential to impact all existing and future buildings, facilities, and populations in Hancock County. The Hazus-MH scenario indicates that minimal to moderate damage is expected from an earthquake occurrence. While Hancock County may not experience a large earthquake, localized damage is possible with an occurrence. A list of specific critical facilities and their associated risk can be found in **Table B.52** at the end of this subsection.

HURRICANE AND TROPICAL STORM

Historical evidence indicates that Hancock County has very significant risk to the hurricane and tropical storm hazard. There have been 9 disaster declarations due to hurricanes or tropical storms (Hurricanes Frederic, Georges, Ivan, Dennis, Katrina, Gustav, and Isaac, as well as Tropical Storms Allison and Isidore). A large number tracks have come near or traversed through the county, as shown and discussed in Section B.2.12. Hazus-MH 3.2 estimates a total annualized loss of $19,423,000 which includes buildings, contents, and inventory throughout the county.

Hurricane Winds
Hurricanes and tropical storms can cause damage through numerous additional hazards such as flooding, erosion, tornadoes, and high winds, thus it is difficult to estimate total potential losses from these cumulative effects. The current Hazus-MH hurricane model only analyzes hurricane winds and storm surge and is not capable of modeling and estimating cumulative losses from all hazards associated with hurricanes; therefore, only these two aspects of hurricane losses are analyzed in this section. It can be assumed that all existing and future buildings and populations are at risk to hurricane and tropical storm

[26] Annualized loss is defined by Hazus-MH as the expected value of loss in any one year.

wind hazard. Hazus-MH 3.2 was used to determine average annualized losses[27] for the county as shown below in **Table B.43.** Only losses to buildings, inventory, and contents are included in the results.

TABLE B.43: AVERAGE ANNUALIZED LOSS ESTIMATIONS FOR HURRICANE WIND HAZARD

Location	Building Damage	Contents Damage	Inventory Loss	Total Annualized Loss
Hancock County	$13,931,000	$5,455,000	$37,000	$19,423,000

Source: Hazus-MH 3.2

Storm Surge

In addition, although it was treated as a separate hazard throughout this plan, storm surge is most often associated with hurricanes and tropical storms. Indeed, Hazus incorporates the storm surge model for estimating damage from storm surge as part of the hurricane model. The storm surge model can only be run as part of a historic hurricane model run and not as part of an annualized loss model. Unfortunately, in this model, storm surge impacts are calculated as part of the total damage from the historic event and thus could not be separated out and evaluated solely in terms of storm surge loss. As such, the estimated losses presented below are combined losses from hurricane winds and storm surge. The historic Hurricane Katrina model was utilized as this was certainly one of the most impactful storms in the region and therefore estimates the potential losses that are possible from a large hurricane event. **Table B.44** presents the losses from this modeled event.

TABLE B.44: POTENTIAL LOSS ESTIMATIONS FOR LARGE HURRICANE EVENT

Location	Building Damage	Contents Damage	Inventory Loss	Total Annualized Loss
Hancock County	$279,895,000	$95,284,000	$600,000	$375,779,000

Source: Hazus-MH 3.2

Social Vulnerability

Given equal susceptibility across the county, it is assumed that the total population, both current and future, is at risk to the hurricane and tropical storm wind hazard. In terms of social vulnerability to storm surge, coastal populations are at much higher risk than inland populations. Since large concentrations of population are located along the coast of Hancock County, there is significant social vulnerability to storm surge in the county.

Critical Facilities

Given equal vulnerability across Hancock County, all critical facilities are considered to be at risk. Some buildings may perform better than others in the face of such an event due to construction and age, among factors. Determining individual building response to wind and storm surge is beyond the scope of this plan. However, this plan will consider mitigation action for especially vulnerable structures and/or critical facilities to mitigate against the effects of the hurricane hazard. A list of specific critical facilities can be found in **Table B.52** at the end of this subsection.

In conclusion, a hurricane event has the potential to impact many existing and future buildings, critical facilities, and populations in Hancock County.

[27] Annualized loss is defined by Hazus-MH as the expected value of loss in any one year.

HAZARDOUS MATERIALS INCIDENT

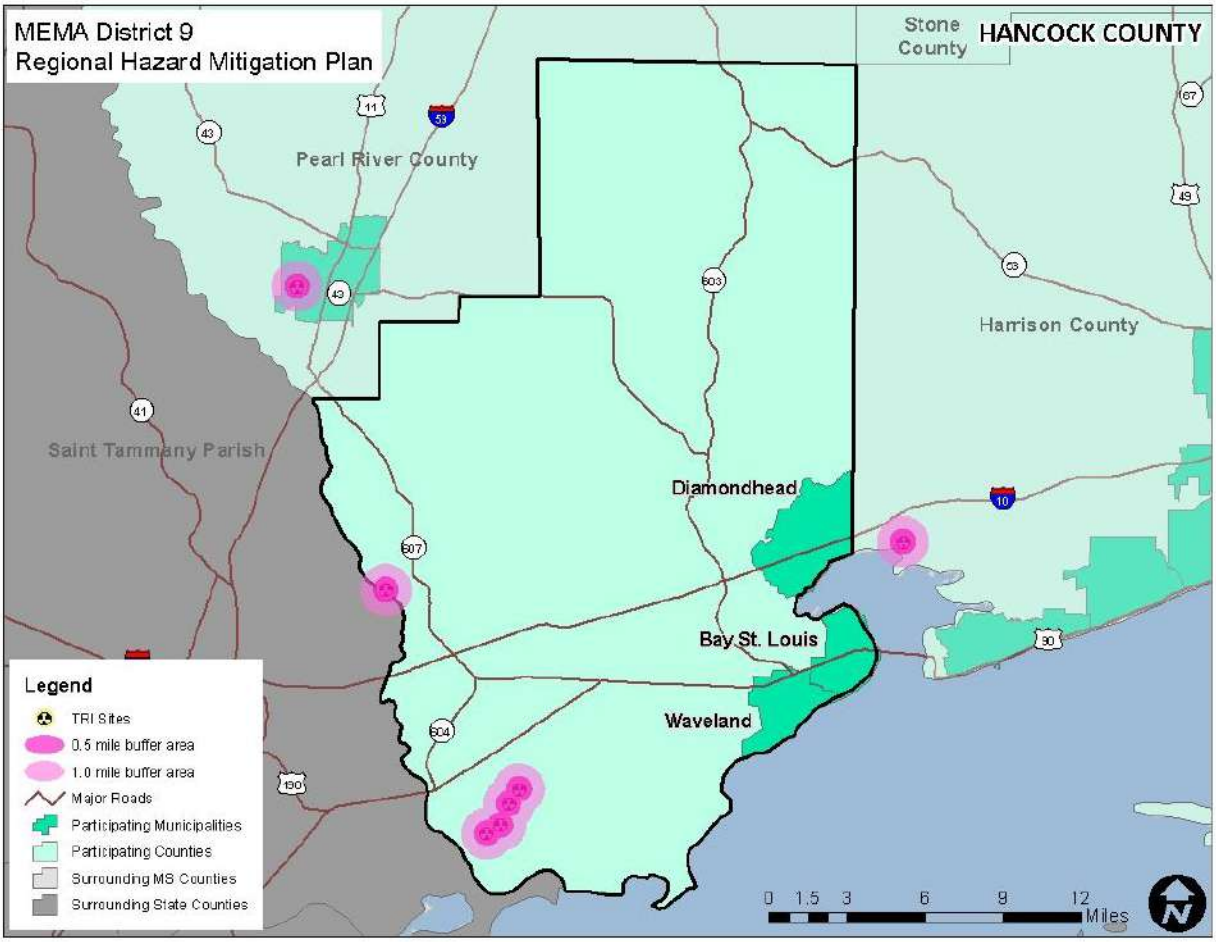
Historical evidence indicates that Hancock County is susceptible to hazardous materials events. A total of 25 HAZMAT incidents have been reported by the Pipeline and Hazardous Materials Safety Administration, resulting in $274,757 (2016 dollars) in property damage as well as 4 deaths. On an annualized level, these damages amount to $8,313 for the county.

Most hazardous materials incidents that occur are contained and suppressed before destroying any property or threatening lives. However, they can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities, and cause affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. Certain chemicals may travel through the air or water, affecting a much larger area than the point of the incidence itself. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features, can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

In order to conduct the vulnerability assessment for this hazard, GIS intersection analysis was used for fixed and mobile areas and building footprints/parcels where available and Census block data where footprints/parcels were not available.[28] In both scenarios, two sizes of buffers—0.5-mile and 1.0-mile—were used. These areas are assumed to represent the different levels of effect: immediate (primary) and secondary. Primary and secondary impact zones were selected based on guidance from the PHMSA Emergency Response Guidebook. For the fixed site analysis, geo-referenced TRI sites in the region, along with buffers, were used for analysis as shown in **Figure B.25.** For the mobile analysis, the major roads (Interstate highway, U.S. highway, and State highway) and railroads, where hazardous materials are primarily transported that could adversely impact people and buildings, were used for the GIS buffer analysis. **Figure B.26** shows the areas used for mobile road toxic release buffer analysis and **Figure B.27** shows the areas used for the mobile railroad toxic release buffer analysis. The results indicate the approximate number of improved properties and improved value, as shown in **Table B.45** (fixed sites), **Table B.46** (mobile roads), and **Table B.47** (mobile railroad sites).[29]

[28] This type of analysis will likely yield inflated results (generally higher than what is actually reported after an actual event).
[29] Note that improved properties included in the 1.0-mile analysis are also included in the 0.5-mile analysis.

FIGURE B.25 : TRI SITES WITH BUFFERS IN HANCOCK COUNTY



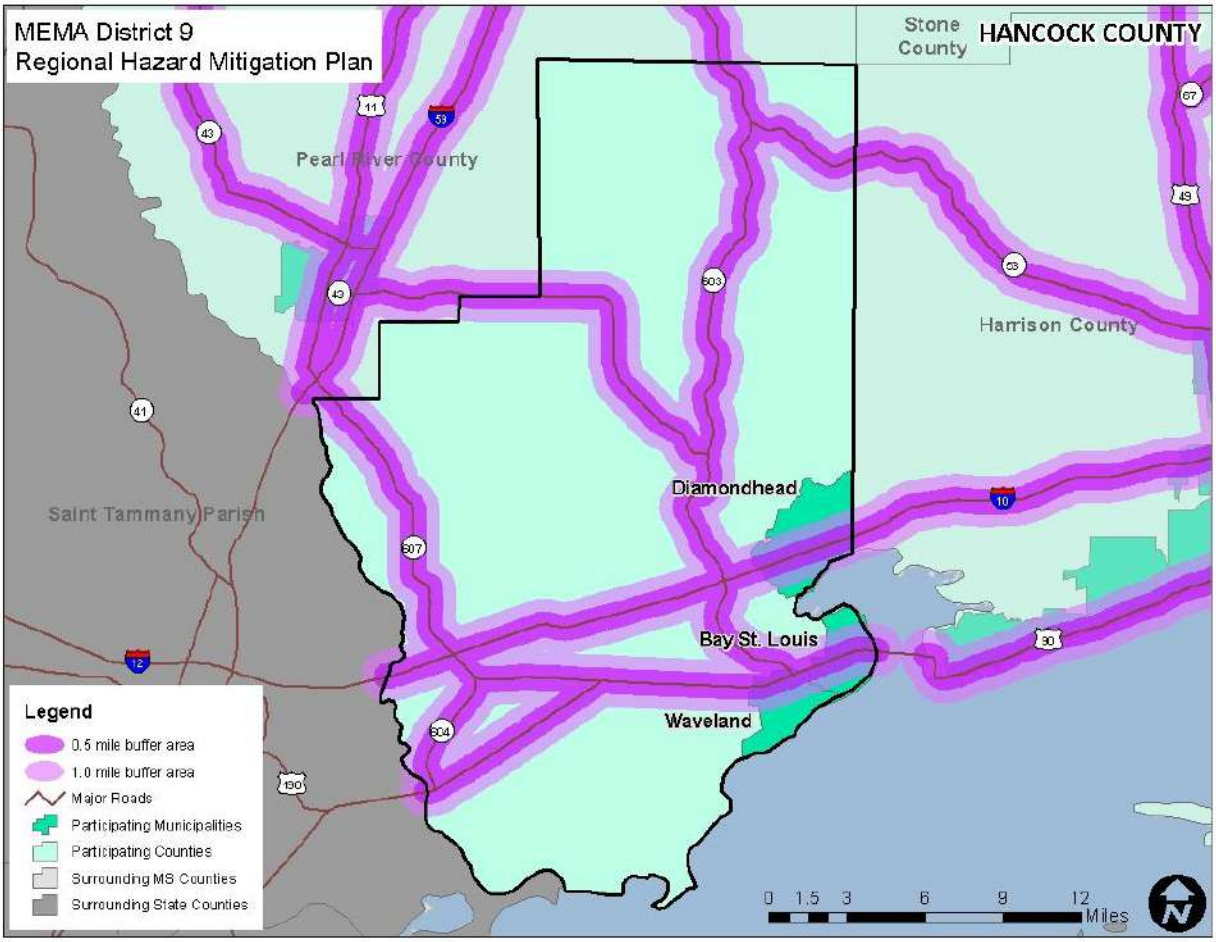
Source: Environmental Protection Agency

TABLE B.45: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS (FIXED SITES)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Bay St. Louis	0	$0	0	$0
Diamondhead	0	$0	0	$0
Waveland	0	$0	0	$0
Unincorporated Area	209	$2,679,000	351	$21,265,000
HANCOCK COUNTY TOTAL†	**209**	**$2,679,000**	**351**	**$21,265,000**

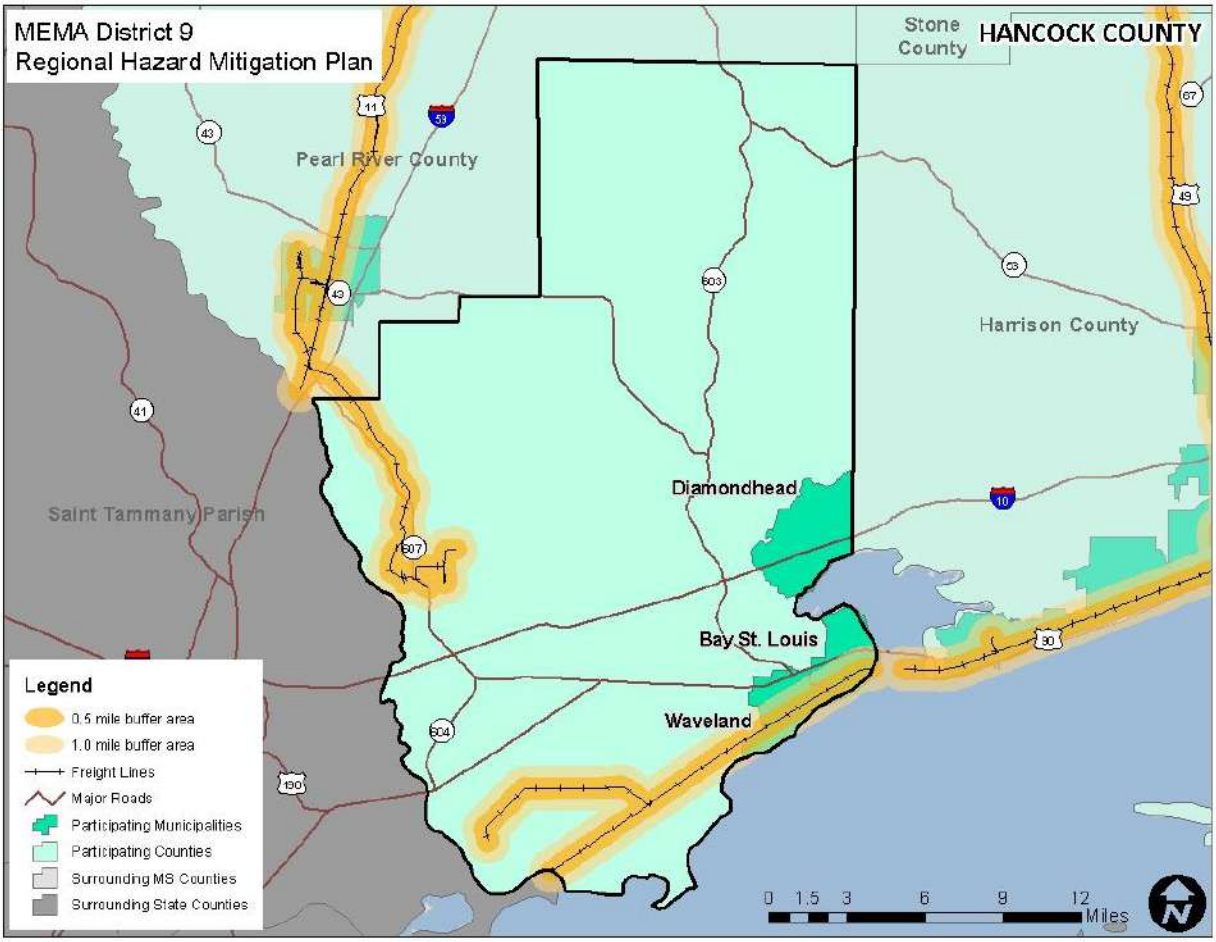
†A small area of the Hancock County parcel data does not contain dollar values. Upon examination of the data, these parcels do have structures located on them. As such, Census Block estimates for values were used in this case.
Source: EPA, MDEQ, Hazus MH 3.2 Data

FIGURE B.26 : MOBILE (ROAD) HAZMAT BUFFERS IN HANCOCK COUNTY



Source: Federal Highway Administration National Highway Planning Network

FIGURE B.27 : MOBILE (RAIL) HAZMAT BUFFERS IN HANCOCK COUNTY



Source: U.S. Department of Transportation Federal Railroad Administration

TABLE B.46: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - ROAD)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Bay St. Louis	3,091	$73,331,871	5,153	$115,765,377
Diamondhead	1,144	$94,088,219	2,515	$232,470,277
Waveland	1,553	$26,881,381	2,902	$57,568,580
Unincorporated Area	9,117	$122,354,193	13,824	$188,187,741
HANCOCK COUNTY TOTAL	**14,905**	**$316,655,664**	**24,394**	**$593,991,975**

Source: NHPN, MDEQ, Hazus MH 3.2 Data

TABLE B.47: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - RAILROAD)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Bay St. Louis	2,602	$50,395,193	4,125	$81,202,156
Diamondhead	0	$0	0	$0
Waveland	2,093	$41,357,755	3,346	$70,790,946
Unincorporated Area	1,084	$5,575,328	1,892	$14,002,776
HANCOCK COUNTY TOTAL	**5,779**	**$97,328,276**	**9,363**	**$165,995,878**

Source: USDOT FRA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Given high susceptibility across the entire county, it is assumed that the total population is at risk to a hazardous materials incident. It should be noted that areas of population concentration may be at an elevated risk due to a greater burden to evacuate population quickly.

Critical Facilities

Fixed Site Analysis:

The critical facility analysis for fixed TRI sites revealed that there are no facilities located in a fixed HAZMAT risk zone. A list of specific critical facilities and their associated risk can be found in **Table B.52** at the end of this subsection.

Mobile Analysis:

The critical facility analysis for transportation corridors revealed that there are 63 facilities located in the primary and secondary road HAZMAT buffer areas. Of these, there were 45 critical facilities located in the primary risk zone including 1 communications, 1 EOC, 5 fire stations, 3 medical, 3 police stations, 2 power/gas, 1 private/non-profit, 9 public facilities, 10 schools, 4 special populations, 1 transportation, and 5 water/wastewater.

For the rail line buffer areas, there were a total of 40 critical facilities located in primary and secondary buffer areas. Of these, 21 facilities are located within the primary buffer area including 1 communications, 2 fire stations, 1 police station, 1 power/gas, 2 private/non-profit, 7 public facilities, 5 schools, and 2 water/wastewater.

A list of specific critical facilities and their associated risk can be found in **Table B.52** at the end of this subsection.

In conclusion, a hazardous material incident has the potential to impact many existing and future buildings, critical facilities, and populations in Hancock County. Those areas in a primary buffer are at the highest risk, though all areas carry some vulnerability due to variations in condition that could alter the impact area (i.e., direction and speed of wind, volume of release, etc.).

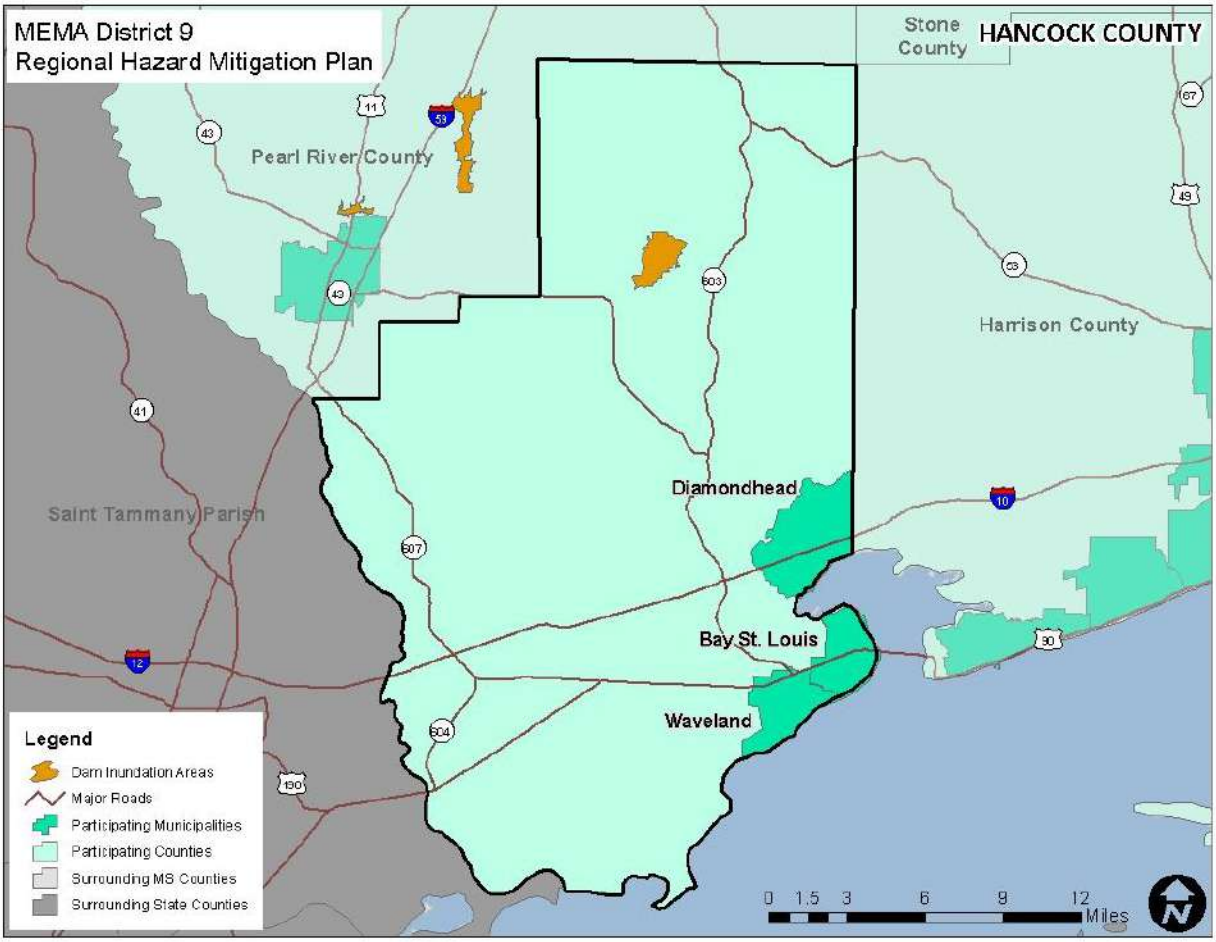
DAM/LEVEE FAILURE

In order to assess risk to a dam or levee failure, a GIS-based analysis was used to estimate exposure to one of the areas delineated by the Mississippi Department of Environmental Quality as a potential inundation area in the event of a failure. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within an identified inundation area. As mentioned previously, this type of inundation mapping has not been completed for every dam/levee in the region, so the results of this analysis likely underestimate the overall vulnerability to a dam or levee failure. However, the analysis is still useful as a sort of baseline minimum of property that is potentially at-risk. The identified inundation areas can be found in **Figure B.28**.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones.

Table B.48 presents the potential at-risk property. Both the number of buildings and the approximate improved value are presented

FIGURE B.28: DAM INUNDATION AREAS IN HANCOCK COUNTY



Source: Mississippi Department of Environmental Quality

TABLE B.48: ESTIMATED EXPOSURE OF IMPROVEMENTS TO THE DAM/LEVEE FAILURE HAZARD

Location	Dam Inundation Area	
	Approx. Number of Buildings	Approx. Improved Value
Bay St. Louis	0	$0
Diamondhead	0	$0
Waveland	0	$0
Unincorporated Area	92	$1,852,055
HANCOCK COUNTY TOTAL	**92**	**$1,852,055**

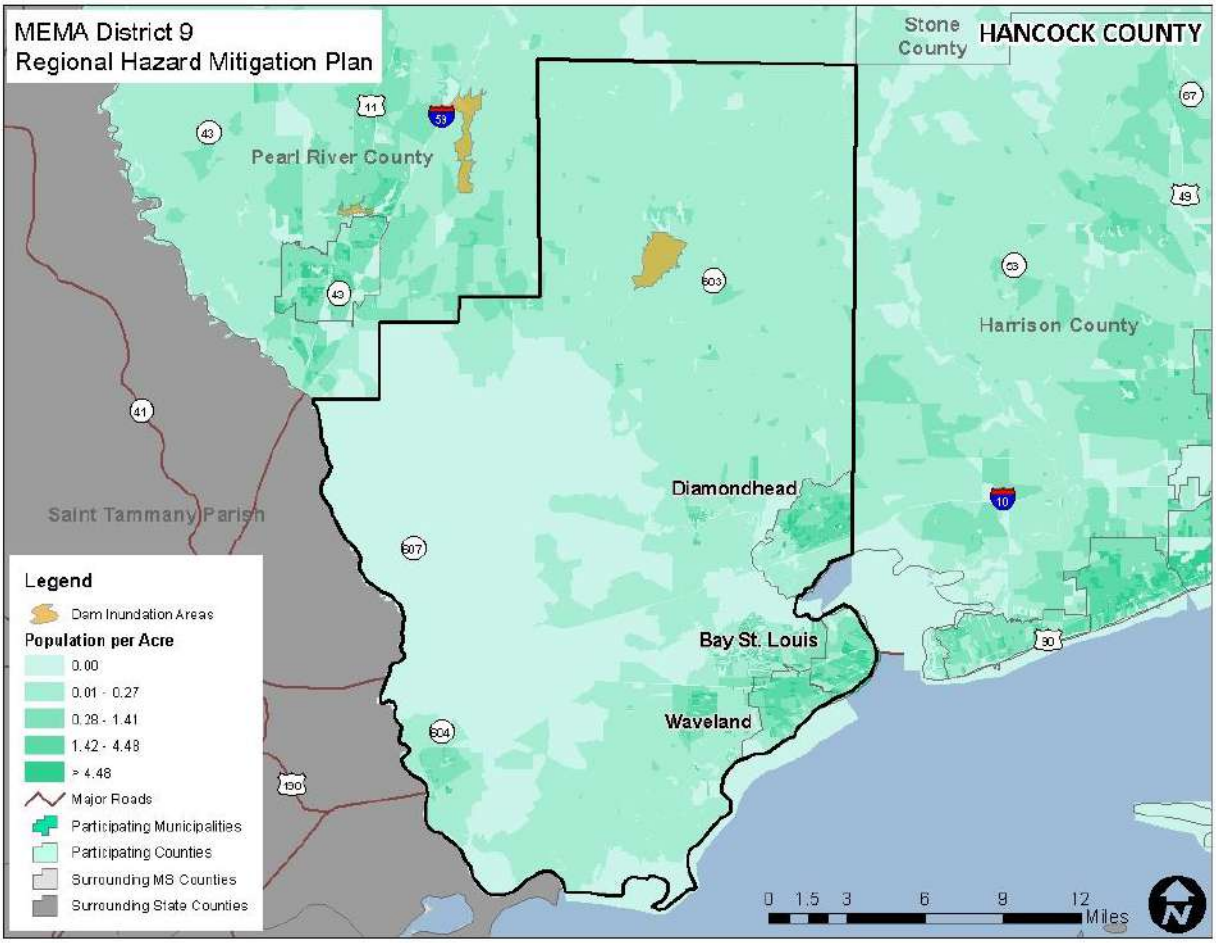
Source: MDEQ, Hazus 3.2

Social Vulnerability

Figure B.29 is presented to gain a better understanding of at-risk population by evaluating census block level population data against dam inundation areas. There is an area of concern in the northern part of

the county, although it should be noted that most of the population of the county is not at risk to a dam/levee failure.

FIGURE B.29: POPULATION DENSITY NEAR DAM INUNDATION AREAS IN HANCOCK COUNTY



Source: MDEQ, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are no facilities located in dam inundation areas. A list of specific critical facilities and their associated risk can be found in **Table B.52** at the end of this subsection.

In conclusion, a dam has the potential to impact a number of existing and future buildings, facilities, and populations in Hancock County, though this analysis is not all-encompassing in terms of risk to a dam or levee failure because inundation mapping is not available for all dams in the region.

CLIMATE CHANGE/SEA LEVEL RISE

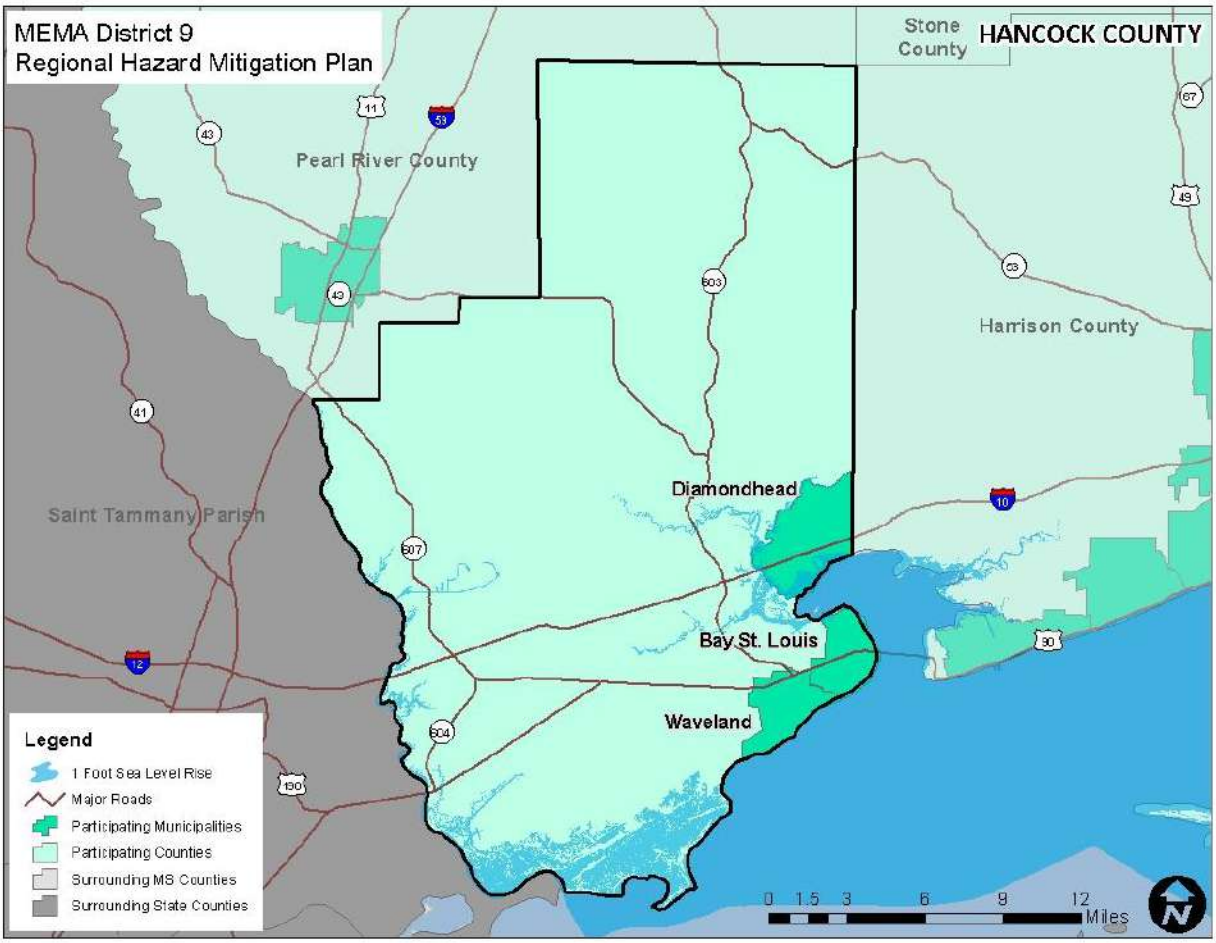
Most assessments carried out across the globe have concluded that climate change is a phenomenon that will impact our planet in the foreseeable future. Among others, the National Climate Assessment, International Panel on Climate Change, and National Oceanic and Atmospheric Administration all project that climate change will impact the United States and will have a major impact on coastal communities

due to the effects of sea level rise. As such, projections concerning sea level rise are important to incorporate into planning efforts in order to identify people and property that may be impacted.

In order to assess sea level rise risk, a GIS-based analysis was used to estimate exposure to future projections of sea level rise using data produced by the National Oceanic and Atmospheric Administration in combination with improved property records for the county. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within the inundation zone that would be created in the event of 1 foot, 3 feet, and 6 feet of sea level rise. A number of different sea level rise scenarios were available via NOAA (from 1 foot to 6 feet, at 1 foot intervals), however these scenarios were selected to demonstrate a range of potential sea level rise scenarios from low to moderate to high projections. These scenarios can be found in **Figure B.30**, **Figure B.31**, and **Figure B.32**.

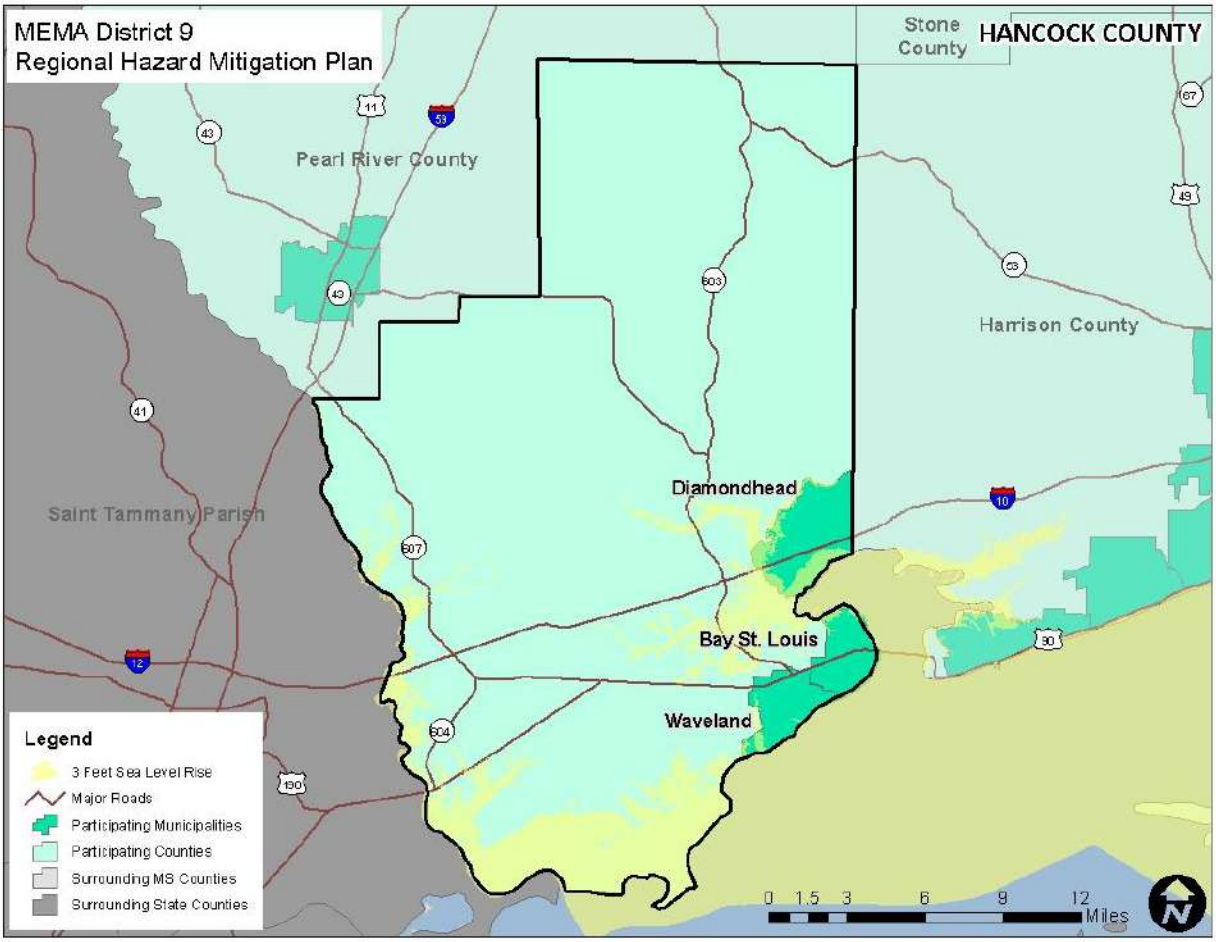
Table B.49 presents the potential at-risk property. Both the number of parcels and the approximate value are presented.

FIGURE B.30: 1 FOOT SEA LEVEL RISE SCENARIO IN HANCOCK COUNTY



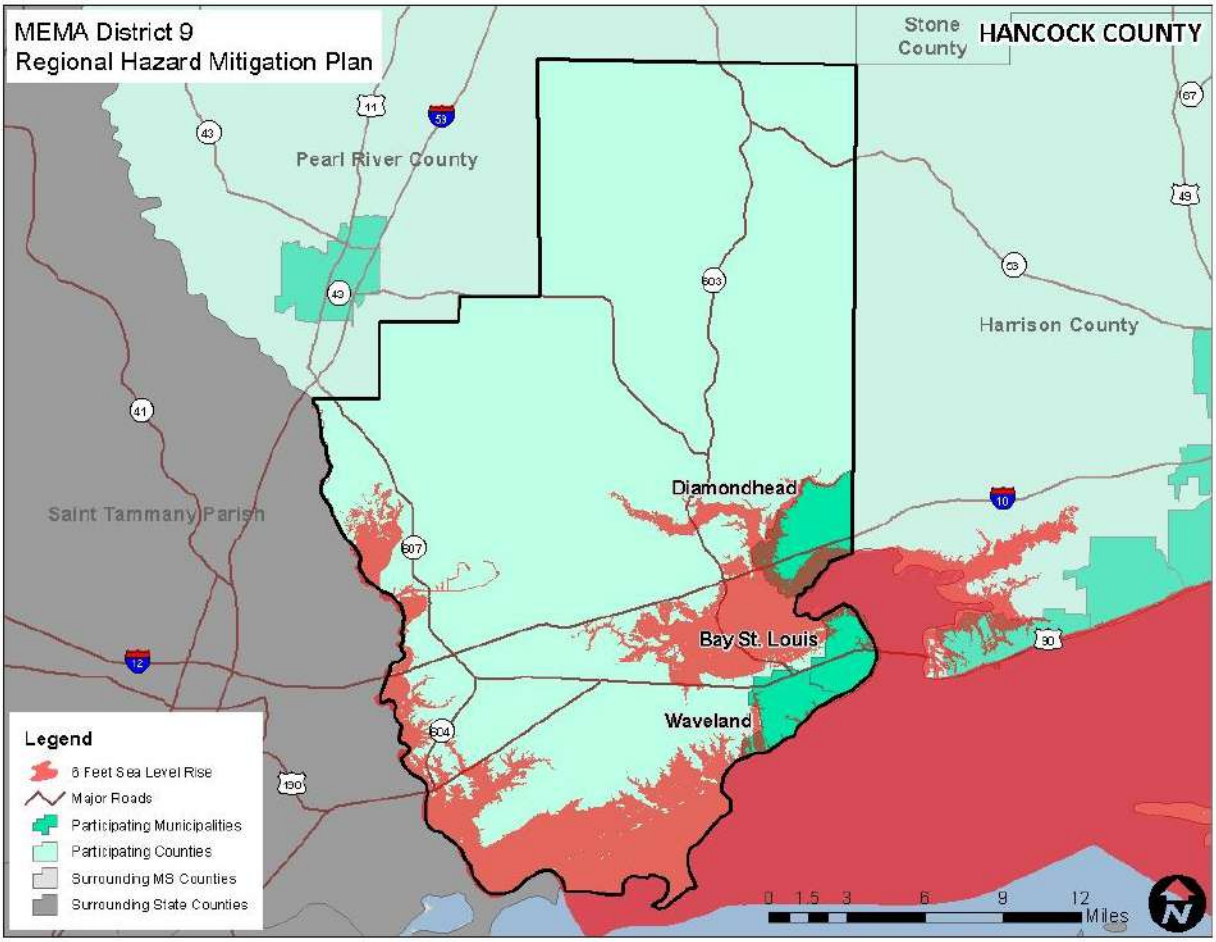
Source: NOAA

FIGURE B.31: 3 FEET SEA LEVEL RISE SCENARIO IN HANCOCK COUNTY



Source: NOAA

FIGURE B.32: 6 FEET SEA LEVEL RISE SCENARIO IN HANCOCK COUNTY



Source: NOAA

TABLE B.49: ESTIMATED EXPOSURE OF PARCELS TO THE SEA LEVEL RISE HAZARD

Location	1.0 foot		3.0 feet		6.0 feet	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Bay St. Louis	0	$0	7	$282,410	61	$1,200,443
Diamondhead	30	$2,087,223	52	$3,752,217	115	$8,691,488
Waveland	0	$0	0	$0	36	$264,371
Unincorporated Area	248	$6,391,403	2,748	$42,892,982	5,296	$77,430,042
HANCOCK COUNTY TOTAL	**248**	**$6,391,403**	**2,755**	**$43,175,392**	**5,357**	**$78,630,485**

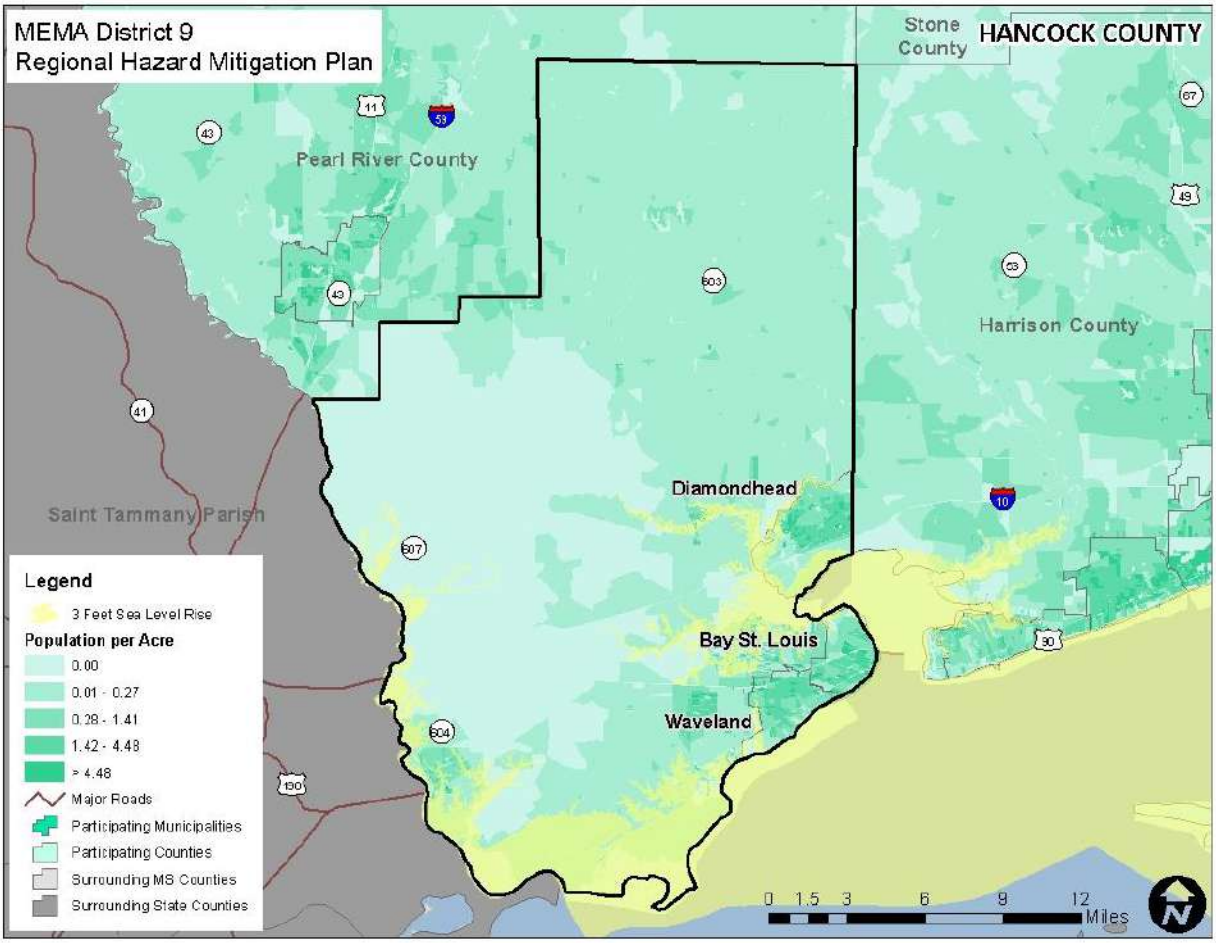
Source: NOAA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Figure B.33 is presented to gain a better understanding of at-risk population by evaluating census block level population data against the 3 feet sea level rise scenario. The three feet scenario was selected since

this is a moderate level projection. Based on this analysis, a significant part of the coastal population in the county is vulnerable to sea level rise.

FIGURE B.33: POPULATION DENSITY WITH 3 FEET SEA LEVEL RISE IN HANCOCK COUNTY



Source: NOAA, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are 3 facilities located in the 3 feet of sea level rise scenario inundation area. As mentioned above, this scenario was selected as it is a mid-range projection for sea level rise based on a number of studies. The 3 facilities include 1 private/non-profit, 1 special population, and 1 transportation. A list of specific critical facilities and their associated risk can be found in **Table B.52** at the end of this subsection.

CONCLUSIONS ON HAZARD VULNERABILITY

Table B.50 presents an overall summary of the community's vulnerability for each jurisdiction. This summary provides key problem statements and identifies the community's greatest vulnerabilities that will be addressed in the mitigation strategy.

TABLE B.50: SUMMARY OF VULNERABILITY FOR HANCOCK COUNTY

	Key Problem Statements
Hancock County	Hancock County, Bay St. Louis, Diamondhead, and Waveland have many low-lying neighborhoods and streets that are especially vulnerable to coastal flooding and storm surge. Vulnerable and at-risk populations including low-income, minority, elderly, or disabled persons disproportionately live in flood prone areas. Additionally, many employers like casinos, resorts, and hotels are located in these vulnerable locations. Disruption or loss of these employers and facilities can result in significant unemployment, economic loss, and migration from the county and cities.

Table B.51 presents a summary of annualized loss for each hazard in Hancock County. Due to the reporting of hazard damages primarily at the county level, it was difficult to determine an accurate annualized loss estimate for each municipality. Therefore, an annualized loss was determined through the damage reported through historical occurrences at the county level. These values should be used as an additional planning tool or measure risk for determining hazard mitigation strategies throughout the county.

It should also be noted that many of these estimates are based on incomplete data and likely underestimate the historic dollar damage sustained in each county. Especially for hazards such as extreme cold, extreme heat, hail, lightning, and winter weather, it is very likely that more damage occurred historically than has been identified.

TABLE B.51: ANNUALIZED LOSS FOR HANCOCK COUNTY

Hazard	Hancock County
Flood-related Hazards	
Dam and Levee Failure	*Not Available*
Erosion	*Not Available*
Flood	$63,260
Storm Surge	$231,917,975
Fire-related Hazards	
Drought	*Not Available*
Lightning	$24,550
Wildfire	*Not Available*
Geologic Hazards	
Earthquake†	$4,000
Wind-related Hazards	
Extreme Cold	$0
Extreme Heat/Heat Wave	*Not Available*
Hailstorm	$0
Hurricane and Tropical Storm	$97,894,098
Severe Thunderstorm/High Wind	$11,182

Hazard	Hancock County
Tornado	$1,232,052
Winter Weather	*Not Available*
Climate Change/Sea Level Rise	*Not Available*
Hazardous Materials Incident/Train Derailment	$8,313
Infectious Disease	*Not Available*

†Historic dollar damage was not available for this hazard, but since estimated annualized losses from Hazus were available, those numbers were used in this table.
*In this table, the term "Not Available" is used to indicate that no records of dollar losses for the particular hazard were recorded. This could be the case either because there were no events that caused dollar damage or because documentation of that particular type of event is not well kept.

As noted previously, all existing and future buildings and populations (including critical facilities) are vulnerable to impacts from atmospheric hazards such as drought and hailstorm. Some buildings may be more vulnerable to some of these hazards based on locations, construction, and building type. In addition, all populations are vulnerable to hazards like infectious disease which could presumably impact any segment of the population without regard to geographic location. **Table B.52** shows the critical facilities vulnerable to additional hazards analyzed in this section. The table lists those assets that are determined to be exposed to each of the identified hazards (marked with an "**X**").

TABLE B.52: AT-RISK CRITICAL FACILITIES IN HANCOCK COUNTY

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
HANCOCK COUNTY																										
Bell South Switching Station		Comm		X				X	X		X	X	X	X	X	X	X	X								X
Cell phone Towers		Comm		X				X	X		X	X	X	X	X	X	X	X								X
Hancock County EMA		EOC		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Clermont Harbor VFD		Fire Station		X			X	X	X	X	X	X	X	X	X	X	X	X						X	X	X
Fenton VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
West Hancock VFD		Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
Diamondhead Dialysis Center		Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Hancock Medical Center		Medical		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Hancock Medical Center Clinics and Offices		Medical		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Hancock County Dispatch Office		Police Station		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
Hancock County Sheriff's Office		Police Station		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Coast Electric Power Association office and distribution lines		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Mississippi Power Company, office and distribution lines		Power/Gas		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
La Frances Fish Camp		Private/Non-Profit		X			X	X	X		X	X	X	X	X	X	X	X						X	X	X
WQRZ Radio Station		Private/Non-Profit		X	X			X	X	X	X	X	X	X	X	X	X	X	X			X	X			X
Buccaneer State Park		Public Facility		X	X			X	X		X	X	X	X	X	X	X	X						X	X	X
Hancock County Courthouse		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
Hancock County Health Department		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Hancock County Jail		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
Hancock County Senior Center		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Kiln Public Library		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Pearlington Public Library		Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
Sand Beach		Public Facility		X				X	X		X	X	X	X	X	X	X	X								X
Scenic Trails		Public Facility		X				X	X		X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Seawall		Public Facility		X				X	X		X	X	X	X	X	X	X	X								X
Bay Catholic Elementary School		School		X				X	X		X	X	X	X	X	X	X	X								X
Bay High School		School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Bay Waveland Child Development Center		School		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Central Christian Academy		School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
East Hancock Elementary School		School		X				X	X		X	X	X	X	X	X	X	X								X
Hancock County Child Development Center		School		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
Hancock County High School		School		X		X		X	X		X	X	X	X	X	X	X	X					X			X
Hancock County Middle School		School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Hancock County North Central Elementary School		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
North Bay Elementary School		School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Our Lady of the Gulf High School		School		X		X		X	X		X	X	X	X	X	X	X	X					X	X	X	X
South Hancock Elementary School		School		X	X			X	X	X	X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
St. Stanislaus College and Dorms		School		X		X		X	X		X	X	X	X	X	X	X	X					X	X	X	X
Waveland Elementary School		School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
West Hancock Elementary School		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Hancock County Evacuation Shelters		Shelter		X				X	X		X	X	X	X	X	X	X	X								X
Aloha RV Park		Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Dunbar Village Terrace and Courtyard		Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
Hancock RV Park		Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Hollywood Casino and RV Park		Special Populations		X	X			X	X		X	X	X	X	X	X	X	X								X
Silver Slipper RV Park		Special Populations		X			X	X	X		X	X	X	X	X	X	X	X	X						X	X
Sunrise RV Park		Special Populations		X	X			X	X		X	X	X	X	X	X	X	X				X	X			X
Woodland Village Nursing Center		Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Bridges on all highways and major roads		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
CSX Railroad and Bridge		Transportation		X				X	X		X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Diamondhead Airport		Transportation		X	X			X	X		X	X	X	X	X	X	X	X					X			X
Interstate Highway 10		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Kiln-Delisle Road		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Port Bienville lead line		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Road Department North County Barn		Transportation		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Road Department South County Barn		Transportation		X	X			X	X	X	X	X	X	X	X	X	X	X								X
State Highways 603,603 and 43		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Stennis International Airport		Transportation		X	X			X	X		X	X	X	X	X	X	X	X								X
U. S. Highway 90		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Diamondhead Regional Wastewater Treatment Plant		Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Hancock County Utility Authority Offices		Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X				X	X			X
Northern Regional Wastewater Treatment Plant		Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Sewer Lift Stations		Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Southern Regional Wastewater Treatment Plant		Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Water Wells		Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Western Regional Wastewater Treatment Plant		Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Bell South	Bay St Louis	Comm		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Cell phone Towers	Bay St Louis	Comm		X		X		X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Bay St. Louis Fire Department #1	Bay St Louis	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Bay St. Louis Fire Department #2	Bay St Louis	Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
Bay St. Louis Police Department	Bay St Louis	Police Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Natural Gas Regulator	Bay St Louis	Power/Gas		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Bay St. Louis-Hancock County Library	Bay St Louis	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Bay St. Louis City Hall	Bay St Louis	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Bay St. Louis Public Works Yard	Bay St Louis	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Bay-Waveland Middle School	Bay St Louis	School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Second Street Elementary	Bay St Louis	School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
St. Rose De Lima School	Bay St Louis	School		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Notre Dame De La Mer Senior Housing	Bay St Louis	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
CSX Railroad Bay Bridge	Bay St Louis	Transportation		X				X	X		X	X	X	X	X	X	X	X	X				X		X	X
Water Well- 10th	Bay St Louis	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
Water Well- Esterbrook	Bay St Louis	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Water Well- Harry	Bay St Louis	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Water Well- St Charles	Bay St Louis	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Diamondhead Fire Station	Diamondhead	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Diamondhead Proposed Police Station	Diamondhead	Police Station		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Diamondhead City Offices	Diamondhead	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Diamondhead POA	Diamondhead	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
East Hancock County Library	Diamondhead	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Waveland Central Fire Station	Waveland	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Waveland Fire Station #1	Waveland	Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Waveland Police Department- New	Waveland	Police Station		X		X		X	X	X	X	X	X	X	X	X	X	X					X		X	X
Waveland Police Department- Temporary	Waveland	Police Station		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Hope Haven	Waveland	Private/Non-Profit		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Waveland City Hall	Waveland	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Waveland City Hall Annex	Waveland	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Waveland Civic Center	Waveland	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Waveland Public Library	Waveland	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Waveland Public Library	Waveland	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Waveland Public Works Yard	Waveland	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X					X		X	X
Davis Ave Water Well	Waveland	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Faith Street Water Well	Waveland	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Gulfside Street Water Well	Waveland	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X					X		X	X
Tide Street Water Well	Waveland	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X							X	X
Waveland Wastewater Treatment Plant	Waveland	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X					X		X	X

B.4 HANCOCK COUNTY CAPABILITY ASSESSMENT

This subsection discusses the capability of Hancock County to implement hazard mitigation activities. More information on the purpose and methodology used to conduct the assessment can be found in Section 7: *Capability Assessment*.

B.4.1 Planning and Regulatory Capability

Table B.53 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for Hancock County. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. A dagger (†) indicates that the given item is administered for that municipality by the county. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the MEMA District 9 Regional Hazard Mitigation Plan.

TABLE B.53: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Planning Tool/Regulatory Tool	Hazard Mitigation Plan	Threat and Hazard Identification and Risk Assessment (THIRA)	Comprehensive Land Use Plan	Floodplain Management Plan/Flood Mitigation Plan	Open Space Management Plan (Parks & Rec/Greenway Plan	Stormwater Management Plan/Ordinance	Natural Resource Protection Plan	Flood Response Plan	Emergency Operations Plan	Emergency Management Accreditation Program (EMAP Accreditation)	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Unified Development Ordinance	Post-Disaster Redevelopment/ Reconstruction Plan/ Ordinance	Building Code	Fire Code	National Flood Insurance Program (NFIP)	NFIP Community Rating System (CRS Program)
HANCOCK COUNTY	✓		✓	✓	✓	✓	✓		✓			✓			✓		✓	✓	✓			✓	✓	✓	
Bay St. Louis	✓		✓			✓	†		†			†			†		✓	✓	✓			✓	✓	✓	✓
Diamondhead	†		✓	†		✓			†			†		✓	†		✓	✓	✓			✓	✓	✓	
Waveland	✓		✓			✓	†		†			†		✓	†		✓	✓	✓			✓	✓	✓	✓

A more detailed discussion on the county's planning and regulatory capabilities follows.

EMERGENCY MANAGEMENT

Hazard Mitigation Plan

Hancock County has previously adopted a hazard mitigation plan. The City of Diamondhead was also included in this plan. The cities of Bay St. Louis and Waveland have also previously adopted municipal-level hazard mitigation plans.

Emergency Operations Plan
Hancock County maintains an emergency operations plan through its Emergency Management Agency. The cities of Bay St. Louis, Diamondhead, and Waveland are each covered by this plan.

GENERAL PLANNING

Comprehensive Land Use Plan
Hancock County has adopted a county comprehensive plan. The cities of Bay St. Louis, Diamondhead, and Waveland have also adopted municipal comprehensive plans.

Capital Improvements Plan
Hancock County has not adopted a capital improvements plan. However, the cities of Diamondhead and Waveland have adopted municipal capital improvements plans.

Historic Preservation Plan
Neither Hancock County nor any of its participating municipalities have a historic preservation plan. However, the City of Bay St. Louis has adopted a historic preservation ordinance.

Zoning Ordinance
Hancock County and the cities of Bay St. Louis, Diamondhead, and Waveland have each adopted a zoning ordinance.

Subdivision Ordinance
Hancock County and the cities of Bay St. Louis, Diamondhead, and Waveland have each adopted a subdivision ordinance.

Building Codes, Permitting, and Inspections
After Hurricane Katrina, Mississippi Legislature mandated the adoption of the International Building Code and International Residential Code in five coastal counties including Hancock County. The cities of Bay St. Louis, Diamondhead, and Waveland have also adopted building codes.

FLOODPLAIN MANAGEMENT

Table B.54 provides NFIP policy and claim information for each participating jurisdiction in Hancock County.

TABLE B.54: NFIP POLICY AND CLAIM INFORMATION

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
HANCOCK COUNTY†	09/09/70	10/16/09	4,265	$1,097,650,600	5,929	$404,676,960
Bay St. Louis	09/11/70	10/16/09	2,240	$647,565,200	1,244	$148,880,718
Diamondhead	05/22/12		14	$3,275,000	0	$0

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
Waveland	09/11/70	10/16/09	1,795	$489,605,500	1,385	$183,867,798

†Includes unincorporated areas of county only
Source: NFIP Community Status information as of 1/10/2017; NFIP claims and policy information as of 10/31/2016

Community Rating System
The cities of Bay St. Louis (Class 7) and Waveland (Class 5) participate in the CRS. Participation in the CRS program should be considered as a mitigation action by Hancock County and the City of Waveland. The program would be most beneficial to the county which has 4,265 NFIP policies in force.

Flood Damage Prevention Ordinance
All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. Hancock County and the cities of Bay St. Louis, Diamondhead, and Waveland all participate in the NFIP and have adopted flood damage prevention ordinances.

Floodplain Management Plan
Hancock County has adopted a floodplain management plan to help prevent damages associated with flooding and flood loss. The City of Diamondhead is also included in this plan.

Open Space Management Plan
Hancock County has adopted a county greenways plan.

Stormwater Management Plan
The cities of Diamondhead and Waveland have both adopted a stormwater management plan. Hancock County and the City of Bay St. Louis have adopted local stormwater management ordinances.

B.4.2 Administrative and Technical Capability

Table B.55 provides a summary of the capability assessment results for Hancock County with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill. A dagger (†) indicates a county-level staff member(s) provides the specified knowledge or skill to that municipality.

TABLE B.55: RELEVANT STAFF/PERSONNEL RESOURCES

Staff/Personnel Resource	Planners with knowledge of land development/land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Emergency Manager	Floodplain Manager	Land Surveyors	Scientists familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in GIS and/or Hazus	Resource development staff or grant writers
HANCOCK COUNTY	✓	✓	✓	✓	✓		✓	✓	✓	✓
Bay St. Louis		✓	✓	†	✓		†	✓	✓	✓
Diamondhead	✓	✓	✓	✓	✓		†	✓	✓	✓
Waveland		✓	✓	✓	✓		†	✓	✓	✓

Credit for having a floodplain manager was given to those jurisdictions that have a flood damage prevention ordinance, and therefore an appointed floodplain administrator, regardless of whether the appointee was dedicated solely to floodplain management. Credit was given for having a scientist familiar with the hazards of the community if a jurisdiction has a Cooperative Extension Service or Soil and Water Conservation Department. Credit was also given for having staff with education or expertise to assess the community's vulnerability to hazards if a staff member from the jurisdiction was a participant on the existing hazard mitigation plan's planning committee.

B.4.3 Fiscal Capability

Table B.56 provides a summary of the results for Hancock County with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource has previously been used to implement hazard mitigation actions. A dagger (†) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds).

TABLE B.56: RELEVANT FISCAL RESOURCES

Fiscal Tool/Resource	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes (or taxing districts)	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation, Revenue, and/or Special Tax Bonds	Partnering Arrangements or Intergovernmental Agreements	Other: HMGP and other federal, state, and private grants/resources
HANCOCK COUNTY	†	†	†	†	†			†	†	✓
Bay St. Louis	†	†							†	†
Diamondhead	†	†	†	†	†			†	†	†
Waveland	†	†	†	†	†			†	†	✓

B.4.4 Political Capability

During the months immediately following a disaster, local public opinion in Hancock County is more likely to shift in support of hazard mitigation efforts.

Table B.57 provides a summary of the results for Hancock County with regard to political capability. A checkmark (✓) indicates the expected degree of political support by local elected officials in terms of adopting/funding information.

TABLE B.57: LOCAL POLITICAL SUPPORT

Political Support	Limited	Moderate	High
HANCOCK COUNTY			✓
Bay St. Louis			✓
Diamondhead		✓	
Waveland			✓

B.4.5 Conclusions on Local Capability

Table B.58 shows the results of the capability assessment using the designed scoring methodology described in Section 7: *Capability Assessment*. The capability score is based solely on the information found in existing hazard mitigation plans and readily available on the jurisdictions' government websites. This information was reviewed by all jurisdictions and each jurisdiction provided feedback on the information included in the capability assessment. Local government input was vital to identifying capabilities. According to the assessment, the average local capability score for the county and its jurisdictions is 47.5, which falls into the moderate capability ranking.

TABLE B.58: CAPABILITY ASSESSMENT RESULTS

Jurisdiction	Overall Capability Score	Overall Capability Rating
HANCOCK COUNTY	55	High
Bay St. Louis	42	Moderate
Diamondhead	44	Moderate
Waveland	49	Moderate

B.5 HANCOCK COUNTY MITIGATION STRATEGY

This subsection provides the blueprint for Hancock County to follow in order to become less vulnerable to its identified hazards. It is based on general consensus of the Regional Hazard Mitigation Council and the findings and conclusions of the capability assessment and risk assessment. Additional Information can be found in Section 8: *Mitigation Strategy* and Section 9: *Mitigation Action Plan*.

B.5.1 Mitigation Goals

Hancock County developed nine mitigation goals in coordination with the other participating MEMA District 9 Region jurisdictions. The regional mitigation goals are presented in **Table B.59**.

TABLE B.59: MEMA DISTRICT 9 REGIONAL MITIGATION GOALS

	Goal
Goal #1	Minimize risk and vulnerability of the community to hazards.
Goal #2	Minimize loss of life, injury, and damages to property, the economy, and the environment.
Goal #3	Minimize loss to critical facilities and infrastructure, utilities, and services.
Goal #4	Improve, expand, and enhance public education, awareness, and preparedness.
Goal #5	Build and enhance local mitigation capabilities to improve the region's ability to prepare for, respond to, and recover.
Goal #6	Enter into partnerships with neighboring jurisdictions, federal and state agencies, and others to share information and develop a more hazard resistant community.
Goal #7	Enhance response procedures and emergency management capabilities.

	Goal
Goal #8	Reduce economic losses, minimize social disruptions, and maintain quality of life.
Goal #9	Protect the environment and natural resources.

B.5.2 Mitigation Action Plan

The mitigation actions proposed by Hancock County and the cities of Bay St. Louis, Diamondhead, and Waveland are listed in the following individual Mitigation Action Plans.

Hancock County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Join the Community Rating System Program.	Hurricane, Flooding, Climate Change	High	Building and Zoning Department	Local	2019	(Action 2012-5.B in previous plan) The county is not currently in the CRS but it would like to continue its efforts to join the program going forward.
P-2	Develop a Repetitive Loss Plan.	Hurricane, Flooding	High	Building and Zoning Department	FEMA-Flood Loss Planning	2021	(Action 2012-5.C in previous plan) Although the county has made significant efforts to reduce its number of repetitive loss properties, it has not developed a formal plan yet
P-3	Encourage household hazardous waste collection days to collect hazardous chemicals.	Hurricane, Flooding	Moderate	Hancock County Board of Supervisors	MS DEQ	2022	(Action 2012-5.D in previous plan) The county has held a household hazardous waste collection day in the past but would like to continue to this program more frequently in the future, so this action will remain in place.
P-4	Require proof of insurance for boats in public marinas as part of the slip contract.	Hurricane, Flooding	Low	Port Director	Local funds	Completed	(Action 2012-5.F in previous plan) The county has started requiring proof of insurance for boats in the public marina as part of the slip contract so this action is complete.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-5	Encourage the Hancock County Solid Waste Authority to contract for a monthly household hazardous waste collection.	Hurricane, Flooding	Low	Hancock County Solid Waste Authority	MS DEQ	2022	(Action 2012-5.G) The HCSWA has not begun monthly collection of household hazardous waste, so this action will remain an action in the plan.
P-6	Update typographic information to 1 foot contours to assist with planning for sea level rise.	Climate Change, Flooding	Low	Building and Zoning Office	Local funds	2017	(Action 2012-11.A) The county has not updated typographic information to 1 foot contours but has made some progress in that direction, so this action will remain in place.
P-7	Consider setbacks from canals and natural waterways to protect structures from sea level rise.	Climate Change, Flooding	Low	Building and Zoning Department	Local funds	2017	(Action 2012-11.B) The county is working to implement setbacks from canals and waterways, however these have not been implemented to the degree the county would like so this action will remain in place.
P-8	Assess and develop continuity plans for Volunteer Fire Departments.	All	High	Hancock County Emergency Management Agency	Local funds	2019	(Action 2006-1.1 in previous plan) Continuity plans for VFDs have been developed and assessed but these plans will need to be reviewed and updated again in the coming years.
P-9	Adopt and implement updates to the International Building Code as the updates become available.	Hurricane, Earthquake, Severe Weather	High	Building Office	Local funds	2022	(Action R2006-4.1 in previous plan) The county has adopted and implemented updates to the IBC as they have come out. However, it is likely that there will be future updates that will need to be adopted going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-10	Continue to implement recommendations of the Drainage Master Plan and continue to upgrade drainage facilities throughout the community to protect private and public property.	Hurricane, Flooding, Dam Failure	Low	Hancock County Road Dept.	Local funds, FEMA-HMGP	2022	(Action R2006-4.8 in previous plan) The county has begun implementing recommendations of the DMP and implemented some projects, but there are still many elements of the plan that need to be implemented going forward.
P-11	Continue to implement the county's substantial damage and cumulative impact requirements.	Hurricane, Flooding	High	Hancock County Building and Zoning Office	Local funds	2022	(Action R2006-4.9 in previous plan) The county has enforced its substantial/cumulative damage requirements, but these will need to be reviewed and evaluated as implementation continues in the future.
P-12	Continue to maintain FEMA Elevation certificates on each building in the floodplain in Hancock County.	Hurricane, Flooding	High	Hancock County and Diamondhead Building Office	Local funds	2022	(Action 2006-4.12 in previous plan) The county has maintained ECs for all buildings in the floodplain and will continue to implement its efforts to this effect going forward.
P-13	Continue to enforce the county's Erosion Control Ordinance to include erosion and sediment control BMPs as required by NPDES Phase II Program.	Hurricane, Flooding	Moderate	Hancock County Building Official; Diamondhead Building Official	Local funds	2022	(Action 2006-4.15 in previous plan) The county's ECO has been implemented using BMPs as required by the Phase II Program. The county will continue its implementation of this program and look for ways to improve practices.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-14	Continue to implement drainage standard operating procedure.	Hurricane, Flooding	Moderate	Hancock County Road Manager	Local funds	2022	(Action 2006-4.20 in previous plan) The county has implemented drainage standard operating procedures over the past several years, but it will plan to review and update these in the coming years as needed to implement properly.
P-15	Draft and adopt a Stream Dumping Ordinance to prohibit deposition of debris in the drainage systems.	Hurricane, Flooding	Low	Hancock County Road Manager	Local funds	2018	(Action R2006-4.21 in previous plan) The county has not implemented a SDO, so this action will need to continue to be pursued going forward.
P-16	Purchase, install, and use the STAMP software program to make flood elevations available for review by building and zoning officials.	Hurricane, Flooding	Moderate	Hancock County Building Office	Local funds	2018	(Action R2006-4.22 in previous plan) The county has not started utilizing the STAMP program but will continue to evaluate the usefulness and implementation of this program.
P-17	Continue to enforce tie down requirements for mobile homes.	All Severe Weather	Moderate	Hancock County Building and Zoning	Local funds	2022	(Action R2006-5.6 in previous plan) The county has been enforcing tie-down requirements for mobile homes but these may need to be evaluated for improvement in the future so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-18	Hancock County Board of Supervisors should require a maintenance plan and an emergency operations plan for dams built as infrastructure within a subdivision. These plans should be required and recorded as part of the subdivision plan.	Dam Failure	Low	Building and Zoning Dept.	Local funds	2017	(Action R2006-8.5 in previous plan) The county has not required maintenance plans or EOPs for dams in subdivisions, but it would like to start implementing this in the future.
P-19	Continue to implement a plan to conserve green spaces.	Erosion, Climate Change, Flooding	Low	Hancock County Board of Supervisors	CIAP, Tidelands	2022	(Action R2006-10.2 in previous plan) The county has worked to conserve green space in many areas of the county, but as development continues, the county will need to remain active in this endeavor.
P-20	Require subdivisions and community development projects to be submitted by a professional engineering and reviewed by a professional engineer employed by the county.	Flooding	Moderate	Hancock County Board of Supervisors; Building and Zoning Department	Local funds	2022	(Action 2006-11.6 in previous plan) County engineers have worked to review all subdivision and community development projects, but additional resources in this task would help improve the processing.
P-21	Keep drainage channels open.	Flooding	Moderate	Road Department	Local funds	2022	(Action 2006-11.10 in previous plan) The county has a maintenance program that aims to keep channels open but there are certainly improvements that could be made and to ensure channels flow freely.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-22	Update drainage study to include areas beyond the surge areas identified with Hurricane Katrina.	Flooding	Moderate	Hancock County Board of Supervisors	Corps of Engineers	2019	(Action 2006-11.11 in previous plan) Although this plan has not been updated beyond surge areas identified during Katrina, these studies have proved useful and the county would like to continue to try to expand these study areas.
Property Protection							
PP-1	Elevate section of Highway 604 to ensure a safe evacuation route.	Hurricane, Flooding	Moderate	Hancock County Board of Supervisors; Gulf Regional Planning Commission	FHWA	2017	(Action 2012-5.I in previous plan) The county has been working with the FHWA to elevate this section of road, but it has not been completed yet, so the action will remain.
PP-2	Relocate Diamondhead Sewer System treatment facilities and other new treatment facilities in Hancock County to areas located outside of the floodplain and elevated above BFE.	Hurricane, Flooding	High	Diamondhead Water and Sewer District	CDBG, CWA-RLF, EPA, FEMA-HMGP	2019	(Action 2006-1.2 in previous plan) These facilities have not been relocated but plans are still in place to implement this action so it will stay in the plan.
PP-3	Continue to harden key lift stations to ensure safe operation during times of no power.	Hurricane, Flooding	High	Hancock County Sewer Organizations	CWA-RLF, FEMA-HMGP	2022	(Action 2006-1.3 in previous plan) The county has hardened a number of key lift stations to ensure continuity of operations, but there are still several vulnerable stations that the county would like to harden.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-4	Retrofit existing sewer systems: equip grinder pumps with surge protectors and provide back-up generators.	All	High	Hancock County Utility Authority Sewer Districts	CWA-RLF, FEMA-HMGP	2022	(Action R2006-1.13 in previous plan) Some existing sewer systems have been equipped, but there are a number that would still benefit from this so the action will remain in place.
PP-5	Build new public buildings above base flood elevation and provide protection from hurricane force winds.	Hurricane, Flooding	High	Hancock County Board of Supervisors; Diamondhead City Council	FEMA-HMGP	2018	(Action R2006-1.14 in previous plan) The county has made great efforts to ensure new public buildings are built above the BFE, but this action will stay in the plan to ensure continual implementation going forward.
PP-6	Establish back-up emergency operations locations throughout the county by strengthening new buildings as they are developed and by hardening existing suitable structures.	Hurricane, Flooding, Tornado, Earthquake	Moderate	Hancock County Emergency Management Agency	FEMA-HMGP	2018	(Action 2006-1.20 in previous plan) The county has attempted to build stronger and harden existing structures, but there are many existing structures especially that could be improved through retrofitting so the county will continue to pursue.
PP-7	Mitigate the library system structures to ensure these buildings are functional after a natural hazard event.	All	High	Hancock County Library System; Hancock County Board of Supervisors	FEMA-HMGP	2019	(Action R2006-3.1 in previous plan) A number of library branches have been addressed through mitigation measures, but there are still several that would benefit from hardening, elevation, or relocation.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-8	Retrofit existing public buildings for wind and water.	Hurricane, Flooding, Tornado, Hailstorm, Severe Thunderstorm/ High Wind	High	Hancock County Board of Supervisors	FEMA-HMGP	2019	(Action 2006-4.10 in previous plan) Many existing public buildings have been retrofit for wind and water, but there are still many public facilities that the county would like to retrofit so this action will be retained.
PP-9	Encourage people to protect property by insuring, floodproofing, and elevating their homes	Hurricane, Flooding, Dam Failure	High	Hancock County Emergency Management Agency, Hancock County Building and Zoning Office, Diamondhead Building Office	Local funds	2022	(Action 2006-4.11 in previous plan) Many efforts have been made to encourage citizens to protect their personal property, but there are still many citizens whose homes/property are not well-protected so the county will continue encouraging personal property protection
PP-10	Seek funding to assist property owners located in Special Flood Hazard Areas in mitigating their homes from flooding through elevation and acquisition, and identify programs to help property owners mitigate their structures from wind damage.	Hurricane, Flooding	High	Hancock County Board of Supervisors	Local funds, FEMA-HMGP	2022	(Action 2006-4.25 in previous plan) The county has used grant funding through HMGP and other grant programs in the past to help citizens mitigate their property, but there are still many areas where mitigation actions could be implemented and the county will continue to pursue funding to help implement.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-11	Encourage the development of safe rooms in homes and businesses in Hancock County.	Tornado	Moderate	Hancock County Building and Zoning	Local funds	2022	(Action 2006-5.9 in previous plan) Many citizens have safe rooms and the county has encouraged these historically, but given the many recent tornado events in the state, the county will need to continue encouraging this even more.
PP-12	Promote the purchase of earthquake insurance by homeowners and business owners.	Earthquake	Low	Building and Zoning Dept.	Local funds	2022	(Action 2006-9.1 in previous plan) The county has promoted purchasing earthquake insurance for homeowners, but many have not purchased this so the county will continue to provide information on this as much as possible.
Natural Resource Protection							
NRP-1	Adopt the "Beneficial Use of Dredge Material" Plan for placement of all new erosion control and reef development activities in near shore water.	Hurricane, Erosion, Climate Change	Moderate	Corps of Engineers	Private funds	2017	(Action 2006-10.1 in previous plan) This plan was updated in 2011, but it will need to be reevaluated in the future and the county will continue to work with the state and private interests in this regard.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
NRP-2	Continue to renourish the beach and adopt beach protection measures.	Hurricane, Climate Change, Coastal Erosion	High	Hancock County Board of Supervisors	Seawall Tax	2022	(Action 2006-10.3 in previous plan) The county has continually renourished the beach in critical areas to try to reduce the impacts of erosion, but this process requires continual action over time so this action will remain in place.
NRP-3	Support marsh re-nourishment and restoration by participating with coastal states to protect wetlands and marshes as protective barriers from storms. Actions may minimize storm surge.	Hurricane	High	Hancock County Board of Supervisors	Restore Act	2022	(Action 2006-10.5 in previous plan) The county has supported restoration of wetlands and marshes when areas have been identified and the county will continue to support these projects where feasible in the future.
NRP-4	Restore barrier islands.	Hurricane, Climate Change, Erosion	Moderate	MS Secretary of State	National Park Service	2022	(Action 2006-10.7 in previous plan) Many of the barrier islands are being quickly depleted and so this action has not been accomplished. The county will continue to pursue this action.
Structural Projects							
SP-1	Determine feasibility to construct levee system to protect southern Hancock County including the areas of Pearlington, Ansley, Clermont Harbor, Waveland, and Bay St. Louis as well as the Port Bienville Industrial Park.	Hurricane, Climate Change	Moderate	Hancock County Board of Supervisors	US Army Corps of Engineers	2017	(Action 2012-5.A in previous plan) The county has coordinated with USACE, but this action has not been accomplished. The county will continue to pursue this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-2	Request that the US Army Corps of Engineers study the impact on southern Hancock County of existing structural flood protection impacts undertaken in southern Louisiana and project structural improvements in southern Louisiana.	Hurricane, Flooding	High	Hancock County Board of Supervisors	Corps of Engineers	2017	(Action 2012-5.H in previous plan) The county has coordinated with USACE, but this action has not been accomplished. The county will continue to pursue this action.
SP-3	Investigate the need for a second north-south roadway in Hancock County.	Hurricane, Flooding	Moderate	Hancock County Board of Supervisors; Gulf Regional Planning Commission	FWHA	2018	(Action R2006-2.6 in previous plan) The county has coordinated with FHWA, but this action has not been accomplished. The county will continue to pursue this action.
SP-4	Increase the capacity of Highway 603 between Highway 43 and Highway 53, and Highway 53 between Highway 603 and Interstate 59, to four lanes.	Hurricane, Flooding	Moderate	Hancock County Board of Supervisors; Gulf Regional Planning Commission	FHWA	2018	(Action R2006-1.18 in previous plan) The county has coordinated with FHWA, but this action has not been accomplished. The county will continue to pursue this action.
SP-5	Increase the capacity of Highway 43 to Interstate 59 from two lanes to four lanes.	Hurricane, Flooding	Moderate	Hancock County Board of Supervisors; Gulf Regional Planning Commission	FHWA	2018	(Action 2006-1.19 in previous plan) The county has coordinated with FHWA, but this action has not been accomplished. The county will continue to pursue this action.
SP-6	Continue to develop centralized water and sewer systems to serve flood-prone areas to assist with recovery by protecting drinking water.	Flooding, Hurricane	High	Hancock County Board of Supervisors; Hancock County Utility Authority	USDA, CIAP, CWA, RLF, CDBG	2020	(Action 2006-11.1 in previous plan) The county has taken a number of steps to develop a centralized, protected water and sewer system, but there are still vulnerable areas to drinking water loss, so the county will continue to work with partners to accomplish this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-7	Modify storm drainage system to implement structural projects that relive existing and projected flood conditions.	Flooding	Moderate	Hancock County Board of Supervisors	NRCS, FEMA-HMGP, CDBG	2022	(Action R2006-11.2 in previous plan) The county has implemented a number of structural projects to improve flood conditions, but there are still many projects that could be implemented to improve this system so the action will remain in place.
SP-8	Continue county culvert replacement program.	Flooding	High	Road Department	Local funds	2022	(Action 2006-11.4 in previous plan) Many culverts have been replaced through this program, but there is a need to continually evaluate culverts for replacement so the action will remain in the plan.
Emergency Services							
ES-1	Where possible and legal, continue to pre-select and negotiate contracts for emergency response and recovery.	All	High	Hancock County Board of Supervisors; Diamondhead City Council	Local	2022	(Action 2012-14.A in previous plan) The county has pre-selected many contracts for response/recovery services and as these contracts expire or the need for new contracts is established, the county will negotiate in advance as much as possible.
ES-2	Complete and maintain a new EOC that provides a safe area for sheltering, staging of equipment, response supplies, and emergency responders after a natural hazard event.	All	High	Hancock County Emergency Management Agency; Hancock County Board of Supervisors	Insurance, FEMA-HMGP	2020	(Action 2006-1.15 in previous plan) The county is working on completing a new EOC with additional capabilities, but this has not been completed yet so the action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-3	Secure and utilize effective new technologies to communicate with residents before, during, and after a hazardous event.	All	High	E-911 Commission	Local funds, FEMA	2022	(Action R2006-2.5 in previous plan) The county has implemented a number of new technologies to communicate with residents, but because technology improves quickly the county will continue to be vigilant about new ways to improve communication.
ES-4	Continue to use the E-911 call out system to alert people living in evacuation zones of the need to evacuate.	Hurricane, Flooding	High	E-911 Commission	Local funds	2022	(Action 2006-2.6) The county has implemented an E-911 system and has made several improvements to the system recently. This action will remain in place as the county continues to make improvements to the system.
ES-5	Investigate incentives to help mobile home parks establish tornado shelters for their residents.	Tornado, All Severe Weather	Moderate	Hancock County Emergency Management Agency	Private Funding	2017	(Action 2006-2.8 in previous plan) The county has attempted to work with park owners to establish tornado shelters, but there are still many that do not have adequate facilities for this so the county will continue to try to find ways to incentivize this.
ES-6	Maintain a special needs only shelter and establish partnerships for operations.	Hurricane, Flooding, Tornado, Earthquake	High	Hancock County Emergency Management Agency; Hancock Medical Center	Local funds	2020	(Action 2006-2.10) The county has established a special needs only shelter, but it is possible additional shelters may be needed as more special needs populations are identified.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-7	Maintain shelter standards.	Hurricane. Flooding, Tornado, Earthquake	Moderate	Hancock County Emergency Management Agency; Hancock County Board of Supervisors	Local funds, FEMA-HMGP	2022	(Action 2006-2.11 in previous plan) The county has established a number of new shelters recently and standards at these have been maintained. This action requires constant vigilance so the county will need to monitor these shelters to ensure standards are met.
ES-8	Support regional pet friendly shelters.	Hurricane, Flooding, Earthquake	Moderate	Hancock County Animal Shelter; Friends of the Animal Shelter	Local funds	2022	(Action 2006-2.12 in previous plan) The county has supported pet-friendly shelters in the past and will plan to do so in the future as well so this action will stay in the plan.
ES-9	Establish a program to micro-chip pets. Pets that have a micro-chip are more likely to be returned to their owners after any hazardous event.	All	Low	Hancock County Animal Shelter; Friends of the Animal Shelter	Foundation/non-profit grants	2019	(Action 2006-2.17 in previous plan) Many pets across the county have been micro-chipped but there are also many that have not so the county will need to continue to encourage this alternative for residents.
ES-10	Maintain shelters in Hancock County.	Hurricane, Flooding, Tornado, Earthquake	High	Hancock County Emergency Management Agency; Hancock County Board of Supervisors	Local funds	2022	(Action R2006-2.18 in previous plan) The county has established a number of new shelters recently and standards at these have been maintained. This action requires constant vigilance so the county will need to monitor these shelters to ensure standards are met.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-11	Establish telecommunications links with Stennis Space Center, Pearl River County, Harrison County, MEMA, and FEMA, and increase reliability of the communications system and interoperability between emergency services responders. Improve public safety internal communications and ensure reliability in any type of disaster.	All	High	E-911 Commission	Local funds, FEMA-HMGP	2020	(Action 2006-3.2 and R2006-3.6 in previous plan) The county has worked with many agencies and neighboring communities to establish interconnected communications systems, but there are always more agencies that may integrated, so the county will work to improve its network in the future.
ES-12	Request cellular phone companies to provide HCEMA with an emergency operations plan for cellular communications during emergency situations.	All	Moderate	Hancock County Emergency Management Agency; Hancock County Building Office	Local funds to review and file plans	2022	(Action 2006-3.5 in previous plan) In the past, the county has worked with cell companies to plan for cellular communications during an event. The county will continue to work with these companies to try to establish the best possible service post-disaster.
ES-13	Enhance E-911 call system to recognize the location of cell phone calls received at the dispatch center.	All	High	E-911 Commission	Local funds, FEMA	2018	(Action 2006-3.10 in previous plan) The county has not been able to accomplish this task due to lack of funding. Will continue to pursue.
ES-14	Join the NOAA Storm Ready Community Alert Program.	All	High	Hancock County Emergency Management Agency	Local funds	2020	(Action 2006-4.3 in previous plan) The county is working to join this program as it had been lacking a secure location previously but that has now been established.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-15	Provide pre-hurricane season exercise.	Hurricane, Flooding	High	Hancock County Emergency Management Agency	Local funds	2018	(Action 2006-4.4 in previous plan) There have been pre-hurricane exercises previously, but the county will need to hold additional exercises each year and ensure that staff is prepared and trained.
ES-16	Augment warning systems throughout Hancock County.	All Severe Weather	High	Hancock County Emergency Management Agency	FEMA-HMGP	2022	(Action 2006-5.3 in previous plan) Although many steps have been taken to augment the warning systems in the county, there are still additional actions that could be taken to improve these systems in the future so the action will remain in place.
ES-17	Purchase brush trucks or quick attack trucks and strategically place the trucks throughout the county for use by multiple stations.	Wildfire	Moderate	Fire Protection Districts	FEMA-AFG, CDBG, RDA	2018	(Action R2006-6.2 in previous plan) Although brush trucks have been established as a good idea, they have not been fully implemented throughout the county.
ES-18	Encourage joint exercises among departments to train together for large wildfires.	Wildfire	High	Hancock County Emergency Management Agency; Fire Protection Districts	Local funds	2018	(Action R2006-6.3 in previous plan) The county has participated in joint exercises previously, but the county will need to hold additional exercises each year and ensure that staff is prepared and trained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-19	Purchase a marine fire fighting vehicle.	Wildfire	Low	Hancock County Board of Supervisors	FEMA-AFG, Coast Restore Act Funds	2020	(Action 2006-6.6 in previous plan) The county has not purchased a marine fire fighting vehicle so this action will remain in place.
ES-20	Diamondhead Property Owners Association will continue to use a warning system to alert golfers of threatening lightning.	All Severe Weather	Moderate	Diamondhead Property Owner's Association	Property dues	2022	(Action R2006-7.1 in previous plan) The DPOA has utilized its warning system in the past and will continue to look for ways to improve this system going forward.
ES-21	Subscribe to the Lightning Detection Network, which alerts subscribers when dangerous lightning is within the region.	All Severe Weather	Low	Hancock County Emergency Management Agency	Local funds	2017	(Action 2006-7.3 in previous plan) Although the county has not subscribed, it will work on this action in the near future.
ES-22	Program emergency warning system to warn for lightning.	All Severe Weather	Low	Hancock County Emergency Management Agency; E-911	FEMA-HMGP	2022	(Action 2006-7.4 in previous plan) Although there are many methods for receiving warning for lightning, the emergency warning system has not been programmed as such. The county will continue to evaluate the efficacy of this action going forward.
ES-23	Spread sand on bridges that may ice during cold weather storms.	Extreme Cold, Winter Weather	Low	Road Department	Local funds	2022	(Action 2006-9.3 in previous plan) The county has spread sand on bridges in the past, but the county will need to continually evaluate best practices for implementation of this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-24	Post signs on all bridges in the county which state "may ice in cold weather."	Extreme Cold, Winter Weather	Low	Road Department	Local funds	2017	(Action 2006-9.4 in previous plan) Most DOT bridges have these signs, however, most county bridges do not. The county will work to improve this in the future.
ES-25	Establish a sheltering plan for people without homes.	Extreme Cold, Winter Weather	Moderate	Hancock County Emergency Management Agency; Human Services	Gulf Coast Continuum of Care	2015	(Action R2006-9.5 in previous plan) Although some private/non-profit entities have assisted in this action, there is no formal plan for this action so the county will continue working to establish a more formalized plan.
ES-26	Provide EMC training for Volunteer Fire Departments and continue to participate in exercises to sharpen emergency response skills.	All	High	Hancock County Emergency Management Agency	Local funds	2017	(Action 2006-13.2 in previous plan) Trainings have been provided on an annual basis in the past and this action will need to be continually implemented going forward so it will remain in place.
ES-27	Establish a fuel reserve for emergency situations.	All	Moderate	Hancock County Emergency Management Agency	Local funds	2022	(Action 2006-13.6 in previous plan) The county has established a fuel reserve in the North Barn. It will continue to maintain this stock and evaluate the need for further reserves in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-28	Continue badging program to ensure that essential county personnel can respond within disaster area to contain damages quickly.	All	High	Hancock County Emergency Management Agency	Local funds	2022	(Action 2006-13.8 in previous plan) A badging program has been established but there is a need for consistently updating badged personnel to ensure they are well-trained and prepared in an emergency.
Public Education and Awareness							
PEA-1	Support mitigation library in the Hancock County Library branches that provides materials on flood proofing and retrofitting and direct county residents to use these resources.	Hurricane, Flooding, Tornado	High	Building and Zoning Department	Local funds	2022	(Action 2012-5.E in previous plan) The county has established education materials in many of its libraries but will need to ensure these materials are up to date by evaluating consistently.
PEA-2	Establish training and outreach programs to prepare local businesses to be competitive in the disaster recovery and rebuilding economics.	All	Moderate	Chamber of Commerce; Pearl River Community College	MDA	2022	(Action 2012-14.B in previous plan) Training and outreach programs to businesses have been established, but these efforts will need to be continued and updated as the economic climate changes.
PEA-3	Publicize evacuation routes and locations of regional shelters.	Hurricane, Flooding, Tornado, Earthquake	Moderate	Hancock County Emergency Management Agency, American Red Cross	Local funds	2022	(Action 2006-2.2 in previous plan) Evacuation routes and shelter locations have been publicized in the past, but it is likely that many citizens still are not aware of the location, so additional efforts at outreach are needed.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-4	Promote the development of personal protection plans.	All	Moderate	Hancock County Emergency Management Agency; American Red Cross	Local funds, private donations, foundation funding	2022	(Action R2006-2.3 in previous plan) The county has promoted personal protection plans for individual citizens, but there are still a great number of citizens without these plans so the county will continue its efforts to promote these.
PEA-5	Establish continuity training workshops for businesses.	All	Low	Hancock County Chamber of Commerce	Local funds, foundations	2022	(Action 2006-3.3 in previous plan) Training and outreach programs to businesses have been established, but these efforts will need to be continued and updated as the economic climate changes.
PEA-6	Mail out a brochure to owners of property located in Special Flood Hazard Areas, suggesting methods for floodproofing.	Hurricane, Flooding, Dam Failure	High	Hancock County Building Official and Diamondhead Building Official	Local funds	2022	(Action 2006-4.18 in previous plan) The county has mailed out information to property owners in the SFHA, but since there are many unmitigated properties still in the SFHA, this action will need to be continued.
PEA-7	The Fire Coordinator and partners will provide homeowner education about protecting homes from wildfires.	Wildfire	High	Mississippi Forestry Commission	State-MFC	2018	(Action R2006-6.4 in previous plan) The Fire Coordinator has provided homeowners with protection information in the past, but many homes are still at risk and homeowners will need to be reminded of the need for them to take action on a regular basis.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-8	Seek partners to educate residents and business owners about invasive species that may contribute to the loss of wetlands	Climate Change, Erosion	Low	MDMR, Land Trust for MS Coastal Plain	EPA Five Star Program, USFWS Focus Funds, CIAP, Tidelands	2022	(Action 2006-10.8 in previous plan) Efforts have been made to educate residents on invasive species, but this is not at the forefront of the mind of many citizens so additional efforts will be required.
PEA-9	Maintain a partnership with the American Red Cross to provide mitigation and prevention education in Hancock County.	All	High	Hancock County Emergency Management Agency; American Red Cross	Local	2022	(Action R2006-12.2 in previous plan) A strong partnership with the Red Cross exists and they have provided education in the past, but there is room for improvement so this action will be evaluated.
PEA-10	Promote public information of prevention actions that can be taken by families and individuals.	All	High	Hancock County Emergency Management Agency	Local	2022	(Action R2006-12.3 in previous plan) The county has promulgated public information for individual citizens, but there are still a great number of citizens who remain uninformed so the county will continue its efforts to promote public awareness.

City of Bay St. Louis Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Apply to Insurance Services Office (ISO) to further lower the NFIP Flood Insurance Rating.	Flooding	High	CRS Administrator; Floodplain Insurance Administrator	Local funds	2018	(Action 2011-01 in previous plan) The city has worked to improve its rating in the CRS and will continue to try to improve that rating by implementing programs to reduce flood risk.
P-2	Develop a Repetitive Loss Plan for the recently annexed area of the city.	Flooding	High	City of Bay St. Louis Flood Insurance Administrator; City Council, CRS Coordinator	MEMA Planning funds, local funds	2021	(Action 2011-02 in previous plan) Although the city has made significant efforts to reduce its number of repetitive loss properties, it has not developed a formal plan yet
P-3	As development occurs in the annexed area, require that green space be set aside.	Flooding	High	City Council	FEMA, local funds	2022	(Action 2011-03 in previous plan) The city has had some development occur in the annexed area, but there will likely be more in the future and the city will need to make sure green space is set aside.
P-4	Participate in the development of the County Hazard Mitigation Plan.	Hurricane, Flooding, Wind	High	Bay St. Louis Building Department; Public Safety Departments	Local funds	2017	(Action 2005-48 in previous plan) The city has worked with the county and several neighboring counties to develop and update a regional hazard mitigation plan this year.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-5	Continue to maintain FEMA elevation certificates on each building in Bay St. Louis.	Flooding	High	Building Official; CRS Coordinator	Local funds	2022	(Action 2000-01 in previous plan) The city has maintained elevation certificates for all buildings, but will need to continue to collect this information going forward so this action will remain in place.
P-6	Continue to enforce City Ordinance No. 285 to protect natural drainage from development.	Flooding	High	Building Official	Local funds	2022	(Action 2000-03a in previous plan) The city has enforced this ordinance, but will continue to enforce it and look for any ways to improve its execution in the future.
P-7	Continue to enforce City Ordinance No. 285 to include erosion and sediment control Best Management Practices (BMP's) as required by NPDES Phase II Program.	Flooding	High	Building Official	Local funds	2022	(Action 2000-03b in previous plan) The city has enforced this ordinance, but will continue to enforce it and look for any ways to improve its execution in the future.
P-8	Continue to enforce the city's Subdivision Regulations to require that streets in subdivisions are located above flood elevation to prevent isolation.	Flooding	High	Building Official	Local funds	2022	(Action 2000-04 in previous plan) The city has enforced Subdivision regulations related to requiring elevated streets, but as new subdivisions are constructed the city will need to remain vigilant in terms of review and enforcement.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-9	Continue to implement the city's Substantial Damage Rule.	Flooding, Hurricane and Tropical Storm	High	Building Official	Local funds	2022	(Action 2000-06 in previous plan) The city has implemented its substantial damage rule with structures impacted by disasters, but it will need to continue to remain vigilant in terms of review and enforcement.
P-10	Continue to implement Drainage Standard Operating Procedure (SOP).	Flooding	High	Public Works Director	Local funds	2022	(Action 2000-07 in previous plan) The city has implemented a Drainage SOP, but it will need to continue to remain vigilant in terms of review and enforcement.
P-11	Continue to enforce the Stream Dumping Ordinance to prohibit depositing of debris in the drainage system.	Flooding	High	Public Works Director	Local funds	2018	(Action 2000-08 in previous plan) The city has enforced the SDO, but will need to continue to work towards ensuring depositing of debris does not take place in the drainage system.
P-12	Continue to enforce standards for hurricane resistant construction.	Hurricane, Tornado, Severe Thunderstorm/ High Wind	High	Building Official	Local funds	2022	(Action 2000-09 in previous plan) The city currently enforces standards for hurricane resistant construction, but as standards change, these standards may need to be updated.
P-13	Continue to enforce the city's Tree Ordinance.	Flooding, Storm Surge, Hurricane	High	City Tree Officer	Local funds	2022	(Action 2000-13 in previous plan) The city has enforced its Tree Ordinance, but it will keep this action in the plan as it continues to attempt to improve implementation of the ordinance.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-14	Digitize property maps to include base flood elevations and flood hazard information.	Flooding	High	Hancock County Tax Assessor	Local funds	2019	(Action 2000-15 in previous plan) The city has begun work on digitizing flood maps and flood hazard information, but there is still some progress to be made in terms of completing this action.
P-15	Partner with NASA's Commercial Remote Sensing Department for additional map based information.	All	Moderate	Planning Department	Local funds	2020	(Action 2000-22 in previous plan) The city has coordinated with NASA on collecting some additional data, but this action will remain in place as additional data will likely become available and continued coordination will be useful.
P-16	Develop a five year capital improvement program and continue to upgrade drainage facilities throughout the city to protect private and public property.	Flooding	High	City Council	Local funds, grant funds for implementation	2022	(Action 2000-23 in previous plan) The city has developed a CIP and has implemented a number of drainage projects throughout its jurisdiction, but as a new five-year period begins, this program's projects will need to be evaluated.
P-17	Coordinate with adjacent communities to assure that actions taken within one community will not contribute to a great impact by hazards within the floodplain and neighboring communities.	Flooding	High	City Council	Staff time	2022	(Action 2000-36 in previous plan) The city has coordinated with the county and neighboring communities to ensure that its actions will not adversely impact those communities. This coordination should be continuous going forward so the city will keep this action in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Property Protection							
PP-1	Seek funding to assist homeowners located in the Special Flood Hazard Areas to mitigate their homes from flooding through elevation and acquisition.	Flooding	High	City Council	FEMA HMGP, FMA, SRL funding, CDBG, and other programs as available	2022	(Action 2005-46 in previous plan) The city has used grant funding through HMGP and other grant programs in the past to help citizens mitigate their property, but there are still many areas where mitigation actions could be implemented and the city will continue to pursue funding to help implement.
Natural Resource Protection							
NRP-1							
Structural Projects							
SP-1							
Emergency Services							
ES-1							
Public Education and Awareness							
PEA-1	Establish a program to offer CEUs to real estate and insurance professionals on hazard mitigation.	Flooding, Severe Thunderstorm/ High Wind	High	Building Official	MEMA, local funds	2020	(Action 2005-40 in previous plan) The city has worked with real estate and insurance professionals to improve their understanding of mitigation but there is still room to improve this understanding further so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	The Building Office should continue to offer site specific information to property owners and update the data available as it is made available by the Tax Assessor, FEMA, and MEMA.	Flooding, Hurricane	High	Building Official	Local funds	2022	(Action 2005-43 in previous plan) The Building Office has offered recommendations to property owners in many cases and has attempted to keep them up to date on their property's risk. However, continued outreach on this is necessary as information is updated and released.
PEA-3	Market the Hazard Mitigation Loan Program to home and business owners.	All	Low	Hancock County Board of Supervisors	FEMA Disaster Resistant Community Funds	2022	(Action 2005-47 in previous plan) The city has worked to improve home/business owners' understanding of the HMLP, but there is still significant education that could take place so the action will stay in the plan.
PEA-4	Continue to mail out a brochure to owners of property located in Special Flood Hazard Areas which suggests methods for flood proofing properties.	Flooding, Hurricane and Tropical Storm, Tornado, Sever Thunderstorm/ High Wind	High	Building Official; CRS Coordinator	Local funds	2022	(Action 2000-05 in previous plan) The city has mailed out information to property owners in the SFHA, but since there are many unmitigated properties still in the SFHA, this action will need to be continued.
PEA-5	Post awareness posters in city offices.	Hurricane, Flooding, Tornado, High Wind, Severe Thunderstorm, Lightning, Heat	High	Building Official	Local funds	2022	(Action 2000-10 in previous plan) Awareness posters have been placed in many city offices to help increase public awareness of risks. However, posters need to be updated and posted in new locations where possible, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-6	Continue an internet website to make hazard mitigation information and programs and requirements in Bay St. Louis available to the public.	All	High	Building Official	Local funds	2022	(Action 2000-16 in previous plan) The city has information about hazard mitigation posted to its website but this information needs to be updated as better information becomes available. This action will remain in plan.
PEA-7	Participate in Hurricane Awareness Week by adopting a proclamation.	Hurricane	Moderate	Community Development Director	Local funds	2017, Annually	(Action 2000-17 in previous plan) The city has annually adopted a proclamation to participate in Hurricane Awareness Week and will continue to do so to improve citizen awareness of hurricane risk.
PEA-8	Participate in the Annual Mississippi Homebuilders Association Fair and Exposition, providing hazard mitigation information and related city programs and regulations.	All	Moderate	Building Official; CRS Coordinator; Fire Department	Local funds	2022	(Action 2000-18 in previous plan) The city has participated in the AMHAFE annually and has provided information on mitigation and regulations to the public at this event. The city will continue its participation in this event going forward.
PEA-9	Continue hurricane and storm safety curriculum in the Bay St. Louis High School.	Hurricane	Moderate	Bay St. Louis Fire and Police Department	Local funds	2022	(Action 2000-20 in previous plan) The city has worked with schools on a hurricane and storm safety curriculum and will plan to continue to participate in this endeavor going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-10	Implement flood awareness/storm surge markers in Special Flood Hazard Areas.	Flooding	Moderate	Building Official	Staff time	2019	(Action 2000-21 in previous plan) Although some storm surge markers have been placed, the city would like to add additional markers and improve overall awareness of the potential risk of this hazard.
PEA-11	Continue to update floodproofing, retrofitting, and construction technology resources in the Hancock County Library located in Bay St. Louis.	Flooding	High	CRS Coordinator	FEMA, staff time	2022	(Action 2000-35 in previous plan) The city has established education materials in its library but will need to ensure these materials are up to date by evaluating consistently.

City of Diamondhead Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Continue to implement a Floodplain Management Ordinance which includes substantial damage and cumulative impact requirements.	Hurricane, Flooding	High	City Building Official	Local funds	2022	(Action 2012-DHB in previous plan) The city has implemented a FDPO with substantial and cumulative damage requirements. The city will continue to review and implement this ordinance and so this action will stay in the plan.
P-2	Develop a Master Stormwater Plan for the City of Diamondhead and implement the recommendations included in the plan.	Hurricane and Flooding	High	City Council and Diamondhead Property Owners Association	USDA-NRCS, USACOE, MDEQ, FEMA-HMGP	2020	(Action 2012-DHE in previous plan) The city has not yet developed a MSP, but it is working to put this together and will maintain this action in the plan as a result.
P-3	Establish natural gas supply in Diamondhead.	All	Low	City Council	CDBG, FEMA-HMGP	2018	(Action 2012-DHG in previous plan) The city has not established a natural gas supply, but it is still planning to achieve this action so it will remain in the plan.
P-4	Establish and maintain fire breaks through Diamondhead.	Wildfire	Low	City Council, Fire Dept.	FEMA-HMGP, MFC	2018	(Action 2012-DHH in previous plan) Although natural fire breaks have not been established in all areas, some have been and the city will continue to establish these in areas where it will be useful.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-5	Establish a dam maintenance program and emergency operations plan for dam failure.	Dam Failure	Low	Public Works Office, Diamondhead Property Owners Association	Local funds	2020	(Action 2012-DHJ in previous plan) Although the city has looked at establishing a dam maintenance program, much work is still left to ensure safety during a dam failure. The city will continue to work towards developing an EOP and improve its dam program.
Property Protection							
PP-1	Reconstruct and elevate Kapalama Drive and the bridge north of Diamondhead to provide an adequate evacuation route.	Hurricane and Flooding	Moderate	City Council	FHWA, FEMA-HMGP	2017	(Action 2012-DHC in previous plan) The city has not elevated this road, but this remains on the list of projects the city would like to implement so this action will remain in the plan.
PP-2	Place power lines underground along city roadways.	All	Moderate	Coast Electric Power Association	CEPA	2017	(Action 2012-DHD in previous plan) Some power lines have been buried to reduce risk of damage during an event, but there are still some above ground lines along with power-related equipment. The city will attempt to implement this action further in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-3	Mitigate City Hall and Public Safety Building for hurricanes.	Hurricane	High	City Council	FEMA-HMGP	2020	(Action 2012-DHM in previous plan) The City Hall and Public Safety buildings have not been mitigated for hurricanes. Both of these facilities will be evaluated to determine if funding can be set aside for this task.
Natural Resource Protection							
NRP-1							
Structural Projects							
SP-1	Construct berm or levee and floodgate with pump to protect a Diamondhead neighborhood from flooding due to an existing drainage outlet that drains to St. Louis Bay.	Hurricane, Flooding	Moderate	City Council	USACOE, FEMA-HMGP, MDOT	2017	(Action 2012-DHF in previous plan) A berm/levee has not been constructed due to lack of available funding but the city will continue to see funding to implement this task in the future.
Emergency Services							
ES-1	Secure and utilize effective outreach methods to communicate with residents before a hazardous event.	All	Moderate	City Council; Fire Protection District	FEMA-HMGP	2022	(Action 2012-DHA in previous plan) The city has utilized various outreach methods to communicate with residents, but as technology has changed the city will continue to evaluate the best means of reaching out to the public prior to hazardous events.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-2	Establish an audible and an electronic warning system for areas susceptible due to flash flooding.	Dam Failure, Flooding	High	City Council; Diamondhead Property Owners Association	Local funds	2020	(Action 2012-DHK in previous plan) The city has established some systems to give warning for areas susceptible to flash flooding. The city will evaluate both audible and electronic systems to determine the best possible ways to provide this warning in the future.
ES-3	Establish warning signage and/or barriers for roads in Diamondhead that are susceptible to flash flooding.	Dam Failure, Flooding	Moderate	City Council; Diamondhead Property Owners Association	FWHA, FEMA-HGP, Local funds	2022	(Action 2012-DHL in previous plan) Some warning signage has been established in the city in areas that are susceptible to flash flooding, but more signage and information is likely necessary, so the city will look to improve on this action in the future.
Public Education and Awareness							
PEA-1	Establish a public information program to alert residents of mitigation actions to reduce damage from natural disasters.	All	Moderate	City Building Office	Local Funds	2022	(Action 2012-DHI in previous plan) Although a public information program exists, there is significant room for improving outreach to citizens to help inform them of actions they can take to reduce their own risk. This action will stay in the plan.

City of Waveland Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Designate an offsite storage facility for public records north of Interstate 10 or implement a system to protect all public records from flood or hurricanes.	Hurricane and Flooding	High	CRS Coordinator	FEMA grant funds	2020	(Action 11 in previous plan) The city has been working to designate an offsite storage facility for public records as well as backing up some systems online. However, this has not been completed so the action will remain in the plan.
P-2	Update the City of Waveland Master Drainage Plan and implement new drainage improvement projects.	Flood	Moderate	Public Works Director	HMGP, CDBG, PA, MDOT, etc. grant funds	2022	(Action 18 in previous plan) A number of projects from the MDP have been implemented to improve drainage in the city, but there are still many drainage projects that the city would like to implement so this action will remain in the plan.
P-3	Use the eight acres the city has located on Waveland Avenue to develop football fields and create green space which will help reduce flooding within the surrounding area.	Flood	Moderate	Mayor's Office; CRS Coordinator; Public Works Director	BP settlement funds, FEMA grant funds	2020	(Action 19 in previous plan) The city has been working to develop a green space area to reduce flood risk, but this project is still in progress so the action will remain in the plan.
P-4	Develop and implement an automated database/GIS system for elevation certificates.	Flood	Moderate	CRS Coordinator	FEMA funding	2022	(Action 21 in previous plan) The city has not fully automated its database of elevation certificates, but it will continue to move to an electronic format and so will retain this action in the plan until that is complete.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-5	Establish programs to cleanout drainage canals throughout the city on an annual basis.	Erosion	High	Public Works Director	FEMA grant program	2017, Annually	(Action 23 in previous plan) The city has a program in place to clean out drainage canals on an annual basis, but it would like to retain this action in the plan as it looks for ways to improve this program.
P-6	Continue to control construction site runoff through requirement of clearing and grading permits erosion and sediment control regulations.	Flooding, Erosion	High	Planning/Code Office	To be determined	2020	(Action 27 in previous plan) The city has implemented regulations to reduce runoff on construction sites, but it would like to work on improving enforcement of these regulations going forward.
P-7	Continue to control post-construction site runoff so it does not exceed pre-development site runoff through enforcement of best management practices.	Flooding, Erosion	High	Planning	To be determined	2020	(Action 28 in previous plan) The city has implemented regulations to reduce runoff on construction sites, but it would like to work on improving enforcement of these regulations going forward.
P-8	Continue to strengthen floodplain regulations as appropriate.	Flooding	High	Floodplain Manager	Existing budget	2020	(Action 29 in previous plan) The city has strong floodplain regulations in place currently, but the city would also like to review these regulations going forward and look at ways to improve them and their enforcement so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-9	Work with flood insurance agents and lending institutions to ensure that mandatory flood insurance requirements are being met in area annexed in 2006 and throughout Waveland when new maps are adopted.	Flooding	High	Floodplain Manager	State, HMGP, FEMA	2020	(Action 33 in previous plan) The city has tried to work with insurance agents and lending institutions to ensure all flood insurance requirements are being met. In general, this has been achieved, but the city will need to continue to be proactive in this, especially as new construction takes place, so this action will remain in place.
P-10	Promote business continuity planning for small business and government.	All	Moderate	Civil Defense Director/Fire Chief	Local	2022	(Action 38 in previous plan) The city has attempted to promote business continuity planning, but many businesses still do not have plans in place so this action will stay in the plan.
P-11	Continue to update information about hazardous materials facilities in Waveland upon receiving Tier II Forms from the facilities.	Hazardous Materials	Moderate	Fire; Civil Defense	Local	2022	(Action 51 in previous plan) The city has collected information on Tier II facilities within the jurisdiction, but as facilities change function over time, this information will need to continue to be collected to ensure the city is aware of potential risk areas. This action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Property Protection							
PP-1	Protect external A/C equipment in the Central Fire Station and install underground storage tanks.	All	High	Fire Department (Chief)	HMGP	2020	(Action 1 in previous plan) The Central Fire Station is still in need of additional retrofitting so this action will be retained in the plan.
PP-2	Elevate residential structures on existing property located in the flood zones to comply with the current flood ordinance.	Flood	High	Fire Chief; Civil Defense; CRS Coordinator	HMGP, FMA	2022	(Action 3 in previous plan) Although many residential properties have been elevated to protect against flooding, there are still a number of structures within the city that are not protected so the city will continue to pursue this action.
PP-3	Acquisition and demolition of repetitive loss and severe repetitive loss properties.	Flood	Moderate	CRS Coordinator	HMGP and FMA grant funds	2022	(Action 17 in previous plan) Although many repetitive loss and severe repetitive loss properties have been mitigated in the city, there are still a number of these types of properties that require mitigation so the action will remain in place.
PP-4	Reconstruction and floodproofing of structure following hurricanes and/or other disasters.	Hurricane, Flooding	Moderate	CRS Coordinator	HMGP or FMA grant programs	2022	(Action 24 in previous plan) After past events, the city has attempted to help rebuild structures in more resilient ways, but given that it is likely that more disasters are likely to impact the city going forward, this action will be retained to continue to focus on building back stronger.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-5	Retrofit city-owned facilities and privately-owned residential structures to help protect these structures from damage during hurricanes and other natural disasters.	Hurricane, Flooding	Moderate	CRS Coordinator	HMGP, CDBG, PA, or FMA grant programs	2022	(Action 25 in previous plan) Several city-owned facilities have been retrofit to better protect them in the even to a disaster, but there are also still a number of facilities that have not been retrofit so the city will keep this action in the plan.
PP-6	Update list of city's repetitive flood loss properties to include properties in area annexed in 2006, and encourage owners of repetitive and severe repetitive loss properties citywide to participate in mitigation activities such as floodproofing, elevation, or buyout programs.	Flooding	High	Floodplain Manager; Planning; CRS Coordinator; Building Official	HMGP, FMA, RFC, SRL	2022	(Action 30 in previous plan) During this plan update, the city has acquired a current list of repetitive loss and severe repetitive loss properties. However, as the city continues to try to reduce this list, it will also continue to work to keep it updated.
PP-7	Acquire or otherwise remove repetitive and severe repetitive loss properties from the floodplain.	Flooding	High	CRS Coordinator	HMGP, FMA	2022	(Action 31 in previous plan) A number of repetitive loss and severe repetitive loss properties have been removed from the list over the years, but there are still a number of properties left on the list that need mitigation.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-8	Encourage business owners to protect vulnerable structures through floodproofing, elevation, shutters, and other mitigation activities.	Hurricane, Flooding	Moderate	Building Official, Planning, Mayor's Office, Floodplain Manager	HMGP	2022	(Action 32 in previous plan) The city has coordinated with business owners to try to encourage them to protect their property and some action has been taken, but there is still additional action that can be taken to improve the safety of businesses throughout the city so this action will remain in the plan.
Natural Resource Protection							
NRP-1	Evaluate and implement the best option for beach front erosion protection. Alternatives include fences, concrete barriers, create dune/vegetative areas.	Erosion	High	Harrison County Sand Beach Authority	Harrison County Beach Authority	2020	(Action 14 in previous plan) There are many areas where beach front erosion is taking place and each area may require different solutions. Some of these have been implemented in different cases, but there will need to be consistent re-evaluation of the shoreline to determine which strategy is best for each area.
NRP-2	Develop and implement a plan in an effort to protect and maintain the natural marshes and other barriers.	Erosion	High	Public Works Director	Local, Regional	2022	(Action 15 in previous plan) The city has tried to be aware of and participate in any efforts to protect and maintain natural barriers to erosion, but there has not been a formal plan to protect these areas so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
NRP-3	Dredge Jackson Marsh to restore wetlands and help reduce flooding.	Erosion	High	Public Works Director	FEMA grant programs	2022	(Action 22 in previous plan) The Jackson Marsh has not been dredged, but the city will continue to evaluate the efficacy of this action going forward so it will remain in the plan.
Structural Projects							
SP-1	Build access road from Sarah Lane north to Adams Lane to allow citizens on Sarah Lane to evacuate during storms.	Hurricane	High	Civil Defense	HMGP, CDBG	2020	(Action 4 in previous plan) An access road from Sarah Lane to Adams Lane has not been constructed but the city would still like to achieve this action so it will remain in the plan.
SP-2	Install barrier (check valve) in culvert under Highway 603 to prevent storm surge from entering the city and flooding homes.	Flood	High	CRS Coordinator; Civil Defense	HMGP, FMA, CDBG	2020	(Action 5 in previous plan) The city has not been able to build a check valve under Highway 603, but this is still an action the city would like to complete so it will remain in the plan.
SP-3	Install barrier (check valve) in culvert under railroad track on South Street to prevent storm surge from entering the city and flooding homes.	Flood	High	CRS Coordinator; Civil Defense	HMGP, FMA, CDBG	2020	(Action 6 in previous plan) The city has not been able to build a check valve under the railroad track on South Street, but this is still an action the city would like to complete so it will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-4	Coordinate with and support the US Army Corps of Engineering on projects in the MsCIP relating to the City of Waveland.	Hurricane, Flooding, Storm Surge, Sea Level Rise	High	All City Departments; Board of Alderman	To be determined	Corps of Engineers to determine schedule	(Action 7 in previous plan) The city has been in coordination with the USACE on projects related to Waveland, but there are still a number of incomplete projects that the city will need to continue to coordinate on.
SP-5	Extend stormwater drainage pipes into gulf to help eliminate sand from filling drainage pipes during storm events.	Erosion	Moderate	Public Works Director	Grant funds	2022	(Action 16 in previous plan) Stormwater drainage pipes have not been extended into gulf, but the city would still like to look into enacting this action to reduce sand buildup during storm events. This action will remain in the plan.
SP-6	Install bypass valves at all City of Waveland sewer lift station pumps to reduce or eliminate the loss of sewer service and cost of vacuum trucks.	Hurricane, Flooding	High	Public Works Director	FEMA grant funds	2022	(Action 26 in previous plan) Bypass valves have been installed at some lift stations, but not at all lift stations. Therefore, the city will retain this action and continue to pursue it.
Emergency Services							
ES-1	Install two warning sirens in the north and northeast areas of the city at a public park and a community center.	All	High	Fire Chief; Civil Defense	HMGP	2020	(Action 2 in previous plan) The city is still looking to acquire funding to install these warning sirens, so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-2	Review current evacuation plan and access to evacuation routes throughout the city.	All	High	CRS Coordinator	FEMA grant programs	2022	(Action 10 in previous plan) The city has reviewed its evacuation plan and routes on a regular basis over the past several years, but this action requires continual attention and evaluation so the city will retain this action.
ES-3	Develop a communication system utilizing LED boards along high traffic areas to warn citizens about the threat of potential hazards affecting the City of Waveland.	All	High	Fire Chief	FEMA grants	2022	(Action 12 in previous plan) The city has utilized signage along high traffic areas to warn citizens of potential hazards, but the city would like to improve its tools and warning systems overall so this action will remain in place.
ES-4	Consider establishing a program to train and verify neighborhoods in first response actions after hazards.	All	Moderate	Civil Defense Director	To be determined	2022	(Action 37 in previous plan) The city has not established a formal program to train neighborhoods in first response actions, but many citizens are trained in these actions. The city will continue to consider establishing a more formalized training program going forward.
ES-5	Establish a facility north of Interstate 10 that can be used as a command center in the event of a major hurricane that can also serve as a shelter for essential city personnel and equipment and house a critical records vault.	All	Moderate	Board of Alderman; Mayor's Office	HMGP, CDBG	2022	(Action 42 in previous plan) The city is still working on trying to establish a facility north of Interstate 10 to serve as a shelter and storage facility. Therefore, this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-6	Develop a generator plan for all critical facilities.	All	Moderate	Fire Chief; Civil Defense Coordinator	HMGP, CDBG	2022	(Action 43 in previous plan) The city has not established a generator plan for all facilities as many critical facilities are still lacking a generator. The city will continue to pursue funding to rectify these gaps.
ES-7	Use the Reverse 911 system to issue evacuation warning and advisories, especially for special needs residents.	All	Moderate	Fire Chief	Local	2022	(Action 44 in previous plan) The city is prepared to use the Reverse 911 system to issue evacuations but the system has yet to be implemented during a large-scale event such as a Katrina, so the city will retain this action to continue to test and refine the system.
ES-8	Use existing data from the monitoring and warning gauges on waterways to predict hazardous situations. Use Hurrevac and other existing computer programs and data to predict hazardous situations.	Flooding	Moderate	Fire Department	USGS, Local	2022	(Action 45 in previous plan) Although city officials have monitored gauges during past events, there is still much room for improving the automation of this system to provide useful information to the city during flood events. The city will continue working to improve this system in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-9	Maintain NOAA StormReady Designation.	All	Low	Fire Chief; Civil Defense Director	NOAA, Local	2022	(Action 46 in previous plan) The city is designated as NOAA StormReady, but maintaining this designation requires a great deal of effort and constant evaluation of its program so the action will remain in place.
ES-10	Enhance the communications system in a coordinated fashion between appropriate departments in the county, city, and the state.	All	Moderate	Civil Defense Coordinator; Fire Chief; Police Chief	Local, State	2022	(Action 48 in previous plan) The city has worked with the county and state to coordinate in improving its overall communication system to maintain consistency across levels of government, but the system is imperfect and the city will work with other agencies to continue to improve communication in the future.
ES-11	The City of Waveland will continue to train its personnel in weapons of mass destruction and hazardous materials response through education programs such as HazMat Level I and II and incident response to terrorist bombing.	Hazardous Materials	Low	Police; Fire; Civil Defense	Local	2022	(Action 49 in previous plan) The city has implemented training on technological/man-made hazards but as new employees are hired and time passes, additional training will be required to maintain an up to date program, so the city will keep this action in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-12	Continue to update CAMEO, MARPLT, and ALOHA software where available and install in all response vehicles.	All	Moderate	Fire; Civil Defense	Local	2022	(Action 50 in previous plan) The city has installed updates to these software programs and installed in many response vehicles, but response personnel need additional training in this software to remain up to date. This action will be retained.
ES-13	Continue to update the Pre-plan Emergency Response Books for hazardous materials locations within Waveland.	Hazardous Materials	Moderate	Fire; Civil Defense	Local	2022	(Action 52 in previous plan) The city has kept the Pre-plan Emergency Response Books updated for locations that house hazardous materials, but as these books are often subject to change based on materials, the city will need to retain this action to ensure up to date information is present.
ES-14	Continue to seek grant funding through FEMA Fire Act Grants and Homeland Security Grants for terrorist and HAZMAT equipment to enable its emergency response personnel to prepare and respond to acts of terrorism and hazardous materials incidents.	Hazardous Materials	Moderate	Police; Fire; Civil Defense	Local	2022	(Action 53 in previous plan) The city has sought grant funding in the past for emergency response personnel, but has not received all of the tools and equipment that it would like to have to ensure it is prepared for a HazMat incident. Therefore, the city will continue to pursue grant funding from these programs.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Public Education and Awareness							
PEA-1	Educate citizens of Waveland about preparedness for all hazards affecting the city.	All	High	CRS Coordinator	City funds	2022	(Action 8 in previous plan) The city has pushed to help educate citizens on preparedness activities they can take to protect themselves. However, since many citizens are still not properly prepared, the city will need to continue to engage citizens to help improve individual preparedness.
PEA-2	Educate homeowners regarding structural upgrades that can be made to residential homes for added protection against damage during hurricanes and flooding and can also help save citizens money on their annual homeowners insurance premiums.	Hurricane and Flooding	Moderate	CRS Coordinator; Planning Department	FEMA grant funds	2022	(Action 9 in previous plan) The city has made efforts to educate homeowners on mitigation techniques they can use to protect their homes against disasters, but many homeowners are still at risk and may need additional education, so this action will remain in place.
PEA-3	Enhance the usability and functionality of the city's website with an updated section to notify citizens about emergency services and hazards threatening the City of Waveland as well as emergency procedures for different types of hazards and evacuation routes.	All	Moderate	CRS Coordinator	City funds	2022	(Action 13 in previous plan) The city has updated its website to include a section that relates to emergency services and hazards. However, it should be noted that this is a work in progress and that many improvements may be made to the site in the future so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-4	Develop a plan to educate and promote flood insurance to the citizens of Waveland.	Flood	High	CRS Coordinator	Local	2022	(Action 20 in previous plan) Although the city has promoted flood insurance purchase for its citizens, a formal program to promote its purchase has not been established. The city will continue its outreach efforts to citizens in this regard, especially those located in the floodplain.
PEA-5	Continue to publicize evacuation routes and approximate travel times to evacuate the area.	Flooding, Hurricane	High	Floodplain Manager; CRS Coordinator	Local	2022	(Action 34 in previous plan) The city has publicized evacuation routes and travel times to evacuate, but some citizens may still not be aware of these routes so the city will push to improve the overall percentage of citizens who know their evacuation route.
PEA-6	Continue to mail flood safety information, including evacuation zones and routes, to every address in Waveland every year.	Flooding	High	Floodplain Manager; Civil Defense Coordinator	Local	2022	(Action 35 in previous plan) In the past, the city has mailed out flood information and evacuation route information to all addresses in the city. This has been a successful program and the city would like to continue to implement it going forward so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-7	Continue to publicize how families can prepare and plan for disaster.	All	High	Civil Defense Coordinator; American Red Cross	Local	2022	(Action 36 in previous plan) The city has promulgated public information for individual citizens, but there are still a great number of citizens who remain uninformed so the city will continue its efforts to promote public awareness.
PEA-8	Publicize information about the special needs registry maintained by the Hancock County Emergency Management Agency and how residents with special needs can register themselves.	All	Moderate	Civil Defense Director	Local	2022	(Action 39 in previous plan) The city has worked to identify special needs citizens and tried to direct them to the special needs services available through the county, but it is likely that there are some citizens with special needs who need to be integrated into this process, so the city will keep this action in place.
PEA-9	Provide information on model construction techniques, such as storm shutters, in public places so people can learn about these mitigation techniques and adopt them for their own homes.	Severe Thunderstorm/ High Wind, Hurricane, Flooding	Moderate	Building Official; CRS Coordinator	Local	2022	(Action 40 in previous plan) The city has developed and promulgated information on construction techniques that can protect homes and businesses, but there are many citizens who have not implemented these measures or who may not know about them, so the city will continue its efforts in this regard.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-10	Encourage residents to acquire and monitor NOAA weather radios.	All	Moderate	Civil Defense Coordinator	Local	2022	(Action 41 in previous plan) A number of citizens have NOAA weather radios, but there are definitively many who do not. The city will continue to encourage more residents to acquire these in the future.
PEA-11	Provide an annual pre-hurricane season workshop and exercise for elected officials and emergency operations staff.	Hurricane	High	Civil Defense	Local	2022	(Action 47 in previous plan) A pre-hurricane season workshop has been held in the city in the past and the city will need to continue to prepare this workshop and host it to ensure any new elected officials and staff are up to date on procedures and that existing personnel remain up to date.

ANNEX C
HARRISON COUNTY

This annex includes jurisdiction-specific information for Harrison County and its participating municipalities. It consists of the following five subsections:

- ❑ C.1 Harrison County Community Profile
- ❑ C.2 Harrison County Risk Assessment
- ❑ C.3 Harrison County Vulnerability Assessment
- ❑ C.4 Harrison County Capability Assessment
- ❑ C.5 Harrison County Mitigation Strategy

C.1 HARRISON COUNTY COMMUNITY PROFILE

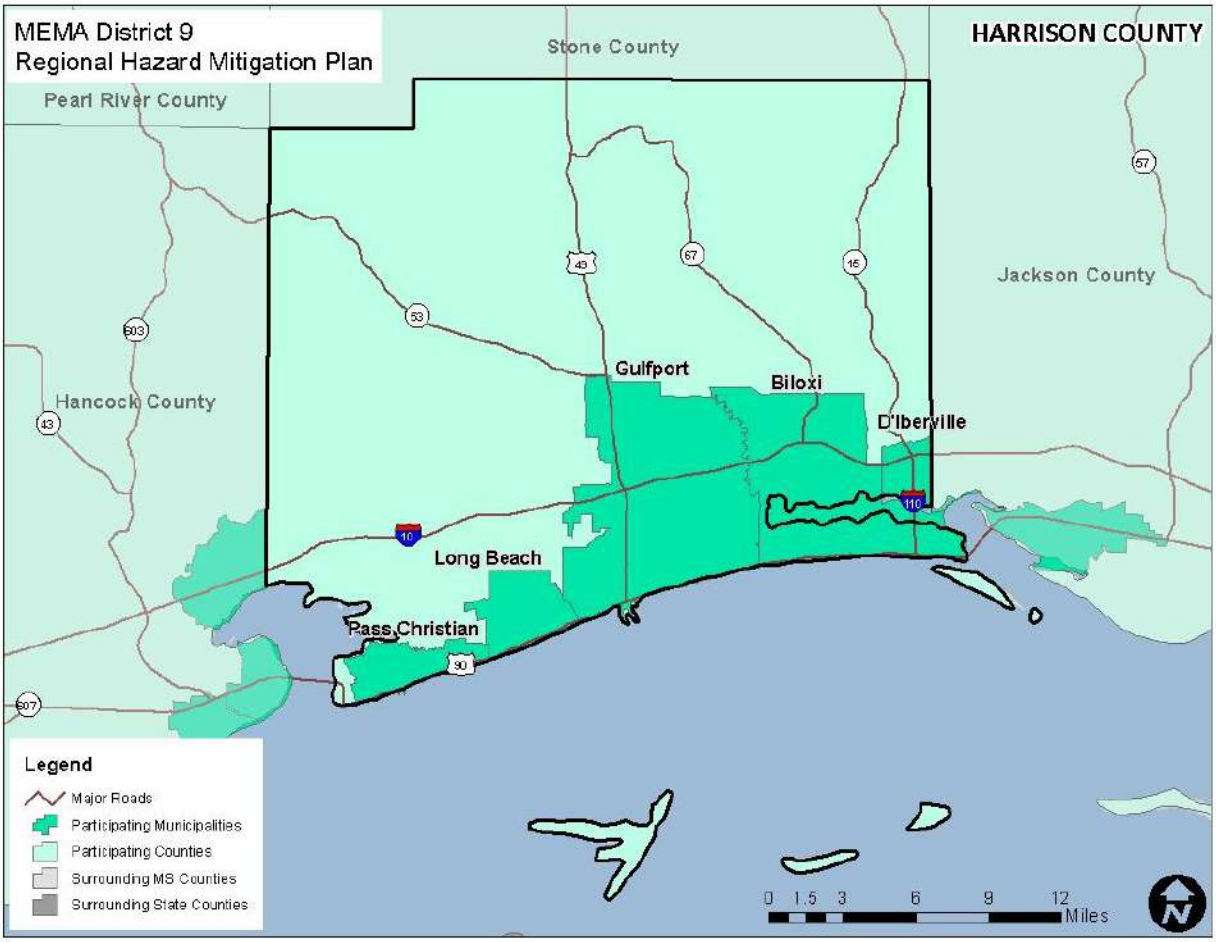
C.1.1 Geography and the Environment

Harrison County is located on the Mississippi coast. It comprises five cities, Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian, as well as many small unincorporated communities. An orientation map is provided as **Figure C.1**.

Harrison County is situated in the East Gulf Coastal Plain. It is made up of the gently rolling Pine Belt, also known as the "Piney Woods," and the coastal area called the Coastal Meadows or Terrace. The region has generally low topographic elevations and extensive tracts of marshy land. There are many rivers, creeks, bayous, and other natural drainage networks in the region which empty into the Gulf of Mexico. The total area of the county is 976 square miles, 402 square miles of which is water area.

Harrison County enjoys four distinct seasons but the climate in the region is generally hot and humid compared to the rest of the United States given its latitude and location along the Gulf Coast. Precipitation is generally highest in winter months when the temperatures are moderately lower, but the likelihood of precipitation remains relatively constant throughout the year. Snowfall is rare but does occur. Summers in the region can become fairly hot with average highs in the nineties and lows in the seventies. The region is also often susceptible to turbulent weather when warm, wet air from the Gulf of Mexico is pushed up into the region to mix with cooler air coming down from across the continent which can result in severe weather conditions. This is particularly true in the spring when seasons are changing and diverse weather patterns interact. The region is also subject to hurricanes and tropical storms from June to October.

FIGURE C.1: HARRISON COUNTY ORIENTATION MAP



C.1.2 Population and Demographics

According to the 2010 Census, Harrison County has a population of 187,105 people. The county has seen a decrease in population between 2000 and 2010, however one municipality has experienced significant growth. The population density is 326 people per square mile. Population counts from the U.S. Census Bureau for 1990, 2000, and 2010 for the county and participating jurisdictions are presented in **Table C.1**.

TABLE C.1: POPULATION COUNTS FOR HARRISON COUNTY

Jurisdiction	1990 Census Population	2000 Census Population	2010 Census Population	% Change 2000-2010
Harrison County	**165,365**	**189,601**	**187,105**	**-1.3%**
Biloxi	46,319	50,644	44,054	-13.0%
D'Iberville	6,566	7,608	9,486	24.7%
Gulfport	40,775	71,127	67,793	-4.7%
Long Beach	15,804	17,320	14,792	-14.6%
Pass Christian	5,557	6,579	4,613	-29.9%

Source: United States Census Bureau, 1990, 2000, 2010 Census

Based on the 2010 Census, the median age of residents of Harrison County is 35.3 years. The racial characteristics of the county are presented in **Table C.2**. Whites make up the majority of the population in the county, accounting for almost 70 percent of the population.

TABLE C.2: DEMOGRAPHICS OF HARRISON COUNTY

Jurisdiction	White, Percent (2010)	Black or African American, Percent (2010)	American Indian or Alaska Native, Percent (2010)	Asian, Percent (2010)	Native Hawaiian or Other Pacific Islander, Percent (2010)	Other Race, Percent (2010)	Two or More Races, percent (2010)	Persons of Hispanic Origin, Percent (2010)*
Harrison County	**69.7%**	**22.1%**	**0.5%**	**2.8%**	**0.1%**	**2.1%**	**2.7%**	**5.3%**
Biloxi	68.4%	19.6%	0.5%	4.4%	0.2%	3.8%	3.1%	8.7%
D'Iberville	70.9%	15.7%	0.5%	8.3%	0.1%	1.2%	3.3%	4.8%
Gulfport	56.9%	36.1%	0.4%	1.7%	0.1%	2.1%	2.7%	5.2%
Long Beach	85.5%	8.3%	0.5%	2.6%	0.1%	1.1%	2.0%	3.7%
Pass Christian	64.3%	27.9%	0.4%	3.9%	0.0%	1.3%	2.2%	3.0%

*Hispanics may be of any race, so also are included in applicable race categories
Source: United States Census Bureau, 2010 Census

C.1.3 Housing

According to the 2010 U.S. Census, there are 85,181 housing units in Harrison County, the majority of which are single family homes. Housing information for the county and five municipalities is presented in **Table C.3**. As shown in the table, there is a low percentage of season housing units throughout the county, except for in the City of Pass Christian.

TABLE C.3: HOUSING CHARACTERISTICS OF HARRISON COUNTY

Jurisdiction	Housing Units (2000)	Housing Units (2010)	Seasonal Units, Percent (2010)	Median Home Value (2011-2015)
Harrison County	**79,636**	**85,181**	**1.9%**	**$137,700**
Biloxi	22,115	21,278	2.2%	$147,200
D'Iberville	3,088	4,298	0.8%	$114,000
Gulfport	29,559	31,602	1.3%	$117,300
Long Beach	7,203	6,695	1.8%	$144,600
Pass Christian	3,351	2,494	10.2%	$169,400

Source: United States Census Bureau, 2000 and 2010 Census, 2011-2015 American Community Survey 5-Year Estimates

C.1.4 Infrastructure

TRANSPORTATION

In Harrison County, Interstate 10 and U.S. Highway 90 run east to west allowing transportation in southern half of the county. Interstate 110/Mississippi Highway 67 and U.S. Highway 49 run north-south through Harrison County.

The Gulfport-Biloxi International Airport is located in Harrison County. This airport is served by three major airlines with direct flights to Atlanta, Charlotte, Dallas/Ft. Worth, and Houston as well as connections to hundreds of locations in the U.S. and worldwide. There are is also a military airport on Kessler Air Force Base in Biloxi.

In terms of other transportation services, Port of Gulfport operates within the county, connecting it to national and global markets. Two Class-I Major railways also serve the county.

UTILITIES

Electrical power in Harrison County is mainly provided by electric power associations. Mississippi Power Company also provides power to some parts of the county.

CenterPoint Energy Resources is the natural gas supplier that serves Harrison County.

Water and sewer service is provided by a number of different sources including several of the participating cities and the county, but unincorporated areas often rely on septic systems and wells in Harrison County.

COMMUNITY FACILITIES

There are a number of buildings and community facilities located throughout Harrison County. According to the data collected for the vulnerability assessment (Section 6.4.1), there are 4 communications facilities, 3 emergency operations centers (EOCs), 32 fire stations, 13 medical facilities, 17 police stations, 92 power/gas facilities, 29 private/non-profit facilities, 75 public facilities, 68 schools, 3 shelters, 69 special populations facilities, 26 transportation facilities, and 42 water/wastewater facilities located within the county.

There are six hospitals located in Harrison County. These include VA Gulf Coast Veterans Health Care System, Merit Health Biloxi, and U.S. Air Force Medical Center Keesler in Biloxi and Garden Park Medical Center, Memorial Hospital, and Select Specialty – Gulfport Hospital in Gulfport. There are also several additional medical care facilities located in the county as outlined in the vulnerability assessment (Section 6.4.1).

Harrison County contains numerous local, state, and national parks and recreation areas, including the Gulf Islands National Seashore, Mississippi Gulf Coast National Heritage Area, and DeSoto National Forest. Golf courses and resorts, recreational and sports fishing, gamming and casinos, and sand beaches are abundant in the county.

C.1.5 Land Use

Many areas of Harrison County are undeveloped or sparsely developed. There are several incorporated municipalities located along the coast. Coastal land use patterns radiate from city centers and commercial land uses are located in central business districts and highway strips, with surrounding housing that becomes progressively large in lot size and floor area with distance from the central business districts. Residential and non-residential densities are generally low, and concentrated mix of uses are infrequent, creating an auto-oriented land use pattern along the coast. Upland land use patterns differ markedly from the coastal plain. There are only a few municipalities and unincorporated rural centers. There is a mix of protected lands, such as the DeSoto National Forest. Private lands are used for exurban housing, agriculture, and forestry. Consistent with its rural character, densities are very low and uses are not mixed, making motor vehicles the only viable mode for virtually all travel.

Local land use and associated regulations are further discussed in *Section 7: Capability Assessment.*

C.1.6 Employment and Industry

According to the 2011 to 2015 American Community Survey (ACS) 5-year estimates, in 2015, Harrison County had an average annual employment of 82,911 workers and an average unemployment rate of 9.7 percent (compared to 10.3 percent for the state). In 2015, the Educational Services, and Health Care and Social Assistance industry employed 19.1 percent of the workforce followed by Arts, Entertainment, and Recreation, and Accommodation and Food Services (17.8%); Retail Trade (12.8%); and Public Administration (9.4%). In 2015, the average annual median household income in Harrison County was $41,722 compared to $39,665 in the state of Mississippi.

C.2 HARRISON COUNTY RISK ASSESSMENT

This subsection includes hazard profiles for each of the significant hazards identified in Section 4: *Hazard Identification* as they pertain to Harrison County. Each hazard profile includes a description of the hazard's location and extent, notable historical occurrences, and the probability of future occurrences. Additional information can be found in Section 5: *Hazard Profiles*.

FLOOD-RELATED HAZARDS

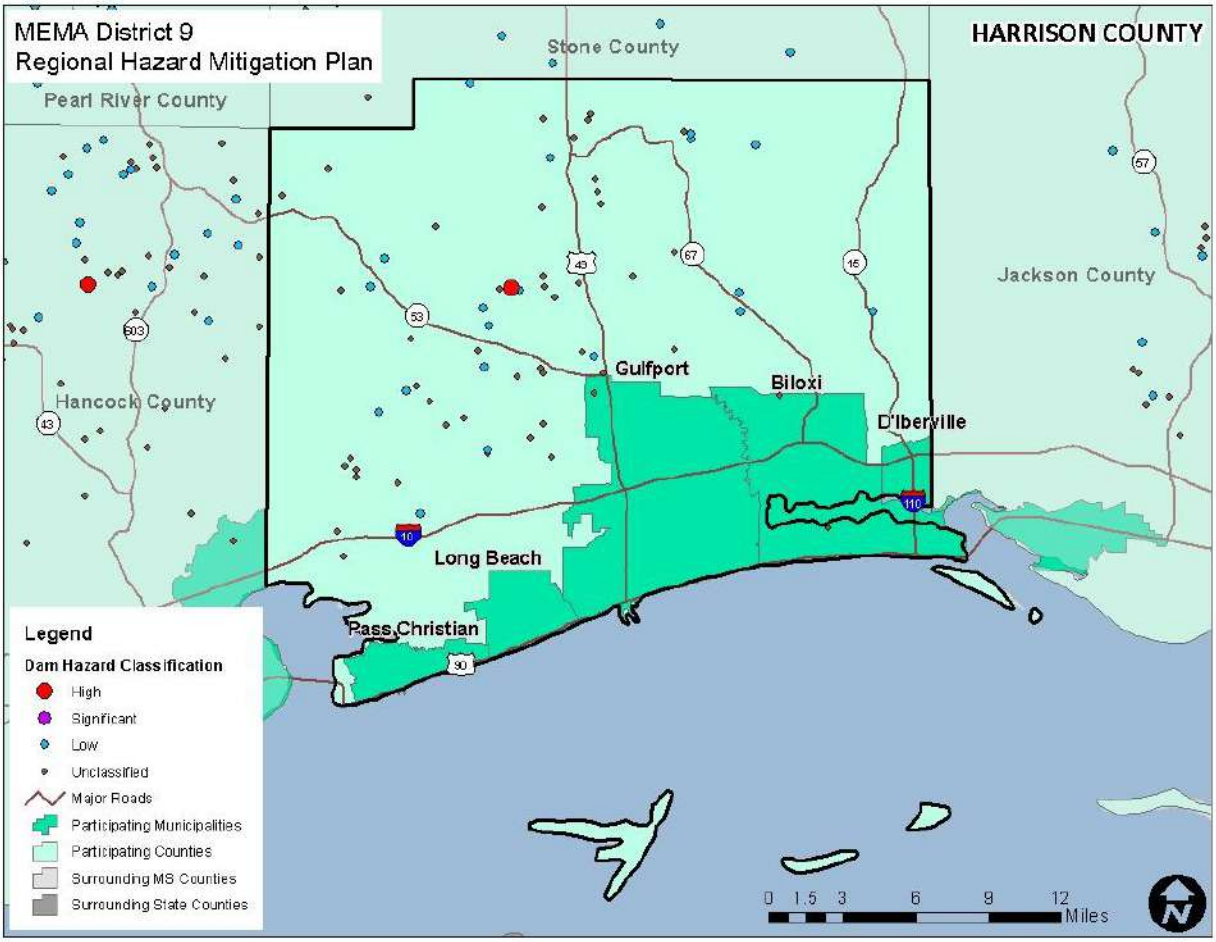
C.2.1 Dam and Levee Failure

LOCATION AND SPATIAL EXTENT

According to the Mississippi Department of Environmental Quality, there is one high hazard dam in Harrison County.[1] **Figure C.2** and **Figure C.3** show the location of this high hazard dam as well as mapped dam inundation areas, and **Table C.4** lists it by name.

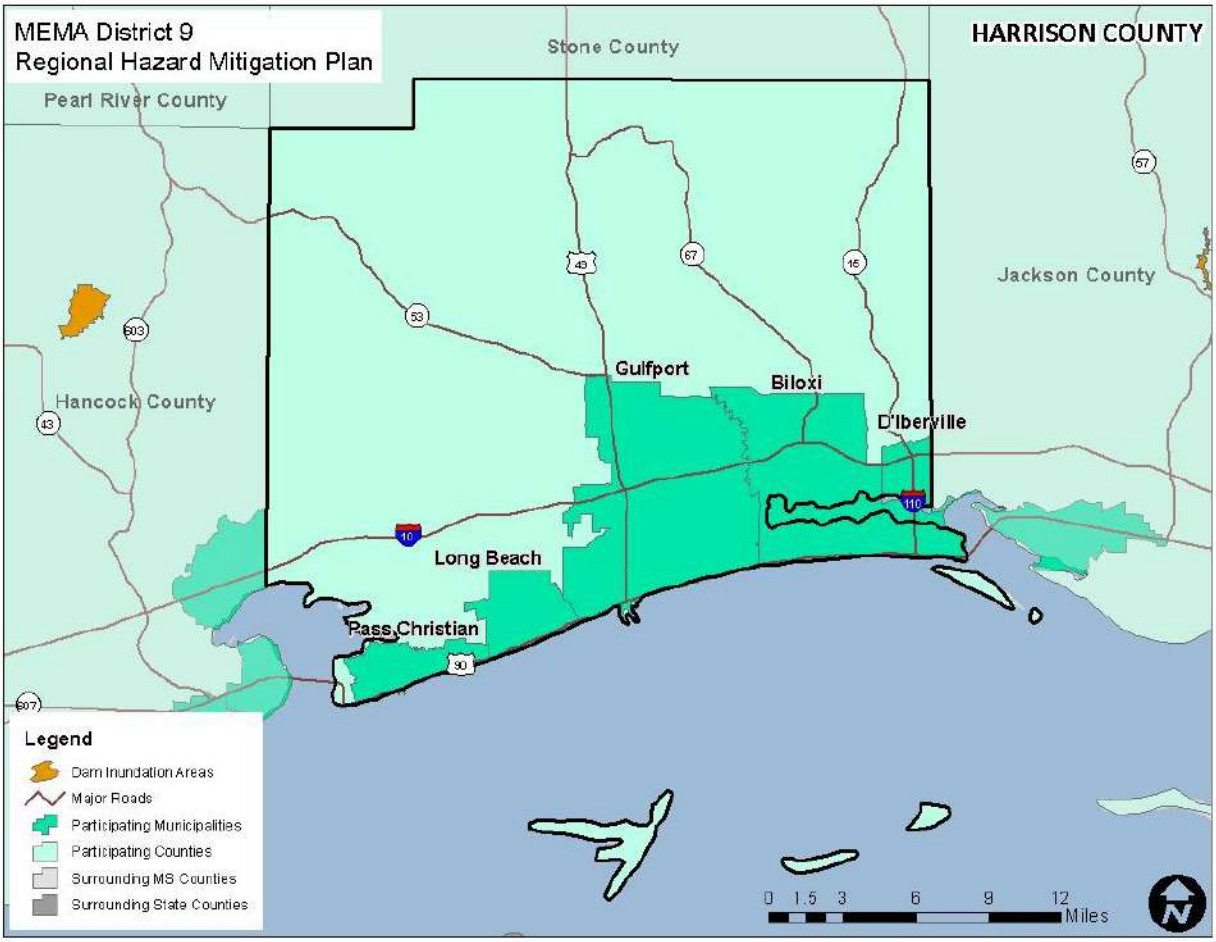
[1] The list of high hazard dams obtained from the Mississippi Department of Environmental Quality was reviewed and amended by local officials to the best of their knowledge.

FIGURE C.2: HARRISON COUNTY HIGH HAZARD DAM LOCATIONS



Source: Mississippi Department of Environmental Quality

FIGURE C.3: HARRISON COUNTY DAM INUNDATION AREAS



Source: Mississippi Department of Environmental Quality

TABLE C.4: HARRISON COUNTY HIGH HAZARD DAMS

Dam Name	Hazard Potential
Harrison County	
LAKE A TWIN LAKES SUBDIVISION DAM	High

Source: Mississippi Department of Environmental Quality

HISTORICAL OCCURRENCES

According to the Mississippi State Hazard Mitigation Plan, there has been one dam failure reported in Harrison County. Although no damage was reported with this event, several breach scenarios in the region could be catastrophic.

Table C.5 below provides a brief description of the one reported dam failure.

TABLE C.5: HARRISON COUNTY DAM FAILURES (1982-2012)

Date	County	Structure Name	Cause of Failure
October 2002	Harrison	Windy Hills Lake	Piping along primary spillway conduit

Source: Mississippi State Hazard Mitigation Plan

PROBABILITY OF FUTURE OCCURRENCES

Given the current dam inventory and historic data, a dam breach is possible (between 1 and 10 percent annual probability) in the future. However, as has been demonstrated in the past, regular monitoring is necessary to prevent these events.

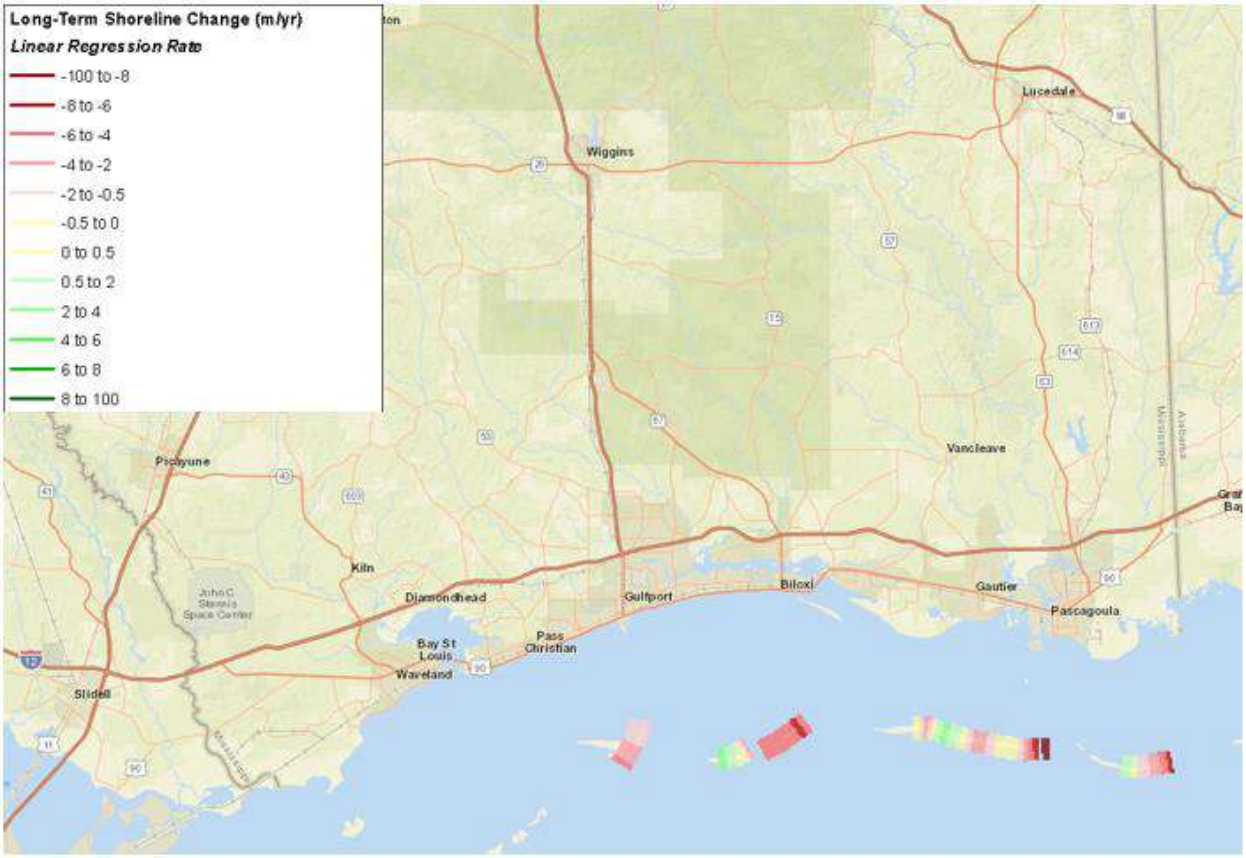
C.2.2 Erosion

LOCATION AND SPATIAL EXTENT

For the most part, major erosion in Harrison County is typically caused by coastal tides, ocean currents, and storm events. Although the county also experiences riverine erosion in many of its inland areas, these are of somewhat less concern than coastal erosion areas which historically have had larger impacts. Unlike inland areas, where the soil has greater organic matter content, coastal soils are mainly composed of fine grained particles such as sand. This makes coastal soils much more susceptible to erosion. Although some areas of the Harrison County coast are protected and natural erosion processes are allowed to take place for the most part, many areas near where development has occurred are especially susceptible.

At this time, there is limited data available on localized areas of erosion. Most of the information collected by the United States Geological Survey (USGS) is focused on the barrier islands that are just off the coast of the mainland. The long-term shoreline change for the barrier islands as calculated by the USGS can be found in **Figure C.4** It should be noted that many areas of the coast are protected through the use of structural techniques. Also, a great deal of renourishment activities are carried out along the mainland coastal communities.

FIGURE C.4: LONG-TERM SHORELINE CHANGE (M/YR) IN THE MEMA DISTRICT 9 REGION



Source: United States Geological Survey

HISTORICAL OCCURRENCES

Several sources were vetted to identify areas of erosion in Harrison County. This includes searching local newspapers, interviewing local officials, and reviewing previous hazard mitigation plans. Because dramatic, short-term erosion tends to take place after major storm events such as hurricanes, flooding, or storm surge, the erosion events often correspond directly with those events. Conversely, with long-term erosion, it is difficult to identify a specific historic occurrence because these events are by nature occurring at all times over a long period at a very gradual rate. Therefore, long-term historic erosion events cannot be confined to a specific timeframe or occurrence.

PROBABILITY OF FUTURE OCCURRENCES

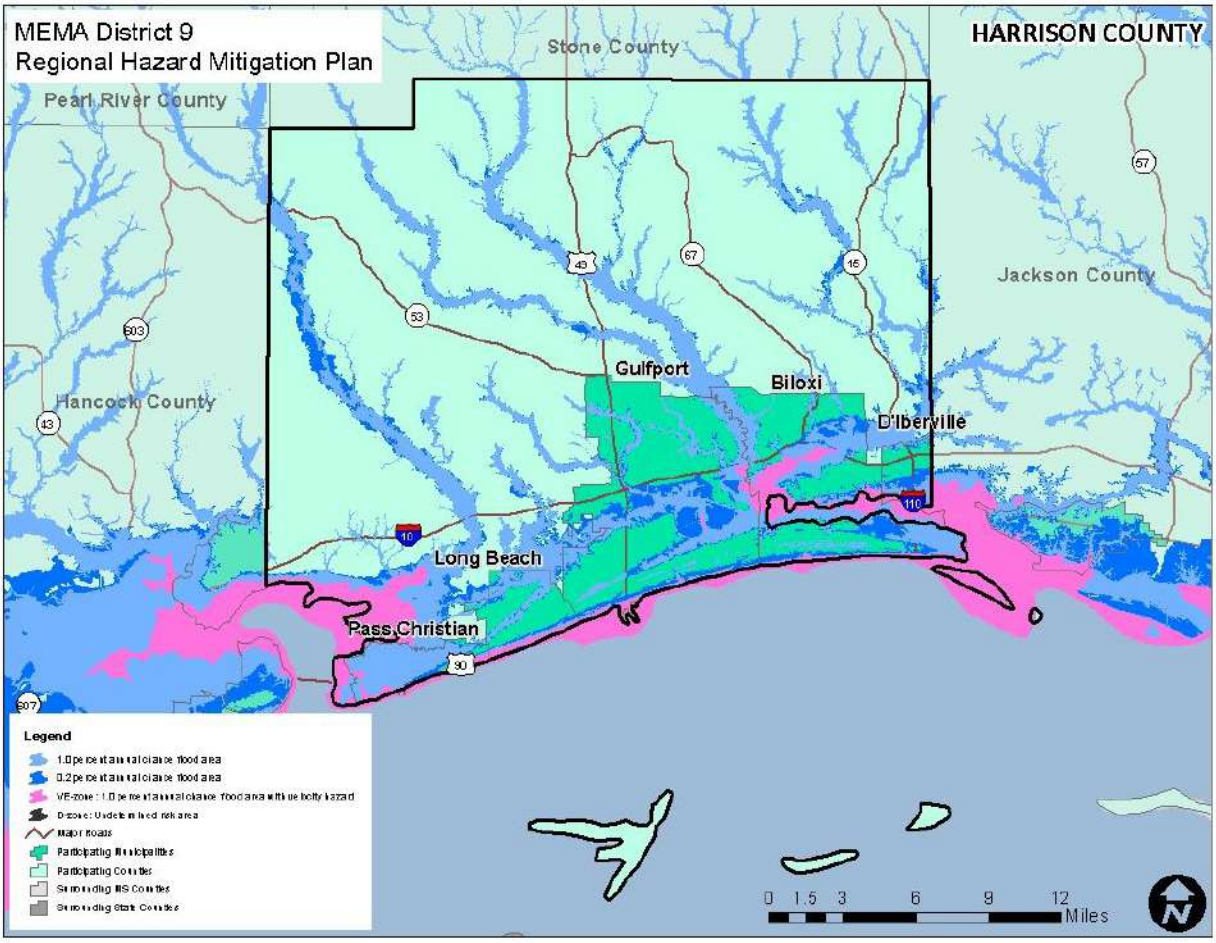
Erosion remains a natural, dynamic, and continuous process for Harrison County, and it will continue to occur. The annual probability level assigned for erosion is likely (between 10 and 100 percent annually).

C.2.3 Flood

LOCATION AND SPATIAL EXTENT

There are areas in Harrison County that are susceptible to flood events. Special flood hazard areas in the county were mapped using Geographic Information System (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM). This includes Zone A (1-percent annual chance floodplain), Zone AE (1-percent annual chance floodplain with elevations), Zone VE (1-percent annual chance floodplain with additional hazards due to storm-induced velocity wave action), Zone X500 (0.2-percent annual chance floodplain), and Zone D (undetermined risk area). **Figure C.5** illustrates the location and extent of currently mapped special flood hazard areas for the county based on best available FEMA Digital Flood Insurance Rate Map (DFIRM) data.

FIGURE C.5: SPECIAL FLOOD HAZARD AREAS IN HARRISON COUNTY



Source: Federal Emergency Management Agency

HISTORICAL OCCURRENCES

Floods were at least partially responsible for six disaster declarations in Harrison County in 1974, 1980, 1990, twice in 1991, and 1995.[2] Information from the National Climatic Data Center was used to ascertain

[2] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

additional historical flood events. The National Climatic Data Center reported a total of 45 events in Harrison County since 1996.[3] These events accounted for over $3.1 million (2016 dollars) in property damage and one fatality in the county.[4] A summary of these events is presented in **Table C.6**. Specific information on flood events, including date, type of flooding, and deaths and injuries, can be found in **Table C.7**.

TABLE C.6: SUMMARY OF FLOOD OCCURRENCES IN HARRISON COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Biloxi	8	0/0	$103,389	$5,169
D'Iberville	1	0/0	$10,339	$3,446
Gulfport	7	0/0	$0	$0
Long Beach	6	1/0	$1,366,517	$195,217
Pass Christian	3	0/0	$0	$0
Unincorporated Area	20	0/0	$1,658,219	$82,911
HARRISON COUNTY TOTAL	**45**	**1/0**	**$3,138,464**	**$286,743**

Source: National Climatic Data Center

TABLE C.7: HISTORICAL FLOOD EVENTS IN HARRISON COUNTY

Location	Date	Type	Deaths/Injuries	Property Damage*
Biloxi				
BILOXI	5/28/1996	Flood	0/0	$0
BILOXI	8/25/2002	Flood	0/0	$0
(BIX)KEESLER AFB BIL	12/12/2009	Flash Flood	0/0	$0
BILOXI	8/18/2013	Flash Flood	0/0	$103,389
BILOXI	4/12/2015	Flash Flood	0/0	$0
BILOXI	4/12/2015	Flash Flood	0/0	$0
(BIX)KEESLER AFB BIL	4/14/2015	Flash Flood	0/0	$0
BILOXI	4/28/2016	Flash Flood	0/0	$0
D'Iberville				
D IBERVILLE	7/6/2013	Flash Flood	0/0	$10,339
Gulfport				
GULFPORT	4/15/1996	Flood	0/0	$0
GULFPORT	7/26/1997	Flood	0/0	$0
GULFPORT	9/19/2001	Flood	0/0	$0
GULFPORT	7/17/2003	Heavy Rain	0/0	$0
GULFPORT	4/5/2008	Heavy Rain	0/0	$0
GULFPORT	2/25/2013	Flash Flood	0/0	$0
(GPT)GULFPORT RGNL A	4/15/2015	Flash Flood	0/0	$0

[3] These flood events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional occurrences have occurred and have gone unreported. As additional local data becomes available, this hazard profile will be amended.

[4] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Type	Deaths/Injuries	Property Damage*
Long Beach				
LONG BEACH	3/28/2009	Flash Flood	1/0	$841,998
LONG BEACH	7/18/2011	Flash Flood	0/0	$0
LONG BEACH	8/29/2012	Flash Flood	0/0	$524,519
LONG BEACH	4/29/2014	Flash Flood	0/0	$0
LONG BEACH	4/29/2014	Flash Flood	0/0	$0
LONG BEACH	4/15/2015	Flash Flood	0/0	$0
Pass Christian				
PASS CHRISTIAN	5/19/1997	Flood	0/0	$0
PASS CHRISTIAN	3/21/2012	Flash Flood	0/0	$0
PASS CHRISTIAN	3/22/2012	Flash Flood	0/0	$0
Unincorporated Area				
SOUTH PORTION	7/8/1996	Flood	0/0	$153,507
COUNTYWIDE	1/7/1998	Flood	0/0	$0
COUNTYWIDE	3/7/1998	Flash Flood	0/0	$0
HARRISON (ZONE)	3/8/1998	Flood	0/0	$0
COUNTYWIDE	6/11/2001	Flash Flood	0/0	$1,019,987
COUNTYWIDE	9/26/2002	Flash Flood	0/0	$0
HARRISON (ZONE)	7/1/2003	Flood	0/0	$196,348
COUNTYWIDE	3/31/2005	Heavy Rain	0/0	$0
COUNTYWIDE	4/1/2005	Flash Flood	0/0	$61,662
HARRISON (ZONE)	4/1/2005	Flood	0/0	$123,325
WOOL MARKET	5/1/2013	Flash Flood	0/0	$103,389
SAUCIER	5/9/2014	Heavy Rain	0/0	$0
LANDON	5/9/2014	Flash Flood	0/0	$0
HENDERSON PT	5/14/2014	Flash Flood	0/0	$0
LYMAN	5/16/2015	Heavy Rain	0/0	$0
WORTHAM	5/16/2015	Flash Flood	0/0	$0
HARRISON (ZONE)	10/25/2015	Coastal Flood	0/0	$0
RICEVILLE	5/17/2016	Heavy Rain	0/0	$0
SAUCIER	5/17/2016	Heavy Rain	0/0	$0
LYMAN	5/17/2016	Flash Flood	0/0	$0

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

HISTORICAL SUMMARY OF INSURED FLOOD LOSSES

According to FEMA flood insurance policy records as of October 2016, there have been 12,677 flood losses reported in Harrison County through the National Flood Insurance Program (NFIP) since 1978, totaling almost $1.3 billion in claims payments. A summary of these figures for the county is provided in **Table C.8**. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP policies, and for losses in which claims were sought and received. It is likely that many additional instances of flood loss in Harrison County were either uninsured, denied claims payment, or not reported.

TABLE C.8: SUMMARY OF INSURED FLOOD LOSSES IN HARRISON COUNTY

Location	Number of Policies	Flood Losses	Claims Payments
Biloxi	5,206	2,293	$253,008,756
D'Iberville	515	27	$1,939,357
Gulfport	5,267	3,078	$285,499,409
Long Beach	2,640	1,505	$152,511,425
Pass Christian	2,093	2,550	$323,619,220
Unincorporated Area	2,640	3,224	$261,560,972
HARRISON COUNTY TOTAL	**18,361**	**12,677**	**$1,278,139,139**

Source: National Flood Insurance Program

REPETITIVE LOSS PROPERTIES

According to the Mississippi Emergency Management Agency, there are 1,300 non-mitigated repetitive loss properties located in Harrison County, which accounted for 3,932 losses and almost $195.5 million in claims payments under the NFIP. The average claim amount for these properties is $49,710. Of the 1,300 properties, 1,109 are single family, 28 are 2-4 family, 30 are assumed condominium, 13 are other residential, 95 are non-residential, and 25 are unknown. Without mitigation, these properties will likely continue to experience flood losses. **Table C.9** presents detailed information on repetitive loss properties and NFIP claims and policies for Harrison County.

TABLE C.9: REPETITIVE LOSS PROPERTIES IN HARRISON COUNTY

Location	Number of Properties	Types of Properties	Number of Losses	Building Payments	Content Payments	Total Payments	Average Payment
Biloxi	239	197 single family; 8 2-4 family; 6 assumed condo; 3 other residential; 25 non residential	663	$27,856,539	$11,012,285	$38,868,824	$58,626
D'Iberville*	25	20 single family; 3 other residential; 2 non-residential	--	--	--	--	--
Gulfport	493	405 single family; 12 2-4 family; 14 assumed condo; 6 other residential; 56 other non-residential	1,554	$51,897,852	$17,554,404	$69,452,256	$44,693

Location	Number of Properties	Types of Properties	Number of Losses	Building Payments	Content Payments	Total Payments	Average Payment
Long Beach	142	134 single family; 3 2-4 family; 2 assumed condo; 3 non-residential	540	$11,802,135	$4,166,690	$15,968,825	$29,572
Pass Christian	175	162 single family; 2 2-4 family; 2 assumed condo; 4 other residential; 5 other non-residential	493	$25,114,472	$7,796,198	$32,910,670	$66,756
Unincorporated Area	226	211 single family; 3 2-4 family; 6 assumed condo; and 6 non-residential	682	$29,049,809	$9,211,082	$38,260,891	$56,101
HARRISON COUNTY TOTAL	**1,300**		**3,932**	**$145,720,807**	**$49,740,659**	**$195,461,466**	**$49,710**

*The information provided by D'Iberville did not include specific building types, number of losses, building payments, or content payments information. Therefore, the number of losses, building payments, contents payments, and total payments for the city are not included in the county total. Building types were determine by searching the addresses online.
Source: Federal Emergency Management Agency, National Flood Insurance Program

PROBABILITY OF FUTURE OCCURRENCES

Flood events will remain a threat in Harrison County, and the probability of future occurrences will remain highly likely (100 percent annual probability). The probability of future flood events based on magnitude and according to best available data is illustrated in the figure above**,** which indicates those areas susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain). Further, as described in other hazard profiles, it is highly likely that Harrison County will continue to experience inland flooding associated with large tropical storms and hurricanes.

It can be inferred from the floodplain location maps, previous occurrences, and repetitive loss properties that risk varies throughout the county. For example, the coastal area of the county has more floodplain and thus a higher risk of flood than the rest of the county. Flood is not the greatest hazard of concern but will continue to occur and cause damage. Therefore, mitigation actions may be warranted, particularly for repetitive loss properties.

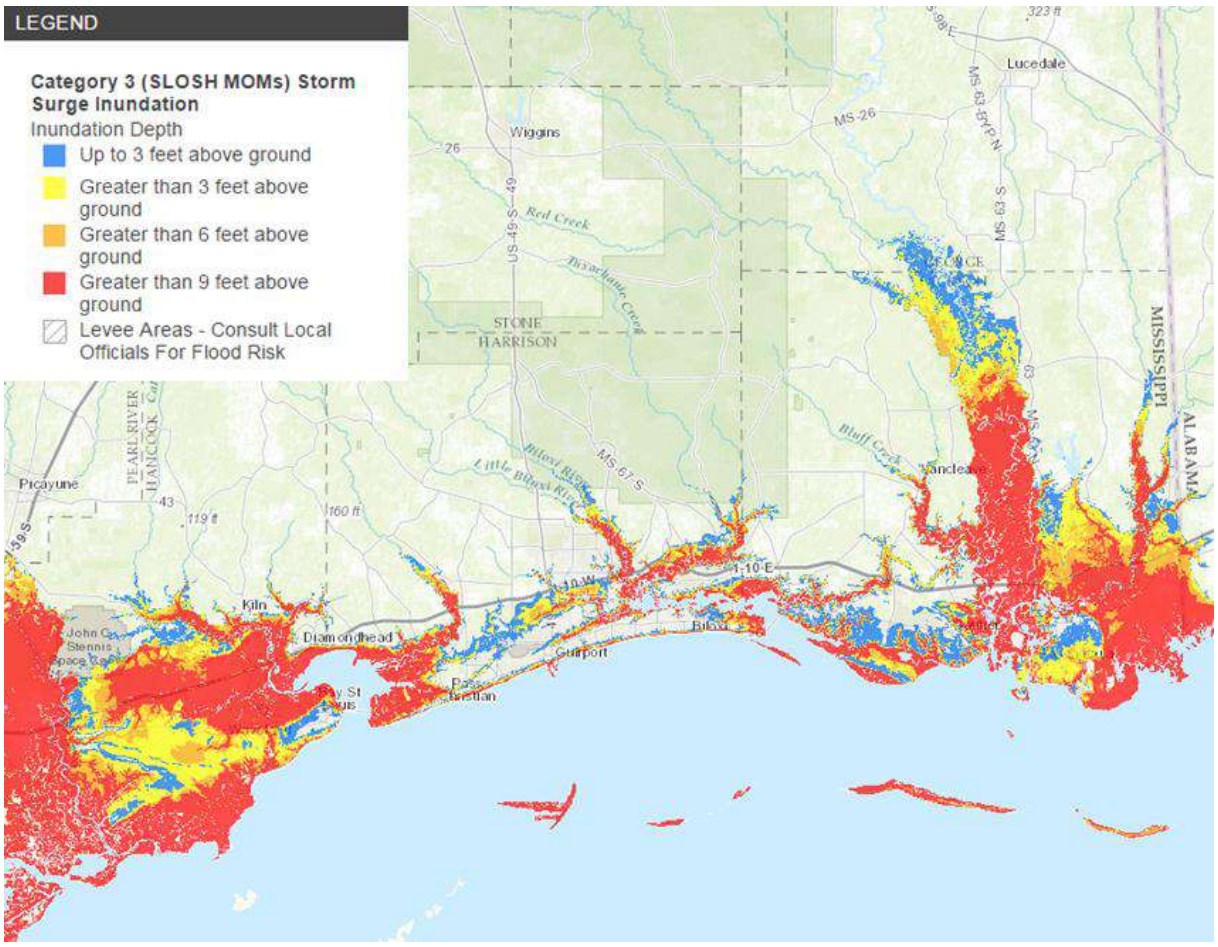
It should also be noted that anticipated sea level rise will increase the probability and intensity of future tidal flooding events in years to come. Rising sea level over time will shorten the return period (increasing the frequency) of significant flood events. This hazard is discussed elsewhere in this section.

C.2.4 Storm Surge

LOCATION AND SPATIAL EXTENT

There are many areas in Harrison County that are subject to potential storm surge inundation as modeled and mapped by the National Oceanic and Atmospheric Administration (NOAA). **Figure C.6** illustrates hurricane storm surge inundation zones based on a Category 3 storm. The illustration is derived from geo-referenced SLOSH (Sea, Lake, and Overland Surge from Hurricanes) data produced by the USACE in coordination with NOAA. SLOSH is a modeling tool used to estimate storm surge for coastal areas resulting from historical, hypothetical, or predicted hurricanes taking into account maximum expected levels for pressure, size, forward speed, track, and winds. Therefore, the SLOSH data is best used for defining the potential maximum surge associated with various storm intensities for any particular location. As shown in the figure, the entire coast of Harrison County is at high risk to storm surge inundation. Inland areas may also experience substantial flooding during a storm event.

FIGURE C.6: STORM SURGE RISK AREAS IN THE MEMA DISTRICT 9 REGION



Source: NOAA

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, 10 storm surge events have been reported for Harrison County since 1998.[5] These events accounted for over $6.9 billion (2016 dollars) in property damage.[6] A summary of these events is presented in **Table C.10**. Detailed information on the recorded storm surge events can be found in **Table C.11**.

TABLE C.10: SUMMARY OF STORM SURGE EVENTS IN HARRISON COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Biloxi	0	0/0	$0	$0
D'Iberville	0	0/0	$0	$0
Gulfport	0	0/0	$0	$0
Long Beach	0	0/0	$0	$0
Pass Christian	1	0/0	$369,406	$20,523
Unincorporated Area	9	0/0	$6,947,455,650	$534,419,665
HARRISON COUNTY TOTAL	**10**	**0/0**	**$6,947,825,056**	**$534,440,188**

Source: National Climatic Data Center

TABLE C.11: HISTORICAL STORM SURGE EVENTS IN HARRISON COUNTY

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
Biloxi				
None reported	--	--	--	--
D'Iberville				
None reported	--	--	--	--
Gulfport				
None reported	--	--	--	--
Long Beach				
None reported	--	--	--	--
Pass Christian				
PASS CHRISTIAN	2/15/1998	2-4 feet above normal	0/0	$369,406
Unincorporated Area				
HARRISON (ZONE)	6/30/2003	--	0/0	$369,406
HARRISON (ZONE)	9/15/2004	3-5 feet above normal	0/0	$327,246
HARRISON (ZONE)	10/9/2004	2-4 feet above normal	0/0	$510,012
HARRISON (ZONE)	7/5/2005	3-5 feet above normal	0/0	$19,125
HARRISON (ZONE)	8/29/2005	19-25 feet	0/0	$369,974
HARRISON (ZONE)	9/1/2008	6-8 feet	0/0	$6,943,176,601
HARRISON (ZONE)	9/11/2008	3-5 feet above normal	0/0	$839,002
HARRISON (ZONE)	9/2/2011	2-4 feet above normal	0/0	$0

[5] These storm surge events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional storm surge conditions have affected Harrison County.
[6] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
HARRISON (ZONE)	8/28/2012	5-10 feet	0/0	$10,707

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

It is highly likely (100 percent annual probability) that Harrison County will continue to experience storm surge associated with large tropical storms, hurricanes, and squalls combined with high tides. As noted in the preceding section (under Flood), anticipated sea level rise will increase the probability and intensity of future storm surge events in years to come.[7] This rise in sea level will not only increase the probability and intensity of tidal flooding events, but will also contribute to the loss of coastal wetlands and erosion of sand beaches that act as protective buffers against storm surge events.

FIRE-RELATED HAZARDS

C.2.5 Drought

Drought typically covers a large area and cannot be confined to any geographic or political boundaries. Furthermore, it is assumed that Harrison County would be uniformly exposed to drought, making the spatial extent potentially widespread. It is also notable that drought conditions typically do not cause significant damage to the built environment but may exacerbate wildfire conditions.

HISTORICAL OCCURRENCES

According to the U.S. Drought Monitor, Harrison County had drought levels of Severe or worse in 6 of the last 17 years (January 2000-October 2016). **Table C.12** shows the most severe drought classification for each year, according to U.S. Drought Monitor classifications. It should be noted that the U.S. Drought Monitor also estimates what percentage of the county is in each classification of drought severity. For example, the most severe classification reported may be exceptional but a majority of the county may actually be in a less severe condition.

TABLE C.12: HISTORICAL DROUGHT OCCURRENCES IN HARRISON COUNTY

Abnormally Dry (D0) Moderate Drought (D1) Severe Drought (D2) Extreme Drought (D3) Exceptional Drought (D4)

	Harrison County
2000	EXCEPTIONAL
2001	MODERATE
2002	SEVERE
2003	ABNORMAL
2004	MODERATE
2005	ABNORMAL
2006	EXTREME
2007	MODERATE

[7] The Sea Level Rise hazard is assessed more extensively under Section C.2.16.

	Harrison County
2008	ABNORMAL
2009	MODERATE
2010	MODERATE
2011	EXCEPTIONAL
2012	SEVERE
2013	MODERATE
2014	SEVERE
2015	MODERATE
2016	ABNORMAL

Source: United States Drought Monitor

No anecdotal information was available from the National Climatic Data Center on droughts in Harrison County.

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that Harrison County has a probability level of likely (between 10 and 100 percent annual probability) for future drought events. However, the extent (or magnitude) of drought and the amount of geographic area covered by drought, varies with each year. Historic information indicates that there is a much lower probability for extreme, long-lasting drought conditions.

C.2.6 Lightning

LOCATION AND SPATIAL EXTENT

Lightning occurs randomly, therefore it is impossible to predict where and with what frequency it will strike. It is assumed that all of Harrison County is uniformly exposed to lightning.

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, there have been 15 recorded lightning events in Harrison County since 1996.[8] These events resulted in more than $382,000 (2016 dollars) in damages.[9] Furthermore, lightning has caused two fatalities and one injury in the county. A summary of these events is presented in **Table C.13**. Detailed information on historical lightning events can be found in **Table C.14**.

It is certain that more than 15 events have impacted the county. Many of the reported events are those that caused damage, and it should be expected that damages are likely much higher for this hazard than what is reported.

[8] These lightning events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is certain that additional lightning events have occurred in Harrison County. As additional local data becomes available, this hazard profile will be amended.

[9] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE C.13: SUMMARY OF LIGHTNING OCCURRENCES IN HARRISON COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Biloxi	3	0/0	$76,754	$3,838
D'Iberville	1	1/0	$0	$0
Gulfport	6	1/0	$119,966	$6,665
Long Beach	0	0/0	$0	$0
Pass Christian	2	0/1	$31,471	$2,098
Unincorporated Area	3	0/0	$154,196	$9,637
HARRISON COUNTY TOTAL	**15**	**2/1**	**$382,387**	**$22,238**

Source: National Climatic Data Center

TABLE C.14: HISTORICAL LIGHTNING OCCURRENCES IN HARRISON COUNTY

Location	Date	Deaths/ Injuries	Property Damage*	Details
Biloxi				
BILOXI	5/28/1996	0/0	$0	Lightning struck a city police communications tower damaging the departments radio and computer system.
BILOXI	8/3/1996	0/0	$76,754	Lightning damaged the emergency 911 telephone system, started a fire that destroyed a house. A door was blown in when lightning struck a nearby tree.
BILOXI	6/6/2005	0/0	$0	A pine tree struck by lightning fell on the roof of a house causing a fire that resulted in extensive damage to the home.
D'Iberville				
D IBERVILLE	8/25/1999	1/0	$0	A 37 year old man was fatally injured by a lightning strike. The man was standing behind a waste collection truck when lightning struck a nearby tree and the charge moved through the tree to the man standing near the truck.
Gulfport				
GULFPORT	7/16/1998	0/0	$0	A lightning strike caused a fire that damaged four condominiums.
GULFPORT	7/26/1999	0/0	$14,457	Lightning started a fire at a house on Pine Forest Road that caused damage to two bedrooms and a hallway. Smoke damage occurred throughout the home.
GULFPORT	6/7/2001	1/0	$0	A lightning strike killed a 25 year old women in Gulfport shortly after lightning injured a 53 year old man in the nearby community of Pass Christian. Lightning also started a fire at a business in Oceans Springs which resulted in $60,000 damage.
GULFPORT	2/2/2006	0/0	$0	Lightning struck a home causing a fire that destroyed the roof, attic and second floor of the house.
GULFPORT	5/15/2008	0/0	$27,967	Lightning struck a house causing a fire in the attic.
GULFPORT	4/19/2013	0/0	$77,542	Lightning struck a Gulfport home during the early morning hours. One home was destroyed by the

Location	Date	Deaths/ Injuries	Property Damage*	Details
				ensuing fire and a second home suffered minor damage to vinyl siding.
Long Beach				
None reported	--	--	--	--
Pass Christian				
PASS CHRISTIAN	6/7/2001	0/1	$0	A lightning strike killed a 25 year old women in Gulfport shortly after lightning injured a 53 year old man in the nearby community of Pass Christian. Lightning also started a fire at a business in Oceans Springs which resulted in $60,000 damage.
PASS CHRISTIAN	3/21/2012	0/0	$31,471	Numerous fires reported, including an apartment complex, at least one home, and several power poles.
Unincorporated Area				
ORANGE GROVE	7/22/2000	0/0	$4,196	Three homes in the Orange Grove area were struck by lightning with one home receiving damage to its roof and attic.
SAUCIER	7/5/2006	0/0		A lightning strike started a fire in a mobile home.
LANDON	5/17/2016	0/0	$150,000	Lightning started fires that damaged homes on River Bend Drive and Lake Vista Drive between Lyman and Gulfport. Time of the event was estimated.

*Property damage is reported in 2016 dollars; All damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

Although there was not a high number of historical lightning events reported in Harrison County via NCDC data, it is a regular occurrence accompanied by thunderstorms. In fact, lightning events will assuredly happen on an annual basis, though not all events will cause damage. According to Vaisala's U.S. National Lightning Detection Network (NLDN), Harrison County is located in an area of the country that experienced an average of 4 to 12 and up lightning flashes per square kilometer per year between 2005 and 2014. Therefore, the probability of future events is highly likely (100 percent annual probability). It can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the county.

C.2.7 Wildfire

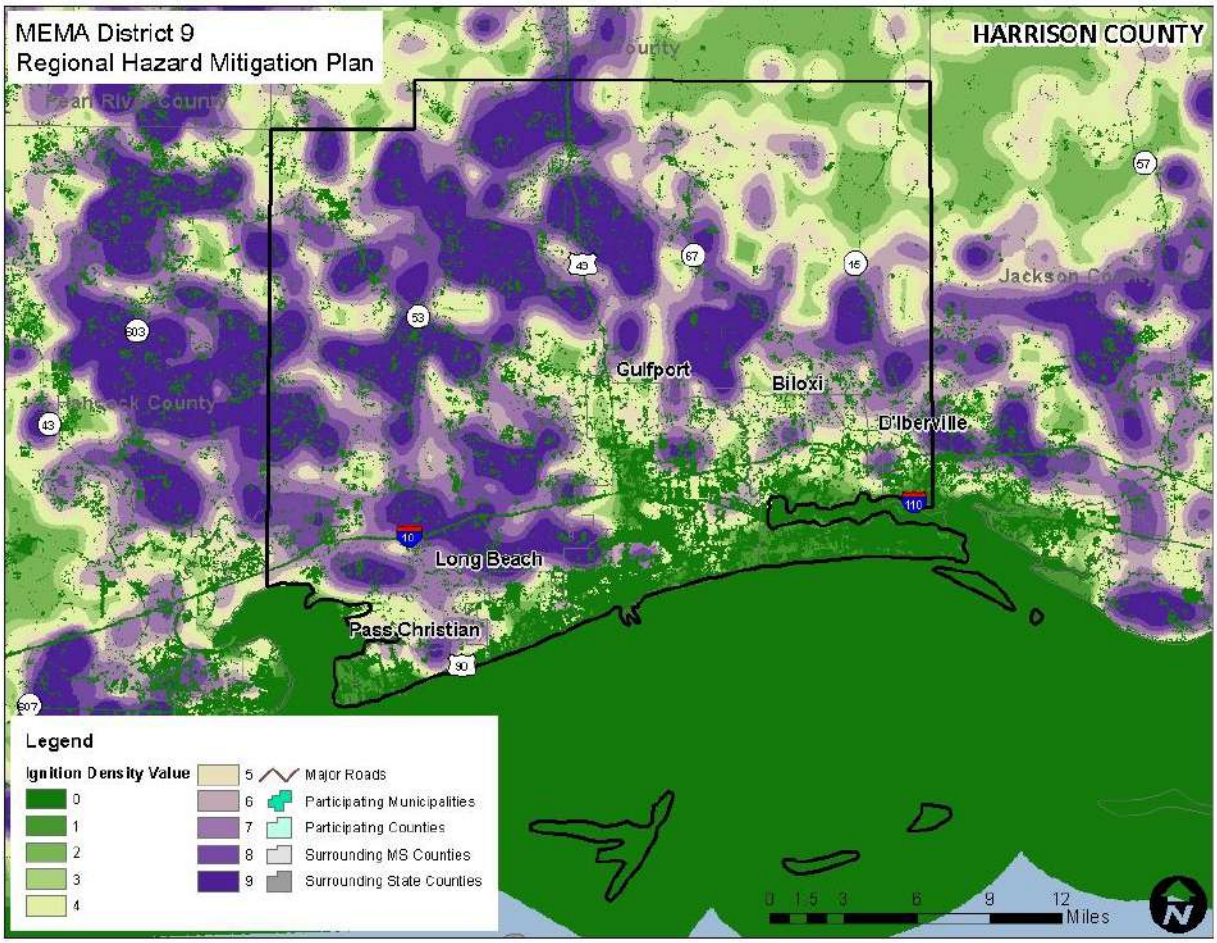
LOCATION AND SPATIAL EXTENT

The entire county is at risk to a wildfire occurrence. However, several factors such as drought conditions or high levels of fuel on the forest floor, may make a wildfire more likely. Furthermore, areas in the urban-wildland interface are particularly susceptible to fire hazard as populations abut formerly undeveloped areas. The Wildfire Ignition Density data shown in the figure below give an indication of historic location.

HISTORICAL OCCURRENCES

Figure C.7 shows the Wildfire Ignition Density in Harrison County based on data from the Southern Wildfire Risk Assessment. This data is based on historical fire ignitions and the likelihood of a wildfire igniting in an area. Occurrence is derived by modeling historic wildfire ignition locations to create an average ignition rate map. This is measured in the number of fires per year per 1,000 acres.[10]

FIGURE C.7: WILDFIRE IGNITION DENSITY IN HARRISON COUNTY



Source: Southern Wildfire Risk Assessment

Based on data from the Mississippi Forestry Commission from 2007 to 2016, Harrison County experiences an average of 88 wildfires annually which burn a combined 1,585 acres, on average per year. The data indicates that most of these fires are small, averaging 18 acres per fire. **Table C.15** provides a summary of wildfire occurrences in Harrison County and **Table C.16** lists the number of reported wildfire occurrences in the county between the years 2007 and 2016.

[10] Southern Wildfire Risk Assessment, 2014.

TABLE C.15: SUMMARY TABLE OF ANNUAL WILDFIRE OCCURRENCES (2007 -2016)*

	Harrison County
Average Number of Fires per year	87.5
Average Number of Acres Burned per year	1,585.0
Average Number of Acres Burned per fire	18.1

*These values reflect averages over a 10-year period.
Source: Mississippi Forestry Commission

TABLE C.16: HISTORICAL WILDFIRE OCCURRENCES IN HARRISON COUNTY

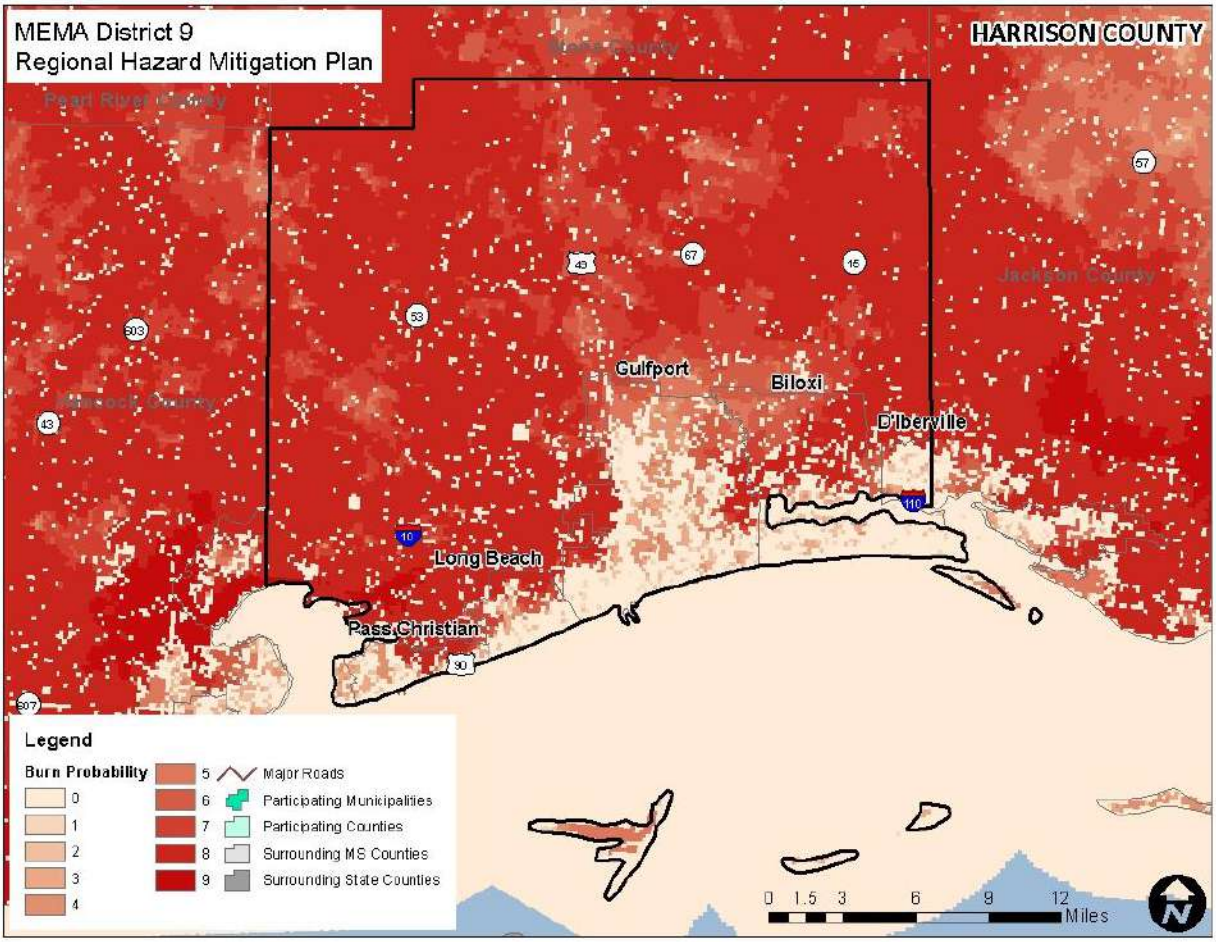
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Harrison County										
Number of Fires	87	86	114	71	185	72	69	51	77	63
Number of Acres Burned	2,469	1,027	1,877	1,052	4,744	906	802	695	1,460	818

Source: Mississippi Forestry Commission

PROBABILITY OF FUTURE OCCURRENCES

Wildfire events will be an ongoing occurrence in Harrison County. **Figure C.8** shows that there is some probability a wildfire will occur throughout the county. However, the likelihood of wildfires increases during drought cycles and abnormally dry conditions. Fires are likely to stay small in size but could increase due to local climate and ground conditions. Dry, windy conditions with an accumulation of forest floor fuel (potentially due to ice storms or lack of fire) could create conditions for a large fire that spreads quickly. It should also be noted that some areas do vary somewhat in risk. For example, highly developed areas are less susceptible unless they are located near the urban-wildland boundary. The risk will also vary due to assets. Areas in the urban-wildland interface will have much more property at risk, resulting in increased vulnerability and need to mitigate compared to rural, mainly forested areas. The probability assigned to Harrison County for future wildfire events is highly likely (100 percent annual probability).

FIGURE C.8: BURN PROBABILITY IN HARRISON COUNTY



Source: Southern Wildfire Risk Assessment

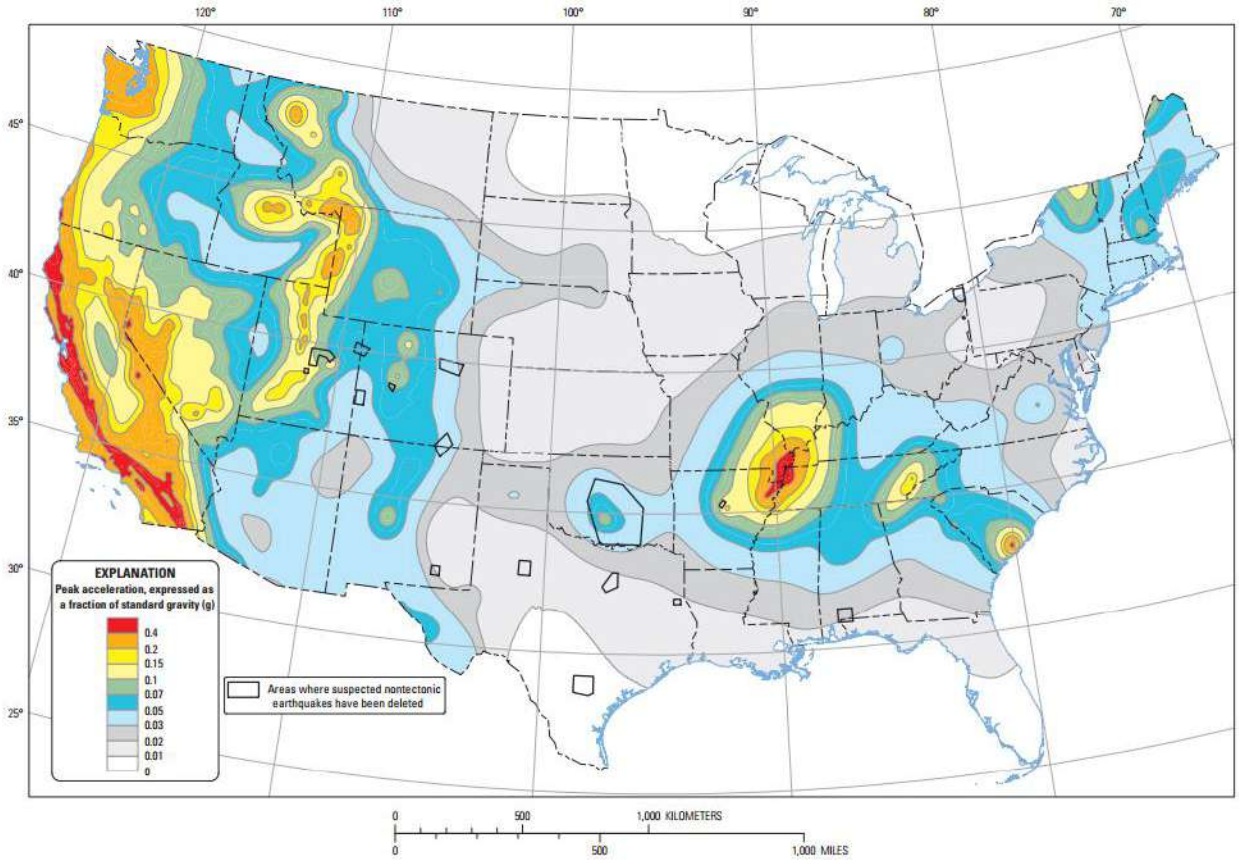
GEOLOGIC HAZARDS

C.2.8 Earthquake

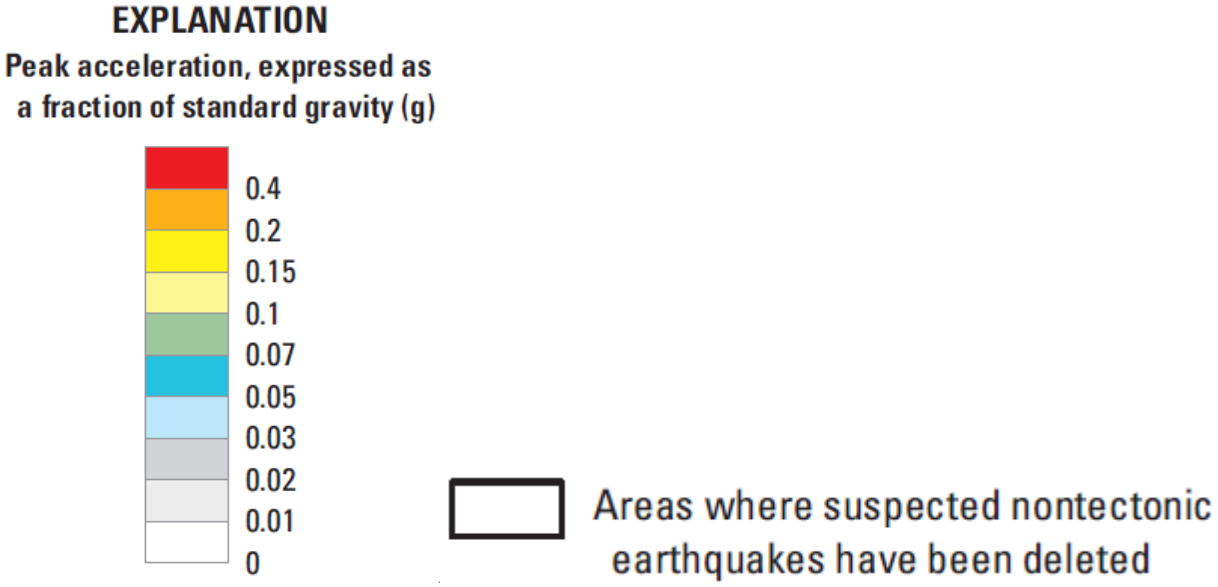
LOCATION AND SPATIAL EXTENT

Figure C.9 shows the intensity level associated with Harrison County, based on the national USGS map of peak acceleration with 10 percent probability of exceedance in 50 years. It is the probability that ground motion will reach a certain level during an earthquake. The data show peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10 percent probability of exceedance in 50 years. The map was compiled by the U.S. Geological Survey (USGS) Geologic Hazards Team, which conducts global investigations of earthquake, geomagnetic, and landslide hazards. According to this map, Harrison County lies within an approximate zone of level "1" to "2" ground acceleration. This indicates that the county exists within an area of low seismic risk.

FIGURE C.9: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS



Ten-percent probability of exceedance in 50 years map of peak ground acceleration



Source: United States Geological Survey, 2014

The primary source of potential damage to Harrison County from an earthquake is the New Madrid Seismic Zone (NMSZ). Historically, a series of earthquakes in 1811 and 1812 demonstrated that this fault zone can produce high magnitude seismic events, sometimes on the scale of a 7.5-8.0 on the Richter scale. The biggest challenge with earthquakes that occur in this area of seismic activity is predicting the recurrence of earthquakes emanating from this zone. Although the magnitude of earthquakes from the NMSZ can be large, they occur very irregularly and fairly infrequently. This makes it extremely difficult to project when they will occur.

It should also be noted that the State of Mississippi Hazard Mitigation Plan identifies certain areas of concern for liquefaction and lists the counties and corresponding zones within those counties that have the highest liquefaction potential. Harrison County does not have any identified liquefaction potential risk.

HISTORICAL OCCURRENCES

At least four earthquakes are known to have affected Harrison County since 1955. **Table C.17** provides a summary of earthquake events reported by the National Centers for Environmental Information (formerly National Geophysical Data Center) between 1638 and 1985, and **Figure C.10** presents a map showing earthquakes whose epicenters have occurred near the county between 1985 and 2015 (no earthquakes occurred within the county boundaries during this period). A detailed occurrence of each event including the date, distance from the epicenter, magnitude, and Modified Mercalli Intensity (if known) can be found in **Table C.18**.[11]

TABLE C.17: SUMMARY OF SEISMIC ACTIVITY IN HARRISON COUNTY

Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
Biloxi	1	IV	< 4.8
D'Iberville	0	--	--
Gulfport	1	V	< 4.8
Long Beach	0	--	--
Pass Christian	1	IV	< 4.8
Unincorporated Area	1	IV	< 4.8
HARRISON COUNTY TOTAL	**4**	**V**	**< 4.8**

Source: National Geophysical Data Center

TABLE C.18: SIGNIFICANT SEISMIC EVENTS IN HARRISON COUNTY (1638 -1985)

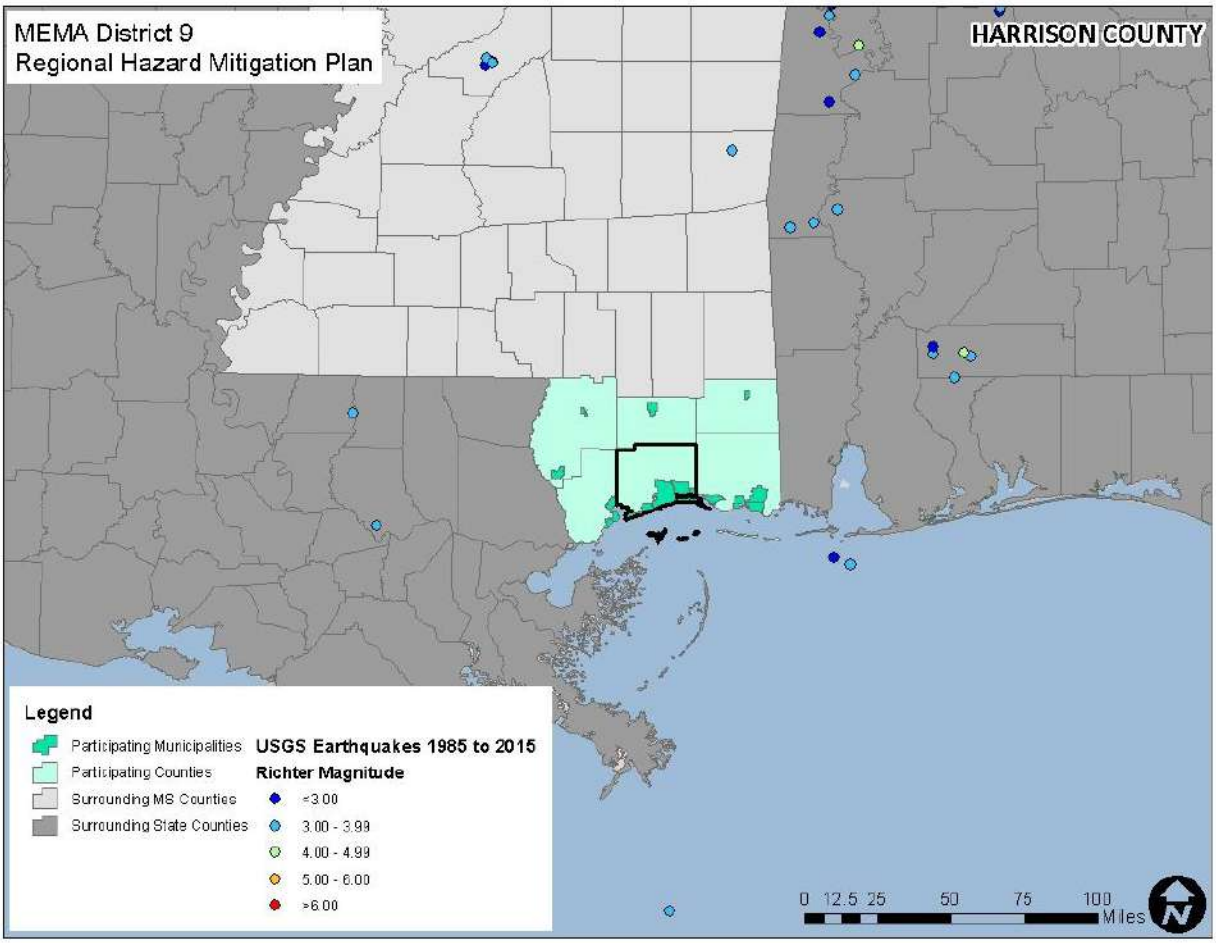
Location	Date	Epicentral Distance	Magnitude	MMI
Biloxi				
BILOXI	2/1/1955	12.0 km	*Unknown*	IV
D'Iberville				
None reported	--	--	--	--
Gulfport				
GULFPORT	2/1/955	2.0 km	*Unknown*	V

[11] Due to reporting mechanisms, not all earthquakes events were recorded during this time. Furthermore, some are missing data, such as the epicenter location, due to a lack of widely used technology. In these instances, a value of "unknown" is reported.

Location	Date	Epicentral Distance	Magnitude	MMI
Long Beach				
None reported	--	--	--	--
Pass Christian				
PASS CHRISTIAN	2/1/1955	16.0 km	*Unknown*	IV
Unincorporated Area				
MISSISSIPPI CITY	2/1/1955	5.0 km	*Unknown*	IV

Source: National Geophysical Data Center

FIGURE C.10: HISTORIC EARTHQUAKES WITH EPICENTERS NEAR HARRISON COUNTY (1985-2015)



Source: United States Geological Survey

PROBABILITY OF FUTURE OCCURRENCES

The probability of significant, damaging earthquake events affecting Harrison County is unlikely. However, it is possible that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light will affect the county. The annual probability level for the county is estimated to be between 1 and 10 percent (possible).

WIND-RELATED HAZARDS

C.2.9 Extreme Cold

Extreme cold typically impacts a large area and cannot be confined to any geographic or political boundaries. The entire county is susceptible to extreme cold conditions.

HISTORICAL OCCURRENCES

Data from the National Climatic Data Center was used to determine historical extreme cold events in Harrison County. Two events were reported:

February 2, 1996 – *Cold/Wind Chill* – An arctic airmass overspread much of south Mississippi bringing the longest extended period of cold weather since 1989. In Amite County, 4SW Gillsburg, a 67 year old man died from hypothermia on the 4th after the fire in a wood burning heater went out. Considerable property damage resulted from broken pipes due to the extended period of subfreezing temperatures. In Jackson County, Moss Point and Gautier had broken pipes in 100 and 147 houses, respectively.

December 18, 1996 – *Cold/Wind Chill* – An arctic airmass overspread south Mississippi resulting in three consecutive nights with subfreezing minimum temperatures. Temperatures lowered into the mid-teens over the southwest section of the state and near 20 degrees along the Gulf Coast.

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that all of Harrison County has a probability level of possible (between 1 and 10 percent annual probability) for future extreme cold events to impact the county.

C.2.10 Extreme Heat

Heat waves typically impact a large area and cannot be confined to any geographic or political boundaries. The entire county is susceptible to extreme heat conditions.

HISTORICAL OCCURRENCES

The National Climatic Data Center was used to determine historical heat wave occurrences in the county.

July 2010 – Several days of temperatures near 100 degrees contributed to two deaths from heat stroke in the Gulfport area. The Harrison County Coroner stated that two deaths in a mobile home on Smith Road near Canal Road were caused by heat stroke. High temperatures at Gulfport Airport, approximately 3 miles away, were between 98 and 102 degrees from July 29 through August 2. Bodies were discovered on August 4, but deaths occurred several days prior to that. Date of deaths was estimated.

PROBABILITY OF FUTURE OCCURRENCES

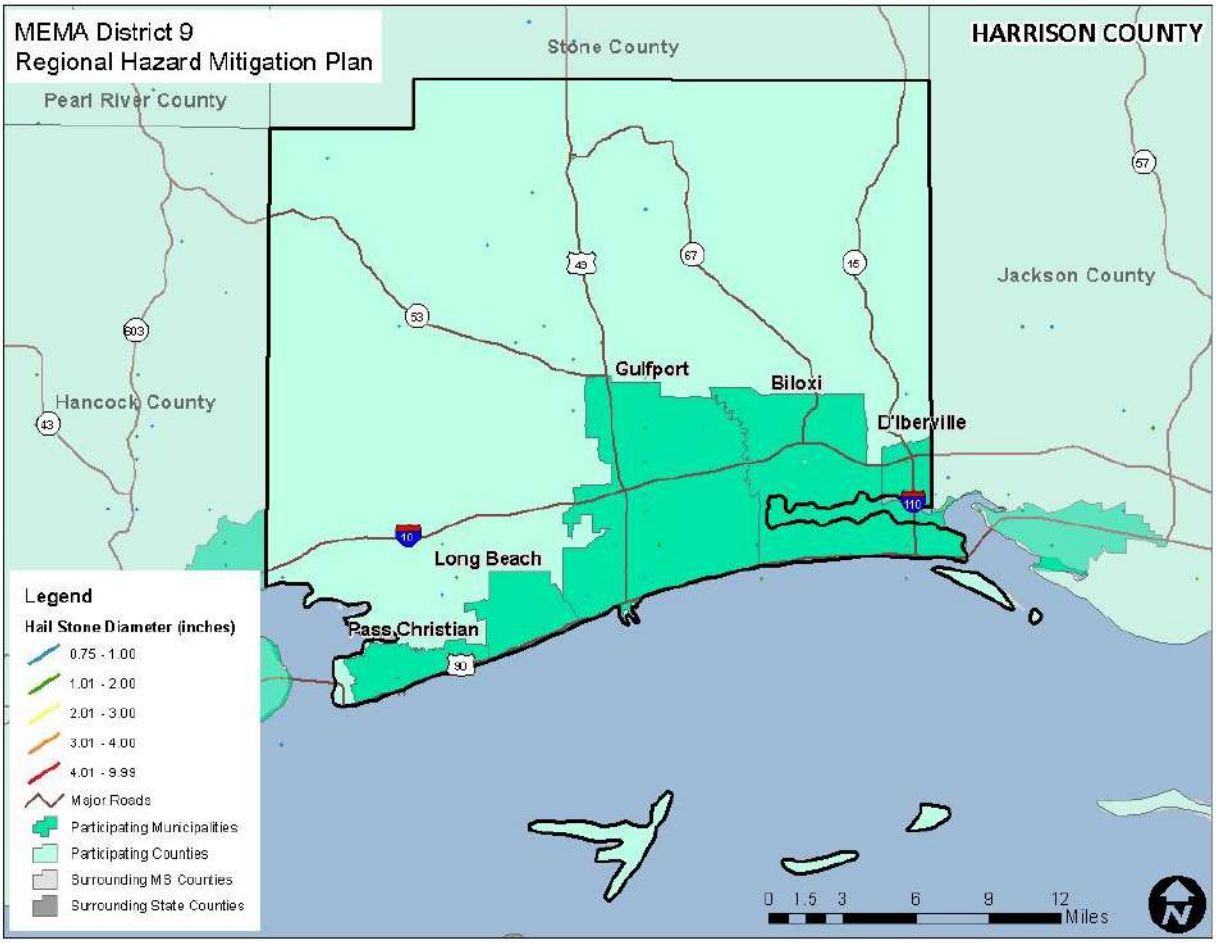
Based on historical occurrence information, it is assumed that all of Harrison County has a probability level of highly likely (100 percent annual probability) for future heat wave events.

C.2.11 Hailstorm

LOCATION AND SPATIAL EXTENT

Hailstorms frequently accompany thunderstorms, so their locations and spatial extents coincide. It is assumed that Harrison County is uniformly exposed to severe thunderstorms; therefore, all areas of the county are equally exposed to hail which may be produced by such storms. With that in mind, **Figure C.11** shows the location of hail events that have impacted the county between 1955 and 2015.

FIGURE C.11: HAILSTORM TRACKS IN HARRISON COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, 73 recorded hailstorm events have affected Harrison County since 1969.[12] In all, hail occurrences did not result in any property damages.[13] Hail ranged in diameter from 0.75 inches to 2.75 inches. **Table C.19** provides a summary of the hail events in Harrison County. Detailed information about each event that occurred in the county is provided in **Table C.20**.

It should be noted that hail is notorious for causing substantial damage to cars, roofs, and other areas of the built environment that may not be reported to the National Climatic Data Center. Therefore, it is likely that damages are greater than the reported value.

TABLE C.19: SUMMARY OF HAIL OCCURRENCES IN HARRISON COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Biloxi	7	0/0	$0	$0
D'Iberville	4	0/0	$0	$0
Gulfport	13	0/0	$0	$0
Long Beach	3	0/0	$0	$0
Pass Christian	4	0/0	$0	$0
Unincorporated Area	42	0/0	$0	$0
HARRISON COUNTY TOTAL	**73**	**0/0**	**$0**	**$0**

Source: National Climatic Data Center

TABLE C.20: HISTORICAL HAIL OCCURRENCES IN HARRISON COUNTY

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
Biloxi				
Biloxi	3/1/1994	0.88 in.	0/0	$0
BILOXI	1/24/1997	2.75 in.	0/0	$0
BILOXI	6/23/1997	1.00 in.	0/0	$0
BILOXI	7/21/2000	1.00 in.	0/0	$0
BILOXI	4/26/2005	0.75 in.	0/0	$0
BILOXI	6/12/2007	0.75 in.	0/0	$0
(BIX)KEESLER AFB BIL	4/28/2016	0.88 in.	0/0	$0
D'Iberville				
D'Iberville	7/9/1995	0.75 in.	0/0	$0
D IBERVILLE	7/14/2000	0.75 in.	0/0	$0
D IBERVILLE	7/4/2009	1.00 in.	0/0	$0
D IBERVILLE	5/25/2010	1.00 in.	0/0	$0
Gulfport				
Gulfport	3/1/1994	1.75 in.	0/0	$0

[12] These hail events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through June 2016. It is likely that additional hail events have affected Harrison County. As additional local data becomes available, this hazard profile will be amended.
[13] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
Gulfport	9/9/1994	0.75 in.	0/0	$0
GULFPORT	2/19/1996	0.75 in.	0/0	$0
GULFPORT	6/3/1996	0.88 in.	0/0	$0
GULFPORT	1/24/1997	1.75 in.	0/0	$0
GULFPORT	3/13/2003	0.88 in.	0/0	$0
GULFPORT	7/17/2003	0.75 in.	0/0	$0
GULFPORT	5/31/2004	0.75 in.	0/0	$0
GULFPORT	2/13/2007	1.00 in.	0/0	$0
GULFPORT	5/11/2007	1.75 in.	0/0	$0
GULFPORT	4/2/2009	0.88 in.	0/0	$0
GULFPORT	4/2/2009	0.75 in.	0/0	$0
(GPT)GULFPORT RGNL A	2/23/2016	1.00 in.	0/0	$0
Long Beach				
LONG BEACH	2/19/1996	0.75 in.	0/0	$0
LONG BEACH	3/7/1998	1.75 in.	0/0	$0
LONG BEACH	4/13/2000	1.75 in.	0/0	$0
Pass Christian				
PASS CHRISTIAN	3/30/1996	1.75 in.	0/0	$0
PASS CHRISTIAN	3/7/1998	1.75 in.	0/0	$0
PASS CHRISTIAN	8/4/2006	0.88 in.	0/0	$0
PASS CHRISTIAN	2/23/2016	1.00 in.	0/0	$0
Unincorporated Area				
HARRISON CO.	4/23/1969	0.75 in.	0/0	$0
HARRISON CO.	5/8/1975	0.75 in.	0/0	$0
HARRISON CO.	6/26/1980	1.75 in.	0/0	$0
HARRISON CO.	3/22/1981	1.75 in.	0/0	$0
HARRISON CO.	5/8/1983	1.75 in.	0/0	$0
HARRISON CO.	4/26/1984	0.75 in.	0/0	$0
HARRISON CO.	8/25/1986	1.75 in.	0/0	$0
HARRISON CO.	8/25/1986	1.75 in.	0/0	$0
HARRISON CO.	1/18/1988	1.00 in.	0/0	$0
HARRISON CO.	5/10/1988	1.75 in.	0/0	$0
HARRISON CO.	11/15/1989	1.75 in.	0/0	$0
HARRISON CO.	3/15/1990	0.75 in.	0/0	$0
HARRISON CO.	4/22/1990	1.75 in.	0/0	$0
HARRISON CO.	1/30/1991	1.00 in.	0/0	$0
HARRISON CO.	4/10/1991	1.00 in.	0/0	$0
HARRISON CO.	6/4/1991	0.80 in.	0/0	$0
HARRISON CO.	8/10/1992	1.00 in.	0/0	$0
SAUCIER	1/24/1997	1.75 in.	0/0	$0
SAUCIER	5/3/1997	1.75 in.	0/0	$0
LIZANA	5/3/1998	0.75 in.	0/0	$0
ORANGE GROVE	7/26/1999	0.75 in.	0/0	$0
SAUCIER	6/25/2000	1.75 in.	0/0	$0
CUEVAS	7/21/2000	0.75 in.	0/0	$0
WOOL MARKET	7/21/2000	0.75 in.	0/0	$0

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
SAUCIER	8/30/2000	1.00 in.	0/0	$0
LYMAN	8/30/2000	1.00 in.	0/0	$0
LYMAN	8/30/2000	1.00 in.	0/0	$0
WORTHAM	8/30/2004	1.00 in.	0/0	$0
LYMAN	7/20/2006	0.75 in.	0/0	$0
LYMAN	6/13/2007	0.88 in.	0/0	$0
SAUCIER	2/17/2008	1.00 in.	0/0	$0
SAUCIER	3/4/2008	1.75 in.	0/0	$0
SAUCIER	8/3/2008	1.25 in.	0/0	$0
SAUCIER	5/26/2011	1.00 in.	0/0	$0
LYMAN	6/6/2011	1.25 in.	0/0	$0
LYMAN	6/6/2011	1.00 in.	0/0	$0
LYMAN	6/6/2011	1.00 in.	0/0	$0
BEAUVOIR	4/4/2012	1.00 in.	0/0	$0
SAUCIER	9/5/2015	1.50 in.	0/0	$0
LYMAN	2/23/2016	1.75 in.	0/0	$0
LANDON	4/28/2016	1.00 in.	0/0	$0
LANDON	4/28/2016	0.75 in.	0/0	$0

*Property damage is reported in 2016 dollars; All damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that the probability of future hail occurrences is highly likely (100 percent annual probability). Since hail is an atmospheric hazard, it is assumed that Harrison County has equal exposure to this hazard. It can be expected that future hail events will continue to cause minor damage to property and vehicles throughout the county.

C.2.12 Hurricane and Tropical Storm

LOCATION AND SPATIAL EXTENT

Hurricanes and tropical storms threaten the entire Atlantic and Gulf seaboard of the United States, and while coastal areas are most directly exposed to the brunt of landfalling storms, their impact is often felt hundreds of miles inland. Harrison County is located in a region of the country that is susceptible to all of the hazards wrought by hurricanes and tropical storms. All areas throughout Harrison County are susceptible to the accompanying hazard effects of extreme wind, flooding, and tornadoes, and coastal areas are also extremely susceptible to the added effects of storm surge, wave action, coastal erosion, and tidal flooding.[14]

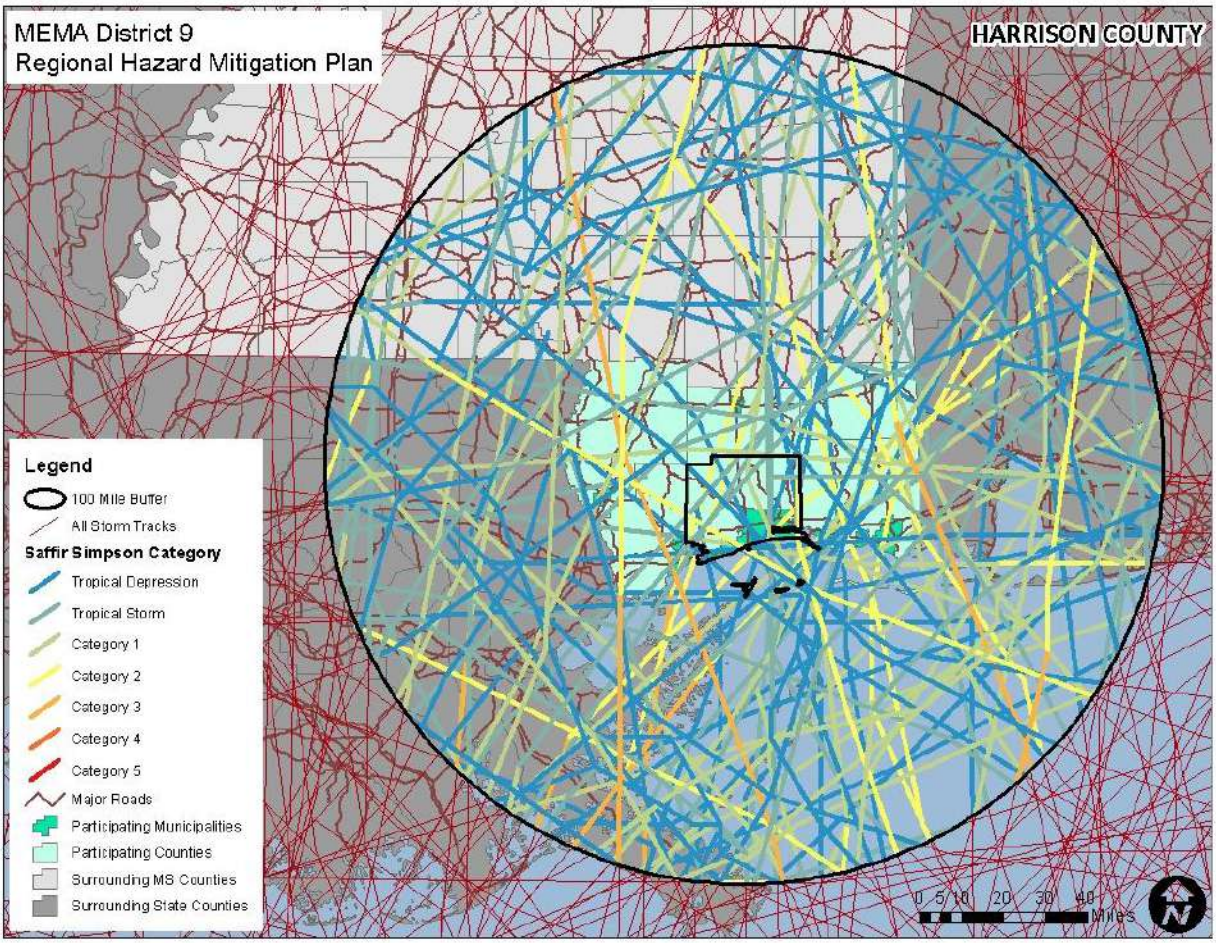
[14] Distinct hazard area locations for flooding, storm surge, wave action, and coastal erosion are discussed elsewhere in this subsection.

HISTORICAL OCCURRENCES

According to the National Hurricane Center's historical storm track records, 119 hurricane or tropical storm/depression tracks have passed within 100 miles of the MEMA District 9 Region since 1855.[15] This includes: 4 Category 3 hurricanes, 15 Category 2 hurricanes, 28 Category 1 hurricanes, 29 tropical storms, and 43 tropical depressions. Additionally, four other major storms had large-scale impacts on the region and are not included in these totals. These storms are listed below and range in Category from 1 to 4.

Of the recorded storm events, 58 hurricane or tropical storm/depression events traversed directly through the region as shown in **Figure C.12**. Notable storms include Hurricane Camille (1969), Hurricane Frederic (1979), and Hurricane Katrina (2005). **Table C.21** provides for each event the date of occurrence, name (if applicable), maximum wind speed (as recorded within 100 miles of the MEMA District 9 Region) and category of the storm based on the Saffir-Simpson Scale.

FIGURE C.12: HISTORICAL HURRICANE STORM TRACKS WITHIN 100 MILES OF THE MEMA DISTRICT 9 REGION



Source: National Oceanic and Atmospheric Administration, National Hurricane Center

[15] These storm track statistics include tropical depressions, tropical storms, and hurricanes. Lesser events may still cause significant local impact in terms of rainfall and high winds.

TABLE C.21: HISTORICAL STORM TRACKS WITHIN 100 MILES OF THE MEMA 9 DISTRICT REGION (1842–2016)

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
8/25/1852	UNNAMED	93	Category 2
8/3/1855	NOT NAMED	--	Tropical Depression
9/16/1855	UNNAMED	96	Category 2
6/24/1857	NOT NAMED	--	Tropical Depression
9/15/1859	UNNAMED	79	Category 1
8/11/1860	UNNAMED	96	Category 2
9/15/1860	UNNAMED	89	Category 2
8/17/1861	NOT NAMED	--	Tropical Depression
11/1/1861	NOT NAMED	--	Tropical Depression
9/15/1862	NOT NAMED	--	Tropical Depression
9/16/1862	NOT NAMED	--	Tropical Depression
10/1/1863	UNNAMED	43	Tropical Storm
6/3/1866	NOT NAMED	--	Tropical Depression
9/16/1867	NOT NAMED	--	Tropical Depression
10/5/1867	UNNAMED	89	Category 2
10/3/1868	NOT NAMED	--	Tropical Depression
9/5/1869	UNNAMED	79	Category 1
7/30/1870	NOT NAMED	--	Tropical Depression
7/11/1872	UNNAMED	59	Tropical Storm
9/18/1875	UNNAMED	18	Tropical Depression
9/18/1877	UNNAMED	79	Category 1
9/1/1879	UNNAMED	89	Category 2
10/7/1879	UNNAMED	59	Tropical Storm
8/31/1880	UNNAMED	70	Category 1
8/2/1881	NOT NAMED	--	Tropical Depression
8/3/1881	UNNAMED	59	Tropical Storm
8/30/1885	UNNAMED	59	Tropical Storm
9/26/1885	UNNAMED	70	Category 1
6/15/1886	UNNAMED	50	Tropical Storm
6/14/1887	UNNAMED	33	Tropical Depression
10/19/1887	UNNAMED	82	Category 1
6/27/1888	NOT NAMED	--	Tropical Depression
9/23/1889	UNNAMED	79	Category 1
8/27/1890	UNNAMED	43	Tropical Storm
9/21/1891	NOT NAMED	--	Tropical Depression
9/12/1892	UNNAMED	59	Tropical Storm
9/7/1893	UNNAMED	79	Category 1
10/2/1893	UNNAMED	97	Category 3
8/7/1894	UNNAMED	59	Tropical Storm
8/15/1895	UNNAMED	59	Tropical Storm
9/13/1900	UNNAMED	43	Tropical Storm
8/14/1901	UNNAMED	82	Category 1
10/9/1905	UNNAMED	43	Tropical Storm
9/27/1906	UNNAMED	93	Category 2

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
9/21/1907	UNNAMED	43	Tropical Storm
8/11/1911	UNNAMED	79	Category 1
6/13/1912	UNNAMED	59	Tropical Storm
7/17/1912	UNNAMED	5	Tropical Depression
9/13/1912	UNNAMED	82	Category 1
9/18/1914	UNNAMED	33	Tropical Depression
9/29/1915	UNNAMED	96	Category 2
7/5/1916	UNNAMED	95	Category 2
10/17/1922	UNNAMED	18	Tropical Depression
6/26/1923	UNNAMED	43	Tropical Storm
10/17/1923	UNNAMED	59	Tropical Storm
9/20/1926	UNNAMED	93	Category 2
9/1/1932	UNNAMED	82	Category 1
10/15/1932	UNNAMED	59	Tropical Storm
7/27/1936	UNNAMED	43	Tropical Storm
8/22/1936	UNNAMED	5	Tropical Depression
6/16/1939	UNNAMED	59	Tropical Storm
9/26/1939	UNNAMED	50	Tropical Storm
9/24/1940	UNNAMED	18	Tropical Depression
9/10/1944	UNNAMED	64	Category 1
9/5/1945	UNNAMED	18	Tropical Depression
9/19/1947	UNNAMED	92	Category 2
9/4/1948	UNNAMED	79	Category 1
9/4/1949	UNNAMED	43	Tropical Storm
8/31/1950	BAKER	82	Category 1
8/1/1955	BRENDA	70	Category 1
8/27/1955	UNNAMED	50	Tropical Storm
9/24/1956	FLOSSY	82	Category 1
9/18/1957	ESTHER	64	Category 1
10/8/1959	IRENE	43	Tropical Storm
9/15/1960	ETHEL	85	Category 2
9/26/1960	FLORENCE	1	Tropical Depression
10/4/1964	HILDA	70	Category 1
9/10/1965	BETSY*	117	Category 4
9/29/1965	DEBBIE	33	Tropical Depression
8/18/1969	CAMILLE	100	Category 3
8/8/1971	UNNAMED	5	Tropical Depression
9/4/1971	FERN	5	Tropical Depression
9/16/1971	EDITH	70	Category 1
7/29/1975	UNNAMED	18	Tropical Depression
10/17/1975	UNNAMED	5	Tropical Depression
9/24/1976	UNNAMED	5	Tropical Depression
7/19/1977	UNNAMED	18	Tropical Depression
9/6/1977	BABE	18	Tropical Depression
10/25/1977	UNNAMED	18	Tropical Depression
8/10/1978	UNNAMED	5	Tropical Depression

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
7/11/1979	BOB	74	Category 1
9/12/1979	FREDERIC	97	Category 3
7/20/1980	UNNAMED	5	Tropical Depression
10/27/1984	UNNAMED	18	Tropical Depression
9/2/1985	ELENA	95	Category 2
10/31/1985	JUAN	64	Category 1
8/12/1987	UNNAMED	5	Tropical Depression
8/8/1988	BERYL	5	Tropical Depression
8/9/1988	BERYL	50	Tropical Storm
9/10/1988	FLORENCE	79	Category 1
8/3/1995	ERIN	82	Category 1
7/19/1997	DANNY	79	Category 1
9/27/1998	GEORGES	92	Category 2
9/20/1998	HERMINE	33	Tropical Depression
6/11/2001	ALLISON	43	Tropical Storm
8/5/2002	BERTHA	33	Tropical Depression
9/14/2002	HANNA	59	Tropical Storm
9/26/2002	ISIDORE	64	Category 1
6/30/2003	BILL	59	Tropical Storm
7/1/2003	BILL	18	Tropical Depression
9/16/2004	IVAN	96	Category 2
6/11/2005	ARLENE	59	Tropical Storm
7/6/2005	CINDY	74	Category 1
7/10/2005	DENNIS*	100	Category 3
8/29/2005	KATRINA	98	Category 3
9/22/2007	TEN	5	Tropical Depression
8/24/2008	FAY	18	Tropical Depression
9/1/2008	GUSTAV*	87	Category 2
11/10/2009	IDA	70	Category 1
7/25/2010	BONNIE	5	Tropical Depression
8/12/2010	FIVE	5	Tropical Depression
9/5/2011	LEE	43	Tropical Storm
8/28/2012	ISAAC*	70	Category 1

*It should be noted that the track of several major hurricanes that impacted the region fell outside of the 100-mile buffer. These storms were included in the table due to their significant impact (Betsy, 1965; Dennis, 2005; Gustav, 2008; and Isaac, 2012), but it should be noted that wind speed and storm category are estimated based on anecdotal information.
Source: National Hurricane Center

Federal records indicate that 12 disaster declarations were made in 1965 (Hurricane Betsy), 1969 (Hurricane Camille), 1979 (Hurricane Frederic), 1985 (Hurricane Elena), 1998 (Hurricane Georges), 2001 (Tropical Storm Allison), 2002 (Tropical Storm Isidore), 2004 (Hurricane Ivan), 2005 (Hurricane Dennis and Hurricane Katrina), 2008 (Hurricane Gustav), and 2012 (Hurricane Isaac).[16] Hurricane and tropical storm events can cause substantial damage in the area due to high winds and flooding.

[16] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

Flooding and high winds from hurricanes and tropical storms can cause damage throughout the county. Anecdotes are available from NCDC for the major storms that have impacted the county as found below:

Hurricane Georges – September 25-29, 1998
Hurricane Georges, a strong Category 2 hurricane moved slowly northwest across the Gulf of Mexico toward southeast Louisiana and coastal Mississippi on the September 25 and September 26. As the hurricane approached the mouth of the Mississippi River on September 27, it slowly turned toward the north making landfall along the Mississippi Coast just to the east of Biloxi, MS at 0400 CST on September 28. The hurricane moved only slowly north during the morning hours, at times becoming nearly stationary. The hurricane finally was downgraded to a tropical storm at 1500CST on September 28 when it was located north of Biloxi. The tropical storm then moved very slowly eastward into southern Alabama on September 29.

The greatest affect from the hurricane occurred over Jackson County which experienced the intense eastern portion of the hurricanes eyewall and highest storm surge.

Due to the slow forward speed of the hurricane very heavy rainfall occurred over eastern Harrison County and Jackson County leading to record flooding on streams and rivers. The barrier islands in the Mississippi Sound were also heavily damaged by wind and storm surge. A new three quarter mile cut developed in the east portion of Ship Island. Total insured property damage in Mississippi was estimated at near 310 million dollars by insurance industry sources. When uninsured losses and public property damage considered, total damages in Mississippi will likely approach $620 million.

Harrison County - Moderate wind damage occurred throughout the parish. Many commercial signs were damaged or destroyed, large trees limbs and trees downed, and wind damaged roofs or houses and businesses. At the Gulfport Harbor, a wind gage recorded a maximum gust of 80 mph at 0415CST on September 28. At approximately the same time period, a gust to 117 mph was recorded in Gulfport, one mile north of the beach. Storm surge flooding was generally 6 to 7 feet above normal across the coast. Storm surge flooding crossed US Highway 90 in several locations, but storm surge flooding to property was not considered major. A maximum stage of 8.1 feet was recorded at the Gulfport Harbor.

Due to the slow movement of the hurricane, heavy rain occurred over the east portion of the county and adjacent areas. Significant river flooding occurred on the Biloxi and Tchoutacabouffa Rivers on the September 28 and September 29. Wortham, on the Biloxi River reached its second highest stage of record with a reading of 25.47 feet on September 29.

Many county residents evacuated low lying areas in advance of the hurricane with approximately 3700 seeking refuge in public evacuation shelters within the county.

Hurricane Katrina – August 24-30, 2005
Hurricane Katrina was one of the strongest and most destructive hurricanes on record to impact the coast of the United States. It will likely be recorded as one the worst natural disaster in the history of the United States to date resulting in catastrophic damage and numerous casualties in southeast Louisiana and along the Mississippi coast. Damage and casualties resulting from Hurricane Katrina extended as far east as Alabama and the panhandle of Florida. Katrina developed from a tropical depression southeast of the Bahamas on August 24th. After moving through the Bahamas as a tropical storm, Katrina strengthened to a category 1 hurricane prior to landfall in south Florida around the Miami area on the 25th of August. Katrina crossed south Florida and entered the Gulf of Mexico and began to strengthen. Hurricane Katrina

strengthened to a category 5 storm on August 28th about 250 miles south southeast of the mouth of the Mississippi River with winds reaching their peak intensity of 175 mph and a central pressure of 902 mb. Post event analysis by the National Hurricane Center indicates that Katrina weakened slightly before making landfall as a strong category 3 storm in initial landfall in lower Plaquemines Parish. Maximum sustained winds were estimated at 110 knots or 127 mph and a central pressure of 920 mb around 610 AM CDT on August 29th in southeast Louisiana just south of Buras in Plaquemines Parish. The storm continued on a north northeast track with the center passing about 40 miles southeast of New Orleans with a second landfall occurring near the Louisiana and Mississippi border around 945 AM CDT as a category 3 storm with maximum sustained winds estimated around 105 knots or 121 mph. Katrina continued to weaken as it moved north northeast across Mississippi during the day, but remained at hurricane strength 100 miles inland near Laurel, Mississippi. Katrina weakened to a tropical depression near Clarksville, Tennessee on August 30th.

Damage across coastal Mississippi was catastrophic. The storm surge associated with Hurricane Katrina approached or exceeded the surge associated with Hurricane Camille and impacted a much more extensive area. Almost total destruction was observed along the immediate coast in Hancock and Harrison Counties with storm surge damage extending north along bays and bayous to Interstate 10. Thousands of homes and businesses were destroyed by the storm surge. Hurricane force winds also caused damage to roofs, power lines, signage, downed trees, and some windows were broken by wind and wind driven debris in areas away from storm surge flooding, wind damage was widespread with fallen trees taking a heavy toll on houses and power lines. Damage was less extensive in southwest Mississippi. Excluding losses covered by the Federal Flood Insurance Program, insured property losses in Mississippi were estimated at 9.8 billion dollars. Uninsured and insured losses combined were estimated to exceed 100 billion dollars across the Gulf Coast.

As of late October, the following fatality figures were reported in the Mississippi coastal counties; Hancock- 52, Harrison - 83, Jackson - 17. Additional details on fatalities will be given in later updates to storm data.

Due to the failure of power and equipment prior to the peak of the storm, data for wind, storm surge, pressure, and rainfall are incomplete. The lowest pressure on the Mississippi coast was estimated to be 928 mb where the hurricane made landfall near the Louisiana Mississippi border. A pressure of 976 mb was recorded at 0951 CDT by a university weather station deployed in Pascagoula, well east of the landfall location. At approximately the same time, the pressure at the NWS office in Slidell, just to the west of landfall location, recorded a pressure of 934.1 mb at 0938 AM CDT.

The highest wind gusts recorded in Mississippi and the adjacent coastal waters were 117 knots (134 mph) at the Pearl River County EOC office in Poplarville and 102 knots (118 mph) at 1000AM CDT by a university wind tower deployed at the Stennis Space Center in Hancock County. Maximum sustained winds in Mississippi were estimated around 105 knots (121 mph) near the storm's second landfall along the Mississippi and Louisiana border. Unofficial wind observations before the gage failed included a wind gust of 106 kt, (122 mph) at 0615 CDT by an amateur radio operator in Long Beach and a wind gust of 108 kt (124 mph) at the EOC in Pascagoula.

Most tide gages were destroyed by the storm surge so storm surge was determined primarily by post storm high water mark surveys conducted by FEMA. An estimated storm surge of approximately 23.0 feet occurred at the Hancock County EOC operations area in Waveland, and the high water mark measured on the Jackson County EOC building in Pascagoula was 16.1 feet. Preliminary estimates of storm surge along

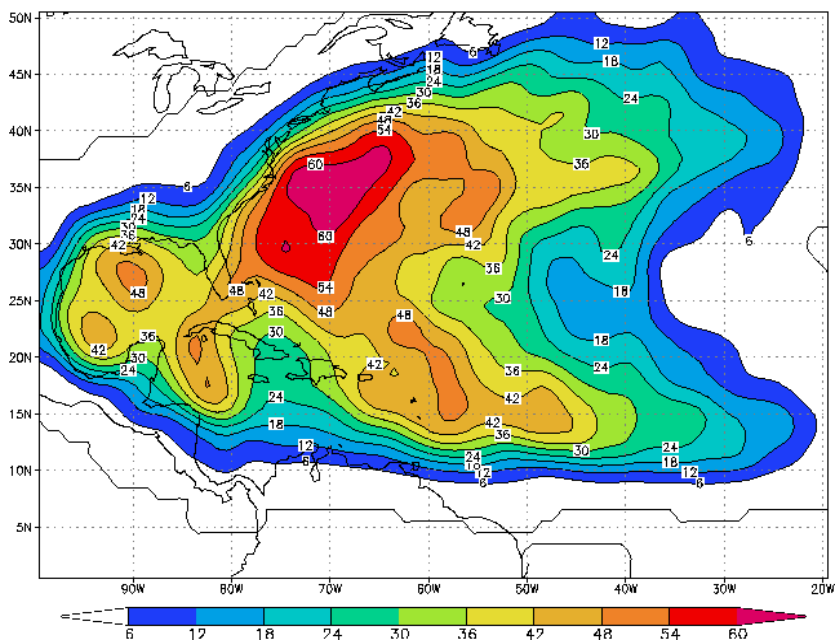
the Mississippi Coast include Hancock County 19-25 feet, Harrison County 19-25 feet, Jackson County 17-21 ft. All storm surge heights are still water elevations referenced to NAVD88 datum.

Storm total rainfall amounts generally ranged from 10 to 16 inches across coastal and south Mississippi with much lower amounts observed over southwest Mississippi. The highest observed storm total rainfall was 11 inches at Stennis Space Center and near Picayune.

PROBABILITY OF FUTURE OCCURRENCES

According to NOAA statistical data, the region is located in an area with an annual probability of a named storm between 30 and 42 percent as presented in **Figure C.13**. This illustration was created by the National Oceanic and Atmospheric Administration's Hurricane Research Division using data from 1944 to 1999 and counting hits when a storm or hurricane was within approximately 100 miles (165 km) of each location. As a reference point, the tip of Florida's outline can be found near the 25N, 80W intersection, and the MEMA District 9 Region is near the 30N, 90W intersection. This empirical probability is fairly consistent with other scientific studies and observed historical data made available through a variety of federal, state, and local sources.

FIGURE C.13: EMPIRICAL PROBABILITY OF A NAMED HURRICANE OR TROPICAL STORM



Source: National Oceanic and Atmospheric Administration

The probability of storm occurrences will vary significantly based on the return interval for different categories of magnitude. The probability of less intense storms (lower return periods) is higher than more intense storms (higher return periods). **Table C.22** profiles the potential peak gust wind speeds that can be expected in the MEMA District 9 Region during a hurricane event for various return periods according to FEMA's HAZUS-MH®.

TABLE C.22: POTENTIAL PEAK GUST WIND SPEEDS PER RETURN PERIOD

50-Year	100-Year	500-Year	1,000-Year
119.4 mph	133.9 mph	160.3 mph	170.0

Source: Federal Emergency Management Agency (Hazus-MH 3.2)

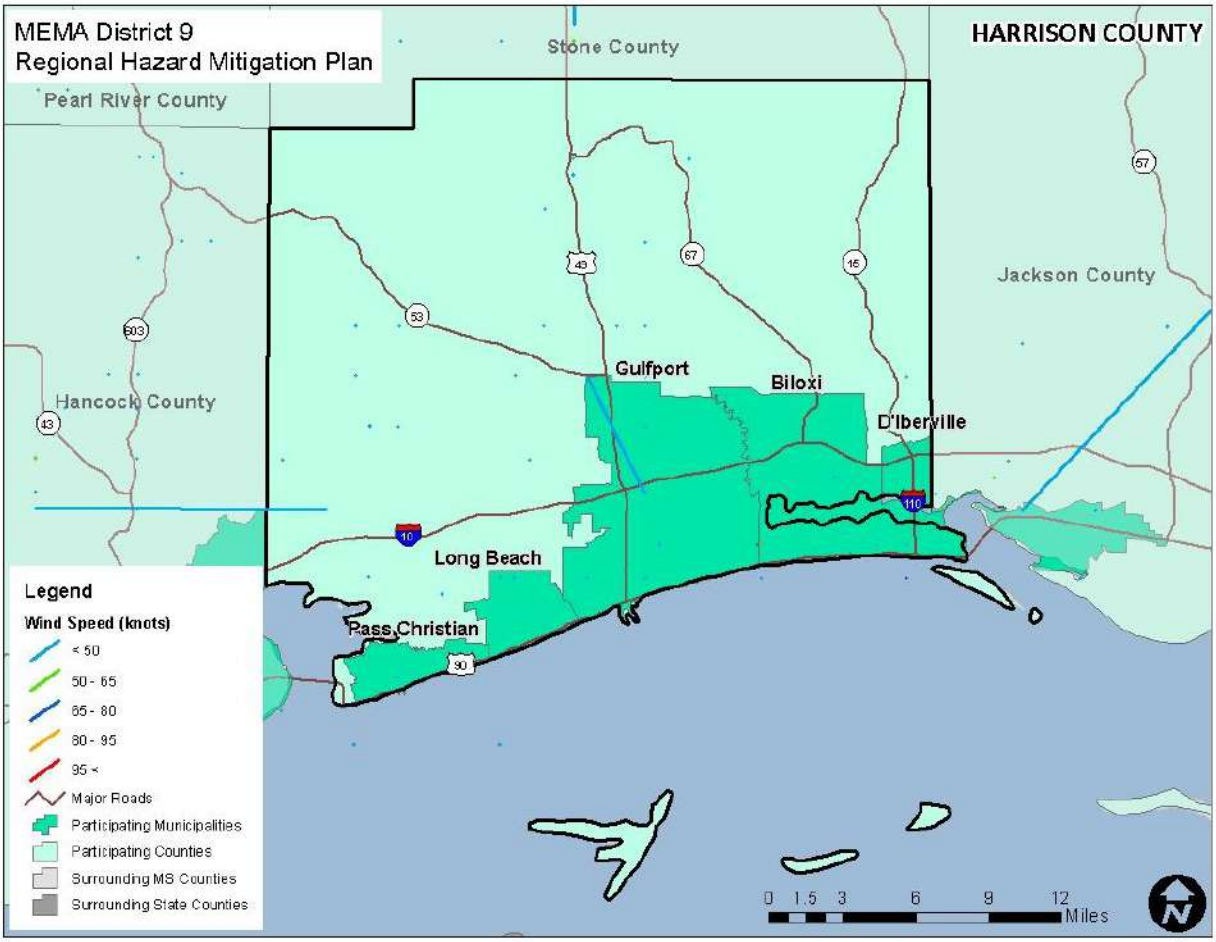
Overall, the probability level of future hurricane and tropical storm occurrence for Harrison County is highly likely (100 percent annual probability).

C.2.13 Severe Thunderstorm/High Wind

LOCATION AND SPATIAL EXTENT

A thunderstorm event is an atmospheric hazard, and thus has no geographic boundaries. It is typically a widespread event that can occur in all regions of the United States. However, thunderstorms are most common in the central and southern states because atmospheric conditions in those regions are favorable for generating these powerful storms. It is assumed that Harrison County has uniform exposure to an event and the spatial extent of an impact could be large. With that in mind, **Figure C.14** shows the location of wind events that have impacted the county between 1955 and 2015.

FIGURE C.14: SEVERE THUNDERSTORM TRACKS IN HARRISON COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

Severe storms were at least partially responsible for five disaster declarations in Harrison County in 1980, 1990, twice in 1991, and 1995.[17] According to NCDC, there have been 185 reported thunderstorm and high wind events since 1963 in Harrison County.[18] These events caused over $1.0 million (2016 dollars) in damages.[19] There were also reports of one fatality and eight injuries. **Table C.23** summarizes this information. Detailed thunderstorm and high wind event reports including date, magnitude, and associated damages for each event are presented in **Table C.24**.

[17] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.
[18] These thunderstorm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through June 2016 and these high wind events are only inclusive of those reported by NCDC from 1996 through June 2016. It is likely that additional thunderstorm and high wind events have occurred in Harrison County. As additional local data becomes available, this hazard profile will be amended.
[19] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE C.23: SUMMARY OF THUNDERSTORM/HIGH WIND OCCURRENCES IN HARRISON COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Biloxi	19	0/0	$350,990	$16,714
D'Iberville	10	0/0	$95,625	$4,554
Gulfport	24	0/0	$241,992	$10,521
Long Beach	5	0/0	$5,684	$284
Pass Christian	6	0/0	$15,825	$688
Unincorporated Area	121	1/8	$317,561	$5,992
HARRISON COUNTY TOTAL	**185**	**1/8**	**$1,027,677**	**$38,753**

Source: National Climatic Data Center

TABLE C.24: HISTORICAL THUNDERSTORM/HIGH WIND OCCURRENCES IN HARRISON COUNTY

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
Biloxi					
Biloxi	7/9/1995	Thunderstorm Wind	0 kts.	0/0	$7,902
BILOXI	1/24/1996	Thunderstorm Wind	--	0/0	$10,746
(BIX)KEESLER AFB BIL	8/2/1996	Thunderstorm Wind	--	0/0	$1,535
BILOXI	9/21/1996	Thunderstorm Wind	--	0/0	$23,026
BILOXI	4/11/1997	Thunderstorm Wind	--	0/0	$7,503
BILOXI	6/23/1997	Thunderstorm Wind	--	0/0	$12,005
BILOXI	1/7/1998	Thunderstorm Wind	--	0/0	$147,763
BILOXI	9/5/2000	Thunderstorm Wind	--	0/0	$6,993
BILOXI	6/12/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
BILOXI	6/19/2007	Thunderstorm Wind	50 kts. EG	0/0	$34,849
BILOXI	9/3/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
BILOXI	3/7/2008	Thunderstorm Wind	65 kts. EG	0/0	$89,494
(BIX)KEESLER AFB BIL	3/7/2008	Thunderstorm Wind	60 kts. MG	0/0	$0
(BIX)KEESLER AFB BIL	7/4/2009	Thunderstorm Wind	57 kts. MG	0/0	$0
BILOXI	7/4/2009	Thunderstorm Wind	57 kts. EG	0/0	$1,123
BILOXI	12/24/2009	Thunderstorm Wind	50 kts. EG	0/0	$2,807
BILOXI	3/22/2012	Thunderstorm Wind	55 kts. EG	0/0	$5,245
BILOXI	7/13/2013	Thunderstorm Wind	52 kts. EG	0/0	$0
(BIX)KEESLER AFB BIL	5/19/2016	Thunderstorm Wind	60 kts. EG	0/0	$0
D'Iberville					
D'Iberville	8/20/1995	Thunderstorm Wind	0 kts.	0/0	$790
D IBERVILLE	10/6/2000	Thunderstorm Wind	--	0/0	$2,098
D IBERVILLE	3/7/2008	Thunderstorm Wind	65 kts. EG	0/0	$89,494
D IBERVILLE	5/25/2010	Thunderstorm Wind	52 kts. EG	0/0	$2,209
D IBERVILLE	3/9/2011	Thunderstorm Wind	60 kts. EG	0/0	$0
D IBERVILLE	8/5/2013	Thunderstorm Wind	52 kts. EG	0/0	$1,034
D IBERVILLE	4/25/2015	Thunderstorm Wind	52 kts. EG	0/0	$0
D IBERVILLE	4/1/2016	Thunderstorm Wind	60 kts. EG	0/0	$0
D IBERVILLE	5/19/2016	Thunderstorm Wind	60 kts. EG	0/0	$0
D IBERVILLE	5/19/2016	Thunderstorm Wind	60 kts. EG	0/0	$0

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
Gulfport					
Gulfport	4/8/1993	Thunderstorm Wind	0 kts.	0/0	$83,340
Gulfport	3/14/1995	Thunderstorm Wind	0 kts.	0/0	$0
Gulfport	7/9/1995	Thunderstorm Wind	0 kts.	0/0	$3,161
GULFPORT	1/18/1996	Thunderstorm Wind	--	0/0	$768
GULFPORT	12/29/1996	Thunderstorm Wind	45 kts.	0/0	$0
GULFPORT	7/11/1997	Thunderstorm Wind	--	0/0	$37,516
GULFPORT ARPT	7/11/1997	Thunderstorm Wind	50 kts.	0/0	$0
GULFPORT	9/1/1997	Thunderstorm Wind	--	0/0	$1,201
GULFPORT	8/14/1999	Thunderstorm Wind	--	0/0	$2,891
(GPT)GULFPORT RGNL A	8/14/1999	Thunderstorm Wind	50 kts.	0/0	$0
GULFPORT	7/24/2002	Thunderstorm Wind	--	0/0	$1,004
GULFPORT	5/1/2004	Thunderstorm Wind	50 kts. EG	0/0	$12,750
GULFPORT	6/19/2004	Thunderstorm Wind	40 kts. EG	0/0	$2,550
GULFPORT	1/5/2007	Thunderstorm Wind	50 kts. EG	0/0	$11,616
GULFPORT	7/14/2008	Thunderstorm Wind	50 kts. EG	0/0	$3,356
GULFPORT	12/24/2009	Thunderstorm Wind	50 kts. EG	0/0	$842
(GPT)GULFPORT RGNL A	4/8/2010	Thunderstorm Wind	52 kts. EG	0/0	$16,568
GULFPORT	5/18/2010	Thunderstorm Wind	52 kts. EG	0/0	$552
GULFPORT	3/9/2011	Thunderstorm Wind	70 kts. EG	0/0	$53,537
GULFPORT	4/11/2013	Thunderstorm Wind	61 kts. EG	0/0	$10,339
GULFPORT ARPT	4/14/2013	Thunderstorm Wind	52 kts. MG	0/0	$0
(GPT)GULFPORT RGNL A	4/25/2015	Thunderstorm Wind	56 kts. EG	0/0	$0
(GPT)GULFPORT RGNL A	6/23/2015	Thunderstorm Wind	58 kts. MG	0/0	$0
(GPT)GULFPORT RGNL A	6/23/2015	Thunderstorm Wind	58 kts. MG	0/0	$0
Long Beach					
LONG BEACH	4/14/1996	Thunderstorm Wind	--	0/0	$3,070
LONG BEACH	12/23/2002	Thunderstorm Wind	--	0/0	$1,339
LONG BEACH	6/2/2004	Thunderstorm Wind	50 kts. EG	0/0	$1,275
LONG BEACH	4/2/2009	Thunderstorm Wind	61 kts. EG	0/0	$0
LONG BEACH	5/19/2016	Thunderstorm Wind	60 kts. EG	0/0	$0
Pass Christian					
Pass Christian	4/8/1993	Thunderstorm Wind	0 kts.	0/0	$833
PASS CHRISTIAN	4/14/1996	Thunderstorm Wind	--	0/0	$768
PASS CHRISTIAN	8/10/2000	Thunderstorm Wind	--	0/0	$350
PASS CHRISTIAN	6/11/2001	Thunderstorm Wind	--	0/0	$6,800
PASS CHRISTIAN	6/12/2003	Thunderstorm Wind	50 kts. EG	0/0	$3,927
PASS CHRISTIAN	3/21/2012	Thunderstorm Wind	55 kts. EG	0/0	$3,147
Unincorporated Area					
HARRISON CO.	7/21/1963	Thunderstorm Wind	50 kts.	0/0	$0
HARRISON CO.	4/14/1964	Thunderstorm Wind	80 kts.	0/0	$0
HARRISON CO.	4/26/1964	Thunderstorm Wind	62 kts.	0/0	$0
HARRISON CO.	5/22/1965	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	7/19/1965	Thunderstorm Wind	60 kts.	0/0	$0
HARRISON CO.	8/16/1966	Thunderstorm Wind	50 kts.	0/0	$0

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
HARRISON CO.	7/11/1968	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	7/29/1968	Thunderstorm Wind	52 kts.	0/0	$0
HARRISON CO.	7/14/1969	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	7/14/1969	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	8/10/1969	Thunderstorm Wind	70 kts.	0/0	$0
HARRISON CO.	2/1/1970	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	4/19/1970	Thunderstorm Wind	50 kts.	0/0	$0
HARRISON CO.	6/15/1970	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	10/13/1970	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	5/12/1971	Thunderstorm Wind	65 kts.	0/0	$0
HARRISON CO.	7/13/1971	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	9/16/1971	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	3/24/1973	Thunderstorm Wind	50 kts.	0/0	$0
HARRISON CO.	2/7/1974	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	2/7/1974	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	5/22/1974	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	7/23/1974	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	8/21/1974	Thunderstorm Wind	61 kts.	0/0	$0
HARRISON CO.	1/10/1975	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	5/8/1975	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	3/4/1977	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	5/3/1978	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	5/3/1978	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	5/3/1978	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	6/7/1978	Thunderstorm Wind	50 kts.	0/0	$0
HARRISON CO.	5/4/1979	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	11/10/1979	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	7/15/1980	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	2/10/1981	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	4/20/1982	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	5/7/1982	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	7/5/1982	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	2/21/1983	Thunderstorm Wind	52 kts.	0/0	$0
HARRISON CO.	4/7/1983	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	10/22/1983	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	12/11/1983	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	6/22/1984	Thunderstorm Wind	50 kts.	0/0	$0
HARRISON CO.	8/11/1984	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	8/11/1984	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	8/11/1984	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	5/21/1985	Thunderstorm Wind	0 kts.	0/1	$0
HARRISON CO.	8/15/1985	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	8/15/1985	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	9/23/1985	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	9/23/1985	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	9/23/1985	Thunderstorm Wind	0 kts.	0/0	$0

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
HARRISON CO.	3/12/1986	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	6/18/1986	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	8/2/1986	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	2/15/1987	Thunderstorm Wind	0 kts.	0/2	$0
HARRISON CO.	3/17/1987	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	7/26/1987	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	5/21/1988	Thunderstorm Wind	55 kts.	0/0	$0
HARRISON CO.	5/24/1988	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	6/8/1989	Thunderstorm Wind	68 kts.	0/0	$0
HARRISON CO.	6/14/1989	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	2/22/1990	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	4/22/1990	Thunderstorm Wind	0 kts.	1/0	$0
HARRISON CO.	5/9/1990	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	5/21/1990	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	9/4/1990	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	12/3/1990	Thunderstorm Wind	0 kts.	0/5	$0
HARRISON CO.	6/6/1991	Thunderstorm Wind	0 kts.	0/0	$0
HARRISON CO.	6/30/1992	Thunderstorm Wind	54 kts.	0/0	$0
HARRISON CO.	9/10/1994	Thunderstorm Wind	0 kts.	0/0	$8,126
Saucier and Lyman	3/7/1995	Thunderstorm Wind	0 kts.	0/0	$4,741
Saucier	5/9/1995	Thunderstorm Wind	0 kts.	0/0	$0
Lyman	5/9/1995	Thunderstorm Wind	0 kts.	0/0	$0
LYMAN	1/24/1997	Thunderstorm Wind	--	0/0	$750
SAUCIER	6/21/1998	Thunderstorm Wind	--	0/0	$739
SAUCIER	8/8/1999	Thunderstorm Wind	--	0/0	$723
SAUCIER	6/25/2000	Thunderstorm Wind	--	0/0	$699
DE LISLE	7/21/2000	Thunderstorm Wind	--	0/0	$140
LYMAN	8/30/2000	Thunderstorm Wind	--	0/0	$13,987
SAUCIER	9/2/2000	Thunderstorm Wind	--	0/0	$6,993
LYMAN	9/2/2000	Thunderstorm Wind	61 kts. E	0/0	$0
LIZANA	11/24/2000	Thunderstorm Wind	--	0/0	$20,980
LYMAN	11/24/2000	Thunderstorm Wind	--	0/0	$41,960
COUNTYWIDE	3/12/2001	Thunderstorm Wind	--	0/0	$3,400
WOOL MARKET	6/11/2001	Thunderstorm Wind	--	0/0	$1,360
LYMAN	7/5/2001	Thunderstorm Wind	--	0/0	$1,360
LYMAN	8/7/2001	Thunderstorm Wind	--	0/0	$1,360
ORANGE GROVE	7/31/2003	Thunderstorm Wind	50 kts. EG	0/0	$10,472
SAUCIER	6/1/2004	Thunderstorm Wind	50 kts. EG	0/0	$638
WORTHAM	8/30/2004	Thunderstorm Wind	50 kts. EG	0/0	$2,550
LIZANA	1/13/2005	Thunderstorm Wind	50 kts. EG	0/0	$617
SAUCIER	4/11/2005	Thunderstorm Wind	50 kts. EG	0/0	$1,850
SAUCIER	4/25/2006	Thunderstorm Wind	50 kts. EG	0/0	$2,389
COUNTYWIDE	8/15/2006	Thunderstorm Wind	50 kts. EG	0/0	$1,195
LYMAN	2/13/2007	Thunderstorm Wind	50 kts. EG	0/0	$4,646
LYMAN	6/19/2007	Thunderstorm Wind	50 kts. EG	0/0	$1,742
LYMAN	5/15/2008	Thunderstorm Wind	50 kts. EG	0/0	$8,949

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
SAUCIER	8/3/2008	Thunderstorm Wind	50 kts. EG	0/0	$1,119
SAUCIER	8/12/2008	Thunderstorm Wind	50 kts. EG	0/0	$1,119
HARRISON (ZONE)	3/1/2010	Strong Wind	45 kts. EG	0/0	$5,523
LANDON	10/27/2010	Thunderstorm Wind	52 kts. EG	0/0	$5,523
WOOL MARKET	10/27/2010	Thunderstorm Wind	52 kts. EG	0/0	$5,523
LANDON	3/9/2011	Thunderstorm Wind	60 kts. EG	0/0	$21,415
LORRAINE	3/9/2011	Thunderstorm Wind	60 kts. EG	0/0	$2,142
LORRAINE	3/9/2011	Thunderstorm Wind	60 kts. EG	0/0	$0
LANDON	4/4/2011	Thunderstorm Wind	70 kts. EG	0/0	$53,537
CUEVAS	6/12/2011	Thunderstorm Wind	55 kts. EG	0/0	$1,071
LIGANA	3/21/2012	Thunderstorm Wind	55 kts. EG	0/0	$10,490
CUEVAS	3/21/2012	Thunderstorm Wind	55 kts. EG	0/0	$15,736
LIGANA	7/3/2012	Thunderstorm Wind	55 kts. EG	0/0	$5,245
DE LISLE	7/18/2012	Thunderstorm Wind	55 kts. EG	0/0	$10,490
WOOL MARKET	8/1/2012	Thunderstorm Wind	55 kts. EG	0/0	$5,245
HARRISON (ZONE)	4/3/2013	High Wind	52 kts. MG	0/0	$0
HARRISON (ZONE)	4/3/2013	High Wind	67 kts. MG	0/0	$20,678
DE LISLE	4/14/2013	Thunderstorm Wind	56 kts. EG	0/0	$10,339
LIGANA	6/24/2015	Thunderstorm Wind	55 kts. EG	0/0	$0
LIGANA	6/24/2015	Thunderstorm Wind	55 kts. EG	0/0	$0
WORTHAM	9/5/2015	Thunderstorm Wind	55 kts. EG	0/0	$0
WORTHAM	12/28/2015	Thunderstorm Wind	60 kts. EG	0/0	$0
CUEVAS	5/19/2016	Thunderstorm Wind	60 kts. EG	0/0	$0

*Property damage is reported in 2016 dollars; all damage may not have been reported.
†E = estimated; EG = estimated gust; ES = estimated sustained; MG = measured gust; MS = measured sustained
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

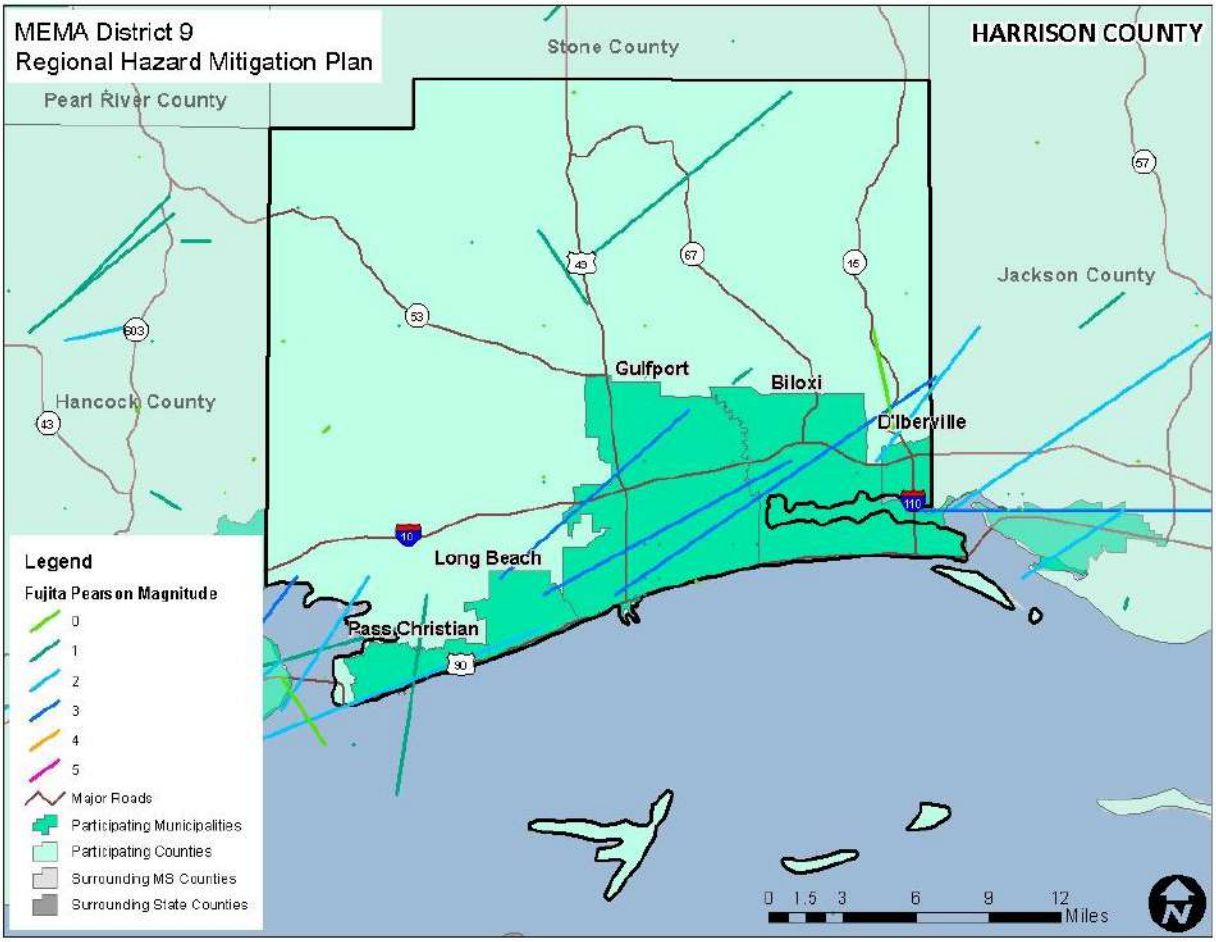
Given the high number of previous events, it is certain that thunderstorm events, including straight-line wind events, will occur in the future. This results in a probability level of highly likely (100 percent annual probability) for the entire county.

C.2.14 Tornado

LOCATION AND SPATIAL EXTENT

Tornadoes occur throughout the state of Mississippi, and thus in Harrison County. Tornadoes typically impact a relatively small area, but damage may be extensive. Event locations are completely random and it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that Harrison County is uniformly exposed to this hazard. With that in mind, **Figure C.15** shows tornado track data for many of the major tornado events that have impacted the county between 1950 and 2015. While no definitive pattern emerges from this data, some areas that have been impacted in the past may be potentially more susceptible in the future.

FIGURE C.15: HISTORICAL TORNADO TRACKS IN HARRISON COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

Tornadoes were at least partially responsible for five disaster declarations in Harrison County in 1980, 1990, twice in 1991, and 1995.[20] According to the National Climatic Data Center, there have been a total of 77 recorded tornado events in Harrison County since 1953, resulting in almost $280.9 million (2016 dollars) in property damages.[21] [22] In addition, 6 fatalities and 81 injuries were reported. The magnitude of these tornadoes ranged from F0 to F3 and EF0 to EF1 in intensity. A summary of these events is presented in **Table C.25**. Detailed information on historic tornado events can be found in **Table C.26**.

[20] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.
[21] These tornado events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1950 through June 2016. It is likely that additional tornadoes have occurred in Harrison County. As additional local data becomes available, this hazard profile will be amended.
[22] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE C.25: SUMMARY OF TORNADO OCCURRENCES IN HARRISON COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Biloxi	6	0/0	$127,157	$7,947
D'Iberville	2	0/0	$10,490	$954
Gulfport	11	0/0	$205,720	$10,286
Long Beach	2	0/0	$21,415	$1,428
Pass Christian	2	0/0	$0	$0
Unincorporated Area	54	6/81	$280,494,069	$4,452,287
HARRISON COUNTY TOTAL	**77**	**6/81**	**$280,858,851**	**$4,472,901**

Source: National Climatic Data Center

TABLE C.26: HISTORICAL TORNADO IMPACTS IN HARRISON COUNTY

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
Biloxi					
BILOXI	7/22/2000	F0	0/0	$0	A large waterspout developed just offshore the coast of Gulfport and Biloxi area.
BILOXI	10/6/2000	Funnel Cloud	0/0	$0	A funnel cloud was sighted by the public over Biloxi Bay.
BILOXI	8/10/2001	Funnel Cloud	0/0	$0	--
BILOXI	10/3/2002	F0	0/0	$20,082	Law enforcement reported a weak tornado touched down. No damage was reported.
BILOXI	7/16/2007	Funnel Cloud	0/0	$0	A funnel cloud was observed near the intersection of Highway 15 and Highway 67.
(BIX)KEESLER AFB BIL	3/9/2011	EF1		$107,075	A tornado touched down near Cedar Lake Road and Popps Ferry Road. Several mobile homes were damaged. One mobile home was rolled and destroyed with minor to moderate damage on several others. Several large tree limbs snapped as well. The tornado was rated at the upper end of EF1 scale.
D'Iberville					
D IBERVILLE	7/14/2005	Funnel Cloud	0/0		A funnel cloud was reported by the Biloxi Police Department.
D IBERVILLE	3/22/2012	EF0	0/0	$10,490	NWS storm survey confirmed a tornado touched down along Highway 67 at Highway 15. Most of the damage was at the starting point with a large shed door blown in, causing roof damage and a patio roof lifted off. Most of the remainder of the damage was to shingles and fences, with an end point in Coventry Estates. The path width was 100 yards with a damage track around 4 miles long. Estimated wind speed was 85 mph.
Gulfport					
GULFPORT	4/13/1996	F0	0/0	$1,535	The public reported that a waterspout damaged several boat's sails, moved onshore

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					and traveled a short distance down a street on the west side of Gulfport.
GULFPORT	4/14/1996	F0	0/0	$0	The public reported a waterspout moved onshore and traveled a short distance down a street in Gulfport. No damage was reported.
GULFPORT	8/11/1997	Waterspout	0/0	$0	The Mississippi Highway Patrol reported a waterspout moving toward shore.
GULFPORT	6/25/1999	Waterspout	0/0	$0	A large waterspout developed just offshore the coast of Gulfport and Biloxi area.
GULFPORT	9/2/2000	F0	0/0	$41,960	A tornado caused damage in a two-block area at Pass and Courthouse Roads. Windows were blown out in a shopping center and roof damage occurred to two businesses. Several cars in a parking lot were damaged, a sign was knocked down, and a tree fell on a moving car on Pass Road.
GULFPORT	6/11/2001	F1	0/0	$135,998	A tornado touched down for a short distance and caused roof and siding damage to 10 houses.
GULFPORT	7/26/2001	Waterspout	0/0	$0	A waterspout was sighted offshore Gulfport.
GULFPORT	8/11/2001	Waterspout	0/0	$0	A waterspout was observed by park rangers near Ship Island.
GULFPORT	7/13/2005	Funnel Cloud	0/0	$0	Two funnel clouds were reported by the Gulfport Police Department over the navy base on the west side of Gulfport.
GULFPORT	2/12/2008	EF0	0/0	$0	A weak tornado was observed briefly touching down in the vicinity of Interstate 10 and Canal Boulevard causing no damage.
GULFPORT	8/29/2012	EF1	0/0	$26,226	The tornado moved inland and uprooted a tree after crossing Beach Boulevard. It caused significant damage to a home under construction on the corner of 15th Street and 18th Avenue. All walls of the home were shifted and leaning, with a portion of the roof collapsed. The tornado also collapsed the porch roof of a home on 19th Avenue. It caused mainly tree damage as it continued to move NNW before lifting.
Long Beach					
LONG BEACH	8/27/2001	Waterspout	0/0	$0	A waterspout was observed by law enforcement officials just off the coast of southwest Harrison County.
LONG BEACH	3/9/2011	EF1	0/0	$21,415	A tornado touched down along Landon Road. One home had a portion of roof removed, as well as a storage building and awning destroyed. Several trees were blown down and large branches snapped.
Pass Christian					
PASS CHRISTIAN	7/31/2004	Funnel Cloud	0/0	$0	A funnel cloud was observed north of Interstate 10 in western Harrison County.

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
PASS CHRISTIAN	4/21/2006	Funnel Cloud	0/0	$0	A funnel cloud was sighted.
Unincorporated Area					
HARRISON CO.	8/9/1953	--	0/0	$22,552	--
HARRISON CO.	8/10/1957	F0	0/0	$257	--
HARRISON CO.	2/26/1958	F2	0/0	$208,350	--
HARRISON CO.	4/6/1963	--	0/0	$196,775	--
HARRISON CO.	4/27/1966	F1	0/0	$185,843	--
HARRISON CO.	10/30/1967	F3	4/17	$180,279,192	--
HARRISON CO.	6/11/1968	F1	0/0	$0	Occupant of Delisle residence which probably suffered most said damage occurred between 1:30 and 2:30 p.m. As lightning frightened children, 3 women and 5 children gathered in front where window was open. A "…real smoky blue cloud came swirling into house, it came through there like a big cloud of blue smoke," owner said, and "it came suddenly." She compared its roaring sound to that of a rolling train. Woman next door saw pieces of damaged house flying through air. Porch was reported destroyed; roof ripped off bedroom, dining room and front room, and water dumped into house; power lines were damaged. Another Delisle woman said it was "really rough up here...I don't know that I've ever seen wind that bad except in a hurricane. She reported tree limbs downed in her neighborhood but no real damage.
HARRISON CO.	6/12/1968	--	0/0	$0	--
HARRISON CO.	11/3/1968	F3	0/5	$0	Thunderstorm moved from SW towards NE. Man in Gulfport Airport Control Tower saw debris fly about 1-1/2 SW when funnel touched ground, it then lifted and passed over airport towards NE, tower deserted when winds reached 52 mph. Damage in sparsely populated manufacturing area of Gulfport (lat. 30.4° N, long. 39.2° W) estimated $60,000. Tornado appeared to have first touched down on 33rd Street just west of Illinois Central Railroad where it damaged a chain link fence, then continued general northeastward across U.S. Highway 49. Man about 3 blocks away describing the tornado wrote he "did not hear it long before it touched down...it was raining fairly hard before it passed over and cleared up completely a little while later." A newspaper man mentioned he had heard a noise and went outside to see tornado, he was quoted, "I heard this rascal buildup and saw it boiling over the area, it began picking up tin from roofs before it touched down at trailer." This

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					trailer, on 33rd Street lot, W of U.S. 90, was lifted off foundation, bounced after hitting ground and smashed against concrete block building about 80 ft away; the 4 occupants, ages 2-29, received relatively minor cuts and bruises. At SW corner 34th Street and 25 Avenue roofs were lifted off and other heavy damage reported to 5 residences, mostly 2-family dwellings (one concrete block and the others frame). On SE corner man watched clouds and saw funnel coming over buildings across the street, he said, "I saw tin flying and hit the deck," - alongside a counted in office of corner service station; others in station and 2 girls in car outside also got down on the floor; tornado took down a large sign at street corner. Nearby at a glass manufacturing plant (E of U.S. 49) a man, age 52, heard tornado, he got down on the floor, a tremendous draft swept him into a 10-ft. concrete pit, his right food was injured. Building had structural damage estimated at $12,000, mostly to windows and roof. At least 8 structures received varying degrees of damage, power lines were severed, signs knocked down, pine trees broken off half way up to the trunk and several trees blown down. Red Cross reported 10 families affected by the tornado.
HARRISON CO.	5/17/1969	--	0/0	$0	--
HARRISON CO.	2/1/1970	F0	0/10	$1,551,888	Newspaper noted "Three structures at the W. M. Ladnier Homes on 28th Street were extensively damaged as a funnel cloud was observed passing through the area…a duplex and a two story, four-unit building had their roofs lifted off on 30th Street and another building, a central non-housing building, was also heavily damaged. Other less severe damage was reported in the project. No serious personal injuries were reported..." A woman living in the project "...heard the wind coming, grabbed her two small children and got behind a couch for protection. AS the storm hit blowing the roof off the upper floor, glass flew about the room. Her daughter had cuts on her hand." The project manager reported that during rainy weather the storm moved from SW towards NE, there was a "loud road, immediately before the wind had died completely down." Damages were estimated $55,000, and 10 persons injured (mostly elderly, treated for shock and minor cuts).
HARRISON CO.	2/1/1970	F2	0/3	$0	Civil Defense Pass Christian (lat. 30.3° N, long. 89.2° W) reported small tornado

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					moving towards NE, some trees and power lines down. Newspaper noted it touched down on Menge Avenue.
HARRISON CO.	8/27/1971	F1	0/0	$148,675	A white funnel cloud came down Bernard Bayou and struck the Sugar Mill Marina area in Handsboro (lat. 30.4° N, long. 89.0° W) and there was about $10,000 damage. At the marina about $5,000 damages when 9 roofs on boat stalls were lifted by the winds. A building adjoining the marina received about $2,000 damages. Three trucks parked near the building were damaged when the marina roofs fell on them.
HARRISON CO.	9/16/1971	F1	0/0	$0	--
HARRISON CO.	5/7/1972	F1	0/0	$0	--
HARRISON CO.	5/7/1972	F2	0/0	$144,051	--
HARRISON CO.	5/7/1972	F1	0/2	$14,405	--
HARRISON CO.	5/7/1972	F1	0/0	$0	--
HARRISON CO.	5/7/1972	F1	0/0	$14,405	--
HARRISON CO.	5/7/1972	F2	0/0	$144,051	--
HARRISON CO.	5/7/1972	F2	0/0	$144,051	Small tornado touched down north of Pass Christian in Arcadia Bayou section, east of the Adams Bridge. One of the Sheriff's units reported the funnel cloud coming down at 5:53 p.m. CST, and the car was blown in the ditch. Storm moved from SW to NE. Glover home had windows blown out, shingles torn from roof, and small trees and limbs broken. Next damaged roof and interior of Lynch home (several hundred dollars); woman said she got under mattress because of flying glass. Last destroyed Price frame home leaving some of owner's belongings strewn amid wreckage of standing walls. Total damages estimated $15,000; no causalities reported.
HARRISON CO.	8/16/1974	F1	0/0	$12,214	The tornado destroyed a mobile office trailer, overturned a truck trailer, and damaged several boats in the harbor.
HARRISON CO.	1/10/1975	F1	0/0	$1,119	--
HARRISON CO.	8/30/1975	F0	0/0	$134	--
HARRISON CO.	10/15/1975	F0	0/0	$0	--
HARRISON CO.	9/5/1977	F2	0/0	$993,618	A tornado spawned by Hurricane Babe touched down briefly at the North Street Elementary School in Pass Christian during the early afternoon while the school was vacated for the Labor Day holiday. One wing of the school collapsed completely demolishing one room and heavily damaging 5 others. The twister lifted shortly after hitting the school. Total damage $250,000/
HARRISON CO.	4/13/1980	F3	0/25	$73,074,333	--

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
HARRISON CO.	5/16/1980	F3	0/0	$730,743	Tornado struck just north of Long Beach, ripping off part of the roof of the city barn, then traveled NE along a skipping path before lifting near I-10 northwest of Biloxi. The hardest hit area appeared to be the Sunkist subdivision northwest of Biloxi, where several well-built brick homes were heavily damaged. Most of the damage path was through wooded areas where considerable timber was destroyed. Property damage included 3 houses and 24 apartments destroyed, 36 houses damaged and 1 trailer destroyed. Estimated property damage $350,000.
HARRISON CO.	5/19/1980	F3	0/4	$7,307,433	--
HARRISON CO.	5/19/1980	F2	0/0	$730,743	--
HARRISON CO.	4/20/1982	F2	0/0	$623,972	--
HARRISON CO.	9/2/1985	F1	0/0	$0	--
HARRISON CO.	9/2/1985	F1	0/0	$0	--
HARRISON CO.	9/23/1985	F0	0/0	$55,960	--
HARRISON CO.	9/23/1985	F2	0/0	$559,603	--
HARRISON CO.	9/23/1985	F1	0/0	$559,603	--
HARRISON CO.	3/29/1987	F0	0/0	$53,005	A weak tornado touched down briefly 10 miles north-northwest of Gulfport. The tops were blown out of some trees and a roof was blown off a barn.
HARRISON CO.	3/29/1987	F0	0/0	$53,005	Another small and very weak tornado touched down in downtown Gulfport. Two buildings had windows broken. Power lines also were knocked down.
HARRISON CO.	3/29/1987	F1	0/0	$53,005	Numerous trees and power lines were blown down 5 miles northeast of Gulfport. Several people heard the roar from the tornado.
HARRISON CO.	3/3/1988	F2	0/0	$508,988	A short-lived, but strong tornado moved northeast through a portion of south Biloxi. Heaviest damage was to a paint store where 8-inch I beams attached to the roof were twisted and removed from the building. Damage was estimated at 50,000 dollars. The tornado also picked up a car and carried it 150 feet into an unoccupied room in a retirement home. Damage was estimated at 15,000 dollars.
HARRISON CO.	5/10/1988	F1	0/0	$50,899	A short-lived weak tornado touched down in Lizana. The tornado was traveling to the southeast and heavily damaged 2 mobile homes. A trail of tree damage marked the path.
Woolmarket	4/12/1994	F2	2/15	$8,125,945	Twenty mobile homes were totally destroyed and four brick homes were partially destroyed. At least four businesses were damaged. The two deaths and the fifteen injuries all occurred in mobile homes.

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					Numerous trees and power lines were blown down. Damage was estimated at near one million dollars. F57M M08M
SAUCIER	11/21/1997	F1	0/0	$75,032	A severe thunderstorm moved out of St. Tammany Parish, Louisiana into extreme south Mississippi. Several short-lived tornadoes touched down as it crossed Pearl River, Hancock, and Harrison Counties. Near Nicholson, a tornado touched down near Nicholson, moving through a mobile home park and also passing across the Mississippi Visitors Center on Interstate Highway 59. Damage path was estimated at approximately four miles, due to lack of ground access in Pearl River drainage area to the west of Nicholson. Preliminary reports from Pearl River County and state officials indicated that 3 single family homes were destroyed and 18 others heavily damaged; and 21 mobile homes were destroyed and 8 others heavily damaged. Several car windows were blown out when the tornado passed through the Visitors Center. One person was injured in the mobile home park and another person suffered minor injuries in a nearby subdivision when their auto was hit by falling trees and limbs. Large hail was also reported by the Sheriff's Office in McNeil. Two additional tornado touch-downs were reported in north Hancock County and north Harrison County as the severe thunderstorm moved northeast. In north Hancock County, civil defense reported two homes were damaged along with two mobile homes when a tornado touched down in a rural area. In north Harrison County, a tornado damaged a convenience store along with heavily damaging a couple of mobile homes. The tornado path lengths in Hancock and Harrison Counties were estimated from damage reports.
DE LISLE	7/1/1998	Funnel Cloud	0/0	$0	Harrison County CD reported a funnel cloud near the Harrison County and Hancock County border.
ORANGE GROVE	9/2/2000	F0	0/0	$699	A weak tornado briefly touched down near Canal Road knocking down several trees.
HOWISON	3/12/2001	F0	0/0	$2,040	A small tornado knocked down several trees.
AIREY	3/12/2001	F0	0/0	$0	A small tornado briefly touched down knocking down trees and power lines.
ORANGE GROVE	11/24/2004	F2	0/0	$3,825,087	A tornado traveled east to west on path along Dedeaux Road between Highway 49 and Three Rivers Road in the Orange Grove community. Most of the damage was rated a

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					F1 intensity by a NWS ground survey, however there were areas of F2 damage. A large church under-construction was heavily damaged or destroyed. Three homes and five businesses received major damage while twenty homes had minor damage. Early estimates were that damage would approach 3 million dollars.
SAUCIER	3/31/2007	Funnel Cloud	0/0	$0	A funnel cloud was observed.
SAUCIER	6/19/2007	Funnel Cloud	0/0	$0	A funnel cloud was observed near the intersection of West Wortham and Shaw Roads.
LYMAN	9/4/2011	EF1	0/0	$21,415	A weak tornado moved along an intermittent path for about 3.6 miles. Large tree limbs were snapped, several trees were blown down and fences blown down. Roof damage to several homes occurred, as well as mobile home damage. Damage path was 3.6 miles, path width 75 yards. Maximum rating low end EF1.
MISSISSIPPI CITY	9/19/2011	EF0	0/0	$0	Waterspout reported moving onshore by law enforcement near Courthouse Road. Dissipation occurred at 1255 CDT. No damage reported.
LIGANA	3/21/2012	EF0	0/0	$5,245	A NWS storm survey concluded that an EF0 tornado with a path width 50 yards wide was on the ground for about one quarter mile. Winds were estimated at 70 mph. Damage was confined to a trailer at Vidalia and Walnut Roads.
WOOL MARKET	3/21/2012	EF1	0/0	$15,736	NWS Storm survey confirmed a tornado touched down on John Lee Road and Roberts Road. Trees were twisted, a travel trailer was flipped, and several homes lost portions of their roofs. The path width was 100 yards, and was on the ground for nearly 1 mile. Estimated wind speed was 90 mph.

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

According to historical information, tornado events pose a significant threat to Harrison County. The probability of future tornado occurrences affecting Harrison County is highly likely (100 percent annual probability).

C.2.15 Winter Weather

LOCATION AND SPATIAL EXTENT

Nearly the entire continental United States is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. Harrison County is not accustomed to severe winter weather conditions and rarely receives severe winter weather, even during the winter months. Events tend to be mild in nature; however, even relatively small accumulations of snow, ice, or other wintery precipitation can lead to losses and damage due to the fact that these events are not commonplace. Given the atmospheric nature of the hazard, the entire county has uniform exposure to a winter storm.

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, there have been a total of four recorded winter storm events in Harrison County since 1996.[23] These events did not result in any property damage.[24] A summary of these events is presented in **Table C.27**. Detailed information on the recorded winter storm events can be found in **Table C.28**.

TABLE C.27: SUMMARY OF WINTER STORM EVENTS IN HARRISON COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Harrison County	4	0/0	$0	$0

Source: National Climatic Data Center

TABLE C.28: HISTORICAL WINTER STORM IMPACTS IN HARRISON COUNTY

Location	Date	Type	Deaths/Injuries	Property Damage*
Biloxi				
None reported	--	--	--	--
D'Iberville				
None reported	--	--	--	--
Gulfport				
None reported	--	--	--	--
Long Beach				
None reported	--	--	--	--
Pass Christian				
None reported	--	--	--	--
Unincorporated Area				
HARRISON (ZONE)	12/18/1996	Heavy Snow	0/0	$0
HARRISON (ZONE)	12/25/2004	Winter Storm	0/0	$0

[23] These ice and winter storm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional winter storm conditions have affected Harrison County.
[24] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Type	Deaths/Injuries	Property Damage*
HARRISON (ZONE)	1/24/2014	Winter Weather	0/0	$0
HARRISON (ZONE)	1/28/2014	Winter Storm	0/0	$0

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

There have been several severe winter weather events in Harrison County. The text below describes one of the major events and associated impacts on the county. Similar impacts can be expected with severe winter weather.

December 2004
A mixture of sleet and snow fell off and on during much of Christmas day resulting in a dusting to one half inch of accumulation across much of southwest, south, and coastal Mississippi. Although not heavy, accumulation of ice and snow in coastal Mississippi is unusual and the winter weather impacted transportation. The mixture of sleet and snow caused a number of bridges and overpasses to become icy which resulted in some traffic accidents and closure of some the elevated roadways.

Winter storms throughout the planning area have several negative externalities including hypothermia, cost of snow and debris cleanup, business and government service interruption, traffic accidents, and power outages. Furthermore, citizens may resort to using inappropriate heating devices that could to fire or an accumulation of toxic fumes.

PROBABILITY OF FUTURE OCCURRENCES

Winter storm events will continue to occur in Harrison County. Based on historical information, the probability is likely (between 10 and 100 percent annual probability).

OTHER HAZARDS

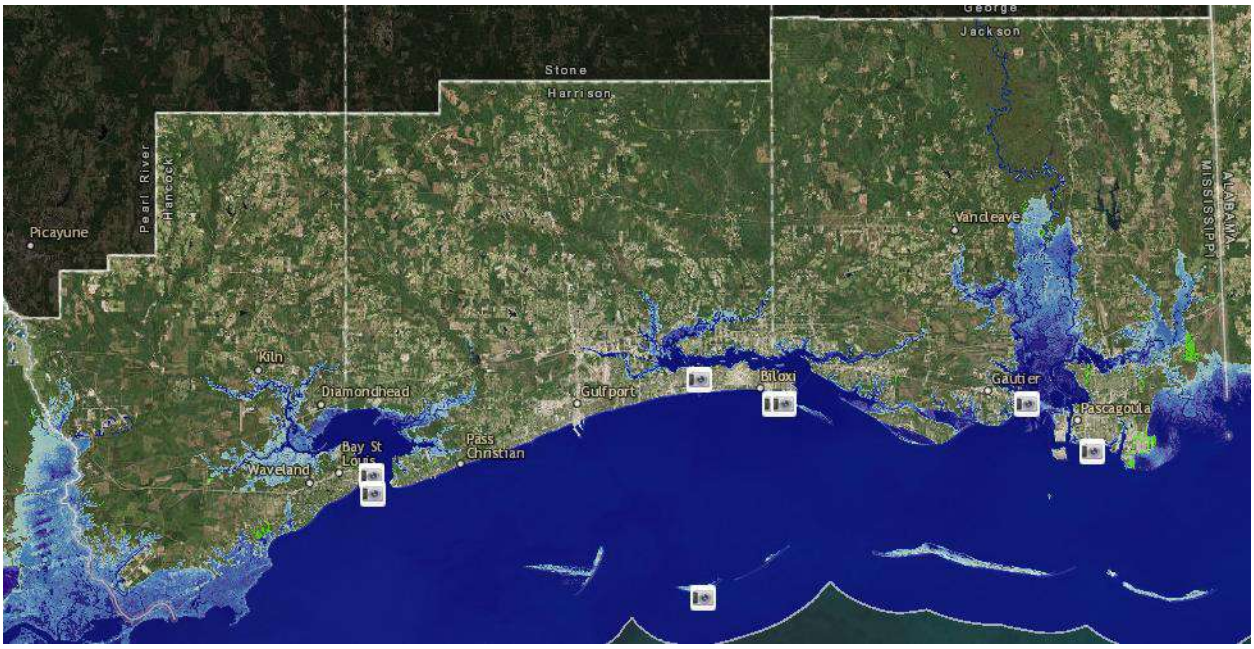
C.2.16 Climate Change/Sea Level Rise

LOCATION AND SPATIAL EXTENT

Climate Change
Climate change can have direct implications on many of the other hazards addressed in this plan since it has the potential to alter the nature and frequency of hazards, including increasing temperature (extreme heat), changes in precipitation (drought, flooding), and more frequent, strong storms (wind, hurricane). Therefore, it is assumed that Harrison County is uniformly exposed to this hazard.

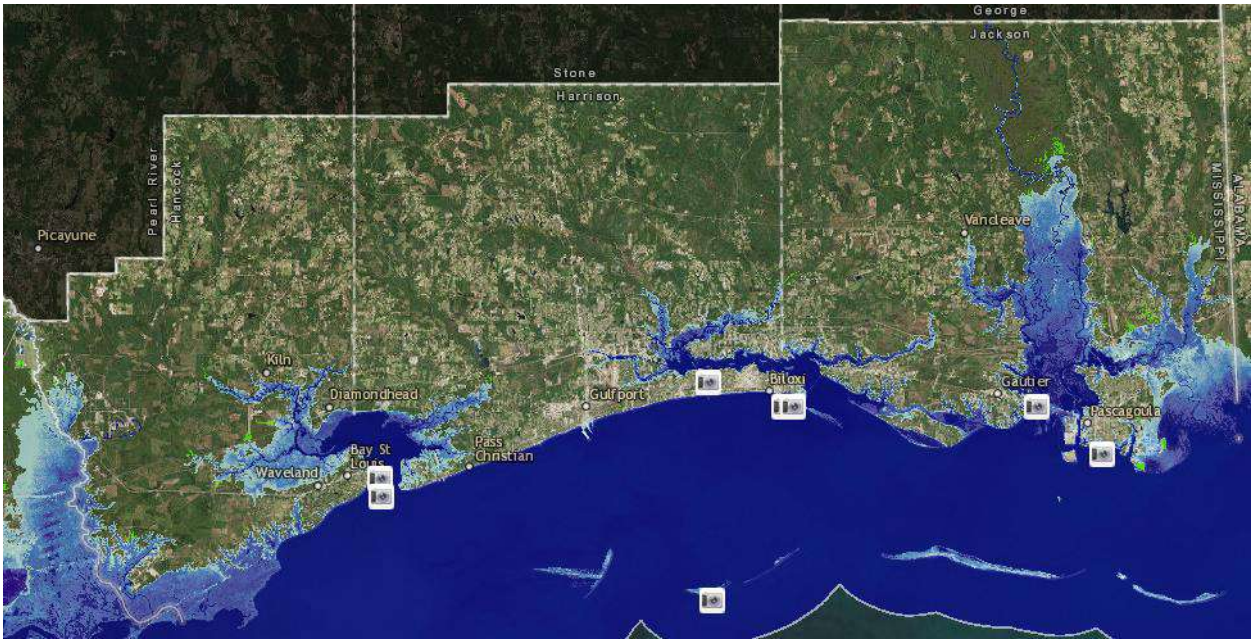
Sea Level Rise
Sea level rise is occurring at a global scale. However, it does not affect areas uniformly and will be more severe in some places. **Figure C.16** identifies areas in MEMA District 9 that would be inundated by water as a result of three feet in sea level rise as per projections by NOAA. The highest level of sea level rise projected by NOAA is shown in **Figure C.17**. This figure shows the inundation areas in the case of six feet of sea level rise. This demonstrates the additional areas that would be impacted beyond the three feet scenario.

FIGURE C.16: THREE FEET SEA LEVEL RISE IN MEMA DISTRICT 9



Source: NOAA

FIGURE C.17: SIX FEET SEA LEVEL RISE IN MEMA DISTRICT 9



Source: NOAA

HISTORICAL OCCURRENCES

Climate Change

According to the *National Climate Assessment*, there have been increasing numbers of days above 95°F and nights above 75°F, and decreasing numbers of extremely cold days since 1970 in the Southeast. Daily

and five-day rainfall intensities have also increased and summers have been either increasingly dry or extremely wet. The number of Category 4 and 5 hurricanes in the Atlantic basin has increased substantially since the early 1980s compared to the historic record that dates back to the mid-1880s. This can be attributed to both natural variability and climate change.

Sea Level Rise
Sea level rise is a slow-onset hazard and specific events/occurrences are not possible to determine.

PROBABILITY OF FUTURE OCCURRENCES

Climate Change
According to the *National Climate Assessment*, temperatures across the Southeast are expected to increase during this century, with shorter-term (year-to-year and decade-to-decade) fluctuations over time due to natural climate variability. Major consequences of warming include significant increases in the number of hot days (95°F or above) and decreases in freezing events. Regional average increases are in the range of 4°F to 8°F by the year 2100.

Projections of future precipitation patterns are less certain than projections for temperature increases. Because the Southeast is located in the transition zone between projected wetter conditions to the north and drier conditions to the southwest, many of the model projections show only small changes relative to natural variations. Additionally, projections further suggest that warming will cause tropical storms to be fewer in number globally, but stronger in force, with more Category 4 and 5 storms, and substantial further increases in extreme precipitation are projected as this century progresses.

Overall, future climate change is considered likely (between 10 and 100 percent annual probability).

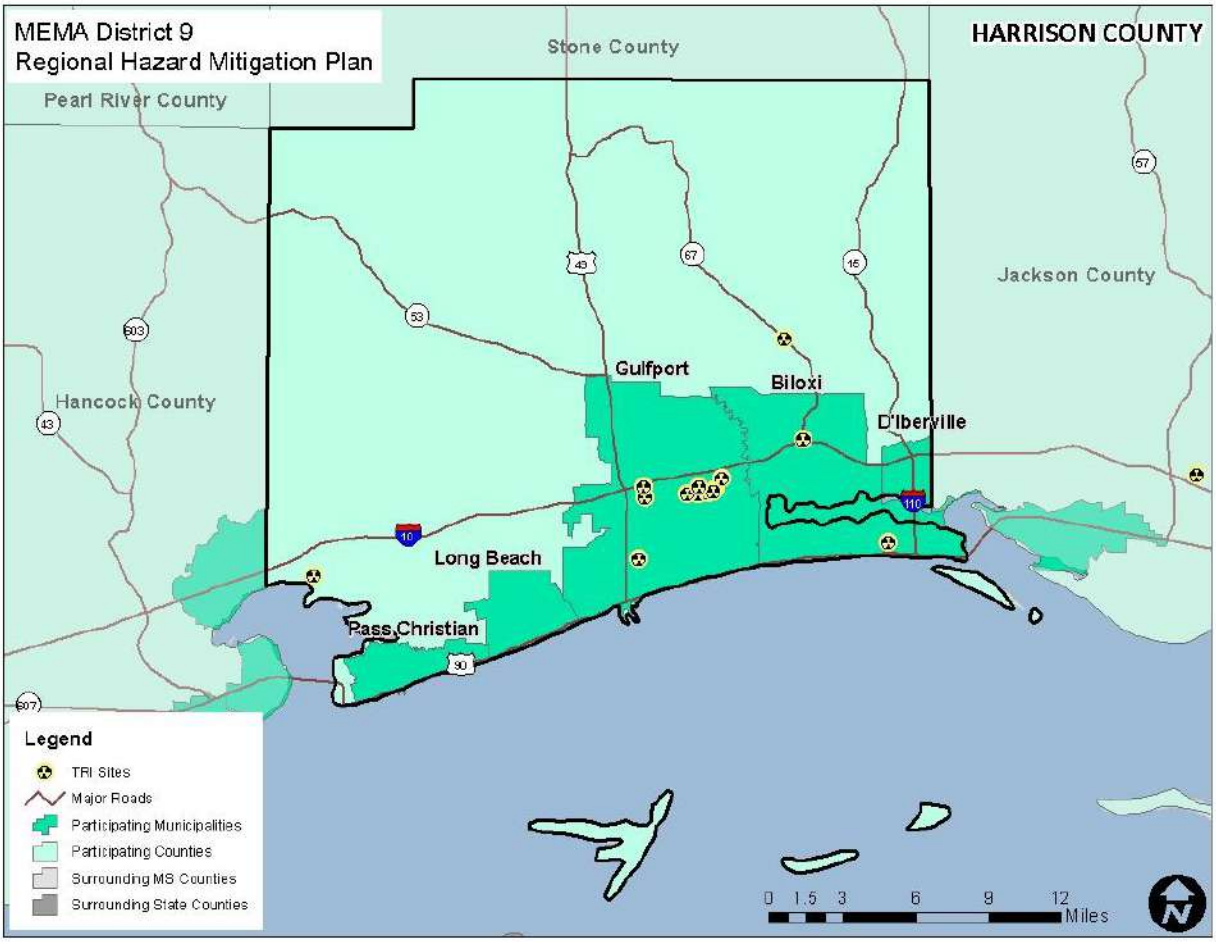
Sea Level Rise
There is still much debate regarding the probability of future occurrence of sea level rise. This section will be updated as more information becomes available. Future sea level rise is considered likely (between 10 and 100 percent annual probability).

C.2.17 Hazardous Materials Incident/Train Derailment

LOCATION AND SPATIAL EXTENT

Harrison County has 14 TRI sites. These sites are shown in **Figure C.18.**

FIGURE C.18: TOXIC RELEASE INVENTORY (TRI) SITES IN HARRISON COUNTY



Source: Environmental Protection Agency

In addition to "fixed" hazardous materials locations, hazardous materials may also impact the county via roadways and railways. Many roads and railways in the county are subject to hazardous materials transport and all roads and railways that permit hazardous material transport are considered potentially at risk to an incident.

HISTORICAL OCCURRENCES

There have been a total of 226 recorded HAZMAT incidents in Harrison County since 1971. These events resulted in over $327,000 (2016 dollars) in property damage as well as five fatalities and one injury.[25] **Table C.29** summarizes the HAZMAT incidents in Harrison County as reported by PHMSA. Detailed information on these events is presented in **Table C.30.**

[25] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE C.29: SUMMARY OF HAZMAT INCIDENTS IN HARRISON COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Biloxi	28	5/0	$53,210	$1,182
D'Iberville	0	0/0	$0	$0
Gulfport	182	0/1	$94,524	$2,148
Long Beach	7	0/0	$0	$0
Pass Christian	4	0/0	$179,481	$8,158
Unincorporated Area	5	0/0	$0	$0
HARRISON COUNTY TOTAL	**226**	**5/1**	**$327,215**	**$11,489**

Source: United States Department of Transportation Pipeline and Hazardous Materials Safety Administration

TABLE C.30: HAZMAT INCIDENTS IN HARRISON COUNTY

Report Number	Date	City	Mode	Serious Incident?	Deaths/ Injuries	Damages ($)*	Quantity Released
Biloxi							
I-1971050036	4/7/1971	BILOXI	Highway	No	0/0	$0	0
I-1972010118	1/10/1972	BILOXI	Highway	No	0/0	$0	0
I-1974090775	9/12/1974	BILOXI	Highway	No	0/0	$0	0
I-1976100494	10/1/1976	BILOXI	Highway	No	0/0	$0	40 LGA
I-1978041179	3/17/1978	BILOXI	Highway	No	0/0	$0	1 LGA
I-1980040502	3/20/1980	BILOXI	Highway	No	0/0	$0	4 LGA
I-1980040504	4/1/1980	BILOXI	Highway	No	0/0	$0	0
I-1982010444	1/13/1982	BILOXI	Highway	No	0/0	$0	60 LGA
I-1982060440	6/5/1982	BILOXI	Highway	No	0/0	$0	0
I-1982060440	6/5/1982	BILOXI	Highway	No	0/0	$0	15 LGA
I-1982110098	10/19/1982	BILOXI	Highway	No	0/0	$0	50 LGA
I-1982110098	10/19/1982	BILOXI	Highway	No	0/0	$0	50 LGA
I-1984080015	7/11/1984	BILOXI	Highway	Yes	0/0	$0	200 LGA
I-1984120186	11/21/1984	BILOXI	Highway	No	0/0	$0	50 LGA
I-1989010371	1/13/1989	BILOXI	Rail	No	0/0	$0	5 LGA
I-1991100049	9/20/1991	BILOXI	Highway	No	0/0	$177	60.75956 LGA
I-1998081332	8/9/1998	BILOXI	Highway	Yes	5/0	$1,182	750 LGA
I-2001040103	3/8/2001	BILOXI	Highway	No	0/0	$796	2 LGA
I-2001041026	4/6/2001	BILOXI	Highway	No	0/0	$408	30 LGA
E-2009120077	11/26/2009	BILOXI	Highway	No	0/0	$6,736	3 LGA
X-2010120001	11/29/2010	BILOXI	Highway	No	0/0	$0	10 LGA
I-2011050376	4/27/2011	BILOXI	Highway	No	0/0	$19,993	100 LGA
I-2012100188	8/16/2012	BILOXI	Highway	Yes	0/0	$22,345	15 LGA
I-2012090193	8/21/2012	BILOXI	Highway	No	0/0	$1,574	5 LGA
I-2012100193	9/9/2012	BILOXI	Highway	No	0/0	$0	20 LGA
I-2012120001	10/23/2012	BILOXI	Highway	No	0/0	$0	0.09375 LGA
X-2015050067	4/13/2015	Biloxi	Highway	No	0/0	$0	5 LGA
E-2016060360	5/28/2016	BULOXIE	Highway	No	0/0	$0	1 LGA
D'Iberville							
None reported	--	--	--	--	--	--	-

Report Number	Date	City	Mode	Serious Incident?	Deaths/ Injuries	Damages ($)*	Quantity Released
Gulfport							
I-1972020248	1/10/1972	GULFPORT	Highway	No	0/0	$0	0
I-1972120072	11/16/1972	GULFPORT	Highway	No	0/0	$0	0
I-1973020317	2/13/1973	GULFPORT	Highway	No	0/0	$0	0
I-1973040165	3/23/1973	GULFPORT	Highway	No	0/0	$0	0
I-1973050063	4/23/1973	GULFPORT	Highway	No	0/0	$0	0
I-1974080440	7/30/1974	GULFPORT	Highway	No	0/0	$0	0
I-1975080169	6/30/1975	GULFPORT	Highway	No	0/0	$0	0
I-1975080174	7/22/1975	GULFPORT	Highway	No	0/0	$0	0
I-1975101084	9/30/1975	GULFPORT	Highway	No	0/0	$0	0
I-1975110254	10/27/1975	GULFPORT	Highway	No	0/0	$0	0
I-1976010283	12/11/1975	GULFPORT	Highway	No	0/0	$0	5 LGA
I-1976040493	3/25/1976	GULFPORT	Highway	No	0/0	$0	15 LGA
I-1976050953	4/21/1976	GULFPORT	Highway	No	0/0	$0	0
I-1976120397	10/29/1976	GULFPORT	Highway	No	0/0	$0	0
I-1977020061	1/6/1977	GULFPORT	Highway	No	0/0	$0	0
I-1977020060	1/12/1977	GULFPORT	Highway	No	0/0	$0	1 SLB
I-1977060397	5/17/1977	GULFPORT	Highway	No	0/0	$0	10 LGA
I-1977081290	8/11/1977	GULFPORT	Highway	No	0/0	$0	5 LGA
I-1977100210	8/30/1977	GULFPORT	Highway	No	0/0	$0	0
I-1977100196	9/2/1977	GULFPORT	Highway	No	0/0	$0	0
I-1978080075	7/27/1978	GULFPORT	Highway	No	0/0	$0	15 LGA
I-1978080096	7/28/1978	GULFPORT	Highway	No	0/0	$0	0
I-1978111014	11/8/1978	GULFPORT	Highway	No	0/0	$0	0
I-1979091352	8/7/1979	GULFPORT	Highway	No	0/0	$0	0
I-1979092086	8/16/1979	GULFPORT	Highway	No	0/0	$0	0
I-1980010328	11/26/1979	GULFPORT	Highway	No	0/0	$0	0
I-1980010166	1/7/1980	GULFPORT	Highway	No	0/0	$0	2 LGA
I-1980050296	5/6/1980	GULFPORT	Highway	No	0/0	$0	15 LGA
I-1981060840	5/15/1980	GULFPORT	Highway	No	0/0	$0	1 LGA
I-1980080494	6/6/1980	GULFPORT	Highway	No	0/0	$0	0
I-1980090848	8/12/1980	GULFPORT	Highway	No	0/0	$0	1 LGA
I-1981020382	1/24/1981	GULFPORT	Highway	No	0/0	$0	50 LGA
I-1981050713	5/4/1981	GULFPORT	Highway	Yes	0/0	$0	146 LGA
I-1982030218	2/19/1982	GULFPORT	Highway	No	0/0	$0	25 LGA
I-1982050457	5/6/1982	GULFPORT	Highway	Yes	0/0	$0	147 LGA
I-1982050457	5/6/1982	GULFPORT	Highway	Yes	0/0	$0	147 LGA
I-1984060075	5/21/1984	GULFPORT	Highway	No	0/0	$0	5 LGA
I-1984080374	7/9/1984	GULFPORT	Highway	No	0/0	$0	0.81 LGA
I-1984080374	7/9/1984	GULFPORT	Highway	No	0/0	$0	0.19 LGA
I-1984120187	11/23/1984	GULFPORT	Highway	No	0/0	$0	50 LGA
I-1985040559	4/2/1985	GULFPORT	Highway	No	0/0	$0	74 LGA
I-1986090122	8/25/1986	GULFPORT	Highway	No	0/0	$0	2 LGA
I-1987060128	5/13/1987	GULFPORT	Rail	No	0/0	$0	10 LGA
I-1988020373	1/27/1988	GULFPORT	Highway	No	0/0	$0	0.063 SLB
I-1990030301	2/14/1990	GULFPORT	Rail	No	0/0	$0	0

Report Number	Date	City	Mode	Serious Incident?	Deaths/ Injuries	Damages ($)*	Quantity Released
I-1990030302	2/14/1990	GULFPORT	Rail	No	0/0	$0	0
I-1990030303	2/14/1990	GULFPORT	Rail	No	0/0	$0	0
I-1990050695	4/27/1990	GULFPORT	Highway	No	0/0	$92	2 LGA
I-1990080939	7/20/1990	GULFPORT	Rail	No	0/0	$0	0
I-1990100741	10/1/1990	GULFPORT	Highway	No	0/0	$2,027	2 LGA
I-1992030439	2/21/1992	GULFPORT	Highway	No	0/0	$3	8 LGA
I-1992060106	5/8/1992	GULFPORT	Rail	No	0/0	$172	0.125 LGA
I-1992080717	7/21/1992	GULFPORT	Highway	No	0/0	$6,822	50 LGA
I-1992090930	9/3/1992	GULFPORT	Highway	No	0/0	$215	0.078125 LGA
I-1993060712	5/12/1993	GULFPORT	Highway	No	0/0	$208	0.25 LGA
I-1993110464	9/6/1993	GULFPORT	Highway	No	0/0	$208	0.25 LGA
I-1993110475	9/23/1993	GULFPORT	Highway	No	0/0	$208	0.25 LGA
I-1994030036	2/18/1994	GULFPORT	Highway	No	0/0	$869	2 LGA
I-1994040310	2/23/1994	GULFPORT	Highway	No	0/0	$0	0
I-1994030880	2/24/1994	GULFPORT	Highway	No	0/0	$0	0
I-1994060844	4/27/1994	GULFPORT	Highway	No	0/0	$0	0.007813 LGA
I-1994080476	6/29/1994	GULFPORT	Highway	No	0/0	$203	0
I-1994080852	7/5/1994	GULFPORT	Highway	No	0/0	$24	10 LGA
I-1994111288	10/27/1994	GULFPORT	Highway	No	0/0	$203	1 LGA
I-1995061142	5/2/1995	GULFPORT	Highway	No	0/0	$0	1.875 LGA
I-1995071630	7/11/1995	GULFPORT	Highway	No	0/0	$0	1 LGA
I-1995080127	7/26/1995	GULFPORT	Highway	No	0/0	$0	2 LGA
I-1995091293	9/12/1995	GULFPORT	Highway	No	0/0	$0	2 LGA
I-1996020561	1/11/1996	GULFPORT	Highway	No	0/0	$384	0.25 LGA
I-1996020561	1/11/1996	GULFPORT	Highway	No	0/0	$384	0.25 LGA
I-1996020863	2/1/1996	GULFPORT	Highway	No	0/0	$192	0.0625 LGA
I-1996040952	3/28/1996	GULFPORT	Highway	No	0/0	$0	2 LGA
I-1996090883	9/9/1996	GULFPORT	Highway	No	0/0	$829	0.25 LGA
I-1997070748	6/21/1997	GULFPORT	Highway	No	0/0	$23	0
I-1998020016	12/30/1997	GULFPORT	Rail	No	0/1	$0	0
I-1998030591	2/3/1998	GULFPORT	Rail	No	0/0	$0	1 LGA
I-1999040773	4/15/1999	GULFPORT	Highway	No	0/0	$181	0.5 LGA
I-1999051086	4/20/1999	GULFPORT	Highway	No	0/0	$101	0.5 LGA
I-1999050826	4/28/1999	GULFPORT	Highway	No	0/0	$296	0.5 LGA
I-1999061169	6/1/1999	GULFPORT	Highway	No	0/0	$181	0.125 LGA
I-1999070316	6/15/1999	GULFPORT	Highway	No	0/0	$181	4.38 LGA
I-1999080104	7/16/1999	GULFPORT	Highway	No	0/0	$181	0.007813 LGA
I-1999091944	8/27/1999	GULFPORT	Highway	No	0/0	$181	0.5 LGA
I-1999091715	8/31/1999	GULFPORT	Highway	No	0/0	$181	0.25 LGA
I-1999100883	9/8/1999	GULFPORT	Highway	No	0/0	$181	0.0625 LGA
I-1999101071	9/30/1999	GULFPORT	Highway	No	0/0	$181	0.25 LGA
I-1999110672	11/4/1999	GULFPORT	Highway	No	0/0	$181	0.007813 LGA
I-1999111262	11/10/1999	GULFPORT	Highway	No	0/0	$181	0.015625 LGA
I-2000010936	1/12/2000	GULFPORT	Highway	No	0/0	$280	0.125 LGA
I-2000020516	1/21/2000	GULFPORT	Highway	No	0/0	$175	0.007813 LGA
I-2000030370	2/17/2000	GULFPORT	Highway	No	0/0	$6,434	35 LGA

Report Number	Date	City	Mode	Serious Incident?	Deaths/ Injuries	Damages ($)*	Quantity Released
I-2000040394	3/6/2000	GULFPORT	Highway	No	0/0	$0	0.0625 LGA
I-2001050321	4/4/2000	GULFPORT	Highway	No	0/0	$769	0.125 LGA
I-2000050862	4/21/2000	GULFPORT	Highway	No	0/0	$175	0.264172 LGA
I-2000051667	5/10/2000	GULFPORT	Highway	No	0/0	$350	0.375 LGA
I-2000060650	5/15/2000	GULFPORT	Highway	No	0/0	$203	0.5 LGA
I-2000090540	5/19/2000	GULFPORT	Highway	No	0/0	$175	0.25 LGA
I-2000060330	5/24/2000	GULFPORT	Highway	No	0/0	$175	0.046875 LGA
I-2000081494	7/24/2000	GULFPORT	Highway	No	0/0	$0	0.125 LGA
I-2000081188	7/27/2000	GULFPORT	Highway	No	0/0	$2,811	20 LGA
I-2000091247	8/10/2000	GULFPORT	Highway	No	0/0	$119	0.015625 LGA
I-2000090885	8/16/2000	GULFPORT	Highway	No	0/0	$455	0.09375 LGA
I-2000100613	9/22/2000	GULFPORT	Highway	No	0/0	$175	0.007813 LGA
I-2000101809	10/9/2000	GULFPORT	Highway	No	0/0	$175	0.015625 LGA
I-2001010156	12/18/2000	GULFPORT	Highway	No	0/0	$0	1 LGA
I-2001051827	5/4/2001	GULFPORT	Highway	No	0/0	$0	50 SLB
I-2001051606	5/15/2001	GULFPORT	Highway	No	0/0	$170	5 LGA
I-2001061556	6/18/2001	GULFPORT	Highway	No	0/0	$170	3 LGA
I-2001071305	7/6/2001	GULFPORT	Highway	No	0/0	$170	0.264063 LGA
I-2001090411	7/27/2001	GULFPORT	Highway	No	0/0	$340	4 LGA
I-2001081639	8/14/2001	GULFPORT	Highway	No	0/0	$170	1 LGA
I-2002011795	10/17/2001	GULFPORT	Highway	No	0/0	$714	0.0625 SLB
I-2001120819	10/23/2001	GULFPORT	Highway	No	0/0	$714	0.5 LGA
I-2002010231	11/15/2001	GULFPORT	Highway	No	0/0	$3,468	40 LGA
I-2002021250	2/5/2002	GULFPORT	Highway	No	0/0	$703	1 LGA
I-2002021352	2/12/2002	GULFPORT	Highway	No	0/0	$703	2 LGA
I-2002030544	2/27/2002	GULFPORT	Highway	No	0/0	$703	2 LGA
I-2002030763	2/28/2002	GULFPORT	Highway	No	0/0	$703	1 LGA
I-2002041329	4/16/2002	GULFPORT	Highway	No	0/0	$703	1 LGA
I-2002050981	5/7/2002	GULFPORT	Highway	No	0/0	$703	1 LGA
I-2002060549	5/24/2002	GULFPORT	Highway	No	0/0	$703	1 LGA
I-2002061185	6/7/2002	GULFPORT	Highway	No	0/0	$410	5 LGA
I-2002070439	6/25/2002	GULFPORT	Highway	No	0/0	$703	2 LGA
I-2003071154	7/2/2003	GULFPORT	Highway	No	0/0	$687	0.125 LGA
I-2004040140	3/25/2004	GULFPORT	Highway	No	0/0	$1,339	0.25 LGA
I-2004040140	3/25/2004	GULFPORT	Highway	No	0/0	$1,339	0.25 LGA
I-2004100191	8/30/2004	GULFPORT	Rail	No	0/0	$10	0.5 LGA
E-2007020133	7/19/2006	GULFPORT	Highway	No	0/0	$0	100 LGA
I-2006101353	10/14/2006	GULFPORT	Highway	No	0/0	$1,278	35 LGA
I-2007061293	6/1/2007	GULFPORT	Highway	No	0/0	$0	1 LGA
X-2007070453	7/24/2007	GULFPORT	Highway	No	0/0	$0	0.039062 LGA
I-2007090291	8/1/2007	GULFPORT	Highway	No	0/0	$0	6 LGA
I-2007100241	9/10/2007	GULFPORT	Highway	No	0/0	$0	1 LGA
E-2007110073	9/27/2007	GULFPORT	Highway	No	0/0	$0	0.125 LGA
X-2007100281	10/2/2007	GULFPORT	Highway	No	0/0	$0	0.125 LGA
X-2007110118	10/30/2007	GULFPORT	Highway	No	0/0	$0	0.078125 LGA
X-2008020206	2/12/2008	GULFPORT	Highway	No	0/0	$0	0.26418 LGA

Report Number	Date	City	Mode	Serious Incident?	Deaths/ Injuries	Damages ($)*	Quantity Released
X-2008040272	4/16/2008	GULFPORT	Highway	No	0/0	$0	0.26418 LGA
X-2008040306	4/17/2008	GULFPORT	Highway	No	0/0	$0	0.007812 LGA
X-2008050107	4/25/2008	GULFPORT	Highway	No	0/0	$0	0.015625 LGA
X-2008050129	4/28/2008	GULFPORT	Highway	No	0/0	$0	0.007812 LGA
X-2008080144	7/18/2008	GULFPORT	Highway	No	0/0	$0	1 LGA
I-2008110442	7/20/2008	GULFPORT	Highway	No	0/0	$26,524	0.13368 GCF
I-2008080502	8/6/2008	GULFPORT	Air	No	0/0	$0	0.132085 LGA
X-2008090024	8/18/2008	GULFPORT	Highway	No	0/0	$0	0.5 LGA
X-2008090231	9/5/2008	GULFPORT	Highway	No	0/0	$0	0.125 SLB
I-2009020255	12/17/2008	GULFPORT	Highway	No	0/0	$2,853	18 LGA
I-2009060327	5/26/2009	GULFPORT	Highway	No	0/0	$0	0.007813 LGA
I-2009090007	6/4/2009	GULFPORT	Highway	No	0/0	$0	10 LGA
I-2009070183	6/28/2009	GULFPORT	Highway	No	0/0	$0	0.5 LGA
E-2010030341	3/29/2010	GULFPORT	Highway	No	0/0	$0	0.125 LGA
E-2010060197	6/8/2010	GULFPORT	Highway	No	0/0	$0	0.023438 LGA
E-2010060298	6/18/2010	GULFPORT	Highway	No	0/0	$0	0.25 LGA
I-2010070266	6/22/2010	GULFPORT	Highway	No	0/0	$0	0
E-2010090344	9/12/2010	GULFPORT	Highway	No	0/0	$1,712	0.25 LGA
I-2011040074	3/24/2011	GULFPORT	Highway	No	0/0	$0	1 LGA
I-2011050067	4/16/2011	GULFPORT	Highway	No	0/0	$0	0.125 LGA
X-2012020188	1/30/2012	GULFPORT	Highway	No	0/0	$0	0.01766 GCF
I-2012060145	5/29/2012	GULFPORT	Air	No	0/0	$0	0
X-2012080602	8/1/2012	GULFPORT	Highway	No	0/0	$0	0.023438 LGA
X-2013020003	1/7/2013	GULFPORT	Highway	No	0/0	$0	2 LGA
X-2013070142	6/15/2013	GULFPORT	Highway	No	0/0	$0	2 LGA
E-2013110137	10/23/2013	GULFPORT	Highway	Yes	0/0	$11,890	80 LGA
E-2013110036	11/1/2013	GULFPORT	Highway	No	0/0	$0	0.25 LGA
E-2014010198	1/17/2014	GULFPORT	Highway	No	0/0	$0	30 LGA
I-2014030411	3/14/2014	GULFPORT	Highway	No	0/0	$0	0.25 LGA
X-2014050305	4/24/2014	GULFPORT	Highway	No	0/0	$0	1 LGA
I-2014050279	5/2/2014	GULFPORT	Highway	No	0/0	$0	0.023438 LGA
I-2014090243	6/26/2014	GULFPORT	Highway	No	0/0	$0	0.5 LGA
X-2014070497	7/2/2014	GULFPORT	Highway	No	0/0	$0	0.007812 LGA
I-2014110314	10/14/2014	GULFPORT	Highway	No	0/0	$7,203	25 LGA
X-2014120010	11/4/2014	GULFPORT	Highway	No	0/0	$0	0.015625 LGA
I-2015030228	2/27/2015	GULFPORT	Highway	No	0/0	$0	0.132085 LGA
E-2015040240	4/15/2015	GULFPORT	Highway	No	0/0	$0	20 LGA
X-2015060121	5/13/2015	GULFPORT	Highway	No	0/0	$0	1 LGA
X-2015060141	5/14/2015	GULFPORT	Highway	No	0/0	$0	1 LGA
X-2015070024	6/2/2015	GULFPORT	Highway	No	0/0	$0	0.007812 LGA
I-2015070261	6/24/2015	GULFPORT	Highway	No	0/0	$0	0.625 LGA
X-2015110321	9/22/2015	GULFPORT	Highway	No	0/0	$0	0.007812 LGA
X-2015110228	9/22/2015	GULFPORT	Highway	No	0/0	$0	0.003906 LGA
X-2015120140	11/5/2015	GULFPORT	Highway	No	0/0	$0	1 LGA
X-2016030032	2/3/2016	GULFPORT	Highway	No	0/0	$0	0.0625 LGA

Report Number	Date	City	Mode	Serious Incident?	Deaths/ Injuries	Damages ($)*	Quantity Released
Long Beach							
I-1981010297	10/7/1980	LONG BEACH	Highway	No	0/0	$0	0
I-1980110817	10/7/1980	LONG BEACH	Highway	No	0/0	$0	0
I-1981010282	10/17/1980	LONG BEACH	Highway	No	0/0	$0	0
I-1990010431	12/11/1989	LONG BEACH	Highway	No	0/0	$0	45 LGA
I-2003010510	12/17/2002	LONG BEACH	Rail	No	0/0	$0	10 LGA
E-2007120098	12/7/2007	LONG BEACH	Highway	No	0/0	$0	3 LGA
X-2015060105	5/12/2015	Long Beach	Highway	No	0/0	$0	0.007812 LGA
Pass Christian							
I-1994050299	3/30/1994	PASS CHRISTIAN	Highway	No	0/0	$544	2 LGA
I-1998020342	1/21/1998	PASS CHRISTIAN	Highway	No	0/0	$0	1 LGA
E-2010030330	3/19/2010	PASS CHRISTIAN	Highway	Yes	0/0	$93,886	150 LGA
I-2010090296	6/1/2010	PASS CHRISTIAN	Highway	Yes	0/0	$85,050	628 LGA
Unincorporated Area							
I-1980010350	1/4/1980	LIZANNA	Highway	No	0/0	$0	100 LGA
I-2004010564	11/21/2003	DE LISLE	Highway	No	0/0	$0	10 LGA
I-2004071426	7/16/2004	MISSISSIPPI CITY	Rail	No	0/0	$0	1 LGA
I-2004100787	8/23/2004	DE LISLE	Highway	No	0/0	$0	0.5 LGA
I-2005040309	3/23/2005	DELISLE	Highway	No	0/0	$0	50 LGA

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: United States Department of Transportation Pipeline and Hazardous Materials Safety Administration

PROBABILITY OF FUTURE OCCURRENCES

Given the location of 14 toxic release inventory sites in Harrison County and prior roadway and railway incidents, it is highly likely (100 percent annual probability) that a hazardous material incident may occur in the county. County and city officials are mindful of this possibility and take precautions to prevent such an event from occurring. Furthermore, there are detailed plans in place to respond to an occurrence.

C.2.18 Infectious Disease

LOCATION AND SPATIAL EXTENT

Due to the nature of a public health/emerging disease threat, it is difficult to identify a precise location where this type of event would occur. Moreover, a large-scale event would have impacts that spread throughout the county. Therefore, all areas in Harrison County are considered equally susceptible to infectious diseases.

HISTORICAL OCCURRENCES

Mosquito-borne illness in Mississippi include West Nile virus, Chikungunya virus, and Zika virus. These illnesses affect birds, animals, and humans, causing flu-like symptoms in people who are bitten by infected mosquitoes. Occasionally illness can be severe, leading to meningitis or encephalitis. According to the Mississippi State Department of Health (MSDH), there have been two reported cases of Zika in Harrison

County as of November 2016. **Table C.31** summarizes the mosquito-borne illnesses in humans reported in the county.

TABLE C.31: SUMMARY OF MOSQUITO-BORNE ILLNESSES IN HARRISON COUNTY

Location	West Nile Virus	Chikungunya	Zika	Other*	Deaths
Harrison County	0	0	2	0	0

*Other mosquito-borne illnesses include La Crosse encephalitis, St. Louis encephalitis, and Eastern Equine encephalitis.
Source: Mississippi State Department of Health

Diseases like influenza and norovirus are regularly occurring health issues in Harrison County. These conditions are not legally reportable to county or state public health agencies, so data on disease incidence is not readily available. MSDH relies upon selected sentinel health practitioners across the state to report the percentage and total patient visits consistent with an influenza-like illness (ILI): fever of 100°F or higher and cough or sore throat. Reports are used to estimate the state's ILI rate and the magnitude of state's influenza activity on a weekly basis. Reports represent only the distribution of flu in the state, not an actual count of all flu cases statewide.

PROBABILITY OF FUTURE OCCURRENCES

Due to some recent incidents that have been recorded across the State of Mississippi and in Harrison County, future occurrences are considered possible (between 1 and 10 percent annual probability).

C.2.19 Conclusions on Hazard Risk

The hazard profiles presented in this section were developed using best available data and result in what may be considered principally a qualitative assessment as recommended by FEMA in its "How-to" guidance document titled *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA Publication 386-2). It relies heavily on historical and anecdotal data, stakeholder input, and professional and experienced judgment regarding observed and/or anticipated hazard impacts. It also carefully considers the findings in other relevant plans, studies, and technical reports.

HAZARD EXTENT

Table C.32 describes the extent of each hazard identified for Harrison County. The extent of a hazard is defined as its severity or magnitude, as it relates to the planning area.

TABLE C.32: EXTENT OF HARRISON COUNTY HAZARDS

Flood-related Hazards	
Dam and Levee Failure	Dam failure extent is defined using the Mississippi Division of Environmental Quality classifications which include Low, Significant, and High. One dam is classified as high-hazard in Harrison County.
Erosion	The extent of erosion can be defined by the measurable rate of erosion that occurs. Some areas of the barrier islands are eroding at 6 to 8 meters per year in Harrison County according to the USGS Coastal and Marine Geology Program's U.S. Gulf of Mexico Interactive Map.

Flood

Flood depth and velocity are recorded via United States Geological Survey stream gages throughout the region. While a gage does not exist for each participating jurisdiction, there is one at or near many areas. The greatest flood recorded for the county was at Biloxi River near Wortham. The maximum historic crest was recorded at 28.94 feet, or 5.94 feet above the major flood stage (reported on May 9, 1995). Additional historic crest heights and the corresponding flood categories are in the table below.

Location/ Jurisdiction	Date	Maximum Historic Crest (ft)	Flood categories			
			Action Stage (ft)	Flood Stage (ft)	Moderate Flood Stage (ft)	Major Flood Stage (ft)
Harrison County						
BILOXI RIVER NEAR WORTHAM	5/9/1995	28.94	16	16	18	23
WOLF RIVER NEAR LANDON	8/31/2012	31.31	26	27	28	30
BILOXI RIVER NEAR LYMAN	5/10/1995	20.95	10	12	16	18
TCHOUTACABOUFFA RIVER NEAR D IBERVILLE	9/30/1998	19.00	8	8	15	18
WOLF RIVER ABOVE GULFPORT	9/1/2012	16.50	7	8	12	15

Storm Surge

Storm surge can be defined by the depth of inundation which is defined by the category of hurricane/tropical storm. Since Harrison County could easily be impacted by a Category 3 storm, depth of inundation could be at least 9 feet in many areas.

Fire-related Hazards

Drought

Drought extent is defined by the U.S. Drought Monitor classifications which include Abnormally Dry, Moderate Drought, Severe Drought, Extreme Drought, and Exceptional Drought. According to the U.S. Drought Monitor classifications, the most severe drought condition is Exceptional. Harrison County has received this ranking twice over the 17-year reporting period.

Lightning

According to the Vaisala's flash density map, Harrison County is located in an area that experiences 4 to 12 and up lightning flashes per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures.

Wildfire

Wildfire data was provided by the Mississippi Forestry Commission and is reported annually by county from 2007-2016. The greatest number of fires to occur in Harrison County in any year 185 in 2011. The greatest number of acres to burn in the county in a single year occurred in 2011 when 4,744 acres were burned. Information on specific occurrences of wildfire and the most severe fires in each jurisdiction is not available. Although this data lists the extent that has occurred, larger and more frequent wildfires are possible throughout the county.

Geologic Hazards

Earthquake

Earthquake extent can be measured by the Richter Scale, the Modified Mercalli Intensity (MMI) scale, and the distance of the epicenter from Harrison County. According to data provided by the National Centers for Environmental Information, the greatest earthquake to impact the county had an MMI of V (slightly strong) and a correlating Richter Scale magnitude estimated at less than 4.8 (reported on February 1, 1955). The epicenter of this earthquake was located 2.0 km away.

Wind-related Hazards	
Extreme Cold	The extent of extreme cold can be defined by the minimum temperature reached. Official long term temperature records are not kept for any areas in Harrison County. However, the temperature has previously ranged from 15 to 20 degrees Fahrenheit in southwest and coastal Mississippi (reported on December 18, 1996).
Extreme Heat	The extent of extreme heat can be measured by the record high temperature recorded. Official long term temperature records are not kept for any areas in Harrison County. However, the highest recorded temperature in Beaumont (north of the county) was 105°F and heat index values were recorded as high as 115°F (reported in July 2000).
Hailstorm	Hail extent can be defined by the size of the hail stone. The largest hail stone reported in Harrison County was 2.75 inches (reported on January 24, 1997). It should be noted that future events may exceed this.
Hurricane and Tropical Storm	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5. The greatest classification of hurricane to traverse directly through Harrison County was Hurricane Elena, a Category 2 storm which carried tropical force winds of 93 knots upon arrival in the county.
Severe Thunderstorm/High Wind	Thunderstorm extent is defined by wind speeds reported. The strongest recorded wind event in Harrison County was 80 knots (reported on April 14, 1964). It should be noted that future events may exceed these historical occurrences.
Tornado	Tornado hazard extent is measured by the Fujita/Enhanced Fujita. The greatest magnitude reported in Harrison County was an F3 (last reported on May 19, 1980).
Winter Weather	The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest snowfall reported in Harrison County was 1-2 inches (reported on December 18, 1996).
Other Hazards	
Climate Change/Sea Level Rise	It is still uncertain what the extent of climate change will be in the future. However, increasing temperature (extreme heat), changes in precipitation (drought, flooding), and more frequent, stronger storms (wind, hurricanes) can be expected. Sea level rise is defined by the areas impacted, but is more often associated with the amount of sea level rise that is expected to take place. Although it is difficult to predict an exact amount of rise, the Climate Change Surging Seas Report intermediate high sea level rise scenario projects 1 foot of rise locally by 2050 and 3.7 feet by 2100.
Hazardous Materials Incident/Train Derailment	According to USDOT PHMSA, the largest hazardous materials incident reported in Harrison County was 750 LGA released on the highway (reported on August 9, 1998). It should be noted that larger events are possible.
Infectious Disease	An infectious disease threat could have large-scale effects throughout the county and may cause illness in many people. Possible impacts from a disease threat depend largely on the impacted population, but might include anything from absenteeism and loss of productivity in the workplace to death or serious illness to humans or livestock. A serious disease threat could affect many thousands of people.

PRIORITY RISK INDEX RESULTS

In order to draw some meaningful planning conclusions on hazard risk for Harrison County, the results of the hazard profiling process were used to generate countywide hazard classifications according to a "Priority Risk Index" (PRI). More information on the PRI and how it was calculated can be found in Section 5.21.2.

Table C.33 summarizes the degree of risk assigned to each category for all initially identified hazards based on the application of the PRI. Assigned risk levels were based on the detailed hazard profiles developed for this subsection, as well as input from the Regional Hazard Mitigation Council. The results were then used in calculating PRI values and making final determinations for the risk assessment.

TABLE C.33: SUMMARY OF PRI RESULTS FOR HARRISON COUNTY

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Flood-related Hazards						
Dam and Levee Failure	Possible	Critical	Small	Less than 6 hours	Less than 6 hours	**2.4**
Erosion	Likely	Limited	Small	More than 24 hours	More than 1 week	**2.4**
Flood	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 24 hours	**3.2**
Storm Surge	Highly Likely	Critical	Moderate	More than 24 hours	Less than 24 hours	**3.0**
Fire-related Hazards						
Drought	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Lightning	Highly Likely	Limited	Negligible	6 to 12 hours	Less than 6 hours	**2.4**
Wildfire	Highly Likely	Minor	Small	Less than 6 hours	Less than 1 week	**2.6**
Geologic Hazards						
Earthquake	Possible	Minor	Moderate	Less than 6 hours	Less than 6 hours	**2.0**
Wind-related Hazards						
Extreme Cold	Possible	Minor	Large	More than 24 hours	Less than 1 week	**2.1**
Extreme Heat	Highly Likely	Minor	Large	More than 24 hours	More than 1 week	**2.8**
Hailstorm	Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours	**2.8**
Hurricane and Tropical Storm	Highly Likely	Critical	Large	More than 24 hours	Less than 24 hours	**3.2**
Severe Thunderstorm/ High Wind	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 6 hours	**3.1**
Tornado	Highly Likely	Critical	Small	Less than 6 hours	Less than 6 hours	**3.0**
Winter Weather	Likely	Minor	Moderate	More than 24 hours	Less than 24 hours	**2.1**
Other Hazards						
Climate Change/Sea Level Rise	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Hazardous Materials Incident/ Train Derailment	Highly Likely	Limited	Small	Less than 6 hours	Less than 24 hours	**2.8**
Infectious Disease	Possible	Limited	Large	More than 24 hours	More than 1 week	**2.5**

C.2.20 Final Determinations on Hazard Risk

The conclusions drawn from the hazard profiling process for Harrison County, including the PRI results and input from the Regional Hazard Mitigation Council, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk, and Low Risk (**Table C.34**). For purposes of these classifications, risk is expressed in relative terms according to the estimated impact that

a hazard will have on human life and property throughout all of Harrison County. A more quantitative analysis to estimate potential dollar losses for each hazard has been performed separately, and is described in Section 6: *Vulnerability Assessment* and below in Section C.3. It should be noted that although some hazards are classified below as posing low risk, their occurrence of varying or unprecedented magnitudes is still possible in some cases and their assigned classification will continue to be evaluated during future plan updates.

Some priorities have changed since the previous plans were adopted due to the merging of multiple local plans to form this regional plan; however, most priorities remain the same.

TABLE C.34: CONCLUSIONS ON HAZARD RISK FOR HARRISON COUNTY

HIGH RISK	Hurricane and Tropical Storm Flood Severe Thunderstorm/High Wind Storm Surge Tornado
MODERATE RISK	Hailstorm Hazardous Materials Incident/Train Derailment Extreme Heat Wildfire Drought Climate Change/Sea Level Rise Infectious Disease
LOW RISK	Lightning Dam and Levee Failure Erosion Winter Weather Extreme Cold Earthquake

C.3 HARRISON COUNTY VULNERABILITY ASSESSMENT

This subsection identifies and quantifies the vulnerability of Harrison County to the significant hazards previously identified. This includes identifying and characterizing an inventory of assets in the county and assessing the potential impact and expected amount of damages caused to these assets by each identified hazard event. More information on the methodology and data sources used to conduct this assessment can be found in Section 6: *Vulnerability Assessment*.

C.3.1 Asset Inventory

Table C.35 lists the estimated number of buildings, parcels, and the total value of improvements for Harrison County and its participating jurisdictions (study area of vulnerability assessment). Because digital

parcel data was not available for every community, data obtained from Hazus-MH 3.2 inventory was utilized to supplement the analysis where gaps existed.

TABLE C.35: IMPROVED PROPERTY IN HARRISON COUNTY

Location	Counts of Buildings	Counts of Parcels	Total Value of Improvements
Biloxi	23,001	16,807	$1,542,665,202
D'Iberville	4,751	3,122	$234,845,437
Gulfport	41,641	32,328	$397,918,520
Long Beach	9,188	7,175	$464,548,692
Pass Christian	3,694	6,224	$183,434,546
Unincorporated Area	41,573	30,912	$3,647,401,420
HARRISON COUNTY TOTAL	**123,848**	**96,568**	**$6,470,813,817**

Source: MDEQ, Hazus-MH 3.2

Table C.36 lists the critical facilities located in Harrison County by type according to data provided by local government officials.

In addition, **Figure C.19** shows the locations of critical facilities in Harrison County. **Table C.52**, at the end of this subsection, shows a complete list of the critical facilities by name, as well as the hazards that affect each facility. Further, it should be noted that the table below may show that some communities do not have any critical facilities of in certain type, when in reality, that particular type of facility may actually be located within the community. This may occur because spatial data for that facility type was not available or because the facility may have been classified under a different category type for that particular community.

TABLE C.36: CRITICAL FACILITY INVENTORY IN HARRISON COUNTY

Location	Communications	EOC	Fire Stations	Medical	Police Station	Power/ Gas	Private/Non-Profit
Biloxi	3	1	9	6	3	1	24
D'Iberville	1	0	1	2	1	3	0
Gulfport	0	0	12	4	11	1	5
Long Beach	0	0	3	0	1	0	0
Pass Christian	0	1	2	1	1	0	0
Unincorporated Area	0	1	5	0	0	87	0
HARRISON COUNTY TOTAL	**4**	**3**	**32**	**13**	**17**	**92**	**29**

Source: Local Governments

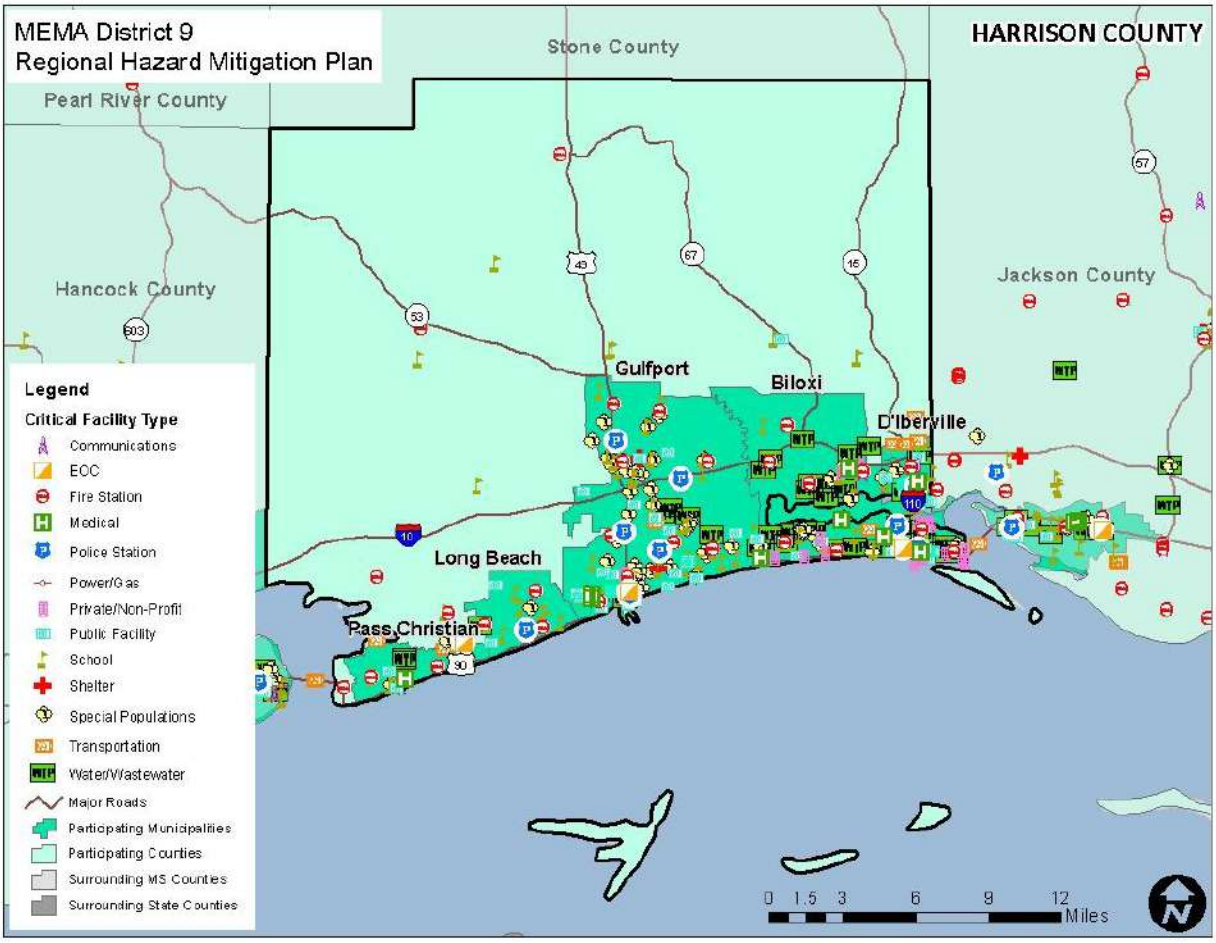
TABLE C.36: CRITICAL FACILITY INVENTORY IN HARRISON COUNTY (CONT.)

Location	Public Facility	School	Shelter	Special Populations	Transportation	Water/ Wastewater
Biloxi	18	9	0	13	2	28
D'Iberville	14	4	0	2	20	4
Gulfport	35	28	3	51	0	4
Long Beach	4	5	0	1	0	3

Location	Public Facility	School	Shelter	Special Populations	Transportation	Water/ Wastewater
Pass Christian	3	3	0	2	3	3
Unincorporated Area	1	19	0	0	1	0
HARRISON COUNTY TOTAL	**75**	**68**	**3**	**69**	**26**	**42**

Source: Local Governments

FIGURE C.19: CRITICAL FACILITY LOCATIONS IN HARRISON COUNTY



Source: Local Governments

C.3.2 Social Vulnerability

In addition to identifying those assets potentially at risk to identified hazards, it is important to identify and assess those particular segments of the resident population in Harrison County that are potentially at risk to these hazards.

Table C.37 lists the population by jurisdiction according to American Community Survey 2015 population estimates. The total population in Harrison County according to Census data is 196,268 persons. Additional population estimates are presented above in Section C.1.

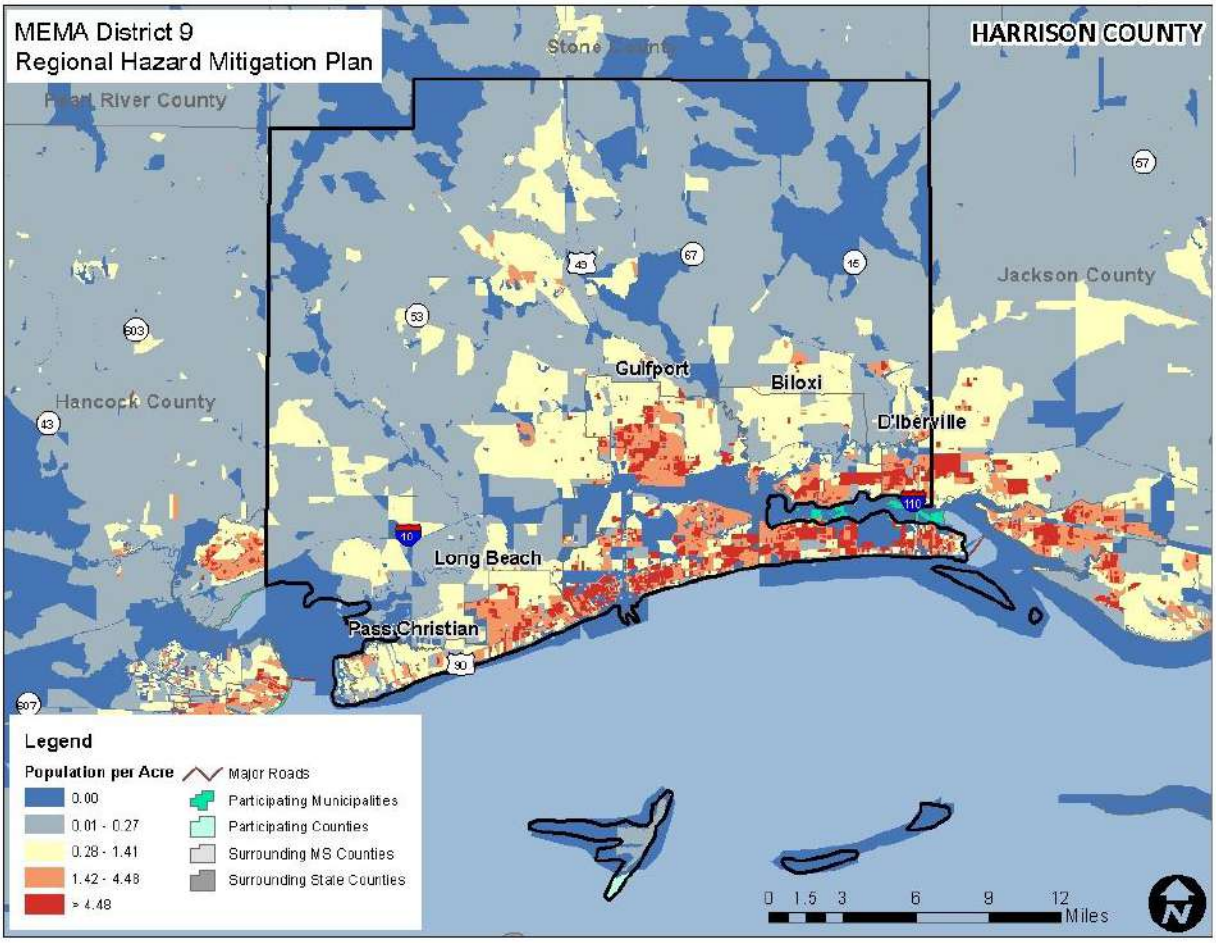
TABLE C.37: TOTAL POPULATION IN HARRISON COUNTY

Location	Total 2015 Population
Biloxi	44,825
D'Iberville	10,532
Gulfport	70,642
Long Beach	15,369
Pass Christian	5,130
Unincorporated Area	49,770
HARRISON COUNTY TOTAL	**196,268**

Source: United States Census Bureau, 2011-2015 American Community Survey 5-Year Estimates

In addition, **Figure C.20** illustrates the population density per acre by census block as it was reported by the U.S. Census Bureau in 2010. As can be seen in the figure, the population is spread out through most of the county, with heavy concentrations in Biloxi, D'Iberville, Gulfport, and Long Beach.

FIGURE C.20: POPULATION DENSITY IN HARRISON COUNTY



Source: United States Census Bureau, 2010 Census

C.3.3 Development Trends and Changes in Vulnerability

Since the previous local-level hazard mitigation plans were approved, Harrison County has experienced moderate growth and development. **Table C.38** shows the number of building units constructed since 2010 according to the U.S. Census American Community Survey.

TABLE C.38: BUILDING COUNTS FOR HARRISON COUNTY

Location	2010	2011	2012	2013	2014	2015	% Building Stock Built Post-2010
Biloxi	21,250	21,675	22,094	21,871	21,537	21,506	1.2%
D'Iberville	3,548	3,814	4,051	4,370	4,620	4,836	36.3%
Gulfport	29,619	30,293	31,556	32,092	32,878	33,421	12.8%
Long Beach	6,504	6,755	6,740	6,734	6,696	6,628	1.9%
Pass Christian	2,299	2,549	2,448	2,642	2,698	2,744	19.4%
Unincorporated Area	17,055	17,925	18,159	18,729	19,395	19,686	15.4%
HARRISON COUNTY TOTAL	**80,275**	**83,011**	**85,048**	**86,438**	**87,824**	**88,821**	**10.6%**

Source: United States Census Bureau, American Community Survey

Table C.39 shows population growth estimates for the county from 2010 to 2015 based on the based on the American Community Survey's annual population estimates.

TABLE C.39: POPULATION GROWTH FOR HARRISON COUNTY

Location	Population Estimates						% Change 2010-2015
	2010	2011	2012	2013	2014	2015	
Biloxi	43,921	44,256	44,223	44,354	44,527	44,825	2.1%
D'Iberville	8,905	9,211	9,539	9,819	10,161	10,532	18.3%
Gulfport	66,286	67,322	68,158	69,004	69,913	70,462	6.3%
Long Beach	14,769	14,872	14,981	15,102	15,224	15,369	4.1%
Pass Christian	4,809	4,756	4,773	4,848	4,957	5,130	6.7%
Unincorporated Area	43,101	44,703	46,436	47,629	48,860	49,950	15.9%
HARRISON COUNTY TOTAL	**181,791**	**185,120**	**188,110**	**190,756**	**193,642**	**196,268**	**8.0%**

Source: United States Census Bureau, American Community Survey

Based on the data above, there has been a moderate rate of residential development and population growth in the county since 2010, and the City of D'Iberville and the unincorporated area have experienced a significant increase in population while the cities of D'Iberville, Gulfport, and Pass Christian as well as the unincorporated area have experienced a significant increase in housing development, resulting in an increased number of structures and people that are vulnerable to the potential impacts of the identified hazards. Therefore, development and population growth have impacted the county's vulnerability since the previous local hazard mitigation plans were approved and there has been an increase in the overall vulnerability.

It is also important to note that as development increases in the future, greater populations and more structures and infrastructure will be exposed to potential hazards if development occurs in the floodplains or other identified areas of high risk.

C.3.4 Vulnerability Assessment Results

As noted in Section 6: *Vulnerability Assessment*, only hazards with a specific geographic boundary, available modeling tool, or sufficient historical data allow for further analysis. Those results, specific to Harrison County, are presented here. All other hazards are assumed to impact the entire planning region (e.g., drought) or, due to lack of data, analysis would not lead to credible results (e.g., infectious disease). The total county exposure, and thus risk to these hazards, was presented in **Table C.35**.

The hazards to be further analyzed in this subsection include: flood, wildfire, earthquake, hurricane and tropical storm winds and storm surge, hazardous materials incident, dam and levee failure, and sea level rise.

The annualized loss estimate for all hazards is presented near the end of this subsection in **Table C.51.**

FLOOD

Historical evidence indicates that Harrison County is susceptible to flood events. A total of 45 flood events have been reported by the National Climatic Data Center resulting in around $3.1 million (2016 dollars) in property damage as well as 1 fatality. On an annualized level, these damages amounted to $286,743 for Harrison County.

In order to assess flood risk, a GIS-based analysis was used to estimate exposure to flood events using Digital Flood Insurance Rate Map (DFIRM) data in combination with improved property records for Harrison County. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within an identified floodplain.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones.

Table C.40 shows the results of the analysis.

TABLE C.40: ESTIMATED EXPOSURE OF PROPERTY TO THE FLOOD HAZARD

Location	1.0-percent ACF		0.2-percent ACF		VE Zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Biloxi	6,417	$365,510,696	4,539	$407,939,146	222	$116,507,908
D'Iberville	1,230	$49,867,008	1,343	$116,368,166	52	$2,113,769
Gulfport	5,127	$379,135,841	7,802	$658,083,931	117	$82,687,105

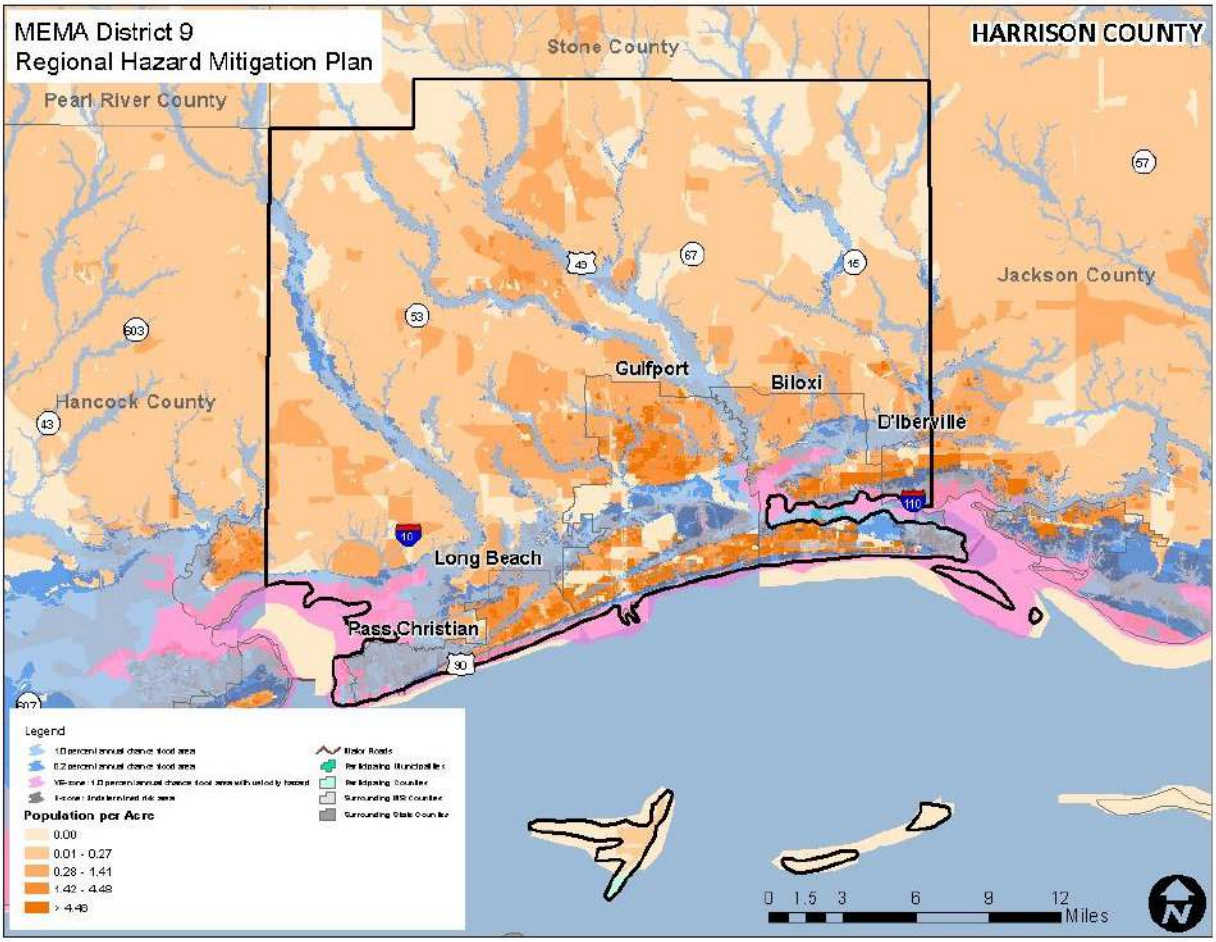
Location	1.0-percent ACF		0.2-percent ACF		VE Zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Long Beach	863	$64,152,921	1,383	$92,278,737	40	$1,523,995
Pass Christian	2,534	$108,363,854	452	$22,954,189	199	$13,772,487
Unincorporated Area	2,445	$112,232,261	1,521	$81,862,192	394	$499,658,084
HARRISON COUNTY TOTAL	**18,616**	**$1,079,262,581**	**17,040**	**$1,379,486,361**	**1,024**	**$716,263,348**

Source: Federal Emergency Management Agency DFIRM, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Figure C.21 is presented to gain a better understanding of at-risk population by evaluating census block level population data against mapped floodplains. There are areas of concern in most of the population centers in the county. Indeed, each of the incorporated municipalities is potentially at risk of being impacted by flooding in some areas of its jurisdiction. Therefore, there is significant population vulnerability to flooding.

FIGURE C.21 : POPULATION DENSITY NEAR FLOODPLAINS IN HARRISON COUNTY



Source: Federal Emergency Management Agency DFIRM, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are 159 facilities located in one of the identified floodplain zones. (Please note, as previously indicated, this analysis does not consider building elevation, which may negate risk.) Of these facilities, 75 are located in the 1.0 percent annual chance flood zone, 67 are located in the 0.2 percent annual chance flood zone, and 17 are located in a VE-zone. A list of specific critical facilities and their associated risk can be found in **Table C.52** at the end of this subsection.

In conclusion, a flood has the potential to impact many existing and future buildings, facilities, and populations in Harrison County, though some areas are at a higher risk than others. All types of structures in a floodplain are at-risk, though elevated structures will have a reduced risk. Such site-specific vulnerability determinations are outside the scope of this assessment but may be considered during future plan updates. Furthermore, areas subject to repetitive flooding should be analyzed for potential mitigation actions.

WILDFIRE

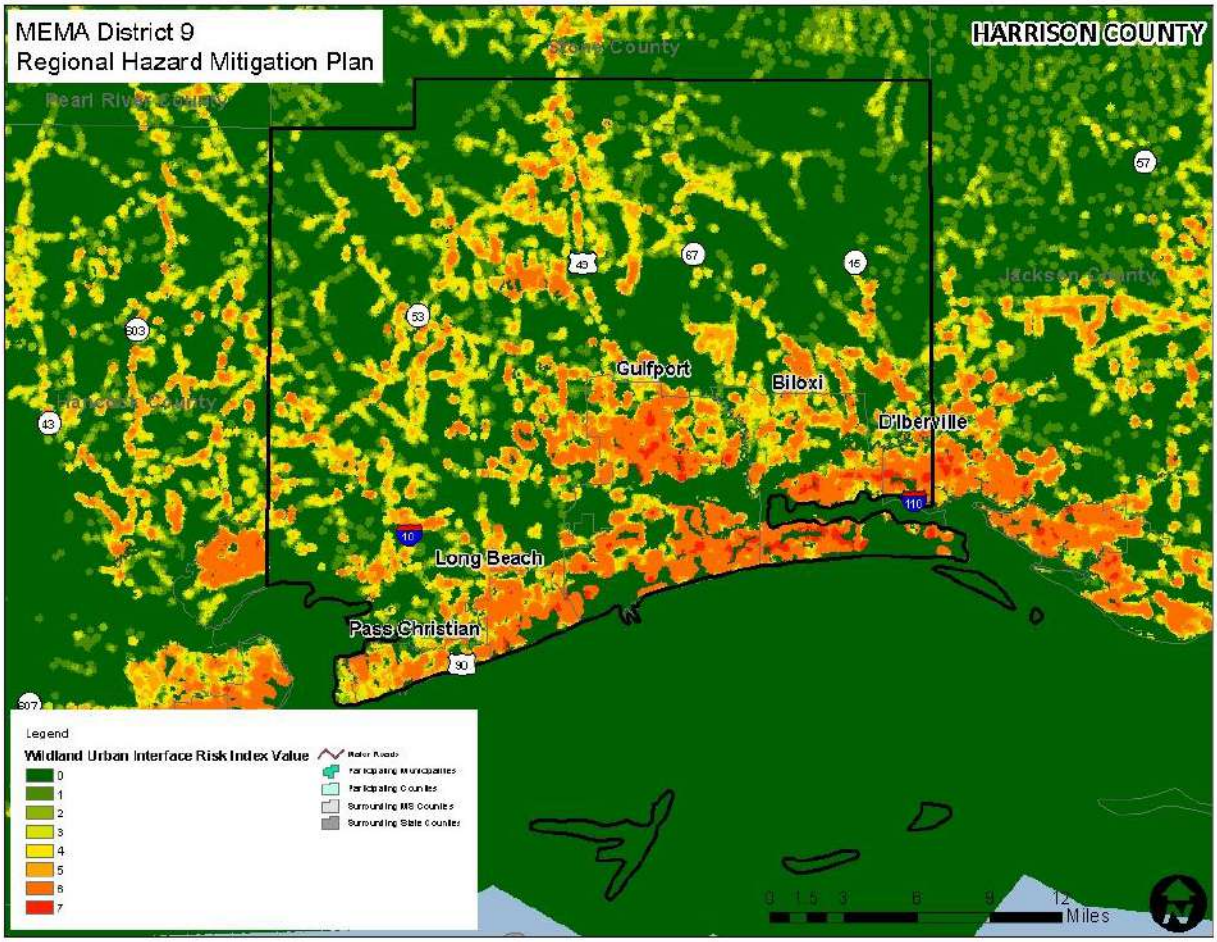
Although historical evidence indicates that Harrison County is susceptible to wildfire events, there are few reports which include information on historic dollar losses. Therefore, it is difficult to calculate a reliable annualized loss figure. Annualized loss is considered relatively low, though it should be noted that a single event could result in significant damages throughout the county.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones. For the critical facility analysis, areas of concern were intersected with critical facility locations.

Figure C.22 shows the Wildland Urban Interface Risk Index (WUIRI) data, which is a data layer that shows a rating of the potential impact of a wildfire on people and their homes. The key input, Wildland Urban Interface (WUI), reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the WUI and rural areas is key information for defining potential wildfire impacts to people and homes. Initially provided as raster data, it was converted to a polygon to allow for analysis. The Wildland Urban Interface Risk Index data ranges from 0 to 7 with higher values being most severe (as noted previously, this is only a measure of relative risk). **Figure C.23** shows the areas of analysis where any grid cell is less than 3. Areas with a value below 3 were chosen to be displayed as areas of risk because this showed the upper echelon of the scale and the areas at highest risk.

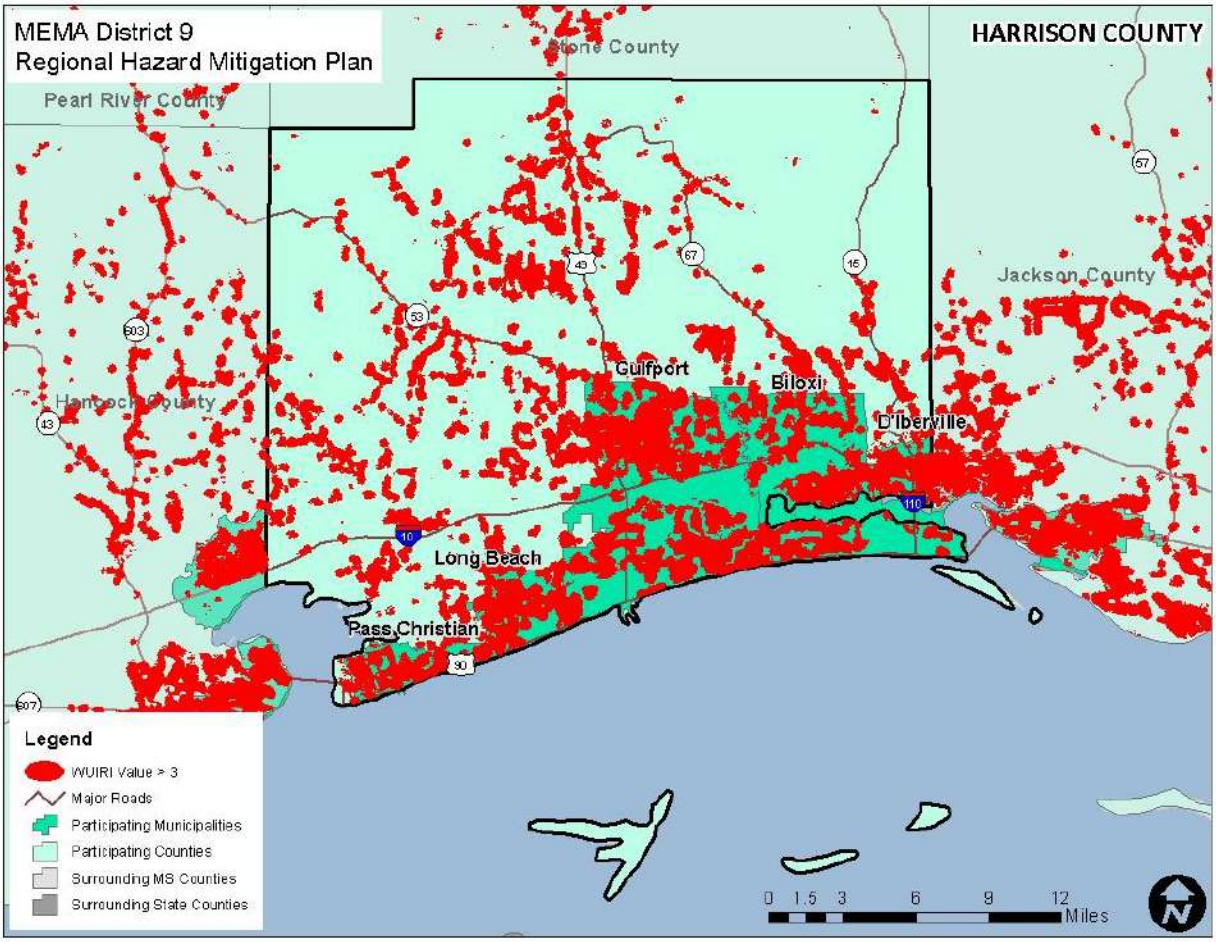
Table C.41 shows the results of the analysis.

FIGURE C.22: WUI RISK INDEX AREAS IN HARRISON COUNTY



Source: Southern Wildfire Risk Assessment Data

FIGURE C.23: WILDFIRE RISK AREAS IN HARRISON COUNTY



Source: Southern Wildfire Risk Assessment Data

TABLE C.41: EXPOSURE OF IMPROVED PROPERTY TO WILDFIRE RISK AREAS

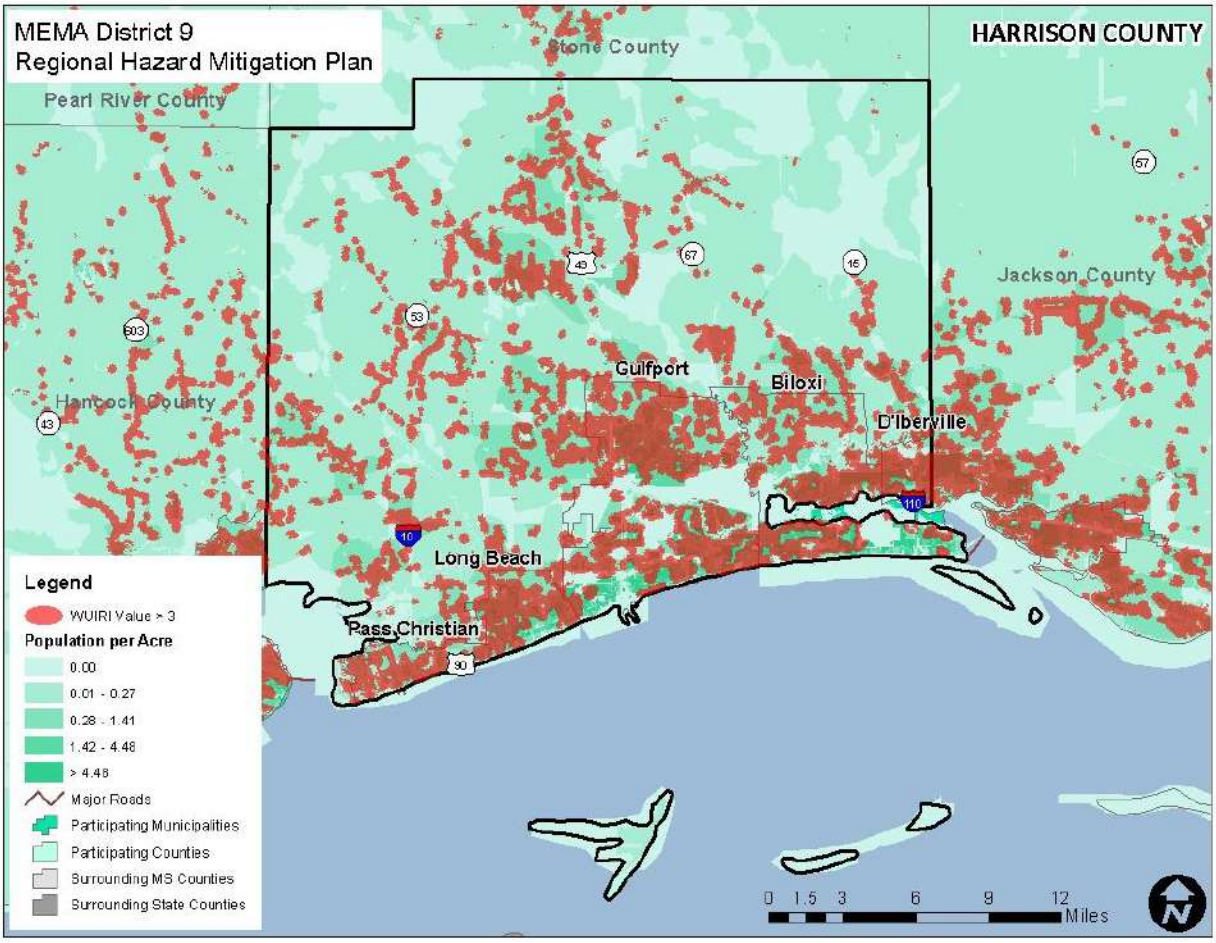
Location	Wildfire Risk	
	Approx. Number of Buildings	Approx. Improved Value
Biloxi	14,782	$990,187,787
D'Iberville	4,036	$173,907,350
Gulfport	30,805	$1,630,516,790
Long Beach	7,348	$392,572,180
Pass Christian	3,413	$164,858,285
Unincorporated Area	27,202	$1,007,466,599
HARRISON COUNTY TOTAL	**87,586**	**$4,359,508,991**

Source: SWRA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Given some level of susceptibility across the county, it is assumed that the total population is at risk to the wildfire hazard. **Figure C.24** shows an overlay of the wildfire risk areas identified above with the population density by census block. This shows that many of the areas of high population concentration are susceptible to wildfire because of their proximity to the wildland urban interface.

FIGURE C.24: WILDFIRE RISK AREAS IN HARRISON COUNTY



Source: Southern Wildfire Risk Assessment Data; United States Census

Critical Facilities

The critical facility analysis revealed that there are 220 critical facilities located in wildfire areas of concern, including 4 communications, 1 EOC, 22 fire stations, 7 medical, 10 police stations, 25 power/gas, 6 private/non-profits, 30 public facilities, 45 schools, 2 shelters, 41 special populations, 3 transportation, and 24 water/wastewater. It should be noted, that several factors could impact the spread of a wildfire putting all facilities at risk. A list of specific critical facilities and their associated risk can be found in **Table C.52** at the end of this subsection.

In conclusion, a wildfire event has the potential to impact many existing and future buildings, critical facilities, and populations in Harrison County.

EARTHQUAKE

As the Hazus-MH model suggests below, and historical occurrences confirm, any earthquake activity in the area is likely to inflict only minor to moderate damage to the county. Hazus-MH 3.2 estimates a total annualized loss of $87,000 which includes buildings, contents, and inventory throughout the county.

For the earthquake hazard vulnerability assessment, a probabilistic scenario was created to estimate the average annualized loss[26] for the county. The results of the analysis are generated at the Census Tract level within Hazus-MH and then aggregated to the county level. Since the scenario is annualized, no building counts are provided. Losses reported included losses due to structure failure, building loss, contents damage, and inventory loss. They do not include losses to business interruption, lost income, or relocation. **Table C.42** summarizes the findings with results rounded to the nearest thousand.

TABLE C.42: AVERAGE ANNUALIZED LOSS ESTIMATIONS FOR EARTHQUAKE HAZARD

Location	Structural Damage	Non-Structural Damage	Contents Damage	Inventory Loss	Total Annualized Loss
Harrison County	$21,000	$51,000	$15,000	$0	$87,000

Source: Hazus-MH 3.2

Social Vulnerability
It can be assumed that all existing and future populations are at risk to the earthquake hazard.

Critical Facilities
The Hazus-MH probabilistic analysis indicated that no critical facilities would sustain measurable damage in an earthquake event. However, all critical facilities should be considered at-risk to minor damage, should an event occur. Specific vulnerabilities for these assets will be greatly dependent on their individual design and the mitigation measures in place. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates.

In conclusion, an earthquake has the potential to impact all existing and future buildings, facilities, and populations in Harrison County. The Hazus-MH scenario indicates that minimal to moderate damage is expected from an earthquake occurrence. While Harrison County may not experience a large earthquake, localized damage is possible with an occurrence. A list of specific critical facilities and their associated risk can be found in **Table C.52** at the end of this subsection.

HURRICANE AND TROPICAL STORM

Historical evidence indicates that Harrison County has very significant risk to the hurricane and tropical storm hazard. There have been 12 disaster declarations due to hurricanes or tropical storms (Hurricanes Betsy, Camille, Frederic, Elena, Georges, Ivan, Dennis, Katrina, Gustav, and Isaac, as well as Tropical Storms Allison and Isidore). A large number tracks have come near or traversed through the county, as shown and discussed in Section C.2.12. Hazus-MH 3.2 estimates a total annualized loss of $162,651,000 which includes buildings, contents, and inventory throughout the county.

[26] Annualized loss is defined by Hazus-MH as the expected value of loss in any one year.

Hurricane Winds

Hurricanes and tropical storms can cause damage through numerous additional hazards such as flooding, erosion, tornadoes, and high winds, thus it is difficult to estimate total potential losses from these cumulative effects. The current Hazus-MH hurricane model only analyzes hurricane winds and storm surge and is not capable of modeling and estimating cumulative losses from all hazards associated with hurricanes; therefore, only these two aspects of hurricane losses are analyzed in this section. It can be assumed that all existing and future buildings and populations are at risk to hurricane and tropical storm wind hazard. Hazus-MH 3.2 was used to determine average annualized losses[27] for the county as shown below in **Table C.43.** Only losses to buildings, inventory, and contents are included in the results.

TABLE C.43: AVERAGE ANNUALIZED LOSS ESTIMATIONS FOR HURRICANE WIND HAZARD

Location	Building Damage	Contents Damage	Inventory Loss	Total Annualized Loss
Harrison County	$111,346,000	$50,844,000	$461,000	$162,651,000

Source: Hazus-MH 3.2

Storm Surge

In addition, although it was treated as a separate hazard throughout this plan, storm surge is most often associated with hurricanes and tropical storms. Indeed, Hazus incorporates the storm surge model for estimating damage from storm surge as part of the hurricane model. The storm surge model can only be run as part of a historic hurricane model run and not as part of an annualized loss model. Unfortunately, in this model, storm surge impacts are calculated as part of the total damage from the historic event and thus could not be separated out and evaluated solely in terms of storm surge loss. As such, the estimated losses presented below are combined losses from hurricane winds and storm surge. The historic Hurricane Katrina model was utilized as this was certainly one of the most impactful storms in the region and therefore estimates the potential losses that are possible from a large hurricane event. **Table C.44** presents the losses from this modeled event.

TABLE C.44: POTENTIAL LOSS ESTIMATIONS FOR LARGE HURRICANE EVENT

Location	Building Damage	Contents Damage	Inventory Loss	Total Annualized Loss
Harrison County	$2,064,136,000	$862,483,000	$7,187,000	$2,933,806,000

Source: Hazus-MH 3.2

Social Vulnerability

Given equal susceptibility across the county, it is assumed that the total population, both current and future, is at risk to the hurricane and tropical storm wind hazard. In terms of social vulnerability to storm surge, coastal populations are at much higher risk than inland populations. Since large concentrations of population are located along the coast of Harrison County, there is significant social vulnerability to storm surge in the county.

Critical Facilities

Given equal vulnerability across Harrison County, all critical facilities are considered to be at risk. Some buildings may perform better than others in the face of such an event due to construction and age, among factors. Determining individual building response to wind and storm surge is beyond the scope of this

[27] Annualized loss is defined by Hazus-MH as the expected value of loss in any one year.

plan. However, this plan will consider mitigation action for especially vulnerable structures and/or critical facilities to mitigate against the effects of the hurricane hazard. A list of specific critical facilities can be found in **Table C.52** at the end of this subsection.

In conclusion, a hurricane event has the potential to impact many existing and future buildings, critical facilities, and populations in Harrison County.

HAZARDOUS MATERIALS INCIDENT

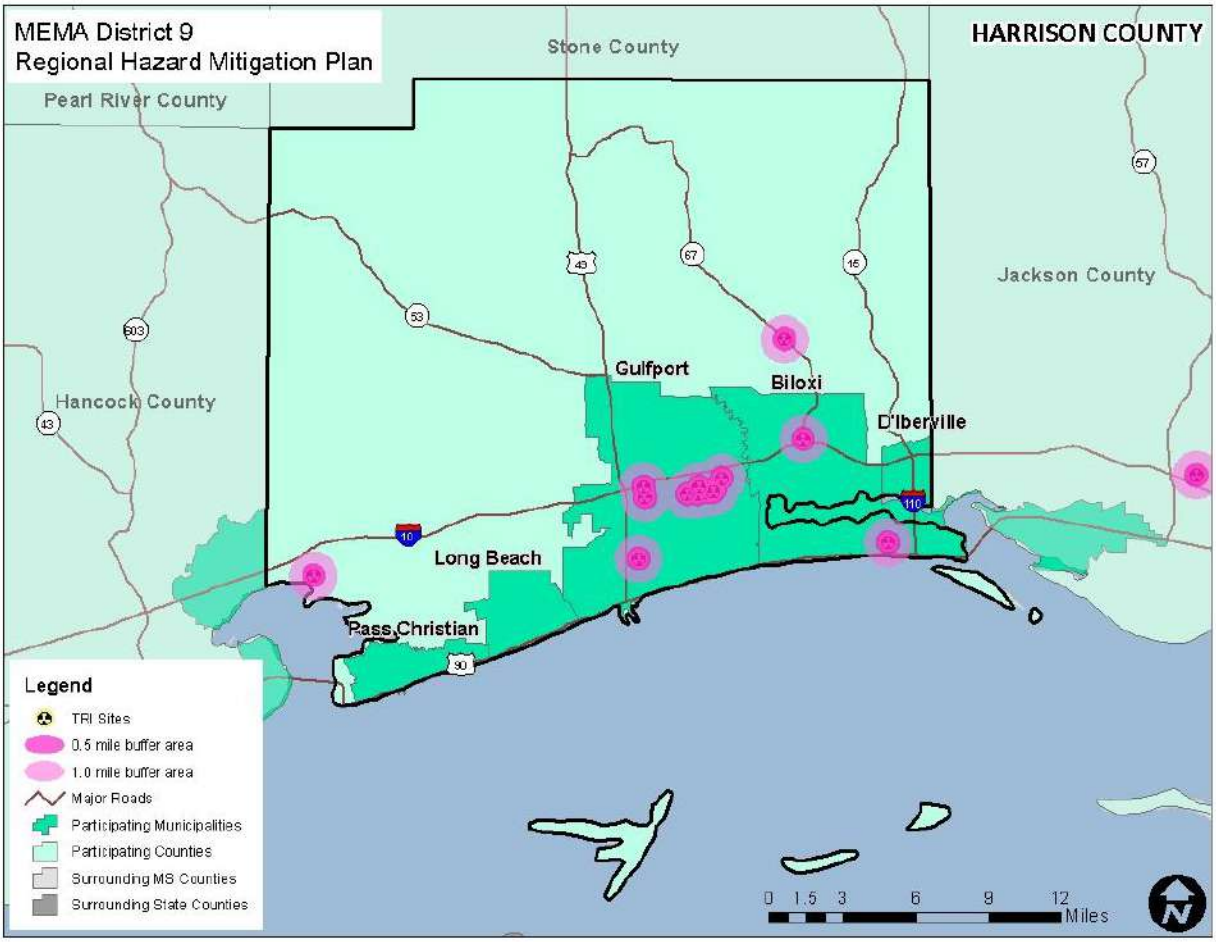
Historical evidence indicates that Harrison County is susceptible to hazardous materials events. A total of 226 HAZMAT incidents have been reported by the Pipeline and Hazardous Materials Safety Administration, resulting in $327,215 (2016 dollars) in property damage as well as 5 deaths and 1 injury. On an annualized level, these damages amount to $11,489 for the county.

Most hazardous materials incidents that occur are contained and suppressed before destroying any property or threatening lives. However, they can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities, and cause affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. Certain chemicals may travel through the air or water, affecting a much larger area than the point of the incidence itself. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features, can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

In order to conduct the vulnerability assessment for this hazard, GIS intersection analysis was used for fixed and mobile areas and building footprints/parcels where available and Census block data where footprints/parcels were not available.[28] In both scenarios, two sizes of buffers—0.5-mile and 1.0-mile—were used. These areas are assumed to represent the different levels of effect: immediate (primary) and secondary. Primary and secondary impact zones were selected based on guidance from the PHMSA Emergency Response Guidebook. For the fixed site analysis, geo-referenced TRI sites in the region, along with buffers, were used for analysis as shown in **Figure C.25.** For the mobile analysis, the major roads (Interstate highway, U.S. highway, and State highway) and railroads, where hazardous materials are primarily transported that could adversely impact people and buildings, were used for the GIS buffer analysis. **Figure C.26** shows the areas used for mobile road toxic release buffer analysis and **Figure C.27** shows the areas used for the mobile railroad toxic release buffer analysis. The results indicate the approximate number of improved properties and improved value, as shown in **Table C.45** (fixed sites), **Table C.46** (mobile roads), and **Table C.47** (mobile railroad sites).[29]

[28] This type of analysis will likely yield inflated results (generally higher than what is actually reported after an actual event).
[29] Note that improved properties included in the 1.0-mile analysis are also included in the 0.5-mile analysis.

FIGURE C.25 : TRI SITES WITH BUFFERS IN HARRISON COUNTY



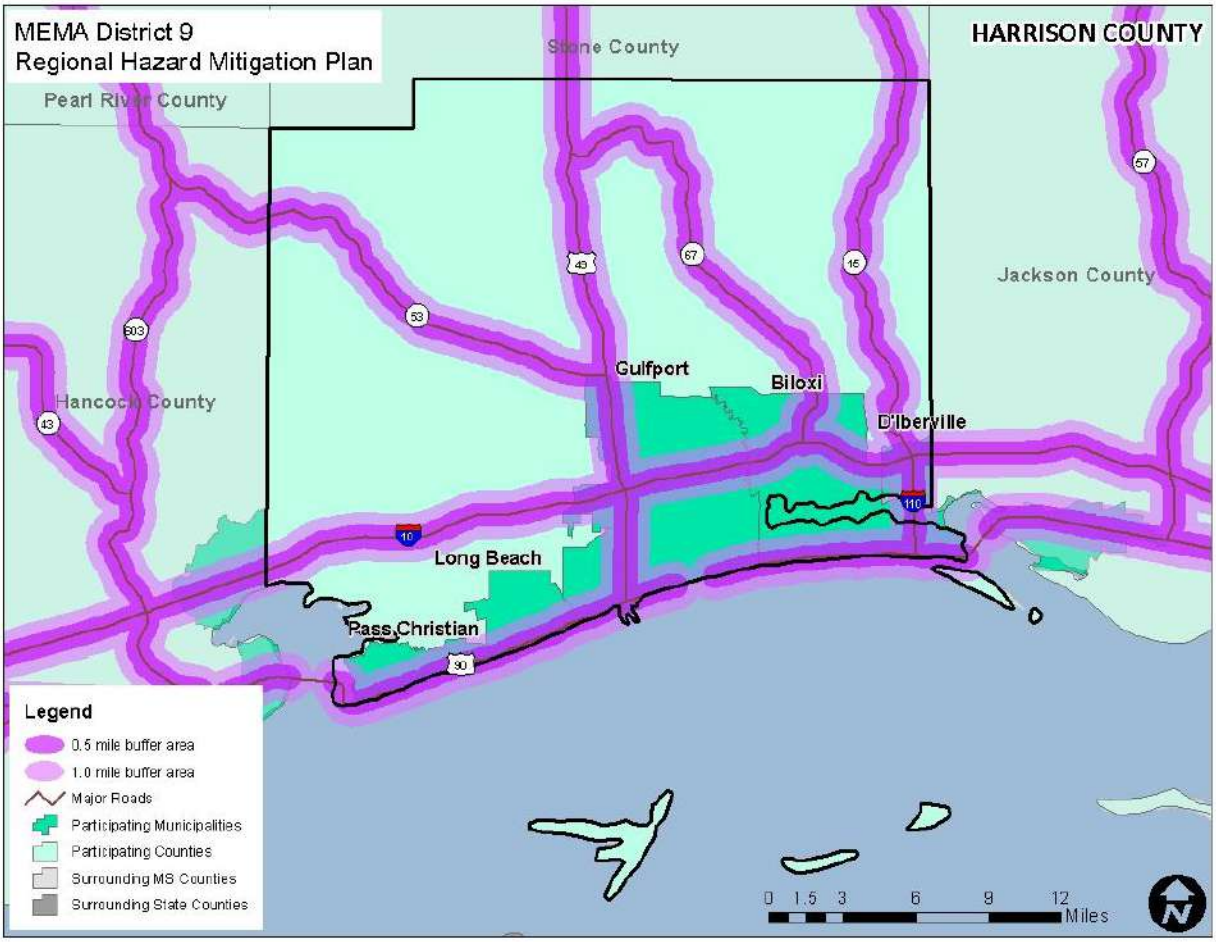
Source: Environmental Protection Agency

TABLE C.45: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS (FIXED SITES)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Biloxi	921	$26,148,977	3,512	$110,705,101
D'Iberville	0	$0	0	$0
Gulfport	1,901	$110,382,535	8,125	$531,451,341
Long Beach	0	$0	0	$0
Pass Christian	0	$0	0	$0
Unincorporated Area	362	$44,838,092	682	$61,784,053
HARRISON COUNTY TOTAL	**3,184**	**$181,369,604**	**12,319**	**$703,940,495**

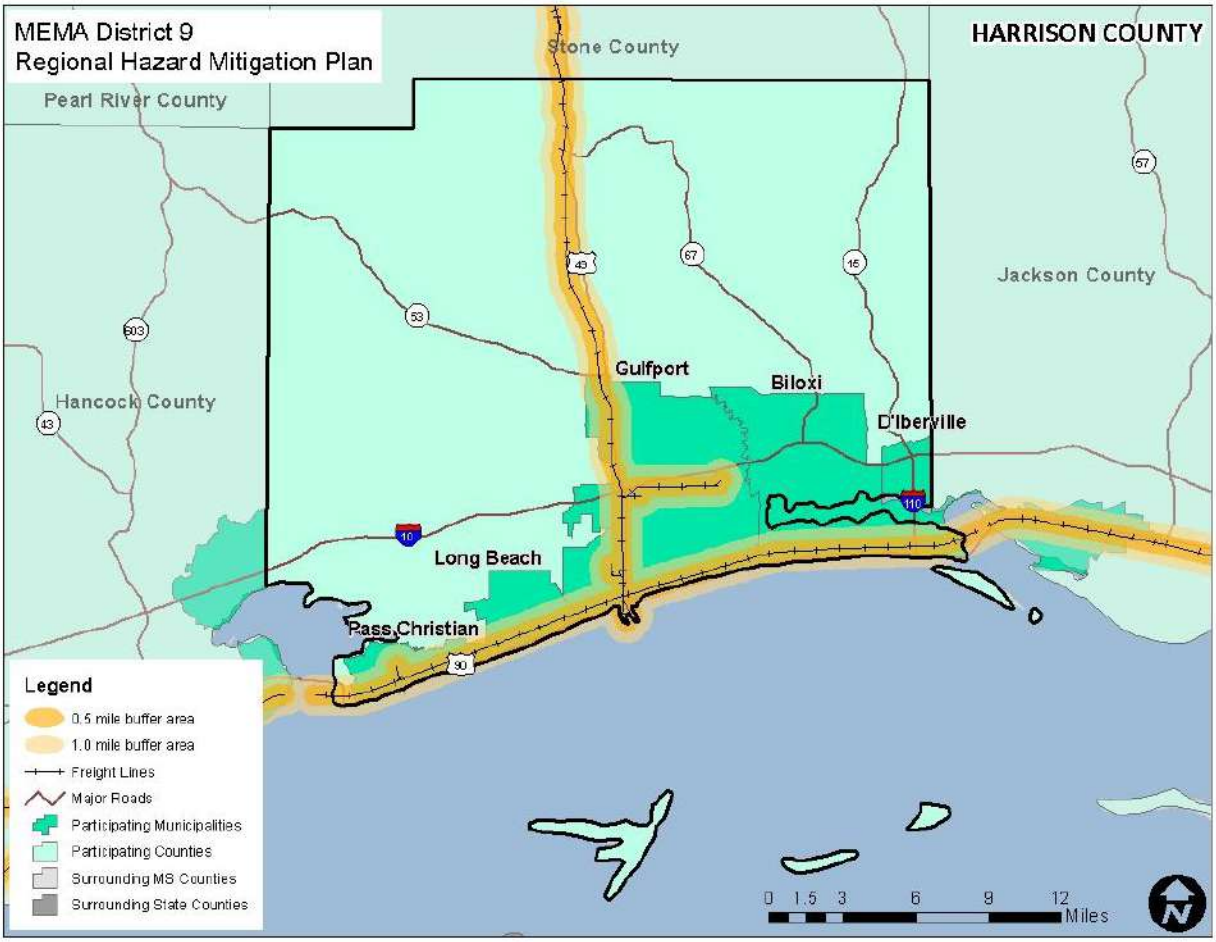
Source: EPA, MDEQ, Hazus MH 3.2 Data

FIGURE C.26 : MOBILE (ROAD) HAZMAT BUFFERS IN HARRISON COUNTY



Source: Federal Highway Administration National Highway Planning Network

FIGURE C.27 : MOBILE (RAIL) HAZMAT BUFFERS IN HARRISON COUNTY



Source: U.S. Department of Transportation Federal Railroad Administration

TABLE C.46: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - ROAD)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Biloxi	8,799	$682,254,259	15,629	$1,016,578,586
D'Iberville	3,119	$166,129,238	4,714	$228,825,255
Gulfport	14,873	$858,010,293	27,596	$1,412,706,984
Long Beach	2,056	$104,404,162	4,838	$226,495,377
Pass Christian	1,761	$78,050,457	3,009	$128,363,439
Unincorporated Area	8,944	$760,225,001	16,110	$1,080,868,709
HARRISON COUNTY TOTAL	**39,552**	**$2,649,073,410**	**71,896**	**$4,093,838,350**

Source: NHPN, MDEQ, Hazus MH 3.2 Data

TABLE C.47: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - RAILROAD)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Biloxi	8,278	$464,061,769	12,404	$464,061,769
D'Iberville	0	$0	0	$0
Gulfport	15,657	$873,267,174	26,556	$873,267,174
Long Beach	4,006	$183,255,865	5,514	$183,255,865
Pass Christian	2,484	$96,055,588	3,079	$96,055,588
Unincorporated Area	2,126	$394,983,057	4,702	$394,983,057
HARRISON COUNTY TOTAL	**32,551**	**$2,011,623,453**	**52,255**	**$2,011,623,453**

Source: USDOT FRA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Given high susceptibility across the entire county, it is assumed that the total population is at risk to a hazardous materials incident. It should be noted that areas of population concentration may be at an elevated risk due to a greater burden to evacuate population quickly.

Critical Facilities

Fixed Site Analysis:

The critical facility analysis for fixed TRI sites revealed that there are 61 facilities located in a fixed HAZMAT risk zone. Of these, 14 facilities are in the primary (0.5 mile) risk area including 1 medical, 3 power/gas, 2 public facilities, 3 schools, 3 special populations, and 2 water/wastewater. A list of specific critical facilities and their associated risk can be found in **Table C.52** at the end of this subsection.

Mobile Analysis:

The critical facility analysis for transportation corridors revealed that there are 300 facilities located in the primary and secondary road HAZMAT buffer areas. Of these, there were 196 critical facilities located in the primary risk zone including 4 communications, 2 EOCs, 18 fire stations, 7 medical, 9 police stations, 19 power/gas, 19 private/non-profit, 44 public facilities, 27 schools, 26 special populations, 4 transportation, and 17 water/wastewater.

For the rail line buffer areas, there were a total of 231 critical facilities located in primary and secondary buffer areas. Of these, 147 facilities are located within the primary buffer area including 1 communications, 2 EOCs, 13 fire stations, 6 medical, 8 police stations, 8 power/gas, 10 private/non-profit, 38 public facilities, 22 schools, 1 shelter, 27 special populations, and 11 water/wastewater.

A list of specific critical facilities and their associated risk can be found in **Table C.52** at the end of this subsection.

In conclusion, a hazardous material incident has the potential to impact many existing and future buildings, critical facilities, and populations in Harrison County. Those areas in a primary buffer are at the highest risk, though all areas carry some vulnerability due to variations in condition that could alter the impact area (i.e., direction and speed of wind, volume of release, etc.).

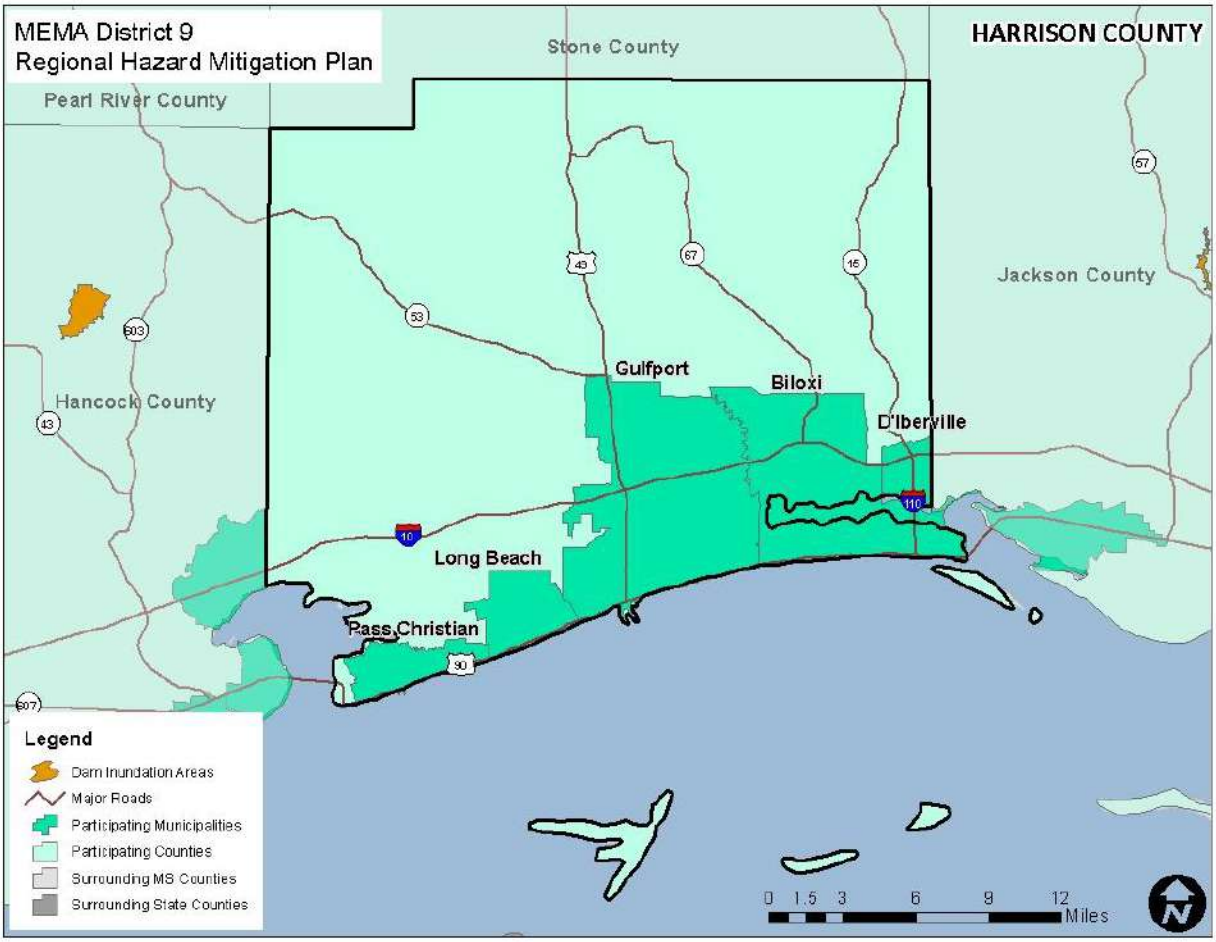
DAM/LEVEE FAILURE

In order to assess risk to a dam or levee failure, a GIS-based analysis was used to estimate exposure to one of the areas delineated by the Mississippi Department of Environmental Quality as a potential inundation area in the event of a failure. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within an identified inundation area. As mentioned previously, this type of inundation mapping has not been completed for every dam/levee in the region, so the results of this analysis likely underestimate the overall vulnerability to a dam or levee failure. However, the analysis is still useful as a sort of baseline minimum of property that is potentially at-risk. The identified inundation areas can be found in **Figure C.28**.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones.

Table C.48 presents the potential at-risk property. Both the number of buildings and the approximate improved value are presented

FIGURE C.28: DAM INUNDATION AREAS IN HARRISON COUNTY



Source: Mississippi Department of Environmental Quality

TABLE C.48: ESTIMATED EXPOSURE OF IMPROVEMENTS TO THE DAM/LEVEE FAILURE HAZARD

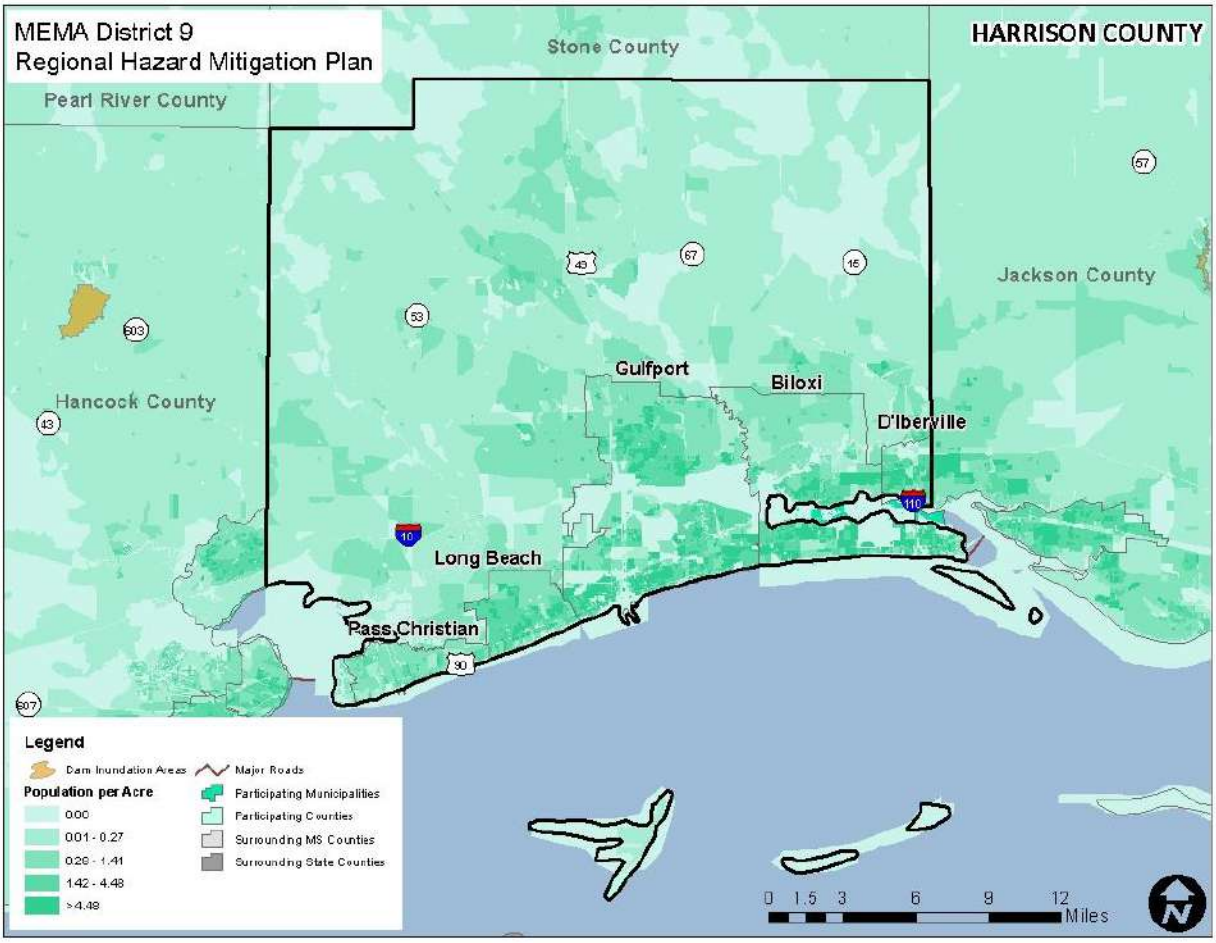
Location	Dam Inundation Area	
	Approx. Number of Buildings	Approx. Improved Value
Biloxi	0	$0
D'Iberville	0	$0
Gulfport	0	$0
Long Beach	0	$0
Pass Christian	0	$0
Unincorporated Area	0	$0
HARRISON COUNTY TOTAL	**0**	**$0**

Source: MDEQ, Hazus 3.2

Social Vulnerability

Figure C.29 is presented to gain a better understanding of at-risk population by evaluating census block level population data against dam inundation areas. There are no areas of concern in the county and it should be noted that most of the population of the region is not at risk to a dam/levee failure.

FIGURE C.29: POPULATION DENSITY NEAR DAM INUNDATION AREAS IN HARRISON COUNTY



Source: MDEQ, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are no facilities located in dam inundation areas. A list of specific critical facilities and their associated risk can be found in **Table C.52** at the end of this subsection.

In conclusion, a dam does not have the potential to impact existing and future buildings, facilities, and populations in Harrison County, though this analysis is not all-encompassing in terms of risk to a dam or levee failure because inundation mapping is not available for all dams in the region.

CLIMATE CHANGE/SEA LEVEL RISE

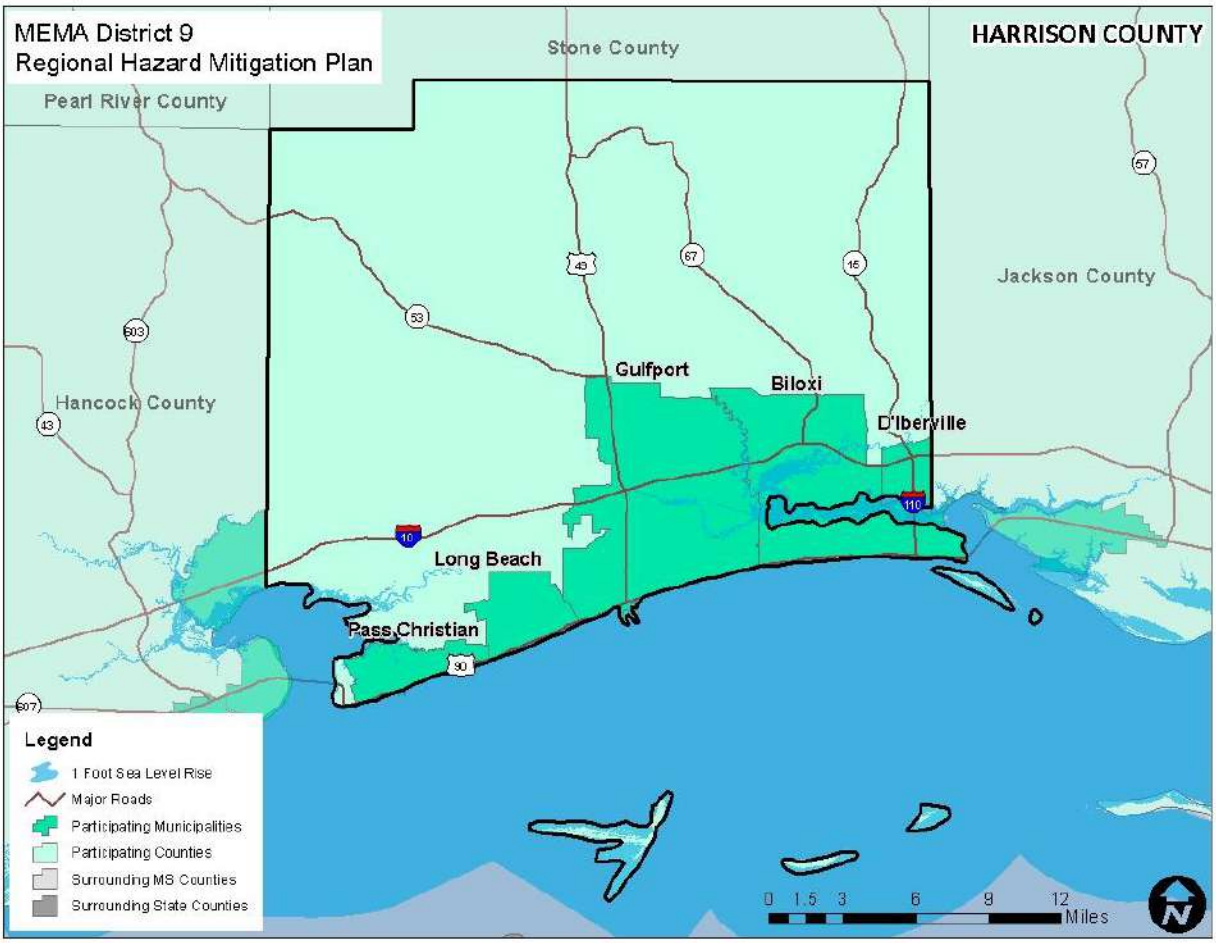
Most assessments carried out across the globe have concluded that climate change is a phenomenon that will impact our planet in the foreseeable future. Among others, the National Climate Assessment, International Panel on Climate Change, and National Oceanic and Atmospheric Administration all project

that climate change will impact the United States and will have a major impact on coastal communities due to the effects of sea level rise. As such, projections concerning sea level rise are important to incorporate into planning efforts in order to identify people and property that may be impacted.

In order to assess sea level rise risk, a GIS-based analysis was used to estimate exposure to future projections of sea level rise using data produced by the National Oceanic and Atmospheric Administration in combination with improved property records for the county. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within the inundation zone that would be created in the event of 1 foot, 3 feet, and 6 feet of sea level rise. A number of different sea level rise scenarios were available via NOAA (from 1 foot to 6 feet, at 1 foot intervals), however these scenarios were selected to demonstrate a range of potential sea level rise scenarios from low to moderate to high projections. These scenarios can be found in **Figure C.30**, **Figure C.31**, and **Figure C.32**.

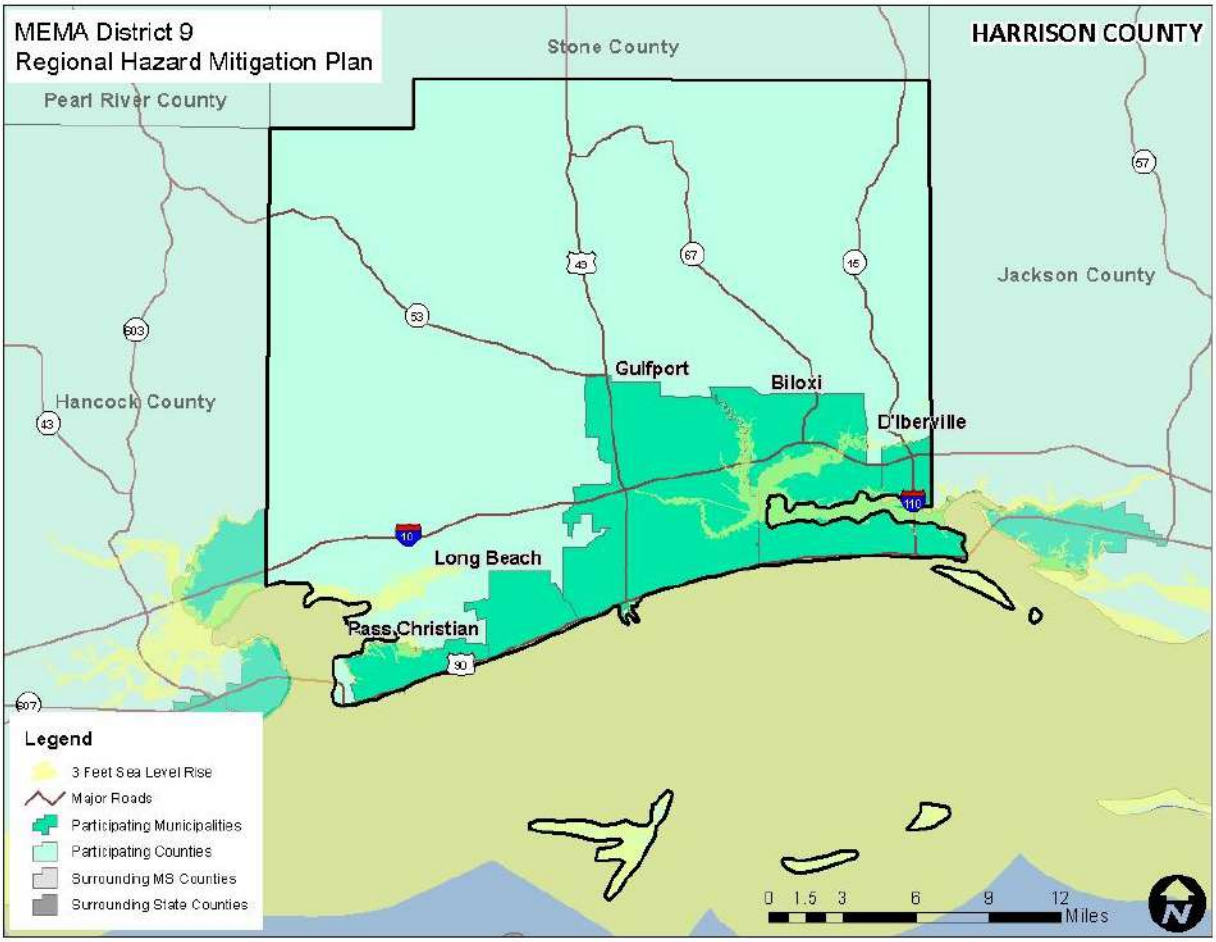
Table C.49 presents the potential at-risk property. Both the number of parcels and the approximate value are presented.

FIGURE C.30: 1 FOOT SEA LEVEL RISE SCENARIO IN HARRISON COUNTY



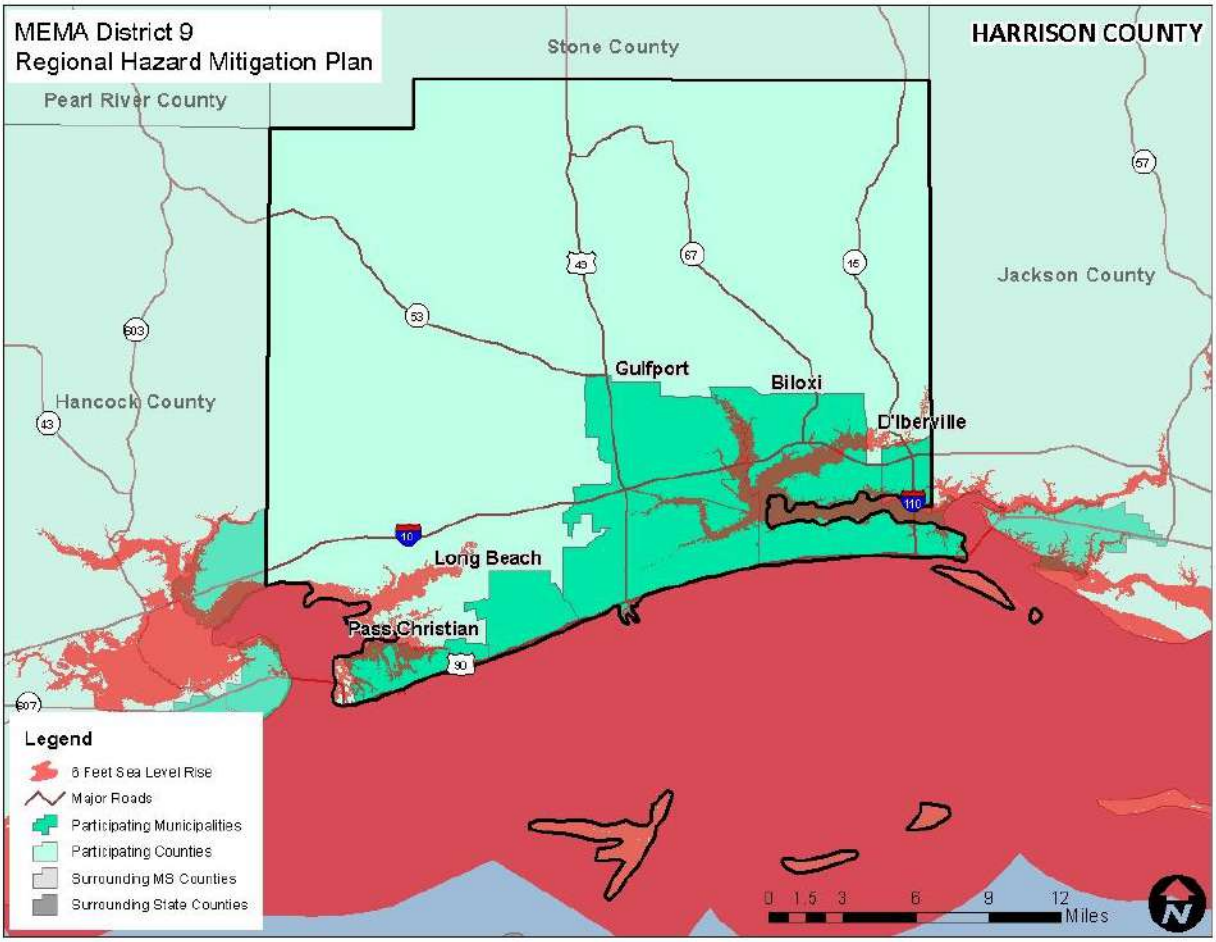
Source: NOAA

FIGURE C.31: 3 FEET SEA LEVEL RISE SCENARIO IN HARRISON COUNTY



Source: NOAA

FIGURE C.32: 6 FEET SEA LEVEL RISE SCENARIO IN HARRISON COUNTY



Source: NOAA

TABLE C.49: ESTIMATED EXPOSURE OF PARCELS TO THE SEA LEVEL RISE HAZARD

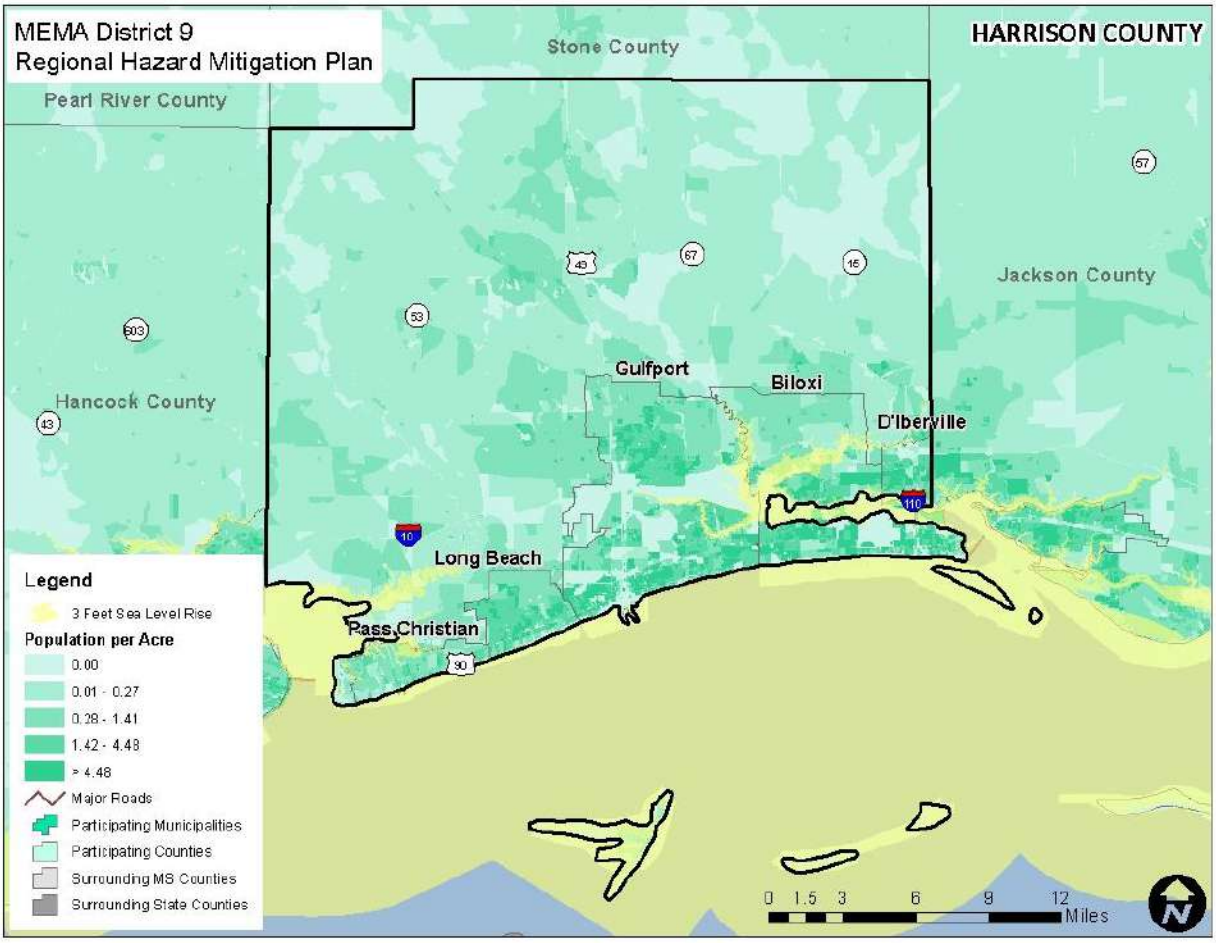
Location	1.0 foot		3.0 feet		6.0 feet	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Biloxi	141	$152,875,152	217	$160,571,178	574	$253,581,853
D'Iberville	3	$88,805	3	$88,805	37	$3,062,657
Gulfport	104	$13,795,779	202	$20,682,997	542	$52,554,190
Long Beach	0	$0	0	$0	0	$0
Pass Christian	36	$3,060,166	122	$11,788,951	701	$46,934,462
Unincorporated Area	265	$475,712,940	523	$498,030,811	1,872	$584,772,990
HARRISON COUNTY TOTAL	**406**	**$628,588,092**	**740**	**$658,601,989**	**2,446**	**$838,354,843**

Source: NOAA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Figure C.33 is presented to gain a better understanding of at-risk population by evaluating census block level population data against the 3 feet sea level rise scenario. The three feet scenario was selected since this is a moderate level projection. Based on this analysis, parts of the coastal population in the county are vulnerable to sea level rise.

FIGURE C.33: POPULATION DENSITY WITH 3 FEET SEA LEVEL RISE IN HARRISON COUNTY



Source: NOAA, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are 15 facilities located in the 3 feet of sea level rise scenario inundation area. As mentioned above, this scenario was selected as it is a mid-range projection for sea level rise based on a number of studies. The 15 facilities include 2 private/non-profit, 2 public facilities, 9 transportation, and 2 water/wastewater. A list of specific critical facilities and their associated risk can be found in **Table C.52** at the end of this subsection.

CONCLUSIONS ON HAZARD VULNERABILITY

Table C.50 presents an overall summary of the community's vulnerability for each jurisdiction. This summary provides key problem statements and identifies the community's greatest vulnerabilities that will be addressed in the mitigation strategy.

TABLE C.50: SUMMARY OF VULNERABILITY FOR HARRISON COUNTY

	Key Problem Statements
Harrison County	Harrison County, Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian have many low-lying neighborhoods and streets that are especially vulnerable to coastal flooding and storm surge. Vulnerable and at-risk populations including low-income, minority, elderly, or disabled persons disproportionately live in flood prone areas. Additionally, many employers like casinos, resorts, and hotels are located in these vulnerable locations. Disruption or loss of these employers and facilities can result in significant unemployment, economic loss, and migration from the county and cities.

Table C.51 presents a summary of annualized loss for each hazard in Harrison County. Due to the reporting of hazard damages primarily at the county level, it was difficult to determine an accurate annualized loss estimate for each municipality. Therefore, an annualized loss was determined through the damage reported through historical occurrences at the county level. These values should be used as an additional planning tool or measure risk for determining hazard mitigation strategies throughout the county.

It should also be noted that many of these estimates are based on incomplete data and likely underestimate the historic dollar damage sustained in each county. Especially for hazards such as extreme cold, extreme heat, hail, lightning, and winter weather, it is very likely that more damage occurred historically than has been identified.

TABLE C.51: ANNUALIZED LOSS FOR HARRISON COUNTY

Hazard	Harrison County
Flood-related Hazards	
Dam and Levee Failure	*Not Available*
Erosion	*Not Available*
Flood	$286,743
Storm Surge	$534,440,188
Fire-related Hazards	
Drought	*Not Available*
Lightning	$22,238
Wildfire	*Not Available*
Geologic Hazards	
Earthquake†	$21,000
Wind-related Hazards	
Extreme Cold	$0
Extreme Heat/Heat Wave	*Not Available*
Hailstorm	$0

Hazard	Harrison County
Hurricane and Tropical Storm	$208,420,678
Severe Thunderstorm/High Wind	$38,753
Tornado	$4,472,901
Winter Weather	*Not Available*
Climate Change/Sea Level Rise	*Not Available*
Hazardous Materials Incident/Train Derailment	$11,489
Infectious Disease	*Not Available*

†Historic dollar damage was not available for this hazard, but since estimated annualized losses from Hazus were available, those numbers were used in this table.
*In this table, the term "Not Available" is used to indicate that no records of dollar losses for the particular hazard were recorded. This could be the case either because there were no events that caused dollar damage or because documentation of that particular type of event is not well kept.

As noted previously, all existing and future buildings and populations (including critical facilities) are vulnerable to impacts from atmospheric hazards such as drought and hailstorm. Some buildings may be more vulnerable to some of these hazards based on locations, construction, and building type. In addition, all populations are vulnerable to hazards like infectious disease which could presumably impact any segment of the population without regard to geographic location. **Table C.52** shows the critical facilities vulnerable to additional hazards analyzed in this section. The table lists those assets that are determined to be exposed to each of the identified hazards (marked with an "**X**").

TABLE C.52: AT-RISK CRITICAL FACILITIES IN HARRISON COUNTY

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
HARRISON COUNTY																										
Harrison County EOC		EOC		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Cuevas VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Henderson Point VFD		Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Lizana VFD		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Saucier VFD		Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
West Harrison VFD		Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Arizona Chemicals		Power/Gas		X			X	X	X		X	X	X	X	X	X	X	X								X
Canal Road- Electric Substation		Power/Gas		X				X	X		X	X	X	X	X	X	X	X				X	X			X
CE Lizana- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Cedar Lake CE- Electric Substation		Power/Gas		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
CenterPoint Entex- Gulfport		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
CenterPoint Entex- Long Beach		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
CenterPoint Entex- Pass Christian		Power/Gas		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Dedeaux- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Diamond Head- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X								X
Dupont- Electric Substation		Power/Gas		X	X			X	X		X	X	X	X	X	X	X	X				X	X			X
East Biloxi- Electric Substation		Power/Gas		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Fernwood- Electric Substation		Power/Gas		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Gay Road- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Gulf South Pipeline Company LP		Power/Gas		X	X			X	X	X	X	X	X	X	X	X	X	X							X	X
Gulfport 29th Ave- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Highway 53- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Jack Watson- Electric Substation		Power/Gas		X		X		X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Keesler- Electric Substation		Power/Gas		X				X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Lamey- Electric Substation		Power/Gas		X		X		X	X	X	X	X	X	X	X	X	X	X					X			X
Landon- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Long Beach- Electric Substation		Power/Gas		X	X			X	X	X	X	X	X	X	X	X	X	X								X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
MG Ind.- Electric Substation		Power/Gas		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Mississipppi Power Company Power Plant		Power/Gas		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Munro Petroleum and Terminal Corp.		Power/Gas		X			X	X	X		X	X	X	X	X	X	X	X				X	X			X
O'Neal Road- Electric Substation		Power/Gas		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Olsen- Electric Substation		Power/Gas		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Pass Christian- Electric Substation		Power/Gas		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Percy Street- Electric Substation		Power/Gas		X	X			X	X		X	X	X	X	X	X	X	X			X	X	X		X	X
Rodensberg- Electric Substation		Power/Gas		X				X	X		X	X	X	X	X	X	X	X					X		X	X
Saucier- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X								X
Saucier CEPA- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X								X
Steely Drive- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Sunkist- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X								X
Tap- Electric Substation		Power/Gas		X	X			X	X		X	X	X	X	X	X	X	X					X			X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Tap- Electric Substation		Power/Gas		X		X		X	X		X	X	X	X	X	X	X	X								X
Tap- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Tap- Electric Substation		Power/Gas		X				X	X		X	X	X	X	X	X	X	X					X			X
Tap- Electric Substation		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Texas Ave.- Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Transmission Line- CE Lizana to Tap		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line- Dedeaux to Jack Watson		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line- Diamond Head to Kiln		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line- East Biloxi to Percy Street		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line- Fernwood to Jack Watson		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line- Fernwood to Texas Ave.		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Transmission Line-Gay Road to Cedar Lake CE		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Gay Road to Cedar Lake CE		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Gulfport 29th Ave to Long Beach		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Highway 53 to Landon		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Jack Watson to Gay Road		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Jack Watson to Hickory Hills		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Jack Watson to Hurricane Creek		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Jack Watson to Kiln		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Jack Watson to Wade		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Transmission Line-Jack Watson to Woolmarket		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Keesler to Rodensberg		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Kiln to Dupont		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Lamey to Gay Road		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Landon to Dedeaux		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Landon to Diamond Head		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Landon to Jack Watson		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Landon to Long Beach		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Landon to O'Neal Road		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Landon to Tap		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Long Beach to Olsen		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X

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Transmission Line-O'Neal Road to Jack Watson		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Olsen to Pass Christian		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Pass Christian to Dupont		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Percy Street to Keesler		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Plant - Jack Watson to Sub - Jack Watson		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Rodensberg to Steely Drive		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Rodensberg to Sunkist		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Saucier CEPA to Highway 53		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Saucier to Saucier CEPA		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X

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Transmission Line-St. Martin to Cedar Lake CE		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Steely Drive to Fernwood		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Sunkist to Cedar Lake CE		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Tap to Canal Road		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Tap to MG Ind.		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Tap to O'Neal Road		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Tap to Watts		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Texas Ave. to Gulfport 29th Ave		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Victor J Daniel Jr to McKnight		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Wiggins to Saucier		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Transmission Line-Woolmarket to Lamey		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Watts- Electric Substation		Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Woolmarket-Electric Substation		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X		X	X	X	X			X
Harrison County Courthouse		Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
DIberville Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Diberville Senior High School		School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
East Harrison High School		School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Harrison Central 9th Grade School		School		X				X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Harrison Central Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Harrison Central High School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Harrison County Alternative School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Harrison County Child Development Center		School		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Harrison County Vocational Complex		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Lizana Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X								X

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Lyman Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
North Gulfport Seventh and Eighth School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
North Woolmarket Elementary School		School		X				X	X		X	X	X	X	X	X	X	X		X	X	X	X			X
Orange Grove Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Pineville Elementary School		School		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Three Rivers Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X								X
West Harrison High School		School		X				X	X		X	X	X	X	X	X	X	X								X
West Wortham Elementary and Middle School		School		X				X	X	X	X	X	X	X	X	X	X	X								X
Woolmarket Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X								X
Gulfport-Biloxi Regional Airport		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Biloxi Communications Center	Biloxi	Comm		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Communications Tower	Biloxi	Comm		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X

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WLOX TV-13	Biloxi	Comm		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Biloxi Emergency Operations	Biloxi	EOC		X				X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Back Bay-Fire Station #3	Biloxi	Fire Station		X	X			X	X		X	X	X	X	X	X	X	X				X	X		X	X
Bay Vista-Fire Station #5	Biloxi	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Cedar Lake/Popps Ferry-Fire Station #7	Biloxi	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Central-Fire Station #1	Biloxi	Fire Station		X				X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
East End-Fire Station #2	Biloxi	Fire Station		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Oaklawn Rd-Fire Station #9	Biloxi	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Popps Ferry-Fire Station #6	Biloxi	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Veterans-Fire Station #4	Biloxi	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Woolmarket- Fire Station #8	Biloxi	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X			X		X			X
Cedar Lake Medical Center	Biloxi	Medical		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Gulf Coast Medical Center	Biloxi	Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Gulf Oak Hospital	Biloxi	Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Keesler Medical Center	Biloxi	Medical		X		X		X	X		X	X	X	X	X	X	X	X		X	X		X		X	X
Merit Hospital	Biloxi	Medical		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Veterans Administration Hospital	Biloxi	Medical		X				X	X		X	X	X	X	X	X	X	X								X
Harrison County Sheriff	Biloxi	Police Station		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Mississippi Marine Patrol Dispatch	Biloxi	Police Station		X		X		X	X		X	X	X	X	X	X	X	X			X		X		X	X
Police Station-Lopez/Quave	Biloxi	Police Station		X				X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Natural Gas Pipeline	Biloxi	Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Beau Rivage	Biloxi	Private/Non-Profit		X			X	X	X		X	X	X	X	X	X	X	X				X	X		X	X
Beauvoir Jeff Davis Home & Library	Biloxi	Private/Non-Profit		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Bond House	Biloxi	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Boomtown Casino	Biloxi	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X	X				X			X
Cadet Point	Biloxi	Private/Non-Profit		X			X	X	X		X	X	X	X	X	X	X	X				X	X			X
Creole Cottage	Biloxi	Private/Non-Profit		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Edgewater Mall	Biloxi	Private/Non-Profit		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Golden Nugget Casino	Biloxi	Private/Non-Profit		X			X	X	X		X	X	X	X	X	X	X	X				X	X			X
Gray-Slay House	Biloxi	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X								X
Hard Rock Casino	Biloxi	Private/Non-Profit		X			X	X	X		X	X	X	X	X	X	X	X				X	X		X	X
Harrah's Gulf Coast Casino	Biloxi	Private/Non-Profit		X			X	X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Home Depot	Biloxi	Private/Non-Profit		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Imperial Palace Resort & Casino	Biloxi	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X				X	X			X
Magnolia Hotel	Biloxi	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Margaritaville Casino	Biloxi	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X								X
Margaritaville Resort	Biloxi	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X	X			X	X		X	X
Old Brick House	Biloxi	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X					X			X
Palace Casino	Biloxi	Private/Non-Profit		X			X	X	X		X	X	X	X	X	X	X	X				X	X		X	X
Saenger Theatre	Biloxi	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Treasure Bay Casino	Biloxi	Private/Non-Profit		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Walmart – Neighborhood- 2050 Pass Road	Biloxi	Private/Non-Profit		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Walmart – Neighborhood- 1820-A Popps Ferry Road	Biloxi	Private/Non-Profit		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Walmart Supercenter	Biloxi	Private/Non-Profit		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
West End Hose Co #3	Biloxi	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Biloxi Port Commission & Small Craft Harbour	Biloxi	Public Facility		X			X	X	X		X	X	X	X	X	X	X	X	X			X	X		X	X
Biloxi Visitors Center	Biloxi	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
City Hall	Biloxi	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Coast Transit Authority	Biloxi	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Community Development	Biloxi	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Donal Snyder Community Center	Biloxi	Public Facility		X				X	X		X	X	X	X	X	X	X	X					X		X	X
Dr Eldon Bolton State Office Bldg	Biloxi	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X			X		X		X	X
Dr. Frank Gruich, Sr. Community Center	Biloxi	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
East Biloxi Library and Civic Center	Biloxi	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Juvenile Detention Center	Biloxi	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Margaret Sherry Library	Biloxi	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X								X
MGM Park	Biloxi	Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Mississippi Coast Coliseum & Convention Center	Biloxi	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Public Safety Garage	Biloxi	Public Facility		X				X	X		X	X	X	X	X	X	X	X								X
Public Works	Biloxi	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Swetman House	Biloxi	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
West Biloxi Public Library	Biloxi	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Woolmarket Civic Center	Biloxi	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X		X	X	X	X			X
Beauvoir Elementary	Biloxi	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Biloxi High School	Biloxi	School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Biloxi Jr High School	Biloxi	School		X				X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Gorenflo Elementary School	Biloxi	School		X	X			X	X		X	X	X	X	X	X	X	X				X	X		X	X
Jeff Davis Elementary	Biloxi	School		X				X	X		X	X	X	X	X	X	X	X					X		X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Michel 7th Grade School	Biloxi	School		X				X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
North Bay Elementary	Biloxi	School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Popps Ferry Elementary	Biloxi	School		X				X	X		X	X	X	X	X	X	X	X					X		X	X
Woolmarket Elementary	Biloxi	School		X				X	X	X	X	X	X	X	X	X	X	X								X
Bay Cove Assisted Living Center	Biloxi	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Biloxi Industries	Biloxi	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Biloxi Veterans Administration & Hospital& Retirement Home	Biloxi	Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Cadet Point Senior Village	Biloxi	Special Populations		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Cottage Memory Care @ Bay Cove	Biloxi	Special Populations		X	X			X	X		X	X	X	X	X	X	X	X								X
Emeritus at Biloxi	Biloxi	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Gabriel Manor Retirement Community	Biloxi	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Gulf Shore Villas	Biloxi	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X

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FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Pillars of Biloxi	Biloxi	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X								X
Precious Care Home	Biloxi	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X								X
Santa Maria Senior Community Center	Biloxi	Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Seashore Development Group	Biloxi	Special Populations		X		X		X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
South Mississippi Regional Center	Biloxi	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
CSX Railroad	Biloxi	Transportation		X			X	X	X		X	X	X	X	X	X	X	X	X				X		X	X
Keesler Air Force Base	Biloxi	Transportation		X		X		X	X		X	X	X	X	X	X	X	X			X				X	X
67 & Oaklawn Well	Biloxi	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X			X
Bradford St Well	Biloxi	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Cedar Lake Well	Biloxi	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Debuys Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Father Ryan Well	Biloxi	Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Greater Ave Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

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Harrison County Wastewater And Solid Waste	Biloxi	Water/ Wastewater		X		X		X	X		X	X	X	X	X	X	X	X	X		X					X
Harrison County Wastewater And Solid Waste	Biloxi	Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X				X	X			X
Hospital Well	Biloxi	Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X			X		X			X
Iberville Well	Biloxi	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Kuhn St Well	Biloxi	Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Lakeview Well	Biloxi	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X							X	X
Lift Stations throughout City	Biloxi	Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Maple St Well	Biloxi	Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
New Bay Vista Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
North Biloxi #1 Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X								X
North Rivervue Well	Biloxi	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Oaklawn Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Old Bay Vista Well	Biloxi	Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X							X	X

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Park Dr Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Pine St Well	Biloxi	Water/ Wastewater		X			X	X	X		X	X	X	X	X	X	X	X				X	X		X	X
Porter Ave Well	Biloxi	Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Rustwood Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X								X
South Hill Well	Biloxi	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Sports Complex Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X								X
Tullis Manor Well	Biloxi	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Vee St Well	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X								X
West Biloxi Wastewater Treatment Plant	Biloxi	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X							X	X
AT&T Communication Center	DIberville	Comm		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
D'Iberville Fire Department	DIberville	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Ocean Springs Hospital	DIberville	Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
South Mississippi Kidney Center	DIberville	Medical		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X

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D'Iberville Police Department	DIberville	Police Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Blossman Propane Gas	DIberville	Power/Gas		X				X	X		X	X	X	X	X	X	X	X				X	X			X
D'Iberville Electric Substation- 10224 Rodriguez Street	DIberville	Power/Gas		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
D'Iberville Electric Substation- 11281 Clinton Lane	DIberville	Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Central Avenue Overlook	DIberville	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X	X			X	X			X
D'Iberville City Hall	DIberville	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
D'Iberville Civic Center	DIberville	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
D'Iberville Public Works Center	DIberville	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
D'Iberville Senior Citizen Center	DIberville	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Fountain Beach Complex	DIberville	Public Facility		X			X	X	X		X	X	X	X	X	X	X	X					X			X
Harrison Co. District 1 Work Center	DIberville	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
Harrison County Public Library	DIberville	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
Marina Complex	DIberville	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X				X	X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
MS Driver's License Facility	DIberville	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
Parks and Recreation Bulding/ D'Iberville Recreation Center	DIberville	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Rudy Moran Park	DIberville	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Town Green	DIberville	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X				X	X			X
US Post Office	DIberville	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X			X
D'Iberville Elementary School	DIberville	School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
D'Iberville High School	DIberville	School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
D'Iberville Middle School	DIberville	School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Sacred Heart School	DIberville	School		X	X			X	X	X	X	X	X	X	X	X	X	X					X			X
Boys & Girls Club: IP Center at North Bay	DIberville	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Gilbert R. Mason Sr. Head Start Center	DIberville	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Automall Parkway	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Bayshore Drive Bridge	DIberville	Transportation		X			X	X	X		X	X	X	X	X	X	X	X	X			X	X			X
Central Avenue	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
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Corso's Bridge	DIberville	Transportation		X	X			X	X		X	X	X	X	X	X	X	X	X			X	X			X
Cypress Creek Bridge	DIberville	Transportation		X	X			X	X	X	X	X	X	X	X	X	X	X	X				X			X
D'Iberville Boulevard	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
HWY 67 Bridge	DIberville	Transportation		X	X			X	X	X	X	X	X	X	X	X	X	X	X			X	X			X
I-110 Bridge/ Drawbridge	DIberville	Transportation		X			X	X	X		X	X	X	X	X	X	X	X	X			X	X			X
Interstate 10	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Interstate 110	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Lamey Bridge	DIberville	Transportation		X	X			X	X		X	X	X	X	X	X	X	X	X				X			X
Lamey Bridge Road	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Lemoyne Boulevard	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
MS Highway 15	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
MS Highway 67	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Old Highway 67	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Popps Ferry Road	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Promenade Parkway	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Rodriguez Street	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Sangani Boulevard	DIberville	Transportation		X				X	X		X	X	X	X	X	X	X	X								X

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D'Iberville Wastewater Plant	DIberville	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
D'Iberville Water Tower- 10085 1st Avenue W	DIberville	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
D'Iberville Water Tower- 11288 Lamey Bridge Road	DIberville	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
HC/D'Iberville POTW	DIberville	Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X					X			X
Central Fire Station	Gulfport	Fire Station		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Fire Station 10	Gulfport	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X			X
Fire Station 11	Gulfport	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Fire Station 12	Gulfport	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Fire Station 2	Gulfport	Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Fire Station 3	Gulfport	Fire Station		X		X		X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Fire Station 4	Gulfport	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Fire Station 5	Gulfport	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Fire Station 6	Gulfport	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Fire Station 7	Gulfport	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Fire Station 8	Gulfport	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Fire Station 9	Gulfport	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X

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Dialysis Centers	Gulfport	Medical		X				X	X		X	X	X	X	X	X	X	X								X
Garden Park Community Hospital	Gulfport	Medical		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Medical Supply Stores	Gulfport	Medical		X				X	X		X	X	X	X	X	X	X	X								X
Memorial Hospital at Gulfport	Gulfport	Medical		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Harrison County Sheriff's Info	Gulfport	Police Station		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Harrison County Sheriff's Office	Gulfport	Police Station		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
North Gulfport Police Complex	Gulfport	Police Station		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Orange Grove Police Sub	Gulfport	Police Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Police Complex Fleet Maintenance Center	Gulfport	Police Station		X				X	X	X	X	X	X	X	X	X	X	X			X					X
Police Complex Motorcycle Storage/General	Gulfport	Police Station		X				X	X	X	X	X	X	X	X	X	X	X			X					X
Police Complex Technical Service Center	Gulfport	Police Station		X				X	X	X	X	X	X	X	X	X	X	X			X					X
Police Department Old Electronic Shop	Gulfport	Police Station		X				X	X	X	X	X	X	X	X	X	X	X			X					X

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Police Department Pistol Range	Gulfport	Police Station		X				X	X	X	X	X	X	X	X	X	X	X			X					X
Police Training Building	Gulfport	Police Station		X				X	X	X	X	X	X	X	X	X	X	X			X					X
Robert J. Curry Public Safety Center	Gulfport	Police Station		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Fuel Centers	Gulfport	Power/Gas		X				X	X		X	X	X	X	X	X	X	X								X
Building Supply Centers	Gulfport	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X								X
Grocery Stores	Gulfport	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X								X
Humane Society	Gulfport	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Media Outlets	Gulfport	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X								X
Pharmacies	Gulfport	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X								X
19th St Recreation Center	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X					X	X	X	X
Armory Building	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X					X	X	X	X
Building Maintenance Parks Facility	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X					X	X	X	X
Carnegie Library	Gulfport	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Cemetery Admin Office	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X

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Charles L Walker Senior Center	Gulfport	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
City Hall	Gulfport	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Feed My Sheep	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Gaston Hewes Rec Center	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Gaston Point Community Center	Gulfport	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Goldin Park - Maintenance Facility	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X								X
Grasslawn Museum Support Building	Gulfport	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Handsboro Community Center	Gulfport	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Harbor Services Facility	Gulfport	Public Facility		X			X	X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Herbert Wilson Rec Center	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Horticulture Building	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Joseph T Jones Building	Gulfport	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Katie Patterson Booth Rec Center	Gulfport	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Leisure Service Admin Building	Gulfport	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X					X	X	X	X

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Lyman Community Center	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
National Guard Complex	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X								X
Naval Battalion Construction Center Gulfport	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Orange Grove Community Center	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Public Works Building	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X								X
Public Works Building 2	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X								X
Public Works Warehouse	Gulfport	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X								X
Records Storage Facility	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X								X
Social Security Office	Gulfport	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Sportsplex Maintenance Shop 1 (West)	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Sportsplex Maintenance Shop 2 (East)	Gulfport	Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X			X
U.S. Coast Guard	Gulfport	Public Facility		X			X	X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
U.S. Customs	Gulfport	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X			X					X

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U.S. Postal Service	Gulfport	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Westside Community Center	Gulfport	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
William H Hardy Building	Gulfport	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Anniston Avenue Elementary	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Bayou View Elementary	Gulfport	School		X		X		X	X		X	X	X	X	X	X	X	X								X
Bayou View Middle School	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X								X
Bel Aire Elementary School	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X			X	X	X		X	X
Blue Cliff College	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X			X	X	X		X	X
Central Elementary	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X			X		X		X	X
Christian Collegiate Academy	Gulfport	School		X	X			X	X	X	X	X	X	X	X	X	X	X					X			X
Gaston Point Elementary	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X					X		X	X
Gulfport Central Middle School	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X					X	X	X	X
Gulfport High School	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Gulfport Schools	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X			X	X	X		X	X
Gulfport Special Education	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X			X	X	X		X	X

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Harrison County Magnet School	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X								X
Harrison County School Support	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X								X
Harrison County Special Ed	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Learning Center	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
MGCCC	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
MGCCC Jefferson Davis Campus	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Northwood Christian Academy	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X								X
Pass Road Elementary School	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X							X	X
St James School	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
St John Catholic Schools	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Temple Christian Academy	Gulfport	School		X				X	X	X	X	X	X	X	X	X	X	X			X		X			X
Turkey Creek School	Gulfport	School		X	X			X	X	X	X	X	X	X	X	X	X	X		X			X		X	X
Twenty-Eighth Street Elementary	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X							X	X
USM Gulf Coast Campus	Gulfport	School		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
West Elementary School	Gulfport	School		X				X	X		X	X	X	X	X	X	X	X					X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Westminster Academy School	Gulfport	School		X		X		X	X		X	X	X	X	X	X	X	X								X
Central Elementary School- Red Cross Shelter	Gulfport	Shelter		X				X	X	X	X	X	X	X	X	X	X	X			X		X		X	X
Central Middle School- Secondary Shelter	Gulfport	Shelter		X				X	X		X	X	X	X	X	X	X	X					X	X	X	X
Orange Grove Community Center- FEMA Shelter	Gulfport	Shelter		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Advanced Psychotherapy Association	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X					X	X	X	X
All My Children	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Alpha Personal Care	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Aunt Donna's Day Care	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Aunt Donna's Daycare & Learning	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X		X	X	X	X		X	X
Boyington Pro Care	Gulfport	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Carey Jane	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Center-Prevention-Child Abuse	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Childhood Wonders	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X			X		X		X	X
Christian Collegiate Academy	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Crises Stabilization Unit	Gulfport	Special Populations		X		X		X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Dickson Rishel Dorothy	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Divine Preschool Academy	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X			X		X		X	X
Driftwood Nursing Home	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Good Shepard Christian Academy	Gulfport	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Gulf Coast Mental Health Center	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Gulf Coast Missionary Baptist	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Gulfport Academy Child Care	Gulfport	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Gulfport Mental Health	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Happy Times Child Care Inc	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Harrison County Head Start	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson Personal Care Home	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Kare-It Patch Day Care	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X			X		X		X	X
Kid Academy Preschool	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Kids Connection	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Kids First Child Development	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Kinder Care Learning Center	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X		X	X
Lakeview Nursing Center	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Lil-Tots Day Care Center	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Memorial Behavioral Health-11150 US 49	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Memorial Behavioral Health-12266 Ashley Dr	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Northwood Christian Academy	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X								X
Nugent Child Development Center	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ovation Learning Center	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Pine Grove Coastal Care Center	Gulfport	Special Populations		X		X		X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Renaissance Counseling Center	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X		X	X
Seasons Senior Behavioral Health	Gulfport	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Simone & Association PLLC	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X		X	X
Smith, Kelly - Crossroads Counseling	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X			X		X		X	X
Staley Teresa	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Sullivan Teresa	Gulfport	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X			X		X		X	X
Tate, Vivian - T & T Association LLC	Gulfport	Special Populations		X				X	X		X	X	X	X	X	X	X	X					X	X	X	X
Temple Christian Academy	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Three Rivers Academy	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X								X
Trinity United Methodist School	Gulfport	Special Populations		X		X		X	X		X	X	X	X	X	X	X	X								X
Turkey Creek Head Start Program	Gulfport	Special Populations		X	X			X	X		X	X	X	X	X	X	X	X		X	X		X		X	X
Twin Oaks Child Development	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X							X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Watch Me Grow Learning Center	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Wee Ones Child Care Inc	Gulfport	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Wesley Academy	Gulfport	Special Populations		X		X		X	X		X	X	X	X	X	X	X	X					X	X	X	X
Westminster Academy School	Gulfport	Special Populations		X		X		X	X		X	X	X	X	X	X	X	X								X
Bernard Bayou Industrial District	Gulfport	Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X	X							X
Harrison County Wastewater And Solid Waste	Gulfport	Water/ Wastewater		X		X		X	X		X	X	X	X	X	X	X	X								X
HC/Delisle Wastewater Treatment	Gulfport	Water/ Wastewater		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
South Gulfport Wastewater Treatment Plan	Gulfport	Water/ Wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X			X					X
Fire Station #1	Long Beach	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Fire Station #2	Long Beach	Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Fire Station #3	Long Beach	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Police Department	Long Beach	Police Station		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
City Hall Building	Long Beach	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Public Works Center	Long Beach	Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Senior/Rec Center	Long Beach	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X								X
South Mississippi Regional Center	Long Beach	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Harper McCaughn Elementary	Long Beach	School		X				X	X	X	X	X	X	X	X	X	X	X								X
High School	Long Beach	School		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Middle School	Long Beach	School		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Quarles Elementary	Long Beach	School		X				X	X	X	X	X	X	X	X	X	X	X								X
Reeves Elementary	Long Beach	School		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Chapman Oaks, Inc.	Long Beach	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X								X
Long Beach Industrial District Park	Long Beach	Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Sewage Collection System: Lift Stations, Water Treatment Facility	Long Beach	Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Water Distribution System: Wells, Tanks, Treatment Facilities	Long Beach	Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X
Emergency Operations Center	Pass Christian	EOC		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Fire Station 1	Pass Christian	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Fire Station 2	Pass Christian	Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Coastal Family Health Clinic	Pass Christian	Medical		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Police Station	Pass Christian	Police Station		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
City Hall	Pass Christian	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Pass Christian Library	Pass Christian	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Public Works Department	Pass Christian	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
High School	Pass Christian	School		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Middle School	Pass Christian	School		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Pass Christian Elementary School	Pass Christian	School		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Boys and Girls Club Gymnasium	Pass Christian	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Dixie White House	Pass Christian	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X							X	X
Henderson Avenue Bridges	Pass Christian	Transportation		X			X	X	X		X	X	X	X	X	X	X	X	X							X
Highway 90, Bay St. Louis Bridge	Pass Christian	Transportation		X				X	X		X	X	X	X	X	X	X	X	X				X		X	X
Menge Avenue Bridges	Pass Christian	Transportation		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Harrison County Wastewater And Solid Waste Management Authority, Long Beach And Pass Christian	Pass Christian	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Long Beach Pass Christian Wastewater Treatment	Pass Christian	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Water System	Pass Christian	Water/ Wastewater		X				X	X		X	X	X	X	X	X	X	X								X

C.4 HARRISON COUNTY CAPABILITY ASSESSMENT

This subsection discusses the capability of Harrison County to implement hazard mitigation activities. More information on the purpose and methodology used to conduct the assessment can be found in Section 7: *Capability Assessment*.

C.4.1 Planning and Regulatory Capability

Table C.53 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for Harrison County. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. A dagger (†) indicates that the given item is administered for that municipality by the county. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the MEMA District 9 Regional Hazard Mitigation Plan.

TABLE C.53: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Planning Tool/Regulatory Tool	Hazard Mitigation Plan	Threat and Hazard Identification and Risk Assessment (THIRA)	Comprehensive Land Use Plan	Floodplain Management Plan/Flood Mitigation Plan	Open Space Management Plan (Parks & Rec/Greenway Plan	Stormwater Management Plan/Ordinance	Natural Resource Protection Plan	Flood Response Plan	Emergency Operations Plan	Emergency Management Accreditation Program (EMAP Accreditation)	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Unified Development Ordinance	Post-Disaster Redevelopment/ Reconstruction Plan/ Ordinance	Building Code	Fire Code	National Flood Insurance Program (NFIP)	NFIP Community Rating System (CRS Program)
HARRISON COUNTY	✓		✓	✓	✓	✓	✓	✓	✓			✓	✓		✓		✓	✓	✓			✓	✓	✓	✓
Biloxi	✓		✓	✓		✓	†		✓			†			†		✓	✓	✓	✓		✓	✓	✓	✓
D'Iberville	✓		✓			✓			✓		✓	†			†		✓	✓	✓			✓	✓	✓	✓
Gulfport	✓		✓	✓		✓	†		✓			†			†		✓	✓	✓			✓	✓	✓	✓
Long Beach	✓		✓	✓		✓	†		✓			†		✓	†		✓	✓	✓			✓	✓	✓	✓
Pass Christian	✓		✓	✓		✓	†		✓			†		✓	†		✓	✓	✓			✓	✓	✓	✓

A more detailed discussion on the county's planning and regulatory capabilities follows.

EMERGENCY MANAGEMENT

Hazard Mitigation Plan
Harrison County has previously adopted a hazard mitigation plan. The cities of Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian have also previously adopted municipal-level hazard mitigation plans.

Disaster Recovery Plan
Harrison County has adopted a disaster recovery plan. The United Way of South Mississippi is the lead partner with Harrison County to manage the county's long-term community recovery plan.

Emergency Operations Plan
Harrison County maintains an emergency operations plan through its Emergency Management Agency. The cities of Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian have also each adopted a municipal-level emergency operations plan.

Continuity of Operations Plan
The City of D'Iberville is the only jurisdiction in Harrison County that has adopted a continuity of operations plan.

Flood Response Plan
Harrison County has adopted a flood response plan.

GENERAL PLANNING

Comprehensive Land Use Plan
Harrison County has adopted a county comprehensive land use plan. The cities of Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian have also adopted municipal comprehensive plans.

Capital Improvements Plan
Harrison County has not adopted a capital improvements plan. However, the cities of Long Beach and Pass Christian have both adopted capital improvements plans.

Historic Preservation Plan
Neither Harrison County nor any of its participating municipalities have a historic preservation plan. However, the cities of Biloxi, Gulfport, and Pass Christian have each adopted a historic preservation ordinance.

Zoning Ordinance
Harrison County and the cities of Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian have each adopted a zoning ordinance. The City of Biloxi includes zoning regulations as part of its local unified development ordinance. The remaining jurisdictions have adopted stand-alone zoning ordinances.

Subdivision Ordinance
Harrison County and the cities of Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian have each adopted a subdivision ordinance. The City of Biloxi includes subdivision regulations as part of its local unified development ordinance. The remaining jurisdictions have adopted stand-alone subdivision ordinances.

Building Codes, Permitting, and Inspections
After Hurricane Katrina, Mississippi Legislature mandated the adoption of the International Building Code and International Residential Code in five coastal counties including Harrison County. The cities of Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian have also adopted building codes.

FLOODPLAIN MANAGEMENT

Table C.54 provides NFIP policy and claim information for each participating jurisdiction in Harrison County.

TABLE C.54: NFIP POLICY AND CLAIM INFORMATION

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
HARRISON COUNTY†	06/15/78	06/16/09	2,640	$729,495,100	3,224	$261,560,972
Biloxi	09/11/70	06/16/09	5,206	$1,397,946,300	2,293	$253,008,756
D'Iberville	11/14/88	06/16/09	515	$146,053,100	27	$1,939,357
Gulfport	09/11/70	06/16/09	5,267	$1,410,675,000	3,078	$285,499,409
Long Beach	09/11/70	06/16/09	1,735	$482,745,600	1,505	$152,511,425
Pass Christian	05/26/70	06/16/09	2,093	$541,527,600	2,550	$323,619,220

†Includes unincorporated areas of county only
Source: NFIP Community Status information as of 1/10/2017; NFIP claims and policy information as of 10/31/2016

Community Rating System
Harrison County (Class 6) as well as the cities of Biloxi (Class 5), D'Iberville (Class 6), Gulfport (Class 7), Long Beach (Class 8), and Pass Christian (Class 7) participate in the CRS.

Flood Damage Prevention Ordinance
All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. Harrison County and the cities of Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian all participate in the NFIP and have adopted flood damage prevention ordinances.

Floodplain Management Plan
Harrison County has adopted a floodplain management plan to help prevent damages associated with flooding and flood loss. The cities of Biloxi, Gulfport, Long Beach, and Pass Christian have also adopted floodplain management plans.

Open Space Management Plan
Harrison County has adopted a county parks and recreation master plan as well as a heritage trails blueways/greenways plan.

Stormwater Management Plan
The cities of D'Iberville, Gulfport, and Long Beach have each adopted a stormwater management plan. Harrison County and the cities of Biloxi, D'Iberville, Long Beach, and Pass Christian have adopted local stormwater management ordinances.

C.4.2 Administrative and Technical Capability

Table C.55 provides a summary of the capability assessment results for Harrison County with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill. A dagger (†) indicates a county-level staff member(s) provides the specified knowledge or skill to that municipality.

TABLE C.55: RELEVANT STAFF/PERSONNEL RESOURCES

Staff/Personnel Resource	Planners with knowledge of land development/land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Emergency Manager	Floodplain Manager	Land Surveyors	Scientists familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in GIS and/or Hazus	Resource development staff or grant writers
HARRISON COUNTY	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Biloxi	✓	✓	✓	✓	✓		†	✓	✓	
D'Iberville	✓	✓	✓	†	✓		†	✓	✓	
Gulfport	✓	✓	✓	✓	✓		†	✓	✓	
Long Beach	✓	✓	✓	✓	✓		†	✓	†	✓
Pass Christian	✓	✓	✓	†	✓		†	✓	†	

Credit for having a floodplain manager was given to those jurisdictions that have a flood damage prevention ordinance, and therefore an appointed floodplain administrator, regardless of whether the appointee was dedicated solely to floodplain management. Credit was given for having a scientist familiar with the hazards of the community if a jurisdiction has a Cooperative Extension Service or Soil and Water Conservation Department. Credit was also given for having staff with education or expertise to assess the community's vulnerability to hazards if a staff member from the jurisdiction was a participant on the existing hazard mitigation plan's planning committee.

C.4.3 Fiscal Capability

Table C.56 provides a summary of the results for Harrison County with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource has previously been used to implement hazard mitigation actions. A dagger (†) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds).

TABLE C.56: RELEVANT FISCAL RESOURCES

Fiscal Tool/Resource	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes (or taxing districts)	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation, Revenue, and/or Special Tax Bonds	Partnering Arrangements or Intergovernmental Agreements	Other: HMGP and other federal, state, and private grants/resources
HARRISON COUNTY	†	†	†	†				†	†	✓
Biloxi	†								†	✓
D'Iberville									†	†
Gulfport	†	†	†						†	✓
Long Beach		†	†						†	✓
Pass Christian					†				†	✓

C.4.4 Political Capability

During the months immediately following a disaster, local public opinion in Harrison County is more likely to shift in support of hazard mitigation efforts.

Table C.57 provides a summary of the results for Harrison County with regard to political capability. A checkmark (✓) indicates the expected degree of political support by local elected officials in terms of adopting/funding information.

TABLE C.57: LOCAL POLITICAL SUPPORT

Political Support	Limited	Moderate	High
HARRISON COUNTY			✓
Biloxi			✓
D'Iberville			✓
Gulfport			✓
Long Beach			✓
Pass Christian			✓

C.4.5 Conclusions on Local Capability

Table C.58 shows the results of the capability assessment using the designed scoring methodology described in Section 7: *Capability Assessment*. The capability score is based solely on the information found in existing hazard mitigation plans and readily available on the jurisdictions' government websites. This information was reviewed by all jurisdictions and each jurisdiction provided feedback on the information included in the capability assessment. Local government input was vital to identifying capabilities. According to the assessment, the average local capability score for the county and its jurisdictions is 50.3, which falls into the high capability ranking.

TABLE C.58: CAPABILITY ASSESSMENT RESULTS

Jurisdiction	Overall Capability Score	Overall Capability Rating
HARRISON COUNTY	61	High
Biloxi	49	Moderate
D'Iberville	43	Moderate
Gulfport	50	High
Long Beach	51	High
Pass Christian	48	Moderate

C.5 HARRISON COUNTY MITIGATION STRATEGY

This subsection provides the blueprint for Harrison County to follow in order to become less vulnerable to its identified hazards. It is based on general consensus of the Regional Hazard Mitigation Council and

the findings and conclusions of the capability assessment and risk assessment. Additional Information can be found in Section 8: *Mitigation Strategy* and Section 9: *Mitigation Action Plan*.

C.5.1 Mitigation Goals

Harrison County developed nine mitigation goals in coordination with the other participating MEMA District 9 Region jurisdictions. The regional mitigation goals are presented in **Table C.59**.

TABLE C.59: MEMA DISTRICT 9 REGIONAL MITIGATION GOALS

	Goal
Goal #1	Minimize risk and vulnerability of the community to hazards.
Goal #2	Minimize loss of life, injury, and damages to property, the economy, and the environment.
Goal #3	Minimize loss to critical facilities and infrastructure, utilities, and services.
Goal #4	Improve, expand, and enhance public education, awareness, and preparedness.
Goal #5	Build and enhance local mitigation capabilities to improve the region's ability to prepare for, respond to, and recover.
Goal #6	Enter into partnerships with neighboring jurisdictions, federal and state agencies, and others to share information and develop a more hazard resistant community.
Goal #7	Enhance response procedures and emergency management capabilities.
Goal #8	Reduce economic losses, minimize social disruptions, and maintain quality of life.
Goal #9	Protect the environment and natural resources.

C.5.2 Mitigation Action Plan

The mitigation actions proposed by Harrison County and the cities of Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian are listed in the following individual Mitigation Action Plans.

Harrison County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Identify resources that are available to be shared between municipalities and the county.	Hurricane, Flood, Thunderstorm, Tornado, All Severe Weather	High	Harrison County Emergency Management	N/A	2021	(Action 2008-7 in previous plan) The county has been working with the municipalities on resource sharing and has identified a number of ways to combine forces. Still, there are many ways in which all communities in the county could increase efficiencies through sharing of resources, so this action will remain in place.
P-2	Build partnerships to share resources.	All	High	Harrison County Emergency Management	N/A	2021	(Action 2008-8 in previous plan) The county has worked with a number of different organizations at the local and regional level to share resources, but there are still many organizations that the county would like to partner with to share resources.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-3	Identify cross ownership and multi-jurisdictional issues related to flood hazards.	Flood	High	Harrison County Planning and Zoning Department	N/!	2021	(Action 2008-9 in previous plan) The county has worked with neighboring communities and with municipalities to try to identify cross ownership issues related to flooding. Although this has been worked on to some degree, there is still additional work to be done on this action, so this will remain in the plan.
P-4	Continue support of the U.S. Army Corps of Engineers study of the Turkey Creek Drainage area and implement recommendations made in the study.	Flood	Moderate	Harrison County Board of Supervisors	U.S. Army Corps of Engineers	2019	(Action 2008-10 in previous plan) This action is currently under review as this is part of the county's Building Program. As this study continues to move forward, the county will work with USACE to implement any recommendations from it.
P-5	Develop a data network that provides "real-time" information from data generated through the county building permit program.	Hurricane, Flood	Moderate	Harrison County Data center	Department of Transportation, general revenues	2018	(Action 2008-11 in previous plan) This action is also being implemented as part of the county's Building Permit Program. There are some data networks that are in place, but the county would like to continue to work on this action going forward.
P-6	Encourage planned development.	Flood	Moderate	Planning Commission of Harrison County, Biloxi, Gulfport	N/A	Completed	(Action 2008-14 in previous plan) The county is currently using planned development so this action is complete.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Adopt Smart Growth policies.	All	Low	Harrison County Board of Supervisors	N/A	2018	(Action 2008-15 in previous plan) The adoption of Smart Growth policies has not taken place, but the county is reviewing these types of policies, so this action will remain in place.
P-8	Develop regulatory standards for floodplain management that go beyond the minimum standards of the NFIP.	Flood, Hurricane	Moderate	Harrison County Building Code Administration and Building Official	N/A	2021	(Action 2008-18 in previous plan) The county has implemented a number of regulatory standards that go above the minimum standards set by the NFIP, but there are other measures the county could implement going forward and so this action will remain in place.
P-9	Develop local, city, and county wetlands regulations that provide the "intent" of the regulations for flood storage (available for CRS credit).	Flood	High	Harrison County Planning and Zoning Department; Planning Departments and Planning Commissions of Biloxi, Gulfport, Long Beach, D'Iberville, and Pass Christian	N/A	2021	(Action 2008-19 in previous plan) The county has developed some wetlands regulations in conjunction with the municipalities related to flood storage, although it should be noted that these are under review and additional measures are being considered so this action will remain in place.
P-10	Continue enforcement of the Zoning Ordinance and amend the ordinance as necessary.	Flood	High	Harrison County Zoning Department and Planning Commission	N/A	2021	(Action 2008-20 in previous plan) The county has enforced the Zoning Ordinance, but it will also need to look into amending this Ordinance going forward, so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-11	Develop subdivision regulations that require a lower number of lots in order to be reviewed.	Flood	Low	Harrison County Planning Commission; Zoning Department; Engineering Department	N/A	2021	(Action 2008-21 in previous plan) The county has not developed additional subdivision regulations related to number of lots, so this action will remain in place.
P-12	Adopt the current International Building Code.	Hurricane, Tornado, Thunderstorm, High Wind, Lightning	Moderate	Harrison County Code Administration	N/A	2021	(Action 2008-22 in previous plan) The county has adopted the IBC, but there will likely be an update of this code in the future that the county will need to review and evaluate, so this action will remain in place.
P-13	Encourage plantings of live oak trees on public and private properties.	Hurricane, Flood	Moderate	Harrison County Beautification Department; Municipal Beautification Departments	MS Department of Transportation, general revenues, private funding	2021	(Action 2008-23 in previous plan) The county has encourage the plantings of live oaks and has even implemented requirements that some streets/areas of the county plant and maintain live oaks. However, there are other areas where the county would like to implement this initiative, so this action will remain in place.
P-14	Develop a county-wide Stormwater Plan.	Flood	Moderate	Harrison County Wastewater District	Coastal Impact Assistance Program, general revenues	2019	(Action 2008-24 in previous plan) The county has developed a stormwater plan, but this plan will need to be updated in the coming years, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-15	Require final inspection by a qualified engineer on behalf of the local government for stormwater conveyances.	Flood	Moderate	Harrison County Board of Supervisors; Cities of Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian	N/A	2021	(Action 2008-26 in previous plan) The county does not currently require final inspection by a qualified engineer on behalf of the local government for stormwater conveyances, so this action will remain in place as the county continues to pursue this.
P-16	Request authority for the Health Department to issue final approval of installed individual onsite wastewater disposal systems.	Flood	Moderate	Mississippi State Department of Health	N/A	2021	(Action 2008-27 in previous plan) Currently there is no authority for the Health Department to issue final approval of installed wastewater disposal systems, so this action will remain in place.
P-17	Encourage and keep record of the elevations of homes, bridges, roads, and reference marks.	Flood	High	Harrison County Engineer; CRS Coordinator	General revenues	2021	(Action 2008-31 in previous plan) The county has been working on keeping records of all elevations that take place on homes, bridges, roads, and reference marks. This is part of the Building Permit Program. However, this will need to continue to be reviewed in the future to ensure proper records are being kept.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-18	Continue to assist FEMA in mapping floodplains by requesting map updates as needed.	Flood	Moderate	Harrison County Emergency Management; Harrison County Board of Supervisors	General revenues, Hazard Mitigation funding	2021	(Action 2008-48 in previous plan) The county has worked with FEMA in its effort to map floodplains on a regular basis and update these maps as necessary. These maps were fairly recently updated, but it is anticipated that future updates will be needed going forward, so this action will remain in place.
P-19	Develop cross platform mobile device accessible web mapping applications to be used for post-disaster reconnaissance, asset inventory, and damage assessments.	All	Moderate	Harrison County GIS Department	Capital budget, Harrison County GIS Coalition	2018	(Action 2014-11 in previous plan) The county has worked on developing cross platform mobile device applications for post-disaster use and has some in place, but this is a constantly evolving process, so new applications will undoubtedly need to be developed in the future.
P-20	Develop and maintain GIS database to track county and city vulnerability (exposure to known hazard areas) through coordination with subject-matter experts and the Harrison County GIS Coalition (HCGISC).	All	Moderate	Harrison County GIS Department; Harrison County Emergency Management Agency	Capital budget, Harrison County GIS Coalition	2018	(Action 2014-14 in previous plan) The county has developed and maintained a GIS database on hazard risks and recently updated that information through the recent plan update. However, as additional data is collected, the county will need to update this information and ensure the best data is available.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-21	Implement a county-wide database of utility infrastructure showing geographic location of underground and surface level water and sewer assets. This database will include municipalities. This will enhance the ability during a declared emergency to determine affected assets during surge/flood events.	All	Moderate	Harrison County GIS Department; Harrison County Emergency Management Agency	Capital budget, Harrison County GIS Coalition	2018	(Action 2014-15 in previous plan) The county has worked to develop a county-wide utility infrastructure database and has done so to some degree, but this database is still under construction and is being worked on to add new utilities as they are installed. This action will remain in place.
P-22	Implement a county-wide database of physical address locations and structures types for rapid spatial analysis of disaster affected properties to determine damage assessments for number of structures by type and estimated values.	All	Moderate	Harrison County GIS Department; Harrison County Emergency Management Agency	Capital budget, Harrison County GIS Coalition	2018	(Action 2014-16 in previous plan) The county has worked to develop a county-wide address database and has done so to some degree, but this database is still under construction and is being worked on to add new properties/structures as they are constructed. This action will remain in place.
Property Protection							
PP-1	Replace exterior skin of main tower of Memorial Hospital.	All	Low	Memorial Hospital	Mitigation Grant, Capital Budget monies	Completed	(Action 2008-6 in previous plan) The exterior skin of the main tower of Memorial Hospital was replaced.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-2	Continue to participate in the Hazard Mitigation Grant Program to purchase and elevation structures that are repeatedly flooded.	Flood, Hurricane	Moderate	Harrison County Board of Supervisors, Cities of Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian	Hazard Mitigation Grant funds, Flood Mitigation Assistant Program funds, Pre-disaster Mitigation Grant Program	2022	(Action 2008-43 in previous plan) The county has participated in the HMGP buyout and elevations programs previously, but there are many properties that may still be eligible for this program and so the county will continue to work to implement this where citizens voluntarily decide they would like to participate.
PP-3	Encourage safe room construction in all new structures or substantially improved structures. To include a new EOC/EMA Office (Safe Room) outside the Historic Flood Zone of Downtown Gulfport.	Hurricane, Tornado, Flood, Thunderstorm, High Wind, Lightning, Hail	Moderate	Harrison County Emergency Management	Local, State, Federal	2021	(Action 2008-44 in previous plan) The county has encouraged safe rooms for all citizens and has constructed safe rooms in many areas that have large populations or vulnerable populations. However, there are still a number of locations where the county would like to add additional safe rooms such as a new EOC/EMA Office.
PP-4	Install storm shutters to protect exterior of ambulance service headquarters, dispatch, and personnel area.	Hurricane, Tornado	Moderate	Harrison County American Medical Response	Grant, state funds	2018	(Action 2008-50 in previous plan) Storm shutters have been installed in some of these ambulance service areas, but there are still areas where the county would like to install shutters, so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-5	Build out a functional Sheriff's Work Center by installing a 125 kw generator to power inmate housing, kitchen, vehicle maintenance center	All	High	Harrison County Inmate Work Center	Local	2018	New Action
PP-6	Construct a new county Emergency Operations Center that is located in a non-flood impact area and which incorporates protection from wind and other hazards to the greatest extent possible	All	High	Harrison County Emergency Management	Hazard Mitigation Grant Funds, Pre-disaster Mitigation Grant Program, Capital Budget	2021	New Action
Natural Resource Protection							
NRP-1	Continue to maintain the sand beach.	Hurricane, Flood, High Wind	High	Harrison County Sand Beach Authority	General revenues, USACE	2022	(Action 2008-13 in previous plan) The county has worked to maintain the sand beach as much as possible and since this action will require constant vigilance and evaluation over time, it will remain in place.
NRP-2	Petition the Secretary of State for tax delinquent properties that lie in the floodplain that may contribute to flood storage, stormwater control, and linked green space. Establish a cooperative maintenance agreement among the communities for the maintenance of these properties.	Flood	Moderate	Community Development; Planning and Recreation Departments of Harrison County and the Cities of Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian	N/A	2020	(Action 2008-28 in previous plan) The county has made some effort to petition the Secretary of State on these properties, but there has not been as much progress as would be hoped so this action will remain in place as the county continues to pursue.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
NRP-3	Encourage acquisition or donation of conservation easements and properties in environmentally sensitive areas.	Flood	Moderate	Harrison County Board of Supervisors	N/A	2022	(Action 2008-29 in previous plan) The county has acquired some conservations easements recently including new areas for Wolf River that have been donated. However, additional conservation space will be beneficial and the county will continue to try to acquire more in the future.
NRP-4	Encourage dune propagation in areas where the seawall is below 10 feet (NGVD).	Hurricane, Flood, High Wind	High	Harrison County Sand Beach Authority	N/A	2022	(Action 2008-30 in previous plan) The county has worked to encourage dune propagation in areas where the seawall is below 10 feet, but this constantly changing landscape requires evaluation to ensure the proper steps are taken to protect dunes. Therefore, this action will remain in place.
Structural Projects							
SP-1	Improve East-West Corridor transportation infrastructure to ensure adequate evacuation clearance times.	Hurricane	Moderate	Harrison County Transportation Authority	Department of Transportation, general revenues	2018	(Action 2008-17a in previous plan) The county has worked on improving the East-West Corridor to ensure adequate evacuations. Many improvements have been made, but as growth continues in the county, these routes will need to be reviewed and evaluated, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-2	Improve North-South Connector in Biloxi transportation infrastructure to ensure adequate evacuation clearance times.	Hurricane	Moderate	Mississippi Department of Transportation	Federal Highway Funds, MS Department of Transportation Funds	2018	(Action 2008-17b in previous plan) The county has worked on improving the North-South Connector in Biloxi to ensure adequate evacuations. Many improvements have been made, but as growth continues in the county, these routes will need to be reviewed and evaluated, so this action will remain in place.
SP-3	Improve North-South Connector in western Harrison County transportation infrastructure to ensure adequate evacuation clearance times.	Hurricane	Moderate	Harrison County Board of Supervisors	Federal Highway Funds, MS Department of Transportation Funds	2018	(Action 2008-17c in previous plan) The county has worked on improving the North-South Connector in the western county to ensure adequate evacuations. Many improvements have been made, but as growth continues in the county, these routes will need to be reviewed and evaluated, so this action will remain in place.
Emergency Services							
ES-1	Increase above ground fuel storage capacity by at least 12,000 gallons for generators at Memorial Hospital. This would allow fuel capacity operation for 96 hours without replenishment.	All	High	Memorial Hospital	Mitigation Grant, Capital Budget monies	2020	(Action 2008-4 in previous plan) The above ground fuel storage capacity has been increased, but the hospital is still looking to install additional generator capacity going forward so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-2	Increase generator capacity at Memorial Hospital to provide sustained uninterrupted patient care before, during, and after an emergency event.	All	High	Memorial Hospital	Mitigation Grant, Capital Budget monies	2022	(Action 2008-5 in previous plan) The generator capacity has been increased, but the hospital is still looking to install additional generator capacity going forward so this action will remain in place.
ES-3	Continue to participate in Hazard Mitigation Grant Program to build 361 community shelters (shelters that meet the requirements of FEMA Publication 361: Design and Construction Guidance for Community Shelters) and stand alone within Harrison County for shelter up to 45% of population.	All	Moderate	Harrison County Emergency Management Agency; Harrison County Board of Supervisors; Harrison County School District	General revenues, federal match, grants	2020	(Action 2008-46 in previous plan) Harrison County School District has partnered with MEMA to harden campuses to the FEMA 361 Standards. From 2011 to 2015, 19 campuses were hardened by installation of protective screens, shutters, and doors. The efforts are being continued by hardening the roofing of the same campuses. To date, the roof hardening just began on the 8th of 19 campuses.
ES-4	Seek Hazard Mitigation funds to provide generator power back up systems, and retrofit county and city-owned critical facilities to meet extreme wind standards.	All	High	Harrison County Emergency Management Agency; Harrison County Board of Supervisors; Harrison County School District	General revenues, Hazard Mitigation funding	2022	(Action 2008-47 in previous plan) The county has used mitigation funds to provide generator backup to many county-owned critical facilities. However, there are still a number of critical facilities that need generators, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-5	Implement a county-wide database of emergency response inventory showing geographic location and emergency point of contact that includes equipment, supplies, and personnel.	All	High	Harrison County GIS Department, Emergency Management Agency, Board of Supervisors	Capital budget, Harrison County GIS Coalition	2019	(Action 2014-1 in previous plan) The county has implemented a number of databases that are meant to show emergency response inventory, but these databases are in need of being updated and new display data may be needed as well.
ES-6	Enhance Reverse 911 and cell phone registration with web applications and emergency alerts as part of the multiple pre-working systems and expand to cover high risk areas not covered.	All	High	Harrison County Board of Supervisors, Emergency Management Agency, IT	MEMA, private donations from cellular companies	2022	(Action 2014-2 in previous plan) The county has worked hard to enhance the Reverse 911 registry by providing ways to register that are diverse. However, there are still many areas/people that may not be covered, so the county will continue to pursue this action.
ES-7	Establish evacuation routes to include a north-south transportation evacuation corridor in west Harrison County.	Hurricane, Tropical Storm, Flood	Moderate	Harrison County Transportation Authority, Planning Commission	MS Dept. of Transportation	2020	(Action 2014-4 in previous plan) The county has established evacuation routes, but will need to re-evaluate these routes on a regular basis and make changes based on new information that has been collected. This action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-8	Develop a plan that defines and clarifies Special Needs as it relates to evacuation and sheltering throughout Emergency Management Services.	All	High	Emergency Management Agency, Dept. of Health, local hospitals, Red Cross	MEMA	2018	(Action 2014-7 in previous plan) The county has done significant planning to define and clarify special needs for evacuation and sheltering. However, there are likely many populations that have not been identified in these planning efforts so this action will remain in place.
ES-9	Expand the use of weather radios as part of the multiple pre-working systems and expand to cover high risk areas not covered.	All	High	Emergency Management Agency, Board of Supervisors	MEMA, private donations	2022	(Action 2014-8 in previous plan) Many citizens throughout the county have weather radios, but there is a need to increase this number as there are still many people in areas where they may not be able to access weather warnings any other way.
ES-10	Continue development of water supply in rural areas in order to service wildfires to protect homes, large timberland, and schools located in rural areas.	Wildfire	Moderate	Harrison County Board of Supervisors, Waterwise, Utility Authority District; MS Development Authority	WaterSMART Water and Energy Efficient Grant funding, Alliance Grants	2022	(Action 2014-9 in previous plan) Much of the county has water supplies available for fighting wildfires, but there are still some areas where this needs to be extended so the county will continue to work on addressing these areas going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-11	Expand the current Flood Warning System to include: GIS mapping of developments and inundation areas to inform warning system and ability to access data through online viewer; further define special needs and include in warning system as a separate criterion for warning; provide public education and outreach for how the system works and who will be informed and criteria for implementing system; and broaden warning mechanisms to include TV messages and social media outlets, include school districts as agency for dismissal or holding during a flood hazard.	All	Moderate	Harrison County Emergency Management Agency, Code Enforcement	Capital budget, in-house	2022	(Action 2014-12 in previous plan) The current Flood Warning System has been updated in many ways, but there are still many features that can be improved and added such as inundation areas. Therefore, this action will be retained in the plan as the county continues to pursue these improvements.
ES-12	Construct a 10,000 square foot Emergency Operations Center that will be strategically located within the county to assist in preparing for and responding to future natural hazards.	All	High	Board of Supervisors, Emergency Management Agency	TBS	2022	(Action 2014-13 in previous plan) The county is working on this project to construct an EOC but the project is not complete, so this action will remain in place.
ES-13	Add bi-fuel capability for existing hospital generators to utilize natural gas as an alternate fuel source.	All	High	Memorial Hospital	Mitigation Grant, Capital Budget monies	2021	New Action
Public Education and Awareness							
PEA-1	Establish an education program to promote the CRS program.	Flood	Moderate	Harrison County Building Department	General revenues	2018	(Action 2008-12 in previous plan) The county has implemented an education program to promote the CRS, but there are many citizens who still do not recognize the benefits of this program, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Create an education outreach program to encourage better design.	Flood	Low	Mississippi Department of Marine Resources	DEQ, EPA, Conference Fees	2017, Annually	(Action 2008-16 in previous plan) The county has created an education program to encourage better design, but many developers and citizens would still benefit from additional programs, so this action will be retained.
PEA-3	Set up booths/displays for mitigation activities at Homeowners Show and building suppliers. Initiate an annual county-wide hurricane fair.	Hurricane, Flood, High Wind	Moderate	Harrison County Emergency Management	General revenues	2020	(Action 2008-32 in previous plan) The county has been involved in a number of public events to try to promote awareness regarding mitigation and hazards and these programs have been successful, but there is still a need to improve and carry out these programs going forward.
PEA-4	Prepare and implement construction workshops with builders.	Hurricane, Tornado, Flood, High Wind	Low	Building Officials from Harrison County and Cities of Biloxi, D'Iberville, Gulfport, Long Beach, and Pass Christian	N/A	2022	(Action 2008-33 in previous plan) Some construction workshops have been carried out for builders, but there is still significant work to be done on this action, so this will be kept in place.
PEA-5	Find funds to develop a model project that contractors and individuals can view.	Hurricane, Tornado, High Wind, Flood	Low	Harrison County Board of Supervisors	FEMA/MEMA, general revenues	2018	(Action 2008-34 in previous plan) The county has not been able to implement a model project, but it will continue to try to find the necessary funding to implement and build.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-6	Continue support of Hurricane Museum.	Hurricane, High Wind, Tornado, Flood	Low	Harrison County Board of Supervisors; Mississippi Maritime and Seafood Industry Museum	General revenues	2022	(Action 2008-39 in previous plan) The county has been supportive of the Hurricane Museum and it is critical that this support be retained. As such, the county will keep this action in place as it continues to support the Museum.
PEA-7	Continue tourist outreach and education about potential hazards and evacuation.	Hurricane, High Wind, Flood	Low	Harrison County Emergency Management; Casino Operators	General revenues	2022	(Action 2008-40 in previous plan) The county has worked on tourist outreach and has done a good job so far of trying to reach this population, but since this population is constantly turning over, there will always be a need for outreach and improving this program.
PEA-8	Continue distribution of military orientation package on hazard preparedness.	Hurricane, Tornado, Flood, High Wind	Moderate	Harrison County Emergency Management	General revenues	2022	(Action 2008-41 in previous plan) The county has distributed military orientation packages on hazard preparedness in the past, but this will need to be retained going forward as information that should be passed along changes.
PEA-9	Prepare an insert on hurricane, tropical storm, and flood preparedness for the Chamber's newcomer packages.	Hurricane, Tornado, Flood, High Wind	Moderate	Harrison County Emergency Management	General revenues	2022	(Action 2008-42 in previous plan) In the past, the county has used inserts in newcomer packages as a way to increase awareness. Since this will need to continue to be carried out as new newcomers arrive, this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-10	Encourage individual residents to purchase and monitor NOAA weather radio broadcasts.	Hurricane, Tornado, Flood, Thunderstorm, High Wind, Lightning, Hail	Moderate	Harrison County Emergency Management Director; local media outlets	N/A	2022	(Action 2008-45 in previous plan) The county has encouraged residents to purchase and monitor radio broadcasts on weather radios, but many citizens do not have these devices that should, so this action will remain in place.
PEA-11	Distribute current stock of disaster preparedness brochures. Print additional brochures. Schedule sessions with local civic groups to discuss preparedness. Provide printed training materials to least EMS agency for employees regarding special needs patients.	All	Moderate	Harrison County Emergency Management Agency	Grant, state funds	2022	(Action 2008-49 in previous plan) The county has made a number of disaster brochures to hand out and has been working to update the materials on these brochures, but this action is not complete so the county will keep it in place going forward.
PEA-12	Develop a public education outreach program to the public for wildfires procedures and protection. The first step in wildfire prevention education is to raise awareness of the responsibilities of living in a fire-prone environment, individual and community action can ensure that homes and neighborhoods are prepared for wildfire.	Wildfire	Moderate	Harrison County Fire Services; MS Forestry Commission	Firewise.org	2022	(Action 2014-3 in previous plan) The county has done some public outreach and awareness work on wildfires, but there are many individuals living in high risk areas that may not be aware of what action they can take to reduce risk. Therefore, this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-13	Educate the public on warning system, 911 reverse system, and the importance of having a weather radio. Coordinate with non-profit organizations and VOAD.	All	High	Harrison County Board of Supervisors, Emergency Management Agency	MEMA, private donations from cellular companies	2018	(Action 2014-5 in previous plan) The county has worked to try to get more citizens to register for the reverse 911 system and this has been successful to some degree, but there are still many citizens who would benefit from signing up and so the county will continue to pursue this action.
PEA-14	Develop a Public Education Outreach program for education to the public for special needs evacuation and sheltering procedures.	All	High	Emergency Management Agency, Dept. of Health, local hospitals, Red Cross	MEMA	2019	(Action 2014-6 in previous plan) The county has developed a public education outreach program for special needs and sheltering, but the groups who require this program may need to have additional focus when it comes to education, so this action will remain in place.
PEA-15	Community education and outreach to develop and provide CEO multi-media services and material to inform residents and absentee property owners in Harrison County about community redevelopment and long-term recovery; natural hazard impacts and risks; hazard mitigation for homeowners and businesses; improved building codes, materials, and techniques; public safety; and property insurance and insurance incentives.	All	Moderate	Emergency Management Agency, Board of Supervisors	FEMA/MEMA, Home Builders Association	2022	(Action 2014-10 in previous plan) The county has worked on developing some long-term public education programs, but these programs require a great deal of effort to implement successfully and a lot of time to see results so this action will be retained as the county continues to work on implementation.

City of Biloxi Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Strictly enforce building and related codes to insure design and construction of new structures (building/infrastructure) will provide maximum protection against all hazards.	All	High	City of Biloxi Community Development, Public Works	Existing budget	2022	(Action 2.2.1 in previous plan) The city has worked to strictly enforce building codes to protect structures against hazards, however, some improvements can still be made to the implementation of these codes so the city will review and update enforcement practices as needed in the future.
P-2	Continue to integrate mitigation strategies into the city's planning initiatives including their Comprehensive Plan, Ordinances, Capital Improvement Plans, etc. for all hazards.	All	High	City of Biloxi Community Development, Public Works	Existing budget	2022	(Action 2.2.2 in previous plan) The city has worked to integrate mitigation efforts into local planning and has done so successfully. However, as this plan has just been updated and new projects are on the horizon, the city will need to keep this action in place and integrate new elements.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-3	Maintain or improve the status of the City of Biloxi in the Community Rating System and the National Flood Insurance Program.	Flood	High	Community Development, Floodplain Manager	HMGP, existing budget	2022	(Action 2.3.4 in previous plan) The city currently participates in the CRS program and has made many improvements to score more points, but there are many actions the city could take to improve its standing in the program, and it will look into taking those actions to enhance its rating going forward.
P-4	Prevent unprotected and improper development in flood hazard areas through the improvement of existing regulations governing building and land development in Biloxi.	Flood	High	Community Development, Floodplain Manager	Existing budget	2022	(Action 2.3.5 in previous plan) The city has worked to improve the type of development that is allowed in known flood areas, but there are many modifications that could be made to these standards and the city will work to improve these standards going forward.
P-5	Research the potential effects of sea level rise, coastal erosion, and salt water intrusion.	Tropical Storm, Erosion, Hurricane	Low	Public Works	To be determined	2022	(Action 2.4.1 in previous plan) The city has invested some time and effort into researching the potential effects of sea level rise, erosion, and salt water intrusion, but there is a need for more and better information concerning these events, so the city will keep this action in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-6	Develop regulation and educational materials for water preservation addressing potential issues that could be caused by drought conditions.	Drought	Moderate	Public Works	Existing budget	2022	(Action 2.4.3 in previous plan) The city has developed a regulation and educational materials for water preservation caused by drought issues. However, this regulation will need to be reviewed and updated in the coming years to ensure it still meets the community's needs. This action will be retained.
P-7	Encourage private and public entities to develop and share Emergency Response Plans/Procedures with the city to improve preparedness and recovery procedures.	All	High	Community Development	Existing budget	2022	(Action 3.3.3 in previous plan) The city has encouraged both private and public entities to develop ERPs to try to improve preparedness at a site/organizational level. This has been successful to some degree, but there is still a need to increase the number of ERPs in the community so this action will remain in place
P-8	Develop Continuity of Operation Plan for city departments to address health and manmade-related incidents.	Manmade Hazards	High	All departments	EMGP, Homeland Security, existing budget	2018	(Action B.2.1 in previous plan) The city has developed procedures to maintain continuity, but there is not a formal plan in place due to staff time commitments. Therefore, the city will continue to pursue this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-9	Conduct a Commodity Flow Study to identify hazards transported into and around the city or stored at fixed site locations.	Hazardous Materials	Moderate	Biloxi Fire Department	EMGP	2020	(Action B.2.2 in previous plan) The city has not yet developed a CFS due to lack of funding, but the city will continue to work towards implementing this action.
P-10	Update and/or develop SOPs for preparedness and response procedures for applicable health and man-made incidents.	Manmade Hazards	High	Biloxi Fire, Police, Public Works, Emergency Management	General budget	2022	(Action B.2.3 in previous plan) The city relatively recently updated its SOP for preparedness and response procedures, but these will likely need to be updated again in the next 5 years so this action will remain in place.
P-11	Continue to enforce building codes, fire prevention codes, and other codes and ordinances that help reduce risks to the health, safety, and welfare of citizens and visitors.	Manmade Hazards	High	Biloxi Fire Department; Biloxi Community Development	General budget	2022	(Action C.1.1 in previous plan) The city has worked to enforce building/fire codes over the past several years, but there will be a need to update the codes in the future, so this action will be retained in the plan.
Property Protection							
PP-1	Storm proof and/or retrofit existing and new critical facilities and infrastructure.	All	High	City of Biloxi	HMGP, existing budget	2022	(Action 2.1.1 in previous plan) The city has made some efforts to retrofit critical facilities, but there are still a number of facilities that would benefit from retrofitting, so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-2	Replace existing traffic signals at major intersections with more durable weather resistant mast arm poles. Install mast arm poles for future traffic improvement projects.	All	High	City of Biloxi Public Works	HMGP	2022	(Action 2.1.2 in previous plan) The city has made some replacements of existing traffic signals with mast arm poles, but there are still some signals that are on traditional hangings, so the city will keep this action in place as it continues to make these replacements.
PP-3	Encourage home/business owners affected by flooding to protect existing and new properties with mitigation strategies such as flood insurance, elevation, floodproofing, structural protection, etc.	Flood	Moderate	City of Biloxi Community Development, Floodplain Manager	Existing budget	2022	(Action 2.3.1 in previous plan) The city has worked to try to ensure that all properties that have been or could be affected by flooding have some form of protection, but there are still many properties that do not, so the city will continue to try to push for more property owners to protect their property.
PP-4	Reduce the number of repetitive losses and severity of flooding for residents of Biloxi with corresponding reduction in costs to federal, state, and local governments.	Flood	High	City of Biloxi Community Development	HMGP	2022	(Action 2.3.2 in previous plan) The city has made significant efforts to try to reduce the number of repetitive loss properties in the community by implementing mitigation projects such as elevation, but there are still a number of repetitive loss properties in the community that the city would like to address if possible, so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-5	Retrofit public piers with improved building materials.	Tropical Storm, Hurricane	High		HMGP, existing budget	2022	(Action 2.5.1 in previous plan) In many cases, city-owned piers/pavilions have been retrofit to ensure stability, but there will be a constant need to make upgrades, so the city will keep this action in the plan going forward.
PP-6	Retrofit/improve bridges.	Hurricane	Moderate	Biloxi Public Works	HMGP	2022	(Action 3.1.4 in previous plan) Although the city has retrofit/improved some bridges, there are still several bridges that have not been addressed, so the city will attempt to address these in the future.
Natural Resource Protection							
NRP-1							
Structural Projects							
SP-1	Continue to improve and upgrade drainage to reduce flooding.	Flood	High	Biloxi Department of Public Works	HMGP, existing budget	2022	(Action 2.3.3 in previous plan) Many drainage improvements have been made throughout the city to try to reduce flooding, but there are still a number of drainage projects the city would like to implement, so this action will be kept in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-2	Explore road materials/signage for areas prone to limited visibility.	All Severe Weather	Moderate	Public Works	Existing budget	2022	(Action 2.4.2 in previous plan) The city has explored road materials/signage for areas prone to limited visibility and has implemented some changes in signage, but there are still places where improved signage would be beneficial, so this action has been retained.
Emergency Services							
ES-1	Evaluate the effectiveness of the outdoor siren system and track maintenance/performance issues.	All	High	Biloxi Emergency Management	Existing budget	2022	(Action 3.1.1 in previous plan) The city has an outdoor siren system in place the provides good coverage for the area, but the city would like to look at ways it can improve this system with potentially more sirens or other ways to communicate to the public.
ES-2	Enhance evacuation routes throughout the city including appropriate signage designating evacuation corridors.	Hurricane, Costal Storm	Moderate	Biloxi Public Works	HMGP	2022	(Action 3.1.2 in previous plan) The city has identified evacuation routes throughout the city boundaries, but there are additional steps the city could take to further identify/label these routes, so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-3	Continue to implement the Reverse 911 notification system and research new technology to improve notification procedures.	All	High	Biloxi Emergency Management	HMGP	2022	(Action 3.1.3 in previous plan) The city has worked hard to enhance the Reverse 911 registry by providing ways to register that are diverse. However, there are still many ways that the system could be improved so the city will continue to pursue this action.
ES-4	Research and pursue alternative communication devices improving communication before, during, and after a disaster.	All	High	Biloxi Emergency Management	HMGP	2022	(Action 3.2.1 in previous plan) The city has some backup communication devices that it can use before, during, and after a disaster, but as technology improves, the city will need to reevaluate and upgrade its devices, so this action will remain in the plan.
ES-5	Continue annual National Incident Management System training for first responders, city officials, and critical employees.	All	High	Biloxi Emergency Management	Existing budget	2022	(Action 3.3.1 in previous plan) Some of the city's employees, officials, and first responders have received NIMS training, but there are still a number who would benefit from this training and as new employees are hired, they will also need this training so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-6	Continue to maintain and update the city's Comprehensive Emergency Management Plan (CEMP) and Standard Operating Procedures (SOP) for applicable departments. Provide overview for new employees and inform existing employees of changes.	All	High	Biloxi Fire and Police Departments	Existing budget	2022	(Action 3.3.2 in previous plan) The city has updated its CEMP and SOP relatively recently, but there will be a need to update these plans again in the next 5 years, so this action will remain in place.
ES-7	Purchase a 5-ton truck.	All	High	Biloxi Emergency Management	To be determined	2022	(Action 3.4.1 in previous plan) The city has not purchased a 5-ton truck yet due to lack of available funds, so this action will be retained in the plan going forward.
ES-8	Secure generators ensuring continuous operation for existing and new critical facilities and infrastructure.	All	High	Biloxi Public Works	HMGP	2022	(Action 4.2.1 in previous plan) The city has acquired some generators to ensure continuity of operations in some critical facilities, but there are still many critical facilities without backup power, so this action will need to continue to be pursued.
ES-9	Conduct annual training exercise for potential manmade hazards.	Manmade Hazards	High	Biloxi Fire, Police, Emergency Management	Existing budget	2022	(Action B.1.1 in previous plan) The city has conducted and participated in a number of training exercises to increase preparedness to man-made events. However, as facilities change and new facilities are added, the city will need to continue these efforts and make sure that the proper communication is in place with these sites.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-10	Continue to explore ways to enhance and improve training and equipment needs for the Biloxi Fire, Police, and Emergency Management Departments.	Manmade Hazards	High	Biloxi Fire and Police	Homeland Security, existing budget	2022	(Action B.1.2 in previous plan) The city has implemented a number of strategies for training for fire, police and EM personnel. However, these personnel will need to be kept up to date on their training and new personnel that is hired will need training as well so this action will be retained in the plan.
Public Education and Awareness							
PEA-1	Continue outreach efforts to educate the public about the dangers of all hazards.	All	High	City of Biloxi Public Affairs	Current budget	2022	(Action 1.1.1 in previous plan) The city has reached out to the public on a large scale to try to provide the best possible information about the dangers of hazards, but there is still much work to be done to keep the public well-informed, so this action will be kept in place.
PEA-2	Promote the Firewise awareness program.	Wildfire	High	City of Biloxi Public Affairs	Current budget	2022	(Action 1.1.2 in previous plan) The city is not currently a Firewise community as there has not been staff time to develop this program, but this action will remain in place as the city continues to pursue this program.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-3	Provide all-hazard education and outreach to vulnerable populations.	All	High	City of Biloxi Public Affairs	Existing budget	2022	(Action 1.1.3 in previous plan) The city has reached out to many vulnerable populations, but since these are critical groups to reach prior to hazard events taking place, there is still significant work that needs to be done to identify and educate these populations.
PEA-4	Work with the Chamber of Commerce and local civic groups to establish continuity in training workshops and distribute education information to new existing businesses.	All	High	Coastal Chamber of Commerce, Biloxi Bay Chamber	Existing budget	2022	(Action 4.1.1 in previous plan) The city has worked with many local civic groups to prepare education and workshops for these groups to improve their knowledge of hazard risk. These efforts have been successful, but there are still many groups that could be targeted for this outreach, so the city will retain this action.
PEA-5	Work with appropriate agencies to identify high risk areas and distribute educational information to residents and business owners.	Manmade Hazards	High	Biloxi Public Affairs	Existing budget	2022	(Action A.1.1 in previous plan) The city has worked with a number of agencies to identify high risk areas to man-made hazards and to inform citizens of these risks. However, this information has been somewhat limited in the past and so the city will continue its efforts to collect this information and push it out to citizens where needed.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-6	Promote a mosquito control and West Nile Virus Prevention program.	Infectious Disease	High	City of Biloxi Public Affairs	Current budget	2022	(Action A.1.2 in previous plan) The city has attempted to implement a number of mosquito control procedures to reduce infectious diseases, but since the outbreak of several recent mosquito borne illnesses, the city may need to reevaluate its policy, so this action will be retained.

City of D'Iberville Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Continue to maintain and update the city's internal Hurricane Action Plan. Provide overview for new employees and inform existing employees of changes.	All	Moderate	City of D'Iberville	Existing budget	2022	(Action 1.1.3 in previous plan) The city has maintained an internal Hurricane Action Plan, but this plan will need to be updated going forward and continue to be used to train new and existing employees. Therefore, this action will remain in place.
P-2	Strictly enforce building and related codes to insure that design and construction of structures will provide maximum protection against hurricanes, floods, and other natural hazards.	All	High	FEMA	Existing budget	2022	(Action 2.3.1 in previous plan) The city has worked to strictly enforce building codes to protect structures against hazards, however, some improvements can still be made to the implementation of these codes so the city will review and update enforcement practices as needed in the future.
P-3	Prevent unprotected and improper development in flood hazard areas and prohibit development in floodways through the improvement of existing regulations, ordinances, and plans governing building and land development in D'Iberville.	Flood	High	D'Iberville Floodplain Manager	Existing budget	2022	(Action 2.3.2 in previous plan) The city has worked to improve the type of development that is allowed in known flood areas, but there are many modifications that could be made to these standards and the city will work to improve these standards going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-4	Continue to maintain elevation certificates for all post-FIRM structures.	Flood, Hurricane	High	D'Iberville Floodplain Manager, CRS Coordinator	Existing budget	2022	(Action 2.3.3 in previous plan) The city has maintained elevation certificates for all post-FIRM structures, but as additional elevations are implemented and development continues in the city, this action will need to be continually addressed and thus will remain in the plan.
P-5	Insure that all properties affected by flooding have some form of protection i.e., flood insurance, elevation, floodproofing, structural protection. etc.	Flood, Hurricane, Storm Surge	High	D'Iberville Floodplain Manager	Existing budget	2022	(Action 2.4.1 in previous plan) The city has worked to try to ensure that all properties that have been or could be affected by flooding have some form of protection, but there are still many properties that do not, so the city will continue to try to push for more property owners to protect their property.
P-6	Maintain or improve the status of the City of D'Iberville in the Community Rating System and the National Flood Insurance Program.	Flood, Hurricane	High	D'Iberville Floodplain Manager, CRS Coordinator	Existing budget	2022	(Action 2.4.3 in previous plan) The city currently participates in the CRS program and has made many improvements to score more points, but there are many actions the city could take to improve its standing in the program, and it will look into taking those actions to enhance its rating going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Enhance the city's government services continuity plan to ensure that emergency operations within the city can function and that day-to-day operations can resume as soon as possible after an emergency.	All	High	D'Iberville City Manager, Mayor, Council	Existing budget	2022	(Action 4.1.1 in previous plan) The city has developed a continuity plan to ensure day to day operations can be resumed after a disaster quickly, but this plan will need to be updated over the next 5 years, so this action will remain in place.
P-8	Enhance the city's regulatory framework to reduce the risk of manmade hazards.	Man-made Hazards	High	City of D'Iberville	Existing budget	2017, Annual	(Action 3.1.1-M in previous plan) The city has made many changes to its regulatory framework to reduce the risk of man-made hazards, but there are still many steps the city could take to further improve this framework. Therefore, the city will keep this action in place.
Property Protection							
PP-1	Storm proof and retrofit critical facilities.	Hurricane, Flood	High	City of D'Iberville	HMGP, existing budget, other	2020	(Action 2.1.1 in previous plan) The city has made some efforts to retrofit critical facilities, but there are still a number of facilities that would benefit from retrofitting, so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-2	Replace existing traffic signals at major intersections with more durable and weather resistant mast arm poles.	Hurricane, Thunderstorm, Tornado	Moderate	City of D'Iberville	HMGP, existing budget, other	2020	(Action 2.1.2 in previous plan) The city has made some replacements of existing traffic signals with mast arm poles, but there are still some signals that are on traditional hangings, so the city will keep this action in place as it continues to make these replacements.
PP-3	Continue to encourage the retrofitting of repetitive loss structures within the city.	Hurricane, Tropical Storm, Tornado, Flood	High	City of D'Iberville Building Department	Existing budget	2022	(Action 2.2.1 in previous plan) A number of repetitive loss properties have been addressed through retrofitting and other means, but there are still many rep loss properties in the city, so this action will remain in place.
PP-4	Promote the building of "safe rooms" in new construction and when remodeling existing structures.	Tornado	Low	FEMA	FEMA	2022	(Action 2.2.4 in previous plan) The city has promoted safe rooms in new construction and in remodels, but there are still a number of structures that need to have safe rooms constructed, so this action will be retained in the plan.
Natural Resource Protection							
NRP-1							

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Structural Projects							
SP-1	Continue to improve and upgrade drainage to reduce flooding.	Flood, Hurricane	High	D'Iberville Public Works	Existing budget, HMGP	2017, Annual review	(Action 2.4.2 in previous plan) Many drainage improvements have been made throughout the city to try to reduce flooding, but there are still a number of drainage projects the city would like to implement, so this action will be kept in the plan.
Emergency Services							
ES-1	Continue annual National Incident Management System training for first responders, city officials, and critical employees.	All	Moderate	City of D'Iberville	Existing budget	2022	(Action 1.1.2 in previous plan) Some of the city's employees, officials, and first responders have received NIMS training, but there are still a number who would benefit from this training and as new employees are hired, they will also need this training so this action will remain in place.
ES-2	Acquire an outdoor siren system.	Tornado, Hurricane, Thunderstorm, Man-made Hazards	High	MEMA, City of D'Iberville	Existing budget	2020	(Action 3.1.1 in previous plan) The city has not acquired an outdoor siren due to lack of funding, so this action will be kept in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-3	Continue to enhance evacuation routes throughout the city through placement and maintenance of appropriate signage.	Hurricane	Moderate	City of D'Iberville	Existing budget	2022	(Action 3.1.2 in previous plan) The city has identified evacuation routes throughout the city boundaries, but there are additional steps the city could take to further identify/label these routes, so this action will be retained.
ES-4	Coordinate with the City of Biloxi to ensure consistency of evacuation plans for Interstate 10 through D'Iberville.	Hurricane	Moderate	City of D'Iberville	Existing budget	2022	(Action 3.2.1 in previous plan) The city has coordinated with Biloxi in the past to ensure consistency of evacuation routes along the Interstate. However, the city will need to remain in close contact and coordination with Biloxi on this and make changes as needed in the future so this action will remain in place.
ES-5	Continue to support and encourage Harrison County's effort to build multiple 361 shelters.	Hurricane	Moderate	Harrison County Emergency Management, Board of Supervisors	Existing budget	2022	(Action 3.3.1 in previous plan) The city has coordinated with the county as it has built a number of 361 shelters to increase capacity, but as the city/county grows, there will be a continual need to increase capacity so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-6	Secure generators to insure continuous operation for critical city facilities and utilities.	Hurricane, Thunderstorm, Winter Storm, Tornado	High	D'Iberville, MEMA	Existing budget	2022	(Action 4.1.2 in previous plan) The city has acquired some generators to ensure continuity of operations in some critical facilities, but there are still many critical facilities without backup power, so this action will need to continue to be pursued.
ES-7	Conduct and participate in annual training exercise at major technological sites to increase preparedness in the event of an incident.	Man-made Hazards	Moderate	City of D'Iberville; American Medical Response; Keesler; others	Existing budget	2017, Annual	(Action 2.1.1-M in previous plan) The city has conducted and participated in a number of training exercises at major technological sites to increase preparedness to man-made events. However, as facilities change and new facilities are added, the city will need to continue these efforts and make sure that the proper communication is in place with these sites.
Public Education and Awareness							
PEA-1	Explore continuing education programs/opportunities for city staff and elected officials.	All	Moderate	City of D'Iberville	Existing budget	2022	(Action 1.1.1 in previous plan) The city has implemented a number of continuing education programs for staff and officials, but these programs likely need to be updated and re-implemented as city staff turns over. Therefore, this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Display hazard outreach materials in lobby of City Hall. Provide outreach materials at city functions and through city mailings.	Hurricane, Thunderstorm, Flood, River Erosion	Moderate	City of D'Iberville, CRS Coordinator	Existing budget	2017, Annual review	(Action 1.2.1 in previous plan) Hazard outreach materials have been displayed in city hall and many mailings have also been sent out to citizens to inform them of hazard risk. However, these materials will need to be reviewed and updated annually and outreach efforts will need to be continued going forward, so this action will remain in place.
PEA-3	Provide hazard education and outreach to vulnerable populations.	All	Moderate	City of D'Iberville	Existing budget	2018	(Action 1.2.2 in previous plan) The city has reached out to many vulnerable populations, but since these are critical groups to reach prior to hazard events taking place, there is still significant work that needs to be done to identify and educate these populations.
PEA-4	Develop and promote a wildfire awareness program.	Wildfire	Moderate	City of D'Iberville	Existing budget	2019	(Action 1.2.3 in previous plan) The city has done some outreach on wildfire awareness, but this program will likely need to be reviewed and updated, so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-5	Work with American Medical Response and Harrison County Emergency Management to educate senior citizens, disabled citizens, and special needs patients about the importance of having a personal evacuation plan.	Hurricane	Moderate	American Medical Response; Harrison County Emergency Management Agency	Existing budget	2022	(Action 1.2.4 in previous plan) The city has worked with AMR and the county to try to educate many vulnerable groups such as seniors and disabled citizens on developing a personal evacuation plan. However, there are still many from these groups who do not have such a plan in place, so this action will need to be retained.
PEA-6	Enhance the city's elevation awareness program, posting flood elevation markers in flood-prone areas.	Tropical Storm, Flood, Storm Surge, Wave Action	High	City of D'Iberville Floodplain Manager, Building Department	Existing budget	2022	(Action 2.2.2 in previous plan) The city has placed a number of high water markers throughout its boundaries and has worked to increase awareness of the available elevation programs. However, there are still many citizens who are unaware of the potential benefits of elevating property, so this action will be retained.
PEA-7	Expand outreach information to property owners regarding retrofitting and floodproofing techniques through community workshops, brochures, and newspaper articles.	Flood	High	City of D'Iberville Floodplain Manager, Building Department	Existing budget	2022	(Action 2.2.3 in previous plan) The city has reached out to many property owners through workshops and brochures, but there is a need to try to expand these efforts and reach citizens in new ways, so the city will review its current efforts and try to make improvements going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-8	Encourage local civic groups to establish continuity training workshops and education information to be distributed to new and existing businesses.	Hurricane	Moderate	Coast Chamber, Civic Organizations	Existing budget	2022	(Action 4.1.3 in previous plan) The city has worked with many local civic groups to prepare education and workshops for these groups to improve their knowledge of hazard risk. These efforts have been successful, but there are still many groups that could be targeted for this outreach, so the city will retain this action.
PEA-9	Work with appropriate agencies to identify high risk areas and distribute education information to residents and business owners.	Man-made Hazards	Moderate	City of D'Iberville	Existing budget	2022	(Action 1.1.1-M in previous plan) The city has worked with a number of agencies to identify high risk areas to man-made hazards and to inform citizens of these risks. However, this information has been somewhat limited in the past and so the city will continue its efforts to collect this information and push it out to citizens where needed.

City of Gulfport Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Continue participation in C-HOST Program.	Flood, Hurricane	High	Building Department	General budget	2022	(Action 4 in previous plan) The city has participated in CHOST to work with other communities in the region on cross-jurisdictional flood issues. The city would like to continue to participate in this program and so it will retain this action in the plan.
P-2	Conduct a feasibility study to mitigate sewer and water lines that cross streams.	Hurricane, Flood	Low	Public Works, Engineering	General funds	2018	(Action 12 in previous plan) The city has not had staff time to conduct a feasibility study to mitigate sewer and water lines that cross streams, but this is still something the city would like to do, so this action will be retained in the plan.
P-3	Require concurrence from all departments on projects through site plan.	All	High	Gulfport Building Department	General funds	2022	(Action 15 in previous plan) Although the city has worked on a number of projects where there has been concurrence from all departments, this has not been a requirement for implementation, so this action will be retained as the city continues to evaluate and pursue.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-4	Partner with the Land Trust for the Coastal Mississippi Plain to preserve open space.	Flood and Erosion	High	Land Trust for the Coastal Mississippi Plain	Land Trust secures grants and private funding	2022	(Action 22 in previous plan) The city has worked with the LTCMP on a number of open space preservation issues, but as development continues to take place, the city would like to continue its efforts to preserve open space in conjunction with the Trust.
P-5	Continue to implement drainage standard operating procedure.	Flood	High	Public Works Director	General funds	2022	(Action 25 in previous plan) The city has implemented its standard operating procedures for drainage over the past several years, but these standards will likely need to be reviewed in the coming years, so this action will be kept in the plan.
P-6	Implement maintenance program for storm water conveyance and detention structures dedicated to the city.	Flood	High	City Public Works Department	CDBG, CIAP	2022	(Action 26 in previous plan) The city has implemented a maintenance program for stormwater conveyance and detention structures, but this program will need to be reviewed and updated in the coming years, so this action will be kept in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Work with county to determine long-term solutions to flooding along the Flat Branch, Turkey Creek, and Brickyard Bayou.	Flood	High	Building Office	US Army Corps of Engineers, US Environmental Protection Agency, HMGP	2022	(Action 27 in previous plan) The city has been in coordination with the county on determining the best solution to these flooding issues, but these have not been fully addressed as there are still potential flooding issues, so the city will keep this action in the plan as it continues to pursue.
P-8	Improve/maintain CRS rating and the NFIP Program.	Flood	High	Building Official	General budget	2022	(Action 28 in previous plan) The city is a current participant in the CRS and has taken a number of actions to improve its rating in the program. However, there are still a number of actions the city could take to further improve its rating, so this action will be retained.
P-9	Become a Firewise Community.	Wildfire	High	Fire Department	MFC, general budget	2020	(Action 29 in previous plan) The city is not currently a Firewise community as there has not been staff time to develop this program, but this action will remain in place as the city continues to pursue this program.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-10	Continue to enforce the city burn ban.	Wildfire	High	City Fire Chief	Currently funds staff to implement	2022	(Action 30 in previous plan) The city has a burn ban ordinance that it enforces and it will continue to enforce this ban when needed. This burn ban may need to be reviewed going forward, so this action will remain in place.
P-11	Participate in local and statewide studies, workshops, and committees that address the all hazards prone to the Mississippi Coast.	All	High	Planning Department, Building Official, Emergency Manager	General budget	2022	(Action 33 in previous plan) The city has participated in a number of workshops over the past several years related to the Mississippi Coast, but as additional workshops and collaborative efforts come to light, there will be a continual need to participate in these activities, so this action will be retained.
P-12	Monitor water supply and establish conservation regulations.	Drought	Moderate	Public Works	General budget	2022	(Action 34 in previous plan) The city has monitored the water supply and established some conservation regulations, but there are still additional regulations that could be enacted and the city will look into these and review for viability going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-13	Update the city's Comprehensive Emergency Management Plan (CEMP).	All	High	Police/Fire Departments	Homeland Security, EMPG	2022	(Action 35 in previous plan) The city has updated its CEMP relatively recently, but there will be a need to update this plan again in the next 5 years, so this action will remain in place.
P-14	Update and implement the Master Drainage Plan.	Flood	High	City Engineer	General budget	2022	(Action 36 in previous plan) The city is currently working towards implementing many elements of the MDP, but this plan will need to be updated in the future, so this action will be kept in place.
P-15	Continue to enforce/improve, as needed, the city's ordinances and regulations for all hazards.	All	High	Gulfport Building Office	General funds	2022	(Action 37 in previous plan) The city has a number of ordinances in place to regulate related to hazards. However, a major focus is on flooding and the city would like to expand that focus, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-16	Enforce the city's substantial damage and substantial improvement rule.	Flood and Hurricane	High	Building Official	General funds	2022	(Action 38 in previous plan) The city has a substantial damage and substantial improvement rule that it has enforced. There are some ways that the city might improve these ordinances, possibly through cumulative approaches, and the city will evaluate the efficacy of these kind of improvements going forward. This action will remain in place.
P-17	Require non-conversion agreements for enclosures below the base flood elevation.	Hurricane and Flood	High	Building Official	General funds	2022	(Action 39 in previous plan) The city has not required non-conversion agreements for enclosures below the BFE due to lack of staff time to implement. This action will be retained as the city continues to pursue.
P-18	Integrate mitigation in to local planning.	All	High	Planning and Zoning	General budget	2019	(Action 40 in previous plan) The city has worked to integrate mitigation efforts into local planning and has done so successfully. However, as this plan has just been updated and new projects are on the horizon, the city will need to keep this action in place and integrate new elements.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-19	Conduct post-disaster Hazard Mitigation Committee meetings for declared events to assess the city's impacts to people and property.	All	High	Deputy Building Official and City Emergency Manager	General funds	2022	(Action 43 in previous plan) In the past, the city has conducted post-disaster HMC meetings to assess impacts to people and property. These meetings will need to be continually implemented post-disaster, so this action will remain in place.
P-20	Conduct annual reviews of the hazard mitigation and flood protection plan.	All	High	Deputy Building Office and City Emergency Manager	General funds	2017, Annually	(Action 44 in previous plan) The city has conducted annual reviews of the hazard mitigation and flood protection plans, but now that the plan has been recently updated, the city will need to continue to perform these reviews.
P-21	Pursue funding for mitigation actions.	All	High	Comptroller	General budget	2022	(Action 45 in previous plan) The city has pursued mitigation action funding through its local budget in several cases, but there are many potential projects that have not been funded yet, so the city will keep this action in place as it attempts to set aside more funding for mitigation projects in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-22	Continue to mitigate educate mosquito control procedures.	Infectious Disease	High	Public Affairs, Public Works	General budget	2022	(Action D in previous plan) The city has attempted to implement a number of mosquito control procedures to reduce the infectious diseases, but since the outbreak of several recent mosquito borne illnesses, the city may need to reevaluate its policy, so this action will be retained.
P-23	Develop a Commodity Flow Study.	Technological/ Man-made Hazards	High	Fire Department	HMGP	2018	(Action E in previous plan) The city has not yet developed a CFS due to lack of funding, but the city will continue to work towards implementing this action.
Property Protection							
PP-1	Storm proof new critical facilities and infrastructure.	All	High	Mayor and City Council	HMGP, CDBG	2022	(Action 5 in previous plan) The city has worked hard to try to storm proof new critical facilities and infrastructure as they are constructed, but this action will require vigilance to ensure it is implemented going forward so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-2	Retrofit existing critical facilities and infrastructure to be more resistant to all hazards.	All	High	City of Gulfport Comptroller	HMGP, CDBG	2022	(Action 6 in previous plan) Although many critical facilities and infrastructure have been retrofit to be more hazard resistant, there are still a number of critical facilities in the city that need to be retrofit, so this action will remain in the plan.
PP-3	Replace cable hung traffic signals with mast arm signals along major highways.	Hurricane, Severe Storm, Tornado	High	MDOT, FHWA	FHWA, CDBG	2022	(Action 7 in previous plan) There have been many places where cable hung traffic signals have been replaced by mast arms on major highways, but there are still a number of locations the city would like to make this change so this action will be retained in the plan.
PP-4	Relocate/retrofit Gulfport's south wastewater treatment plant.	Hurricane, Flood	High	City of Gulfport	HMGP, MDEQ, CDBG, restore/recovery programs	2019	(Action 8 in previous plan) The city has not had funding available to relocate/retrofit its south wastewater treatment plant to the degree that it would like, so this action will remain in the plan going forward.
PP-5	Complete the installation of Supervisory Control and Data Acquisition (SCADA) units.	All	High	Public Works Department	General funds	2018	(Action 9 in previous plan) The city is still working on installing the SCADA units, so this action will remain in the plan as the city tries to complete this project.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-6	Elevate/relocate bridges that provide access to neighborhoods to protect residents.	Flood, Hurricane	Moderate	Engineering	406, HMA, other federal/state transportation programs	2020	(Action 10 in previous plan) The city has elevate and relocated some bridges that provide access to neighborhoods, but there are still some areas where bridge improvements would help ensure better access in the event of a flood, so the city will continue to pursue this action going forward.
PP-7	Armor bridge approaches and abutments to prevent washouts.	Hurricane and Flood	Moderate	Mayor and City Council	406, HMA, other federal/state transportation programs	2022	(Action 11 in previous plan) Although the city has armored some bridge approaches and abutments, there are still several bridges that have not been addressed, so the city will attempt to address these in the future.
PP-8	Upgrade the North Wastewater Treatment Plan to eliminate need for the South Plant.	All	High	Public Works, Engineering; Harrison County Wastewater	HMGP, MDEQ, restore program	2022	(Action 13 in previous plan) The city has not made upgrades to the North Wastewater Treatment Plant to the degree that it will no longer need the South Plan due to lack of funding. As such, this action will remain in the plan.
PP-9	Retrofit city-owned piers/pavilions.	Hurricane, Flood, Severe Weather	Low	Public Works	HMGP, general funds	2022	(Action 14 in previous plan) In many cases, city-owned piers/pavilions have been retrofit to ensure stability, but there will be a constant need to make upgrades, so the city will keep this action in the plan going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-10	Promote elevation/acquisition activities to residents/commercial owners located in the Special Flood Hazard Area.	Hurricane and Flood	High	City of Gulfport Planning Department	FMA	2022	(Action 23 in previous plan) The city has worked with local property owners to implement elevation and acquisition projects in the SFHA, but there are still many potential properties that are located in these areas that have not been mitigated, so this action will remain in the plan.
PP-11	Create defensible space around structures and infrastructure.	Wildfire	High	Public Works	General funds	2022	(Action 31 in previous plan) The city has used defensible space strategies in a number of locations to try to protect structures and infrastructure, but the city would like to employ this strategy in several other locations as well, so this action will be retained in the plan.
PP-12	Install lightning grounding systems and lighting protection devices on critical sewer and water systems and city buildings.	Hurricane and All Severe Weather	Moderate	Public Works Department	General funds	2022	(Action 32 in previous plan) In some cases, the city has installed lightning grounding systems and lightning protection devices to protect critical infrastructure, but there are still many places where infrastructure is not protected with these systems, so this action will be retained in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Natural Resource Protection							
NRP-1	Support Harrison County's efforts to re-nourish the beach and implement beach protection measures.	Hurricane, Erosion, Flood	High	Harrison County Sand Beach Department and Board of Supervisors	Seawall Tax, local funds, funding through NOAA	2022	(Action 18 in previous plan) The city has worked with the county over the past several years to maintain and renourish the beach through beach protection measures. However, these efforts will need to be reviewed and evaluated to ensure proper actions are taking place going forward so this action will stay in place.
NRP-2	Support marsh restoration efforts.	Hurricane and Erosion	High	Harrison County Sand Beach	Tidelands funds, foundation funds, funding from NOAA, EPA, CIAP	2022	(Action 19 in previous plan) The city has been involved in and supportive of marsh restoration efforts to act as sinks for water. These efforts are important and the city will need to continue to find new areas to preserve marshes, so this action will remain in place.
NRP-3	Support the restoration of the barrier islands.	Hurricane, Erosion	High	Department of Marine Resources	Coastal Impact Assistance Program, Tidelands Funds	2022	(Action 20 in previous plan) The city has worked with county and state officials to support the restoration of barrier islands off the coast to act as protective buffers to storm surge and erosion. However, further efforts are likely needed to continue to protect these features, so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
NRP-4	Continue to enforce no wake zones and water speed limits.	Flood and Erosion	High	MDMR, Harrison County Sherriff, MDWFP	Not applicable	2022	(Action 21 in previous plan) The city currently works to enforce "no wake" zones and water speed limits which can help reduce erosion rates. These policies may need to be evaluated over the next 5 years to ensure they are still meeting an adequate standard, so this action will be retained.
Structural Projects							
SP-1	Promote/build detention ponds when appropriate.	Flood	High	Engineering Department	CDBG, included in new development funding	2022	(Action 16 in previous plan) In many cases when new construction is built, detention ponds have been constructed as part of these projects, but there is likely to still be further need to implement detention ponds in other locations in the city, so this action will remain in place.
SP-2	Upgrade drainage systems and culverts.	Flood	High	Engineering Department	HMGP, CDBG, CIAP funding, or as part of developer agreement	2022	(Action 24 in previous plan) Many drainage systems and culverts have been constructed throughout the city, but there is likely to still be further need to implement these projects in other locations in the city, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Emergency Services							
ES-1	Install severe weather warning systems across the city.	All Severe Weather, Tornado	Moderate	Mayor, City Council, Engineering	HMGP	2018	(Action 1 in previous plan) Although the city does have some severe weather warning systems in place, there is a need to enhance these systems to provide better warning of severe weather. This action will remain in the plan.
ES-2	Install electronic information alert signs over major evacuation routes to alert residents and travelers of threat conditions.	All	High	Mississippi Department of Transportation	FHWA	2018	(Action 2 in previous plan) The city has historically used electronic signs over evacuation routes to warn residents of impending threats. However, the city would also like to have additional sign capacity over more routes in order to increase the audience that receives these messages.
ES-3	Continue to work with CTA and other transportation providers to evacuate people that do not have transportation.	Hurricane and Flood	High	Harrison County, MEMA	FEMA	2022	(Action 3 in previous plan) The city has worked with CTA and other transportation providers to set up means of evacuation for those who do not have transportation. However, the city will need to continue to foster these and other new relationships to ensure there is adequate availability of transportation in the event of a disaster. This event will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-4	Secure generators for existing and new critical facilities and infrastructure.	All	High	City of Gulfport Comptroller, Public Works Director	HMGP	2022	(Action 17 in previous plan) A number of critical facilities and infrastructure have been set up with generators to maintain backup power, but there are many facilities that would benefit from backup power that do not have it, so this action will remain in the plan.
ES-5	Conduct annual first responder training for all hazards.	All	High	Emergency Manager	General funds	2017, Annual	(Action 41 in previous plan) The city has tried to ensure that annual first responder trainings for hazards take place regularly. The city would like to continue to try to implement this program and update/refine it where necessary so that all first responders are properly trained and up to date.
ES-6	Conduct annual NIMS training for first responders, city officials, and critical employees.	All	High	Fire and Police Departments	General budget	2017, Annual	(Action 42 in previous plan) Some of the city's employees, officials, and first responders have received NIMS training, but there are still a number who would benefit from this training and as new employees are hired, they will also need this training so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-7	Continue to participate with state and federal agencies in training and educational programs for technological, man-made, and health-related hazards.	Hazardous Materials, Infectious Disease	High	City Emergency Manager, key staff	General budget	2022	(Action B in previous plan) The city has participated in training with officials at a number of different levels of government to be involved in training and educational programs. There will be a constant need as conditions change to stay up to date by participating in these programs, so the city will keep this action in place.
Public Education and Awareness							
PEA-1	Establish and maintain a hazard preparedness link on the city's web page.	All	High	Public Affairs	General funds	2022	(Action 46 in previous plan) There is a hazard preparedness area on the city's web page, but this information will likely need to be updated during the next 5 years, so this action will be retained.
PEA-2	Promote workshops for emergency preparedness plans.	All	High	Emergency Manager	Undetermined	2022	(Action 47 in previous plan) The city has held some workshops for emergency preparedness plans, but the city has not reached as many people as it would like, so it will look towards enhancing ways to encourage citizens to develop these plans.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-3	Work with applicable agencies to identify high risk areas and distribute educational information.	Infectious Disease, Hazardous Materials	High	Emergency Manager, Public Affairs	MSDH, EMPG, Homeland Security, city general funds	2022	(Action A in previous plan) Although the city has worked with a number of agencies to use as repositories for information on hazard risk for citizens, the city would like to determine if there are other agencies that might also provide a good outlet for this and improve relations with those agencies that the city already works with. This action will remain in place.
PEA-4	Encourage the development of training and emergency planning for private companies that handle hazardous materials.	Hazardous Materials	High	Emergency Manager, Police and Fire Officials	General budget	2022	(Action C in previous plan) The city has not done a substantial amount of training and planning for private companies that handle hazardous materials due to staff time limitations, but the city would like to improve in this area, so this action will be retained.

City of Long Beach Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Implement a residential water metering program to monitor water usage and promote conservation and limit water usage during periods of severe drought.	Drought	Moderate	Public Works and Board of Alderman	CDBG	2022	(Action 2 in previous plan) The city has implemented a residential water metering program, but this policy/program may need to be re-evaluated going forward to ensure that it is being used as effectively as possible. This action will be retained.
P-2	Develop and enhance building codes.	All	Moderate	Building Official	General fund	2019	(Action 19 in previous plan) The city has developed and adopted a set of building codes to try to ensure people and property are protected in the face of hazards, however, there are many enhancements the city could make to ensure better protection and the city will review these codes in the future.
P-3	Participate as a member of CHOST to meet and discuss issues and solutions to flooding problems with neighboring jurisdictions.	Flood, Hurricane	Moderate	Building Official	General fund	2022	(Action 20 in previous plan) The city has worked with neighboring communities to try to solve multi-jurisdictional flood issues, but there are still a number of cross-jurisdictional issues that could be addressed to reduce flood problems, so the city will keep this action in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Property Protection							
PP-1	Acquisition of several repetitive loss properties located within the city limits of Long Beach.	Flood, Hurricane, Thunderstorm	Low	Civil Defense Coordinator and Building Official	HMGP or FMA	2022	(Action 3 in previous plan) The city has acquired some rep loss properties in the past, but there are still a number of properties that are repetitive loss in the city that the city will look at in terms of voluntary buyouts.
PP-2	Elevation projects including several residential structures located within the city limits of Long Beach that are below the current BFE requirements.	Flood, Hurricane, Thunderstorm	Moderate	Civil Defense Coordinator and Building Official	HMGP or FMA	2022	(Action 4 in previous plan) The city has implemented a number of elevation projects, but there are still many homes that need to be elevated above BFE and possibly above that level to provide additional protection, so this action will be retained.
PP-3	Reconstruction/rebuild of homes through grant funding and public assistance following flooding, tropical storms, and hurricanes.	Flood, Hurricane, Thunderstorm	Moderate	Civil Defense Coordinator and Building Official	HMGP and general fund	2022	(Action 5 in previous plan) The city has experienced a number of disasters that require rebuild of homes and have done so in a way that attempts to mitigate future losses. However, there are still many homes at risk and the city will continue to focus on addressing these homes through construction techniques going forward.
Natural Resource Protection							
NRP-1							

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Structural Projects							
SP-1	Gandy Circle drainage improvements.	Flood	Moderate	Board of Alderman	HMGP, PA, CDBG	2022	(Action 6 in previous plan) The Gandy Circle drainage improvements have not been constructed due to lack of funding, so this action will be retained in the plan.
SP-2	Royal Drive drainage improvements	Flood	Moderate	Board of Alderman	HMGP, PA, CDBG	2022	(Action 7 in previous plan) The Royal Drive drainage improvements have not been constructed due to lack of funding, so this action will be retained in the plan.
SP-3	Bear Creek drainage canal improvements from Douglas to USM to reshape and stabilize drainage channel.	Flood	Moderate	Board of Alderman	CDBG, PDM, HMGP	2022	(Action 8 in previous plan) Bear Creek drainage canal improvements have not been constructed due to lack of funding, so this action will be retained in the plan.
SP-4	Canal #1 drainage improvements to reshape and stabilize drainage canal.	Flood	Low	Board of Alderman and County Board of Supervisors	CDBG, PDM, HMGP	2022	(Action 9 in previous plan) Canal #1 drainage improvements have not been constructed due to lack of funding, so this action will be retained in the plan.
SP-5	Canal #1 bridge replacement. Commission Road Bridge is in poor condition. Timber piling and caps are deteriorating. Bridge should be replaced and channel widened to improve stormwater flow.	Erosion	Moderate	Board of Alderman	CDBG, HMGP	2022	(Action 10 in previous plan) Canal #1 bridge replacement and channel widening have not been constructed due to lack of funding, so this action will be retained in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-6	Gates Avenue drainage outfall needs small, inadequate culverts to be improved.	Flood	Moderate	Board of Alderman	CDBG, PDM, HMGP	2022	(Action 11 in previous plan) Gates Avenue culverts have not been improved due to lack of funding, so this action will be retained in the plan.
SP-7	Long Beach Harbor "issues" improvements including bank stabilization and bulkhead replacement.	Erosion	Moderate	Board of Alderman and Port Commission	CDBG, Tidelands, PA, HMGP	2022	(Action 12 in previous plan) Long Beach Harbor improvements have not been constructed due to lack of funding, so this action will be retained in the plan.
SP-8	Turkey Creek drainage reservoir to retain flood waters and eliminate flooding.	Flood	Low	Board of Alderman and neighboring jurisdictions	FEMA	2022	(Action 13 in previous plan) Turkey Creek drainage reservoir has not been constructed due to lack of funding, so this action will be retained in the plan.
SP-9	Commission Road drainage improvements.	Flood	Low	Board of Alderman	CDBG, PDM, PA, HMGP	2022	(Action 14 in previous plan) Commission Road drainage improvements have not been constructed due to lack of funding, so this action will be retained in the plan.
SP-10	Citywide drainage canal improvements including reshaping and stabilizing drainage canals throughout the city. (St. Augustine, Green Acres Ditch). Install rip rap/reslope and stabilize.	Flood	Moderate	Board of Alderman	CDBG, PDM, PA, HMGP	2022	(Action 15 in previous plan) Citywide canal drainage improvements have not been constructed due to lack of funding, so this action will be retained in the plan.
SP-11	Construct new water tower and tank to eliminate low water pressure issues and poor water quality during periods of Drought.	Drought	Low	Board of Alderman	FEMA	2022	(Action 16 in previous plan) A new water tower and tank have not been constructed due to lack of funding, so this action will be retained in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-12	Construct new water well to eliminate low water pressure issues and poor water quality during periods of drought.	Drought	Low	Board of Alderman	FEMA	2022	(Action 17 in previous plan) A new water well has not been constructed due to lack of funding, so this action will be retained in the plan.
Emergency Services							
ES-1	Install warning sirens to notify citizens of threatening weather or man-made hazards.	All	High	Fire and Police Departments	HMGP	2022	(Action 1 in previous plan) Warning sirens have not been installed due to lack of funding, so this action will remain in the plan.
Public Education and Awareness							
PEA-1	Maintain and enhance website to inform residents of hazards and preparation.	All	Moderate	Building Code Office	General fund	2020	(Action 18 in previous plan) The city has developed a website to enhance public education and awareness of hazards. However, this will need to be reviewed and updated in the coming years to ensure information is up to date, so this action will be retained.

City of Pass Christian Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Enhance the city's Continuity Plan to ensure that emergency operations can function and that day-to-day management of the city can be back on track as soon as possible after an emergency.	All	High	Fire and Police Departments	Emergency operations budget	2022	The city has developed a Continuity Plan, but there are many ways that it may be enhanced that have not been implemented yet, so the city will keep this action in place.
P-2	Incorporate the Pass Christian hazard Mitigation Plan into the city's Comprehensive Plan and other strategic planning processes.	All	High	Board of Alderman, Planning Commission	City budget	2022	The city has worked over the past several years to incorporate the hazard mitigation plan into the city's comprehensive plan, but since there has been a recent update to this plan, the city will need to update the comprehensive plan accordingly.
P-3	Develop and implement a Capital Improvement Plan (CIP) for the City of Pass Christian.	All	Moderate	Public Works Department	PDM Grant, FEMA	2022	The city has not implemented a formal CIP, but it has implemented a number of capital improvement projects. The city will keep this action in place as it continues to try to develop a more formal plan.
Property Protection							
PP-1							

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Natural Resource Protection							
NRP-1	Work with the Harrison County Sand Beach Authority to continue maintaining the beach and seawall to allow them to continue to serve their function of mitigating wave and flooding action to protect U.S. Highway 90.	Flood, Hurricane	Moderate	Harrison County Sand Beach Authority	Mississippi Coastal Improvement Program, U.S. Army Corps of Engineers	2022	The city has worked with the county to ensure the protection of the beach and seawall to provide protection to the community and mitigate flooding. The city will continue to work with the county going forward on this action, so this will remain in the plan.
NRP-2	Preserve and protect trees and vegetation on uninhabited properties to improve natural stormwater management and flood control processes.	Flood	Moderate	Public Works Department	City budget	2022	The city has preserved and protected trees and other forms of vegetation to attempt to improve natural stormwater infiltration and recycle. However, as development continues to occur in the city, this action will take further importance, so this action will remain in the plan.
NRP-3	Work with the Harrison County Sand Beach Authority to continue dune propagation in areas along the beach where the seawall is below 10 foot in elevation.	Hurricane, Flood	Low	Harrison County Sand Beach Authority	Harrison County Sand Beach Authority	2022	The city has worked with the county to use dune propagation in areas along the beach where the seawall is below 10 feet. However, this action requires consistent evaluation to ensure the proper steps are being taken, so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Structural Projects							
SP-1	Build a new drinking water well in area less prone to flooding.	Flood	High	Water Department	Water Department, water usage fees	2022	The city has not yet built a new drinking water well, but it will continue to look into implementing this action in the future.
SP-2	Continue the city's efforts to upgrade drainage facilities.	Flood	High	Fire and Police Departments	PDM Grant, FEMA	2022	The city has updated a number of drainage facilities, but there are still many drainage projects that the city is looking to implement, so it will retain this action in the plan.
SP-3	Develop a new east/west roadway connecting Menge and Easpy Avenues.	All	Moderate	Public Works Department, Harrison County	Public Works Department, Harrison County	2022	The city has not yet developed a new east/west roadway connecting these roads, so this action will be retained going forward.
SP-4	Improve the north/south roadway access in western Pass Christian.	All	Moderate	Public Works Department, Harrison County	Public Works Department, Harrison County	2022	Improvements to the north/south roadway access have not been made, so this action will be retained going forward.
SP-5	Improve drainage through incorporating additional storm sewer improvements on roads that were not upgraded after the storm.	Flood	Moderate	Public Works Department, Harrison County	Public Works Department, Harrison County	2022	A number of roads still have not been upgraded through drainage improvements to stormwater management so the city will keep this action in the plan as it continues to pursue.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Emergency Services							
ES-1	Implement an early warning network to alert citizens to oncoming hazards.	All	High	Fire and Police Departments	PDM Grant, FEMA	2022	Although there is a network in place to provide early warning to citizens, there are many technologies and systems that could be implemented to improve the current system, so this action will be retained.
ES-2	Upgrade fire protection through acquisition of a new fire truck capable of reaching new elevated buildings and construct a fire station large enough to accommodate it.	Wildfire	High	Fire and Police Department	PDM Grant, FEMA	2022	The city has not purchased a new fire truck with these capabilities nor constructed a corresponding fire station. Therefore, this action will be retained in the plan.
Public Education and Awareness							
PEA-1	Create a partnership to assist with development of Family Disaster Plans.	All	High	Fire and Police Departments	Emergency operations budget	2022	The city has worked to encourage the development of Family Disaster Plans, but there are still many families without these plans, so the city will continue to pursue this action.
PEA-2	Establish and implement a public education and outreach program focused on hurricane evacuation procedures.	All	High	Fire and Police Departments	Emergency operations budget	2022	The city has done a good bit of outreach related to hurricane evacuation procedures, but there are still many citizens who are not fully aware of the steps they need to take and so further education is needed.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-3	Reach out to at-risk and vulnerable families through programs aimed at local schools and youth programs.	All	Moderate	Pass Christian Schools	Pass Christian Schools	2022	The city has done some outreach to vulnerable families through local school programs, but these programs have not reached as many families as the city would like, so this action will be retained in the plan.
PEA-4	Educate residents on their part in managing stormwater and reducing flooding through better disposal practices.	Flood	Moderate	Buildings Department	City budget	2022	Many residents are aware of stormwater management and disposal techniques, but this is still an issue many others are not as informed about, so the city will continue to try to push for more education of citizens.
PEA-5	Continue to teach floodplain management curriculum in Pass Christian High School science classes.	Flood	Low	Pass Christian Schools	Pass Christian Schools	2022	There is a floodplain management curriculum at the high school, but this program will need to be reviewed and updated according to the latest information that is available about floodplain management. The city will look into this program and work with the school to make improvements.
PEA-6	Provide education and outreach materials at local public functions and through direct mail-outs.	All	Low	Buildings Department	Buildings Department	2022	Education materials have been sent out in direct mailings to address many issues, but these mailings will still need to be sent out to keep new residents informed and to keep existing residents up to date on hazard risk. This action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-7	Work with the Gulf Coast Community Action Agency to provide one-to-one outreach on preparedness and risk to low-income residents.	All	Low	Buildings Department	Buildings Department	2022	The city has worked with GCCAA to help provide one on one outreach to low income residents where possible. However, this program has not reached all of its target audience so this action will remain in the plan as the city continues to pursue.
PEA-8	Continue participation in the Gulf Coast Homeowner's Show and other "trade" shows to provide mitigation and preparedness information to the public.	All	Low	Buildings Department	Building Departments	2022	The city has participated in a number of trade shows and public events to try to get information out to citizens and builders in the community. This program has been successful in many ways and will need to be continued to get maximum effect. This action will be retained in the plan.

ANNEX D
JACKSON COUNTY

This annex includes jurisdiction-specific information for Jackson County and its participating municipalities. It consists of the following five subsections:

- ❑ D.1 Jackson County Community Profile
- ❑ D.2 Jackson County Risk Assessment
- ❑ D.3 Jackson County Vulnerability Assessment
- ❑ D.4 Jackson County Capability Assessment
- ❑ D.5 Jackson County Mitigation Strategy

D.1 JACKSON COUNTY COMMUNITY PROFILE

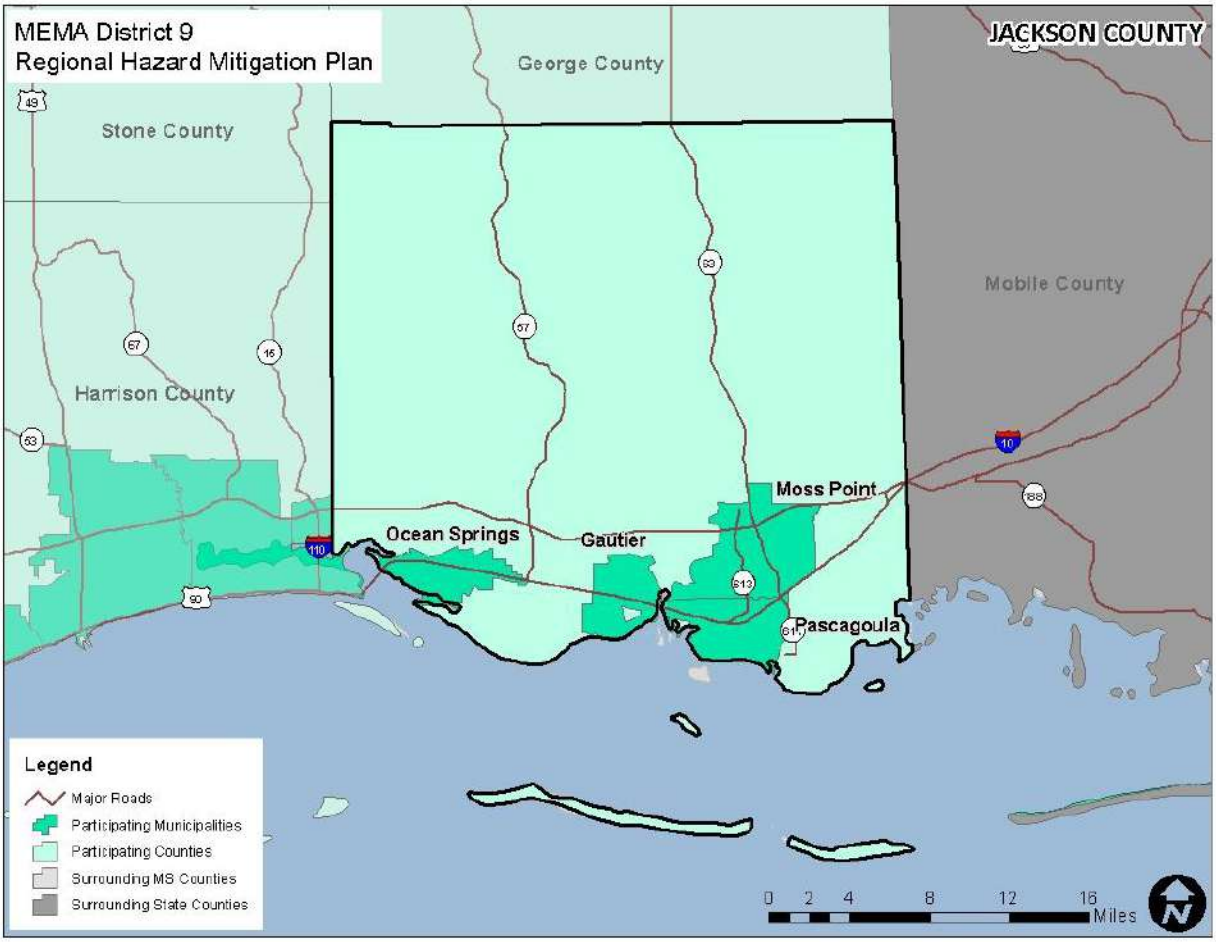
D.1.1 Geography and the Environment

Jackson County is located on the Mississippi coast. It comprises four cities, Gautier, Moss Point, Ocean Springs, and Pascagoula, as well as many small unincorporated communities. An orientation map is provided as **Figure D.1**.

Jackson County is situated in the East Gulf Coastal Plain. It is made up of the gently rolling Pine Belt, also known as the "Piney Woods," and the coastal area called the Coastal Meadows or Terrace. The region has generally low topographic elevations and extensive tracts of marshy land. There are many rivers, creeks, bayous, and other natural drainage networks in the region which empty into the Gulf of Mexico. The total area of the county is 1,043 square miles, 321 square miles of which is water area.

Jackson County enjoys four distinct seasons but the climate in the region is generally hot and humid compared to the rest of the United States given its latitude and location along the Gulf Coast. Precipitation is generally highest in winter months when the temperatures are moderately lower, but the likelihood of precipitation remains relatively constant throughout the year. Snowfall is rare but does occur. Summers in the region can become fairly hot with average highs in the nineties and lows in the seventies. The region is also often susceptible to turbulent weather when warm, wet air from the Gulf of Mexico is pushed up into the region to mix with cooler air coming down from across the continent which can result in severe weather conditions. This is particularly true in the spring when seasons are changing and diverse weather patterns interact. The region is also subject to hurricanes and tropical storms from June to October.

FIGURE D.1: JACKSON COUNTY ORIENTATION MAP



D.1.2 Population and Demographics

According to the 2010 Census, Jackson County has a population of 139,668 people. The county has seen an increase in population between 2000 and 2010, however two municipalities have experienced decline. The population density is 193 people per square mile. Population counts from the U.S. Census Bureau for 1990, 2000, and 2010 for the county and participating jurisdictions are presented in **Table D.1**.

TABLE D.1: POPULATION COUNTS FOR JACKSON COUNTY

Jurisdiction	1990 Census Population	2000 Census Population	2010 Census Population	% Change 2000-2010
Jackson County	**115,243**	**131,420**	**139,668**	**6.3%**
Gautier	10,088	11,681	18,572	59.0%
Moss Point	17,837	15,851	13,704	-13.5%
Ocean Springs	14,658	17,225	17,442	1.3%
Pascagoula	25,899	26,200	22,392	-14.5%

Source: United States Census Bureau, 1990, 2000, 2010 Census

Based on the 2010 Census, the median age of residents of Jackson County is 37.2 years. The racial characteristics of the county are presented in **Table D.2**. Whites make up the majority of the population in the county, accounting for about 72 percent of the population, however the City of Moss Point has a majority black population.

TABLE D.2: DEMOGRAPHICS OF JACKSON COUNTY

Jurisdiction	White, Percent (2010)	Black or African American, Percent (2010)	American Indian or Alaska Native, Percent (2010)	Asian, Percent (2010)	Native Hawaiian or Other Pacific Islander, Percent (2010)	Other Race, Percent (2010)	Two or More Races, percent (2010)	Persons of Hispanic Origin, Percent (2010)*
Jackson County	**72.1%**	**21.5%**	**0.4%**	**2.2%**	**0.1%**	**1.9%**	**1.9%**	**4.6%**
Gautier	61.1%	32.4%	0.5%	1.5%	0.0%	2.2%	2.2%	5.3%
Moss Point	23.9%	73.6%	0.2%	0.4%	0.0%	0.8%	1.1%	1.9%
Ocean Springs	85.4%	7.4%	0.4%	3.1%	0.1%	1.3%	2.2%	4.2%
Pascagoula	58.8%	32.7%	0.3%	1.0%	0.1%	5.4%	1.7%	11.0%

*Hispanics may be of any race, so also are included in applicable race categories
Source: United States Census Bureau, 2010 Census

D.1.3 Housing

According to the 2010 US Census, there are 60,067 housing units in Jackson County, the majority of which are single family homes or mobile homes. Housing information for the county and four municipalities is presented in **Table D.3**. As shown in the table, there is a low percentages of seasonal housing units throughout the county.

TABLE D.3: HOUSING CHARACTERISTICS OF JACKSON COUNTY

Jurisdiction	Housing Units (2000)	Housing Units (2010)	Seasonal Units, Percent (2010)	Median Home Value (2011-2015)
Jackson County	**51,678**	**60,067**	**1.7%**	**$121,200**
Gautier	4,597	8,047	2.4%	$114,500
Moss Point	6,237	6,194	0.6%	$86,900
Ocean Springs	7,072	7,814	1.8%	$146,800
Pascagoula	3,351	10,224	0.7%	$104,400

Source: United States Census Bureau, 2000 and 2010 Census, 2011-2015 American Community Survey 5-Year Estimates

D.1.4 Infrastructure

TRANSPORTATION

In Jackson County, Interstate 10 and U.S. Highway 90 run east to west allowing transportation in southern half of the county. Mississippi Highway 63 and 57 run north-south through Jackson County.

The Trent Lott International Airport and the Ocean Springs Airport are a general aviation and public-use airport, respectively, which are located in Jackson County. The Gulfport-Biloxi International Airport,

located in Harrison County, also serves the county. This airport is served by three major airlines with direct flights to Atlanta, Charlotte, Dallas/Ft. Worth, and Houston as well as connections to hundreds of locations in the U.S. and worldwide.

In terms of other transportation services, Port of Pascagoula operates within the county, connecting it to national and global markets. One Class-I Major and one Class-III Local railways also serve the county.

UTILITIES

Electrical power in Jackson County is mainly provided by electric power associations. Mississippi Power Company also provides power to some parts of the county.

There are two private and municipal natural gas suppliers that serve Jackson County. These include CenterPoint Energy Resources and the City of Pascagoula.

Water and sewer service is provided by a number of different sources including several of the participating cities and the county, but unincorporated areas often rely on septic systems and wells in Jackson County.

COMMUNITY FACILITIES

There are a number of buildings and community facilities located throughout Jackson County. According to the data collected for the vulnerability assessment (Section 6.4.1), there are 5 communications facilities, 3 emergency operations centers (EOCs), 45 fire stations, 4 medical facilities, 8 police stations, 1 power/gas facility, 20 private/non-profit facilities, 50 public facilities, 75 schools, 7 shelters, 27 special populations facilities, 3 transportation facilities, and 25 water/wastewater facilities located within the county.

There are two hospitals located in Jackson County. These include Singing River Hospital in Pascagoula and Ocean Springs Hospital in Ocean Springs. There are also additional medical care facilities located in the county as outlined in the vulnerability assessment (Section 6.4.1).

Jackson County contains numerous local, state, and national parks and recreation areas, including the Gulf Islands National Seashore, Mississippi Gulf Coast National Heritage Area, DeSoto National Forest, and Shepard State Park. Golf courses and resorts, recreational and sports fishing, gamming and casinos, and sand beaches are abundant in the county.

D.1.5 Land Use

Many areas of Jackson County are undeveloped or sparsely developed. There are several incorporated municipalities located along the coast. Coastal land use patterns radiate from city centers and commercial land uses are located in central business districts and highway strips, with surrounding housing that becomes progressively large in lot size and floor area with distance from the central business districts. Residential and non-residential densities are generally low, and concentrated mix of uses are infrequent, creating an auto-oriented land use pattern along the coast. Upland land use patterns differ markedly from the coastal plain. There are only a few municipalities and unincorporated rural centers. There is a mix of protected lands, such as the DeSoto National Forest and several National Wildlife Refuges. Private lands

are used for exurban housing, agriculture, and forestry. Consistent with its rural character, densities are very low and uses are not mixed, making motor vehicles the only viable mode for virtually all travel.

Local land use and associated regulations are further discussed in *Section 7: Capability Assessment.*

D.1.6 Employment and Industry

According to the 2011 to 2015 American Community Survey (ACS) 5-year estimates, in 2015, Jackson County had an average annual employment of 58,824 workers and an average unemployment rate of 9.1 percent (compared to 10.3 percent for the state). In 2015, the Educational Services, and Health Care and Social Assistance industry employed 20.2 percent of the workforce. Manufacturing was the second largest industry, employing 18.8 percent of workers, followed by Arts, Entertainment, and Recreation, and Accommodation and Food Services (15.4%) and Retail Trade (10.6%). In 2015, the average annual median household income in Jackson County was $48,406 compared to $39,665 in the state of Mississippi.

D.2 JACKSON COUNTY RISK ASSESSMENT

This subsection includes hazard profiles for each of the significant hazards identified in Section 4: *Hazard Identification* as they pertain to Jackson County. Each hazard profile includes a description of the hazard's location and extent, notable historical occurrences, and the probability of future occurrences. Additional information can be found in Section 5: *Hazard Profiles*.

FLOOD-RELATED HAZARDS

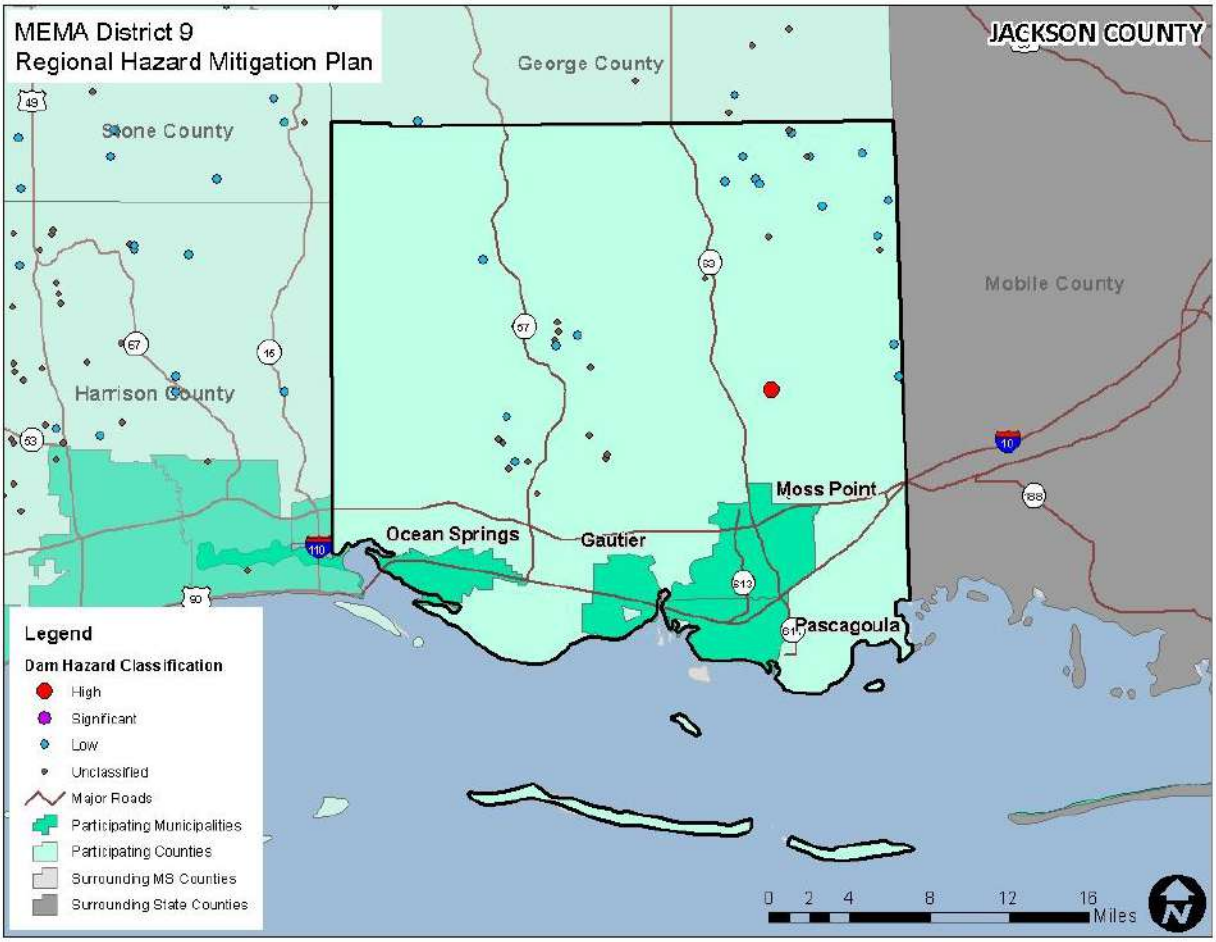
D.2.1 Dam and Levee Failure

LOCATION AND SPATIAL EXTENT

According to the Mississippi Department of Environmental Quality, there is one high hazard dam in Jackson County.[1] **Figure D.2** and **Figure D.3** show the location of this high hazard dam as well as mapped dam inundation areas, and **Table D.4** lists it by name.

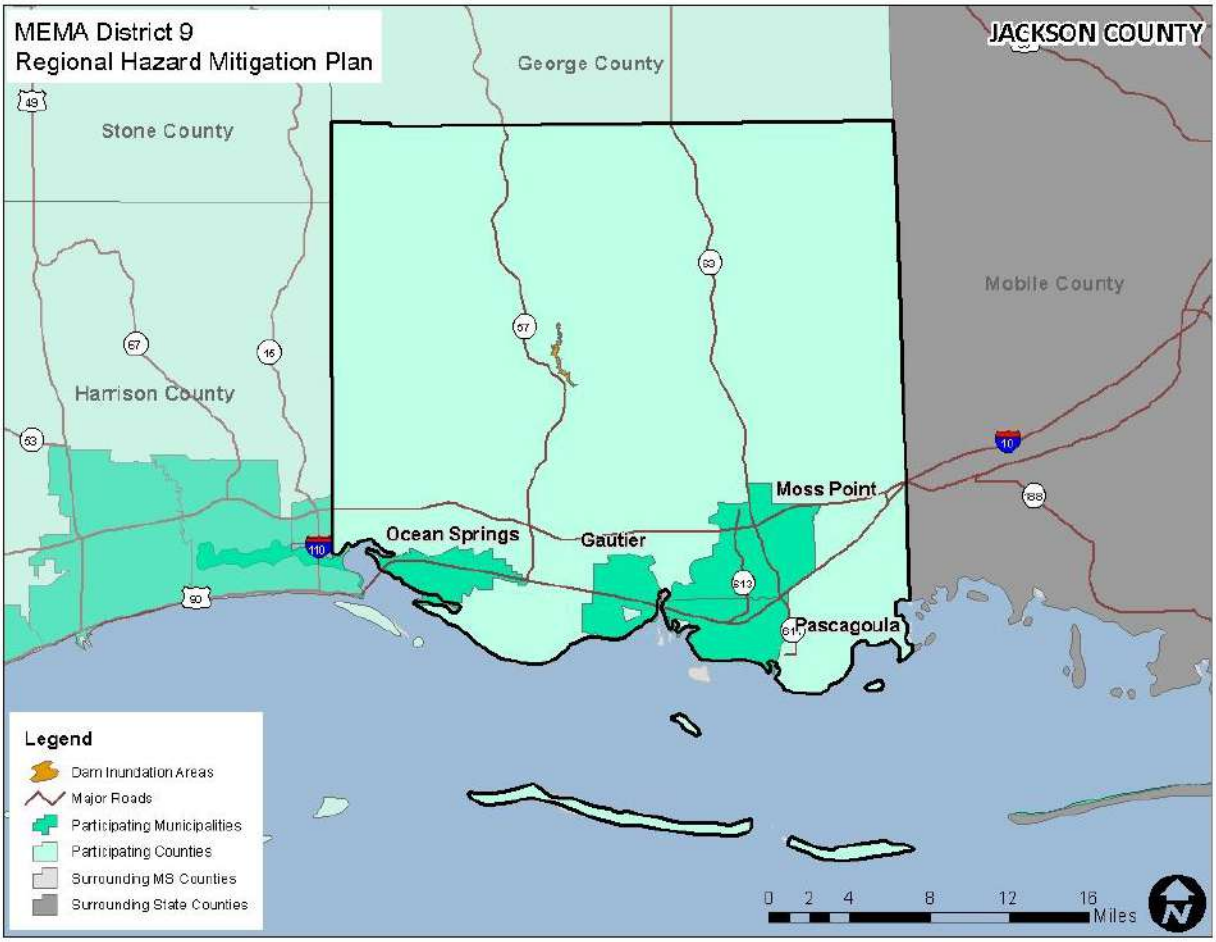
[1] The list of high hazard dams obtained from the Mississippi Department of Environmental Quality was reviewed and amended by local officials to the best of their knowledge.

FIGURE D.2: JACKSON COUNTY HIGH HAZARD DAM LOCATIONS



Source: Mississippi Department of Environmental Quality

FIGURE D.3: JACKSON COUNTY DAM INUNDATION AREAS



Source: Mississippi Department of Environmental Quality

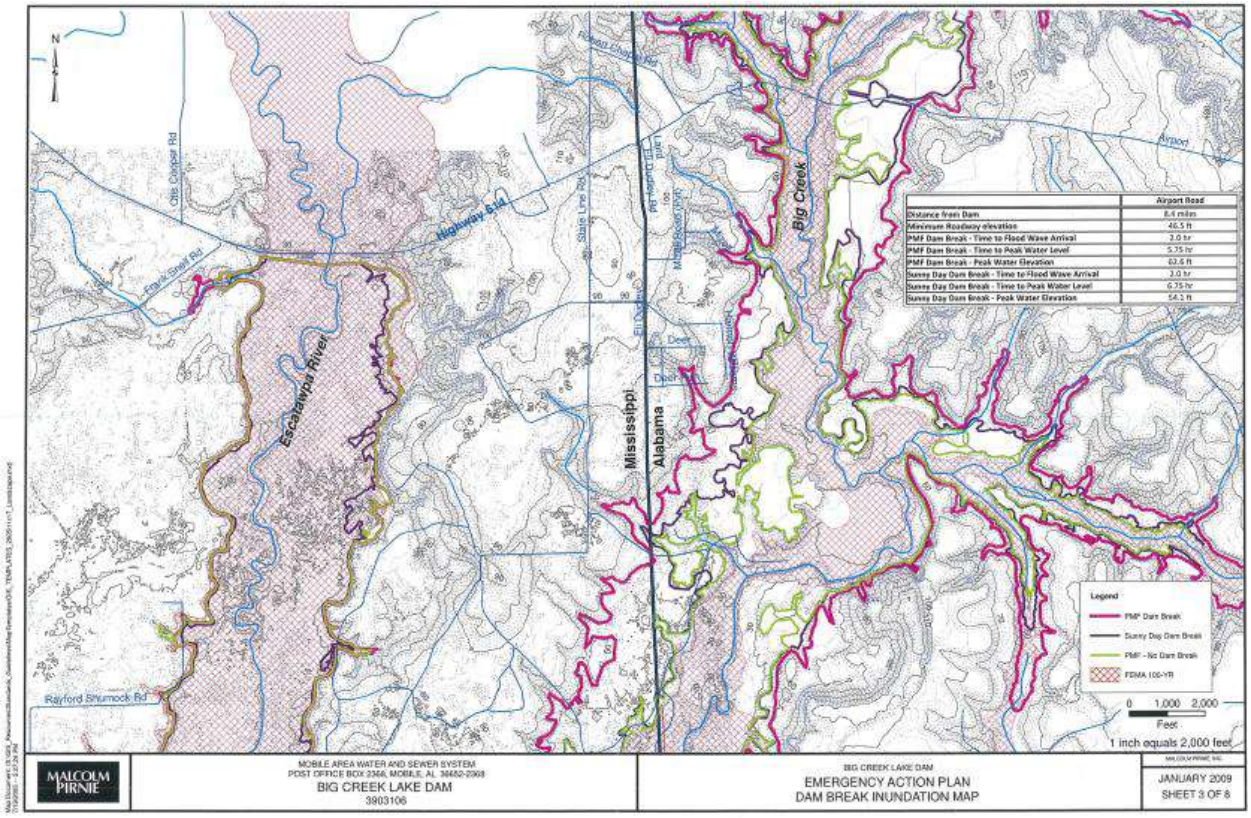
TABLE D.4: JACKSON COUNTY HIGH HAZARD DAMS

Dam Name	Hazard Potential
Jackson County	
BLACK CREEK COOLING WATER DAM	High

Source: Mississippi Department of Environmental Quality

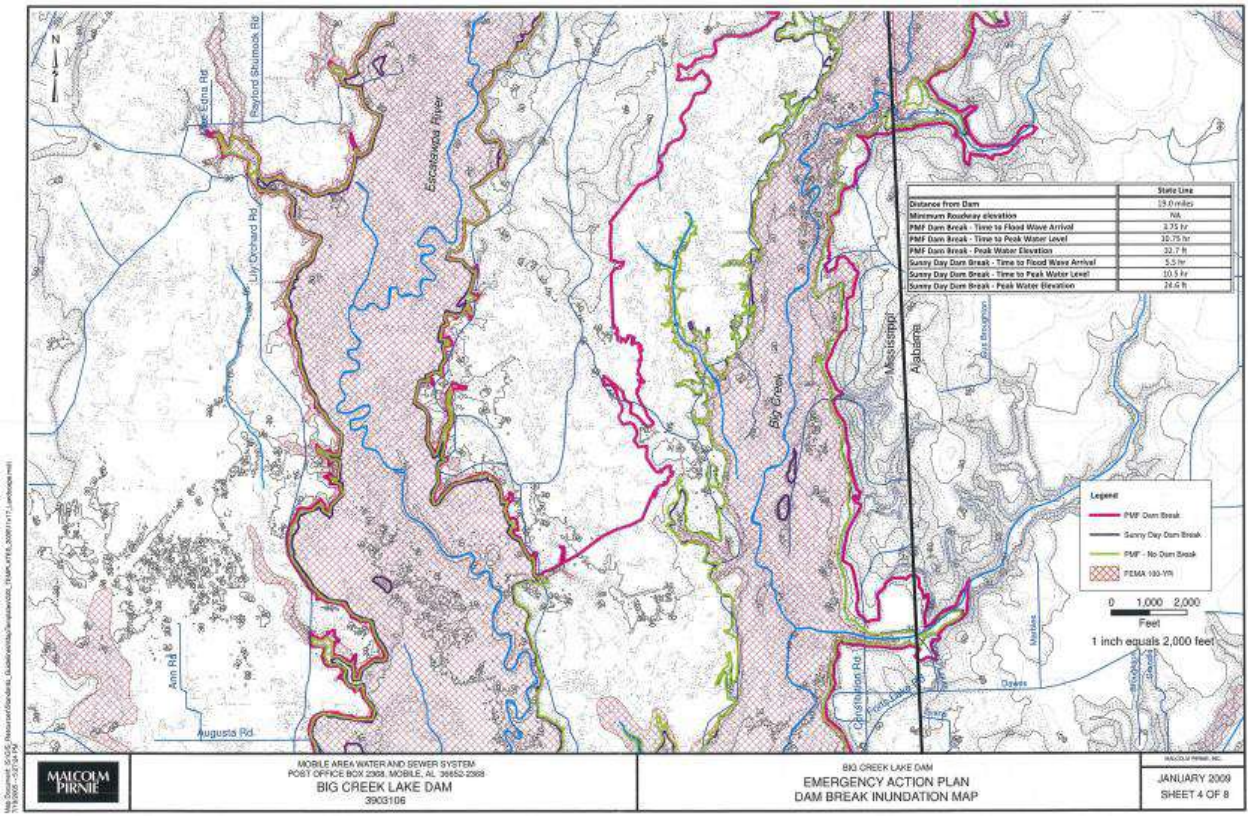
Additionally, although it is technically outside the State of Mississippi, the Big Creek Lake Dam in Alabama poses a potential risk to some areas in eastern Jackson County and has been identified as the greatest threat in terms of dam failure in the county. The Emergency Action Plan for this dam provides probable maximum flood areas in both Alabama and Mississippi, demonstrating potential areas at risk in several scenarios including dam break, sunny day dam break, and no dam break. This mapping is found in **Figure D.4**, **Figure D.5**, **Figure D.6**, **Figure D.7**, **Figure D.8**, and **Figure D.9.**

FIGURE D.4: BIG CREEK LAKE DAM FAILURE SCENARIOS



Source: Big Creek Lake Dam Emergency Action Plan

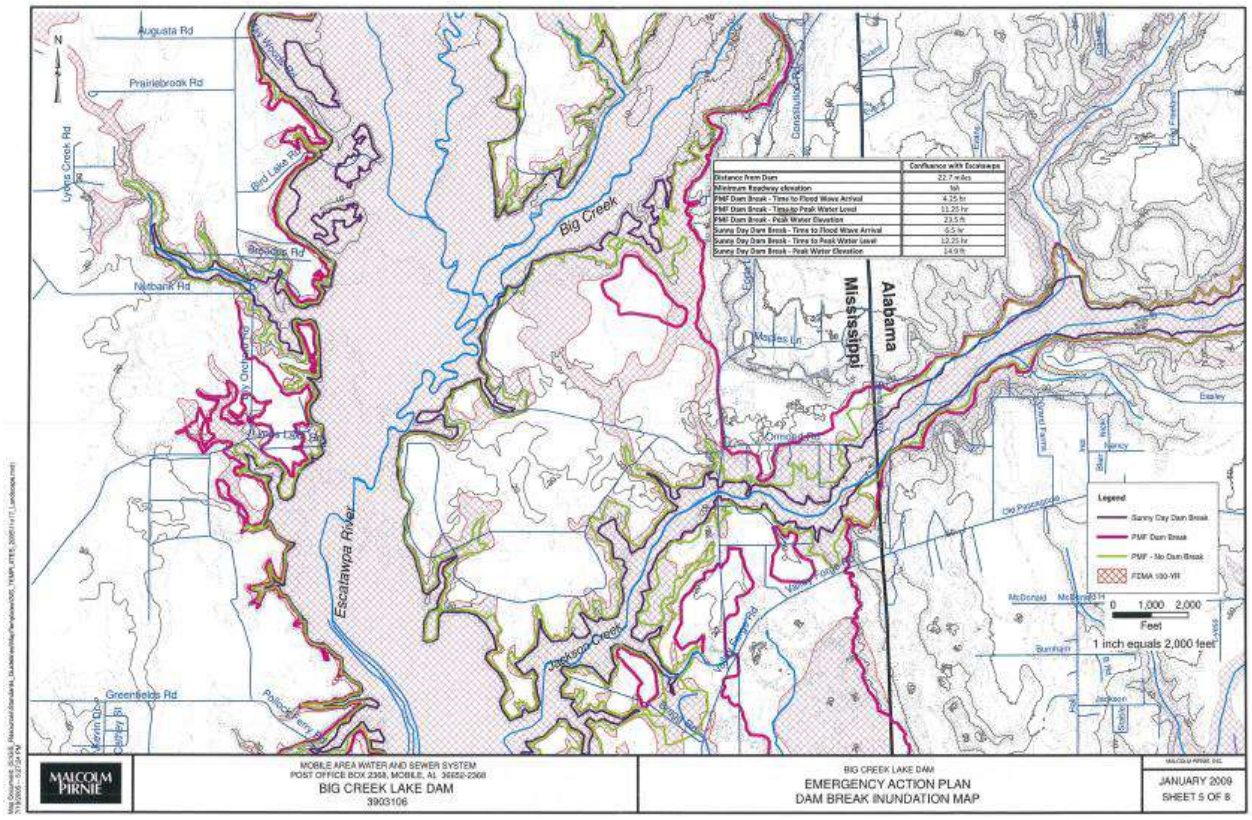
FIGURE D.5: BIG CREEK LAKE DAM FAILURE SCENARIOS



	State Line
Distance from Dam	19.0 miles
Minimum Roadway elevation	NA
PMF Dam Break - Time to Flood Wave Arrival	3.75 hr
PMF Dam Break - Time to Peak Water Level	10.75 hr
PMF Dam Break - Peak Water Elevation	32.7 ft
Sunny Day Dam Break - Time to Flood Wave Arrival	5.5 hr
Sunny Day Dam Break - Time to Peak Water Level	10.5 hr
Sunny Day Dam Break - Peak Water Elevation	24.6 ft

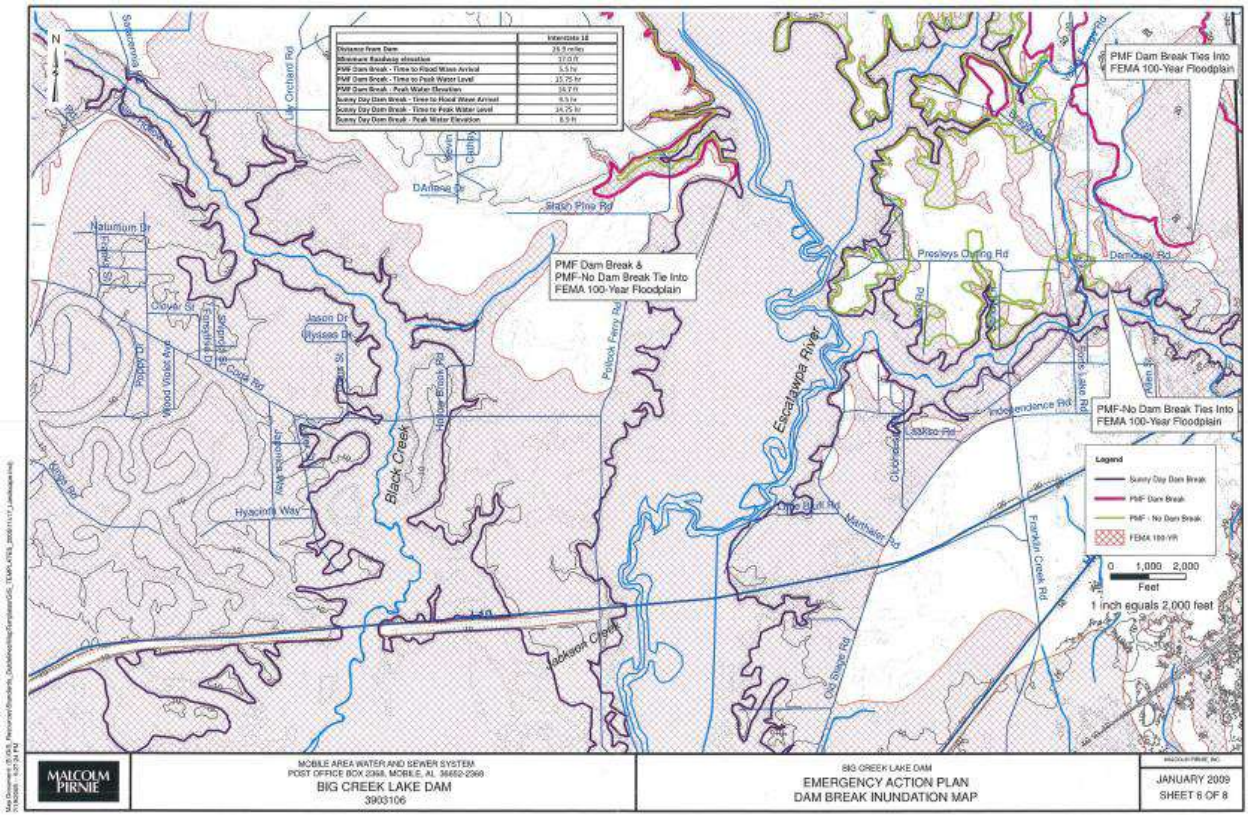
Source: Big Creek Lake Dam Emergency Action Plan

FIGURE D.6: BIG CREEK LAKE DAM FAILURE SCENARIOS



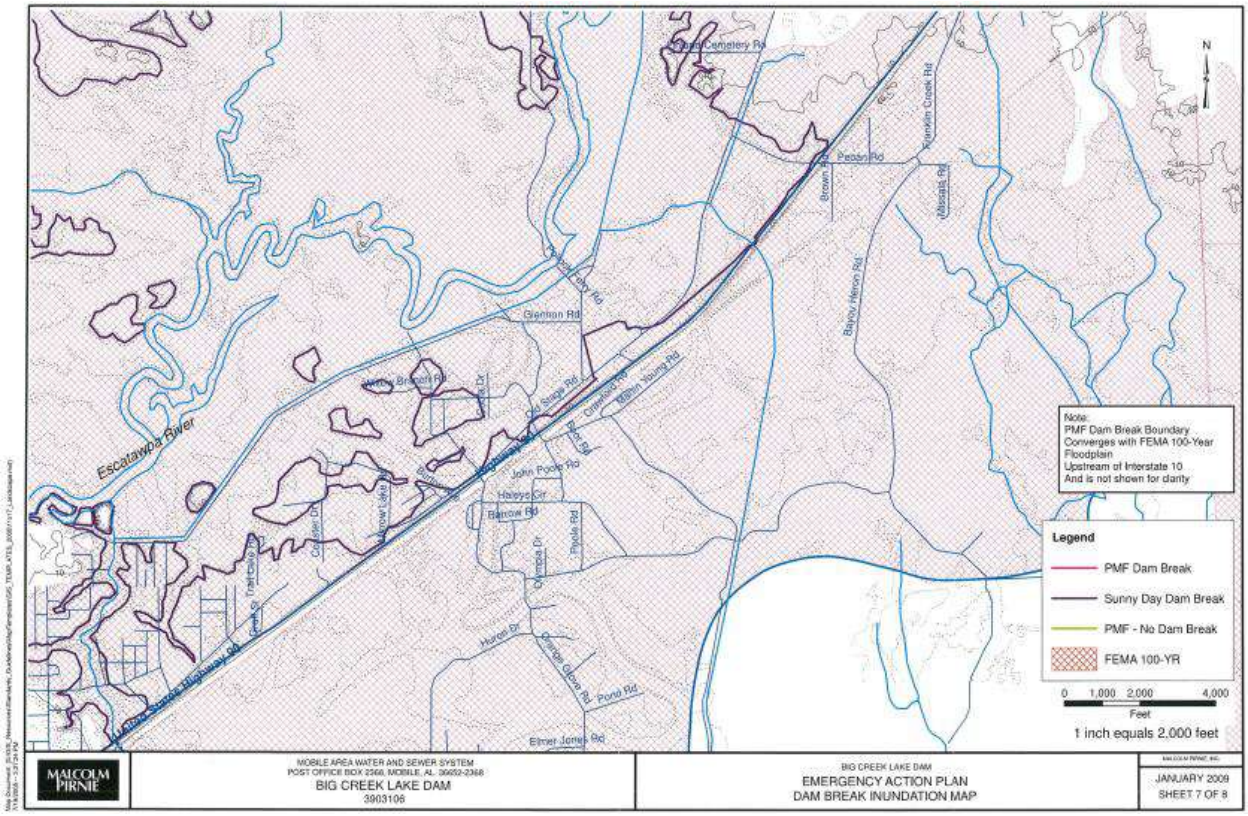
Source: Big Creek Lake Dam Emergency Action Plan

FIGURE D.7: BIG CREEK LAKE DAM FAILURE SCENARIOS



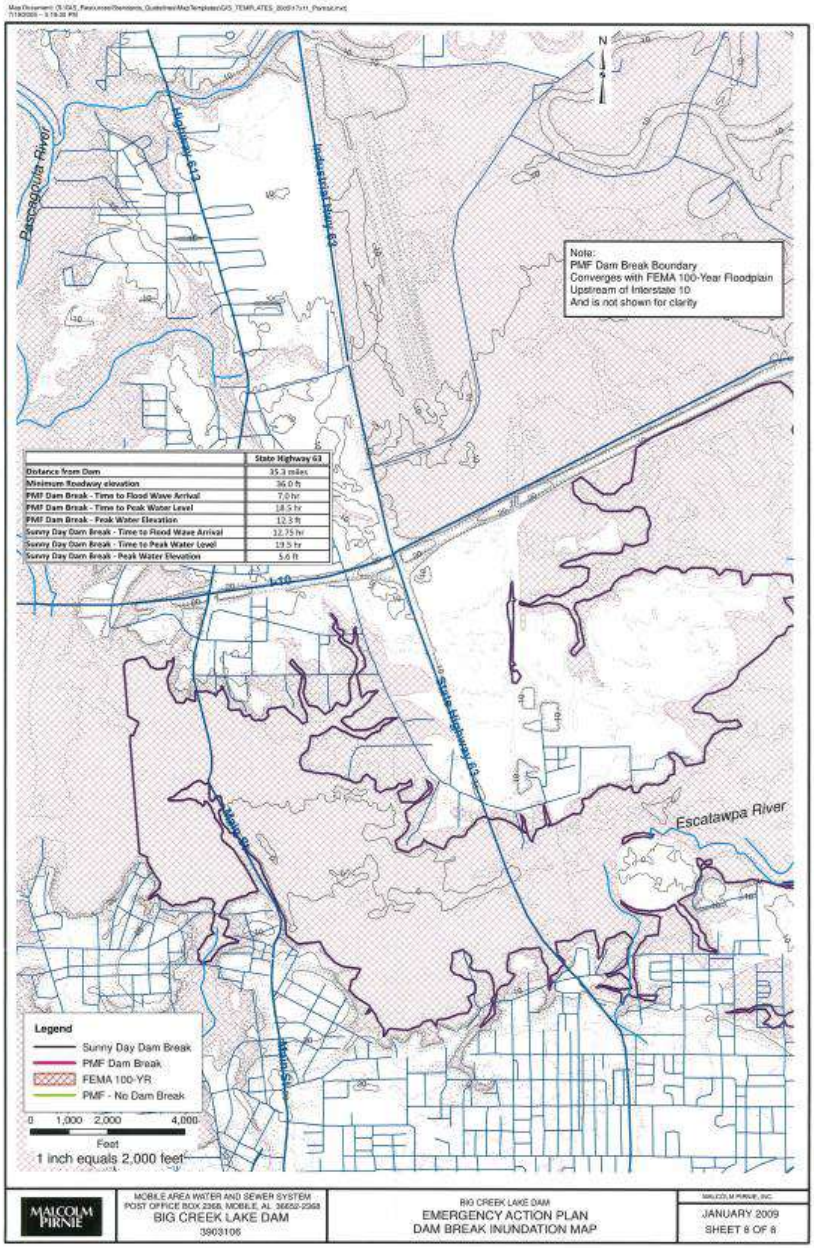
Source: Big Creek Lake Dam Emergency Action Plan

FIGURE D.8: BIG CREEK LAKE DAM FAILURE SCENARIOS



Source: Big Creek Lake Dam Emergency Action Plan

FIGURE D.9: BIG CREEK LAKE DAM FAILURE SCENARIOS



Source: Big Creek Lake Dam Emergency Action Plan

HISTORICAL OCCURRENCES

According to the Mississippi State Hazard Mitigation Plan, there have been no dam failures reported in Jackson County (**Table D.5)**. However, several breach scenarios in the region could be catastrophic.

TABLE D.5: JACKSON COUNTY DAM FAILURES (1982-2012)

Date	County	Structure Name	Cause of Failure
None reported	Jackson	--	--

Source: Mississippi State Hazard Mitigation Plan

PROBABILITY OF FUTURE OCCURRENCES

Given the current dam inventory and historic data, a dam breach is possible (between 1 and 10 percent annual probability) in the future. However, as has been demonstrated in the past, regular monitoring is necessary to prevent these events.

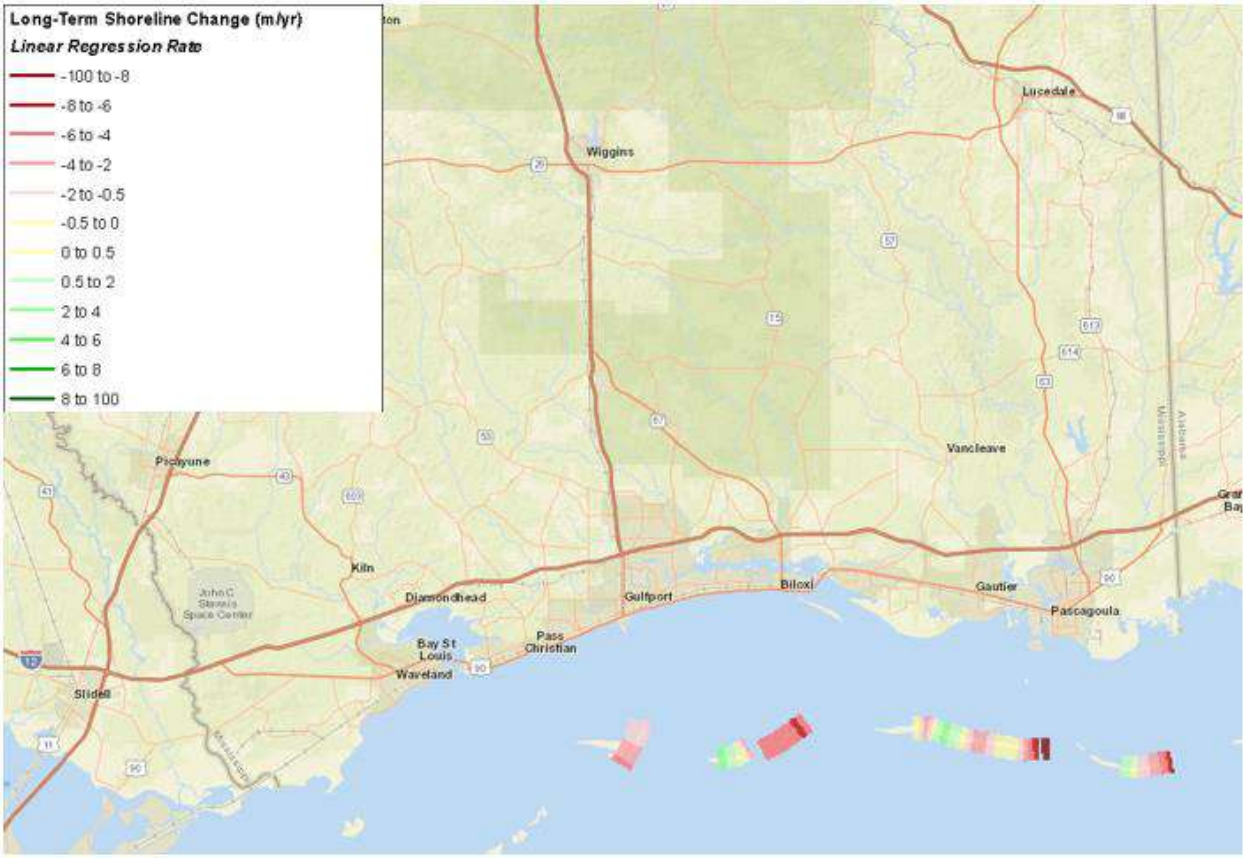
D.2.2 Erosion

LOCATION AND SPATIAL EXTENT

For the most part, major erosion in Jackson County is typically caused by coastal tides, ocean currents, and storm events. Although the county also experiences riverine erosion in many of its inland areas, these are of somewhat less concern than coastal erosion areas which historically have had larger impacts. Unlike inland areas, where the soil has greater organic matter content, coastal soils are mainly composed of fine grained particles such as sand. This makes coastal soils much more susceptible to erosion. Although some areas of the Jackson County coast are protected and natural erosion processes are allowed to take place for the most part, many areas near where development has occurred are especially susceptible.

At this time, there is limited data available on localized areas of erosion. Most of the information collected by the United States Geological Survey (USGS) is focused on the barrier islands that are just off the coast of the mainland. The long-term shoreline change for the barrier islands as calculated by the USGS can be found in **Figure D.10** It should be noted that many areas of the coast are protected through the use of structural techniques. Also, a great deal of renourishment activities are carried out along the mainland coastal communities.

FIGURE D.10: LONG-TERM SHORELINE CHANGE (M/YR) IN THE MEMA DISTRICT 9 REGION



Source: United States Geological Survey

HISTORICAL OCCURRENCES

Several sources were vetted to identify areas of erosion in Jackson County. This includes searching local newspapers, interviewing local officials, and reviewing previous hazard mitigation plans. Because dramatic, short-term erosion tends to take place after major storm events such as hurricanes, flooding, or storm surge, the erosion events often correspond directly with those events. Conversely, with long-term erosion, it is difficult to identify a specific historic occurrence because these events are by nature occurring at all times over a long period at a very gradual rate. Therefore, long-term historic erosion events cannot be confined to a specific timeframe or occurrence.

PROBABILITY OF FUTURE OCCURRENCES

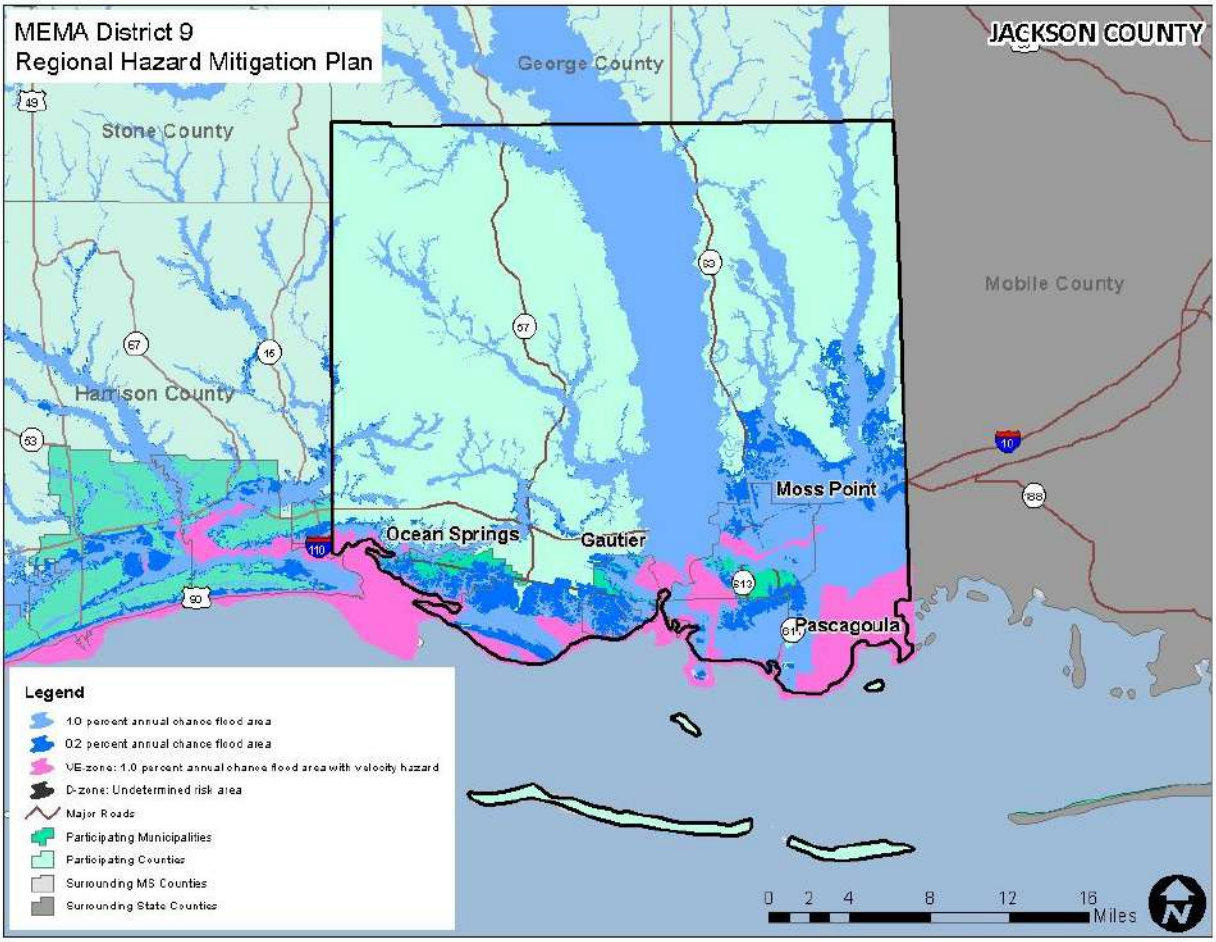
Erosion remains a natural, dynamic, and continuous process for Jackson County, and it will continue to occur. The annual probability level assigned for erosion is likely (between 10 and 100 percent annually).

D.2.3 Flood

LOCATION AND SPATIAL EXTENT

There are areas in Jackson County that are susceptible to flood events. Special flood hazard areas in the county were mapped using Geographic Information System (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM). This includes Zone A (1-percent annual chance floodplain), Zone AE (1-percent annual chance floodplain with elevations), Zone VE (1-percent annual chance floodplain with additional hazards due to storm-induced velocity wave action), Zone X500 (0.2-percent annual chance floodplain), and Zone D (undetermined risk area). **Figure D.11** illustrates the location and extent of currently mapped special flood hazard areas for the county based on best available FEMA Digital Flood Insurance Rate Map (DFIRM) data.

FIGURE D.11: SPECIAL FLOOD HAZARD AREAS IN JACKSON COUNTY



Source: Federal Emergency Management Agency

HISTORICAL OCCURRENCES

Floods were at least partially responsible for five disaster declarations in Jackson County in 1974, 1980, 1990, 1995 and 2009.[2] Information from the National Climatic Data Center was used to ascertain additional historical flood events. The National Climatic Data Center reported a total of 25 events in Jackson County since 1996.[3] These events accounted for almost $4.1 million (2016 dollars) in property damage.[4] A summary of these events is presented in **Table D.6**. Specific information on flood events, including date, type of flooding, and deaths and injuries, can be found in **Table D.7**.

TABLE D.6: SUMMARY OF FLOOD OCCURRENCES IN JACKSON COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Gautier	0	0/0	$0	$0
Moss Point	2	0/0	$1,325,787	$94,699
Ocean Springs	2	0/0	$0	$0
Pascagoula	4	0/0	$128,387	$9,171
Unincorporated Area	17	0/0	$2,616,915	$130,846
JACKSON COUNTY TOTAL	**25**	**0/0**	**$4,071,089**	**$234,715**

Source: National Climatic Data Center

TABLE D.7: HISTORICAL FLOOD EVENTS IN JACKSON COUNTY

Location	Date	Type	Deaths/Injuries	Property Damage*
Gautier				
None reported	--	--	--	--
Moss Point				
MOSS PT	8/5/2002	Flash Flood	0/0	$66,941
JACKSON CO ARPT	8/30/2012	Flash Flood	0/0	$1,258,846
Ocean Springs				
OCEAN SPGS	4/6/2005	Flash Flood	0/0	$0
OCEAN SPGS	4/29/2014	Flash Flood	0/0	$0
Pascagoula				
PASCAGOULA	6/20/2002	Flood	0/0	$0
PASCAGOULA	8/9/2006	Heavy Rain	0/0	$0
PASCAGOULA	9/3/2011	Flash Flood	0/0	$26,769
PASCAGOULA	9/27/2015	Flash Flood	0/0	$101,618
Unincorporated Area				
PECAN	4/15/1996	Flash Flood	0/0	$0
SOUTH PORTION	7/8/1996	Flood	0/0	$153,507
COUNTYWIDE	1/7/1998	Flash Flood	0/0	$73,881

[2] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.
[3] These flood events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional occurrences have occurred and have gone unreported. As additional local data becomes available, this hazard profile will be amended.
[4] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Type	Deaths/Injuries	Property Damage*
COUNTYWIDE	3/7/1998	Flash Flood	0/0	$0
JACKSON (ZONE)	3/8/1998	Flood	0/0	$0
COUNTYWIDE	6/11/2001	Flash Flood	0/0	$203,997
JACKSON (ZONE)	7/1/2003	Flood	0/0	$130,898
COUNTYWIDE	3/31/2005	Heavy Rain	0/0	$0
COUNTYWIDE	4/1/2005	Flash Flood	0/0	$246,649
JACKSON (ZONE)	4/1/2005	Flood	0/0	$246,649
ORANGE GROVE	3/28/2009	Flash Flood	0/0	$0
NORTH BILOXI ARPT	9/22/2009	Flash Flood	0/0	$0
OCEAN SPGS ARPT	9/5/2012	Flash Flood	0/0	$10,490
OCEAN SPGS ARPT	9/5/2012	Flash Flood	0/0	$0
ARENA	2/25/2013	Flash Flood	0/0	$0
VANCLEAVE	5/1/2013	Flash Flood	0/0	$1,550,842
JACKSON (ZONE)	10/25/2015	Coastal Flood	0/0	$0

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

HISTORICAL SUMMARY OF INSURED FLOOD LOSSES

According to FEMA flood insurance policy records as of October 2016, there have been 8,963 flood losses reported in Jackson County through the National Flood Insurance Program (NFIP) since 1978, totaling almost $699.3 million in claims payments. A summary of these figures for the county is provided in **Table D.8**. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP policies, and for losses in which claims were sought and received. It is likely that many additional instances of flood loss in Jackson County were either uninsured, denied claims payment, or not reported.

TABLE D.8: SUMMARY OF INSURED FLOOD LOSSES IN JACKSON COUNTY

Location	Number of Policies	Flood Losses	Claims Payments
Gautier	1,724	681	$59,663,535
Moss Point	1,131	886	$28,225,055
Ocean Springs	2,622	823	$86,224,366
Pascagoula	4,944	2,763	$221,292,452
Unincorporated Area	5,996	3,810	$303,874,274
JACKSON COUNTY TOTAL	**16,417**	**8,963**	**$699,279,682**

Source: National Flood Insurance Program

REPETITIVE LOSS PROPERTIES

According to the Mississippi Emergency Management Agency, there are 1,259 non-mitigated repetitive loss properties located in Jackson County, which accounted for 3,142 losses and over $175.6 million in claims payments under the NFIP. The average claim amount for these properties is $55,891. Of the 1,259 properties, 1,150 are single family, 9 are 2-4 family, 15 are assumed condominium, 23 are other residential, and 62 are non-residential. Without mitigation, these properties will likely continue to

experience flood losses. **Table D.9** presents detailed information on repetitive loss properties and NFIP claims and policies for Jackson County.

TABLE D.9: REPETITIVE LOSS PROPERTIES IN JACKSON COUNTY

Location	Number of Properties	Types of Properties	Number of Losses	Building Payments	Content Payments	Total Payments	Average Payment
Gautier	147	135 single family; 4 assumed condo; 1 other residential; 7 non-residential	335	$16,568,956	$5,576,243	$22,145,199	$66,105
Moss Point	186	178 single family; 1 assumed condo; 7 non-residential	483	$12,142,035	$2,958,376	$15,100,411	$31,264
Ocean Springs	50	44 single family; 1 2-4 family; 1 assumed condo; 1 other residential; 3 other non-residential	135	$13,249,569	$2,042,105	$15,291,674	$113,272
Pascagoula	516	450 single family; 8 2-4 family; 7 assumed condo; 19 other residential; 32 other non-residential	1,219	$56,849,172	$18,164,235	$75,013,407	$61,537
Unincorporated Area	360	343 single family; 2 assumed condo; 2 other residential; 13 other non-residential	970	$37,493,776	$10,564,551	$48,058,327	$49,545
JACKSON COUNTY TOTAL	**1,259**		**3,142**	**$136,303,508**	**$39,305,510**	**$175,609,018**	**$55,891**

Source: Federal Emergency Management Agency, National Flood Insurance Program

PROBABILITY OF FUTURE OCCURRENCES

Flood events will remain a threat in Jackson County, and the probability of future occurrences will remain highly likely (100 percent annual probability). The probability of future flood events based on magnitude and according to best available data is illustrated in the figure above**,** which indicates those areas susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain). Further, as described in other hazard profiles, it is highly likely that Jackson County will continue to experience inland flooding associated with large tropical storms and hurricanes.

It can be inferred from the floodplain location maps, previous occurrences, and repetitive loss properties that risk varies throughout the county. For example, the eastern half of the county has more floodplain and thus a higher risk of flood than the rest of the county. Flood is not the greatest hazard of concern but will continue to occur and cause damage. Therefore, mitigation actions may be warranted, particularly for repetitive loss properties.

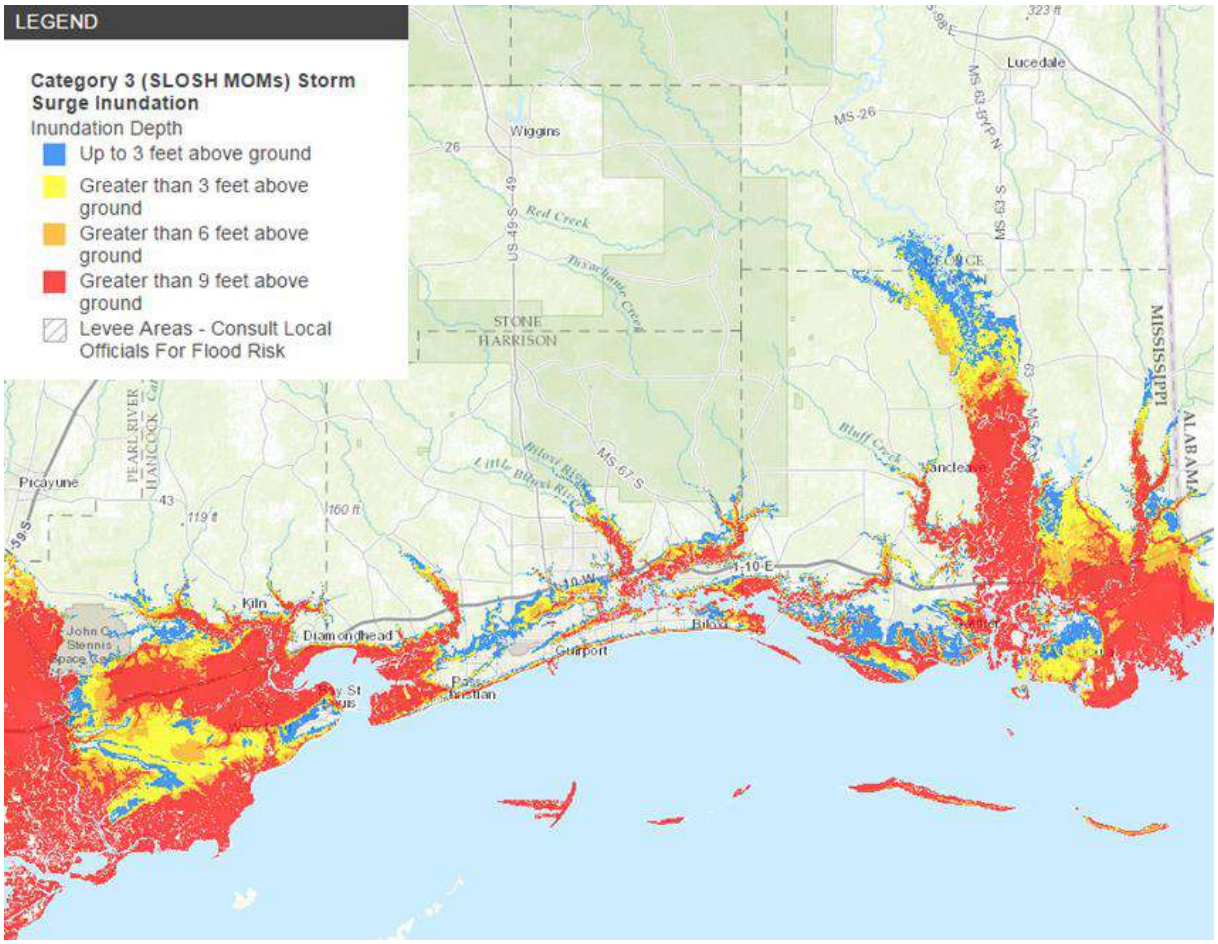
It should also be noted that anticipated sea level rise will increase the probability and intensity of future tidal flooding events in years to come. Rising sea level over time will shorten the return period (increasing the frequency) of significant flood events. This hazard is discussed elsewhere in this section.

D.2.4 Storm Surge

LOCATION AND SPATIAL EXTENT

There are many areas in Jackson County that are subject to potential storm surge inundation as modeled and mapped by the National Oceanic and Atmospheric Administration (NOAA). **Figure D.12** illustrates hurricane storm surge inundation zones based on a Category 3 storm. The illustration is derived from geo-referenced SLOSH (Sea, Lake, and Overland Surge from Hurricanes) data produced by the USACE in coordination with NOAA. SLOSH is a modeling tool used to estimate storm surge for coastal areas resulting from historical, hypothetical, or predicted hurricanes taking into account maximum expected levels for pressure, size, forward speed, track, and winds. Therefore, the SLOSH data is best used for defining the potential maximum surge associated with various storm intensities for any particular location. As shown in the figure, the entire coast and central portion of Jackson County is at high risk to storm surge inundation. Inland areas may also experience substantial flooding during a storm event.

FIGURE D.12: STORM SURGE RISK AREAS IN THE MEMA DISTRICT 9 REGION



Source: NOAA

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, nine storm surge events have been reported for Jackson County since 1998.[5] These events accounted for almost $2.8 billion (2016 dollars) in property damage.[6] A summary of these events is presented in **Table D.10**. Detailed information on the recorded storm surge events can be found in **Table D.11**.

TABLE D.10: SUMMARY OF STORM SURGE EVENTS IN JACKSON COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Gautier	0	0/0	$0	$0
Moss Point	0	0/0	$0	$0
Ocean Springs	1	0/0	$369,406	$20,523
Pascagoula	0	0/0	$0	$0

[5] These storm surge events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional storm surge conditions have affected Jackson County.
[6] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Unincorporated Area	8	0/0	$2,778,107,544	$213,721,103
JACKSON COUNTY TOTAL	**9**	**0/0**	**$2,778,476,950**	**$213,721,103**

Source: National Climatic Data Center

TABLE D.11: HISTORICAL STORM SURGE EVENTS IN JACKSON COUNTY

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
Gautier				
None reported	--	--	--	--
Moss Point				
None reported	--	--	--	--
Ocean Springs				
OCEAN SPGS	2/15/1998	2-4 feet above normal	0/0	$369,406
Pascagoula				
None reported	--	--	--	--
Unincorporated Area				
JACKSON (ZONE)	6/30/2003	--	0/0	$369,406
JACKSON (ZONE)	9/15/2004	3-5 feet above normal	0/0	$327,246
JACKSON (ZONE)	7/5/2005	3-5 feet above normal	0/0	$1,530,035
JACKSON (ZONE)	8/29/2005	17-21 feet	0/0	$246,649
JACKSON (ZONE)	9/1/2008	4.5-6 feet	0/0	$2,774,804,148
JACKSON (ZONE)	9/11/2008	2-4 feet above normal	0/0	$559,335
JACKSON (ZONE)	9/2/2011	2-4 feet above normal	0/0	$0
JACKSON (ZONE)	8/28/2012	5 feet	0/0	$10,707

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

It is highly likely (100 percent annual probability) that Jackson County will continue to experience storm surge associated with large tropical storms, hurricanes, and squalls combined with high tides. As noted in the preceding section (under Flood), anticipated sea level rise will increase the probability and intensity of future storm surge events in years to come.[7] This rise in sea level will not only increase the probability and intensity of tidal flooding events, but will also contribute to the loss of coastal wetlands and erosion of sand beaches that act as protective buffers against storm surge events.

FIRE-RELATED HAZARDS

D.2.5 Drought

Drought typically covers a large area and cannot be confined to any geographic or political boundaries. Furthermore, it is assumed that Jackson County would be uniformly exposed to drought, making the

[7] The Sea Level Rise hazard is assessed more extensively under Section D.2.16.

spatial extent potentially widespread. It is also notable that drought conditions typically do not cause significant damage to the built environment but may exacerbate wildfire conditions.

HISTORICAL OCCURRENCES

According to the U.S. Drought Monitor, Jackson County had drought levels of Severe or worse in 7 of the last 17 years (January 2000-October 2016). **Table D.12** shows the most severe drought classification for each year, according to U.S. Drought Monitor classifications. It should be noted that the U.S. Drought Monitor also estimates what percentage of the county is in each classification of drought severity. For example, the most severe classification reported may be exceptional but a majority of the county may actually be in a less severe condition.

TABLE D.12: HISTORICAL DROUGHT OCCURRENCES IN JACKSON COUNTY

Abnormally Dry (D0) Moderate Drought (D1) Severe Drought (D2) Extreme Drought (D3) Exceptional Drought (D4)

	Jackson County
2000	EXCEPTIONAL
2001	MODERATE
2002	SEVERE
2003	ABNORMAL
2004	MODERATE
2005	ABNORMAL
2006	EXTREME
2007	MODERATE
2008	ABNORMAL
2009	MODERATE
2010	SEVERE
2011	EXCEPTIONAL
2012	SEVERE
2013	MODERATE
2014	SEVERE
2015	MODERATE
2016	MODERATE

Source: United States Drought Monitor

No anecdotal information was available from the National Climatic Data Center on droughts in Jackson County.

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that Jackson County has a probability level of likely (between 10 and 100 percent annual probability) for future drought events. However, the extent (or magnitude) of drought and the amount of geographic area covered by drought, varies with each year. Historic information indicates that there is a much lower probability for extreme, long-lasting drought conditions.

D.2.6 Lightning

LOCATION AND SPATIAL EXTENT

Lightning occurs randomly, therefore it is impossible to predict where and with what frequency it will strike. It is assumed that all of Jackson County is uniformly exposed to lightning.

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, there have been 18 recorded lightning events in Jackson County since 1996.[8] These events resulted in almost $336,000 (2016 dollars) in damages.[9] Furthermore, lightning has caused one fatality and three injuries in the county. A summary of these events is presented in **Table D.13**. Detailed information on historical lightning events can be found in **Table D.14**.

It is certain that more than 18 events have impacted the county. Many of the reported events are those that caused damage, and it should be expected that damages are likely much higher for this hazard than what is reported.

TABLE D.13: SUMMARY OF LIGHTNING OCCURRENCES IN JACKSON COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Gautier	0	0/0	$0	$0
Moss Point	1	0/0	$2,678	$191
Ocean Springs	4	0/0	$89,747	$4,487
Pascagoula	8	1/3	$30,557	$1,698
Unincorporated Area	5	0/0	$212,656	$10,633
JACKSON COUNTY TOTAL	**18**	**1/3**	**$335,638**	**$17,009**

Source: National Climatic Data Center

TABLE D.14: HISTORICAL LIGHTNING OCCURRENCES IN JACKSON COUNTY

Location	Date	Deaths/ Injuries	Property Damage*	Details
Gautier				
None reported	--	--	--	--
Moss Point				
MOSS PT	8/2/2002	0/0	$2,678	Lightning struck a power pole and transformer.
Ocean Springs				
OCEAN SPGS	4/29/1996	0/0	$6,140	Lightning struck an electric meter and caused a house fire.

[8] These lightning events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is certain that additional lightning events have occurred in Jackson County. As additional local data becomes available, this hazard profile will be amended.
[9] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Deaths/ Injuries	Property Damage*	Details
OCEAN SPGS	9/21/1996	0/0		Lightning damaged several transformers setting the utility poles on fire.
OCEAN SPGS	6/7/2001	0/0	$81,599	A lightning strike killed a 25 year old women in Gulfport shortly after lightning injured a 53 year old man in the nearby community of Pass Christian. Lightning also started a fire at a business in Oceans Springs which resulted in $60,000 damage.
OCEAN SPGS	8/2/2002	0/0	$2,008	A lightning strike caused a fire in an exterior wall of a house.
Pascagoula				
PASCAGOULA	3/5/1998	0/0	$0	Lightning struck and sheared off a 60-foot utility pole resulting in an extensive power outage, up to 7 hours, in Pascagoula, Ocean Springs and Gautier.
PASCAGOULA	5/6/1998	0/0	$29,553	Lightning struck a restaurant and office building causing damage to computers and other equipment.
PASCAGOULA	8/2/2002	0/0	$1,004	A lightning strike damaged some of the electrical outlets in a house.
PASCAGOULA	8/2/2002	0/0	$0	Lightning struck a gas meter.
PASCAGOULA	8/2/2002	0/0	$0	Lightning struck an antenna on a house.
PASCAGOULA	8/2/2003	0/0	$0	Lightning ignited a fire of a tank containing 350,000 barrels of crude oil at an oil refinery.
PASCAGOULA	6/28/2004	0/3	$0	Three people were struck by lightning at a ship yard. One person was transported to a hospital and suffered burns on his face and hands and a broken jaw.
PASCAGOULA	7/31/2011	1/0	$0	Broadcast media reported that a person was struck and killed by lightning while on the pier at Pascagoula Beach Pier.
Unincorporated Area				
ESCATAWPA	6/7/1996	0/0	$153,507	A lightning strike started a fire which destroyed a house.
ESCATAWPA	7/5/1998	0/0	$14,776	Lightning hit a church blowing out most of the lights, destroying the security system, and cracking windows.
VANCLEAVE	7/21/2003	0/0	$32,725	Lightning caused a fire that damaged the roof of a house.
VANCLEAVE	7/21/2003	0/0	$1,309	A lightning strike at a gas station caused minor damage.
HURLEY	7/12/2013	0/0	$10,339	Lightning strikes damaged 5 golf carts, 3 chargers and a sprinkler system at Whispering Pines Golf Course in Hurley.

*Property damage is reported in 2016 dollars; All damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

Although there was not a high number of historical lightning events reported in Jackson County via NCDC data, it is a regular occurrence accompanied by thunderstorms. In fact, lightning events will assuredly happen on an annual basis, though not all events will cause damage. According to Vaisala's U.S. National Lightning Detection Network (NLDN), Jackson County is located in an area of the country that experienced

an average of 4 to 12 and up lightning flashes per square kilometer per year between 2005 and 2014. Therefore, the probability of future events is highly likely (100 percent annual probability). It can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the county.

D.2.7 Wildfire

LOCATION AND SPATIAL EXTENT

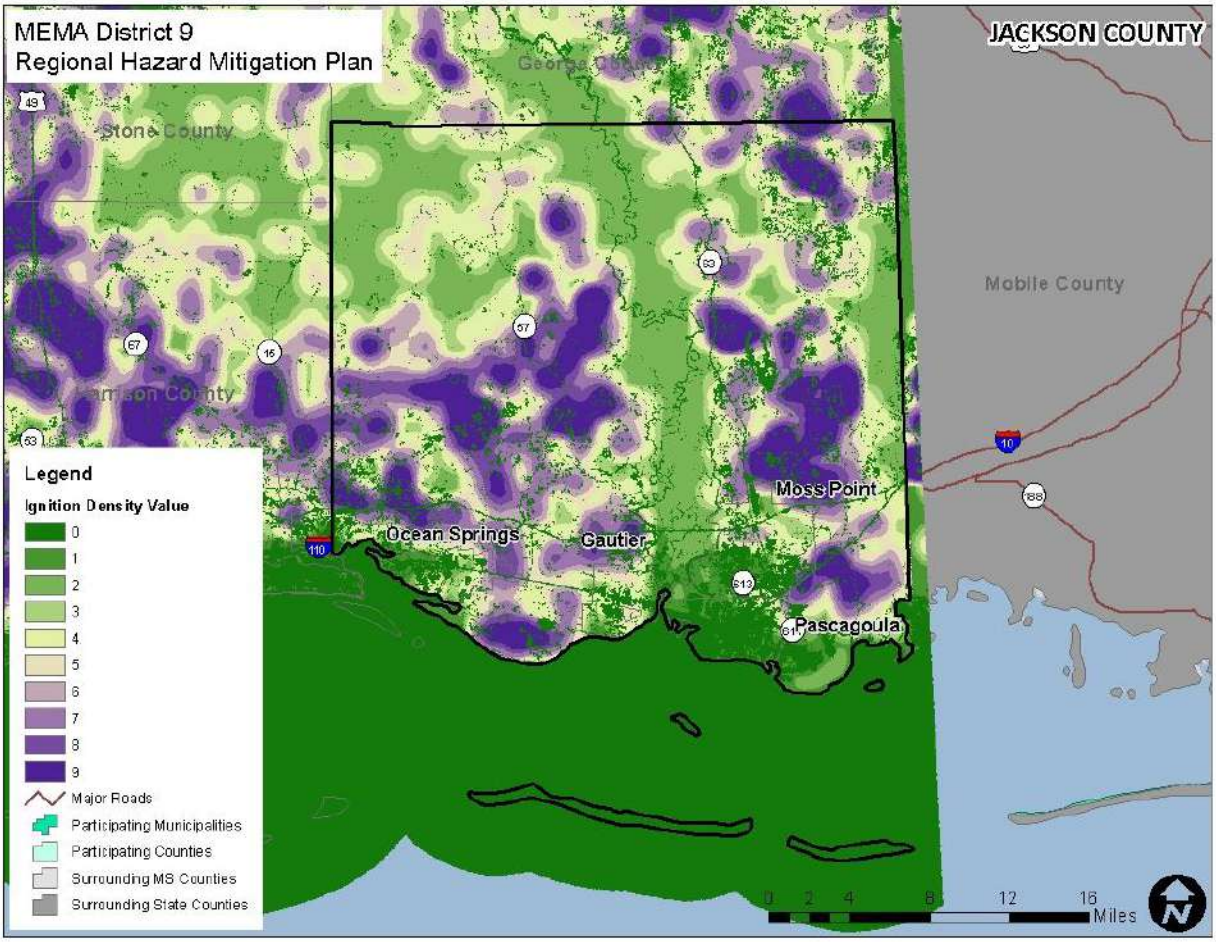
The entire county is at risk to a wildfire occurrence. However, several factors such as drought conditions or high levels of fuel on the forest floor, may make a wildfire more likely. Furthermore, areas in the urban-wildland interface are particularly susceptible to fire hazard as populations abut formerly undeveloped areas. The Wildfire Ignition Density data shown in the figure below give an indication of historic location.

HISTORICAL OCCURRENCES

Figure D.13 shows the Wildfire Ignition Density in Jackson County based on data from the Southern Wildfire Risk Assessment. This data is based on historical fire ignitions and the likelihood of a wildfire igniting in an area. Occurrence is derived by modeling historic wildfire ignition locations to create an average ignition rate map. This is measured in the number of fires per year per 1,000 acres.[10]

[10] Southern Wildfire Risk Assessment, 2014.

FIGURE D.13: WILDFIRE IGNITION DENSITY IN JACKSON COUNTY



Source: Southern Wildfire Risk Assessment

Based on data from the Mississippi Forestry Commission from 2007 to 2016, Jackson County experiences an average of 78 wildfires annually which burn a combined 1,857 acres, on average per year. The data indicates that most of these fires are small, averaging 24 acres per fire. **Table D.15** provides a summary of wildfire occurrences in Jackson County and **Table D.16** lists the number of reported wildfire occurrences in the county between the years 2007 and 2016.

TABLE D.15: SUMMARY TABLE OF ANNUAL WILDFIRE OCCURRENCES (2007 -2016)*

	Jackson County
Average Number of Fires per year	78.7
Average Number of Acres Burned per year	1,856.7
Average Number of Acres Burned per fire	23.6

*These values reflect averages over a 10-year period.
Source: Mississippi Forestry Commission

TABLE D.16: HISTORICAL WILDFIRE OCCURRENCES IN JACKSON COUNTY

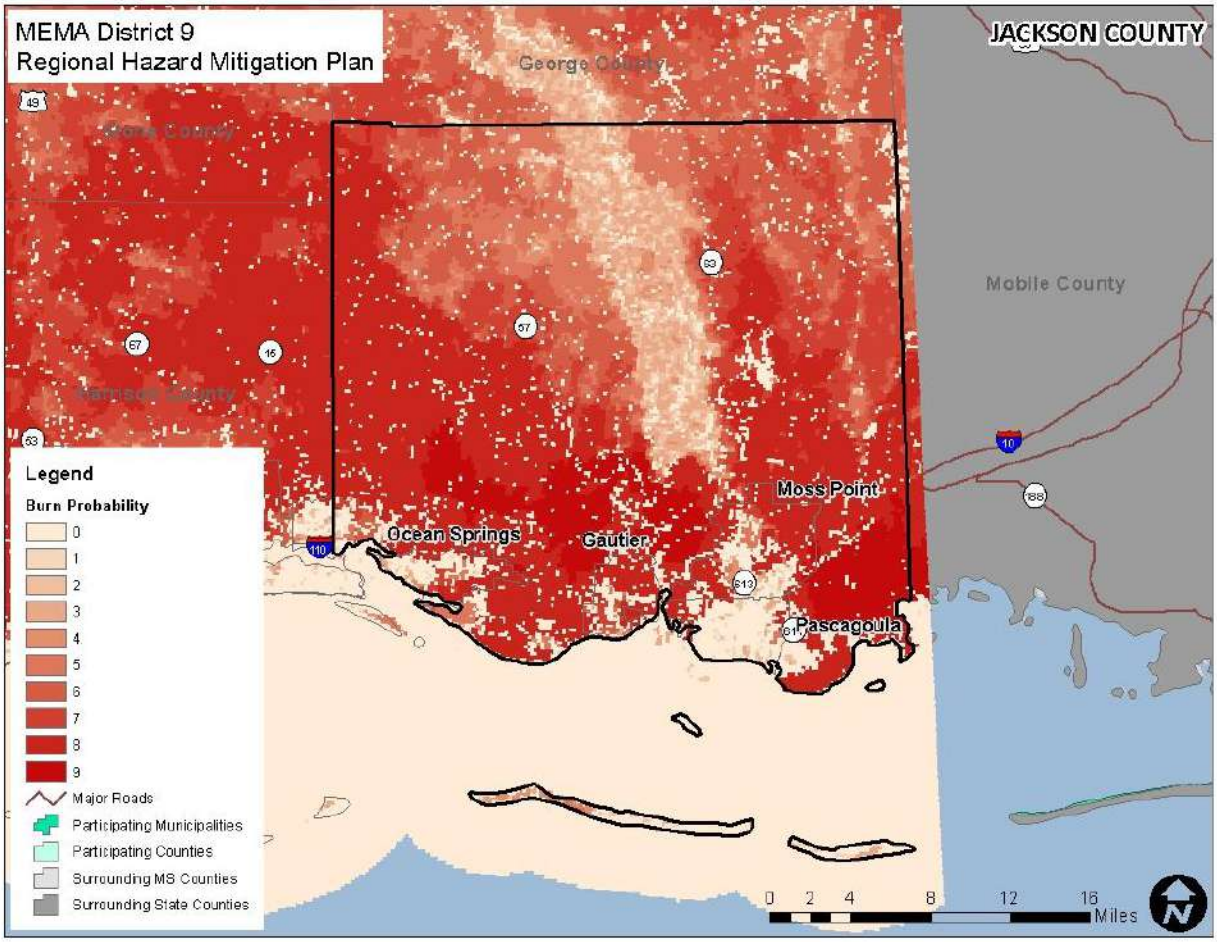
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Jackson County										
Number of Fires	107	73	79	47	161	67	71	44	88	50
Number of Acres Burned	1,863	1,742	1,441	418	3,660	776	1,272	621	1,754	5,020

Source: Mississippi Forestry Commission

PROBABILITY OF FUTURE OCCURRENCES

Wildfire events will be an ongoing occurrence in Jackson County. **Figure D.14** shows that there is some probability a wildfire will occur throughout the county. However, the likelihood of wildfires increases during drought cycles and abnormally dry conditions. Fires are likely to stay small in size but could increase due to local climate and ground conditions. Dry, windy conditions with an accumulation of forest floor fuel (potentially due to ice storms or lack of fire) could create conditions for a large fire that spreads quickly. It should also be noted that some areas do vary somewhat in risk. For example, highly developed areas are less susceptible unless they are located near the urban-wildland boundary. The risk will also vary due to assets. Areas in the urban-wildland interface will have much more property at risk, resulting in increased vulnerability and need to mitigate compared to rural, mainly forested areas. The probability assigned to Jackson County for future wildfire events is highly likely (100 percent annual probability).

FIGURE D.14: BURN PROBABILITY IN JACKSON COUNTY



Source: Southern Wildfire Risk Assessment

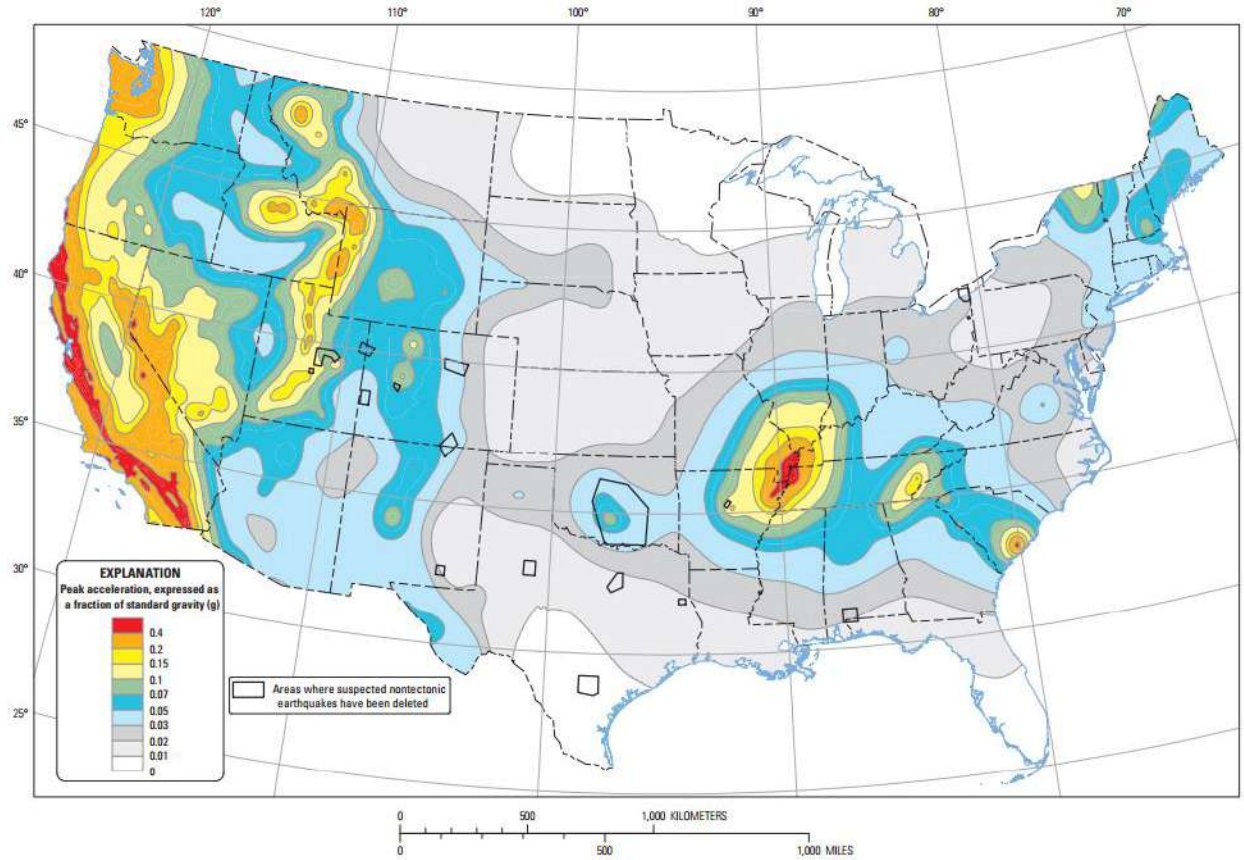
GEOLOGIC HAZARDS

D.2.8 Earthquake

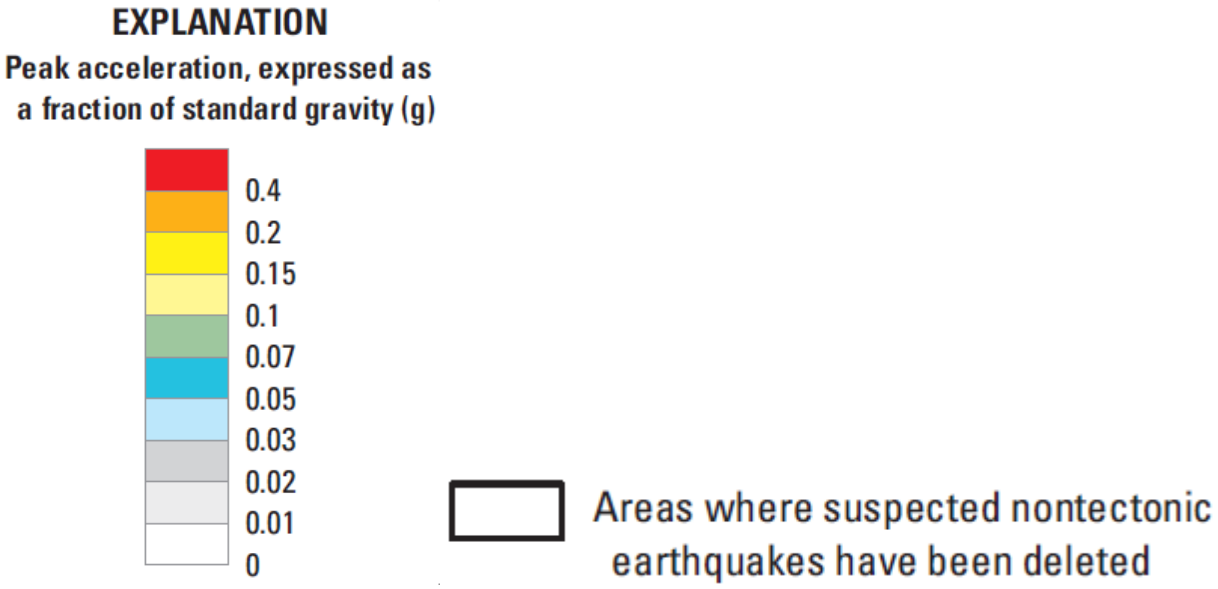
LOCATION AND SPATIAL EXTENT

Figure D.15 shows the intensity level associated with Jackson County, based on the national USGS map of peak acceleration with 10 percent probability of exceedance in 50 years. It is the probability that ground motion will reach a certain level during an earthquake. The data show peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10 percent probability of exceedance in 50 years. The map was compiled by the U.S. Geological Survey (USGS) Geologic Hazards Team, which conducts global investigations of earthquake, geomagnetic, and landslide hazards. According to this map, Jackson County lies within an approximate zone of level "1" to "2" ground acceleration. This indicates that the county exists within an area of low seismic risk.

FIGURE D.15: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS



Ten-percent probability of exceedance in 50 years map of peak ground acceleration



Source: United States Geological Survey, 2014

The primary source of potential damage to Jackson County from an earthquake is the New Madrid Seismic Zone (NMSZ). Historically, a series of earthquakes in 1811 and 1812 demonstrated that this fault zone can produce high magnitude seismic events, sometimes on the scale of a 7.5-8.0 on the Richter scale. The biggest challenge with earthquakes that occur in this area of seismic activity is predicting the recurrence of earthquakes emanating from this zone. Although the magnitude of earthquakes from the NMSZ can be large, they occur very irregularly and fairly infrequently. This makes it extremely difficult to project when they will occur.

It should also be noted that the State of Mississippi Hazard Mitigation Plan identifies certain areas of concern for liquefaction and lists the counties and corresponding zones within those counties that have the highest liquefaction potential. Jackson County does not have any identified liquefaction potential risk.

HISTORICAL OCCURRENCES

No earthquakes are known to have affected Jackson County since 1638. **Table D.17** provides a summary of earthquake events reported by the National Centers for Environmental Information (formerly National Geophysical Data Center) between 1638 and 1985, and **Figure D.16** presents a map showing earthquakes whose epicenters have occurred near the county between 1985 and 2015 (no earthquakes occurred within the county boundaries during this period). A detailed occurrence of each event including the date, distance from the epicenter, magnitude, and Modified Mercalli Intensity (if known) can be found in **Table D.18**.[11]

TABLE D.17: SUMMARY OF SEISMIC ACTIVITY IN JACKSON COUNTY

Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
Gautier	0	--	--
Moss Point	0	--	--
Ocean Springs	0	--	--
Pascagoula	0	--	--
Unincorporated Area	0	--	--
JACKSON COUNTY TOTAL	**0**	**--**	**--**

Source: National Geophysical Data Center

TABLE D.18: SIGNIFICANT SEISMIC EVENTS IN JACKSON COUNTY (1638 -1985)

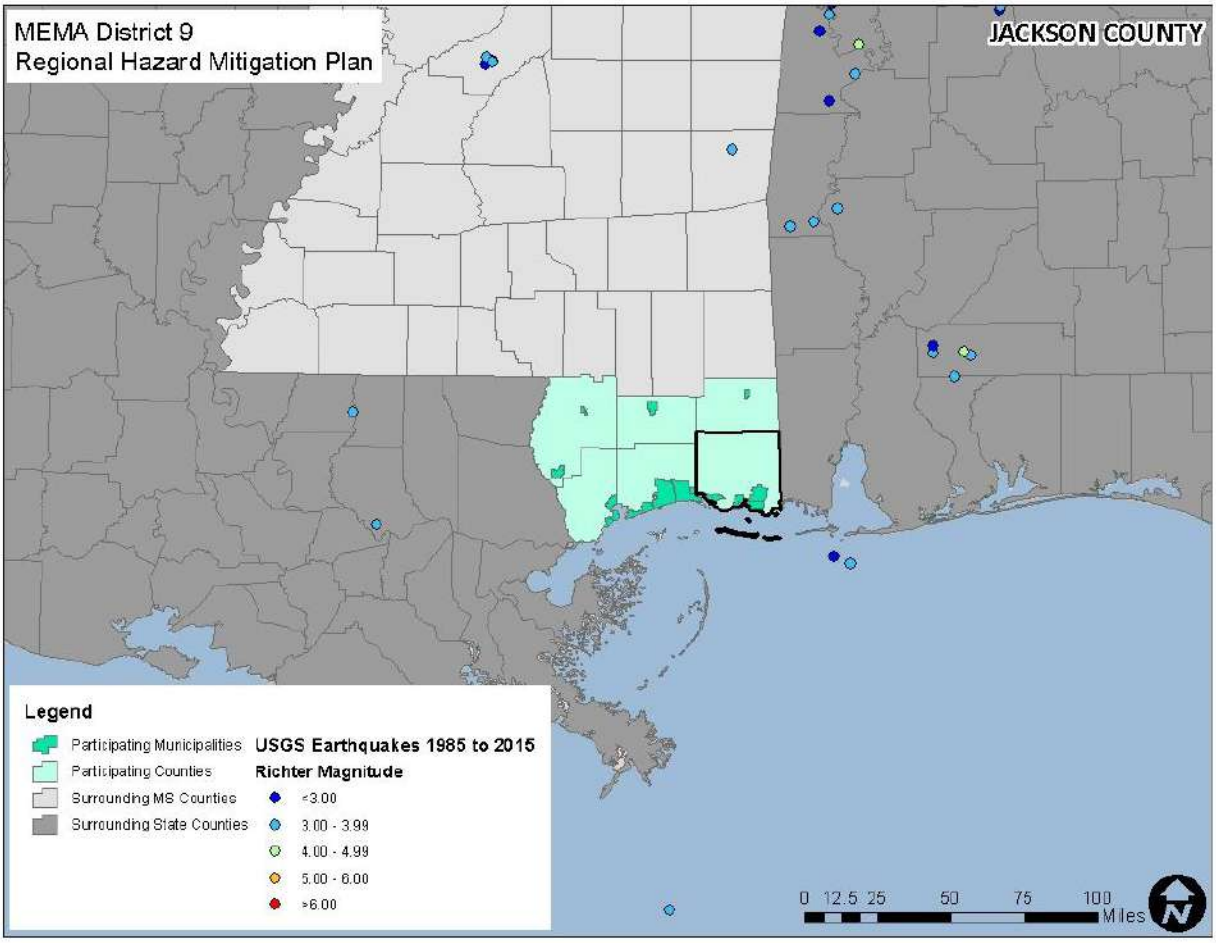
Location	Date	Epicentral Distance	Magnitude	MMI
Gautier				
None reported	--	--	--	--
Moss Point				
None reported	--	--	--	--
Ocean Springs				
None reported	--	--	--	--
Pascagoula				
None reported	--	--	--	--

[11] Due to reporting mechanisms, not all earthquakes events were recorded during this time. Furthermore, some are missing data, such as the epicenter location, due to a lack of widely used technology. In these instances, a value of "unknown" is reported.

Location	Date	Epicentral Distance	Magnitude	MMI
Unincorporated Area				
None reported	--	--	--	--

Source: National Geophysical Data Center

FIGURE D.16: HISTORIC EARTHQUAKES WITH EPICENTERS NEAR JACKSON COUNTY (1985-2015)



Source: United States Geological Survey

PROBABILITY OF FUTURE OCCURRENCES

The probability of significant, damaging earthquake events affecting Jackson County is unlikely. However, it is possible that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light will affect the county. The annual probability level for the county is estimated to be between 1 and 10 percent (possible).

WIND-RELATED HAZARDS

D.2.9 Extreme Cold

Extreme cold typically impacts a large area and cannot be confined to any geographic or political boundaries. The entire county is susceptible to extreme cold conditions.

HISTORICAL OCCURRENCES

Data from the National Climatic Data Center was used to determine historical extreme cold events in Jackson County. Two events were reported:

February 2, 1996 – *Cold/Wind Chill* – An arctic airmass overspread much of south Mississippi bringing the longest extended period of cold weather since 1989. In Amite County, 4SW Gillsburg, a 67 year old man died from hypothermia on the 4th after the fire in a wood burning heater went out. Considerable property damage resulted from broken pipes due to the extended period of subfreezing temperatures. In Jackson County, Moss Point and Gautier had broken pipes in 100 and 147 houses, respectively.

December 18, 1996 – *Cold/Wind Chill* – An arctic airmass overspread south Mississippi resulting in three consecutive nights with subfreezing minimum temperatures. Temperatures lowered into the mid-teens over the southwest section of the state and near 20 degrees along the Gulf Coast.

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that all of Jackson County has a probability level of possible (between 1 and 10 percent annual probability) for future extreme cold events to impact the county.

D.2.10 Extreme Heat

Heat waves typically impact a large area and cannot be confined to any geographic or political boundaries. The entire county is susceptible to extreme heat conditions.

HISTORICAL OCCURRENCES

The National Climatic Data Center was used to determine historical heat wave occurrences in the county.

July 2000 – July was a hot and dry month in Southeast Mississippi. In Beaumont the temperature was 100 degrees or higher eleven days during the month with the hottest being 105 degrees. In Richton the temperature was 100 degrees or higher three days during the month with the hottest being 102 degrees. In Waynesboro the temperature was 100 degrees or higher four days during the month with the hottest being 103 degrees. In Wiggins the temperature was 100 degrees or higher nine days during the month with 105 degrees being the hottest. In addition to being hot is was also a dry month across the area. Most stations ended up with below normal rainfall totals for the month. In Jackson County, a 68 year old man died from heat exhaustion while sitting in his pickup truck in a parking lot with the windows rolled up, and 10 days later, a 58 year old male was found dead from heat exhaustion while sitting in his truck in the driveway of his home with the windows rolled up.

August 2010 – Hot and humid conditions produced heat index values between 110 and 115 degrees over coastal Mississippi. A 48 year old construction worker collapsed and died while working on a highway construction project. Jackson County coroner classified the fatality as heat related with the cause of death as hyperthermia.

PROBABILITY OF FUTURE OCCURRENCES

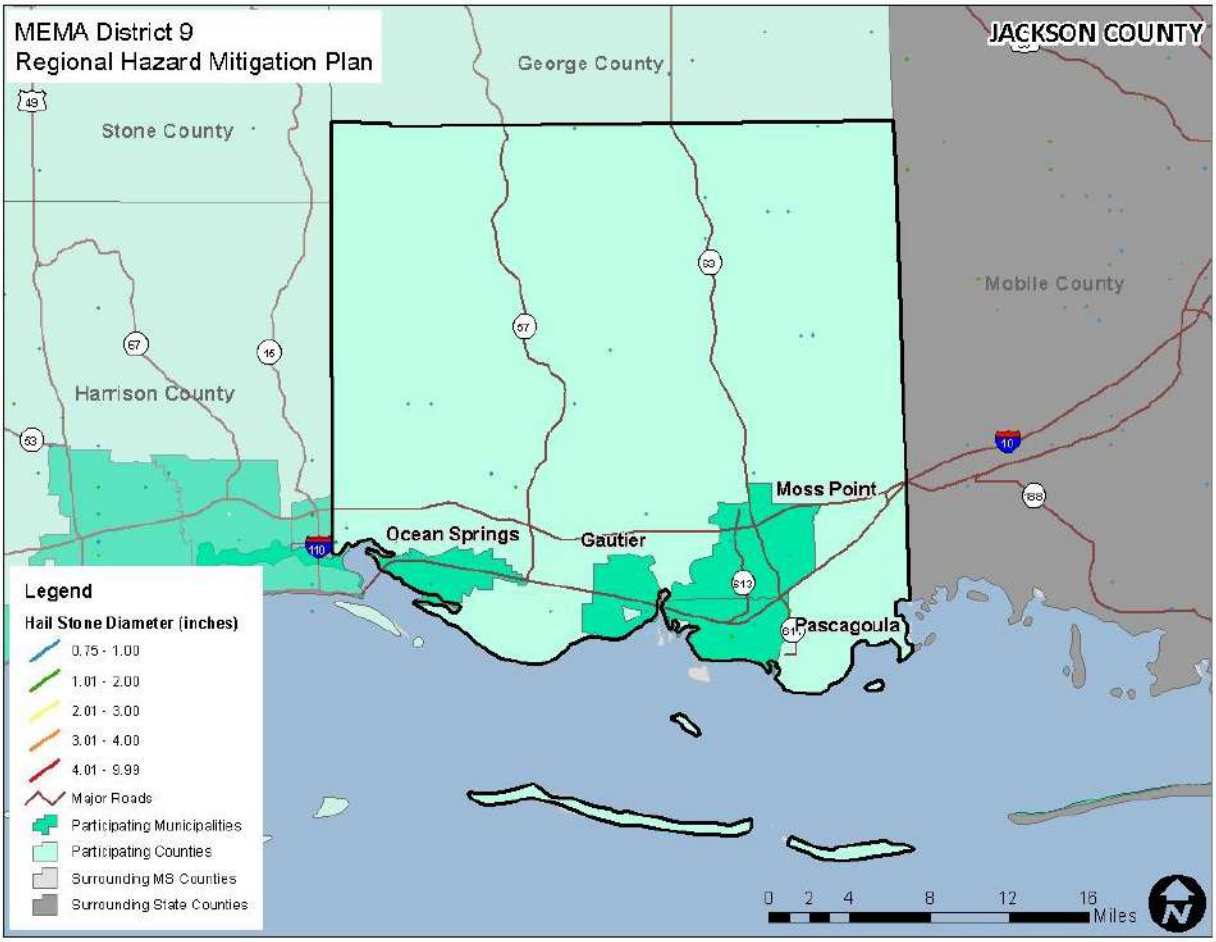
Based on historical occurrence information, it is assumed that all of Jackson County has a probability level of highly likely (100 percent annual probability) for future heat wave events.

D.2.11 Hailstorm

LOCATION AND SPATIAL EXTENT

Hailstorms frequently accompany thunderstorms, so their locations and spatial extents coincide. It is assumed that Jackson County is uniformly exposed to severe thunderstorms; therefore, all areas of the county are equally exposed to hail which may be produced by such storms. With that in mind, **Figure D.17** shows the location of hail events that have impacted the county between 1955 and 2015.

FIGURE D.17: HAILSTORM TRACKS IN JACKSON COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, 64 recorded hailstorm events have affected Jackson County since 1965.[12] In all, hail occurrences resulted in almost $300 (2016 dollars) in property damages.[13] Hail ranged in diameter from 0.75 inches to 3.0 inches. **Table D.19** provides a summary of the hail events in Jackson County. Detailed information about each event that occurred in the county is provided in **Table D.20**.

It should be noted that hail is notorious for causing substantial damage to cars, roofs, and other areas of the built environment that may not be reported to the National Climatic Data Center. Therefore, it is likely that damages are greater than the reported value.

[12] These hail events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through June 2016. It is likely that additional hail events have affected Jackson County. As additional local data becomes available, this hazard profile will be amended.

[13] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE D.19: SUMMARY OF HAIL OCCURRENCES IN JACKSON COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Gautier	4	0/0	$289	$17
Moss Point	3	0/0	$0	$0
Ocean Springs	9	0/0	$0	$0
Pascagoula	6	0/0	$0	$0
Unincorporated Area	42	0/0	$0	$0
JACKSON COUNTY TOTAL	**64**	**0/0**	**$289**	**$17**

Source: National Climatic Data Center

TABLE D.20: HISTORICAL HAIL OCCURRENCES IN JACKSON COUNTY

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
Gautier				
GAUTIER	4/29/1999	1.00 in.	0/0	$0
GAUTIER	4/29/1999	1.75 in.	0/0	$289
GAUTIER	5/1/2013	1.00 in.	0/0	$0
GAUTIER	4/25/2015	1.00 in.	0/0	$0
Moss Point				
Moss Point	6/2/1995	0.75 in.	0/0	$0
MOSS PT	4/29/1999	1.75 in.	0/0	$0
MOSS PT	7/17/2003	0.88 in.	0/0	$0
Ocean Springs				
OCEAN SPGS	4/14/1996	1.75 in.	0/0	$0
OCEAN SPGS	1/8/1997	0.75 in.	0/0	$0
OCEAN SPGS	5/28/1999	0.88 in.	0/0	$0
OCEAN SPGS	3/11/2001	1.75 in.	0/0	$0
OCEAN SPGS	4/29/2004	0.88 in.	0/0	$0
OCEAN SPGS	5/29/2005	1.25 in.	0/0	$0
OCEAN SPGS	6/23/2006	1.00 in.	0/0	$0
OCEAN SPGS	7/13/2007	1.00 in.	0/0	$0
OCEAN SPGS	4/28/2016	1.00 in.	0/0	$0
Pascagoula				
Pascagoula	5/3/1994	0.88 in.	0/0	$0
PASCAGOULA	5/6/1998	0.75 in.	0/0	$0
PASCAGOULA	4/29/1999	0.75 in.	0/0	$0
PASCAGOULA	7/25/2004	0.88 in.	0/0	$0
PASCAGOULA	6/23/2006	0.88 in.	0/0	$0
PASCAGOULA	4/25/2015	1.75 in.	0/0	$0
Unincorporated Area				
JACKSON CO.	4/19/1965	3.00 in.	0/0	$0
JACKSON CO.	4/23/1969	1.75 in.	0/0	$0
JACKSON CO.	5/24/1972	1.75 in.	0/0	$0
JACKSON CO.	3/31/1976	1.75 in.	0/0	$0
JACKSON CO.	5/19/1980	1.00 in.	0/0	$0

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
JACKSON CO.	7/7/1980	1.75 in.	0/0	$0
JACKSON CO.	3/22/1981	0.75 in.	0/0	$0
JACKSON CO.	6/11/1982	0.75 in.	0/0	$0
JACKSON CO.	3/24/1984	1.75 in.	0/0	$0
JACKSON CO.	3/24/1984	1.75 in.	0/0	$0
JACKSON CO.	7/15/1985	1.75 in.	0/0	$0
JACKSON CO.	4/18/1988	1.75 in.	0/0	$0
JACKSON CO.	4/18/1988	1.75 in.	0/0	$0
JACKSON CO.	5/23/1989	0.75 in.	0/0	$0
JACKSON CO.	6/30/1989	0.75 in.	0/0	$0
JACKSON CO.	4/22/1990	1.75 in.	0/0	$0
JACKSON CO.	1/30/1991	0.75 in.	0/0	$0
JACKSON CO.	5/26/1992	0.75 in.	0/0	$0
Oxford	5/18/1993	1.75 in.	0/0	$0
Hurley	7/2/1995	1.00 in.	0/0	$0
Van Cleave	7/9/1995	0.75 in.	0/0	$0
HURLEY	3/18/1996	0.75 in.	0/0	$0
HURLEY	3/30/1996	1.75 in.	0/0	$0
WADE	9/1/1997	0.75 in.	0/0	$0
VANCLEAVE	5/6/1998	0.75 in.	0/0	$0
HURLEY	3/29/2000	2.00 in.	0/0	$0
VANCLEAVE	7/21/2000	0.75 in.	0/0	$0
HURLEY	3/31/2002	1.00 in.	0/0	$0
ESCATAWPA	8/2/2002	1.00 in.	0/0	$0
HURLEY	5/3/2003	1.75 in.	0/0	$0
ESCATAWPA	3/31/2005	1.00 in.	0/0	$0
VANCLEAVE	4/1/2005	0.75 in.	0/0	$0
WADE	12/28/2007	0.75 in.	0/0	$0
HURLEY	5/25/2008	1.00 in.	0/0	$0
VANCLEAVE	4/2/2009	0.75 in.	0/0	$0
WADE	5/15/2009	0.88 in.	0/0	$0
WADE	7/26/2009	1.00 in.	0/0	$0
WADE	5/26/2011	1.75 in.	0/0	$0
HURLEY	6/5/2011	1.00 in.	0/0	$0
BIG PT	7/12/2013	1.00 in.	0/0	$0
WADE	2/23/2016	1.75 in.	0/0	$0
NORTH BILOXI ARPT	4/28/2016	1.25 in.	0/0	$0

*Property damage is reported in 2016 dollars; All damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that the probability of future hail occurrences is highly likely (100 percent annual probability). Since hail is an atmospheric hazard, it is assumed that Jackson County has equal exposure to this hazard. It can be expected that future hail events will continue to cause minor damage to property and vehicles throughout the county.

D.2.12 Hurricane and Tropical Storm

LOCATION AND SPATIAL EXTENT

Hurricanes and tropical storms threaten the entire Atlantic and Gulf seaboard of the United States, and while coastal areas are most directly exposed to the brunt of landfalling storms, their impact is often felt hundreds of miles inland. Jackson County is located in a region of the country that is susceptible to all of the hazards wrought by hurricanes and tropical storms. All areas throughout Jackson County are susceptible to the accompanying hazard effects of extreme wind, flooding, and tornadoes, and coastal areas are also extremely susceptible to the added effects of storm surge, wave action, coastal erosion, and tidal flooding.[14]

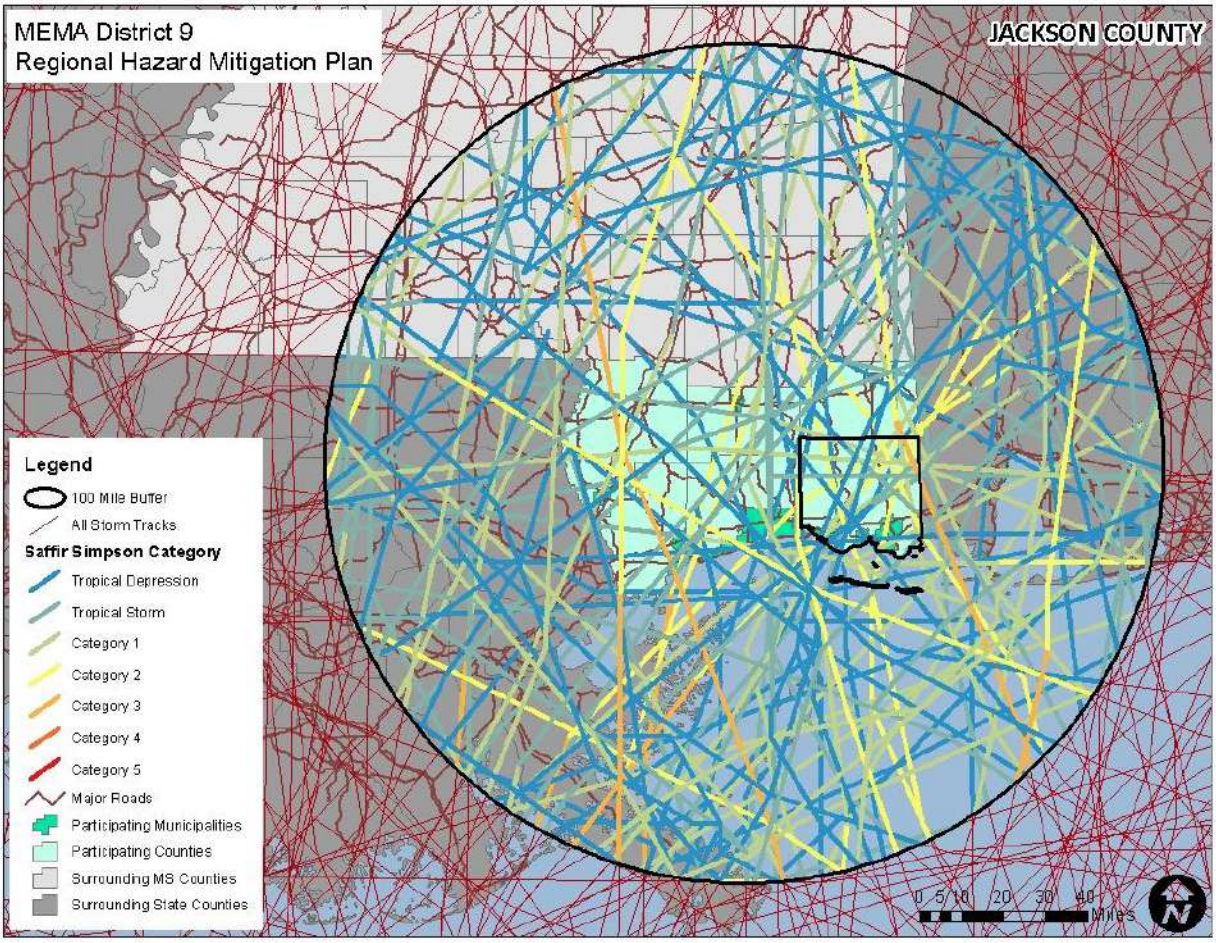
HISTORICAL OCCURRENCES

According to the National Hurricane Center's historical storm track records, 119 hurricane or tropical storm/depression tracks have passed within 100 miles of the MEMA District 9 Region since 1855.[15] This includes: 4 Category 3 hurricanes, 15 Category 2 hurricanes, 28 Category 1 hurricanes, 29 tropical storms, and 43 tropical depressions. Additionally, four other major storms had large-scale impacts on the region and are not included in these totals. These storms are listed below and range in Category from 1 to 4.

Of the recorded storm events, 58 hurricane or tropical storm/depression events traversed directly through the region as shown in **Figure D.18**. Notable storms include Hurricane Camille (1969), Hurricane Frederic (1979), and Hurricane Katrina (2005). **Table D.21** provides for each event the date of occurrence, name (if applicable), maximum wind speed (as recorded within 100 miles of the MEMA District 9 Region) and category of the storm based on the Saffir-Simpson Scale.

[14] Distinct hazard area locations for flooding, storm surge, wave action, and coastal erosion are discussed elsewhere in this subsection.
[15] These storm track statistics include tropical depressions, tropical storms, and hurricanes. Lesser events may still cause significant local impact in terms of rainfall and high winds.

FIGURE D.18: HISTORICAL HURRICANE STORM TRACKS WITHIN 100 MILES OF THE MEMA DISTRICT 9 REGION



Source: National Oceanic and Atmospheric Administration, National Hurricane Center

TABLE D.21: HISTORICAL STORM TRACKS WITHIN 100 MILES OF THE MEMA 9 DISTRICT REGION (1842–2016)

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
8/25/1852	UNNAMED	93	Category 2
8/3/1855	NOT NAMED	--	Tropical Depression
9/16/1855	UNNAMED	96	Category 2
6/24/1857	NOT NAMED	--	Tropical Depression
9/15/1859	UNNAMED	79	Category 1
8/11/1860	UNNAMED	96	Category 2
9/15/1860	UNNAMED	89	Category 2
8/17/1861	NOT NAMED	--	Tropical Depression
11/1/1861	NOT NAMED	--	Tropical Depression
9/15/1862	NOT NAMED	--	Tropical Depression
9/16/1862	NOT NAMED	--	Tropical Depression
10/1/1863	UNNAMED	43	Tropical Storm

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
6/3/1866	NOT NAMED	--	Tropical Depression
9/16/1867	NOT NAMED	--	Tropical Depression
10/5/1867	UNNAMED	89	Category 2
10/3/1868	NOT NAMED	--	Tropical Depression
9/5/1869	UNNAMED	79	Category 1
7/30/1870	NOT NAMED	--	Tropical Depression
7/11/1872	UNNAMED	59	Tropical Storm
9/18/1875	UNNAMED	18	Tropical Depression
9/18/1877	UNNAMED	79	Category 1
9/1/1879	UNNAMED	89	Category 2
10/7/1879	UNNAMED	59	Tropical Storm
8/31/1880	UNNAMED	70	Category 1
8/2/1881	NOT NAMED	--	Tropical Depression
8/3/1881	UNNAMED	59	Tropical Storm
8/30/1885	UNNAMED	59	Tropical Storm
9/26/1885	UNNAMED	70	Category 1
6/15/1886	UNNAMED	50	Tropical Storm
6/14/1887	UNNAMED	33	Tropical Depression
10/19/1887	UNNAMED	82	Category 1
6/27/1888	NOT NAMED	--	Tropical Depression
9/23/1889	UNNAMED	79	Category 1
8/27/1890	UNNAMED	43	Tropical Storm
9/21/1891	NOT NAMED	--	Tropical Depression
9/12/1892	UNNAMED	59	Tropical Storm
9/7/1893	UNNAMED	79	Category 1
10/2/1893	UNNAMED	97	Category 3
8/7/1894	UNNAMED	59	Tropical Storm
8/15/1895	UNNAMED	59	Tropical Storm
9/13/1900	UNNAMED	43	Tropical Storm
8/14/1901	UNNAMED	82	Category 1
10/9/1905	UNNAMED	43	Tropical Storm
9/27/1906	UNNAMED	93	Category 2
9/21/1907	UNNAMED	43	Tropical Storm
8/11/1911	UNNAMED	79	Category 1
6/13/1912	UNNAMED	59	Tropical Storm
7/17/1912	UNNAMED	5	Tropical Depression
9/13/1912	UNNAMED	82	Category 1
9/18/1914	UNNAMED	33	Tropical Depression
9/29/1915	UNNAMED	96	Category 2
7/5/1916	UNNAMED	95	Category 2
10/17/1922	UNNAMED	18	Tropical Depression
6/26/1923	UNNAMED	43	Tropical Storm
10/17/1923	UNNAMED	59	Tropical Storm
9/20/1926	UNNAMED	93	Category 2
9/1/1932	UNNAMED	82	Category 1
10/15/1932	UNNAMED	59	Tropical Storm

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
7/27/1936	UNNAMED	43	Tropical Storm
8/22/1936	UNNAMED	5	Tropical Depression
6/16/1939	UNNAMED	59	Tropical Storm
9/26/1939	UNNAMED	50	Tropical Storm
9/24/1940	UNNAMED	18	Tropical Depression
9/10/1944	UNNAMED	64	Category 1
9/5/1945	UNNAMED	18	Tropical Depression
9/19/1947	UNNAMED	92	Category 2
9/4/1948	UNNAMED	79	Category 1
9/4/1949	UNNAMED	43	Tropical Storm
8/31/1950	BAKER	82	Category 1
8/1/1955	BRENDA	70	Category 1
8/27/1955	UNNAMED	50	Tropical Storm
9/24/1956	FLOSSY	82	Category 1
9/18/1957	ESTHER	64	Category 1
10/8/1959	IRENE	43	Tropical Storm
9/15/1960	ETHEL	85	Category 2
9/26/1960	FLORENCE	1	Tropical Depression
10/4/1964	HILDA	70	Category 1
9/10/1965	BETSY*	117	Category 4
9/29/1965	DEBBIE	33	Tropical Depression
8/18/1969	CAMILLE	100	Category 3
8/8/1971	UNNAMED	5	Tropical Depression
9/4/1971	FERN	5	Tropical Depression
9/16/1971	EDITH	70	Category 1
7/29/1975	UNNAMED	18	Tropical Depression
10/17/1975	UNNAMED	5	Tropical Depression
9/24/1976	UNNAMED	5	Tropical Depression
7/19/1977	UNNAMED	18	Tropical Depression
9/6/1977	BABE	18	Tropical Depression
10/25/1977	UNNAMED	18	Tropical Depression
8/10/1978	UNNAMED	5	Tropical Depression
7/11/1979	BOB	74	Category 1
9/12/1979	FREDERIC	97	Category 3
7/20/1980	UNNAMED	5	Tropical Depression
10/27/1984	UNNAMED	18	Tropical Depression
9/2/1985	ELENA	95	Category 2
10/31/1985	JUAN	64	Category 1
8/12/1987	UNNAMED	5	Tropical Depression
8/8/1988	BERYL	5	Tropical Depression
8/9/1988	BERYL	50	Tropical Storm
9/10/1988	FLORENCE	79	Category 1
8/3/1995	ERIN	82	Category 1
7/19/1997	DANNY	79	Category 1
9/27/1998	GEORGES	92	Category 2
9/20/1998	HERMINE	33	Tropical Depression

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
6/11/2001	ALLISON	43	Tropical Storm
8/5/2002	BERTHA	33	Tropical Depression
9/14/2002	HANNA	59	Tropical Storm
9/26/2002	ISIDORE	64	Category 1
6/30/2003	BILL	59	Tropical Storm
7/1/2003	BILL	18	Tropical Depression
9/16/2004	IVAN	96	Category 2
6/11/2005	ARLENE	59	Tropical Storm
7/6/2005	CINDY	74	Category 1
7/10/2005	DENNIS*	100	Category 3
8/29/2005	KATRINA	98	Category 3
9/22/2007	TEN	5	Tropical Depression
8/24/2008	FAY	18	Tropical Depression
9/1/2008	GUSTAV*	87	Category 2
11/10/2009	IDA	70	Category 1
7/25/2010	BONNIE	5	Tropical Depression
8/12/2010	FIVE	5	Tropical Depression
9/5/2011	LEE	43	Tropical Storm
8/28/2012	ISAAC*	70	Category 1

*It should be noted that the track of several major hurricanes that impacted the region fell outside of the 100-mile buffer. These storms were included in the table due to their significant impact (Betsy, 1965; Dennis, 2005; Gustav, 2008; and Isaac, 2012), but it should be noted that wind speed and storm category are estimated based on anecdotal information.
Source: National Hurricane Center

Federal records indicate that 12 disaster declarations were made in 1965 (Hurricane Betsy), 1969 (Hurricane Camille), 1979 (Hurricane Frederic), 1985 (Hurricane Elena), 1998 (Hurricane Georges), 2001 (Tropical Storm Allison), 2002 (Tropical Storm Isidore), 2004 (Hurricane Ivan), 2005 (Hurricane Dennis and Hurricane Katrina), 2008 (Hurricane Gustav), and 2012 (Hurricane Isaac).[16] Hurricane and tropical storm events can cause substantial damage in the area due to high winds and flooding.

Flooding and high winds from hurricanes and tropical storms can cause damage throughout the county. Anecdotes are available from NCDC for the major storms that have impacted the county as found below:

Hurricane Georges – September 25-29, 1998
Hurricane Georges, a strong Category 2 hurricane moved slowly northwest across the Gulf of Mexico toward southeast Louisiana and coastal Mississippi on the September 25 and September 26. As the hurricane approached the mouth of the Mississippi River on September 27, it slowly turned toward the north making landfall along the Mississippi Coast just to the east of Biloxi, MS at 0400 CST on September 28. The hurricane moved only slowly north during the morning hours, at times becoming nearly stationary. The hurricane finally was downgraded to a tropical storm at 1500CST on September 28 when it was located north of Biloxi. The tropical storm then moved very slowly eastward into southern Alabama on September 29.

The greatest affect from the hurricane occurred over Jackson County which experienced the intense eastern portion of the hurricanes eyewall and highest storm surge.

[16] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

Due to the slow forward speed of the hurricane very heavy rainfall occurred over eastern Harrison County and Jackson County leading to record flooding on streams and rivers. The barrier islands in the Mississippi Sound were also heavily damaged by wind and storm surge. A new three quarter mile cut developed in the east portion of Ship Island. Total insured property damage in Mississippi was estimated at near 310 million dollars by insurance industry sources. When uninsured losses and public property damage considered, total damages in Mississippi will likely approach $620 million.

Jackson County - Jackson County bore the brunt of Hurricane Georges with the area experiencing the strong right front quadrant of the hurricane's circulation. A storm surge of 8 to 11 feet caused storm surge flooding along low lying coastal areas. This was the greatest storm surge flooding in Jackson County in nearly 30 years. In the east beach section of the Bellefontaine area, 23 of 27 homes were heavily damaged or destroyed by storm surge. Many businesses and industries located in low lying coastal areas were flooded causing considerable property damage and loss of revenue. The U.S. Navy facility at Pascagoula suffered $2.2 million in property damage, primarily roof and water damage.

Several unofficial anemometers recorded gusts between 85 and 100 mph in the Pascagoula area. Moderate wind damage was reported across the parish. Numerous commercial signs were destroyed, trees downed, roofs damaged, and power lines and poles downed.

Approximately 4600 people sought refuge in public hurricane evacuation shelters in Jackson County. Two shelters, one in Gautier and one in Pascagoula, suffered wind damage to the roof at the height of the storm.

Due to the slow forward speed of Hurricane Georges, widespread heavy rainfall occurred over Jackson County and over the watershed of the Pascagoula and Escatawpa Rivers. Rainfall of 10 to 15 inches was common over Jackson County. River flooding developed over much of the county by September 28. A record flood crest of 20.82 feet was established on Red Creek at Vestry. On the Escatawpa River, a record flood crest of 22.70 feet was established at Agricola. Approximately 3,000 people were evacuated from flooded areas, primarily in the Escatawpa River basin, with hundreds of structures flooded in the county.

Hurricane Katrina – August 24-30, 2005
Hurricane Katrina was one of the strongest and most destructive hurricanes on record to impact the coast of the United States. It will likely be recorded as one the worst natural disaster in the history of the United States to date resulting in catastrophic damage and numerous casualties in southeast Louisiana and along the Mississippi coast. Damage and casualties resulting from Hurricane Katrina extended as far east as Alabama and the panhandle of Florida. Katrina developed from a tropical depression southeast of the Bahamas on August 24th. After moving through the Bahamas as a tropical storm, Katrina strengthened to a category 1 hurricane prior to landfall in south Florida around the Miami area on the 25th of August. Katrina crossed south Florida and entered the Gulf of Mexico and began to strengthen. Hurricane Katrina strengthened to a category 5 storm on August 28th about 250 miles south southeast of the mouth of the Mississippi River with winds reaching their peak intensity of 175 mph and a central pressure of 902 mb. Post event analysis by the National Hurricane Center indicates that Katrina weakened slightly before making landfall as a strong category 3 storm in initial landfall in lower Plaquemines Parish. Maximum sustained winds were estimated at 110 knots or 127 mph and a central pressure of 920 mb around 610 AM CDT on August 29th in southeast Louisiana just south of Buras in Plaquemines Parish. The storm continued on a north northeast track with the center passing about 40 miles southeast of New Orleans with a second landfall occurring near the Louisiana and Mississippi border around 945 AM CDT as a

category 3 storm with maximum sustained winds estimated around 105 knots or 121 mph. Katrina continued to weaken as it moved north northeast across Mississippi during the day, but remained at hurricane strength 100 miles inland near Laurel, Mississippi. Katrina weakened to a tropical depression near Clarksville, Tennessee on August 30th.

Damage across coastal Mississippi was catastrophic. The storm surge associated with Hurricane Katrina approached or exceeded the surge associated with Hurricane Camille and impacted a much more extensive area. Almost total destruction was observed along the immediate coast in Hancock and Harrison Counties with storm surge damage extending north along bays and bayous to Interstate 10. Thousands of homes and businesses were destroyed by the storm surge. Hurricane force winds also caused damage to roofs, power lines, signage, downed trees, and some windows were broken by wind and wind driven debris in areas away from storm surge flooding, wind damage was widespread with fallen trees taking a heavy toll on houses and power lines. Damage was less extensive in southwest Mississippi. Excluding losses covered by the Federal Flood Insurance Program, insured property losses in Mississippi were estimated at 9.8 billion dollars. Uninsured and insured losses combined were estimated to exceed 100 billion dollars across the Gulf Coast.

As of late October, the following fatality figures were reported in the Mississippi coastal counties; Hancock- 52, Harrison - 83, Jackson - 17. Additional details on fatalities will be given in later updates to storm data.

Due to the failure of power and equipment prior to the peak of the storm, data for wind, storm surge, pressure, and rainfall are incomplete. The lowest pressure on the Mississippi coast was estimated to be 928 mb where the hurricane made landfall near the Louisiana Mississippi border. A pressure of 976 mb was recorded at 0951 CDT by a university weather station deployed in Pascagoula, well east of the landfall location. At approximately the same time, the pressure at the NWS office in Slidell, just to the west of landfall location, recorded a pressure of 934.1 mb at 0938 AM CDT.

The highest wind gusts recorded in Mississippi and the adjacent coastal waters were 117 knots (134 mph) at the Pearl River County EOC office in Poplarville and 102 knots (118 mph) at 1000AM CDT by a university wind tower deployed at the Stennis Space Center in Hancock County. Maximum sustained winds in Mississippi were estimated around 105 knots (121 mph) near the storm's second landfall along the Mississippi and Louisiana border. Unofficial wind observations before the gage failed included a wind gust of 106 kt, (122 mph) at 0615 CDT by an amateur radio operator in Long Beach and a wind gust of 108 kt (124 mph) at the EOC in Pascagoula.

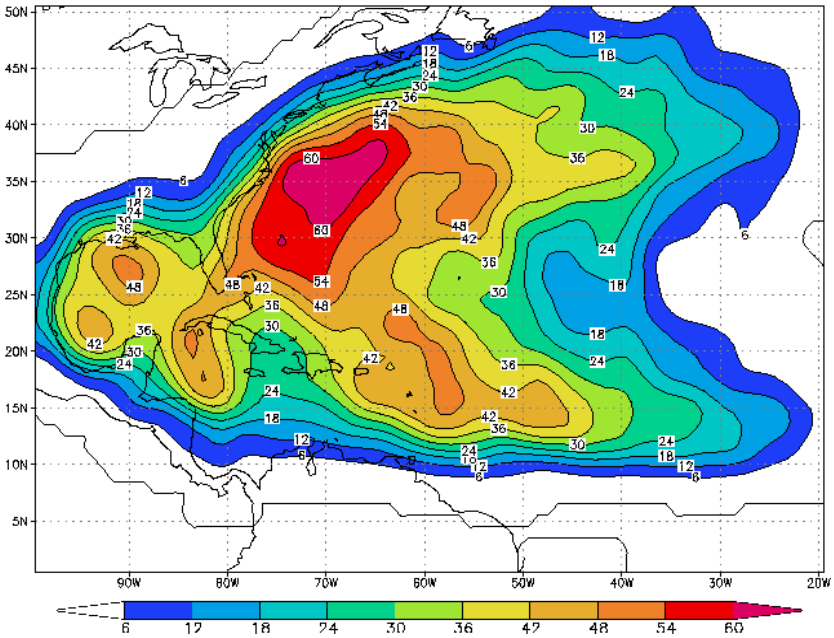
Most tide gages were destroyed by the storm surge so storm surge was determined primarily by post storm high water mark surveys conducted by FEMA. An estimated storm surge of approximately 23.0 feet occurred at the Hancock County EOC operations area in Waveland, and the high water mark measured on the Jackson County EOC building in Pascagoula was 16.1 feet. Preliminary estimates of storm surge along the Mississippi Coast include Hancock County 19-25 feet, Harrison County 19-25 feet, Jackson County 17-21 ft. All storm surge heights are still water elevations referenced to NAVD88 datum.

Storm total rainfall amounts generally ranged from 10 to 16 inches across coastal and south Mississippi with much lower amounts observed over southwest Mississippi. The highest observed storm total rainfall was 11 inches at Stennis Space Center and near Picayune.

PROBABILITY OF FUTURE OCCURRENCES

According to NOAA statistical data, the region is located in an area with an annual probability of a named storm between 30 and 42 percent as presented in **Figure D.19**. This illustration was created by the National Oceanic and Atmospheric Administration's Hurricane Research Division using data from 1944 to 1999 and counting hits when a storm or hurricane was within approximately 100 miles (165 km) of each location. As a reference point, the tip of Florida's outline can be found near the 25N, 80W intersection, and the MEMA District 9 Region is near the 30N, 90W intersection. This empirical probability is fairly consistent with other scientific studies and observed historical data made available through a variety of federal, state, and local sources.

FIGURE D.19: EMPIRICAL PROBABILITY OF A NAMED HURRICANE OR TROPICAL STORM



Source: National Oceanic and Atmospheric Administration

The probability of storm occurrences will vary significantly based on the return interval for different categories of magnitude. The probability of less intense storms (lower return periods) is higher than more intense storms (higher return periods). **Table D.22** profiles the potential peak gust wind speeds that can be expected in the MEMA District 9 Region during a hurricane event for various return periods according to FEMA's HAZUS-MH®.

TABLE D.22: POTENTIAL PEAK GUST WIND SPEEDS PER RETURN PERIOD

50-Year	100-Year	500-Year	1,000-Year
119.4 mph	133.9 mph	160.3 mph	170.0

Source: Federal Emergency Management Agency (Hazus-MH 3.2)

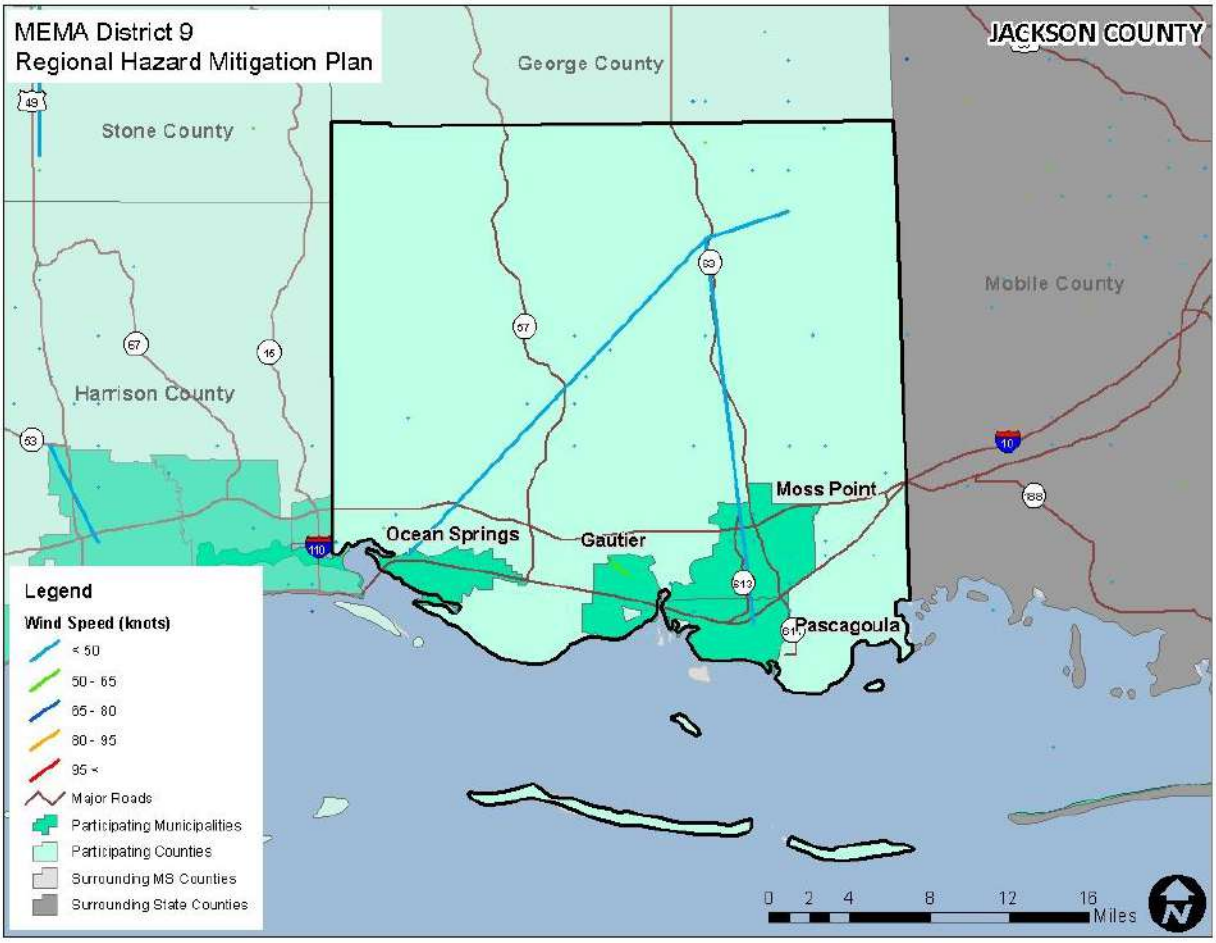
Overall, the probability level of future hurricane and tropical storm occurrence for Jackson County is highly likely (100 percent annual probability).

D.2.13 Severe Thunderstorm/High Wind

LOCATION AND SPATIAL EXTENT

A thunderstorm event is an atmospheric hazard, and thus has no geographic boundaries. It is typically a widespread event that can occur in all regions of the United States. However, thunderstorms are most common in the central and southern states because atmospheric conditions in those regions are favorable for generating these powerful storms. It is assumed that Jackson County has uniform exposure to an event and the spatial extent of an impact could be large. With that in mind, **Figure D.20** shows the location of wind events that have impacted the county between 1955 and 2015.

FIGURE D.20: SEVERE THUNDERSTORM TRACKS IN JACKSON COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

Severe storms were at least partially responsible for four disaster declarations in Jackson County in 1980, 1990, 1995, and 2009.[17] According to NCDC, there have been 127 reported thunderstorm and high wind

[17] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

events since 1959 in Jackson County.[18] These events caused over $459,000 (2016 dollars) in damages.[19] There were also reports of three injuries. **Table D.23** summarizes this information. Detailed thunderstorm and high wind event reports including date, magnitude, and associated damages for each event are presented in **Table D.24**.

TABLE D.23: SUMMARY OF THUNDERSTORM/HIGH WIND OCCURRENCES IN JACKSON COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Gautier	3	0/2	$109,389	$9,116
Moss Point	3	0/0	$7,226	$602
Ocean Springs	12	0/0	$29,120	$1,456
Pascagoula	15	0/0	$118,805	$5,657
Unincorporated Area	94	0/1	$194,828	$3,418
JACKSON COUNTY TOTAL	**127**	**0/3**	**$459,368**	**$20,249**

Source: National Climatic Data Center

TABLE D.24: HISTORICAL THUNDERSTORM/HIGH WIND OCCURRENCES IN JACKSON COUNTY

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
Gautier					
GAUTIER	6/2/2004	Thunderstorm Wind	50 kts. EG	0/0	$7,650
GAUTIER	4/14/2014	Thunderstorm Wind	65 kts. EG	0/2	$101,739
GAUTIER	4/25/2015	Thunderstorm Wind	52 kts. EG	0/0	$0
Moss Point					
MOSS PT	6/2/2004	Thunderstorm Wind	50 kts. EG	0/0	$1,275
MOSS PT	8/30/2006	Thunderstorm Wind	50 kts. EG	0/0	$597
MOSS PT	8/24/2011	Thunderstorm Wind	52 kts. EG	0/0	$5,354
Ocean Springs					
OCEAN SPGS	9/21/1996	Thunderstorm Wind	--	0/0	$1,535
OCEAN SPGS	1/4/2000	Thunderstorm Wind	--	0/0	$1,399
OCEAN SPGS	5/28/2000	Thunderstorm Wind	--	0/0	$699
OCEAN SPGS	7/21/2000	Thunderstorm Wind	--	0/0	$699
OCEAN SPGS	11/5/2002	Thunderstorm Wind	--	0/0	$2,008
OCEAN SPGS	4/29/2004	Thunderstorm Wind	50 kts. EG	0/0	$1,275
OCEAN SPGS	6/2/2004	Thunderstorm Wind	50 kts. EG	0/0	$1,275
OCEAN SPGS	7/13/2004	Thunderstorm Wind	50 kts. EG	0/0	$1,913
OCEAN SPGS	7/13/2004	Thunderstorm Wind	50 kts. EG	0/0	$3,825
OCEAN SPGS	6/19/2007	Thunderstorm Wind	55 kts. MG	0/0	$13,939
OCEAN SPGS	5/28/2010	Thunderstorm Wind	52 kts. EG	0/0	$552
OCEAN SPGS	6/17/2016	Thunderstorm Wind	55 kts. EG	0/0	$0

[18] These thunderstorm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through June 2016 and these high wind events are only inclusive of those reported by NCDC from 1996 through June 2016. It is likely that additional thunderstorm and high wind events have occurred in Jackson County. As additional local data becomes available, this hazard profile will be amended.

[19] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
Pascagoula					
Pascagoula	5/9/1995	Thunderstorm Wind	60 kts.	0/0	$0
PASCAGOULA	1/26/1996	Thunderstorm Wind	--	0/0	$768
PASCAGOULA	1/24/1997	Thunderstorm Wind	--	0/0	$1,501
PASCAGOULA	4/5/1997	Thunderstorm Wind	--	0/0	$3,001
PASCAGOULA	6/5/1998	Thunderstorm Wind	--	0/0	$739
PASCAGOULA	7/16/1998	Thunderstorm Wind	--	0/0	$7,388
PASCAGOULA	12/4/1998	Thunderstorm Wind	--	0/0	$7,388
PASCAGOULA	7/21/2000	Thunderstorm Wind	--	0/0	$1,049
PASCAGOULA	8/10/2000	Thunderstorm Wind	--	0/0	$699
PASCAGOULA	9/5/2000	Thunderstorm Wind	--	0/0	$2,797
PASCAGOULA	11/9/2000	Thunderstorm Wind	--	0/0	$55,947
PASCAGOULA	6/11/2001	Thunderstorm Wind	52 kts. M	0/0	$0
PASCAGOULA	10/13/2001	Thunderstorm Wind	--	0/0	$34,000
PASCAGOULA	6/17/2005	Thunderstorm Wind	50 kts. EG	0/0	$1,850
PASCAGOULA	5/15/2008	Thunderstorm Wind	50 kts. EG	0/0	$1,678
Unincorporated Area					
JACKSON CO.	4/20/1959	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	5/9/1960	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	1/11/1963	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	7/10/1965	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	10/30/1967	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	6/12/1968	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	7/29/1968	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	12/27/1968	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	2/1/1970	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	3/2/1971	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	3/2/1972	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	6/22/1972	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	3/24/1973	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	5/8/1973	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	5/8/1973	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	5/27/1973	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	5/26/1974	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	1/10/1975	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	5/13/1976	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	5/24/1976	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	6/1/1977	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	7/2/1977	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	7/15/1977	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	7/15/1977	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	3/3/1979	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	4/23/1979	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	7/24/1979	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	4/13/1980	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	4/13/1980	Thunderstorm Wind	0 kts.	0/0	$0

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
JACKSON CO.	7/7/1980	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	7/7/1980	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	2/10/1981	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	3/22/1981	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	5/19/1981	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	6/11/1982	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	7/5/1982	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	7/6/1982	Thunderstorm Wind	57 kts.	0/0	$0
JACKSON CO.	1/31/1983	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	2/1/1983	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	2/1/1983	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	4/14/1983	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	5/3/1983	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	8/5/1983	Thunderstorm Wind	52 kts.	0/0	$0
JACKSON CO.	12/11/1983	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	12/11/1983	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	2/26/1984	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	2/26/1984	Thunderstorm Wind	52 kts.	0/0	$0
JACKSON CO.	2/26/1984	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	6/19/1986	Thunderstorm Wind	56 kts.	0/0	$0
JACKSON CO.	10/6/1986	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	7/26/1987	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	3/4/1988	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	7/25/1988	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	7/31/1988	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	5/6/1989	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	6/8/1989	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	7/20/1989	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	2/10/1990	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	3/15/1990	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	12/22/1990	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	4/14/1991	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	4/29/1991	Thunderstorm Wind	0 kts.	0/0	$0
JACKSON CO.	4/20/1992	Thunderstorm Wind	58 kts.	0/0	$0
JACKSON CO.	6/15/1992	Thunderstorm Wind	64 kts.	0/0	$0
JACKSON CO.	11/3/1992	Thunderstorm Wind	0 kts.	0/0	$0
Hurley	3/7/1995	Thunderstorm Wind	0 kts.	0/0	$4,741
VANCLEAVE	3/18/1996	Thunderstorm Wind	--	0/0	$1,535
VANCLEAVE	7/6/1997	Thunderstorm Wind	--	0/0	$750
BIG PT	1/7/1998	Thunderstorm Wind	--	0/0	$443
HELENA	3/3/1999	Thunderstorm Wind	--	0/0	$36,142
WADE	8/2/1999	Thunderstorm Wind	--	0/0	$36,142
ESCATAWPA	8/14/1999	Thunderstorm Wind	--	0/0	$14,457
ESCATAWPA	8/20/2000	Thunderstorm Wind	--	0/0	$699
VANCLEAVE	9/1/2000	Thunderstorm Wind	52 kts. E	0/0	$0
COUNTYWIDE	6/11/2001	Thunderstorm Wind	--	0/0	$13,600

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
COUNTYWIDE	6/11/2001	Thunderstorm Wind	--	0/0	$34,000
VANCLEAVE	12/31/2002	Thunderstorm Wind	--	0/0	$2,008
VANCLEAVE	7/21/2003	Thunderstorm Wind	50 kts. EG	0/0	$5,236
WADE	4/29/2004	Thunderstorm Wind	50 kts. EG	0/0	$1,913
WADE	7/25/2004	Thunderstorm Wind	50 kts. EG	0/0	$638
COUNTYWIDE	8/15/2006	Thunderstorm Wind	50 kts. EG	0/1	$1,195
WADE	11/6/2006	Thunderstorm Wind	50 kts. EG	0/0	$2,389
WADE	3/1/2007	Thunderstorm Wind	50 kts. EG	0/0	$1,742
VANCLEAVE	2/12/2008	Thunderstorm Wind	50 kts. EG	0/0	$2,797
VANCLEAVE	6/29/2008	Thunderstorm Wind	50 kts. EG	0/0	$1,678
HILDA	3/9/2011	Thunderstorm Wind	52 kts. MG	0/0	$0
WADE	3/9/2011	Thunderstorm Wind	60 kts. EG	0/0	$0
VANCLEAVE	5/26/2011	Thunderstorm Wind	55 kts. EG	0/0	$10,707
HILDA	2/18/2012	Thunderstorm Wind	52 kts. EG	0/0	$15,736
VANCLEAVE	7/3/2012	Thunderstorm Wind	55 kts. EG	0/0	$5,245
VANCLEAVE	12/20/2012	Thunderstorm Wind	61 kts. EG	0/0	$0
HURLEY	7/12/2013	Thunderstorm Wind	52 kts. EG	0/0	$1,034
NORTH BILOXI ARPT	4/1/2016	Thunderstorm Wind	60 kts. EG	0/0	$0
VANCLEAVE	5/19/2016	Thunderstorm Wind	60 kts. EG	0/0	$0

*Property damage is reported in 2016 dollars; all damage may not have been reported.
†E = estimated; EG = estimated gust; ES = estimated sustained; MG = measured gust; MS = measured sustained
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

Given the high number of previous events, it is certain that thunderstorm events, including straight-line wind events, will occur in the future. This results in a probability level of highly likely (100 percent annual probability) for the entire county.

D.2.14 Tornado

LOCATION AND SPATIAL EXTENT

Tornadoes occur throughout the state of Mississippi, and thus in Jackson County. Tornadoes typically impact a relatively small area, but damage may be extensive. Event locations are completely random and it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that Jackson County is uniformly exposed to this hazard. With that in mind, **Figure D.21** shows tornado track data for many of the major tornado events that have impacted the county between 1950 and 2015. While no definitive pattern emerges from this data, some areas that have been impacted in the past may be potentially more susceptible in the future.

FIGURE D.21: HISTORICAL TORNADO TRACKS IN JACKSON COUNTY

Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

Tornadoes were at least partially responsible for four disaster declarations in Jackson County in 1980, 1990, 1995, and 2009.[20] According to the National Climatic Data Center, there have been a total of 60 recorded tornado events in Jackson County since 1958, resulting in over $7.9 million (2016 dollars) in property damages.[21] [22] In addition, 19 injuries were reported. The magnitude of these tornadoes ranged from F0 to F2 and EF0 to EF2 in intensity. A summary of these events is presented in **Table D.25**. Detailed information on historic tornado events can be found in **Table D.26**.

[20] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.
[21] These tornado events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1950 through June 2016. It is likely that additional tornadoes have occurred in Jackson County. As additional local data becomes available, this hazard profile will be amended.
[22] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE D.25: SUMMARY OF TORNADO OCCURRENCES IN JACKSON COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Gautier	2	0/0	$153,507	$7,675
Moss Point	5	0/0	$0	$0
Ocean Springs	6	0/0	$118,939	$5,664
Pascagoula	4	0/0	$132,885	$7,817
Unincorporated Area	43	0/19	$7,510,682	$129,495
JACKSON COUNTY TOTAL	**60**	**0/19**	**$7,916,013**	**$150,650**

Source: National Climatic Data Center

TABLE D.26: HISTORICAL TORNADO IMPACTS IN JACKSON COUNTY

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
Gautier					
GAUTIER	4/29/1996	F0	0/0	$153,507	A waterspout moved on shore and caused damage at a small airport. Two light aircraft were destroyed, two others were damaged, and aircraft hangar was slightly damaged and several trees were downed.
GAUTIER	7/2/1999	Waterspout	0/0	$0	Two waterspouts were observed off the Jackson County coast south of Gautier.
Moss Point					
Moss Point	5/9/1995	F1	0/0	$0	Several houses were damaged when a tornado touched down. Path length and width estimated.
PASCAGOULA JCKSN ARP	7/16/2000	F0	0/0	$0	A small tornado briefly touched down near the Pascagoula Jackson Airport resulting in no damage.
MOSS PT	8/10/2000	Funnel Cloud	0/0	$0	A funnel cloud was observed.
MOSS PT	10/6/2000	Funnel Cloud	0/0	$0	A funnel cloud was observed in the Moss Point and Pascagoula areas.
MOSS PT	8/5/2001	Funnel Cloud	0/0	$0	A funnel cloud was observed near the Mississippi and Alabama state line.
Ocean Springs					
Ocean Springs	5/9/1995	F1	0/0	$0	A tornado touched down briefly with only minor damage reported.
OCEAN SPGS	4/29/1996	Waterspout	0/0	$3,070	A waterspout damaged several small sailboats.
OCEAN SPGS	6/17/2005	Funnel Cloud	0/0	$0	A funnel cloud was reported near a school on Government Street.
OCEAN SPGS	11/15/2006	F1	0/0	$59,735	Roof damage occurred to an elementary school, and power lines were blown down when a weak tornado touched down.
OCEAN SPGS	2/13/2007	EF0	0/0	$0	A weak tornado briefly touched down near mile marker 56 on Interstate 10 causing no significant damage.
OCEAN SPGS	4/2/2009	EF0	0/0	$56,133	Several homes received damage in the Pinehurst subdivision just outside of Ocean

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					Springs. Fourteen homes received minor damage while two homes had their roofs partially lifted off. A National Weather Service storm survey determined that the damage was the result of a high end EF0 tornado with an estimated 3 second wind gust speed of 75 to 85 mph.
Pascagoula					
PASCAGOULA	3/13/1999	F0	0/0	$0	A tornado briefly touched down but caused no damage one mile east of Pascagoula south of Interstate 10.
PASCAGOULA	8/7/2001	F0	0/0	$34,000	A waterspout moved onshore and caused minor damage at the U.S. Navy Station just south of Pascagoula. The weak tornado damaged several cars, a recreational vehicle, a power pole, and the roof of the fire station. Eyewitness said the tornado/waterspout traveled north up the Pascagoula River for a short distance then dissipated.
PASCAGOULA	3/26/2009	EF0	0/0	$20,208	A weak tornado briefly touched down causing damage around Tucker Street and 8th Street and on Taylor Street. Pascagoula High School experienced light damage when the scoreboard on the football field was blown down and numerous sections of fence were knocked down with debris littering the field. Traffic lights around the area were knocked down and several trees were blown down. Maximum winds associated with this tornado were estimated around 75 mph with a path length around 250 yards and a maximum width of 50 yards.
PASCAGOULA	8/30/2012	EF2	0/0	$78,678	A tornado touched down in the south portion of Pascagoula. Most of the damage was consistent with EF-1 scale damage consisting of downed trees and light structural damage to a few houses. A small area of significant damage...EF-2...occurred where nearly all of the roof of a large house was blown off. Path length 0.7 miles. Path width 40 yards.
Unincorporated Area					
JACKSON CO.	2/26/1958	F2	0/1	$208,350	--
JACKSON CO.	4/6/1963	F1	0/3	$196,775	--
JACKSON CO.	4/27/1966	F2	0/1	$185,843	--
JACKSON CO.	5/8/1969	F1	0/1	$0	--
JACKSON CO.	8/9/1969	--	0/0	$0	--
JACKSON CO.	12/21/1969	F1	0/0	$16,407	During cloudy and rainy weather with thunderstorms, a small twister (funnel not observed) move northeastward. There was scattered wind damage along a 3-mile path, "east on west end of Choctaw St., from intersection of Church St. and east on Mayo St., and in a northeast direction over

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					downtown Moss Point" where the storm "was aloft" and "at the time of the storm the clouds turned black and windy." Most of the damage was confined to a 3-block area in northwest section of Moss Point (lat. 30.4° N, long. 88.5° W). Two houses shifted from foundation blocks and received extensive roof damage, a church lost some shingles, several homes lost parts of roofs, a boat house at end of Choctaw lifted from foundation and deposited destroying boat house and heavily damaging boat. A number of trees were blown down, power and gas lines out for a while. Police Department reported no deaths or injuries, damages $5,000.
JACKSON CO.	2/12/1971	F1	0/2	$14,867	Civil Defense Director reported storm moved from SW towards NE. During cloudy weather a small funnel dipped down at 9:30 a.m. in the Wade community where a trailer was overturned, a woman and small girl were injured, and several trees blown over. Damages estimated above $500.
JACKSON CO.	5/8/1971	F2	0/0	$148,675	Storms moved from west towards east. During a period of thunderstorms with hail, a funnel cloud was observed by owners of Kamp Grounds of America, State Highway 57 and I-20. The damage "track was a lazy 'S' oriented from west to east, destroyed one barn - 20% of residential roof and destroyed mobile home (owned by John Bush).... " Report of "sounds like a fast-moving train." The damage area was 1/2 mile E and S of the intersection off Highway 57. Newspaper noted woman "at the Tommy Reed residence nearby the trailer notified the (Ocean Springs) police when she saw the debris outside her house." Civil Defense Director Pascagoula estimated damages $8,500. Hail at 12 noon, 1/4 inch to pea size, covered half the ground for about 5 square miles in the Fontainebleau area.
JACKSON CO.	5/8/1971	F1	0/0	$14,867	Storm moved from W to E. During rainy weather, one small funnel (not observed) unroofed barn and house. About 8 N Moss Point, Highway 63 and 613, north of Escatawpa (lat. 30.5° N, long. 88.5° W). County Civil Defense Director estimated damages $2,000.
JACKSON CO.	2/13/1973	F1	0/1	$13,562	Newspaper noted, "A twister touched down near Old Highway 90 and Seaman Road around midnight Tuesday (13th)…and damaged the camper…owned by A. V. Duda of Shore Drive in Gulf Hills." At this time, movement was reported towards the NW.

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					About 1/2 mile away on south side of Solomon Road, halfway between E. Cedar and S. Seaman roads, roof taken off greenhouse and damaged pile of building material on east side of Harry Barnett's house. The tornado reportedly started making a turn to NE as it crossed Solomon Road, and passed on the west side of Charles Tonner's house on the north corner of Solomon and Seaman roads. Mr. Tonner stated, "I was awake and I could hear it roaring. I opened two doors, on the south and the other on the east side. All of a sudden it sopped lightning and raining, then it passed over to the west of my house, then it started raining again. To the north of my house about 20 yards, the bushes 8 to 10 feet tall were twisted and tied in knots. Then it turned NE; a big sycamore tree was split and chewed up about 400 yards away on Solomon Road in Wesley Ladnier's yard." Jackson County Patroman stated, "The trees were in different directions...it appeared that the tornado traveled about a third of a mile before lifting. It cut a path about 30 yards wide." The length of the destructive path believed under 1 1/4 miles and the width from 30 to 80 yards with the average about 40 yards. A small house just north of the Tonner's house was heavily damaged and man inside was pinned under debris; he received small cuts on right arm. Damages estimated over $1,000 to house.
JACKSON CO.	6/13/1974	F0	0/0	$147	--
JACKSON CO.	6/20/1974	F0	0/0	$1,221	--
JACKSON CO.	9/8/1974	F0	0/0	$147	Slight timber damage resulted during the brief tornado touch down.
JACKSON CO.	11/4/1974	F1	0/0	$147	--
JACKSON CO.	1/10/1975	F1	0/0	$1,119	--
JACKSON CO.	1/10/1975	F2	0/0	$1,119,205	--
JACKSON CO.	5/2/1977	F2	0/0	$99,362	--
JACKSON CO.	6/1/1977	F0	0/0	$994	A small tornado briefly touched down 3 1/2 mi. E of the intersection of Highway 63 & 613 or about 7 mi. NNE of Moss Point. Damage was mainly to trees and power lines.
JACKSON CO.	7/15/1977	F0	0/1	$993,618	High winds from an intensifying thunderstorm caused widespread damage throughout the Pascagoula, Moss Point, and Gautier communities. Most of the damage was to boats and marine facilities but also included house trailers, storage sheds, and automobiles. Total damage $80,000. This was believed to be a small tornado.

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
JACKSON CO.	7/29/1978	--	0/0	$9,235	A waterspout moved inland at Gautier, near Pascagoula. It blew a few backyard buildings around, knocked a tree onto some power lines, did minor damage to one home, a mobile home, and one automobile in the 2 to 4 minutes it lasted.
JACKSON CO.	4/23/1979	F0	0/0	$8,294	--
JACKSON CO.	5/19/1980	F2	0/0	$730,743	--
JACKSON CO.	2/10/1981	F2	0/2	$662,412	--
JACKSON CO.	4/25/1982	F2	0/3	$623,972	A small tornado touched down briefly in the southern area of Moss Point destroying a used furniture store and taking the roof off of a new super market. Minor damage was also reported at several residences. Three people were injured by flying glass. One woman was seriously when her mobile home was overturned. About 1,500 residences were without power from downed power lines.
JACKSON CO.	2/1/1983	F1	0/3	$604,551	A small tornado touched down briefly along Highway 614 three miles southeast of Hurley. The tornado turned over a mobile home.
JACKSON CO.	5/21/1985	F2	0/0	$559,603	--
JACKSON CO.	5/21/1985	F1	0/1	$559,603	--
JACKSON CO.	9/16/1988	F0	0/0	$50,899	A very small tornado touched down briefly in Moss Point. The tornado damaged a roof, ripped the hood off of a car and scattered garbage around.
JACKSON CO.	2/10/1990	F1	0/0	$460,698	A tornado touched down briefly in the Franklin Creek community. It damaged a roof on a commercial business. It damaged several houses and blew down numerous sheds.
Vancleave	3/1/1994	F0	0/0	$8,126	--
JACKSON CO.	12/3/1994	F0	0/0	$0	A tornado briefly touched down near intersection of I 10 and Hwy 613. The tornado was over swamp grass and no damage was reported.
Springs	5/9/1995	--	0/0	$0	A waterspout moved onshore then traveled northeast across Keesler Air Force Base. Trees were knocked down, several cars damaged, and commercial signs damaged. The tornado moved into extreme west Jackson County damaging a mobile home and a couple of storage buildings.
HURLEY	1/18/1996	F0	0/0	$0	The public reported that a tornado touched down momentarily without causing any damage.
VANCLEAVE	8/10/2000	Funnel Cloud	0/0	$0	Several funnel clouds were sighted just north of Vancleave.
ESCATAWPA	8/20/2000	F0	0/0	$2,797	Several trees were knocked down and some homes had windows blown out.

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
HURLEY	6/11/2001	F0	0/0	$6,800	A weak tornado snapped off tree tops.
VANCLEAVE	8/30/2003	Funnel Cloud	0/0	$0	A funnel cloud was observed.
VANCLEAVE	6/6/2005	Funnel Cloud	0/0	$0	A funnel cloud was observed.
VANCLEAVE	10/18/2007	EF1	0/0	$104,546	A tornado destroyed one mobile home and heavily damaged at least ten others in the Lucasville community just west of Vancleave. In addition, the tornado destroyed several outbuildings, snapped trees, and knocked down power lines.
VANCLEAVE	12/24/2009	EF0	0/0	$2,245	A weak tornado briefly touched down knocking down numerous trees along its path.
FONTAINEBLEAU	4/4/2011	EF1	0/0	$37,476	Roofing was peeled off of a couple of metal commercial buildings in the Fountainbleau area. Windows were blown out of two houses. Large sections of two fences were blown down. Several medium trees were blown down and large tree limbs were snapped. Damage path was approximately 0.1 mile long and 75 yards wide. Estimated strength of tornado was low end EF1.
COLL TOWN	5/26/2011	EF0	0/0	$21,415	A weak tornado touched down about 1/4 mile southwest of the intersection of Mississippi Highway 63 and Mississippi Highway 613, and travelled intermittently for approximately 3 miles to the northeast. A portable office building was flipped over, power lines were blown down, and several trees were knocked down.
OCEAN SPGS ARPT	8/29/2012	EF1	0/0	$41,962	A tornado touched down in the Gulf Park Estates area causing damage to roofs on several houses and blowing out windows. A few trees were downed and large tree branches snapped. Path length approximately 0.4 miles. Path width 40 yards.

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

According to historical information, tornado events pose a significant threat to Jackson County. The probability of future tornado occurrences affecting Jackson County is highly likely (100 percent annual probability).

D.2.15 Winter Weather

LOCATION AND SPATIAL EXTENT

Nearly the entire continental United States is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. Jackson County is not accustomed to severe winter weather conditions and rarely receives severe winter weather, even during the winter months. Events tend to be mild in nature; however, even relatively small accumulations of snow, ice, or other wintery precipitation can lead to losses and damage due to the fact that these events are not commonplace. Given the atmospheric nature of the hazard, the entire county has uniform exposure to a winter storm.

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, there have been a total of four recorded winter storm events in Jackson County since 1996.[23] These events did not result in any property damage.[24] A summary of these events is presented in **Table D.27**. Detailed information on the recorded winter storm events can be found in **Table D.28**.

TABLE D.27: SUMMARY OF WINTER STORM EVENTS IN JACKSON COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Jackson County	4	0/0	$0	$0

Source: National Climatic Data Center

TABLE D.28: HISTORICAL WINTER STORM IMPACTS IN JACKSON COUNTY

Location	Date	Type	Deaths/Injuries	Property Damage*
Gautier				
None reported	--	--	--	--
Moss Point				
None reported	--	--	--	--
Ocean Springs				
None reported	--	--	--	--
Pascagoula				
None reported	--	--	--	--
Unincorporated Area				
JACKSON (ZONE)	12/18/1996	Heavy Snow	0/0	$0
JACKSON (ZONE)	12/25/2004	Winter Storm	0/0	$0
JACKSON (ZONE)	1/24/2014	Winter Weather	0/0	$0

[23] These ice and winter storm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional winter storm conditions have affected Jackson County.
[24] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Type	Deaths/Injuries	Property Damage*
JACKSON (ZONE)	1/28/2014	Sleet	0/0	$0

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

There have been several severe winter weather events in Jackson County. The text below describes one of the major events and associated impacts on the county. Similar impacts can be expected with severe winter weather.

December 2004
A mixture of sleet and snow fell off and on during much of Christmas day resulting in a dusting to one half inch of accumulation across much of southwest, south, and coastal Mississippi. Although not heavy, accumulation of ice and snow in coastal Mississippi is unusual and the winter weather impacted transportation. The mixture of sleet and snow caused a number of bridges and overpasses to become icy which resulted in some traffic accidents and closure of some the elevated roadways.

Winter storms throughout the planning area have several negative externalities including hypothermia, cost of snow and debris cleanup, business and government service interruption, traffic accidents, and power outages. Furthermore, citizens may resort to using inappropriate heating devices that could to fire or an accumulation of toxic fumes.

PROBABILITY OF FUTURE OCCURRENCES

Winter storm events will continue to occur in Jackson County. Based on historical information, the probability is likely (between 10 and 100 percent annual probability).

OTHER HAZARDS

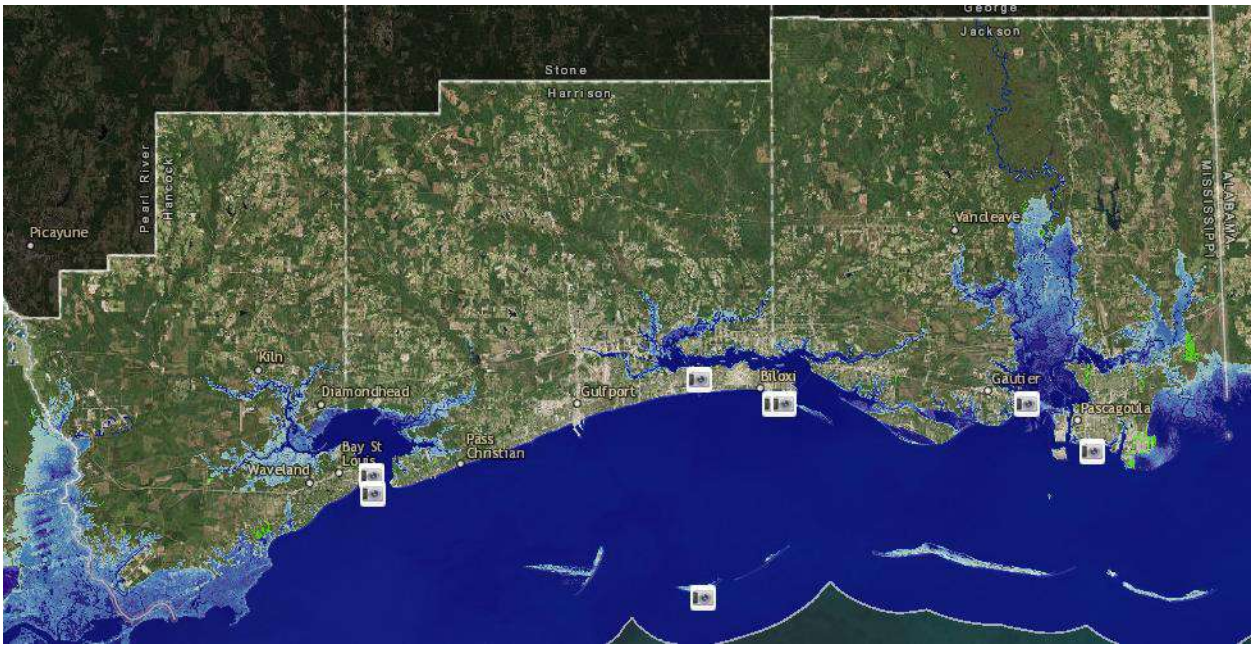
D.2.16 Climate Change/Sea Level Rise

LOCATION AND SPATIAL EXTENT

Climate Change
Climate change can have direct implications on many of the other hazards addressed in this plan since it has the potential to alter the nature and frequency of hazards, including increasing temperature (extreme heat), changes in precipitation (drought, flooding), and more frequent, strong storms (wind, hurricane). Therefore, it is assumed that Jackson County is uniformly exposed to this hazard.

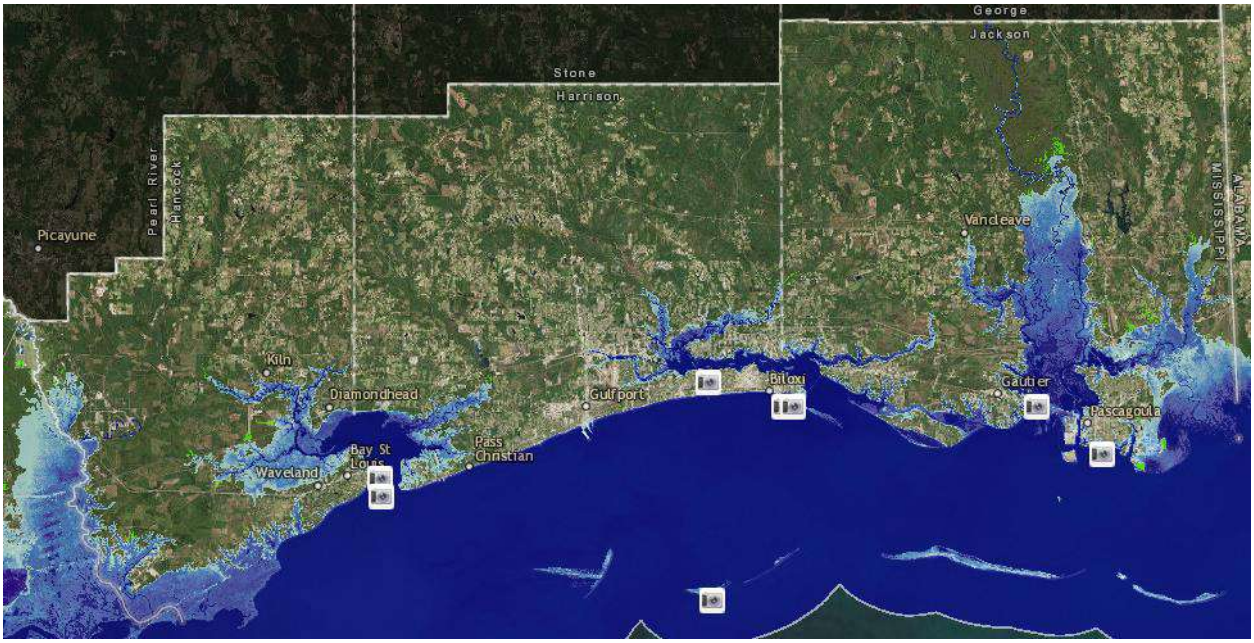
Sea Level Rise
Sea level rise is occurring at a global scale. However, it does not affect areas uniformly and will be more severe in some places. **Figure D.22** identifies areas in MEMA District 9 that would be inundated by water as a result of three feet in sea level rise as per projections by NOAA. The highest level of sea level rise projected by NOAA is shown in **Figure D.23**. This figure shows the inundation areas in the case of six feet of sea level rise. This demonstrates the additional areas that would be impacted beyond the three feet scenario.

FIGURE D.22: THREE FEET SEA LEVEL RISE IN MEMA DISTRICT 9



Source: NOAA

FIGURE D.23: SIX FEET SEA LEVEL RISE IN MEMA DISTRICT 9



Source: NOAA

HISTORICAL OCCURRENCES

Climate Change

According to the *National Climate Assessment*, there have been increasing numbers of days above 95°F and nights above 75°F, and decreasing numbers of extremely cold days since 1970 in the Southeast. Daily

and five-day rainfall intensities have also increased and summers have been either increasingly dry or extremely wet. The number of Category 4 and 5 hurricanes in the Atlantic basin has increased substantially since the early 1980s compared to the historic record that dates back to the mid-1880s. This can be attributed to both natural variability and climate change.

Sea Level Rise
Sea level rise is a slow-onset hazard and specific events/occurrences are not possible to determine.

PROBABILITY OF FUTURE OCCURRENCES

Climate Change
According to the *National Climate Assessment*, temperatures across the Southeast are expected to increase during this century, with shorter-term (year-to-year and decade-to-decade) fluctuations over time due to natural climate variability. Major consequences of warming include significant increases in the number of hot days (95°F or above) and decreases in freezing events. Regional average increases are in the range of 4°F to 8°F by the year 2100.

Projections of future precipitation patterns are less certain than projections for temperature increases. Because the Southeast is located in the transition zone between projected wetter conditions to the north and drier conditions to the southwest, many of the model projections show only small changes relative to natural variations. Additionally, projections further suggest that warming will cause tropical storms to be fewer in number globally, but stronger in force, with more Category 4 and 5 storms, and substantial further increases in extreme precipitation are projected as this century progresses.

Overall, future climate change is considered likely (between 10 and 100 percent annual probability).

Sea Level Rise
There is still much debate regarding the probability of future occurrence of sea level rise. This section will be updated as more information becomes available. Future sea level rise is considered likely (between 10 and 100 percent annual probability).

D.2.17 Hazardous Materials Incident/Train Derailment

LOCATION AND SPATIAL EXTENT

Jackson County has 11 TRI sites. These sites are shown in **Figure D.24.**

FIGURE D.24: TOXIC RELEASE INVENTORY (TRI) SITES IN JACKSON COUNTY

Source: Environmental Protection Agency

In addition to "fixed" hazardous materials locations, hazardous materials may also impact the county via roadways and railways. Many roads and railways in the county are subject to hazardous materials transport and all roads and railways that permit hazardous material transport are considered potentially at risk to an incident.

HISTORICAL OCCURRENCES

There have been a total of 176 recorded HAZMAT incidents in Jackson County since 1971. These events resulted in over $1.0 million (2016 dollars) in property damage as well as 15 injuries.[25] **Table D.29** summarizes the HAZMAT incidents in Jackson County as reported by PHMSA. Detailed information on these events is presented in **Table D.30.**

[25] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE D.29: SUMMARY OF HAZMAT INCIDENTS IN JACKSON COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Gautier	10	0/0	$5,556	$142
Moss Point	31	0/3	$509,186	$13,762
Ocean Springs	13	0/5	$231,373	$5,509
Pascagoula	119	0/7	$284,357	$6,319
Unincorporated Area	3	0/0	$1,535	$45
JACKSON COUNTY TOTAL	**176**	**0/15**	**$1,032,007**	**$25,777**

Source: United States Department of Transportation Pipeline and Hazardous Materials Safety Administration

TABLE D.30: HAZMAT INCIDENTS IN JACKSON COUNTY

Report Number	Date	City	Mode	Serious Incident?	Deaths/ Injuries	Damages ($)*	Quantity Released
Gautier							
I-1977030472	2/22/1977	GAUTHIER	Highway	No	0/0	$0	0
I-1981010388	12/8/1980	GAUTIER	Highway	No	0/0	$0	55 LGA
I-1985060052	5/20/1985	GAUTIER	Highway	No	0/0	$0	10 LGA
I-1997120989	12/5/1997	GAUTIER	Highway	No	0/0	$2,078	100 LGA
I-1998050760	2/24/1998	GAUTIER	Highway	No	0/0	$59	0.5 LGA
I-1998071333	6/19/1998	GAUTIER	Highway	No	0/0	$185	2.6 LGA
I-2004061465	6/9/2004	GAUTIER	Highway	No	0/0	$0	0
I-2011030410	2/24/2011	GAUTIER	Highway	No	0/0	$3,234	50 LGA
I-2011040139	3/23/2011	GAUTIER	Highway	No	0/0	$0	0.085938 LGA
I-2014060126	5/23/2014	GAUTIER	Highway	No	0/0	$0	0.007812 LGA
Moss Point							
I-1979030340	2/1/1979	MOSS POINT	Highway	No	0/0	$0	100 LGA
I-1980070813	6/27/1980	MOSS POINT	Highway	No	0/0	$0	20 LGA
I-1982040264	3/26/1982	MOSS POINT	Highway	No	0/0	$0	20 LGA
I-1982120264	12/9/1982	MOSS POINT	Rail	No	0/0	$0	1 SLB
I-1983060152	5/27/1983	MOSS POINT	Highway	Yes	0/0	$0	0
I-1983060152	5/27/1983	MOSS POINT	Highway	Yes	0/0	$0	1,700 SLB
I-1985020262	2/7/1985	MOSS POINT	Highway	No	0/0	$0	12,692 GCF
I-1988020519	2/11/1988	MOSS POINT	Rail	No	0/0	$0	0.12 LGA
I-1989060133	5/18/1989	MOSS POINT	Highway	No	0/0	$0	0.25 LGA
I-1990080718	7/25/1990	MOSS POINT	Highway	No	0/0	$10,489	55 LGA
I-1990120212	11/3/1990	MOSS POINT	Highway	No	0/0	$37	2 LGA
I-1990120213	11/3/1990	MOSS POINT	Highway	No	0/1	$0	1 LGA
I-1995081086	7/25/1995	MOSS POINT	Highway	No	0/0	$435	30 LGA
I-1995091387	9/8/1995	MOSS POINT	Rail	No	0/1	$0	1 LGA
I-1996030760	3/12/1996	MOSS POINT	Highway	No	0/0	$0	5 LGA
I-1997020237	7/8/1996	MOSS POINT	Highway	No	0/1	$0	160 SLB
I-1997060725	5/23/1997	MOSS POINT	Highway	No	0/0	$35,715	60 LGA
I-1999091811	9/17/1999	MOSS POINT	Highway	No	0/0	$0	1 LGA
I-2000120388	9/3/2000	MOSS POINT	Highway	No	0/0	$0	2 LGA
I-2001030532	3/3/2001	MOSS POINT	Highway	No	0/0	$0	2 LGA

Report Number	Date	City	Mode	Serious Incident?	Deaths/ Injuries	Damages ($)*	Quantity Released
I-2001060219	5/29/2001	MOSS POINT	Highway	No	0/0	$0	0.25 LGA
I-2001080529	7/16/2001	MOSS POINT	Highway	No	0/0	$0	0
I-2005040358	4/16/2004	MOSS POINT	Highway	Yes	0/0	$143,618	1,643 LGA
I-2006101616	9/19/2006	MOSSPOINT	Highway	No	0/0	$15,053	98 LGA
I-2007050473	1/4/2007	MOSS POINT	Highway	Yes	0/0	$256,486	1,290 LGA
I-2013040017	3/21/2013	MOSS POINT	Highway	No	0/0	$0	0.01671 GCF
E-2013100210	7/17/2013	MOSS POINT	Rail	No	0/0	$46,525	0.13368 GCF
I-2013100011	9/20/2013	MOSS POINT	Rail	No	0/0	$827	0.6684 GCF
E-2014080019	7/21/2014	MOSS PONT	Highway	No	0/0	$0	0.004178 GCF
I-2014120269	11/12/2014	MOSS POINT	Rail	No	0/0	$0	0.01671 GCF
E-2014120220	11/30/2014	MOSS POINT	Highway	No	0/0	$0	0.25 LGA
Ocean Springs							
I-1974060025	5/26/1974	OCEAN SPRINGS	Highway	No	0/0	$0	0
I-1975080280	7/28/1975	OCEAN SPRINGS	Highway	No	0/0	$0	0
I-1990120636	11/20/1990	OCEAN SPRINGS	Highway	Yes	0/4	$130,838	5,000 LGA
I-1991040453	3/23/1991	OCEAN SPRINGS	Highway	No	0/0	$141	75 LGA
I-1993030215	1/30/1993	OCEAN SPRINGS	Highway	Yes	0/0	$16,083	150 LGA
I-1996090555	8/5/1996	OCEAN SPRINGS	Rail	No	0/0	$7,675	100 LGA
I-1996121072	11/20/1996	OCEAN SPRINGS	Rail	Yes	0/1	$0	15 LGA
I-2000050942	2/4/2000	OCEAN SPRINGS	Highway	Yes	0/0	$17,134	320 SLB
I-2004091344	2/2/2004	OCEAN SPRINGS	Highway	No	0/0	$0	0.001308 LGA
I-2008030153	8/31/2007	OCEAN SPRINGS	Highway	Yes	0/0	$0	80 LGA
E-2008120026	11/14/2008	OCEAN SPRINGS	Highway	No	0/0	$0	3 LGA
I-2010050392	4/21/2009	OCEAN SPRINGS	Highway	No	0/0	$59,501	10 LGA
I-2010060210	7/21/2009	OCEAN SPRINGS	Highway	No	0/0	$0	3 LGA
Pascagoula							
I-1971110168	11/9/1971	PASEAGOULA	Highway	No	0/0	$0	0
I-1973060159	5/31/1973	PASCAGOULA	Highway	No	0/0	$0	0
I-1974050542	1/31/1974	PASCAGOULA	Highway	No	0/0	$0	0
I-1974090345	8/13/1974	PASCAGOULA	Highway	No	0/1	$0	0
I-1974120237	11/20/1974	PASCAGOULA	Rail	No	0/1	$0	0
I-1975040178	3/24/1975	PASCAGOULA	Highway	No	0/0	$0	0
I-1975060436	5/15/1975	PASCAGOULA	Highway	No	0/0	$0	0
I-1975060062	5/22/1975	PASCAGOULA	Highway	No	0/0	$0	0
I-1976040745	4/15/1976	PASCAGOULA	Rail	No	0/1	$0	5 LGA
I-1976091099	9/21/1976	PASCAGOULA	Highway	Yes	0/0	$0	1,500 LGA
I-1977010383	11/1/1976	PASCAGOLA	Highway	No	0/0	$0	0
I-1976110815	11/3/1976	PASCAGOULA	Highway	No	0/0	$0	0
I-1977071609	6/20/1977	PASCAGOULA	Highway	No	0/0	$0	2 LGA
I-1977070910	7/5/1977	PASCAGOULA	Highway	No	0/0	$0	0
I-1978051546	5/22/1978	PASCOUGLA	Highway	No	0/0	$0	5 LGA
I-1978061053	5/30/1978	PASCAGOULA	Rail	No	0/0	$0	0
I-1978061054	5/30/1978	PASCAGOULA	Rail	No	0/0	$0	0
I-1978090515	8/16/1978	PASCAGOULA	Rail	No	0/0	$0	1 LGA
I-1978090080	8/20/1978	PASCAGOULA	Highway	Yes	0/0	$0	4,246 LGA
I-1978110271	10/6/1978	PASCAGOULA	Highway	No	0/0	$0	2 LGA

Report Number	Date	City	Mode	Serious Incident?	Deaths/ Injuries	Damages ($)*	Quantity Released
I-1978101450	10/12/1978	PASCAGOULA	Rail	No	0/1	$0	5 LGA
I-1979051170	3/30/1979	PASCAGOULA	Highway	No	0/0	$0	5 LGA
I-1979051067	5/15/1979	PASCAGOULA	Highway	No	0/0	$0	1 LGA
I-1979110452	9/19/1979	PASCAGOULA	Highway	No	0/0	$0	25 LGA
I-1979110453	10/18/1979	PASCAGOULA	Highway	No	0/0	$0	105 LGA
I-1979110454	10/22/1979	PASCAGOULA	Highway	No	0/0	$0	25 LGA
I-1979110455	10/24/1979	PASCAGOULA	Highway	No	0/0	$0	10 LGA
I-1979110178	10/31/1979	PASCAGOULA	Highway	Yes	0/0	$0	413 LGA
I-1979110456	11/1/1979	PASCAGOULA	Highway	No	0/0	$0	50 LGA
I-1979110457	11/2/1979	PASCAGOULA	Highway	No	0/0	$0	20 LGA
I-1979110458	11/5/1979	PASCAGOULA	Highway	No	0/0	$0	5 LGA
I-1979120327	11/21/1979	PASCAGOULA	Highway	No	0/0	$0	10 LGA
I-1980011216	12/14/1979	PASCAGOULA	Highway	No	0/0	$0	25 LGA
I-1980050559	3/6/1980	PASCAGOULA	Highway	No	0/0	$0	2 LGA
I-1980050189	3/22/1980	PASCAGOULA	Highway	No	0/0	$0	3 LGA
I-1980040503	4/9/1980	PASCAGOULA	Highway	No	0/0	$0	1 LGA
I-1980041669	4/15/1980	PASCAGOULA	Rail	No	0/0	$0	1 LGA
I-1980061490	7/7/1980	PASCAGOULA	Rail	No	0/0	$0	3 LGA
I-1981030030	2/18/1981	PASCAGOULA	Rail	No	0/1	$0	0
I-1981070008	4/29/1981	PASCAGOULA	Highway	No	0/0	$0	1 LGA
I-1981070889	7/9/1981	PASCAGOULA	Rail	No	0/0	$0	0
I-1981100341	9/26/1981	PASCAGOULA	Rail	No	0/0	$0	0
I-1982060113	5/12/1982	PASCAGOULA	Rail	No	0/0	$0	10 LGA
I-1982110279	10/28/1982	PASCAGOULA	Rail	No	0/0	$0	0
I-1983020294	1/28/1983	PASCAGOULA	Rail	No	0/0	$0	1 SLB
I-1983030288	3/9/1983	PASCAGOULA	Rail	No	0/0	$0	1 SLB
I-1983050365	4/29/1983	PASCAGOULA	Highway	No	0/0	$0	20 LGA
I-1984020061	2/1/1984	PASCAGOULA	Rail	No	0/0	$0	0
I-1984110294	11/7/1984	PASCAGOULA	Rail	No	0/0	$0	0
I-1986020308	2/21/1986	PASCAGOULA	Rail	No	0/0	$0	0
I-1987010215	12/31/1986	PASCAGOULA	Highway	Yes	0/0	$0	2,000 LGA
I-1987040267	4/9/1987	PASCAGOULA	Rail	No	0/0	$0	1 LGA
I-1987040267	4/9/1987	PASCAGOULA	Rail	No	0/0	$0	1 LGA
I-1987100269	9/15/1987	PASCAGOULA	Highway	No	0/0	$0	1 LGA
I-1988080379	4/25/1988	PASCAGOULA	Highway	No	0/0	$0	5 LGA
I-1989100554	9/5/1989	PASCAGOULA	Highway	No	0/0	$0	1 LGA
I-1989100448	10/1/1989	PASCAGOULA	Highway	No	0/0	$0	10 LGA
I-1989110451	11/19/1989	PASCAGOULA	Highway	No	0/0	$0	4 LGA
I-1990020627	2/16/1990	PASCAGOULA	Highway	No	0/0	$160	50 LGA
I-1990050152	4/24/1990	PASCAGOULA	Rail	No	0/0	$0	1 LGA
I-1990090136	8/26/1990	PASCAGOULA	Highway	No	0/0	$282	10 LGA
I-1991020701	1/2/1991	PASCAGOULA	Highway	No	0/0	$451	0.0625 LGA
I-1991020648	1/22/1991	PASCAGOULA	Highway	No	0/0	$345	0.0625 LGA
I-1991090834	9/13/1991	PASCAGOULA	Highway	No	0/0	$690	5 LGA
I-1992040474	3/12/1992	PASCAGOULA	Highway	No	0/0	$618	0.5 SLB
I-1992070667	6/8/1992	PASCAGOULA	Highway	No	0/0	$60	0.25 SLB

Report Number	Date	City	Mode	Serious Incident?	Deaths/ Injuries	Damages ($)*	Quantity Released
I-1993030066	1/26/1993	PASCAGOULA	Highway	No	0/0	$575	0.03125 LGA
I-1994040825	3/22/1994	PASCAGOULA	Highway	No	0/0	$3,429	0.25 LGA
I-1994070002	6/15/1994	PASCAGOULA	Highway	No	0/0	$0	0.000528 LGA
I-1994070081	6/30/1994	PASCAGOULA	Highway	No	0/0	$0	0.003906 LGA
I-1995050823	4/19/1995	PASCAGOULA	Highway	No	0/0	$0	0
I-1995080711	7/13/1995	PASCAGOULA	Highway	No	0/0	$0	15 LGA
I-1996010997	1/19/1996	PASCAGOULA	Highway	No	0/0	$31	20 LGA
I-1996030874	3/5/1996	PASCAGOULA	Highway	No	0/0	$0	1 LGA
I-1996050207	4/10/1996	PASCAGOULA	Highway	No	0/0	$0	0.5 LGA
I-1996080687	5/22/1996	PASCAGOULA	Highway	No	0/0	$0	0.125 LGA
I-1996120520	9/10/1996	PASCAGOULA	Highway	Yes	0/0	$0	1,000 LGA
I-1996100255	9/27/1996	PASCAGOULA	Highway	No	0/0	$0	1 LGA
I-1997030890	3/3/1997	PASCAGOULA	Highway	No	0/0	$56	37 LGA
I-1997081026	7/30/1997	PASCAGOULA	Highway	No	0/2	$0	3 LGA
I-1997100740	9/17/1997	PASCAGOULA	Highway	No	0/0	$705	1 LGA
I-1999010819	1/8/1999	PASCAGOULA	Highway	Yes	0/0	$1,590	350 LGA
I-1999050081	2/12/1999	PASCAGOULA	Highway	No	0/0	$7	5 LGA
I-1999040504	3/3/1999	PASCAGOULA	Highway	No	0/0	$145	100 LGA
I-1999061431	5/6/1999	PASCAGOULA	Highway	No	0/0	$14	10 LGA
I-1999082065	7/13/1999	PASCAGOULA	Highway	No	0/0	$2,891	0
I-2000050946	5/5/2000	PASCAGOULA	Highway	No	0/0	$21	15 LGA
I-2000061173	5/23/2000	PASCAGOULA	Highway	No	0/0	$16,651	10 LGA
I-2000080290	7/10/2000	PASCAGOULA	Highway	No	0/0	$0	0.5 LGA
I-2000110079	10/18/2000	PASCAGOULA	Rail	No	0/0	$0	0.25 LGA
I-2001010960	1/13/2001	PASCAGOULA	Rail	No	0/0	$0	1 LGA
I-2001081278	8/14/2001	PASCAGOULA	Highway	No	0/0	$0	5 LGA
I-2001081198	8/16/2001	PASCAGOULA	Highway	No	0/0	$2,720	2 LGA
I-2002011771	11/2/2001	PASCAGOULA	Highway	No	0/0	$0	0.125 LGA
I-2002020962	11/28/2001	PASCAGOULA	Highway	No	0/0	$0	1 LGA
I-2002020961	12/3/2001	PASCAGOULA	Highway	No	0/0	$0	2 LGA
I-2002020632	12/28/2001	PASCAGOULA	Rail	No	0/0	$0	0.125 GCF
I-2002060158	4/10/2002	PASCAGOULA	Highway	No	0/0	$134	20 LGA
I-2002061440	5/17/2002	PASCAGOULA	Highway	No	0/0	$0	1 LGA
I-2002100644	9/11/2002	PASCAGOULA	Rail	No	0/0	$0	0.25 LGA
I-2002100020	9/24/2002	PASCAGOULA	Highway	Yes	0/0	$201	146 LGA
I-2003020680	2/10/2003	PASCAGOULA	Highway	No	0/0	$0	0.020625 LGA
I-2003100595	9/9/2003	PASCAGOULA	Highway	No	0/0	$0	8 LGA
I-2004090557	9/2/2004	PASCAGOULA	Highway	No	0/0	$0	0.125 LGA
I-2005020749	1/3/2005	PASCAGOULA	Rail	No	0/0	$3,700	2 LGA
I-2006071418	7/9/2006	PASCAGOULA	Rail	No	0/0	$2,987	10 LGA
E-2007050096	4/12/2007	PASCAGOULA	Highway	No	0/0	$0	0.000654 LGA
I-2008070479	12/24/2007	PASCAGOULA	Highway	Yes	0/0	$68,382	5 LGA
X-2008060157	5/23/2008	PASCAGOULA	Rail	No	0/0	$5,593	0.08355 GCF
I-2008090770	8/24/2008	PASLAGOULA	Highway	Yes	0/0	$145,660	2 LGA
X-2011100149	9/22/2011	PASCAGOULA	Rail	No	0/0	$2,142	0.1 LGA
X-2011100149	9/22/2011	PASCAGOULA	Rail	No	0/0	$2,142	0.1 LGA

Report Number	Date	City	Mode	Serious Incident?	Deaths/ Injuries	Damages ($)*	Quantity Released
X-2011100149	9/22/2011	PASCAGOULA	Rail	No	0/0	$2,142	0.1 LGA
X-2011100149	9/22/2011	PASCAGOULA	Rail	No	0/0	$2,142	0.1 LGA
X-2012030191	3/3/2012	Pascagoula	Rail	No	0/0	$1,574	0.06684 GCF
X-2013060347	6/18/2013	Pascagoula	Rail	Yes	0/0	$3,102	0.2 LGA
X-2013080210	7/30/2013	Pascagoula	Rail	No	0/0	$2,585	1 LGA
X-2014080049	7/23/2014	Pascagoula	Rail	No	0/0	$1,933	1 LGA
X-2016070541	7/15/2016	Pascagoula	Rail	Yes	0/0	$8,500	1.3368 GCF
Unincorporated Area							
I-1982090508	9/4/1982	ESCATAWPA	Highway	No	0/0	$0	10 LGA
I-1996050948	5/17/1996	EAST MOSS POINT	Highway	Yes	0/0	$0	300 LGA
I-1996080916	7/16/1996	ESCATAWPA	Highway	No	0/0	$1,535	1 LGA

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: United States Department of Transportation Pipeline and Hazardous Materials Safety Administration

PROBABILITY OF FUTURE OCCURRENCES

Given the location of 11 toxic release inventory sites in Jackson County and prior roadway and railway incidents, it is highly likely (100 percent annual probability) that a hazardous material incident may occur in the county. County and city officials are mindful of this possibility and take precautions to prevent such an event from occurring. Furthermore, there are detailed plans in place to respond to an occurrence.

D.2.18 Infectious Disease

LOCATION AND SPATIAL EXTENT

Due to the nature of a public health/emerging disease threat, it is difficult to identify a precise location where this type of event would occur. Moreover, a large-scale event would have impacts that spread throughout the county. Therefore, all areas in Jackson County are considered equally susceptible to infectious diseases.

HISTORICAL OCCURRENCES

Mosquito-borne illness in Mississippi include West Nile virus, Chikungunya virus, and Zika virus. These illnesses affect birds, animals, and humans, causing flu-like symptoms in people who are bitten by infected mosquitoes. Occasionally illness can be severe, leading to meningitis or encephalitis. According to the Mississippi State Department of Health (MSDH), there has been one reported case of West Nile Virus in Jackson County as of November 2016. **Table D.31** summarizes the mosquito-borne illnesses in humans reported in the county.

TABLE D.31: SUMMARY OF MOSQUITO-BORNE ILLNESSES IN JACKSON COUNTY

Location	West Nile Virus	Chikungunya	Zika	Other*	Deaths
Jackson County	1	0	0	0	0

*Other mosquito-borne illnesses include La Crosse encephalitis, St. Louis encephalitis, and Eastern Equine encephalitis.
Source: Mississippi State Department of Health

Diseases like influenza and norovirus are regularly occurring health issues in Jackson County. These conditions are not legally reportable to county or state public health agencies, so data on disease incidence is not readily available. MSDH relies upon selected sentinel health practitioners across the state to report the percentage and total patient visits consistent with an influenza-like illness (ILI): fever of 100°F or higher and cough or sore throat. Reports are used to estimate the state's ILI rate and the magnitude of state's influenza activity on a weekly basis. Reports represent only the distribution of flu in the state, not an actual count of all flu cases statewide.

PROBABILITY OF FUTURE OCCURRENCES

Due to some recent incidents that have been recorded across the State of Mississippi and in Jackson County, future occurrences are considered possible (between 1 and 10 percent annual probability).

D.2.19 Conclusions on Hazard Risk

The hazard profiles presented in this section were developed using best available data and result in what may be considered principally a qualitative assessment as recommended by FEMA in its "How-to" guidance document titled *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA Publication 386-2). It relies heavily on historical and anecdotal data, stakeholder input, and professional and experienced judgment regarding observed and/or anticipated hazard impacts. It also carefully considers the findings in other relevant plans, studies, and technical reports.

HAZARD EXTENT

Table D.32 describes the extent of each hazard identified for Jackson County. The extent of a hazard is defined as its severity or magnitude, as it relates to the planning area.

TABLE D.32: EXTENT OF JACKSON COUNTY HAZARDS

Flood-related Hazards	
Dam and Levee Failure	Dam failure extent is defined using the Mississippi Division of Environmental Quality classifications which include Low, Significant, and High. One dam is classified as high-hazard in Jackson County.
Erosion	The extent of erosion can be defined by the measurable rate of erosion that occurs. Some areas of the barrier islands are eroding at 6 to 8 meters per year in Jackson County according to the USGS Coastal and Marine Geology Program's U.S. Gulf of Mexico Interactive Map.
Flood	Flood depth and velocity are recorded via United States Geological Survey stream gages throughout the region. While a gage does not exist for each participating jurisdiction, there is one at or near many areas. The greatest flood recorded for the county was at Pascagoula River at Graham Ferry. The maximum historic crest was recorded at 20.10 feet, or 0.1 feet

above the major flood stage (reported on February 28, 1961). Additional historic crest heights and the corresponding flood categories are in the table below.

Location/ Jurisdiction	Date	Maximum Historic Crest (ft)	Flood categories			
			Action Stage (ft)	Flood Stage (ft)	Moderate Flood Stage (ft)	Major Flood Stage (ft)
Jackson County						
PASCAGOULA RIVER AT GRAHAM FERRY	2/28/1961	20.10	15	16	18	20
ESCATAWPA RIVER ABOVE ORANGE GROVE	9/28/1998	11.90	6	8	12	15

Storm Surge	Storm surge can be defined by the depth of inundation which is defined by the category of hurricane/tropical storm. Since Jackson County could easily be impacted by a Category 3 storm, depth of inundation could be at least 9 feet in many areas.
Fire-related Hazards	
Drought	Drought extent is defined by the U.S. Drought Monitor classifications which include Abnormally Dry, Moderate Drought, Severe Drought, Extreme Drought, and Exceptional Drought. According to the U.S. Drought Monitor classifications, the most severe drought condition is Exceptional. Jackson County has received this ranking twice over the 17-year reporting period.
Lightning	According to the Vaisala's flash density map, Jackson County is located in an area that experiences 4 to 12 and up lightning flashes per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures.
Wildfire	Wildfire data was provided by the Mississippi Forestry Commission and is reported annually by county from 2007-2016. The greatest number of fires to occur in Jackson County in any year 161 in 2011. The greatest number of acres to burn in the county in a single year occurred in 2016 when 5,020 acres were burned. Information on specific occurrences of wildfire and the most severe fires in each jurisdiction is not available. Although this data lists the extent that has occurred, larger and more frequent wildfires are possible throughout the county.
Geologic Hazards	
Earthquake	Earthquake extent can be measured by the Richter Scale, the Modified Mercalli Intensity (MMI) scale, and the distance of the epicenter from Jackson County. According to data provided by the National Centers for Environmental Information, no earthquakes were reported in Jackson County.
Wind-related Hazards	
Extreme Cold	The extent of extreme cold can be defined by the minimum temperature reached. Official long term temperature records are not kept for any areas in Jackson County. However, the temperature has previously ranged from 15 to 20 degrees Fahrenheit in southwest and coastal Mississippi (reported on December 18, 1996).
Extreme Heat	The extent of extreme heat can be measured by the record high temperature recorded. Official long term temperature records are not kept for any areas in Jackson County. However, the highest recorded temperature in Beaumont (northwest of the county) was 105°F and heat index values were recorded as high as 115°F (reported in July 2000).
Hailstorm	Hail extent can be defined by the size of the hail stone. The largest hail stone reported in Jackson County was 3.00 inches (reported on April 19, 1965). It should be noted that future events may exceed this.

Hurricane and Tropical Storm	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5. The greatest classification of hurricane to traverse directly through Jackson County was Hurricane Frederic, a Category 3 storm which carried tropical force winds of 97 knots upon arrival in the county.
Severe Thunderstorm/High Wind	Thunderstorm extent is defined by wind speeds reported. The strongest recorded wind event in Jackson County was 65 knots (reported on April 14, 2014). It should be noted that future events may exceed these historical occurrences.
Tornado	Tornado hazard extent is measured by the Fujita/Enhanced Fujita. The greatest magnitude reported in Jackson County was an EF2 (reported on August 30, 2012).
Winter Weather	The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest snowfall reported in Jackson County was 1-2 inches (reported on December 18, 1996).
Other Hazards	
Climate Change/Sea Level Rise	It is still uncertain what the extent of climate change will be in the future. However, increasing temperature (extreme heat), changes in precipitation (drought, flooding), and more frequent, stronger storms (wind, hurricanes) can be expected. Sea level rise is defined by the areas impacted, but is more often associated with the amount of sea level rise that is expected to take place. Although it is difficult to predict an exact amount of rise, the Climate Change Surging Seas Report intermediate high sea level rise scenario projects 1 foot of rise locally by 2050 and 3.7 feet by 2100.
Hazardous Materials Incident/Train Derailment	According to USDOT PHMSA, the largest hazardous materials incident reported in Jackson County was 12,692 GCF released on the highway (reported on February 7, 1985). It should be noted that larger events are possible.
Infectious Disease	An infectious disease threat could have large-scale effects throughout the county and may cause illness in many people. Possible impacts from a disease threat depend largely on the impacted population, but might include anything from absenteeism and loss of productivity in the workplace to death or serious illness to humans or livestock. A serious disease threat could affect many thousands of people.

PRIORITY RISK INDEX RESULTS

In order to draw some meaningful planning conclusions on hazard risk for Jackson County, the results of the hazard profiling process were used to generate countywide hazard classifications according to a "Priority Risk Index" (PRI). More information on the PRI and how it was calculated can be found in Section 5.21.2.

Table D.33 summarizes the degree of risk assigned to each category for all initially identified hazards based on the application of the PRI. Assigned risk levels were based on the detailed hazard profiles developed for this subsection, as well as input from the Regional Hazard Mitigation Council. The results were then used in calculating PRI values and making final determinations for the risk assessment.

TABLE D.33: SUMMARY OF PRI RESULTS FOR JACKSON COUNTY

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Flood-related Hazards						

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Dam and Levee Failure	Possible	Critical	Small	Less than 6 hours	Less than 6 hours	**2.4**
Erosion	Likely	Limited	Small	More than 24 hours	More than 1 week	**2.4**
Flood	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 24 hours	**3.2**
Storm Surge	Highly Likely	Critical	Moderate	More than 24 hours	Less than 24 hours	**3.0**
Fire-related Hazards						
Drought	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Lightning	Highly Likely	Limited	Negligible	6 to 12 hours	Less than 6 hours	**2.4**
Wildfire	Highly Likely	Minor	Small	Less than 6 hours	Less than 1 week	**2.6**
Geologic Hazards						
Earthquake	Possible	Minor	Moderate	Less than 6 hours	Less than 6 hours	**2.0**
Wind-related Hazards						
Extreme Cold	Possible	Minor	Large	More than 24 hours	Less than 1 week	**2.1**
Extreme Heat	Highly Likely	Minor	Large	More than 24 hours	More than 1 week	**2.8**
Hailstorm	Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours	**2.8**
Hurricane and Tropical Storm	Highly Likely	Critical	Large	More than 24 hours	Less than 24 hours	**3.2**
Severe Thunderstorm/ High Wind	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 6 hours	**3.1**
Tornado	Highly Likely	Critical	Small	Less than 6 hours	Less than 6 hours	**3.0**
Winter Weather	Likely	Minor	Moderate	More than 24 hours	Less than 24 hours	**2.1**
Other Hazards						
Climate Change/Sea Level Rise	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Hazardous Materials Incident/ Train Derailment	Highly Likely	Limited	Small	Less than 6 hours	Less than 24 hours	**2.8**
Infectious Disease	Possible	Limited	Large	More than 24 hours	More than 1 week	**2.5**

D.2.20 Final Determinations on Hazard Risk

The conclusions drawn from the hazard profiling process for Jackson County, including the PRI results and input from the Regional Hazard Mitigation Council, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk, and Low Risk (**Table D.34**). For purposes of these classifications, risk is expressed in relative terms according to the estimated impact that a hazard will have on human life and property throughout all of Jackson County. A more quantitative analysis to estimate potential dollar losses for each hazard has been performed separately, and is described in Section 6: *Vulnerability Assessment* and below in Section D.3. It should be noted that although some hazards are classified below as posing low risk, their occurrence of varying or unprecedented magnitudes is still possible in some cases and their assigned classification will continue to be evaluated during future plan updates.

Some priorities have changed since the previous plans were adopted due to the merging of multiple local plans to form this regional plan; however, most priorities remain the same.

TABLE D.34: CONCLUSIONS ON HAZARD RISK FOR JACKSON COUNTY

HIGH RISK	Hurricane and Tropical Storm Flood Severe Thunderstorm/High Wind Storm Surge Tornado
MODERATE RISK	Hailstorm Hazardous Materials Incident/Train Derailment Extreme Heat Wildfire Drought Climate Change/Sea Level Rise Infectious Disease
LOW RISK	Lightning Dam and Levee Failure Erosion Winter Weather Extreme Cold Earthquake

D.3 JACKSON COUNTY VULNERABILITY ASSESSMENT

This subsection identifies and quantifies the vulnerability of Jackson County to the significant hazards previously identified. This includes identifying and characterizing an inventory of assets in the county and assessing the potential impact and expected amount of damages caused to these assets by each identified hazard event. More information on the methodology and data sources used to conduct this assessment can be found in Section 6: *Vulnerability Assessment*.

D.3.1 Asset Inventory

Table D.35 lists the estimated number of buildings, parcels, and the total value of improvements for Jackson County and its participating jurisdictions (study area of vulnerability assessment). Because digital parcel data was not available for every community, data obtained from Hazus-MH 3.2 inventory was utilized to supplement the analysis where gaps existed.

TABLE D.35: IMPROVED PROPERTY IN JACKSON COUNTY

Location	Counts of Buildings	Counts of Parcels	Total Value of Improvements
Gautier	7,194	5,573	$397,918,520
Moss Point	10,825	8,690	$405,337,190
Ocean Springs	10,325	8,072	$905,620,110

Location	Counts of Buildings	Counts of Parcels	Total Value of Improvements
Pascagoula	14,967	9,886	$852,583,870
Unincorporated Area	56,987	48,414	$2,431,927,960
JACKSON COUNTY TOTAL	**100,298**	**80,635**	**$4,993,387,650**

Source: MDEQ, Hazus-MH 3.2

Table D.36 lists the critical facilities located in Jackson County by type according to data provided by local government officials.

In addition, **Figure D.25** shows the locations of critical facilities in Jackson County. **Table D.52**, at the end of this subsection, shows a complete list of the critical facilities by name, as well as the hazards that affect each facility. Further, it should be noted that the table below may show that some communities do not have any critical facilities of in certain type, when in reality, that particular type of facility may actually be located within the community. This may occur because spatial data for that facility type was not available or because the facility may have been classified under a different category type for that particular community.

TABLE D.36: CRITICAL FACILITY INVENTORY IN JACKSON COUNTY

Location	Communications	EOC	Fire Stations	Medical	Police Station	Power/ Gas	Private/Non-Profit
Gautier	0	0	3	0	1	0	0
Moss Point	0	0	4	0	1	0	0
Ocean Springs	0	1	4	2	3	0	2
Pascagoula	1	1	3	2	2	1	17
Unincorporated Area	4	1	31	0	1	0	1
JACKSON COUNTY TOTAL	**5**	**3**	**45**	**4**	**8**	**1**	**20**

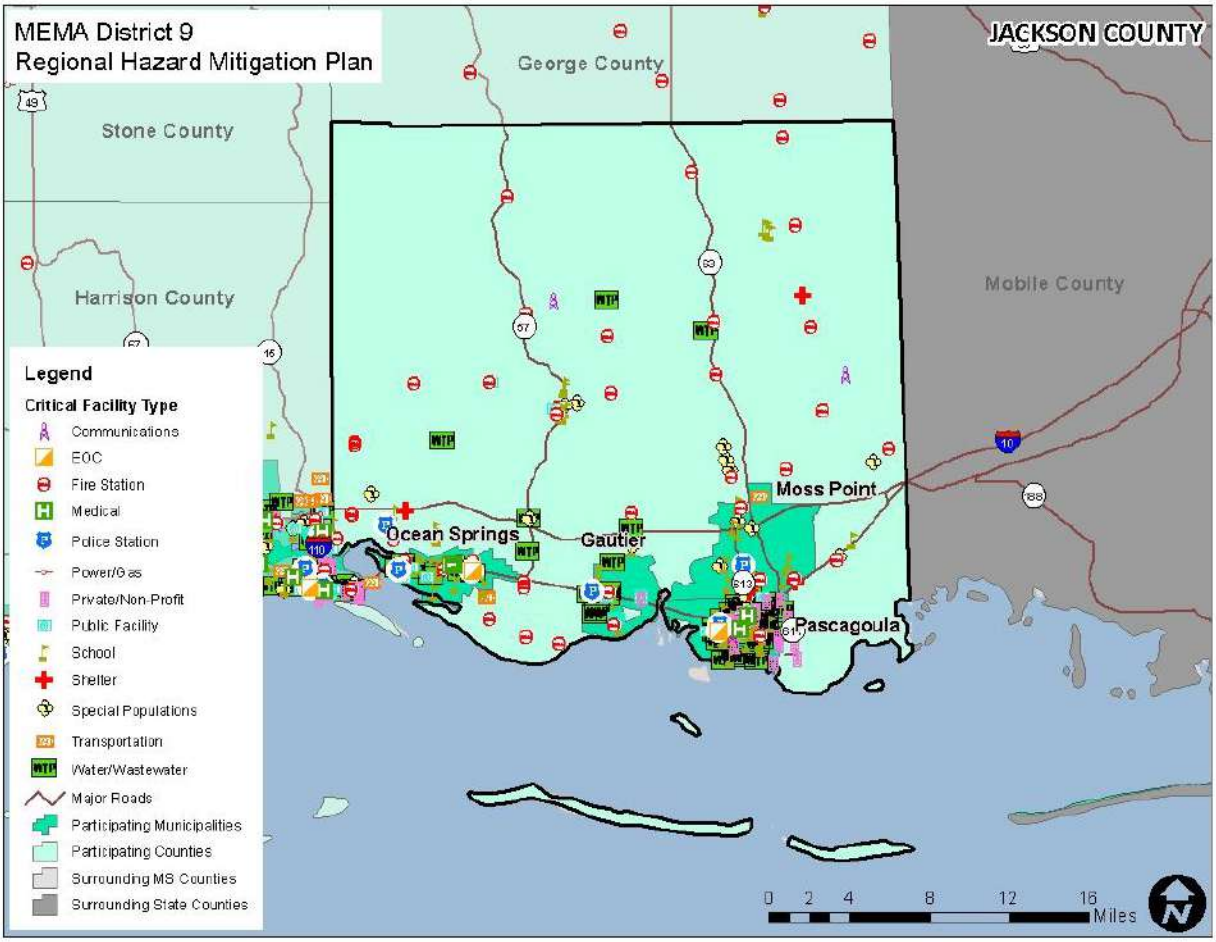
Source: Local Governments

TABLE D.36: CRITICAL FACILITY INVENTORY IN JACKSON COUNTY (CONT.)

Location	Public Facility	School	Shelter	Special Populations	Transportation	Water/ Wastewater
Gautier	1	6	0	0	0	0
Moss Point	2	13	4	7	0	1
Ocean Springs	13	13	0	5	1	8
Pascagoula	6	24	0	5	0	33
Unincorporated Area	28	19	3	10	2	14
JACKSON COUNTY TOTAL	**50**	**75**	**7**	**27**	**3**	**56**

Source: Local Governments

FIGURE D.25: CRITICAL FACILITY LOCATIONS IN JACKSON COUNTY



Source: Local Governments

D.3.2 Social Vulnerability

In addition to identifying those assets potentially at risk to identified hazards, it is important to identify and assess those particular segments of the resident population in Jackson County that are potentially at risk to these hazards.

Table D.37 lists the population by jurisdiction according to American Community Survey 2015 population estimates. The total population in Jackson County according to Census data is 140,676 persons. Additional population estimates are presented above in Section D.1.

TABLE D.37: TOTAL POPULATION IN JACKSON COUNTY

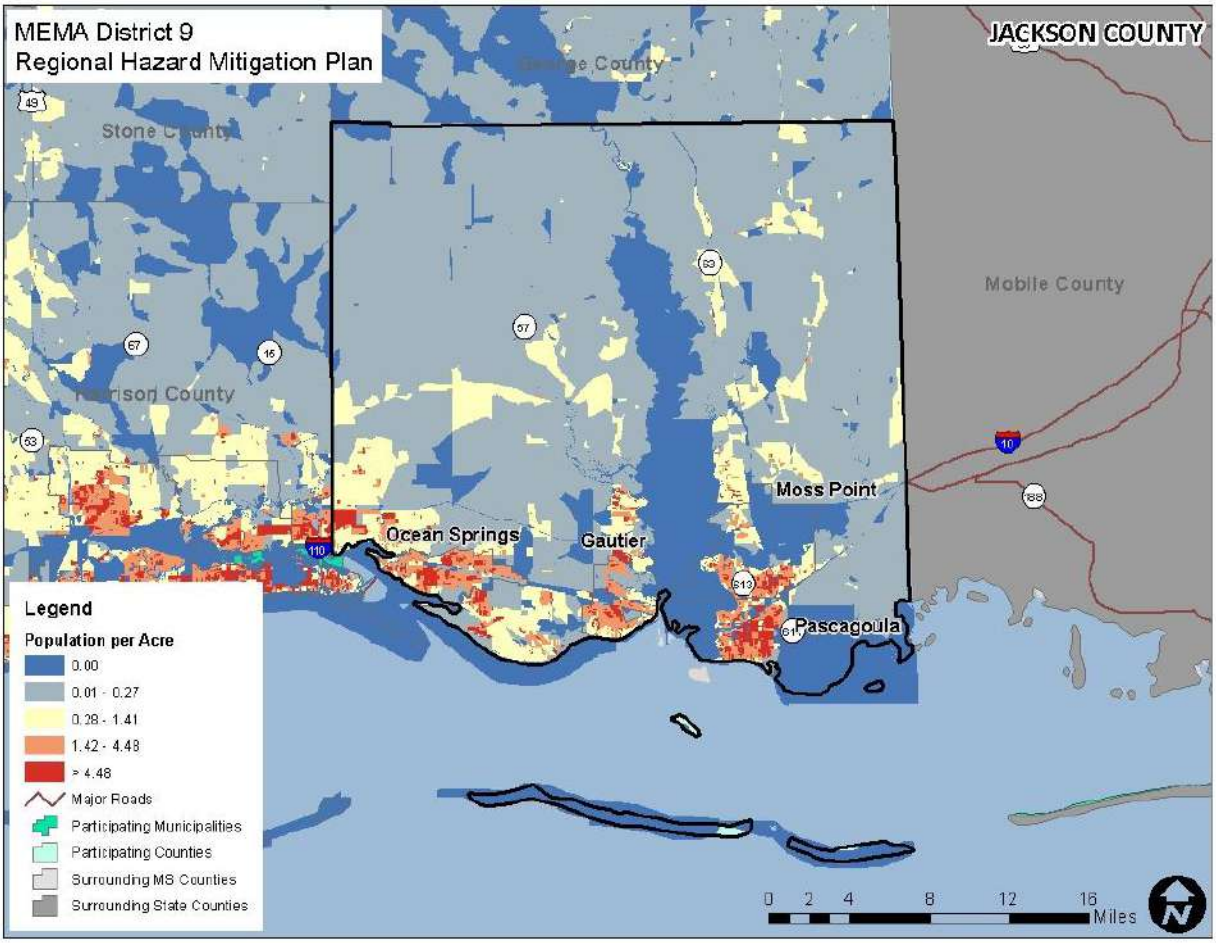
Location	Total 2015 Population
Gautier	18,563
Moss Point	13,685
Ocean Springs	17,528
Pascagoula	22,230

Location	Total 2015 Population
Unincorporated Area	68,670
JACKSON COUNTY TOTAL	**140,676**

Source: United States Census Bureau, 2011-2015 American Community Survey 5-Year Estimates

In addition, **Figure D.26** illustrates the population density per acre by census block as it was reported by the U.S. Census Bureau in 2010. As can be seen in the figure, the population is spread out through most of the county, with heavy concentrations in Gautier, Moss Point, Ocean Springs, and Pascagoula.

FIGURE D.26: POPULATION DENSITY IN JACKSON COUNTY



Source: United States Census Bureau, 2010 Census

D.3.3 Development Trends and Changes in Vulnerability

Since the previous local-level hazard mitigation plans were approved, Jackson County has experienced moderate growth and development. **Table D.38** shows the number of building units constructed since 2010 according to the U.S. Census American Community Survey.

TABLE D.38: BUILDING COUNTS FOR JACKSON COUNTY

Location	2010	2011	2012	2013	2014	2015	% Building Stock Built Post-2010
Gautier	7,507	7,748	7,886	8,034	8,113	8,180	9.0%
Moss Point	6,305	6,488	6,555	6,435	6,505	6,476	2.7%
Ocean Springs	7,246	7,482	7,628	7,892	7,880	7,625	5.2%
Pascagoula	10,803	10,935	10,696	10,813	10,574	10,891	0.8%
Unincorporated Area	26,134	26,563	27,046	27,063	27,577	27,717	6.1%
JACKSON COUNTY TOTAL	**57,995**	**59,216**	**59,811**	**60,237**	**60,649**	**60,889**	**5.0%**

Source: United States Census Bureau, American Community Survey

Table D.39 shows population growth estimates for the county from 2010 to 2015 based on the based on the American Community Survey's annual population estimates.

TABLE D.39: POPULATION GROWTH FOR JACKSON COUNTY

Location	Population Estimates						% Change 2010-2015
	2010	2011	2012	2013	2014	2015	
Gautier	18,088	18,344	18,502	18,539	18,581	18,563	2.6%
Moss Point	13,963	13,885	13,807	13,749	13,690	13,685	-2.0%
Ocean Springs	17,258	17,379	17,420	17,474	17,446	17,528	1.6%
Pascagoula	22,947	22,765	22,523	22,372	22,239	22,230	-3.1%
Unincorporated Area	64,826	66,138	67,178	67,772	68,238	68,670	5.9%
JACKSON COUNTY TOTAL	**137,082**	**138,511**	**139,430**	**139,906**	**140,194**	**140,676**	**2.6%**

Source: United States Census Bureau, American Community Survey

Based on the data above, there has been a moderate rate of residential development and population growth in the county since 2010, and the majority of incorporated jurisdictions have experienced slight increases in population and housing development, resulting in an increased number of structures and people that are vulnerable to the potential impacts of the identified hazards. However, the cities of Moss Point and Pascagoula have both experienced a decline in both population since 2010 according to estimates. Therefore, development and population growth have impacted the county's vulnerability since the previous local hazard mitigation plans were approved and there has been an increase in the overall vulnerability.

It is also important to note that as development increases in the future, greater populations and more structures and infrastructure will be exposed to potential hazards if development occurs in the floodplains or other identified areas of high risk.

D.3.4 Vulnerability Assessment Results

As noted in Section 6: *Vulnerability Assessment*, only hazards with a specific geographic boundary, available modeling tool, or sufficient historical data allow for further analysis. Those results, specific to

Jackson County, are presented here. All other hazards are assumed to impact the entire planning region (e.g., drought) or, due to lack of data, analysis would not lead to credible results (e.g., infectious disease). The total county exposure, and thus risk to these hazards, was presented in **Table D.35**.

The hazards to be further analyzed in this subsection include: flood, wildfire, earthquake, hurricane and tropical storm winds and storm surge, hazardous materials incident, dam and levee failure, and sea level rise.

The annualized loss estimate for all hazards is presented near the end of this subsection in **Table D.51.**

FLOOD

Historical evidence indicates that Jackson County is susceptible to flood events. A total of 25 flood events have been reported by the National Climatic Data Center resulting in around $4.1 million (2016 dollars) in property damage. On an annualized level, these damages amounted to $234,715 for Jackson County.

In order to assess flood risk, a GIS-based analysis was used to estimate exposure to flood events using Digital Flood Insurance Rate Map (DFIRM) data in combination with improved property records for Jackson County. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within an identified floodplain.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones.

Table D.40 shows the results of the analysis.

TABLE D.40: ESTIMATED EXPOSURE OF PROPERTY TO THE FLOOD HAZARD

Location	1.0-percent ACF		0.2-percent ACF		VE Zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Gautier	2,316	$118,332,200	4,728	$281,124,330	84	$7,279,640
Moss Point	3,119	$130,471,550	2,572	$132,822,500	55	$5,563,840
Ocean Springs	1,226	$154,955,040	5,987	$571,123,770	94	$12,202,880
Pascagoula	12,248	$644,004,050	2,804	$243,751,930	171	$13,956,290
Unincorporated Area	10,787	$481,853,710	8,300	$536,609,990	629	$45,577,430
JACKSON COUNTY TOTAL	**29,696**	**$1,529,616,550**	**24,391**	**$1,765,432,520**	**1,033**	**$84,580,080**

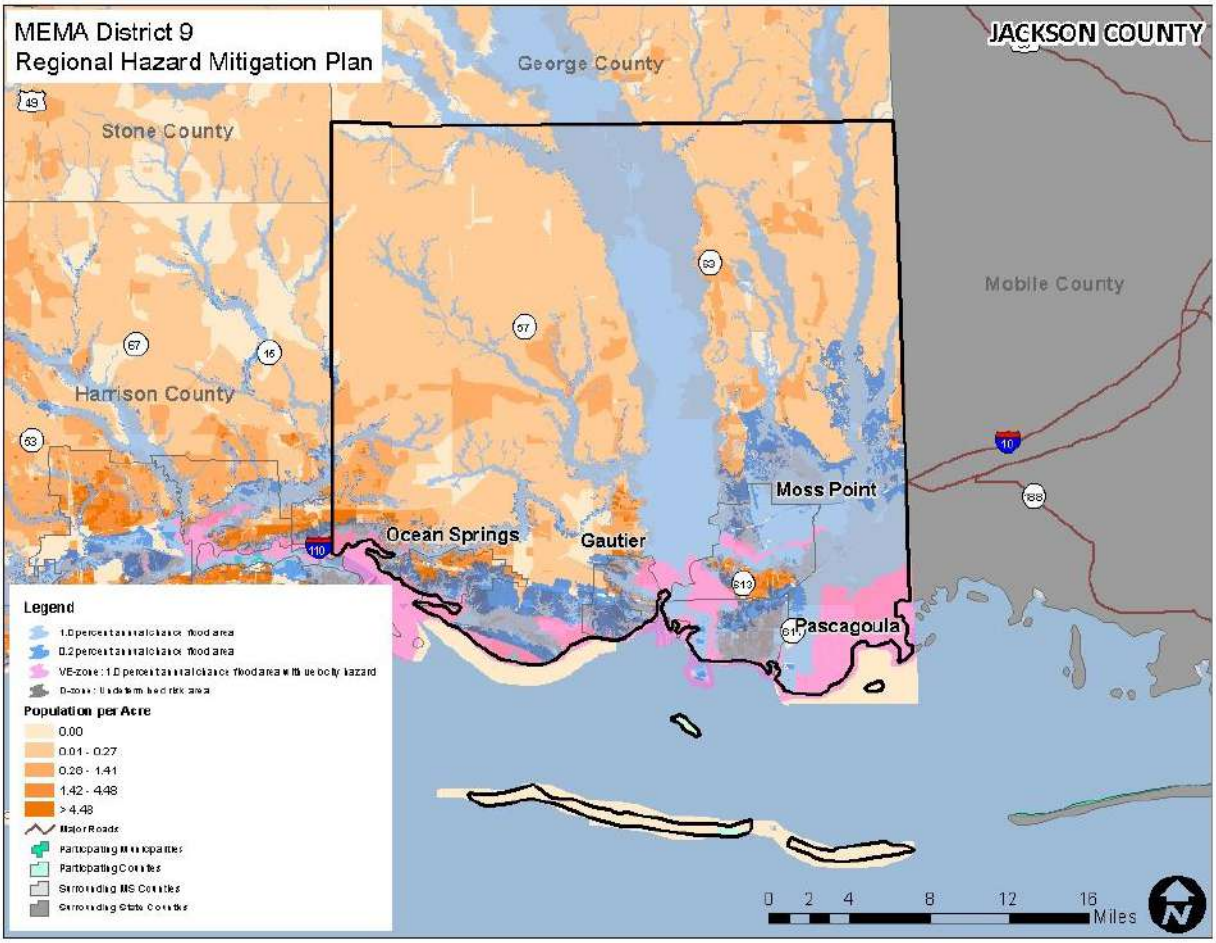
Source: Federal Emergency Management Agency DFIRM, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Figure D.27 is presented to gain a better understanding of at-risk population by evaluating census block level population data against mapped floodplains. There are areas of concern in most of the population

centers in the county. Indeed, each of the incorporated municipalities is potentially at risk of being impacted by flooding in some areas of its jurisdiction. Therefore, there is significant population vulnerability to flooding.

FIGURE D.27 : POPULATION DENSITY NEAR FLOODPLAINS IN JACKSON COUNTY



Source: Federal Emergency Management Agency DFIRM, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are 195 facilities located in one of the identified floodplain zones. (Please note, as previously indicated, this analysis does not consider building elevation, which may negate risk.) Of these facilities, 88 are located in the 1.0 percent annual chance flood zone, 103 are located in the 0.2 percent annual chance flood zone, and 4 are located in a VE-zone. A list of specific critical facilities and their associated risk can be found in **Table D.52** at the end of this subsection.

In conclusion, a flood has the potential to impact many existing and future buildings, facilities, and populations in Jackson County, though some areas are at a higher risk than others. All types of structures in a floodplain are at-risk, though elevated structures will have a reduced risk. Such site-specific vulnerability determinations are outside the scope of this assessment but may be considered during future plan updates. Furthermore, areas subject to repetitive flooding should be analyzed for potential mitigation actions.

WILDFIRE

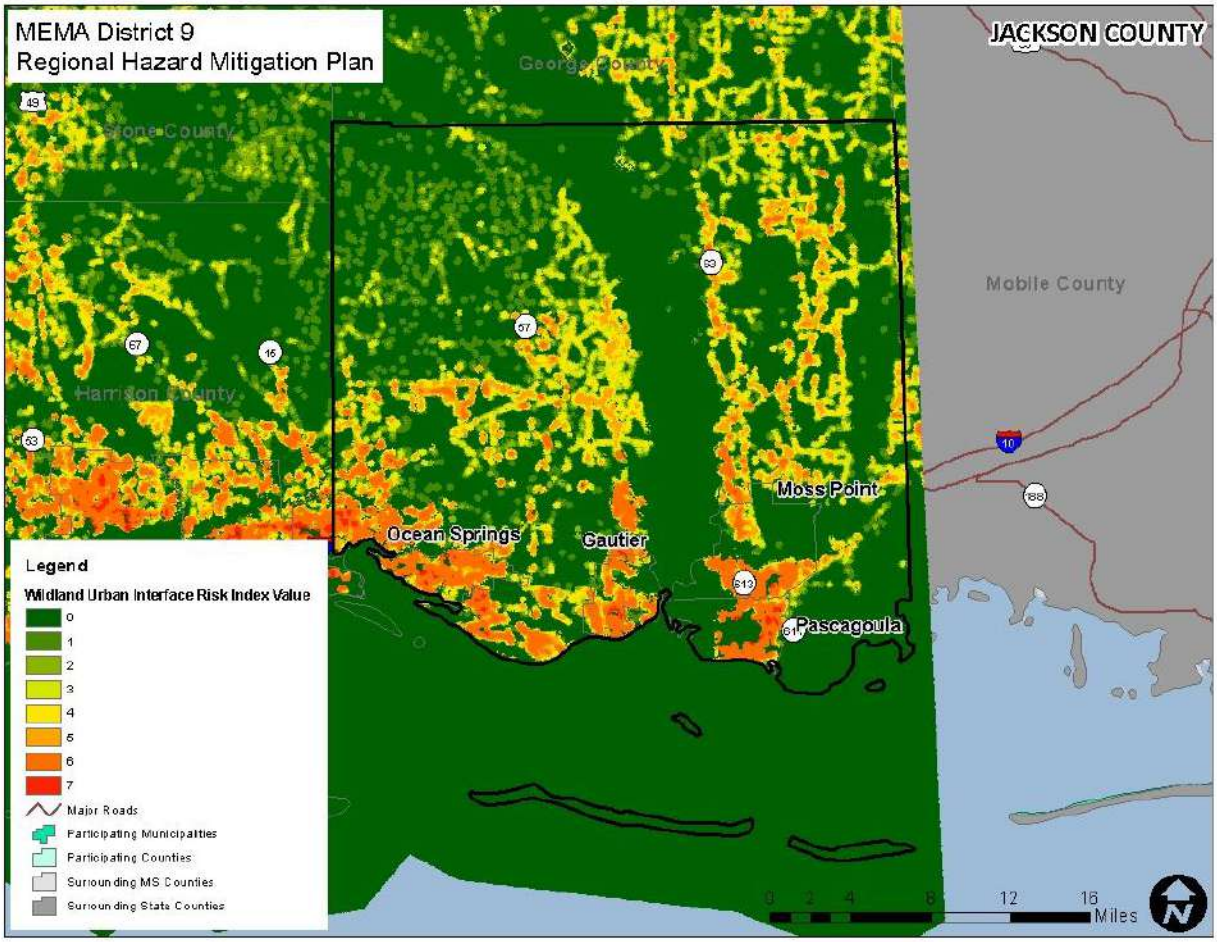
Although historical evidence indicates that Jackson County is susceptible to wildfire events, there are few reports which include information on historic dollar losses. Therefore, it is difficult to calculate a reliable annualized loss figure. Annualized loss is considered relatively low, though it should be noted that a single event could result in significant damages throughout the county.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones. For the critical facility analysis, areas of concern were intersected with critical facility locations.

Figure D.28 shows the Wildland Urban Interface Risk Index (WUIRI) data, which is a data layer that shows a rating of the potential impact of a wildfire on people and their homes. The key input, Wildland Urban Interface (WUI), reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the WUI and rural areas is key information for defining potential wildfire impacts to people and homes. Initially provided as raster data, it was converted to a polygon to allow for analysis. The Wildland Urban Interface Risk Index data ranges from 0 to 7 with higher values being most severe (as noted previously, this is only a measure of relative risk). **Figure D.29** shows the areas of analysis where any grid cell is less than 3. Areas with a value below 3 were chosen to be displayed as areas of risk because this showed the upper echelon of the scale and the areas at highest risk.

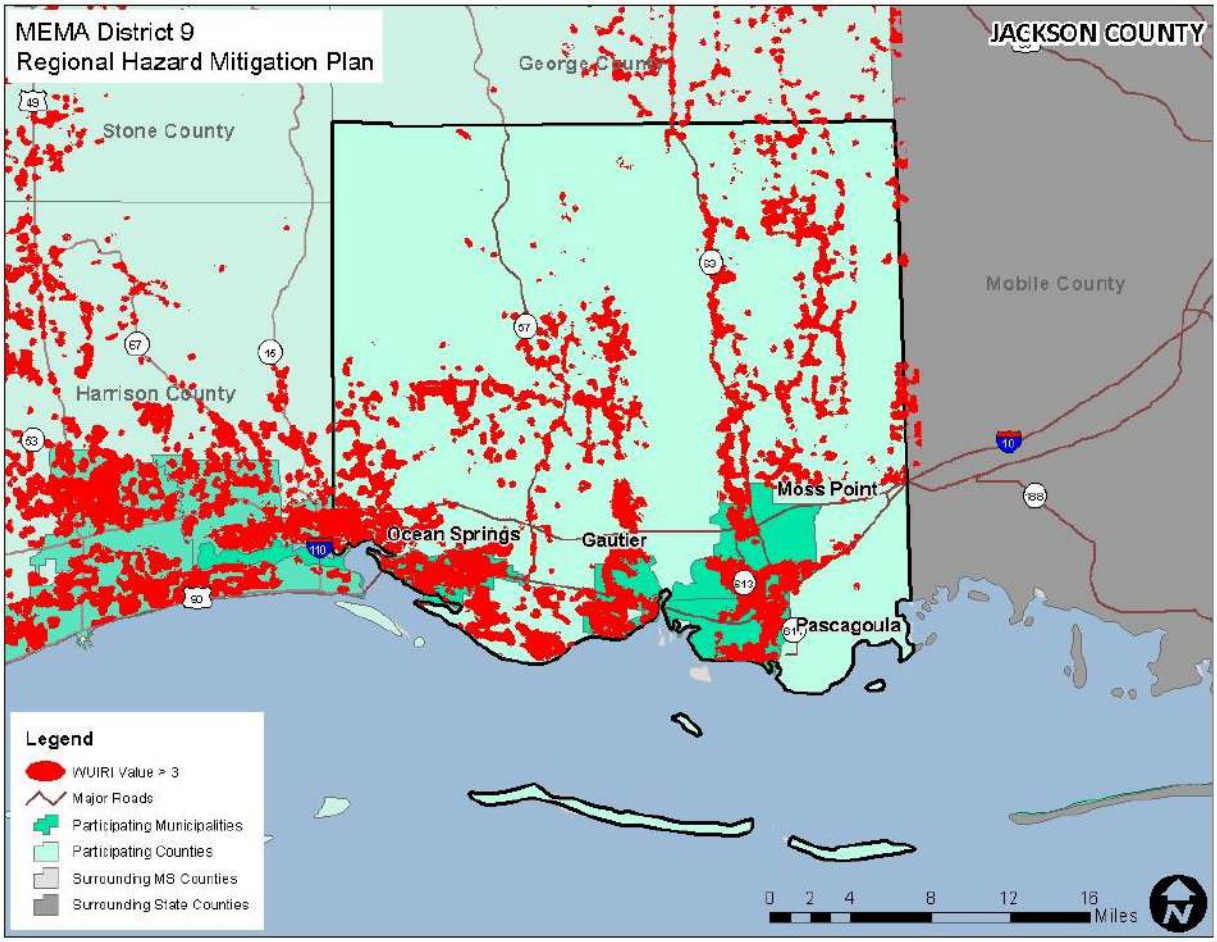
Table D.41 shows the results of the analysis.

FIGURE D.28: WUI RISK INDEX AREAS IN JACKSON COUNTY



Source: Southern Wildfire Risk Assessment Data

FIGURE D.29: WILDFIRE RISK AREAS IN JACKSON COUNTY



Source: Southern Wildfire Risk Assessment Data

TABLE D.41: EXPOSURE OF IMPROVED PROPERTY TO WILDFIRE RISK AREAS

Location	Wildfire Risk	
	Approx. Number of Buildings	Approx. Improved Value
Gautier	6,767	$362,594,440
Moss Point	9,227	$342,127,140
Ocean Springs	9,622	$850,642,070
Pascagoula	9,231	$541,505,990
Unincorporated Area	40,410	$1,880,656,320
JACKSON COUNTY TOTAL	**75,257**	**$3,977,525,960**

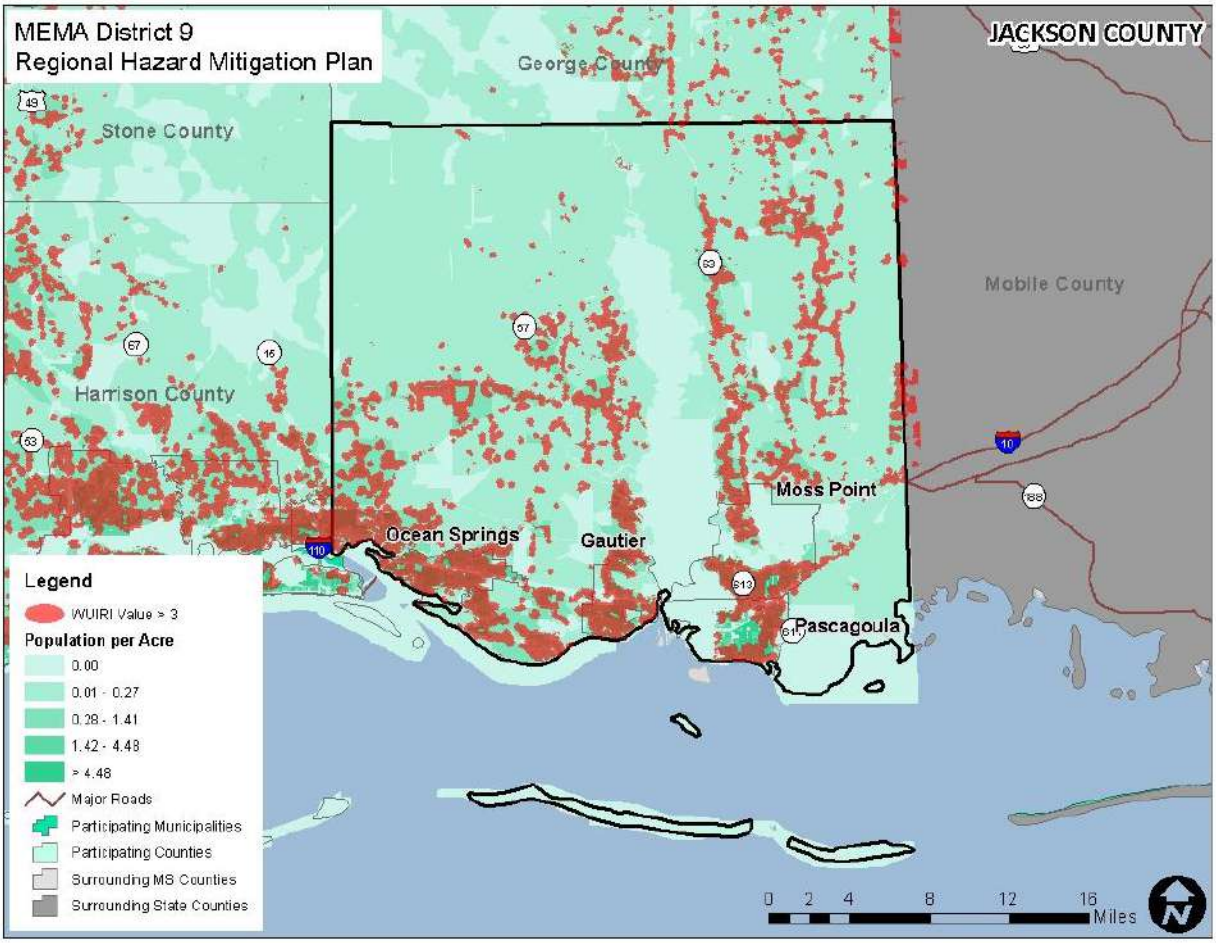
Source: SWRA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Given some level of susceptibility across the county, it is assumed that the total population is at risk to the wildfire hazard. **Figure D.30** shows an overlay of the wildfire risk areas identified above with the

population density by census block. This shows that many of the areas of high population concentration are susceptible to wildfire because of their proximity to the wildland urban interface.

FIGURE D.30: WILDFIRE RISK AREAS IN JACKSON COUNTY



Source: Southern Wildfire Risk Assessment Data; United States Census

Critical Facilities

The critical facility analysis revealed that there are 202 critical facilities located in wildfire areas of concern, including 1 communications, 1 EOC, 39 fire stations, 1 medical, 5 police stations, 8 private/non-profits, 33 public facilities, 43 schools, 6 shelters, 23 special populations, 2 transportation, and 40 water/wastewater. It should be noted, that several factors could impact the spread of a wildfire putting all facilities at risk. A list of specific critical facilities and their associated risk can be found in **Table D.52** at the end of this subsection.

In conclusion, a wildfire event has the potential to impact many existing and future buildings, critical facilities, and populations in Jackson County.

EARTHQUAKE

As the Hazus-MH model suggests below, and historical occurrences confirm, any earthquake activity in the area is likely to inflict only minor to moderate damage to the county. Hazus-MH 3.2 estimates a total annualized loss of $49,000 which includes buildings, contents, and inventory throughout the county.

For the earthquake hazard vulnerability assessment, a probabilistic scenario was created to estimate the average annualized loss[26] for the county. The results of the analysis are generated at the Census Tract level within Hazus-MH and then aggregated to the county level. Since the scenario is annualized, no building counts are provided. Losses reported included losses due to structure failure, building loss, contents damage, and inventory loss. They do not include losses to business interruption, lost income, or relocation. **Table D.42** summarizes the findings with results rounded to the nearest thousand.

TABLE D.42: AVERAGE ANNUALIZED LOSS ESTIMATIONS FOR EARTHQUAKE HAZARD

Location	Structural Damage	Non-Structural Damage	Contents Damage	Inventory Loss	Total Annualized Loss
Jackson County	$12,000	$29,000	$8,000	$0	$49,000

Source: Hazus-MH 3.2

Social Vulnerability
It can be assumed that all existing and future populations are at risk to the earthquake hazard.

Critical Facilities
The Hazus-MH probabilistic analysis indicated that no critical facilities would sustain measurable damage in an earthquake event. However, all critical facilities should be considered at-risk to minor damage, should an event occur. Specific vulnerabilities for these assets will be greatly dependent on their individual design and the mitigation measures in place. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates.

In conclusion, an earthquake has the potential to impact all existing and future buildings, facilities, and populations in Jackson County. The Hazus-MH scenario indicates that minimal to moderate damage is expected from an earthquake occurrence. While Jackson County may not experience a large earthquake, localized damage is possible with an occurrence. A list of specific critical facilities and their associated risk can be found in **Table D.52** at the end of this subsection.

HURRICANE AND TROPICAL STORM

Historical evidence indicates that Jackson County has very significant risk to the hurricane and tropical storm hazard. There have been 12 disaster declarations due to hurricanes or tropical storms (Hurricanes Betsy, Camille, Frederic, Elena, Georges, Ivan, Dennis, Katrina, Gustav, and Isaac, as well as Tropical Storms Allison and Isidore). A large number tracks have come near or traversed through the county, as shown and discussed in Section D.2.10. Hazus-MH 3.2 estimates a total annualized loss of $102,555,000 which includes buildings, contents, and inventory throughout the county.

[26] Annualized loss is defined by Hazus-MH as the expected value of loss in any one year.

Hurricane Winds

Hurricanes and tropical storms can cause damage through numerous additional hazards such as flooding, erosion, tornadoes, and high winds, thus it is difficult to estimate total potential losses from these cumulative effects. The current Hazus-MH hurricane model only analyzes hurricane winds and storm surge and is not capable of modeling and estimating cumulative losses from all hazards associated with hurricanes; therefore, only these two aspects of hurricane losses are analyzed in this section. It can be assumed that all existing and future buildings and populations are at risk to hurricane and tropical storm wind hazard. Hazus-MH 3.2 was used to determine average annualized losses[27] for the county as shown below in **Table D.43.** Only losses to buildings, inventory, and contents are included in the results.

TABLE D.43: AVERAGE ANNUALIZED LOSS ESTIMATIONS FOR HURRICANE WIND HAZARD

Location	Building Damage	Contents Damage	Inventory Loss	Total Annualized Loss
Jackson County	$70,481,000	$31,767,000	$307,000	$102,555,000

Source: Hazus-MH 3.2

Storm Surge

In addition, although it was treated as a separate hazard throughout this plan, storm surge is most often associated with hurricanes and tropical storms. Indeed, Hazus incorporates the storm surge model for estimating damage from storm surge as part of the hurricane model. The storm surge model can only be run as part of a historic hurricane model run and not as part of an annualized loss model. Unfortunately, in this model, storm surge impacts are calculated as part of the total damage from the historic event and thus could not be separated out and evaluated solely in terms of storm surge loss. As such, the estimated losses presented below are combined losses from hurricane winds and storm surge. The historic Hurricane Katrina model was utilized as this was certainly one of the most impactful storms in the region and therefore estimates the potential losses that are possible from a large hurricane event. **Table D.44** presents the losses from this modeled event.

TABLE D.44: POTENTIAL LOSS ESTIMATIONS FOR LARGE HURRICANE EVENT

Location	Building Damage	Contents Damage	Inventory Loss	Total Annualized Loss
Jackson County	$381,792,000	$142,547,000	$605,000	$524,944,000

Source: Hazus-MH 3.2

Social Vulnerability

Given equal susceptibility across the county, it is assumed that the total population, both current and future, is at risk to the hurricane and tropical storm wind hazard. In terms of social vulnerability to storm surge, coastal populations are at much higher risk than inland populations. Since large concentrations of population are located along the coast of Jackson County, there is significant social vulnerability to storm surge in the county.

Critical Facilities

Given equal vulnerability across Jackson County, all critical facilities are considered to be at risk. Some buildings may perform better than others in the face of such an event due to construction and age, among factors. Determining individual building response to wind and storm surge is beyond the scope of this

[27] Annualized loss is defined by Hazus-MH as the expected value of loss in any one year.

plan. However, this plan will consider mitigation action for especially vulnerable structures and/or critical facilities to mitigate against the effects of the hurricane hazard. A list of specific critical facilities can be found in **Table D.52** at the end of this subsection.

In conclusion, a hurricane event has the potential to impact many existing and future buildings, critical facilities, and populations in Jackson County.

HAZARDOUS MATERIALS INCIDENT

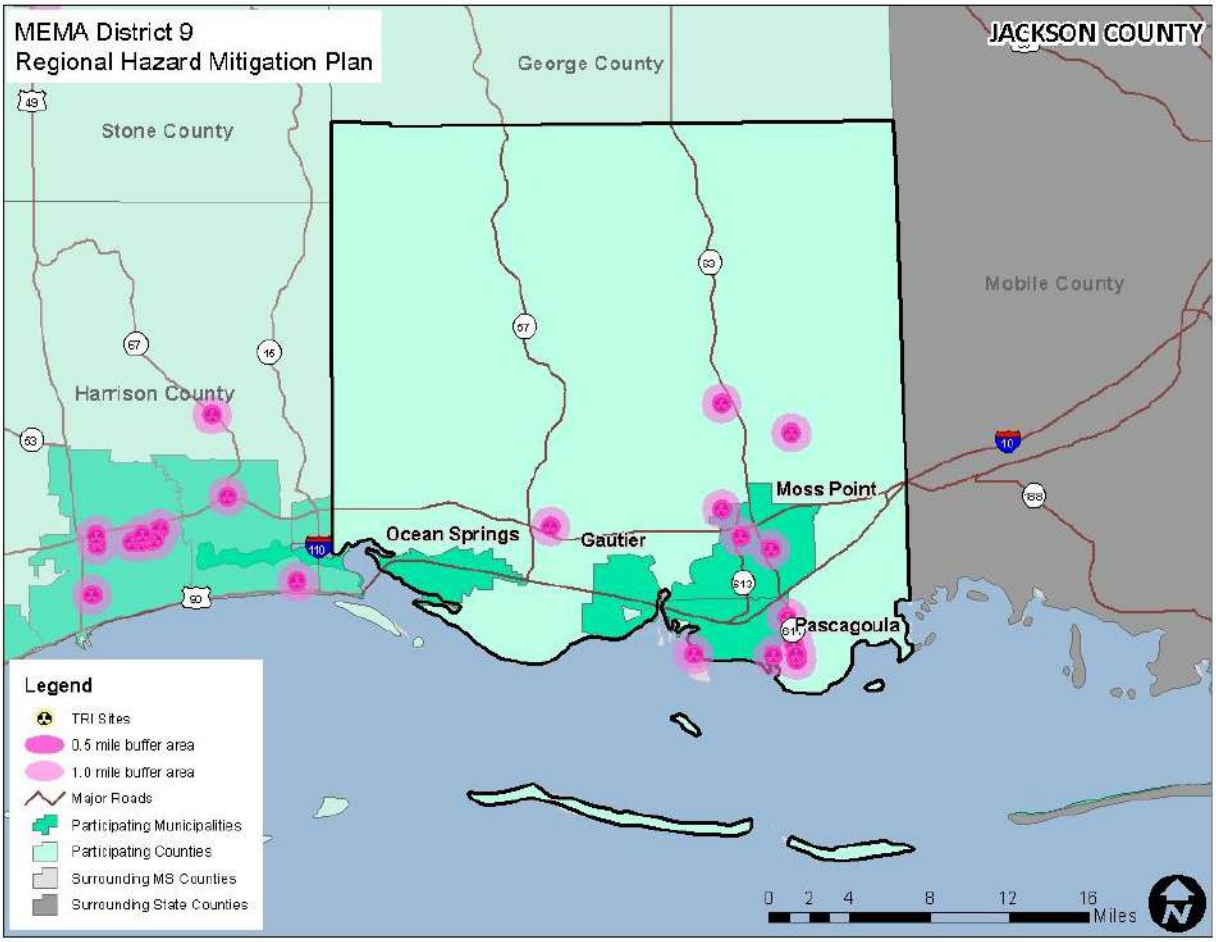
Historical evidence indicates that Jackson County is susceptible to hazardous materials events. A total of 176 HAZMAT incidents have been reported by the Pipeline and Hazardous Materials Safety Administration, resulting in $1.0 million (2016 dollars) in property damage as well as 15 injuries. On an annualized level, these damages amount to $25,777 for the county.

Most hazardous materials incidents that occur are contained and suppressed before destroying any property or threatening lives. However, they can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities, and cause affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. Certain chemicals may travel through the air or water, affecting a much larger area than the point of the incidence itself. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features, can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

In order to conduct the vulnerability assessment for this hazard, GIS intersection analysis was used for fixed and mobile areas and building footprints/parcels where available and Census block data where footprints/parcels were not available.[28] In both scenarios, two sizes of buffers—0.5-mile and 1.0-mile—were used. These areas are assumed to represent the different levels of effect: immediate (primary) and secondary. Primary and secondary impact zones were selected based on guidance from the PHMSA Emergency Response Guidebook. For the fixed site analysis, geo-referenced TRI sites in the region, along with buffers, were used for analysis as shown in **Figure D.31.** For the mobile analysis, the major roads (Interstate highway, U.S. highway, and State highway) and railroads, where hazardous materials are primarily transported that could adversely impact people and buildings, were used for the GIS buffer analysis. **Figure D.32** shows the areas used for mobile road toxic release buffer analysis and **Figure D.33** shows the areas used for the mobile railroad toxic release buffer analysis. The results indicate the approximate number of improved properties and improved value, as shown in **Table D.45** (fixed sites), **Table D.46** (mobile roads), and **Table D.47** (mobile railroad sites).[29]

[28] This type of analysis will likely yield inflated results (generally higher than what is actually reported after an actual event).
[29] Note that improved properties included in the 1.0-mile analysis are also included in the 0.5-mile analysis.

FIGURE D.31 : TRI SITES WITH BUFFERS IN JACKSON COUNTY



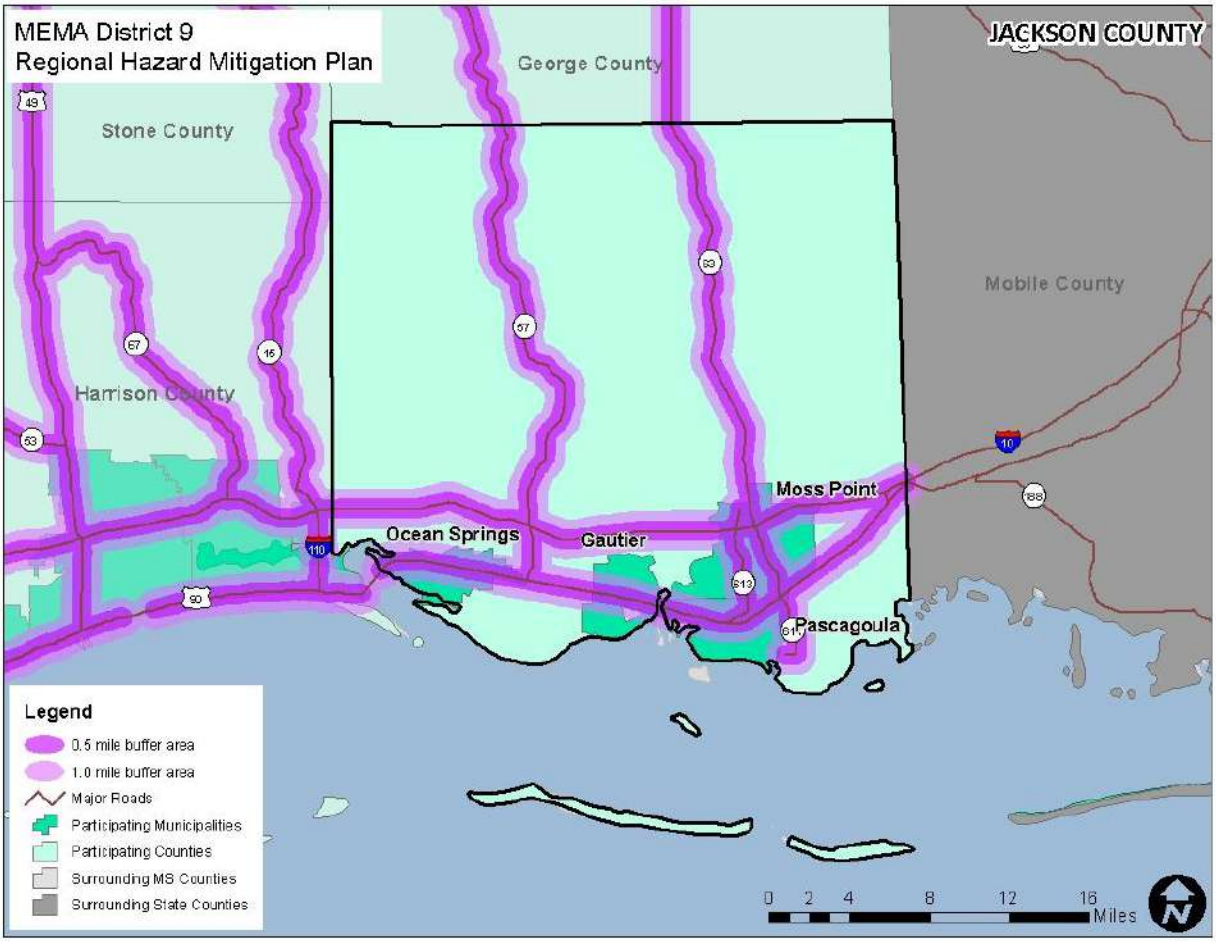
Source: Environmental Protection Agency

TABLE D.45: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS (FIXED SITES)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Gautier	0	$0	0	$0
Moss Point	583	$19,614,990	1,818	$74,425,480
Ocean Springs	0	$0	0	$0
Pascagoula	1,003	$39,815,600	3,902	$180,770,120
Unincorporated Area	968	$29,897,250	2,531	$67,036,780
JACKSON COUNTY TOTAL	**2,554**	**$89,327,840**	**8,251**	**$322,232,380**

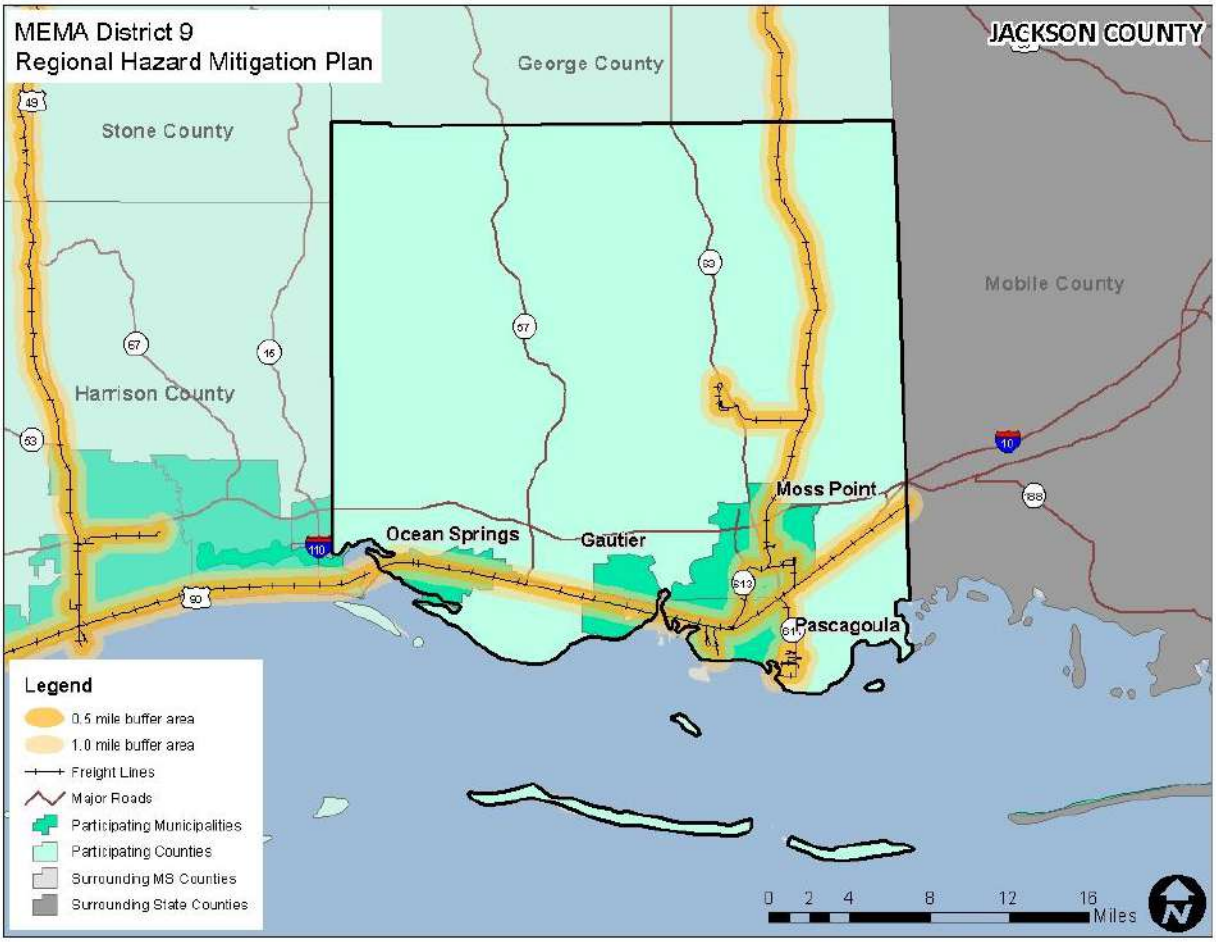
Source: EPA, MDEQ, Hazus MH 3.2 Data

FIGURE D.32 : MOBILE (ROAD) HAZMAT BUFFERS IN JACKSON COUNTY



Source: Federal Highway Administration National Highway Planning Network

FIGURE D.33 : MOBILE (RAIL) HAZMAT BUFFERS IN JACKSON COUNTY



Source: U.S. Department of Transportation Federal Railroad Administration

TABLE D.46: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - ROAD)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Gautier	2,038	$128,322,620	3,973	$231,157,040
Moss Point	6,704	$250,007,730	10,082	$360,729,220
Ocean Springs	6,109	$560,929,950	9,412	$825,611,110
Pascagoula	4,913	$365,649,400	9,604	$599,308,610
Unincorporated Area	10,707	$405,885,670	20,582	$842,454,330
JACKSON COUNTY TOTAL	**30,471**	**$1,710,795,370**	**53,653**	**$2,859,260,310**

Source: NHPN, MDEQ, Hazus MH 3.2 Data

TABLE D.47: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - RAILROAD)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Gautier	2,105	$96,599,920	4,241	$229,056,300
Moss Point	4,380	$143,660,210	8,047	$285,876,040
Ocean Springs	5,349	$502,955,290	9,255	$811,896,650
Pascagoula	5,903	$415,698,900	11,166	$649,874,460
Unincorporated Area	5,225	$159,075,020	8,949	$302,491,080
JACKSON COUNTY TOTAL	**22,962**	**$1,317,989,340**	**41,658**	**$2,279,194,530**

Source: USDOT FRA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Given high susceptibility across the entire county, it is assumed that the total population is at risk to a hazardous materials incident. It should be noted that areas of population concentration may be at an elevated risk due to a greater burden to evacuate population quickly.

Critical Facilities

Fixed Site Analysis:

The critical facility analysis for fixed TRI sites revealed that there are 21 facilities located in a fixed HAZMAT risk zone. Of these, 6 facilities are in the primary (0.5 mile) risk area including 4 private/non-profit, 1 school, and 1 water/wastewater. A list of specific critical facilities and their associated risk can be found in **Table D.52** at the end of this subsection.

Mobile Analysis:

The critical facility analysis for transportation corridors revealed that there are 237 facilities located in the primary and secondary road HAZMAT buffer areas. Of these, there were 173 critical facilities located in the primary risk zone including 2 communications, 3 EOCs, 20 fire stations, 4 medical, 7 police stations, 1 power/gas, 16 private/non-profit, 33 public facilities, 36 schools, 6 shelters, 16 special populations, and 29 water/wastewater.

For the rail line buffer areas, there were a total of 209 critical facilities located in primary and secondary buffer areas. Of these, 148 facilities are located within the primary buffer area including 4 communications, 3 EOCs, 14 fire stations, 4 medical, 6 police stations, 1 power/gas, 17 private/non-profit, 22 public facilities, 33 schools, 4 shelters, 11 special populations, and 29 water/wastewater.

A list of specific critical facilities and their associated risk can be found in **Table D.52** at the end of this subsection.

In conclusion, a hazardous material incident has the potential to impact many existing and future buildings, critical facilities, and populations in Jackson County. Those areas in a primary buffer are at the highest risk, though all areas carry some vulnerability due to variations in condition that could alter the impact area (i.e., direction and speed of wind, volume of release, etc.).

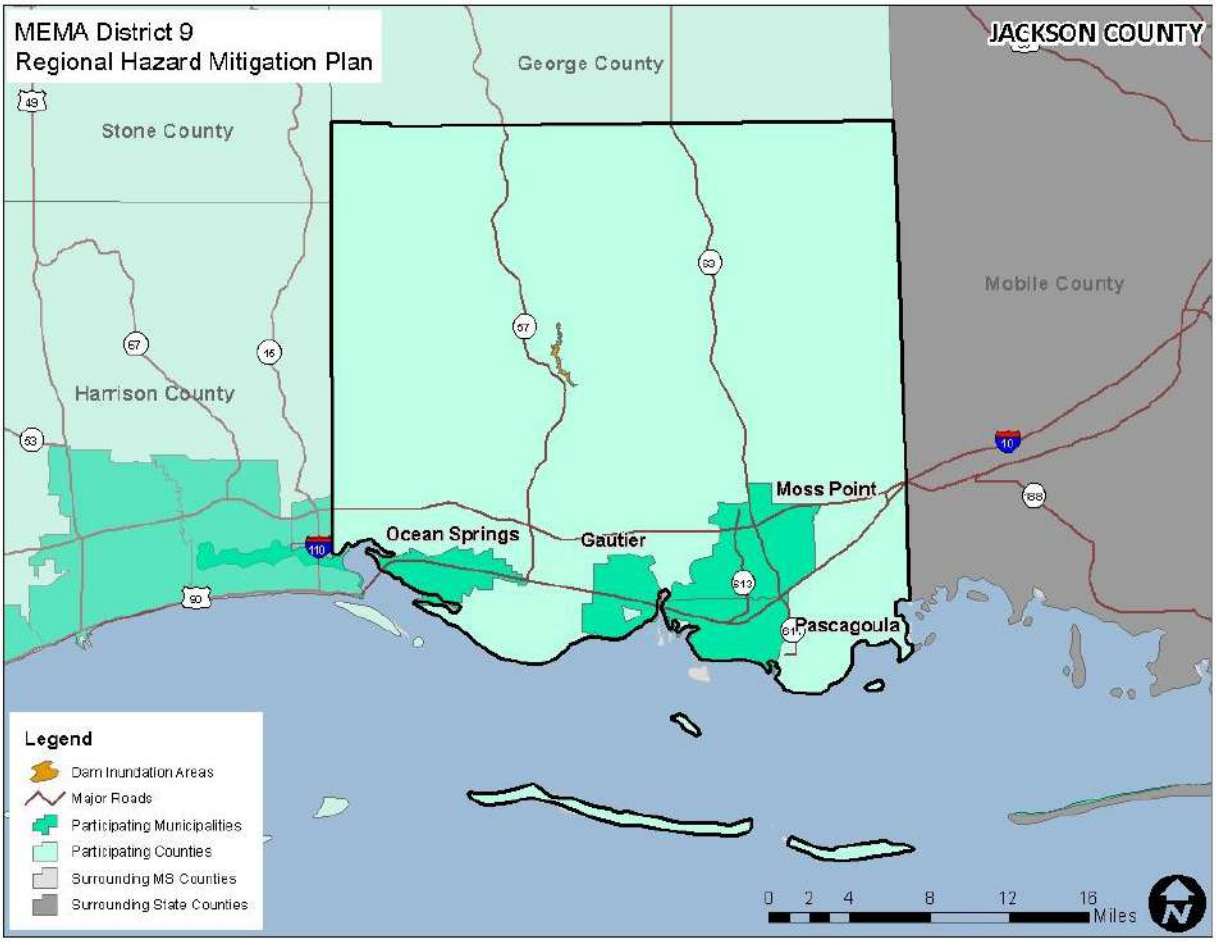
DAM/LEVEE FAILURE

In order to assess risk to a dam or levee failure, a GIS-based analysis was used to estimate exposure to one of the areas delineated by the Mississippi Department of Environmental Quality as a potential inundation area in the event of a failure. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within an identified inundation area. As mentioned previously, this type of inundation mapping has not been completed for every dam/levee in the region, so the results of this analysis likely underestimate the overall vulnerability to a dam or levee failure. However, the analysis is still useful as a sort of baseline minimum of property that is potentially at-risk. The identified inundation areas can be found in **Figure D.34**.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones.

Table D.48 presents the potential at-risk property. Both the number of buildings and the approximate improved value are presented

FIGURE D.34: DAM INUNDATION AREAS IN JACKSON COUNTY



Source: Mississippi Department of Environmental Quality

TABLE D.48: ESTIMATED EXPOSURE OF IMPROVEMENTS TO THE DAM/LEVEE FAILURE HAZARD

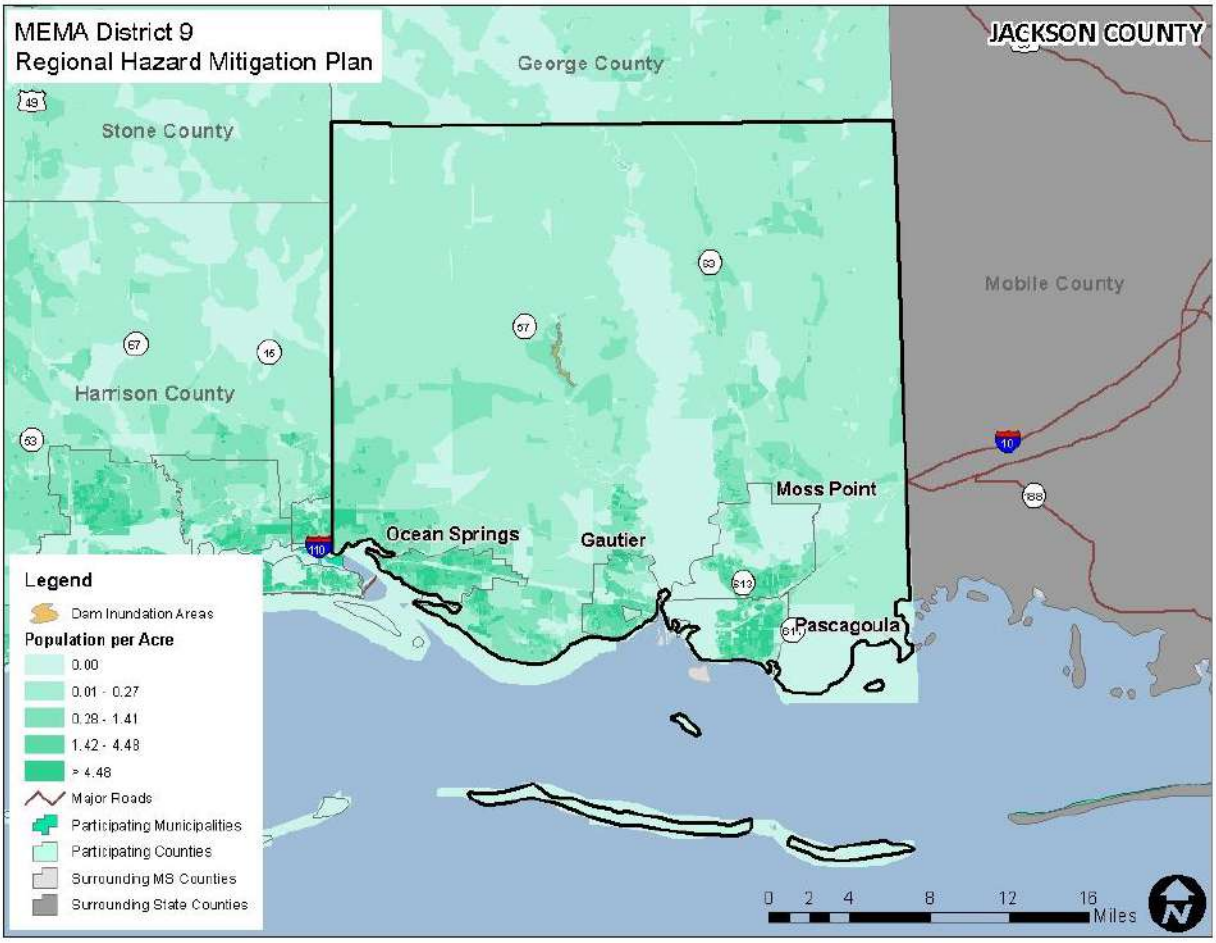
Location	Dam Inundation Area	
	Approx. Number of Buildings	Approx. Improved Value
Gautier	0	$0
Moss Point	0	$0
Ocean Springs	0	$0
Pascagoula	0	$0
Unincorporated Area	1	$0
JACKSON COUNTY TOTAL†	**1**	**$0**

†This does not include areas that would be inundated by the Big Creek Lake Dam, located in Alabama as geospatial data for the inundation area was not available.
Source: MDEQ, Hazus 3.2

Social Vulnerability

Figure D.35 is presented to gain a better understanding of at-risk population by evaluating census block level population data against dam inundation areas. There is an area of concern in the central part of the county, although it should be noted that most of the population of the county is not at risk to a dam/levee failure.

FIGURE D.35: POPULATION DENSITY NEAR DAM INUNDATION AREAS IN JACKSON COUNTY



Source: MDEQ, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are no facilities located in dam inundation areas. A list of specific critical facilities and their associated risk can be found in **Table D.52** at the end of this subsection.

In conclusion, a dam has the potential to impact a number of existing and future buildings, facilities, and populations in Jackson County, though this analysis is not all-encompassing in terms of risk to a dam or levee failure because inundation mapping is not available for all dams in the region.

CLIMATE CHANGE/SEA LEVEL RISE

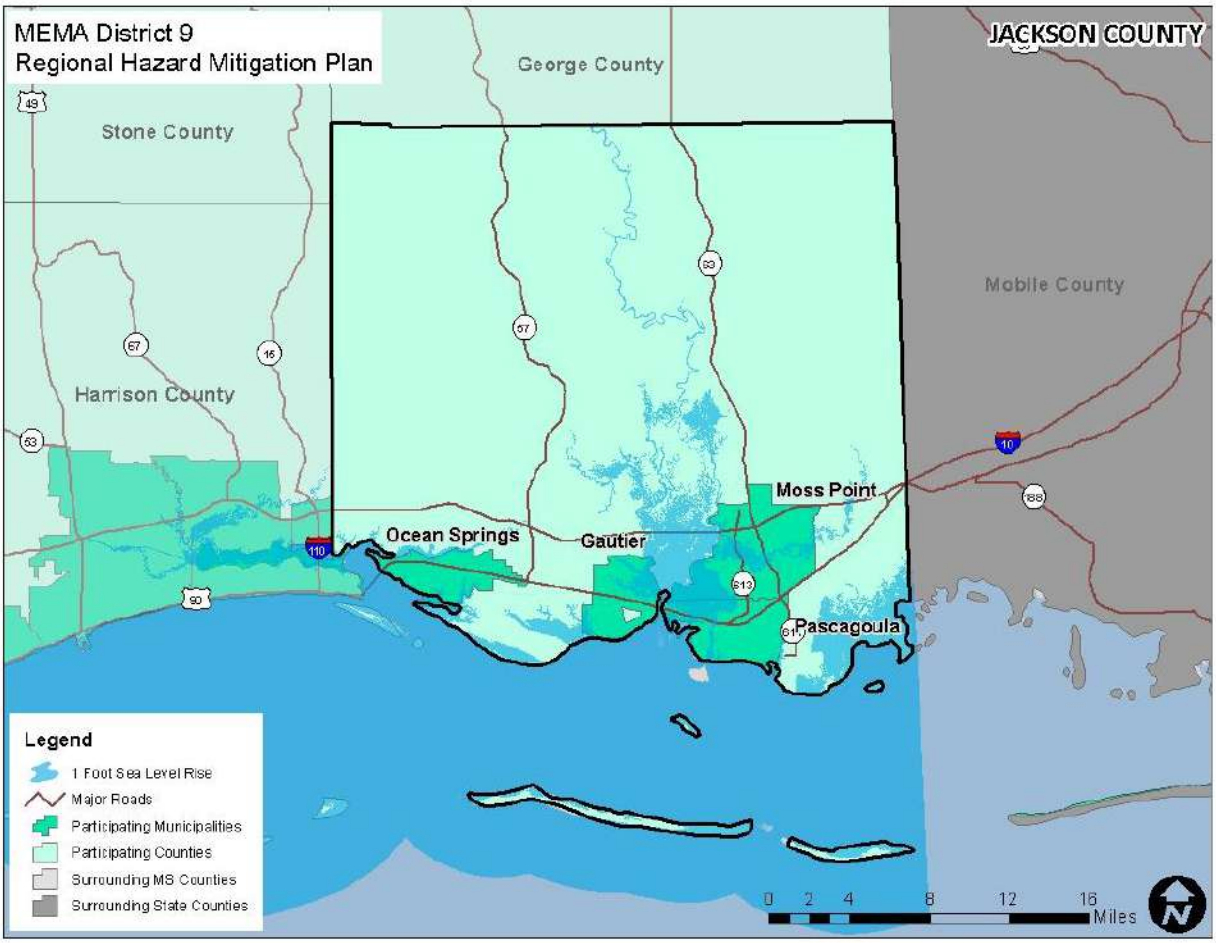
Most assessments carried out across the globe have concluded that climate change is a phenomenon that will impact our planet in the foreseeable future. Among others, the National Climate Assessment,

International Panel on Climate Change, and National Oceanic and Atmospheric Administration all project that climate change will impact the United States and will have a major impact on coastal communities due to the effects of sea level rise. As such, projections concerning sea level rise are important to incorporate into planning efforts in order to identify people and property that may be impacted.

In order to assess sea level rise risk, a GIS-based analysis was used to estimate exposure to future projections of sea level rise using data produced by the National Oceanic and Atmospheric Administration in combination with improved property records for the county. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within the inundation zone that would be created in the event of 1 foot, 3 feet, and 6 feet of sea level rise. A number of different sea level rise scenarios were available via NOAA (from 1 foot to 6 feet, at 1 foot intervals), however these scenarios were selected to demonstrate a range of potential sea level rise scenarios from low to moderate to high projections. These scenarios can be found in **Figure D.36**, **Figure D.37**, and **Figure D.38**.

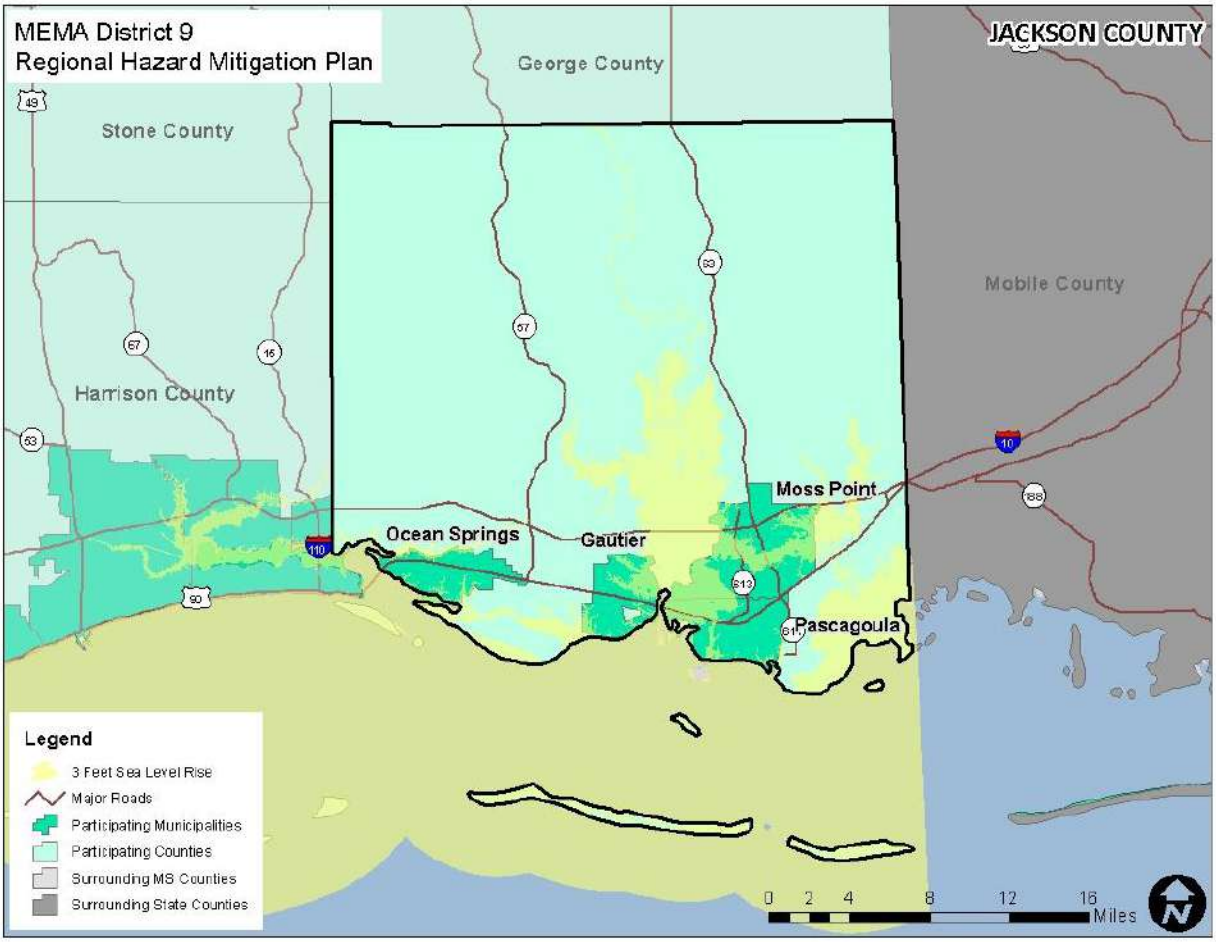
Table D.49 presents the potential at-risk property. Both the number of parcels and the approximate value are presented.

FIGURE D.36: 1 FOOT SEA LEVEL RISE SCENARIO IN JACKSON COUNTY



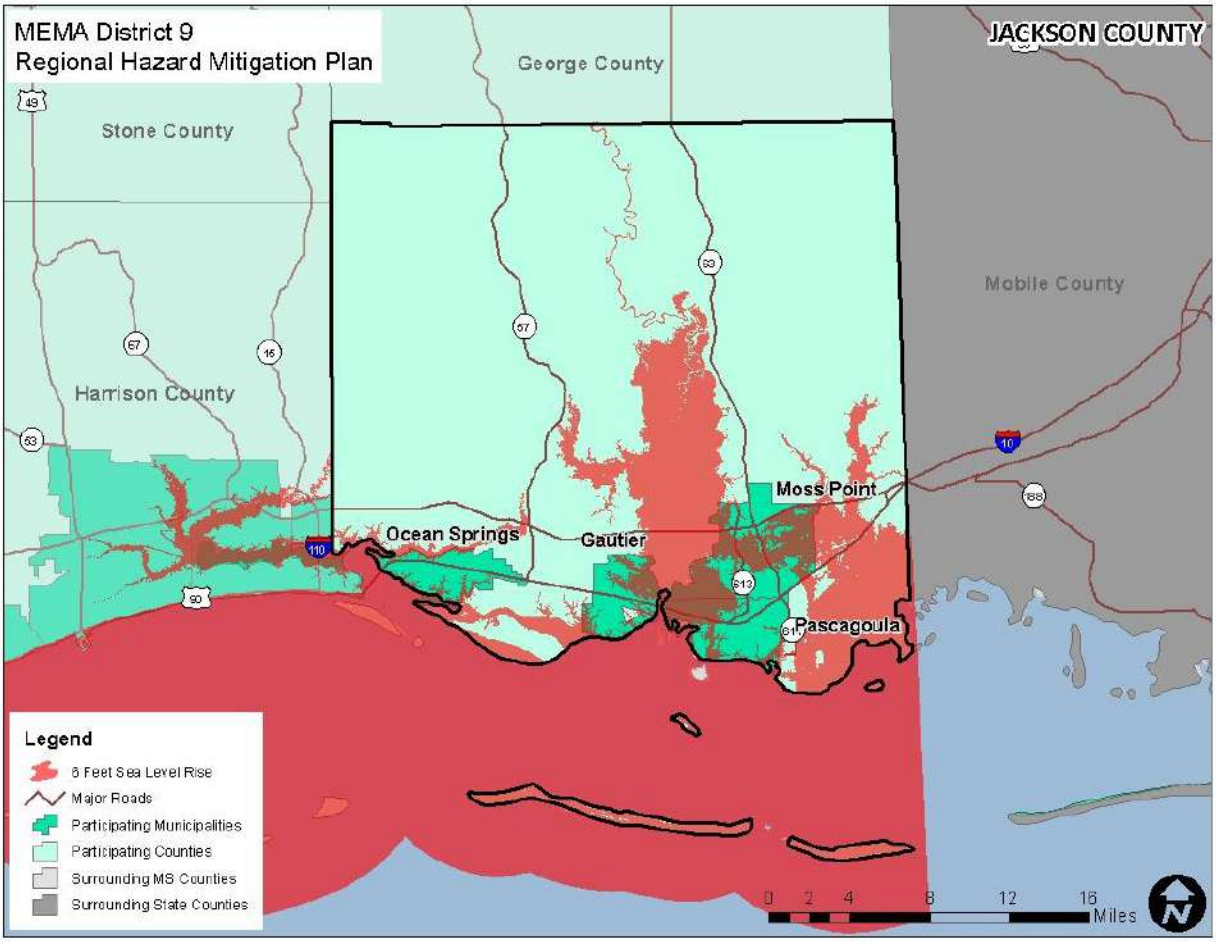
Source: NOAA

FIGURE D.37: 3 FEET SEA LEVEL RISE SCENARIO IN JACKSON COUNTY



Source: NOAA

FIGURE D.38: 6 FEET SEA LEVEL RISE SCENARIO IN JACKSON COUNTY



Source: NOAA

TABLE D.49: ESTIMATED EXPOSURE OF PARCELS TO THE SEA LEVEL RISE HAZARD

Location	1.0 foot		3.0 feet		6.0 feet	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Gautier	110	$8,651,090	371	$29,086,520	773	$49,712,830
Moss Point	71	$5,883,400	244	$17,686,870	1,550	$56,765,010
Ocean Springs	49	$12,727,870	118	$24,058,690	278	$47,884,160
Pascagoula	65	$6,319,600	245	$28,427,260	1,102	$73,423,870
Unincorporated Area	809	$54,924,890	2,046	$145,204,630	6,728	$324,849,720
JACKSON COUNTY TOTAL	**919**	**$63,575,980**	**2,417**	**$174,291,150**	**7,501**	**$374,562,550**

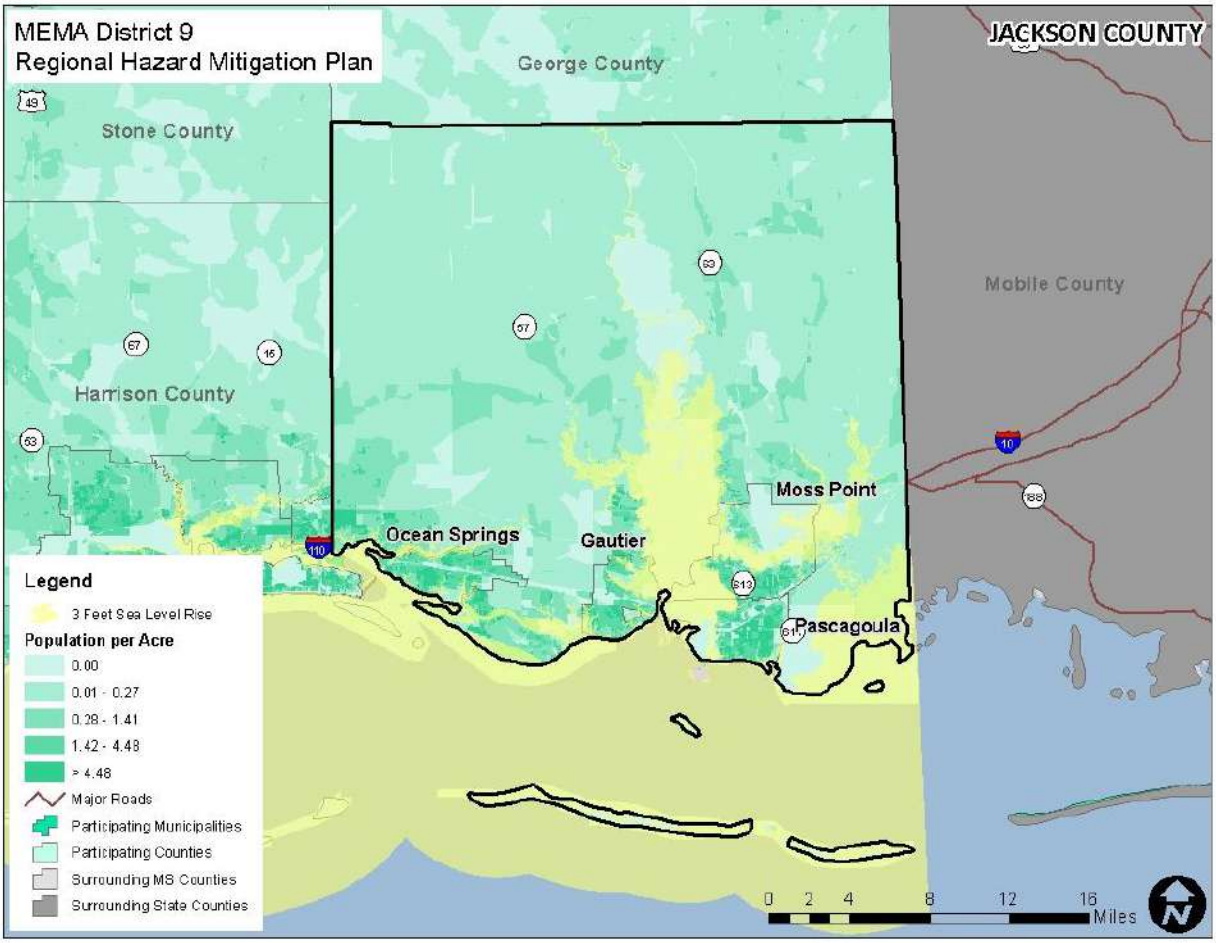
Source: NOAA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Figure D.39 is presented to gain a better understanding of at-risk population by evaluating census block level population data against the 3 feet sea level rise scenario. The three feet scenario was selected since

this is a moderate level projection. Based on this analysis, a significant part of the coastal population in the county is vulnerable to sea level rise.

FIGURE D.39: POPULATION DENSITY WITH 3 FEET SEA LEVEL RISE IN JACKSON COUNTY



Source: NOAA, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are 3 facilities located in the 3 feet of sea level rise scenario inundation area. As mentioned above, this scenario was selected as it is a mid-range projection for sea level rise based on a number of studies. The 5 facilities include 2 public facilities and 3 water/wastewater. A list of specific critical facilities and their associated risk can be found in **Table D.52** at the end of this subsection.

CONCLUSIONS ON HAZARD VULNERABILITY

Table D.50 presents an overall summary of the community's vulnerability for each jurisdiction. This summary provides key problem statements and identifies the community's greatest vulnerabilities that will be addressed in the mitigation strategy.

TABLE D.50: SUMMARY OF VULNERABILITY FOR JACKSON COUNTY

	Key Problem Statements
Jackson County	Jackson County, Gautier, Moss Point, Ocean Springs, and Pascagoula have many low-lying neighborhoods and streets that are especially vulnerable to coastal flooding and storm surge. Vulnerable and at-risk populations including low-income, minority, elderly, or disabled persons disproportionately live in flood prone areas. Additionally, many employers like casinos, resorts, and hotels are located in these vulnerable locations. Disruption or loss of these employers and facilities can result in significant unemployment, economic loss, and migration from the county and cities.

Table D.51 presents a summary of annualized loss for each hazard in Jackson County. Due to the reporting of hazard damages primarily at the county level, it was difficult to determine an accurate annualized loss estimate for each municipality. Therefore, an annualized loss was determined through the damage reported through historical occurrences at the county level. These values should be used as an additional planning tool or measure risk for determining hazard mitigation strategies throughout the county.

It should also be noted that many of these estimates are based on incomplete data and likely underestimate the historic dollar damage sustained in each county. Especially for hazards such as extreme cold, extreme heat, hail, lightning, and winter weather, it is very likely that more damage occurred historically than has been identified.

TABLE D.51: ANNUALIZED LOSS FOR JACKSON COUNTY

Hazard	Jackson County
Flood-related Hazards	
Dam and Levee Failure	*Not Available*
Erosion	*Not Available*
Flood	$234,715
Storm Surge	$213,721,103
Fire-related Hazards	
Drought	*Not Available*
Lightning	$17,009
Wildfire	*Not Available*
Geologic Hazards	
Earthquake†	$12,000
Wind-related Hazards	
Extreme Cold	$7,675
Extreme Heat/Heat Wave	*Not Available*
Hailstorm	$17
Hurricane and Tropical Storm	$101,235,648

Hazard	Jackson County
Severe Thunderstorm/High Wind	$20,249
Tornado	$150,650
Winter Weather	*Not Available*
Climate Change/Sea Level Rise	*Not Available*
Hazardous Materials Incident/Train Derailment	$25,777
Infectious Disease	*Not Available*

†Historic dollar damage was not available for this hazard, but since estimated annualized losses from Hazus were available, those numbers were used in this table.
*In this table, the term "Not Available" is used to indicate that no records of dollar losses for the particular hazard were recorded. This could be the case either because there were no events that caused dollar damage or because documentation of that particular type of event is not well kept.

As noted previously, all existing and future buildings and populations (including critical facilities) are vulnerable to impacts from atmospheric hazards such as drought and hailstorm. Some buildings may be more vulnerable to some of these hazards based on locations, construction, and building type. In addition, all populations are vulnerable to hazards like infectious disease which could presumably impact any segment of the population without regard to geographic location. **Table D.52** shows the critical facilities vulnerable to additional hazards analyzed in this section. The table lists those assets that are determined to be exposed to each of the identified hazards (marked with an "**X**").

TABLE D.52: AT-RISK CRITICAL FACILITIES IN JACKSON COUNTY

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
JACKSON COUNTY																										
EOC Radio Communication Tower		Comm		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Fontainebleau Radio Communication Tower		Comm		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Lily Orchard Radio Communication Tower		Comm		X		X		X	X		X	X	X	X	X	X	X	X								X
Vancleave Radio Communication Tower		Comm		X				X	X		X	X	X	X	X	X	X	X						X		X
County EOC		EOC		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Central Jackson County Fire Dept - Fontainebleau		Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X		X	X
Central Jackson County Fire Dept - Vancleave		Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X			X
East Central Nutbank Sub Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
East Central Sub Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
East Central Sub Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X							X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Escatawpa Central Fire Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X	X		X
Fontainebleau Main Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Fontainebleau Sub Sta.		Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Fort Bayou Volunteer Fire Dept - Station 1		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Fort Bayou Volunteer Fire Dept - Station 2		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Fort Bayou Volunteer Fire Dept - Station 3		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Fort Ramsay Fire Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Forts Lake Main Sta.		Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Forts Lake Orange Grove Sub Sta.		Fire Station		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Gulf Park Est. Fire Sta.		Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Helena Fire Sat.		Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Latimer Main Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Latimer Sub Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
North East Jackson County Fire Dept - East Central Station		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
North East Jackson County Fire Dept - Three Rivers Station		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
North Fire Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X			X
South Fire Sta.		Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X								X
St. Andrews Fire Sta.		Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Three Rivers North Sub Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Three Rivers Sub Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Vancleave May Lane Sta.		Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Vancleave Mt Pleasant Sub Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Vancleave River Rd Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Vancleave Waltman Rd. Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
West Jackson Co. Big Ridge Rd Sta.		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
West Jackson Co. Sub		Fire Station		X			X	X	X	X	X	X	X	X	X	X	X	X					X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Jackson County Sheriff Dept Substation - St. Martin		Police Station		X		X		X	X	X	X	X	X	X	X	X	X	X					X			X
Old School House		Private/Non-Profit		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Aluminum Bleachers		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Baseball Concesion		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Batting Cage		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Boat Ramp - Wood		Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X	X			X	X		X	X
City Hall Annex S		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
City Park Pavillion D		Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
City Park Pavillion E		Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
City Park Restroom		Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
City Park Storage		Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
County Health Department		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Football Concession		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Football Pressbox - N		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Football Pressbox - S		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Jackson County Complex		Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson County Complex - Jefferson Street		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Jackson County Fairgrounds (Primary POD site)		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson County Main Road Office		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X								X
Outside Property		Public Facility		X				X	X		X	X	X	X	X	X	X	X								X
Park Restrooms		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
PW Storage Barn		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X		X	X
PW Warehouse		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Recreation Dept.		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
School Hse Storage		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Senior Bldg		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Storage Bldg		Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Storage Warehouse		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X		X	X
Vancleave Arena (Secondary POD site)		Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Warehouse (Maint)		Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X		X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Alternative School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
East Central High School		School		X				X	X	X	X	X	X	X	X	X	X	X								X
East Central Lower Elementary		School		X				X	X	X	X	X	X	X	X	X	X	X								X
East Central Middle School		School		X				X	X	X	X	X	X	X	X	X	X	X								X
East Central Upper Elementary		School		X				X	X	X	X	X	X	X	X	X	X	X								X
Jackson County Alternative School - Vancleave		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Jackson County Technology Center - Vancleave		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Mississippi Gulf Coast Community College Gautier Campus		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Orange Lake Elementary		School		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
St. Martin East Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
St. Martin High School		School		X				X	X	X	X	X	X	X	X	X	X	X								X
St. Martin Middle School		School		X				X	X		X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
St. Martin North Elementary School		School		X		X		X	X	X	X	X	X	X	X	X	X	X					X			X
St. Martin Upper Elementary School		School		X				X	X		X	X	X	X	X	X	X	X								X
Vancleave High School		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Vancleave Lower Elementary		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Vancleave Middle School		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Vancleave Upper Elementary		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Vocational Technical Center		School		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Central Jackson County Shelter		Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
East Jackson County Shelter		Shelter		X				X	X	X	X	X	X	X	X	X	X	X							X	X
West Jackson County Shelter		Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Big Oaks Trailer Park - Moss Point		Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Bluff Creek Campground		Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Camp Journey's End Campground		Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X			X
Martin Lake Resort		Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Presley's Outing		Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X								X
River Oaks Trailer Park - Moss Point		Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Riverbend Park Resort		Special Populations		X				X	X	X	X	X	X	X	X	X	X	X								X
Santa Maria Campground		Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X			X
White Sands Campground		Special Populations		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Woodland Park Mobile Home Village - Moss Point		Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson County Airport		Transportation		X		X		X	X		X	X	X	X	X	X	X	X					X		X	X
Ocean Springs Airport (private)		Transportation		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Jackson County Utility Authority WWTP - Moss Point		Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Jackson County Utility Authority WWTP - Pascagoula		Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Jackson County Utility Authority WWTP - Vancleave		Water/ wastewater		X				X	X		X	X	X	X	X	X	X	X								X
River Pump Station		Water/ wastewater		X	X			X	X		X	X	X	X	X	X	X	X				X	X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Water Tower-Rear of 2502 College Circle		Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Water Tower-Next to 1416 Lark Dr.		Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Water Tower (Mall)-W of 290 Dolphin Dr.		Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X	X				X		X	X
Water Well #1 & #6		Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Water Well #10		Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Water Well #11		Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Water Well #4		Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X								X
Water Well #7		Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X	X				X		X	X
Water Well #8		Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Water Well #9		Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X							X	X
Central Fire Sta.	Gautier	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Martin Bluff Fire Sta.	Gautier	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Willie Ladnnier Fire Sta.	Gautier	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Gautier Police Dept.	Gautier	Police Station		X		X		X	X		X	X	X	X	X	X	X	X				X	X		X	X
City Hall North	Gautier	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X		X	X
College Park Elementary	Gautier	School		X		X		X	X		X	X	X	X	X	X	X	X					X	X	X	X
Gautier Elementary School	Gautier	School		X		X		X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Gautier High School	Gautier	School		X				X	X		X	X	X	X	X	X	X	X					X			X
Gautier Middle School	Gautier	School		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Martin Bluff Elementary School	Gautier	School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Singing River Elementary School	Gautier	School		X				X	X		X	X	X	X	X	X	X	X								X
Moss Point Central Fire Station	Moss Point	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Moss Point Dr. M. L. K. Fire Station	Moss Point	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Moss Point Kreole Fire Station	Moss Point	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Moss Point North Fire Station	Moss Point	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X			X	X	X	X		X
City of Moss Point Police Dept.	Moss Point	Police Station		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
City of Moss Point (City Hall)	Moss Point	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
City of Moss Point (Public Works)	Moss Point	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Alternative Learning Center	Moss Point	School		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Charlotte Hyatt Elementary School	Moss Point	School		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
East Park Elementary School	Moss Point	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Escatawpa Elementary	Moss Point	School		X		X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X			X
God's LIttle Angels	Moss Point	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Kidde Kollege	Moss Point	School		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Kreole Elementary School	Moss Point	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Little People Learning Center	Moss Point	School		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Magnolia Junior High School	Moss Point	School		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Moss Point High School	Moss Point	School		X				X	X	X	X	X	X	X	X	X	X	X					X			X
The Punkin Patch	Moss Point	School		X	X			X	X	X	X	X	X	X	X	X	X	X			X	X	X			X
University of Lil' Tots	Moss Point	School		X		X		X	X	X	X	X	X	X	X	X	X	X			X	X	X			X
West Elementary School	Moss Point	School		X		X		X	X	X	X	X	X	X	X	X	X	X					X		X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
1st Missionary Baptist Church	Moss Point	Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
2nd Missionary Baptist Church	Moss Point	Shelter		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
East Park School	Moss Point	Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Emergency Shelter	Moss Point	Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Johnson House Personal Care Home	Moss Point	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X			X	X	X		X	X
Pathway Personal Care Home	Moss Point	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Providence Home Care	Moss Point	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Rehabilitation Centers	Moss Point	Special Populations		X	X			X	X	X	X	X	X	X	X	X	X	X			X	X	X			X
Serenity Assisted Living Manor	Moss Point	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Singing River Rehab & Nursing	Moss Point	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
We Care Hospice	Moss Point	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Lift stations, wells, and pumping stations in the City	Moss Point	Water/ wastewater		X				X	X		X	X	X	X	X	X	X	X								X
EOC	Ocean Springs	EOC		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Fire Station 1--Central	Ocean Springs	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
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Fire Station 2--Bernard Beaugez	Ocean Springs	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Fire Station 3--Champ Gay	Ocean Springs	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Fire Station 4--Main/EOC	Ocean Springs	Fire Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Hospital	Ocean Springs	Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
On Call Urgent Care Center	Ocean Springs	Medical		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Police Station	Ocean Springs	Police Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Police Station	Ocean Springs	Police Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Police Station/Jail/Court-Under Construction	Ocean Springs	Police Station		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Mary C. O'Keefe Cultural Center for Arts and Education	Ocean Springs	Private/Non-Profit		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Walter Anderson Museum	Ocean Springs	Private/Non-Profit		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Armory Building	Ocean Springs	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Fort Maurepas	Ocean Springs	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Ocean Springs City Hall	Ocean Springs	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Civic Center	Ocean Springs	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Community Center	Ocean Springs	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Harbor--County Building	Ocean Springs	Public Facility		X			X	X	X		X	X	X	X	X	X	X	X	X				X		X	X
Ocean Springs Human Resources	Ocean Springs	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Library	Ocean Springs	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Parks & Recreation	Ocean Springs	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Ocean Springs Planning Dept.	Ocean Springs	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Public Works	Ocean Springs	Public Facility		X				X	X		X	X	X	X	X	X	X	X								X
Ocean Springs Public Works Maintenance Bldg	Ocean Springs	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Senior Center	Ocean Springs	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Alternative Education Center	Ocean Springs	School		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Elizabeth H. Keys Technology Center	Ocean Springs	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Grace Baptist Academy	Ocean Springs	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Greyhound Stadium Fieldhouse	Ocean Springs	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Magnolia Park Elementary	Ocean Springs	School		X		X		X	X	X	X	X	X	X	X	X	X	X					X		X	X
Oak Park Elementary	Ocean Springs	School		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs High School	Ocean Springs	School		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Middle School	Ocean Springs	School		X		X		X	X	X	X	X	X	X	X	X	X	X					X		X	X
Ocean Springs School District Administration Bldg	Ocean Springs	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Pecan Park Elementary	Ocean Springs	School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
St. Alphonsus Catholic School	Ocean Springs	School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Taconi School	Ocean Springs	School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
University of Southern Mississippi – Gulf Coast Research	Ocean Springs	School		X		X		X	X	X	X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
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Dorchester Arms	Ocean Springs	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Nursing Center	Ocean Springs	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Samaritan House Retirement Apartments	Ocean Springs	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
The Gardens	Ocean Springs	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Villa Maria Retirement Apartments	Ocean Springs	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Ocean Springs Airport	Ocean Springs	Transportation		X		X		X	X	X	X	X	X	X	X	X	X	X								X
Water Tower- 405 Halstead Drive	Ocean Springs	Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X					X		X	X
Water Tower- 828 Handy Road	Ocean Springs	Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Water Tower- 514 Washington Avenue	Ocean Springs	Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Water Tower- 602 Pine Drive	Ocean Springs	Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Water Tower- (Civic Center) 3706 Highway 90	Ocean Springs	Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Water Tower and Well- Sunplex Industrial Park	Ocean Springs	Water/ wastewater		X				X	X		X	X	X	X	X	X	X	X				X	X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Water Well- 3044 Pabst Rd	Ocean Springs	Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Water Well- 1501 Deana Road	Ocean Springs	Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Bell South Switching Station	Pascagoula	Comm		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Jackson County Emergency Management Agency	Pascagoula	EOC		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Bayou Cassette Fire Station	Pascagoula	Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X					X			X
Central Fire Station	Pascagoula	Fire Station		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Lake Fire Station	Pascagoula	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Acadian Ambulance Service	Pascagoula	Medical		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Singing River Hospital	Pascagoula	Medical		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson County Sheriff's Department	Pascagoula	Police Station		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Pascagoula Police Department	Pascagoula	Police Station		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Mississippi Power Company Work Yard	Pascagoula	Power/Gas		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
American Red Cross	Pascagoula	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Blossman Propane	Pascagoula	Private/Non-Profit		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Central Appliance	Pascagoula	Private/Non-Profit		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Chevron Products	Pascagoula	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
First Chemical	Pascagoula	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Gulf Concrete	Pascagoula	Private/Non-Profit		X		X		X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Gulf Sales and Supply	Pascagoula	Private/Non-Profit		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Jerry Lee's Grocery and Market	Pascagoula	Private/Non-Profit		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Lowe's Building Supply	Pascagoula	Private/Non-Profit		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Midstream Fuel Service	Pascagoula	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X			X		X	X	X	X
Pandle Incorporated	Pascagoula	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X			X		X		X	X
Rolls Royce Naval Marine 3	Pascagoula	Private/Non-Profit		X	X			X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Sav-A-Lot Grocery	Pascagoula	Private/Non-Profit		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Signal International	Pascagoula	Private/Non-Profit		X		X		X	X		X	X	X	X	X	X	X	X		X	X		X	X	X	X
The Salvation Army	Pascagoula	Private/Non-Profit		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Wal-Mart	Pascagoula	Private/Non-Profit		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Wayne Lee's Grocery and Market	Pascagoula	Private/Non-Profit		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson County Board of Supervisors	Pascagoula	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson County Jail	Pascagoula	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Pascagoula City Hall	Pascagoula	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Pascagoula Public Housing Authority	Pascagoula	Public Facility		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Pascagoula Public Works Dept - Yard and Building Department	Pascagoula	Public Facility		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
U.S. Coast Guard Facility	Pascagoula	Public Facility		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Applied Technology Center	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Arlington Heights Elementary School	Pascagoula	School		X	X			X	X	X	X	X	X	X	X	X	X	X			X		X		X	X
Beach Elementary School	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X							X	X
Bethel Academy	Pascagoula	School		X	X			X	X	X	X	X	X	X	X	X	X	X			X					X
Central Elementary School	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Cherokee Elementary School	Pascagoula	School		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Colmer Middle School	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X		X	X
Eastlawn Elementary School	Pascagoula	School		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Fair Elementary School	Pascagoula	School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Family Interactive Center	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Instructional Administrative Service Center	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Jackson County School for Exceptional Children	Pascagoula	School		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson Elementary School	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X		X	X
Lake Elementary School	Pascagoula	School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Opportunity Center	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Pascagoula High School	Pascagoula	School		X		X		X	X		X	X	X	X	X	X	X	X					X	X	X	X
Pascagoula Opportunity Center	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Pascagoula Vocational Technical Center	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Resurrection Catholic Elementary School	Pascagoula	School		X	X			X	X	X	X	X	X	X	X	X	X	X			X					X
Resurrection Middle/High School	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
St. Peter the Apostle Catholic School	Pascagoula	School		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Sugar Bear's Daycare	Pascagoula	School		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Trent Lott Middle School	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X		X	X
William H. Colmer Jr. High	Pascagoula	School		X	X			X	X		X	X	X	X	X	X	X	X					X		X	X
Bay Tower Assisted Living	Pascagoula	Special Populations		X				X	X		X	X	X	X	X	X	X	X								X
Chateau Deville Nursing Home	Pascagoula	Special Populations		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Plaza Community Living Center	Pascagoula	Special Populations		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Restoration Adult Home Care Center	Pascagoula	Special Populations		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Willow Creek Senior Housing	Pascagoula	Special Populations		X	X			X	X		X	X	X	X	X	X	X	X					X		X	X
14th Street Well	Pascagoula	Water/ wastewater		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
A Blue Lake LiftStation	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
A North Market Well	Pascagoula	Water/ wastewater		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Bayou Cassotte Water Purification Plant and Well 3	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X					X			X
Beach Well	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X						X	X	X
Belair/Monclair Lift Station	Pascagoula	Water/ wastewater		X	X			X	X		X	X	X	X	X	X	X	X					X		X	X
Belair/Washington Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X								X
Briarwood Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Chicot and Ingalls Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X			X					X
Communy Water Purification Plant and Well #1, #2 & #3	Pascagoula	Water/ wastewater		X	X			X	X		X	X	X	X	X	X	X	X					X		X	X
Criswell Water Purification Plant	Pascagoula	Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Delmas Lift Station	Pascagoula	Water/ wastewater		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Douglas Well	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X			X					X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Emerson Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Ford Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Hospital! Old Mobile Lift Station	Pascagoula	Water/ wastewater		X	X			X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Jackson County Utility Authority Wastewater Treatment Facility	Pascagoula	Water/ wastewater		X	X			X	X		X	X	X	X	X	X	X	X					X	X	X	X
Kenneth Lift Station	Pascagoula	Water/ wastewater		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Live Oak Lift Station	Pascagoula	Water/ wastewater		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Louise Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X			X		X		X	X
Magnolia Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X					X	X	X	X
Market/Parsley Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X							X	X
Moreland Lift Station	Pascagoula	Water/ wastewater		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
North River Road Lift Station	Pascagoula	Water/ wastewater		X			X	X	X		X	X	X	X	X	X	X	X	X				X	X	X	X
Orchard Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
Pine Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Poitevin Lift Station	Pascagoula	Water/ wastewater		X				X	X	X	X	X	X	X	X	X	X	X								X
Searstown Lift Station	Pascagoula	Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Searstown Well	Pascagoula	Water/ wastewater		X		X		X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Sherwood Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X					X		X	X
South River Road Lift Station	Pascagoula	Water/ wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Telephone Well	Pascagoula	Water/ wastewater		X		X		X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Washington Bayou Lift Station	Pascagoula	Water/ wastewater		X			X	X	X	X	X	X	X	X	X	X	X	X			X					X

D.4 JACKSON COUNTY CAPABILITY ASSESSMENT

This subsection discusses the capability of Jackson County to implement hazard mitigation activities. More information on the purpose and methodology used to conduct the assessment can be found in Section 7: *Capability Assessment*.

D.4.1 Planning and Regulatory Capability

Table D.53 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for Jackson County. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. A dagger (†) indicates that the given item is administered for that municipality by the county. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the MEMA District 9 Regional Hazard Mitigation Plan.

TABLE D.53: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Planning Tool/Regulatory Tool	Hazard Mitigation Plan	Threat and Hazard Identification and Risk Assessment (THIRA)	Comprehensive Land Use Plan	Floodplain Management Plan/Flood Mitigation Plan	Open Space Management Plan (Parks & Rec/Greenway Plan	Stormwater Management Plan/Ordinance	Natural Resource Protection Plan	Flood Response Plan	Emergency Operations Plan	Emergency Management Accreditation Program (EMAP Accreditation)	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Unified Development Ordinance	Post-Disaster Redevelopment/ Reconstruction Plan/ Ordinance	Building Code	Fire Code	National Flood Insurance Program (NFIP)	NFIP Community Rating System (CRS Program)
JACKSON COUNTY	✓		✓			✓			✓			✓			✓		✓	✓	✓			✓	✓	✓	✓
Gautier	†		✓		✓	✓			✓			†		✓	†		✓	✓	✓	✓		✓	✓	✓	✓
Moss Point	✓		✓						✓			†			†		✓	✓	✓			✓	✓	✓	
Ocean Springs	✓		✓			✓			✓			†			†		✓	✓	✓	✓		✓	✓	✓	✓
Pascagoula	✓		✓		✓	✓			✓			†			†		✓	✓	✓	✓		✓	✓	✓	✓

A more detailed discussion on the county's planning and regulatory capabilities follows.

EMERGENCY MANAGEMENT

Hazard Mitigation Plan
Jackson County has previously adopted a hazard mitigation plan. The City of Gautier was also included in this plan. The cities of Moss Point, Ocean Springs, and Pascagoula have also previously adopted municipal-level hazard mitigation plans.

Emergency Operations Plan
Jackson County maintains an emergency operations plan through its Emergency Management Agency. The cities of Gautier, Moss Point, Ocean Springs, and Pascagoula have also each adopted a municipal-level emergency operations plan.

GENERAL PLANNING

Comprehensive Land Use Plan
Jackson County has adopted a county comprehensive plan. The cities of Gautier, Moss Point, Ocean Springs, and Pascagoula have also adopted municipal comprehensive plans.

Capital Improvements Plan
Jackson County has not adopted a capital improvements plan. However, the City of Gautier has adopted a capital improvements plan.

Historic Preservation Plan
Neither Jackson County nor any of its participating municipalities have a historic preservation plan. However, the cities of Gautier, Ocean Springs, and Pascagoula have each adopted a historic preservation ordinance.

Zoning Ordinance
Jackson County and the cities of Gautier, Moss Point, Ocean Springs, and Pascagoula have each adopted a zoning ordinance. The cities of Gautier, Ocean Springs, and Pascagoula include zoning regulations as part of their local unified development ordinances. The remaining jurisdictions have adopted stand-alone zoning ordinances.

Subdivision Ordinance
Jackson County and the cities of Gautier, Moss Point, Ocean Springs, and Pascagoula have each adopted a subdivision ordinance. The cities of Gautier, Ocean Springs, and Pascagoula include subdivision regulations as part of their local unified development ordinances. The remaining jurisdictions have adopted stand-alone subdivision ordinances.

Building Codes, Permitting, and Inspections
After Hurricane Katrina, Mississippi Legislature mandated the adoption of the International Building Code and International Residential Code in five coastal counties including Jackson County. The cities of Gautier, Moss Point, Ocean Springs, and Pascagoula have also adopted building codes.

FLOODPLAIN MANAGEMENT

Table D.54 provides NFIP policy and claim information for each participating jurisdiction in Jackson County.

TABLE D.54: NFIP POLICY AND CLAIM INFORMATION

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
JACKSON COUNTY†	04/03/78	03/16/09	5,996	$1,507,783,300	3,810	$303,874,274
Gautier	11/13/86	03/16/09	1,724	$434,030,100	681	$59,663,535
Moss Point	09/18/70	03/16/09	1,131	$238,909,100	886	$28,225,055
Ocean Springs	09/18/70	03/16/09	2,622	$749,420,700	823	$86,224,366
Pascagoula	09/18/70	03/16/09	4,944	$1,164,782,600	2,763	$221,292,452

†Includes unincorporated areas of county only

Source: NFIP Community Status information as of 1/10/2017; NFIP claims and policy information as of 10/31/2016

Community Rating System

Jackson County (Class 9) as well as the cities of Gautier (Class 7), Ocean Springs (Class 6), and Pascagoula (Class 7) participate in the CRS. Participation in the CRS program should be considered as a mitigation action by the City of Moss Point. The program would beneficial to the city which has 1,131 NFIP policies in force.

Flood Damage Prevention Ordinance

All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. Jackson County and the cities of Gautier, Moss Point, Ocean Springs, and Pascagoula all participate in the NFIP and have adopted flood damage prevention ordinances.

Open Space Management Plan

Jackson County has not adopted a county open space management plan. However, the cities of Gautier and Pascagoula each have a municipal parks and recreation master plan in place.

Stormwater Management Plan

Jackson County and the City of Gautier have both adopted a stormwater management plan. The cities of Gautier, Ocean Springs, and Pascagoula have adopted local stormwater management ordinances.

D.4.2 Administrative and Technical Capability

Table D.55 provides a summary of the capability assessment results for Jackson County with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill. A dagger (†) indicates a county-level staff member(s) provides the specified knowledge or skill to that municipality.

TABLE D.55: RELEVANT STAFF/PERSONNEL RESOURCES

Staff/Personnel Resource	Planners with knowledge of land development/land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Emergency Manager	Floodplain Manager	Land Surveyors	Scientists familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in GIS and/or Hazus	Resource development staff or grant writers
JACKSON COUNTY	✓	✓	✓	✓	✓		✓	✓	✓	✓
Gautier	✓	✓	✓	†	✓		†	✓	✓	✓
Moss Point		✓	✓	†	✓		†	✓	†	
Ocean Springs	✓	✓	✓	†	✓		†	✓		✓
Pascagoula	✓	✓	✓	✓	✓		†	✓	✓	✓

Credit for having a floodplain manager was given to those jurisdictions that have a flood damage prevention ordinance, and therefore an appointed floodplain administrator, regardless of whether the appointee was dedicated solely to floodplain management. Credit was given for having a scientist familiar with the hazards of the community if a jurisdiction has a Cooperative Extension Service or Soil and Water Conservation Department. Credit was also given for having staff with education or expertise to assess the community's vulnerability to hazards if a staff member from the jurisdiction was a participant on the existing hazard mitigation plan's planning committee.

D.4.3 Fiscal Capability

Table D.56 provides a summary of the results for Jackson County with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource has previously been used to implement hazard mitigation actions. A dagger (†) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds).

TABLE D.56: RELEVANT FISCAL RESOURCES

Fiscal Tool/Resource	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes (or taxing districts)	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation, Revenue, and/or Special Tax Bonds	Partnering Arrangements or Intergovernmental Agreements	Other: HMGP and other federal, state, and private grants/resources
JACKSON COUNTY	†								†	✓
Gautier	†								†	✓
Moss Point	†	✓	†	†	†			†	†	✓
Ocean Springs		✓			†				†	✓
Pascagoula	†	†		†	†			†	†	✓

D.4.4 Political Capability

During the months immediately following a disaster, local public opinion in Jackson County is more likely to shift in support of hazard mitigation efforts.

Table D.57 provides a summary of the results for Jackson County with regard to political capability. A checkmark (✓) indicates the expected degree of political support by local elected officials in terms of adopting/funding information.

TABLE D.57: LOCAL POLITICAL SUPPORT

Political Support	Limited	Moderate	High
JACKSON COUNTY			✓
Gautier			✓
Moss Point		✓	
Ocean Springs			✓
Pascagoula			✓

D.4.5 Conclusions on Local Capability

Table D.58 shows the results of the capability assessment using the designed scoring methodology described in Section 7: *Capability Assessment*. The capability score is based solely on the information found in existing hazard mitigation plans and readily available on the jurisdictions' government websites. This information was reviewed by all jurisdictions and each jurisdiction provided feedback on the information included in the capability assessment. Local government input was vital to identifying capabilities. According to the assessment, the average local capability score for the county and its jurisdictions is 46.2, which falls into the moderate capability ranking.

TABLE D.58: CAPABILITY ASSESSMENT RESULTS

Jurisdiction	Overall Capability Score	Overall Capability Rating
JACKSON COUNTY	46	Moderate
Gautier	46	Moderate
Moss Point	41	Moderate
Ocean Springs	46	Moderate
Pascagoula	52	High

D.5 JACKSON COUNTY MITIGATION STRATEGY

This subsection provides the blueprint for Jackson County to follow in order to become less vulnerable to its identified hazards. It is based on general consensus of the Regional Hazard Mitigation Council and the findings and conclusions of the capability assessment and risk assessment. Additional Information can be found in Section 8: *Mitigation Strategy* and Section 9: *Mitigation Action Plan*.

D.5.1 Mitigation Goals

Jackson County developed nine mitigation goals in coordination with the other participating MEMA District 9 Region jurisdictions. The regional mitigation goals are presented in **Table D.59**.

TABLE D.59: MEMA DISTRICT 9 REGIONAL MITIGATION GOALS

	Goal
Goal #1	Minimize risk and vulnerability of the community to hazards.
Goal #2	Minimize loss of life, injury, and damages to property, the economy, and the environment.
Goal #3	Minimize loss to critical facilities and infrastructure, utilities, and services.
Goal #4	Improve, expand, and enhance public education, awareness, and preparedness.
Goal #5	Build and enhance local mitigation capabilities to improve the region's ability to prepare for, respond to, and recover.
Goal #6	Enter into partnerships with neighboring jurisdictions, federal and state agencies, and others to share information and develop a more hazard resistant community.

	Goal
Goal #7	Enhance response procedures and emergency management capabilities.
Goal #8	Reduce economic losses, minimize social disruptions, and maintain quality of life.
Goal #9	Protect the environment and natural resources.

D.5.2 Mitigation Action Plan

The mitigation actions proposed by Jackson County and the cities of Gautier, Moss Point, Ocean Springs, and Pascagoula are listed in the following individual Mitigation Action Plans.

Jackson County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Enforce building codes.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 14 in previous plan) The county has maintained its practice of enforcing building codes over the past several years. It will evaluate these codes in the coming years and ensure that they are still being enforced properly so this action will remain in place.
P-2	Maintain debris program to clean drainage ways from existing properties and critical facilities.	Flood	High	Gautier Street Division; Jackson County Road Department	Internal	2022	(Action 16 in previous plan) The county has developed and maintained a debris program that has been successful, but there are likely some areas where the county can improve this program in the future, so this action will remain in place.
P-3	Maintain debris program to clear roadside ditches and culverts.	Flood	High	Gautier Street Division; Jackson County Road Department	Internal	2022	(Action 17 in previous plan) The county has developed and maintained a debris program that has been successful, but there are likely some areas where the county can improve this program in the future, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-4	Develop/enforce landscaping requirements to provide absorption of average volumes of rainfall on property.	Flood	Moderate	Gautier and Jackson County Planning Departments	Internal	2022	(Action 18 in previous plan) The county has developed some requirements related to landscaping, but these may need to be revised and reviewed for improving enforcement so the county will keep this plan in place.
P-5	Enforce storm water ordinances and encourage use of pervious surfaces and natural absorption of rainwater.	Flood	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 20 in previous plan) The county has worked to enforce its stormwater ordinances and encourage use of pervious surfaces in construction, but there are still many areas where there is room for improvement in this regard so the county will maintain this action.
P-6	Enforce the revised Digital Flood Insurance Rate Map (DFIRM).	Flood	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 21 in previous plan) The county has reviewed the DFIRM and is currently enforcing all regulations that pertain to areas located in flood zones. The county will evaluate its regulations related to floodplains to ensure that they are up to the highest possible standard feasible.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Control vegetation growth around critical facilities.	Wildfire	High	Gautier Street Division; Jackson County Road Department	Internal	2022	(Action 23 in previous plan) The county has monitored vegetation growth around most critical facilities, but there is still additional work to be done related to managing this growth around critical facilities so the county will keep this action in place.
P-8	Coordinate prescribed burns in heavily forested areas with state and federal agencies.	Wildfire	High	Gautier and Jackson County Fire Departments	Internal	2022	(Action 24 in previous plan) When necessary, the county has worked with state and federal agencies to initiate prescribed burns. This practice will need to be continually evaluated and coordination with the proper agencies is also needed so the action will stay in place.
P-9	Conduct a study of the effects of sea level rise and develop mitigation strategies to minimize those effects.	Sea Level Rise	Low	Gautier and Jackson County Planning Departments	Internal	2022	(Action 26 in previous plan) No localized study of the effects of sea level rise has been carried out, though there have been some national level studies. The county will continue to pursue a more localized evaluation of the impacts of sea level rise in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-10	Encourage private land owners on waterfronts to implement erosion control measures.	Erosion	Low	Gautier and Jackson County Planning Departments	Internal	2022	(Action 27 in previous plan) Some efforts have been made to encourage private land owners to implement erosion control measures on their property, but many have still not taken the necessary steps, so the county will continue to encourage these actions going forward.
P-11	Develop/enforce water use ordinance to address drought condition procedures.	Drought	High	Gautier and Jackson County Planning Departments	Internal	2020	(Action 28 in previous plan) The county has not developed a specific ordinance to address drought condition procedures, but it has enacted some restrictions in the past. The county will continue to look at adopting a specific ordinance to this effect.
P-12	Conduct study on aquifers to determine impacts on public and private wells.	Drought	Moderate	Jackson County Utility Authority	Jackson County Utility Authority	2022	(Action 29 in previous plan) The county has not conducted a study of aquifers due to a lack of funding, but this is still a priority action that must be coordinated with the utility authority, so the action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-13	Implement dredging program for the Bayou areas to improve effects of sediment buildup caused by storm surge.	Storm Surge	Moderate	Gautier Public Works; Jackson County Public Works	MDMR, USACE, NRCS, CIAP, Tideland	2022	(Action 33 in previous plan) Some dredging has been done in the Bayou areas, but an official program has not been implemented to the scale necessary to prevent all impacts from storm surge so the county will continue to work on improving the implementation of this action in the future.
P-14	Develop continuity of operations plans.	All	High	Jackson County and City of Gautier	Internal	2020	(Action 49 in previous plan) The county has not developed a formal continuity of operations plan, but does have some strategies in place to ensure continuity of operations. The county will work to develop a formal plan going forward.
P-15	Develop Emergency response plans.	All	High	Jackson County and City of Gautier	Internal	2022	(Action 50 in previous plan) The county has developed an emergency operations plan, but it will need to be reviewed in the coming years to ensure it still identifies proper protocols. This action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-16	Develop capital improvement plans.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 52 in previous plan) The county does not have a formal CIP, but it does have a program in place for spending on infrastructure. The county will continue to work on implementing this program and evaluating the development of a formal CIP.
P-17	Develop/enhance asset inventories (e.g., critical facilities, infrastructure, equipment) into GIS.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 55 in previous plan) During this plan update, a number of additional critical facilities were digitized into GIS. However, some facilities were still not included in this digitization so the county will continue to work on this.
P-18	Upgrade devices used for damage assessments and communication as technology improves/changes.	All	High	Jackson County Emergency Management Agency	Internal	2022	(Action 56 in previous plan) The county has devices it uses for damage assessments, but these devices are indeed getting out of date so it will look for ways to improve its assets in this area where possible going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-19	Seek opportunities to continue to lower the CRS rating (and insurance rate).	Flood	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 57 in previous plan) The county participates in the CRS, but it has not reached a level 1 yet, so there are certainly ways in which the county can improve its program and score more points. The county will continue to evaluate the best steps it can take to do this.
P-20	Incorporate the goals and objectives of the hazard mitigation plan into all planning documents and ordinances.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 58 in previous plan) The goals of the hazard mitigation plan have been incorporated into other planning documents, but as this plan and those documents are updated, additional effort to ensure up to date information will be needed.
P-21	Conduct annual review of the hazard mitigation plan.	All	High	Hazard Mitigation Council; Gautier and Jackson County Planning Departments	Internal	2017, Annually	(Action 59 in previous plan) The county has conducted annual reviews of its hazard mitigation plan, but this action will need to be kept in place as the county plans to continue this practice.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-22	Conduct evaluation of mitigation strategies and projects following a hazard impact.	All	High	Hazard Mitigation Council; Jackson County Emergency Management Agency	Internal	2022	(Action 60 in previous plan) The county has evaluated mitigation actions after hazards have impacted the community and generally tried to update the mitigation plan accordingly, but this has not always been the case so the county will work on improving its implementation of this action.
P-23	Document damages/losses sustained from natural hazards.	All	High	Jackson County Emergency Management Agency	Internal	2022	(Action 61 in previous plan) For the most part, the county has documented damage caused by natural hazards, especially after very large events. However, the county would like to improve its documentation techniques for accuracy, so it will continue to work on this action.
P-24	Conduct After Action Reviews (AAR) following events to capture lessons learned, reassess damages incurred, and complete damage assessment forms with accurate information.	All	High	Hazard Mitigation Council	Internal	2022	(Action 62 in previous plan) The county has conducted AARs following many of its major disaster events, but there are certainly ways in which the county can improve its review process and so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Property Protection							
PP-1	Upgrade/harden water and wastewater facilities. (Gautier water towers/wells, Shell landing Wastewater Collection Systems, Jackson County motor control centers, Jackson County sanitary generators)	All	High	City of Gautier; Jackson County Utility Authority	HMA	2022	(Action 3 in previous plan) Although some efforts have been made to harden water/wastewater facilities in the county, there are still many that are unprotected and vulnerable so the county will retain this action.
PP-2	Harden existing critical facilities. (Gautier Police Dept., Gautier Public Works, Gautier Maintenance Shop, Singing River Hospital and Ocean Springs Hospital, Gautier Fire Dept., Pascagoula/Moss Point Wastewater Treatment Facility, and Escatawpa Wastewater Reclamation Facility).	All	High	City of Gautier; Jackson Count; Singing River Health	HMA	2022	(Action 4 in previous plan) Although some efforts have been made to harden critical facilities in the county, there are still many that are unprotected and vulnerable so the county will retain this action.
PP-3	Elevate/improve roads and bridges that are below base flood elevation.	Flood	High	Jackson County Road Dept.; Gautier Public Works	Local, State, Federal	2022	(Action 5 in previous plan) Many roads have been elevated above BFE in the county, but there are certainly some that have not and the county would like to work towards addressing those roads that are vulnerable to flooding.
PP-4	Relocate Jackson County Emergency Operation Center to county-owned property on Jim Ramsey Road.	All	High	Jackson County	HMA	2017	(Action 8 in previous plan) The county has not yet relocated its EOC to the property on Jim Ramsey Road but this is still in the works and the county will continue to push forward with this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-5	Relocate Jackson County Sheriff Dispatch/E-911 with EOC on Jim Ramsey Road or to existing EOC on Convent Avenue.	All	High	Jackson County	HMA	2017	(Action 9 in previous plan) The county has not yet relocated its EOC to the property on Jim Ramsey Road but this is still in the works and the county will continue to push forward with this action.
PP-6	Encourage use of underground utilities in higher elevation areas.	All	Moderate	Gautier and Jackson County Planning Departments	Internal	2022	(Action 11 in previous plan) The county has evaluated the use of underground utilities in areas that are high enough that those utilities will not be flooded. This is very location dependent, so the county will continue to implement where it makes the most sense in the future.
PP-7	Construct all new critical facilities and infrastructure with materials designed to minimize impacts from all hazards.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 12 in previous plan) The county has attempted to build all new critical facilities up to a standard that will protect them as best as possible from hazard impacts. As new facilities are constructed, the county will continue to try to build to the best possible standard.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-8	Identify location for community safe rooms in Gautier and Jackson County to accommodate the remaining population not covered in the existing safe rooms.	All	High	Gautier City Council; Jackson County Board of Supervisors	HMA	2022	(Action 13 in previous plan) Several safe rooms have been identified across the county but these do not cover the entirety of the county population, so additional safe rooms will need to be identified.
PP-9	Acquisition/demolition of Severe Repetitive Loss Properties (SRL) and Repetitive Flood Claim (RFC) properties by continuing to apply for FMA to mitigate when practical.	Flood	High	Gautier and Jackson County Planning Departments	FMA	2022	(Action 19 in previous plan) The county has mitigated a number of repetitive/severe repetitive loss properties, but there are still a number of these types of properties that need to be mitigated so the county will keep this action in place.
PP-10	Raise lift stations and other critical infrastructure above base floodplain where feasible.	Flood	High	Jackson County Utility Authority; City of Gautier	Local	2022	(Action 22 in previous plan) Some lift stations have been raised above the BFE, but others have not and there is still significant critical infrastructure located in the floodplain. The county will look at ways to mitigate the impacts to this infrastructure in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-11	Encourage existing and new developments to include surge and lightning protectors and use of enhanced construction materials.	Lightning	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 30 in previous plan) The county has encouraged developers to include surge and lightning protectors in new construction, but this has not always been implemented so the county will retain this action and continue to encourage this going forward.
PP-12	Implement mast arm traffic signal improvements.	All	High	Gautier Street Division; Jackson County Road Department	Local	2022	(Action 31 in previous plan) The county has implemented mast arms at several intersections, but there are many where mast arms are still not in place so the county will continue to pursue this action going forward.
PP-13	Mount street signs to existing mast arm traffic signals.	All	High	Gautier Street Division; Jackson County Road Department	Local	2022	(Action 32 in previous plan) In many cases where mast arms are in place, street signs have been mounted to the mast arms, but as many intersections do not have mast arms, this action will need to be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Natural Resource Protection							
NRP-1	Develop/maintain a beach erosion and renourishment program.	Erosion	Moderate	Gautier and Jackson County Public Works	Internal	2022	(Action 25 in previous plan) The county has implemented beach renourishment in many locations to reduce the effects of erosion, but since erosion is a continual process, this action will need to be retained going forward.
Structural Projects							
SP-1	Coordinate with applicable agencies on constructing new roadways and bridges above the base flood elevation.	Flood	High	Gautier Public Works, Jackson County Road Department	Local	2022	(Action 15 in previous plan) The county has worked with state and federal DOTs to try to ensure that new roadways and bridges are constructed above BFE, but this will need to be addressed as more roads are constructed in the future.
Emergency Services							
ES-1	Identify and prioritize portable generator hook ups or permanent mount units for wells, lift stations, and facilities.	All	High	Jackson County; City of Gautier; Jackson County Utility	HMA	2020	(Action 1 in previous plan) The county has identified a number of locations for portable generator hookup and has generally prioritized those locations. However, there are still additional locations where the county would like to make hookups available so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-2	Explore options for back up water supply system/service for Ocean Springs and Singing River Hospitals.	All	High	Singing River Health Systems	Local	2017	(Action 6 in previous plan) The hospitals have worked to identify alternative sources of water supply and service, but these will need to be checked on a regular basis to ensure these supplies are maintained. The county will keep this action in place.
ES-3	Develop agreements/reprocess for providing tie-ins and back up water service for Jackson County Utility Authority and Gautier.	All	High	Jackson County Utility Authority; Gautier Public Works	Local	2017	(Action 7 in previous plan) The county has developed some agreements for backup water supply service, but will need to continue to manage those agreements and ensure that backup water supplies remain available in the event of a disaster.
ES-4	Improve notification procedures of impending hazards and evacuation procedures.	All	High	Jackson County Emergency Management Agency	Local	2018	(Action 40 in previous plan) The county is consistently working on improving notification procedures for impending disasters, but there is still room for improvement and so the county will keep this action in place.
ES-5	Develop/update and conduct exercises on response procedures.	All	High	Jackson County and City of Gautier	Internal	2019	(Action 51 in previous plan) The county has developed and conducted a number of exercises on response procedures, but in order to remain on top of this sort of training, the county will plan to conduct additional exercises going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-6	Increase evacuation route options and coordination of activation by working with state/federal agencies.	All	High	Jackson County Emergency Management Agency	Local	2020	(Action 53 in previous plan) Evacuation routes are identified for the county, but the county would like to identify additional routes that citizens can use to evacuate to speed the evacuation process overall.
ES-7	Improve signage/traffic control devices for evacuations.	All	High	Jackson County Emergency Management Agency	Local	2020	(Action 54 in previous plan) The county has experienced evacuations before and have provided both signage and traffic control. However, the county would like to improve both of these aspects of evacuations so this action will remain in the plan.
Public Education and Awareness							
PEA-1	Educate the public on all hazard preparedness.	All	High	Jackson County Emergency Management Agency	Local	2022	(Action 36 in previous plan) The county has put in extensive efforts to educate the public on all hazard preparedness, but this is a continuous process that needs to be constantly evaluated to ensure the public is aware of risks and actions they can take to reduce risk.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Educate the public on all hazard mitigation programs (safe rooms, wind retrofit, etc.).	All	High	Jackson County Emergency Management Agency	Local	2022	(Action 37 in previous plan) The county has worked on educating the public about hazard mitigation programs and successfully encouraged many citizens to mitigate their homes/businesses. Nevertheless, many citizens are still not fully aware of programs available to assist them, so the county will keep this action in place.
PEA-3	Educate the public about the benefits of flood mitigation of homes and businesses.	Flood	High	Jackson County Emergency Management Agency	Local	2022	(Action 38 in previous plan) The county has focused on flood mitigation education with many home and business owners as this is a major threat to the community. Given that flood programs, funding, and insurance are constantly changing, this action will stay in place.
PEA-4	Continue to deliver programs to residents, business owners, and developers regarding best management practices for storm water control and household hazardous waste.	Flood, Hazardous Materials Incident	High	Gautier and Jackson County Planning Departments	Local	2022	(Action 39 in previous plan) The county has enacted several programs to help promote best practices for storm water control and household hazardous waste. However, many residents/businesses do not implement these practices so more education is likely required.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-5	Develop education materials for water conservation.	Drought	High	Gautier and Jackson County Planning Departments	Local	2022	(Action 41 in previous plan) The county has some information for the public on water conservation, but overall there needs to be more emphasis on getting citizens to implement these measures in the future.
PEA-6	Promote Firewise program to homeowners, builders/contractors, and developers.	Wildfire	High	Gautier and Jackson County Fire Departments	Local	2022	(Action 42 in previous plan) The county has encouraged the use of the Firewise program on many stakeholder groups, but there are still many areas that would benefit from implementing more elements of the Firewise program so this action will be retained.
PEA-7	Develop outreach strategies for non-English communities.	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 43 in previous plan) The county has generally focused on English language outreach strategies, but with a growing population of non-English speakers, the county would like to put more emphasis on reaching those groups so it will focus on this action going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-8	Develop outreach strategies for tourists (i.e., part-time residents, RV campers, vacationers, etc.)	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 44 in previous plan) The county has tried to incorporate tourists into much of its planning, but outreach/education strategies aimed towards tourists are not as prevalent. This is an action the county will try to focus on in the future.
PEA-9	Develop outreach strategies for elderly and low-income residents.	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 45 in previous plan) Outreach towards these vulnerable populations has been carried out in the past, but because these populations may need additional assistance in the event of a disaster, the county will retain this action and try to provide extra focus on these populations.
PEA-10	Develop outreach strategies for the physically challenged.	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 46 in previous plan) Outreach towards these vulnerable populations has been carried out in the past, but because these populations may need additional assistance in the event of a disaster, the county will retain this action and try to provide extra focus on these populations.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-11	Develop outreach strategies for those with mental health disabilities.	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 47 in previous plan) Outreach towards these vulnerable populations has been carried out in the past, but because these populations may need additional assistance in the event of a disaster, the county will retain this action and try to provide extra focus on these populations.
PEA-12	Develop outreach strategies and implement school programs for children.	All	High	All school districts and daycare providers within the county	Local	2022	(Action 48 in previous plan) Outreach towards these vulnerable populations has been carried out in the past, but because these populations may need additional assistance in the event of a disaster, the county will retain this action and try to provide extra focus on these populations.

City of Gautier Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Enforce building codes.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 14 in previous plan) The city has maintained its practice of enforcing building codes over the past several years. It will evaluate these codes in the coming years and ensure that they are still being enforced properly so this action will remain in place.
P-2	Maintain debris program to clean drainage ways from existing properties and critical facilities.	Flood	High	Gautier Street Division; Jackson County Road Department	Internal	2022	(Action 16 in previous plan) The city has developed and maintained a debris program that has been successful, but there are likely some areas where the city can improve this program in the future, so this action will remain in place.
P-3	Maintain debris program to clear roadside ditches and culverts.	Flood	High	Gautier Street Division; Jackson County Road Department	Internal	2022	(Action 17 in previous plan) The city has developed and maintained a debris program that has been successful, but there are likely some areas where the city can improve this program in the future, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-4	Develop/enforce landscaping requirements to provide absorption of average volumes of rainfall on property.	Flood	Moderate	Gautier and Jackson County Planning Departments	Internal	2022	(Action 18 in previous plan) The city has developed some requirements related to landscaping, but these may need to be revised and reviewed for improving enforcement so the city will keep this plan in place.
P-5	Enforce storm water ordinances and encourage use of pervious surfaces and natural absorption of rainwater.	Flood	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 20 in previous plan) The city has worked to enforce its stormwater ordinances and encourage use of pervious surfaces in construction, but there are still many areas where there is room for improvement in this regard so the city will maintain this action.
P-6	Enforce the revised Digital Flood Insurance Rate Map (DFIRM).	Flood	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 21 in previous plan) The city has reviewed the DFIRM and is currently enforcing all regulations that pertain to areas located in flood zones. The city will evaluate its regulations related to floodplains to ensure that they are up to the highest possible standard feasible.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Control vegetation growth around critical facilities.	Wildfire	High	Gautier Street Division; Jackson County Road Department	Internal	2022	(Action 23 in previous plan) The city has monitored vegetation growth around most critical facilities, but there is still additional work to be done related to managing this growth around critical facilities so the city will keep this action in place.
P-8	Coordinate prescribed burns in heavily forested areas with state and federal agencies.	Wildfire	High	Gautier and Jackson County Fire Departments	Internal	2022	(Action 24 in previous plan) When necessary, the city has worked with state and federal agencies to initiate prescribed burns. This practice will need to be continually evaluated and coordination with the proper agencies is also needed so the action will stay in place.
P-9	Conduct a study of the effects of sea level rise and develop mitigation strategies to minimize those effects.	Sea Level Rise	Low		Internal	2022	(Action 26 in previous plan) No localized study of the effects of sea level rise has been carried out, though there have been some national level studies. The city will continue to pursue a more localized evaluation of the impacts of sea level rise in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-10	Encourage private land owners on waterfronts to implement erosion control measures.	Erosion	Low	Gautier and Jackson County Planning Departments	Internal	2022	(Action 27 in previous plan) Some efforts have been made to encourage private land owners to implement erosion control measures on their property, but many have still not taken the necessary steps, so the city will continue to encourage these actions going forward.
P-11	Develop/enforce water use ordinance to address drought condition procedures.	Drought	High	Gautier and Jackson County Planning Departments	Internal	2020	(Action 28 in previous plan) The city has not developed a specific ordinance to address drought condition procedures, but it has enacted some restrictions in the past. The city will continue to look at adopting a specific ordinance to this effect.
P-12	Implement dredging program for the Bayou areas to improve effects of sediment buildup caused by storm surge.	Storm Surge	Moderate	Gautier Public Works; Jackson County Public Works	Jackson County Utility Authority	2022	(Action 29 in previous plan) The city has not conducted a study of aquifers due to a lack of funding, but this is still a priority action that must be coordinated with the utility authority, so the action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-13	Develop continuity of operations plans.	All	High	Jackson County and City of Gautier	MDMR, USACE, NRCS, CIAP, Tideland	2022	(Action 33 in previous plan) Some dredging has been done in the Bayou areas, but an official program has not been implemented to the scale necessary to prevent all impacts from storm surge so the city will continue to work on improving the implementation of this action in the future.
P-14	Emergency response plans.	All	High	Jackson County and City of Gautier	Internal	2020	(Action 49 in previous plan) The city has not developed a formal continuity of operations plan, but does have some strategies in place to ensure continuity of operations. The city will work to develop a formal plan going forward.
P-15	Develop capital improvement plans.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 50 in previous plan) The city has developed an emergency operations plan, but it will need to be reviewed in the coming years to ensure it still identifies proper protocols. This action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-16	Develop/enhance asset inventories (e.g., critical facilities, infrastructure, equipment) into GIS.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 52 in previous plan) The city does not have a formal CIP, but it does have a program in place for spending on infrastructure. The city will continue to work on implementing this program and evaluating the development of a formal CIP.
P-17	Upgrade decides used for damage assessments and communication as technology improves/changes.	All	High	Jackson County Emergency Management Agency	Internal	2022	(Action 55 in previous plan) During this plan update, a number of additional critical facilities were digitized into GIS. However, some facilities were still not included in this digitization so the city will continue to work on this.
P-18	Seek opportunities to continue to lower the CRS rating (and insurance rate).	Flood	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 56 in previous plan) The city has devices it uses for damage assessments, but these devices are indeed getting out of date so it will look for ways to improve its assets in this area where possible going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-19	Incorporate the goals and objectives of the hazard mitigation plan into all planning documents and ordinances.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 57 in previous plan) The city participates in the CRS, but it has not reached a level 1 yet, so there are certainly ways in which the city can improve its program and score more points. The city will continue to evaluate the best steps it can take to do this.
P-20	Conduct annual review of the hazard mitigation plan.	All	High	Hazard Mitigation Council; Gautier and Jackson County Planning Departments	Internal	2022	(Action 58 in previous plan) The goals of the hazard mitigation plan have been incorporated into other planning documents, but as this plan and those documents are updated, additional effort to ensure up to date information will be needed.
P-21	Conduct evaluation of mitigation strategies and projects following a hazard impact.	All	High	Hazard Mitigation Council; Jackson County Emergency Management Agency	Internal	2017, Annually	(Action 59 in previous plan) The city has conducted annual reviews of its hazard mitigation plan, but this action will need to be kept in place as the city plans to continue this practice.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-22	Document damages/losses sustained from natural hazards.	All	High	Jackson County Emergency Management Agency	Internal	2022	(Action 60 in previous plan) The city has evaluated mitigation actions after hazards have impacted the community and generally tried to update the mitigation plan accordingly, but this has not always been the case so the city will work on improving its implementation of this action.
P-23	Conduct After Action Reviews (AAR) following events to capture lessons learned, reassess damages incurred, and complete damage assessment forms with accurate information.	All	High	Hazard Mitigation Council	Internal	2022	(Action 61 in previous plan) For the most part, the city has documented damage caused by natural hazards, especially after very large events. However, the city would like to improve its documentation techniques for accuracy, so it will continue to work on this action.
Property Protection							
PP-1	Retrofit critical facilities with safe rooms, including the Fire, Police, Public Works, and City Hall facilities.	All	Moderate	City of Gautier	HMA	2022	(Action 2 in previous plan) Although some efforts have been made to harden critical facilities in the city, there are still many that are unprotected and vulnerable so the city will retain this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-2	Upgrade/harden water and wastewater facilities. (Gautier water towers/wells, Shell landing Wastewater Collection Systems, Jackson County motor control centers, Jackson County sanitary generators)	All	High	City of Gautier; Jackson County Utility Authority	HMA	2022	(Action 3 in previous plan) Although some efforts have been made to harden water/wastewater facilities in the city, there are still many that are unprotected and vulnerable so the city will retain this action.
PP-3	Harden existing critical facilities. (Gautier Police Dept., Gautier Public Works, Gautier Maintenance Shop, Singing River Hospital and Ocean Springs Hospital, Gautier Fire Dept., Pascagoula/Moss Point Wastewater Treatment Facility, and Escatawpa Wastewater Reclamation Facility).	All	High	City of Gautier; Jackson Count; Singing River Health	HMA	2022	(Action 4 in previous plan) Although some efforts have been made to harden critical facilities in the city, there are still many that are unprotected and vulnerable so the city will retain this action.
PP-4	Elevate/improve roads and bridges that are below base flood elevation.	Flood	High	Jackson County Road Dept.; Gautier Public Works	Local, State, Federal	2022	(Action 5 in previous plan) Many roads have been elevated above BFE in the city, but there are certainly some that have not and the city would like to work towards addressing those roads that are vulnerable to flooding.
PP-5	Relocate Emergency Operation Center for Gautier.	All	High	City of Gautier	HMA	2017	(Action 10 in previous plan) The city has not yet relocated its but this is still in the works and the city will continue to push forward with this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-6	Encourage use of underground utilities in higher elevation areas.	All	Moderate	Gautier and Jackson County Planning Departments	Internal	2022	(Action 11 in previous plan) The city has evaluated the use of underground utilities in areas that are high enough that those utilities will not be flooded. This is very location dependent, so the city will continue to implement where it makes the most sense in the future.
PP-7	Construct all new critical facilities and infrastructure with materials designed to minimize impacts from all hazards.	All	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 12 in previous plan) The city has attempted to build all new critical facilities up to a standard that will protect them as best as possible from hazard impacts. As new facilities are constructed, the city will continue to try to build to the best possible standard.
PP-8	Identify location for community safe rooms in Gautier and Jackson County to accommodate the remaining population not covered in the existing safe rooms.	All	High	Gautier City Council; Jackson County Board of Supervisors	HMA	2022	(Action 13 in previous plan) Several safe rooms have been identified across the city but these do not cover the entirety of the city population, so additional safe rooms will need to be identified.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-9	Acquisition/demolition of Severe Repetitive Loss Properties (SRL) and Repetitive Flood Claim (RFC) properties by continuing to apply for FMA to mitigate when practical.	Flood	High	Gautier and Jackson County Planning Departments	FMA	2022	(Action 19 in previous plan) The city has mitigated a number of repetitive/severe repetitive loss properties, but there are still a number of these types of properties that need to be mitigated so the city will keep this action in place.
PP-10	Raise lift stations and other critical infrastructure above base floodplain where feasible.	Flood	High	Jackson County Utility Authority; City of Gautier	Local	2022	(Action 22 in previous plan) Some lift stations have been raised above the BFE, but others have not and there is still significant critical infrastructure located in the floodplain. The city will look at ways to mitigate the impacts to this infrastructure in the future.
PP-11	Encourage existing and new developments to include surge and lightning protectors and use of enhanced construction materials.	Lightning	High	Gautier and Jackson County Planning Departments	Internal	2022	(Action 30 in previous plan) The city has encouraged developers to include surge and lightning protectors in new construction, but this has not always been implemented so the city will retain this action and continue to encourage this going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-12	Implement mast arm traffic signal improvements.	All	High	Gautier Street Division; Jackson County Road Department	Local	2022	(Action 31 in previous plan) The city has implemented mast arms at several intersections, but there are many where mast arms are still not in place so the city will continue to pursue this action going forward.
PP-13	Mount street signs to existing mast arm traffic signals.	All	High	Gautier Street Division; Jackson County Road Department	Local	2022	(Action 32 in previous plan) In many cases where mast arms are in place, street signs have been mounted to the mast arms, but as many intersections do not have mast arms, this action will need to be retained.
Natural Resource Protection							
NRP-1	Develop/maintain a beach erosion and renourishment program.	Erosion	Moderate	Gautier and Jackson County Public Works	Internal	2022	(Action 25 in previous plan) The city has implemented beach renourishment in many locations to reduce the effects of erosion, but since erosion is a continual process, this action will need to be retained going forward.
NRP-2	Acquisition of natural wetlands for City of Gautier land conservation. 32 acre parcel north of Singing River Mall to be used as Town Green)	Flood	Low	Gautier Planning Department	CIAP	Completed	(Action 34 in previous plan) The city has acquired the land north of Singing River Mall to be used as Town Green.
NRP-3	Land acquisition for City of Gautier City Park Community Center-Phase 1. Improvements to City Park along Mary Walker Bayou.	Flood	Low	Gautier Planning Department	Tideland Funding FY2010	Completed	(Action 35 in previous plan) The city has acquired the land for the City Park Community Center.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Structural Projects							
SP-1	Coordinate with applicable agencies on constructing new roadways and bridges above the base flood elevation.	Flood	High	Gautier Public Works, Jackson County Road Department	Local	2022	(Action 15 in previous plan) The city has worked with state and federal DOTs to try to ensure that new roadways and bridges are constructed above BFE, but this will need to be addressed as more roads are constructed in the future.
Emergency Services							
ES-1	Identify and prioritize portable generator hook ups or permanent mount units for wells, lift stations, and facilities.	All	High	Jackson County; City of Gautier; Jackson County Utility	HMA	2020	(Action 1 in previous plan) The city has identified a number of locations for portable generator hookup and has generally prioritized those locations. However, there are still additional locations where the city would like to make hookups available so this action will remain in the plan.
ES-2	Develop agreements/reprocess for providing tie-ins and back up water service for Jackson County Utility Authority and Gautier.	All	High	Jackson County Utility Authority; Gautier Public Works	Local	2017	(Action 7 in previous plan) The city has developed some agreements for backup water supply service, but will need to continue to manage those agreements and ensure that backup water supplies remain available in the event of a disaster.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-3	Improve notification procedures of impending hazards and evacuation procedures.	All	High	Jackson County Emergency Management Agency	Local	2018	(Action 40 in previous plan) The city is consistently working on improving notification procedures for impending disasters, but there is still room for improvement and so the city will keep this action in place.
ES-4	Develop/update and conduct exercises on response procedures.	All	High	Jackson County and City of Gautier	Internal	2019	(Action 51 in previous plan) The city has developed and conducted a number of exercises on response procedures, but in order to remain on top of this sort of training, the city will plan to conduct additional exercises going forward.
ES-5	Increase evacuation route options and coordination of activation by working with state/federal agencies.	All	High	Jackson County Emergency Management Agency	Local	2020	(Action 53 in previous plan) Evacuation routes are identified for the city, but the city would like to identify additional routes that citizens can use to evacuate to speed the evacuation process overall.
ES-6	Improve signage/traffic control devices for evacuations.	All	High	Jackson County Emergency Management Agency	Local	2020	(Action 54 in previous plan) The city has experienced evacuations before and have provided both signage and traffic control. However, the city would like to improve both of these aspects of evacuations so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Public Education and Awareness							
PEA-1	Educate the public on all hazard preparedness.	All	High	Jackson County Emergency Management Agency	Local	2022	(Action 36 in previous plan) The city has put in extensive efforts to educate the public on all hazard preparedness, but this is a continuous process that needs to be constantly evaluated to ensure the public is aware of risks and actions they can take to reduce risk.
PEA-2	Educate the public on all hazard mitigation programs (safe rooms, wind retrofit, etc.).	All	High	Jackson County Emergency Management Agency	Local	2022	(Action 37 in previous plan) The city has worked on educating the public about hazard mitigation programs and successfully encouraged many citizens to mitigate their homes/businesses. Nevertheless, many citizens are still not fully aware of programs available to assist them, so the city will keep this action in place.
PEA-3	Educate the public about the benefits of flood mitigation of homes and businesses.	Flood	High	Jackson County Emergency Management Agency	Local	2022	(Action 38 in previous plan) The city has focused on flood mitigation education with many home and business owners as this is a major threat to the community. Given that flood programs, funding, and insurance are constantly changing, this action will stay in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-4	Continue to deliver programs to residents, business owners, and developers regarding best management practices for storm water control and household hazardous waste.	Flood, Hazardous Materials Incident	High	Gautier and Jackson County Planning Departments	Local	2022	(Action 39 in previous plan) The city has enacted several programs to help promote best practices for storm water control and household hazardous waste. However, many residents/businesses do not implement these practices so more education is likely required.
PEA-5	Develop education materials for water conservation.	Drought	High	Gautier and Jackson County Planning Departments	Local	2022	(Action 41 in previous plan) The city has some information for the public on water conservation, but overall there needs to be more emphasis on getting citizens to implement these measures in the future.
PEA-6	Promote Firewise program to homeowners, builders/contractors, and developers.	Wildfire	High	Gautier and Jackson County Fire Departments	Local	2022	(Action 42 in previous plan) The city has encouraged the use of the Firewise program on many stakeholder groups, but there are still many areas that would benefit from implementing more elements of the Firewise program so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-7	Develop outreach strategies for non-English communities.	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 43 in previous plan) The city has generally focused on English language outreach strategies, but with a growing population of non-English speakers, the city would like to put more emphasis on reaching those groups so it will focus on this action going forward.
PEA-8	Develop outreach strategies for tourists (i.e., part-time residents, RV campers, vacationers, etc.)	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 44 in previous plan) The city has tried to incorporate tourists into much of its planning, but outreach/education strategies aimed towards tourists are not as prevalent. This is an action the city will try to focus on in the future.
PEA-9	Develop outreach strategies for elderly and low-income residents.	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 45 in previous plan) Outreach towards these vulnerable populations has been carried out in the past, but because these populations may need additional assistance in the event of a disaster, the city will retain this action and try to provide extra focus on these populations.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-10	Develop outreach strategies for the physically challenged.	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 46 in previous plan) Outreach towards these vulnerable populations has been carried out in the past, but because these populations may need additional assistance in the event of a disaster, the city will retain this action and try to provide extra focus on these populations.
PEA-11	Develop outreach strategies for those with mental health disabilities.	All	High	Applicable state and federal agencies and local agencies/ associations	Local	2022	(Action 47 in previous plan) Outreach towards these vulnerable populations has been carried out in the past, but because these populations may need additional assistance in the event of a disaster, the city will retain this action and try to provide extra focus on these populations.
PEA-12	Develop outreach strategies and implement school programs for children.	All	High	All school districts and daycare providers within the county	Local	2022	(Action 48 in previous plan) Outreach towards these vulnerable populations has been carried out in the past, but because these populations may need additional assistance in the event of a disaster, the city will retain this action and try to provide extra focus on these populations.

City of Moss Point Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Update Emergency Operation Plan.	All	High	Fire and Human Resources Departments	Budget	2018	(Action 2 in previous plan) The city's EOP has been updated in the past, but it is likely that a new update will be needed over the next 5 years, so this action will remain in place.
P-2	New water supply tank.	Drought	Moderate	Public Works Department	Budget as capital outlay project for Public Works	2020	(Action 5 in previous plan) The city has not acquired a new water supply tank due to lack of funding, so this action will remain in place.
P-3	Develop no burn ordinance.	Drought, Wildfire	Moderate	Fire Department	N/A or minimal	2018	(Action 6 in previous plan) The city has implemented a no burn restriction at several points when needed, but this action may need to be reviewed in the future to ensure that it is up to date.
P-4	Promote and implement conservation program (in coordination with developing emergency drought ordinance).	Drought	High	Fire Department and Building Inspection	N/A or minimal	2018	(Action 7 in previous plan) The city has promoted and implemented a conservation program, but this program will need to be updated so the action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Property Protection							
PP-1	Retrofit/361.	Hurricane	Low	Community Development	CDBG grant funding, city funding	2019	(Action 8 in previous plan) The city has worked to try to retrofit a number of structures to provide protection against wind and flood related hazards, but many structures are still vulnerable and would benefit from retrofitting, so this action will remain in the plan.
PP-2	Elevation of streets.	Flood, Hurricane, Severe Thunderstorm	Moderate	Public Works and Governing Body	Local	2022	(Action 10 in previous plan) Some streets in the city have been protected through elevations, but there are still many that have not, so this action will need to remain in the plan.
PP-3	Bridge replacement.	Flood, Hurricane, Severe Thunderstorm	Moderate	Public Works and Governing Body	Local	2022	(Action 11 in previous plan) Some bridge replacements have been carried out to provide less at-risk crossing in the city. However, the city still has some identified bridges that it would like to replace.
PP-4	Acquisition projects.	Flood, Hurricane, Severe Thunderstorm	Low	Community Development	HMGP, CDBG	2022	(Action 12 in previous plan) The city has participated in acquisition projects in the past, but there are still many properties could be acquired through voluntary programs to reduce overall hazard risk.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-5	Home elevation projects.	Flood, Hurricane, Severe Thunderstorm	Moderate	Community Development	CDBG Hazard Mitigation funding, city and county funding	2022	(Action 13 in previous plan) The city has participated in elevation projects in the past, but there are still many properties could be elevated through voluntary programs to reduce overall hazard risk.
Natural Resource Protection							
NRP-1							
Structural Projects							
SP-1	Drainage improvement projects.	Flood, Hurricane, Severe Thunderstorm	High	Community Development and Public Works	CDBG Hazard Mitigation funding, city and county funding	2018	(Action 14 in previous plan) The city has implemented some drainage improvement projects, but there are still a number of drainage related projects that the city would like to implement going forward so this action will remain in the plan.
SP-2	Scaling system.	Flood, Hurricane, Severe Thunderstorm	High	Public Works	CIAP Grant funding, city and county funding	2020	(Action 15 in previous plan) The city has not developed a scaling system, but it would still like to pursue this action going forward so it will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Emergency Services							
ES-1	Evacuation routing and planning.	All	Moderate	Police Department	Seek/secure grant opportunities with MDOT, MS Public Safety Commission, etc.	2018	(Action 3 in previous plan) Evacuation routes have been identified by the city, but there is more planning for an evacuation scenario that needs to be completed to be fully prepared so the city will keep this action in place.
ES-2	Establish an effective early warning audio system (sirens).	All	Low	Police and Fire Department	Seek grant opportunities with MDOT, MS Public Safety Commission, etc.	2019	(Action 4 in previous plan) The city is still working to solidify its early warning system. Therefore, this action will be left in the plan to be pursued further going forward.
ES-3	Generator	Hurricane	High	Community Development Department	Budget and/or secure CDBG grant funding	2019	(Action 9 in previous plan) The city has some backup power generation capabilities, but the city feels it would still benefit greatly from extra generators if funding is available, so this action will remain in place.
Public Education and Awareness							
PEA-1	Public outreach: education and preparedness for all hazards.	All	High	Fire and Human Resources Department	Existing budget	2022	(Action 1 in previous plan) The city has made an effort to reach out to the public and provide education on the risks the community faces in terms of hazards. However, many citizens remain under-informed, so this action will remain in place.

City of Ocean Springs Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Coordinate with the Ocean Springs participants on Jackson County's Haz-Mat team to ensure the adequacy of the regional response strategy.	Hazardous Materials Incident	High	Fire Department	MS Dept. of Public Safety Planning	2022	The city has continuously coordinated with participants on the Jackson County HazMat team to ensure a regional response strategy to HazMat incidents. However, the need for continual support and coordination exists, so the city will leave this action in place.
P-2	Buildings above a certain elevation must have sprinklers for fire protection.	Wildfire	High	Buildings Department	Individual home and building owners	2022	The city has been working to implement a regulation to ensure that buildings above a certain elevation have sprinklers. The work of implementing this action is not complete, so the county will continue to work towards this goal going forward.
P-3	Include structural design, elevation, and location standards in the Unified Development Code to mitigate effects of natural hazards.	All	High	Planning and Community Development	Administrative – not revenue dependent	2020	To the best of its ability, the city has implemented structural design and location standards in its UDC. However, the city believes there are still improvements that could be made so this action will remain in place as the city will review its UDC in the coming years.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-4	Continue to require that development exceeds FEMA's require base elevations by a measure of one foot.	Flood	High	Buildings Department	Administrative – not revenue dependent	2022	The city has implemented a plus one foot of BFE requirement for elevation of buildings in the floodplain and in order to continue implementing this higher standard, the city will retain this action in the plan.
P-5	Continue to require lot elevation determination for structures in new subdivision through site plan review.	Flood	High	Buildings Department	Administrative – not revenue dependent	2022	The city has required lot elevation determination in the past for structures in a new subdivision and since this regulation has worked effectively, the county will retain this action in the plan as it continues to implement and review the status of the regulation.
P-6	Continue to enforce city's subdivision regulations for developments in flood hazard areas by enforcing flood ordinance and restricting development in floodplain.	Flood	High	Planning and Community Development; Buildings Department	Administrative – not revenue dependent	2022	The city has implemented subdivision regulations to ensure enforcement of the flood ordinance and ensure development in the floodplain takes place within a reasonable level of regulation. The city will continue to build on its existing subdivision regulations by implementing and working to improve them going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Undertake an annual review of the Hazard Mitigation Plan with the assistance of the floodplain manager, building official, city planner, and EOC coordinator.	All	High	Planning and Community Development	Administrative – not revenue dependent	2017, Annually	The city has attempted to carry out annual reviews of the hazard mitigation plan and has been generally successful. Going forward, the city will keep this action in place as it aims to continue to undertake annual reviews of the plan.
P-8	Incorporated the Ocean Springs Hazard Mitigation Plan into the city's Comprehensive Plan.	All	High	Planning and Community Development; Planning Commission; Board of Alderman	Administrative – not revenue dependent	2022	The goals of the hazard mitigation plan have been incorporated into the city's Comprehensive Plan, but as this plan and the Comprehensive Plan are updated, additional effort to ensure up to date information will be needed.
P-9	Develop a Capital Improvements Plan (CIP) for the City of Ocean Springs.	All	High	Planning and Community Development; Public Works	MDA – Economic Development	2020	The city does not have a formal CIP, but it does have a program in place for spending on infrastructure. The city will continue to work on implementing this program and evaluating the development of a formal CIP.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-10	Maintain elevation certificates on all structures built after the adoption of new FIRM maps.	Flood	High	Buildings Department	Administrative – not revenue dependent	2022	Thus far, the city has maintained a database of elevation certificates for structures built after the adoption of new FIRM maps. However, as development continues, any structures located in the floodplain will need to have this data collected so this action will remain in place.
P-11	Continue to promote storm smart coasts through the Coastal Hazard Outreach Strategy Team (C-HOST) which brings together local officials, community stakeholders, private businesses, and major employers to coordinate messages and develop new projects with the guidance of building officials and floodplain managers from Ocean Springs, Pascagoula, Gautier, Bay St. Louise, Biloxi, D'Iberville, Gulfport, Harrison County, Long Beach, Pass Christian, and Waveland.	Hurricane, Storm Surge, Flood	Moderate	Buildings Department	FEMA, Sea Grant	2022	The city has participated with other local stakeholders and community officials on the C-HOST in the past and the city would like to continue to participate in this going forward, so this action will remain in the plan.
P-12	Enhance the city's Continuity Plan to ensure that emergency operations can function and that day-to-day management of the city can be back on track as soon as possible after an emergency.	All	Moderate	Fire Department	MS Dept. of Public Safety	2022	The city has developed a Continuity Plan to help ensure restoration of daily functions quickly after a disaster. However, there are many efficiencies that the city would like to build into its future iterations of the Continuity Plan, so this action will be carried forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-13	Maintain flood elevation certificates in the Buildings Department.	Flood	Moderate	Buildings Department	Administrative – not revenue dependent	2022	Thus far, the city has maintained a database of elevation certificates for structures built in identified flood zones. However, as development continues, any structures located in the floodplain will need to have this data collected so this action will remain in place.
P-14	Conduct regional beach clean-up programs to reduce the potential of damage from flooding and free-floating debris.	Flood	Moderate	MS Power	DMR, Sea Grant	2017, Annually	The city has participated in regional beach cleanup efforts to try to reduce damage from debris during a storm. These efforts must be carried out regularly, so this action will be kept in the plan.
P-15	Provide buffers between natural forest and urban development to protect against wildfire.	Wildfire	Moderate	Planning and Community Development	MS Dept. of Forestry, Gulf Islands National Seashore	2020	The city has worked in some areas to provide a buffer area between developed and undeveloped areas, but there are still areas of wildland urban interface that create risk for homes and businesses, so this action will be retained.
P-16	Study potential effects of sea level rise on near shore structures and infrastructure and prepare to adopt mitigation measures to minimize its effects.	Sea Level Rise	Low	Mayor's Office; Planning and Community Development	MS AL Sea Grant, COE	2022	Although some study of sea level rise inundation areas has been prepared to give an idea of risk areas, there is still additional study that needs to take place to fully understand the risk of sea level rise so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-17	Mandate larger setbacks from bayous and streams.	Flood	Low	Planning and Community Development	Administrative – not revenue dependent	2022	The city currently has some regulations in place regarding setbacks from bayous and streams, but by mandating larger setbacks, citizens would be more likely to be protected from flood events. Therefore, this action will remain in the plan.
P-18	Conduct regular controlled burns to limit fuel for forest fires in wet pine savanna habitats.	Wildfire	Low	Fire Department; MS Department of Forestry	MS Dept. of Forestry	2018	The city has worked with MS Forestry to conduct controlled burns on a regular basis to reduce fuel loads that contribute to forest fires. Although this has been successful, there is a continual need to monitor fuel loads and implement controlled burns so this action will remain in the plan.
Property Protection							
PP-1	Encourage the underground placement of electric, telephone, and cable TV lines by developers working outside of the coastal zone to improve aesthetics, prevent disfigurement of trees, and provide protection form high winds and other hazards.	Hurricane, Tornado, Severe Thunderstorm	High	Public Works Department; MS Power; Singing River Electric	MEMA - HMGP	2022	In some areas, the city has worked with utility companies to place utilities underground in areas where it is appropriate and these lines won't likely be affected by flooding. However, there are still areas where underground utilities would be appropriate and have not been placed, so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-2	New construction of city buildings should meet the 2012 IBC.	All	High	Buildings Department; Board of Alderman	MDA – Energy Efficiency Programs	2022	The city has worked hard to ensure compliance with the IBC in areas where new construction is taking place. As growth continues to take place within the city, officials will need to continue to implement this action so it will remain in the plan going forward.
PP-3	Inspect water wells and towers to ensure they are sufficiently strong to withstand high winds and storm surge.	Hurricane, Storm Surge, Tornado, Severe Thunderstorm	High	Water Department	DEQ, EPA	2022	The city has undertaken fairly frequent inspection of water wells and towers to ensure they are strong enough to withstand high winds and storm surge, but this inspection process needs to occur consistently as infrastructure may be aging or damaged after storm events. As such, this action will remain in place.
PP-4	Prepare lift stations for inundation and power outages by raising electrical equipment above the BFE in the event of storm surge and long-term power outages.	Hurricane, Storm Surge, Flood	High	MS Power; Public Works	Utility fees	2022	Some of the lift stations in the city have been raised above the BFE, but there are still a number of lift stations that need to be elevated to a higher level to be protected, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-5	Mitigate properties in V and AE zones through acquisition.	Flood	Moderate	Mayor's Office; Parks Department	COE, MEMA-HMGP, MCIAP/ Army Corps of Engineers	2022	The city has utilized acquisition as a means of mitigation on properties in flood zones in the past, but there are still a number of properties located in flood areas that may be eligible for voluntary acquisition pending property owner interest. This action will remain in place.
PP-6	Protect transformers after a tropical storm or hurricane by washing down salt spray before power supply is re-engaged.	Hurricane	Low	MS Power; Singing River Electric; Fire Department	MS Power, Singing River Electric, Fire Department	2022	After storm events, the city has sprayed down transformers before re-engaging power supply. However, as this is an action that will need to be implemented again in the future, this action will remain in the plan.
Natural Resource Protection							
NRP-1	Preserve trees and vegetation on uninhabited properties to improve stormwater management/flood control.	Flood	Low	Parks and Public Works Departments	MDOT (MS Dept. of Forestry)	2022	The city has generally tried to preserve trees and vegetation on uninhabited properties to improve stormwater management, but there are still some significant steps the city could take to try to use trees/vegetation to its advantage and the city will continue to look at those options going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
NRP-2	Preserve natural/wetlands and riparian areas through acquisition or conservation easements.	Flood	Low	Mayor's Office; Grants Department	FEMA, Army Corps of Engineers/ MCIAP, MEMA-HMGP	2022	The city has used conservation easements and acquisition to preserve riparian areas and wetlands in the past, but it may look to use this tool in the future to expand areas or identify new areas for preservation. This action will remain in place.
NRP-3	Extend sand beach additional 100 feet to the east and stabilize with plantings.	Storm Surge, Erosion	Low	Planning and Community Development; Jackson County	FEMA Grant, DMR, COE	2020	Although efforts have been made to extend the sand beach already, the city will continue to evaluate extending the sand beach and stabilizing it with plantings to try to preserve the beach from eroding.
NRP-4	Request that Jackson County continue dune propagation in areas along East Beach and Front Beach.	Storm Surge, Erosion	Low	Jackson County	Jackson County Seawall Tax	2022	The city has worked with the county to propagate dunes to serve as a buffer along several beaches. Although this action has been undertaken in the past, it will need constant evaluation and review as the city continues to implement it going forward.
Structural Projects							
SP-1	Maintain the Jackson County seawall tax.	Storm Surge, Erosion	Moderate	Jackson County	Jackson County	2022	The city/county have implemented a seawall tax to help ensure the integrity of the seawall. This tax must be reviewed consistently so the action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-2	Continue the city's efforts to upgrade drainage facilities along coastal roadways.	Flood	Moderate	Public Works and Streets	COE, MEMA-HMGP, MCIAP	2022	A number of drainage projects have been implemented along coastal roadways, but the city must continue to evaluate more potential projects and implement those to ensure proper drainage and avoid flooded roads. This action will remain in place.
Emergency Services							
ES-1	Maintain a hazardous materials, oil spill, and natural gas response force to address immediate aftermath of a material release.	Hazardous Materials Incident	High	Fire Department	AFG, SAFER	2022	The city currently has a HazMat response force in place, but to maintain this force, the city will need to provide proper training and staffing going forward. As such, this action will remain in place.
ES-2	Update the city's Hazard Mitigation and Emergency Response Plan and its Hurricane Response Plan to ensure emergency service and evacuation routes are adequate for demand, well-marked, and accessible to individuals with special needs during inclement weather.	All	High	Planning and Community Development Department; Fire Department	MEMA - HMGP	2018	The city is currently updating its HMP through this effort and will need to correspondingly update its ERP and HRP to ensure data is up to date. This action will remain in the plan.
ES-3	Maintain a reverse 911 call-back system for railroad derailments and other hazardous material spills.	Hazardous Materials Incident	High	Fire Department	MS Dept. of Public Safety Planning	2022	Currently the city works with MS DPS to ensure that a reverse 911 call-back system is in place. The city will review this system and continue to make sure that a reverse 911 call-back system is maintained to alert citizens of a HazMat incident.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-4	Increase the number of fire department and police personnel trained to respond to hazardous waste releases on the railroad, highways, hospital, and other critical facilities.	Hazardous Materials Incident	Moderate	Buildings Department	FEMA, AFG	2012	Although a number of fire and police personnel in the city are trained in responding to HazMat incidents, the city would like to aim to have even more personnel trained in responding to these incidents as redundancy. Therefore, this action will remain in place.
ES-5	Complete Fire Station 4/EOC to shelter emergency personnel in place during a natural disaster.	All	Moderate	Fire Department	CDBG - Complete	Completed	The city has completed Fire Station 4/EOC, so this action is complete.
ES-6	Finish construction of shelter and multipurpose center at Gay Lemon property.	All	Moderate	Mayor's Office; Parks Department	MEMA - HMGP	Completed	The city has finished construction on the shelter and multipurpose center so this action is complete.
ES-7	Implement an early warning network to alert citizens to oncoming hazards.	All	Moderate	Fire and Police Departments	MS Dept. of Public Safety Planning, AFG	2022	The city has an early warning network in place to alert citizens of potential hazards, however, there are several ways that the city could improve its current warning system, so the city will retain this action.
ES-8	Establish high ground staging area for emergency vehicles that provides added protection from wind-blown debris.	All	Moderate	Fire and Police Departments	FEMA	2020	The city has not established a high ground staging area for emergency vehicles to protect from wind-blown debris, so this action will remain in the plan going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-9	As population grows to the east, southeast, and northeast, plan for the expansion of the city's firefighting capacity through an additional facility, possible on the Highway 57 corridor, including new fire trucks, personnel, and equipment.	All	Low	Fire Department	AFG	2022	The city is continuing to expand and may need a new facility in the future. This action has not been carried out but the city will continue to monitor population growth and act on this once it is required.
ES-10	Plan for the construction of an underpass to the railroad tracks at Halstead for emergency evacuation with a water pump to prevent groundwater flooding.	All	Low	Public Works Department	MS Dept. of Public Safety Planning, MDOT, DEQ, EPA	2022	This action has not been completed and so the city will continue to evaluate the situation on Halstead Road to determine if an underpass would be necessary.
ES-11	Upgrade fire protection through acquisition of a new fire truck capable of reaching new elevated buildings and construct a fire station large enough to accommodate it.	Wildfire	Low	Fire Department	AFG	2022	The city has not acquired a new fire truck of this capacity nor constructed an additional station. This action is not complete and will be carried over in the plan.
Public Education and Awareness							
PEA-1	Create partnership to assist with development of Family Disaster Plans.	All	High	Fire Department	Administrative – not revenue dependent	2022	The city has worked on providing citizens with information on its website to assist with creating Family Disaster Plans. However, there are ways that the city could be more proactive in promoting these plans, so the city will retain this action.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Educate residents on how better waste disposal can reduce flooding.	Flood	Moderate	Public Works; Planning and Community Development	FEMA, Sea Grant	2022	The city has promulgated information to citizens about how better waste disposal can reduce flooding, but many citizens are still disposing of waste in inappropriate ways so additional outreach and strategies to improve disposal are required.
PEA-3	Provide outreach materials about mitigating the impact of a hazard through city mailings and raise the awareness of home and business owners.	All	Moderate	Mayor's Office; Buildings and Water Departments	FEMA, Sea Grant	2017, Annually	The city has provided outreach materials about mitigating personal property using mailings, but public outreach requires constant attention as new property owners move in and because many property owners need reminders about these activities.
PEA-4	Encourage small businesses to develop business continuity plans.	All	Moderate	Mayor's Office	MDA – Economic Development, FEMA	2018	The city has encouraged continuity plans for small businesses, but not all businesses have these developed so the city will continue to pursue this action.
PEA-5	Launch a coordinated education effort on hurricane evacuation procedures to teach people who should evacuate, when evacuation should begin, and routes available through Ocean Springs and the surrounding areas.	Hurricane	Low	Fire and Police Departments	FEMA, Sea Grant	2019	The city has worked on educating the public on evacuation procedures, but these efforts have not reached all residents and so the city will retain this action and continue to try to improve the education of citizens in this matter overall.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-6	Participate in Gulf Coast Homeowner's Show and building supply store shows to provide mitigation information to the public.	All	Low	Buildings Department	FEMA, Sea Grant	2022	The city has participated in the Gulf Coast Homeowner's Show in the past and this is a critical event to continue to participate in going forward so the city will retain this action in the plan.

City of Pascagoula Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Update Emergency Response Plan.	All	Moderate	Fire	General Fund	2017, Annually	(Action 4 in previous plan) The city has updated its ERP on an annual basis in the past and would like to continue to do so going forward, so this action will be retained in the plan.
P-2	Adopt Local Hazard Mitigation Plan as part of Comprehensive Plan.	All	Moderate	Community and Economic Development Department	General Fund	2018	(Action 6 in previous plan) Once the HMP has been approved and adopted by the city, it will integrate it into the local comprehensive plan and adopt it as part of that plan.
P-3	Enhance enforcement of existing codes, ordinances, etc.	All	Moderate	Planning and Building	General Fund	2022	(Action 7 in previous plan) Currently, the city is enforcing its existing codes and ordinances, but there are certainly aspects of the code that could be enforced in better ways, so the city will continue to evaluate code enforcement going forward and work to improve it.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-4	Continued compliance with the NFIP/implementation of CRS Activities.	Flood, Hurricane, Severe Thunderstorm	Moderate	Planning and Building	General Fund	2022	(Action 11 in previous plan) The city is currently in compliance with all NFIP activities and is a participant in the CRS. However, as the city moves forward, it may try to improve its flood management/insurance activities to try to gain more points in the CRS.
P-5	Continue to participate in the Jackson County Stormwater Taskforce.	Flood, Hurricane, Tropical Storm, Severe Thunderstorm	Moderate	Planning and Building; Public Works	General Fund	2017, Annually	(Action 13 in previous plan) The city has participated in the Jackson County Stormwater Taskforce over the past several years and is planning to continue that participation in order to improve stormwater management in the city. Therefore, this action will remain in the plan.
P-6	Maintenance of existing drainage facilities.	Flood, Hurricane, Tropical Storm, Severe Thunderstorm	High	Public Works; Engineering	General Fund	2022	(Action 15 in previous plan) The city has put in great efforts to maintain its existing drainage facilities, but it will be looking for ways to improve those facilities going forward, so the action will be retained in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Continue implementation of open space preservation.	Flood, Hurricane, Tropical Storm, Severe Thunderstorm	Moderate	Planning and Building	General Fund	2022	(Action 16 in previous plan) The city has taken many strides to retain areas of open space to improve overall stormwater management. However, as the city grows, there will be increasing demand for development and the need to consistently try to implement this action and retain open space in the community.
P-8	Continue citizens' hotline for drainage issues.	Flood, Hurricane, Thunderstorm, Erosion	High	Planning and Building; Public Relations	General Fund, HMGP grants	2022	(Action 18 in previous plan) The city created a citizens' hotline for drainage issues and it is still active. The city will look at ways to improve the hotline going forward and will continue this action.
Property Protection							
PP-1	Protect water wells, sewer systems, and ensure backup power.	All	High	Public Works	City Budget Utility Fund, Hazard Mitigation Grant funding	2020	(Action 5 in previous plan) The city has taken action to protect a number of water/wastewater/power facilities, but there are many that remain unprotected and so the city will keep this action in place as it attempts to address these facilities.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-2	Residential elevation.	Flood	High	Planning and Building; CRS Coordinator	HMGP, FMA	2022	(Action 8 in previous plan) The city has used elevation as a mitigation strategy on a number of properties in the past, but there are still many properties in the city that could benefit from this mitigation technique if found to be cost-beneficial. This action will remain in place.
PP-3	Property acquisition project.	Flood	Moderate	CRS Coordinator	HMGP and FMA Grant funds	2022	(Action 9 in previous plan) The city has used acquisition as a mitigation strategy on a number of properties in the past, but there are still many properties in the city that could benefit from this mitigation technique if found to be cost-beneficial. This action will remain in place.
PP-4	Mitigation reconstruction/ floodproofing.	Hurricane, Flood	Moderate	CRS Coordinator	HMGP or FMA Grant programs	2022	(Action 10 in previous plan) The city has used reconstruction and floodproofing as a mitigation strategy on a number of properties in the past, but there are still many properties in the city that could benefit from this mitigation technique if found to be cost-beneficial. This action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PP-5	Structure hardening: upgrade roof systems/windows to meet current code requirements to ensure continuity of emergency services – Pascagoula Police Dept., Lake Avenue Fire Station, City Hall, and others.	Hurricane, Severe Thunderstorm/ High Wind, Hailstorm, Tornado	High	Planning and Building Department; Economic Development	General Fund; Hazard Mitigation Grants	2022	(Action 14 in previous plan) The city has used structure hardening as a mitigation strategy on certain critical facilities, but there are still many critical facilities in the city that could benefit from this mitigation technique if found to be cost-beneficial. This action will remain in place.
PP-6	Relocation and placement of utilities.	Flood, Hurricane, Tropical Storm, Severe Thunderstorm	High	Planning and Building; Economic Development; Public Works	HMGP funding, City of Pascagoula Utility Fund, state and federal grants, JCUA budget funding	2022	(Action 19 in previous plan) The city has tried to relocated existing utilities and place new utilities in low-risk areas, but there are still a number of utilities that are in higher risk areas, so the city will continue to try to identify those and implement relocation where feasible.
PP-7	Critical facilities inventory and mitigation opportunities.	All	Moderate	Public Works; Police; Fire; Parks and Recreation; Economic Development; Building and Planning; City Hall	HMGP and PDM Grants	2018	(Action 20 in previous plan) The city has included a critical facilities inventory in this plan, but there are still some facilities that have not been identified in geospatial format, so the city will continue to try to identify those facilities and mitigation opportunities for all facilities.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Natural Resource Protection							
NRP-1	Natural resource protection – wetlands, others.	Flood, Hurricane, Severe Thunderstorm, Erosion	High	Planning and Building; Public Relations	General Fund, Hazard Mitigation grants, and other funded activities	2022	(Action 17 in previous plan) The city has worked with regional partners to try to increase the protection of natural resources such as wetlands, but the demand for development is likely to increase and so the city will retain this action to attempt to continue preserving natural resources.
Structural Projects							
SP-1	Implement projects from Master Drainage Plan.	Flood, Hurricane, Tropical Storm, Severe Thunderstorm	High	Public Works; Engineering	General Fund	2022	(Action 12 in previous plan) Some of the projects for the MDP have been implemented, but there are still many that have not so the action will remain in place.
Emergency Services							
ES-1	Coordination of evacuation planning and sheltering	All	Moderate	Pascagoula Police/Fire	General Fund, CDBG, HMGP funding	2017, Annually	(Action 2 in previous plan) On an annual basis, the city discusses evacuation plans with regional partners and sheltering areas. These plans will be reviewed in the coming years so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-2	NIMS certification.	All	High	Fire/Police	Federal grant	2022	(Action 3 in previous plan) Many employees have taken NIMS courses and have helped enhance the capacity of the city overall. However, more training will be needed by new employees and to keep current employees up to date, so this action will remain in place.
Public Education and Awareness							
PEA-1	Public/stakeholder outreach: education and preparedness for all hazards.	All	High	Planning and Building; Public Relations	General Fund; Hazard Mitigation Grants	Mailing biannually, web and media constant	(Action 1 in previous plan) The city has used mailings as the primary means for reaching out to the public and educating them on hazard risk, but the city will want to look to provide information through new and different technological formats going forward. Therefore, the city will retain this action as it evaluates the best methods for outreach.
PEA-2	Provide post-disaster guidance materials.	All	Moderate	Planning and Building	Existing budget	2022	(Action 21 in previous plan) The city has developed post-disaster guidance materials that it has available to the public and has distributed to some degree, but there are areas where improvement could be made to the material so this will likely be updated going forward.

ANNEX E
PEARL RIVER COUNTY

This annex includes jurisdiction-specific information for Pearl River County and its participating municipalities. It consists of the following five subsections:

- ❑ E.1 Pearl River County Community Profile
- ❑ E.2 Pearl River County Risk Assessment
- ❑ E.3 Pearl River County Vulnerability Assessment
- ❑ E.4 Pearl River County Capability Assessment
- ❑ E.5 Pearl River County Mitigation Strategy

E.1 PEARL RIVER COUNTY COMMUNITY PROFILE

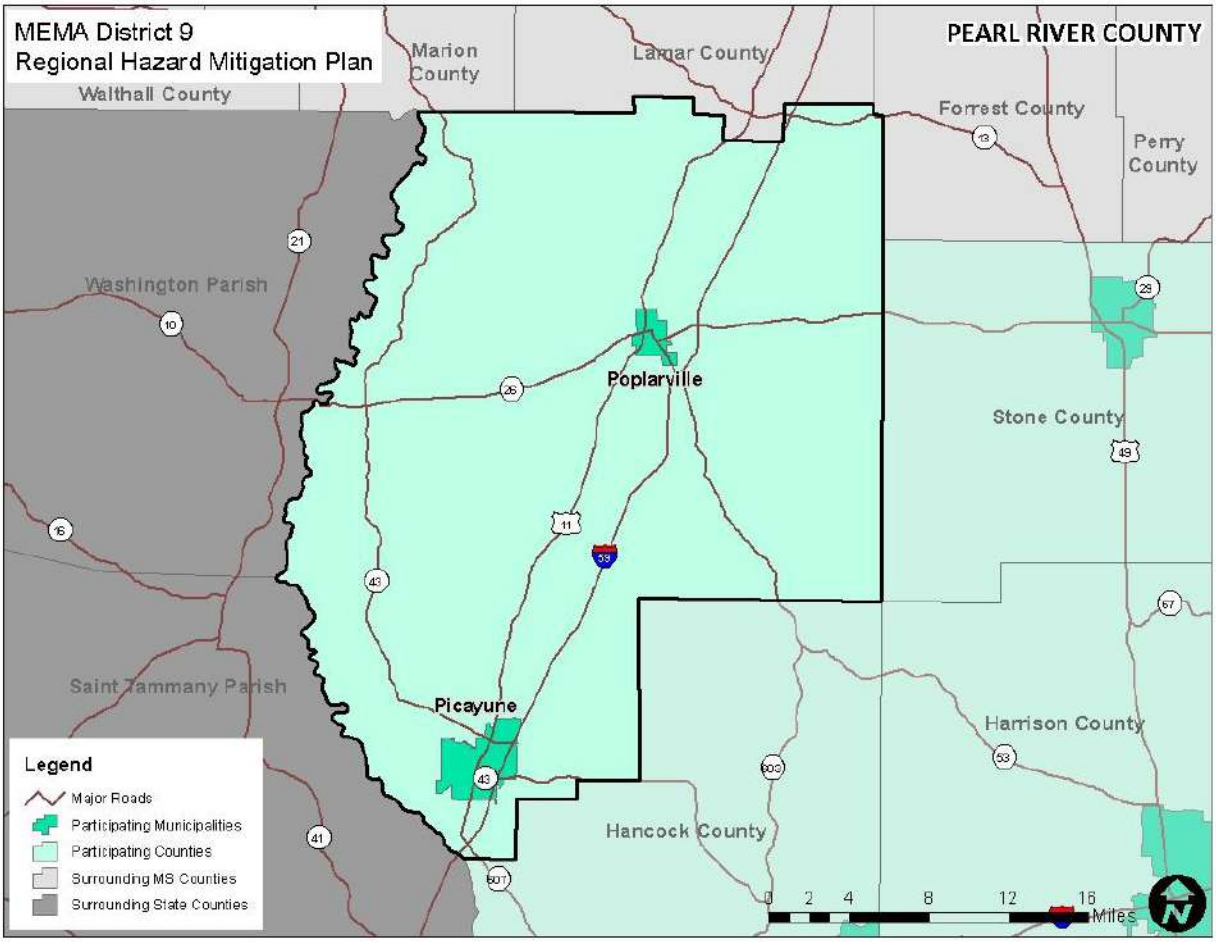
E.1.1 Geography and the Environment

Pearl River County is located in southern Mississippi. It comprises two cities, Picayune and Poplarville, as well as many small unincorporated communities. An orientation map is provided as **Figure E.1**.

Pearl River County is situated in the East Gulf Coastal Plain. It is made up of the gently rolling Pine Belt, also known as the "Piney Woods," and the coastal area called the Coastal Meadows or Terrace. The region has generally low topographic elevations and extensive tracts of marshy land. There are many rivers, creeks, bayous, and other natural drainage networks in the region which empty into the Gulf of Mexico. The total area of the county is 819 square miles, 8 square miles of which is water area.

Pearl River County enjoys four distinct seasons but the climate in the region is generally hot and humid compared to the rest of the United States given its latitude and location along the Gulf Coast. Precipitation is generally highest in winter months when the temperatures are moderately lower, but the likelihood of precipitation remains relatively constant throughout the year. Snowfall is rare but does occur. Summers in the region can become fairly hot with average highs in the nineties and lows in the seventies. The region is also often susceptible to turbulent weather when warm, wet air from the Gulf of Mexico is pushed up into the region to mix with cooler air coming down from across the continent which can result in severe weather conditions. This is particularly true in the spring when seasons are changing and diverse weather patterns interact. The region is also subject to hurricanes and tropical storms from June to October.

FIGURE E.1: PEARL RIVER COUNTY ORIENTATION MAP



E.1.2 Population and Demographics

According to the 2010 Census, Pearl River County has a population of 55,834 people. The county has seen an increase in population between 2000 and 2010. The population density is 69 people per square mile. Population counts from the US Census Bureau for 1990, 2000, and 2010 for the county and participating jurisdictions are presented in **Table E.1**.

TABLE E.1: POPULATION COUNTS FOR PEARL RIVER COUNTY

Jurisdiction	1990 Census Population	2000 Census Population	2010 Census Population	% Change 2000-2010
Pearl River County	**38,714**	**48,621**	**55,834**	**14.8%**
Picayune	10,633	10,535	10,878	3.3%
Poplarville	2,561	2,601	2,894	11.3%

Source: United States Census Bureau, 1990, 2000, 2010 Census

Based on the 2010 Census, the median age of residents of Pearl River County is 38.9 years. The racial characteristics of the county are presented in **Table E.2**. Whites make up the majority of the population

in the county, accounting for 84 percent of the population, however the incorporated municipalities have larger black populations compared to the rest of the county.

TABLE E.2: DEMOGRAPHICS OF PEARL RIVER COUNTY

Jurisdiction	White, Percent (2010)	Black or African American, Percent (2010)	American Indian or Alaska Native, Percent (2010)	Asian, Percent (2010)	Native Hawaiian or Other Pacific Islander, Percent (2010)	Other Race, Percent (2010)	Two or More Races, percent (2010)	Persons of Hispanic Origin, Percent (2010)*
Pearl River County	**84.0%**	**12.3%**	**0.6%**	**0.4%**	**0.1%**	**0.9%**	**1.7%**	**2.9%**
Picayune	59.3%	36.7%	0.3%	0.6%	0.0%	1.1%	1.9%	3.1%
Poplarville	66.1%	29.6%	0.3%	1.0%	0.1%	0.4%	2.4%	1.7%

*Hispanics may be of any race, so also are included in applicable race categories
Source: United States Census Bureau, 2010 Census

E.1.3 Housing

According to the 2010 U.S. Census, there are 23,968 housing units in Pearl River County, the majority of which are single family homes or mobile homes. Housing information for the county and two municipalities is presented in **Table E.3**. As shown in the table, there is a low lower percentage of seasonal housing units throughout the county.

TABLE E.3: HOUSING CHARACTERISTICS OF PEARL RIVER COUNTY

Jurisdiction	Housing Units (2000)	Housing Units (2010)	Seasonal Units, Percent (2010)	Median Home Value (2011-2015)
Pearl River County	**20,610**	**23,968**	**3.6%**	**$114,100**
Picayune	4,568	4,891	0.8%	$109,700
Poplarville	936	1,019	1.8%	$111,400

Source: United States Census Bureau, 2000 and 2010 Census, 2011-2015 American Community Survey 5-Year Estimates

E.1.4 Infrastructure

TRANSPORTATION

In Pearl River County, Interstate 59 and U.S. Highway 11 run roughly northeast to southwest allowing transportation across the county. Mississippi Highway 26 runs east-west and Mississippi Highway 43 and 53 run north-south through Pearl River County.

The Picayune Municipal Airport and Poplarville-Pearl River County Airport are two general aviation airports located in Pearl River County. The Oreck Airport in Poplarville is a notable private-use airport in the county. The Gulfport-Biloxi International Airport, located in Harrison County, also serves the county. This airport is served by three major airlines with direct flights to Atlanta, Charlotte, Dallas/Ft. Worth, and Houston as well as connections to hundreds of locations in the U.S. and worldwide.

In terms of other transportation services, one Class-I Major railway also serves the county.

UTILITIES

Electrical power in Pearl River County is mainly provided by electric power associations. Mississippi Power Company also provides power to some parts of the county.

There are two private and municipal natural gas suppliers that serve Pearl River County. These include CenterPoint Energy Resources and the City of Picayune.

Water and sewer service is provided by a number of different sources, but unincorporated areas often rely on septic systems and wells in Pearl River County.

COMMUNITY FACILITIES

There are a number of buildings and community facilities located throughout Pearl River County. According to the data collected for the vulnerability assessment (Section 6.4.1), there are 5 communications facilities, 1 emergency operations center (EOC), 29 fire stations, 4 medical facilities, 3 police stations, 8 public facilities, 5 shelters, 1 transportation facility, and 9 water/wastewater facilities located within the county.

There are three hospitals located in Pearl River County. Crosby Memorial Hospital and Highland Community Hospital in Picayune and Pearl River County Hospital in Poplarville. There are also additional medical care facilities located in the county as outlined in the vulnerability assessment (Section 6.4.1).

Pearl River County contains numerous local, state, and national parks and recreation areas, including the Mississippi Gulf Coast National Heritage Area and DeSoto National Forest. Golf courses and other recreational opportunities are also available in the county.

E.1.5 Land Use

Many areas of Pearl River County are undeveloped or sparsely developed. There are two small incorporated municipalities located in the county and a few unincorporated rural centers. There is a mix of protected lands, such as the DeSoto National Forest and a National Wildlife Refuge. Private lands are used for exurban housing, agriculture, and forestry. Consistent with its rural character, densities are very low and uses are not mixed, making motor vehicles the only viable mode for virtually all travel.

Local land use and associated regulations are further discussed in *Section 7: Capability Assessment.*

E.1.6 Employment and Industry

According to the 2011 to 2015 American Community Survey (ACS) 5-year estimates, in 2015, Pearl River County had an average annual employment of 20,219 workers and an average unemployment rate of 12.1 percent (compared to 10.3 percent for the state). In 2015, the Educational Services, and Health Care and Social Assistance industry employed 21.9 percent of the workforce followed by Retail Trade (13.3%); Construction (10.0%); and Arts, Entertainment, and Recreation, and Accommodation and Food Services

(9.5%). In 2015, the average annual median household income in Pearl River County was $40,976 compared to $39,665 in the state of Mississippi.

E.2 PEARL RIVER COUNTY RISK ASSESSMENT

This subsection includes hazard profiles for each of the significant hazards identified in Section 4: *Hazard Identification* as they pertain to Pearl River County. Each hazard profile includes a description of the hazard's location and extent, notable historical occurrences, and the probability of future occurrences. Additional information can be found in Section 5: *Hazard Profiles*.

FLOOD-RELATED HAZARDS

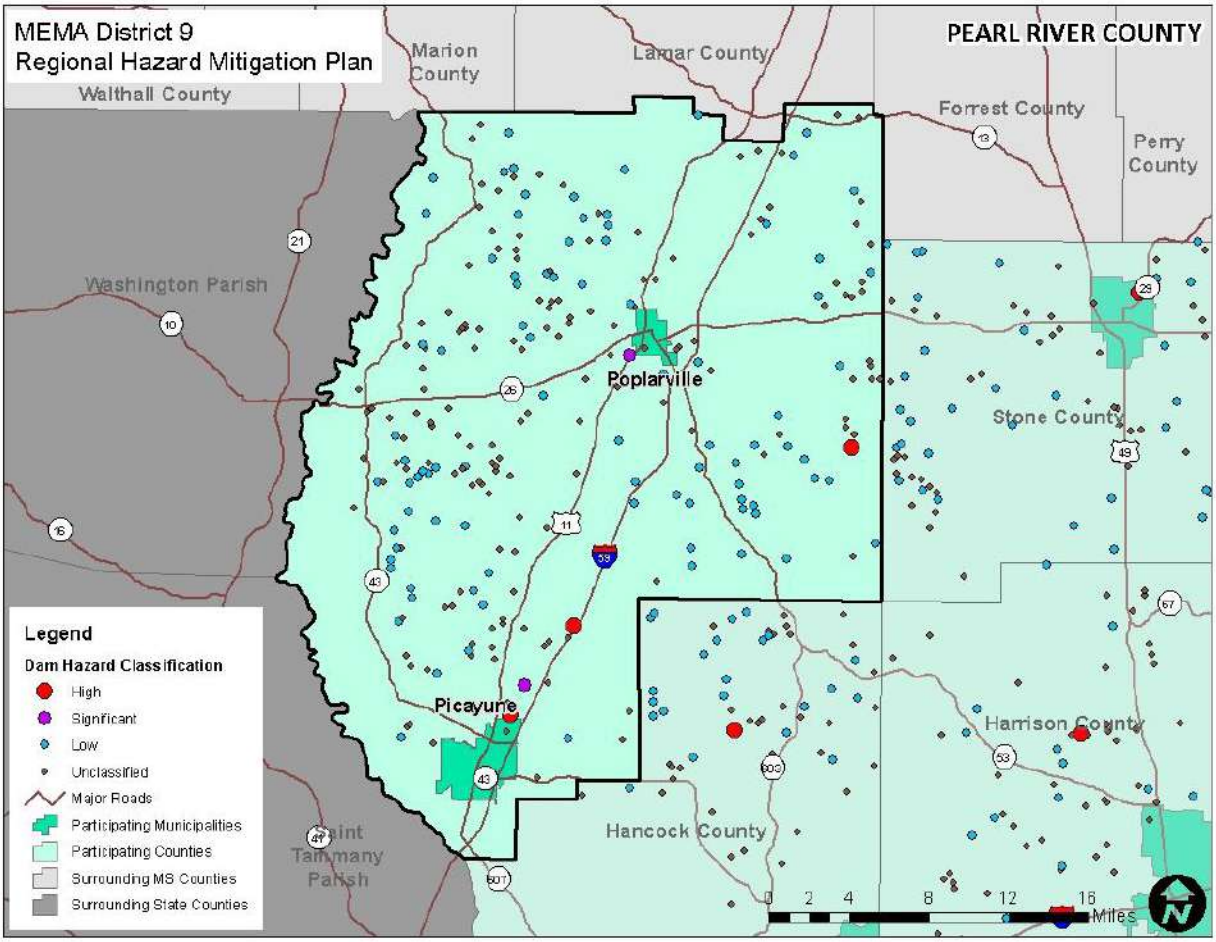
E.2.1 Dam and Levee Failure

LOCATION AND SPATIAL EXTENT

According to the Mississippi Department of Environmental Quality, there are three high hazard dams in Pearl River County.[1] **Figure E.2** and **Figure E.3** show the location of each of these high hazard dams as well as mapped dam inundation areas, and **Table E.4** lists them by name.

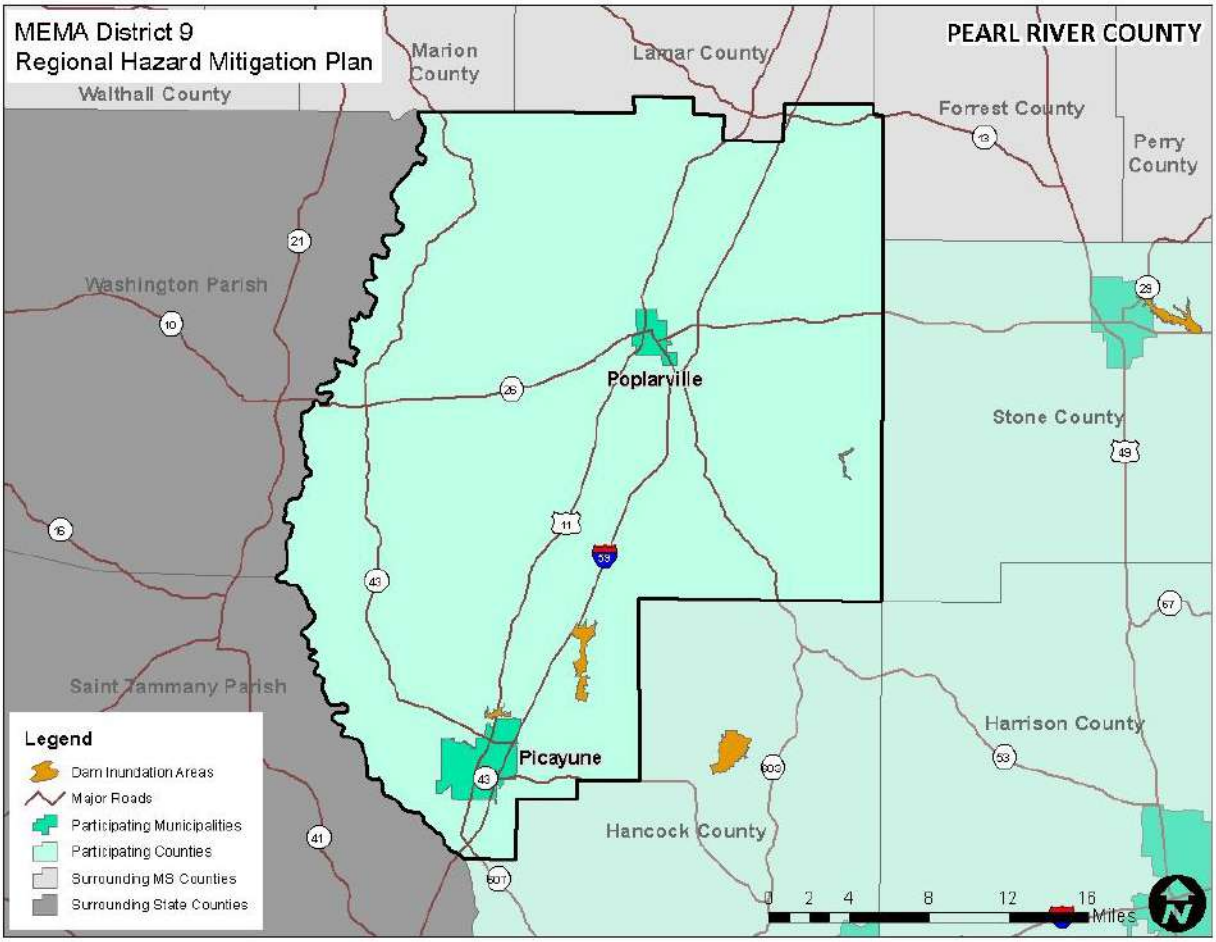
[1] The list of high hazard dams obtained from the Mississippi Department of Environmental Quality was reviewed and amended by local officials to the best of their knowledge.

FIGURE E.2: PEARL RIVER COUNTY HIGH HAZARD DAM LOCATIONS



Source: Mississippi Department of Environmental Quality

FIGURE E.3: PEARL RIVER COUNTY DAM INUNDATION AREAS



Source: Mississippi Department of Environmental Quality

TABLE E.4: PEARL RIVER COUNTY HIGH HAZARD DAMS

Dam Name	Hazard Potential
Pearl River County	
ANCHOR LAKE DAM	High
GO GO ROAD LAKE DAM	High
HIDE-A-WAY LAKE DAM	High

Source: Mississippi Department of Environmental Quality

HISTORICAL OCCURRENCES

According to the Mississippi State Hazard Mitigation Plan, there have been two dam failures reported in Pearl River County. Although no damage was reported with these events, several breach scenarios in the region could be catastrophic.

Table E.5 below provides a brief description of the two reported dam failures.

TABLE E.5: PEARL RIVER COUNTY DAM FAILURES (1982-2012)

Date	County	Structure Name	Cause of Failure
April 1983	Pearl River	Anchor Lake	Breached
April 2004	Pearl River	Dove Lake	Piping

Source: Mississippi State Hazard Mitigation Plan

PROBABILITY OF FUTURE OCCURRENCES

Given the current dam inventory and historic data, a dam breach is possible (between 1 and 10 percent annual probability) in the future. However, as has been demonstrated in the past, regular monitoring is necessary to prevent these events.

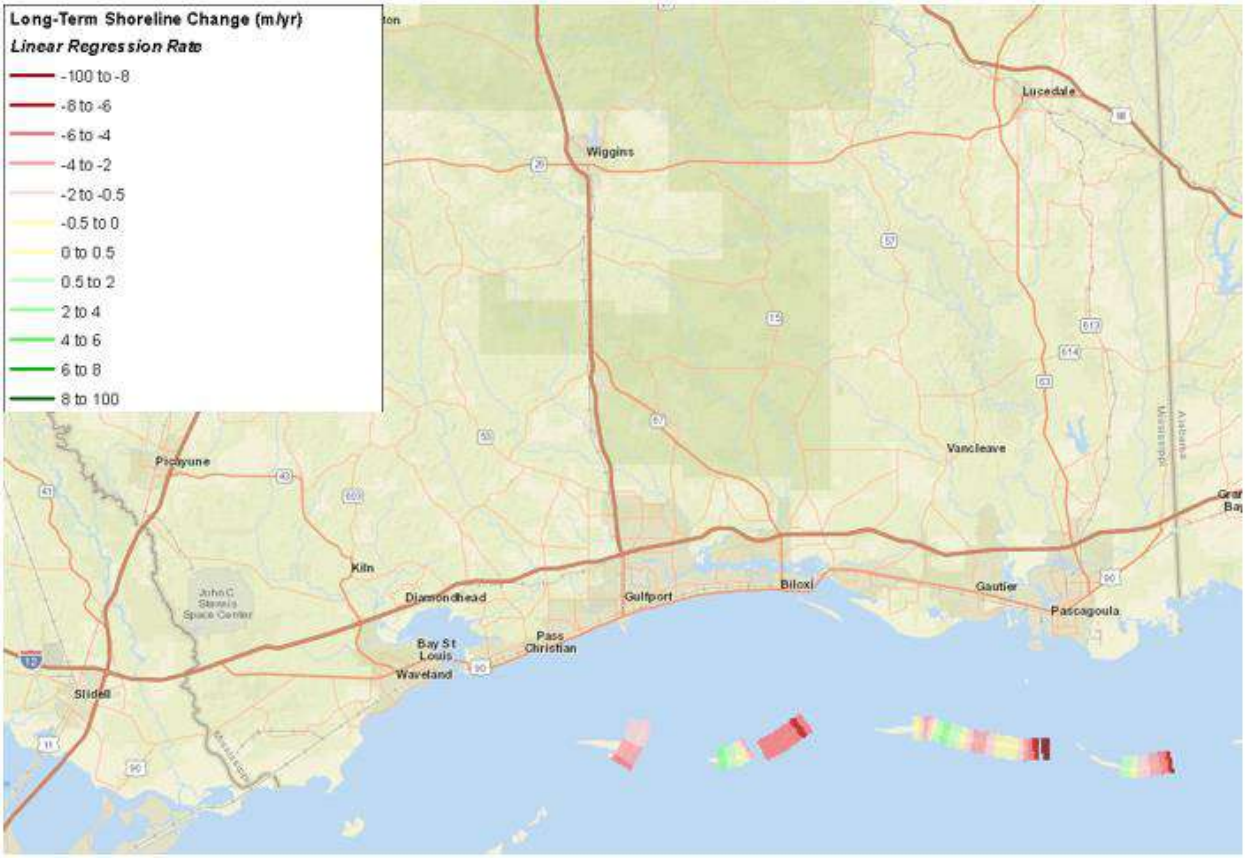
E.2.2 Erosion

LOCATION AND SPATIAL EXTENT

For the most part, major erosion in the MEMA District 9 Region is typically caused by coastal tides, ocean currents, and storm events. Although the region also experiences riverine erosion in many of its inland areas, including Pearl River County, these are of somewhat less concern than coastal erosion areas which historically have had larger impacts. Unlike inland areas, where the soil has greater organic matter content, coastal soils are mainly composed of fine grained particles such as sand. This makes coastal soils much more susceptible to erosion. Although some areas of the MEMA District 9 Region coast are protected and natural erosion processes are allowed to take place for the most part, many areas near where development has occurred are especially susceptible.

At this time, there is limited data available on localized areas of erosion. Most of the information collected by the United States Geological Survey (USGS) is focused on the barrier islands that are just off the coast of the mainland. The long-term shoreline change for the barrier islands as calculated by the USGS can be found in **Figure E.4** It should be noted that many areas of the coast are protected through the use of structural techniques. Also, a great deal of renourishment activities are carried out along the mainland coastal communities.

FIGURE E.4: LONG-TERM SHORELINE CHANGE (M/YR) IN THE MEMA DISTRICT 9 REGION



Source: United States Geological Survey

HISTORICAL OCCURRENCES

Several sources were vetted to identify areas of erosion in Pearl River County. This includes searching local newspapers, interviewing local officials, and reviewing previous hazard mitigation plans. Because dramatic, short-term erosion tends to take place after major storm events such as hurricanes, flooding, or storm surge, the erosion events often correspond directly with those events. Conversely, with long-term erosion, it is difficult to identify a specific historic occurrence because these events are by nature occurring at all times over a long period at a very gradual rate. Therefore, long-term historic erosion events cannot be confined to a specific timeframe or occurrence.

PROBABILITY OF FUTURE OCCURRENCES

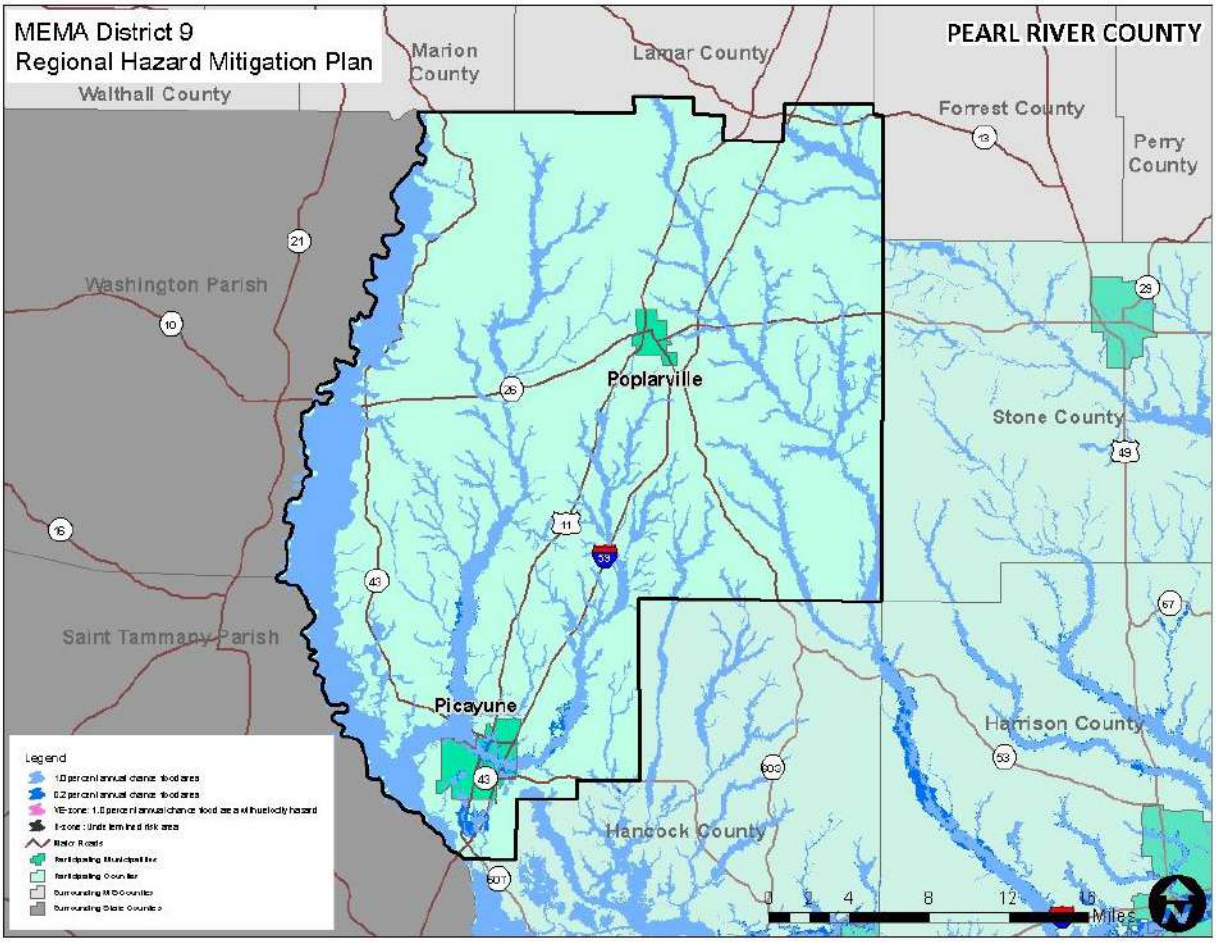
Erosion remains a natural, dynamic, and continuous process for Pearl River County, and it will continue to occur. The annual probability level assigned for erosion is likely (between 10 and 100 percent annually).

E.2.3 Flood

LOCATION AND SPATIAL EXTENT

There are areas in Pearl River County that are susceptible to flood events. Special flood hazard areas in the county were mapped using Geographic Information System (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM). This includes Zone A (1-percent annual chance floodplain), Zone AE (1-percent annual chance floodplain with elevations), Zone VE (1-percent annual chance floodplain with additional hazards due to storm-induced velocity wave action), Zone X500 (0.2-percent annual chance floodplain), and Zone D (undetermined risk area). **Figure E.5** illustrates the location and extent of currently mapped special flood hazard areas for the county based on best available FEMA Digital Flood Insurance Rate Map (DFIRM) data.

FIGURE E.5: SPECIAL FLOOD HAZARD AREAS IN PEARL RIVER COUNTY



Source: Federal Emergency Management Agency

HISTORICAL OCCURRENCES

Floods were at least partially responsible for six disaster declarations in Pearl River County in 1974, 1983, 1991, 1995, 2003, and 2016.[2] Information from the National Climatic Data Center was used to ascertain

[2] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

additional historical flood events. The National Climatic Data Center reported a total of 20 events in Pearl River County since 1997.[3] These events accounted for over $3.6 million (2016 dollars) in property damage in the county.[4] A summary of these events is presented in **Table E.6**. Specific information on flood events, including date, type of flooding, and deaths and injuries, can be found in **Table E.7**.

TABLE E.6: SUMMARY OF FLOOD OCCURRENCES IN PEARL RIVER COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Picayune	2	0/0	$31,876	$2,656
Poplarville	1	0/0	$0	$0
Unincorporated Area	17	0/0	$3,581,047	$188,476
PEARL RIVER COUNTY TOTAL	**20**	**0/0**	**$3,612,923**	**$191,132**

Source: National Climatic Data Center

TABLE E.7: HISTORICAL FLOOD EVENTS IN PEARL RIVER COUNTY

Location	Date	Type	Deaths/Injuries	Property Damage*
Picayune				
PICAYUNE	4/25/2004	Flash Flood	0/0	$31,876
PICAYUNE	3/21/2012	Flash Flood	0/0	$0
Poplarville				
POPLARVILLE	5/21/1997	Flood	0/0	$0
Unincorporated Area				
PINE GROVE	2/25/1997	Flood	0/0	$0
COUNTYWIDE	1/7/1998	Flash Flood	0/0	$147,763
COUNTYWIDE	3/3/2001	Flash Flood	0/0	$13,600
COUNTYWIDE	6/11/2001	Flood	0/0	$0
COUNTYWIDE	9/26/2002	Flash Flood	0/0	$0
COUNTYWIDE	6/30/2003	Flash Flood	0/0	$654,492
PEARL RIVER (ZONE)	7/1/2003	Flood	0/0	$654,492
COUNTYWIDE	4/1/2005	Flash Flood	0/0	$30,831
PEARL RIVER (ZONE)	4/1/2005	Flood	0/0	$30,831
MILL CREEK	10/22/2007	Flash Flood	0/0	$0
TYLER	10/23/2007	Flood	0/0	$0
NICHOLSON	6/10/2012	Flash Flood	0/0	$0
NICHOLSON	8/29/2012	Flash Flood	0/0	$1,049,039
OZONA	4/14/2015	Flash Flood	0/0	$0
NICHOLSON	4/14/2015	Flash Flood	0/0	$0
CYBUR	3/10/2016	Flash Flood	0/0	$500,000
NICHOLSON	3/11/2016	Flood	0/0	$500,000

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

[3] These flood events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional occurrences have occurred and have gone unreported. As additional local data becomes available, this hazard profile will be amended.
[4] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

HISTORICAL SUMMARY OF INSURED FLOOD LOSSES

According to FEMA flood insurance policy records as of October 2016, there have been 568 flood losses reported in Pearl River County through the National Flood Insurance Program (NFIP) since 1978, totaling almost $13.5 million in claims payments. A summary of these figures for the county is provided in **Table E.8**. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP policies, and for losses in which claims were sought and received. It is likely that many additional instances of flood loss in Pearl River County were either uninsured, denied claims payment, or not reported.

TABLE E.8: SUMMARY OF INSURED FLOOD LOSSES IN PEARL RIVER COUNTY

Location	Number of Policies	Flood Losses	Claims Payments
Picayune	255	194	$3,579,193
Poplarville	2	0	$0
Unincorporated Area	732	374	$9,905,285
PEARL RIVER COUNTY TOTAL	**989**	**568**	**$13,484,478**

Source: National Flood Insurance Program

REPETITIVE LOSS PROPERTIES

According to the Mississippi Emergency Management Agency, there are 69 non-mitigated repetitive loss properties located in Pearl River County, which accounted for 219 losses and almost $4.4 million in claims payments under the NFIP. The average claim amount for these properties is $19,945. Of the 69 properties, 66 are residential and 3 are non-residential. Without mitigation, these properties will likely continue to experience flood losses. **Table E.9** presents detailed information on repetitive loss properties and NFIP claims and policies for Pearl River County.

TABLE E.9: REPETITIVE LOSS PROPERTIES IN PEARL RIVER COUNTY

Location	Number of Properties	Types of Properties	Number of Losses	Building Payments	Content Payments	Total Payments	Average Payment
Picayune	30	26 single family; 1 2-4 family; 1 other residential; 2 other non-residential	88	$1,285,638	$302,289	$1,587,927	$18,045
Poplarville	0	--	0	$0	$0	$0	$0

Location	Number of Properties	Types of Properties	Number of Losses	Building Payments	Content Payments	Total Payments	Average Payment
Unincorporated Area*	39	38 residential; 1 commercial	131	--	--	$2,779,983	$21,221
PEARL RIVER COUNTY TOTAL	**69**		**219**			**$4,367,910**	**$19,945**

*The information provided by the county for the unincorporated area did not include specific building types, building payments, or content payments information.
Source: Federal Emergency Management Agency, National Flood Insurance Program

PROBABILITY OF FUTURE OCCURRENCES

Flood events will remain a threat in Pearl River County, and the probability of future occurrences will remain highly likely (100 percent annual probability). The probability of future flood events based on magnitude and according to best available data is illustrated in the figure above**,** which indicates those areas susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain). Further, as described in other hazard profiles, it is highly likely that Pearl River County will continue to experience inland flooding associated with large tropical storms and hurricanes.

It can be inferred from the floodplain location maps, previous occurrences, and repetitive loss properties that risk varies throughout the county. For example, the western portion of the county has more floodplain and thus a higher risk of flood than the rest of the county. Flood is not the greatest hazard of concern but will continue to occur and cause damage. Therefore, mitigation actions may be warranted, particularly for repetitive loss properties.

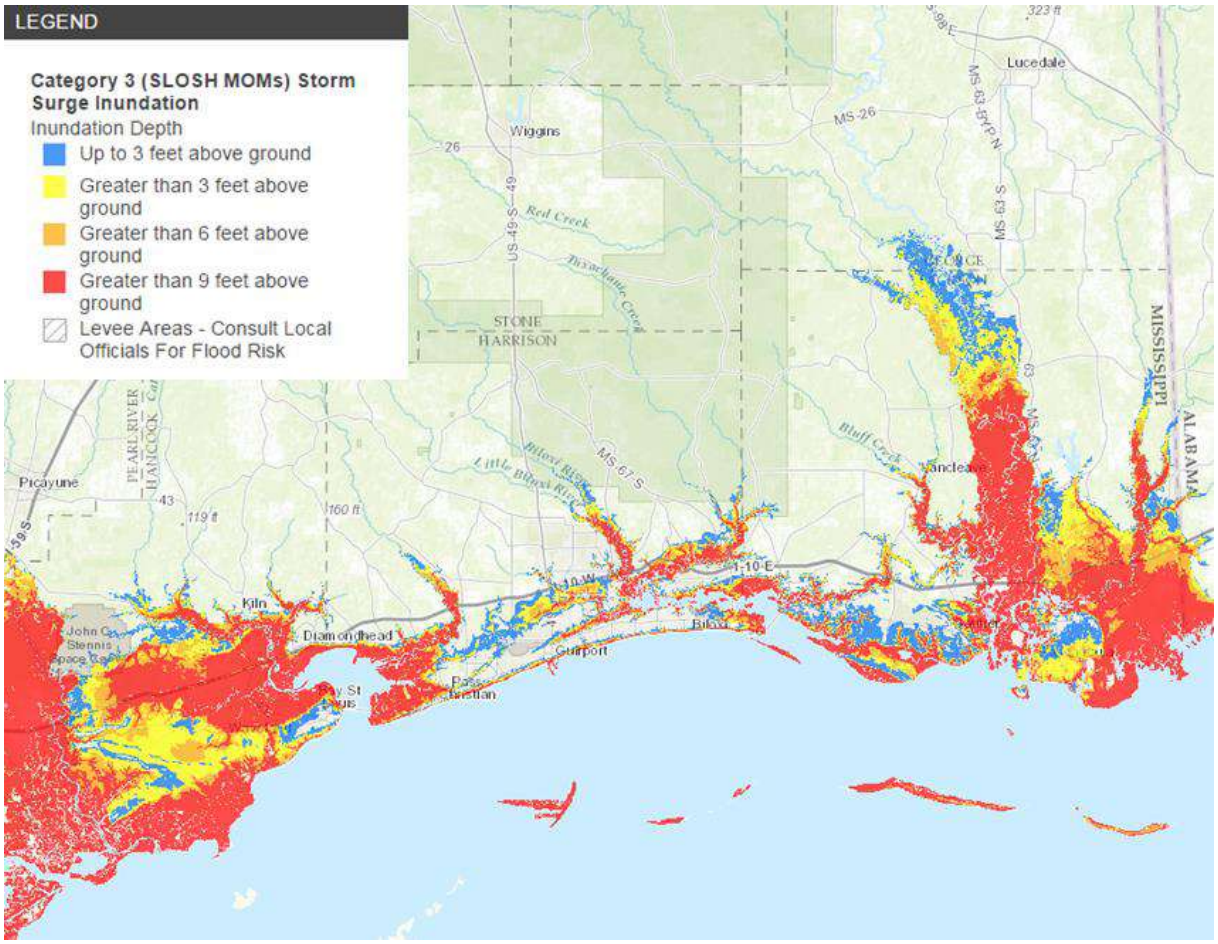
It should also be noted that anticipated sea level rise will increase the probability and intensity of future tidal flooding events in years to come. Rising sea level over time will shorten the return period (increasing the frequency) of significant flood events. This hazard is discussed elsewhere in this section.

E.2.4 Storm Surge

LOCATION AND SPATIAL EXTENT

There are is a small area in Pearl River County that is subject to potential storm surge inundation as modeled and mapped by the National Oceanic and Atmospheric Administration (NOAA). **Figure E.6** illustrates hurricane storm surge inundation zones based on a Category 3 storm. The illustration is derived from geo-referenced SLOSH (Sea, Lake, and Overland Surge from Hurricanes) data produced by the USACE in coordination with NOAA. SLOSH is a modeling tool used to estimate storm surge for coastal areas resulting from historical, hypothetical, or predicted hurricanes taking into account maximum expected levels for pressure, size, forward speed, track, and winds. Therefore, the SLOSH data is best used for defining the potential maximum surge associated with various storm intensities for any particular location. As shown in the figure, a small area in southern Pearl River County is at risk to storm surge inundation. Inland areas may also experience substantial flooding during a storm event.

FIGURE E.6: STORM SURGE RISK AREAS IN THE MEMA DISTRICT 9 REGION



Source: NOAA

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, no storm surge events have been reported for Pearl River County since 1996.[5] [6] A summary of these events is presented in **Table E.10**. Detailed information on the recorded storm surge events can be found in **Table E.11**.

TABLE E.10: SUMMARY OF STORM SURGE EVENTS IN PEARL RIVER COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Picayune	0	0/0	$0	$0
Poplarville	0	0/0	$0	$0

[5] These storm surge events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016.
[6] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Unincorporated Area	0	0/0	$0	$0
PEARL RIVER COUNTY TOTAL	**0**	**0/0**	**$0**	**$0**

Source: National Climatic Data Center

TABLE E.11: HISTORICAL STORM SURGE EVENTS IN PEARL RIVER COUNTY

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
Picayune				
None reported	--	--	--	--
Poplarville				
None reported	--	--	--	--
Unincorporated Area				
None reported	--	--	--	--

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

It is possible (between 1 and 10 percent annual probability) that Pearl River County will experience storm surge associated with large tropical storms, hurricanes, and squalls combined with high tides. As noted in the preceding section (under Flood), anticipated sea level rise will increase the probability and intensity of future storm surge events in years to come.[7] This rise in sea level will not only increase the probability and intensity of tidal flooding events, but will also contribute to the loss of coastal wetlands and erosion of sand beaches that act as protective buffers against storm surge events.

FIRE-RELATED HAZARDS

E.2.5 Drought

Drought typically covers a large area and cannot be confined to any geographic or political boundaries. Furthermore, it is assumed that Pearl River County would be uniformly exposed to drought, making the spatial extent potentially widespread. It is also notable that drought conditions typically do not cause significant damage to the built environment but may exacerbate wildfire conditions.

HISTORICAL OCCURRENCES

According to the U.S. Drought Monitor, Pearl River County had drought levels of Severe or worse in 8 of the last 17 years (January 2000-October 2016). **Table E.12** shows the most severe drought classification for each year, according to U.S. Drought Monitor classifications. It should be noted that the U.S. Drought Monitor also estimates what percentage of the county is in each classification of drought severity. For example, the most severe classification reported may be exceptional but a majority of the county may actually be in a less severe condition.

[7] The Sea Level Rise hazard is assessed more extensively under Section E.2.16.

TABLE E.12: HISTORICAL DROUGHT OCCURRENCES IN PEARL RIVER COUNTY

Abnormally Dry (D0) Moderate Drought (D1) Severe Drought (D2) Extreme Drought (D3) Exceptional Drought (D4)

	Pearl River County
2000	EXCEPTIONAL
2001	MODERATE
2002	SEVERE
2003	ABNORMAL
2004	ABNORMAL
2005	ABNORMAL
2006	EXTREME
2007	MODERATE
2008	MODERATE
2009	MODERATE
2010	SEVERE
2011	EXCEPTIONAL
2012	SEVERE
2013	ABNORMAL
2014	SEVERE
2015	EXTREME
2016	ABNORMAL

Source: United States Drought Monitor

No anecdotal information was available from the National Climatic Data Center on droughts in Pearl River County.

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that Pearl River County has a probability level of likely (between 10 and 100 percent annual probability) for future drought events. However, the extent (or magnitude) of drought and the amount of geographic area covered by drought, varies with each year. Historic information indicates that there is a much lower probability for extreme, long-lasting drought conditions.

E.2.6 Lightning

LOCATION AND SPATIAL EXTENT

Lightning occurs randomly, therefore it is impossible to predict where and with what frequency it will strike. It is assumed that all of Pearl River County is uniformly exposed to lightning.

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, there have been six recorded lightning events in Pearl River County since 1996.[8] These events resulted in nearly $133,000 (2016 dollars) in damages.[9] Furthermore, lightning has caused one injury in the county. A summary of these events is presented in **Table E.13**. Detailed information on historical lightning events can be found in **Table E.14**.

It is certain that more than six events have impacted the county. Many of the reported events are those that caused damage, and it should be expected that damages are likely much higher for this hazard than what is reported.

TABLE E.13: SUMMARY OF LIGHTNING OCCURRENCES IN PEARL RIVER COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Picayune	3	0/0	$0	$0
Poplarville	1	0/0	$132,986	$7,388
Unincorporated Area	2	0/1	$0	$0
PEARL RIVER COUNTY TOTAL	**6**	**0/1**	**$132,986**	**$7,388**

Source: National Climatic Data Center

TABLE E.14: HISTORICAL LIGHTNING OCCURRENCES IN PEARL RIVER COUNTY

Location	Date	Deaths/ Injuries	Property Damage*	Details
Picayune				
PICAYUNE	12/29/1996	0/0	$0	Lightning struck a utility transmission line causing a power outage over a large area. Heavy rain (5 to 6 inches) over a few hours caused several streets to flood.
PICAYUNE	8/8/2002	0/0	$0	Lightning struck a house in the North Hill subdivision.
PICAYUNE	8/5/2004	0/0	$0	Lightning strikes damaged two houses in the North Hill subdivision.
Poplarville				
POPLARVILLE	3/7/1998	0/0	$132,986	A house fire started by lightning caused extensive damage.
Unincorporated Area				
CARRIERE	5/3/1998	0/1	$0	Lightning struck a man while he was in a swimming pool.
CARRIERE	5/3/1998	0/0	$0	Pearl River County Sheriff's Office reported that a lightning strike ignited a house fire.

*Property damage is reported in 2016 dollars; All damage may not have been reported.
Source: National Climatic Data Center

[8] These lightning events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is certain that additional lightning events have occurred in Pearl River County. As additional local data becomes available, this hazard profile will be amended.
[9] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

PROBABILITY OF FUTURE OCCURRENCES

Although there was not a high number of historical lightning events reported in Pearl River County via NCDC data, it is a regular occurrence accompanied by thunderstorms. In fact, lightning events will assuredly happen on an annual basis, though not all events will cause damage. According to Vaisala's U.S. National Lightning Detection Network (NLDN), Pearl River County is located in an area of the country that experienced an average of 4 to 12 lightning flashes per square kilometer per year between 2005 and 2014. Therefore, the probability of future events is highly likely (100 percent annual probability). It can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the county.

E.2.7 Wildfire

LOCATION AND SPATIAL EXTENT

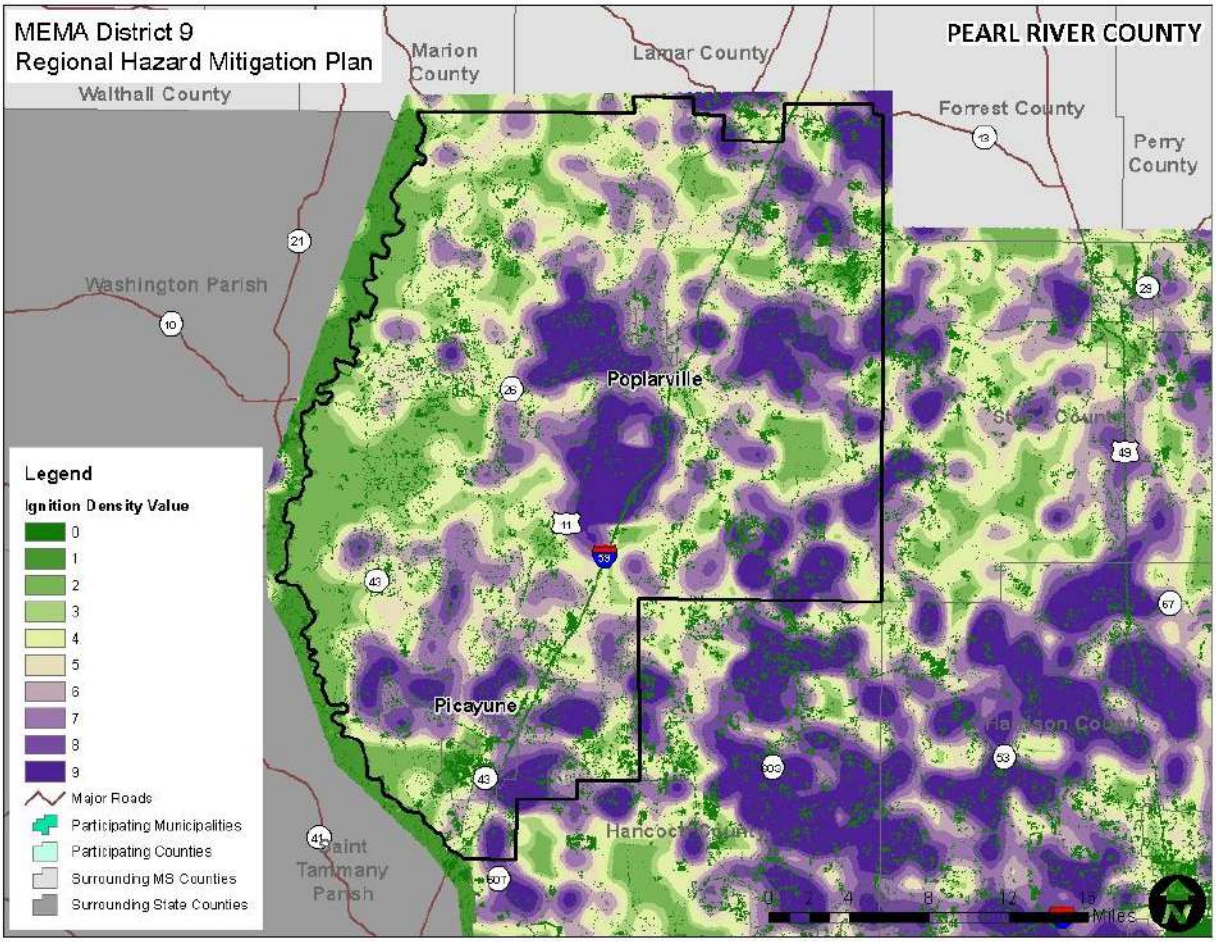
The entire county is at risk to a wildfire occurrence. However, several factors such as drought conditions or high levels of fuel on the forest floor, may make a wildfire more likely. Furthermore, areas in the urban-wildland interface are particularly susceptible to fire hazard as populations abut formerly undeveloped areas. The Wildfire Ignition Density data shown in the figure below give an indication of historic location.

HISTORICAL OCCURRENCES

Figure E.7 shows the Wildfire Ignition Density in Pearl River County based on data from the Southern Wildfire Risk Assessment. This data is based on historical fire ignitions and the likelihood of a wildfire igniting in an area. Occurrence is derived by modeling historic wildfire ignition locations to create an average ignition rate map. This is measured in the number of fires per year per 1,000 acres.[10]

[10] Southern Wildfire Risk Assessment, 2014.

FIGURE E.7: WILDFIRE IGNITION DENSITY IN PEARL RIVER COUNTY



Source: Southern Wildfire Risk Assessment

Based on data from the Mississippi Forestry Commission from 2007 to 2016, Pearl River County experiences an average of 119 wildfires annually which burn a combined 1,956 acres, on average per year. The data indicates that most of these fires are small, averaging 16 acres per fire. **Table E.15** provides a summary of wildfire occurrences in Pearl River County and **Table E.16** lists the number of reported wildfire occurrences in the county between the years 2007 and 2016.

TABLE E.15: SUMMARY TABLE OF ANNUAL WILDFIRE OCCURRENCES (2007 -2016)*

	Pearl River County
Average Number of Fires per year	119.0
Average Number of Acres Burned per year	1,956.2
Average Number of Acres Burned per fire	16.4

*These values reflect averages over a 10-year period.
Source: Mississippi Forestry Commission

TABLE E.16: HISTORICAL WILDFIRE OCCURRENCES IN PEARL RIVER COUNTY

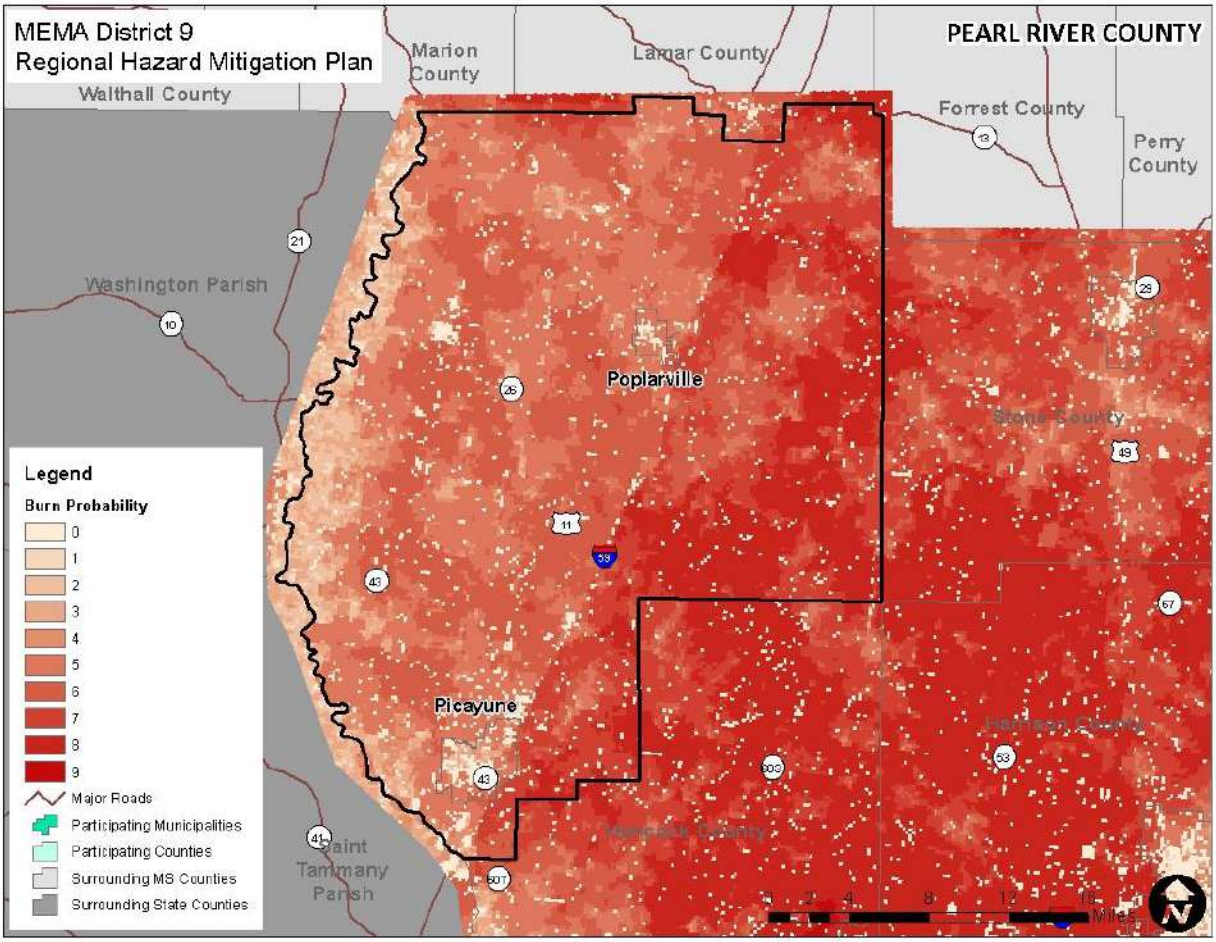
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Pearl River County										
Number of Fires	140	111	123	95	199	61	134	127	119	81
Number of Acres Burned	2,863	2,020	1,559	2,070	4,118	630	1,442	986	1,199	2,675

Source: Mississippi Forestry Commission

PROBABILITY OF FUTURE OCCURRENCES

Wildfire events will be an ongoing occurrence in Pearl River County. **Figure E.8** shows that there is some probability a wildfire will occur throughout the county. However, the likelihood of wildfires increases during drought cycles and abnormally dry conditions. Fires are likely to stay small in size but could increase due to local climate and ground conditions. Dry, windy conditions with an accumulation of forest floor fuel (potentially due to ice storms or lack of fire) could create conditions for a large fire that spreads quickly. It should also be noted that some areas do vary somewhat in risk. For example, highly developed areas are less susceptible unless they are located near the urban-wildland boundary. The risk will also vary due to assets. Areas in the urban-wildland interface will have much more property at risk, resulting in increased vulnerability and need to mitigate compared to rural, mainly forested areas. The probability assigned to Pearl River County for future wildfire events is highly likely (100 percent annual probability).

FIGURE E.8: BURN PROBABILITY IN PEARL RIVER COUNTY



Source: Southern Wildfire Risk Assessment

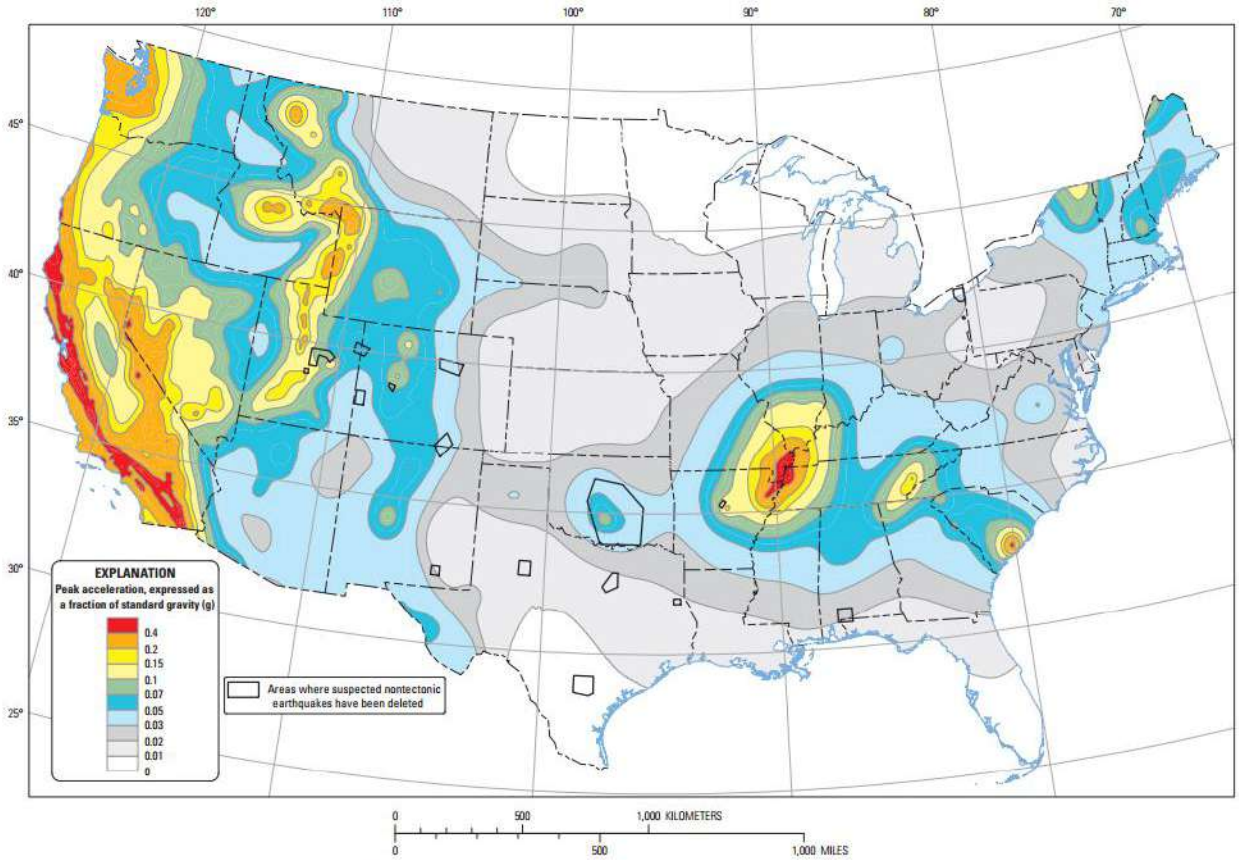
GEOLOGIC HAZARDS

E.2.8 Earthquake

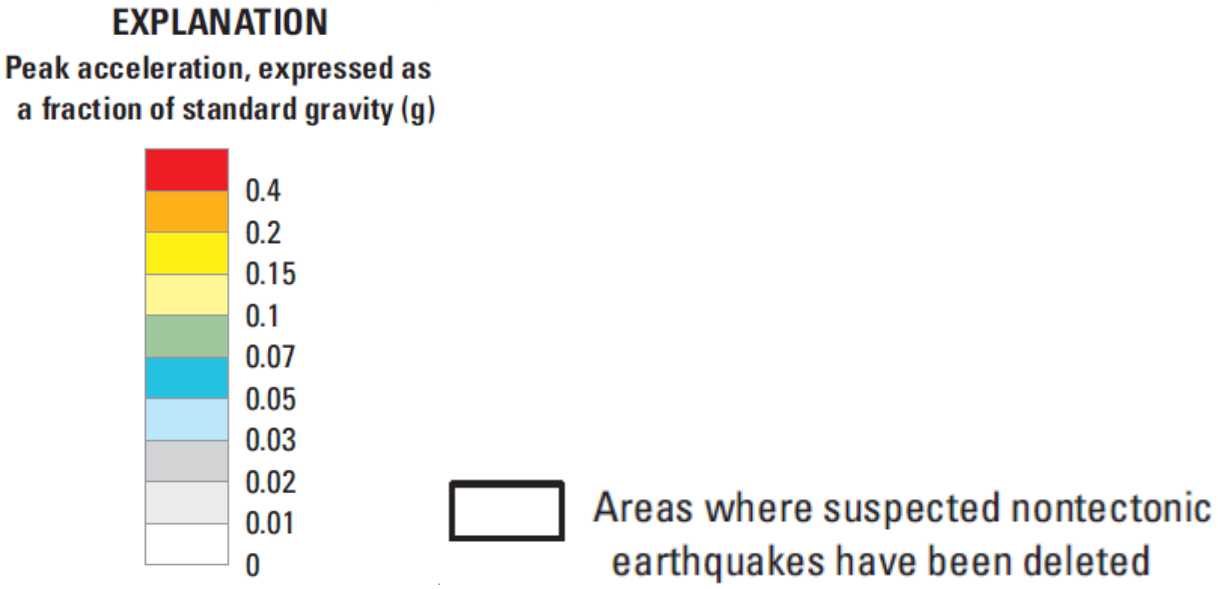
LOCATION AND SPATIAL EXTENT

Figure E.9 shows the intensity level associated with Pearl River County, based on the national USGS map of peak acceleration with 10 percent probability of exceedance in 50 years. It is the probability that ground motion will reach a certain level during an earthquake. The data show peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10 percent probability of exceedance in 50 years. The map was compiled by the U.S. Geological Survey (USGS) Geologic Hazards Team, which conducts global investigations of earthquake, geomagnetic, and landslide hazards. According to this map, Pearl River County lies within an approximate zone of level “1” to “3” ground acceleration. This indicates that the county exists within an area of low seismic risk.

FIGURE E.9: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS



Ten-percent probability of exceedance in 50 years map of peak ground acceleration



Source: United States Geological Survey, 2014

The primary source of potential damage to Pearl River County from an earthquake is the New Madrid Seismic Zone (NMSZ). Historically, a series of earthquakes in 1811 and 1812 demonstrated that this fault zone can produce high magnitude seismic events, sometimes on the scale of a 7.5-8.0 on the Richter scale. The biggest challenge with earthquakes that occur in this area of seismic activity is predicting the recurrence of earthquakes emanating from this zone. Although the magnitude of earthquakes from the NMSZ can be large, they occur very irregularly and fairly infrequently. This makes it extremely difficult to project when they will occur.

It should also be noted that the State of Mississippi Hazard Mitigation Plan identifies certain areas of concern for liquefaction and lists the counties and corresponding zones within those counties that have the highest liquefaction potential. Pearl River County does not have any identified liquefaction potential risk.

HISTORICAL OCCURRENCES

No earthquakes are known to have affected Pearl River County since 1638. **Table E.17** provides a summary of earthquake events reported by the National Centers for Environmental Information (formerly National Geophysical Data Center) between 1638 and 1985, and **Figure E.10** presents a map showing earthquakes whose epicenters have occurred near the county between 1985 and 2015 (no earthquakes occurred within the county boundaries during this period). A detailed occurrence of each event including the date, distance from the epicenter, magnitude, and Modified Mercalli Intensity (if known) can be found in **Table E.18**.[11]

TABLE E.17: SUMMARY OF SEISMIC ACTIVITY IN PEARL RIVER COUNTY

Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
Picayune	0	--	--
Poplarville	0	--	--
Unincorporated Area	0	--	--
PEARL RIVER COUNTY TOTAL	**0**	**--**	**--**

Source: National Geophysical Data Center

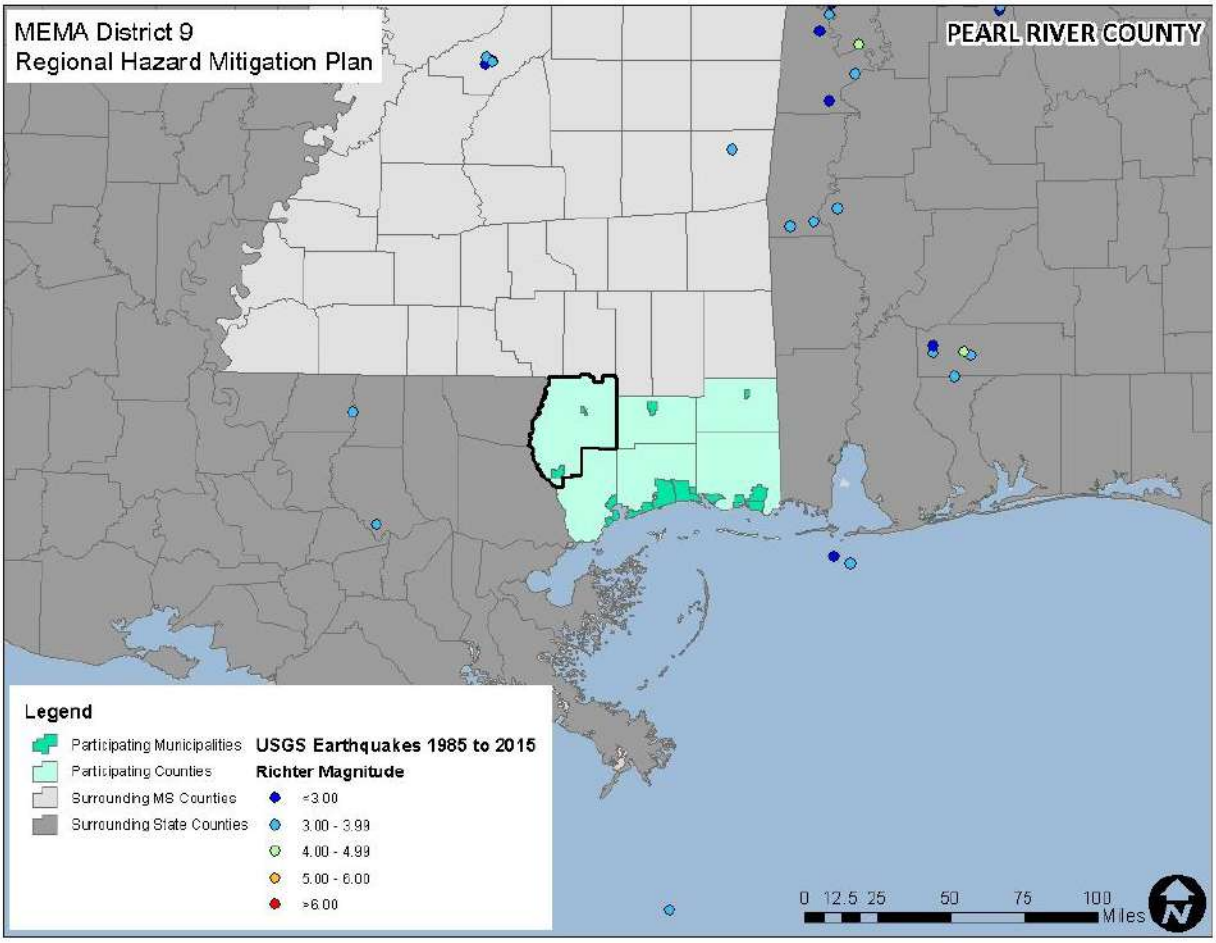
TABLE E.18: SIGNIFICANT SEISMIC EVENTS IN PEARL RIVER COUNTY (1638 -1985)

Location	Date	Epicentral Distance	Magnitude	MMI
Picayune				
None reported	--	--	--	--
Poplarville				
None reported	--	--	--	--
Unincorporated Area				
None reported	--	--	--	--

Source: National Geophysical Data Center

[11] Due to reporting mechanisms, not all earthquakes events were recorded during this time. Furthermore, some are missing data, such as the epicenter location, due to a lack of widely used technology. In these instances, a value of "unknown" is reported.

FIGURE E.10: HISTORIC EARTHQUAKES WITH EPICENTERS NEAR PEARL RIVER COUNTY (1985-2015)



Source: United States Geological Survey

PROBABILITY OF FUTURE OCCURRENCES

The probability of significant, damaging earthquake events affecting Pearl River County is unlikely. However, it is possible that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light will affect the county. The annual probability level for the county is estimated to be between 1 and 10 percent (possible).

WIND-RELATED HAZARDS

E.2.9 Extreme Cold

Extreme cold typically impacts a large area and cannot be confined to any geographic or political boundaries. The entire county is susceptible to extreme cold conditions.

HISTORICAL OCCURRENCES

Data from the National Climatic Data Center was used to determine historical extreme cold events in Pearl River County. Two events were reported:

February 2, 1996 – *Cold/Wind Chill* – An arctic airmass overspread much of south Mississippi bringing the longest extended period of cold weather since 1989. In Amite County, 4SW Gillsburg, a 67 year old man died from hypothermia on the 4th after the fire in a wood burning heater went out. Considerable property damage resulted from broken pipes due to the extended period of subfreezing temperatures. In Jackson County, Moss Point and Gautier had broken pipes in 100 and 147 houses, respectively.

December 18, 1996 – *Cold/Wind Chill* – An arctic airmass overspread south Mississippi resulting in three consecutive nights with subfreezing minimum temperatures. Temperatures lowered into the mid-teens over the southwest section of the state and near 20 degrees along the Gulf Coast.

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that all of Pearl River County has a probability level of possible (between 1 and 10 percent annual probability) for future extreme cold events to impact the county.

E.2.10 Extreme Heat

Heat waves typically impact a large area and cannot be confined to any geographic or political boundaries. The entire county is susceptible to extreme heat conditions.

HISTORICAL OCCURRENCES

The National Climatic Data Center was used to determine historical heat wave occurrences in the county. No events specific to Pearl River County were reported, however, several events were reported elsewhere in the region. Similar events and impacts can be expected in Pearl River County.

July 2000 – July was a hot and dry month in Southeast Mississippi. In Beaumont the temperature was 100 degrees or higher eleven days during the month with the hottest being 105 degrees. In Richton the temperature was 100 degrees or higher three days during the month with the hottest being 102 degrees. In Waynesboro the temperature was 100 degrees or higher four days during the month with the hottest being 103 degrees. In Wiggins the temperature was 100 degrees or higher nine days during the month with 105 degrees being the hottest. In addition to being hot is was also a dry month across the area. Most stations ended up with below normal rainfall totals for the month. In Jackson County, a 68 year old man died from heat exhaustion while sitting in his pickup truck in a parking lot with the windows rolled up, and 10 days later, a 58 year old male was found dead from heat exhaustion while sitting in his truck in the driveway of his home with the windows rolled up.

August 2007 – Heat advisories were issued for a combination of high temperatures and high humidities. Heat index vales were between 110 and 115 degrees. Several public buildings and churches allowed people to come in and cool off during the heat of the day.

July 2010 – Several days of temperatures near 100 degrees contributed to two deaths from heat stroke in the Gulfport area. The Harrison County Coroner stated that two deaths in a mobile home on Smith Road near Canal Road were caused by heat stroke. High temperatures at Gulfport Airport, approximately 3 miles away, were between 98 and 102 degrees from July 29 through August 2. Bodies were discovered on August 4, but deaths occurred several days prior to that. Date of deaths was estimated.

August 2010 – Hot and humid conditions produced heat index values between 110 and 115 degrees over coastal Mississippi. A 48 year old construction worker collapsed and died while working on a highway construction project. Jackson County coroner classified the fatality as heat related with the cause of death as hyperthermia.

PROBABILITY OF FUTURE OCCURRENCES

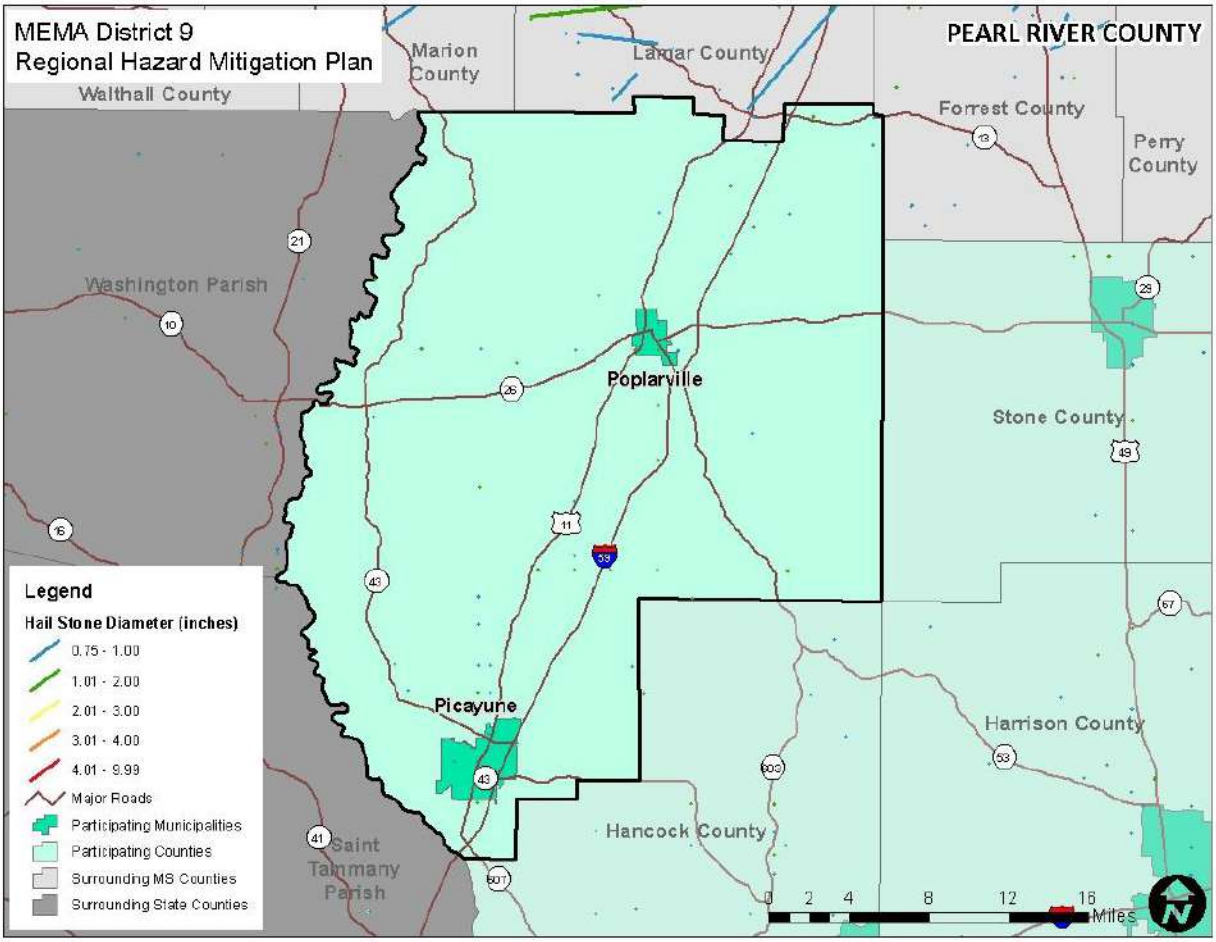
Based on historical occurrence information, it is assumed that all of Pearl River County has a probability level of highly likely (100 percent annual probability) for future heat wave events.

E.2.11 Hailstorm

LOCATION AND SPATIAL EXTENT

Hailstorms frequently accompany thunderstorms, so their locations and spatial extents coincide. It is assumed that Pearl River County is uniformly exposed to severe thunderstorms; therefore, all areas of the county are equally exposed to hail which may be produced by such storms. With that in mind, **Figure E.11** shows the location of hail events that have impacted the county between 1955 and 2015.

FIGURE E.11: HAILSTORM TRACKS IN PEARL RIVER COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, 61 recorded hailstorm events have affected Pearl River County since 1968.[12] In all, hail occurrences did not result in any property damages.[13] Hail ranged in diameter from 0.25 inches to 1.75 inches. **Table E.19** provides a summary of the hail events in Pearl River County. Detailed information about each event that occurred in the county is provided in **Table E.20**.

It should be noted that hail is notorious for causing substantial damage to cars, roofs, and other areas of the built environment that may not be reported to the National Climatic Data Center. Therefore, it is likely that damages are greater than the reported value.

[12] These hail events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through June 2016. It is likely that additional hail events have affected Pearl River County. As additional local data becomes available, this hazard profile will be amended.

[13] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE E.19: SUMMARY OF HAIL OCCURRENCES IN PEARL RIVER COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Picayune	11	0/0	$0	$0
Poplarville	16	0/0	$0	$0
Unincorporated Area	34	0/0	$0	$0
PEARL RIVER COUNTY TOTAL	**61**	**0/0**	**$0**	**$0**

Source: National Climatic Data Center

TABLE E.20: HISTORICAL HAIL OCCURRENCES IN PEARL RIVER COUNTY

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
Picayune				
Picayune	2/11/1993	0.75 in.	0/0	$0
Picayune	3/15/1995	0.25 in.	0/0	$0
PICAYUNE	4/15/1996	1.00 in.	0/0	$0
PICAYUNE	3/29/1997	0.75 in.	0/0	$0
PICAYUNE	5/28/1997	0.88 in.	0/0	$0
PICAYUNE	8/14/1999	0.75 in.	0/0	$0
PICAYUNE	2/25/2004	0.88 in.	0/0	$0
PICAYUNE	3/31/2005	0.88 in.	0/0	$0
PICAYUNE	4/1/2005	1.75 in.	0/0	$0
PICAYUNE	8/3/2008	1.00 in.	0/0	$0
PICAYUNE	7/2/2009	0.88 in.	0/0	$0
Poplarville				
Poplarville	5/9/1995	0.75 in.	0/0	$0
Poplarville	11/2/1995	1.75 in.	0/0	$0
POPLARVILLE	1/8/1997	0.88 in.	0/0	$0
POPLARVILLE	7/10/1998	1.50 in.	0/0	$0
POPLARVILLE	4/24/2003	1.75 in.	0/0	$0
POPLARVILLE	4/24/2003	1.75 in.	0/0	$0
POPLARVILLE	8/20/2003	1.00 in.	0/0	$0
POPLARVILLE	3/26/2005	0.88 in.	0/0	$0
POPLARVILLE	3/31/2005	0.88 in.	0/0	$0
POPLARVILLE	4/26/2005	0.75 in.	0/0	$0
POPLARVILLE	4/26/2005	1.00 in.	0/0	$0
POPLARVILLE	6/17/2005	1.75 in.	0/0	$0
POPLARVILLE	5/8/2006	0.75 in.	0/0	$0
POPLARVILLE	5/11/2007	1.75 in.	0/0	$0
POPLARVILLE	4/15/2011	1.00 in.	0/0	$0
POPLARVILLE	3/31/2013	1.00 in.	0/0	$0
Unincorporated Area				
PEARL RIVER CO.	3/11/1968	1.50 in.	0/0	$0
PEARL RIVER CO.	3/18/1972	1.75 in.	0/0	$0
PEARL RIVER CO.	8/4/1978	1.75 in.	0/0	$0
PEARL RIVER CO.	7/1/1979	1.75 in.	0/0	$0

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
PEARL RIVER CO.	7/27/1980	1.75 in.	0/0	$0
PEARL RIVER CO.	5/22/1983	1.75 in.	0/0	$0
PEARL RIVER CO.	4/15/1985	0.75 in.	0/0	$0
PEARL RIVER CO.	5/1/1985	0.88 in.	0/0	$0
PEARL RIVER CO.	6/16/1986	1.25 in.	0/0	$0
PEARL RIVER CO.	4/18/1988	0.75 in.	0/0	$0
PEARL RIVER CO.	5/10/1988	1.75 in.	0/0	$0
PEARL RIVER CO.	5/10/1988	0.75 in.	0/0	$0
PEARL RIVER CO.	5/24/1988	1.00 in.	0/0	$0
PEARL RIVER CO.	7/28/1989	0.75 in.	0/0	$0
PEARL RIVER CO.	4/19/1991	1.25 in.	0/0	$0
Crossroads	2/11/1993	1.00 in.	0/0	$0
Lumberton	3/25/1994	1.75 in.	0/0	$0
Silver Run	3/15/1995	1.75 in.	0/0	$0
CROSSROADS	3/29/1997	1.75 in.	0/0	$0
MC NEIL	11/21/1997	1.75 in.	0/0	$0
MILLARD	3/6/1999	0.75 in.	0/0	$0
MC NEIL	3/29/2000	0.75 in.	0/0	$0
CARRIERE	8/31/2000	0.88 in.	0/0	$0
CROSSROADS	2/25/2004	0.88 in.	0/0	$0
CROSSROADS	5/8/2006	0.75 in.	0/0	$0
MC NEIL	8/4/2006	0.75 in.	0/0	$0
CROSSROADS	8/5/2006	1.75 in.	0/0	$0
MC NEIL	5/12/2009	1.75 in.	0/0	$0
MC NEIL	5/13/2011	1.00 in.	0/0	$0
CAESAR	6/6/2011	1.00 in.	0/0	$0
CAESAR	6/6/2011	1.25 in.	0/0	$0
HILLSDALE	6/10/2011	1.00 in.	0/0	$0
CROSSROADS	3/29/2016	1.00 in.	0/0	$0
HILLSDALE	3/29/2016	1.50 in.	0/0	$0

*Property damage is reported in 2016 dollars; All damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that the probability of future hail occurrences is highly likely (100 percent annual probability). Since hail is an atmospheric hazard, it is assumed that Pearl River County has equal exposure to this hazard. It can be expected that future hail events will continue to cause minor damage to property and vehicles throughout the county.

E.2.12 Hurricane and Tropical Storm

LOCATION AND SPATIAL EXTENT

Hurricanes and tropical storms threaten the entire Atlantic and Gulf seaboard of the United States, and while coastal areas are most directly exposed to the brunt of landfalling storms, their impact is often felt hundreds of miles inland. Pearl River County is located in a region of the country that is susceptible to all

of the hazards wrought by hurricanes and tropical storms. All areas throughout Pearl River County are susceptible to the accompanying hazard effects of extreme wind, flooding, and tornadoes.[14]

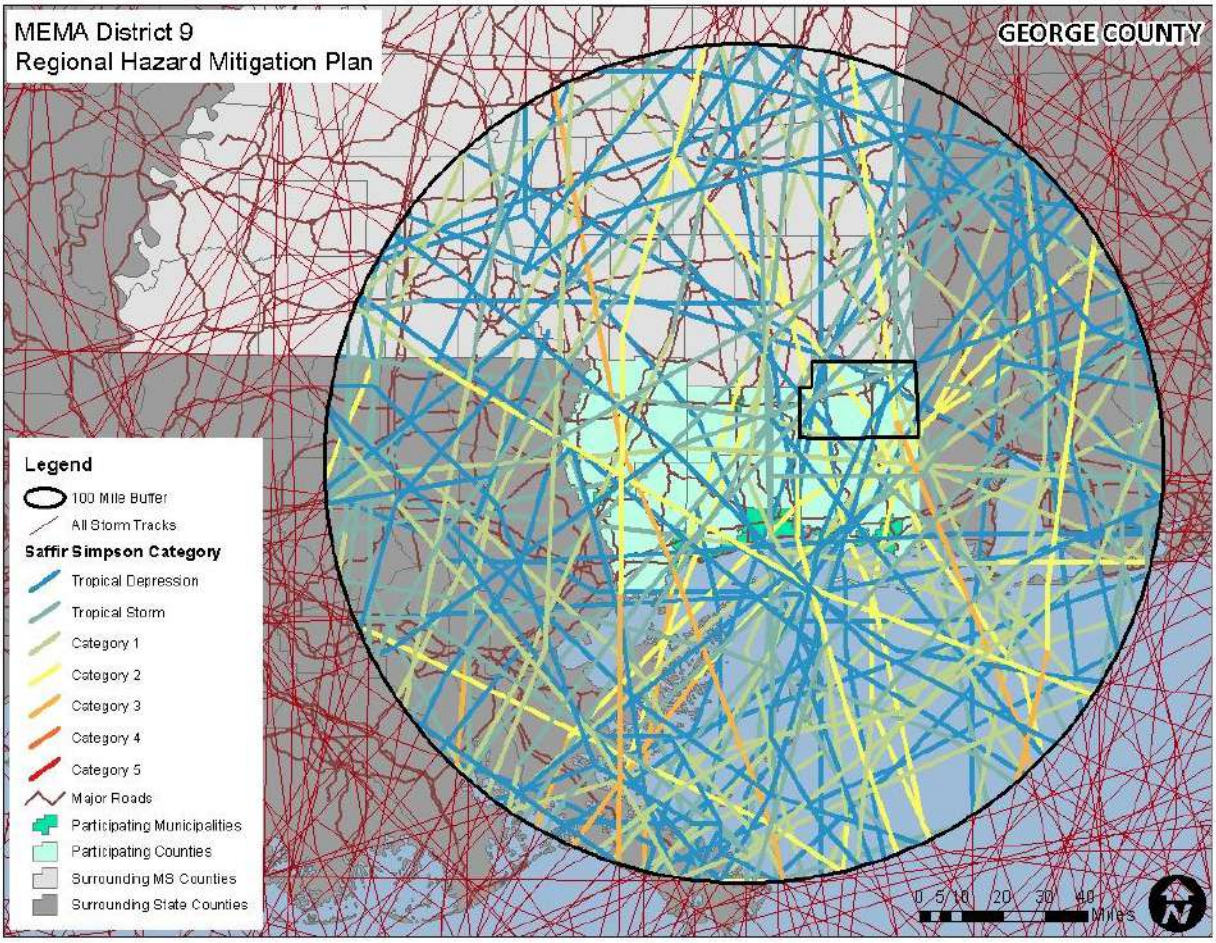
HISTORICAL OCCURRENCES

According to the National Hurricane Center's historical storm track records, 119 hurricane or tropical storm/depression tracks have passed within 100 miles of the MEMA District 9 Region since 1855.[15] This includes: 4 Category 3 hurricanes, 15 Category 2 hurricanes, 28 Category 1 hurricanes, 29 tropical storms, and 43 tropical depressions. Additionally, four other major storms had large-scale impacts on the region and are not included in these totals. These storms are listed below and range in Category from 1 to 4.

Of the recorded storm events, 58 hurricane or tropical storm/depression events traversed directly through the region as shown in **Figure E.12**. Notable storms include Hurricane Camille (1969), Hurricane Frederic (1979), and Hurricane Katrina (2005). **Table E.21** provides for each event the date of occurrence, name (if applicable), maximum wind speed (as recorded within 100 miles of the MEMA District 9 Region) and category of the storm based on the Saffir-Simpson Scale.

[14] Distinct hazard area locations for flooding is discussed elsewhere in this subsection.
[15] These storm track statistics include tropical depressions, tropical storms, and hurricanes. Lesser events may still cause significant local impact in terms of rainfall and high winds.

FIGURE E.12: HISTORICAL HURRICANE STORM TRACKS WITHIN 100 MILES OF THE MEMA DISTRICT 9 REGION



Source: National Oceanic and Atmospheric Administration, National Hurricane Center

TABLE E.21: HISTORICAL STORM TRACKS WITHIN 100 MILES OF THE MEMA 9 DISTRICT REGION (1842–2016)

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
8/25/1852	UNNAMED	93	Category 2
8/3/1855	NOT NAMED	--	Tropical Depression
9/16/1855	UNNAMED	96	Category 2
6/24/1857	NOT NAMED	--	Tropical Depression
9/15/1859	UNNAMED	79	Category 1
8/11/1860	UNNAMED	96	Category 2
9/15/1860	UNNAMED	89	Category 2
8/17/1861	NOT NAMED	--	Tropical Depression
11/1/1861	NOT NAMED	--	Tropical Depression
9/15/1862	NOT NAMED	--	Tropical Depression
9/16/1862	NOT NAMED	--	Tropical Depression
10/1/1863	UNNAMED	43	Tropical Storm

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
6/3/1866	NOT NAMED	--	Tropical Depression
9/16/1867	NOT NAMED	--	Tropical Depression
10/5/1867	UNNAMED	89	Category 2
10/3/1868	NOT NAMED	--	Tropical Depression
9/5/1869	UNNAMED	79	Category 1
7/30/1870	NOT NAMED	--	Tropical Depression
7/11/1872	UNNAMED	59	Tropical Storm
9/18/1875	UNNAMED	18	Tropical Depression
9/18/1877	UNNAMED	79	Category 1
9/1/1879	UNNAMED	89	Category 2
10/7/1879	UNNAMED	59	Tropical Storm
8/31/1880	UNNAMED	70	Category 1
8/2/1881	NOT NAMED	--	Tropical Depression
8/3/1881	UNNAMED	59	Tropical Storm
8/30/1885	UNNAMED	59	Tropical Storm
9/26/1885	UNNAMED	70	Category 1
6/15/1886	UNNAMED	50	Tropical Storm
6/14/1887	UNNAMED	33	Tropical Depression
10/19/1887	UNNAMED	82	Category 1
6/27/1888	NOT NAMED	--	Tropical Depression
9/23/1889	UNNAMED	79	Category 1
8/27/1890	UNNAMED	43	Tropical Storm
9/21/1891	NOT NAMED	--	Tropical Depression
9/12/1892	UNNAMED	59	Tropical Storm
9/7/1893	UNNAMED	79	Category 1
10/2/1893	UNNAMED	97	Category 3
8/7/1894	UNNAMED	59	Tropical Storm
8/15/1895	UNNAMED	59	Tropical Storm
9/13/1900	UNNAMED	43	Tropical Storm
8/14/1901	UNNAMED	82	Category 1
10/9/1905	UNNAMED	43	Tropical Storm
9/27/1906	UNNAMED	93	Category 2
9/21/1907	UNNAMED	43	Tropical Storm
8/11/1911	UNNAMED	79	Category 1
6/13/1912	UNNAMED	59	Tropical Storm
7/17/1912	UNNAMED	5	Tropical Depression
9/13/1912	UNNAMED	82	Category 1
9/18/1914	UNNAMED	33	Tropical Depression
9/29/1915	UNNAMED	96	Category 2
7/5/1916	UNNAMED	95	Category 2
10/17/1922	UNNAMED	18	Tropical Depression
6/26/1923	UNNAMED	43	Tropical Storm
10/17/1923	UNNAMED	59	Tropical Storm
9/20/1926	UNNAMED	93	Category 2
9/1/1932	UNNAMED	82	Category 1
10/15/1932	UNNAMED	59	Tropical Storm

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
7/27/1936	UNNAMED	43	Tropical Storm
8/22/1936	UNNAMED	5	Tropical Depression
6/16/1939	UNNAMED	59	Tropical Storm
9/26/1939	UNNAMED	50	Tropical Storm
9/24/1940	UNNAMED	18	Tropical Depression
9/10/1944	UNNAMED	64	Category 1
9/5/1945	UNNAMED	18	Tropical Depression
9/19/1947	UNNAMED	92	Category 2
9/4/1948	UNNAMED	79	Category 1
9/4/1949	UNNAMED	43	Tropical Storm
8/31/1950	BAKER	82	Category 1
8/1/1955	BRENDA	70	Category 1
8/27/1955	UNNAMED	50	Tropical Storm
9/24/1956	FLOSSY	82	Category 1
9/18/1957	ESTHER	64	Category 1
10/8/1959	IRENE	43	Tropical Storm
9/15/1960	ETHEL	85	Category 2
9/26/1960	FLORENCE	1	Tropical Depression
10/4/1964	HILDA	70	Category 1
9/10/1965	BETSY*	117	Category 4
9/29/1965	DEBBIE	33	Tropical Depression
8/18/1969	CAMILLE	100	Category 3
8/8/1971	UNNAMED	5	Tropical Depression
9/4/1971	FERN	5	Tropical Depression
9/16/1971	EDITH	70	Category 1
7/29/1975	UNNAMED	18	Tropical Depression
10/17/1975	UNNAMED	5	Tropical Depression
9/24/1976	UNNAMED	5	Tropical Depression
7/19/1977	UNNAMED	18	Tropical Depression
9/6/1977	BABE	18	Tropical Depression
10/25/1977	UNNAMED	18	Tropical Depression
8/10/1978	UNNAMED	5	Tropical Depression
7/11/1979	BOB	74	Category 1
9/12/1979	FREDERIC	97	Category 3
7/20/1980	UNNAMED	5	Tropical Depression
10/27/1984	UNNAMED	18	Tropical Depression
9/2/1985	ELENA	95	Category 2
10/31/1985	JUAN	64	Category 1
8/12/1987	UNNAMED	5	Tropical Depression
8/8/1988	BERYL	5	Tropical Depression
8/9/1988	BERYL	50	Tropical Storm
9/10/1988	FLORENCE	79	Category 1
8/3/1995	ERIN	82	Category 1
7/19/1997	DANNY	79	Category 1
9/27/1998	GEORGES	92	Category 2
9/20/1998	HERMINE	33	Tropical Depression

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
6/11/2001	ALLISON	43	Tropical Storm
8/5/2002	BERTHA	33	Tropical Depression
9/14/2002	HANNA	59	Tropical Storm
9/26/2002	ISIDORE	64	Category 1
6/30/2003	BILL	59	Tropical Storm
7/1/2003	BILL	18	Tropical Depression
9/16/2004	IVAN	96	Category 2
6/11/2005	ARLENE	59	Tropical Storm
7/6/2005	CINDY	74	Category 1
7/10/2005	DENNIS*	100	Category 3
8/29/2005	KATRINA	98	Category 3
9/22/2007	TEN	5	Tropical Depression
8/24/2008	FAY	18	Tropical Depression
9/1/2008	GUSTAV*	87	Category 2
11/10/2009	IDA	70	Category 1
7/25/2010	BONNIE	5	Tropical Depression
8/12/2010	FIVE	5	Tropical Depression
9/5/2011	LEE	43	Tropical Storm
8/28/2012	ISAAC*	70	Category 1

*It should be noted that the track of several major hurricanes that impacted the region fell outside of the 100-mile buffer. These storms were included in the table due to their significant impact (Betsy, 1965; Dennis, 2005; Gustav, 2008; and Isaac, 2012), but it should be noted that wind speed and storm category are estimated based on anecdotal information.
Source: National Hurricane Center

Federal records indicate that 12 disaster declarations were made in 1965 (Hurricane Betsy), 1969 (Hurricane Camille), 1979 (Hurricane Frederic), 1985 (Hurricane Elena), 1998 (Hurricane Georges), 2001 (Tropical Storm Allison), 2002 (Tropical Storm Isidore), 2004 (Hurricane Ivan), 2005 (Hurricane Dennis and Hurricane Katrina), 2008 (Hurricane Gustav), and 2012 (Hurricane Isaac).[16] Hurricane and tropical storm events can cause substantial damage in the area due to high winds and flooding.

Flooding and high winds from hurricanes and tropical storms can cause damage throughout the county. Anecdotes are available from NCDC for the major storms that have impacted the county as found below:

Hurricane Georges – September 25-29, 1998
Hurricane Georges, a strong Category 2 hurricane moved slowly northwest across the Gulf of Mexico toward southeast Louisiana and coastal Mississippi on the September 25 and September 26. As the hurricane approached the mouth of the Mississippi River on September 27, it slowly turned toward the north making landfall along the Mississippi Coast just to the east of Biloxi, MS at 0400 CST on September 28. The hurricane moved only slowly north during the morning hours, at times becoming nearly stationary. The hurricane finally was downgraded to a tropical storm at 1500CST on September 28 when it was located north of Biloxi. The tropical storm then moved very slowly eastward into southern Alabama on September 29.

The greatest affect from the hurricane occurred over Jackson County which experienced the intense eastern portion of the hurricanes eyewall and highest storm surge.

[16] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

Due to the slow forward speed of the hurricane very heavy rainfall occurred over eastern Harrison County and Jackson County leading to record flooding on streams and rivers. The barrier islands in the Mississippi Sound were also heavily damaged by wind and storm surge. A new three quarter mile cut developed in the east portion of Ship Island. Total insured property damage in Mississippi was estimated at near 310 million dollars by insurance industry sources. When uninsured losses and public property damage considered, total damages in Mississippi will likely approach $620 million.

Pearl River County - Damage was mainly confined to downed tree limbs and trees, minor to moderate roof damage to homes and businesses, and power outages from downed power lines. Several secondary highways and roadways in the county were blocked by fallen trees. Storm total rainfall was fairly light with amounts of 2 to 4 inches common. About 200 people were sheltered in public hurricane evacuations shelters in the county.

Hurricane Katrina – August 24-30, 2005
Hurricane Katrina was one of the strongest and most destructive hurricanes on record to impact the coast of the United States. It will likely be recorded as one the worst natural disaster in the history of the United States to date resulting in catastrophic damage and numerous casualties in southeast Louisiana and along the Mississippi coast. Damage and casualties resulting from Hurricane Katrina extended as far east as Alabama and the panhandle of Florida. Katrina developed from a tropical depression southeast of the Bahamas on August 24th. After moving through the Bahamas as a tropical storm, Katrina strengthened to a category 1 hurricane prior to landfall in south Florida around the Miami area on the 25th of August. Katrina crossed south Florida and entered the Gulf of Mexico and began to strengthen. Hurricane Katrina strengthened to a category 5 storm on August 28th about 250 miles south southeast of the mouth of the Mississippi River with winds reaching their peak intensity of 175 mph and a central pressure of 902 mb. Post event analysis by the National Hurricane Center indicates that Katrina weakened slightly before making landfall as a strong category 3 storm in initial landfall in lower Plaquemines Parish. Maximum sustained winds were estimated at 110 knots or 127 mph and a central pressure of 920 mb around 610 AM CDT on August 29th in southeast Louisiana just south of Buras in Plaquemines Parish. The storm continued on a north northeast track with the center passing about 40 miles southeast of New Orleans with a second landfall occurring near the Louisiana and Mississippi border around 945 AM CDT as a category 3 storm with maximum sustained winds estimated around 105 knots or 121 mph. Katrina continued to weaken as it moved north northeast across Mississippi during the day, but remained at hurricane strength 100 miles inland near Laurel, Mississippi. Katrina weakened to a tropical depression near Clarksville, Tennessee on August 30th.

Damage across coastal Mississippi was catastrophic. The storm surge associated with Hurricane Katrina approached or exceeded the surge associated with Hurricane Camille and impacted a much more extensive area. Almost total destruction was observed along the immediate coast in Hancock and Harrison Counties with storm surge damage extending north along bays and bayous to Interstate 10. Thousands of homes and businesses were destroyed by the storm surge. Hurricane force winds also caused damage to roofs, power lines, signage, downed trees, and some windows were broken by wind and wind driven debris in areas away from storm surge flooding, wind damage was widespread with fallen trees taking a heavy toll on houses and power lines. Damage was less extensive in southwest Mississippi. Excluding losses covered by the Federal Flood Insurance Program, insured property losses in Mississippi were estimated at 9.8 billion dollars. Uninsured and insured losses combined were estimated to exceed 100 billion dollars across the Gulf Coast.

Due to the failure of power and equipment prior to the peak of the storm, data for wind, storm surge, pressure, and rainfall are incomplete. The lowest pressure on the Mississippi coast was estimated to be 928 mb where the hurricane made landfall near the Louisiana Mississippi border. A pressure of 976 mb was recorded at 0951 CDT by a university weather station deployed in Pascagoula, well east of the landfall location. At approximately the same time, the pressure at the NWS office in Slidell, just to the west of landfall location, recorded a pressure of 934.1 mb at 0938 AM CDT.

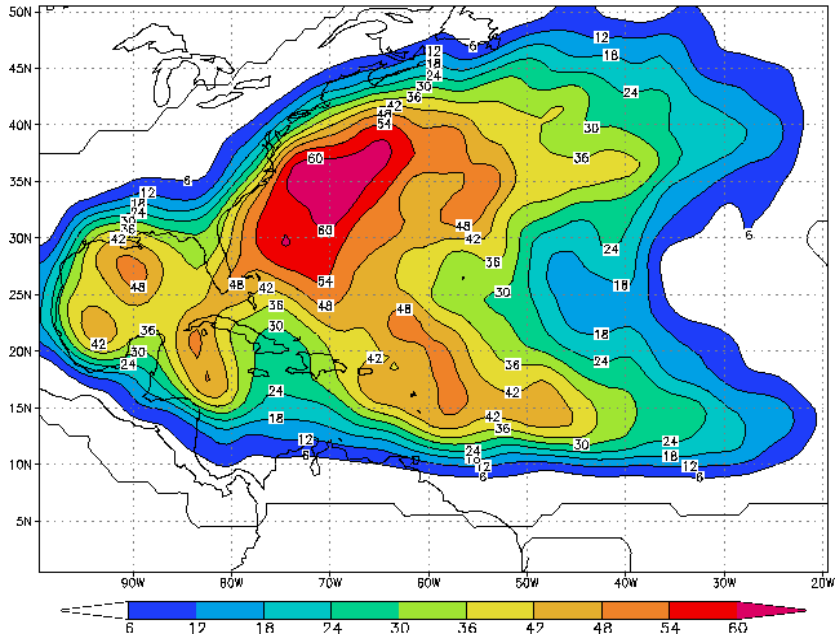
The highest wind gusts recorded in Mississippi and the adjacent coastal waters were 117 knots (134 mph) at the Pearl River County EOC office in Poplarville and 102 knots (118 mph) at 1000AM CDT by a university wind tower deployed at the Stennis Space Center in Hancock County. Maximum sustained winds in Mississippi were estimated around 105 knots (121 mph) near the storm's second landfall along the Mississippi and Louisiana border. Unofficial wind observations before the gage failed included a wind gust of 106 kt, (122 mph) at 0615 CDT by an amateur radio operator in Long Beach and a wind gust of 108 kt (124 mph) at the EOC in Pascagoula.

Storm total rainfall amounts generally ranged from 10 to 16 inches across coastal and south Mississippi with much lower amounts observed over southwest Mississippi. The highest observed storm total rainfall was 11 inches at Stennis Space Center and near Picayune.

PROBABILITY OF FUTURE OCCURRENCES

According to NOAA statistical data, the region is located in an area with an annual probability of a named storm between 30 and 42 percent as presented in **Figure E.13**. This illustration was created by the National Oceanic and Atmospheric Administration's Hurricane Research Division using data from 1944 to 1999 and counting hits when a storm or hurricane was within approximately 100 miles (165 km) of each location. As a reference point, the tip of Florida's outline can be found near the 25N, 80W intersection, and the MEMA District 9 Region is near the 30N, 90W intersection. This empirical probability is fairly consistent with other scientific studies and observed historical data made available through a variety of federal, state, and local sources.

FIGURE E.13: EMPIRICAL PROBABILITY OF A NAMED HURRICANE OR TROPICAL STORM



Source: National Oceanic and Atmospheric Administration

The probability of storm occurrences will vary significantly based on the return interval for different categories of magnitude. The probability of less intense storms (lower return periods) is higher than more intense storms (higher return periods). **Table E.22** profiles the potential peak gust wind speeds that can be expected in the MEMA District 9 Region during a hurricane event for various return periods according to FEMA's HAZUS-MH®.

TABLE E.22: POTENTIAL PEAK GUST WIND SPEEDS PER RETURN PERIOD

50-Year	100-Year	500-Year	1,000-Year
119.4 mph	133.9 mph	160.3 mph	170.0

Source: Federal Emergency Management Agency (Hazus-MH 3.2)

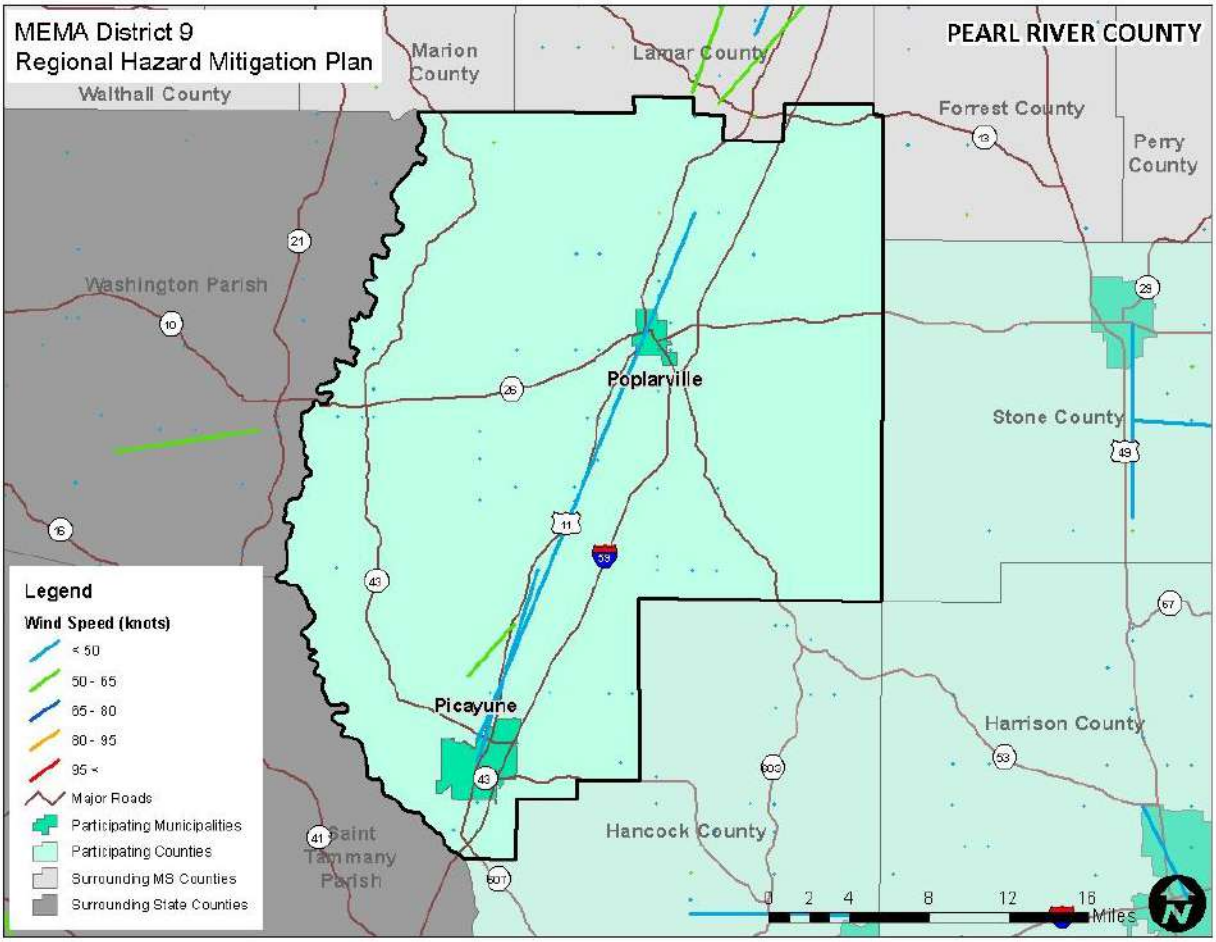
Overall, the probability level of future hurricane and tropical storm occurrence for Pearl River County is highly likely (100 percent annual probability).

E.2.13 Severe Thunderstorm/High Wind

LOCATION AND SPATIAL EXTENT

A thunderstorm event is an atmospheric hazard, and thus has no geographic boundaries. It is typically a widespread event that can occur in all regions of the United States. However, thunderstorms are most common in the central and southern states because atmospheric conditions in those regions are favorable for generating these powerful storms. It is assumed that Pearl River County has uniform exposure to an event and the spatial extent of an impact could be large. With that in mind, **Figure E.14** shows the location of wind events that have impacted the county between 1955 and 2015.

FIGURE E.14: SEVERE THUNDERSTORM TRACKS IN PEARL RIVER COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

Severe storms were at least partially responsible for six disaster declarations in Pearl River County in 1983, 1991, 1995, 2001, 2003, and 2016.[17] According to NCDC, there have been 145 reported thunderstorm and high wind events since 1960 in Pearl River County.[18] These events caused over $7.3 million (2016 dollars) in damages.[19] There were also reports of three injuries. **Table E.23** summarizes this information. Detailed thunderstorm and high wind event reports including date, magnitude, and associated damages for each event are presented in **Table E.24**.

[17] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.
[18] These thunderstorm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through June 2016 and these high wind events are only inclusive of those reported by NCDC from 1996 through June 2016. It is likely that additional thunderstorm and high wind events have occurred in Pearl River County. As additional local data becomes available, this hazard profile will be amended.
[19] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE E.23: SUMMARY OF THUNDERSTORM/HIGH WIND OCCURRENCES IN PEARL RIVER COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Picayune	22	0/2	$6,844,811	$360,253
Poplarville	38	0/1	$183,304	$8,332
Unincorporated Area	85	0/0	$274,287	$4,898
PEARL RIVER COUNTY TOTAL	**145**	**0/3**	**$7,302,402**	**$373,483**

Source: National Climatic Data Center

TABLE E.24: HISTORICAL THUNDERSTORM/HIGH WIND OCCURRENCES IN PEARL RIVER COUNTY

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
Picayune					
PICAYUNE	1/24/1997	Thunderstorm Wind	--	0/0	$750
PICAYUNE	5/28/1997	Thunderstorm Wind	--	0/0	$1,501
PICAYUNE	7/24/1998	Thunderstorm Wind	--	0/0	$739
PICAYUNE	8/14/1999	Thunderstorm Wind	--	0/2	$72,285
PICAYUNE	7/22/2000	Thunderstorm Wind	--	0/0	$25,176
PICAYUNE	9/5/2000	Thunderstorm Wind	--	0/0	$1,399
PICAYUNE	6/11/2001	Thunderstorm Wind	--	0/0	$27,200
PICAYUNE	11/24/2001	Thunderstorm Wind	--	0/0	$1,020
PICAYUNE	8/8/2002	Thunderstorm Wind	--	0/0	$1,004
PICAYUNE	10/29/2002	Thunderstorm Wind	--	0/0	$6,694,080
PICAYUNE	12/31/2002	Thunderstorm Wind	--	0/0	$1,004
PICAYUNE	11/18/2003	Thunderstorm Wind	50 kts. EG	0/0	$654
PICAYUNE	6/2/2004	Thunderstorm Wind	50 kts. EG	0/0	$638
PICAYUNE	8/5/2004	Thunderstorm Wind	50 kts. EG	0/0	$10,200
PICAYUNE	2/2/2006	Thunderstorm Wind	50 kts. EG	0/0	$0
PICAYUNE	7/12/2007	Thunderstorm Wind	50 kts. EG	0/0	$1,742
PICAYUNE	3/27/2009	Thunderstorm Wind	50 kts. EG	0/0	$1,684
PICAYUNE	7/2/2009	Thunderstorm Wind	50 kts. EG	0/0	$1,684
PICAYUNE	3/9/2011	Thunderstorm Wind	61 kts. EG	0/0	$0
PICAYUNE	5/10/2013	Thunderstorm Wind	52 kts. EG	0/0	$1,034
PICAYUNE	4/8/2014	Thunderstorm Wind	52 kts. EG	0/0	$1,017
PICAYUNE	8/8/2015	Thunderstorm Wind	52 kts. EG	0/0	$0
Poplarville					
Poplarville	1/27/1994	Thunderstorm Wind	0 kts.	0/0	$813
Poplarville	3/7/1995	Thunderstorm Wind	0 kts.	0/0	$3,161
Poplarville to	4/21/1995	Thunderstorm Wind	0 kts.	0/0	$0
Poplarville	8/20/1995	Thunderstorm Wind	0 kts.	0/0	$790
Poplarville	12/17/1995	Thunderstorm Wind	0 kts.	0/0	$15,804
POPLARVILLE	6/2/1996	Thunderstorm Wind	--	0/0	$154
POPLARVILLE	11/1/1997	Thunderstorm Wind	--	0/0	$300
POPLARVILLE	2/10/1998	Thunderstorm Wind	--	0/0	$7,388

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
POPLARVILLE	2/15/1998	Thunderstorm Wind	--	0/0	$14,776
POPLARVILLE	7/10/1998	Thunderstorm Wind	--	0/0	$7,388
POPLARVILLE	2/13/2000	Thunderstorm Wind	--	0/0	$2,797
POPLARVILLE	4/24/2000	Thunderstorm Wind	--	0/0	$140
POPLARVILLE	8/20/2000	Thunderstorm Wind	--	0/0	$699
POPLARVILLE	8/26/2000	Thunderstorm Wind	--	0/0	$140
POPLARVILLE	11/9/2000	Thunderstorm Wind	--	0/0	$55,947
POPLARVILLE	5/26/2001	Thunderstorm Wind	--	0/0	$2,040
POPLARVILLE	6/11/2001	Thunderstorm Wind	--	0/0	$6,800
POPLARVILLE	6/11/2001	Thunderstorm Wind	--	0/0	$20,400
POPLARVILLE	10/11/2001	Thunderstorm Wind	--	0/0	$680
POPLARVILLE	10/13/2001	Thunderstorm Wind	--	0/0	$2,720
POPLARVILLE	7/7/2002	Thunderstorm Wind	--	0/0	$1,339
POPLARVILLE	4/24/2003	Thunderstorm Wind	50 kts. EG	0/0	$1,963
POPLARVILLE	6/12/2003	Thunderstorm Wind	50 kts. EG	0/0	$1,963
POPLARVILLE	6/1/2004	Thunderstorm Wind	50 kts. EG	0/0	$1,275
POPLARVILLE	6/22/2004	Thunderstorm Wind	50 kts. EG	0/0	$1,275
POPLARVILLE	6/27/2004	Thunderstorm Wind	50 kts. EG	0/0	$1,275
POPLARVILLE	3/22/2005	Thunderstorm Wind	50 kts. EG	0/0	$1,850
POPLARVILLE	8/21/2005	Thunderstorm Wind	50 kts. EG	0/0	$2,466
POPLARVILLE	10/27/2006	Thunderstorm Wind	50 kts. EG	0/0	$1,195
POPLARVILLE	11/6/2006	Thunderstorm Wind	50 kts. EG	0/0	$1,792
POPLARVILLE	11/14/2006	Thunderstorm Wind	50 kts. EG	0/0	$11,947
POPLARVILLE	6/19/2007	Thunderstorm Wind	50 kts. EG	0/0	$1,742
POPLARVILLE	1/31/2008	Thunderstorm Wind	50 kts. EG	0/0	$839
POPLARVILLE	6/21/2008	Thunderstorm Wind	50 kts. EG	0/0	$2,237
POPLARVILLE	10/15/2009	Thunderstorm Wind	50 kts. EG	0/0	$1,684
POPLARVILLE	4/24/2010	Thunderstorm Wind	52 kts. EG	0/0	$0
POPLARVILLE	8/12/2010	Thunderstorm Wind	52 kts. EG	0/0	$5,523
POPLARVILLE	10/2/2014	Thunderstorm Wind	70 kts. EG	0/1	$0
Unincorporated Area					
PEARL RIVER CO.	5/6/1960	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	12/27/1968	Thunderstorm Wind	65 kts.	0/0	$0
PEARL RIVER CO.	4/13/1969	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	2/1/1970	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	2/1/1970	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	5/26/1973	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	1/10/1975	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	1/10/1975	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	5/27/1976	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	5/31/1977	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	5/7/1979	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	7/1/1979	Thunderstorm Wind	84 kts.	0/0	$0
PEARL RIVER CO.	4/13/1980	Thunderstorm Wind	65 kts.	0/0	$0
PEARL RIVER CO.	4/13/1980	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	4/13/1980	Thunderstorm Wind	0 kts.	0/0	$0

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
PEARL RIVER CO.	5/18/1980	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	7/7/1980	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	9/25/1980	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	6/13/1982	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	12/11/1983	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	4/26/1985	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	5/21/1985	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	8/17/1986	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	8/17/1986	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	5/18/1989	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	4/14/1990	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	4/27/1990	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	12/3/1990	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	4/14/1991	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	6/4/1991	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	6/29/1992	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	6/29/1992	Thunderstorm Wind	0 kts.	0/0	$0
PEARL RIVER CO.	3/25/1994	Thunderstorm Wind	0 kts.	0/0	$8,126
CROSSROADS	2/21/1997	Thunderstorm Wind	--	0/0	$0
OZONA	5/3/1997	Thunderstorm Wind	--	0/0	$15,006
HILLSDALE	4/17/1998	Thunderstorm Wind	--	0/0	$1,478
COUNTYWIDE	6/5/1998	Thunderstorm Wind	--	0/0	$7,388
CARRIERE	9/7/1999	Thunderstorm Wind	--	0/0	$145
MC NEIL	6/24/2000	Thunderstorm Wind	--	0/0	$140
COUNTYWIDE	7/16/2000	Thunderstorm Wind	--	0/0	$1,399
CARRIERE	7/22/2000	Thunderstorm Wind	--	0/0	$699
COUNTYWIDE	7/27/2000	Thunderstorm Wind	--	0/0	$350
COUNTYWIDE	8/20/2000	Thunderstorm Wind	--	0/0	$1,049
COUNTYWIDE	1/19/2001	Thunderstorm Wind	--	0/0	$10,880
DERBY	3/12/2001	Thunderstorm Wind	--	0/0	$54,399
NICHOLSON	11/29/2001	Thunderstorm Wind	--	0/0	$1,360
COUNTYWIDE	4/8/2002	Thunderstorm Wind	--	0/0	$20,082
MC NEIL	4/8/2002	Thunderstorm Wind	--	0/0	$2,008
CAESAR	4/8/2002	Thunderstorm Wind	--	0/0	$2,008
CAESAR	4/8/2002	Thunderstorm Wind	--	0/0	$13,388
MC NEIL	8/19/2002	Thunderstorm Wind	--	0/0	$2,008
SAVANNAN	3/13/2003	Thunderstorm Wind	50 kts. EG	0/0	$654
COUNTYWIDE	8/20/2003	Thunderstorm Wind	50 kts. EG	0/0	$2,618
CROSSROADS	12/16/2003	Thunderstorm Wind	50 kts. EG	0/0	$15,708
COUNTYWIDE	6/6/2004	Thunderstorm Wind	50 kts. EG	0/0	$2,550
COUNTYWIDE	4/30/2005	Thunderstorm Wind	50 kts. EG	0/0	$2,466
MC NEIL	8/21/2005	Thunderstorm Wind	50 kts. EG	0/0	$1,233
CROSSROADS	5/8/2006	Thunderstorm Wind	50 kts. EG	0/0	$1,792
CROSSROADS	5/8/2006	Thunderstorm Wind	50 kts. EG	0/0	$1,792
COUNTYWIDE	7/16/2006	Thunderstorm Wind	50 kts. EG	0/0	$2,389
MC NEIL	8/4/2006	Thunderstorm Wind	50 kts. EG	0/0	$597

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
MC NEIL	10/19/2006	Thunderstorm Wind	50 kts. EG	0/0	$1,195
NICHOLSON	10/19/2006	Thunderstorm Wind	50 kts. EG	0/0	$2,389
MC NEIL	10/27/2006	Thunderstorm Wind	50 kts. EG	0/0	$1,195
CROSSROADS	11/14/2006	Thunderstorm Wind	50 kts. EG	0/0	$1,195
CROSSROADS	2/12/2008	Thunderstorm Wind	50 kts. EG	0/0	$2,237
HILLSDALE	2/12/2008	Thunderstorm Wind	50 kts. EG	0/0	$2,797
MC NEIL	3/3/2008	Thunderstorm Wind	50 kts. EG	0/0	$1,678
MC NEIL	5/15/2008	Thunderstorm Wind	50 kts. EG	0/0	$8,949
MC NEIL	8/3/2008	Thunderstorm Wind	50 kts. EG	0/0	$1,678
MC NEIL	8/12/2008	Thunderstorm Wind	50 kts. EG	0/0	$2,237
SAVANNAN	8/12/2008	Thunderstorm Wind	50 kts. EG	0/0	$1,119
CARRIERE	3/26/2009	Thunderstorm Wind	50 kts. EG	0/0	$1,684
HILLSDALE	4/12/2009	Thunderstorm Wind	61 kts. EG	0/0	$0
PEARL RIVER (ZONE)	3/1/2010	Strong Wind	45 kts. EG	0/0	$5,523
HILLSDALE	4/4/2011	Thunderstorm Wind	55 kts. EG	0/0	$1,071
SILVER RUN	4/4/2011	Thunderstorm Wind	70 kts. EG	0/0	$16,061
HILLSDALE	6/10/2011	Thunderstorm Wind	60 kts. EG	0/0	$10,707
MC NEIL	6/28/2011	Thunderstorm Wind	60 kts. EG	0/0	$2,142
CYBUR	2/18/2012	Thunderstorm Wind	52 kts. EG	0/0	$5,245
CARRIERE	2/18/2012	Thunderstorm Wind	52 kts. EG	0/0	$10,490
MC NEIL	8/9/2012	Thunderstorm Wind	55 kts. EG	0/0	$20,981
TYLER	5/12/2015	Thunderstorm Wind	60 kts. EG	0/0	$0
CARRIERE	10/31/2015	Thunderstorm Wind	60 kts. EG	0/0	$0
MC NEIL	10/31/2015	Thunderstorm Wind	60 kts. EG	0/0	$0

*Property damage is reported in 2016 dollars; all damage may not have been reported.
†E = estimated; EG = estimated gust; ES = estimated sustained; MG = measured gust; MS = measured sustained
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

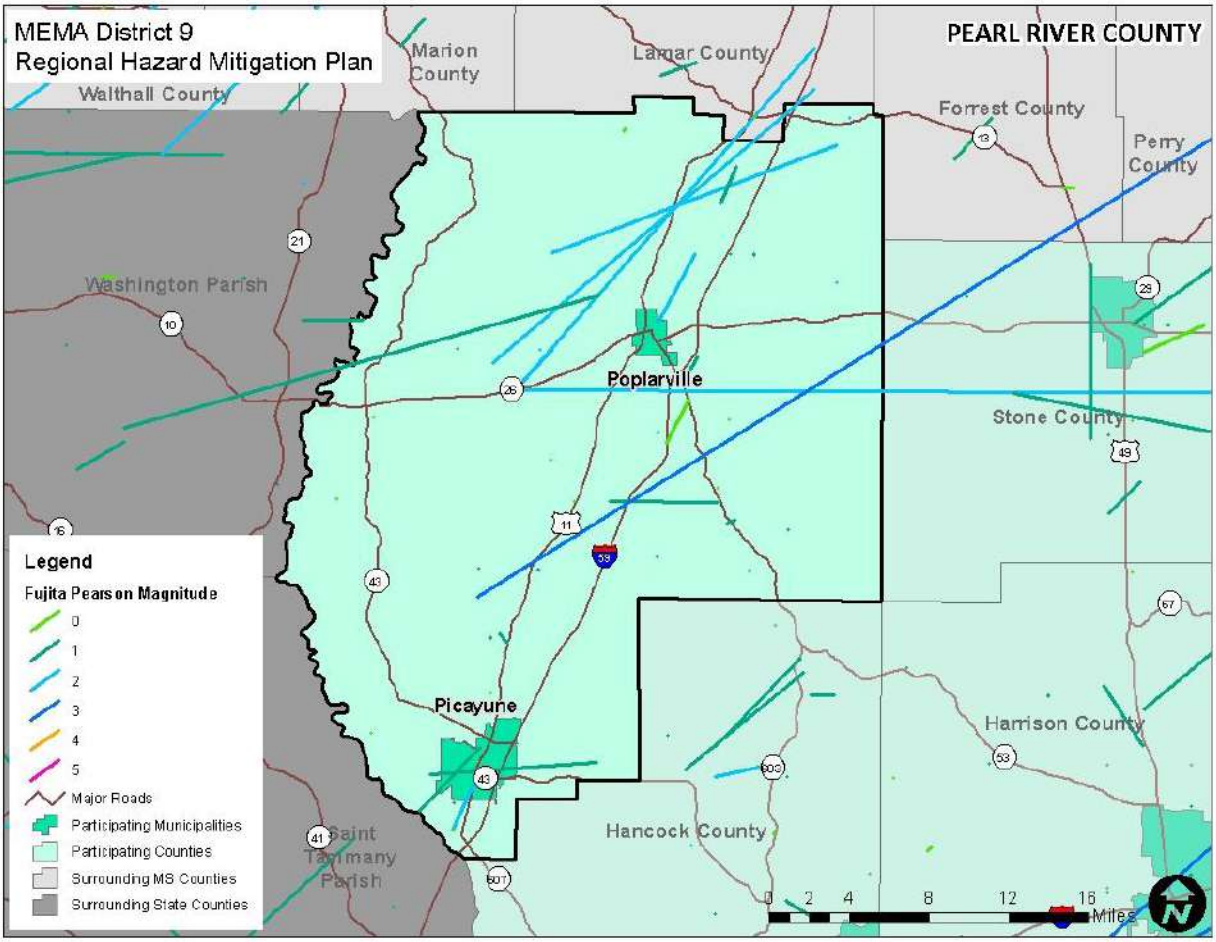
Given the high number of previous events, it is certain that thunderstorm events, including straight-line wind events, will occur in the future. This results in a probability level of highly likely (100 percent annual probability) for the entire county.

E.2.14 Tornado

LOCATION AND SPATIAL EXTENT

Tornadoes occur throughout the state of Mississippi, and thus in Pearl River County. Tornadoes typically impact a relatively small area, but damage may be extensive. Event locations are completely random and it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that Pearl River County is uniformly exposed to this hazard. With that in mind, **Figure E.15** shows tornado track data for many of the major tornado events that have impacted the county between 1950 and 2015. While no definitive pattern emerges from this data, some areas that have been impacted in the past may be potentially more susceptible in the future.

FIGURE E.15: HISTORICAL TORNADO TRACKS IN PEARL RIVER COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

Tornadoes were at least partially responsible for five disaster declarations in Pearl River County in 1983, 1991, 1995, 2001, and 2003.[20] According to the National Climatic Data Center, there have been a total of 56 recorded tornado events in Pearl River County since 1956, resulting in almost $9.5 million (2016 dollars) in property damages.[21] [22] In addition, 37 injuries were reported. The magnitude of these tornadoes ranged from F0 to F2 and EF0 to EF3 in intensity. A summary of these events is presented in **Table E.25**. Detailed information on historic tornado events can be found in **Table E.26**.

[20] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.
[21] These tornado events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1950 through June 2016. It is likely that additional tornadoes have occurred in Pearl River County. As additional local data becomes available, this hazard profile will be amended.
[22] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE E.25: SUMMARY OF TORNADO OCCURRENCES IN PEARL RIVER COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Picayune	3	0/0	$139,531	$9,302
Poplarville	14	0/1	$287,680	$13,699
Unincorporated Area	39	0/36	$9,023,220	$150,387
PEARL RIVER COUNTY TOTAL	**56**	**0/37**	**$9,450,431**	**$173,388**

Source: National Climatic Data Center

TABLE E.26: HISTORICAL TORNADO IMPACTS IN PEARL RIVER COUNTY

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
Picayune					
PICAYUNE	6/4/2001	Funnel Cloud	0/0		Sheriff's Office personnel sighted funnel clouds in several locations, some extending to near the tree top level. No damage was reported.
PICAYUNE	4/7/2003	F1	0/0	$130,898	A weak tornado produced intermittent damage along a path from 2.5 miles west southwest of Picayune to 6 miles east of Picayune along Highway 43. Most of the damage occurred as the tornado moved across the southern portions of Picayune where a number of large commercial signs were damaged, a semi-trailer was blown over, the roof of a business was partially ripped off, numerous trees were knocked down and damaged, and several service station canopies were heavily damaged. Several homes were damaged by falling trees.
PICAYUNE	1/13/2005	F0	0/0	$8,633	A weak tornado touched down briefly along Memorial Boulevard causing minor damage to the windows and roofs of three businesses and knocking out the windows of 16 vehicles in parking lots.
Poplarville					
Poplarville	5/19/1995	F1	0/0	$0	Sheriff's office reported a tornado touched down south of Poplarville damaging a mobile home and downing trees. Tornado path length and width estimated.
POPLARVILLE	1/15/1997	F1	0/0	$0	The Office of Emergency Preparedness reported that a tin roof was blown off a house on Ott Davis Road. Downed power lines caused a house fire. A large tree was uprooted and a short swath of pine trees were snapped off.
POPLARVILLE	10/25/1997	F1	0/0	$90,039	The Sheriff's Office reported one mobile home destroyed, two others damaged and the roof of a house damaged.
POPLARVILLE	9/20/1998	F1	0/1	$110,822	A tropical depression that formed in the central Gulf of Mexico on September 17th

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					strengthened to a minimal tropical storm named Hermine on the morning of the 18th. Tropical Storm Hermine meandered in the Gulf of Mexico for a period of time before beginning a slow north northeast motion that brought it ashore in the early morning hours of the 20th near Cocodrie, LA in Terrebonne Parish. Tropical Storm Hermine then drifted north over southeast Louisiana and was downgraded to a tropical depression 50 miles northwest of New Orleans during the evening of the 20th. Winds associated with Hermine were of minimal tropical storm force and were mainly contained in squalls. A peak wind gust of 46 mph in a squall was measured just off the southeast coast of Louisiana at the Burrwood NOAA C-MAN station near the mouth of the Mississippi River at 1139 CST on September 19th. Two tornadoes developed in rainbands associated with Tropical Storm Hermine on September 20th. The first tornado occurred around 0730 CST 10 miles south of Poplarville, MS and destroyed two mobile homes, damaged seven cars, and caused one injury. A second weak tornado briefly touched down near Bay St. Louis, MS around 0850 CST resulting in only minor damage. Isolated flash flooding also occurred with Tropical Storm Hermine on September 20th when 4 to 5 inches of rain fell on areas of Walthall county. Sections of a few roadways in southern Walthall county were briefly under water including Mississippi Highway 27 which was covered by up to a foot of water in places.
POPLARVILLE	7/22/2000	F0	0/0	$0	A weak tornado briefly touched down resulting in no damage.
POPLARVILLE	6/4/2001	Funnel Cloud	0/0	$0	Sheriff's Office personnel sighted funnel clouds in several locations, some extending to near the tree top level. No damage was reported.
POPLARVILLE	4/24/2003	F0	0/0	$2,618	A weak tornado knocked down stadium lights at Poplarville High School and downed trees nearby.
POPLARVILLE	6/3/2004	Funnel Cloud	0/0	$0	A funnel cloud was observed near McNeill-McHenry Road.
POPLARVILLE	8/22/2005	Funnel Cloud	0/0	$0	A funnel cloud was observed just southeast of Poplarville.
POPLARVILLE	2/13/2007	EF0	0/0	$1,742	A weak tornado briefly touched down near Highway 53 knocking down trees, but causing no other significant damage.

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
POPLARVILLE	3/1/2007	Funnel Cloud	0/0	$0	Multiple sightings of a funnel cloud were reported from the Millard area.
POPLARVILLE	5/4/2009	EF1	0/0	$8,981	A tornado traveled a two-mile path north northeast of Poplarville uprooting several large trees and knocking down power lines. The tornado also moved a mobile home off of its blocks and tore off the steeple of a church.
POPLARVILLE	4/4/2011	EF1	0/0	$32,122	Multiple trees were snapped off, a few soft woods and one hard wood tree. Two hard wood trees were uprooted. Forty percent of a metal roof was blown off a house with a few roof beams broken off. The beams and metal roof were blown about 150 yards to the east. Maximum estimated winds 95 mph, maximum width about 50 yards, and a path length of 400 yards.
POPLARVILLE	1/13/2013	EF1	0/0	$41,356	A storm survey confirmed a tornado touchdown. The tornado touched down on Progress Road just east of Interstate 59 and traveled approximately 1 mile. The path width was approximately 150 yards. Over one dozen hardwood and softwood trees were snapped, one of which severely damaged a pickup truck. A metal workshop building had significant roof damage in which half of it was removed. A trampoline was lifted and thrown approximately 200 yards. The damage was consistent with EF-1 intensity. Winds were estimated at 95 mph.
Unincorporated Area					
PEARL RIVER CO.	7/23/1956	F0	0/0	$0	--
PEARL RIVER CO.	5/2/1957	F0	0/0	$257	--
PEARL RIVER CO.	2/26/1958	F2	0/4	$2,083,503	--
PEARL RIVER CO.	10/3/1964	F2	0/0	$0	--
PEARL RIVER CO.	11/3/1968	F2	0/0	$173,027	Radar indicated a line of thunderstorms at 4:25 PM from near Bogalusa, La. to Columbia, Miss. moving rapidly toward the east. From 4:50 to 5:30 PM people reported during cloudy rainy weather storm moved from W towards E; one funnel observed aloft most of the time; some heard road like jet airplane. PEARL RIVER COUNTY: At White Sands 8 WSW Poplarville man reported thunder began about 4 PM, and tornado "came through very swift" about 4:50 PM, and "was gone in seconds." There was "hard thunder and roaring before...then funnel formed about 5 miles West of my house, it swept through 3/4 mile of my place, about 1/4 mile wide....Blew down

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					20 acres tung trees, 40 acres pine timber, 1 house (tenant) and 1 feed shed, tin off 2 other barns, much damage to 200 pecan trees, lots of fence down." He reported one funnel "bouncing up and down...from ground to 20 ft. high." He estimated $5,000 damage on his place. In the area of Derby and Savannah, there was high wind damage to trees, shelters and some buildings. No injuries from the winds were reported. Woman saw tornado cross Highway 59, she said, "There was lots of funnels, looked like fingers pointed down; also rotating counter clockwise, very dark clouds with a large tail trailing." STONE COUNTY: In the western part of the county, at Smith Community man reported storm was traveling east along township line between 2 and 3, it did not vary over 1 mile..." Damage occurred along a 1/4 mile wide. At about 5 PM, "Trees and other debris on side was felled NE; center of path felled east; on north side of path it felled toward SE. There is evidence there was several small funnels." Red Creek Community (in western Stone County) had houses damaged but no injuries. The worst damage was a house chimney blown down and roof caved in, corn crop flattened, tung orchard damaged; at another place roof was blown off. Damage occurred over 450 yard wide path, one funnel observed touching ground, and some heard roar. Storm reported to have begun at 4:45 PM, ended 5:15 PM. About 15 miles away, at Big Level Community, 4 SE Wiggins, one funnel observed during rainy weather remained aloft most of time. Man reported storm 5:15-5:"0 PM at nursery, width of path 100 yds; equipment and tool sheds badly damaged, room attached to house carried 1/2 mile, weather instruments damaged, debris closed road. A couple and son, age 11, received lacerations and bruises 5:25-5:30 PM when one end of their house was destroyed; path 200 ft. wide. In area SE of Wiggins, other signs of damage to barns and outhouses were reported; trees up to 3 ft. in diameter uprooted; house trailer about 10 miles east of Big Level moved about 4 ft. off foundation. Damage in the Wiggins area estimated at $15,000. Radar at Mobile indicated a single thunderstorm cell (in Stone County) but no hook was observed. Authorities said 7 homes were damaged in Stone County.
PEARL RIVER CO.	11/3/1968	F2	0/5	$0	Radar indicated a line of thunderstorms at 4:25 PM from near Bogalusa, La. to Columbia,

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					Miss. moving rapidly toward the east. From 4:50 to 5:30 PM people reported during cloudy rainy weather storm moved from W towards E; one funnel observed aloft most of the time; some heard road like jet airplane. PEARL RIVER COUNTY: At White Sands 8 WSW Poplarville man reported thunder began about 4 PM, and tornado "came through very swift" about 4:50 PM, and "was gone in seconds." There was "hard thunder and roaring before...then funnel formed about 5 miles West of my house, it swept through 3/4 mile of my place, about 1/4 mile wide....Blew down 20 acres tung trees, 40 acres pine timber, 1 house (tenant) and 1 feed shed, tin off 2 other barns, much damage to 200 pecan trees, lots of fence down." He reported one funnel "bouncing up and down...from ground to 20 ft. high." He estimated $5,000 damage on his place. In the area of Derby and Savannah, there was high wind damage to trees, shelters and some buildings. No injuries from the winds were reported. Woman saw tornado cross Highway 59, she said, "There was lots of funnels, looked like fingers pointed down; also rotating counter clockwise, very dark clouds with a large tail trailing." STONE COUNTY: In the western part of the county, at Smith Community man reported storm was traveling east along township line between 2 and 3, it did not vary over 1 mile..." Damage occurred along a 1/4 mile wide. At about 5 PM, "Trees and other debris on side was felled NE; center of path felled east; on north side of path it felled toward SE. There is evidence there was several small funnels." Red Creek Community (in western Stone County) had houses damaged but no injuries. The worst damage was a house chimney blown down and roof caved in, corn crop flattened, tung orchard damaged; at another place roof was blown off. Damage occurred over 450 yard wide path, one funnel observed touching ground, and some heard roar. Storm reported to have begun at 4:45 PM, ended 5:15 PM. About 15 miles away, at Big Level Community, 4 SE Wiggins, one funnel observed during rainy weather remained aloft most of time. Man reported storm 5:15-5:"0 PM at nursery, width of path 100 yds; equipment and tool sheds badly damaged, room attached to house carried 1/2 mile, weather instruments damaged, debris closed road. A couple and son, age 11, received lacerations and bruises 5:25-5:30 PM when one end of their house

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					was destroyed; path 200 ft. wide. In area SE of Wiggins, other signs of damage to barns and outhouses were reported; trees up to 3 ft. in diameter uprooted; house trailer about 10 miles east of Big Level moved about 4 ft. off foundation. Damage in the Wiggins area estimated at $15,000. Radar at Mobile indicated a single thunderstorm cell (in Stone County) but no hook was observed. Authorities said 7 homes were damaged in Stone County.
PEARL RIVER CO.	5/8/1969	F2	0/0	$164,069	--
PEARL RIVER CO.	8/25/1971	F1	0/0	$148,675	Storm moved from E towards W. Small twister touched down in West Union community near Carriere (lat. 30.6° N, long. 89.7° W). During rainy weather, there were 2 funnels, one remained aloft and one touched down. There was a roaring sound as a train makes. Many trees were broken off, a trailer was picked up, turn over and thrown against the top of a car. Property damage estimated $13,000, crop damages $200.
PEARL RIVER CO.	5/7/1972	F1	0/0	$1,441	A funnel cloud aloft was sighted by a National Guard unit to the south of Poplarville. It touched down a little later about 1:04 p.m. CST near a city dump 2 S Poplarville (lat. 30.8° N, long. 89.5° W) uprooting some trees and breaking others. It left the ground a short distance then dipped twice near a Poplarville housing project. About 13 houses were damaged, some losing part or all of their tin roof. Several power lines downed with power failure in small areas. Several persons heard the wind roar, a man said it sounded like a train attempting to turn around in town. The path was from SSW towards NWE, length in town 2 to 2 1/2 miles, width in town not over 150 feet. Damages estimated $25,000-$30,0000. No damage reported beyond Poplarville; greatest damage in town 1/2 to 3/4 mile section.
PEARL RIVER CO.	5/7/1972	F2	0/0	$144,051	A funnel cloud aloft was sighted by a National Guard unit to the south of Poplarville. It touched down a little later about 1:04 p.m. CST near a city dump 2 S Poplarville (lat. 30.8° N, long. 89.5° W) uprooting some trees and breaking others. It left the ground a short distance then dipped twice near a Poplarville housing project. About 13 houses were damaged, some losing part or all of their tin roof. Several power lines downed with power failure in small areas. Several persons heard the wind roar, a man said it sounded like a train attempting to turn around in town. The

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					path was from SSW towards NWE, length in town 2 to 2 1/2 miles, width in town not over 150 feet. Damages estimated $25,000-$30,0000. No damage reported beyond Poplarville; greatest damage in town 1/2 to 3/4 mile section.
PEARL RIVER CO.	5/26/1973	F2	0/4	$135,615	--
PEARL RIVER CO.	11/27/1973	F1	0/0	$135,615	Warehouse and several trailers damaged near Picayune.
PEARL RIVER CO.	4/2/1974	F1	0/0	$122,136	--
PEARL RIVER CO.	3/8/1976	F1	0/0	$10,582	A narrow, swirling black cloud accompanied by a "freight train sound" uprooted trees, raked shingles off several houses, cracked or broke 15 window panes, tore away parts of an iron fence, blew a mobile home and a storage shed off their blocks, destroyed a barn, broke 3 power line poles and left two others leaning badly. Heavy rain accompanied the storm. Witnesses said it did not have the characteristic funnel shape, but was a "black cloud going in circles."
PEARL RIVER CO.	3/27/1976	F2	0/1	$105,823	The tornado first touched down in the Spring Hill Community where 1 mobile home was damaged and the occupant injured. Moving NE it crossed Hwy 11 at Hillsdale's crossroads and I-59 causing one truck to overturn on the interstate when a pine tree was hurled onto the pavement. In the Red Top Community 3 S Lumberton 2 barns and shed were destroyed, 1 house roof was blown off, a cemetery and 3 dairy barns damaged, and trees uprooted. The last evidence was in the Pistol Ridge Community E of Lumberton. Damage $45,000.
PEARL RIVER CO.	3/7/1980	F1	0/0	$73,074	--
PEARL RIVER CO.	5/19/1980	F2	0/0	$73,074	A small tornado touched down briefly in the White Sands area of Pearl River County 6 miles west of Poplarville. The tornado struck the farm of Don Oldmixon, destroying a barn and uprooting two large trees, one of which fell through the roof of the Oldmixon house. The Oldmixons saw the tornado approaching.
PEARL RIVER CO.	2/15/1987	F2	0/2	$530,046	A strong tornado destroyed one home and damaged several others. A couple of house trailers were overturned, and several mobile homes destroyed. About 6 vehicles also were damaged. If the tornado had been about 150 yards further south, it would have tracked across a much more populated area including 3 trailer parks.
WHITE SAND	2/19/1996	F2	0/10	$1,074,551	A strong tornado touched down just northwest of the White Sand community. The

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					most significant damage occurred in the initial 2.2 miles just to the north of the White Sand community where ten people were injured; five seriously, requiring hospitalization. The most serious was a woman who suffered a broken back, broken ribs and a punctured lung. The tornado continued on the ground continuously to just north of Poplarville, then intermittently to near Hillsdale. The county suffered considerable property damage with five houses destroyed, 10 had major damage and 14 minor damage. Nine mobile homes were destroyed, 3 sustained major damage and 5 minor damage. Numerous barns and other buildings were damaged. Several farm animals were killed. Large areas of 8 to 12 inch diameter trees were downed. The tornado path was surveyed by National Weather Service employees.
MC NEIL	2/19/1996	F1	0/0	$153,507	A tornado touched down along a near continuous path. Several houses were damaged and several mobile homes were destroyed. Large trees were downed or uprooted, including a pecan tree with a trunk diameter of 36 inches. The tornado was visually spotted by emergency rescue crews on Interstate Highway 59 northeast of McNeil who were responding to the tornado damage in the north portion of the county. National Weather Service employees surveyed the tornado damage path.
NICHOLSON	11/21/1997	F1	0/2	$1,050,449	A severe thunderstorm moved out of St. Tammany Parish, Louisiana into extreme south Mississippi. Several short-lived tornadoes touched down as it crossed Pearl River, Hancock, and Harrison Counties. Near Nicholson, a tornado touched down near Nicholson, moving through a mobile home park and also passing across the Mississippi Visitors Center on Interstate Highway 59. Damage path was estimated at approximately four miles, due to lack of ground access in Pearl River drainage area to the west of Nicholson. Preliminary reports from Pearl River County and state officials indicated that 3 single family homes were destroyed and 18 others heavily damaged; and 21 mobile homes were destroyed and 8 others heavily damaged. Several car windows were blown out when the tornado passed through the Visitors Center. One person was injured in the mobile home park and another person suffered minor injuries in a nearby subdivision when their auto was hit by falling trees and limbs. Large hail was also reported by the

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					Sheriff's Office in McNeil. Two additional tornado touch-downs were reported in north Hancock County and north Harrison County as the severe thunderstorm moved northeast. In north Hancock County, civil defense reported two homes were damaged along with two mobile homes when a tornado touched down in a rural area. In north Harrison County, a tornado damaged a convenience store along with heavily damaging a couple of mobile homes. The tornado path lengths in Hancock and Harrison Counties were estimated from damage reports.
SAVANNAN	5/30/1999	F0	0/0	$0	A tornado was observed by fire department personnel touching down in open country near the community of Savannah. No damage was reported.
NICHOLSON	7/22/2000	F0	0/0	$4,196	A small tornado touched down briefly near Nicholson causing a trailer to lose its roof and tree damage.
MILLARD	3/12/2001	F0	0/0	$40,799	A small tornado caused severe to moderate structural damage to buildings, blew the windows out of several vehicles, and knocked down trees and power lines.
CYBUR	6/4/2001	Funnel Cloud	0/0	$0	Sheriff's Office personnel sighted funnel clouds in several locations, some extending to near the tree top level. No damage was reported.
CARRIERE	8/13/2001	F0	0/0	$1,360	A weak tornado touched down briefly knocking down a few trees.
CROSSROADS	10/3/2002	F0	0/0	$13,388	A weak tornado touched down downing trees.
CROSSROADS	4/24/2003	F1	0/0	$65,449	A weak tornado crossed into Pearl River County Mississippi from Washington Parish Louisiana about 3 miles north of Crossroads and produced intermittent damage along a path 8 miles long that ended four miles northwest of Poplarville. Most of the damage was to downed trees. Several houses and structures in Ford Creek Rd and Hilt Fornea Rd areas suffered damage.
MC NEIL	6/24/2004	Funnel Cloud	0/0	$0	A funnel cloud was observed along Interstate 59 just north of McNeill.
MC NEIL	5/8/2006	Funnel Cloud	0/0	$0	A funnel cloud was briefly observed.
MC NEIL	5/11/2007	Funnel Cloud	0/0	$0	A funnel cloud was observed along Highway 11 just north of McNeil.
NICHOLSON	3/9/2011	EF1	0/0	$21,415	A NWS Storm Survey has determined that damage in the Picayune area was a confirmed EF1 tornado with a path length of 3 miles and path width of 100 yards. This tornado was either the same tornado or formed from the same meso cyclone that produced damage

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					earlier in St Tammany Parish before it crossed the large Pearl River Basin swamp. The track started with mostly EF0 damage on Jackson Landing Road and continued northeast across South Beech Street and Goodyear Boulevard, where the EF1 damage was noted to a residence near 6th Street and Forest, due to a large pine tree snapping and landing on the home. The tornado began dissipating and only minor damage was found near Highway 11 and Carroll Street.
MC NEIL	9/4/2011	EF1	0/0	$53,537	A weak tornado moved along an intermittent path for approximately 0.6 miles. Large tree limbs were snapped and several trees were blown down. Shingles were peeled from a garage and aluminum fascia was peeled off of an eave. The tornado also tossed a single engine Cessna aircraft that had been chained to anchors about 35 yards, severely damaging it. Additionally, a pontoon boat that had been anchored to shore, was ripped from its mooring anchors and badly damaged. Path width was approximately 100 yards. Maximum rating was low end EF1.
HILLSDALE	1/26/2012	EF0	0/0	$10,490	A tornado touched down just off of Ott Stanford Road. A patio roof was peeled back and ripped off half of the roof of one home. The tornado traveled to the northeast and destroyed a small well shed and then tore another patio roof off of a second home. The tornado continued to the northeast, finally snapping one small pine tree before lifting. Maximum wind speed was estimated at 75 mph, path width was 100 yards, path length was 200 yards.
PEARL RIVER CO ARPT	12/9/2012	EF0	0/0	$10,490	A weak tornado touched down a couple of times just south of Poplarville, causing minor property damage. A pool was overturned and minor damage was reported to a mobile home on Dupont Harts Chapel Road. A porch and an outbuilding were damaged at a residence on Highway 53. Path length was approximately 1.5 miles and path width was 20 yards. Maximum winds were estimated at 70 mph.
MILL CREEK	12/25/2012	EF3	0/8	$2,622,597	The tornado initially touched down on Harris Road on the southwest side of McNeil causing EF0 and EF1 damage, where it snapped several pine trees. It moved northeastward and rapidly intensified, resulting in a small area of upper range EF-2 and low end EF-3 damage along Joe Smith Road and Sones Chapel Road. The worst damage occurred when a single-story brick veneer triplex dwelling was destroyed with only two small interior walls standing. The tornado weakened

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					after crossing Highway 11, causing mainly tree and minor roof damage, until it re-intensified in the far northeast corner of Pearl River County near Red Hill church Road. It caused upper range EF-1 damage as it was leaving Pearl River County into Stone County. County officials preliminary estimate of 22 homes destroyed, 8 homes with major damage, 16 homes with minor damage and an additional 9 homes affected. Eight people were transported by EMS to area hospitals, although additional minor injuries likely occurred. Maximum winds in Pearl River County were estimated around 140 mph. This tornado continued to track northeast across several more counties in south Mississippi for a total path length of 61 miles. Event times were based on radar and eyewitness accounts.
SAVANNAN	10/31/2015	EF1	0/0	$0	A tornado touched down just west of Mississippi Highway 53 and south of Mcneil-Mchenry Road in Pearl River County. Near where the tornado touched down, an outbuilding was destroyed and tree limbs were downed. As the tornado tracked east-northeast, more tree limbs were downed and a few wooden power poles and trees were snapped. Shortly after travelling east of Highway 53, a mobile home and outbuilding were damaged. Additional tree damage continued farther east-northeast before the tornado lifted.
CYBUR	2/23/2016	EF1	0/0	$0	A weak tornado touched down near Donley Burks Road west of Highway 43 and moved northeastward. Minor to moderate damage was noted on 5 homes with numerous trees downed and uprooted in rural parts of the County. A tin roof was also torn off of one home. The tornado lifted near Osborn Moody Road. Maximum wind speeds were estimated near 100 mph.
WHITE SAND	2/23/2016	EF1	0/0	$0	A weak tornado damaged a few mobile homes and shifted one mobile home off its foundation. It also snapped trees and large branches. It continued into Marion County before lifting. Maximum wind speeds in Pearl River County were estimated at 90 mph.

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

According to historical information, tornado events pose a significant threat to Pearl River County. The probability of future tornado occurrences affecting Pearl River County is highly likely (100 percent annual probability).

E.2.15 Winter Weather

LOCATION AND SPATIAL EXTENT

Nearly the entire continental United States is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. Pearl River County is not accustomed to severe winter weather conditions and rarely receives severe winter weather, even during the winter months. Events tend to be mild in nature; however, even relatively small accumulations of snow, ice, or other wintery precipitation can lead to losses and damage due to the fact that these events are not commonplace. Given the atmospheric nature of the hazard, the entire county has uniform exposure to a winter storm.

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, there have been a total of four recorded winter storm events in Pearl River County since 2008.[23] These events did not result in any property damage.[24] A summary of these events is presented in **Table E.27**. Detailed information on the recorded winter storm events can be found in **Table E.28**.

TABLE E.27: SUMMARY OF WINTER STORM EVENTS IN PEARL RIVER COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Pearl River County	4	0/0	$0	$0

Source: National Climatic Data Center

TABLE E.28: HISTORICAL WINTER STORM IMPACTS IN PEARL RIVER COUNTY

Location	Date	Type	Deaths/Injuries	Property Damage*
Picayune				
None reported	--	--	--	--
Poplarville				
None reported	--	--	--	--
Unincorporated Area				
PEARL RIVER (ZONE)	12/11/2008	Heavy Snow	0/0	$0
PEARL RIVER (ZONE)	12/4/2009	Winter Storm	0/0	$0
PEARL RIVER (ZONE)	1/24/2014	Winter Weather	0/0	$0

[23] These ice and winter storm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional winter storm conditions have affected Pearl River County.
[24] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Type	Deaths/Injuries	Property Damage*
PEARL RIVER (ZONE)	1/28/2014	Sleet	0/0	$0

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

There have been several severe winter weather events in Pearl River County. The text below describes one of the major events and associated impacts on the county. Similar impacts can be expected with severe winter weather.

December 2008
A rare and widespread snowfall occurred across much of south Mississippi, beginning early in the morning of December 11th and continuing until around the noon hour, as an unusually strong and cold upper level storm system moved across the region. The snow, which was occasionally heavy, affected all but the coastal areas of south Mississippi. Snowfall amounts of 2 to 3 inches were common in this area; however, up to 6 inches of snow was reported in western Pearl River County.

Winter storms throughout the planning area have several negative externalities including hypothermia, cost of snow and debris cleanup, business and government service interruption, traffic accidents, and power outages. Furthermore, citizens may resort to using inappropriate heating devices that could to fire or an accumulation of toxic fumes.

PROBABILITY OF FUTURE OCCURRENCES

Winter storm events will continue to occur in Pearl River County. Based on historical information, the probability is likely (between 10 and 100 percent annual probability).

OTHER HAZARDS

E.2.16 Climate Change/Sea Level Rise

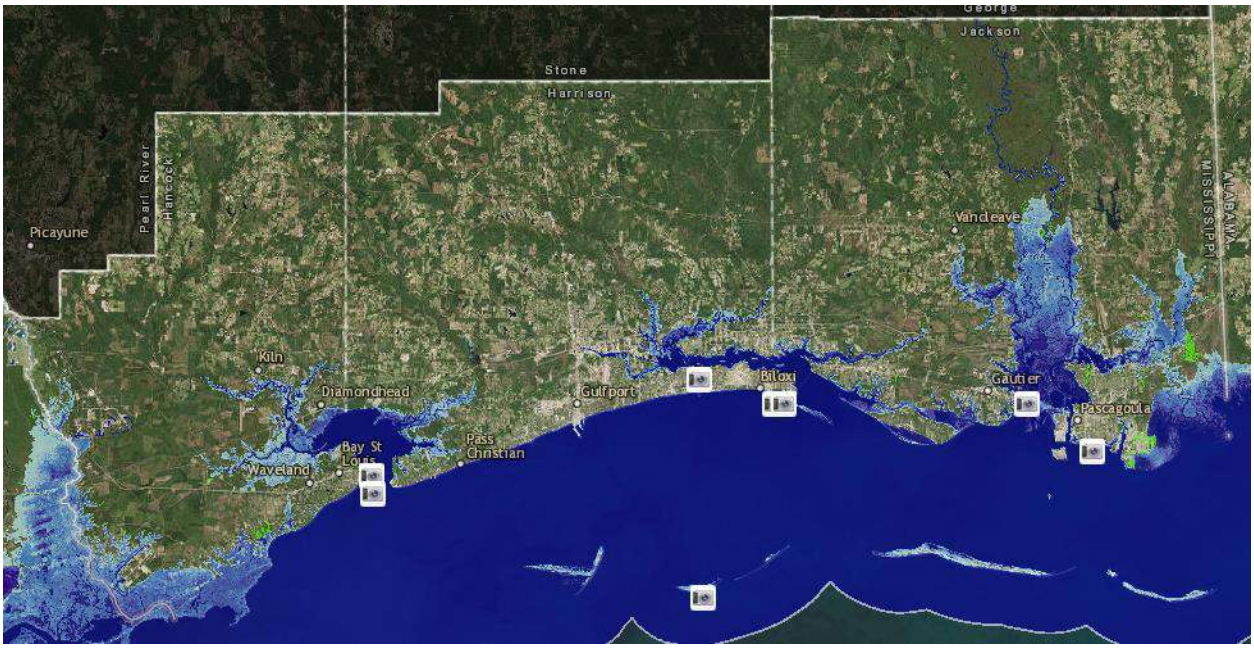
LOCATION AND SPATIAL EXTENT

Climate Change
Climate change can have direct implications on many of the other hazards addressed in this plan since it has the potential to alter the nature and frequency of hazards, including increasing temperature (extreme heat), changes in precipitation (drought, flooding), and more frequent, strong storms (wind, hurricane). Therefore, it is assumed that Pearl River County is uniformly exposed to this hazard.

Sea Level Rise
Sea level rise is occurring at a global scale. However, it does not affect areas uniformly and will be more severe in some places. **Figure E.16** identifies areas in MEMA District 9 that would be inundated by water as a result of three feet in sea level rise as per projections by NOAA. The highest level of sea level rise projected by NOAA is shown in **Figure E.17**. This figure shows the inundation areas in the case of six feet of sea level rise. This demonstrates the additional areas that would be impacted beyond the three feet scenario.

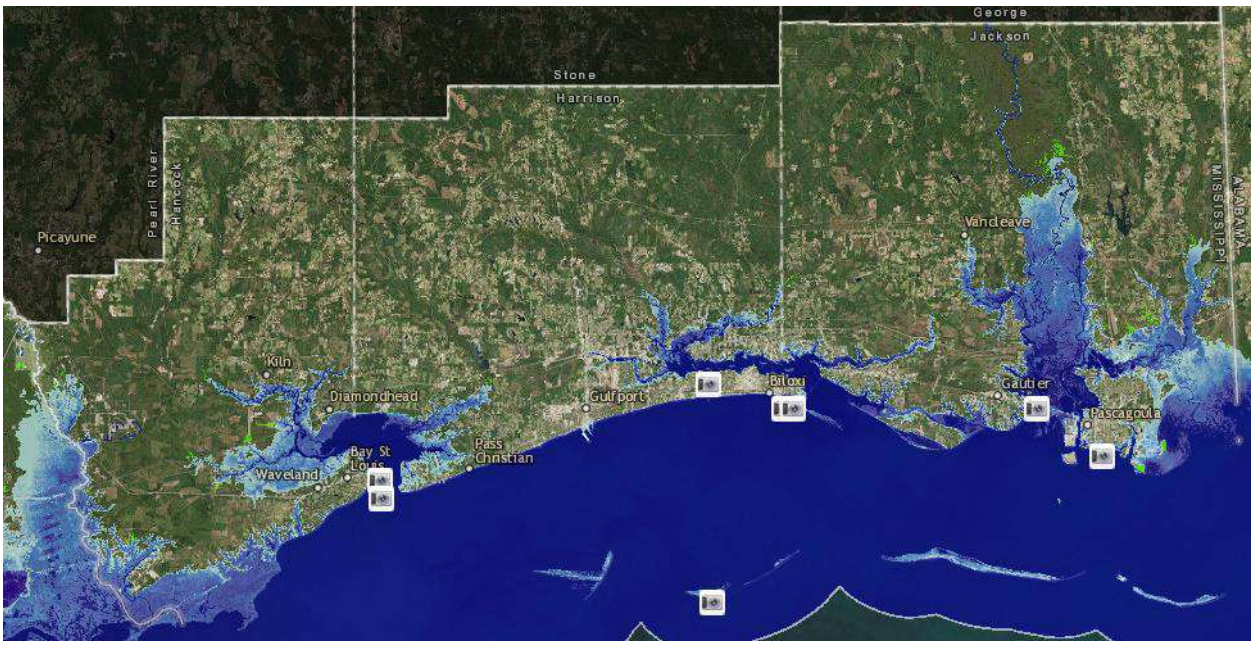
There are no areas in Pearl River County that would be impacted by projected sea level rise.

FIGURE E.16: THREE FEET SEA LEVEL RISE IN MEMA DISTRICT 9



Source: NOAA

FIGURE E.17: SIX FEET SEA LEVEL RISE IN MEMA DISTRICT 9



Source: NOAA

HISTORICAL OCCURRENCES

Climate Change
According to the *National Climate Assessment*, there have been increasing numbers of days above 95°F and nights above 75°F, and decreasing numbers of extremely cold days since 1970 in the Southeast. Daily and five-day rainfall intensities have also increased and summers have been either increasingly dry or extremely wet. The number of Category 4 and 5 hurricanes in the Atlantic basin has increased substantially since the early 1980s compared to the historic record that dates back to the mid-1880s. This can be attributed to both natural variability and climate change.

Sea Level Rise
Sea level rise is a slow-onset hazard and specific events/occurrences are not possible to determine.

PROBABILITY OF FUTURE OCCURRENCES

Climate Change
According to the *National Climate Assessment*, temperatures across the Southeast are expected to increase during this century, with shorter-term (year-to-year and decade-to-decade) fluctuations over time due to natural climate variability. Major consequences of warming include significant increases in the number of hot days (95°F or above) and decreases in freezing events. Regional average increases are in the range of 4°F to 8°F by the year 2100.

Projections of future precipitation patterns are less certain than projections for temperature increases. Because the Southeast, is located in the transition zone between projected wetter conditions to the north and drier conditions to the southwest, many of the model projections show only small changes relative to natural variations. Additionally, projections further suggest that warming will cause tropical storms to be fewer in number globally, but stronger in force, with more Category 4 and 5 storms, and substantial further increases in extreme precipitation are projected as this century progresses.

Overall, future climate change is considered likely (between 10 and 100 percent annual probability).

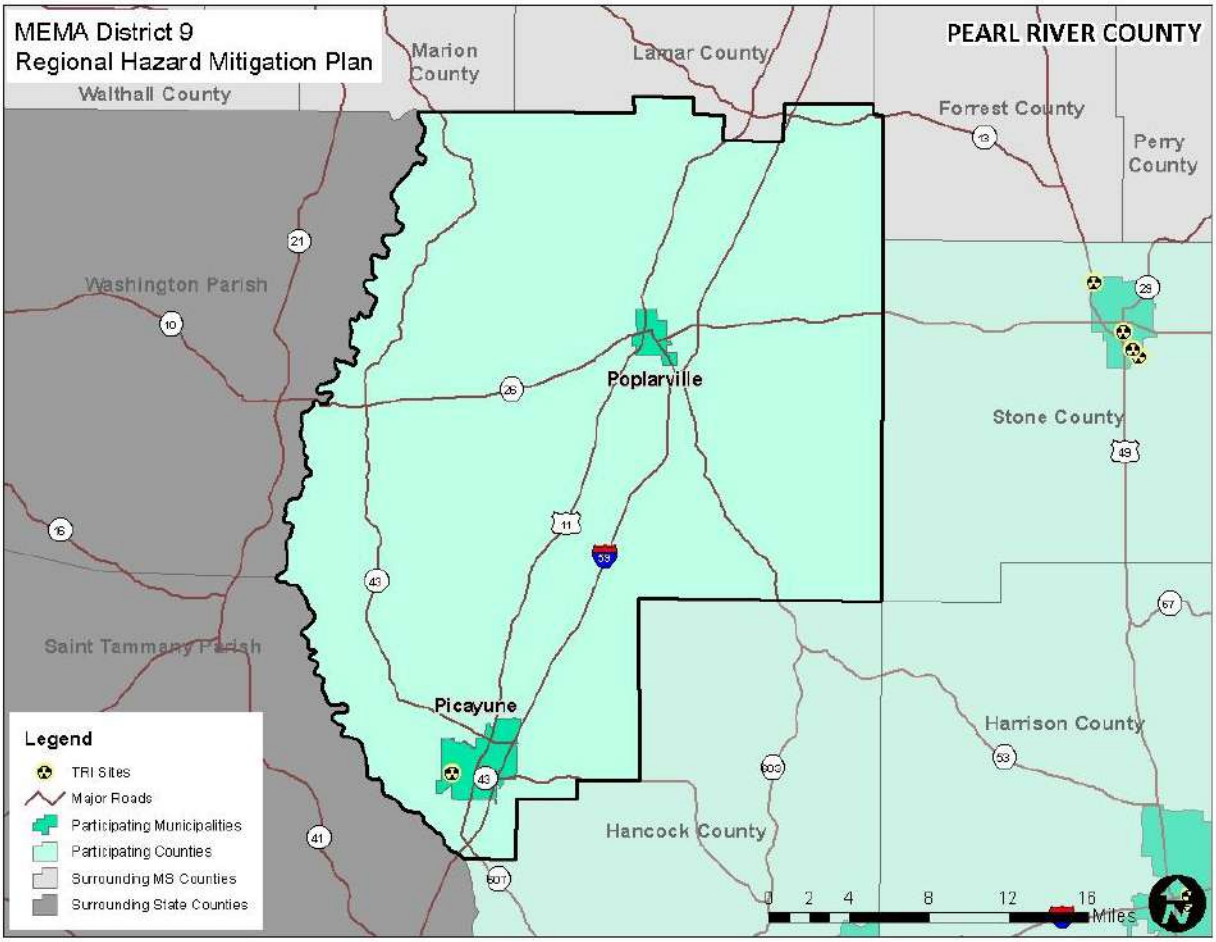
Sea Level Rise
There is still much debate regarding the probability of future occurrence of sea level rise. This section will be updated as more information becomes available. Future sea level rise is considered likely (between 10 and 100 percent annual probability).

E.2.17 Hazardous Materials Incident/Train Derailment

LOCATION AND SPATIAL EXTENT

Pearl River County has one TRI site. This site is shown in **Figure E.18.**

FIGURE E.18: TOXIC RELEASE INVENTORY (TRI) SITES IN PEARL RIVER COUNTY



Source: Environmental Protection Agency

In addition to "fixed" hazardous materials locations, hazardous materials may also impact the county via roadways and railways. Many roads and railways in the county are subject to hazardous materials transport and all roads and railways that permit hazardous material transport are considered potentially at risk to an incident.

HISTORICAL OCCURRENCES

There have been a total of 25 recorded HAZMAT incidents in Pearl River County since 1973. These events resulted in more than $315,000 (2016 dollars) in property damage as well as one injury.[25] **Table E.29** summarizes the HAZMAT incidents in Pearl River County as reported by PHMSA. Detailed information on these events is presented in **Table E.30.**

[25] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE E.29: SUMMARY OF HAZMAT INCIDENTS IN PEARL RIVER COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Picayune	11	0/1	$142,745	$3,660
Poplarville	1	0/0	$14,168	$616
Unincorporated Area	13	0/0	$158,455	$3,685
PEARL RIVER COUNTY TOTAL	**25**	**0/1**	**$315,368**	**$7,961**

Source: United States Department of Transportation Pipeline and Hazardous Materials Safety Administration

TABLE E.30: HAZMAT INCIDENTS IN PEARL RIVER COUNTY

Report Number	Date	City	Mode	Serious Incident?	Deaths/ Injuries	Damages ($)*	Quantity Released
Picayune							
I-1977071487	6/30/1977	PICAYUNE	Highway	No	0/0	$0	84 LGA
I-1979040925	3/16/1979	PICAYUNE	Highway	No	0/0	$0	75 LGA
I-1982090199	8/25/1982	PICAYUNE	Highway	No	0/0	$0	10 LGA
I-1985090477	9/6/1985	PICAYUNE	Highway	No	0/0	$0	3,000 GCF
I-1989070711	7/8/1989	PICAYUNE	Highway	Yes	0/0	$0	200 LGA
I-1990060757	6/14/1990	PICAYUNE	Highway	No	0/0	$0	75 LGA
I-1997110033	10/25/1997	PICAYUNE	Highway	No	0/0	$1,201	1 LGA
I-1998040304	3/24/1998	PICAYUNE	Highway	No	0/0	$1,064	16 SLB
I-2002030021	2/4/2002	PICAYUNE	Highway	No	0/0	$8	4 LGA
I-2002080951	7/16/2002	PICAYUNE	Highway	Yes	0/1	$139,398	2,875 LGA
I-2016030078	2/24/2016	PICAYUNE	Highway	No	0/0	$1,075	25 LGA
Poplarville							
I-1993110731	10/7/1993	POPLARVILLE	Highway	No	0/0	$14,168	35 LGA
Unincorporated Area							
I-1973120133	10/20/1973	NICHOLSON	Rail	No	0/0	$0	0
I-1978100239	9/24/1978	MCNEIL	Highway	Yes	0/0	$0	1,063 SLB
I-1980071620	4/13/1980	CARRIERE	Rail	Yes	0/0	$0	3,000 LGA
I-1980071619	4/13/1980	CARRIERE	Rail	Yes	0/0	$0	96,000 LGA
I-1980070734	7/6/1980	MCNEILL	Highway	No	0/0	$0	35 LGA
I-1981070740	7/15/1981	MCNEILL	Highway	No	0/0	$0	1 LGA
I-1991060029	5/4/1991	CARRIERE	Highway	No	0/0	$14,324	30 LGA
I-1992040277	3/10/1992	NICHOLSON	Highway	No	0/0	$86	50 LGA
I-1994061666	6/16/1994	MCNEIL	Highway	No	0/0	$7,352	5 LGA
I-1995030813	3/7/1995	NICHOLSON	Highway	No	0/0	$0	0.5 LGA
I-2000061620	2/16/2000	MCNEIL	Highway	No	0/0	$0	0.0625 LGA
I-2002101035	9/10/2002	MCNEIL	Highway	Yes	0/0	$136,559	0
I-2003010645	12/11/2002	MCNEIL	Highway	No	0/0	$134	1 LGA

*Property damage is reported in 2016 dollars; all damage may not have been reported.

Source: United States Department of Transportation Pipeline and Hazardous Materials Safety Administration

PROBABILITY OF FUTURE OCCURRENCES

Given the location of one toxic release inventory site in Pearl River County and prior roadway and railway incidents, it is highly likely (100 percent annual probability) that a hazardous material incident may occur in the county. County and city officials are mindful of this possibility and take precautions to prevent such an event from occurring. Furthermore, there are detailed plans in place to respond to an occurrence.

E.2.18 Infectious Disease

LOCATION AND SPATIAL EXTENT

Due to the nature of a public health/emerging disease threat, it is difficult to identify a precise location where this type of event would occur. Moreover, a large-scale event would have impacts that spread throughout the county. Therefore, all areas in Pearl River County are considered equally susceptible to infectious diseases.

HISTORICAL OCCURRENCES

Mosquito-borne illness in Mississippi include West Nile virus, Chikungunya virus, and Zika virus. These illnesses affect birds, animals, and humans, causing flu-like symptoms in people who are bitten by infected mosquitoes. Occasionally illness can be severe, leading to meningitis or encephalitis. According to the Mississippi State Department of Health (MSDH), there have been no reported cases of mosquito-borne illnesses in Pearl River County as of November 2016. **Table E.31** summarizes the mosquito-borne illnesses in humans reported in the county.

TABLE E.31: SUMMARY OF MOSQUITO-BORNE ILLNESSES IN PEARL RIVER COUNTY

Location	West Nile Virus	Chikungunya	Zika	Other*	Deaths
Pearl River County	0	0	0	0	0

*Other mosquito-borne illnesses include La Crosse encephalitis, St. Louis encephalitis, and Eastern Equine encephalitis.
Source: Mississippi State Department of Health

Diseases like influenza and norovirus are regularly occurring health issues in Pearl River County. These conditions are not legally reportable to county or state public health agencies, so data on disease incidence is not readily available. MSDH relies upon selected sentinel health practitioners across the state to report the percentage and total patient visits consistent with an influenza-like illness (ILI): fever of 100°F or higher and cough or sore throat. Reports are used to estimate the state's ILI rate and the magnitude of state's influenza activity on a weekly basis. Reports represent only the distribution of flu in the state, not an actual count of all flu cases statewide.

PROBABILITY OF FUTURE OCCURRENCES

Due to some recent incidents that have been recorded across the State of Mississippi and in counties neighboring Pearl River County, future occurrences are considered possible (between 1 and 10 percent annual probability).

E.2.19 Conclusions on Hazard Risk

The hazard profiles presented in this section were developed using best available data and result in what may be considered principally a qualitative assessment as recommended by FEMA in its "How-to" guidance document titled *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA Publication 386-2). It relies heavily on historical and anecdotal data, stakeholder input, and professional and experienced judgment regarding observed and/or anticipated hazard impacts. It also carefully considers the findings in other relevant plans, studies, and technical reports.

HAZARD EXTENT

Table E.32 describes the extent of each hazard identified for Pearl River County. The extent of a hazard is defined as its severity or magnitude, as it relates to the planning area.

TABLE E.32: EXTENT OF PEARL RIVER COUNTY HAZARDS

<table>
<tr><th colspan="2">Flood-related Hazards</th></tr>
<tr><td>Dam and Levee Failure</td><td>Dam failure extent is defined using the Mississippi Division of Environmental Quality classifications which include Low, Significant, and High. Three dams are classified as high-hazard in Pearl River County.</td></tr>
<tr><td>Erosion</td><td>The extent of erosion can be defined by the measurable rate of erosion that occurs. There are no erosion rate records located in Pearl River County.</td></tr>
<tr><td>Flood</td><td>Flood depth and velocity are recorded via United States Geological Survey stream gages throughout the region. While a gage does not exist for each participating jurisdiction, there is one at or near many areas. The greatest flood recorded for the county was at West Hobolochitto Creek near McNeill. The maximum historic crest was recorded at 29.96 feet, or 9.96 feet above the major flood stage (reported on July 5, 1916). Additional historic crest heights and the corresponding flood categories are in the table below.
<table>
<tr><th rowspan="2">Location/ Jurisdiction</th><th rowspan="2">Date</th><th rowspan="2">Maximum Historic Crest (ft)</th><th colspan="4">Flood categories</th></tr>
<tr><th>Action Stage (ft)</th><th>Flood Stage (ft)</th><th>Moderate Flood Stage (ft)</th><th>Major Flood Stage (ft)</th></tr>
<tr><td colspan="7">Pearl River County</td></tr>
<tr><td>WEST HOBOLOCHITTO CREEK NEAR MCNEILL</td><td>7/5/1916</td><td>29.96</td><td>12</td><td>15</td><td>18</td><td>20</td></tr>
<tr><td>EAST HOBOLOCHITTO CREEK NEAR CAESAR</td><td>9/2/2012</td><td>21.53</td><td>12</td><td>15</td><td>17</td><td>20</td></tr>
</table></td></tr>
<tr><td>Storm Surge</td><td>Storm surge can be defined by the depth of inundation which is defined by the category of hurricane/tropical storm. Since the MEMA District 9 Region could easily be impacted by a Category 3 storm, depth of inundation could be at least 9 feet in many areas. However, there is only a small area in Pearl River County that could potentially be impacted.</td></tr>
<tr><th colspan="2">Fire-related Hazards</th></tr>
<tr><td>Drought</td><td>Drought extent is defined by the U.S. Drought Monitor classifications which include Abnormally Dry, Moderate Drought, Severe Drought, Extreme Drought, and Exceptional</td></tr>
</table>

	Drought. According to the U.S. Drought Monitor classifications, the most severe drought condition is Exceptional. Pearl River County has received this ranking twice over the 17-year reporting period.
Lightning	According to the Vaisala's flash density map, Pearl River County is located in an area that experiences 4 to 12 lightning flashes per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures.
Wildfire	Wildfire data was provided by the Mississippi Forestry Commission and is reported annually by county from 2007-2016. The greatest number of fires to occur in Pearl River County in any year 199 in 2011. The greatest number of acres to burn in the county in a single year occurred in 2011 when 4,118 acres were burned. Information on specific occurrences of wildfire and the most severe fires in each jurisdiction is not available. Although this data lists the extent that has occurred, larger and more frequent wildfires are possible throughout the county.
Geologic Hazards	
Earthquake	Earthquake extent can be measured by the Richter Scale, the Modified Mercalli Intensity (MMI) scale, and the distance of the epicenter from Pearl River County. According to data provided by the National Centers for Environmental Information, no earthquakes were reported in Pearl River County.
Wind-related Hazards	
Extreme Cold	The extent of extreme cold can be defined by the minimum temperature reached. Official long term temperature records are not kept for any areas in Pearl River County. However, the temperature has previously ranged from 15 to 20 degrees Fahrenheit in southwest and coastal Mississippi (reported on December 18, 1996).
Extreme Heat	The extent of extreme heat can be measured by the record high temperature recorded. Official long term temperature records are not kept for any areas in Pearl River County. However, the highest recorded temperature in Beaumont (northeast of the county) was 105°F and heat index values were recorded as high as 115°F (reported in July 2000).
Hailstorm	Hail extent can be defined by the size of the hail stone. The largest hail stone reported in Pearl River County was 1.75 inches (last reported on May 12, 2009). It should be noted that future events may exceed this.
Hurricane and Tropical Storm	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5. The greatest classification of hurricane to traverse directly through Pearl River County was Hurricane Camille, a Category 3 storm which carried tropical force winds of 100 knots upon arrival in the county.
Severe Thunderstorm/High Wind	Thunderstorm extent is defined by wind speeds reported. The strongest recorded wind event in Pearl River County was 84 knots (reported on July 1, 1979). It should be noted that future events may exceed these historical occurrences.
Tornado	Tornado hazard extent is measured by the Fujita/Enhanced Fujita. The greatest magnitude reported in Pearl River County was an EF3 (reported on December 25, 2012).
Winter Weather	The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest snowfall reported in Pearl River County was 6 inches (reported on December 11, 2008).
Other Hazards	
Climate Change/Sea Level Rise	It is still uncertain what the extent of climate change will be in the future. However, increasing temperature (extreme heat), changes in precipitation (drought, flooding), and more frequent, stronger storms (wind, hurricanes) can be expected. Sea level rise is defined by the areas impacted, but is more often associated with the amount of sea level rise that is expected to take place. Although it is difficult to predict an exact

	amount of rise, the Climate Change Surging Seas Report intermediate high sea level rise scenario projects 1 foot of rise locally by 2050 and 3.7 feet by 2100.
Hazardous Materials Incident/Train Derailment	According to USDOT PHMSA, the largest hazardous materials incident reported in Pearl River County was 96,000 LGA released on the railway (reported on April 13, 1980). It should be noted that larger events are possible.
Infectious Disease	An infectious disease threat could have large-scale effects throughout the county and may cause illness in many people. Possible impacts from a disease threat depend largely on the impacted population, but might include anything from absenteeism and loss of productivity in the workplace to death or serious illness to humans or livestock. A serious disease threat could affect many thousands of people.

PRIORITY RISK INDEX RESULTS

In order to draw some meaningful planning conclusions on hazard risk for Pearl River County, the results of the hazard profiling process were used to generate countywide hazard classifications according to a "Priority Risk Index" (PRI). More information on the PRI and how it was calculated can be found in Section 5.21.2.

Table E.33 summarizes the degree of risk assigned to each category for all initially identified hazards based on the application of the PRI. Assigned risk levels were based on the detailed hazard profiles developed for this subsection, as well as input from the Regional Hazard Mitigation Council. The results were then used in calculating PRI values and making final determinations for the risk assessment.

TABLE E.33: SUMMARY OF PRI RESULTS FOR PEARL RIVER COUNTY

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Flood-related Hazards						
Dam and Levee Failure	Possible	Critical	Small	Less than 6 hours	Less than 6 hours	**2.4**
Erosion	Likely	Minor	Small	More than 24 hours	More than 1 week	**2.1**
Flood	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 24 hours	**3.2**
Storm Surge	Possible	Limited	Small	More than 24 hours	Less than 24 hours	**1.9**
Fire-related Hazards						
Drought	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Lightning	Highly Likely	Limited	Negligible	6 to 12 hours	Less than 6 hours	**2.4**
Wildfire	Highly Likely	Minor	Small	Less than 6 hours	Less than 1 week	**2.6**
Geologic Hazards						
Earthquake	Possible	Minor	Moderate	Less than 6 hours	Less than 6 hours	**2.0**
Wind-related Hazards						
Extreme Cold	Possible	Minor	Large	More than 24 hours	Less than 1 week	**2.1**
Extreme Heat	Highly Likely	Minor	Large	More than 24 hours	More than 1 week	**2.8**
Hailstorm	Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours	**2.8**
Hurricane and Tropical Storm	Highly Likely	Critical	Large	More than 24 hours	Less than 24 hours	**3.2**

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Severe Thunderstorm/ High Wind	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 6 hours	**3.1**
Tornado	Highly Likely	Critical	Small	Less than 6 hours	Less than 6 hours	**3.0**
Winter Weather	Likely	Minor	Moderate	More than 24 hours	Less than 24 hours	**2.1**
Other Hazards						
Climate Change/Sea Level Rise	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Hazardous Materials Incident/ Train Derailment	Highly Likely	Limited	Small	Less than 6 hours	Less than 24 hours	**2.8**
Infectious Disease	Possible	Limited	Large	More than 24 hours	More than 1 week	**2.5**

E.2.20 Final Determinations on Hazard Risk

The conclusions drawn from the hazard profiling process for Pearl River County, including the PRI results and input from the Regional Hazard Mitigation Council, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk, and Low Risk (**Table E.34**). For purposes of these classifications, risk is expressed in relative terms according to the estimated impact that a hazard will have on human life and property throughout all of Pearl River County. A more quantitative analysis to estimate potential dollar losses for each hazard has been performed separately, and is described in Section 6: *Vulnerability Assessment* and below in Section E.3. It should be noted that although some hazards are classified below as posing low risk, their occurrence of varying or unprecedented magnitudes is still possible in some cases and their assigned classification will continue to be evaluated during future plan updates.

Some priorities have changed since the previous plans were adopted due to the merging of multiple local plans to form this regional plan; however, most priorities remain the same.

TABLE E.34: CONCLUSIONS ON HAZARD RISK FOR PEARL RIVER COUNTY

HIGH RISK	Hurricane and Tropical Storm Flood Severe Thunderstorm/High Wind Tornado
MODERATE RISK	Hailstorm Hazardous Materials Incident/Train Derailment Extreme Heat Wildfire Drought Climate Change/Sea Level Rise Infectious Disease
LOW RISK	Lightning Dam and Levee Failure Erosion Winter Weather Extreme Cold Earthquake Storm Surge

E.3 PEARL RIVER COUNTY VULNERABILITY ASSESSMENT

This subsection identifies and quantifies the vulnerability of Pearl River County to the significant hazards previously identified. This includes identifying and characterizing an inventory of assets in the county and assessing the potential impact and expected amount of damages caused to these assets by each identified hazard event. More information on the methodology and data sources used to conduct this assessment can be found in Section 6: *Vulnerability Assessment*.

E.3.1 Asset Inventory

Table E.35 lists the estimated number of buildings, parcels, and the total value of improvements for Pearl River County and its participating jurisdictions (study area of vulnerability assessment). Because digital parcel data was not available for every community, data obtained from Hazus-MH 3.2 inventory was utilized to supplement the analysis where gaps existed.

TABLE E.35: IMPROVED PROPERTY IN PEARL RIVER COUNTY

Location	Counts of Buildings	Counts of Parcels	Total Value of Improvements
Picayune	7,020	6,411	$1,406,763,000
Poplarville	1,964	1,538	$344,167,000

Location	Counts of Buildings	Counts of Parcels	Total Value of Improvements
Unincorporated Area	41,737	36,176	$2,999,794,000
PEARL RIVER COUNTY TOTAL†	**50,721**	**44,125**	**$4,750,724,000**

†Improvement values for Pearl River County are based on Hazus 3.2 estimates at the Census Block level
Source: MDEQ, Hazus-MH 3.2

Table E.36 lists the critical facilities located in Pearl River County by type according to data provided by local government officials.

In addition, **Figure E.19** shows the locations of critical facilities in Pearl River County. **Table E.52**, at the end of this subsection, shows a complete list of the critical facilities by name, as well as the hazards that affect each facility. Further, it should be noted that the table below may show that some communities do not have any critical facilities of in certain type, when in reality, that particular type of facility may actually be located within the community. This may occur because spatial data for that facility type was not available or because the facility may have been classified under a different category type for that particular community.

TABLE E.36: CRITICAL FACILITY INVENTORY IN PEARL RIVER COUNTY

Location	Communications	EOC	Fire Stations	Medical	Police Station	Power/ Gas	Private/Non-Profit
Picayune	1	0	8	3	2	0	0
Poplarville	4	1	11	1	1	0	0
Unincorporated Area	0	0	10	0	0	0	0
PEARL RIVER COUNTY TOTAL	**5**	**1**	**29**	**4**	**3**	**0**	**0**

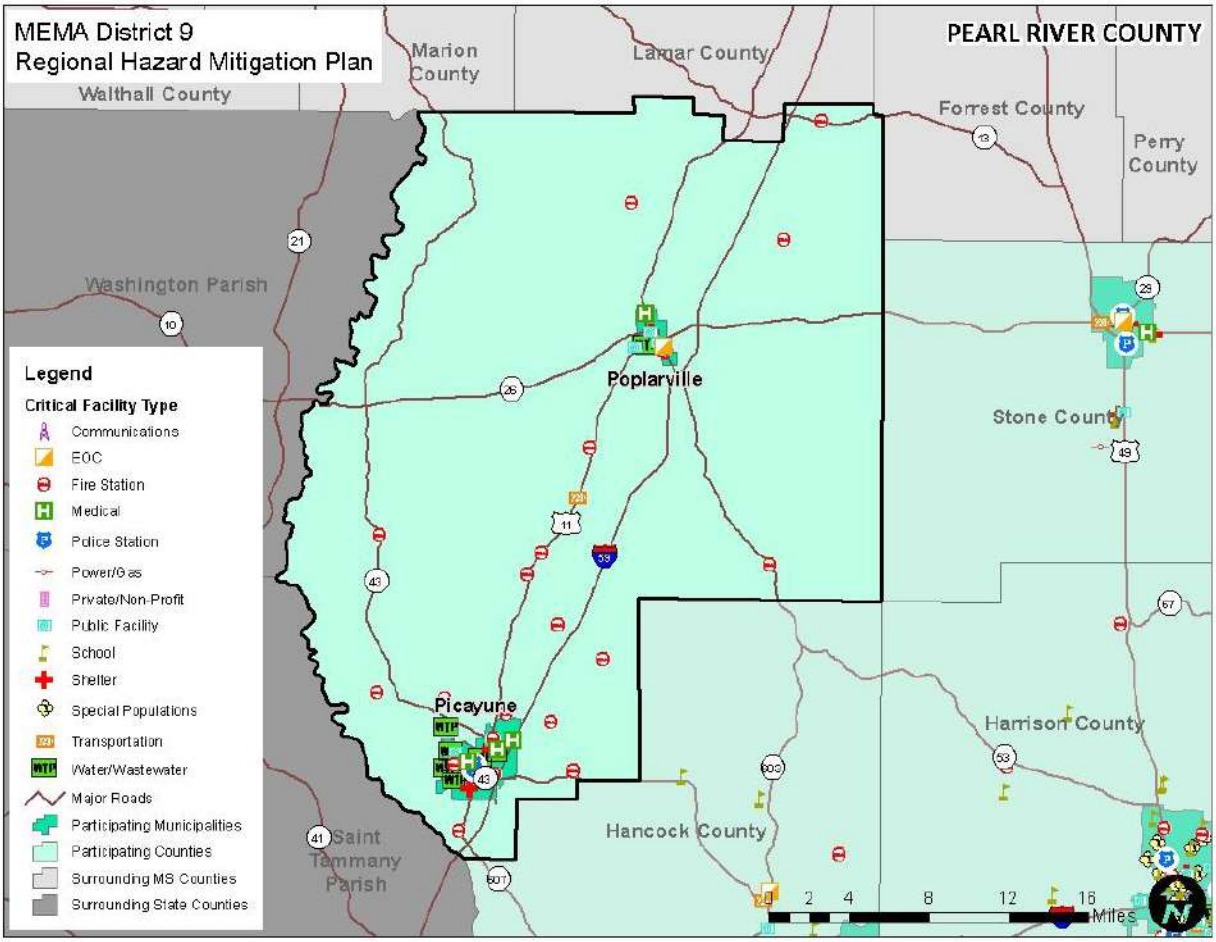
Source: Local Governments

TABLE E.36: CRITICAL FACILITY INVENTORY IN PEARL RIVER COUNTY (CONT.)

Location	Public Facility	School	Shelter	Special Populations	Transportation	Water/ Wastewater
Picayune	4	0	3	0	0	7
Poplarville	3	0	2	0	0	1
Unincorporated Area	1	0	0	0	1	1
PEARL RIVER COUNTY TOTAL	**8**	**0**	**5**	**0**	**1**	**9**

Source: Local Governments

FIGURE E.19: CRITICAL FACILITY LOCATIONS IN PEARL RIVER COUNTY



Source: Local Governments

E.3.2 Social Vulnerability

In addition to identifying those assets potentially at risk to identified hazards, it is important to identify and assess those particular segments of the resident population in Pearl River County that are potentially at risk to these hazards.

Table E.37 lists the population by jurisdiction according to American Community Survey 2015 population estimates. The total population in Pearl River County according to Census data is 55,196 persons. Additional population estimates are presented above in Section E.1.

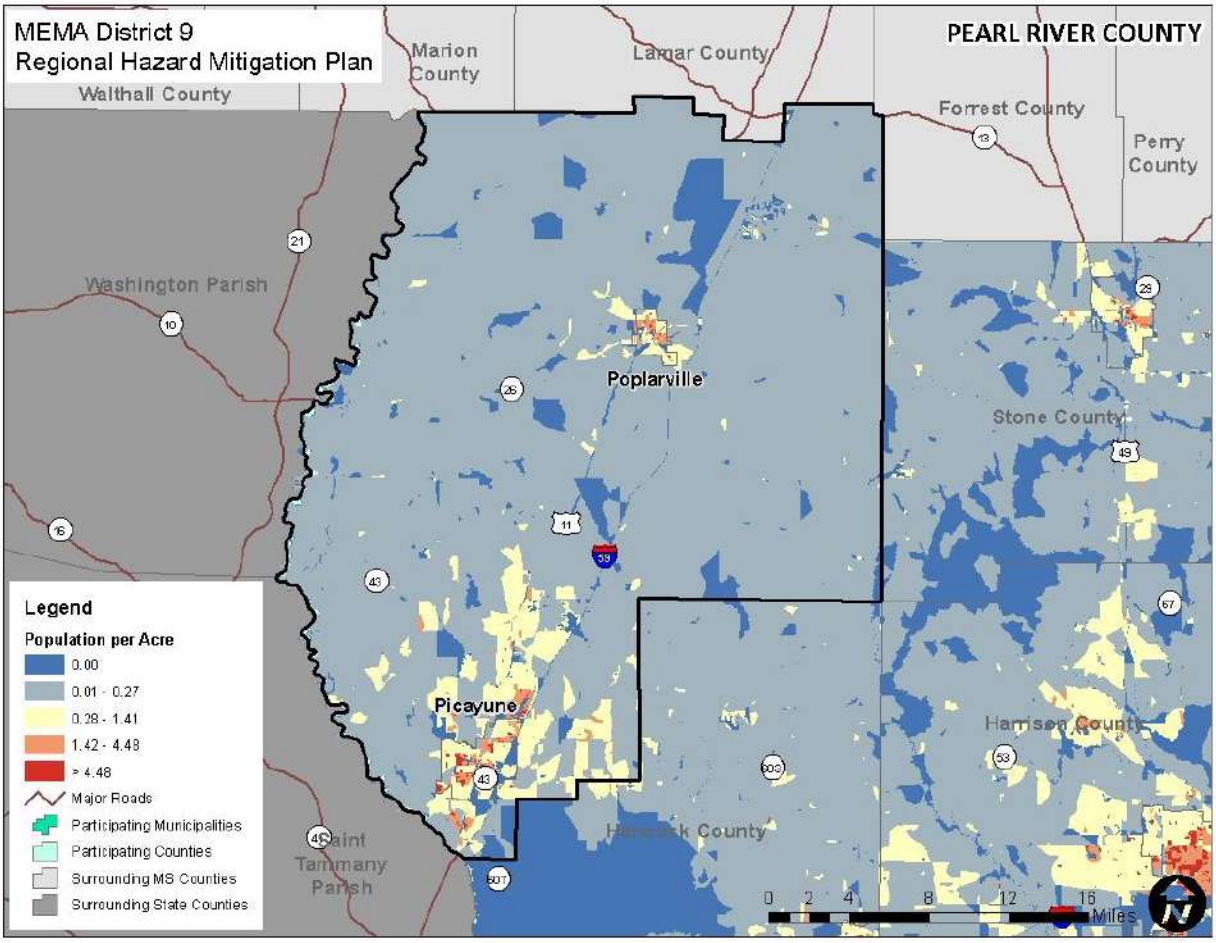
TABLE E.37: TOTAL POPULATION IN PEARL RIVER COUNTY

Location	Total 2015 Population
Picayune	10,784
Poplarville	2,919
Unincorporated Area	41,493
PEARL RIVER COUNTY TOTAL	**55,196**

Source: United States Census Bureau, 2011-2015 American Community Survey 5-Year Estimates

In addition, **Figure E.20** illustrates the population density per acre by census block as it was reported by the U.S. Census Bureau in 2010. As can be seen in the figure, the population is spread out through most of the county, with a heavier concentration in Picayune and Poplarville.

FIGURE E.20: POPULATION DENSITY IN PEARL RIVER COUNTY



Source: United States Census Bureau, 2010 Census

E.3.3 Development Trends and Changes in Vulnerability

Since the previous local-level hazard mitigation plans were approved, Pearl River County has experienced moderate growth and development. **Table E.38** shows the number of building units constructed since 2010 according to the U.S. Census American Community Survey.

TABLE E.38: BUILDING COUNTS FOR PEARL RIVER COUNTY

Location	2010	2011	2012	2013	2014	2015	% Building Stock Built Post-2010
Picayune	5,106	4,901	4,864	4,850	4,785	4,854	-4.9%
Poplarville	937	1,108	1,095	1,063	1,021	1,006	7.4%

Location	2010	2011	2012	2013	2014	2015	% Building Stock Built Post-2010
Unincorporated Area	17,649	17,868	18,109	18,222	18,476	18,563	5.2%
PEARL RIVER COUNTY TOTAL	**23,692**	**23,877**	**24,068**	**24,135**	**24,282**	**24,423**	**3.1%**

Source: United States Census Bureau, American Community Survey

Table E.39 shows population growth estimates for the county from 2010 to 2015 based on the based on the American Community Survey's annual population estimates.

TABLE E.39: POPULATION GROWTH FOR PEARL RIVER COUNTY

Location	Population Estimates						% Change 2010-2015
	2010	2011	2012	2013	2014	2015	
Picayune	11,087	11,023	10,982	10,901	10,838	10,784	-2.7%
Poplarville	3,016	2,977	2,923	2,852	2,874	2,919	-3.2%
Unincorporated Area	41,820	42,042	41,981	41,816	41,581	41,493	-0.8%
PEARL RIVER COUNTY TOTAL	**55,923**	**56,042**	**55,886**	**55,569**	**55,293**	**55,196**	**-1.3%**

Source: United States Census Bureau, American Community Survey

Based on the data above, there has been a moderate rate of residential development in the county since 2010, and the some of the county has experienced slight increases in housing development, resulting in an increased number of structures that are vulnerable to the potential impacts of the identified hazards. However, the City of Picayune has experienced a slight decline in housing development since 2010 according to estimates. Additionally, there has been a slight decline in population since 2010 across the county. Therefore, development has impacted the county's vulnerability since the previous local hazard mitigation plans were approved and there has been an increase in the overall vulnerability.

It is also important to note that as development increases in the future, greater populations and more structures and infrastructure will be exposed to potential hazards if development occurs in the floodplains or other identified areas of high risk.

E.3.4 Vulnerability Assessment Results

As noted in Section 6: *Vulnerability Assessment*, only hazards with a specific geographic boundary, available modeling tool, or sufficient historical data allow for further analysis. Those results, specific to Pearl River County, are presented here. All other hazards are assumed to impact the entire planning region (e.g., drought) or, due to lack of data, analysis would not lead to credible results (e.g., infectious disease). The total county exposure, and thus risk to these hazards, was presented in **Table E.35**.

The hazards to be further analyzed in this subsection include: flood, wildfire, earthquake, hurricane and tropical storm winds and storm surge, hazardous materials incident, dam and levee failure, and sea level rise.

The annualized loss estimate for all hazards is presented near the end of this subsection in **Table E.51.**

FLOOD

Historical evidence indicates that Pearl River County is susceptible to flood events. A total of 20 flood events have been reported by the National Climatic Data Center resulting in $3.6 million (2016 dollars) in property damage. On an annualized level, these damages amounted to $191,132 for Pearl River County.

In order to assess flood risk, a GIS-based analysis was used to estimate exposure to flood events using Digital Flood Insurance Rate Map (DFIRM) data in combination with improved property records for Pearl River County. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within an identified floodplain.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones.

Table E.40 shows the results of the analysis.

TABLE E.40: ESTIMATED EXPOSURE OF PROPERTY TO THE FLOOD HAZARD

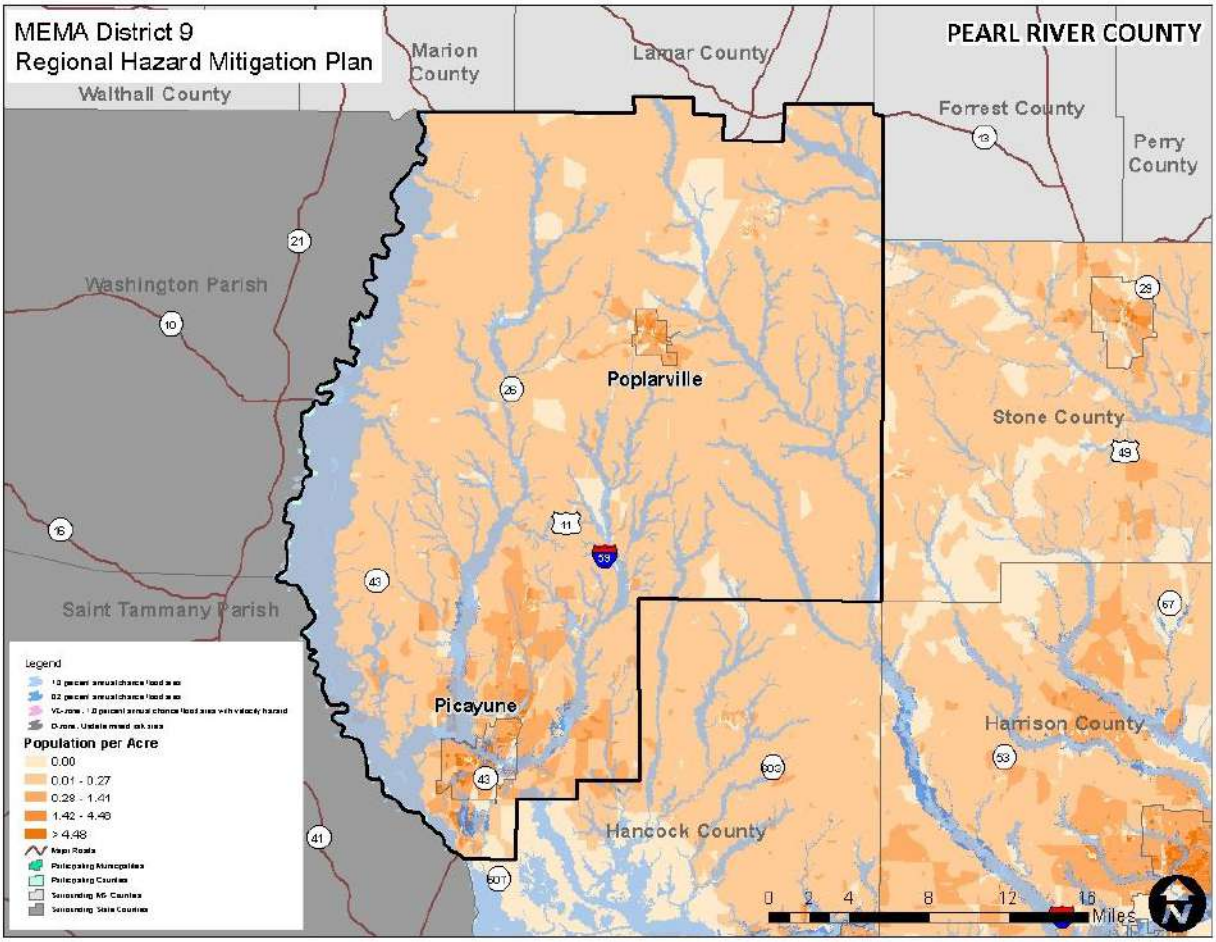
Location	1.0-percent ACF		0.2-percent ACF		VE Zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Picayune	576	$549,169,000	629	$394,185,000	0	$0
Poplarville	0	$0	0	$0	0	$0
Unincorporated Area	3,280	$1,140,592,000	778	$208,993,000	0	$0
PEARL RIVER COUNTY TOTAL*	**3,856**	**$1,689,761,000**	**1,407**	**$603,178,000**	**0**	**$0**

** As noted above, parcel value data was not available for Pearl River County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: Federal Emergency Management Agency DFIRM, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Figure E.21 is presented to gain a better understanding of at-risk population by evaluating census block level population data against mapped floodplains. There are areas of concern in several of the population centers in the county. Therefore, there is significant population vulnerability to flooding.

FIGURE E.21 : POPULATION DENSITY NEAR FLOODPLAINS IN PEARL RIVER COUNTY



Source: Federal Emergency Management Agency DFIRM, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are 7 facilities located in one of the identified floodplain zones. (Please note, as previously indicated, this analysis does not consider building elevation, which may negate risk.) All 7 of these facilities are located in the 1.0 percent annual chance flood zone. A list of specific critical facilities and their associated risk can be found in **Table E.52** at the end of this subsection.

In conclusion, a flood has the potential to impact many existing and future buildings, facilities, and populations in Pearl River County, though some areas are at a higher risk than others. All types of structures in a floodplain are at-risk, though elevated structures will have a reduced risk. Such site-specific vulnerability determinations are outside the scope of this assessment but may be considered during future plan updates. Furthermore, areas subject to repetitive flooding should be analyzed for potential mitigation actions.

WILDFIRE

Although historical evidence indicates that Pearl River County is susceptible to wildfire events, there are few reports which include information on historic dollar losses. Therefore, it is difficult to calculate a

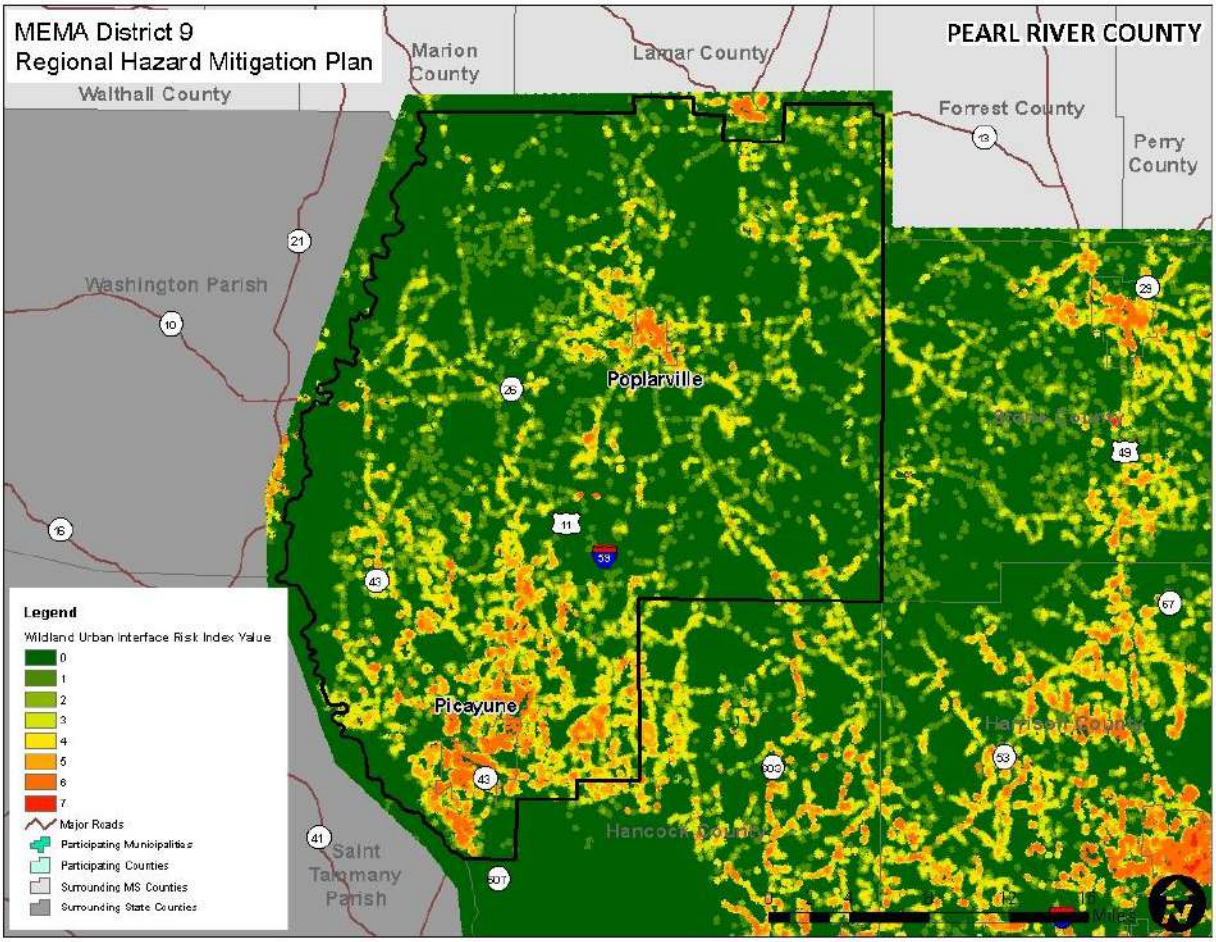
reliable annualized loss figure. Annualized loss is considered relatively low, though it should be noted that a single event could result in significant damages throughout the county.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones. For the critical facility analysis, areas of concern were intersected with critical facility locations.

Figure E.22 shows the Wildland Urban Interface Risk Index (WUIRI) data, which is a data layer that shows a rating of the potential impact of a wildfire on people and their homes. The key input, Wildland Urban Interface (WUI), reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the WUI and rural areas is key information for defining potential wildfire impacts to people and homes. Initially provided as raster data, it was converted to a polygon to allow for analysis. The Wildland Urban Interface Risk Index data ranges from 0 to 7 with higher values being most severe (as noted previously, this is only a measure of relative risk). **Figure E.23** shows the areas of analysis where any grid cell is less than 3. Areas with a value below 3 were chosen to be displayed as areas of risk because this showed the upper echelon of the scale and the areas at highest risk.

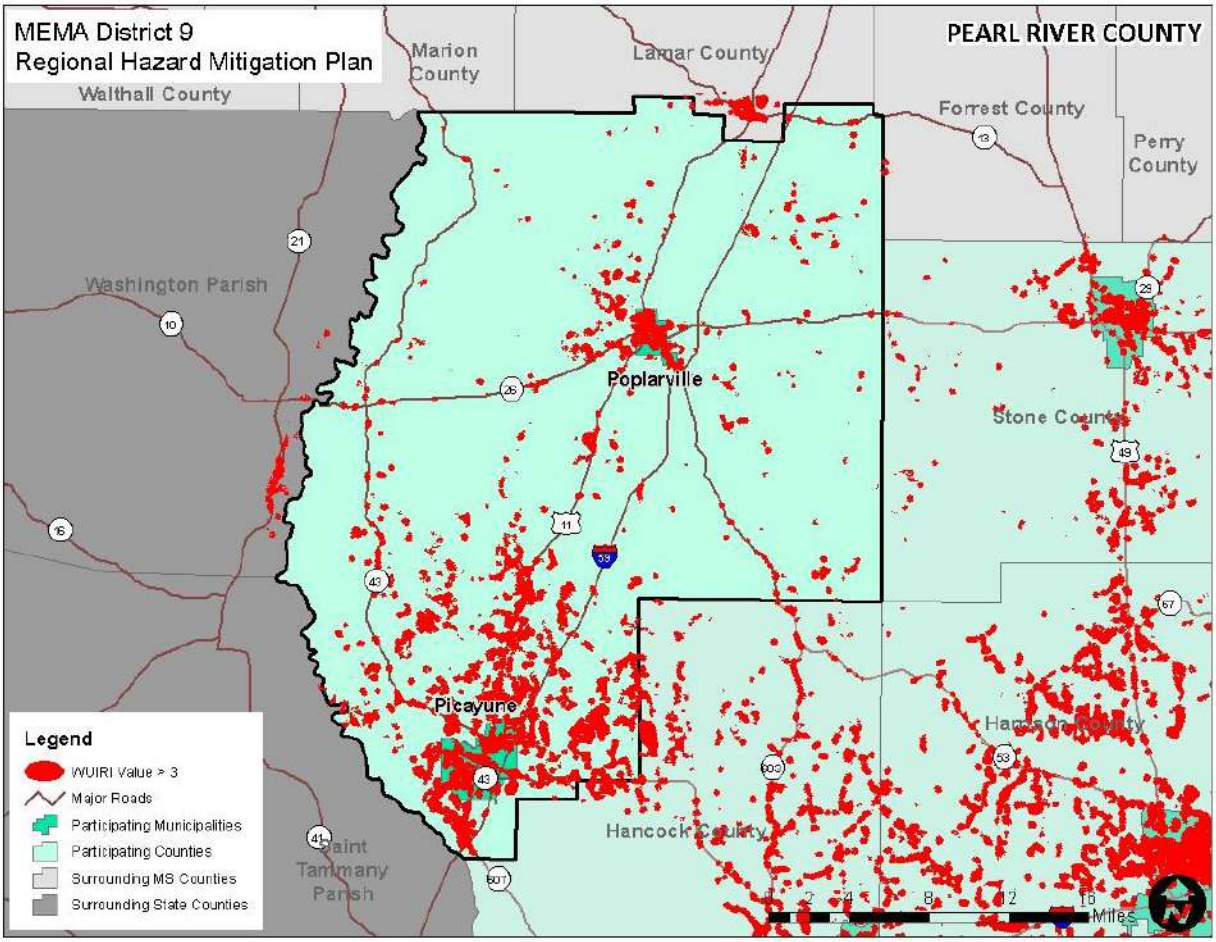
Table E.41 shows the results of the analysis.

FIGURE E.22: WUI RISK INDEX AREAS IN PEARL RIVER COUNTY



Source: Southern Wildfire Risk Assessment Data

FIGURE E.23: WILDFIRE RISK AREAS IN PEARL RIVER COUNTY



Source: Southern Wildfire Risk Assessment Data

TABLE E.41: EXPOSURE OF IMPROVED PROPERTY TO WILDFIRE RISK AREAS

Location	Wildfire Risk	
	Approx. Number of Buildings	Approx. Improved Value
Picayune	6,411	$1,357,763,000
Poplarville	1,846	$319,907,000
Unincorporated Area	21,492	$2,674,471,000
PEARL RIVER COUNTY TOTAL*	**29,749**	**$4,352,141,000**

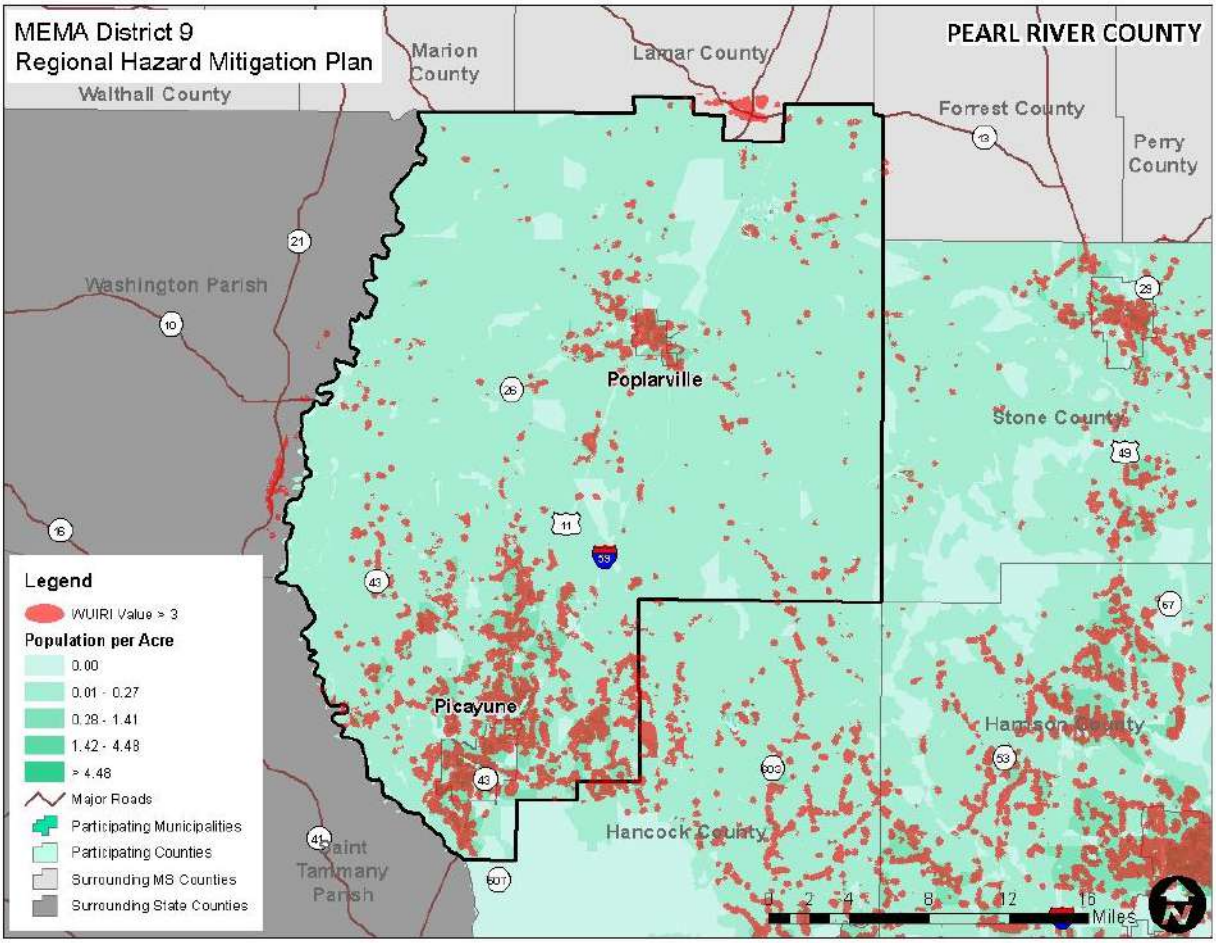
** As noted above, parcel value data was not available for Pearl River County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: SWRA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Given some level of susceptibility across the entire county, it is assumed that the total population is at risk to the wildfire hazard. **Figure E.24** shows an overlay of the wildfire risk areas identified above with the

population density by census block. This shows that many of the areas of high population concentration are susceptible to wildfire because of their proximity to the wildland urban interface.

FIGURE E.24: WILDFIRE RISK AREAS IN PEARL RIVER COUNTY



Source: Southern Wildfire Risk Assessment Data; United States Census

Critical Facilities

The critical facility analysis revealed that there are 43 critical facilities located in wildfire areas of concern, including 1 EOC, 17 fire stations, 2 medical, 3 police stations, 7 public facilities, 4 shelters, 1 transportation, and 8 water/wastewater. It should be noted, that several factors could impact the spread of a wildfire putting all facilities at risk. A list of specific critical facilities and their associated risk can be found in **Table E.52** at the end of this subsection.

In conclusion, a wildfire event has the potential to impact many existing and future buildings, critical facilities, and populations in Pearl River County.

EARTHQUAKE

As the Hazus-MH model suggests below, and historical occurrences confirm, any earthquake activity in the area is likely to inflict only minor to moderate damage to the county. Hazus-MH 3.2 estimates a total annualized loss of $20,000 which includes buildings, contents, and inventory throughout the county.

For the earthquake hazard vulnerability assessment, a probabilistic scenario was created to estimate the average annualized loss[26] for the county. The results of the analysis are generated at the Census Tract level within Hazus-MH and then aggregated to the county level. Since the scenario is annualized, no building counts are provided. Losses reported included losses due to structure failure, building loss, contents damage, and inventory loss. They do not include losses to business interruption, lost income, or relocation. **Table E.42** summarizes the findings with results rounded to the nearest thousand.

TABLE E.42: AVERAGE ANNUALIZED LOSS ESTIMATIONS FOR EARTHQUAKE HAZARD

Location	Structural Damage	Non-Structural Damage	Contents Damage	Inventory Loss	Total Annualized Loss
Pearl River County	$5,000	$12,000	$3,000	$0	$20,000

Source: Hazus-MH 3.2

Social Vulnerability
It can be assumed that all existing and future populations are at risk to the earthquake hazard.

Critical Facilities
The Hazus-MH probabilistic analysis indicated that no critical facilities would sustain measurable damage in an earthquake event. However, all critical facilities should be considered at-risk to minor damage, should an event occur. Specific vulnerabilities for these assets will be greatly dependent on their individual design and the mitigation measures in place. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates.

In conclusion, an earthquake has the potential to impact all existing and future buildings, facilities, and populations in Pearl River County. The Hazus-MH scenario indicates that minimal to moderate damage is expected from an earthquake occurrence. While Pearl River County may not experience a large earthquake, localized damage is possible with an occurrence. A list of specific critical facilities and their associated risk can be found in **Table E.52** at the end of this subsection.

HURRICANE AND TROPICAL STORM

Historical evidence indicates that Pearl River County has very significant risk to the hurricane and tropical storm hazard. There have been 12 disaster declarations due to hurricanes or tropical storms ((Hurricanes Betsy, Camille, Frederic, Elena, Georges, Ivan, Dennis, Katrina, Gustav, and Isaac, as well as Tropical Storms Allison and Isidore). A large number tracks have come near or traversed through the county, as shown and discussed in Section E.2.12. Hazus-MH 3.2 estimates a total annualized loss of $10,541,000 which includes buildings, contents, and inventory throughout the county.

Hurricane Winds
Hurricanes and tropical storms can cause damage through numerous additional hazards such as flooding, erosion, tornadoes, and high winds, thus it is difficult to estimate total potential losses from these cumulative effects. The current Hazus-MH hurricane model only analyzes hurricane winds and storm surge and is not capable of modeling and estimating cumulative losses from all hazards associated with hurricanes; therefore, only these two aspects of hurricane losses are analyzed in this section. It can be

[26] Annualized loss is defined by Hazus-MH as the expected value of loss in any one year.

assumed that all existing and future buildings and populations are at risk to hurricane and tropical storm wind hazard. Hazus-MH 3.2 was used to determine average annualized losses[27] for the county as shown below in **Table E.43.** Only losses to buildings, inventory, and contents are included in the results.

TABLE E.43: AVERAGE ANNUALIZED LOSS ESTIMATIONS FOR HURRICANE WIND HAZARD

Location	Building Damage	Contents Damage	Inventory Loss	Total Annualized Loss
Pearl River County	$7,495,000	$3,020,000	$26,000	$10,541,000

Source: Hazus-MH 3.2

Storm Surge

In addition, although it was treated as a separate hazard throughout this plan, storm surge is most often associated with hurricanes and tropical storms. Indeed, Hazus incorporates the storm surge model for estimating damage from storm surge as part of the hurricane model. The storm surge model can only be run as part of a historic hurricane model run and not as part of an annualized loss model. Unfortunately, in this model, storm surge impacts are calculated as part of the total damage from the historic event and thus could not be separated out and evaluated solely in terms of storm surge loss. As such, the estimated losses presented below are combined losses from hurricane winds and storm surge. The historic Hurricane Katrina model was utilized as this was certainly one of the most impactful storms in the region and therefore estimates the potential losses that are possible from a large hurricane event. **Table E.44** presents the losses from this modeled event.

TABLE E.44: POTENTIAL LOSS ESTIMATIONS FOR LARGE HURRICANE EVENT

Location	Building Damage	Contents Damage	Inventory Loss	Total Annualized Loss
Pearl River County	$205,561,000	$75,831,000	$628,000	$282,020,000

Source: Hazus-MH 3.2

Social Vulnerability

Given equal susceptibility across the county, it is assumed that the total population, both current and future, is at risk to the hurricane and tropical storm wind hazard. In terms of social vulnerability to storm surge, coastal populations are at much higher risk than inland populations. Since Pearl River County is not located on the coast, there is lower social vulnerability to storm surge compared to the rest of the region.

Critical Facilities

Given equal vulnerability across Pearl River County, all critical facilities are considered to be at risk. Some buildings may perform better than others in the face of such an event due to construction and age, among factors. Determining individual building response to wind and storm surge is beyond the scope of this plan. However, this plan will consider mitigation action for especially vulnerable structures and/or critical facilities to mitigate against the effects of the hurricane hazard. A list of specific critical facilities can be found in **Table E.52** at the end of this subsection.

In conclusion, a hurricane event has the potential to impact many existing and future buildings, critical facilities, and populations in Pearl River County.

[27] Annualized loss is defined by Hazus-MH as the expected value of loss in any one year.

HAZARDOUS MATERIALS INCIDENT

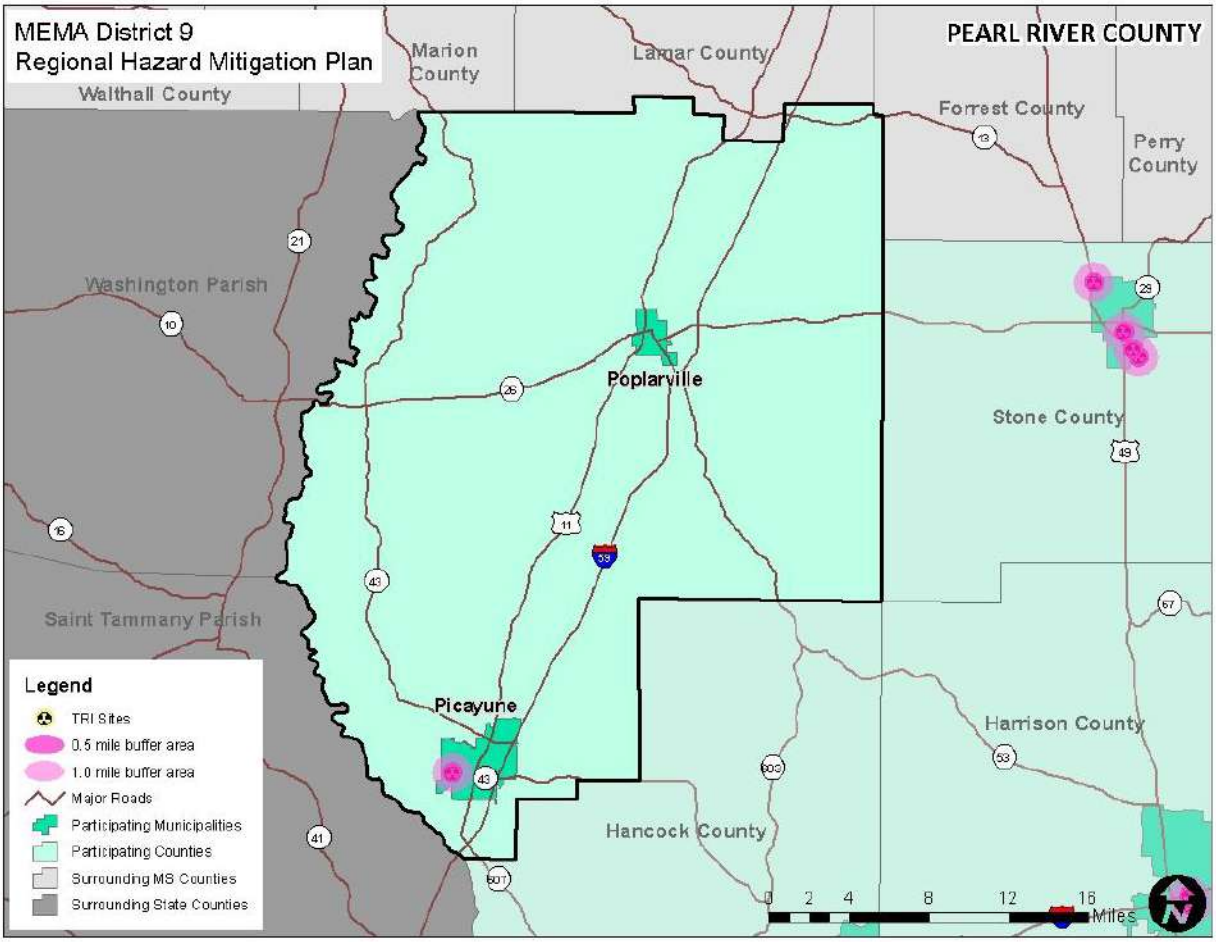
Historical evidence indicates that Pearl River County is susceptible to hazardous materials events. A total of 25 HAZMAT incidents have been reported by the Pipeline and Hazardous Materials Safety Administration, resulting in $315,368 (2016 dollars) in property damage as well as 1 injury. On an annualized level, these damages amount to $7,961 for the county.

Most hazardous materials incidents that occur are contained and suppressed before destroying any property or threatening lives. However, they can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities, and cause affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. Certain chemicals may travel through the air or water, affecting a much larger area than the point of the incidence itself. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features, can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

In order to conduct the vulnerability assessment for this hazard, GIS intersection analysis was used for fixed and mobile areas and building footprints/parcels where available and Census block data where footprints/parcels were not available.[28] In both scenarios, two sizes of buffers—0.5-mile and 1.0-mile—were used. These areas are assumed to represent the different levels of effect: immediate (primary) and secondary. Primary and secondary impact zones were selected based on guidance from the PHMSA Emergency Response Guidebook. For the fixed site analysis, geo-referenced TRI sites in the region, along with buffers, were used for analysis as shown in **Figure E.25.** For the mobile analysis, the major roads (Interstate highway, U.S. highway, and State highway) and railroads, where hazardous materials are primarily transported that could adversely impact people and buildings, were used for the GIS buffer analysis. **Figure E.26** shows the areas used for mobile road toxic release buffer analysis and **Figure E.27** shows the areas used for the mobile railroad toxic release buffer analysis. The results indicate the approximate number of improved properties and improved value, as shown in **Table E.45** (fixed sites), **Table E.46** (mobile roads), and **Table E.47** (mobile railroad sites).[29]

[28] This type of analysis will likely yield inflated results (generally higher than what is actually reported after an actual event).
[29] Note that improved properties included in the 1.0-mile analysis are also included in the 0.5-mile analysis.

FIGURE E.25 : TRI SITES WITH BUFFERS IN PEARL RIVER COUNTY



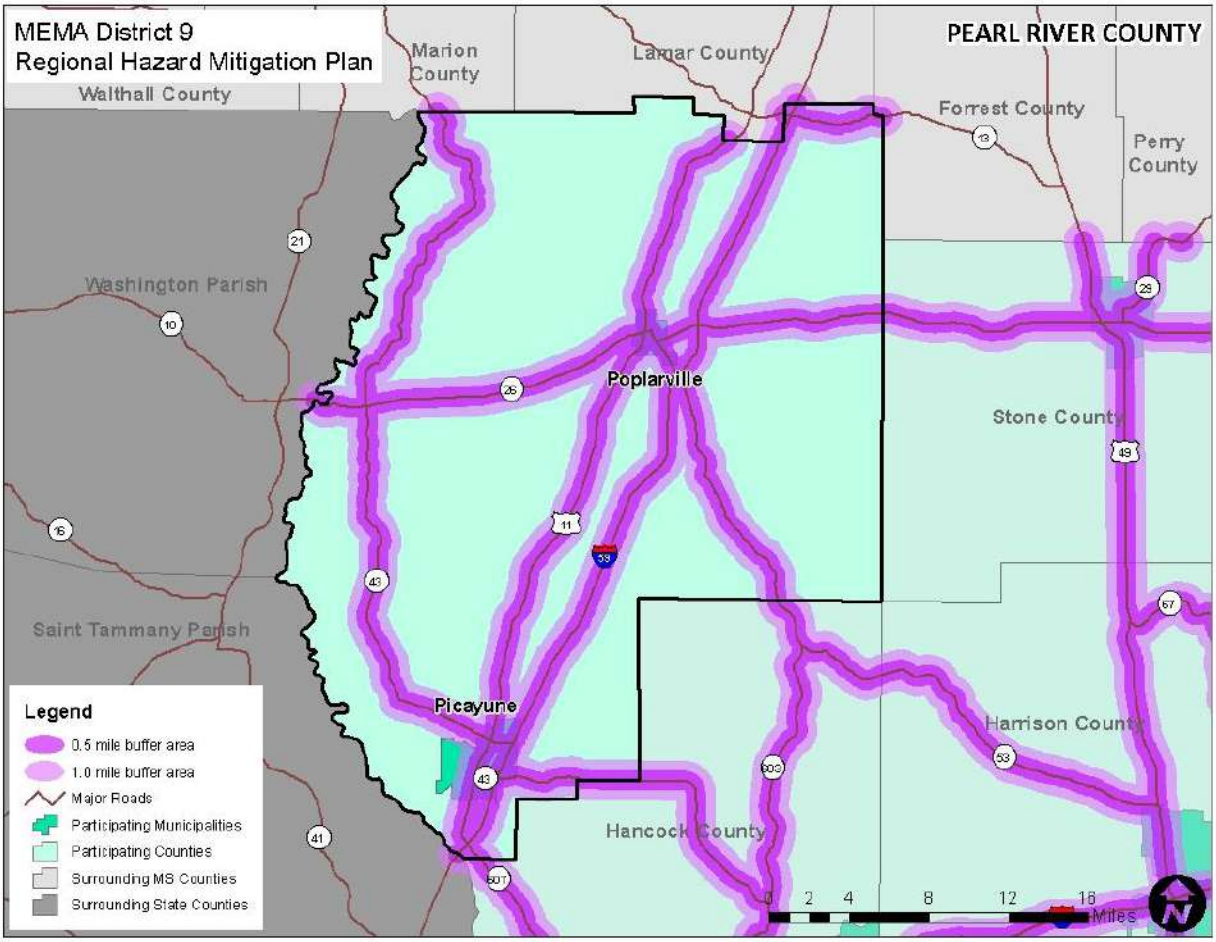
Source: Environmental Protection Agency

TABLE E.45: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS (FIXED SITES)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Picayune	489	$106,765,000	2,196	$399,979,343
Poplarville	0	$0	0	$0
Unincorporated Area	0	$0	69	$12,567,657
PEARL RIVER COUNTY TOTAL*	**489**	**$106,765,000**	**2,265**	**$412,547,000**

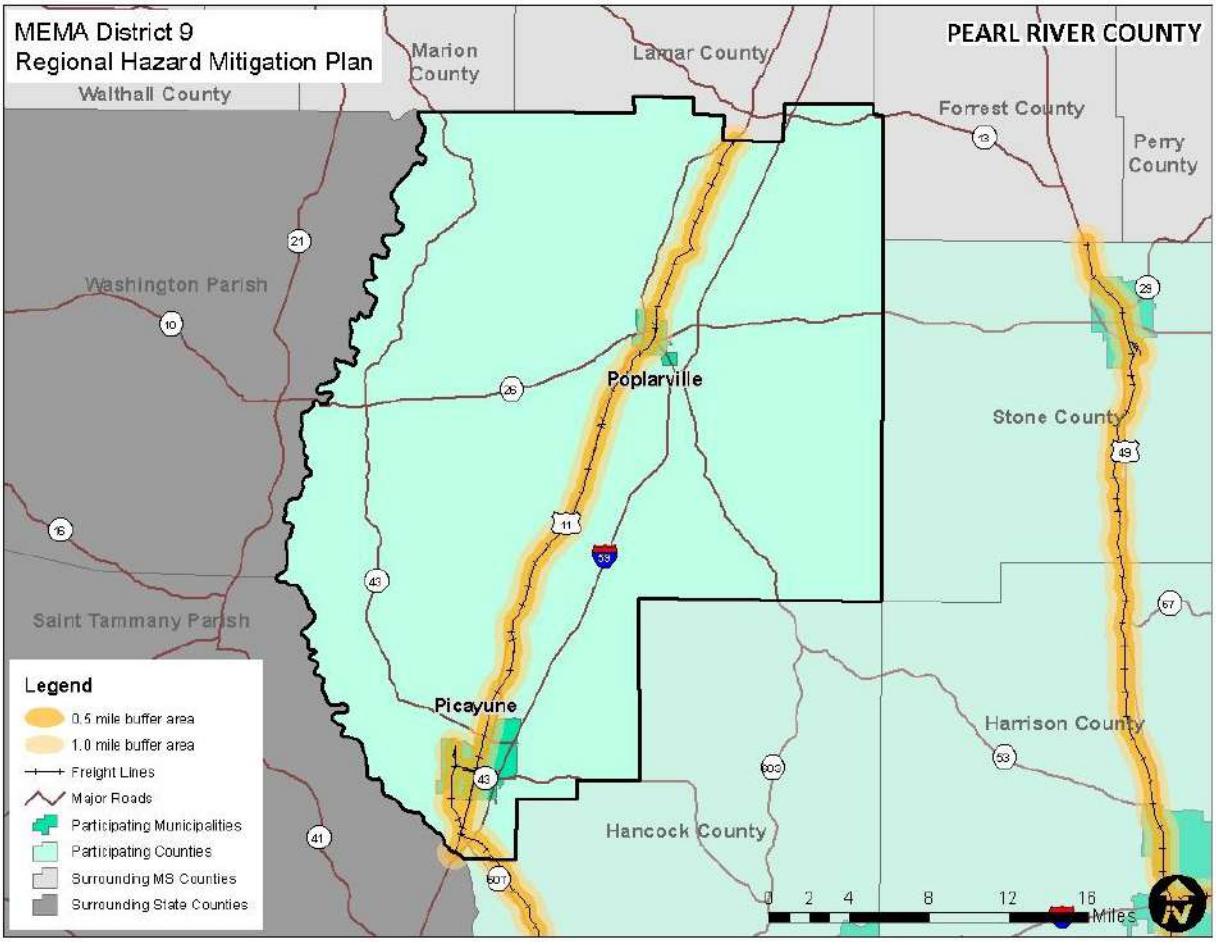
** As noted above, parcel value data was not available for Pearl River County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: EPA, MDEQ, Hazus MH 3.2 Data

FIGURE E.26 : MOBILE (ROAD) HAZMAT BUFFERS IN PEARL RIVER COUNTY



Source: Federal Highway Administration National Highway Planning Network

FIGURE E.27 : MOBILE (RAIL) HAZMAT BUFFERS IN PEARL RIVER COUNTY



Source: U.S. Department of Transportation Federal Railroad Administration

TABLE E.46: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - ROAD)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Picayune	4,438	$1,133,195,000	5,927	$1,244,649,000
Poplarville	1,941	$315,740,000	1,964	$321,992,000
Unincorporated Area	14,482	$1,662,491,000	22,611	$2,065,877,000
PEARL RIVER COUNTY TOTAL*	**20,861**	**$3,111,426,000**	**30,502**	**$3,632,518,000**

** As noted above, parcel value data was not available for Pearl River County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: NHPN, MDEQ, Hazus MH 3.2 Data

TABLE E.47: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - RAILROAD)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Picayune	3,863	$855,158,000	5,742	$1,159,817,000
Poplarville	1,163	$189,638,000	1,704	$287,734,000
Unincorporated Area	5,102	$606,959,000	8,123	$806,004,000
PEARL RIVER COUNTY TOTAL*	**10,128**	**$1,651,755,000**	**15,569**	**$2,253,555,000**

** As noted above, parcel value data was not available for Pearl River County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: USDOT FRA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability
Given high susceptibility across the entire county, it is assumed that the total population is at risk to a hazardous materials incident. It should be noted that areas of population concentration may be at an elevated risk due to a greater burden to evacuate population quickly.

Critical Facilities
Fixed Site Analysis:
The critical facility analysis for fixed TRI sites revealed that there are 5 facilities located in a fixed HAZMAT risk zone. Of these, 4 facilities are in the primary (0.5 mile) risk area including 1 fire station and 3 water/wastewater. A list of specific critical facilities and their associated risk can be found in **Table E.52** at the end of this subsection.

Mobile Analysis:
The critical facility analysis for transportation corridors revealed that there are 42 facilities located in the primary and secondary road HAZMAT buffer areas. Of these, there were 38 critical facilities located in the primary risk zone including 1 EOC, 12 fire stations, 4 medical, 3 police stations, 7 public facilities, 5 shelters, 1 transportation, and 5 water/wastewater.

For the rail line buffer areas, there were a total of 36 critical facilities located in primary and secondary buffer areas. Of these, 27 facilities are located within the primary buffer area including 5 fire stations, 1 medical, 3 police stations, 7 public facilities, 3 shelters, 1 transportation, and 7 water/wastewater.

A list of specific critical facilities and their associated risk can be found in **Table E.52** at the end of this subsection.

In conclusion, a hazardous material incident has the potential to impact many existing and future buildings, critical facilities, and populations in Pearl River County. Those areas in a primary buffer are at the highest risk, though all areas carry some vulnerability due to variations in condition that could alter the impact area (i.e., direction and speed of wind, volume of release, etc.).

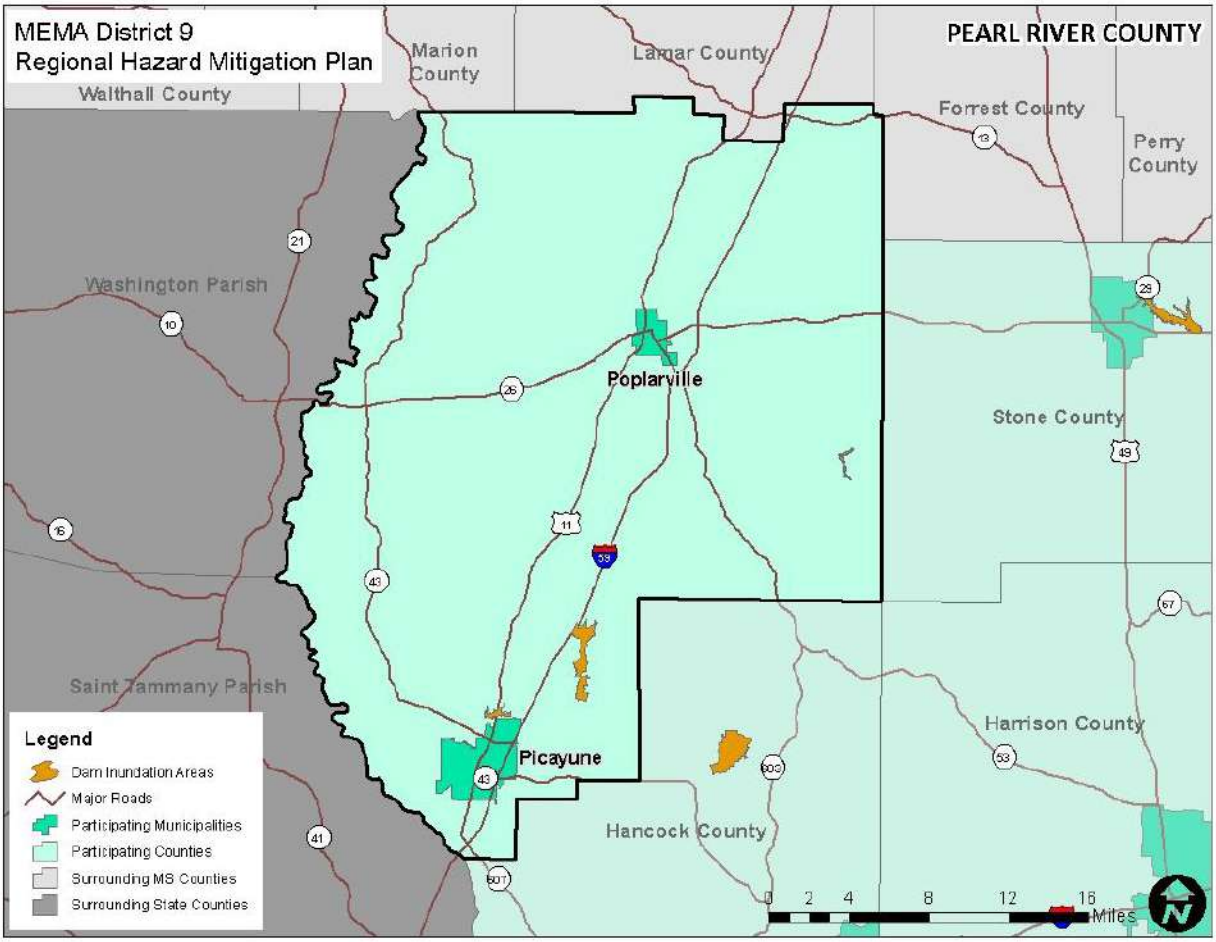
DAM/LEVEE FAILURE

In order to assess risk to a dam or levee failure, a GIS-based analysis was used to estimate exposure to one of the areas delineated by the Mississippi Department of Environmental Quality as a potential inundation area in the event of a failure. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within an identified inundation area. As mentioned previously, this type of inundation mapping has not been completed for every dam/levee in the region, so the results of this analysis likely underestimate the overall vulnerability to a dam or levee failure. However, the analysis is still useful as a sort of baseline minimum of property that is potentially at-risk. The identified inundation areas can be found in **Figure E.28**.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones.

Table E.48 presents the potential at-risk property. Both the number of buildings and the approximate improved value are presented

FIGURE E.28: DAM INUNDATION AREAS IN PEARL RIVER COUNTY



Source: Mississippi Department of Environmental Quality

TABLE E.48: ESTIMATED EXPOSURE OF IMPROVEMENTS TO THE DAM/LEVEE FAILURE HAZARD

Location	Dam Inundation Area	
	Approx. Number of Buildings	Approx. Improved Value
Picayune	0	$0
Poplarville	0	$0
Unincorporated Area	86	$70,289,000
PEARL RIVER COUNTY TOTAL*	**86**	**$70,289,000**

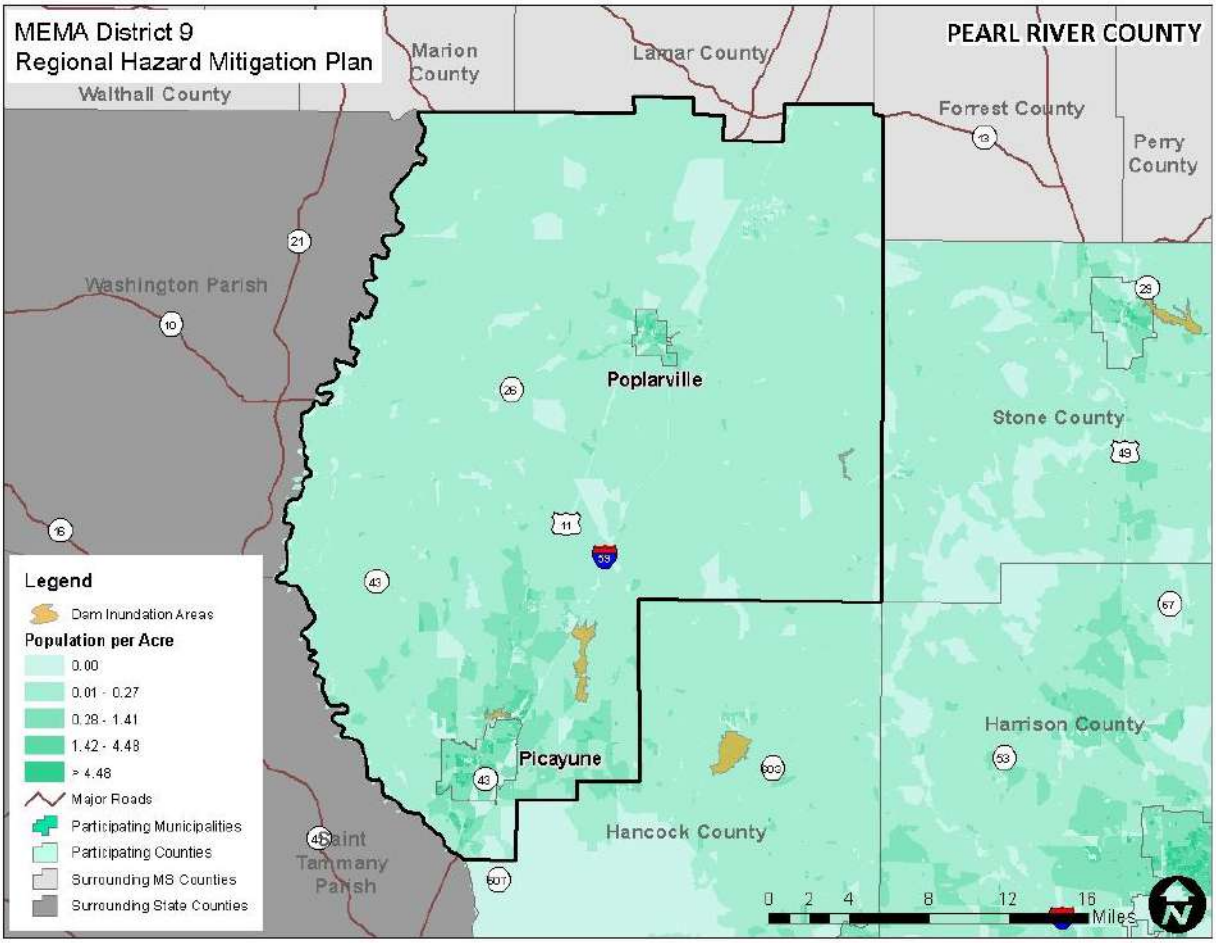
** As noted above, parcel value data was not available for Pearl River County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: MDEQ, Hazus 3.2

Social Vulnerability

Figure E.29 is presented to gain a better understanding of at-risk population by evaluating census block level population data against dam inundation areas. There are areas of concern in the southern part of

the county, although it should be noted that most of the population of the county is not at risk to a dam/levee failure.

FIGURE E.29: POPULATION DENSITY NEAR DAM INUNDATION AREAS IN PEARL RIVER COUNTY



Source: MDEQ, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there is 1 fire station located in dam inundation areas. A list of specific critical facilities and their associated risk can be found in **Table E.52** at the end of this subsection.

In conclusion, a dam has the potential to impact a number of existing and future buildings, facilities, and populations in Pearl River County, though this analysis is not all-encompassing in terms of risk to a dam or levee failure because inundation mapping is not available for all dams in the region.

CLIMATE CHANGE/SEA LEVEL RISE

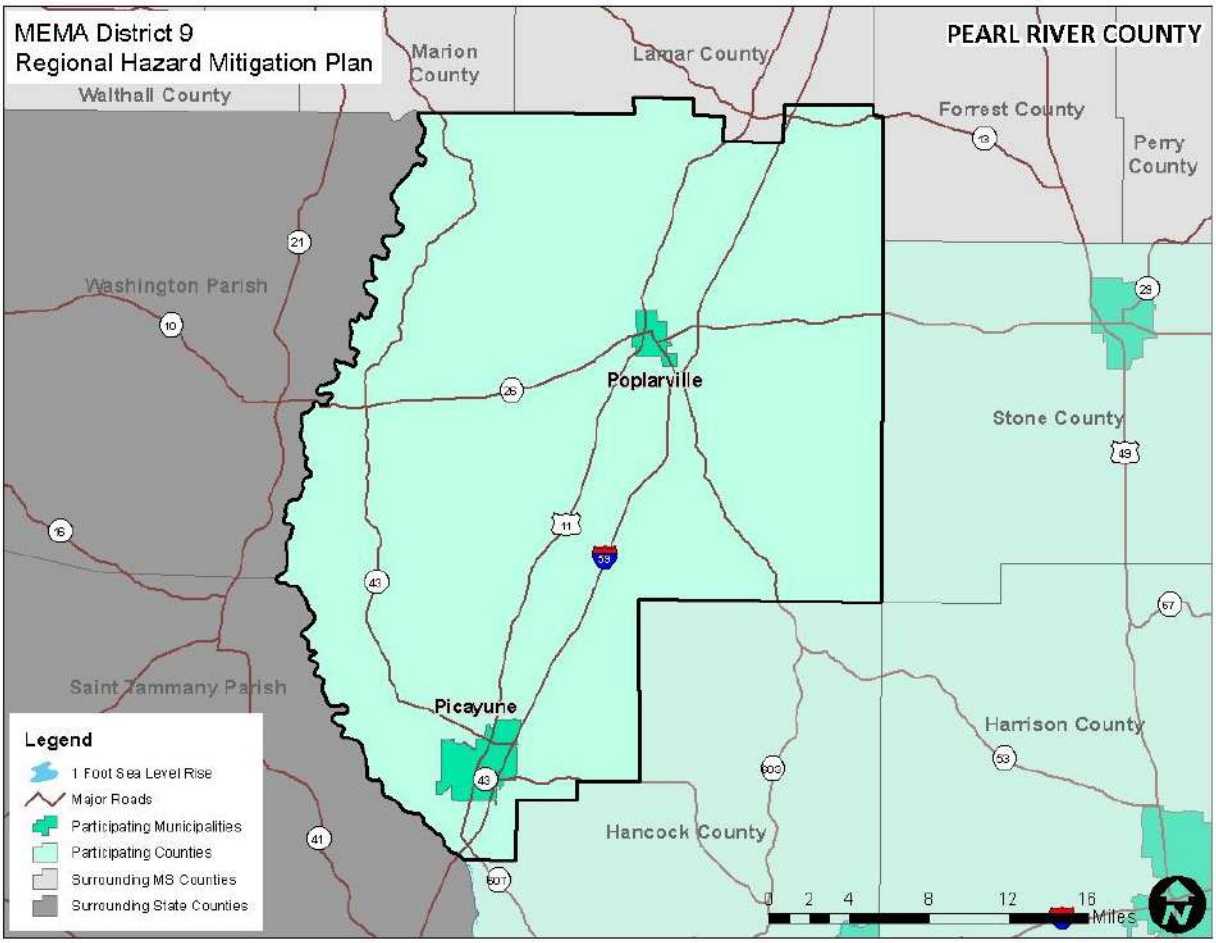
Most assessments carried out across the globe have concluded that climate change is a phenomenon that will impact our planet in the foreseeable future. Among others, the National Climate Assessment, International Panel on Climate Change, and National Oceanic and Atmospheric Administration all project that climate change will impact the United States and will have a major impact on coastal communities

due to the effects of sea level rise. As such, projections concerning sea level rise are important to incorporate into planning efforts in order to identify people and property that may be impacted.

In order to assess sea level rise risk, a GIS-based analysis was used to estimate exposure to future projections of sea level rise using data produced by the National Oceanic and Atmospheric Administration in combination with improved property records for the county. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within the inundation zone that would be created in the event of 1 foot, 3 feet, and 6 feet of sea level rise. A number of different sea level rise scenarios were available via NOAA (from 1 foot to 6 feet, at 1 foot intervals), however these scenarios were selected to demonstrate a range of potential sea level rise scenarios from low to moderate to high projections. These scenarios can be found in **Figure E.30**, **Figure E.31**, and **Figure E.32**.

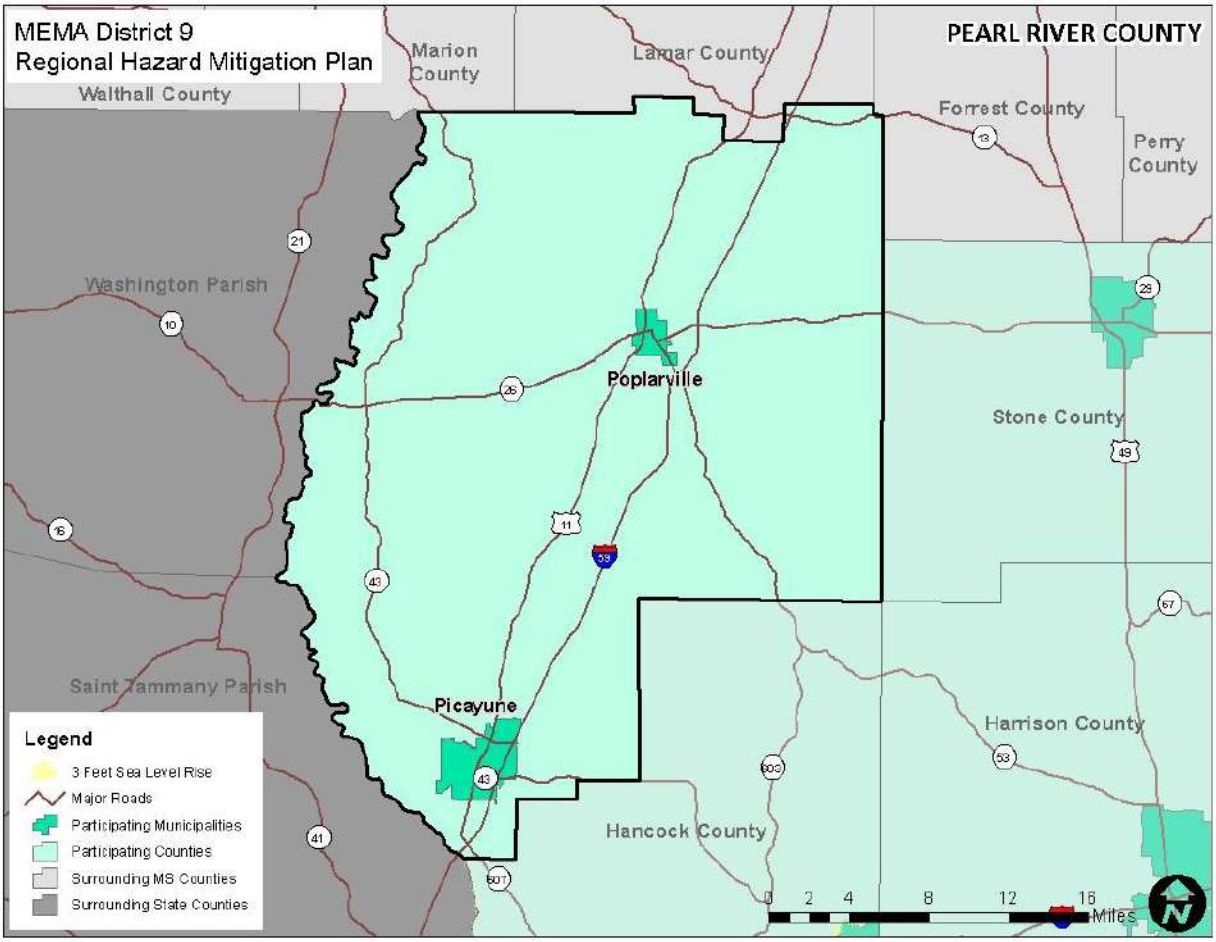
Table E.49 presents the potential at-risk property. Both the number of parcels and the approximate value are presented.

FIGURE E.30: 1 FOOT SEA LEVEL RISE SCENARIO IN PEARL RIVER COUNTY



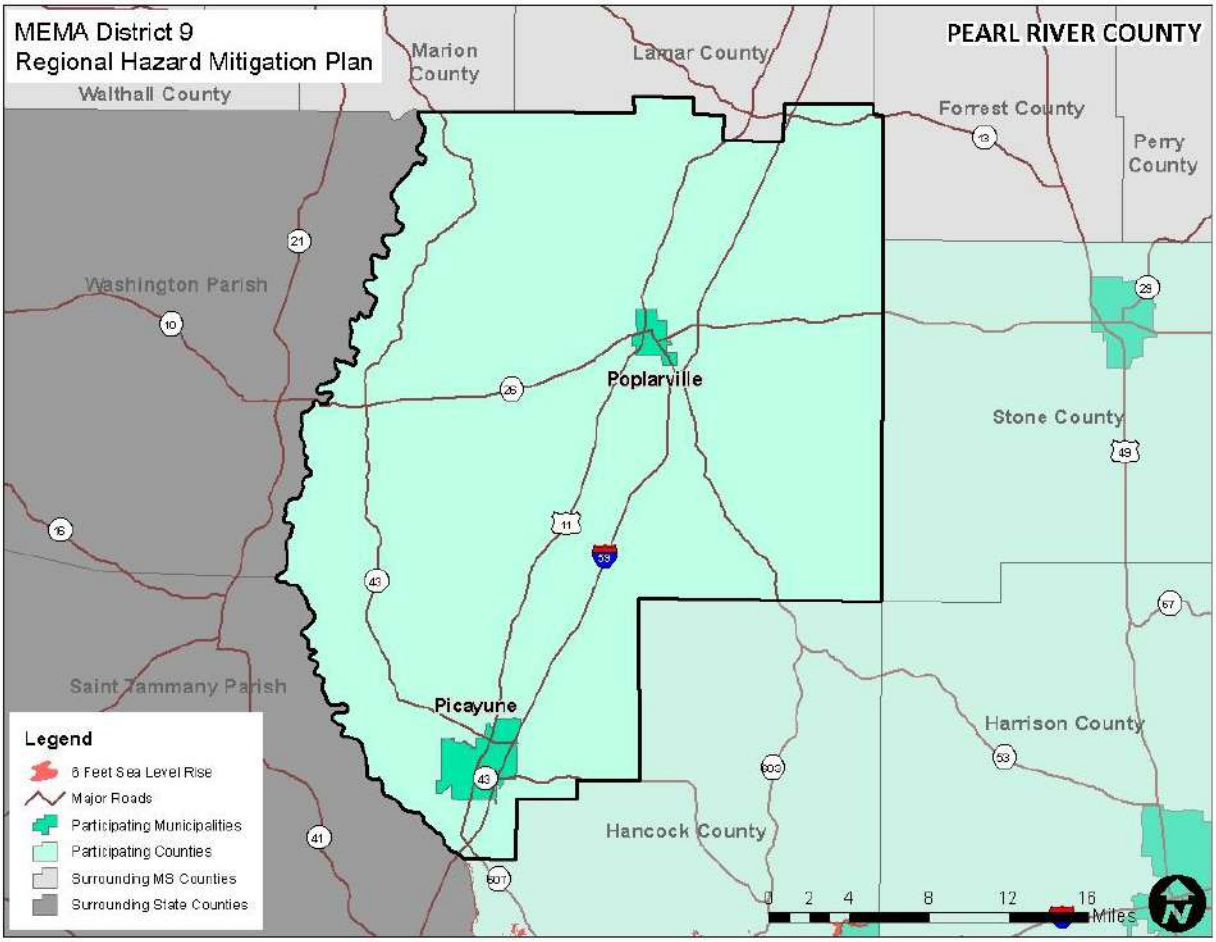
Source: NOAA

FIGURE E.31: 3 FEET SEA LEVEL RISE SCENARIO IN PEARL RIVER COUNTY



Source: NOAA

FIGURE E.32: 6 FEET SEA LEVEL RISE SCENARIO IN PEARL RIVER COUNTY



Source: NOAA

TABLE E.49: ESTIMATED EXPOSURE OF PARCELS TO THE SEA LEVEL RISE HAZARD

Location	1.0 foot		3.0 feet		6.0 feet	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Picayune	0	$0	0	$0	0	$0
Poplarville	0	$0	0	$0	0	$0
Unincorporated Area	0	$0	0	$0	0	$0
PEARL RIVER COUNTY TOTAL*	**0**	**$0**	**0**	**$0**	**0**	**$0**

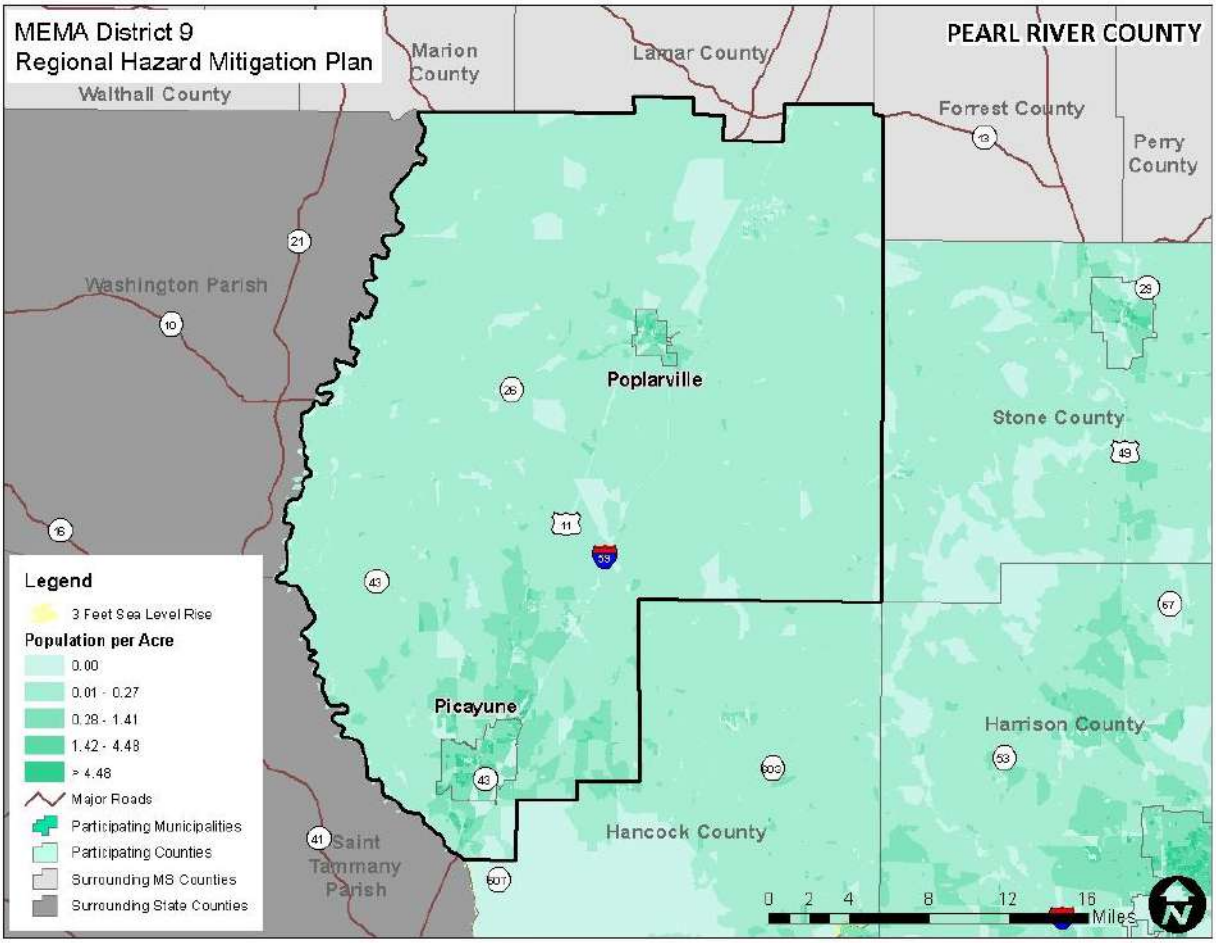
** As noted above, parcel value data was not available for Pearl River County. As a result of this data limitation, at risk Census block building counts and values of the structures were used where necessary.*
Source: NOAA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Figure E.33 is presented to gain a better understanding of at-risk population by evaluating census block level population data against the 3 feet sea level rise scenario. The three feet scenario was selected since

this is a moderate level projection. Based on this analysis, there is no part of the population in the county that is vulnerable to sea level rise.

FIGURE E.33: POPULATION DENSITY WITH 3 FEET SEA LEVEL RISE IN PEARL RIVER COUNTY



Source: NOAA, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are no facilities located in the 3 feet of sea level rise scenario inundation area. As mentioned above, this scenario was selected as it is a mid-range projection for sea level rise based on a number of studies. A list of specific critical facilities and their associated risk can be found in **Table E.52** at the end of this subsection.

CONCLUSIONS ON HAZARD VULNERABILITY

Table E.50 presents an overall summary of the community's vulnerability for each jurisdiction. This summary provides key problem statements and identifies the community's greatest vulnerabilities that will be addressed in the mitigation strategy.

TABLE E.50: SUMMARY OF VULNERABILITY FOR PEARL RIVER COUNTY

	Key Problem Statements
Pearl River County	Pearl River, Picayune, and Poplarville have a large amount of timber, open, and agriculture land, creating an enhanced risk to wildfires across the county. The county is also more vulnerable to drought which can damage crop yields or reduce stock and crop production in the agricultural sector, resulting in economic loss.

Table E.51 presents a summary of annualized loss for each hazard in Pearl River County. Due to the reporting of hazard damages primarily at the county level, it was difficult to determine an accurate annualized loss estimate for each municipality. Therefore, an annualized loss was determined through the damage reported through historical occurrences at the county level. These values should be used as an additional planning tool or measure risk for determining hazard mitigation strategies throughout the county.

It should also be noted that many of these estimates are based on incomplete data and likely underestimate the historic dollar damage sustained in each county. Especially for hazards such as extreme cold, extreme heat, hail, lightning, and winter weather, it is very likely that more damage occurred historically than has been identified.

TABLE E.51: ANNUALIZED LOSS FOR PEARL RIVER COUNTY

Hazard	Pearl River County
Flood-related Hazards	
Dam and Levee Failure	*Not Available*
Erosion	*Not Available*
Flood	$191,132
Storm Surge	$0
Fire-related Hazards	
Drought	*Not Available*
Lightning	$7,388
Wildfire	*Not Available*
Geologic Hazards	
Earthquake†	$5,000
Wind-related Hazards	
Extreme Cold	$0
Extreme Heat/Heat Wave	*Not Available*
Hailstorm	$0
Hurricane and Tropical Storm	$76,274,291
Severe Thunderstorm/High Wind	$373,483
Tornado	$173,388
Winter Weather	*Not Available*

Hazard	Pearl River County
Other Hazards	
Climate Change/Sea Level Rise	*Not Available*
Hazardous Materials Incident/Train Derailment	$7,961
Infectious Disease	*Not Available*

†Historic dollar damage was not available for this hazard, but since estimated annualized losses from Hazus were available, those numbers were used in this table.
*In this table, the term "Not Available" is used to indicate that no records of dollar losses for the particular hazard were recorded. This could be the case either because there were no events that caused dollar damage or because documentation of that particular type of event is not well kept.

As noted previously, all existing and future buildings and populations (including critical facilities) are vulnerable to impacts from atmospheric hazards such as drought and hailstorm. Some buildings may be more vulnerable to some of these hazards based on locations, construction, and building type. In addition, all populations are vulnerable to hazards like infectious disease which could presumably impact any segment of the population without regard to geographic location. **Table E.52** shows the critical facilities vulnerable to additional hazards analyzed in this section. The table lists those assets that are determined to be exposed to each of the identified hazards (marked with an "**X**").

TABLE E.52: AT-RISK CRITICAL FACILITIES IN PEARL RIVER COUNTY

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
PEARL RIVER COUNTY																										
Carriere Volunteer Fire Department 1		Fire Station		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Carriere Volunteer Fire Department 2 (Hide-A-Way Lake)		Fire Station	X	X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Carriere Volunteer Fire Department 3		Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Carriere Volunteer Fire Department 4 (Anchor Lake)		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Henleyfield Volunteer Fire Department 1		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Leetown Volunteer Fire Department		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
McNeill Volunteer Fire Department 1		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
North Central Volunteer Fire Department 2		Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Northeast Volunteer Fire Department 1		Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Northeast Volunteer Fire Department 2		Fire Station		X				X	X		X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Pearl River County Courthouse		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Pearl River County Road Department		Transportation		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Sewer Lift Station		Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
South Repeater	Picayune	Comm		X				X	X		X	X	X	X	X	X	X	X								X
Nicholson Volunteer Fire Department 1	Picayune	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Picayune Fire Department Central Station	Picayune	Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X			X
Picayune Fire Station No. 1	Picayune	Fire Station		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Picayune Fire Station No. 3	Picayune	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X		X	X			X	X	X
Pine Grove Volunteer Fire Department 1	Picayune	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Pine Grove Volunteer Fire Department 2	Picayune	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X					X			X
Southeast Volunteer Fire Department 1	Picayune	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Southeast Volunteer Fire Department 2	Picayune	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Covenant Health and Rehab	Picayune	Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Highland Community Hospital	Picayune	Medical		X				X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	X
Pearl River Dialysis Unit	Picayune	Medical		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Picayune Criminal Justice Center	Picayune	Police Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Picayune Police Department	Picayune	Police Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
County Office Building	Picayune	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
National Guard Amory	Picayune	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Picayune City Hall	Picayune	Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Picayune Public Works	Picayune	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
Pearl River County Resource Center/Manna Ministries	Picayune	Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Picayune 1st Baptist Church	Picayune	Shelter		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
Roseland Park Elementary	Picayune	Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Sewer Lift Station-203 Memorial Blvd.	Picayune	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Sewer Lift Station-703 Hwy. 11 North	Picayune	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Sewer Lift Station-Read Road	Picayune	Water/ Wastewater		X	X			X	X		X	X	X	X	X	X	X	X				X	X		X	X
Sewer Lift Station-South Beech	Picayune	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X		X	X			X	X	X
Sewer Lift Station-900 S. Beech	Picayune	Water/ Wastewater		X	X			X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X
Sewer Treatment Plant-Airport Road	Picayune	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X		X	X			X	X	X
Sewer Treatment Plant-Neal Road	Picayune	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X						X	X	X
Central Repeater	Poplarville	Comm		X				X	X		X	X	X	X	X	X	X	X								X
Emergency Communication's Tower	Poplarville	Comm		X				X	X		X	X	X	X	X	X	X	X								X
Poplarville Repeater	Poplarville	Comm		X				X	X		X	X	X	X	X	X	X	X								X
West Repeater	Poplarville	Comm		X				X	X		X	X	X	X	X	X	X	X								X
Pearl River County Emergency Management	Poplarville	EOC		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Amackertown Volunteer Fire Department Station 1	Poplarville	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Amackertown Volunteer Fire Department Station 2	Poplarville	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Crossroads Fire Department 1	Poplarville	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Derby/Whitesand Volunteer Fire Department 1	Poplarville	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Derby/Whitesand Volunteer Fire Department 2	Poplarville	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
North Central Volunteer Fire Department 1	Poplarville	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X								X
Poplarville Fire Department	Poplarville	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Steephollow Volunteer Fire Department 1	Poplarville	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Steephollow Volunteer Fire Department 2	Poplarville	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X
Steephollow Volunteer Fire Department 3	Poplarville	Fire Station		X				X	X		X	X	X	X	X	X	X	X								X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Steephollow Volunteer Fire Department 4	Poplarville	Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Pearl River County Hospital & Nursing Home	Poplarville	Medical		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Poplarville Police Department	Poplarville	Police Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
National Guard Amory	Poplarville	Public Facility		X	X			X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Poplarville City Hall	Poplarville	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Poplarville Public Works	Poplarville	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Poplarville 1st Baptist Church	Poplarville	Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Poplarville Middle School	Poplarville	Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X		X	X
Sewer Treatment Plant	Poplarville	Water/ Wastewater		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

E.4 PEARL RIVER COUNTY CAPABILITY ASSESSMENT

This subsection discusses the capability of Pearl River County to implement hazard mitigation activities. More information on the purpose and methodology used to conduct the assessment can be found in Section 7: *Capability Assessment*.

E.4.1 Planning and Regulatory Capability

Table E.53 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for Pearl River County. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. A dagger (†) indicates that the given item is administered for that municipality by the county. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the MEMA District 9 Regional Hazard Mitigation Plan.

TABLE E.53: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Planning Tool/Regulatory Tool	Hazard Mitigation Plan	Threat and Hazard Identification and Risk Assessment (THIRA)	Comprehensive Land Use Plan	Floodplain Management Plan/Flood Mitigation Plan	Open Space Management Plan (Parks & Rec/Greenway Plan	Stormwater Management Plan/Ordinance	Natural Resource Protection Plan	Flood Response Plan	Emergency Operations Plan	Emergency Management Accreditation Program (EMAP Accreditation)	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Unified Development Ordinance	Post-Disaster Redevelopment/ Reconstruction Plan/ Ordinance	Building Code	Fire Code	National Flood Insurance Program (NFIP)	NFIP Community Rating System (CRS Program)
PEARL RIVER COUNTY	✓		✓						✓						✓		✓		✓			✓	✓	✓	✓
Picayune	†		✓						✓					✓	†		✓	✓	✓			✓	✓	✓	✓
Poplarville	†		✓						†						†		✓	✓	✓			✓	✓	✓	

A more detailed discussion on the county's planning and regulatory capabilities follows.

EMERGENCY MANAGEMENT

Hazard Mitigation Plan

Pearl River County has previously adopted a hazard mitigation plan. The cities of Picayune and Poplarville were also included in this plan.

Emergency Operations Plan
Pearl River County maintains an emergency operations plan through its Emergency Management Agency. The City of Poplarville is also covered by this plan. The City of Picayune has adopted a municipal-level emergency operations plan.

GENERAL PLANNING

Comprehensive Land Use Plan
Pearl River County has adopted a county comprehensive plan. The cities of Picayune and Poplarville have also adopted municipal comprehensive plans.

Capital Improvements Plan
Pearl River County has not adopted a capital improvements plan. However, the City of Picayune has adopted a capital improvements plan.

Zoning Ordinance
Pearl River County does not have a zoning ordinance in place, and overregulation is a serious concern for the public. However, the cities of Picayune and Poplarville have adopted zoning ordinances.

Subdivision Ordinance
Pearl River County and the cities of Picayune and Poplarville have each adopted a subdivision ordinance.

Building Codes, Permitting, and Inspections
After Hurricane Katrina, Mississippi Legislature mandated the adoption of the International Building Code and International Residential Code in five coastal counties including Pearl River County. The cities of Picayune and Poplarville have also adopted building codes.

FLOODPLAIN MANAGEMENT

Table E.54 provides NFIP policy and claim information for each participating jurisdiction in Pearl River County.

TABLE E.54: NFIP POLICY AND CLAIM INFORMATION

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
PEARL RIVER COUNTY†	05/17/90	06/03/08	732	$154,033,900	374	$9,905,285
Picayune	03/04/80	06/03/08	255	$56,011,200	194	$3,579,193
Poplarville	11/08/07	(NSFHA)	2	$700,000	0	$0

†Includes unincorporated areas of county only
(NSFHA) – No Special Flood Hazard Area – All Zone C
Source: NFIP Community Status information as of 1/10/2017; NFIP claims and policy information as of 10/31/2016

Community Rating System
Pearl River County (Class 8) and the City of Picayune (Class 8) participate in the CRS. Participation in the CRS program should be considered as a mitigation action by the City of Poplarville.

Flood Damage Prevention Ordinance
All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. Pearl River County and the cities of Picayune and Poplarville all participate in the NFIP and have adopted flood damage prevention ordinances.

E.4.2 Administrative and Technical Capability

Table E.55 provides a summary of the capability assessment results for Pearl River County with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill. A dagger (†) indicates a county-level staff member(s) provides the specified knowledge or skill to that municipality.

TABLE E.55: RELEVANT STAFF/PERSONNEL RESOURCES

Staff/Personnel Resource	Planners with knowledge of land development/land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Emergency Manager	Floodplain Manager	Land Surveyors	Scientists familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in GIS and/or Hazus	Resource development staff or grant writers
PEARL RIVER COUNTY	✓	✓	✓	✓	✓		✓	✓	✓	✓
Picayune	✓	✓	✓	†	✓		†	✓	†	✓
Poplarville	†	✓		†	✓		†	✓	†	✓

Credit for having a floodplain manager was given to those jurisdictions that have a flood damage prevention ordinance, and therefore an appointed floodplain administrator, regardless of whether the appointee was dedicated solely to floodplain management. Credit was given for having a scientist familiar with the hazards of the community if a jurisdiction has a Cooperative Extension Service or Soil and Water Conservation Department. Credit was also given for having staff with education or expertise to assess the community's vulnerability to hazards if a staff member from the jurisdiction was a participant on the existing hazard mitigation plan's planning committee.

E.4.3 Fiscal Capability

Table E.56 provides a summary of the results for Pearl River County with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource has previously been used to implement hazard mitigation actions. A dagger (†) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds).

TABLE E.56: RELEVANT FISCAL RESOURCES

Fiscal Tool/Resource	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes (or taxing districts)	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation, Revenue, and/or Special Tax Bonds	Partnering Arrangements or Intergovernmental Agreements	Other: HMGP and other federal, state, and private grants/resources
PEARL RIVER COUNTY	†	✓	†	†	†			†	†	✓
Picayune	†	✓	†	†	†			†	†	✓
Poplarville		✓	†		†			†	†	✓

E.4.4 Political Capability

During the months immediately following a disaster, local public opinion in Pearl River County is more likely to shift in support of hazard mitigation efforts.

Table E.57 provides a summary of the results for Pearl River County with regard to political capability. A checkmark (✓) indicates the expected degree of political support by local elected officials in terms of adopting/funding information.

TABLE E.57: LOCAL POLITICAL SUPPORT

Political Support	Limited	Moderate	High
PEARL RIVER COUNTY			✓
Picayune			✓
Poplarville		✓	

E.4.5 Conclusions on Local Capability

Table E.58 shows the results of the capability assessment using the designed scoring methodology described in Section 7: *Capability Assessment*. The capability score is based solely on the information found in existing hazard mitigation plans and readily available on the jurisdictions' government websites. This information was reviewed by all jurisdictions and each jurisdiction provided feedback on the information included in the capability assessment. Local government input was vital to identifying capabilities. According to the assessment, the average local capability score for the county and its jurisdictions is 42.7, which falls into the moderate capability ranking.

TABLE E.58: CAPABILITY ASSESSMENT RESULTS

Jurisdiction	Overall Capability Score	Overall Capability Rating
PEARL RIVER COUNTY	47	Moderate
Picayune	46	Moderate
Poplarville	35	Moderate

E.5 PEARL RIVER COUNTY MITIGATION STRATEGY

This subsection provides the blueprint for Pearl River County to follow in order to become less vulnerable to its identified hazards. It is based on general consensus of the Regional Hazard Mitigation Council and the findings and conclusions of the capability assessment and risk assessment. Additional Information can be found in Section 8: *Mitigation Strategy* and Section 9: *Mitigation Action Plan*.

E.5.1 Mitigation Goals

Pearl River County developed nine mitigation goals in coordination with the other participating MEMA District 9 Region jurisdictions. The regional mitigation goals are presented in **Table E.59**.

TABLE E.59: MEMA DISTRICT 9 REGIONAL MITIGATION GOALS

	Goal
Goal #1	Minimize risk and vulnerability of the community to hazards.
Goal #2	Minimize loss of life, injury, and damages to property, the economy, and the environment.
Goal #3	Minimize loss to critical facilities and infrastructure, utilities, and services.
Goal #4	Improve, expand, and enhance public education, awareness, and preparedness.
Goal #5	Build and enhance local mitigation capabilities to improve the region's ability to prepare for, respond to, and recover.
Goal #6	Enter into partnerships with neighboring jurisdictions, federal and state agencies, and others to share information and develop a more hazard resistant community.
Goal #7	Enhance response procedures and emergency management capabilities.
Goal #8	Reduce economic losses, minimize social disruptions, and maintain quality of life.
Goal #9	Protect the environment and natural resources.

E.5.2 Mitigation Action Plan

The mitigation actions proposed by Pearl River County and the cities if Picayune and Poplarville are listed in the following individual Mitigation Action Plans.

Pearl River County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Develop a Stormwater Management Plan for Pearl River County.	Flood	High	County Planning and Development; Board of Supervisors; Picayune City Council	U.S. Army Corps of Engineers; Hazard Mitigation Grant Program	2022	(Action 1.1 in previous plan) The county has not developed a formal Stormwater Management Plan. Although stormwater management regulations are in place and being enforced, the county will keep this action in place as it works towards an official plan.
P-2	Develop a capital improvement program that includes drainage.	Flood	Moderate	Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Local funding	2022	(Action 1.2 in previous plan) The county has developed a capital improvement program and some drainage projects have been included in this program in the past. However, there are a number of drainage projects the county would like to implement that are not part of the program currently, so the county will continue to attempt to include these in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-3	Establish a policy of extra-territorial review of subdivisions adjacent to jurisdictional boundaries to insure a comprehensive review of cumulative impacts within the watershed.	All	High	Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Local budget	2022	(Action 1.5 in previous plan) The county has worked with the cities to allow extra-territorial review of subdivisions outside jurisdictional boundaries, but as development continues within the county, this action will need to be retained to ensure comprehensive watershed impacts are addressed.
P-4	Establish a comprehensive drainage model.	Flood	Moderate	Pearl River County Department of Planning and Development; City of Picayune Engineering Department; City of Poplarville Public Works; Pearl River County Tax Office	Dues to regional planning agency (SMPDD)	2022	(Action 2.1 in previous plan) The county and cities have worked with the regional planning agency to establish a comprehensive drainage model, however, as conditions change in the watershed and development takes place, this model will need to be updated, so this action will stay in the plan.
P-5	Provide updated information to the U.S. Army Corps of Engineers through a grant program entitle planning assistance to states.	Flood	Moderate	Pearl River County Department of Planning and Development; Pearl River County Mapping Office; U.S. Army Corps of Engineers	USA Planning Assistance to States	2022	(Action 2.3 in previous plan) The county has worked with USACE and provided local information when needed. The county will continue to work with the USACE to try to help with this program and future planning efforts so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-6	Establish pre-disaster maintenance procedures for right of way along county roadways.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Road Department; Pearl River County Engineer	Local budgets	2022	(Action 2.4 in previous plan) The county has established some pre-disaster maintenance procedures, but these procedures will need to be reviewed and updated and new procedures may need to be added. Therefore, the action will be kept in place.
P-7	The county will establish and adopt a policy on maintaining drainage ways. This policy will include regularly scheduled maintenance and the establishment of written tracking policy.	Flood	High	Pearl River County Road Manager	Local budgets	2022	(Action 2.5 in previous plan) The county has established a policy on maintaining drainage ways, but these policies will need to be reviewed and updated in the coming years, so this action will be retained.
P-8	Continue an ordinance and policy to determine and require the correct size culverts.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Department of Planning and Development	Local funds	2022	(Action 2.6 in previous plan) The county has established an ordinance/policy to determine and require the correct size culverts, but this program will need to be re-evaluated in the coming years, so this action will be retained.
P-9	Establish a policy of extra-territorial review of subdivisions adjacent to jurisdictional boundaries to insure a comprehensive review of cumulative impacts within the watershed.	Flood	High	Pearl River County Board of Supervisors; City of Picayune Mayor and City Council; City of Poplarville Mayor and Board of Alderman	Local funding	Deleted	(Action 2.7 in previous plan) This action was combined with P-3.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-10	Minimize damage to structure through code enforcement.	All	Moderate	Pearl River County Board of Supervisors; City of Picayune Mayor and City Council; City of Poplarville Mayor and Board of Alderman	Local funds and revenues	2022	(Action 2.10 in previous plan) The county has worked to minimize damage to structures through code enforcement, but implementation of this action likely needs to be more vigorous, so this action will be retained.
P-11	Adopt and implement a regulation requiring building owners to retrofit their structures for flood damage if the structure's insured loss exceeds 50% or more of the structure's value.	Flood	Moderate	Pearl River County Department of Planning and Development; City of Picayune Planning Department	Local funding	2022	(Action 2.11 in previous plan) The county has implemented a regulation requiring building owners to retrofit structures if their losses exceed the structure's value by more than 50%.
P-12	Establish a formal policy to invite countywide staff to attend site plan review for projects that are immediately adjacent to the jurisdiction or will impact the jurisdiction.	All	Moderate	Pearl River County Board of Supervisors; City Council of Picayune; Poplarville Board of Alderman	Local revenues	2020	(Action 3.1 in previous plan) A formal policy has not been established to invite countywide staff to attend site plan reviews, but the county will work with the cities to develop and implement this action going forward.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Property Protection							
PP-1	Reduce the number of repetitive loss properties within the county by elevating and where elevation is not an option, purchase properties at owner's request.	Flood	High	Pearl River County Board of Supervisors; Picayune Board of Alderman; Pearl River County Department of Planning and Development; Picayune Planning and Development Department	Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance Grants (FMA), Severe Repetitive Loss Grants (SRL), MEMA Planning Funds	2022	(Action 2.9 in previous plan) The county has implemented mitigation projects to address a number of repetitive loss properties, but there are still a number of these properties throughout the county so this action will be retained as the county attempts to further reduce its number of repetitive loss properties.
Natural Resource Protection							
NRP-1	Continue and expand stream protection and preservation programs to secure easements to protect riparian areas.	Flood	High	Mississippi Department of Wildfire and Parks; Pearl River County Department of Planning and Development	Department of Interior; Soil and Water Conservation	2022	(Action 1.3 in previous plan) The county has worked to secure easements to protect many riparian areas in the county, but going forward, the county will want to continue this program and expand riparian protection in other areas, so this action will remain in place.
NRP-2	Continue to preserve green spaces.	Flood	High	Pearl River County Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Private	2022	(Action 1.4 in previous plan) The county has worked to preserve green spaces in many areas, but as continual growth and development take place, the county will need to continue to work towards preserving green spaces, so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Structural Projects							
SP-1	Follow through with Alligator Branch improvements.	Flood	Moderate	Pearl River County Board of Supervisors	Hazard Mitigation Grant Program	2022	(Action 2.8 in previous plan) The county has not carried out the Alligator Branch improvements, so this action will be retained in the plan.
Emergency Services							
ES-1	Through a Mississippi/Louisiana Partnership, establish a first responders shelter to house personnel and parking space for necessary equipment until the emergency has passed and personnel and equipment can be returned to Louisiana. Also, establish and man an information center to pass on critical information to returning evacuees where evacuees can temporarily remain until it is safe to return to their homes.	Hurricane	Moderate	Pearl River County Civil Defense Agency; Pearl River County Board of Supervisors; Louisiana Emergency Management Agency; Mississippi Emergency Management Agency	FEMA Grants, local emergency management funding	2022	(Action 3.2 in previous plan) The county has worked with surrounding states and counties to establish partnerships for sheltering responders and an information center for returning evacuees. This action will need to be reviewed in the coming years to ensure that these operations are ready for disaster implementation so this action will be kept in the plan.
Public Education and Awareness							
PEA-1	Provide easily accessible tax map information to the municipalities in the county, insurance agents, realtors, banking interest, and individuals.	Flood	High	Pearl River Mapping Office; Pearl River County Tax Office	Local funds	2022	(Action 2.2 in previous plan) The county has provided tax map information that is easily available to the public via its online tax map viewer. This information will need to be continually updated as changes are made to the tax map, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Establish monthly educational programs for local government and staff.	All	High	Pearl River County Department of Planning and Development; Picayune Planning and Development Office	Salaries	2022	(Action 4.1 in previous plan) The county has carried out educational programs for local governments and staff, but these programs have not always been held on a monthly basis so the county will work on improving this program so it is more consistent and will retain this action.
PEA-3	Continue outreach to the community, including local officials, about the Hazard Mitigation Grant Program and requirements of elevation and purchase programs.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Department of Planning and Development	HMGP	2022	(Action 4.2 in previous plan) The county has reached out to the public and city officials to keep them informed about HMGP and other grant programs, but there will likely be a need for continued output of information as officials change and as many officials may need refreshers on the subject. As such, this program will be kept in place.
PEA-4	Establish a hazard mitigation library at the public library.	All	High	Picayune CRS Coordinator; Pearl River County Library System; Pearl River County Department of Planning and Development	Local funding	2020	(Action 4.3 in previous plan) The county has established a hazard mitigation library at the public library, but these materials are in need of updating, so this action will be left in place to ensure materials are current.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-5	Develop a brochure "Hazards in Pearl River County" that will detail hazards within the county.	Flood, Hurricane, Tornado, Wind	High	Pearl River County Emergency Management	Local funding	2020	(Action 4.4 in previous plan) The county has developed a number of materials for public outreach, but these materials will need to be updated in the coming years, so this action will remain in place.
PEA-6	Develop three programs for "Focus on Pearl River County" on WRJW.	Hurricane, Flood, Tornado, Wind	High	Pearl River County Emergency Management; Pearl River County Planning and Development; WRJW	Local funds	2022	(Action 4.5 in previous plan) The county has developed some programs for WRJW in the past, but during the next several years, additional programs may need to be developed to provide more current data, so this action will remain in place.
PEA-7	Establish a speaker's forum.	Hurricane, Tornado, Flood, Wind Storm	High	Pearl River Emergency Management	Local funds	2022	(Action 4.6 in previous plan) The county will need to work on establishing a speaker's forum as this has not yet been consistently established yet. This action will remain in place.
PEA-8	Establish a hazard mitigation and disaster preparedness booth at the Blueberry Festival and the Picayune Street Fair.	Flood, Hurricane, Tornado, Wind Storm	High	Pearl River County Emergency Management; Picayune CRS Coordinator	Local funding	2022	(Action 4.7 in previous plan) In the past, the county has had a hazard mitigation and disaster preparedness booth at these festivals and this has been a successful public outreach event, so this action will be kept in place as the county continues to implement this action and consider other public events for outreach.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-9	Encourage the Chambers of Commerce, PRCDA, and Civil Defense to develop a program on business continuity planning for businesses.	Hurricane, Flood, Tornado	Low	Picayune and Poplarville Chamber of Commerce	Local	2022	(Action 4.8 in previous plan) The county has encouraged the development of a program on business continuity planning and some outreach has been done to try to get local businesses to think about continuity plans, but these is still a great deal of work to be done as many businesses do not have this in place. This action will remain in the plan.
PEA-10	Advise school officials and teachers of availability of education materials for children.	Hurricane, Flood, Tornado, High Wind, Thunderstorm	Moderate	Pearl River Emergency Management; Picayune CRS Coordinator	Local revenues	2022	(Action 4.9 in previous plan) The county has reached out to many school officials to try to promulgate educational materials to children and this has been successful, but additional efforts are needed to continue and improve the program's reach going forward so this action will remain in place.

City of Picayune Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Develop a Stormwater Management Plan for Pearl River County.	Flood	High	County Planning and Development; Board of Supervisors; Picayune City Council	U.S. Army Corps of Engineers; Hazard Mitigation Grant Program	2022	(Action 1.1 in previous plan) The county has not developed a formal Stormwater Management Plan. Although stormwater management regulations are in place and being enforced, the county will keep this action in place as it works towards an official plan.
P-2	Develop a capital improvement program that includes drainage.	Flood	Moderate	Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Local funding	2022	(Action 1.2 in previous plan) The county has developed a capital improvement program and some drainage projects have been included in this program in the past. However, there are a number of drainage projects the county would like to implement that are not part of the program currently, so the county will continue to attempt to include these in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-3	Establish a policy of extra-territorial review of subdivisions adjacent to jurisdictional boundaries to insure a comprehensive review of cumulative impacts within the watershed.	All	High	Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Local budget	2022	(Action 1.5 in previous plan) The county has worked with the cities to allow extra-territorial review of subdivisions outside jurisdictional boundaries, but as development continues within the county, this action will need to be retained to ensure comprehensive watershed impacts are addressed.
P-4	Establish a comprehensive drainage model.	Flood	Moderate	Pearl River County Department of Planning and Development; City of Picayune Engineering Department; City of Poplarville Public Works; Pearl River County Tax Office	Dues to regional planning agency (SMPDD)	2022	(Action 2.1 in previous plan) The county and cities have worked with the regional planning agency to establish a comprehensive drainage model, however, as conditions change in the watershed and development takes place, this model will need to be updated, so this action will stay in the plan.
P-5	Provide updated information to the U.S. Army Corps of Engineers through a grant program entitle planning assistance to states.	Flood	Moderate	Pearl River County Department of Planning and Development; Pearl River County Mapping Office; U.S. Army Corps of Engineers	USA Planning Assistance to States	2022	(Action 2.3 in previous plan) The city has worked with USACE and provided local information when needed. The city will continue to work with the USACE to try to help with this program and future planning efforts so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-6	Establish pre-disaster maintenance procedures for right of way along county roadways.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Road Department; Pearl River County Engineer	Local budgets	2022	(Action 2.4 in previous plan) The county has established some pre-disaster maintenance procedures, but these procedures will need to be reviewed and updated and new procedures may need to be added. Therefore, the action will be kept in place.
P-7	The county will establish and adopt a policy on maintaining drainage ways. This policy will include regularly scheduled maintenance and the establishment of written tracking policy.	Flood	High	Pearl River County Road Manager	Local budgets	2022	(Action 2.5 in previous plan) The county has established a policy on maintaining drainage ways, but these policies will need to be reviewed and updated in the coming years, so this action will be retained.
P-8	Continue an ordinance and policy to determine and require the correct size culverts.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Department of Planning and Development	Local funds	2022	(Action 2.6 in previous plan) The county has established an ordinance/policy to determine and require the correct size culverts, but this program will need to be re-evaluated in the coming years, so this action will be retained.
P-9	Establish a policy of extra-territorial review of subdivisions adjacent to jurisdictional boundaries to insure a comprehensive review of cumulative impacts within the watershed.	Flood	High	Pearl River County Board of Supervisors; City of Picayune Mayor and City Council; City of Poplarville Mayor and Board of Alderman	Local funding	Deleted	(Action 2.7 in previous plan) This action was combined with P-3.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-10	Minimize damage to structure through code enforcement.	All	Moderate	Pearl River County Board of Supervisors; City of Picayune Mayor and City Council; City of Poplarville Mayor and Board of Alderman	Local funds and revenues	2022	(Action 2.10 in previous plan) The county has worked to minimize damage to structures through code enforcement, but implementation of this action likely needs to be more vigorous, so this action will be retained.
P-11	Adopt and implement a regulation requiring building owners to retrofit their structures for flood damage if the structure's insured loss exceeds 50% or more of the structure's value.	Flood	Moderate	Pearl River County Department of Planning and Development; City of Picayune Planning Department	Local funding	2022	(Action 2.11 in previous plan) The county has implemented a regulation requiring building owners to retrofit structures if their losses exceed the structure's value by more than 50%.
P-12	Establish a formal policy to invite countywide staff to attend site plan review for projects that are immediately adjacent to the jurisdiction or will impact the jurisdiction.	All	Moderate	Pearl River County Board of Supervisors; City Council of Picayune; Poplarville Board of Alderman	Local revenues	2020	(Action 3.1 in previous plan) A formal policy has not been established to invite countywide staff to attend site plan reviews, but the county will work with the cities to develop and implement this action going forward.
P-13	File an amendment to the Community Rating System application requesting additional CRS credit to further lower the city's NFIP CRS application.	Flood	High	Picayune Planning and Building Code	FEMA/MEMA HMGP Planning Grant	2020	(Action A.1 in previous plan) The city has been participating in the CRS, but it would like to continue to lower its rating and so will continue to address items to gain more credits and improve its score.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-14	Request funding to prepare a repetitive loss plan for the city, identifying and cataloging all repetitive loss properties, ownership, and whether or not owner is interested in mitigation activities.	Flood	High	Picayune Planning and Building Code	FEMA/MEMA HMGP Planning Grant	2022	(Action A.2 in previous plan) The city has taken a number of steps to plan for and implement a program that will reduce the number of repetitive loss properties in the city. This plan is still being enacted, so this action will remain in place.
P-15	Adopt the International Building Codes.	Wind, Flood, Earthquake, Tornado	High	Picayune Planning and Building	Local General Funds	2022	(Action A.4 in previous plan) The city has adopted the IBC and will continue to enforce this code, although it will also want to continue to improve enforcement of this code going forward, so this action will remain in place.
Property Protection							
PP-1	Reduce the number of repetitive loss properties within the county by elevating and where elevation is not an option, purchase properties at owner's request.	Flood	High	Pearl River County Board of Supervisors; Picayune Board of Alderman; Pearl River County Department of Planning and Development; Picayune Planning and Development Department	Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance Grants (FMA), Severe Repetitive Loss Grants (SRL), MEMA Planning Funds	2022	(Action 2.9 in previous plan) The county has implemented mitigation projects to address a number of repetitive loss properties, but there are still a number of these properties throughout the county so this action will be retained as the county attempts to further reduce its number of repetitive loss properties.
PP-2	Reduce the number of repetitive loss properties by requesting grant funding to acquire or to mitigate additional repetitive loss structures.	Flood	High	Picayune Planning and Building Code	FEMA/MEMA HMGP Planning Grant	Deleted	(Action A.3 in previous plan) This action was combined with PP-1.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Natural Resource Protection							
NRP-1	Continue and expand stream protection and preservation programs to secure easements to protect riparian areas.	Flood	High	Mississippi Department of Wildfire and Parks; Pearl River County Department of Planning and Development	Department of Interior; Soil and Water Conservation	2022	(Action 1.3 in previous plan) The county has worked to secure easements to protect many riparian areas in the county, but going forward, the county will want to continue this program and expand riparian protection in other areas, so this action will remain in place.
NRP-2	Continue to preserve green spaces.	Flood	High	Pearl River County Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Private	2022	(Action 1.4 in previous plan) The county has worked to preserve green spaces in many areas, but as continual growth and development take place, the county will need to continue to work towards preserving green spaces, so this action will be retained.
Structural Projects							
SP-1	Follow through with Alligator Branch improvements.	Flood	Moderate	Pearl River County Board of Supervisors	Hazard Mitigation Grant Program	2022	(Action 2.8 in previous plan) The county has not carried out the Alligator Branch improvements, so this action will be retained in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Emergency Services							
ES-1	Through a Mississippi/Louisiana Partnership, establish a first responders shelter to house personnel and parking space for necessary equipment until the emergency has passed and personnel and equipment can be returned to Louisiana. Also, establish and man an information center to pass on critical information to returning evacuees where evacuees can temporarily remain until it is safe to return to their homes.	Hurricane	Moderate	Pearl River County Civil Defense Agency; Pearl River County Board of Supervisors; Louisiana Emergency Management Agency; Mississippi Emergency Management Agency	FEMA Grants, local emergency management funding	2022	(Action 3.2 in previous plan) The county has worked with surrounding states and counties to establish partnerships for sheltering responders and an information center for returning evacuees. This action will need to be reviewed in the coming years to ensure that these operations are ready for disaster implementation so this action will be kept in the plan.
Public Education and Awareness							
PEA-1	Provide easily accessible tax map information to the municipalities in the county, insurance agents, realtors, banking interest, and individuals.	Flood	High	Pearl River Mapping Office; Pearl River County Tax Office	Local funds	2022	(Action 2.2 in previous plan) The county has provided tax map information that is easily available to the public via its online tax map viewer. This information will need to be continually updated as changes are made to the tax map, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Establish monthly educational programs for local government and staff.	All	High	Pearl River County Department of Planning and Development; Picayune Planning and Development Office	Salaries	2022	(Action 4.1 in previous plan) The county has carried out educational programs for local governments and staff, but these programs have not always been held on a monthly basis so the county will work on improving this program so it is more consistent and will retain this action.
PEA-3	Continue outreach to the community, including local officials, about the Hazard Mitigation Grant Program and requirements of elevation and purchase programs.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Department of Planning and Development	HMGP	2022	(Action 4.2 in previous plan) The county has reached out to the public and city officials to keep them informed about HMGP and other grant programs, but there will likely be a need for continued output of information as officials change and as many officials may need refreshers on the subject. As such, this program will be kept in place.
PEA-4	Establish a hazard mitigation library at the public library.	All	High	Picayune CRS Coordinator; Pearl River County Library System; Pearl River County Department of Planning and Development	Local funding	2020	(Action 4.3 in previous plan) The county has established a hazard mitigation library at the public library, but these materials are in need of updating, so this action will be left in place to ensure materials are current.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-5	Develop a brochure "Hazards in Pearl River County" that will detail hazards within the county.	Flood, Hurricane, Tornado, Wind	High	Pearl River County Emergency Management	Local funding	2020	(Action 4.4 in previous plan) The county has developed a number of materials for public outreach, but these materials will need to be updated in the coming years, so this action will remain in place.
PEA-6	Develop three programs for "Focus on Pearl River County" on WRJW.	Hurricane, Flood, Tornado, Wind	High	Pearl River County Emergency Management; Pearl River County Planning and Development; WRJW	Local funds	2022	(Action 4.5 in previous plan) The county has developed some programs for WRJW in the past, but during the next several years, additional programs may need to be developed to provide more current data, so this action will remain in place.
PEA-7	Establish a speaker's forum.	Hurricane, Tornado, Flood, Wind Storm	High	Pearl River Emergency Management	Local funds	2022	(Action 4.6 in previous plan) The county will need to work on establishing a speaker's forum as this has not yet been consistently established yet. This action will remain in place.
PEA-8	Establish a hazard mitigation and disaster preparedness booth at the Blueberry Festival and the Picayune Street Fair.	Flood, Hurricane, Tornado, Wind Storm	High	Pearl River County Emergency Management; Picayune CRS Coordinator	Local funding	2022	(Action 4.7 in previous plan) In the past, the county has had a hazard mitigation and disaster preparedness booth at these festivals and this has been a successful public outreach event, so this action will be kept in place as the county continues to implement this action and consider other public events for outreach.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-9	Encourage the Chambers of Commerce, PRCDA, and Civil Defense to develop a program on business continuity planning for businesses.	Hurricane, Flood, Tornado	Low	Picayune and Poplarville Chamber of Commerce	Local	2022	(Action 4.8 in previous plan) The county has encouraged the development of a program on business continuity planning and some outreach has been done to try to get local businesses to think about continuity plans, but these is still a great deal of work to be done as many businesses do not have this in place. This action will remain in the plan.
PEA-10	Advise school officials and teachers of availability of education materials for children.	Hurricane, Flood, Tornado, High Wind, Thunderstorm	Moderate	Pearl River Emergency Management; Picayune CRS Coordinator	Local revenues	2022	(Action 4.9 in previous plan) The county has reached out to many school officials to try to promulgate educational materials to children and this has been successful, but additional efforts are needed to continue and improve the program's reach going forward so this action will remain in place.

City of Poplarville Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Develop a Stormwater Management Plan for Pearl River County.	Flood	High	County Planning and Development; Board of Supervisors; Picayune City Council	U.S. Army Corps of Engineers; Hazard Mitigation Grant Program	2022	(Action 1.1 in previous plan) The county has not developed a formal Stormwater Management Plan. Although stormwater management regulations are in place and being enforced, the county will keep this action in place as it works towards an official plan.
P-2	Develop a capital improvement program that includes drainage.	Flood	Moderate	Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Local funding	2022	(Action 1.2 in previous plan) The county has developed a capital improvement program and some drainage projects have been included in this program in the past. However, there are a number of drainage projects the county would like to implement that are not part of the program currently, so the county will continue to attempt to include these in the future.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-3	Establish a policy of extra-territorial review of subdivisions adjacent to jurisdictional boundaries to insure a comprehensive review of cumulative impacts within the watershed.	All	High	Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Local budget	2022	(Action 1.5 in previous plan) The county has worked with the cities to allow extra-territorial review of subdivisions outside jurisdictional boundaries, but as development continues within the county, this action will need to be retained to ensure comprehensive watershed impacts are addressed.
P-4	Establish a comprehensive drainage model.	Flood	Moderate	Pearl River County Department of Planning and Development; City of Picayune Engineering Department; City of Poplarville Public Works; Pearl River County Tax Office	Dues to regional planning agency (SMPDD)	2022	(Action 2.1 in previous plan) The county and cities have worked with the regional planning agency to establish a comprehensive drainage model, however, as conditions change in the watershed and development takes place, this model will need to be updated, so this action will stay in the plan.
P-5	Provide updated information to the U.S. Army Corps of Engineers through a grant program entitle planning assistance to states.	Flood	Moderate	Pearl River County Department of Planning and Development; Pearl River County Mapping Office; U.S. Army Corps of Engineers	USA Planning Assistance to States	2022	(Action 2.3 in previous plan) The city has worked with USACE and provided local information when needed. The city will continue to work with the USACE to try to help with this program and future planning efforts so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-6	Establish pre-disaster maintenance procedures for right of way along county roadways.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Road Department; Pearl River County Engineer	Local budgets	2022	(Action 2.4 in previous plan) The county has established some pre-disaster maintenance procedures, but these procedures will need to be reviewed and updated and new procedures may need to be added. Therefore, the action will be kept in place.
P-7	The county will establish and adopt a policy on maintaining drainage ways. This policy will include regularly scheduled maintenance and the establishment of written tracking policy.	Flood	High	Pearl River County Road Manager	Local budgets	2022	(Action 2.5 in previous plan) The county has established a policy on maintaining drainage ways, but these policies will need to be reviewed and updated in the coming years, so this action will be retained.
P-8	Continue an ordinance and policy to determine and require the correct size culverts.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Department of Planning and Development	Local funds	2022	(Action 2.6 in previous plan) The county has established an ordinance/policy to determine and require the correct size culverts, but this program will need to be re-evaluated in the coming years, so this action will be retained.
P-9	Establish a policy of extra-territorial review of subdivisions adjacent to jurisdictional boundaries to insure a comprehensive review of cumulative impacts within the watershed.	Flood	High	Pearl River County Board of Supervisors; City of Picayune Mayor and City Council; City of Poplarville Mayor and Board of Alderman	Local funding	Deleted	(Action 2.7 in previous plan) This action was combined with P-3.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-10	Minimize damage to structure through code enforcement.	All	Moderate	Pearl River County Board of Supervisors; City of Picayune Mayor and City Council; City of Poplarville Mayor and Board of Alderman	Local funds and revenues	2022	(Action 2.10 in previous plan) The county has worked to minimize damage to structures through code enforcement, but implementation of this action likely needs to be more vigorous, so this action will be retained.
P-11	Adopt and implement a regulation requiring building owners to retrofit their structures for flood damage if the structure's insured loss exceeds 50% or more of the structure's value.	Flood	Moderate	Pearl River County Department of Planning and Development; City of Picayune Planning Department	Local funding	2022	(Action 2.11 in previous plan) The county has implemented a regulation requiring building owners to retrofit structures if their losses exceed the structure's value by more than 50%.
P-12	Establish a formal policy to invite countywide staff to attend site plan review for projects that are immediately adjacent to the jurisdiction or will impact the jurisdiction.	All	Moderate	Pearl River County Board of Supervisors; City Council of Picayune; Poplarville Board of Alderman	Local revenues	2020	(Action 3.1 in previous plan) A formal policy has not been established to invite countywide staff to attend site plan reviews, but the county will work with the cities to develop and implement this action going forward.
P-13	Develop and adopt a flood ordinance for the City of Poplarville.	Flood	High	Poplarville Board of Alderman	Local budgets	2022	(Action B.3 in previous plan) The city has developed a flood ordinance and will continue to work on implementation and enforcement of the ordinance going forward, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Property Protection							
PP-1	Reduce the number of repetitive loss properties within the county by elevating and where elevation is not an option, purchase properties at owner's request.	Flood	High	Pearl River County Board of Supervisors; Picayune Board of Alderman; Pearl River County Department of Planning and Development; Picayune Planning and Development Department	Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance Grants (FMA), Severe Repetitive Loss Grants (SRL), MEMA Planning Funds	2022	(Action 2.9 in previous plan) The county has implemented mitigation projects to address a number of repetitive loss properties, but there are still a number of these properties throughout the county so this action will be retained as the county attempts to further reduce its number of repetitive loss properties.
Natural Resource Protection							
NRP-1	Continue and expand stream protection and preservation programs to secure easements to protect riparian areas.	Flood	High	Mississippi Department of Wildfire and Parks; Pearl River County Department of Planning and Development	Department of Interior; Soil and Water Conservation	2022	(Action 1.3 in previous plan) The county has worked to secure easements to protect many riparian areas in the county, but going forward, the county will want to continue this program and expand riparian protection in other areas, so this action will remain in place.
NRP-2	Continue to preserve green spaces.	Flood	High	Pearl River County Board of Supervisors; Poplarville Board of Alderman; Picayune City Council	Private	2022	(Action 1.4 in previous plan) The county has worked to preserve green spaces in many areas, but as continual growth and development take place, the county will need to continue to work towards preserving green spaces, so this action will be retained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Structural Projects							
SP-1	Follow through with Alligator Branch improvements.	Flood	Moderate	Pearl River County Board of Supervisors	Hazard Mitigation Grant Program	2022	(Action 2.8 in previous plan) The county has not carried out the Alligator Branch improvements, so this action will be retained in the plan.
Emergency Services							
ES-1	Through a Mississippi/Louisiana Partnership, establish a first responders shelter to house personnel and parking space for necessary equipment until the emergency has passed and personnel and equipment can be returned to Louisiana. Also, establish and man an information center to pass on critical information to returning evacuees where evacuees can temporarily remain until it is safe to return to their homes.	Hurricane	Moderate	Pearl River County Civil Defense Agency; Pearl River County Board of Supervisors; Louisiana Emergency Management Agency; Mississippi Emergency Management Agency	FEMA Grants, local emergency management funding	2022	(Action 3.2 in previous plan) The county has worked with surrounding states and counties to establish partnerships for sheltering responders and an information center for returning evacuees. This action will need to be reviewed in the coming years to ensure that these operations are ready for disaster implementation so this action will be kept in the plan.
Public Education and Awareness							
PEA-1	Provide easily accessible tax map information to the municipalities in the county, insurance agents, realtors, banking interest, and individuals.	Flood	High	Pearl River Mapping Office; Pearl River County Tax Office	Local funds	2022	(Action 2.2 in previous plan) The county has provided tax map information that is easily available to the public via its online tax map viewer. This information will need to be continually updated as changes are made to the tax map, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-2	Establish monthly educational programs for local government and staff.	All	High	Pearl River County Department of Planning and Development; Picayune Planning and Development Office	Salaries	2022	(Action 4.1 in previous plan) The county has carried out educational programs for local governments and staff, but these programs have not always been held on a monthly basis so the county will work on improving this program so it is more consistent and will retain this action.
PEA-3	Continue outreach to the community, including local officials, about the Hazard Mitigation Grant Program and requirements of elevation and purchase programs.	Flood	High	Pearl River County Board of Supervisors; Pearl River County Department of Planning and Development	HMGP	2022	(Action 4.2 in previous plan) The county has reached out to the public and city officials to keep them informed about HMGP and other grant programs, but there will likely be a need for continued output of information as officials change and as many officials may need refreshers on the subject. As such, this program will be kept in place.
PEA-4	Establish a hazard mitigation library at the public library.	All	High	Picayune CRS Coordinator; Pearl River County Library System; Pearl River County Department of Planning and Development	Local funding	2020	(Action 4.3 in previous plan) The county has established a hazard mitigation library at the public library, but these materials are in need of updating, so this action will be left in place to ensure materials are current.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-5	Develop a brochure "Hazards in Pearl River County" that will detail hazards within the county.	Flood, Hurricane, Tornado, Wind	High	Pearl River County Emergency Management	Local funding	2020	(Action 4.4 in previous plan) The county has developed a number of materials for public outreach, but these materials will need to be updated in the coming years, so this action will remain in place.
PEA-6	Develop three programs for "Focus on Pearl River County" on WRJW.	Hurricane, Flood, Tornado, Wind	High	Pearl River County Emergency Management; Pearl River County Planning and Development; WRJW	Local funds	2022	(Action 4.5 in previous plan) The county has developed some programs for WRJW in the past, but during the next several years, additional programs may need to be developed to provide more current data, so this action will remain in place.
PEA-7	Establish a speaker's forum.	Hurricane, Tornado, Flood, Wind Storm	High	Pearl River Emergency Management	Local funds	2022	(Action 4.6 in previous plan) The county will need to work on establishing a speaker's forum as this has not yet been consistently established yet. This action will remain in place.
PEA-8	Establish a hazard mitigation and disaster preparedness booth at the Blueberry Festival and the Picayune Street Fair.	Flood, Hurricane, Tornado, Wind Storm	High	Pearl River County Emergency Management; Picayune CRS Coordinator	Local funding	2022	(Action 4.7 in previous plan) In the past, the county has had a hazard mitigation and disaster preparedness booth at these festivals and this has been a successful public outreach event, so this action will be kept in place as the county continues to implement this action and consider other public events for outreach.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-9	Encourage the Chambers of Commerce, PRCDA, and Civil Defense to develop a program on business continuity planning for businesses.	Hurricane, Flood, Tornado	Low	Picayune and Poplarville Chamber of Commerce	Local	2022	(Action 4.8 in previous plan) The county has encouraged the development of a program on business continuity planning and some outreach has been done to try to get local businesses to think about continuity plans, but these is still a great deal of work to be done as many businesses do not have this in place. This action will remain in the plan.
PEA-10	Advise school officials and teachers of availability of education materials for children.	Hurricane, Flood, Tornado, High Wind, Thunderstorm	Moderate	Pearl River Emergency Management; Picayune CRS Coordinator	Local revenues	2022	(Action 4.9 in previous plan) The county has reached out to many school officials to try to promulgate educational materials to children and this has been successful, but additional efforts are needed to continue and improve the program's reach going forward so this action will remain in place.

ANNEX F
STONE COUNTY

This annex includes jurisdiction-specific information for Stone County and its participating municipalities. It consists of the following five subsections:

- ❑ F.1 Stone County Community Profile
- ❑ F.2 Stone County Risk Assessment
- ❑ F.3 Stone County Vulnerability Assessment
- ❑ F.4 Stone County Capability Assessment
- ❑ F.5 Stone County Mitigation Strategy

F.1 STONE COUNTY COMMUNITY PROFILE

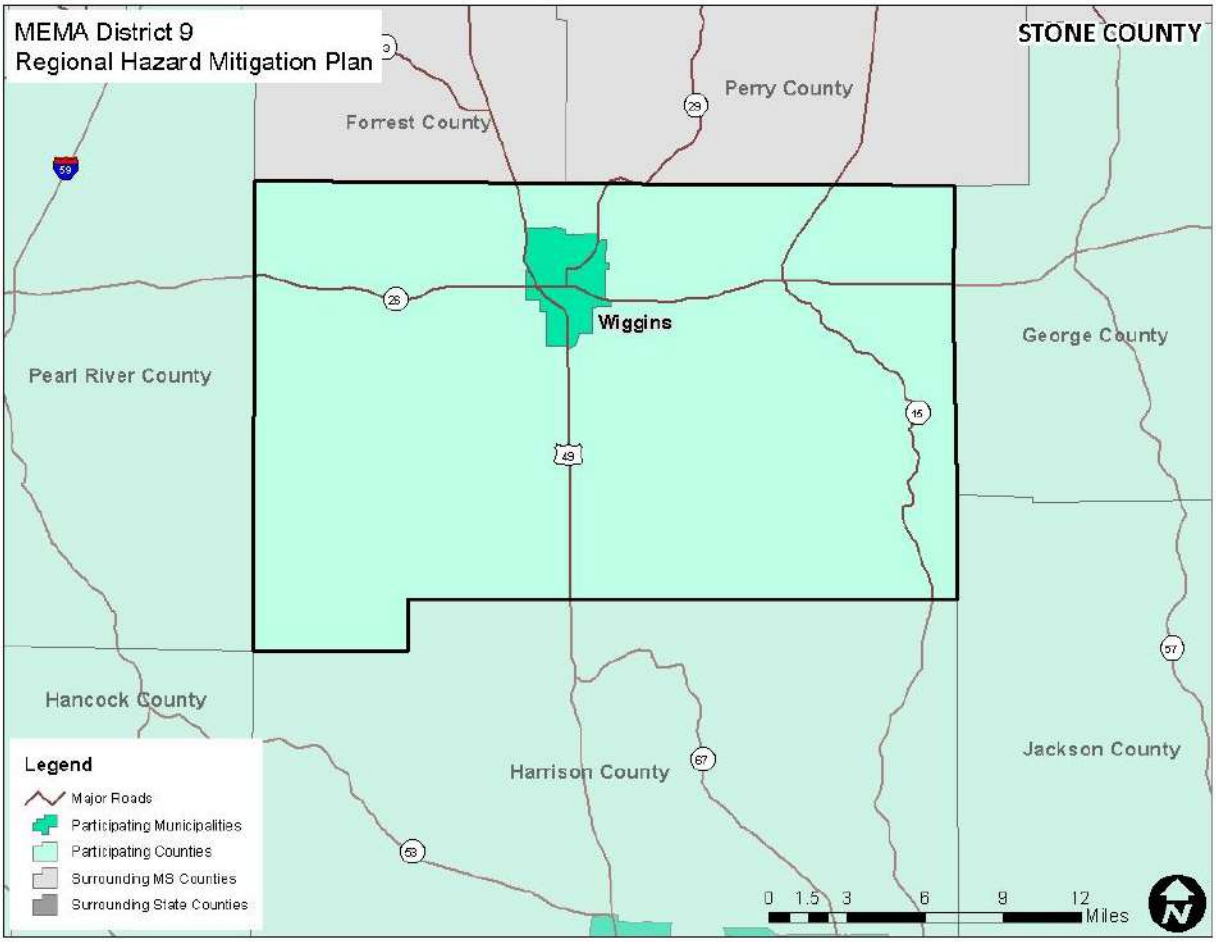
F.1.1 Geography and the Environment

Stone County is located in southern Mississippi. It comprises one city, Wiggins, as well as many small unincorporated communities. An orientation map is provided as **Figure F.1**.

Stone County is situated in the East Gulf Coastal Plain. It is made up of the gently rolling Pine Belt, also known as the "Piney Woods," and the coastal area called the Coastal Meadows or Terrace. The region has generally low topographic elevations and extensive tracts of marshy land. There are many rivers, creeks, bayous, and other natural drainage networks in the region which empty into the Gulf of Mexico. The total area of the county is 484 square miles, 5 square miles of which is water area.

Stone County enjoys four distinct seasons but the climate in the region is generally hot and humid compared to the rest of the United States given its latitude and location along the Gulf Coast. Precipitation is generally highest in winter months when the temperatures are moderately lower, but the likelihood of precipitation remains relatively constant throughout the year. Snowfall is rare but does occur. Summers in the region can become fairly hot with average highs in the nineties and lows in the seventies. The region is also often susceptible to turbulent weather when warm, wet air from the Gulf of Mexico is pushed up into the region to mix with cooler air coming down from across the continent which can result in severe weather conditions. This is particularly true in the spring when seasons are changing and diverse weather patterns interact. The region is also subject to hurricanes and tropical storms from June to October.

FIGURE F.1: STONE COUNTY ORIENTATION MAP



F.1.2 Population and Demographics

According to the 2010 Census, Stone County has a population of 17,786 people. The county has seen a significant increase in population between 2000 and 2010. The population density is 40 people per square mile. Population counts from the U.S. Census Bureau for 1990, 2000, and 2010 for the county and participating jurisdiction are presented in **Table F.1**.

TABLE F.1: POPULATION COUNTS FOR STONE COUNTY

Jurisdiction	1990 Census Population	2000 Census Population	2010 Census Population	% Change 2000-2010
Stone County	**10,750**	**13,622**	**17,786**	**30.6%**
Wiggins	3,185	3,849	4,390	14.1%

Source: United States Census Bureau, 1990, 2000, 2010 Census

Based on the 2010 Census, the median age of residents of Stone County is 35.9 years. The racial characteristics of the county are presented in **Table F.2**. Whites make up the majority of the population in the county, accounting for almost 79 percent of the population.

TABLE F.2: DEMOGRAPHICS OF STONE COUNTY

Jurisdiction	White, Percent (2010)	Black or African American, Percent (2010)	American Indian or Alaska Native, Percent (2010)	Asian, Percent (2010)	Native Hawaiian or Other Pacific Islander, Percent (2010)	Other Race, Percent (2010)	Two or More Races, percent (2010)	Persons of Hispanic Origin, Percent (2010)*
Stone County	**78.6%**	**19.1%**	**0.5%**	**0.3%**	**0.0%**	**0.3%**	**1.1%**	**1.3%**
Wiggins	64.4%	33.4%	0.4%	0.4%	0.0%	0.3%	1.1%	0.9%

*Hispanics may be of any race, so also are included in applicable race categories
Source: United States Census Bureau, 2010 Census

F.1.3 Housing

According to the 2010 U.S. Census, there are 7,161housing units in Stone County, the majority of which are single family homes or mobile homes. Housing information for the county and one municipality is presented in **Table F.3**. As shown in the table, there is a low percentages of seasonal housing units throughout the county.

TABLE F.3: HOUSING CHARACTERISTICS OF STONE COUNTY

Jurisdiction	Housing Units (2000)	Housing Units (2010)	Seasonal Units, Percent (2010)	Median Home Value (2011-2015)
Stone County	**5,343**	**7,161**	**3.8%**	**$111,800**
Wiggins	1,546	1,658	0.9%	$108,500

Source: United States Census Bureau, 2000 and 2010 Census, 2011-2015 American Community Survey 5-Year Estimates

F.1.4 Infrastructure

TRANSPORTATION

In Stone County, U.S. Highway 49 and Mississippi Highway 15 run north to south allowing transportation in the county. Mississippi Highway 26 runs east-west through Stone County. U.S.

The Dean Griffin Memorial Airport is a general aviation airport located in Stone County. The Gulfport-Biloxi International Airport, located in Harrison County, also serves the county. This airport is served by three major airlines with direct flights to Atlanta, Charlotte, Dallas/Ft. Worth, and Houston as well as connections to hundreds of locations in the U.S. and worldwide.

In terms of other transportation services, one Class-I Major railway also serves the county.

UTILITIES

Electrical power in Stone County is mainly provided by electric power associations. Mississippi Power Company also provides power to some parts of the county.

CenterPoint Energy Resources is the natural gas supplier that serves Stone County.

Water and sewer service is provided by a number of different sources, but unincorporated areas often rely on septic systems and wells in Stone County.

COMMUNITY FACILITIES

There are a number of buildings and community facilities located throughout Stone County. According to the data collected for the vulnerability assessment (Section 6.4.1), there are 1 communications facility, 1 emergency operations center (EOC), 1 fire station, 1 medical facility, 2 police stations, 3 power/gas facilities, 7 public facilities, 5 schools, 4 shelters, and 2 transportation facilities located within the county.

There is one hospital located in Stone County. It is Stone County Hospital in the City of Wiggins.

Stone County contains numerous local, state, and national parks and recreation areas, including the Mississippi Gulf Coast National Heritage Area and DeSoto National Forest. Golf courses and other recreational opportunities are also available in the county.

F.1.5 Land Use

Many areas of Stone County are undeveloped or sparsely developed. There is one small incorporated municipality located in the county and a few unincorporated rural centers. There is a mix of protected lands, such as the DeSoto National Forest. Private lands are used for exurban housing, agriculture, and forestry. Consistent with its rural character, densities are very low and uses are not mixed, making motor vehicles the only viable mode for virtually all travel.

Local land use and associated regulations are further discussed in *Section 7: Capability Assessment.*

F.1.6 Employment and Industry

According to the 2011 to 2015 American Community Survey (ACS) 5-year estimates, in 2015, Stone County had an average annual employment of 6,920 workers and an average unemployment rate of 9.7 percent (compared to 10.3 percent for the state). In 2015, the Educational Services, and Health Care and Social Assistance industry employed the most people, with 27.5 percent of the workforce, followed by Manufacturing (12.0%) and Retail Trade (9.8%). In 2015, the average annual median household income in Stone County was $45,025 compared to $39,665 in the state of Mississippi.

F.2 STONE COUNTY RISK ASSESSMENT

This subsection includes hazard profiles for each of the significant hazards identified in Section 4: *Hazard Identification* as they pertain to Stone County. Each hazard profile includes a description of the hazard's location and extent, notable historical occurrences, and the probability of future occurrences. Additional information can be found in Section 5: *Hazard Profiles*.

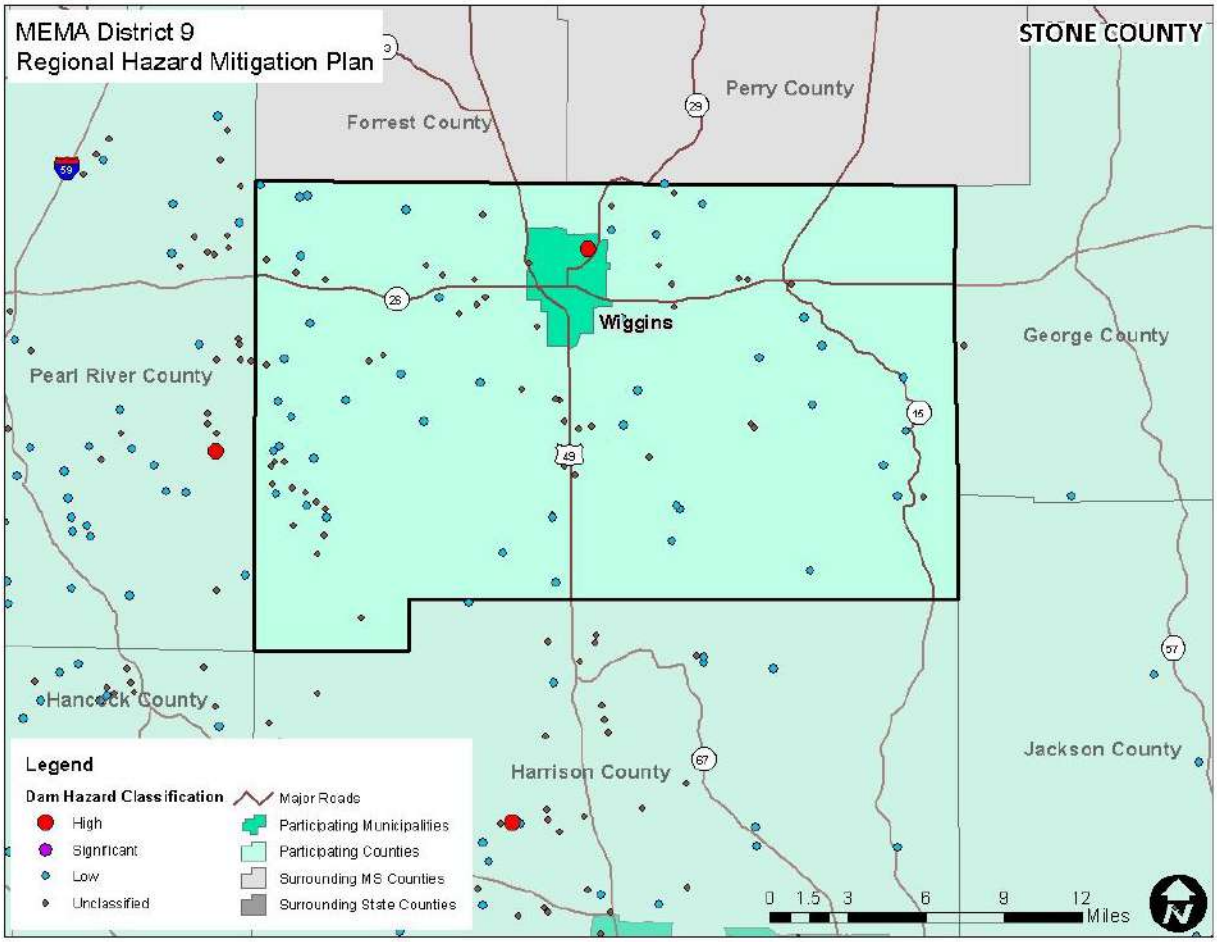
FLOOD-RELATED HAZARDS

F.2.1 Dam and Levee Failure

LOCATION AND SPATIAL EXTENT

According to the Mississippi Department of Environmental Quality, there is one high hazard dam in Stone County.[1] **Figure F.2** and **Figure F.3** show the location of this high hazard dam as well as mapped dam inundation areas, and **Table F.4** lists it by name.

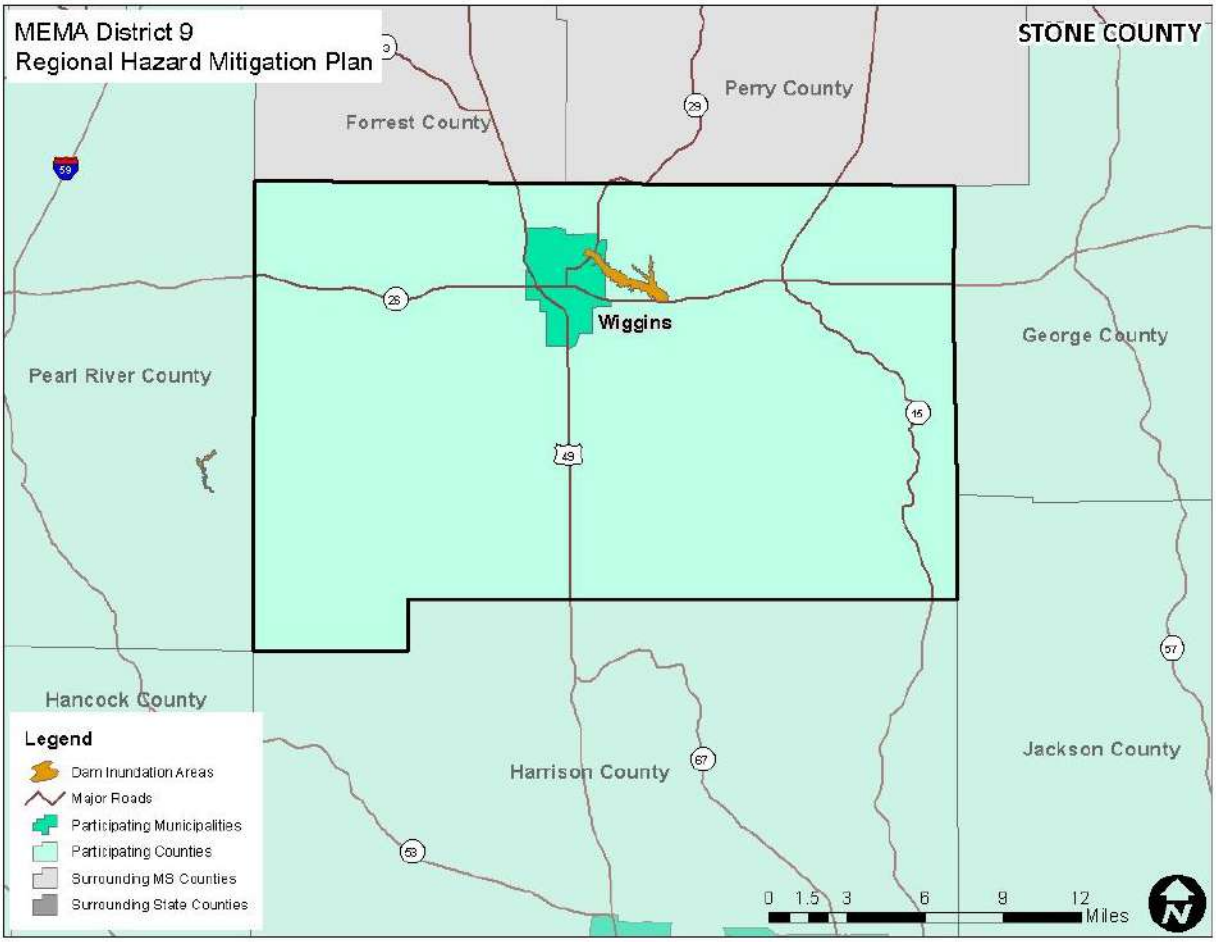
FIGURE F.2: STONE COUNTY HIGH HAZARD DAM LOCATIONS



Source: Mississippi Department of Environmental Quality

[1] The list of high hazard dams obtained from the Mississippi Department of Environmental Quality was reviewed and amended by local officials to the best of their knowledge.

FIGURE F.3: STONE COUNTY DAM INUNDATION AREAS



Source: Mississippi Department of Environmental Quality

TABLE F.4: STONE COUNTY HIGH HAZARD DAMS

Dam Name	Hazard Potential
Stone County	
FLINT CREEK RESERVOIR DAM	High

Source: Mississippi Department of Environmental Quality

HISTORICAL OCCURRENCES

According to the Mississippi State Hazard Mitigation Plan, there have been no dam failures reported in Stone County (**Table F.5**). However, several breach scenarios in the region could be catastrophic.

TABLE F.5: STONE COUNTY DAM FAILURES (1982-2012)

Date	County	Structure Name	Cause of Failure
None reported	Stone	--	--

Source: Mississippi State Hazard Mitigation Plan

PROBABILITY OF FUTURE OCCURRENCES

Given the current dam inventory and historic data, a dam breach is possible (between 1 and 10 percent annual probability) in the future. However, as has been demonstrated in the past, regular monitoring is necessary to prevent these events.

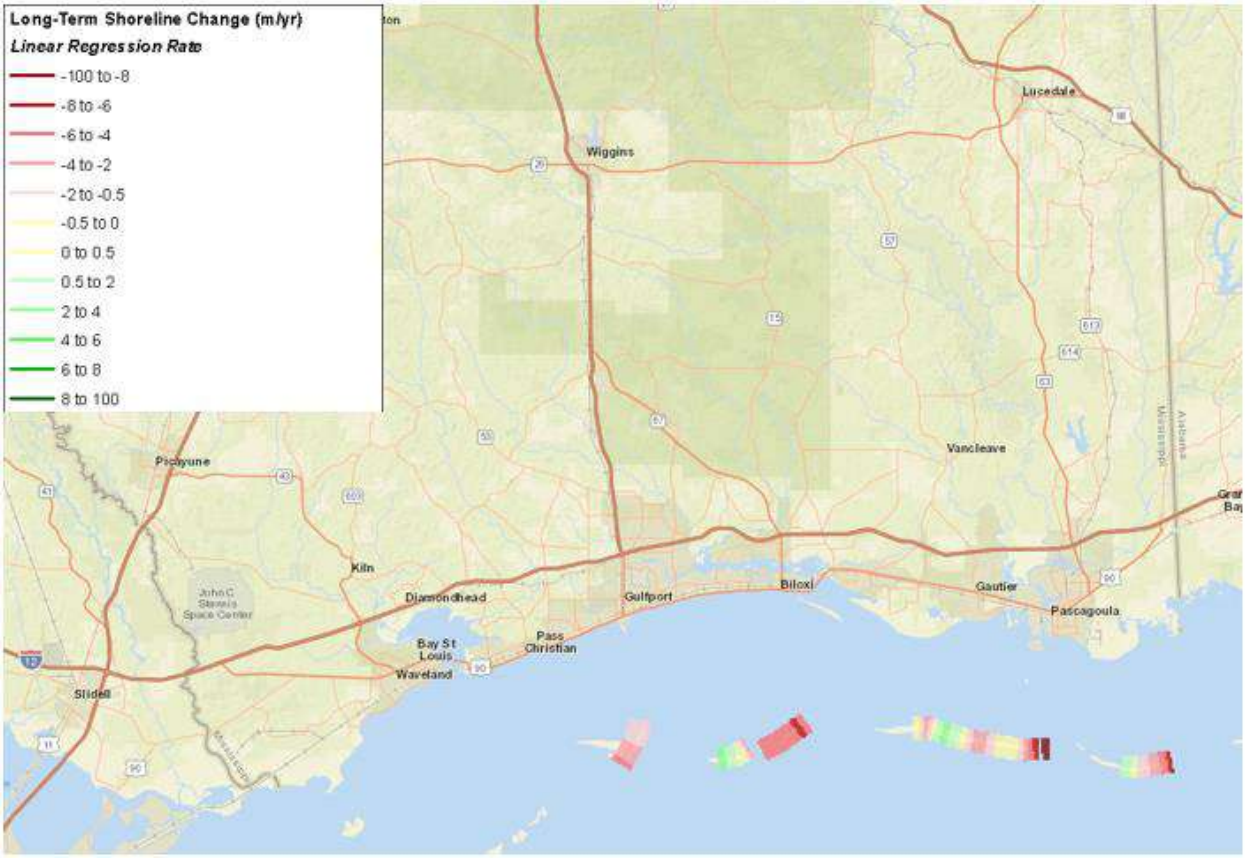
F.2.2 Erosion

LOCATION AND SPATIAL EXTENT

For the most part, major erosion in the MEMA District 9 Region is typically caused by coastal tides, ocean currents, and storm events. Although the region also experiences riverine erosion in many of its inland areas, including Stone County, these are of somewhat less concern than coastal erosion areas which historically have had larger impacts. Unlike inland areas, where the soil has greater organic matter content, coastal soils are mainly composed of fine grained particles such as sand. This makes coastal soils much more susceptible to erosion. Although some areas of the MEMA District 9 Region coast are protected and natural erosion processes are allowed to take place for the most part, many areas near where development has occurred are especially susceptible.

At this time, there is limited data available on localized areas of erosion. Most of the information collected by the United States Geological Survey (USGS) is focused on the barrier islands that are just off the coast of the mainland. The long-term shoreline change for the barrier islands as calculated by the USGS can be found in **Figure F.4** It should be noted that many areas of the coast are protected through the use of structural techniques. Also, a great deal of renourishment activities are carried out along the mainland coastal communities.

FIGURE F.4: LONG-TERM SHORELINE CHANGE (M/YR) IN THE MEMA DISTRICT 9 REGION



Source: United States Geological Survey

HISTORICAL OCCURRENCES

Several sources were vetted to identify areas of erosion in Stone County. This includes searching local newspapers, interviewing local officials, and reviewing previous hazard mitigation plans. Because dramatic, short-term erosion tends to take place after major storm events such as hurricanes, flooding, or storm surge, the erosion events often correspond directly with those events. Conversely, with long-term erosion, it is difficult to identify a specific historic occurrence because these events are by nature occurring at all times over a long period at a very gradual rate. Therefore, long-term historic erosion events cannot be confined to a specific timeframe or occurrence.

PROBABILITY OF FUTURE OCCURRENCES

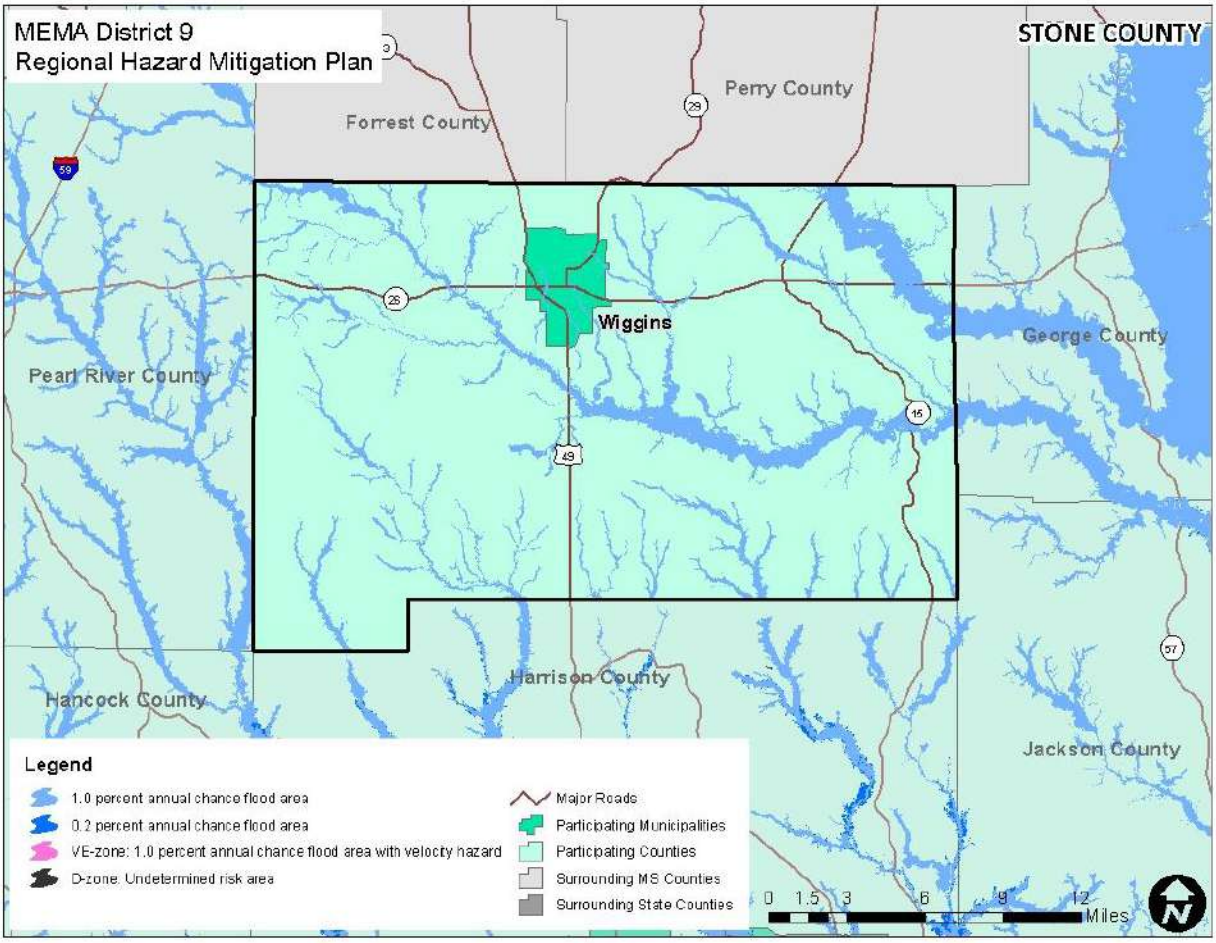
Erosion remains a natural, dynamic, and continuous process for Stone County, and it will continue to occur. The annual probability level assigned for erosion is likely (between 10 and 100 percent annually).

F.2.3 Flood

LOCATION AND SPATIAL EXTENT

There are areas in Stone County that are susceptible to flood events. Special flood hazard areas in the county were mapped using Geographic Information System (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM). This includes Zone A (1-percent annual chance floodplain), Zone AE (1-percent annual chance floodplain with elevations), Zone VE (1-percent annual chance floodplain with additional hazards due to storm-induced velocity wave action), Zone X500 (0.2-percent annual chance floodplain), and Zone D (undetermined risk area). **Figure F.5** illustrates the location and extent of currently mapped special flood hazard areas for the county based on best available FEMA Digital Flood Insurance Rate Map (DFIRM) data.

FIGURE F.5: SPECIAL FLOOD HAZARD AREAS IN STONE COUNTY



Source: Federal Emergency Management Agency

HISTORICAL OCCURRENCES

Floods were at least partially responsible for one disaster declaration in Stone County in 2009.[2] Information from the National Climatic Data Center was used to ascertain additional historical flood

[2] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

events. The National Climatic Data Center reported a total of 24 events in Stone County since 1998.[3] These events accounted for over $146,000 (2016 dollars) in property damage in the county.[4] A summary of these events is presented in **Table F.6**. Specific information on flood events, including date, type of flooding, and deaths and injuries, can be found in **Table F.7**.

TABLE F.6: SUMMARY OF FLOOD OCCURRENCES IN STONE COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Wiggins	9	0/0	$13,987	$874
Unincorporated Area	15	0/0	$132,331	$7,352
STONE COUNTY TOTAL	**24**	**0/0**	**$146,318**	**$8,226**

Source: National Climatic Data Center

TABLE F.7: HISTORICAL FLOOD EVENTS IN STONE COUNTY

Location	Date	Type	Deaths/Injuries	Property Damage*
Wiggins				
WIGGINS	6/16/2000	Flash Flood	0/0	$13,987
WIGGINS	9/26/2002	Flash Flood	0/0	$0
WIGGINS	10/27/2002	Flash Flood	0/0	$0
WIGGINS	10/22/2007	Flash Flood	0/0	$0
WIGGINS	3/27/2009	Flash Flood	0/0	$0
WIGGINS	2/4/2010	Flash Flood	0/0	$0
WIGGINS	3/5/2011	Flash Flood	0/0	$0
WIGGINS	3/21/2012	Flash Flood	0/0	$0
WIGGINS	3/22/2012	Flash Flood	0/0	$0
Unincorporated Area				
WEST PORTION	1/26/1998	Flash Flood	0/0	$1,478
NORTHWEST PORTION	4/28/1998	Flash Flood	0/0	$14,776
COUNTYWIDE	9/28/1998	Flash Flood	0/0	$0
COUNTYWIDE	3/3/2001	Flash Flood	0/0	$13,600
EAST PORTION	10/28/2002	Flash Flood	0/0	$0
COUNTYWIDE	12/31/2002	Flash Flood	0/0	$0
NORTH CENTRAL PORTION	4/7/2003	Flash Flood	0/0	$0
COUNTYWIDE	6/30/2003	Flash Flood	0/0	$0
PERKINSTON	5/12/2004	Flash Flood	0/0	$0
COUNTYWIDE	8/29/2005	Flash Flood	0/0	$0
WHITES CROSSING	12/21/2006	Flash Flood	0/0	$47,788
BEATRICE	4/5/2008	Flash Flood	0/0	$0
BEATRICE	9/1/2008	Flash Flood	0/0	$2,237
MC HENRY	8/29/2012	Flood	0/0	$52,452

[3] These flood events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional occurrences have occurred and have gone unreported. As additional local data becomes available, this hazard profile will be amended.

[4] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Type	Deaths/Injuries	Property Damage*
RAMSEY SPGS	4/14/2015	Flash Flood	0/0	$0

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

HISTORICAL SUMMARY OF INSURED FLOOD LOSSES

According to FEMA flood insurance policy records as of October 2016, there have been 11 flood losses reported in Stone County through the National Flood Insurance Program (NFIP) since 1978, totaling over $115,000 in claims payments. A summary of these figures for the county is provided in **Table F.8**. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP policies, and for losses in which claims were sought and received. It is likely that many additional instances of flood loss in Stone County were either uninsured, denied claims payment, or not reported.

TABLE F.8: SUMMARY OF INSURED FLOOD LOSSES IN STONE COUNTY

Location	Number of Policies	Flood Losses	Claims Payments
Wiggins	5	0	$0
Unincorporated Area	31	11	$115,205
STONE COUNTY TOTAL	**36**	**11**	**$115,205**

Source: National Flood Insurance Program

REPETITIVE LOSS PROPERTIES

According to the Mississippi Emergency Management Agency, there are two non-mitigated repetitive loss properties located in Stone County, which accounted for four losses and almost $24,000 in claims payments under the NFIP. The average claim amount for these properties is $5,968. Both properties are single family. Without mitigation, these properties will likely continue to experience flood losses. **Table F.9** presents detailed information on repetitive loss properties and NFIP claims and policies for Stone County.

TABLE F.9: REPETITIVE LOSS PROPERTIES IN STONE COUNTY

Location	Number of Properties	Types of Properties	Number of Losses	Building Payments	Content Payments	Total Payments	Average Payment
Wiggins	0	--	0	$0	$0	$0	$0
Unincorporated Area	2	2 single family	4	$8,641	$15,233	$23,874	$5,968
STONE COUNTY TOTAL	**2**		**4**	**$8,641**	**$15,233**	**$23,874**	**$5,968**

Source: Federal Emergency Management Agency, National Flood Insurance Program

PROBABILITY OF FUTURE OCCURRENCES

Flood events will remain a threat in Stone County, and the probability of future occurrences will remain highly likely (100 percent annual probability). The probability of future flood events based on magnitude and according to best available data is illustrated in the figure above**,** which indicates those areas

susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain). Further, as described in other hazard profiles, it is highly likely that Stone County will continue to experience inland flooding associated with large tropical storms and hurricanes.

It can be inferred from the floodplain location maps, previous occurrences, and repetitive loss properties that risk varies throughout the county. For example, the eastern half of the county has more floodplain and thus a higher risk of flood than the rest of the county. Flood is not the greatest hazard of concern but will continue to occur and cause damage. Therefore, mitigation actions may be warranted, particularly for repetitive loss properties.

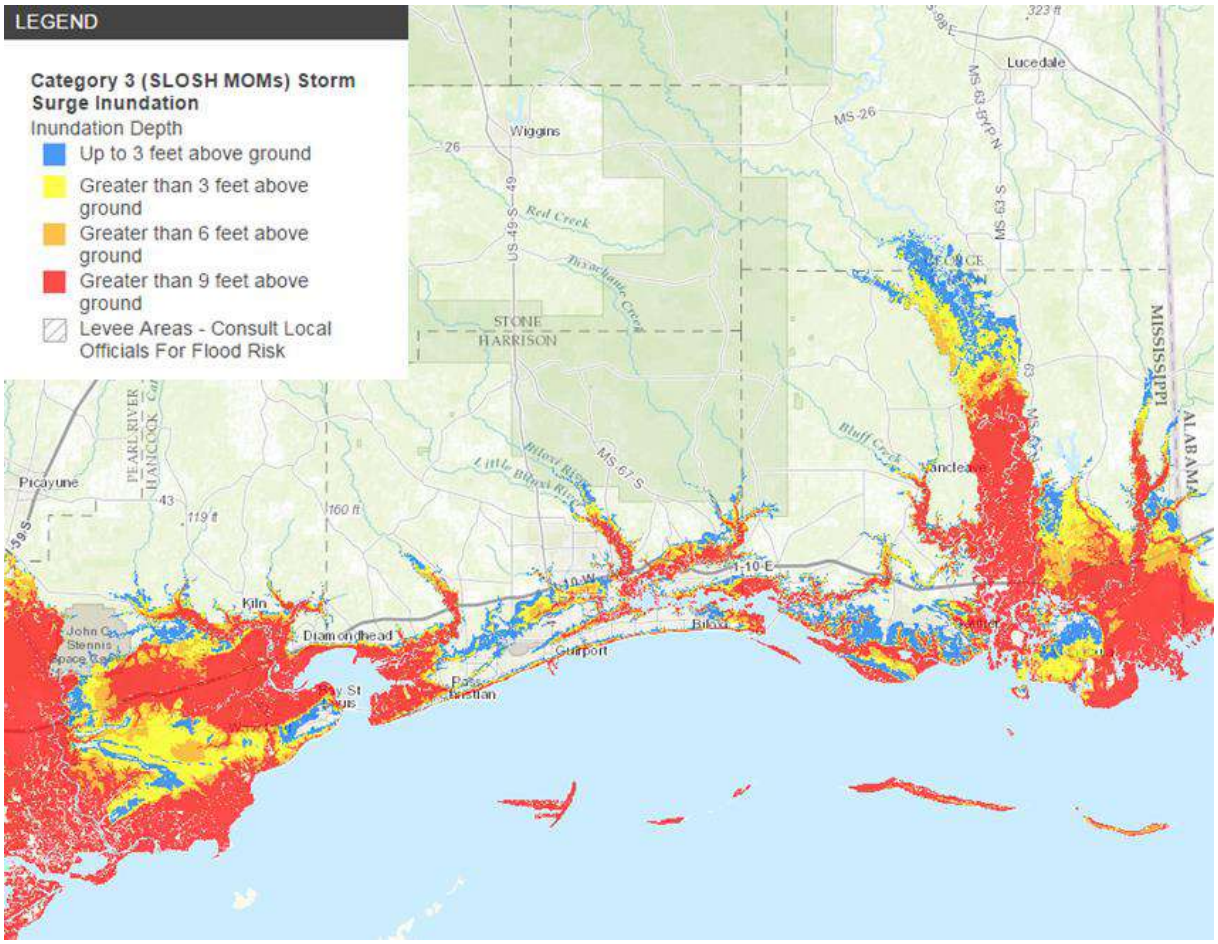
It should also be noted that anticipated sea level rise will increase the probability and intensity of future tidal flooding events in years to come. Rising sea level over time will shorten the return period (increasing the frequency) of significant flood events. This hazard is discussed elsewhere in this section.

F.2.4 Storm Surge

LOCATION AND SPATIAL EXTENT

There are no areas in Stone County that are subject to potential storm surge inundation as modeled and mapped by the National Oceanic and Atmospheric Administration (NOAA). **Figure F.6** illustrates hurricane storm surge inundation zones based on a Category 3 storm. The illustration is derived from geo-referenced SLOSH (Sea, Lake, and Overland Surge from Hurricanes) data produced by the USACE in coordination with NOAA. SLOSH is a modeling tool used to estimate storm surge for coastal areas resulting from historical, hypothetical, or predicted hurricanes taking into account maximum expected levels for pressure, size, forward speed, track, and winds. Therefore, the SLOSH data is best used for defining the potential maximum surge associated with various storm intensities for any particular location. As shown in the figure, no areas in Stone County are at risk to storm surge inundation. However, inland areas may also experience substantial flooding during a storm event.

FIGURE F.6: STORM SURGE RISK AREAS IN THE MEMA DISTRICT 9 REGION



Source: NOAA

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, no storm surge events have been reported for Stone County since 1996.[5] [6] A summary of these events is presented in **Table F.10**. Detailed information on the recorded storm surge events can be found in **Table F.11**.

TABLE F.10: SUMMARY OF STORM SURGE EVENTS IN STONE COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Wiggins	0	0/0	$0	$0
Unincorporated Area	0	0/0	$0	$0
STONE COUNTY TOTAL	**0**	**0/0**	**$0**	**$0**

Source: National Climatic Data Center

[5] These storm surge events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016.

[6] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE F.11: HISTORICAL STORM SURGE EVENTS IN STONE COUNTY

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
Wiggins				
None reported	--	--	--	--
Unincorporated Area				
None reported	--	--	--	--

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

It is unlikely (less than 1 percent annual probability) that Stone County will experience storm surge associated with large tropical storms, hurricanes, and squalls combined with high tides. As noted in the preceding section (under Flood), anticipated sea level rise will increase the probability and intensity of future storm surge events in years to come.[7] This rise in sea level will not only increase the probability and intensity of tidal flooding events, but will also contribute to the loss of coastal wetlands and erosion of sand beaches that act as protective buffers against storm surge events.

FIRE-RELATED HAZARDS

F.2.5 Drought

Drought typically covers a large area and cannot be confined to any geographic or political boundaries. Furthermore, it is assumed that Stone County would be uniformly exposed to drought, making the spatial extent potentially widespread. It is also notable that drought conditions typically do not cause significant damage to the built environment but may exacerbate wildfire conditions.

HISTORICAL OCCURRENCES

According to the U.S. Drought Monitor, Stone County had drought levels of Severe or worse in 8 of the last 17 years (January 2000-October 2016). **Table F.12** shows the most severe drought classification for each year, according to U.S. Drought Monitor classifications. It should be noted that the U.S. Drought Monitor also estimates what percentage of the county is in each classification of drought severity. For example, the most severe classification reported may be exceptional but a majority of the county may actually be in a less severe condition.

TABLE F.12: HISTORICAL DROUGHT OCCURRENCES IN STONE COUNTY

Abnormally Dry (D0) Moderate Drought (D1) Severe Drought (D2) Extreme Drought (D3) Exceptional Drought (D4)

	Stone County
2000	**EXCEPTIONAL**
2001	**MODERATE**
2002	**SEVERE**

[7] The Sea Level Rise hazard is assessed more extensively under Section F.2.16.

	Stone County
2003	ABNORMAL
2004	ABNORMAL
2005	ABNORMAL
2006	EXTREME
2007	MODERATE
2008	ABNORMAL
2009	MODERATE
2010	SEVERE
2011	EXCEPTIONAL
2012	SEVERE
2013	ABNORMAL
2014	SEVERE
2015	SEVERE
2016	ABNORMAL

Source: United States Drought Monitor

No anecdotal information was available from the National Climatic Data Center on droughts in Stone County.

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that Stone County has a probability level of likely (between 10 and 100 percent annual probability) for future drought events. However, the extent (or magnitude) of drought and the amount of geographic area covered by drought, varies with each year. Historic information indicates that there is a much lower probability for extreme, long-lasting drought conditions.

F.2.6 Lightning

LOCATION AND SPATIAL EXTENT

Lightning occurs randomly, therefore it is impossible to predict where and with what frequency it will strike. It is assumed that all of Stone County is uniformly exposed to lightning.

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, there have been five recorded lightning events in Stone County since 2002.[8] These events resulted in almost $91,000 (2016 dollars) in damages.[9] Furthermore, lightning has caused two injuries in the county. A summary of these events is presented in **Table F.13**. Detailed information on historical lightning events can be found in **Table F.14**.

[8] These lightning events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is certain that additional lightning events have occurred in Stone County. As additional local data becomes available, this hazard profile will be amended.

[9] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

It is certain that more than five events have impacted the county. Many of the reported events are those that caused damage, and it should be expected that damages are likely much higher for this hazard than what is reported.

TABLE F.13: SUMMARY OF LIGHTNING OCCURRENCES IN STONE COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Wiggins	5	0/2	$90,767	$6,483
Unincorporated Area	0	0/0	$0	$0
STONE COUNTY TOTAL	**5**	**0/2**	**$90,767**	**$6,483**

Source: National Climatic Data Center

TABLE F.14: HISTORICAL LIGHTNING OCCURRENCES IN STONE COUNTY

Location	Date	Deaths/ Injuries	Property Damage*	Details
Wiggins				
WIGGINS	8/25/2002	0/0	$13,388	Lightning struck three trees and started a fire in a building near the strike. The fire was put out but the building suffered some minor damage from the fire.
WIGGINS	3/12/2003	0/0	$26,180	Lightning struck the communications center in Wiggins. The 911 center was without service for several hours.
WIGGINS	6/9/2007	0/0	$23,232	A home was struck by lightning in Wiggins. The strike caused a fire in the hot water heater. The fire was contained to a small area. The home still suffered considerable smoke and water damage.
WIGGINS	7/3/2008	0/0	$27,967	Lightning struck a few buildings in Wiggins causing a fire that damaged the buildings.
WIGGINS	8/4/2010	0/2	$0	Four individuals were struck by lightning at Flint Creek Water Park. Two of them were transported to a hospital.
Unincorporated Area				
None reported	--	--	--	--

*Property damage is reported in 2016 dollars; All damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

Although there was not a high number of historical lightning events reported in Stone County via NCDC data, it is a regular occurrence accompanied by thunderstorms. In fact, lightning events will assuredly happen on an annual basis, though not all events will cause damage. According to Vaisala's U.S. National Lightning Detection Network (NLDN), Stone County is located in an area of the country that experienced an average of 4 to 12 and up lightning flashes per square kilometer per year between 2005 and 2014. Therefore, the probability of future events is highly likely (100 percent annual probability). It can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the county.

F.2.7 Wildfire

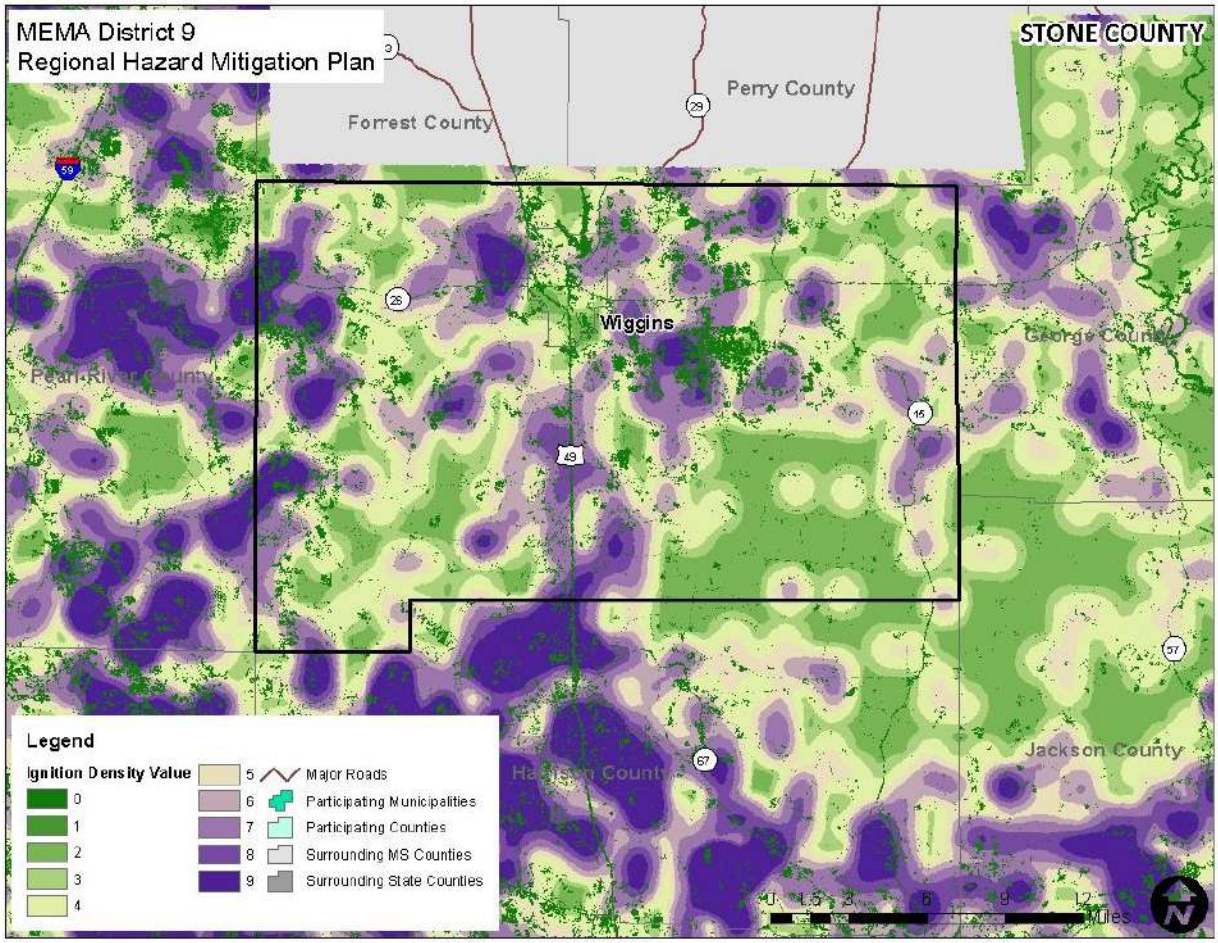
LOCATION AND SPATIAL EXTENT

The entire county is at risk to a wildfire occurrence. However, several factors such as drought conditions or high levels of fuel on the forest floor, may make a wildfire more likely. Furthermore, areas in the urban-wildland interface are particularly susceptible to fire hazard as populations abut formerly undeveloped areas. The Wildfire Ignition Density data shown in the figure below give an indication of historic location.

HISTORICAL OCCURRENCES

Figure F.7 shows the Wildfire Ignition Density in Stone County based on data from the Southern Wildfire Risk Assessment. This data is based on historical fire ignitions and the likelihood of a wildfire igniting in an area. Occurrence is derived by modeling historic wildfire ignition locations to create an average ignition rate map. This is measured in the number of fires per year per 1,000 acres.[10]

FIGURE F.7: WILDFIRE IGNITION DENSITY IN STONE COUNTY



Source: Southern Wildfire Risk Assessment

[10] Southern Wildfire Risk Assessment, 2014.

Based on data from the Mississippi Forestry Commission from 2007 to 2016, Stone County experiences an average of 41 wildfires annually which burn a combined 364 acres, on average per year. The data indicates that most of these fires are small, averaging nine acres per fire. **Table F.15** provides a summary of wildfire occurrences in Stone County and **Table F.16** lists the number of reported wildfire occurrences in the county between the years 2007 and 2016.

TABLE F.15: SUMMARY TABLE OF ANNUAL WILDFIRE OCCURRENCES (2007 -2016)*

	Stone County
Average Number of Fires per year	40.9
Average Number of Acres Burned per year	363.7
Average Number of Acres Burned per fire	8.9

*These values reflect averages over a 10-year period.
Source: Mississippi Forestry Commission

TABLE F.16: HISTORICAL WILDFIRE OCCURRENCES IN STONE COUNTY

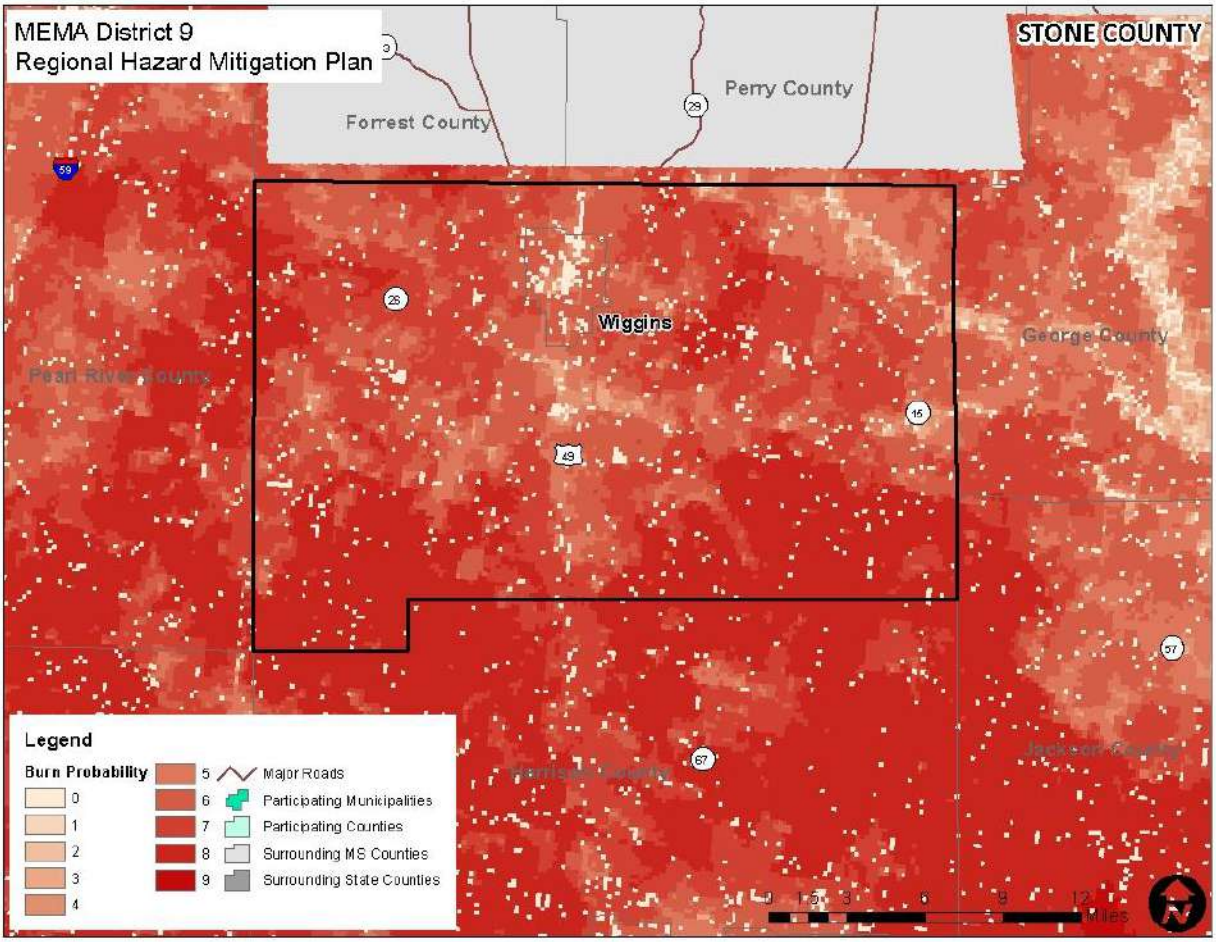
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Stone County										
Number of Fires	52	42	52	30	58	18	39	36	58	24
Number of Acres Burned	492	377	542	168	401	67	368	296	236	690

Source: Mississippi Forestry Commission

PROBABILITY OF FUTURE OCCURRENCES

Wildfire events will be an ongoing occurrence in Stone County. **Figure F.8** shows that there is some probability a wildfire will occur throughout the county. However, the likelihood of wildfires increases during drought cycles and abnormally dry conditions. Fires are likely to stay small in size but could increase due to local climate and ground conditions. Dry, windy conditions with an accumulation of forest floor fuel (potentially due to ice storms or lack of fire) could create conditions for a large fire that spreads quickly. It should also be noted that some areas do vary somewhat in risk. For example, highly developed areas are less susceptible unless they are located near the urban-wildland boundary. The risk will also vary due to assets. Areas in the urban-wildland interface will have much more property at risk, resulting in increased vulnerability and need to mitigate compared to rural, mainly forested areas. The probability assigned to Stone County for future wildfire events is highly likely (100 percent annual probability).

FIGURE F.8: BURN PROBABILITY IN STONE COUNTY



Source: Southern Wildfire Risk Assessment

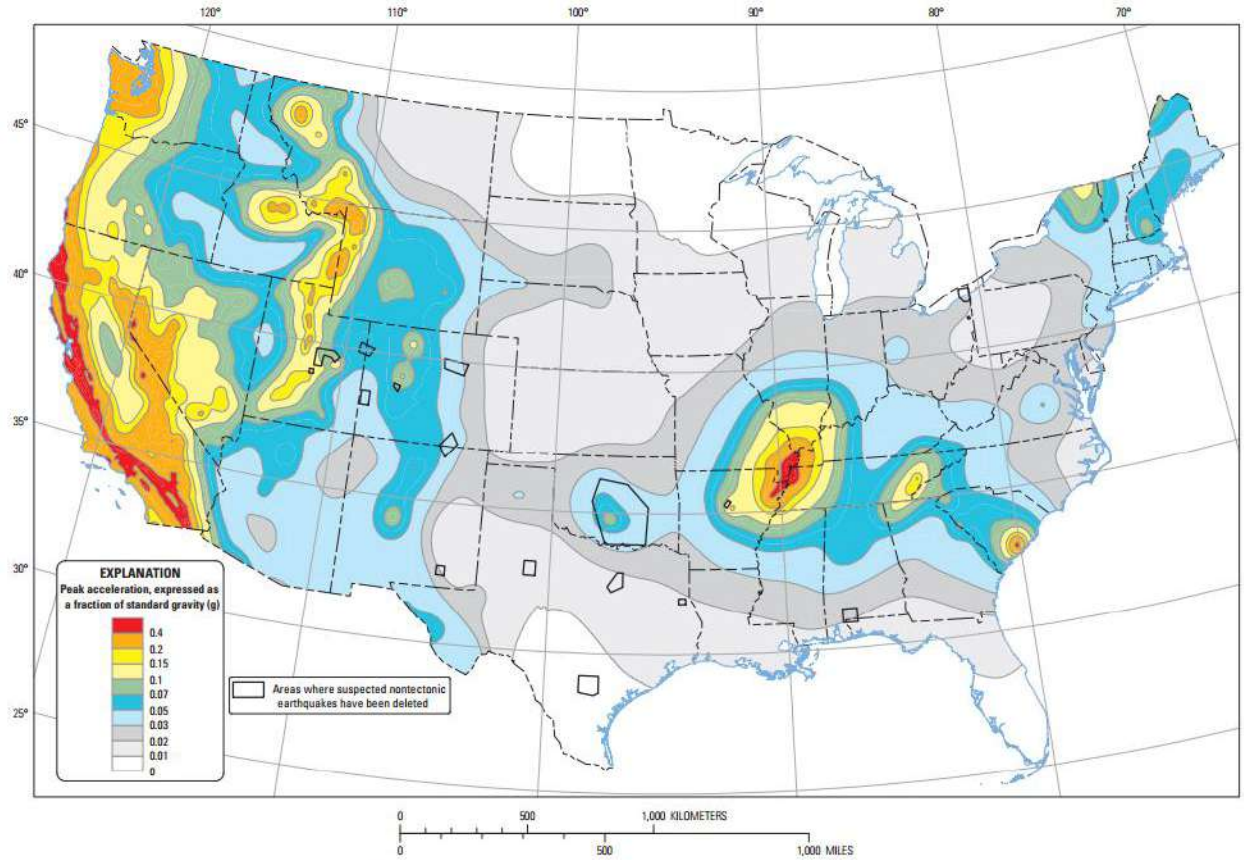
GEOLOGIC HAZARDS

F.2.8 Earthquake

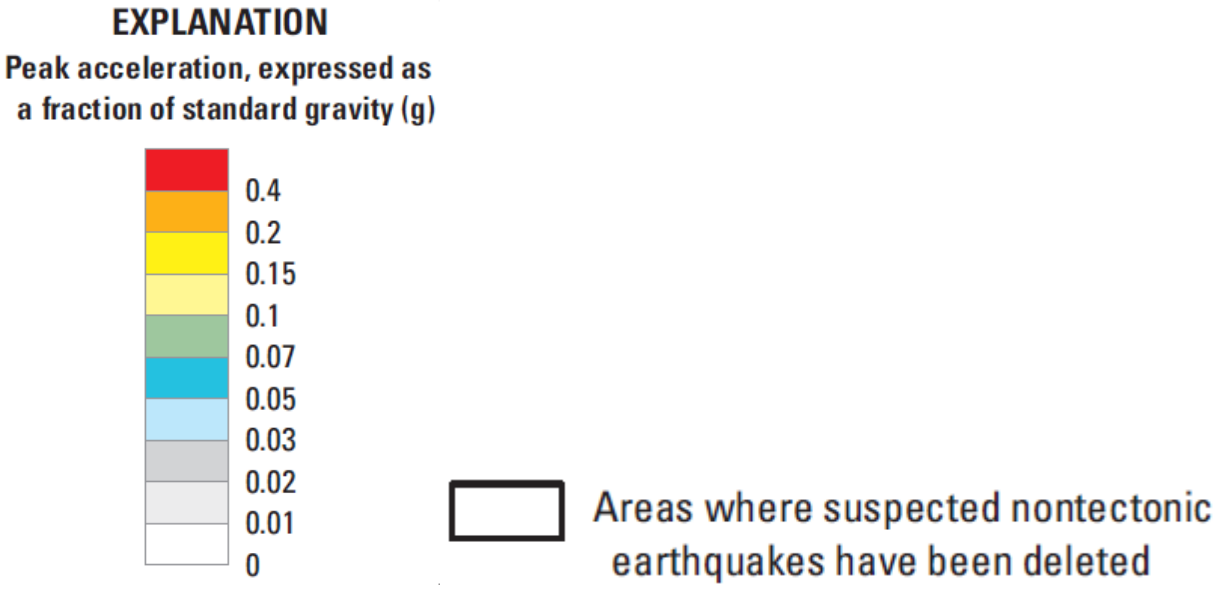
LOCATION AND SPATIAL EXTENT

Figure F.9 shows the intensity level associated with Stone County, based on the national USGS map of peak acceleration with 10 percent probability of exceedance in 50 years. It is the probability that ground motion will reach a certain level during an earthquake. The data show peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10 percent probability of exceedance in 50 years. The map was compiled by the U.S. Geological Survey (USGS) Geologic Hazards Team, which conducts global investigations of earthquake, geomagnetic, and landslide hazards. According to this map, Stone County lies within an approximate zone of level “1” to “3” ground acceleration. This indicates that the county exists within an area of low seismic risk.

FIGURE F.9: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS



Ten-percent probability of exceedance in 50 years map of peak ground acceleration



Source: United States Geological Survey, 2014

The primary source of potential damage to Stone County from an earthquake is the New Madrid Seismic Zone (NMSZ). Historically, a series of earthquakes in 1811 and 1812 demonstrated that this fault zone can produce high magnitude seismic events, sometimes on the scale of a 7.5-8.0 on the Richter scale. The biggest challenge with earthquakes that occur in this area of seismic activity is predicting the recurrence of earthquakes emanating from this zone. Although the magnitude of earthquakes from the NMSZ can be large, they occur very irregularly and fairly infrequently. This makes it extremely difficult to project when they will occur.

It should also be noted that the State of Mississippi Hazard Mitigation Plan identifies certain areas of concern for liquefaction and lists the counties and corresponding zones within those counties that have the highest liquefaction potential. Stone County does not have any identified liquefaction potential risk.

HISTORICAL OCCURRENCES

No earthquakes are known to have affected Stone County since 1638. **Table F.17** provides a summary of earthquake events reported by the National Centers for Environmental Information (formerly National Geophysical Data Center) between 1638 and 1985, and **Figure F.10** presents a map showing earthquakes whose epicenters have occurred near the county between 1985 and 2015 (no earthquakes occurred within the county boundaries during this period). A detailed occurrence of each event including the date, distance from the epicenter, magnitude, and Modified Mercalli Intensity (if known) can be found in **Table F.18**.[11]

TABLE F.17: SUMMARY OF SEISMIC ACTIVITY IN STONE COUNTY

Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
Wiggins	0	--	--
Unincorporated Area	0	--	--
STONE COUNTY TOTAL	**0**	**--**	**--**

Source: National Geophysical Data Center

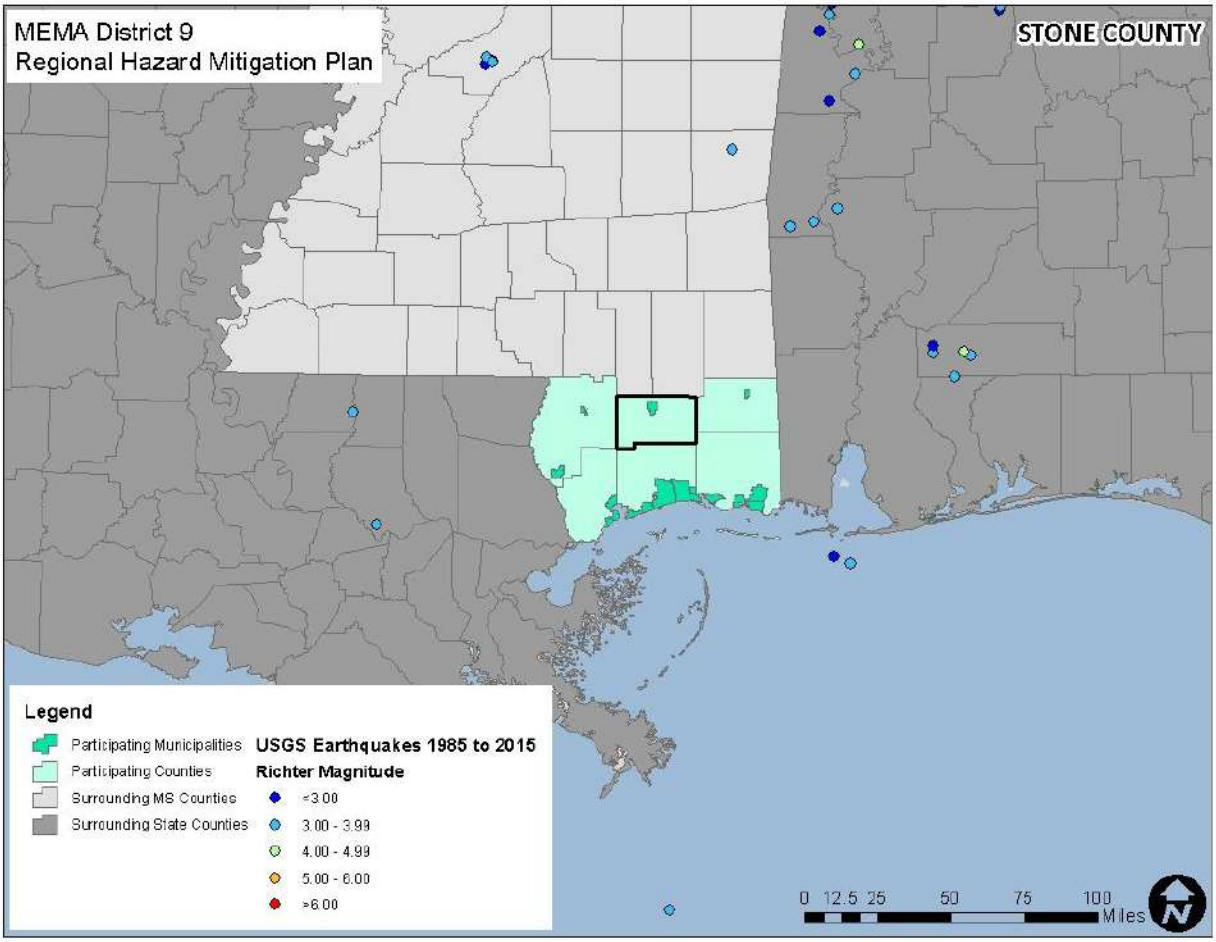
TABLE F.18: SIGNIFICANT SEISMIC EVENTS IN STONE COUNTY (1638 -1985)

Location	Date	Epicentral Distance	Magnitude	MMI
Wiggins				
None reported	--	--	--	--
Unincorporated Area				
None reported	--	--	--	--

Source: National Geophysical Data Center

[11] Due to reporting mechanisms, not all earthquakes events were recorded during this time. Furthermore, some are missing data, such as the epicenter location, due to a lack of widely used technology. In these instances, a value of "unknown" is reported.

FIGURE F.10: HISTORIC EARTHQUAKES WITH EPICENTERS NEAR STONE COUNTY (1985-2015)



Source: United States Geological Survey

PROBABILITY OF FUTURE OCCURRENCES

The probability of significant, damaging earthquake events affecting Stone County is unlikely. However, it is possible that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light will affect the county. The annual probability level for the county is estimated to be between 1 and 10 percent (possible).

WIND-RELATED HAZARDS

F.2.9 Extreme Cold

Extreme cold typically impacts a large area and cannot be confined to any geographic or political boundaries. The entire county is susceptible to extreme cold conditions.

HISTORICAL OCCURRENCES

Data from the National Climatic Data Center was used to determine historical extreme cold events in Stone County. No events specific to the county were reported, however, two events were reported elsewhere in the region. Similar events and impacts can be expected in Stone County.

February 2, 1996 – *Cold/Wind Chill* – An arctic airmass overspread much of south Mississippi bringing the longest extended period of cold weather since 1989. In Amite County, 4SW Gillsburg, a 67 year old man died from hypothermia on the 4th after the fire in a wood burning heater went out. Considerable property damage resulted from broken pipes due to the extended period of subfreezing temperatures. In Jackson County, Moss Point and Gautier had broken pipes in 100 and 147 houses, respectively.

December 18, 1996 – *Cold/Wind Chill* – An arctic airmass overspread south Mississippi resulting in three consecutive nights with subfreezing minimum temperatures. Temperatures lowered into the mid-teens over the southwest section of the state and near 20 degrees along the Gulf Coast.

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that all of Stone County has a probability level of possible (between 1 and 10 percent annual probability) for future extreme cold events to impact the county.

F.2.10 Extreme Heat

Heat waves typically impact a large area and cannot be confined to any geographic or political boundaries. The entire county is susceptible to extreme heat conditions.

HISTORICAL OCCURRENCES

The National Climatic Data Center was used to determine historical heat wave occurrences in the county.

July 2000 – July was a hot and dry month in Southeast Mississippi. In Beaumont the temperature was 100 degrees or higher eleven days during the month with the hottest being 105 degrees. In Richton the temperature was 100 degrees or higher three days during the month with the hottest being 102 degrees. In Waynesboro the temperature was 100 degrees or higher four days during the month with the hottest being 103 degrees. In Wiggins the temperature was 100 degrees or higher nine days during the month with 105 degrees being the hottest. In addition to being hot is was also a dry month across the area. Most stations ended up with below normal rainfall totals for the month. In Jackson County, a 68 year old man died from heat exhaustion while sitting in his pickup truck in a parking lot with the windows rolled up, and 10 days later, a 58 year old male was found dead from heat exhaustion while sitting in his truck in the driveway of his home with the windows rolled up.

August 2007 – Heat advisories were issued for a combination of high temperatures and high humidities. Heat index vales were between 110 and 115 degrees. Several public buildings and churches allowed people to come in and cool off during the heat of the day.

PROBABILITY OF FUTURE OCCURRENCES

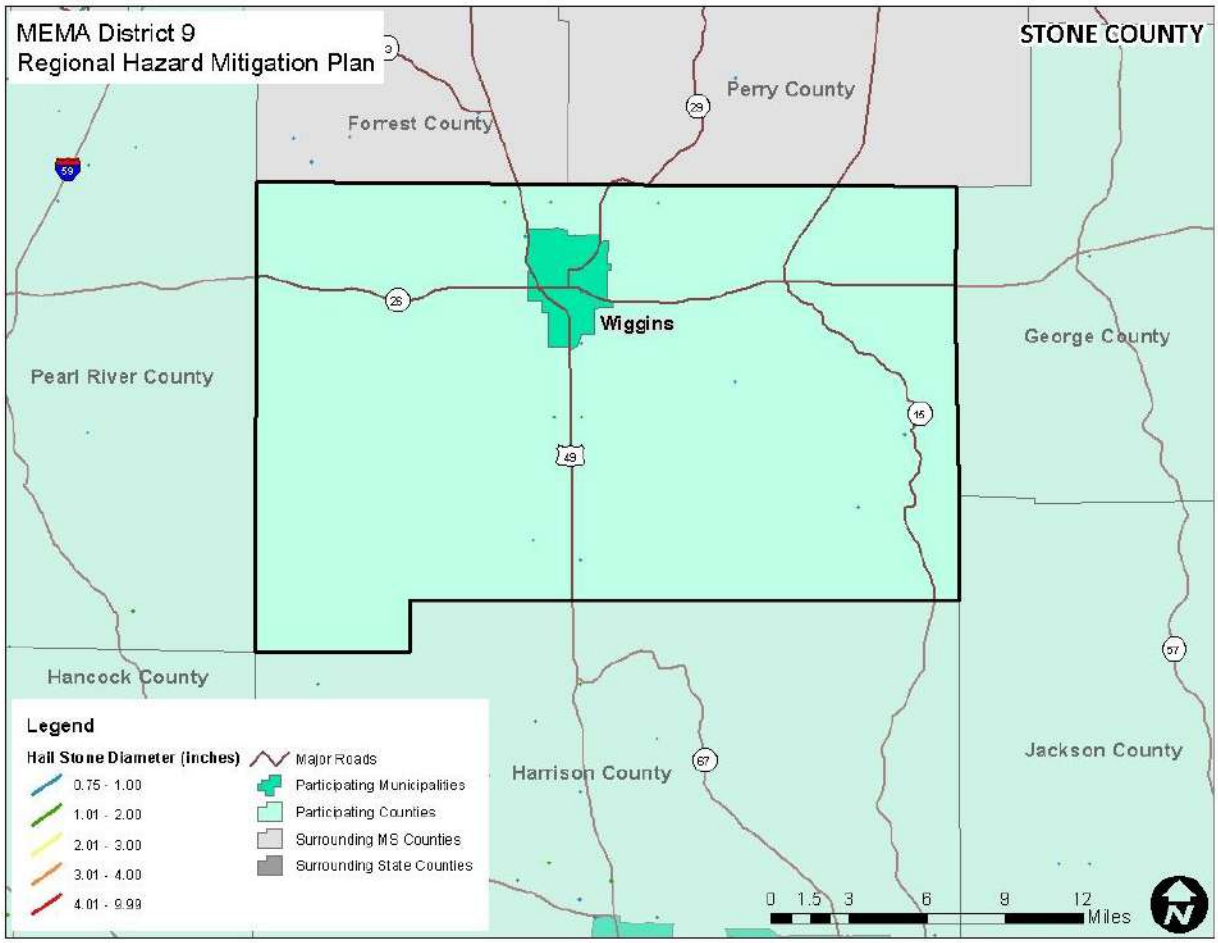
Based on historical occurrence information, it is assumed that all of Stone County has a probability level of highly likely (100 percent annual probability) for future heat wave events.

F.2.11 Hailstorm

LOCATION AND SPATIAL EXTENT

Hailstorms frequently accompany thunderstorms, so their locations and spatial extents coincide. It is assumed that Stone County is uniformly exposed to severe thunderstorms; therefore, all areas of the county are equally exposed to hail which may be produced by such storms. With that in mind, **Figure F.11** shows the location of hail events that have impacted the county between 1955 and 2015.

FIGURE F.11: HAILSTORM TRACKS IN STONE COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, 24 recorded hailstorm events have affected Stone County since 1960.[12] In all, hail occurrences did not result in any property damages.[13] Hail ranged in diameter from 0.75 inches to 2.0 inches. **Table F.19** provides a summary of the hail events in Stone County. Detailed information about each event that occurred in the county is provided in **Table F.20**.

It should be noted that hail is notorious for causing substantial damage to cars, roofs, and other areas of the built environment that may not be reported to the National Climatic Data Center. Therefore, it is likely that damages are greater than the reported value.

TABLE F.19: SUMMARY OF HAIL OCCURRENCES IN STONE COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Wiggins	8	0/0	$0	$0
Unincorporated Area	16	0/0	$0	$0
STONE COUNTY TOTAL	**24**	**0/0**	**$0**	**$0**

Source: National Climatic Data Center

TABLE F.20: HISTORICAL HAIL OCCURRENCES IN STONE COUNTY

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
Wiggins				
WIGGINS	5/23/1997	0.75 in.	0/0	$0
WIGGINS	1/23/2000	0.75 in.	0/0	$0
WIGGINS	8/1/2003	0.75 in.	0/0	$0
WIGGINS	4/29/2004	0.75 in.	0/0	$0
WIGGINS	4/26/2005	0.75 in.	0/0	$0
WIGGINS	5/12/2009	1.00 in.	0/0	$0
WIGGINS	7/2/2009	0.75 in.	0/0	$0
WIGGINS	6/22/2015	0.75 in.	0/0	$0
Unincorporated Area				
STONE CO.	5/5/1960	1.75 in.	0/0	$0
STONE CO.	3/11/1968	2.00 in.	0/0	$0
STONE CO.	4/18/1988	1.75 in.	0/0	$0
STONE CO.	6/4/1991	1.25 in.	0/0	$0
STONE CO.	6/5/1991	0.75 in.	0/0	$0
STONE CO.	5/31/1995	0.75 in.	0/0	$0
PERKINSTON	11/1/1997	0.88 in.	0/0	$0
PERKINSTON	3/6/1998	0.75 in.	0/0	$0
BEATRICE	4/13/2000	0.75 in.	0/0	$0

[12] These hail events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through June 2016. It is likely that additional hail events have affected Stone County. As additional local data becomes available, this hazard profile will be amended.
[13] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Magnitude	Deaths/Injuries	Property Damage*
PERKINSTON	10/13/2001	1.75 in.	0/0	$0
WHITES CROSSING	3/31/2002	0.75 in.	0/0	$0
RAMSEY SPGS	7/8/2004	0.88 in.	0/0	$0
PERKINSTON	8/15/2006	1.00 in.	0/0	$0
MC HENRY	5/11/2007	0.88 in.	0/0	$0
MC HENRY	9/1/2008	0.75 in.	0/0	$0
PERKINSTON	2/18/2012	1.75 in.	0/0	$0

*Property damage is reported in 2016 dollars; All damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

Based on historical occurrence information, it is assumed that the probability of future hail occurrences is highly likely (100 percent annual probability). Since hail is an atmospheric hazard, it is assumed that Stone County has equal exposure to this hazard. It can be expected that future hail events will continue to cause minor damage to property and vehicles throughout the county.

F.2.12 Hurricane and Tropical Storm

LOCATION AND SPATIAL EXTENT

Hurricanes and tropical storms threaten the entire Atlantic and Gulf seaboard of the United States, and while coastal areas are most directly exposed to the brunt of landfalling storms, their impact is often felt hundreds of miles inland. Stone County is located in a region of the country that is susceptible to all of the hazards wrought by hurricanes and tropical storms. All areas throughout Stone County are susceptible to the accompanying hazard effects of extreme wind, flooding, and tornadoes.[14]

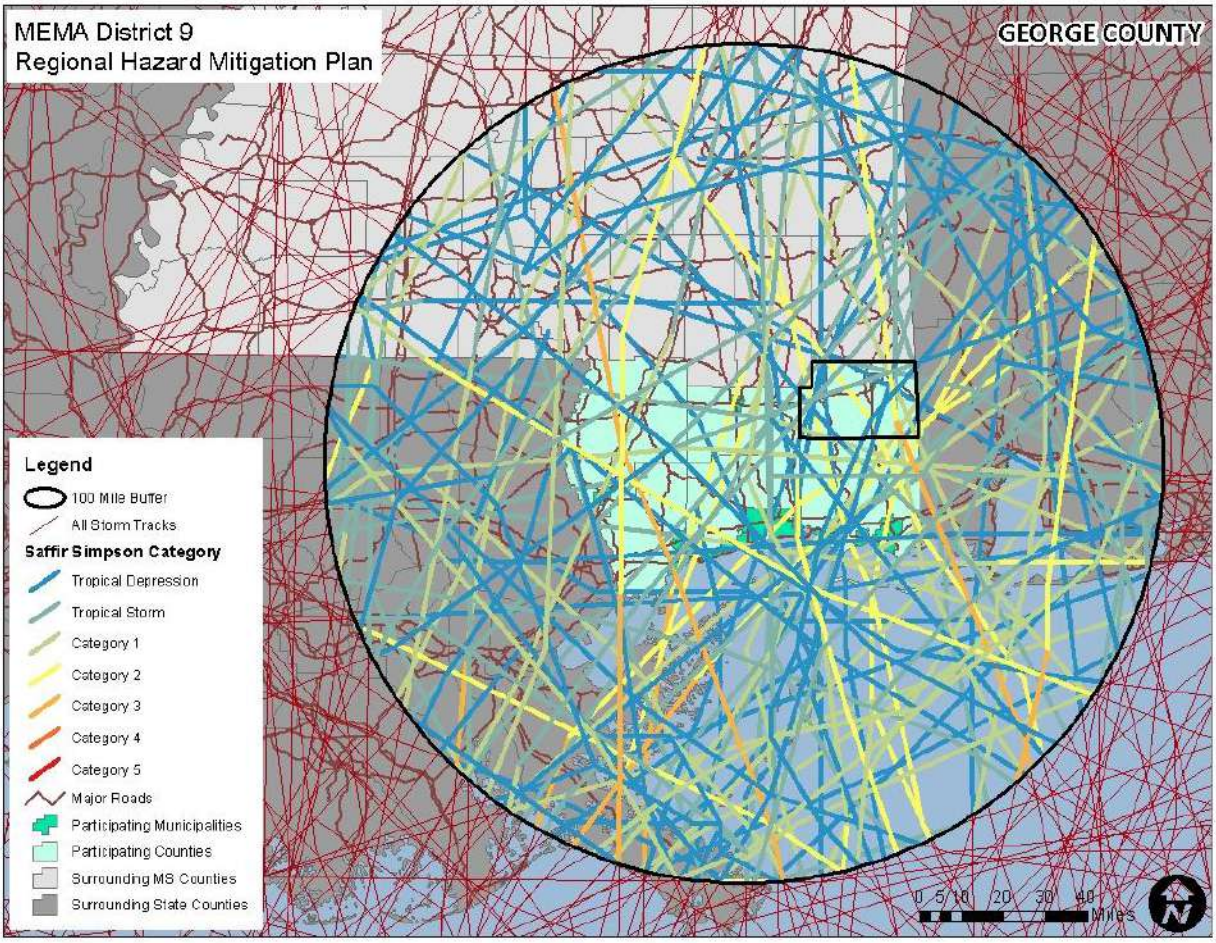
HISTORICAL OCCURRENCES

According to the National Hurricane Center's historical storm track records, 119 hurricane or tropical storm/depression tracks have passed within 100 miles of the MEMA District 9 Region since 1855.[15] This includes: 4 Category 3 hurricanes, 15 Category 2 hurricanes, 28 Category 1 hurricanes, 29 tropical storms, and 43 tropical depressions. Additionally, four other major storms had large-scale impacts on the region and are not included in these totals. These storms are listed below and range in Category from 1 to 4.

Of the recorded storm events, 58 hurricane or tropical storm/depression events traversed directly through the region as shown in **Figure F.12**. Notable storms include Hurricane Camille (1969), Hurricane Frederic (1979), and Hurricane Katrina (2005). **Table F.21** provides for each event the date of occurrence, name (if applicable), maximum wind speed (as recorded within 100 miles of the MEMA District 9 Region) and category of the storm based on the Saffir-Simpson Scale.

[14] Distinct hazard area locations for flooding is discussed elsewhere in this subsection.
[15] These storm track statistics include tropical depressions, tropical storms, and hurricanes. Lesser events may still cause significant local impact in terms of rainfall and high winds.

FIGURE F.12: HISTORICAL HURRICANE STORM TRACKS WITHIN 100 MILES OF THE MEMA DISTRICT 9 REGION



Source: National Oceanic and Atmospheric Administration, National Hurricane Center

TABLE F.21: HISTORICAL STORM TRACKS WITHIN 100 MILES OF THE MEMA 9 DISTRICT REGION (1842–2016)

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
8/25/1852	UNNAMED	93	Category 2
8/3/1855	NOT NAMED	--	Tropical Depression
9/16/1855	UNNAMED	96	Category 2
6/24/1857	NOT NAMED	--	Tropical Depression
9/15/1859	UNNAMED	79	Category 1
8/11/1860	UNNAMED	96	Category 2
9/15/1860	UNNAMED	89	Category 2
8/17/1861	NOT NAMED	--	Tropical Depression
11/1/1861	NOT NAMED	--	Tropical Depression
9/15/1862	NOT NAMED	--	Tropical Depression
9/16/1862	NOT NAMED	--	Tropical Depression
10/1/1863	UNNAMED	43	Tropical Storm

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
6/3/1866	NOT NAMED	--	Tropical Depression
9/16/1867	NOT NAMED	--	Tropical Depression
10/5/1867	UNNAMED	89	Category 2
10/3/1868	NOT NAMED	--	Tropical Depression
9/5/1869	UNNAMED	79	Category 1
7/30/1870	NOT NAMED	--	Tropical Depression
7/11/1872	UNNAMED	59	Tropical Storm
9/18/1875	UNNAMED	18	Tropical Depression
9/18/1877	UNNAMED	79	Category 1
9/1/1879	UNNAMED	89	Category 2
10/7/1879	UNNAMED	59	Tropical Storm
8/31/1880	UNNAMED	70	Category 1
8/2/1881	NOT NAMED	--	Tropical Depression
8/3/1881	UNNAMED	59	Tropical Storm
8/30/1885	UNNAMED	59	Tropical Storm
9/26/1885	UNNAMED	70	Category 1
6/15/1886	UNNAMED	50	Tropical Storm
6/14/1887	UNNAMED	33	Tropical Depression
10/19/1887	UNNAMED	82	Category 1
6/27/1888	NOT NAMED	--	Tropical Depression
9/23/1889	UNNAMED	79	Category 1
8/27/1890	UNNAMED	43	Tropical Storm
9/21/1891	NOT NAMED	--	Tropical Depression
9/12/1892	UNNAMED	59	Tropical Storm
9/7/1893	UNNAMED	79	Category 1
10/2/1893	UNNAMED	97	Category 3
8/7/1894	UNNAMED	59	Tropical Storm
8/15/1895	UNNAMED	59	Tropical Storm
9/13/1900	UNNAMED	43	Tropical Storm
8/14/1901	UNNAMED	82	Category 1
10/9/1905	UNNAMED	43	Tropical Storm
9/27/1906	UNNAMED	93	Category 2
9/21/1907	UNNAMED	43	Tropical Storm
8/11/1911	UNNAMED	79	Category 1
6/13/1912	UNNAMED	59	Tropical Storm
7/17/1912	UNNAMED	5	Tropical Depression
9/13/1912	UNNAMED	82	Category 1
9/18/1914	UNNAMED	33	Tropical Depression
9/29/1915	UNNAMED	96	Category 2
7/5/1916	UNNAMED	95	Category 2
10/17/1922	UNNAMED	18	Tropical Depression
6/26/1923	UNNAMED	43	Tropical Storm
10/17/1923	UNNAMED	59	Tropical Storm
9/20/1926	UNNAMED	93	Category 2
9/1/1932	UNNAMED	82	Category 1
10/15/1932	UNNAMED	59	Tropical Storm

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
7/27/1936	UNNAMED	43	Tropical Storm
8/22/1936	UNNAMED	5	Tropical Depression
6/16/1939	UNNAMED	59	Tropical Storm
9/26/1939	UNNAMED	50	Tropical Storm
9/24/1940	UNNAMED	18	Tropical Depression
9/10/1944	UNNAMED	64	Category 1
9/5/1945	UNNAMED	18	Tropical Depression
9/19/1947	UNNAMED	92	Category 2
9/4/1948	UNNAMED	79	Category 1
9/4/1949	UNNAMED	43	Tropical Storm
8/31/1950	BAKER	82	Category 1
8/1/1955	BRENDA	70	Category 1
8/27/1955	UNNAMED	50	Tropical Storm
9/24/1956	FLOSSY	82	Category 1
9/18/1957	ESTHER	64	Category 1
10/8/1959	IRENE	43	Tropical Storm
9/15/1960	ETHEL	85	Category 2
9/26/1960	FLORENCE	1	Tropical Depression
10/4/1964	HILDA	70	Category 1
9/10/1965	BETSY*	117	Category 4
9/29/1965	DEBBIE	33	Tropical Depression
8/18/1969	CAMILLE	100	Category 3
8/8/1971	UNNAMED	5	Tropical Depression
9/4/1971	FERN	5	Tropical Depression
9/16/1971	EDITH	70	Category 1
7/29/1975	UNNAMED	18	Tropical Depression
10/17/1975	UNNAMED	5	Tropical Depression
9/24/1976	UNNAMED	5	Tropical Depression
7/19/1977	UNNAMED	18	Tropical Depression
9/6/1977	BABE	18	Tropical Depression
10/25/1977	UNNAMED	18	Tropical Depression
8/10/1978	UNNAMED	5	Tropical Depression
7/11/1979	BOB	74	Category 1
9/12/1979	FREDERIC	97	Category 3
7/20/1980	UNNAMED	5	Tropical Depression
10/27/1984	UNNAMED	18	Tropical Depression
9/2/1985	ELENA	95	Category 2
10/31/1985	JUAN	64	Category 1
8/12/1987	UNNAMED	5	Tropical Depression
8/8/1988	BERYL	5	Tropical Depression
8/9/1988	BERYL	50	Tropical Storm
9/10/1988	FLORENCE	79	Category 1
8/3/1995	ERIN	82	Category 1
7/19/1997	DANNY	79	Category 1
9/27/1998	GEORGES	92	Category 2
9/20/1998	HERMINE	33	Tropical Depression

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
6/11/2001	ALLISON	43	Tropical Storm
8/5/2002	BERTHA	33	Tropical Depression
9/14/2002	HANNA	59	Tropical Storm
9/26/2002	ISIDORE	64	Category 1
6/30/2003	BILL	59	Tropical Storm
7/1/2003	BILL	18	Tropical Depression
9/16/2004	IVAN	96	Category 2
6/11/2005	ARLENE	59	Tropical Storm
7/6/2005	CINDY	74	Category 1
7/10/2005	DENNIS*	100	Category 3
8/29/2005	KATRINA	98	Category 3
9/22/2007	TEN	5	Tropical Depression
8/24/2008	FAY	18	Tropical Depression
9/1/2008	GUSTAV*	87	Category 2
11/10/2009	IDA	70	Category 1
7/25/2010	BONNIE	5	Tropical Depression
8/12/2010	FIVE	5	Tropical Depression
9/5/2011	LEE	43	Tropical Storm
8/28/2012	ISAAC*	70	Category 1

*It should be noted that the track of several major hurricanes that impacted the region fell outside of the 100-mile buffer. These storms were included in the table due to their significant impact (Betsy, 1965; Dennis, 2005; Gustav, 2008; and Isaac, 2012), but it should be noted that wind speed and storm category are estimated based on anecdotal information.
Source: National Hurricane Center

Federal records indicate that 10 disaster declarations were made in 1969 (Hurricane Camille), 1979 (Hurricane Frederic), 1985 (Hurricane Elena), 1998 (Hurricane Georges), 2002 (Tropical Storm Isidore), 2004 (Hurricane Ivan), 2005 (Hurricane Dennis and Hurricane Katrina), 2008 (Hurricane Gustav), and 2012 (Hurricane Isaac).[16] Hurricane and tropical storm events can cause substantial damage in the area due to high winds and flooding.

Flooding and high winds from hurricanes and tropical storms can cause damage throughout the county. Anecdotes are available from NCDC for the major storms that have impacted the county as found below:

Hurricane Georges – September 25-29, 1998
Hurricane Georges, a strong Category 2 hurricane moved slowly northwest across the Gulf of Mexico toward southeast Louisiana and coastal Mississippi on the September 25 and September 26. As the hurricane approached the mouth of the Mississippi River on September 27, it slowly turned toward the north making landfall along the Mississippi Coast just to the east of Biloxi, MS at 0400 CST on September 28. The hurricane moved only slowly north during the morning hours, at times becoming nearly stationary. The hurricane finally was downgraded to a tropical storm at 1500CST on September 28 when it was located north of Biloxi. The tropical storm then moved very slowly eastward into southern Alabama on September 29.

Most of the inland counties in Southeast Mississippi had damage from heavy rains and from trees and power lines being blown down by the persistent winds. One of the hardest hit areas by the high winds

[16] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

was in Stone County Mississippi near where the center of the hurricane moved. Eighty five homes were damaged in Stone County by the wind. Fifty four homes had minor damage, twenty six had major damage and five were destroyed. Most of the damage was along and east of U. S. Highway 49.

Throughout the area, agriculture took a beating with the cotton, soybean and pecan crop almost totally destroyed.

Hurricane Katrina – August 24-30, 2005
Hurricane Katrina was one of the strongest and most destructive hurricanes on record to impact the coast of the United States. It will likely be recorded as one the worst natural disaster in the history of the United States to date resulting in catastrophic damage and numerous casualties in southeast Louisiana and along the Mississippi coast. Damage and casualties resulting from Hurricane Katrina extended as far east as Alabama and the panhandle of Florida. Katrina developed from a tropical depression southeast of the Bahamas on August 24th. After moving through the Bahamas as a tropical storm, Katrina strengthened to a category 1 hurricane prior to landfall in south Florida around the Miami area on the 25th of August. Katrina crossed south Florida and entered the Gulf of Mexico and began to strengthen. Hurricane Katrina strengthened to a category 5 storm on August 28th about 250 miles south southeast of the mouth of the Mississippi River with winds reaching their peak intensity of 175 mph and a central pressure of 902 mb. Post event analysis by the National Hurricane Center indicates that Katrina weakened slightly before making landfall as a strong category 3 storm in initial landfall in lower Plaquemines Parish. Maximum sustained winds were estimated at 110 knots or 127 mph and a central pressure of 920 mb around 610 AM CDT on August 29th in southeast Louisiana just south of Buras in Plaquemines Parish. The storm continued on a north northeast track with the center passing about 40 miles southeast of New Orleans with a second landfall occurring near the Louisiana and Mississippi border around 945 AM CDT as a category 3 storm with maximum sustained winds estimated around 105 knots or 121 mph. Katrina continued to weaken as it moved north northeast across Mississippi during the day, but remained at hurricane strength 100 miles inland near Laurel, Mississippi. Katrina weakened to a tropical depression near Clarksville, Tennessee on August 30th.

Due to the failure of power and equipment prior to the peak of the storm, data for wind, storm surge, pressure, and rainfall are incomplete. The lowest pressure on the Mississippi coast was estimated to be 928 mb where the hurricane made landfall near the Louisiana Mississippi border. A pressure of 976 mb was recorded at 0951 CDT by a university weather station deployed in Pascagoula, well east of the landfall location. At approximately the same time, the pressure at the NWS office in Slidell, just to the west of landfall location, recorded a pressure of 934.1 mb at 0938 AM CDT.

The highest wind gusts recorded in Mississippi and the adjacent coastal waters were 117 knots (134 mph) at the Pearl River County EOC office in Poplarville and 102 knots (118 mph) at 1000AM CDT by a university wind tower deployed at the Stennis Space Center in Hancock County. Maximum sustained winds in Mississippi were estimated around 105 knots (121 mph) near the storm's second landfall along the Mississippi and Louisiana border. Unofficial wind observations before the gage failed included a wind gust of 106 kt, (122 mph) at 0615 CDT by an amateur radio operator in Long Beach and a wind gust of 108 kt (124 mph) at the EOC in Pascagoula.

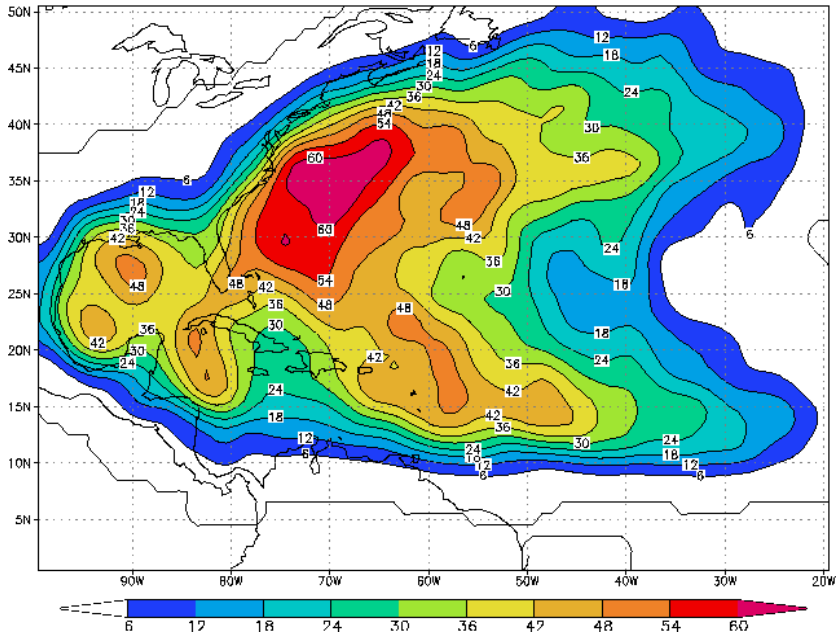
High winds from Katrina caused significant tree and power line damage to the counties that border the Mississippi and Alabama state line. Wind gusts of 80-100 mph were estimated across Stone County and 70-90 mph across George County. Many of the fallen trees fell on structures and caused damage. Stone County received the most damage.

Storm total rainfall amounts generally ranged from 10 to 16 inches across coastal and south Mississippi with much lower amounts observed over southwest Mississippi. The highest observed storm total rainfall was 11 inches at Stennis Space Center and near Picayune.

PROBABILITY OF FUTURE OCCURRENCES

According to NOAA statistical data, the region is located in an area with an annual probability of a named storm between 30 and 42 percent as presented in **Figure F.13**. This illustration was created by the National Oceanic and Atmospheric Administration's Hurricane Research Division using data from 1944 to 1999 and counting hits when a storm or hurricane was within approximately 100 miles (165 km) of each location. As a reference point, the tip of Florida's outline can be found near the 25N, 80W intersection, and the MEMA District 9 Region is near the 30N, 90W intersection. This empirical probability is fairly consistent with other scientific studies and observed historical data made available through a variety of federal, state, and local sources.

FIGURE F.13: EMPIRICAL PROBABILITY OF A NAMED HURRICANE OR TROPICAL STORM



Source: National Oceanic and Atmospheric Administration

The probability of storm occurrences will vary significantly based on the return interval for different categories of magnitude. The probability of less intense storms (lower return periods) is higher than more intense storms (higher return periods). **Table F.22** profiles the potential peak gust wind speeds that can be expected in the MEMA District 9 Region during a hurricane event for various return periods according to FEMA's HAZUS-MH®.

TABLE F.22: POTENTIAL PEAK GUST WIND SPEEDS PER RETURN PERIOD

50-Year	100-Year	500-Year	1,000-Year
119.4 mph	133.9 mph	160.3 mph	170.0

Source: Federal Emergency Management Agency (Hazus-MH 3.2)

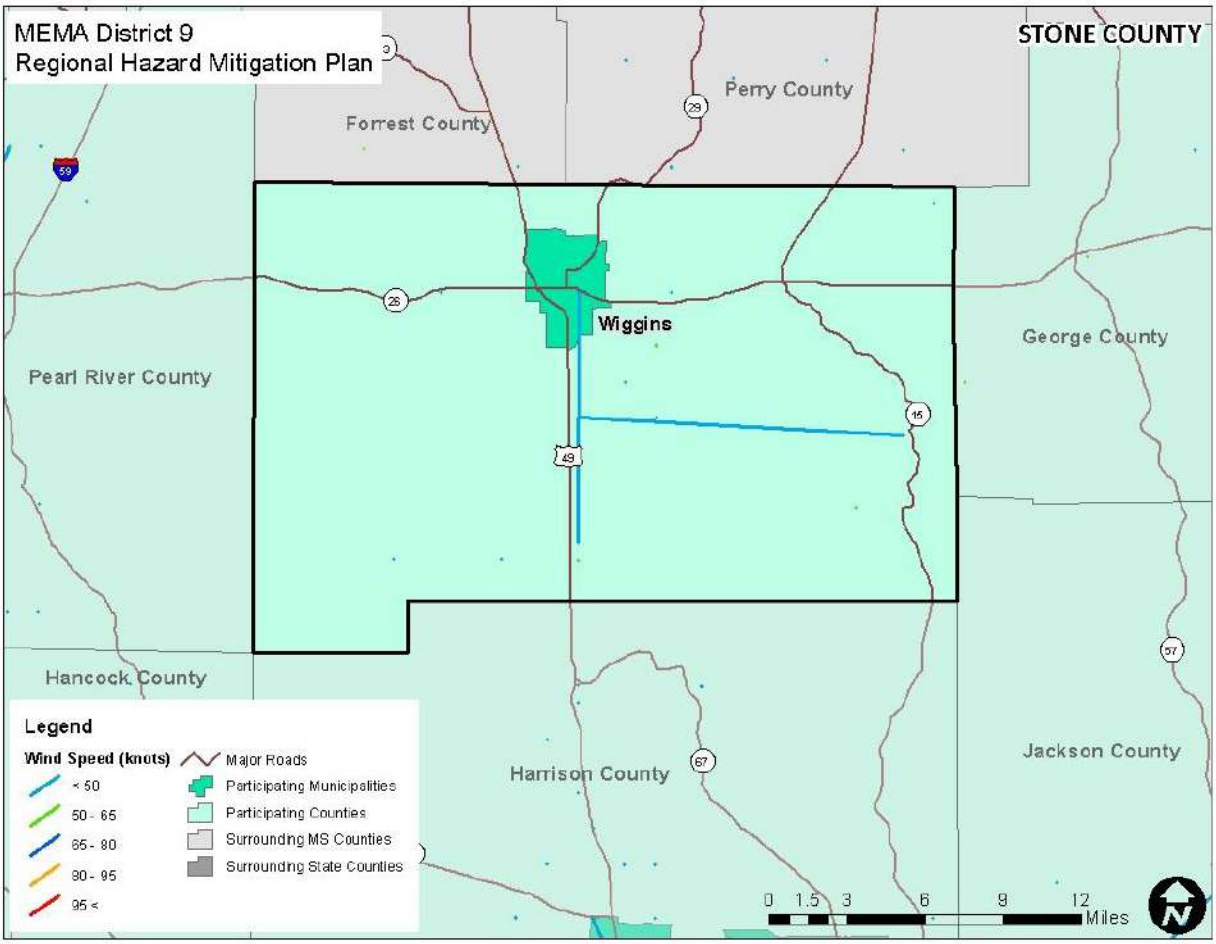
Overall, the probability level of future hurricane and tropical storm occurrence for Stone County is highly likely (100 percent annual probability).

F.2.13 Severe Thunderstorm/High Wind

LOCATION AND SPATIAL EXTENT

A thunderstorm event is an atmospheric hazard, and thus has no geographic boundaries. It is typically a widespread event that can occur in all regions of the United States. However, thunderstorms are most common in the central and southern states because atmospheric conditions in those regions are favorable for generating these powerful storms. It is assumed that Stone County has uniform exposure to an event and the spatial extent of an impact could be large. With that in mind, **Figure F.14** shows the location of wind events that have impacted the county between 1955 and 2015.

FIGURE F.14: SEVERE THUNDERSTORM TRACKS IN STONE COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

Severe storms were at least partially responsible for two disaster declarations in Stone County in 1971 and 2009.[17] According to NCDC, there have been 72 reported thunderstorm and high wind events since 1971 in Stone County.[18] These events caused nearly $908,000 (2016 dollars) in damages.[19] There were also reports of one fatality and five injuries. **Table F.23** summarizes this information. Detailed thunderstorm and high wind event reports including date, magnitude, and associated damages for each event are presented in **Table F.24**.

TABLE F.23: SUMMARY OF THUNDERSTORM/HIGH WIND OCCURRENCES IN STONE COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Wiggins	39	1/5	$589,788	$28,085
Unincorporated Area	33	0/0	$318,141	$7,070
STONE COUNTY TOTAL	**72**	**1/5**	**$907,929**	**$35,155**

Source: National Climatic Data Center

TABLE F.24: HISTORICAL THUNDERSTORM/HIGH WIND OCCURRENCES IN STONE COUNTY

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
Wiggins					
Wiggins	3/7/1995	Thunderstorm Wind	0 kts.	1/0	$79,020
Wiggins	4/21/1995	Thunderstorm Wind	0 kts.	0/0	$1,580
Wiggins	5/9/1995	Thunderstorm Wind	0 kts.	0/0	$3,161
Wiggins	5/9/1995	Thunderstorm Wind	0 kts.	0/0	$790
WIGGINS	6/22/1996	Thunderstorm Wind	45 kts.	0/5	$153,507
WIGGINS	1/24/1997	Thunderstorm Wind	50 kts.	0/0	$3,001
WIGGINS	2/21/1997	Thunderstorm Wind	50 kts.	0/0	$3,001
WIGGINS	4/5/1997	Thunderstorm Wind	50 kts.	0/0	$1,501
WIGGINS	4/27/1997	Thunderstorm Wind	50 kts.	0/0	$1,501
WIGGINS	6/18/1997	Thunderstorm Wind	50 kts.	0/0	$1,501
WIGGINS	10/25/1997	Thunderstorm Wind	50 kts.	0/0	$7,503
WIGGINS	1/22/1998	Thunderstorm Wind	50 kts.	0/0	$4,433
WIGGINS	2/10/1998	Thunderstorm Wind	50 kts.	0/0	$4,433
WIGGINS	1/2/1999	Thunderstorm Wind	55 kts.	0/0	$7,228
WIGGINS	7/25/1999	Thunderstorm Wind	55 kts.	0/0	$28,914
WIGGINS	1/23/2000	Thunderstorm Wind	50 kts. E	0/0	$6,993
WIGGINS	9/5/2000	Thunderstorm Wind	55 kts. E	0/0	$0
WIGGINS	1/19/2001	Thunderstorm Wind	55 kts. E	0/0	$2,720

[17] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.
[18] These thunderstorm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through June 2016 and these high wind events are only inclusive of those reported by NCDC from 1996 through June 2016. It is likely that additional thunderstorm and high wind events have occurred in Stone County. As additional local data becomes available, this hazard profile will be amended.
[19] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
WIGGINS	5/2/2001	Thunderstorm Wind	50 kts. E	0/0	$4,080
WIGGINS	4/8/2002	Thunderstorm Wind	55 kts. E	0/0	$13,388
WIGGINS	7/12/2002	Thunderstorm Wind	50 kts. E	0/0	$13,388
WIGGINS	10/29/2002	Thunderstorm Wind	50 kts. E	0/0	$10,711
WIGGINS	4/7/2003	Thunderstorm Wind	50 kts. EG	0/0	$6,545
WIGGINS	6/27/2004	Thunderstorm Wind	50 kts. EG	0/0	$6,375
WIGGINS	4/30/2005	Thunderstorm Wind	50 kts. EG	0/0	$9,866
WIGGINS	7/16/2006	Thunderstorm Wind	50 kts. EG	0/0	$9,558
WIGGINS	8/15/2006	Thunderstorm Wind	50 kts. EG	0/0	$9,558
WIGGINS	2/13/2007	Thunderstorm Wind	50 kts. EG	0/0	$11,616
WIGGINS	6/19/2007	Thunderstorm Wind	50 kts. EG	0/0	$13,939
WIGGINS	1/31/2008	Thunderstorm Wind	50 kts. EG	0/0	$8,949
WIGGINS	8/7/2008	Thunderstorm Wind	50 kts. EG	0/0	$11,187
WIGGINS	1/6/2009	Thunderstorm Wind	50 kts. EG	0/0	$28,067
WIGGINS	7/4/2009	Thunderstorm Wind	52 kts. EG	0/0	$16,840
WIGGINS	8/4/2010	Thunderstorm Wind	52 kts. EG	0/0	$11,045
WIGGINS	3/9/2011	Thunderstorm Wind	78 kts. EG	0/0	$53,537
WIGGINS	3/9/2011	Thunderstorm Wind	52 kts. EG	0/0	$10,707
WIGGINS	3/9/2011	Thunderstorm Wind	61 kts. EG	0/0	$21,415
WIGGINS	2/18/2012	Thunderstorm Wind	61 kts. EG	0/0	$3,147
WIGGINS	6/24/2015	Thunderstorm Wind	52 kts. EG	0/0	$5,081
Unincorporated Area					
STONE CO.	2/7/1971	Thunderstorm Wind	0 kts.	0/0	$0
STONE CO.	2/26/1971	Thunderstorm Wind	0 kts.	0/0	$0
STONE CO.	5/3/1978	Thunderstorm Wind	0 kts.	0/0	$0
STONE CO.	12/2/1984	Thunderstorm Wind	0 kts.	0/0	$0
STONE CO.	4/20/1992	Thunderstorm Wind	0 kts.	0/0	$0
Perkinston	1/27/1994	Thunderstorm Wind	0 kts.	0/0	$813
STONE CO.	4/21/1995	Thunderstorm Wind	0 kts.	0/0	$3,951
Canton	5/9/1995	Thunderstorm Wind	0 kts.	0/0	$790
Silver Run Lake	5/9/1995	Thunderstorm Wind	0 kts.	0/0	$790
BEATRICE	2/19/1996	Thunderstorm Wind	55 kts.	0/0	$3,838
MC HENRY	9/21/1996	Thunderstorm Wind	50 kts.	0/0	$2,303
COUNTYWIDE	6/5/1998	Thunderstorm Wind	60 kts.	0/0	$44,329
CENTRAL PORTION	7/3/1998	Thunderstorm Wind	50 kts.	0/0	$10,343
COUNTYWIDE	3/2/1999	Thunderstorm Wind	50 kts.	0/0	$14,457
MC HENRY	8/20/2000	Thunderstorm Wind	65 kts. E	0/0	$13,987
MC HENRY	4/8/2002	Thunderstorm Wind	65 kts. E	0/0	$6,694
WHITES CROSSING	12/31/2002	Thunderstorm Wind	50 kts. E	0/0	$6,694
PERKINSTON	12/7/2004	Thunderstorm Wind	50 kts. EG	0/0	$10,200
RAMSEY SPGS	5/29/2006	Thunderstorm Wind	50 kts. EG	0/0	$11,947
RAMSEY SPGS	6/2/2006	Thunderstorm Wind	50 kts. EG	0/0	$11,947
CENTRAL PORTION	8/15/2006	Thunderstorm Wind	50 kts. EG	0/0	$23,894
PERKINSTON	10/27/2006	Thunderstorm Wind	50 kts. EG	0/0	$47,788
MC HENRY	1/31/2008	Thunderstorm Wind	50 kts. EG	0/0	$13,424
MC HENRY	2/12/2008	Thunderstorm Wind	50 kts. EG	0/0	$13,424

Location	Date	Type	Magnitude	Deaths/Injuries	Property Damage*
WHITES CROSSING	3/3/2008	Thunderstorm Wind	50 kts. EG	0/0	$11,187
PERKINSTON	4/4/2008	Thunderstorm Wind	50 kts. EG	0/0	$33,560
PERKINSTON	3/26/2009	Thunderstorm Wind	50 kts. EG	0/0	$13,472
INDA	4/4/2011	Thunderstorm Wind	50 kts. EG	0/0	$0
TEN MILE	6/10/2011	Thunderstorm Wind	52 kts. EG	0/0	$2,142
WHITES CROSSING	2/18/2012	Thunderstorm Wind	61 kts. EG	0/0	$5,245
MC HENRY	8/29/2012	Thunderstorm Wind	52 kts. EG	0/0	$5,245
PERKINSTON	4/11/2013	Thunderstorm Wind	52 kts. EG	0/0	$5,169
WHITES CROSSING	5/20/2015	Thunderstorm Wind	52 kts. EG	0/0	$508

*Property damage is reported in 2016 dollars; all damage may not have been reported.
†E = estimated; EG = estimated gust; ES = estimated sustained; MG = measured gust; MS = measured sustained
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

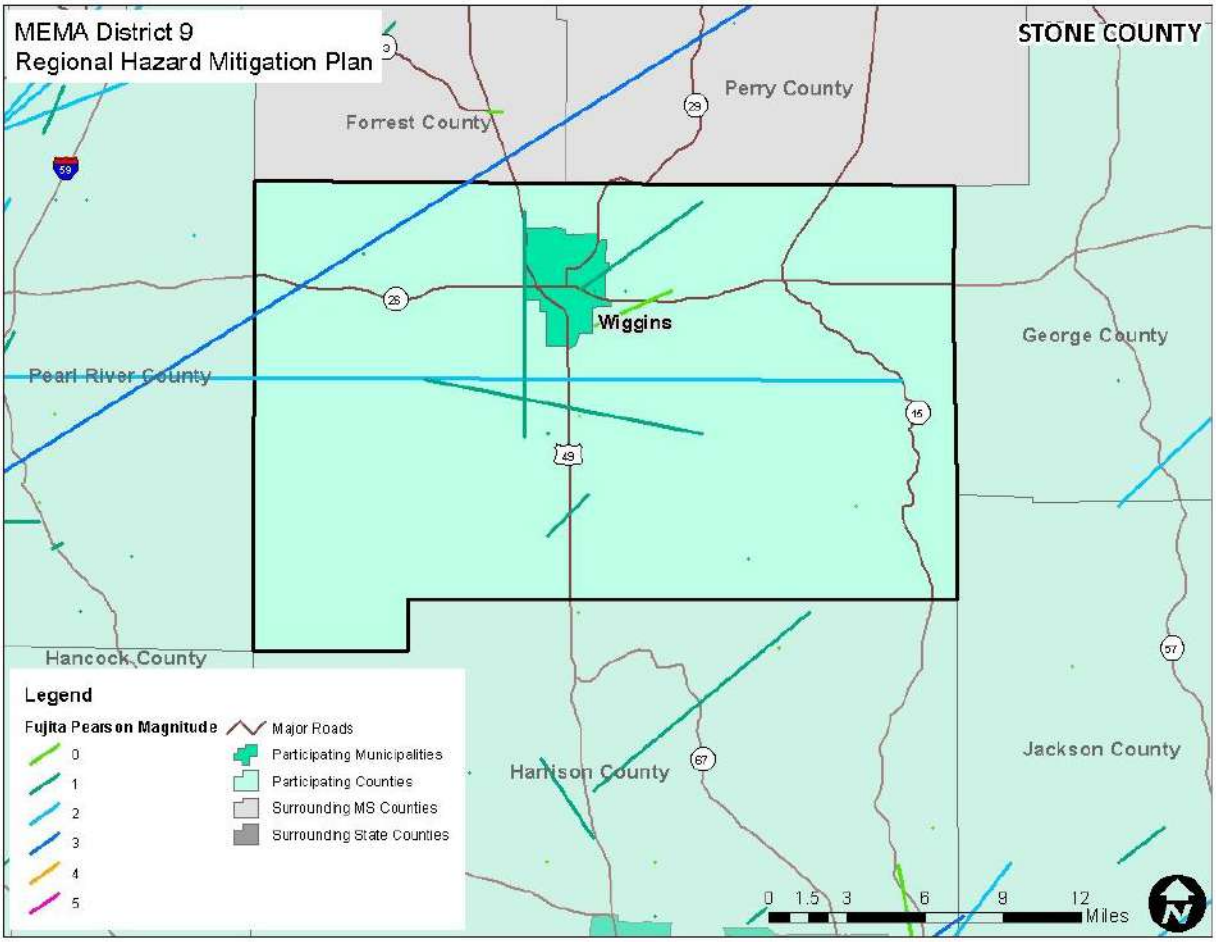
Given the high number of previous events, it is certain that thunderstorm events, including straight-line wind events, will occur in the future. This results in a probability level of highly likely (100 percent annual probability) for the entire county.

F.2.14 Tornado

LOCATION AND SPATIAL EXTENT

Tornadoes occur throughout the state of Mississippi, and thus in Stone County. Tornadoes typically impact a relatively small area, but damage may be extensive. Event locations are completely random and it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that Stone County is uniformly exposed to this hazard. With that in mind, **Figure F.15** shows tornado track data for many of the major tornado events that have impacted the county between 1950 and 2015. While no definitive pattern emerges from this data, some areas that have been impacted in the past may be potentially more susceptible in the future.

FIGURE F.15: HISTORICAL TORNADO TRACKS IN STONE COUNTY



Source: National Weather Service Storm Prediction Center

HISTORICAL OCCURRENCES

Tornadoes were at least partially responsible for two disaster declarations in Stone County in 1971 and 2009.[20] According to the National Climatic Data Center, there have been a total of 22 recorded tornado events in Stone County since 1953, resulting in almost $1.8 million (2016 dollars) in property damages.[21] [22] In addition, five injuries were reported. The magnitude of these tornadoes ranged from F0 to F2 and EF1 to EF2 in intensity. A summary of these events is presented in **Table F.25**. Detailed information on historic tornado events can be found in **Table F.26**.

[20] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.
[21] These tornado events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1950 through June 2016. It is likely that additional tornadoes have occurred in Stone County. As additional local data becomes available, this hazard profile will be amended.
[22] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE F.25: SUMMARY OF TORNADO OCCURRENCES IN STONE COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Wiggins	7	0/0	$134,091	$7,057
Unincorporated Area	15	0/5	$1,665,573	$26,438
STONE COUNTY TOTAL	**22**	**0/5**	**$1,799,664**	**$33,495**

Source: National Climatic Data Center

TABLE F.26: HISTORICAL TORNADO IMPACTS IN STONE COUNTY

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
Wiggins					
WIGGINS	4/27/1997	Funnel Cloud	0/0	$0	A funnel cloud was observed just north of Wiggins. The funnel never touched down and no damage was found in the area.
WIGGINS	4/24/2000	F0	0/0	$41,960	It was found from a National Weather Service Storm Survey that two different tornadoes of similar strength, width and distance, tracked east and southeast of Wiggins, MS. (See April 00 Storm Data) The first began in Wiggins near State Highways 29 and 26. The tornado moved northeast crossing State Highway 26 near 4th Street, then moved across Clubhouse Drive and went back into the clouds near McGregor and Big Four Roads. The tornado was a F0, about 50 yards wide and traveled mostly at tree top level a distance of approximately 2 miles. Almost all of the damage was to trees, except at 4th Street and State Highway 26, where an auto parts store had its windows blown out by debris. High winds then pushed one side of the cinder block store over. An old building near the store, that had been vacant for some time, was blown over.
WIGGINS	4/24/2000	F0	0/0	$20,980	The second tornado began near King Bee Road just west of Big Level. This tornado also moved northeast, moving across Bond Lott Cemetery and John Willis Roads before lifting back into the clouds near Big Four Road and State Highway 26, near Whites Crossing. As with the first tornado, the track was at tree top level, with damage primarily to trees, except near State Highway 26. Here a business had some tin blown off its sides and roof. Some of the tin blew into a field where a vehicle was damaged and two cows were killed. This tornado was a F0, was about 50 yards wide, and traveled 3.5 miles. No injuries were reported.
WIGGINS	10/3/2002	F0	0/0	$6,694	A weak F0 tornado produced some minor tree damage just southeast of Wiggins.

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
WIGGINS	11/24/2004	F0		$6,375	A weak tornado briefly touched down and downed trees west of the town of Wiggins.
WIGGINS	1/5/2007	F0	0/0	$58,081	A weak tornado first touched down near the fire station in Wiggins. The tornado did some minor roof damage to the station. The tornado then moved across the street and blew the roof off of the old train depot. The tornado then moved across a business where several metal buildings were damaged. The tornado then went back into the clouds just northeast of the business. Some debris from the train depot was found about a quarter of a mile away near Flint Creek Water Park. No one was injured.
DEAN GRIFFIN MEM ARP	12/25/2012	EF2	0/0	$0	The tornado moved from northeast Pearl River county into extreme northwest Stone county causing significant damage to a few homes on Magnolia Road. It crossed Highway 26...snapping numerous pine trees in the lake Tac-O-Leen campground. The tornado continued northeast destroying a manufactured home on Will Lee road and heavily damaging several frame houses. A manufactured home was also rolled into a frame house. Emergency Management also reported trees down on Progress Road before the tornado exited Stone County into Forrest County. This tornado segment in Stone County is part of a 61 mile long track tornado that went from central Pearl River County to western Greene County Mississippi.
Unincorporated Area					
STONE CO.	4/4/1953	F2	0/0	$225,518	--
STONE CO.	5/4/1953	F1	0/0	$225,518	--
STONE CO.	6/5/1959	--	0/0	$20,692	--
STONE CO.	6/12/1959	F1	0/0	$20,692	Small tornado uprooted trees 16" diameter, damaged some roofs and TV antennas in NE part of town.
STONE CO.	11/22/1961	F1	0/0	$20,138	--
STONE CO.	12/10/1967	F1	0/1	$180,279	--
STONE CO.	11/3/1968	F2	0/3	$173,027	Radar indicated a line of thunderstorms at 4:15 PM from near Bogalusa, La. to Columbia, Miss. moving rapidly toward the east. From 4:50 to 5:30 PM people reported during cloudy rainy weather storm moved from W towards E; one funnel observed aloft most of the time; some heard roar like jet airplane. PERAL RIVER COUNTY: At White Sands 8 WSW Poplarville man reported thunder began about 4 PM, and tornado "came through very swift" about 4:50 PM, and "was gone in seconds." There was "hard thunder and roaring before...then funnel formed about 5 miles

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					West of my house, it swept through 3/4 mile of my place, about 1/4 mile wide....Blew down 20 acres tung trees, 40 acres pine timber, 1 house (tenant) and 1 feed shed, tin off 2 other barns, much damage to 200 pecan trees, lots of fence down." He reported one funnel "bouncing up and down...from ground to 20 ft. high." He estimated $5,000 damage on his place. In the area of Derby and Savannah, there was high wind damage to trees, shelters and some buildings. No injuries from the winds were reported. Woman saw tornado cross Highway 59, she said, "There was lots of funnels, looked like fingers pointed down; also rotating counter clockwise, very dark clouds with a large tail trailing." STONE COUNTY: In the western part of the county, at Smith Community, man reported storm was traveling east along township line between 2 and 3, it did not vary over 1 mile...." Damage occurred along a path 1/4 mile wide. At about 5 PM, "Trees and other debris on one side was felled NE; center of path felled east; on north side of path it felled toward SE. There is evidence there was several small funnels." Red Creek Community (in western Stone County) had houses damaged but no injuries. The worst damage was a house chimney blown down and roof caved in, corn crop flattened, tung orchard damaged; at another place roof was blown off. Damage occurred over a 450 yard wide path, one funnel observed touching ground, and some heard roar. Storm reported to have begun at 4:45 PM, ended 5:15 PM. About 15 miles away, at Big Level Community, 4 SE Wiggins, one funnel observed during rainy weather remained aloft most of time. Man reported storm 5:15-5:20 PM at nursery, width of path 100 yds; equipment and tool sheds badly damaged, room attached to house carried 1/2 mile, weather instruments damaged, debris closed road. A couple and son, age 11, received lacerations and bruises 5:25-5:30 PM when one end of their house was destroyed; path 200 ft. wide. In area SE of Wiggins, other signs of damage to barns and outhouses were reported; trees up to 3 ft. in diameter uprooted; house trailer about 10 miles east of Big Level moved about 4 ft. off foundation. Damage in Wiggins area estimated at $15,000. Radar at Mobile indicated a single thunderstorm cell (in Stone County) but no hook was observed. Authorities said 7 homes were damaged in Stone County.

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
STONE CO.	4/13/1969	F1	0/0	$0	Tornado touchdown reported by public 7 W Wiggins (Lat. 30.9° N, Long. 89.2° W). Highway Patrol reported 1 barn destroyed and slight damage to house, no injuries.
STONE CO.	2/12/1971	F1	0/0	$0	Tornado dipped down 1 W Wiggins (lat. 30.9° N, long. 89.1° W) where 4 house trailers were overturned and at 2 E Wiggins where it tore roof of Country Club and splintered part of frame structure.
STONE CO.	9/2/1985	F1	0/0	$559,603	--
STONE CO.	2/15/1987	F1	0/0	$53,005	A tornado touched down 4 miles south of Wiggins. One barn was destroyed while several residences reported minor roof damage. Numerous pine trees were also uprooted.
PERKINSTON	10/29/2002	F0	0/0	$10,711	A weak tornado briefly touched down near Perkinston. A few trees were blown down and a barn was damaged by the tornado.
BEATRICE	11/24/2004	F0	0/0	$6,375	A weak tornado briefly touched down near Beatrice. Several trees were damaged by the tornado.
TEN MILE	9/4/2011	EF1	0/1	$107,075	The tornado touched down just north of Bankston Road which is just west of the town of Perkinston. The tornado moved north and lifted in the town of Bond near the intersection of U.S. Highway 49 and Pump Branch Road. The path length was approximately 9 miles, but was not always fully in contact with the ground and became very narrow in several places. Numerous trees were blown over or snapped with several trees snapped off at the top. Two residences suffered damage from the tornado. A double-wide mobile home on Sumrall Road west of Perkinston lost 40 percent of its roof. The mobile home was also shifted off its concrete masonry unit piers, consistent with EF-1 intensity damage with winds between 86 MPH and 110 MPH. One adult male was injured in the mobile home, suffering cuts and abrasions to his arms. A single-wide mobile home, on College Avenue West, was severely damaged when a large tree fell on it.
PERRY	9/30/2012	EF1	0/0	$62,942	The tornado touched down one quarter mile north of West McHenry Road and west of US Highway 49 where trees were snapped off at mid-trunk and uprooted. The tornado continued northeast to Pine Avenue where it briefly increased in strength to EF-1 intensity and nearly 100 yards wide taking the roof off of one residence and damaging the roof structures of 4 other homes. The tornado then continued northeast across Highway 49 before lifting on Wire Road East near the Highway 49

Location	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					intersection where a wooden backyard privacy fence was blown down and a few trees were topped out.

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

PROBABILITY OF FUTURE OCCURRENCES

According to historical information, tornado events pose a significant threat to Stone County. The probability of future tornado occurrences affecting Stone County is highly likely (100 percent annual probability).

F.2.15 Winter Weather

LOCATION AND SPATIAL EXTENT

Nearly the entire continental United States is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. Stone County is not accustomed to severe winter weather conditions and rarely receives severe winter weather, even during the winter months. Events tend to be mild in nature; however, even relatively small accumulations of snow, ice, or other wintery precipitation can lead to losses and damage due to the fact that these events are not commonplace. Given the atmospheric nature of the hazard, the entire county has uniform exposure to a winter storm.

HISTORICAL OCCURRENCES

According to the National Climatic Data Center, there have been a total of three recorded winter storm events in Stone County since 2002.[23] These events did not result in any property damage.[24] A summary of these events is presented in **Table F.27**. Detailed information on the recorded winter storm events can be found in **Table F.28**.

TABLE F.27: SUMMARY OF WINTER STORM EVENTS IN STONE COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Stone County	3	0/0	$0	$0

Source: National Climatic Data Center

[23] These ice and winter storm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through June 2016. It is likely that additional winter storm conditions have affected Stone County.
[24] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

TABLE F.28: HISTORICAL WINTER STORM IMPACTS IN STONE COUNTY

Location	Date	Type	Deaths/Injuries	Property Damage*
Wiggins				
None reported	--	--	--	--
Unincorporated Area				
STONE (ZONE)	1/1/2002	Winter Storm	0/0	$0
STONE (ZONE)	12/11/2008	Winter Weather	0/0	$0
STONE (ZONE)	2/12/2010	Winter Storm	0/0	$0

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: National Climatic Data Center

There have been several severe winter weather events in Stone County. The text below describes one of the major events and associated impacts on the county. Similar impacts can be expected with severe winter weather.

February 2010
An area of low pressure moved across the north central Gulf. Heavy rain changed over to snow across portions of the central gulf coast as the low moved to the east. Snowfall accumulations ranged from a dusting to as much as 4 inches across interior southeast Mississippi. Broadcast media reported 3 inches of snow on cars in Lucedale. The emergency manager reported 1 inch of snow across Stone County. Some power outages were also reported.

Winter storms throughout the planning area have several negative externalities including hypothermia, cost of snow and debris cleanup, business and government service interruption, traffic accidents, and power outages. Furthermore, citizens may resort to using inappropriate heating devices that could to fire or an accumulation of toxic fumes.

PROBABILITY OF FUTURE OCCURRENCES

Winter storm events will continue to occur in Stone County. Based on historical information, the probability is likely (between 10 and 100 percent annual probability).

OTHER HAZARDS

F.2.16 Climate Change/Sea Level Rise

LOCATION AND SPATIAL EXTENT

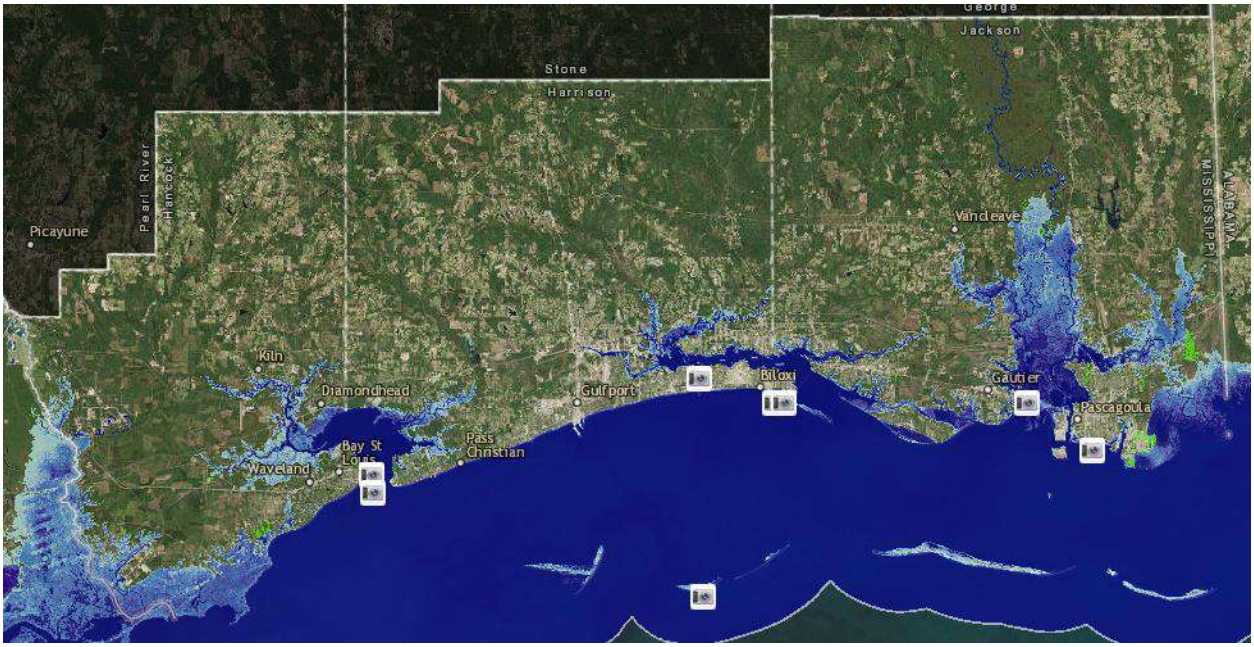
Climate Change
Climate change can have direct implications on many of the other hazards addressed in this plan since it has the potential to alter the nature and frequency of hazards, including increasing temperature (extreme heat), changes in precipitation (drought, flooding), and more frequent, strong storms (wind, hurricane). Therefore, it is assumed that Stone County is uniformly exposed to this hazard.

Sea Level Rise

Sea level rise is occurring at a global scale. However, it does not affect areas uniformly and will be more severe in some places. **Figure F.16** identifies areas in MEMA District 9 that would be inundated by water as a result of three feet in sea level rise as per projections by NOAA. The highest level of sea level rise projected by NOAA is shown in **Figure F.17**. This figure shows the inundation areas in the case of six feet of sea level rise. This demonstrates the additional areas that would be impacted beyond the three feet scenario.

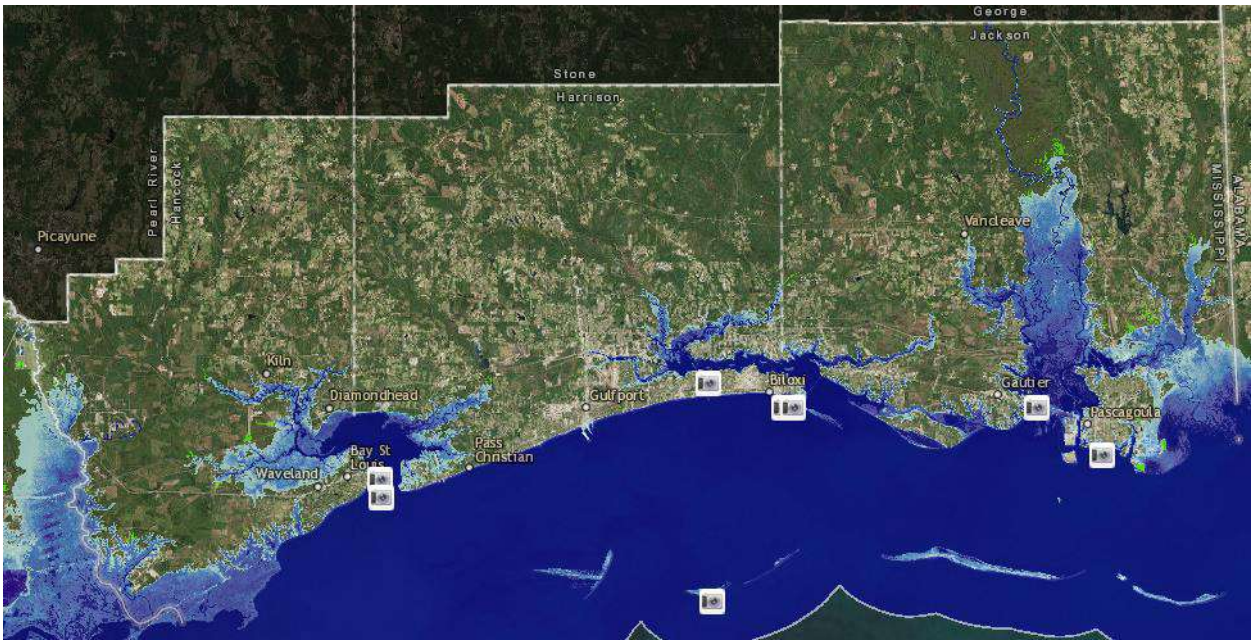
There are no areas in Stone County that would be impacted by projected sea level rise.

FIGURE F.16: THREE FEET SEA LEVEL RISE IN MEMA DISTRICT 9



Source: NOAA

FIGURE F.17: SIX FEET SEA LEVEL RISE IN MEMA DISTRICT 9



Source: NOAA

HISTORICAL OCCURRENCES

Climate Change

According to the *National Climate Assessment*, there have been increasing numbers of days above 95°F and nights above 75°F, and decreasing numbers of extremely cold days since 1970 in the Southeast. Daily and five-day rainfall intensities have also increased and summers have been either increasingly dry or extremely wet. The number of Category 4 and 5 hurricanes in the Atlantic basin has increased substantially since the early 1980s compared to the historic record that dates back to the mid-1880s. This can be attributed to both natural variability and climate change.

Sea Level Rise

Sea level rise is a slow-onset hazard and specific events/occurrences are not possible to determine.

PROBABILITY OF FUTURE OCCURRENCES

Climate Change

According to the *National Climate Assessment*, temperatures across the Southeast are expected to increase during this century, with shorter-term (year-to-year and decade-to-decade) fluctuations over time due to natural climate variability. Major consequences of warming include significant increases in the number of hot days (95°F or above) and decreases in freezing events. Regional average increases are in the range of 4°F to 8°F by the year 2100.

Projections of future precipitation patterns are less certain than projections for temperature increases. Because the Southeast, is located in the transition zone between projected wetter conditions to the north and drier conditions to the southwest, many of the model projections show only small changes relative to natural variations. Additionally, projections further suggest that warming will cause tropical storms to be

fewer in number globally, but stronger in force, with more Category 4 and 5 storms, and substantial further increases in extreme precipitation are projected as this century progresses.

Overall, future climate change is considered likely (between 10 and 100 percent annual probability).

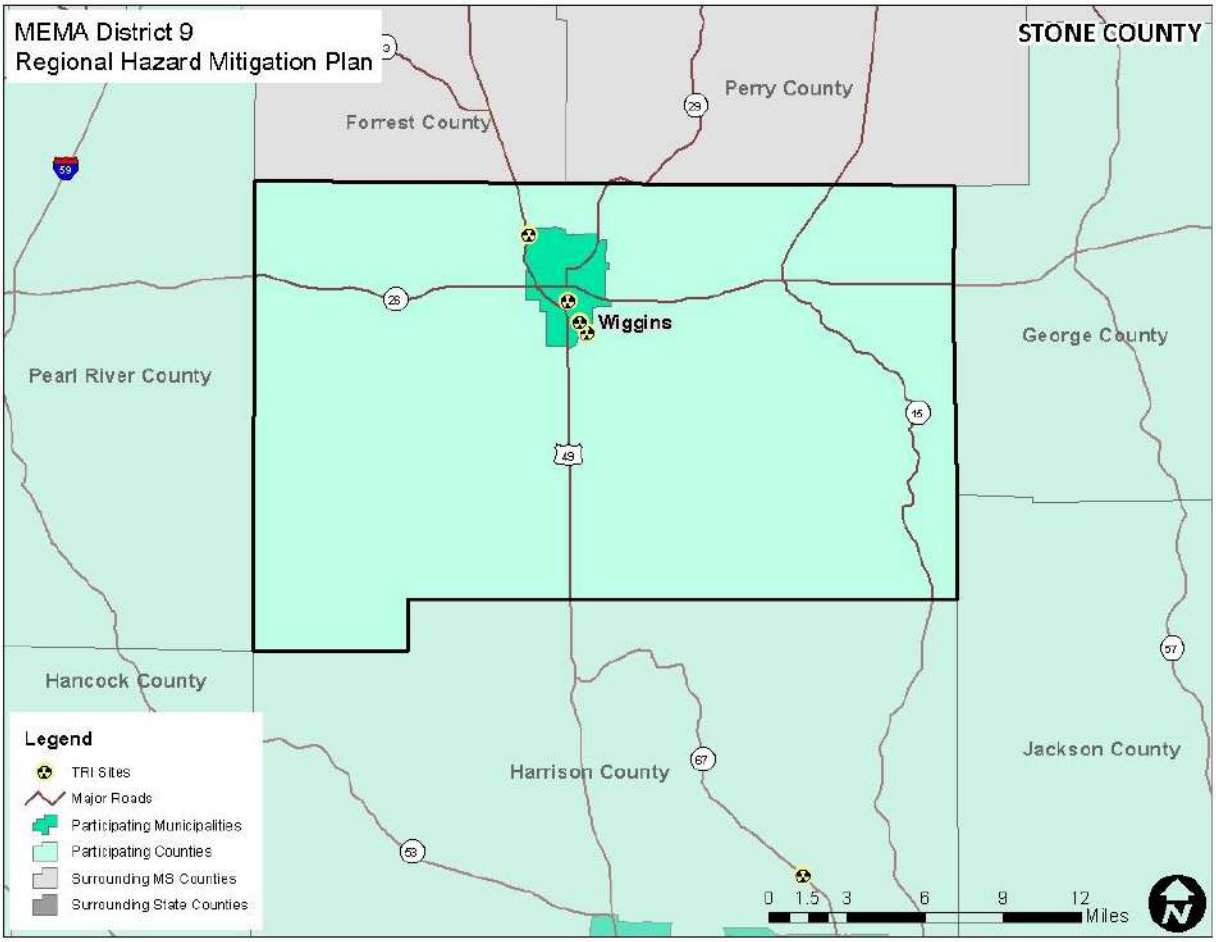
Sea Level Rise
There is still much debate regarding the probability of future occurrence of sea level rise. This section will be updated as more information becomes available. Future sea level rise is considered likely (between 10 and 100 percent annual probability).

F.2.17 Hazardous Materials Incident/Train Derailment

LOCATION AND SPATIAL EXTENT

Stone County has four TRI sites. These sites are shown in **Figure F.18.**

FIGURE F.18: TOXIC RELEASE INVENTORY (TRI) SITES IN STONE COUNTY



Source: Environmental Protection Agency

In addition to "fixed" hazardous materials locations, hazardous materials may also impact the county via roadways and railways. Many roads and railways in the county are subject to hazardous materials transport and all roads and railways that permit hazardous material transport are considered potentially at risk to an incident.

HISTORICAL OCCURRENCES

There have been a total of 10 recorded HAZMAT incidents in Stone County since 1974. These events resulted in almost $84,000 (2016 dollars) in property damage.[25] **Table F.29** summarizes the HAZMAT incidents in Stone County as reported by PHMSA. Detailed information on these events is presented in **Table F.30.**

TABLE F.29: SUMMARY OF HAZMAT INCIDENTS IN STONE COUNTY

Location	Number of Occurrences	Deaths/Injuries	Property Damage (2016)	Annualized Property Losses
Wiggins	8	0/0	$26	$1
Unincorporated Area	2	0/0	$83,900	$2,996
STONE COUNTY TOTAL	**10**	**0/0**	**$83,926**	**$2,997**

Source: United States Department of Transportation Pipeline and Hazardous Materials Safety Administration

TABLE F.30: HAZMAT INCIDENTS IN STONE COUNTY

Report Number	Date	City	Mode	Serious Incident?	Deaths/ Injuries	Damages ($)*	Quantity Released
Wiggins							
I-1975010301	12/29/1974	WIGGINS	Highway	No	0/0	$0	0
I-1978090756	8/18/1978	WIGGINS	Highway	No	0/0	$0	10 LGA
I-1978120660	12/6/1978	WIGGINS	Highway	No	0/0	$0	50 LGA
I-1979070188	6/7/1979	WIGGINS	Highway	No	0/0	$0	5 LGA
I-1980110585	10/31/1980	WIGGINS	Highway	Yes	0/0	$0	300 LGA
I-1987060203	5/14/1987	WIGGINS	Rail	No	0/0	$0	0
I-1994060772	5/19/1994	WIGGINS	Highway	No	0/0	$0	55 LGA
I-2004071106	6/9/2004	WIGGINS	Highway	No	0/0	$26	5 LGA
Unincorporated Area							
I-1988020177	1/17/1988	PERKINSTON	Highway	No	0/0	$0	0
X-2008110194	10/21/2008	McHenry	Rail	No	0/0	$83,900	0

*Property damage is reported in 2016 dollars; all damage may not have been reported.
Source: United States Department of Transportation Pipeline and Hazardous Materials Safety Administration

PROBABILITY OF FUTURE OCCURRENCES

Given the location of four toxic release inventory sites in Stone County and prior roadway and railway incidents, it is highly likely (100 percent annual probability) that a hazardous material incident may occur

[25] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913. For 2016, the August 2016 monthly index was used.

in the county. County and city officials are mindful of this possibility and take precautions to prevent such an event from occurring. Furthermore, there are detailed plans in place to respond to an occurrence.

F.2.18 Infectious Disease

LOCATION AND SPATIAL EXTENT

Due to the nature of a public health/emerging disease threat, it is difficult to identify a precise location where this type of event would occur. Moreover, a large-scale event would have impacts that spread throughout the county. Therefore, all areas in Stone County are considered equally susceptible to infectious diseases.

HISTORICAL OCCURRENCES

Mosquito-borne illness in Mississippi include West Nile virus, Chikungunya virus, and Zika virus. These illnesses affect birds, animals, and humans, causing flu-like symptoms in people who are bitten by infected mosquitoes. Occasionally illness can be severe, leading to meningitis or encephalitis. According to the Mississippi State Department of Health (MSDH), there have been no reported cases of mosquito-borne illnesses in Stone County as of November 2016. **Table F.31** summarizes the mosquito-borne illnesses in humans reported in the county.

TABLE F.31: SUMMARY OF MOSQUITO-BORNE ILLNESSES IN STONE COUNTY

Location	West Nile Virus	Chikungunya	Zika	Other*	Deaths
Stone County	0	0	0	0	0

*Other mosquito-borne illnesses include La Crosse encephalitis, St. Louis encephalitis, and Eastern Equine encephalitis.
Source: Mississippi State Department of Health

Diseases like influenza and norovirus are regularly occurring health issues in Stone County. These conditions are not legally reportable to county or state public health agencies, so data on disease incidence is not readily available. MSDH relies upon selected sentinel health practitioners across the state to report the percentage and total patient visits consistent with an influenza-like illness (ILI): fever of 100°F or higher and cough or sore throat. Reports are used to estimate the state's ILI rate and the magnitude of state's influenza activity on a weekly basis. Reports represent only the distribution of flu in the state, not an actual count of all flu cases statewide.

PROBABILITY OF FUTURE OCCURRENCES

Due to some recent incidents that have been recorded across the State of Mississippi and in counties neighboring Stone County, future occurrences are considered possible (between 1 and 10 percent annual probability).

F.2.19 Conclusions on Hazard Risk

The hazard profiles presented in this section were developed using best available data and result in what may be considered principally a qualitative assessment as recommended by FEMA in its "How-to" guidance document titled *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA

Publication 386-2). It relies heavily on historical and anecdotal data, stakeholder input, and professional and experienced judgment regarding observed and/or anticipated hazard impacts. It also carefully considers the findings in other relevant plans, studies, and technical reports.

HAZARD EXTENT

Table F.32 describes the extent of each hazard identified for Stone County. The extent of a hazard is defined as its severity or magnitude, as it relates to the planning area.

TABLE F.32: EXTENT OF STONE COUNTY HAZARDS

<table>
<tr><th colspan="2">Flood-related Hazards</th></tr>
<tr><td>Dam and Levee Failure</td><td>Dam failure extent is defined using the Mississippi Division of Environmental Quality classifications which include Low, Significant, and High. One dam is classified as high-hazard in Stone County.</td></tr>
<tr><td>Erosion</td><td>The extent of erosion can be defined by the measurable rate of erosion that occurs. There are no erosion rate records located in Stone County.</td></tr>
<tr><td>Flood</td><td>Flood depth and velocity are recorded via United States Geological Survey stream gages throughout the region. Although there are no gages available in Stone County, the county can expect flood extent to be similar to the other counties in the region.
<table>
<tr><th rowspan="2">Location/ Jurisdiction</th><th rowspan="2">Date</th><th rowspan="2">Maximum Historic Crest (ft)</th><th colspan="4">Flood categories</th></tr>
<tr><th>Action Stage (ft)</th><th>Flood Stage (ft)</th><th>Moderate Flood Stage (ft)</th><th>Major Flood Stage (ft)</th></tr>
<tr><td colspan="7">Stone County</td></tr>
<tr><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td><td>n/a</td></tr>
</table></td></tr>
<tr><td>Storm Surge</td><td>Storm surge can be defined by the depth of inundation which is defined by the category of hurricane/tropical storm. Since the MEMA District 9 Region could easily be impacted by a Category 3 storm, depth of inundation could be at least 9 feet in many areas. However, there are no areas in Stone County that could potentially be impacted.</td></tr>
<tr><th colspan="2">Fire-related Hazards</th></tr>
<tr><td>Drought</td><td>Drought extent is defined by the U.S. Drought Monitor classifications which include Abnormally Dry, Moderate Drought, Severe Drought, Extreme Drought, and Exceptional Drought. According to the U.S. Drought Monitor classifications, the most severe drought condition is Exceptional. Stone County has received this ranking twice over the 17-year reporting period.</td></tr>
<tr><td>Lightning</td><td>According to the Vaisala's flash density map, Stone County is located in an area that experiences 4 to 12 and up lightning flashes per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures.</td></tr>
<tr><td>Wildfire</td><td>Wildfire data was provided by the Mississippi Forestry Commission and is reported annually by county from 2007-2016. The greatest number of fires to occur in Stone County in any year 58 in 2011 and 2015. The greatest number of acres to burn in the county in a single year occurred in 2016 when 690 acres were burned. Information on specific occurrences of wildfire and the most severe fires in each jurisdiction is not available. Although this data lists the extent that has occurred, larger and more frequent wildfires are possible throughout the county.</td></tr>
</table>

Geologic Hazards	
Earthquake	Earthquake extent can be measured by the Richter Scale, the Modified Mercalli Intensity (MMI) scale, and the distance of the epicenter from Stone County. According to data provided by the National Centers for Environmental Information, no earthquakes were reported in Stone County.
Wind-related Hazards	
Extreme Cold	The extent of extreme cold can be defined by the minimum temperature reached. Official long term temperature records are not kept for any areas in Stone County. However, the temperature has previously ranged from 15 to 20 degrees Fahrenheit in southwest and coastal Mississippi (reported on December 18, 1996).
Extreme Heat	The extent of extreme heat can be measured by the record high temperature recorded. Official long term temperature records are not kept for any areas in Stone County. However, the highest recorded temperature in Beaumont (north of the county) was 105°F and heat index values were recorded as high as 115°F (reported in July 2000).
Hailstorm	Hail extent can be defined by the size of the hail stone. The largest hail stone reported in Stone County was 2.00 inches (reported on March 11, 1968). It should be noted that future events may exceed this.
Hurricane and Tropical Storm	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5. The greatest classification of hurricane to traverse directly through Stone County was Unnamed 1855 Storm, a Category 2 storm which carried tropical force winds of 93 knots upon arrival in the county.
Severe Thunderstorm/High Wind	Thunderstorm extent is defined by wind speeds reported. The strongest recorded wind event in Stone County was 78 knots (reported on March 9, 2011). It should be noted that future events may exceed these historical occurrences.
Tornado	Tornado hazard extent is measured by the Fujita/Enhanced Fujita. The greatest magnitude reported in Stone County was an EF2 (reported on December 25, 2012).
Winter Weather	The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest snowfall reported in Stone County was 1 inch (reported on February 12, 2010).
Other Hazards	
Climate Change/Sea Level Rise	It is still uncertain what the extent of climate change will be in the future. However, increasing temperature (extreme heat), changes in precipitation (drought, flooding), and more frequent, stronger storms (wind, hurricanes) can be expected. Sea level rise is defined by the areas impacted, but is more often associated with the amount of sea level rise that is expected to take place. Although it is difficult to predict an exact amount of rise, the Climate Change Surging Seas Report intermediate high sea level rise scenario projects 1 foot of rise locally by 2050 and 3.7 feet by 2100.
Hazardous Materials Incident/Train Derailment	According to USDOT PHMSA, the largest hazardous materials incident reported in Stone County was 300 LGA released on the highway (reported on October 31, 1980). It should be noted that larger events are possible.
Infectious Disease	An infectious disease threat could have large-scale effects throughout the county and may cause illness in many people. Possible impacts from a disease threat depend largely on the impacted population, but might include anything from absenteeism and loss of productivity in the workplace to death or serious illness to humans or livestock. A serious disease threat could affect many thousands of people.

PRIORITY RISK INDEX RESULTS

In order to draw some meaningful planning conclusions on hazard risk for Stone County, the results of the hazard profiling process were used to generate countywide hazard classifications according to a "Priority Risk Index" (PRI). More information on the PRI and how it was calculated can be found in Section 5.21.2.

Table F.33 summarizes the degree of risk assigned to each category for all initially identified hazards based on the application of the PRI. Assigned risk levels were based on the detailed hazard profiles developed for this subsection, as well as input from the Regional Hazard Mitigation Council. The results were then used in calculating PRI values and making final determinations for the risk assessment.

TABLE F.33: SUMMARY OF PRI RESULTS FOR STONE COUNTY

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Flood-related Hazards						
Dam and Levee Failure	Possible	Critical	Small	Less than 6 hours	Less than 6 hours	**2.4**
Erosion	Likely	Minor	Small	More than 24 hours	More than 1 week	**2.1**
Flood	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 24 hours	**3.2**
Storm Surge	Unlikely	Minor	Negligible	More than 24 hours	Less than 24 hours	**1.1**
Fire-related Hazards						
Drought	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Lightning	Highly Likely	Limited	Negligible	6 to 12 hours	Less than 6 hours	**2.4**
Wildfire	Highly Likely	Minor	Small	Less than 6 hours	Less than 1 week	**2.6**
Geologic Hazards						
Earthquake	Possible	Minor	Moderate	Less than 6 hours	Less than 6 hours	**2.0**
Wind-related Hazards						
Extreme Cold	Possible	Minor	Large	More than 24 hours	Less than 1 week	**2.1**
Extreme Heat	Highly Likely	Minor	Large	More than 24 hours	More than 1 week	**2.8**
Hailstorm	Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours	**2.8**
Hurricane and Tropical Storm	Highly Likely	Critical	Large	More than 24 hours	Less than 24 hours	**3.2**
Severe Thunderstorm/ High Wind	Highly Likely	Critical	Moderate	6 to 12 hours	Less than 6 hours	**3.1**
Tornado	Highly Likely	Critical	Small	Less than 6 hours	Less than 6 hours	**3.0**
Winter Weather	Likely	Minor	Moderate	More than 24 hours	Less than 24 hours	**2.1**
Other Hazards						
Climate Change/Sea Level Rise	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Hazardous Materials Incident/ Train Derailment	Highly Likely	Limited	Small	Less than 6 hours	Less than 24 hours	**2.8**
Infectious Disease	Possible	Limited	Large	More than 24 hours	More than 1 week	**2.5**

F.2.20 Final Determinations on Hazard Risk

The conclusions drawn from the hazard profiling process for Stone County, including the PRI results and input from the Regional Hazard Mitigation Council, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk, and Low Risk (**Table F.34**). For purposes of these classifications, risk is expressed in relative terms according to the estimated impact that a hazard will have on human life and property throughout all of Stone County. A more quantitative analysis to estimate potential dollar losses for each hazard has been performed separately, and is described in Section 6: *Vulnerability Assessment* and below in Section F.3. It should be noted that although some hazards are classified below as posing low risk, their occurrence of varying or unprecedented magnitudes is still possible in some cases and their assigned classification will continue to be evaluated during future plan updates.

Some priorities have changed since the previous plans were adopted due to the merging of multiple local plans to form this regional plan; however, most priorities remain the same.

TABLE F.34: CONCLUSIONS ON HAZARD RISK FOR STONE COUNTY

HIGH RISK	Hurricane and Tropical Storm Flood Severe Thunderstorm/High Wind Tornado
MODERATE RISK	Hailstorm Hazardous Materials Incident/Train Derailment Extreme Heat Wildfire Drought Climate Change/Sea Level Rise Infectious Disease
LOW RISK	Lightning Dam and Levee Failure Erosion Winter Weather Extreme Cold Earthquake Storm Surge

F.3 STONE COUNTY VULNERABILITY ASSESSMENT

This subsection identifies and quantifies the vulnerability of Stone County to the significant hazards previously identified. This includes identifying and characterizing an inventory of assets in the county and

assessing the potential impact and expected amount of damages caused to these assets by each identified hazard event. More information on the methodology and data sources used to conduct this assessment can be found in Section 6: *Vulnerability Assessment*.

F.3.1 Asset Inventory

Table F.35 lists the estimated number of buildings, parcels, and the total value of improvements for Stone County and its participating jurisdictions (study area of vulnerability assessment). Because digital parcel data was not available for every community, data obtained from Hazus-MH 3.2 inventory was utilized to supplement the analysis where gaps existed.

TABLE F.35: IMPROVED PROPERTY IN STONE COUNTY

Location	Counts of Buildings	Counts of Parcels	Total Value of Improvements
Wiggins	3,187	2,416	$132,113,728
Unincorporated Area	12,583	10,819	$287,065,278
STONE COUNTY TOTAL	**15,770**	**13,235**	**$419,179,006**

Source: MDEQ, Hazus-MH 3.2

Table F.36 lists the critical facilities located in Stone County by type according to data provided by local government officials.

In addition, **Figure F.19** shows the locations of critical facilities in Stone County. **Table F.52**, at the end of this subsection, shows a complete list of the critical facilities by name, as well as the hazards that affect each facility. Further, it should be noted that the table below may show that some communities do not have any critical facilities of in certain type, when in reality, that particular type of facility may actually be located within the community. This may occur because spatial data for that facility type was not available or because the facility may have been classified under a different category type for that particular community.

TABLE F.36: CRITICAL FACILITY INVENTORY IN STONE COUNTY

Location	Communications	EOC	Fire Stations	Medical	Police Station	Power/ Gas	Private/Non-Profit
Wiggins	1	1	0	0	1	0	0
Unincorporated Area	0	0	1	1	1	3	0
STONE COUNTY TOTAL	**1**	**1**	**1**	**1**	**2**	**3**	**0**

Source: Local Governments

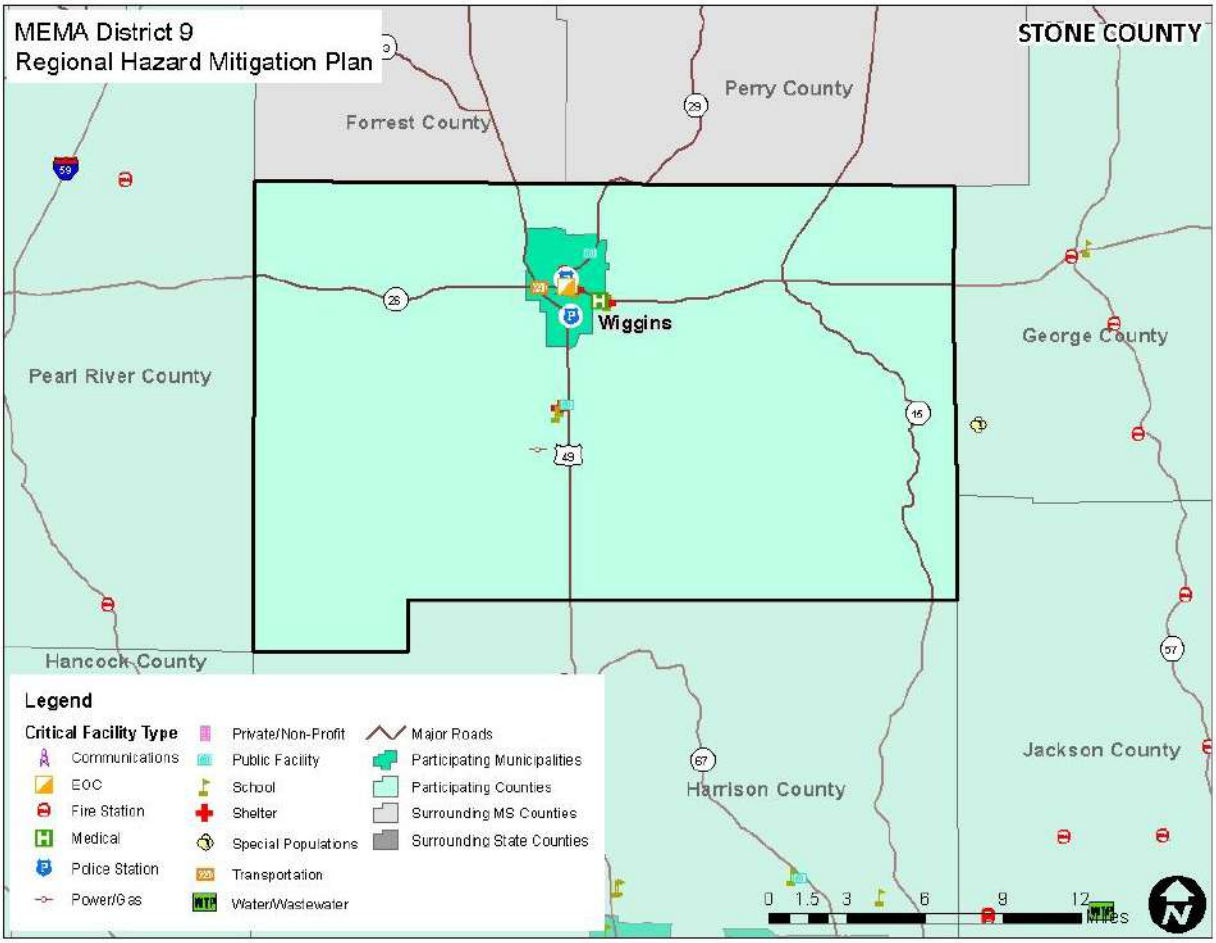
TABLE F.36: CRITICAL FACILITY INVENTORY IN STONE COUNTY (CONT.)

Location	Public Facility	School	Shelter	Special Populations	Transportation	Water/ Wastewater
Wiggins	1	0	0	0	0	0
Unincorporated Area	6	5	4	0	2	0

Location	Public Facility	School	Shelter	Special Populations	Transportation	Water/ Wastewater
STONE COUNTY TOTAL	7	5	4	0	2	0

Source: Local Governments

FIGURE F.19: CRITICAL FACILITY LOCATIONS IN STONE COUNTY



Source: Local Governments

F.3.2 Social Vulnerability

In addition to identifying those assets potentially at risk to identified hazards, it is important to identify and assess those particular segments of the resident population in Stone County that are potentially at risk to these hazards.

Table F.37 lists the population by jurisdiction according to American Community Survey 2015 population estimates. The total population in Stone County according to Census data is 17,978 persons. Additional population estimates are presented above in Section F.1.

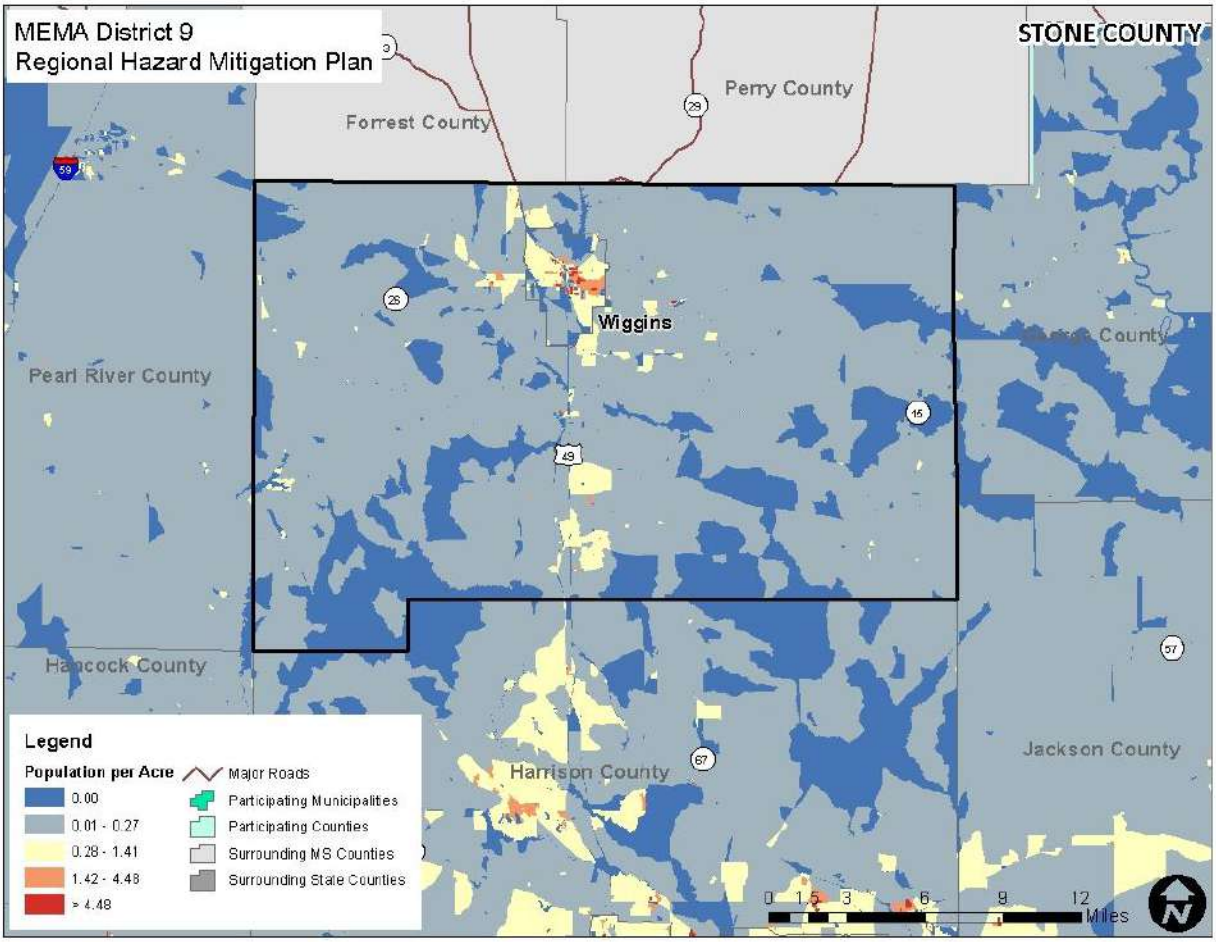
TABLE F.37: TOTAL POPULATION IN STONE COUNTY

Location	Total 2015 Population
Wiggins	4,487
Unincorporated Area	13,491
STONE COUNTY TOTAL	**17,978**

Source: United States Census Bureau, 2011-2015 American Community Survey 5-Year Estimates

In addition, **Figure F.20** illustrates the population density per acre by census block as it was reported by the U.S. Census Bureau in 2010. As can be seen in the figure, the population is spread out through most of the county, with a heavier concentration in Wiggins.

FIGURE F.20: POPULATION DENSITY IN STONE COUNTY



Source: United States Census Bureau, 2010 Census

F.3.3 Development Trends and Changes in Vulnerability

Since the previous local-level hazard mitigation plans were approved, Stone County has experienced moderate growth and development. **Table F.38** shows the number of building units constructed since 2010 according to the U.S. Census American Community Survey.

TABLE F.38: BUILDING COUNTS FOR STONE COUNTY

Location	2010	2011	2012	2013	2014	2015	% Building Stock Built Post-2010
Wiggins	1,437	1,660	1,460	1,439	1,459	1,513	5.3%
Unincorporated Area	5,444	5,388	5,627	5,705	5,733	5,703	4.8%
STONE COUNTY TOTAL	**6,881**	**7,048**	**7,087**	**7,144**	**7,192**	**7,216**	**4.9%**

Source: United States Census Bureau, American Community Survey

Table F.39 shows population growth estimates for the county from 2010 to 2015 based on the based on the American Community Survey's annual population estimates.

TABLE F.39: POPULATION GROWTH FOR STONE COUNTY

Location	Population Estimates						% Change 2010-2015
	2010	2011	2012	2013	2014	2015	
Wiggins	4,281	4,237	4,399	4,446	4,463	4,487	4.8%
Unincorporated Area	12,642	13,057	13,258	13,408	13,478	13,491	6.7%
STONE COUNTY TOTAL	**16,923**	**17,294**	**17,657**	**17,854**	**17,941**	**17,978**	**6.2%**

Source: United States Census Bureau, American Community Survey

Based on the data above, there has been a moderate rate of residential development and population growth in the county since 2010, resulting in an increased number of structures and people that are vulnerable to the potential impacts of the identified hazards. Therefore, development and population growth have impacted the county's vulnerability since the previous local hazard mitigation plans were approved and there has been an increase in the overall vulnerability.

It is also important to note that as development increases in the future, greater populations and more structures and infrastructure will be exposed to potential hazards if development occurs in the floodplains or other identified areas of high risk.

F.3.4 Vulnerability Assessment Results

As noted in Section 6: *Vulnerability Assessment*, only hazards with a specific geographic boundary, available modeling tool, or sufficient historical data allow for further analysis. Those results, specific to Stone County, are presented here. All other hazards are assumed to impact the entire planning region (e.g., drought) or, due to lack of data, analysis would not lead to credible results (e.g., infectious disease). The total county exposure, and thus risk to these hazards, was presented in **Table F.35**.

The hazards to be further analyzed in this subsection include: flood, wildfire, earthquake, hurricane and tropical storm winds and storm surge, hazardous materials incident, dam and levee failure, and sea level rise.

The annualized loss estimate for all hazards is presented near the end of this subsection in **Table F.51.**

FLOOD

Historical evidence indicates that Stone County is susceptible to flood events. A total of 24 flood events have been reported by the National Climatic Data Center resulting in $146,318 (2016 dollars) in property damage. On an annualized level, these damages amounted to $8,226 for Stone County.

In order to assess flood risk, a GIS-based analysis was used to estimate exposure to flood events using Digital Flood Insurance Rate Map (DFIRM) data in combination with improved property records for Stone County. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within an identified floodplain.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones.

Table F.40 shows the results of the analysis.

TABLE F.40: ESTIMATED EXPOSURE OF PROPERTY TO THE FLOOD HAZARD

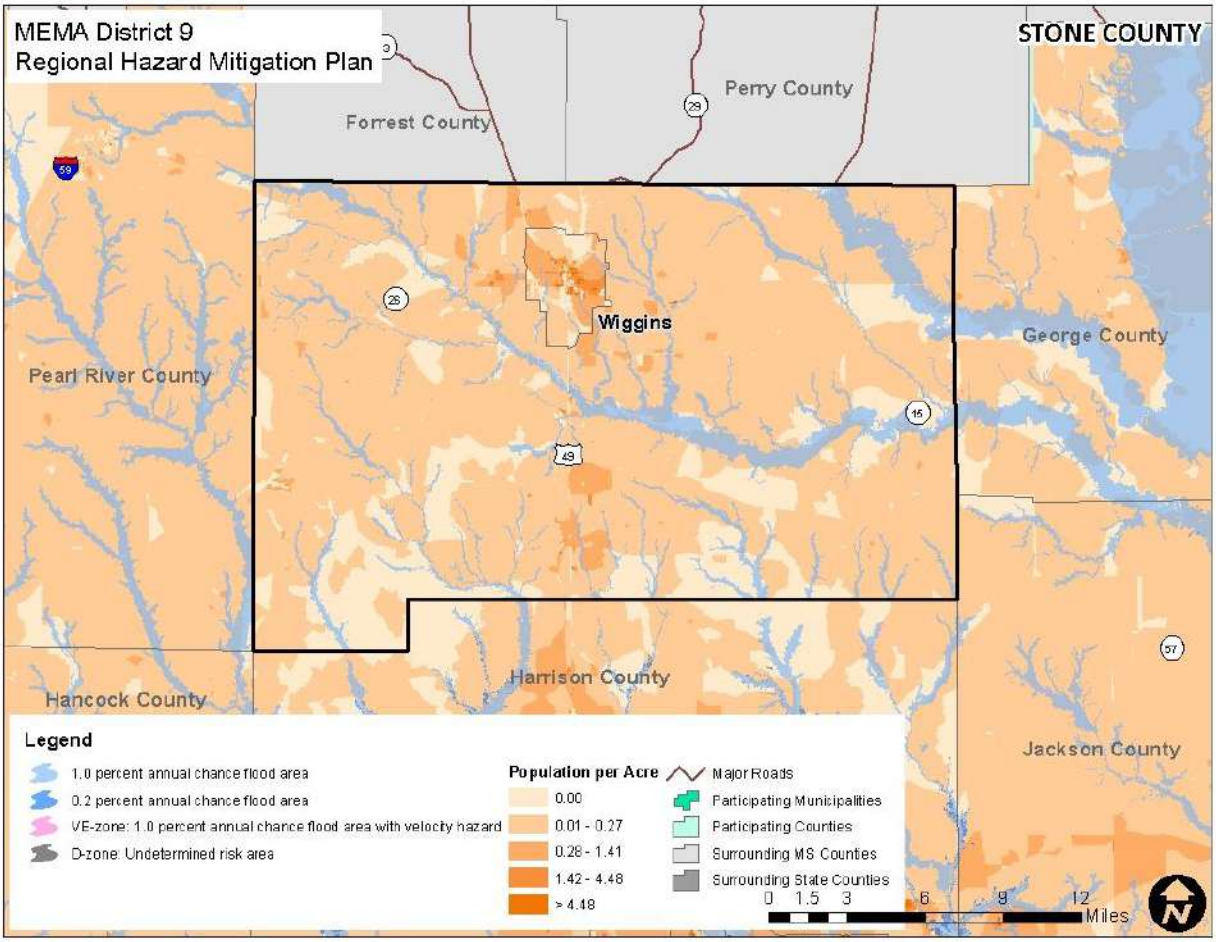
Location	1.0-percent ACF		0.2-percent ACF		VE Zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Wiggins	12	$873,286	0	$0	0	$0
Unincorporated Area	199	$3,246,802	0	$0	0	$0
STONE COUNTY TOTAL	**211**	**$4,120,088**	**0**	**$0**	**0**	**$0**

Source: Federal Emergency Management Agency DFIRM, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Figure F.21 is presented to gain a better understanding of at-risk population by evaluating census block level population data against mapped floodplains. There are areas of concern in several of the population centers in the county. Therefore, there is significant population vulnerability to flooding.

FIGURE F.21 : POPULATION DENSITY NEAR FLOODPLAINS IN STONE COUNTY



Source: Federal Emergency Management Agency DFIRM, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are no facilities located in one of the identified floodplain zones. A list of specific critical facilities and their associated risk can be found in **Table F.52** at the end of this subsection.

In conclusion, a flood has the potential to impact many existing and future buildings, facilities, and populations in Stone County, though some areas are at a higher risk than others. All types of structures in a floodplain are at-risk, though elevated structures will have a reduced risk. Such site-specific vulnerability determinations are outside the scope of this assessment but may be considered during future plan updates. Furthermore, areas subject to repetitive flooding should be analyzed for potential mitigation actions.

WILDFIRE

Although historical evidence indicates that Stone County is susceptible to wildfire events, there are few reports which include information on historic dollar losses. Therefore, it is difficult to calculate a reliable

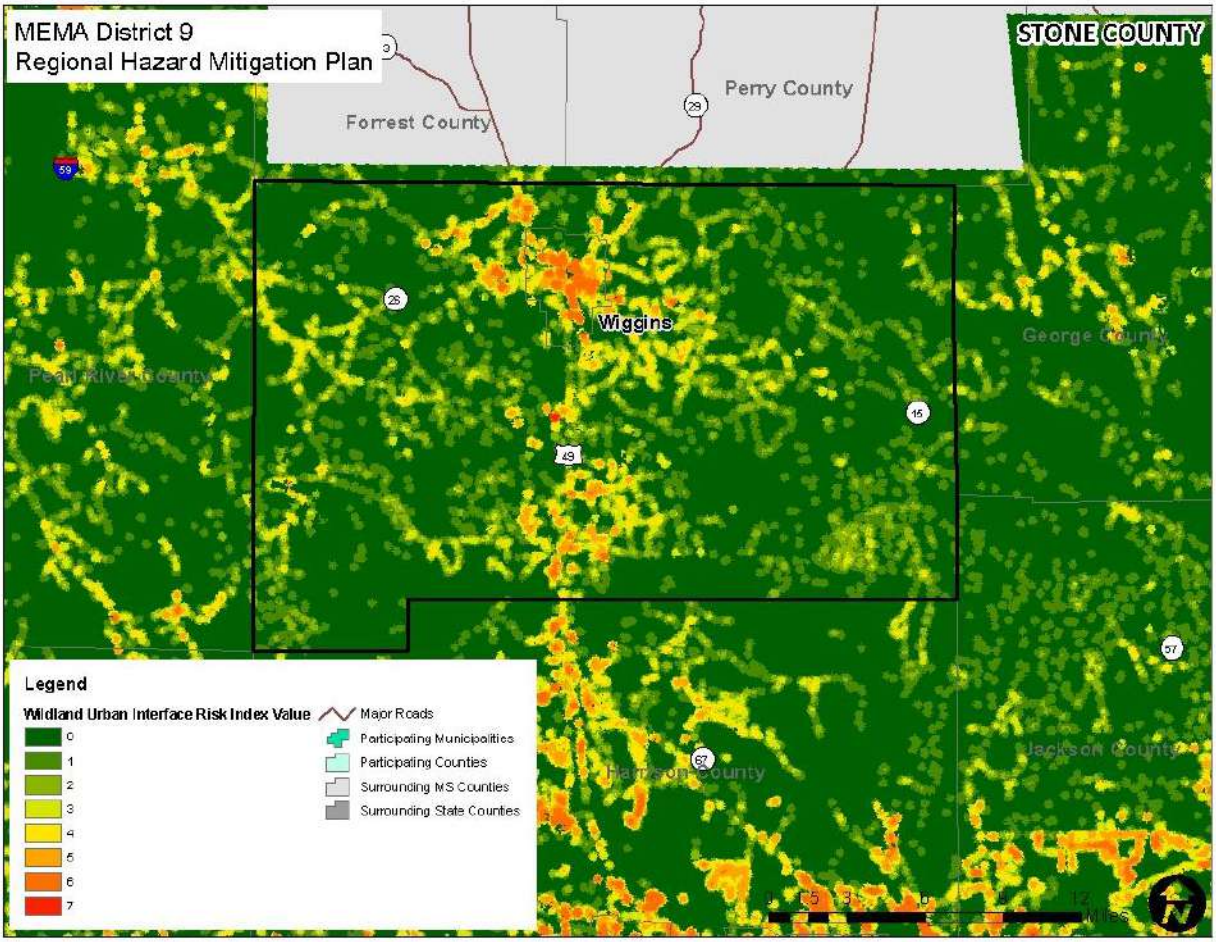
annualized loss figure. Annualized loss is considered relatively low, though it should be noted that a single event could result in significant damages throughout the county.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones. For the critical facility analysis, areas of concern were intersected with critical facility locations.

Figure F.22 shows the Wildland Urban Interface Risk Index (WUIRI) data, which is a data layer that shows a rating of the potential impact of a wildfire on people and their homes. The key input, Wildland Urban Interface (WUI), reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the WUI and rural areas is key information for defining potential wildfire impacts to people and homes. Initially provided as raster data, it was converted to a polygon to allow for analysis. The Wildland Urban Interface Risk Index data ranges from 0 to 7 with higher values being most severe (as noted previously, this is only a measure of relative risk). **Figure F.23** shows the areas of analysis where any grid cell is less than 3. Areas with a value below 3 were chosen to be displayed as areas of risk because this showed the upper echelon of the scale and the areas at highest risk.

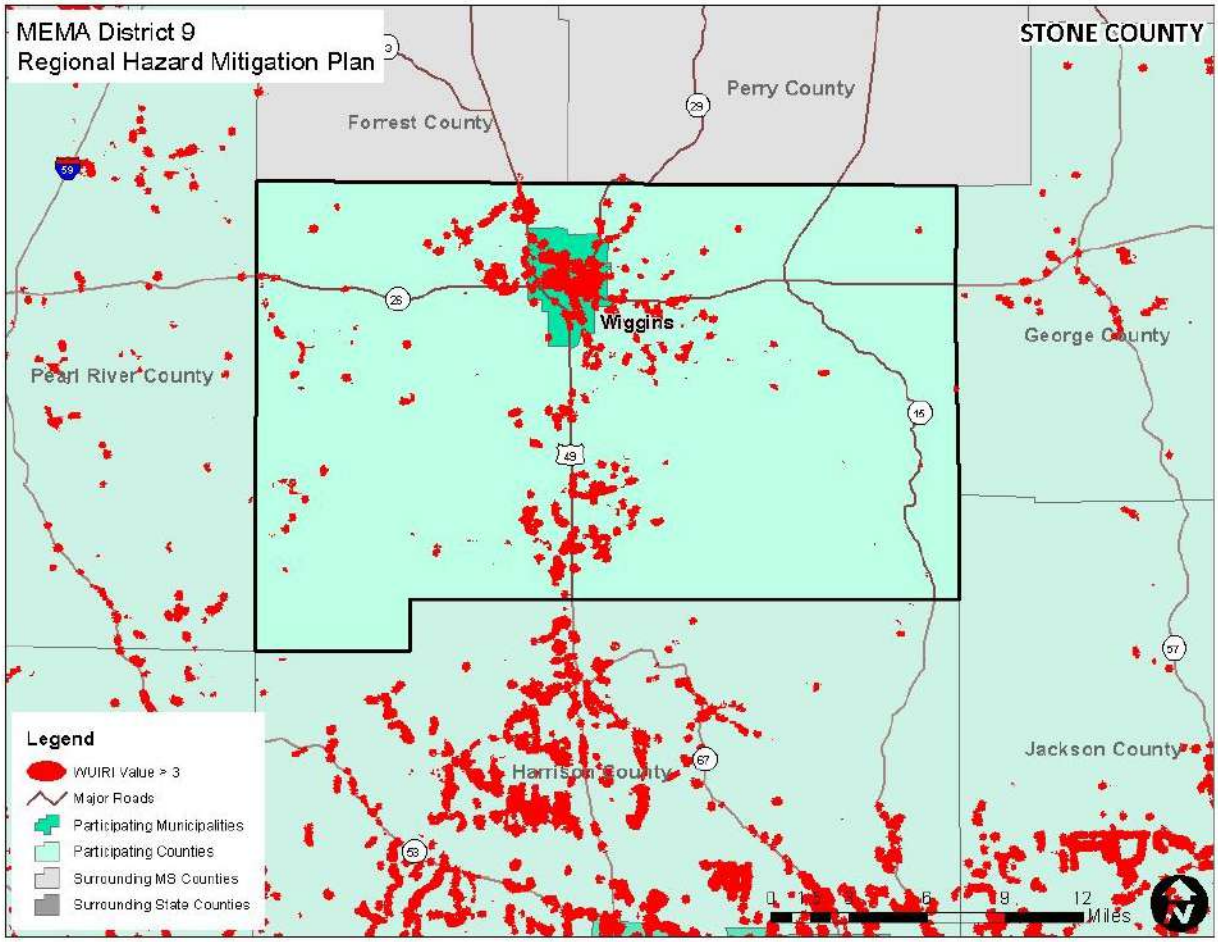
Table F.41 shows the results of the analysis.

FIGURE F.22: WUI RISK INDEX AREAS IN STONE COUNTY



Source: Southern Wildfire Risk Assessment Data

FIGURE F.23: WILDFIRE RISK AREAS IN STONE COUNTY



Source: Southern Wildfire Risk Assessment Data

TABLE F.41: EXPOSURE OF IMPROVED PROPERTY TO WILDFIRE RISK AREAS

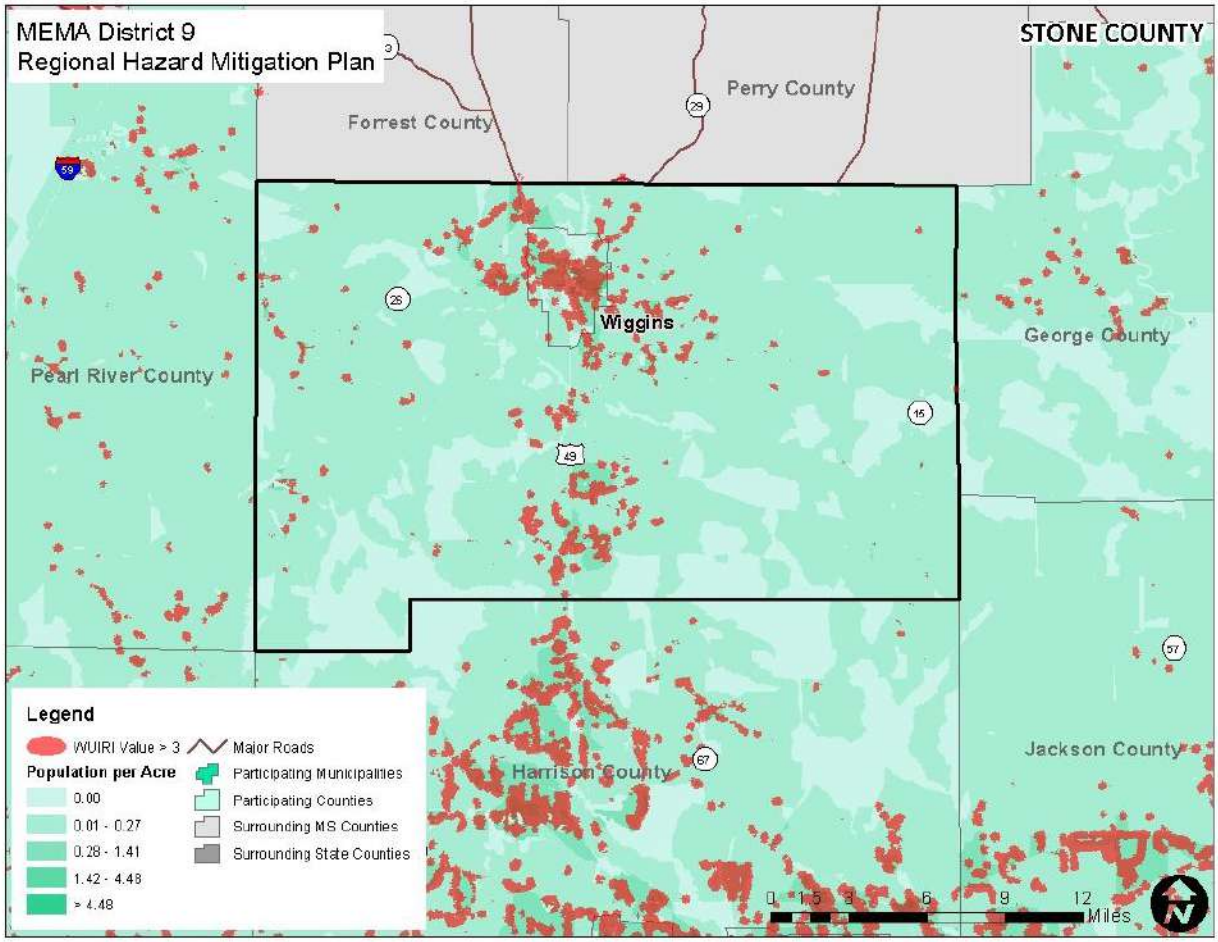
Location	Wildfire Risk	
	Approx. Number of Buildings	Approx. Improved Value
Wiggins	2,664	$104,838,031
Unincorporated Area	4,082	$87,845,059
STONE COUNTY TOTAL	**6,746**	**$192,683,090**

Source: SWRA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Given some level of susceptibility across the entire county, it is assumed that the total population is at risk to the wildfire hazard. **Figure F.24** shows an overlay of the wildfire risk areas identified above with the population density by census block. This shows that many of the areas of high population concentration are susceptible to wildfire because of their proximity to the wildland urban interface.

FIGURE F.24: WILDFIRE RISK AREAS IN STONE COUNTY



Source: Southern Wildfire Risk Assessment Data; United States Census

Critical Facilities

The critical facility analysis revealed that there are 20 critical facilities located in wildfire areas of concern, including 1 communications, 1 EOC, 1 fire station, 2 police stations, 2 power/gas, 5 public facilities, 4 schools, and 4 shelters. It should be noted, that several factors could impact the spread of a wildfire putting all facilities at risk. A list of specific critical facilities and their associated risk can be found in **Table F.52** at the end of this subsection.

In conclusion, a wildfire event has the potential to impact many existing and future buildings, critical facilities, and populations in Stone County.

EARTHQUAKE

As the Hazus-MH model suggests below, and historical occurrences confirm, any earthquake activity in the area is likely to inflict only minor to moderate damage to the county. Hazus-MH 3.2 estimates a total annualized loss of $8,000 which includes buildings, contents, and inventory throughout the county.

For the earthquake hazard vulnerability assessment, a probabilistic scenario was created to estimate the average annualized loss[26] for the county. The results of the analysis are generated at the Census Tract level within Hazus-MH and then aggregated to the county level. Since the scenario is annualized, no building counts are provided. Losses reported included losses due to structure failure, building loss, contents damage, and inventory loss. They do not include losses to business interruption, lost income, or relocation. **Table F.42** summarizes the findings with results rounded to the nearest thousand.

TABLE F.42: AVERAGE ANNUALIZED LOSS ESTIMATIONS FOR EARTHQUAKE HAZARD

Location	Structural Damage	Non-Structural Damage	Contents Damage	Inventory Loss	Total Annualized Loss
Stone County	$2,000	$5,000	$1,000	$0	$8,000

Source: Hazus-MH 3.2

Social Vulnerability
It can be assumed that all existing and future populations are at risk to the earthquake hazard.

Critical Facilities
The Hazus-MH probabilistic analysis indicated that no critical facilities would sustain measurable damage in an earthquake event. However, all critical facilities should be considered at-risk to minor damage, should an event occur. Specific vulnerabilities for these assets will be greatly dependent on their individual design and the mitigation measures in place. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates.

In conclusion, an earthquake has the potential to impact all existing and future buildings, facilities, and populations in Stone County. The Hazus-MH scenario indicates that minimal to moderate damage is expected from an earthquake occurrence. While Stone County may not experience a large earthquake, localized damage is possible with an occurrence. A list of specific critical facilities and their associated risk can be found in **Table F.52** at the end of this subsection.

HURRICANE AND TROPICAL STORM

Historical evidence indicates that Stone County has very significant risk to the hurricane and tropical storm hazard. There have been 10 disaster declarations due to hurricanes or tropical storms (Hurricanes Camille, Frederic, Elena, Georges, Ivan, Dennis, Katrina, Gustav, and Isaac, as well as Tropical Storms Isidore). A large number tracks have come near or traversed through the county, as shown and discussed in Section F.2.12. Hazus-MH 3.2 estimates a total annualized loss of $5,329,000 which includes buildings, contents, and inventory throughout the county.

Hurricane Winds
Hurricanes and tropical storms can cause damage through numerous additional hazards such as flooding, erosion, tornadoes, and high winds, thus it is difficult to estimate total potential losses from these cumulative effects. The current Hazus-MH hurricane model only analyzes hurricane winds and storm surge and is not capable of modeling and estimating cumulative losses from all hazards associated with hurricanes; therefore, only these two aspects of hurricane losses are analyzed in this section. It can be assumed that all existing and future buildings and populations are at risk to hurricane and tropical storm

[26] Annualized loss is defined by Hazus-MH as the expected value of loss in any one year.

wind hazard. Hazus-MH 3.2 was used to determine average annualized losses[27] for the county as shown below in **Table F.43.** Only losses to buildings, inventory, and contents are included in the results.

TABLE F.43: AVERAGE ANNUALIZED LOSS ESTIMATIONS FOR HURRICANE WIND HAZARD

Location	Building Damage	Contents Damage	Inventory Loss	Total Annualized Loss
Stone County	$3,629,000	$1,683,000	$17,000	$5,329,000

Source: Hazus-MH 3.2

Storm Surge

In addition, although it was treated as a separate hazard throughout this plan, storm surge is most often associated with hurricanes and tropical storms. Indeed, Hazus incorporates the storm surge model for estimating damage from storm surge as part of the hurricane model. The storm surge model can only be run as part of a historic hurricane model run and not as part of an annualized loss model. Unfortunately, in this model, storm surge impacts are calculated as part of the total damage from the historic event and thus could not be separated out and evaluated solely in terms of storm surge loss. As such, the estimated losses presented below are combined losses from hurricane winds and storm surge. The historic Hurricane Katrina model was utilized as this was certainly one of the most impactful storms in the region and therefore estimates the potential losses that are possible from a large hurricane event. **Table F.44** presents the losses from this modeled event.

TABLE F.44: POTENTIAL LOSS ESTIMATIONS FOR LARGE HURRICANE EVENT

Location	Building Damage	Contents Damage	Inventory Loss	Total Annualized Loss
Stone County	$88,416,000	$39,047,000	$495,000	$127,958,000

Source: Hazus-MH 3.2

Social Vulnerability

Given equal susceptibility across the county, it is assumed that the total population, both current and future, is at risk to the hurricane and tropical storm wind hazard. In terms of social vulnerability to storm surge, coastal populations are at much higher risk than inland populations. Since Stone County is not located on the coast, there is lower social vulnerability to storm surge compared to the rest of the region.

Critical Facilities

Given equal vulnerability across Stone County, all critical facilities are considered to be at risk. Some buildings may perform better than others in the face of such an event due to construction and age, among factors. Determining individual building response to wind and storm surge is beyond the scope of this plan. However, this plan will consider mitigation action for especially vulnerable structures and/or critical facilities to mitigate against the effects of the hurricane hazard. A list of specific critical facilities can be found in **Table F.52** at the end of this subsection.

In conclusion, a hurricane event has the potential to impact many existing and future buildings, critical facilities, and populations in Stone County.

[27] Annualized loss is defined by Hazus-MH as the expected value of loss in any one year.

HAZARDOUS MATERIALS INCIDENT

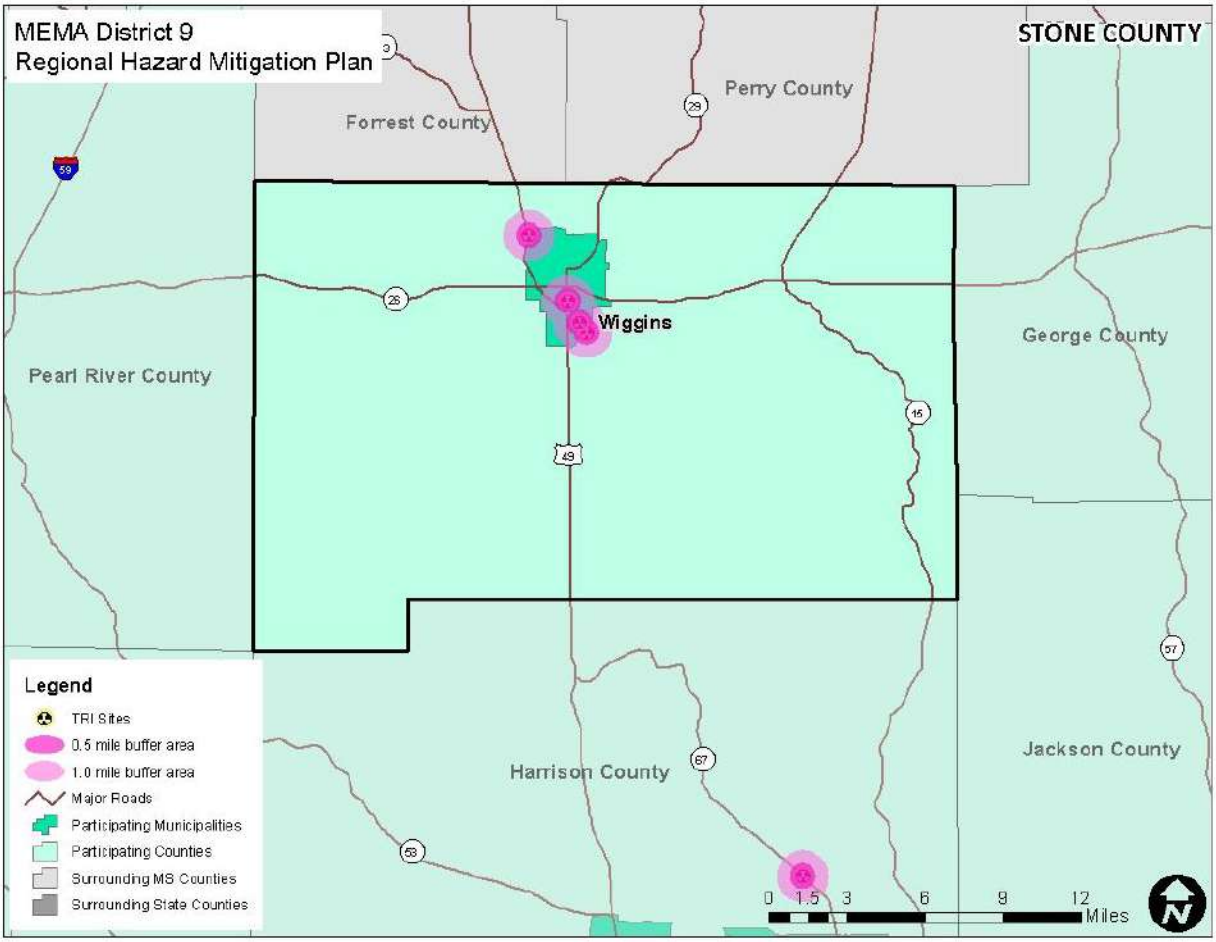
Historical evidence indicates that Stone County is susceptible to hazardous materials events. A total of 10 HAZMAT incidents have been reported by the Pipeline and Hazardous Materials Safety Administration, resulting in $83,926 (2016 dollars) in property damage. On an annualized level, these damages amount to $2,997 for the county.

Most hazardous materials incidents that occur are contained and suppressed before destroying any property or threatening lives. However, they can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities, and cause affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. Certain chemicals may travel through the air or water, affecting a much larger area than the point of the incidence itself. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features, can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

In order to conduct the vulnerability assessment for this hazard, GIS intersection analysis was used for fixed and mobile areas and building footprints/parcels where available and Census block data where footprints/parcels were not available.[28] In both scenarios, two sizes of buffers—0.5-mile and 1.0-mile—were used. These areas are assumed to represent the different levels of effect: immediate (primary) and secondary. Primary and secondary impact zones were selected based on guidance from the PHMSA Emergency Response Guidebook. For the fixed site analysis, geo-referenced TRI sites in the region, along with buffers, were used for analysis as shown in **Figure F.25.** For the mobile analysis, the major roads (Interstate highway, U.S. highway, and State highway) and railroads, where hazardous materials are primarily transported that could adversely impact people and buildings, were used for the GIS buffer analysis. **Figure F.26** shows the areas used for mobile road toxic release buffer analysis and **Figure F.27** shows the areas used for the mobile railroad toxic release buffer analysis. The results indicate the approximate number of improved properties and improved value, as shown in **Table F.45** (fixed sites), **Table F.46** (mobile roads), and **Table F.47** (mobile railroad sites).[29]

[28] This type of analysis will likely yield inflated results (generally higher than what is actually reported after an actual event).
[29] Note that improved properties included in the 1.0-mile analysis are also included in the 0.5-mile analysis.

FIGURE F.25 : TRI SITES WITH BUFFERS IN STONE COUNTY



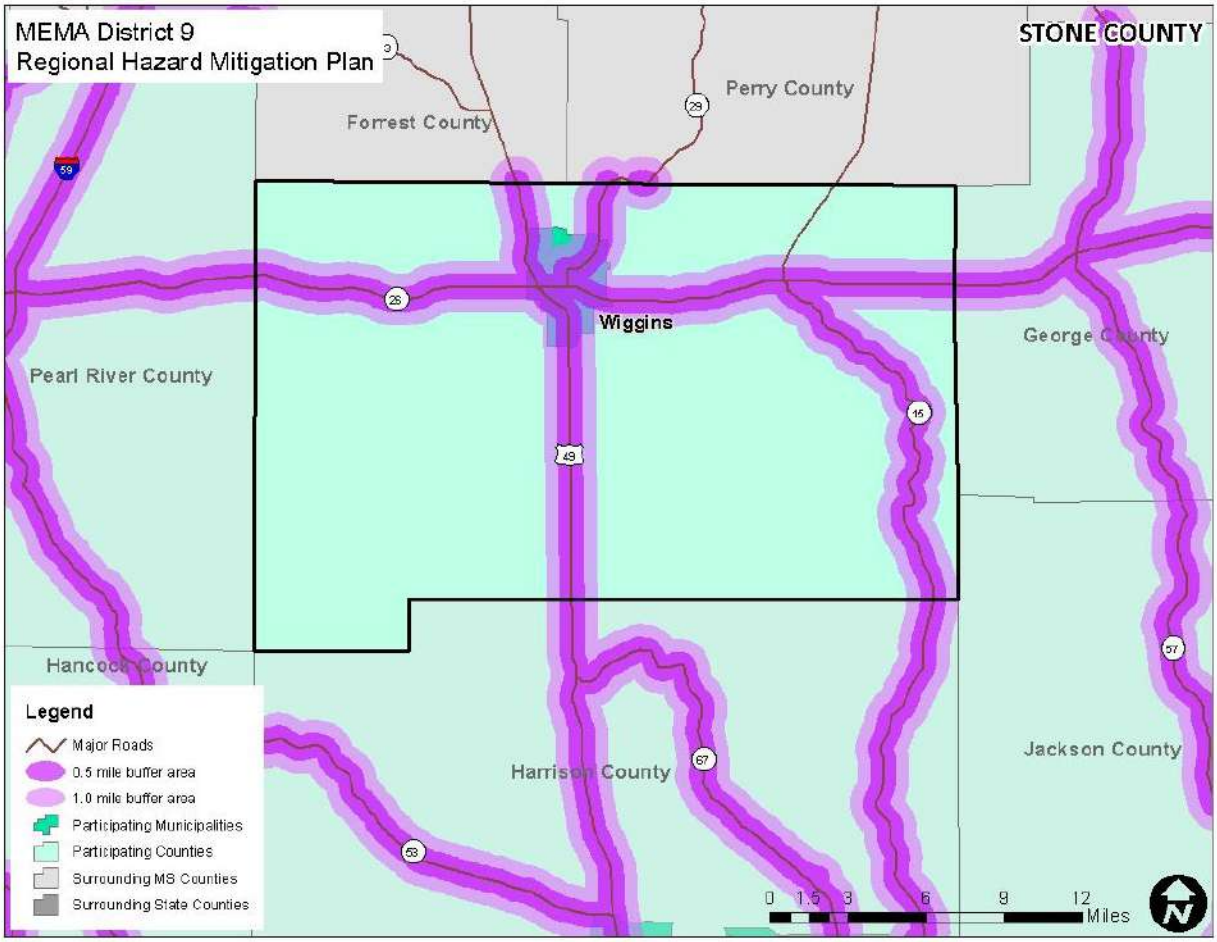
Source: Environmental Protection Agency

TABLE F.45: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS (FIXED SITES)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Wiggins	387	$17,016,665	1,349	$56,455,906
Unincorporated Area	80	$4,522,067	510	$14,347,640
STONE COUNTY TOTAL	**467**	**$21,538,732**	**1,859**	**$70,803,546**

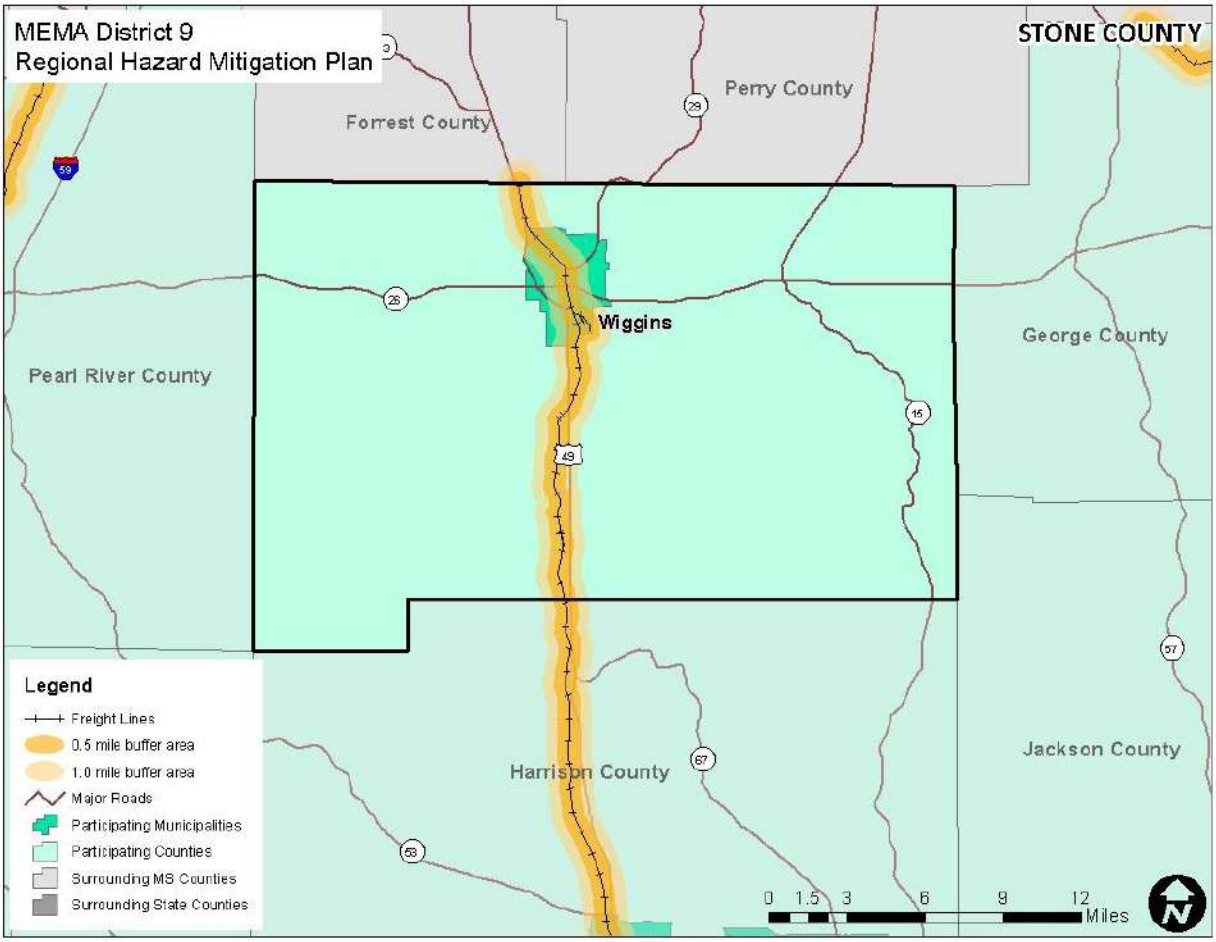
Source: EPA, MDEQ, Hazus MH 3.2 Data

FIGURE F.26 : MOBILE (ROAD) HAZMAT BUFFERS IN STONE COUNTY



Source: Federal Highway Administration National Highway Planning Network

FIGURE F.27 : MOBILE (RAIL) HAZMAT BUFFERS IN STONE COUNTY



Source: U.S. Department of Transportation Federal Railroad Administration

TABLE F.46: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - ROAD)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Wiggins	2,630	$106,292,189	3,183	$126,862,624
Unincorporated Area	3,718	$72,302,731	5,744	$116,173,128
STONE COUNTY TOTAL	**6,348**	**$178,594,920**	**8,927**	**$243,035,752**

Source: NHPN, MDEQ, Hazus MH 3.2 Data

TABLE F.47: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - RAILROAD)

Location	0.5-mile buffer zone		1.0-mile buffer zone	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Wiggins	1,729	$62,551,284	2,535	$102,100,359
Unincorporated Area	1,667	$36,131,066	2,539	$52,541,034
STONE COUNTY TOTAL	**3,396**	**$98,682,350**	**5,074**	**$154,641,393**

Source: USDOT FRA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Given high susceptibility across the entire county, it is assumed that the total population is at risk to a hazardous materials incident. It should be noted that areas of population concentration may be at an elevated risk due to a greater burden to evacuate population quickly.

Critical Facilities

Fixed Site Analysis:

The critical facility analysis for fixed TRI sites revealed that there are 12 facilities located in a fixed HAZMAT risk zone. Of these, 4 facilities are in the primary (0.5 mile) risk area including 1 police station, 2 power/gas, and 1 public facility. A list of specific critical facilities and their associated risk can be found in **Table F.52** at the end of this subsection.

Mobile Analysis:

The critical facility analysis for transportation corridors revealed that there are 25 facilities located in the primary and secondary road HAZMAT buffer areas. All 25 of these critical facilities were located in the primary risk zone including 1 communications, 1 EOC, 1 fire station, 1 medical, 2 police stations, 2 power/gas, 7 public facilities, 5 schools, 4 shelters, and 1 transportation.

For the rail line buffer areas, there were a total of 21 critical facilities located in primary and secondary buffer areas. Of these, 20 facilities are located within the primary buffer area including communications, 1 EOC, 1 fire station, 2 police stations, 2 power/gas, 6 public facilities, 4 schools, and 3 shelters.

A list of specific critical facilities and their associated risk can be found in **Table F.52** at the end of this subsection.

In conclusion, a hazardous material incident has the potential to impact many existing and future buildings, critical facilities, and populations in Stone County. Those areas in a primary buffer are at the highest risk, though all areas carry some vulnerability due to variations in condition that could alter the impact area (i.e., direction and speed of wind, volume of release, etc.).

DAM/LEVEE FAILURE

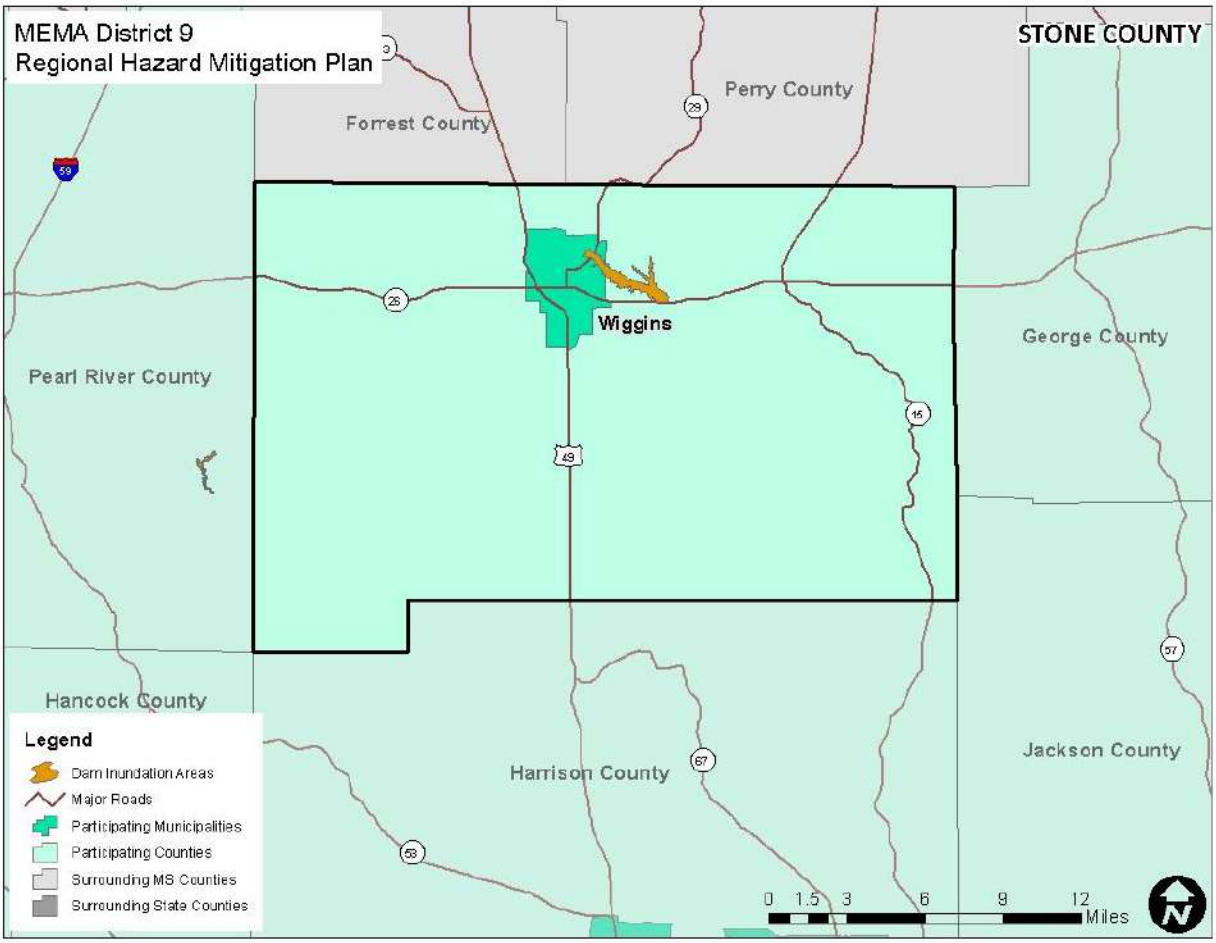
In order to assess risk to a dam or levee failure, a GIS-based analysis was used to estimate exposure to one of the areas delineated by the Mississippi Department of Environmental Quality as a potential inundation area in the event of a failure. The determination of value at-risk (exposure) was calculated

using GIS analysis by summing the values for improved properties that were located within an identified inundation area. As mentioned previously, this type of inundation mapping has not been completed for every dam/levee in the region, so the results of this analysis likely underestimate the overall vulnerability to a dam or levee failure. However, the analysis is still useful as a sort of baseline minimum of property that is potentially at-risk. The identified inundation areas can be found in **Figure F.28**.

In general, building footprint and parcel data were used in this analysis. However, in some communities, due to a lack of digital parcel data, it was determined that analysis using the inventory from Hazus-MH 3.2 would be used to supplement the building/parcel data. It should be noted that this data will merely be an estimation and may not reflect actual counts or values located in dam inundation areas. Indeed, in almost all cases, this data likely overestimates the amount of property in the identified risk zones.

Table F.48 presents the potential at-risk property. Both the number of buildings and the approximate improved value are presented

FIGURE F.28: DAM INUNDATION AREAS IN STONE COUNTY



Source: Mississippi Department of Environmental Quality

TABLE F.48: ESTIMATED EXPOSURE OF IMPROVEMENTS TO THE DAM/LEVEE FAILURE HAZARD

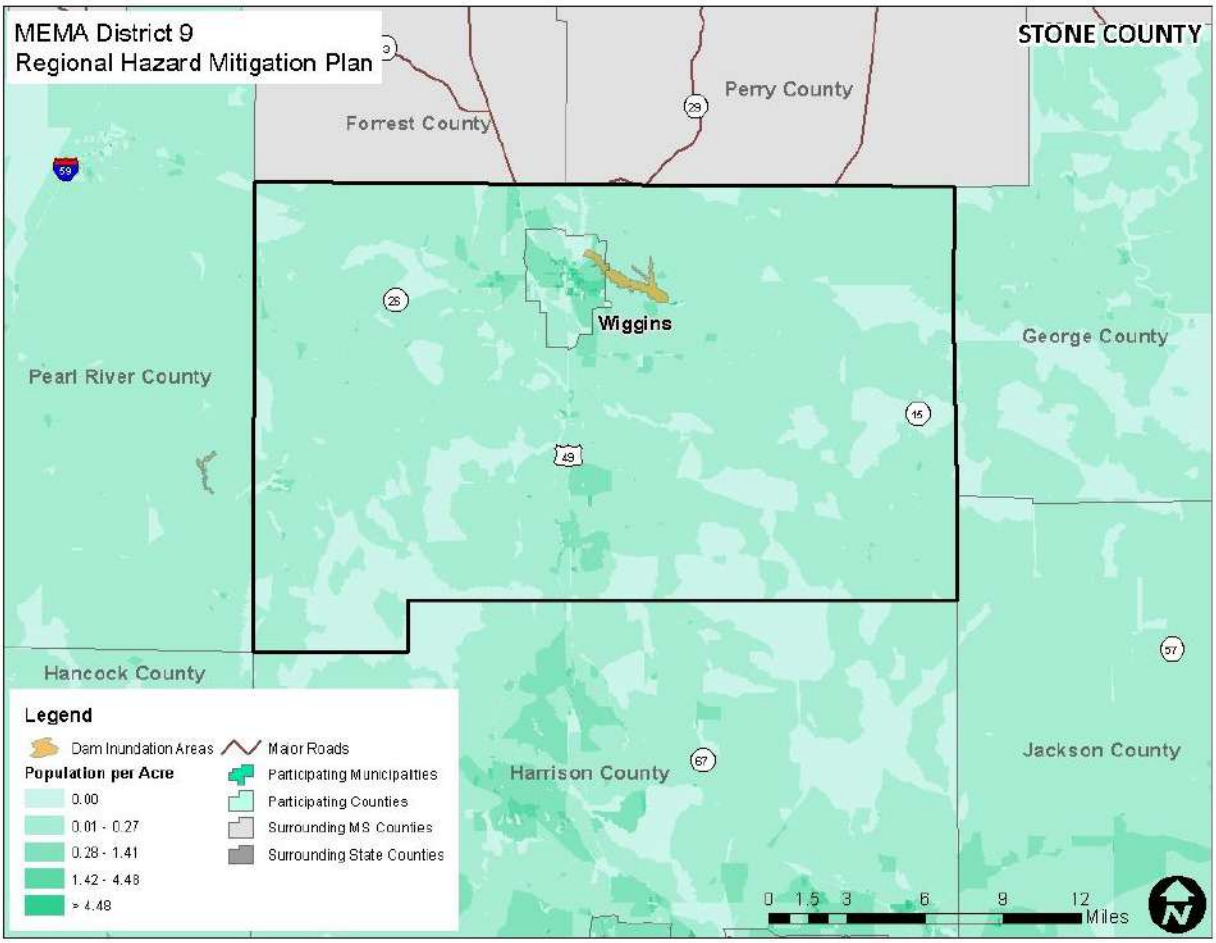
Location	Dam Inundation Area	
	Approx. Number of Buildings	Approx. Improved Value
Wiggins	18	$808,698
Unincorporated Area	11	$341,490
STONE COUNTY TOTAL	**29**	**$1,150,188**

Source: MDEQ, Hazus 3.2

Social Vulnerability

Figure F.29 is presented to gain a better understanding of at-risk population by evaluating census block level population data against dam inundation areas. There is an area of concern in the northern part of the county, although it should be noted that most of the population of the county is not at risk to a dam/levee failure.

FIGURE F.29: POPULATION DENSITY NEAR DAM INUNDATION AREAS IN STONE COUNTY



Source: MDEQ, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there is 1 dam located in dam inundation areas. Since it is a dam itself, it is not surprising that it is located in the inundation area. A list of specific critical facilities and their associated risk can be found in **Table F.52** at the end of this subsection.

In conclusion, a dam has the potential to impact a number of existing and future buildings, facilities, and populations in Stone County, though this analysis is not all-encompassing in terms of risk to a dam or levee failure because inundation mapping is not available for all dams in the region.

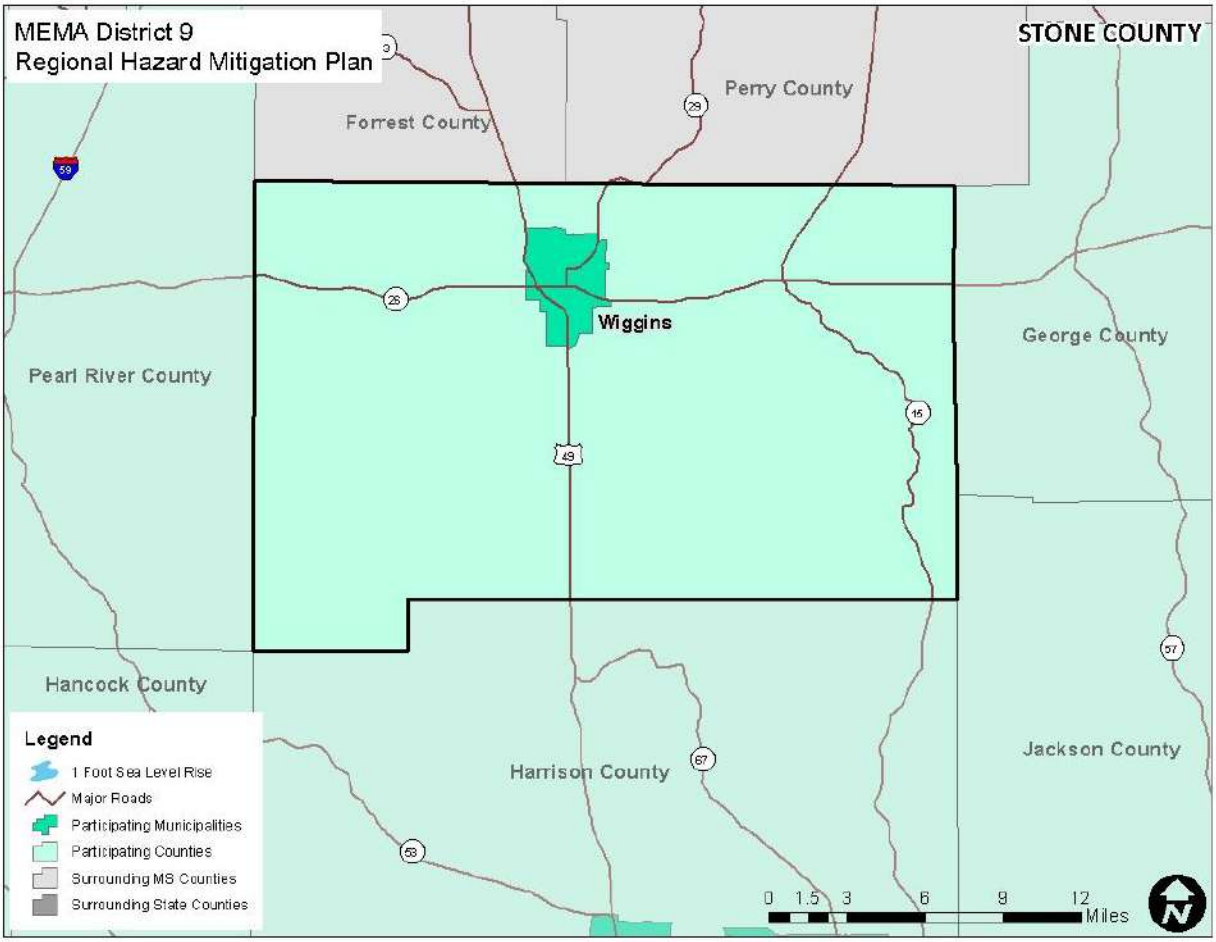
CLIMATE CHANGE/SEA LEVEL RISE

Most assessments carried out across the globe have concluded that climate change is a phenomenon that will impact our planet in the foreseeable future. Among others, the National Climate Assessment, International Panel on Climate Change, and National Oceanic and Atmospheric Administration all project that climate change will impact the United States and will have a major impact on coastal communities due to the effects of sea level rise. As such, projections concerning sea level rise are important to incorporate into planning efforts in order to identify people and property that may be impacted.

In order to assess sea level rise risk, a GIS-based analysis was used to estimate exposure to future projections of sea level rise using data produced by the National Oceanic and Atmospheric Administration in combination with improved property records for the county. The determination of value at-risk (exposure) was calculated using GIS analysis by summing the values for improved properties that were located within the inundation zone that would be created in the event of 1 foot, 3 feet, and 6 feet of sea level rise. A number of different sea level rise scenarios were available via NOAA (from 1 foot to 6 feet, at 1 foot intervals), however these scenarios were selected to demonstrate a range of potential sea level rise scenarios from low to moderate to high projections. These scenarios can be found in **Figure F.30**, **Figure F.31**, and **Figure F.32**.

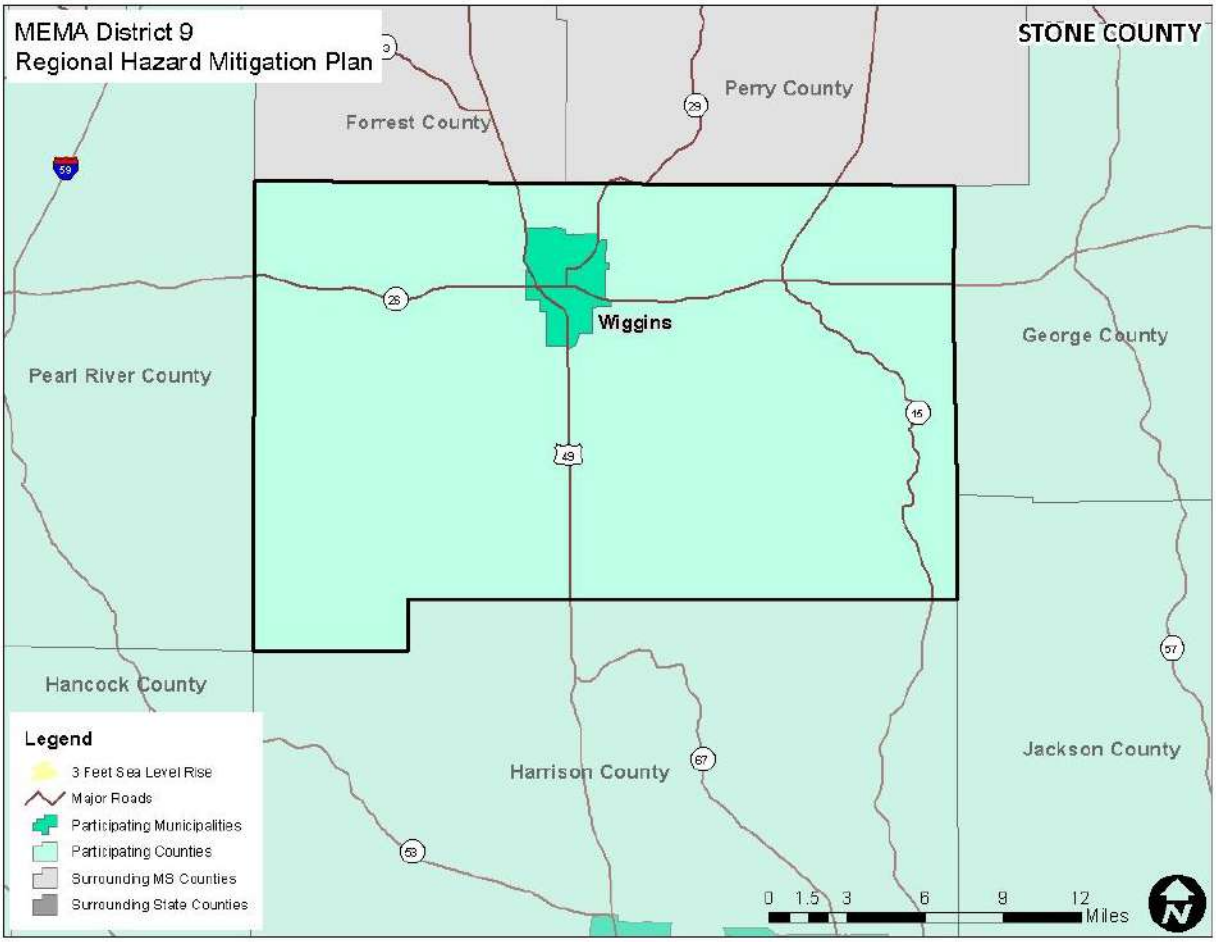
Table F.49 presents the potential at-risk property. Both the number of parcels and the approximate value are presented.

FIGURE F.30: 1 FOOT SEA LEVEL RISE SCENARIO IN STONE COUNTY



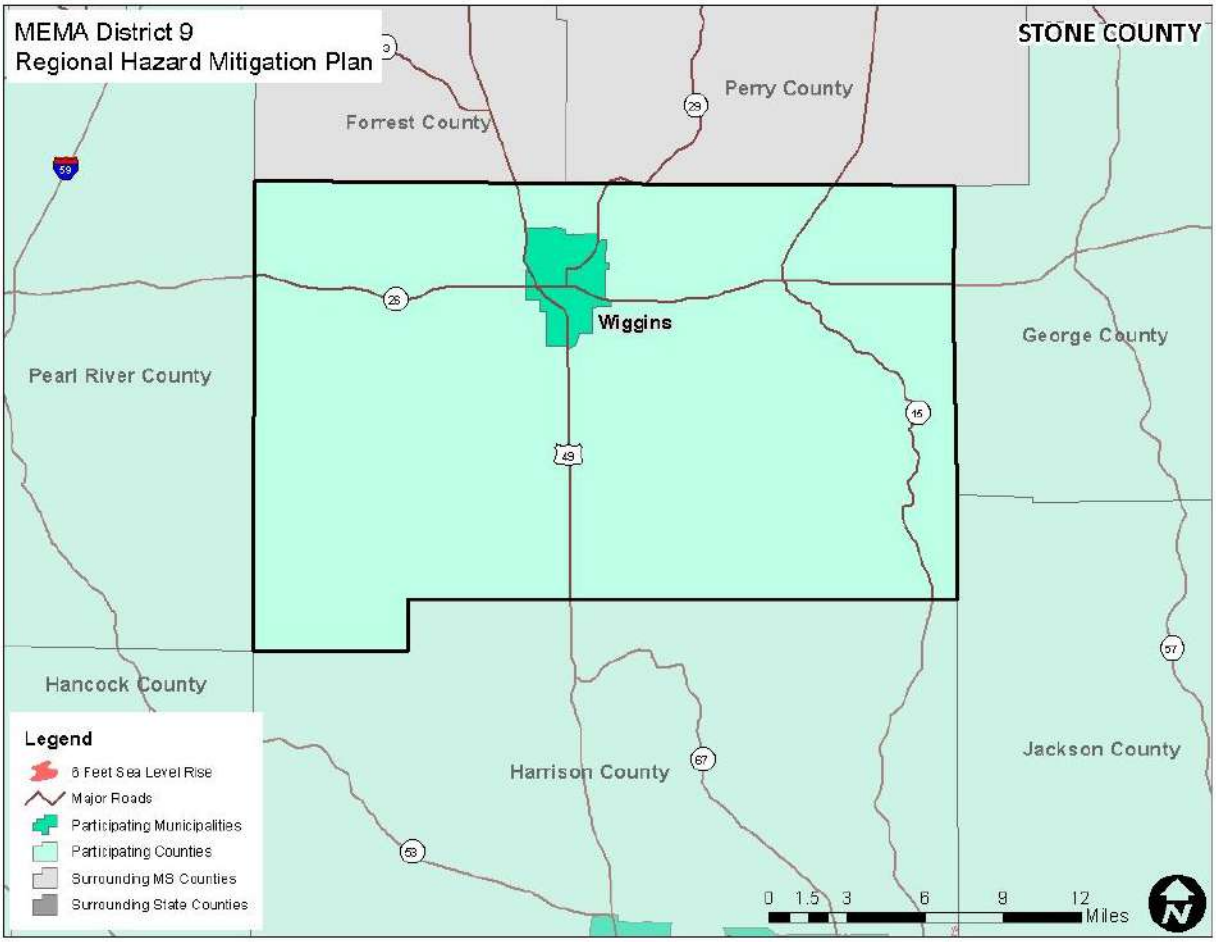
Source: NOAA

FIGURE F.31: 3 FEET SEA LEVEL RISE SCENARIO IN STONE COUNTY



Source: NOAA

FIGURE F.32: 6 FEET SEA LEVEL RISE SCENARIO IN STONE COUNTY



Source: NOAA

TABLE F.49: ESTIMATED EXPOSURE OF PARCELS TO THE SEA LEVEL RISE HAZARD

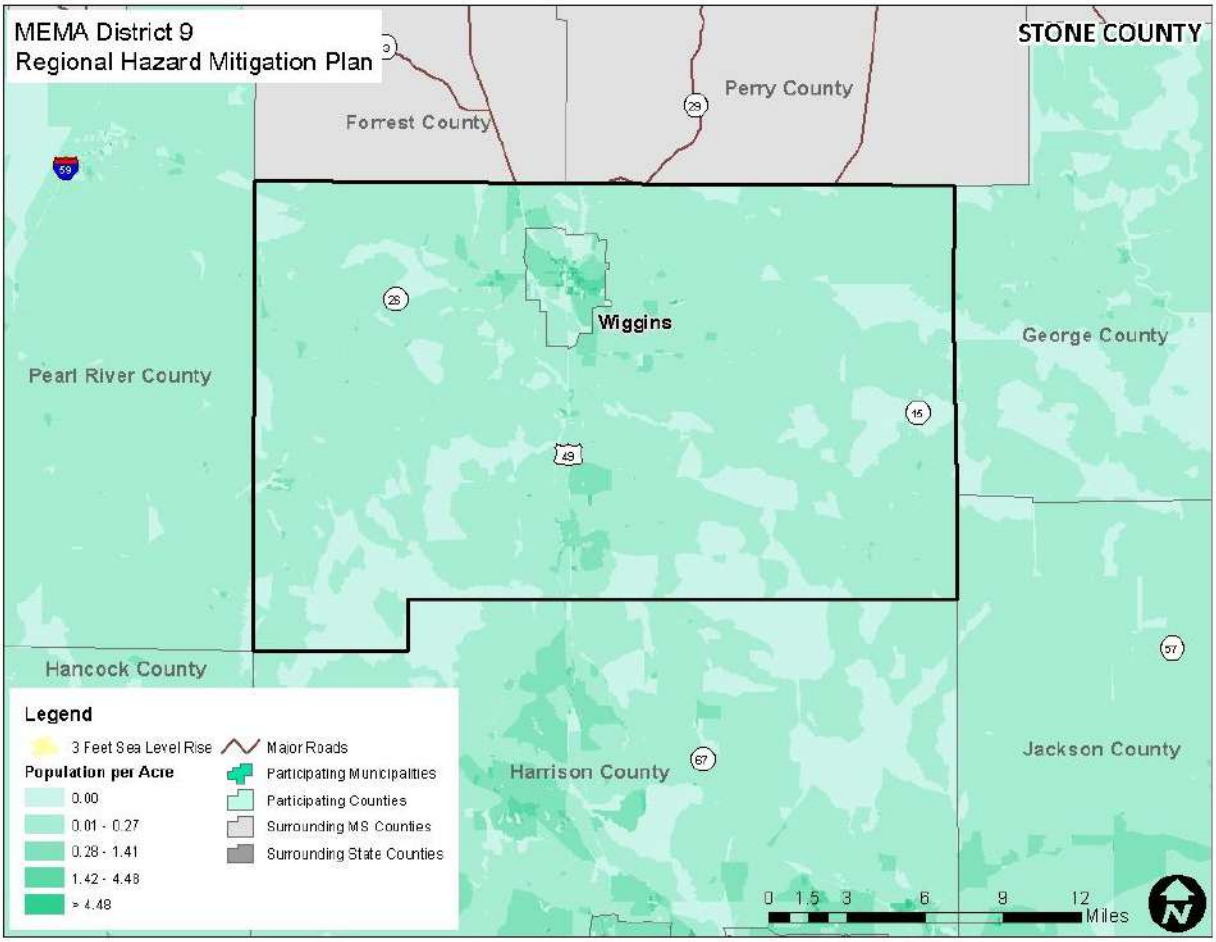
Location	1.0 foot		3.0 feet		6.0 feet	
	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value	Approx. Number of Buildings	Approx. Improved Value
Wiggins	0	$0	0	$0	0	$0
Unincorporated Area	0	$0	0	$0	0	$0
STONE COUNTY TOTAL	**0**	**$0**	**0**	**$0**	**0**	**$0**

Source: NOAA, MDEQ, Hazus MH 3.2 Data

Social Vulnerability

Figure F.33 is presented to gain a better understanding of at-risk population by evaluating census block level population data against the 3 feet sea level rise scenario. The three feet scenario was selected since this is a moderate level projection. Based on this analysis, there is no part of the population in the county that is vulnerable to sea level rise.

FIGURE F.33: POPULATION DENSITY WITH 3 FEET SEA LEVEL RISE IN STONE COUNTY



Source: NOAA, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are no facilities located in the 3 feet of sea level rise scenario inundation area. As mentioned above, this scenario was selected as it is a mid-range projection for sea level rise based on a number of studies. A list of specific critical facilities and their associated risk can be found in **Table F.52** at the end of this subsection.

CONCLUSIONS ON HAZARD VULNERABILITY

Table F.50 presents an overall summary of the community's vulnerability for each jurisdiction. This summary provides key problem statements and identifies the community's greatest vulnerabilities that will be addressed in the mitigation strategy.

TABLE F.50: SUMMARY OF VULNERABILITY FOR STONE COUNTY

	Key Problem Statements
Stone County	Stone County and Wiggins have a large amount of timber, open, and agriculture land, creating an enhanced risk to wildfires across the county. The county is also more vulnerable to drought which can damage crop yields or reduce stock and crop production in the agricultural sector, resulting in economic loss.

Table F.51 presents a summary of annualized loss for each hazard in Stone County. Due to the reporting of hazard damages primarily at the county level, it was difficult to determine an accurate annualized loss estimate for each municipality. Therefore, an annualized loss was determined through the damage reported through historical occurrences at the county level. These values should be used as an additional planning tool or measure risk for determining hazard mitigation strategies throughout the county.

It should also be noted that many of these estimates are based on incomplete data and likely underestimate the historic dollar damage sustained in each county. Especially for hazards such as extreme cold, extreme heat, hail, lightning, and winter weather, it is very likely that more damage occurred historically than has been identified.

TABLE F.51: ANNUALIZED LOSS FOR STONE COUNTY

Hazard	Stone County
Flood-related Hazards	
Dam and Levee Failure	*Not Available*
Erosion	*Not Available*
Flood	$8,226
Storm Surge	$0
Fire-related Hazards	
Drought	*Not Available*
Lightning	$6,483
Wildfire	*Not Available*
Geologic Hazards	
Earthquake†	$2,000
Wind-related Hazards	
Extreme Cold	$0
Extreme Heat/Heat Wave	*Not Available*
Hailstorm	$0
Hurricane and Tropical Storm	$19,180,679
Severe Thunderstorm/High Wind	$35,155
Tornado	$33,495
Winter Weather	*Not Available*
Other Hazards	

Hazard	Stone County
Climate Change/Sea Level Rise	*Not Available*
Hazardous Materials Incident/Train Derailment	$2,997
Infectious Disease	*Not Available*

†Historic dollar damage was not available for this hazard, but since estimated annualized losses from Hazus were available, those numbers were used in this table.
*In this table, the term "Not Available" is used to indicate that no records of dollar losses for the particular hazard were recorded. This could be the case either because there were no events that caused dollar damage or because documentation of that particular type of event is not well kept.

As noted previously, all existing and future buildings and populations (including critical facilities) are vulnerable to impacts from atmospheric hazards such as drought and hailstorm. Some buildings may be more vulnerable to some of these hazards based on locations, construction, and building type. In addition, all populations are vulnerable to hazards like infectious disease which could presumably impact any segment of the population without regard to geographic location. **Table F.52** shows the critical facilities vulnerable to additional hazards analyzed in this section. The table lists those assets that are determined to be exposed to each of the identified hazards (marked with an "**X**").

TABLE F.52: AT-RISK CRITICAL FACILITIES IN STONE COUNTY

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
STONE COUNTY																										
Wiggins Fire Department		Fire Station		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Stone County Hospital		Medical		X				X	X		X	X	X	X	X	X	X	X				X	X			X
Stone Co. Sheriff Department		Police Station		X				X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
MS Power Main Sub-Station		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
MS Power Sub-Station		Power/Gas		X				X	X		X	X	X	X	X	X	X	X							X	X
MS Power Sub-Station		Power/Gas		X				X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Flint Creek Reservoir Dam		Public Facility	X	X				X	X		X	X	X	X	X	X	X	X				X	X			X
Regional Correctional Facility		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Stone County Courthouse		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Stone County Health Department		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
US Postal Perkinston		Public Facility		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X
US Postal Wiggins		Public Facility		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
MS Gulf Coast Community College		School		X				X	X		X	X	X	X	X	X	X	X				X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Perkinston Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Stone Elementary School		School		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Stone High School		School		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Stone Middle School		School		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Perkinston Elementary School/Shelter		Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Stone Elementary School/Shelter		Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X			X
Stone High School/Shelter		Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
Stone Middle School/Shelter		Shelter		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X
MS Hwy 26/ Hwy 49 Intersection		Transportation		X				X	X		X	X	X	X	X	X	X	X				X	X			X
US Highway 49		Transportation		X				X	X		X	X	X	X	X	X	X	X								X
Stone County 911 Center	Wiggins	Comm		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Stone Co. Emergency Operation/Communication Center	Wiggins	EOC		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Wiggins Police Department	Wiggins	Police Station		X				X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X

			Flood-Related					Fire-Related			G	Wind-Related							Other Hazards							
FACILITY NAME	CITY/TOWN (if applicable)	FACILITY TYPE	Dam and Levee Failure	Erosion	Flood – 100 year	Flood – 500 year	Flood – VE-zone	Drought	Lightning	Wildfire	Earthquake	Extreme Cold	Extreme Heat/ Heat Wave	Hailstorm	Hurricane and Tropical Storm	Severe Thunderstorm/ High Wind	Tornado	Winter Weather	Sea Level Rise- 3 feet	Fixed HAZMAT – 0.5 mile	Fixed HAZMAT – 1.0 mile	Mobile HAZMAT – 0.5 mile (road)	Mobile HAZMAT – 1.0 mile (road)	Mobile HAZMAT – 0.5 mile (rail)	Mobile HAZMAT – 1.0 mile (rail)	Infectious Disease
Wiggins City Hall	Wiggins	Public Facility		X				X	X	X	X	X	X	X	X	X	X	X				X	X	X	X	X

F.4 STONE COUNTY CAPABILITY ASSESSMENT

This subsection discusses the capability of Stone County to implement hazard mitigation activities. More information on the purpose and methodology used to conduct the assessment can be found in Section 7: *Capability Assessment*.

F.4.1 Planning and Regulatory Capability

Table F.53 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for Stone County. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. A dagger (†) indicates that the given item is administered for that municipality by the county. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the MEMA District 9 Regional Hazard Mitigation Plan.

TABLE F.53: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Planning Tool/Regulatory Tool	Hazard Mitigation Plan	Threat and Hazard Identification and Risk Assessment (THIRA)	Comprehensive Land Use Plan	Floodplain Management Plan/Flood Mitigation Plan	Open Space Management Plan (Parks & Rec/Greenway Plan	Stormwater Management Plan/Ordinance	Natural Resource Protection Plan	Flood Response Plan	Emergency Operations Plan	Emergency Management Accreditation Program (EMAP Accreditation)	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Unified Development Ordinance	Post-Disaster Redevelopment/ Reconstruction Plan/ Ordinance	Building Code	Fire Code	National Flood Insurance Program (NFIP)	NFIP Community Rating System (CRS Program)
STONE COUNTY	✓		✓						✓				✓	✓	✓		✓		✓			✓	✓	✓	✓
Wiggins	†		✓						†				✓		†		✓	✓	✓	✓		✓	✓	✓	

A more detailed discussion on the county's planning and regulatory capabilities follows.

EMERGENCY MANAGEMENT

Hazard Mitigation Plan
Stone County has previously adopted a hazard mitigation plan. The City of Wiggins was also included in this plan.

Disaster Recovery Plan
Stone County and the City of Wiggins have adopted a disaster recovery plan, the Stone County/City of Wiggins Long-Term Community Recovery Plan.

Emergency Operations Plan
Stone County maintains an emergency operations plan through its Emergency Management Agency. The City of Wiggins is covered by this plan.

GENERAL PLANNING

Comprehensive Land Use Plan
Stone County has adopted a county comprehensive plan. The City of Wiggins has also adopted a municipal comprehensive plan.

Capital Improvements Plan
Stone County has adopted a capital improvements plan.

Zoning Ordinance
Stone County does not have a zoning ordinance in place. However, the City of Wiggins has adopted a zoning ordinance and includes zoning regulations as part of its local unified development ordinance.

Subdivision Ordinance
Stone County and the City of Wiggins have each adopted a subdivision ordinance. The City of Wiggins includes subdivision regulations as part of its local unified development ordinance and the county has adopted a stand-alone subdivision ordinance.

Building Codes, Permitting, and Inspections
After Hurricane Katrina, Mississippi Legislature mandated the adoption of the International Building Code and International Residential Code in five coastal counties including Stone County. The City of Wiggins has also adopted a building code.

FLOODPLAIN MANAGEMENT

Table F.54 provides NFIP policy and claim information for each participating jurisdiction in Stone County.

TABLE F.54: NFIP POLICY AND CLAIM INFORMATION

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
STONE COUNTY†	09/01/87	06/16/11	31	$7,553,000	11	$115,205
Wiggins	06/16/11	06/16/11	5	$939,600	0	$0

†Includes unincorporated areas of county only
Source: NFIP Community Status information as of 1/10/2017; NFIP claims and policy information as of 10/31/2016

Community Rating System
Stone County (Class 9) participates in the CRS. Participation in the CRS program should be considered as a mitigation action by the City of Wiggins.

Flood Damage Prevention Ordinance
All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. Stone County and the City of Wiggins both participate in the NFIP and have adopted flood damage prevention ordinances.

F.4.2 Administrative and Technical Capability

Table F.55 provides a summary of the capability assessment results for Stone County with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill. A dagger (†) indicates a county-level staff member(s) provides the specified knowledge or skill to that municipality.

TABLE F.55: RELEVANT STAFF/PERSONNEL RESOURCES

Staff/Personnel Resource	Planners with knowledge of land development/land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Emergency Manager	Floodplain Manager	Land Surveyors	Scientists familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in GIS and/or Hazus	Resource development staff or grant writers
STONE COUNTY	✓	✓	✓	✓	✓		✓	✓	✓	
Wiggins	✓	✓	✓	†	✓		†	✓		

Credit for having a floodplain manager was given to those jurisdictions that have a flood damage prevention ordinance, and therefore an appointed floodplain administrator, regardless of whether the appointee was dedicated solely to floodplain management. Credit was given for having a scientist familiar with the hazards of the community if a jurisdiction has a Cooperative Extension Service or Soil and Water Conservation Department. Credit was also given for having staff with education or expertise to assess the community's vulnerability to hazards if a staff member from the jurisdiction was a participant on the existing hazard mitigation plan's planning committee.

F.4.3 Fiscal Capability

Table F.56 provides a summary of the results for Stone County with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource has previously been used to implement hazard mitigation actions. A dagger (†) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds).

TABLE F.56: RELEVANT FISCAL RESOURCES

Fiscal Tool/Resource	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes (or taxing districts)	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation, Revenue, and/or Special Tax Bonds	Partnering Arrangements or Intergovernmental Agreements	Other: HMGP and other federal, state, and private grants/resources
STONE COUNTY		†							†	†
Wiggins		†							†	†

F.4.4 Political Capability

During the months immediately following a disaster, local public opinion in Stone County is more likely to shift in support of hazard mitigation efforts.

Table F.57 provides a summary of the results for Stone County with regard to political capability. A checkmark (✓) indicates the expected degree of political support by local elected officials in terms of adopting/funding information.

TABLE F.57: LOCAL POLITICAL SUPPORT

Political Support	Limited	Moderate	High
STONE COUNTY			✓
Wiggins		✓	

F.4.5 Conclusions on Local Capability

Table F.58 shows the results of the capability assessment using the designed scoring methodology described in Section 7: *Capability Assessment*. The capability score is based solely on the information found in existing hazard mitigation plans and readily available on the jurisdictions' government websites. This information was reviewed by all jurisdictions and each jurisdiction provided feedback on the information included in the capability assessment. Local government input was vital to identifying capabilities. According to the assessment, the average local capability score for the county and its jurisdictions is 38.0, which falls into the moderate capability ranking.

TABLE F.58: CAPABILITY ASSESSMENT RESULTS

Jurisdiction	Overall Capability Score	Overall Capability Rating
STONE COUNTY	42	Moderate
Wiggins	34	Moderate

F.5 STONE COUNTY MITIGATION STRATEGY

This subsection provides the blueprint for Stone County to follow in order to become less vulnerable to its identified hazards. It is based on general consensus of the Regional Hazard Mitigation Council and the findings and conclusions of the capability assessment and risk assessment. Additional Information can be found in Section 8: *Mitigation Strategy* and Section 9: *Mitigation Action Plan*.

F.5.1 Mitigation Goals

Stone County developed nine mitigation goals in coordination with the other participating MEMA District 9 Region jurisdictions. The regional mitigation goals are presented in **Table F.59**.

TABLE F.59: MEMA DISTRICT 9 REGIONAL MITIGATION GOALS

	Goal
Goal #1	Minimize risk and vulnerability of the community to hazards.
Goal #2	Minimize loss of life, injury, and damages to property, the economy, and the environment.
Goal #3	Minimize loss to critical facilities and infrastructure, utilities, and services.
Goal #4	Improve, expand, and enhance public education, awareness, and preparedness.
Goal #5	Build and enhance local mitigation capabilities to improve the region's ability to prepare for, respond to, and recover.
Goal #6	Enter into partnerships with neighboring jurisdictions, federal and state agencies, and others to share information and develop a more hazard resistant community.
Goal #7	Enhance response procedures and emergency management capabilities.
Goal #8	Reduce economic losses, minimize social disruptions, and maintain quality of life.
Goal #9	Protect the environment and natural resources.

F.5.2 Mitigation Action Plan

The mitigation actions proposed by Stone County and the City of Wiggins are listed in the following individual Mitigation Action Plans.

Stone County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Provide flood monitors along Red Creek to monitor flood levels to inform/warn people of dangerous water levels.	Flood	High	Emergency Operations Director; Stone County Board of Supervisors; U.S. Geological Survey	MEMA, Environmental Protection Agency, South Mississippi Land Trust	2022	(Action 1.4.A in previous plan) There are some flood gauges set up along Red Creek, but the county would be interested supplementing these with additional monitors to provide more comprehensive data. This action will be kept in the plan.
P-2	Study ways to provide property value protection for residents from encroachment but limiting restraints on property owners. (Study, plan, and implement selected land use ordinances.)	All	High	Stone County Board of Supervisors; City of Wiggins	MDA, Coastal Impact Assistance Program (CIAP)	2021	(Action 2.1.A in previous plan) The county has implemented some regulations intended to provide protection to property owners, but as development continues, the county will need to continually evaluate actions that could be taken in terms of land use practices. This action will be retained in the plan.
P-3	Update and enhance Geographic Information System (GIS) and connect EOC building in order to improve the county/city capacity to respond to disasters; to create and manage spatial data; and to enhance the tax assessment, environmental preservation, mapping, and other county functions that rely on detailed geographic information.	All	Moderate	Stone County Tax Assessor's Office; Emergency Operations	MEMA/FEMA, local, GORR	2022	(Action 2.1.B in previous plan) The county has made improvements to its GIS system and collected additional data that is connected in the EOC. However, overall, the county would still like to work on increasing its capacity in this area, so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-4	Conduct a comprehensive study to determine the best possible location for new schools and district lines to accommodate future growth in Stone County School System.	Coastal Storms	Moderate	Stone County School Board; Stone County; City of Wiggins	Local, private foundations	2020	(Action 2.2.A in previous plan) The county has attempted to collect data on future growth and risk areas and to use that information to determine where schools should be located. However, a comprehensive study has not yet been completed, so this action will remain in place.
P-5	Secure and preserve county records to digitized format and develop and maintain electronic data storage.	Hurricane, Tornado	High	Stone County Chancery Clerk	MEMA, USDA Rural Development, state funding, local	2018	(Action 2.2.A in previous plan) The county has begun preserving many of its records in electronic format, however, this transition is not complete and so the county will retain this action in the plan.
P-6	Promote economic development in Wiggins by continuing to revitalize the downtown area, thereby increasing its attractiveness to new businesses, the growing population, and visitors.	All	Moderate	City of Wiggins; Stone County Economic Development Partnership; Stone County	CDBG, USDA, local	2022	(Action 3.1.A in previous plan) The county has taken a number of steps to try to promote economic development in downtown Wiggins while also taking into account mitigation strategies. However, there is still significant work that can be accomplished to build the downtown both economically and resiliently, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Develop a retail targeting strategy for City of Wiggins and Stone County.	All	Moderate	City of Wiggins; Stone County Economic Development Partnership	CDBG, USDA, local	2022	(Action 3.1.B in previous plan) The county and city have been working to develop a retail targeting strategy that takes into account resilient growth strategies. However, this work is not complete and so this action will remain in place.
P-8	Provide an entrepreneurial initiative for developing small businesses in Stone County and City of Wiggins.	All	Moderate	Stone County Economic Development Partnership; Mississippi Gulf Coast Community College; Stone County Board of Supervisors; private partners	MDA, private foundations, MGCCC, Stone County EDP	2022	(Action 3.1.C in previous plan) The county and city have worked to develop entrepreneurial initiatives for small businesses and have done so with an eye towards making businesses more resilient to hazards. However, there are still more businesses that the county would like to work with going forward so this action will remain in place.
P-9	Expand technology infrastructure (Broadband telecommunication) to support small business development in Stone County.	All	Moderate	Stone County Economic Development Partnership; Stone County	USDA Rural Development, AT&T	2022	(Action 3.1.D in previous plan) The county has expanded technology infrastructure and has attempted to do so in resilient ways so that it will be protected going forward. As this infrastructure continues to expand in the county, additional measures will need to be taken to ensure safe expansion.
Property Protection							
PP-1							

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Natural Resource Protection							
NRP-1							
Structural Projects							
SP-1	Expand sewer service and enhance potable water service in county and City of Wiggins; provide additional fire plugs in city and unincorporated areas of county.	All	Moderate	Stone County Utility Authority; rural water systems; City of Wiggins	USDA, local, CDBG	2022	(Action 1.2.A in previous plan) The county and city have worked together with the Utility Authority when expansion of utility service is required. As these expansions continue to take place in the future, it will be important to retain this action in the plan.
SP-2	Widen Highway 26 to encourage safer, more efficient traffic flow through Wiggins and across Stone County.	All	Moderate	MDOT; City of Wiggins	MDOT	2022	(Action 1.3.A in previous plan) This has not been completed yet, but it is anticipated that this project will help with evacuation of citizens in the event of an impending disaster, so this action will be retained.
SP-3	Build safer access roads from U.S. Highway 49 into Perkinston Elementary School and Mississippi Gulf Coast Community College.	All	Moderate	MDOT; Stone County Board of Supervisors; MGCCC	MDOT, CDBG, MDA	2022	(Action 1.3.B in previous plan) These access roads have not been completed, so this action will be retained in the plan.
SP-4	Upgrade major artery roads and bridges throughout high growth areas of county (roads: East McHenry, West McHenry, East Wire Road, West Wire Road, King Bee, New Hope Road, Perkinston-Silver Run, City Road, and City Bridge Road; bridges: Inda Road Bridge).	All	Moderate	Stone County board of Supervisors	State Aid Roads, local MDA	2022	(Action 1.3.C in previous plan) Although some upgrades have been made to a number of roads in the county, there are still several major roadway projects that the county would like to see completed to prevent flooding and improve evacuation.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-5	Implement erosion protection procedures/projects on Red Creek at City Bridge, Highway 49/Perkinston, and Ramsey Springs infrastructure.	Erosion	Low	Stone County Board of Supervisors; Land Trust of South Mississippi; MDEQ	Mississippi Game and Fish, local, Land Trust of South Mississippi	2020	(Action 1.3.D in previous plan) Some erosion protection activities have been implemented along Red Creek, but erosion is a consistent force that needs to be re-evaluated and addressed constantly, so this action will remain in place.
SP-6	Upgrade railroad crossings with safety cross arms and warning lights.	Hazardous Materials/ Railroad Incidents	High	MDOT and KCS Railroad	MDOT and KCS Railroad	2020	(Action 1.3.E in previous plan) Some railroad crossings in the county are still lacking safety cross arms and warning lights, so the county will continue to work with MDOT and the railroad to address deficient crossings where possible.
SP-7	Improve drainage throughout the county at identified flood prone areas as delineated by county flood maps.	Flood	High	Stone County Board of Supervisors, U.S. Geological Survey	Pat Harrison Waterway District, local, MEMA/FEMA	2022	(Action 1.4.B in previous plan) The county has implemented a number of drainage projects to try to reduce flood impacts, but there are still many that have been identified that have not been completed so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Emergency Services							
ES-1	Improve county-wide emergency communications to include radios, base stations, satellite phones, warning systems, and enhanced CAD system and staffing for 911.	All	High	Emergency Operations Director	Homeland Security, MEMA/FEMA	2022	(Action 1.1.A in previous plan) The county's existing communications systems are adequate, but there are many ways in which these systems could be improved, so the county will continue to evaluate possible ways to enhance the system overall with both tactics and technology.
ES-2	Provide sufficient evacuation routes and notify public of evacuation routes and procedures and shelter locations in a timely manner.	Hurricane, Coastal Storm	Moderate	MEMA; MDOT; Stone County Emergency Operations	MEMA/FEMA	2022	(Action 1.1.D in previous plan) The county has worked with other agencies to identify evacuation routes and shelter locations. However, these evacuation routes need to be more widely publicized and shelter locations will need to be re-evaluated in the coming years.
ES-3	Prepare fire stations on east, west, and south areas of county with safe rooms and in-place generators to allow fire personnel to stay on site during hazard event such as hurricane force winds.	Hurricane, Tornado	Moderate	Stone County Fire Coordinator; Stone County	MEMA/FEMA	2022	(Action 1.1.E in previous plan) Fire stations have been retrofit to some degree to provide safe areas, but additional protection levels would be welcome so the action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-4	Provide personnel to improve the firefighting delivery system, insurance ratings, and assist in coordinating efforts of volunteer fire departments.	All	Moderate	City of Wiggins; Stone County Fire Coordinator	Local	2022	(Action 1.1.F in previous plan) The county has personnel on hand that are able to implement these activities, but the county would like to enhance its available personnel, so this action will be retained.
ES-5	Provide firefighting capability for multi-story buildings and commercial/industrial facilities.	All	Moderate	City of Wiggins; Stone County Board of Supervisors	U.S. Fire Administration, FEMA, CDBG	2022	(Action 1.1.G in previous plan) The county has personnel on hand that are able to implement these activities, but the county would like to enhance its available personnel, so this action will be retained.
ES-6	Provide mobile alternate emergency service site for serving remote areas and as a backup for the Emergency Operations Center if out of commission.	All	High	City of Wiggins; Stone County Board of Supervisors; Emergency Operations Director	FEMA/MEMA, Homeland Security	2020	(Action 1.1.H in previous plan) The county has this capability available, but it may look at expanding its capabilities so that better service can be provided if the EOC is out of commission. This action will be retained.
ES-7	Upgrade emergency operations 911 system equipment/software and add personnel to support emergency services.	All	High	Stone County Board of Supervisors; Emergency Operations	Homeland Security, FEMA/MEMA, local	2022	(Action 2.1.C in previous plan) The county has upgraded its equipment and software, but another upgrade will likely be necessary and additional support personnel will be needed as this has not yet been attained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-8	Provide community centers in areas of concentrated population that can be used for emergency service centers in recovery phase of disasters.	All	High	Stone County Board of Supervisors	CDBG, local	2022	(Action 2.2.B in previous plan) Some community centers are available throughout the county, but the county may need to expand and provide additional centers in the future, so it will retain this action and look to improve this service.
Public Education and Awareness							
PEA-1	Provide disaster preparedness and recovery education/training to residents, pre-school, and school children/youth/college students to include hurricane/tornadoes, chemical spills, flooding, fire, and railroad crossings.	All	High	Emergency Operations Director	MEMA, Red Cross	2022	(Action 1.1.B in previous plan) The county is involved in a number of outreach activities to different groups throughout the county, but there is certainly a need to try to reach more groups and provide updated information to groups that have already been reached so this action will be retained.
PEA-2	Provide fire and emergency preparedness and response education to children/youth/college students and other residents of the county/city.	Wildfire	Low	Stone County Fire Coordinator; City of Wiggins Fire Chief; American Red Cross	MEMA, U.S. Fire Administration, county/city, private sources	2022	(Action 1.1.C in previous plan) The county has specifically targeted wildfire preparedness in the past and will continue with this program in the future so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-3	Conduct safety awareness programming alerting residents of Stone County and Wiggins of the increased train activity, speed, and capacity to include dangers at railroad crossing brought forth from the KCS rail upgrade from Gulfport to Hattiesburg, MS.	Hazardous Materials/ Railroad Incident	Moderate	Emergency Operations Director; Stone County Board of Supervisors; City of Wiggins; KCS Railroad	Local and KCS railroad	2022	(Action 1.1.I in previous plan) Safety awareness programs on train incidents have been carried out for residents throughout the county, but it is likely that there are still groups that have not been reached so this action will be retained.

City of Wiggins Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Prevention							
P-1	Provide flood monitors along Red Creek to monitor flood levels to inform/warn people of dangerous water levels.	Flood	High	Emergency Operations Director; Stone County Board of Supervisors; U.S. Geological Survey	MEMA, Environmental Protection Agency, South Mississippi Land Trust	2022	(Action 1.4.A in previous plan) There are some flood gauges set up along Red Creek, but the county/city would be interested supplementing these with additional monitors to provide more comprehensive data. This action will be kept in the plan.
P-2	Study ways to provide property value protection for residents from encroachment but limiting restraints on property owners. (Study, plan, and implement selected land use ordinances.)	All	High	Stone County Board of Supervisors; City of Wiggins	MDA, Coastal Impact Assistance Program (CIAP)	2021	(Action 2.1.A in previous plan) The county has implemented some regulations intended to provide protection to property owners, but as development continues, the county will need to continually evaluate actions that could be taken in terms of land use practices. This action will be retained in the plan.
P-3	Update and enhance Geographic Information System (GIS) and connect EOC building in order to improve the county/city capacity to respond to disasters; to create and manage spatial data; and to enhance the tax assessment, environmental preservation, mapping, and other county functions that rely on detailed geographic information.	All	Moderate	Stone County Tax Assessor's Office; Emergency Operations	MEMA/FEMA, local, GORR	2022	(Action 2.1.B in previous plan) The county has made improvements to its GIS system and collected additional data that is connected in the EOC. However, overall, the county would still like to work on increasing its capacity in this area, so this action will remain in the plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-4	Conduct a comprehensive study to determine the best possible location for new schools and district lines to accommodate future growth in Stone County School System.	Coastal Storms	Moderate	Stone County School Board; Stone County; City of Wiggins	Local, private foundations	2020	(Action 2.2.A in previous plan) The county has attempted to collect data on future growth and risk areas and to use that information to determine where schools should be located. However, a comprehensive study has not yet been completed, so this action will remain in place.
P-5	Secure and preserve county records to digitized format and develop and maintain electronic data storage.	Hurricane, Tornado	High	Stone County Chancery Clerk	MEMA, USDA Rural Development, state funding, local	2018	(Action 2.2.A in previous plan) The county has begun preserving many of its records in electronic format, however, this transition is not complete and so the county will retain this action in the plan.
P-6	Promote economic development in Wiggins by continuing to revitalize the downtown area, thereby increasing its attractiveness to new businesses, the growing population, and visitors.	All	Moderate	City of Wiggins; Stone County Economic Development Partnership; Stone County	CDBG, USDA, local	2022	(Action 3.1.A in previous plan) The county has taken a number of steps to try to promote economic development in downtown Wiggins while also taking into account mitigation strategies. However, there is still significant work that can be accomplished to build the downtown both economically and resiliently, so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
P-7	Develop a retail targeting strategy for City of Wiggins and Stone County.	All	Moderate	City of Wiggins; Stone County Economic Development Partnership	CDBG, USDA, local	2022	(Action 3.1.B in previous plan) The county and city have been working to develop a retail targeting strategy that takes into account resilient growth strategies. However, this work is not complete and so this action will remain in place.
P-8	Provide an entrepreneurial initiative for developing small businesses in Stone County and City of Wiggins.	All	Moderate	Stone County Economic Development Partnership; Mississippi Gulf Coast Community College; Stone County Board of Supervisors; private partners	MDA, private foundations, MGCCC, Stone County EDP	2022	(Action 3.1.C in previous plan) The county and city have worked to develop entrepreneurial initiatives for small businesses and have done so with an eye towards making businesses more resilient to hazards. However, there are still more businesses that the county would like to work with going forward so this action will remain in place.
P-9	Expand technology infrastructure (Broadband telecommunication) to support small business development in Stone County.	All	Moderate	Stone County Economic Development Partnership; Stone County	USDA Rural Development, AT&T	2022	(Action 3.1.D in previous plan) The county has expanded technology infrastructure and has attempted to do so in resilient ways so that it will be protected going forward. As this infrastructure continues to expand in the county, additional measures will need to be taken to ensure safe expansion.
Property Protection							
PP-1							

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Natural Resource Protection							
NRP-1							
Structural Projects							
SP-1	Expand sewer service and enhance potable water service in county and City of Wiggins; provide additional fire plugs in city and unincorporated areas of county.	All	Moderate	Stone County Utility Authority; rural water systems; City of Wiggins	USDA, local, CDBG	2022	(Action 1.2.A in previous plan) The county and city have worked together with the Utility Authority when expansion of utility service is required. As these expansions continue to take place in the future, it will be important to retain this action in the plan.
SP-2	Widen Highway 26 to encourage safer, more efficient traffic flow through Wiggins and across Stone County.	All	Moderate	MDOT; City of Wiggins	MDOT	2022	(Action 1.3.A in previous plan) This has not been completed yet, but it is anticipated that this project will help with evacuation of citizens in the event of an impending disaster, so this action will be retained.
SP-3	Build safer access roads from U.S. Highway 49 into Perkinston Elementary School and Mississippi Gulf Coast Community College.	All	Moderate	MDOT; Stone County Board of Supervisors; MGCCC	MDOT, CDBG, MDA	2022	(Action 1.3.B in previous plan) These access roads have not been completed, so this action will be retained in the plan.
SP-4	Upgrade major artery roads and bridges throughout high growth areas of county (roads: East McHenry, West McHenry, East Wire Road, West Wire Road, King Bee, New Hope Road, Perkinston-Silver Run, City Road, and City Bridge Road; bridges: Inda Road Bridge).	All	Moderate	Stone County board of Supervisors	State Aid Roads, local MDA	2022	(Action 1.3.C in previous plan) Although some upgrades have been made to a number of roads in the county, there are still several major roadway projects that the county would like to see completed to prevent flooding and improve evacuation.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
SP-5	Implement erosion protection procedures/projects on Red Creek at City Bridge, Highway 49/Perkinston, and Ramsey Springs infrastructure.	Erosion	Low	Stone County Board of Supervisors; Land Trust of South Mississippi; MDEQ	Mississippi Game and Fish, local, Land Trust of South Mississippi	2020	(Action 1.3.D in previous plan) Some erosion protection activities have been implemented along Red Creek, but erosion is a consistent force that needs to be re-evaluated and addressed constantly, so this action will remain in place.
SP-6	Upgrade railroad crossings with safety cross arms and warning lights.	Hazardous Materials/ Railroad Incidents	High	MDOT and KCS Railroad	MDOT and KCS Railroad	2020	(Action 1.3.E in previous plan) Some railroad crossings in the county are still lacking safety cross arms and warning lights, so the county will continue to work with MDOT and the railroad to address deficient crossings where possible.
SP-7	Improve drainage throughout the county at identified flood prone areas as delineated by county flood maps.	Flood	High	Stone County Board of Supervisors, U.S. Geological Survey	Pat Harrison Waterway District, local, MEMA/FEMA	2022	(Action 1.4.B in previous plan) The county has implemented a number of drainage projects to try to reduce flood impacts, but there are still many that have been identified that have not been completed so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
Emergency Services							
ES-1	Improve county-wide emergency communications to include radios, base stations, satellite phones, warning systems, and enhanced CAD system and staffing for 911.	All	High	Emergency Operations Director	Homeland Security, MEMA/FEMA	2022	(Action 1.1.A in previous plan) The county's existing communications systems are adequate, but there are many ways in which these systems could be improved, so the county will continue to evaluate possible ways to enhance the system overall with both tactics and technology.
ES-2	Provide sufficient evacuation routes and notify public of evacuation routes and procedures and shelter locations in a timely manner.	Hurricane, Coastal Storm	Moderate	MEMA; MDOT; Stone County Emergency Operations	MEMA/FEMA	2022	(Action 1.1.D in previous plan) The county has worked with other agencies to identify evacuation routes and shelter locations. However, these evacuation routes need to be more widely publicized and shelter locations will need to be re-evaluated in the coming years.
ES-3	Prepare fire stations on east, west, and south areas of county with safe rooms and in-place generators to allow fire personnel to stay on site during hazard event such as hurricane force winds.	Hurricane, Tornado	Moderate	Stone County Fire Coordinator; Stone County	MEMA/FEMA	2022	(Action 1.1.E in previous plan) Fire stations have been retrofit to some degree to provide safe areas, but additional protection levels would be welcome so the action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-4	Provide personnel to improve the firefighting delivery system, insurance ratings, and assist in coordinating efforts of volunteer fire departments.	All	Moderate	City of Wiggins; Stone County Fire Coordinator	Local	2022	(Action 1.1.F in previous plan) The county has personnel on hand that are able to implement these activities, but the county would like to enhance its available personnel, so this action will be retained.
ES-5	Provide firefighting capability for multi-story buildings and commercial/industrial facilities.	All	Moderate	City of Wiggins; Stone County Board of Supervisors	U.S. Fire Administration, FEMA, CDBG	2022	(Action 1.1.G in previous plan) The county has personnel on hand that are able to implement these activities, but the county would like to enhance its available personnel, so this action will be retained.
ES-6	Provide mobile alternate emergency service site for serving remote areas and as a backup for the Emergency Operations Center if out of commission.	All	High	City of Wiggins; Stone County Board of Supervisors; Emergency Operations Director	FEMA/MEMA, Homeland Security	2020	(Action 1.1.H in previous plan) The county has this capability available, but it may look at expanding its capabilities so that better service can be provided if the EOC is out of commission. This action will be retained.
ES-7	Upgrade emergency operations 911 system equipment/software and add personnel to support emergency services.	All	High	Stone County Board of Supervisors; Emergency Operations	Homeland Security, FEMA/MEMA, local	2022	(Action 2.1.C in previous plan) The county has upgraded its equipment and software, but another upgrade will likely be necessary and additional support personnel will be needed as this has not yet been attained.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
ES-8	Provide community centers in areas of concentrated population that can be used for emergency service centers in recovery phase of disasters.	All	High	Stone County Board of Supervisors	CDBG, local	2022	(Action 2.2.B in previous plan) Some community centers are available throughout the county, but the county may need to expand and provide additional centers in the future, so it will retain this action and look to improve this service.
Public Education and Awareness							
PEA-1	Provide disaster preparedness and recovery education/training to residents, pre-school, and school children/youth/college students to include hurricane/tornadoes, chemical spills, flooding, fire, and railroad crossings.	All	High	Emergency Operations Director	MEMA, Red Cross	2022	(Action 1.1.B in previous plan) The county is involved in a number of outreach activities to different groups throughout the county, but there is certainly a need to try to reach more groups and provide updated information to groups that have already been reached so this action will be retained.
PEA-2	Provide fire and emergency preparedness and response education to children/youth/college students and other residents of the county/city.	Wildfire	Low	Stone County Fire Coordinator; City of Wiggins Fire Chief; American Red Cross	MEMA, U.S. Fire Administration, county/city, private sources	2022	(Action 1.1.C in previous plan) The county has specifically targeted wildfire preparedness in the past and will continue with this program in the future so this action will remain in place.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2017)
PEA-3	Conduct safety awareness programming alerting residents of Stone County and Wiggins of the increased train activity, speed, and capacity to include dangers at railroad crossing brought forth from the KCS rail upgrade from Gulfport to Hattiesburg, MS.	Railroad Incident	Moderate	Emergency Operations Director; Stone County Board of Supervisors; City of Wiggins; KCS Railroad	Local and KCS railroad	2022	(Action 1.1.I in previous plan) Safety awareness programs on train incidents have been carried out for residents throughout the county, but it is likely that there are still groups that have not been reached so this action will be retained.

APPENDIX A
PLAN ADOPTION

This appendix includes the FEMA APP and ADD Letters and the local adoption resolutions for each of the participating jurisdictions.

APPENDIX B
PLANNING TOOLS

This appendix includes the following:

1. List of Recommended Stakeholders
2. Blank Public Participation Survey
3. GIS Data Inventory Sheet
4. Scoring Criteria for Capability Assessment
5. Blank Mitigation Action Worksheet
6. Mitigation Action Progress Report Form
7. Plan Update Evaluation Worksheet

In establishing a planning team, you want to ensure that you have a broad range of backgrounds and experiences represented. Below are some suggestions for agencies to include in a planning team. There are many organizations, both governmental and community-based, that should be included when creating a local team. In addition, state organizations can be included on local teams, when appropriate, to serve as a source of information and to provide guidance and coordination.

Use the checklist as a starting point for forming your team. Check the boxes beside any individuals or organizations that you have in your community/state that you believe should be included on your planning team so you can follow up with them.

Task A. Create the planning team – *Suggestions for team members.* Date:_____

Local/Tribal

- ☐ Administrator/Manager's Office
- ☐ Budget/Finance Office
- ☐ Building Code Enforcement Office
- ☐ City/County Attorney's Office
- ☐ Economic Development Office
- ☐ Emergency Preparedness Office
- ☐ Fire and Rescue Department
- ☐ Hospital Management
- ☐ Local Emergency Planning Committee
- ☐ Planning and Zoning Office
- ☐ Police/Sheriff's Department
- ☐ Public Works Department
- ☐ Sanitation Department
- ☐ School Board
- ☐ Transportation Department
- ☐ Tribal Leaders

Special Districts and Authorities

- ☐ Airport and Seaport Authorities
- ☐ Business Improvement District(s)
- ☐ Fire Control District
- ☐ Flood Control District
- ☐ Redevelopment Agencies
- ☐ Regional/Metropolitan Planning Organization(s)
- ☐ School District(s)
- ☐ Transit/Transportation Agencies

Others

- ☐ Architectural/Engineering/Planning Firms
- ☐ Citizen Corps
- ☐ Colleges/Universities
- ☐ Land Developers
- ☐ Major Employers/Businesses
- ☐ Professional Associations
- ☐ Retired Professionals

State

- ☐ Adjutant General's Office (National Guard)
- ☐ Board of Education
- ☐ Building Code Office
- ☐ Climatologist
- ☐ Earthquake Program Manager
- ☐ Economic Development Office
- ☐ Emergency Management Office/State Hazard Mitigation Officer
- ☐ Environmental Protection Office
- ☐ Fire Marshal's Office
- ☐ Geologist
- ☐ Homeland Security Coordinator's Office
- ☐ Housing Office
- ☐ Hurricane Program Manager
- ☐ Insurance Commissioner's Office
- ☐ National Flood Insurance Program Coordinator
- ☐ Natural Resources Office
- ☐ Planning Agencies
- ☐ Police
- ☐ Public Health Office
- ☐ Public Information Office
- ☐ Tourism Department

Non-Governmental Organizations (NGOs)

- ☐ American Red Cross
- ☐ Chamber of Commerce
- ☐ Community/Faith-Based Organizations
- ☐ Environmental Organizations
- ☐ Homeowners Associations
- ☐ Neighborhood Organizations
- ☐ Private Development Agencies
- ☐ Utility Companies
- ☐ Other Appropriate NGOs

PUBLIC PARTICIPATION SURVEY
FOR HAZARD MITIGATION PLANNING

We need your help! Please take a few minutes to complete this survey.

The Counties of George, Hancock, Harrison, Jackson, Pearl River, and Stone are working together to become less vulnerable to natural hazards, such as hurricanes, tornadoes, and floods, as well as man-made hazards, including hazardous materials incidents, and your participation is important to us!

The counties, along with local jurisdictions and other partners, are working to prepare a multi-jurisdictional *Hazard Mitigation Plan*. This Plan will identify and assess our community's natural and man-made hazard risks and determine how to best mitigate, or minimize and manage, those risks.

This survey is an opportunity for you to share your opinions and participate in the mitigation planning process. The information you provide will help us better understand your hazard concerns and can lead to mitigation activities that should help lessen the impacts of future hazard events.

Please help us by completing this survey by February 15, 2017 and returning it to:

Ryan Wiedenman, Atkins
1616 E Millbrook Road, Suite 310
Raleigh, NC 27609

Surveys can also be faxed to: (919) 876-6848 c/o Ryan Wiedenman or scanned and emailed to: Ryan Wiedenman at ryan.wiedenman@atkinsglobal.com.

If you have any questions regarding this survey or would like to learn about more ways you can participate in the development of the *MEMA District 9 Regional Hazard Mitigation Plan*, please contact Atkins, planning consultant for the project. You may reach Ryan Wiedenman (Atkins) at 919-431-5295 or by email at ryan.wiedenman@atkinsglobal.com.

1. Where do you live?

- ❑ Unincorporated George County
- ❑ Unincorporated Hancock County
- ❑ Unincorporated Harrison County
- ❑ Unincorporated Jackson County
- ❑ Unincorporated Pearl River County
- ❑ Unincorporated Sone County
- ❑ Bay St. Louis
- ❑ Biloxi
- ❑ Diamondhead
- ❑ D'Iberville
- ❑ Gautier
- ❑ Gulfport
- ❑ Long Beach
- ❑ Lucedale
- ❑ Moss Point
- ❑ Ocean Springs
- ❑ Pascagoula
- ❑ Pass Christian
- ❑ Picayune
- ❑ Poplarville
- ❑ Waveland
- ❑ Wiggins
- ❑ Other: _____

2. **Is your home located in a floodplain?**

   - ❑ Yes
   - ❑ No
   - ❑ I don't know

3. **Do you have flood insurance for your home/personal property?**

   - ❑ Yes
   - ❑ No
   - ❑ I don't know

   a. **If "No," why not?**

      - ❑ Not located in floodplain
      - ❑ Too expensive
      - ❑ Not necessary because it never floods
      - ❑ Not necessary because my property is elevated or otherwise protected
      - ❑ Never really considered it
      - ❑ Other (please explain): _____

4. **Have you ever experienced or been impacted by a natural disaster or man-made incident?**

   - ❑ Yes
   - ❑ No

   a. **If "Yes," please explain:**

5. **On a scale of 1 to 5, how concerned are you about the possibility of your community being impacted by a natural disaster or man-made incident?**

   - ❑ 1 – Not at all
   - ❑ 2 – Slightly
   - ❑ 3 – Moderately
   - ❑ 4 – Very
   - ❑ 5 – Extremely

6. **Please select the <u>three</u> hazards you think pose the *greatest concern* to your community:**

- ❑ Climate Change/Sea Level Rise
- ❑ Coastal/Riverine Erosion/Wave Action
- ❑ Dam Failure
- ❑ Drought
- ❑ Earthquake
- ❑ Extreme Cold
- ❑ Extreme Heat
- ❑ Flood/Flood from SE Winds/Flood from Stormwater
- ❑ Hailstorm
- ❑ Hazardous Materials Incident/Train Derailment
- ❑ Hurricane/Tropical Storm
- ❑ Infectious Disease
- ❑ Lightning
- ❑ Severe Thunderstorm/High Wind
- ❑ Storm Surge
- ❑ Tornado
- ❑ Tsunami
- ❑ Wildfire
- ❑ Winter Weather

7. **Is there another hazard not listed above that you think is a wide-scale threat to your community?**

- ❑ Yes (please explain): _____
- ❑ No

8. **On a scale of 1 to 5, how prepared do you feel if a natural disaster or man-made incident were to occur?**

- ❑ 1 – Not at all
- ❑ 2 – Slightly
- ❑ 3 – Moderately
- ❑ 4 – Very
- ❑ 5 – Extremely

9. **Have you taken any actions to make your home, neighborhood, or family safer from hazards?**

- ❑ Yes
- ❑ No

   a. **If "Yes," please explain:**

10. **Are you interested in making your home, neighborhood, or family safer from hazards?**

- ❑ Yes
- ❑ No

11. **On a scale of 1 to 5, how informed do you feel about the risks and potential impacts of natural disasters and man-made incidents?**

- ❑ 1 – Not at all
- ❑ 2 – Slightly
- ❑ 3 – Moderately
- ❑ 4 – Very
- ❑ 5 – Extremely

12. **Do you know which government department or agency to contact regarding your risks from hazards in your area?**

- ❑ Yes
- ❑ No

13. **Please select the way(s) you prefer to receive information about how to make your home, neighborhood, or family safer from hazards:**

- ❑ Newspaper
- ❑ Television
- ❑ Radio
- ❑ Internet
- ❑ Social media
- ❑ Email
- ❑ Mail
- ❑ Public workshops/meetings
- ❑ School meetings
- ❑ Other (please explain): _____

14. **Please select the way(s) you prefer to receive alerts or warnings about impending hazard events or dangerous conditions:**

- ❑ Television
- ❑ Radio
- ❑ Landline phone
- ❑ Cell phone
- ❑ Text message
- ❑ Facebook
- ❑ Twitter
- ❑ Other (please explain): _____

15. **In your opinion, what are some steps your local government could take to reduce the risk of future hazard damages in your community?**

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

Category	Very Important	Somewhat Important	Not Important
1. Prevention Administrative or regulatory actions that influence the way land is developed and buildings are built. Examples include planning and zoning, building codes, open space preservation, and floodplain regulations.	❑	❑	❑
2. Property Protection Actions that involve modification of existing buildings to protect them from a hazard or removal from the hazard area. Examples include acquisition, relocation, elevation, structural retrofits, and storm shutters.	❑	❑	❑
3. Natural Resource Protection Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples include floodplain protection, habitat preservation, slope stabilization, riparian buffers, and forest management.	❑	❑	❑
4. Structural Projects Actions intended to lessen the impact of a hazard by modifying the natural progression of the hazard. Examples include dams, levees, detention/retention basins, channel modification, retaining walls, and storm sewers.	❑	❑	❑
5. Emergency Services Actions that protect people and property during and immediately after a hazard event. Examples include warning systems, evacuation planning, emergency response training, and protection of critical emergency facilities or systems.	❑	❑	❑
6. Public Education and Awareness Actions to inform citizens about hazards and the techniques they can use to protect themselves and their property. Examples include outreach projects, school education programs, library materials, and demonstration events.	❑	❑	❑

THANK YOU FOR YOUR PARTICIPATION!

GIS Data Request Sheet
MEMA District 9 Regional Hazard Mitigation Plan

Data requested	Available?	Received?	Potential Sources
Tax Parcel Data			Tax Assessor
including replacement value			
Building Footprints			Tax Assessor/GIS office
Critical Facilities (in GIS or list form with addresses)			Tax Assessor/GIS office
examples include:			
government buildings			
hospitals			
senior care			
police/fire/EMS/EOC			
locally significant buildings			
schools			
Local hazard studies			public works, natural resources, planning
examples include:			
Flood Studies (HEC-RAS, Risk MAP)			
Local Hazard History Articles			
Areas of Concern Studies			

If you have any questions, please contact:

Ryan Wiedenman
ryan.wiedenman@gmail.com
919-431-5295

Points System for Capability Ranking

0-24 points = Limited overall capability **25-49 points = Moderate overall capability** **50-86 points = High overall capability**

I. Planning and Regulatory Capability
(Up to 48 points)

Yes = 3 points
Under Development = 1 point
Included under county plan/code/ordinance/program = 1 point
No = 0 points

- Hazard Mitigation Plan
- Threat Hazard and Identification and Risk Assessment (THIRA)
- Comprehensive Land Use Plan
- Floodplain Management Plan/Flood Mitigation Plan
- National Flood Insurance Program (NFIP)
- NFIP Community Rating System (CRS Program)

Yes = 2 points
Under Development = 1 point
Included under county plan/code/ordinance/program = 1 point
No = 0 points

- Open Space Management Plan/Parks & Recreation Plan/Greenways Plan
- Stormwater Management Plan/Ordinance
- Natural Resource Protection Plan
- Flood Response Plan
- Emergency Operations Plan
- Emergency Management Accreditation Program (EMAP Accreditation)
- Continuity of Operations Plan
- Evacuation Plan
- Disaster Recovery Plan
- Flood Damage Prevention Ordinance
- Post-disaster Redevelopment/Reconstruction Plan/Ordinance

Yes = 1 point
No = 0 points

- Capital Improvements Plan
- Economic Development Plan
- Historic Preservation Plan
- Zoning Ordinance
- Subdivision Ordinance
- Unified Development Ordinance

- Building Code
- Fire Code

II. Administrative and Technical Capability
(Up to 15 points)

Yes = 2 points
Service provided by county = 1 point
No = 0 points

- Planners with knowledge of land development and land management practices
- Engineers or professionals trained in construction practices related to buildings and/or infrastructure
- Planners or engineers with an understanding of natural and/or human-caused hazards
- Emergency manager
- Floodplain manager

Yes = 1 point
No = 0 points

- Land surveyors
- Scientist familiar with the hazards of the community
- Staff with education or expertise to assess the community's vulnerability to hazards
- Personnel skilled in Geographical Information Systems (GIS) and/or Hazus
- Resource development staff or grant writers

III. Fiscal Capability
(Up to 20 points)

Yes - used to implement mitigation = 2 points
Yes - available = 1 point
No = 0 points

- Capital Improvement Programming
- Community Development Block Grants (CDBG)
- Special Purpose Taxes (or tax districts)
- Gas/Electric Utility Fees
- Water/Sewer Fees
- Stormwater Utility Fees
- Development Impact Fees
- General Obligation/Revenue/Special Tax Bonds
- Partnering arrangements or intergovernmental agreements
- Other

IV. Political Capability
(Up to 3 points)

High = 3 point
Moderate = 2 points
Limited = 1 point

- Degree of support by local elected officials in terms of adopting/funding mitigation

MITIGATION ACTION WORKSHEETS

Mitigation Action Worksheets are used to identify potential hazard mitigation actions that participating jurisdictions in MEMA District 9 will consider to reduce the negative effects of identified hazards. The worksheets provide a simple yet effective method of organizing potential actions in a user-friendly manner that can easily be incorporated into the Region's Hazard Mitigation Plan.

The worksheets are to be used as part of a strategic planning process and are designed to be:

a.) completed electronically (worksheets and instructions will be e-mailed to members of the Regional Hazard Mitigation Council following the Mitigation Strategy Workshop);
b.) reviewed with your department/organization for further consideration; and
c.) returned according to the contact information provided below.

Please return all completed worksheets no later than January 18, 2017 to:

Ryan Wiedenman, Project Manager Atkins
Electronic copies may be e-mailed to: ryan.wiedenman@atkinsglobal.com
Hard copies may be faxed to: 919-876-6848 (Attn: Ryan Wiedenman)

INSTRUCTIONS

Each mitigation action should be considered to be a separate local project, policy or program and each individual action should be entered into a separate worksheet. By identifying the implementation requirements for each action, the worksheets will help lay the framework for engaging in distinct actions that will help reduce the community's overall vulnerability and risk. Detailed explanations on how to complete the worksheet are provided below.

Proposed Action: Identify a specific action that, if accomplished, will reduce vulnerability and risk in the impact area. Actions may be in the form of local policies (i.e., regulatory or incentive-based measures), programs or structural mitigation projects and should be consistent with any pre-identified mitigation goals and objectives.

Site and Location: Provide details with regard to the physical location or geographic extent of the proposed action, such as the location of a specific structure to be mitigated, whether a program will be citywide, countywide or regional, etc.

History of Damages: Provide a brief history of any known damages as it relates to the proposed action and the hazard(s) being addressed. For example, the proposed elevation of a repetitive loss property should include an overview of the number of times the structure has flooded, total dollar amount of damages if available, etc.

Hazard(s) Addressed: List the hazard(s) the proposed action is designed to mitigate against.

Category: Indicate the most appropriate category for the proposed action as discussed during the Mitigation Strategy Workshop (Prevention; Property Protection; Natural Resource Protection; Structural Projects; Emergency Services; Public Education and Awareness).

Priority: Indicate whether the action is a "high" priority, "moderate" priority or "low" priority based generally on the following criteria:

1. Effect on overall risk to life and property
2. Ease of implementation / technical feasibility
3. Project costs versus benefits
4. Political and community support
5. Funding availability

Estimated Cost: If applicable, indicate what the total cost will be to accomplish this action. This amount will be an estimate until actual final dollar amounts can be determined. Some actions (such as ordinance revisions) may only cost "local staff time" and should be noted so.

Potential Funding Sources: If applicable, indicate how the cost to complete the action will be funded. For example, funds may be provided from existing operating budgets or general funds, a previously established contingency fund, a cost-sharing federal or state grant program, etc.

Lead Agency/Department Responsible: Identify the local agency, department or organization that is best suited to implement the proposed action.

Implementation Schedule: Indicate when the action will begin and when the action is expected to be completed. Remember that some actions will require only a minimal amount of time, while others may require a long-term or continuous effort.

Comments: This space is provided for any additional information or details that may not be captured under the previous headings.

	MITIGATION ACTION
Proposed Action:	
BACKGROUND INFORMATION	
Site and Location:	
History of Damages:	

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	
Category:	
Priority (High, Moderate, Low):	
Estimated Cost:	
Potential Funding Sources:	
Lead Agency/Department Responsible:	
Implementation Schedule:	

COMMENTS

Mitigation Action Progress Report Form

Progress Report Period	From Date:	To Date:
Action/Project Title		
Responsible Agency		
Contact Name		
Contact Phone/Email		
Project Status	❏ Project completed ❏ Project canceled ❏ Project on schedule ❏ Anticipated completion date:_____ ❏ Project delayed Explain _____	

Summary of Project Progress for this Report Period

1. What was accomplished for this project during this reporting period?

_____

_____

2. What obstacles, problems, or delays did the project encounter?

_____

_____

3. If uncompleted, is the project still relevant? Should the project be changed or revised?

_____

_____

4. Other comments

_____

_____

Plan Update Evaluation Worksheet

Plan Section	Considerations	Explanation
Planning Process	Should new jurisdictions and/or districts be invited to participate in future plan updates?	
	Have any internal or external agencies been invaluable to the mitigation strategy?	
	Can any procedures (e.g., meeting announcements, plan updates) be done differently or more efficiently?	
	Has the Planning Team undertaken any public outreach activities?	
	How can public participation be improved?	
	Have there been any changes in public support and/or decision- maker priorities related to hazard mitigation?	
Capability Assessment	Have jurisdictions adopted new policies, plans, regulations, or reports that could be incorporated into this plan?	
	Are there different or additional administrative, human, technical, and financial resources available for mitigation planning?	
	Are there different or new education and outreach programs and resources available for mitigation activities?	
	Has NFIP participation changed in the participating jurisdictions?	
Risk Assessment	Has a natural and/or technical or human-caused disaster occurred?	
	Should the list of hazards addressed in the plan be modified?	
	Are there new data sources and/or additional maps and studies available? If so, what are they and what have they revealed? Should the information be incorporated into future plan updates?	
	Do any new critical facilities or infrastructure need to be added to the asset lists?	
	Have any changes in development trends occurred that could create additional risks?	
	Are there repetitive losses and/or severe repetitive losses to document?	

Worksheet 7.2

Plan Update Evaluation Worksheet

Plan Section	Considerations	Explanation
Mitigation Strategy	Is the mitigation strategy being implemented as anticipated? Were the cost and timeline estimates accurate?	
	Should new mitigation actions be added to the Action Plan? Should existing mitigation actions be revised or eliminated from the plan?	
	Are there new obstacles that were not anticipated in the plan that will need to be considered in the next plan update?	
	Are there new funding sources to consider?	
	Have elements of the plan been incorporated into other planning mechanisms?	
Plan Maintenance Procedures	Was the plan monitored and evaluated as anticipated?	
	What are needed improvements to the procedures?	

APPENDIX C
LOCAL MITIGATION PLAN REVIEW TOOL

DRAFT

LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: MEMA District 9 (George, Hancock, Harrison, Jackson, Pearl River, and Stone Counties)	**Title of Plan:** MEMA District 9 Regional Hazard Mitigation Plan	**Date of Plan:** February 2017
Local Point of Contact: Ryan Wiedenman	**Address:** 1616 E. Millbrook Rd., Ste 160 Raleigh, NC 27609	
Title: Senior Planner		
Agency: Atkins		
Phone Number: 919-431-5295	**E-Mail:** ryan.wiedenman@atkinsglobal.com	

State Reviewer: Loretta Robinson	**Title:** Hazard Mitigation Planner **lrobinson@mema.ms.gov**	**Date:** April 20, 2017

FEMA Reviewer: **Jessica Gibson** **Edwardine S. Marrone**	**Title:** Program Analyst HM Program Analyst	**Date:** 06-27-17 07-21-17
Date Received in FEMA Region *IV*	06-27-17	
Plan Not Approved	07-21-17	
Plan Approvable Pending Adoption		
Plan Approved		

✓ Denotes FEMA Reviewer concurs with State Reviewers notations.

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SECTION 1:
REGULATION CHECKLIST

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been 'Met' or 'Not Met.' The 'Required Revisions' summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan** (section and/or page number)	**Met**	**Not Met**
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	1:4 & 2:5-2:14	X	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Section 2.4-2.7 App. B; App. D pp.2:7-2:7-2:16 ✓	X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))			X
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Table 4.3 (Pg 4:8)	X	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Section 10.4 pp. 10:10-10:11 ✓	X	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Section 10.3 pp.10:8-10-10 ✓	X	

DRAFT

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT A: REQUIRED REVISIONS ***A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))*** The final opportunity for the public to comment on the plan to approval has not been held. The public must be given an opportunity to be involved in both the drafting stage and prior to plan approval/adoption. **REQUIRED REVISION:** • Document that the public was provided an opportunity to comment on the Plan prior to the approval. Local Comments: Participating jurisdictions will hold public meetings before the final plan is officially adopted by the local governing bodies once FEMA has granted conditional approval of the plan. *For additional information, please see Element A, Planning Process in the Local Mitigation Plan Review Guide, October 1, 2011, Pages 15-17 and Tasks 2 & 3 of the Local Mitigation Planning Handbook, March 2013.*			
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))			X
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Section 5 pp.5:1-5:87 Jurisdiction-specific annexes (Section X.2) ✓	X	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))			X
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))			X

ELEMENT B: REQUIRED REVISIONS

B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))

The plan is missing extent for several hazards. The list below is organized by hazard:

Flood: Gauge height and peak discharge are listed in table 5-33, but this does not indicate what the severity or magnitude of the hazard and does not meet the extent requirement. Peak discharge and gauge height need to be provided in context in order to determine how severe the flood is. Additionally, the highest gauge height is not necessarily the greatest flood. The depth of the gauge is frequently, but not always, from the streambed. A peak gauge reading of 50 feet may not indicate a flood if the river is generally at 48 feet and not in flood. Context can be provided by descriptions of impact at each height. This information is available at the USS stream gauge website and is located on the site for each gauge. (The website can be found at https:// waterdata.usgs.gov/nwis/rt). Flood extent can also be met with a description of the flood damage and height in the jurisdiction or information on the flood stage. For example:

Pascagoula River at Merrill:
32 A portion of the railroad tracks will become flooded as the level rises to 32 feet and higher.
26 Flooding of residences will subside as the level drops below 25 feet.
25 Flooding of some residences will occur as the level rises above 25 feet.
24 Streets and portions of the old business section of Merrill will become flooded. At 24 feet the bridge becomes inacessible by vehicles.
24 Flooding of streets and the old business section of Merrill will subside as the river level drops below 23 feet.
23.5 Water is under homes in Plum Bluff Estates
20 Water covers the main road at Plum Bluff in southern George County.
19 Some flooding of lowlands in the area will continue until the river level drops below 18 feet.
18.5 Water covers roads at Smith's Fish Camp in Southern George County.
18 Some roads west of the river become flooded.
15 Water is under homes in Cedar Creek Estates.
14 Roads to Cedar Creek Estates are impassable.
13 Water covers the roads in Cedar Creek Estates in northern Jackson County.

OR

Flood Categories (in feet)
Major Flood Stage: 32
Moderate Flood Stage: 25
Flood Stage: 22
Action Stage: 12.5

Wildfire: In table 5-33 the greatest number of acres burned and greatest number of fires per year is listed. This does not meet the requirements for extent which should be "…described in terms of the specific measurement of an occurrence …" (Local Mitigation Plan Review Guide Pg. 19). Extent can be met by pulling out information on the most severe fires in each jurisdiction. If this information is not available, extent can be met by the data provided and a statement that information on specific occurrences is not available.

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met

Required Revision:

- Provide extent for flood for all jurisdictions.

  Local Comments: Provided the maximum historic crest and flood categories (action stage, flood stage, moderate flood stage, and major flood stage) for each of the available USGS gages in the region in Section 5 Table 5.33 (pp. 5:77-5:78) as well as each of the county annexes.

- Provide extent for wildfire for all jurisdictions

  Local Comments: Included a statement indicating information on specific occurrences of wildfire and the most severe fires in each jurisdiction is not available in Section 5 Table 5.33 (p. 5:78) as well as each of the county annexes.

B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))

The plan does not include an overall summary of the community's vulnerability for each jurisdiction. The plan does an impressive job of providing vulnerability data in a rigorous and appropriate manner. The overall summary of vulnerability identifies structures, systems, populations or other community assets and is more than a list of the total exposure of population, structures, and critical facilities in the planning area. An example of an overall summary is a list of key issues or problem statements that clearly describes the community's greatest vulnerabilities and that will be addressed in the mitigation strategy. This is often unique to each jurisdiction rather than the hazard as it takes into account the hazard, the exposure, and distinctive community attributes. For example, low lying neighborhoods and streets in Biloxi (or other coastal jurisdictions) are susceptible to coastal flooding from storm surge. Vulnerable and at risk populations including low-income, minorities, elderly, or disabled persons disproportionally live in flood prone areas. Additionally, many major employers like casinos and hotels are located in these vulnerable locations. Disruption or loss of these employers and facilities can result in significant local unemployment, economic loss, and migration from the cities. Another example is that agriculture-based jurisdictions may be more vulnerable to drought which can directly damage crop yields or depressed stock and crop prices due to low production or stock being sold because of high feed and maintenance costs. Vulnerability can depend on location, construction, or contents. For instance, this may involve a location within a floodplain, construction that is not elevated or susceptible contents like vital records. In developing the summary, describe the possible types of local damage, while also explaining the population and facilities at risk.

Required Revision:

- Provide an overall summary of each jurisdiction's vulnerabilities.

  Local Comments: Added a table with key problem statements summarizing each jurisdiction's vulnerabilities in Section 6 Table 6.16 (pp. 6:42-6:43) as well as each of the county annexes.

B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))

The plan does not indicate structure type for repetitively damaged properties for the City of D'Iberville (Pg. C:13).

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
Required Revision: • The plan must describe the types (residential, commercial, institutional, etc.) of repetitive loss properties in identified flood hazard areas for all jurisdictions. Provide this information for the City of D'Iberville. Local Comments: Added the number of each building type for the repetitive loss properties in D'Iberville in Annex C Table C.9 (p. C:13). *For additional information, please see Element B, Hazard Identification and Risk Assessment, in the "Local Mitigation Plan Review Guide", October 1, 2011, Pages 18-21 and Task 5 of the Local Mitigation Planning Handbook, March 2013.*			
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Section 7; pp. 7:1-7:17 Jurisdiction-specific annexes (Section X.4) ✓	X	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Section 5.5.4 (Table 5.7) pp. 5:16-17 Section 7.3.4 (Table 7.2); pp. 7:9-7:10 Jurisdiction-specific annexes (Section X.2.3 and X.4.1; Table X.8 and Table X.53) ✓	X	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Section 8.2 pp. 8:3-8:6 Jurisdiction-specific annexes (Section X.5.1) ✓	X	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Section 8.3-8.4 pp. 8:4-8:6 Section 9.2; pp. 9:3-9:240 Jurisdiction-specific annexes (Section X.5.2) ✓	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Section 8.1.1; p. 8:2 Section 9.2; pp 9:2-9:240 Jurisdiction-specific annexes (Section X.5.2) ✓	X	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Section 7.3.1 pp. 7:2 (Table 7.1); Section 10.1-10.2; pp. 10:1-10:7 Jurisdiction-specific annexes (Section X.4.1; Table X.52) ✓	X	
ELEMENT C: REQUIRED REVISIONS			
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Section 6.4.3; pp. 6:12-614 Jurisdiction-specific annexes (Section X.3.3) ✓	X	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Section 9.2; pp. 9:2-9:240 Jurisdiction-specific annexes (Section X.5.2) ✓	X	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))			X

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT D: REQUIRED REVISIONS ***D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))*** The plan does not describe if and how any priorities changed. The plan does lay out the current priorities (Table 5.35 and Table 5.36), but needs to describe any changes in priorities. If no change has occurred, this element can be met by making a statement to that effect. If specific jurisdictions have changed their priorities that can be described on a jurisdictional basis. If all of the priorities have changed due to the merging of multiple plans, this element can be met by clearly making a statement to that effect. **REQUIRED REVISIONS:** • Include a description reflecting if and how any priorities changed. Local Comments: Included a statement indicating some priorities have changed since the previous plans were adopted due to the merging of multiple local plans to form this regional plan; however, most priorities remain the same in Section 5 (p. 5.84) as well as each of the county annexes. *For additional information, please see Element D, Plan Review, Evaluation, and Implementation, in the Local Mitigation Plan Review Guide, October 1, 2011, Pages 26-27.*			
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))			X
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))			X

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1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met

ELEMENT E: REQUIRED REVISIONS

E2. The District 9 Regional Hazard Mitigation Plan has not been adopted at this time. This is a draft review.

E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))

E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))

The plan has not been formally adopted by the local governing body requesting approval. In addition, no supporting documentation has been submitted by each participating jurisdiction adopting the plan. The adopting resolutions will be added upon FEMA's approval pending adoption.

REQUIRED REVISIONS:

- If adopted after FEMA review, adoption **must** take place within one calendar year of receipt of FEMA's "Approval Pending Adoption".

  Local Comments: The plan will be formally adopted by each of the participating jurisdictions within one year of receipt of FEMA's "Approval Pending Adoption" and adoption resolutions will be added to Appendix A.

- Each jurisdiction that is included in the plan **must** have its governing body adopt the plan prior to FEMA approval.

  Local Comments: The plan will be formally adopted by each of the participating jurisdictions within one year of receipt of FEMA's "Approval Pending Adoption" and adoption resolutions will be added to Appendix A.

(*For additional information, please see the "Local Mitigation Plan Review Guide", Element E, Plan Adoption, dated October 1, 2011, Pages 28 - 29). Also see Task 8 of the Local Mitigation Handbook dated March 2013*

ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			
F1.			
F2.			

ELEMENT F: REQUIRED REVISIONS

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SECTION 2:
PLAN ASSESSMENT

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item, and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature, and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the overall plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

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A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

Plan Strengths:

It is a good practice to include such a diverse group of individuals in the mitigation process. Looking at the whole community allows for a stronger mitigation plan and increases the willingness of the community to engage in mitigation actions.

The meetings are well documented and provide a comprehensive record of what occurred.

Each community is different and requires a different approach. Continue to work both as a collective group that can exchange ideas and practices that are successful, but also continues to respect local autonomy. Many hazards cross jurisdictional boundaries and require cooperative efforts. It is a good practice that each community distributed survey in way that would best reach their citizens. This exemplifies the group's commitment to the whole community and respect for local autonomy.

The plan stated a plan amendment process which was clearly communicated and will allow for a smoother amendment process should the need arise.

Opportunities for Improvement:

Consider bringing in stakeholders even earlier into the planning process. This can allow for an earlier inclusion of different ideas and encourage stakeholders to take more ownership over mitigation actions.

To assist in planning the major plan update in five years, consider providing a table listing the dates and the major stages of the mitigation planning process. Additionally, listing the specific groups or individuals that were approached as stakeholders would simplify reaching out to them again.

While many hazard specific resources were used to determine which hazards to include, other plans, studies, reports, and technical information can also be incorporated into the plan and planning process to better understand available mitigation actions and new approaches to hazard mitigation.

Element B: Hazard Identification and Risk Assessment

Plan Strengths:

The hazards listed provide a comprehensive list of hazards that impact the area. Effective mitigation begins with a comprehensive understanding of risk based on vulnerabilities to threats and hazards.

The summary of insured flood losses (Table 5.7) and the summary of repetitive loss properties (Table 5.8) are very well done and provide a clear understanding of the relative exposure for each jurisdiction.

The discussion of climate change / sea level rise is well done and indicates how these hazards will intensify other hazards.

Including infectious disease is a forward looking approach to understanding hazards. The planning committee should be commended for including this hazard and taking a comprehensive view of risk.

Opportunities for Improvement:

The prioritization risk index takes into account a wide range of concerns (such as impact and duration). This encourages an objective approach. As this approach is refined consider breaking areas like impact into jurisdiction specific areas – this allows a jurisdiction that has successfully completed a range of mitigation actions against a hazard to understand their risk has been reduced. For example, a community that has invested in safe rooms and tornado resistant building codes may have a reduced impact from the same tornado compared to a community that has yet to implement these actions or has a higher number of mobile homes (and hence will suffer higher damage). While it is a good practice to understand risk across the district – some level of jurisdictional differentiation is required. This is also true with many spatial hazards like storm surge which is unlikely to impact the inland jurisdictions as severely as the coastal.

Consider including flood depth grids as another tool for risk communication from flooding.

It is appropriate and a good practice to approach hazards differently depending upon their innate characteristics – like whether they are spatially constrained. Be cautious of getting tied up in the models and place the results into perspective. A variety of individuals will use a hazard mitigation plan for a variety of reasons. Context helps put the numerical data into perspective for those less familiar with the model's nuances and peculiarities. At the same time the data is valuable for more detailed planning and is useful for those who can interpret the model outcomes more directly.

All hazards, but particularly many of the hazards listed in section 6.2.1 can be thought of beyond their impacts to structures. Broaden the analysis to other assets such as places of cultural/historical or environmental value, locations of employment, tourism or recreation, along with populations having special needs because of physical, economic, demographic, cultural, or environmental challenges. For example: the elderly and homeless are often at higher risk from extreme heat and winter weather. Drought can strongly impact crop yield which will impact the rural communities. Consider working with each jurisdiction to understand the impacts of the hazard to the whole community. This also relates to providing overall summaries of vulnerabilities that help the plan user know what the most critical risks are.

When doing your analysis of infectious disease, consider a range of actions to reduce mosquito breeding areas, providing education to residents and visitors, and to developing strong communication plans between all stakeholders (for example: Mississippi State Department of Public Health, physicians and hospitals, local officials, and the public). Cities such as Miami, Florida may be able to provide examples of successful actions and implementation strategies. Keep in mind that many mosquito borne diseases disproportionately impact economically disadvantaged areas and all populations are at increased risk following many natural disasters.

Work with the Mississippi Department of Environmental Quality – Dam Safety Division to gather and include inundation maps for all of the high hazard dams in addition to determining the hazard status of the unclassified dams.

Element C: Mitigation Strategy

Plan Strengths:

The capability assessment provides an exemplary analysis of the capabilities of each jurisdiction. Table 7.1 and the discussion that follows clearly lay out many opportunities for what abilities each jurisdiction has.

Many jurisdictions had considered a variety of different funding sources for mitigation actions. This allows a greater chance for receiving funding. Continue to work together and share this information to create a stronger regional approach and outcome.

In general, the mitigation actions were comprehensive. These should be shared across all of the jurisdictions to encourage spreading new ideas and merge efforts together to a greater effect. The attention paid to vulnerable populations creates a mitigation plan that works for the whole community.

The comments on the status of the mitigation actions show that MEMA District 9 understands that mitigation is a process that is never entirely finished. Actions must be continued to ensure that new development and residents are protected and that plans are revised and kept current.

The plan is clear and straight forward in how it references older actions and indicates how they will be renumbered. It focuses on grouping together like actions to allow for the plan to easily used and approached to determine the range of mitigation actions that each community is interested in.

Many of the jurisdictions already participate in the Community Rating System (CRS) Program. As these jurisdictions know, CRS can reduce the cost of flood insurance premiums while providing enhanced protection for the community at large.

Opportunities for Improvement:

The prioritization and cost/benefit approach could be much stronger. Consider developing a more robust process that allows for flexibility in the jurisdictions and encourages a wide range of inputs to make sure that the priorities are indicative of the community's needs and abilities. Document how communities have input into the design of the prioritization approach in this section.

Several jurisdictions had the same set of mitigation actions. Mitigation approaches and actions need to be tailored to the unique needs and capabilities of the specific community. The plan will be more effective as a whole if you work closely with each jurisdiction to produce mitigation actions specific to their needs as well. Work with each jurisdiction to identify a range of actions that they can implement in addition to the actions best taken in support of MEMA District 9.

Just as mitigation actions need to be continued to be useful, the larger process needs to be continued to determine if overall priorities have shifted or if the hazards have changed. Many of the jurisdictions had no actions. Despite how thorough some jurisdiction's mitigation actions were, new actions should be evaluated and added, where appropriate.

Communities that do not participate in CRS should consider joining. Work with the existing CRS communities to determine strategies for joining the program. There are a variety of actions communities can take to meet CRS goals – many may already be being done in the community. This can be a significant savings for residents and for any public buildings that are insured.

Element D: Plan Update, Evaluation, and Implementation (*Plan Updates Only*)

Plan Strengths:

Continue with the plan's analysis of changes in development and how this has increased or decreased the vulnerability of each jurisdiction. Significant development has occurred in many of the jurisdictions and should be evaluated in the context of vulnerability and impact shifts.

The plan's table for mitigation actions in section nine very clearly expresses the status of hazard mitigation actions. The table indicates the actions that have been completed.

Opportunities for Improvement:

Add additional specifics as to why implementation is delayed or slowed. Many mitigation actions note that there was a problem with implementation, but doesn't explain why. The explanation is necessary to understand how to overcome the problems.

B. Resources for Implementing Your Approved Plan

Mitigation Planning Toolkit:
This is an extensive web based tool to assist States, Local, and Tribal Communities involved in Hazard Mitigation Plan Development and Updates. The content will help guide the direction of plan development and required updates.
http://www.fema.gov/library/viewRecord.do?id=5580

Local Mitigation Planning Handbook:
This Handbook provides guidance to local governments on developing or updating hazard mitigation plans to meet the requirements under the Code of Federal Regulations (CFR) Title 44 – Emergency Management and Assistance §201.6.
Use the Local Plan Guide and Handbook in tandem to understand technical requirements
http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=7209

Integrating Mitigation Strategies with Local Planning:
This resource provides practical guidance on how to incorporate risk reduction strategies into existing local plans, policies, codes, and programs that guide community development or redevelopment patterns.
http://www.fema.gov/library/viewRecord.do?id=7130

Mitigation Ideas:
Communities can use this resource to identify and evaluate a range of potential mitigation actions for reducing risk to natural hazards and disasters.
http://www.fema.gov/media-library/assets/documents/30627?id=6938

Community Rating System:
This guide is an introduction to the Community Ration System and provides basic information, example mitigation ideas, and methods to request more detailed information.
https://www.fema.gov/national-flood-insurance-program-community-rating-system

Risk MAP Program:
This resource provides an introduction to Risk MAP and information about the products Risk MAP offers to better understand flood risk. This information can help planning to reduce flood risk and communicate with residents.
https://www.fema.gov/risk-map-program-information-community-officials

Mitigation Flood and Drought Conditions under Hazard Mitigation Assistance
Aquifer storage and recovery, floodplain and stream restoration, flood diversion and storage, and green infrastructure methods are eligible under the Hazard Mitigation Assistance programs to support communities in reducing the risks associated with mitigating the impacts of flood and drought conditions
https://www.fema.gov/media-library/assets/documents/110202

Dam Safety Resources
An overview on the topic of Dam Safety, as well as the National Dam Safety Program (NDSP). It is intended to serve as a resource for people who live near dams, as well as agencies and local authorities with responsibility for dams and areas impacted by dams.
https://www.fema.gov/dam-safety-publications-resources

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SECTION 3:
MULTI-JURISDICTION SUMMARY SHEET (OPTIONAL)

INSTRUCTIONS: For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, which required Elements for each jurisdiction were 'Met' or 'Not Met,' and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; it should be used as an optional worksheet to ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Require-ments
1	George County	County	Nancy Smith	355 Cox St, Lucedale, MS 39452	emadirector@georgecountyms.gov	601-947-7557	N	N	Y	N	N	
2	Lucedale	City	Doug Lee	5126 Main St, Lucedale, MS 39452	dlee@cityoflucedale.com	601-947-2082	N	N	Y	N	N	
3	Hancock County	County	John Evans	18333 Hwy 603, Kiln, MS 39556	hcema2@att.net	228-255-0942	N	N	Y	N	N	
4	Bay St. Louis	City	Les Fillingame	688 Hwy 90, Bay St. Louis, MS 39520	bslmayor@bellsouth.net	228-466-8951	N	N	Y	N	N	

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MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Require-ments
5	Diamondhead	City	Ronald Jones	5000 Diamondhead Cir, Diamondhead, MS 39525	rjones@diamondhead.ms.gov	228-222-4626	N	N	Y	N	N	
6	Waveland	City	Christine Gallagher	301 Coleman Ave, Waveland, MS 39576	cgallagher@waveland-ms.gov	228-466-2549	N	N	Y	N	N	
7	Harrison County	County	Bruce Wilkerson	1801 23rd Ave, Gulfport, MS 39501	bawilkerson@co.harrison.ms.us	228-865-4002	N	N	Y	N	N	
8	Biloxi	City	Richard Stickler	676 Dr Martin Luther King Jr Blvd, Biloxi, MS 39530	rstickler@biloxi.ms.us	228-435-6270	N	N	Y	N	N	
9	D'Iberville	City	Hank Rogers	10383 Auto Mall Pkwy, D'Iberville, MS 39540	hrogers@diberville.ms.us	228-392-7966 Ext. 1024	N	N	Y	N	N	

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MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Require-ments
10	Gulfport	City	Wayne Miller	4050 Hewes Ave, Gulfport, MS 39507	wmiller@gulfport-ms.gov	228-868-5740	N	N	Y	N	N	
11	Long Beach	City	John Eustace	201 Jeff Davis Ave/ P.O. Box 929, Long Beach, MS 39560	jeustace@cityflongbeachms.com	228-863-1554	N	N	Y	N	N	
12	Pass Christian	City	Shad Jeanfreau	200 W. Scenic Dr, Pass Christian, MS 39571	shad@ci.pass-christian.ms.us	228-452-3316	N	N	Y	N	N	
13	Jackson County	County	Donald Langham	1912 Live Oak Ave, Pascagoula, MS 39568	donald_langham@co.jackson.ms.us	228-769-3111	N	N	Y	N	N	
14	Gautier	City	Zack Duke	3305 Gautier Vancleave Rd, Gautier, MS 39553	zduke@gautier-ms.gov	228-497-1878	N	N	Y	N	N	

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MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Require-ments
15	Moss Point	City	Billy Broom field	4320 McInnis Ave, Moss Point, MS 39563	Billy.Broomfield@cityofmosspoint.org	228-475-0300 Ext. 9	N	N	Y	N	N	
16	Ocean Springs	City	Hilliard Fountain	P.O. Box 1800, Ocean Springs, MS 39566	hfountain@oceanspring s-ms.gov	228-875-6712	N	N	Y	N	N	
17	Pascagoula	City	Joseph Huffman	603 Watts Ave, Pascagoula, MS 39567	citymanager@cityofpascagoula.com	228-938-6614	N	N	Y	N	N	
18	Pearl River County	County	Danny Manley	810 Hwy 11 South, Poplarville, MS 39470	dmanley@pearlrivercounty.net	601-795-3058	N	N	Y	N	N	
19	Picayune	City	Jim Luke	203 Goodyear Blvd, Picayune, MS 39466	citymanager@picayune.ms.us	601-799-0615	N	N	Y	N	N	

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MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Require-ments
20	Poplarville	City	Brad Necaise	200 Hwy 26 East, Poplarville, MS 39470	poplarvillemayor@gmail.com	601-795-8161	N	N	Y	N	N	
21	Stone County	County	Raven James	323 Cavers Ave East, Wiggins, MS 39577	rjames@stoneconuntyms.gov	601-928-3077	N	N	Y	N	N	
22	Wiggins	City	Misha Parker	117 College Ave East, Wiggins, MS 39577	mparker@cityofwiggins.com	601-928-4060	N	N	Y	N	N	

APPENDIX D
PLANNING PROCESS DOCUMENTATION

This appendix includes the following:

1. Meeting Agendas
2. Meeting Minutes
3. Meeting Sign-In Sheets
4. Public Survey Advertisements
5. Public Survey Results

AGENDA

MEMA District 9 Regional Hazard Mitigation Plan
Hazard Mitigation Council Meeting

August 30, 2016
10:00 AM – Noon

1) **Introductions**

2) **Overview of Mitigation/Icebreaker Exercise**

3) **Project Overview**
   a) Key Objectives
   b) Project Tasks
   c) Project Schedule
   d) Project Staffing

4) **Data Collection**
   a) GIS Data Inventory
   b) Capability Assessment Survey
   c) Public Participation Survey
   d) Existing Mitigation Actions

5) **Roles & Responsibilities**
   a) Atkins
   b) County Leads
   c) Participating Jurisdictions

6) **Next Steps**
   a) Data collection efforts
   b) Begin public outreach
   c) Identify Municipal Points of Contact

7) **Questions, Issues, or Concerns**

ATKINS

AGENDA

MEMA District 9 Regional Hazard Mitigation Plan
Mitigation Strategy Meeting

December 13, 2016
10:00 AM – Noon

1) **Introductions**

2) **Mitigation Refresher**

3) **Project Schedule**

4) **Risk Assessment Findings**
   a) Hazard History and Profiles
   b) Conclusions on Risk: PRI

5) **Capability Assessment Findings**
   a) Indicators
   b) Results

6) **Public Involvement Activities**

7) **Mitigation Strategy**
   a) Current Goals/Actions
   b) New Actions
   c) Discussion

8) **Next Steps**
   a) Mitigation Actions
   b) Other Documentation Needed

9) **Questions, Issues, or Concerns**

ATKINS

AGENDA

MEMA District 9 Regional Hazard Mitigation Plan
Harrison County Meeting

February 8, 2017
10:00 AM – Noon

1) **Introductions**

2) **Mitigation Refresher**

3) **Project Schedule**

4) **Risk Assessment Findings**
   a) Hazard Profiles
   b) Conclusions on Risk: PRI

5) **Capability Assessment Findings**
   a) Indicators/Results

6) **Mitigation Strategy**
   a) Current Goals/Actions
   b) New Actions
   c) Working on Action Updates

7) **Next Steps**
   a) Mitigation Actions
   b) Other Documentation Needed

8) **Questions, Issues, or Concerns**

ATKINS

Meeting Minutes
MEMA District 9 Regional Hazard Mitigation Plan
Project Kickoff Meeting
August 30, 2016

Ryan Wiedenman, Project Manager from the project consulting team, Atkins, started the meeting by welcoming the representatives from each county, participating municipal jurisdictions, and other stakeholders.

Mr. Wiedenman led the kickoff meeting and began by providing an overview of the items to be discussed at the meeting and briefly reviewed each of the handouts that were distributed in the meeting packets (agenda, project description, and presentation slides). He then provided a brief overview of mitigation and discussed the Disaster Mitigation Act of 2000.

He gave a list of the participating jurisdictions for the regional plan, noting that every local government in the region is participating in an existing county-level or municipal-level hazard mitigation plan. These plans expire at various times over the next several years, so the planning team will plan to develop a draft to submit to FEMA by early 2017.

Mr. Wiedenman then explained the six different categories of mitigation techniques (emergency services; prevention; natural resource protection; structural projects; public education and awareness; and property protection) and gave examples of each. This explanation culminated with an Ice Breaker Exercise for the attendees.

Mr. Wiedenman instructed attendees on how to complete the exercise. Attendees were given an equal amount of fictitious FEMA money and asked to spend it in the various mitigation categories. Money could be thought of as grant money that communities received towards mitigation. Attendees were asked to target their money towards areas of mitigation that are of greatest concern for their community. Ideally, the exercise helps pinpoint areas of mitigation that the community may want to focus on when developing mitigation grants. Mr. Wiedenman also presented the Ice Breaker Exercise results which were:

- Prevention- $92
- Property Protection- $66
- Natural Resource Protection- $38
- Structural- $54
- Emergency Services- $52
- Public Education- $18

Mr. Wiedenman then discussed the key objectives and structure of the planning process, explaining the specific tasks to be accomplished for this project, including the planning process, risk assessment, vulnerability assessment, capability assessment, mitigation strategy and action plan, plan maintenance procedures, and documentation. The project schedule was presented along with the project staffing chart, which demonstrates the number of experienced individuals that will be working on this project.
The data collection needs and public outreach efforts were also discussed.

Mr. Wiedenman then reviewed the roles and responsibilities of Atkins, participating jurisdictions, and stakeholders. The presentation concluded with a discussion of the next steps to be taken in the project development, which included discussing data collection efforts, public outreach, and the next meeting for the RHMC.

The meeting was opened for questions and comments, but nothing of note was brought up from a technical perspective.

Mr. Wiedenman thanked everyone for attending and identified himself as the point of contact for any questions or issues. The meeting was adjourned.

Meeting Minutes
MEMA District 9 Regional Hazard Mitigation Plan
Mitigation Strategy Meeting
December 13, 2016

Mr. Ryan Wiedenman with Atkins welcomed everyone to the meeting and went over safety and administrative topics. He then went on to discuss the findings and information that Atkins pulled together since the kickoff meeting.

Mr. Wiedenman initiated the meeting with a review of the meeting handouts, which included an agenda, presentation slides, proposed goals for the plan, capability assessment tables, mitigation actions from each community's existing plans, critical facilities, and repetitive loss request letters. Mr. Wiedenman reviewed the project schedule and stated that a draft of the Hazard Mitigation Plan would be presented to the Hazard Mitigation Council in February.

He then presented the findings of the risk assessment, starting with a review of the Presidential Disaster Declarations that have impacted the region. He then explained the process for preparing Hazard Profiles and discussed how each hazard falls into one of five categories: Flood-related, Fire-related, Geologic, Wind-related, and Other hazards. He indicated that each hazard must be evaluated and then profiled and assessed to determine a relative risk for each hazard.

Mr. Wiedenman reviewed the Hazard Profiles and the following bullets summarize the information presented:

<u>Flood-Related Hazards</u>

- DAM/LEVEE FAILURE. There have been 4 recorded dam failures in the region according to the State HMP. There are 7 high hazard dams in the region. Future occurrences are possible.

- EROSION. There have been significant instances of major erosion reported in the past, especially along the barrier islands, some of which are eroding at a rate of 6 to 8 meters per year.

- FLOOD. There have been 168 flood events recorded in MEMA District 9 since 1996, resulting in over $12.1 million in property damage per NCDC. There have been 71,772 NFIP losses since 1978 and approximately $5.45 million in claims. Future occurrences are highly likely.

- STORM SURGE. The previous occurrences of storm surge coincide with the hazard history for hurricanes/tropical storms. Many areas of coastal Mississippi would be inundated by storm surge, in some cases at depths of over 9 feet.

- TSUNAMI. No history of tsunamis in the Gulf of Mexico, so future occurrences are unlikely. However, there is some possibility that a sub-marine landslide could cause a tsunami.

Fire-Related Hazards

- DROUGHT. There have been nine years (out of the past seventeen, 2000-2016) where drought conditions have been reported as severe to exceptional in the region and future occurrences are likely.

- LIGHTNING. There have been 57 recorded lightning events reported by the National Climatic Data Center (NCDC) since 1996 and coastal Mississippi is in one of the highest risk zones in the country for lightning. Future occurrences are highly likely.

- WILDFIRE. There is an average of 464 fires per year reported in the region. These burn an annual average of 8,297 acres. Future occurrences are highly likely.

Geologic Hazards

- EARTHQUAKES. There have been 7 recorded earthquake events in MEMA District 9 since 1886. The strongest had a recorded magnitude of V MMI. Future occurrences are possible.

Wind-Related Hazards

- EXTREME COLD. There have been 8 recorded extreme cold events reported by the National Climatic Data Center (NCDC) since 1996. Cold spells of 15-20 degrees Fahrenheit indicate that extreme cold could impact the region. Future occurrences are possible.

- EXTREME HEAT. There have been 8 recorded extreme heat events reported by the National Climatic Data Center (NCDC) since 1996. Heat extents of 105 degrees indicate that extreme heat is a hazard of concern for the region. Future occurrences are highly likely.

- HAILSTORM. There have been 310 recorded events since 1950. Future occurrences are highly likely.

- HURRICANES AND TROPICAL STORMS. NOAA data shows that 119 storm tracks have come within 100 miles of the region since 1842, including 12 that caused disaster declarations. Future occurrences are highly likely.

- SEVERE THUNDERSTORM/HIGH WIND. There have been 704 severe thunderstorm/high wind events reported since 1950 with $11.0 million in reported property damages. Two deaths have been reported. Future occurrences are highly likely.

- TORNADOES. There have been 283 recorded tornado events reported in the region since 1950. $383.5 million in property damages. 6 deaths and 170 injuries have been reported. Future occurrences are highly likely.

- WINTER WEATHER. There have been 23 recorded winter weather events in the region since 1996. Future occurrences are likely.

Other Hazards

- CLIMATE CHANGE/SEA LEVEL RISE. Climate change and sea level rise are likely to impact the region going forward. This hazard will exacerbate other hazards such as extreme heat, drought, and flood. It will also likely produce more frequent strong storms. Sea level rise of three feet may occur and would inundate many coastal areas.

- INFECTIOUS DISEASE. Several types of infectious disease may impact the region, but the region is especially susceptible to mosquito-borne illnesses. Communicable diseases such as influenza also pose a threat.

- HAZARDOUS MATERIALS INCIDENT/TRAIN DERAILMENT. There have been 473 hazardous materials incidents reported by the PHMSA since 1971. 41 of these were serious incidents. The largest was a spill of 96,000 LGA in Carriere in 1980.

The results of the hazard identification and profiling process were used to generate a Priority Risk Index (PRI), which categorizes and prioritizes potential hazards as high, moderate or low risk based on probability, impact, spatial extent, warning time, and duration. The highest PRI was assigned to Hurricane/Tropical Storm and Flood followed by Severe Thunderstorm/High Wind, Storm Surge, and Tornado.

In concluding the review of Hazard Profiles, Mr. Wiedenman stated if anyone had additional information for the hazard profiles, or had concerns with any of the data presented, they should call or email him.

Mr. Wiedenman presented the Capability Assessment Findings. Atkins has developed a scoring system that was used to rank the participating jurisdictions in terms of capability in four major areas (Planning and Regulatory; Administrative and Technical; Fiscal; Political). Important capability indicators include National Flood Insurance Program (NFIP) participation, Building Code Effective Grading Schedule (BCEGS) score, Community Rating System (CRS) participation, and the Local Capability Assessment Survey conducted by Atkins.

Mr. Wiedenman reviewed the Relevant Plans and Ordinances, Relevant Staff/Personnel Resources, and Relevant Fiscal Resources. All of these categories were used to rate the overall capability of the participating counties and jurisdictions. Most jurisdictions are in the moderate range for Planning and Regulatory Capability and in the moderate range for Fiscal Capability. There is variation between the jurisdictions for Administrative and Technical Capability, though a large majority have access to staff with GIS and planning experience. Based upon the scoring methodology developed by Atkins, it was determined that most of the participating jurisdictions have moderate capability to implement hazard mitigation programs and activities.

Mr. Wiedenman also discussed the results of the public participation survey that was posted on several of the participating counties' and municipal websites. As of the meeting date, 485 responses had been received. Mr. Wiedenman explained that the survey would close in February, so the RHMC could make one final push to get the survey out to the public. Based on preliminary survey results, respondents felt that Hurricane/Tropical Storm posed the greatest threat to their neighborhood, followed by Severe Thunderstorm/High Wind and Storm Surge. 88 percent of the respondents were interested in making

their homes more resistant to hazards. However, 31 percent don't know who to contact regarding reducing their risks to hazards.

Mr. Wiedenman gave an overview of Mitigation Strategy Development and presented the existing goals for each plan as well as a set of recommended goals that Atkins developed based on the previous plans' goals. The Hazard Mitigation Council accepted the proposed goals for the plan. Mr. Wiedenman then provided an overview and examples of suggested mitigation actions for MEMA District 9 counties and their municipalities. Mr. Wiedenman then asked each county and the municipalities to provide a status update for their existing mitigation actions (completed, deleted, or deferred) by January 13, 2016. Mr. Wiedenman also asked council members to include any new mitigation actions by that date.

Mr. Wiedenman thanked the group for taking the time to attend and explained that if council members had any issues or questions about the planning process or their next steps, they could contact him. The meeting was adjourned.

Meeting Minutes
MEMA District 9 Regional Hazard Mitigation Plan
Harrison County Meeting
February 8, 2017

Mr. Rupert Lacy of Harrison County Emergency Management began the meeting by explaining that, in an effort to enhance local stakeholder involvement, Harrison County requested a county-level meeting as part of the plan development process that was to include the various stakeholder groups from within the county that might have an interest in mitigation, such as the hospital and the air force base. At this meeting, the primary focus would be to gain feedback from these other stakeholder groups on potential mitigation actions and projects that they would like to implement.

Mr. Lacy then turned the meeting over to Mr. Ryan Wiedenman of Atkins who gave the stakeholders a brief overview of the work that had been completed on the plan so far and provided a summary of the risk assessment and capability assessment information that was presented at the last regional-level meeting of the HMC. No major comments were received on this information.

Mr. Wiedenman then went on to lead an open discussion of existing actions from each community's existing hazard mitigation plan. Existing actions were provided to all members who reviewed these actions and provided updates on any progress that had been made on the actions.

After this discussion was complete, the remainder of the time was spent developing new actions and projects that could be included in the updated version of the plan. Many stakeholders provided ideas that they would like to have included in the plan and there was significant discussion on the various projects throughout the community that were desired. After recording many of these ideas and updates, Mr. Wiedenman stated that if there were any additional ideas that came up in discussions after the meeting, that they could be emailed to him to include in the mitigation action plan.

Mr. Wiedenman then thanked the group for attending and explained the next steps that would be taken to prepare the draft plan. The meeting was adjourned.

MEMA District 9 Regional Hazard Mitigation Plan
Hazard Mitigation Council Meeting

August 30, 2016
10:00AM-12:00PM

Name	Title	Organization	Phone Number	E-mail Address
Nancy Smith	Director	George Co. EMA	601-947-7557	emadirector@georgecountyms.gov
Raven James	Director	Stone Co. EMA	601-928-3077	rjames@stonecountyms.gov
Carolyn Nelson	Area Coordinator	MEMA	601 398 6881	cnelson@memams.gov
Donald Langham	EMA Coordinator	Jackson Co EMA	228 769-3111	donald_langham@co.jackson.ms.us
Craig Tynes	Director of Physical Plant	Pearl River Community College	601-590-2996	ctynes@prcc.edu
Mark Dronet	Assistant Fire Chief	Biloxi Fire	228-435-6200	MDRONET@BILOXI.MS.US
Robert Jones	Chief Gautier FD	Gautier FD	228-497-1656	rjones@gautier-ms.gov
Wayne Miller	Director of Public Works	City of Gulfport	228-868-5740	wmiller@gulfport-ms.gov

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Name	Title	Organization	Phone Number	E-mail Address
Shad Jeanfreau	Building official	Pass Christian	228-547-6374	shad@ci.pass-christian.ms.us
Carolyn Woodcock	Safety officer	Harrison County	228-1669-2954	cwoodcock@co.harrison.ms.us
Christy Lebatard	Dir. of Eng.	City of Biloxi	228-435-6269	clebatard@biloxi.ms.us
NATE Wilson	EMA Director	Ocean Springs	228-381-0625	nwilson@oceanspringsms.gov
Kristyn Gunter	Business Dvlp Mgr	Southern MS PDD	228-323-2584	kgunter@smpdd.com
Danny Manley	PRC	EMA	601-273-1394	dmanley@pearlrivercounty.net
Bruce Wilkerson	Operations officer HCEMA	EMA	(228) 865-4002	bwilkerson@co.harrison.ms.us
Loretta Robinson	MEMA planner	MEMA	228 594 3121	lrobinson@memams.gov
John A Emmer	Dep EMA Dir	Hancock Co EMA	228-493-7813	hcemaz@att.net

ATKINS

MEMA District 9 Regional Hazard Mitigation Plan
Hazard Mitigation Council Meeting

December 13, 2016

10:00AM-12:00PM

Name	Title	Organization	Phone Number	E-mail Address
Rupert H. Lacy	Director	Harrison Co EMA	228 865 4002	rupertlacy@co.harrison.ms.us
Vicki Watkins	CRS Coordinator	City of Diberville	228.273.3324	vwatkins@diberville.ms.us
Jeanna Ritchie	EFM, Planning	Pearl River Co.	601-403-2202	tritchie@pearlrivercounty.net
Keith Brown	Fire Chief	City of Picayune	601-798-6513	kbrown@picayune.ms.us
Robert Jones	Fire Chief	City of Gautier	228-497-1656	rjones@gautier-ms.gov
Hank Rogers	Building Official	City of Diberville	228.392.7266 ext 1024	hrogers@diberville.ms.us
NATE WILSON	EMA Director Deputy Fire chief	Ocean Springs	228-381-0625	nwilson@oceanspringsms.gov
Loretta Robinson	MEMA	MEMA	228-594-3128	lrobinson@mema.ms.gov

ATKINS

Name	Title	Organization	Phone Number	E-mail Address
Donald Langham	Emergency Management	Jackson County	228-769-3111	donald_langham@co.jackson.ms.us
Raven James	Director	Stone Co.	601-928-3077	rjames@stonecountyms.gov
Danny Manley	"	Pearl River	601-273-1394	dmanley@pearlrivercounty.net
WAYNE MILLER	DIRECTOR OF PUBLIC WORKS	GULFPORT	228-868-5740	Wmiller@gulfport-ms.gov
Nancy Smith	EMA Director	George	601-947-7557	emadirector@georgecountyms.gov
Shad Jeanfreau	Building Official	City of Pass-Christian	228-452-3306	shad@ci.pass-christian.ms.us
Kristyn Gunter	Business Outreach Div. Director	Southern MS Planning + Dev. District	228-323-2584	kgunter@smpdd.com

MEMA District 9 Regional Hazard Mitigation Plan
Harrison County Meeting

February 8, 2017
10:00AM-12:00PM

Name	Title	Organization	Phone Number	E-mail Address
Matthew Jalufka	Emergency Manager Keesler AFB	Keesler Office of Emergency Management	377-4847	matthew.jalufka.1.ctr@us.af.mil
Kenneth McDowell	Safety Officer	Memorial Hospital	228 323-1436	Kmcdowell@mhg.com
Dusty Reed	Harrison Co GIS	Harrison Co	228 865-4064	DLReed@co.harrison.ms.us
JOHN MCFARLAND	EXEC DIR	AMERICAN RED CROSS	228-229-2189	John.Mcfarland2@redcross.org
CATHY GARNER	SECURITY DIRECTOR	Schools Harrison County	228-539-6538	cgarner@harrison.k12.ms.us
THOMAS CLIFFORD	MAJOR H.C.S.O.	H.C.S.O.	896-0615	Tom.Clifford@HARRISON COUNTY SHERIFF
Bill PATRICK	BUREAU DIR. MIT PLANS MEMA	MEMA	6012017734	bpatrick@mema.ms.gov
Kelvin Jack	Planner	HCZoning	831 3367	

ATKINS

Name	Title	Organization	Phone Number	E-mail Address
Pat Sullivan	Fire Marshal	Harr. Co. Fire	228-518-2038	psullivan@co.harrison.ms.us
Tommy Murphy	Coast Div Mgr	MPC	228 324-5140	TLMURPHY@southern[illegible].com
Robyn L. Ladner	Safety officer	HC	228-669-9910	rladner@co.harrison.ms.us
Carolyn Woodcock	Safety Officer 5	HC BOS	228-6669-2954	cwoodcock@co.harrison.ms.us
Jody Spires	ENGINEER	HC	228-297-8714	jspires@co.harrison.ms.us
Loretta Robinson	Planner	MEMA	228-594-3127	lrobinson@mema.ms.gov
Michelle Crowley	B/C Safety + Health	Biloxi Fire	228-697-7900	mcrowley@biloxi.ms.us ~~[illegible]~~
DAVID KINGMAN	GAMING AGENT DIRECTOR	MS GAMING COMMISSION	(228) 386-4920	dkingman@mgc.state.ms.us
Michelle Watts	Admin. Asst./OPS Harr. Co. EMA	EMA	(228)865-4002	mwatts@co.harrison.ms.us
Fred Garofo	VP Admin	MHG	865 3407	

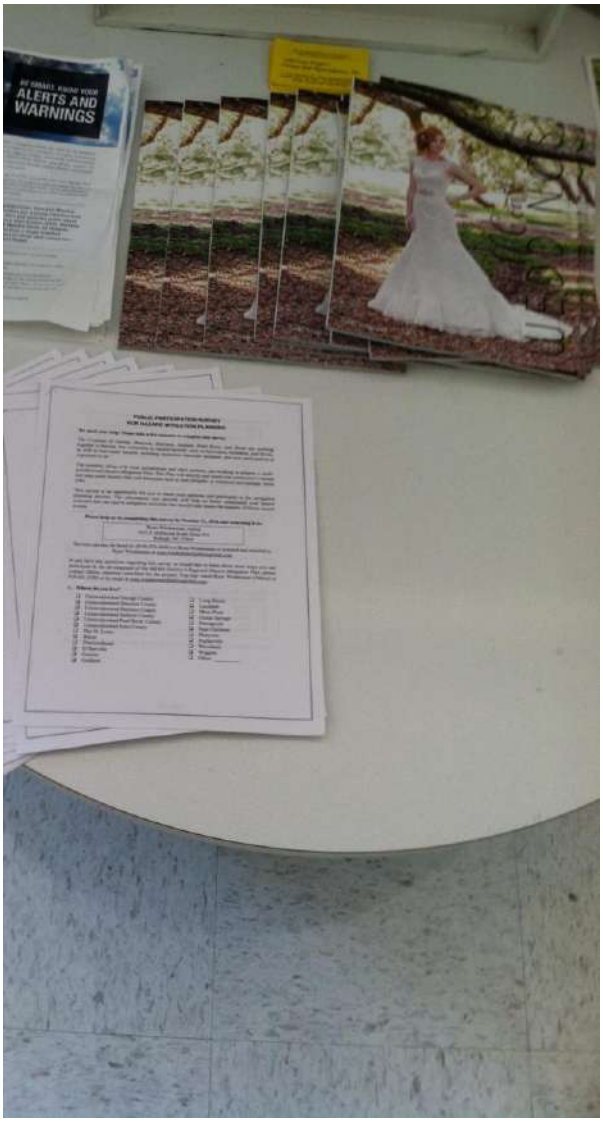
ATKINS

Name	Title	Organization	Phone Number	E-mail Address
Bruce Wilkerson	Operations Officer	HCEMA	(228) 865-4002	bawilkerson@co.harrison.ms.us
[illegible]	Director Haz mat.	HCEMA	228-865-4002	RuperTracy@co.harrison.ms.us

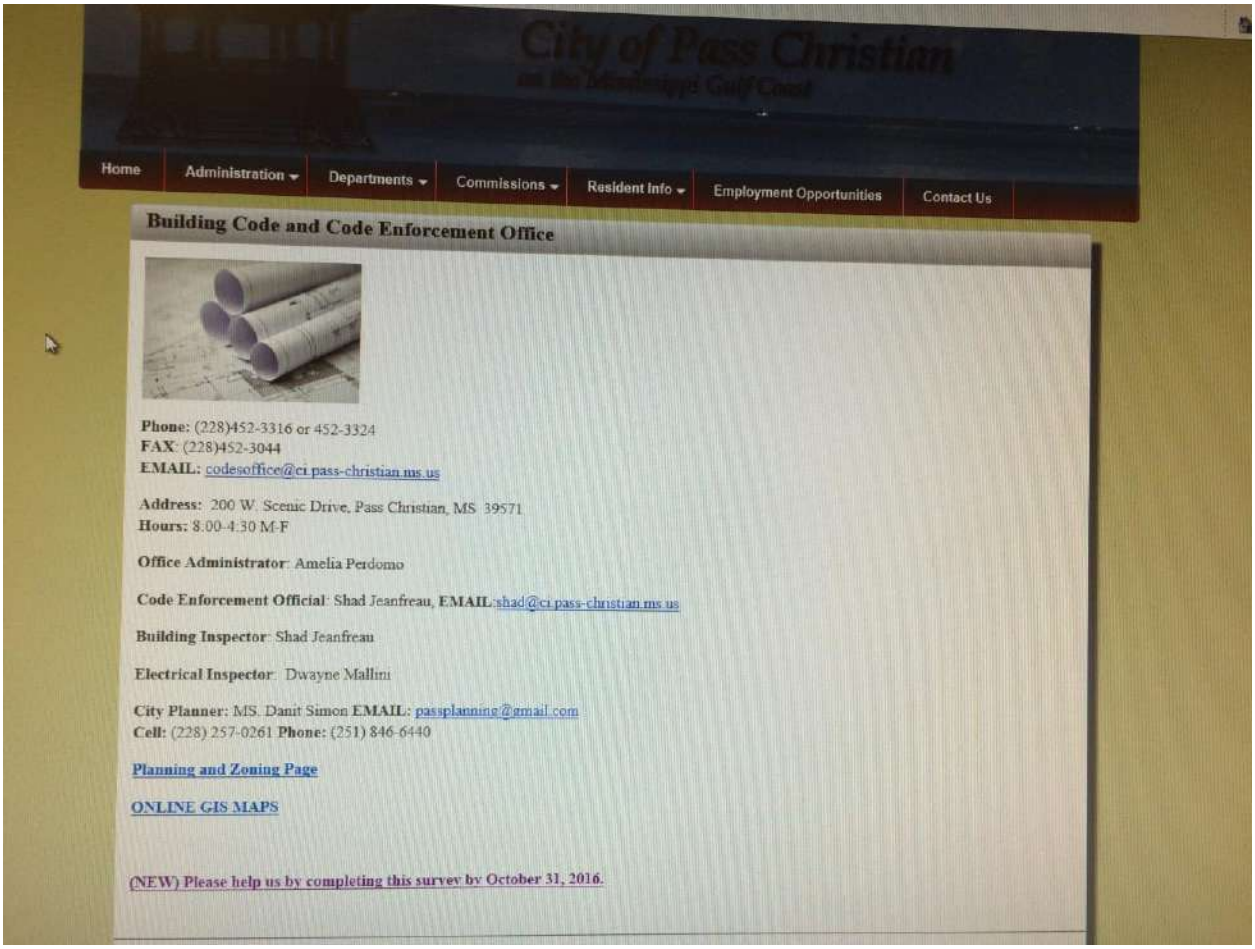
ATKINS

Public Survey Advertisements

Harrison County



Pass Christian



City of Pass Christian
on the Mississippi Gulf Coast

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Building Code and Code Enforcement Office

Phone: (228)452-3316 or 452-3324
FAX: (228)452-3044
EMAIL: codesoffice@ci.pass-christian.ms.us

Address: 200 W. Scenic Drive, Pass Christian, MS 39571
Hours: 8:00-4:30 M-F

Office Administrator: Amelia Perdomo

Code Enforcement Official: Shad Jeanfreau, **EMAIL**:shad@ci.pass-christian.ms.us

Building Inspector: Shad Jeanfreau

Electrical Inspector: Dwayne Mallini

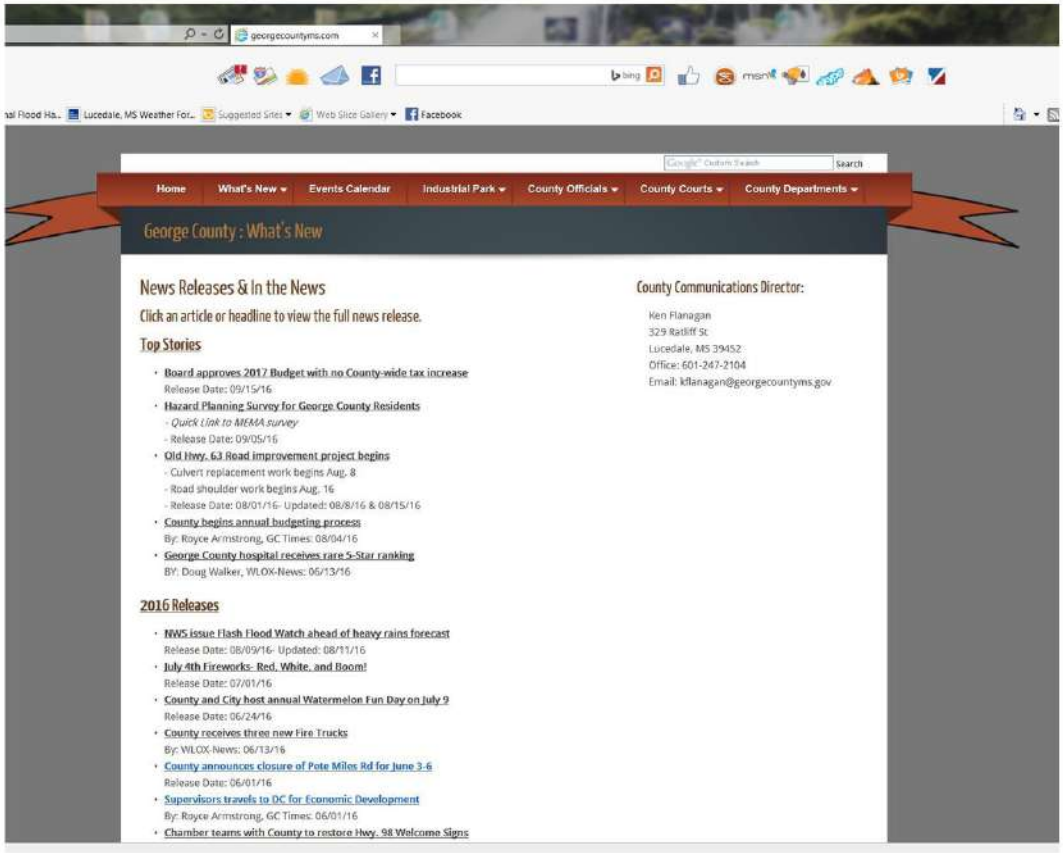
City Planner: MS. Danit Simon **EMAIL:** passplanning@gmail.com
Cell: (228) 257-0261 **Phone:** (251) 846-6440

Planning and Zoning Page

ONLINE GIS MAPS

(NEW) Please help us by completing this survey by October 31, 2016.

George County



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George County MS Emergency Management

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Morris Smith

Write a comment...

George County MS Emergency Management
Published by Nancy Howell Smith [?] · August 31 at 9:43am ·

PUBLIC PARTICIPATION SURVEY
FOR HAZARD MITIGATION PLANNING

We need your help! Please take a few minutes to complete this survey.

The Counties of George, Hancock, Harrison, Jackson, Pearl River, and Stone are working together to become less vulnerable to natural hazards, such as hurricanes, tornadoes, and floods, as well as man-made hazards, including hazardous materials incidents, and your participation is important to us.

The counties, along with local jurisdictions and other partners, are working to prepare a multi-jurisdictional Hazard Mitigation Plan. This plan will identify and assess our community's natural and man-made hazard risks and determine how to mitigate, or minimize and manage, those risks.

This survey is an opportunity for you to share your opinions and participate in the mitigation planning process. The information you provide will help us better understand your hazard concerns and can lead to mitigation activities that should help lessen the impacts of future hazard events.

Please click on the link below to complete the survey. Thank you.

http://www.surveygizmo.com/.../Public-Participation-Survey-fo...

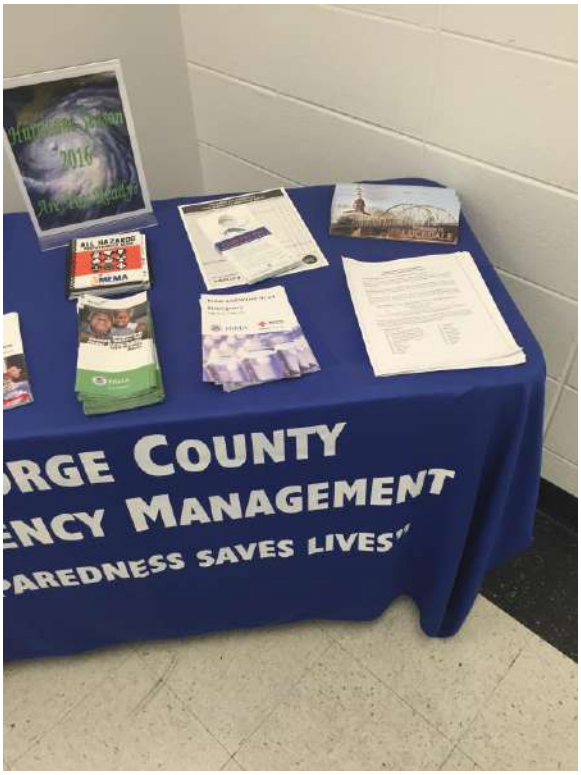
1,552 people reached | Boost Post

Like | Comment | Share

Morris Smith, Lori Knott Musa and 8 others | Chronological

19 shares

George County MS Emergency Management Please Share. Thank you!!!
Like · Reply · 1 · Commented on by Nancy Howell Smith [?] · August 31 at


ALL HAZARDS
MEMA
RGE COUNTY
ENCY MANAGEMENT
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GEORGE
COUNTY FAIR
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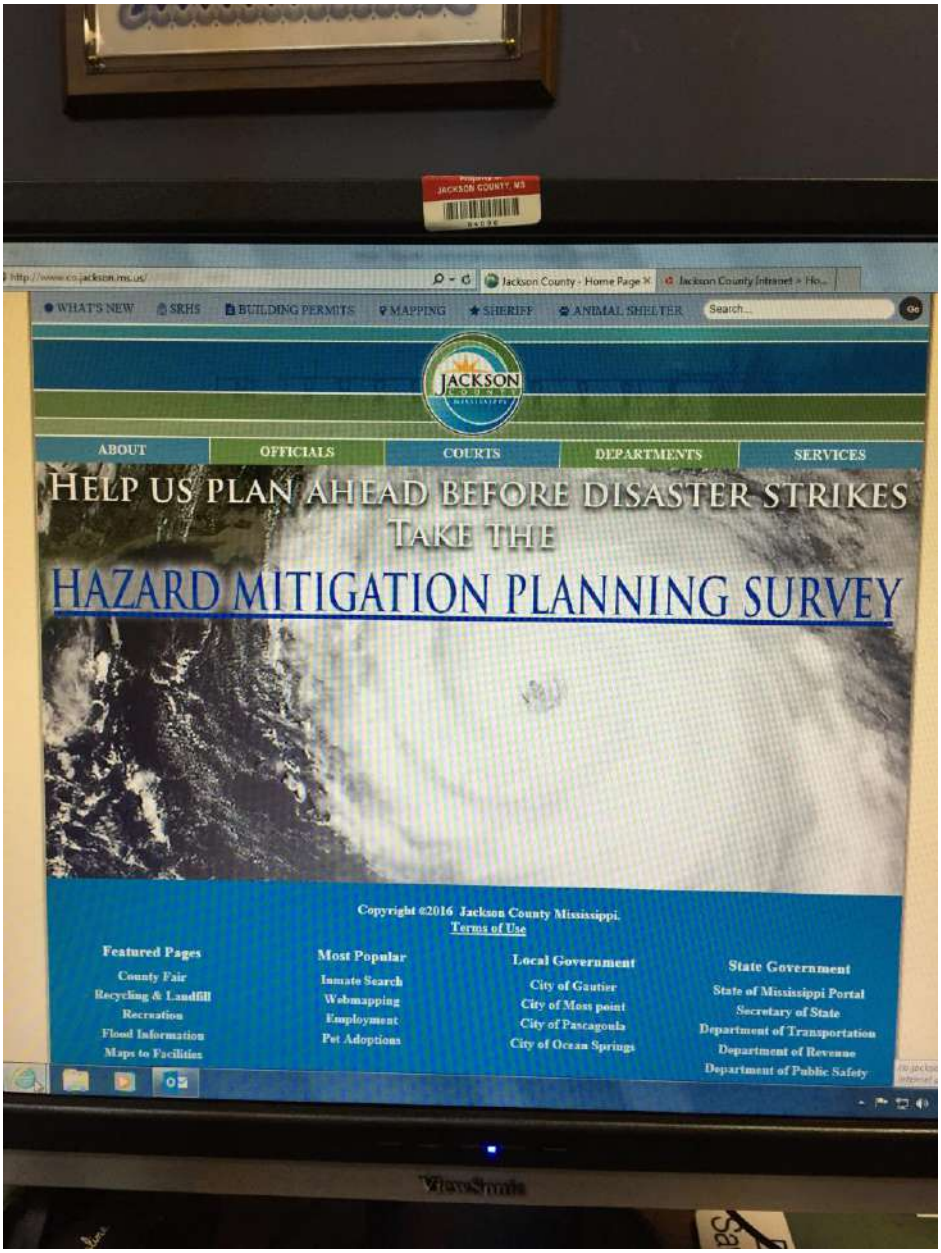
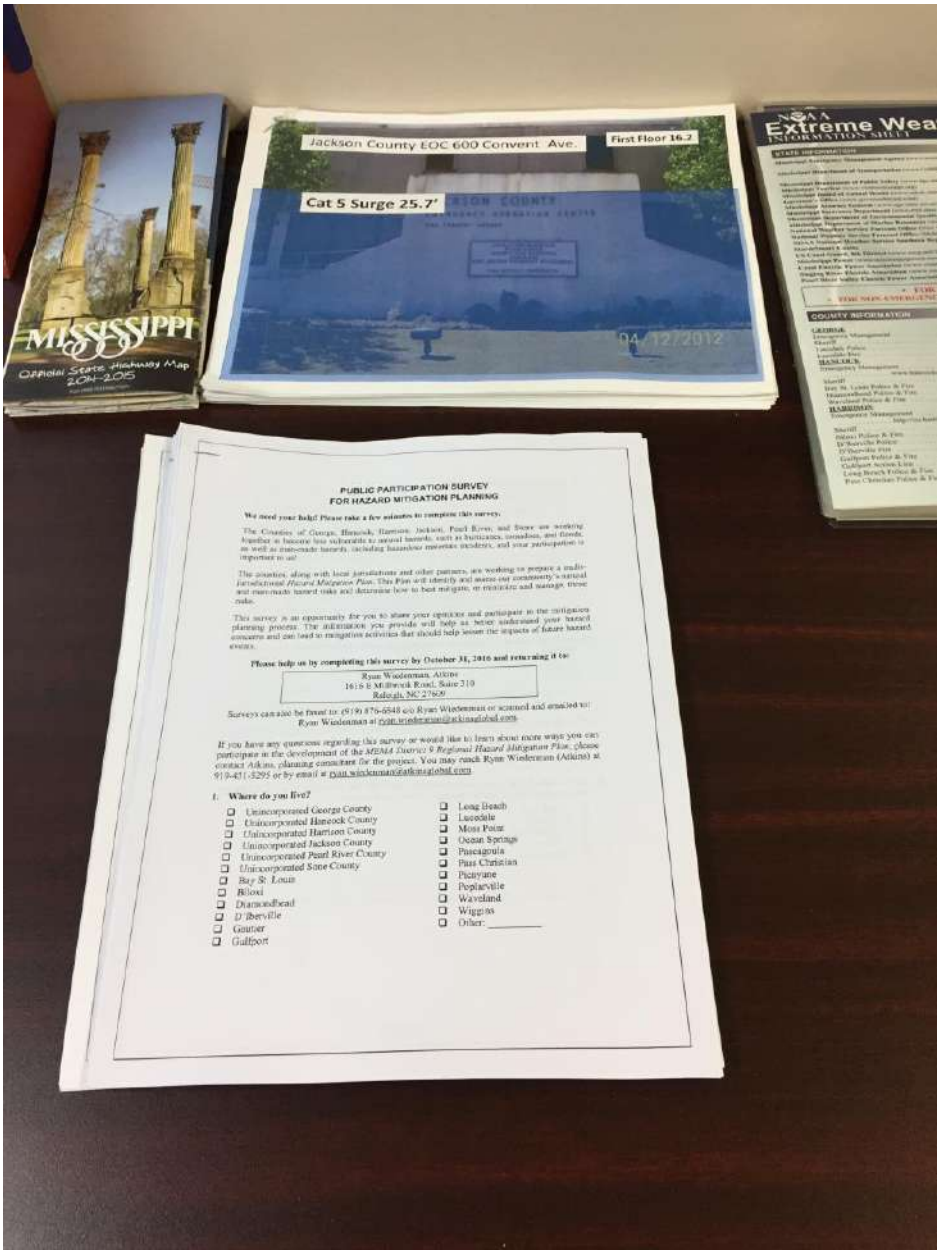
GEORGE COUNTY HOSPITAL
1940

Jackson County





PUBLIC PARTICIPATION SURVEY
FOR HAZARD MITIGATION PLANNING

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The Counties of George, Hancock, Harrison, Jackson, Pearl River, and Stone are working together to become less vulnerable to natural hazards, such as hurricanes, tornadoes, and floods, as well as man-made hazards, including hazardous materials incidents, and your participation is important to us!

The counties, along with local jurisdictions and other partners, are working to prepare a multi-jurisdictional *Hazard Mitigation Plan*. This Plan will identify and assess our community's natural and man-made hazard risks and determine how to best mitigate, or minimize and manage, these risks.

This survey is an opportunity for you to share your opinions and participate in the mitigation planning process. The information you provide will help us better understand your hazard concerns and can lead to mitigation activities that should help lessen the impacts of future hazard events.

Please help us by completing this survey by October 31, 2016 and returning it to:

Ryan Wiedenman, Atkins
1616 E Millbrook Road, Suite 310
Raleigh, NC 27609

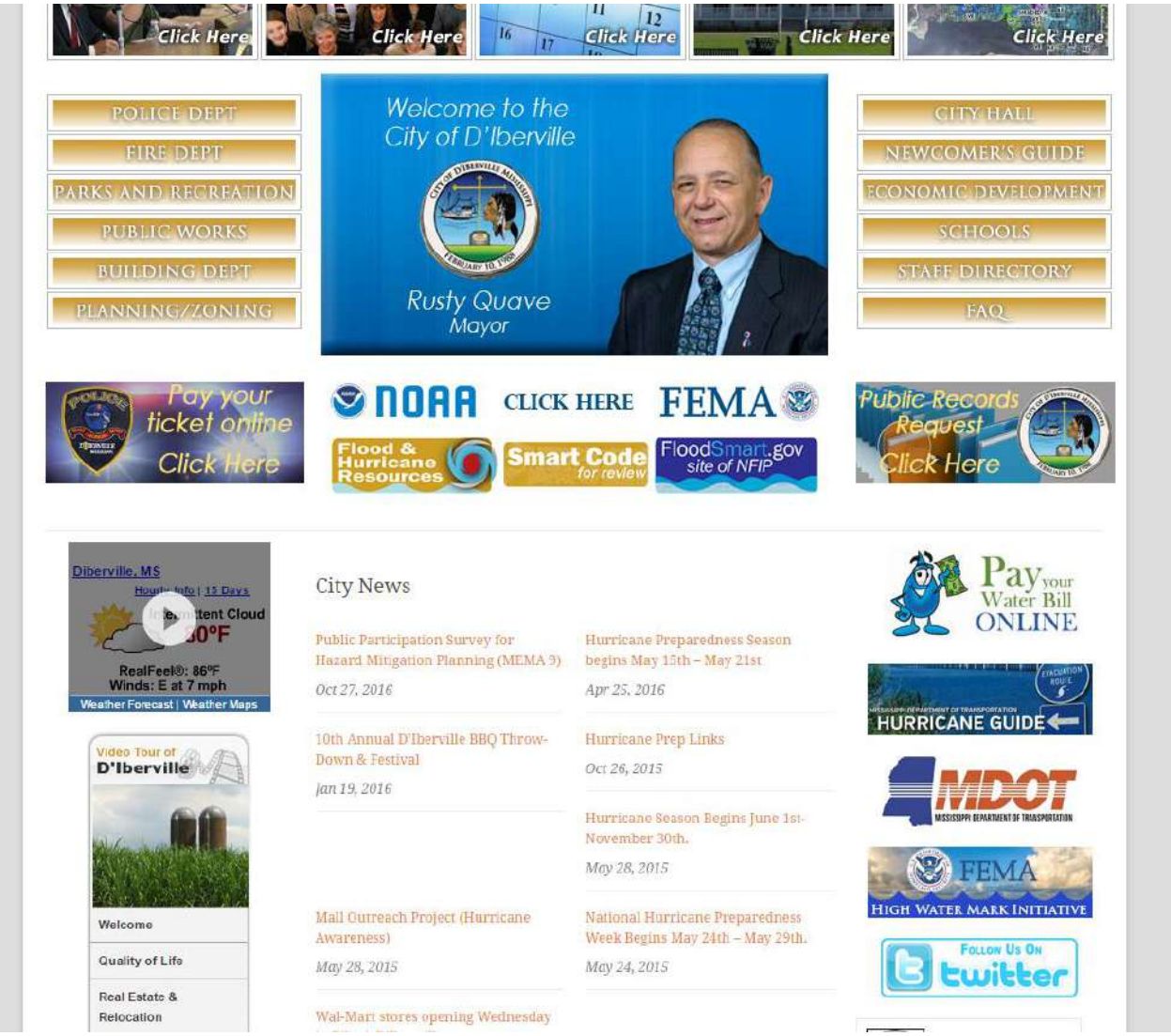
Surveys can also be faxed to: (919) 876-6848 c/o Ryan Wiedenman or scanned and emailed to: Ryan Wiedenman at ryan.wiedenman@atkinsglobal.com.

If you have any questions regarding this survey or would like to learn about more ways you can participate in the development of the MEMA District 8 Regional Hazard Mitigation Plan, please contact Atkins, planning consultant for the project. You may reach Ryan Wiedenman (Atkins) at 919-431-3295 or by email @ ryan.wiedenman@atkinsglobal.com.

1. Where do you live?

- ☐ Unincorporated George County
- ☐ Unincorporated Hancock County
- ☐ Unincorporated Harrison County
- ☐ Unincorporated Jackson County
- ☐ Unincorporated Pearl River County
- ☐ Unincorporated Stone County
- ☐ Bay St. Louis
- ☐ Biloxi
- ☐ Diamondhead
- ☐ D'Iberville
- ☐ Gautier
- ☐ Gulfport
- ☐ Long Beach
- ☐ Lucedale
- ☐ Moss Point
- ☐ Ocean Springs
- ☐ Pascagoula
- ☐ Pass Christian
- ☐ Picayune
- ☐ Poplarville
- ☐ Waveland
- ☐ Wiggins
- ☐ Other: _____

City of D'Iberville



CITY OF D'IBERVILLE

Announcements: Applications are being accepted for Firefighter I (Recruit) Vacancy. Entry level position. Requirements: high school diploma, ability to pass physical agility and written exams, ability to lift 100 lbs and drag 165 lbs and current driver's license. Applications will be taken through 11/1/16. EOE.

Public Participation Survey for Hazard Mitigation Planning (MEMA 9)

October 27, 2016 by andrew 0 Comment

The City of D'Iberville is working with a number of counties and communities in the MEMA District 9 Region to develop a hazard mitigation plan which will act as a guide for our community to become less vulnerable to natural hazards, such as hurricanes, tornadoes, and floods. Your participation in this process is important to us and this survey is an opportunity for you to share your opinions and participate in the planning process. The information you provide will help us better understand your hazard concerns and can lead to mitigation activities that should help lessen the impacts of future hazard events. The survey is located on our Flood Management page.

CLICK HERE TO ACCESS THE SURVEY

City of Waveland

Pearl River County

Welcome to Pearl River Co...

Pearl River County Mississippi

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PEARL RIVER COUNTY

- Board of Supervisors
- Administration
- Chancery Clerk
- Circuit Clerk
- Data Processing
- E-911 Addressing
- Extension Office
- Emergency Management
- Justice Court
- Mapping/GIS
- Planning and Development
- Road
- Sheriff
- Tax Assessor/Collector

LIVING IN PEARL RIVER COUNTY

- Education
  - County School District
  - Picayune Schools
  - Poplarville Schools
  - Pearl River Community College
- Hospitals
  - County Hostpital
- Chambers of Commerce
  - Poplarville
  - Picayune
  - Partners for Pearl River County
- Pearl River Library System
- County SPCA
- Volunteer Fire Departments
- Cities
  - Poplarville
  - Picayune

STATE OF MISSISSIPPI

- Tenth District Chancery

Welcome to Pearl River County!

We need your help! Please take a few minutes to complete this survey.

Pearl River County was officially organized by an act of the Legislature in February, 1890, on lands taken from Marion and Hancock Counties.
The land area of the new county had earlier been a part of the short-lived Pearl County. Pearl County was officially formed in 1872. The county courthouse was located in a Masonic building which burned not long after the county was formed, destroying all its early records. Because of financial problems, a sparse population and a limited tax base, Pearl County was abolished in 1878 and the land was returned to Marion and Hancock Counties.
Prior to the establishment of Pearl River County, a rail line, the New Orleans and Northeastern, was built through the area, and it aided greatly the area's population growth.
Pearl River County's seat of government, Poplarville, was named after "poplar" Jim Smith, who had owned the land on which it was located. Incorporated March 4, 1886, Poplarville boasted 236 residents in 1890 when Pearl River County was formed. The first Pearl River County courthouse was built in l892 at a cost of $8,298. The original courthouse later housed the Pearl River County Hospital and then offices of the county welfare department.
The first school in the county opened in Lumberton in 1890, and two years later, a school opened at Poplarville.
In 1900, the young county suffered a setback when residents of one of its two main towns, Lumberton, voted to become a part of neighboring Lamar County. How- ever, in 1908 it received a tremendous boost when an area approximately one- third the size of the original Pearl River County was taken from Hancock County and added to it. With the addition of this new territory, Pearl River County reached its present size of 828 square miles, making it the fourth largest of Mississippi's 82 counties.
Included in the added territory was the town of Picayune. Incorporated September, 30,1904, Picayune had a population of 846 by 1910, and it has since become Pearl River County's largest city.
In 1907, a young lawyer-minister-farmer from Pearl River County, Theodore Gilmore Bilbo, was elected to the Mississippi Senate, beginning a long political career which took him twice to the governors mansion and finally to a 12-year tenure in the United States Senate. History shows that Bilbo was an extremely progressive governor, and his first term (1916-1920)

Pearl River County Website
Pearl River County Board Minutes

SEARCH

Browse Board Minutes
County Employee Webmail

Welcome to Pearl River Co...

PUBLIC DOCUMENTS | SEND COMMENTS | PAY TAXES ONLINE | FLOOD INFORMATION | DIRECTORY

PEARL RIVER COUNTY

- Board of Supervisors
- Administration
- Chancery Clerk
- Circuit Clerk
- Data Processing
- E-911 Addressing
- Extension Office
- Emergency Management
- Justice Court
- Mapping/GIS
- Planning and Development
- Sheriff
- Tax Assessor/Collector

LIVING IN PEARL RIVER COUNTY

- Education
  - County School District
  - Picayune Schools
  - Poplarville Schools
  - Pearl River Community College
- Chambers of Commerce
  - Poplarville
  - Picayune
  - Partners for Pearl River County
- Pearl River Library System
- County SPCA
- Volunteer Fire Departments

STATE OF MISSISSIPPI

- Tenth District Chancery Court
- State of Mississippi
- Governor
- Senate
- Legislature
- House of Representatives
- Attorney General
- Treasury Department

NATIONAL

- US Government
- White House
- US Senate
- US House of

Emergency Management

Emergency Management Director and Fire Services Coordinator

Danny Manley

Office : 601 795 3058

Cell: 601 273 1394

Fax: 601 795 3074

Email: **dmanley@pearlrivercounty.net**

Communications Officer

David Moore

Office: 601 795 3058

Cell 601 916 3167

Email: **dmoore@pearlrivercounty.net** or

dmoore@prceoc.net

PUBLIC PARTICIPATION SURVEY
FOR HAZARD MITIGATION PLANNING

We need your help! Please take a few minutes to complete this survey.

The Counties of George, Hancock, Harrison, Jackson, Pearl River, and Stone are working together to become less vulnerable to natural hazards, such as hurricanes, tornadoes, and floods, as well as man-made hazards, including hazardous materials incidents, and your participation is important to us!

The counties, along with local jurisdictions and other partners, are working to prepare a multi-jurisdictional *Hazard Mitigation Plan*. This Plan will identify and assess our community's natural and man-made hazard risks and determine how to best mitigate, or minimize and manage, those risks.

This survey is an opportunity for you to share your opinions and participate in the mitigation planning process. The information you provide will help us better understand your hazard concerns and can lead to mitigation activities that should help lessen the impacts of future hazard events.

Please help us by completing this survey by October 31, 2016

Complete the Survey Online

Download and Mail the Survey

FEMA Disaster Declaration

Flood Recovery Information 3-30-2016

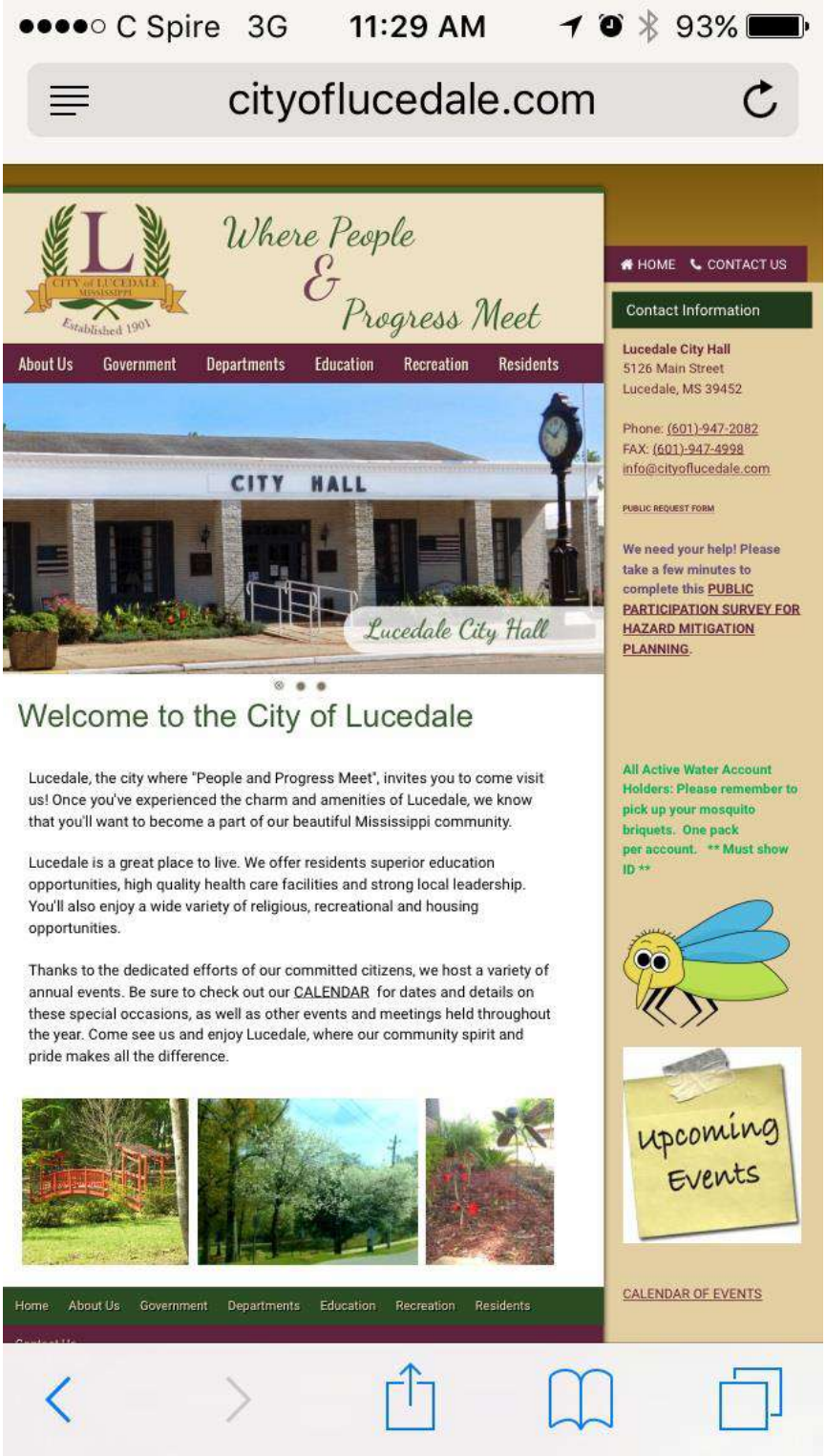
Pearl River County Website

Pearl River County Board Minutes

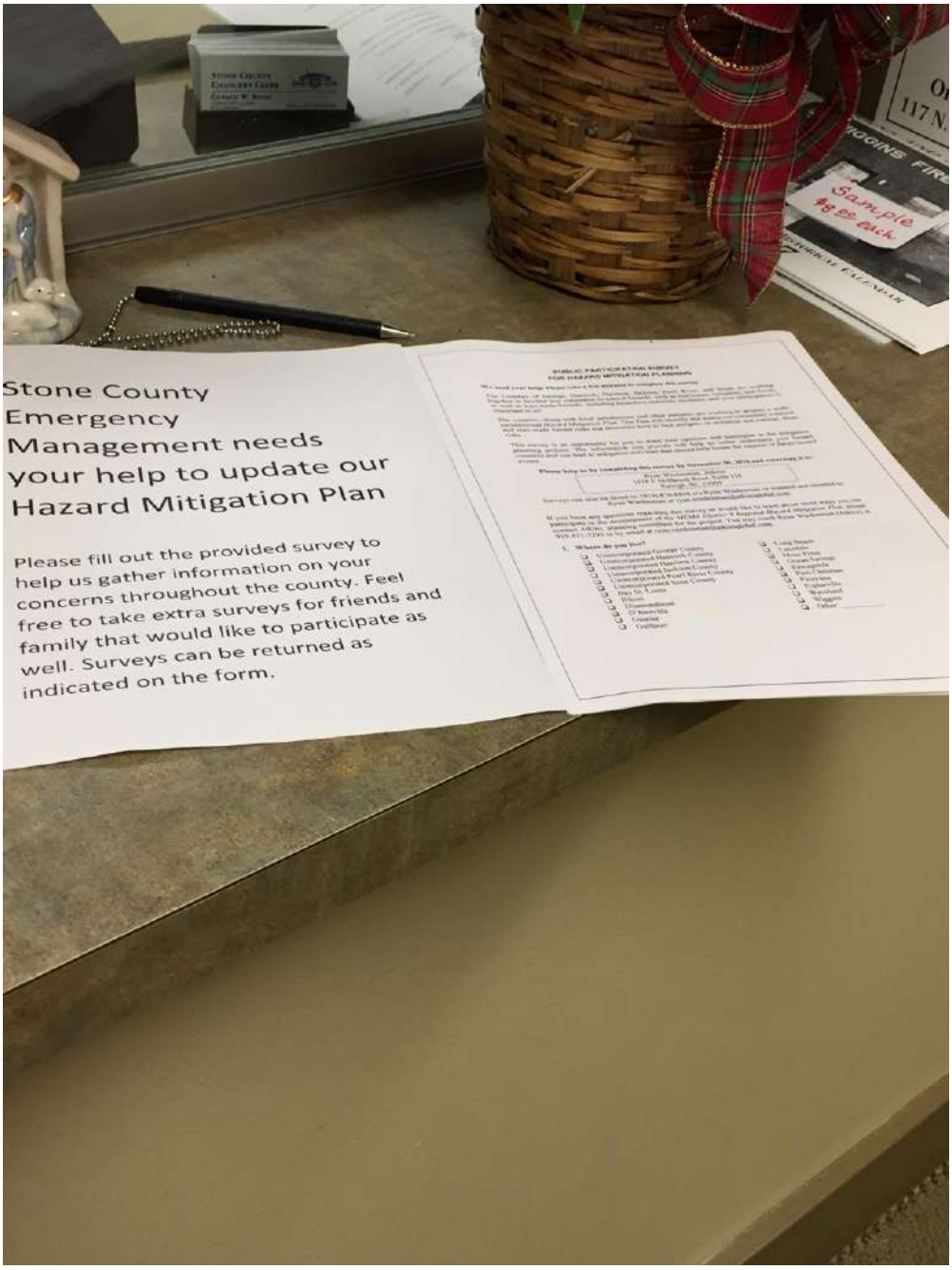
SEARCH

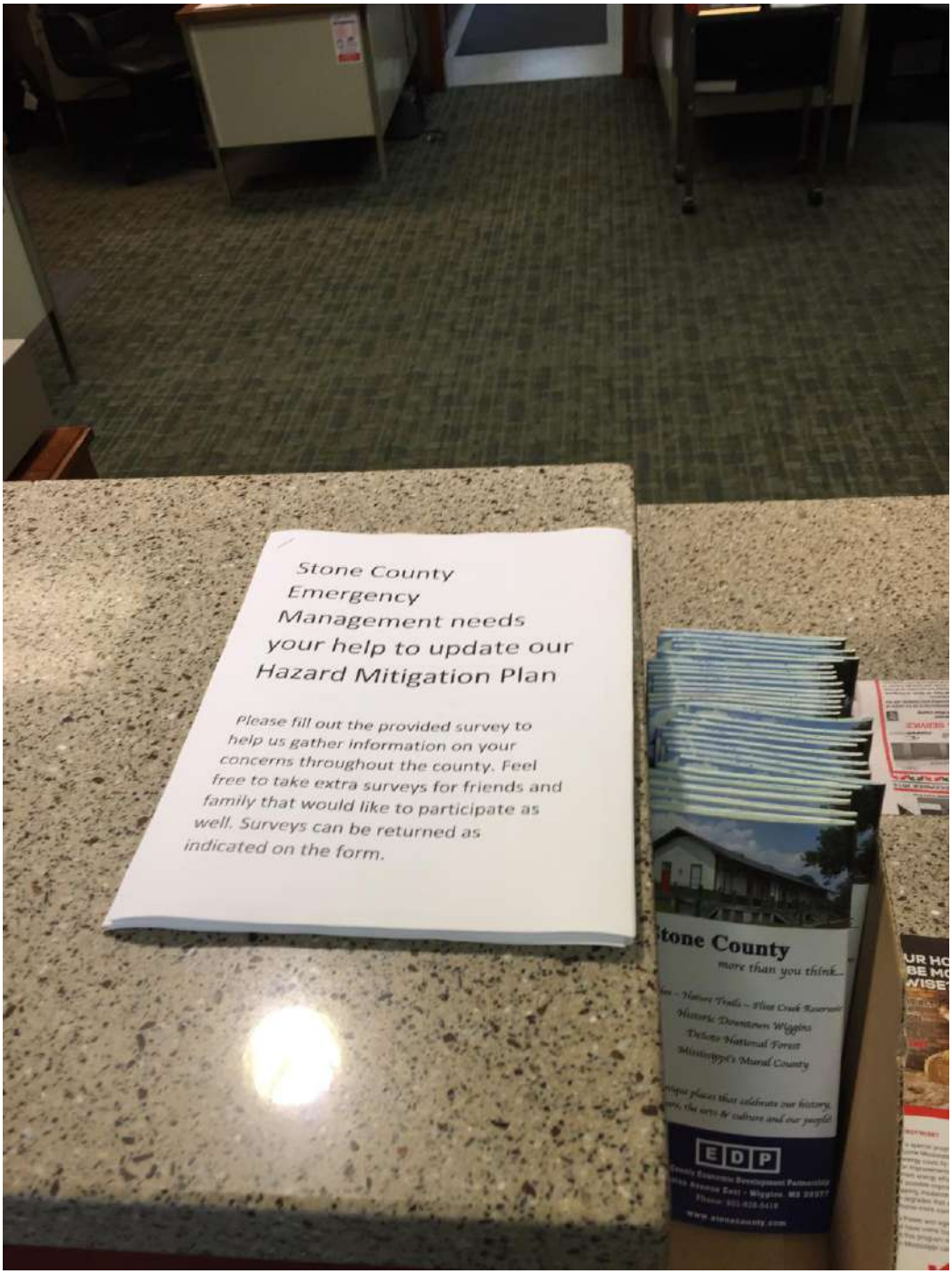
Browse Board Minutes

Lucedale

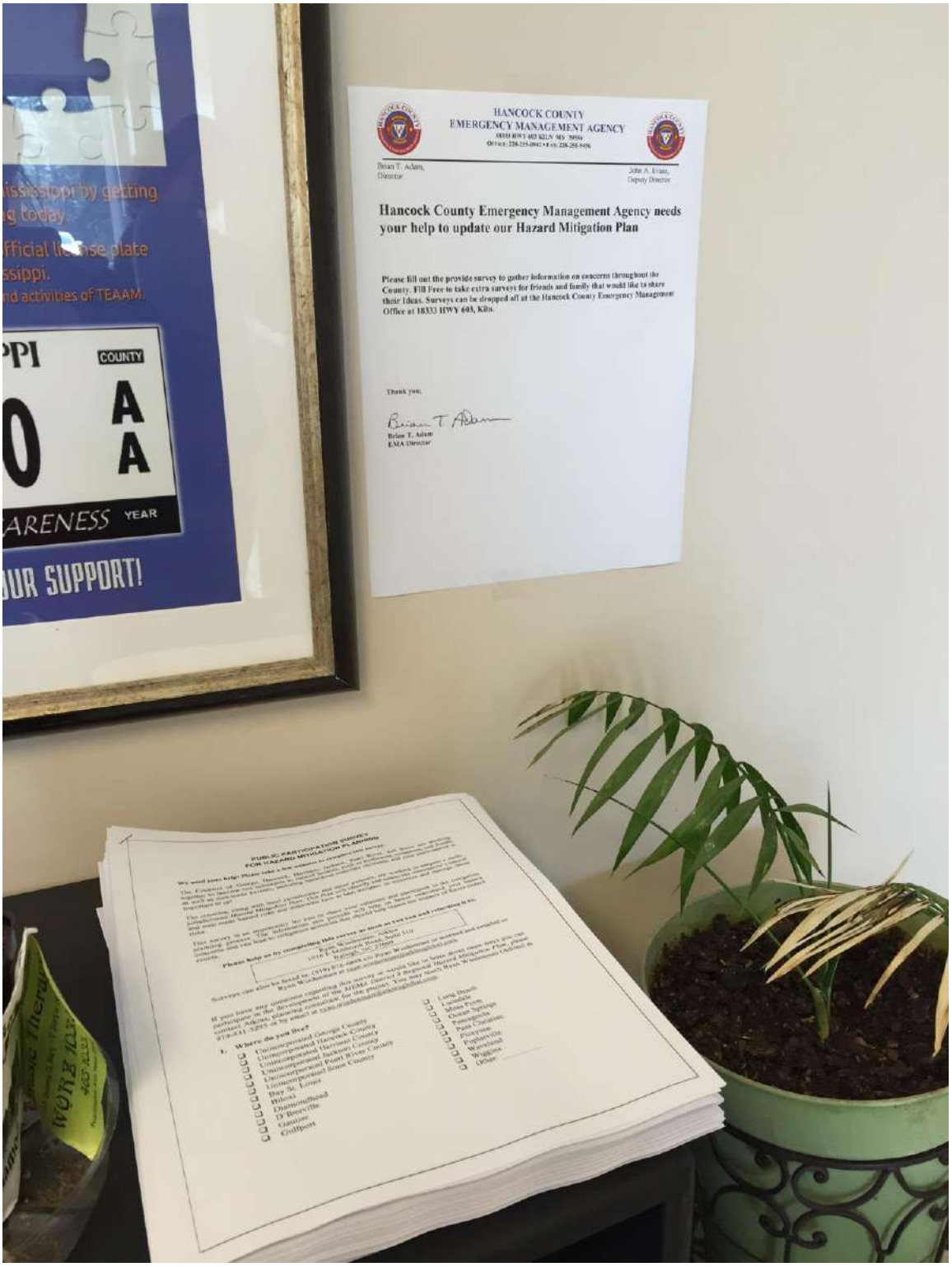

C Spire 3G 11:29 AM 93%
cityoflucedale.com
Where People & Progress Meet
Established 1901
About Us Government Departments Education Recreation Residents
CITY HALL
Lucedale City Hall
Welcome to the City of Lucedale
Lucedale, the city where "People and Progress Meet", invites you to come visit us! Once you've experienced the charm and amenities of Lucedale, we know that you'll want to become a part of our beautiful Mississippi community.
Lucedale is a great place to live. We offer residents superior education opportunities, high quality health care facilities and strong local leadership. You'll also enjoy a wide variety of religious, recreational and housing opportunities.
Thanks to the dedicated efforts of our committed citizens, we host a variety of annual events. Be sure to check out our CALENDAR for dates and details on these special occasions, as well as other events and meetings held throughout the year. Come see us and enjoy Lucedale, where our community spirit and pride makes all the difference.
Home About Us Government Departments Education Recreation Residents
HOME CONTACT US
Contact Information
Lucedale City Hall
5126 Main Street
Lucedale, MS 39452
Phone: (601)-947-2082
FAX: (601)-947-4998
info@cityoflucedale.com
PUBLIC REQUEST FORM
We need your help! Please take a few minutes to complete this PUBLIC PARTICIPATION SURVEY FOR HAZARD MITIGATION PLANNING.
All Active Water Account Holders: Please remember to pick up your mosquito briquets. One pack per account. ** Must show ID **
Upcoming Events
CALENDAR OF EVENTS

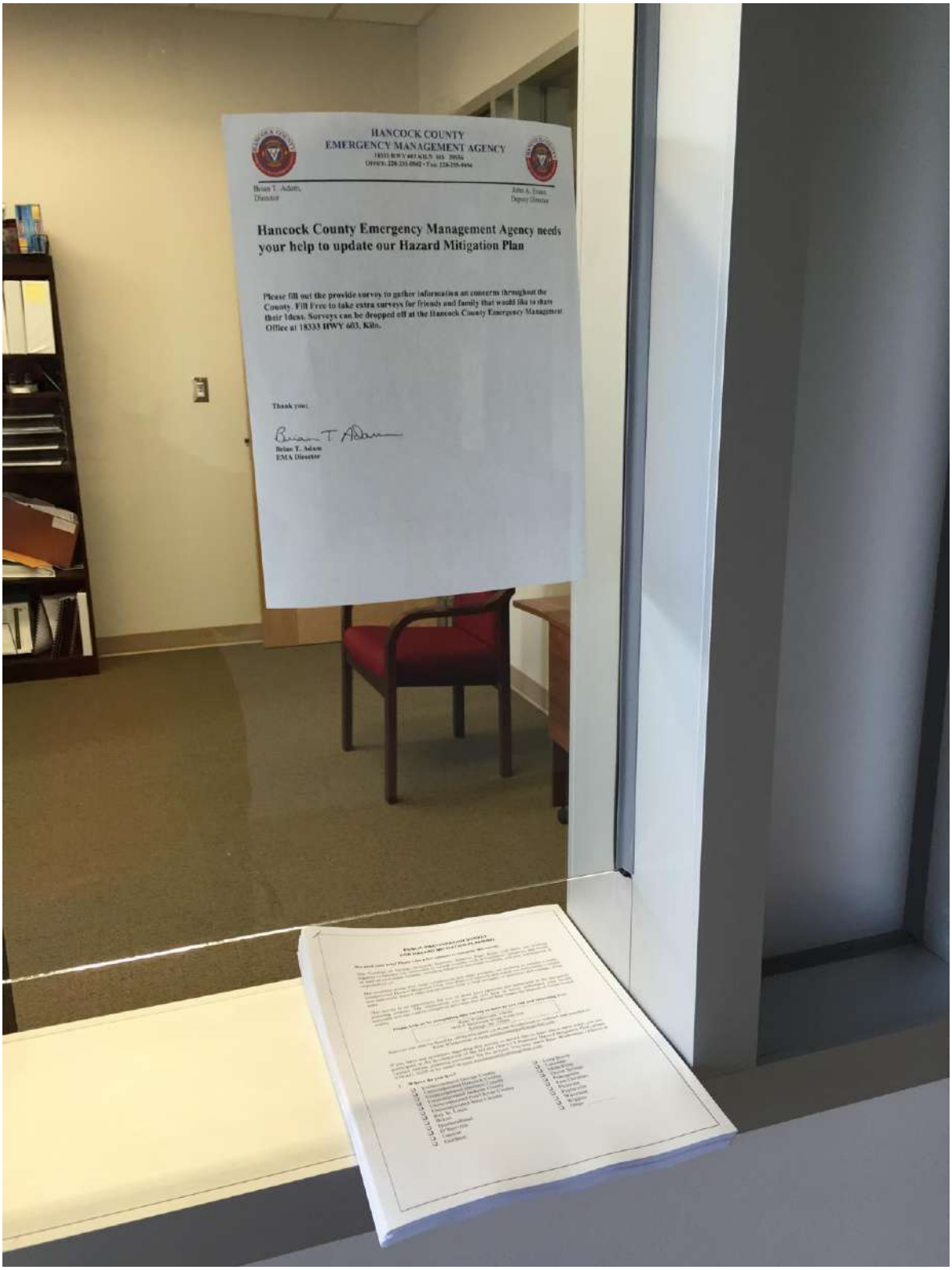
Stone County




Stone County
Emergency
Management needs
your help to update our
Hazard Mitigation Plan
Please fill out the provided survey to help us gather information on your concerns throughout the county. Feel free to take extra surveys for friends and family that would like to participate as well. Surveys can be returned as indicated on the form.
Stone County
more than you think...
Historic Downtown Wiggins
Delisle National Forest
Mississippi's Mural County
EDP

Hancock County




HANCOCK COUNTY
EMERGENCY MANAGEMENT AGENCY
Hancock County Emergency Management Agency needs your help to update our Hazard Mitigation Plan
Please fill out the provide surveys to gather information an concerns throughout the County. Fill Free to take extra surveys for friends and family that would like to share their Ideas. Surveys can be dropped off at the Hancock County Emergency Management Office at 18333 HWY 603, Kiln.
Thank you:
Brian T. Adam
EMA Director

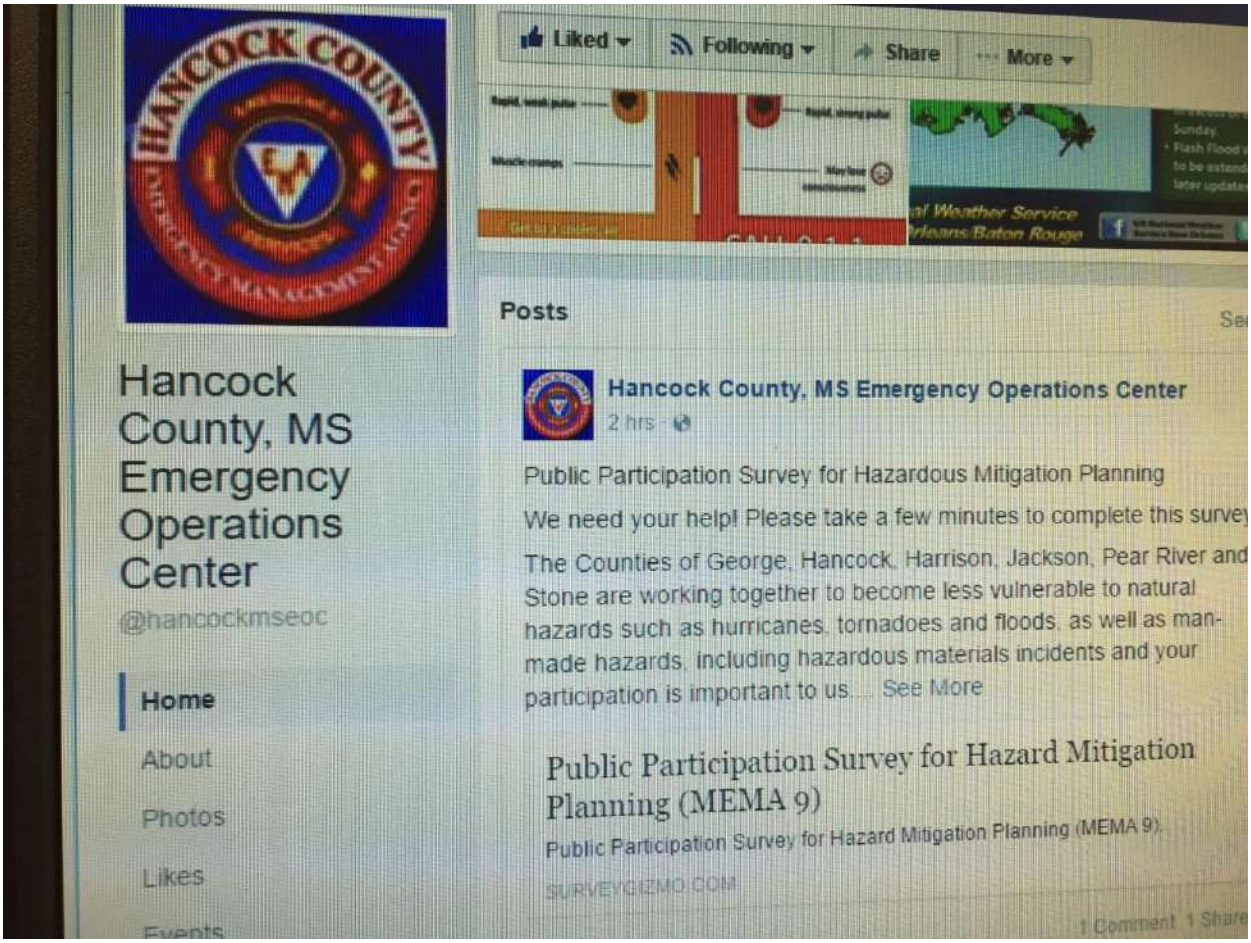

Liked
Following
Share
More
Hancock County, MS Emergency Operations Center
@hancockmseoc
Home
About
Photos
Likes
Events
Posts
Hancock County, MS Emergency Operations Center
2 hrs
Public Participation Survey for Hazardous Mitigation Planning
We need your help! Please take a few minutes to complete this survey
The Counties of George, Hancock, Harrison, Jackson, Pear River and Stone are working together to become less vulnerable to natural hazards such as hurricanes, tornadoes and floods, as well as man-made hazards, including hazardous materials incidents and your participation is important to us... See More
Public Participation Survey for Hazard Mitigation Planning (MEMA 9)
Public Participation Survey for Hazard Mitigation Planning (MEMA 9).
SURVEYGIZMO.COM
1 Comment 1 Share

Photo Source: FEMA Media Library

MEMA District 9
Regional Hazard Mitigation Plan

Public Participation Survey Results

ATKINS

Public Participation Survey

- Provides an opportunity for the public to share opinions and participate in the planning process
- Link to survey posted on county and city websites
- 538 completed surveys received

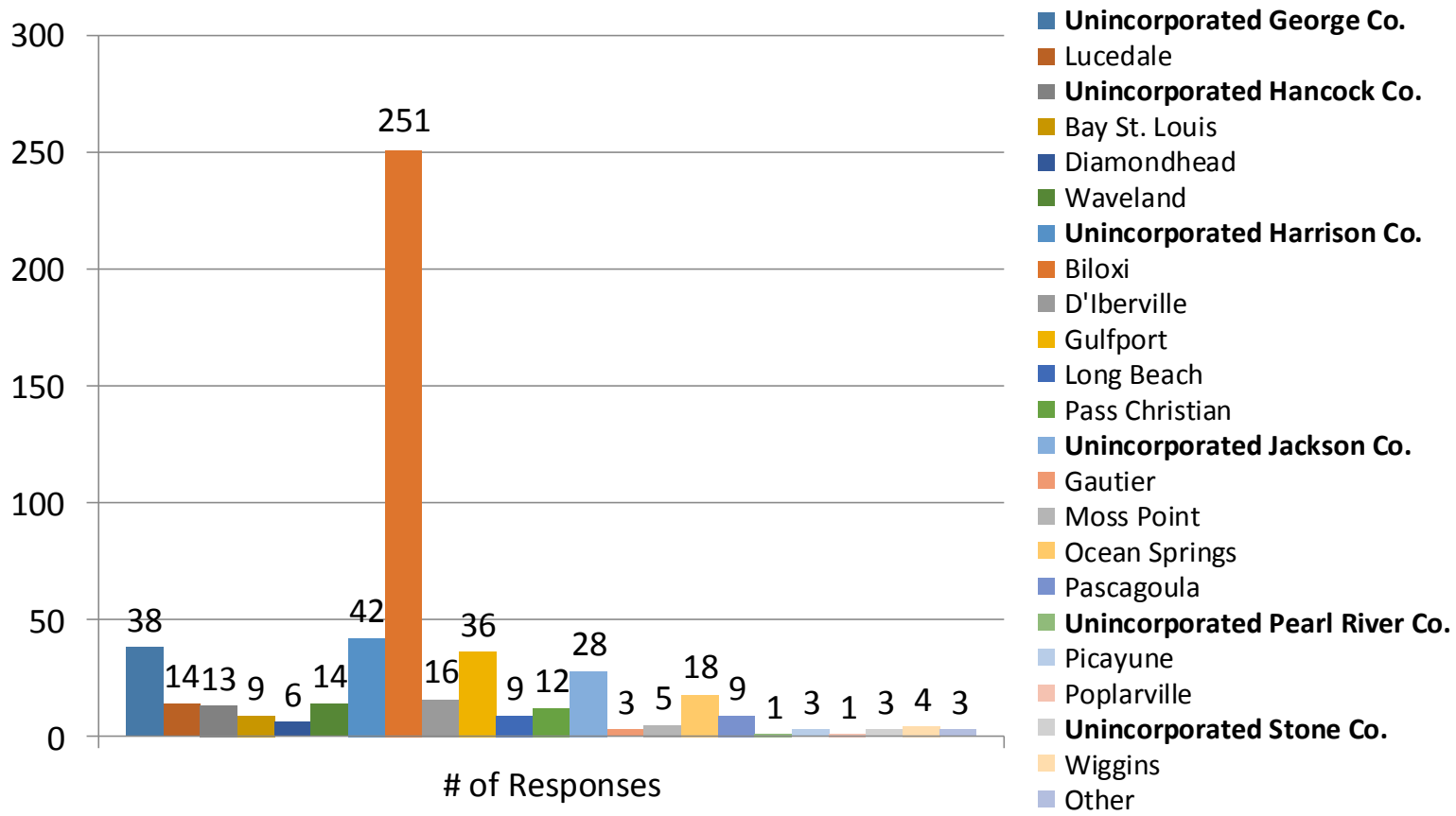
ATKINS

Public Participation Survey Highlights

- 88% of respondents are interested in making their homes safer from hazards
- 56% have already taken action to make their homes safer from hazards
- 32% do not who to contact regarding risks from hazards

ATKINS

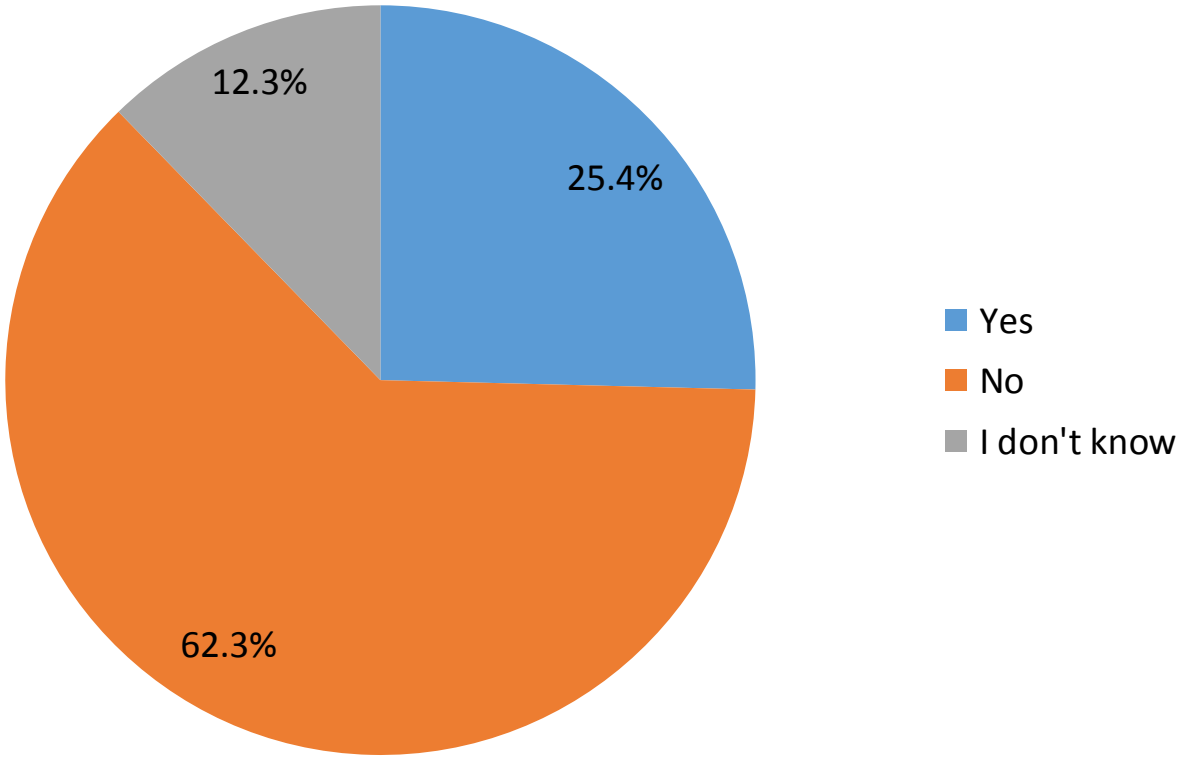
1. Where do you live?



"Other" responses:
-Madison, MS
-Coden, AL
-Jonesboro, AR

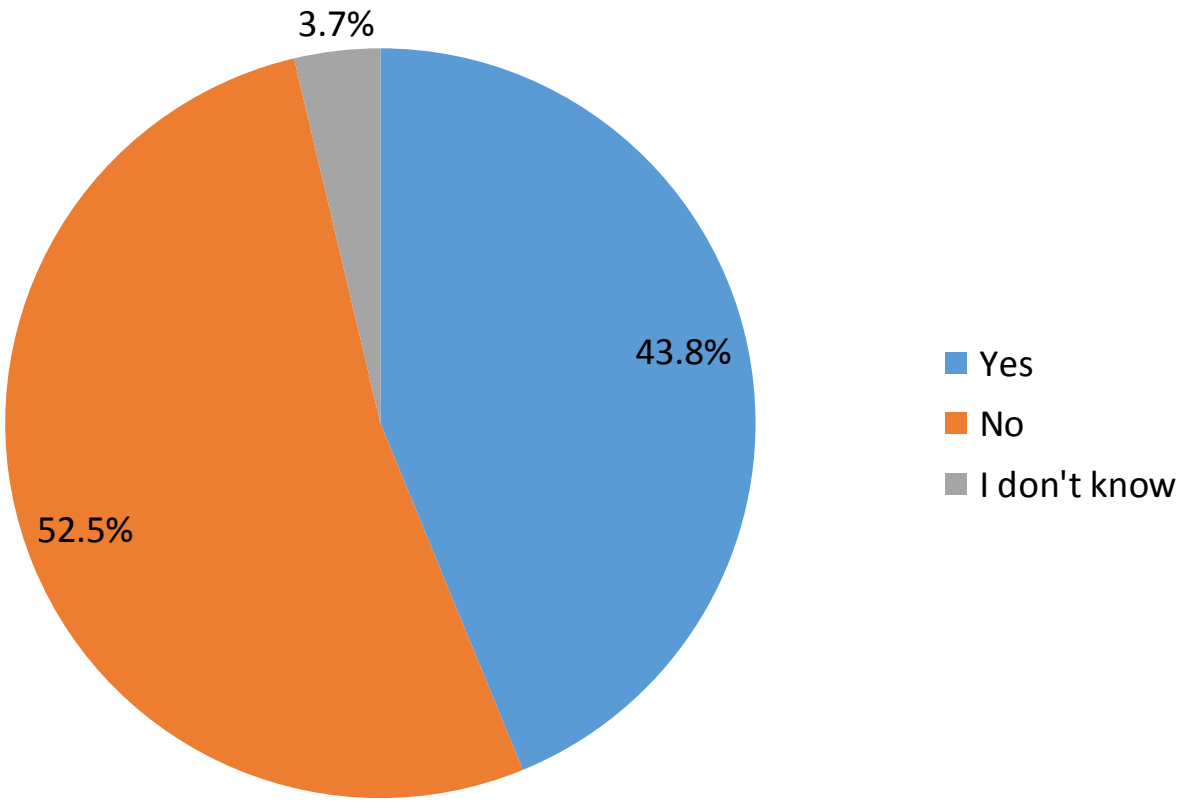
ATKINS

2. Is your home in a floodplain?



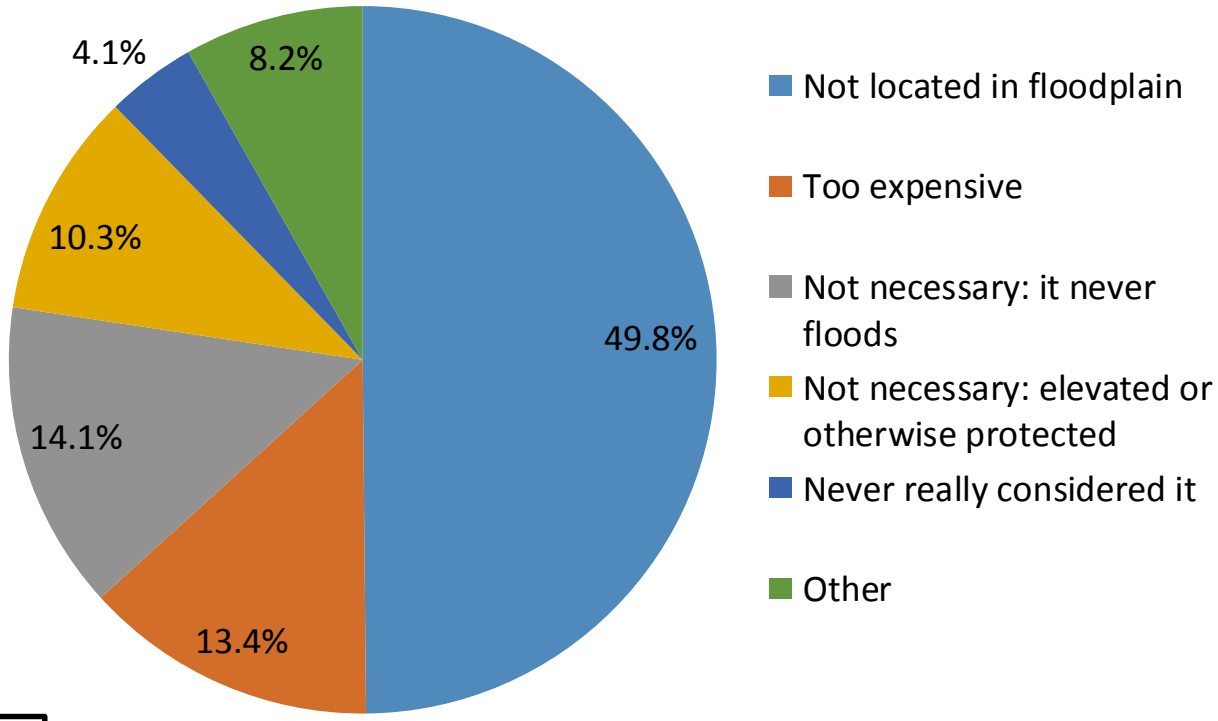
ATKINS

3. Do you have flood insurance?



ATKINS

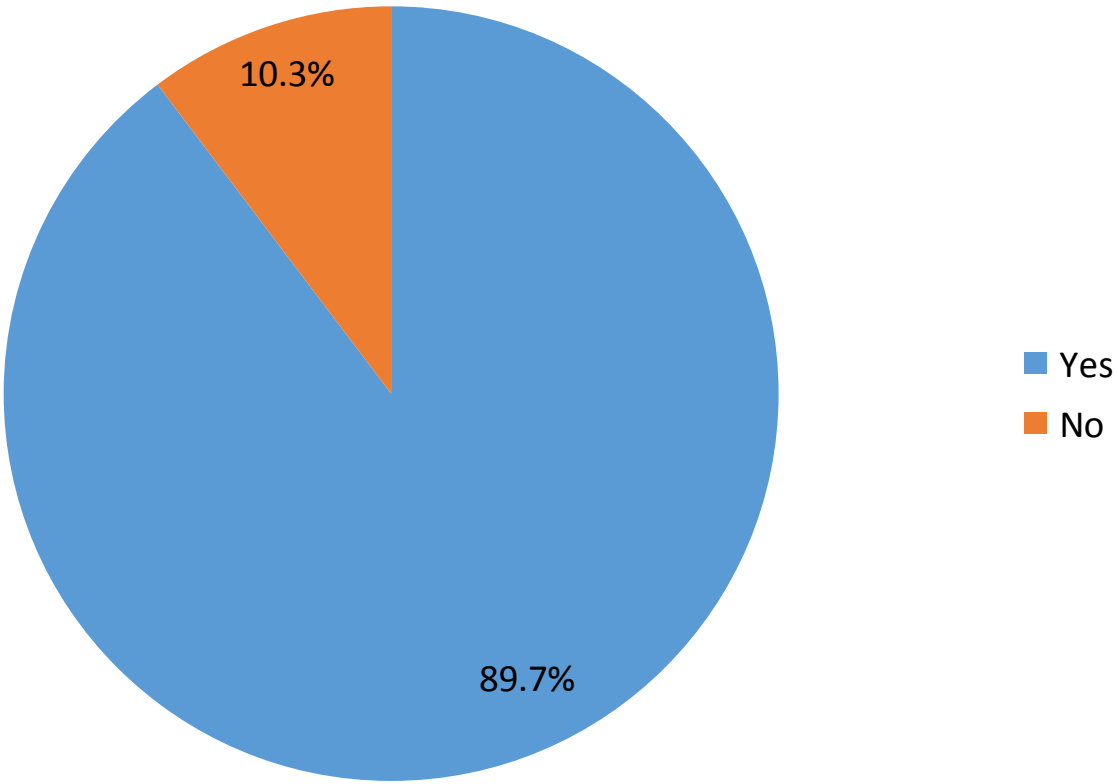
3a. Why no flood insurance?



"Other" responses:
-Rent
-Self-insured

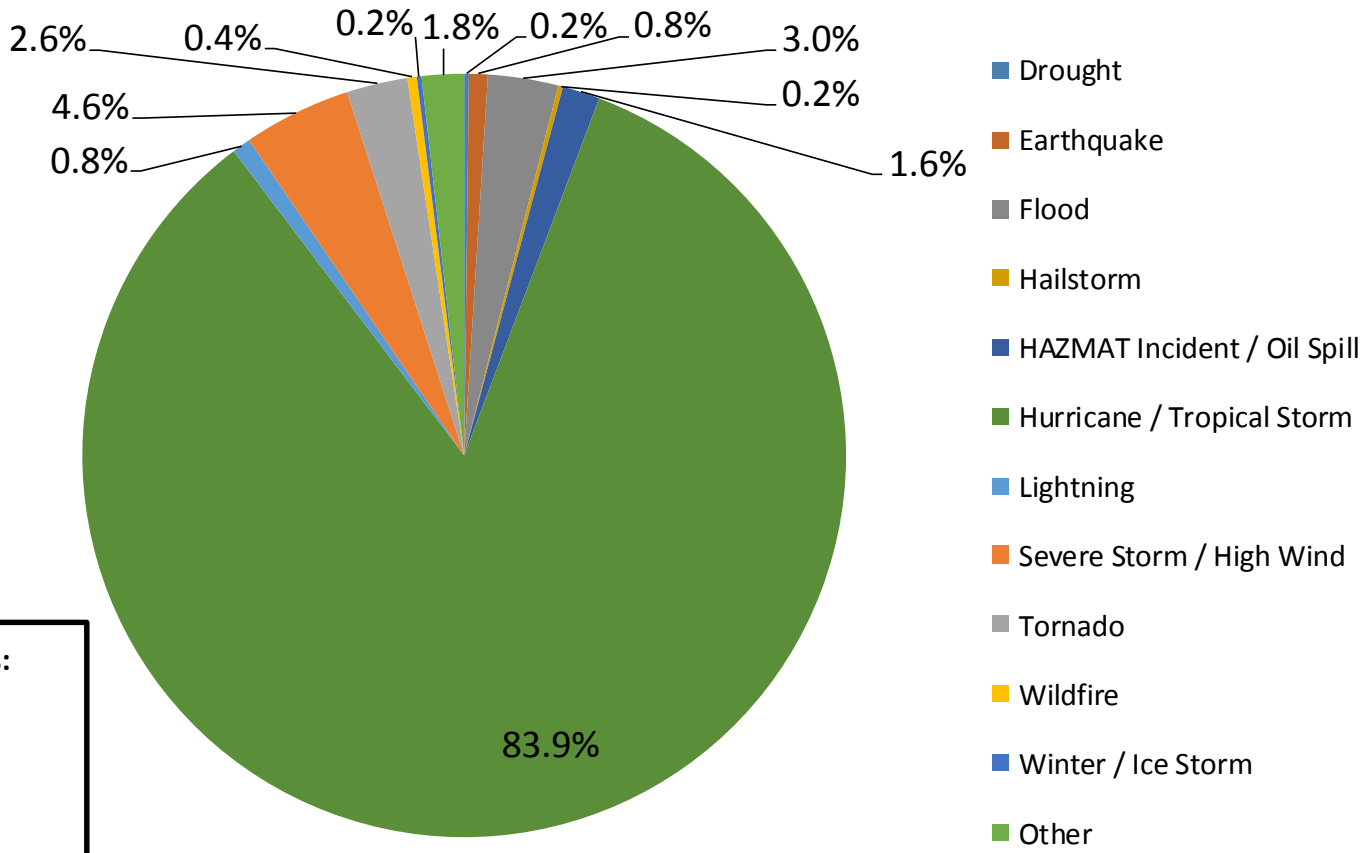
ATKINS

4. Have you experienced a disaster?



ATKINS

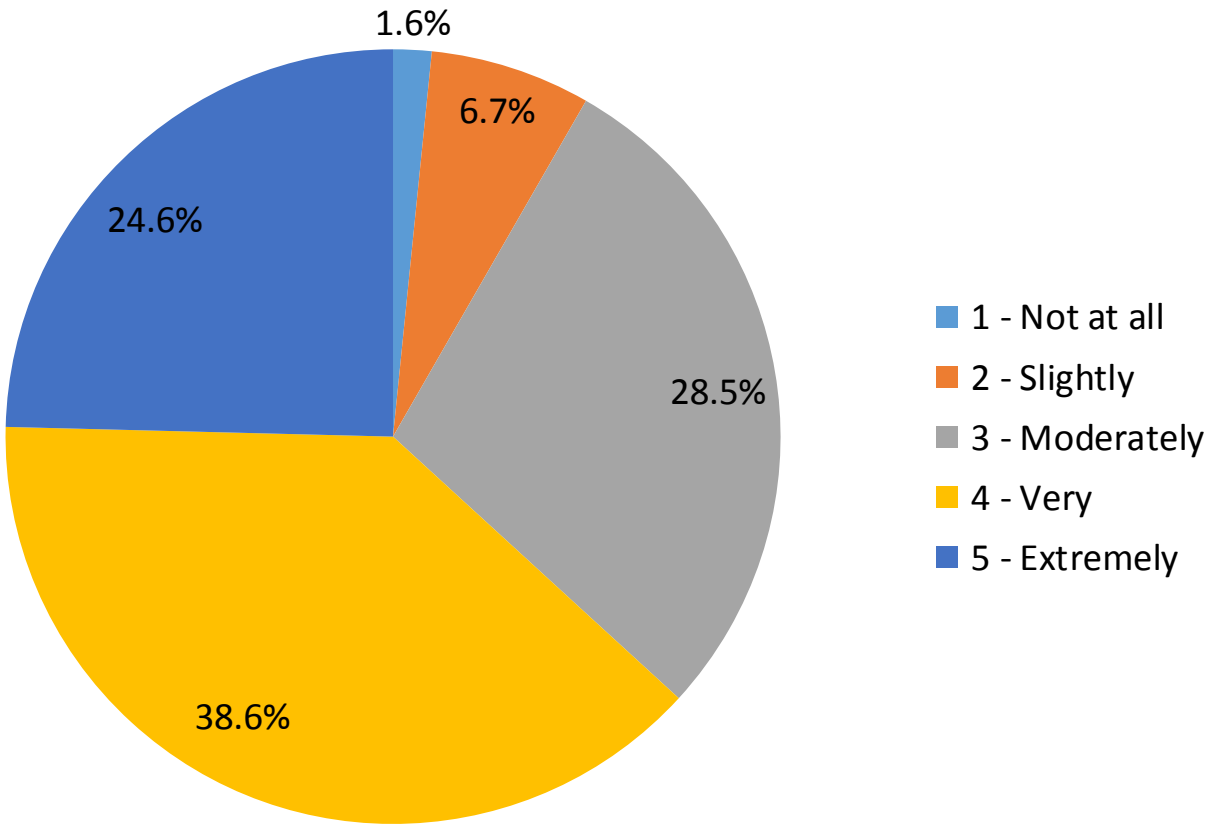
4a. Examples of disasters experienced



"Other" responses:
-House fire
-Electrical accident
-Riots
-Power outage
-Traffic
-West Nile Virus
-Pollution
-Man-made

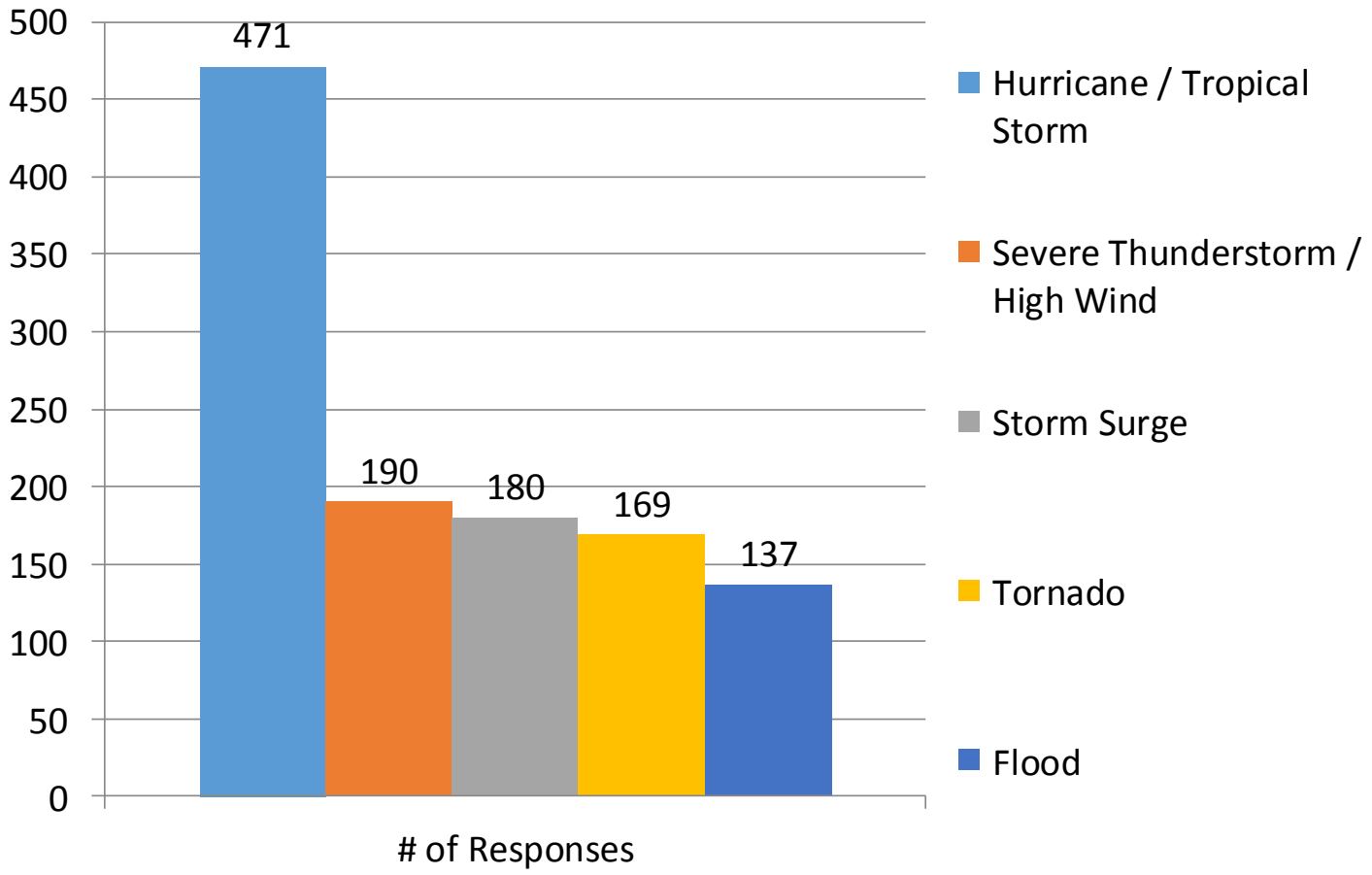
ATKINS

5. How concerned about possibility of being impacted by disaster?



ATKINS

6. Hazards of greatest concern?



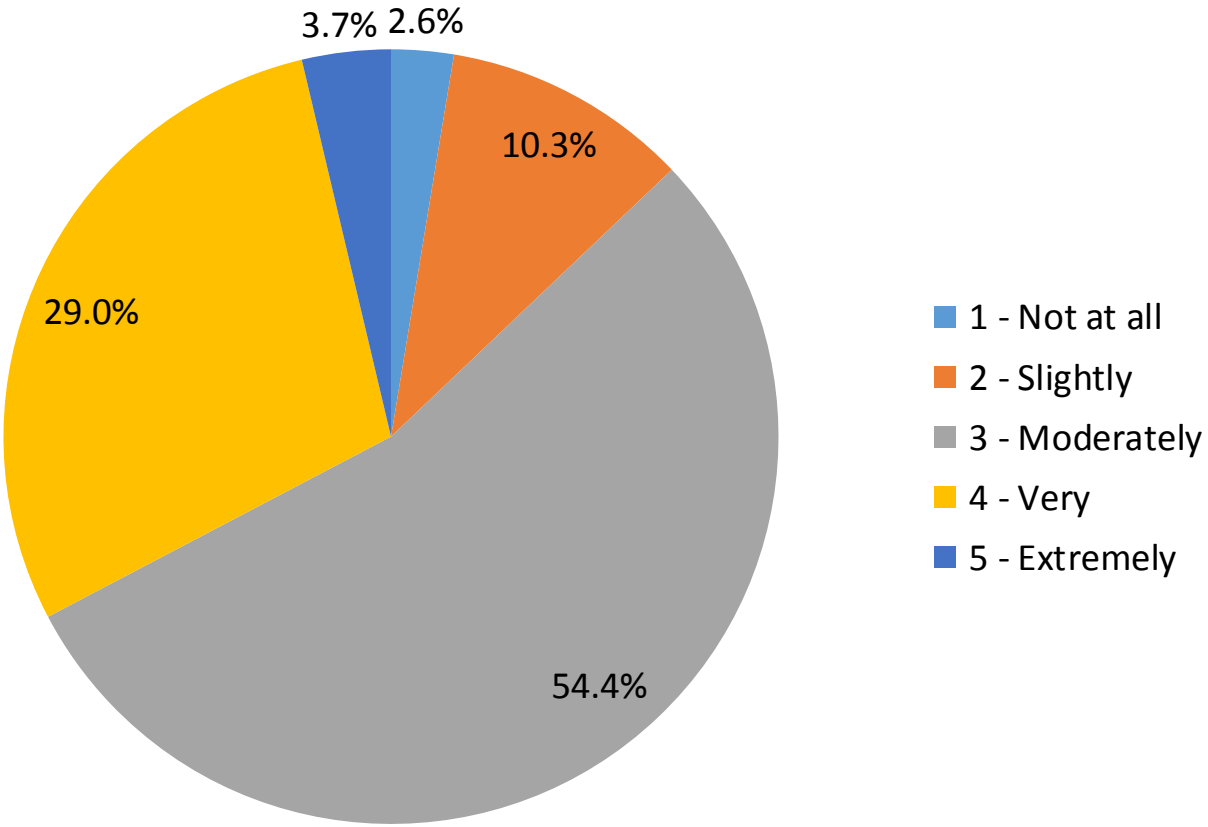
ATKINS

7. Other hazards not listed?

- Terrorism
- Active shooter
- Bomb threat
- Civil unrest/riots
- Water contamination/pollution
- Drugs/gangs/crime
- Electromagnetic pulse (EMP)
- Pipeline failure
- Plane crash
- Nuclear incident

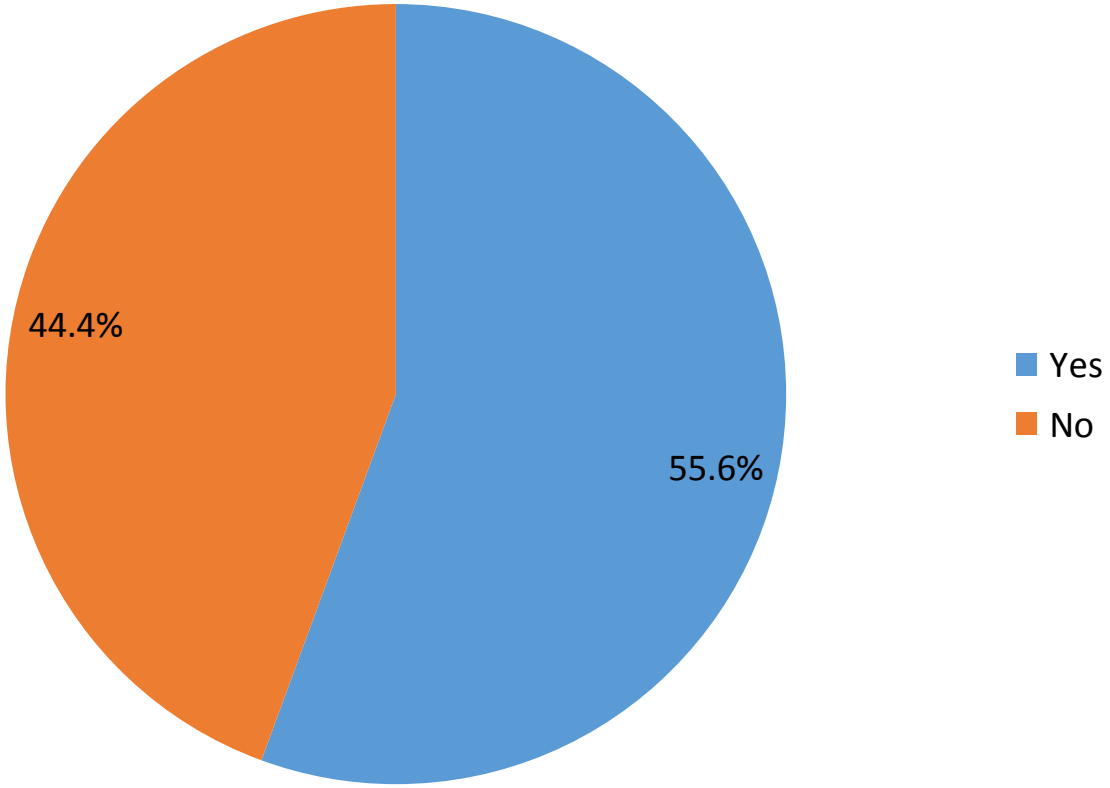
ATKINS

8. How prepared if disaster occurs?



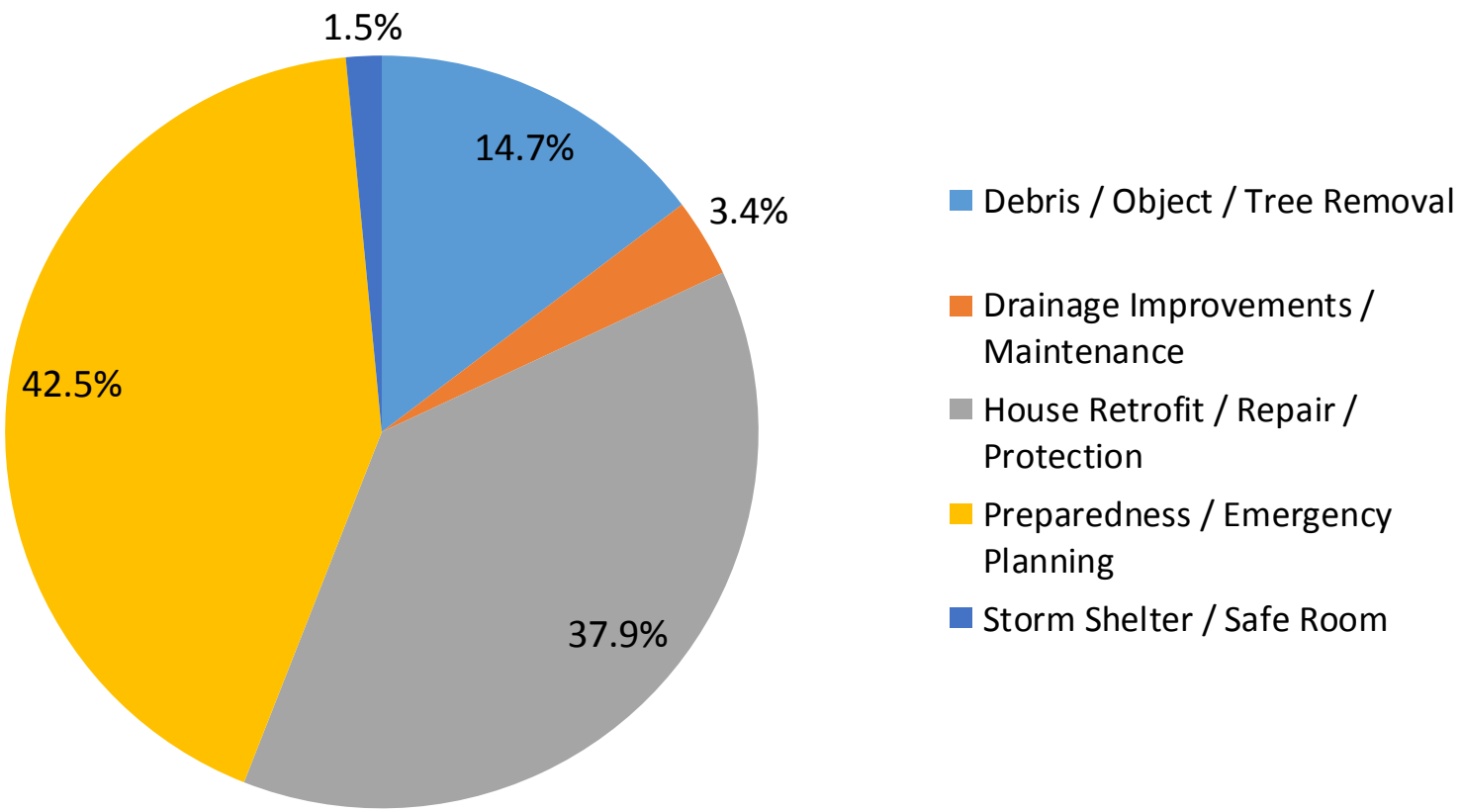
ATKINS

9. Taken action to be safer from hazards?



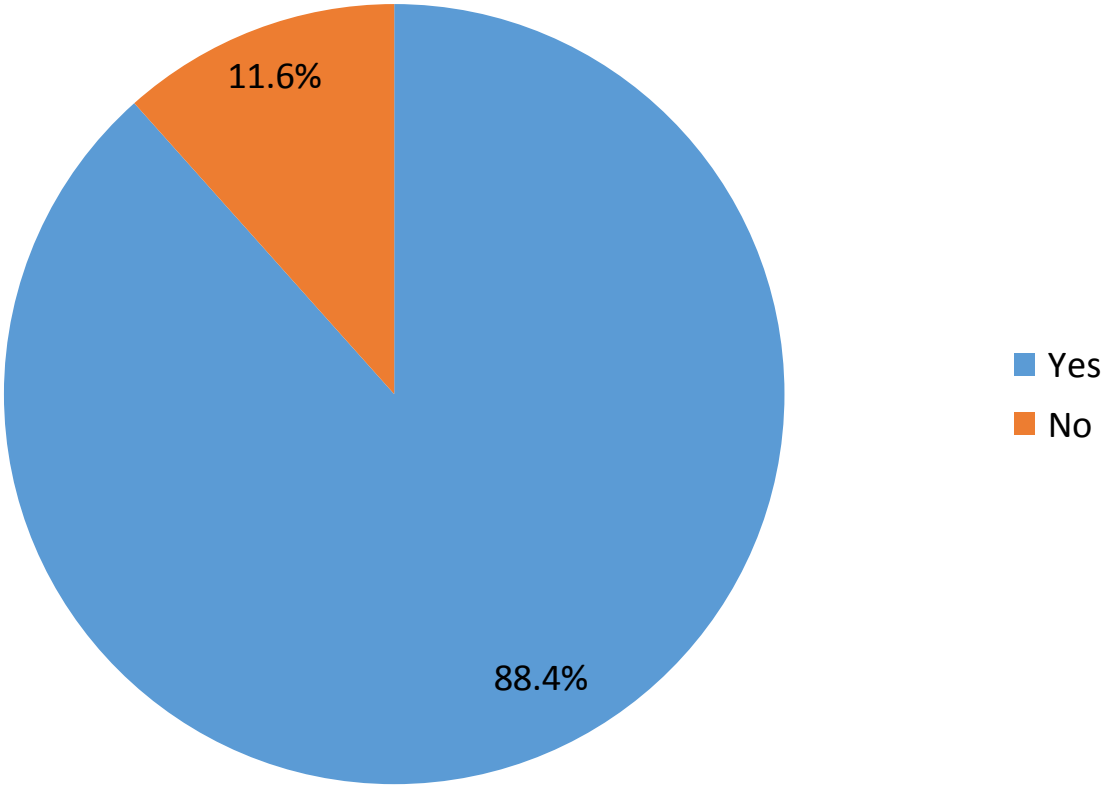
ATKINS

9a. Examples of actions taken



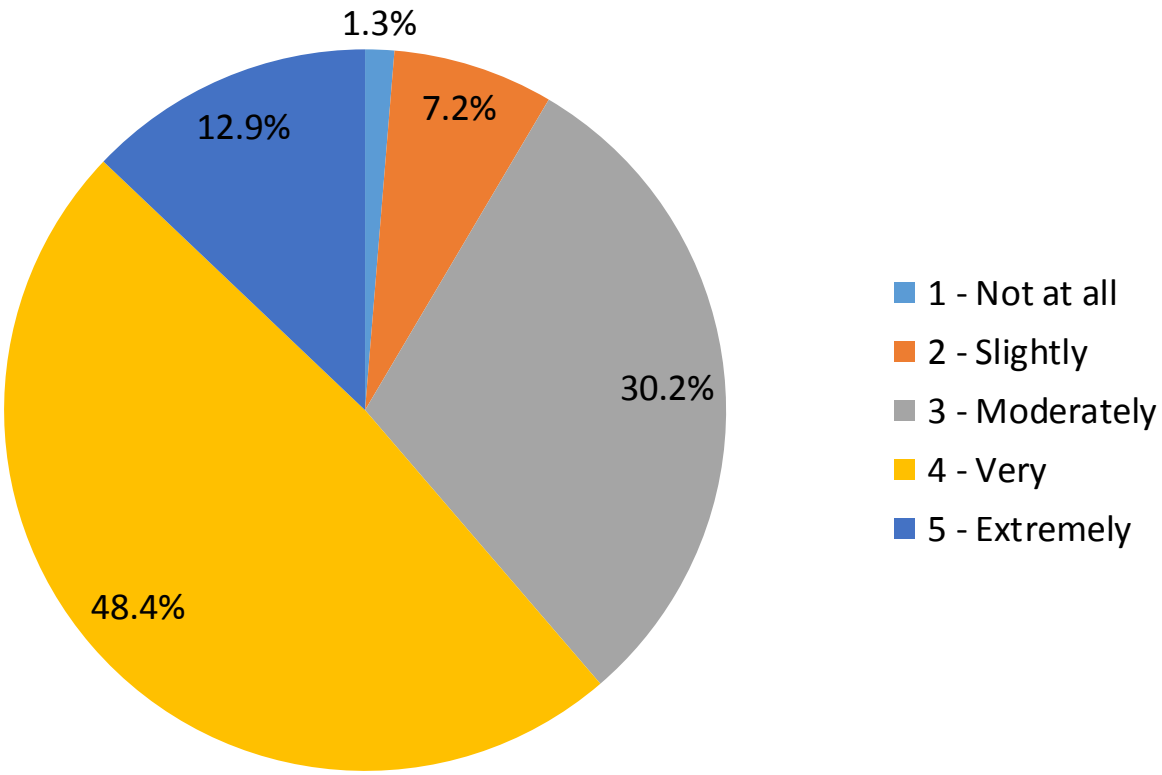
ATKINS

10. Interested in being safer from hazards?



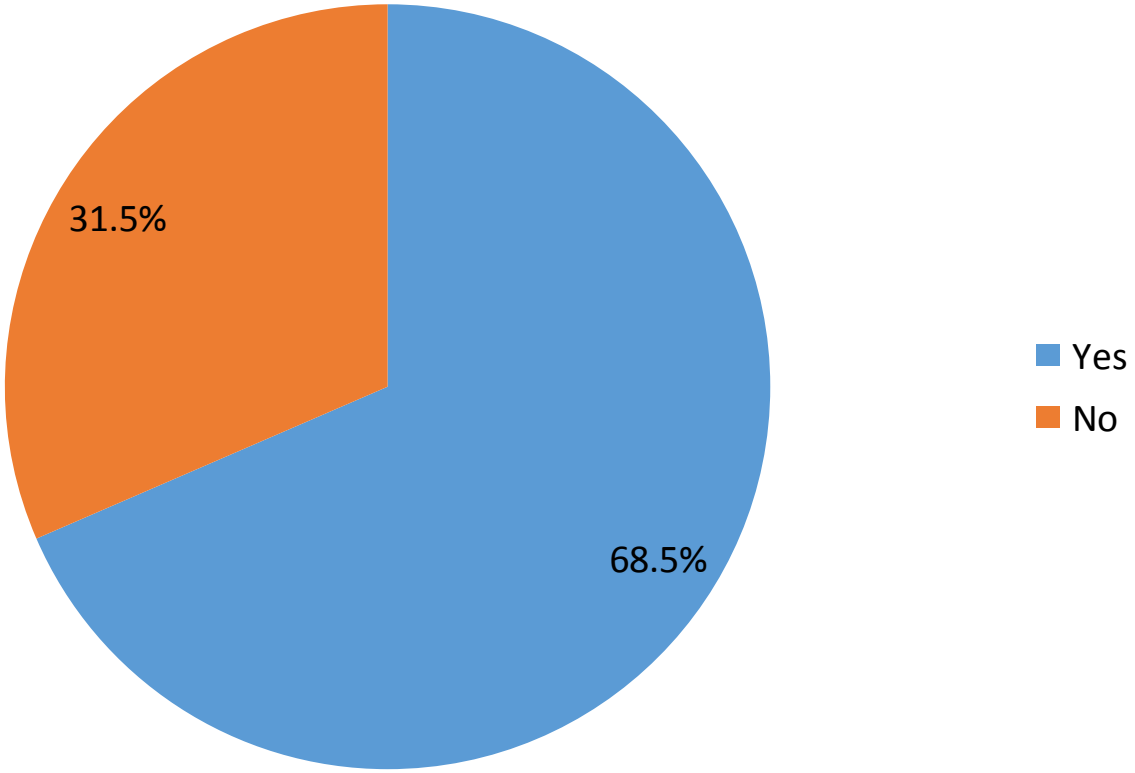
ATKINS

11. How informed about risks and impacts of disasters?



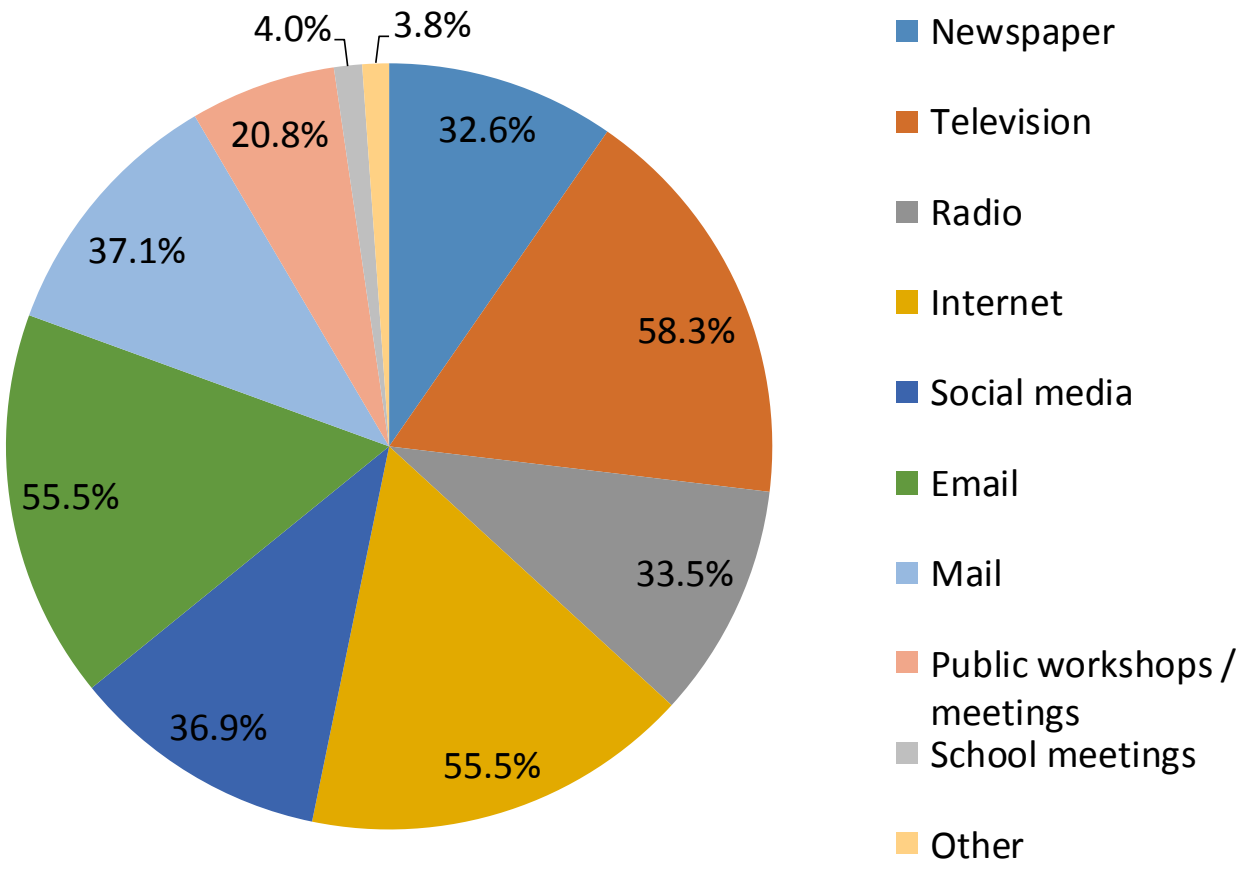
ATKINS

12. Know who to contact regarding risks from hazards?



ATKINS

13. Preferred way to receive info. about being safer from hazards?



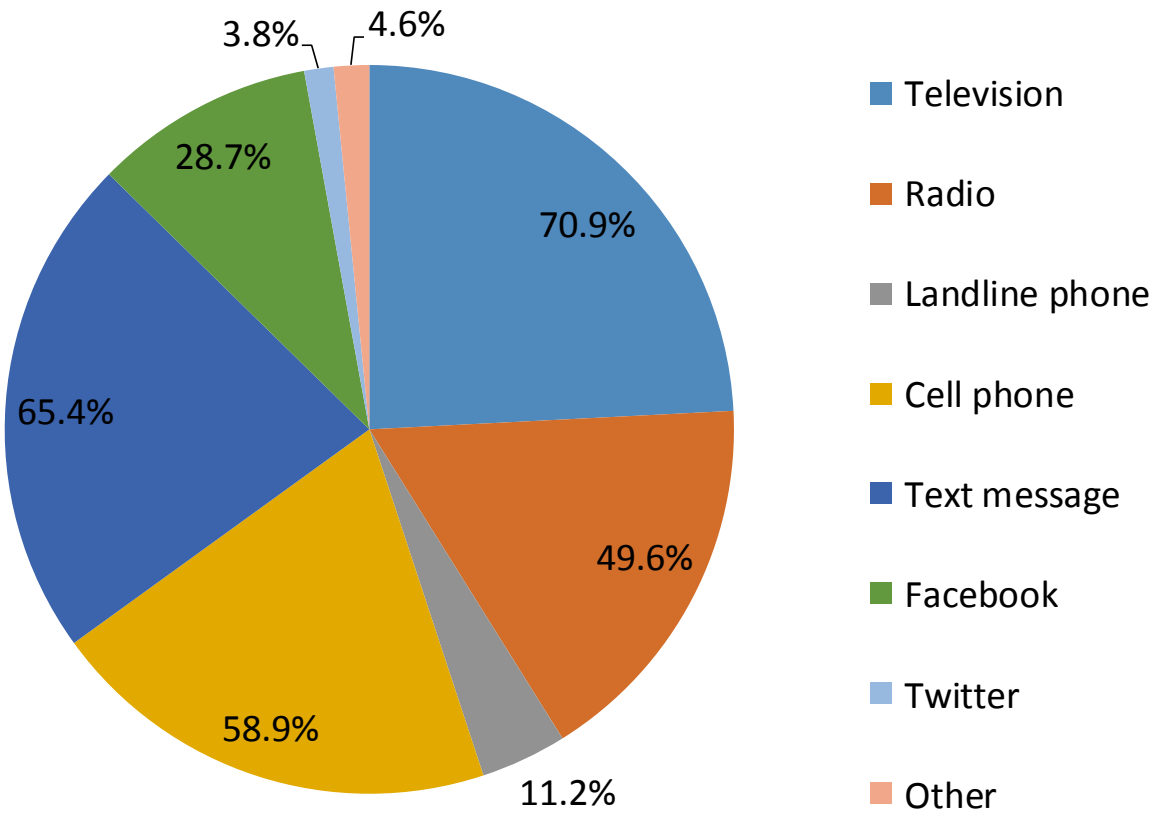
ATKINS

13. Other ways to receive information

- Council meetings
- Fire Department
- Work/co-workers
- Word of mouth/neighbor-to-neighbor
- Webinars/online trainings
- Experts/professionals
- Networking

ATKINS

14. Preferred way to receive alerts/ warnings about hazard events?



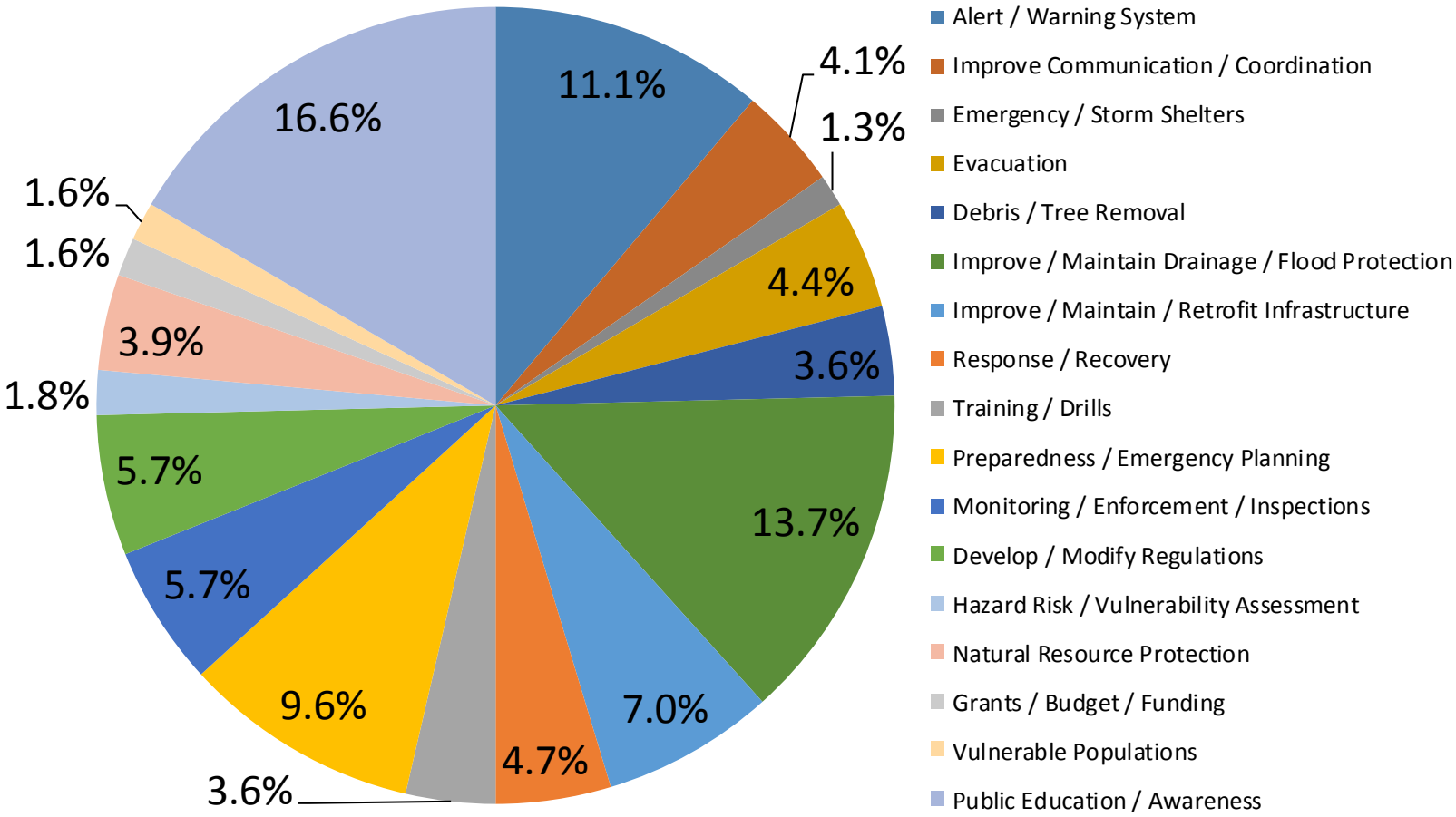
ATKINS

14. Other ways to receive alerts/ warnings

- NOAA Weather Radio
- Email
- EMA websites/facebook pages

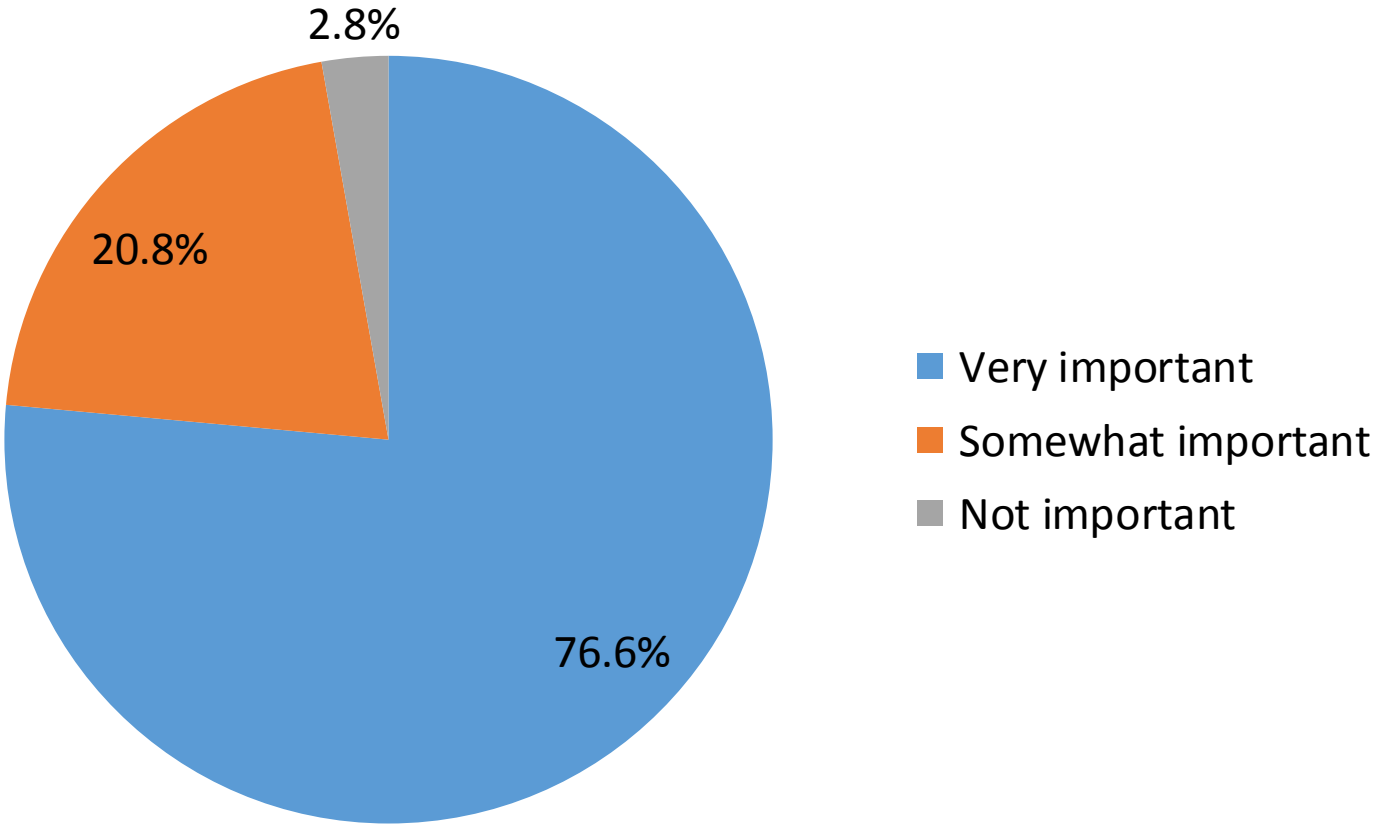
ATKINS

15. Steps local gov't could take to reduce risk



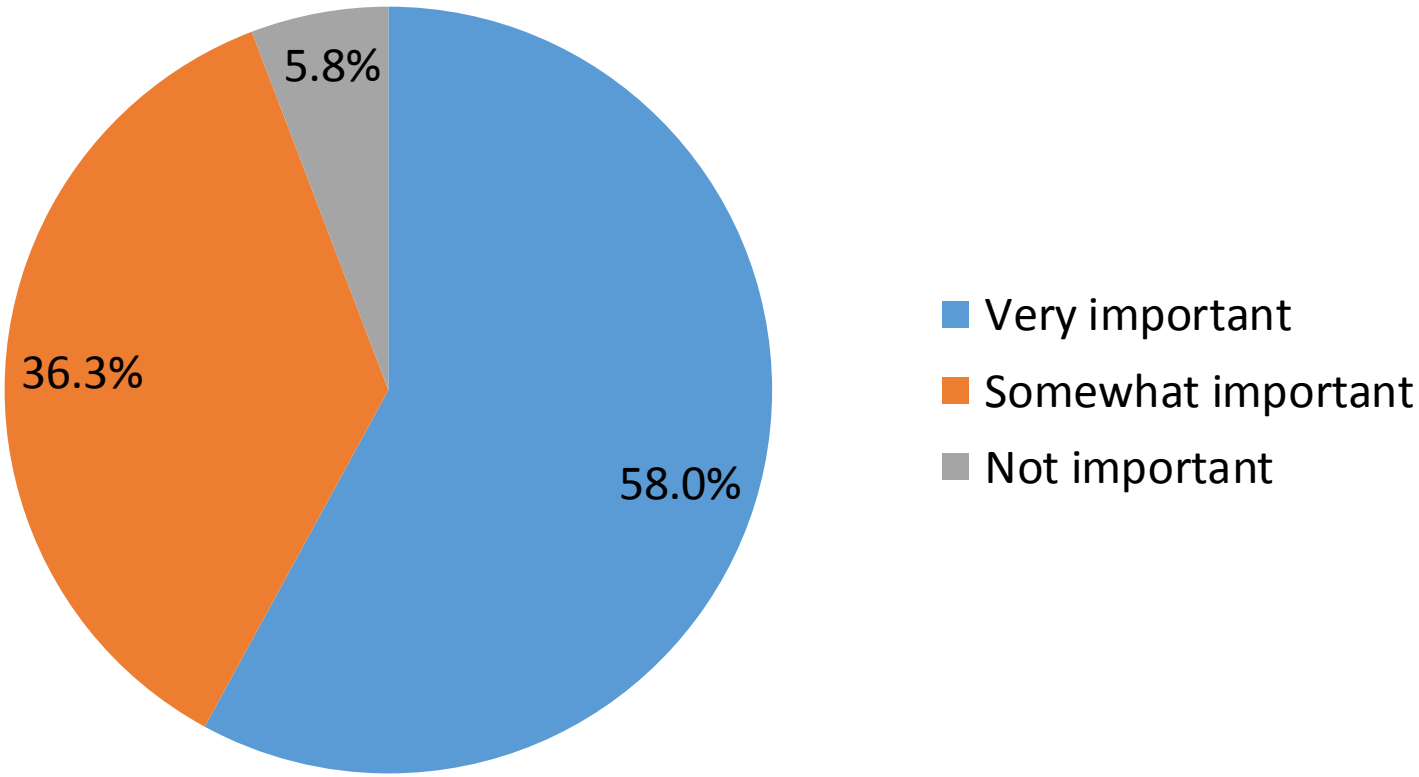
ATKINS

16. Mitigation Actions: Prevention



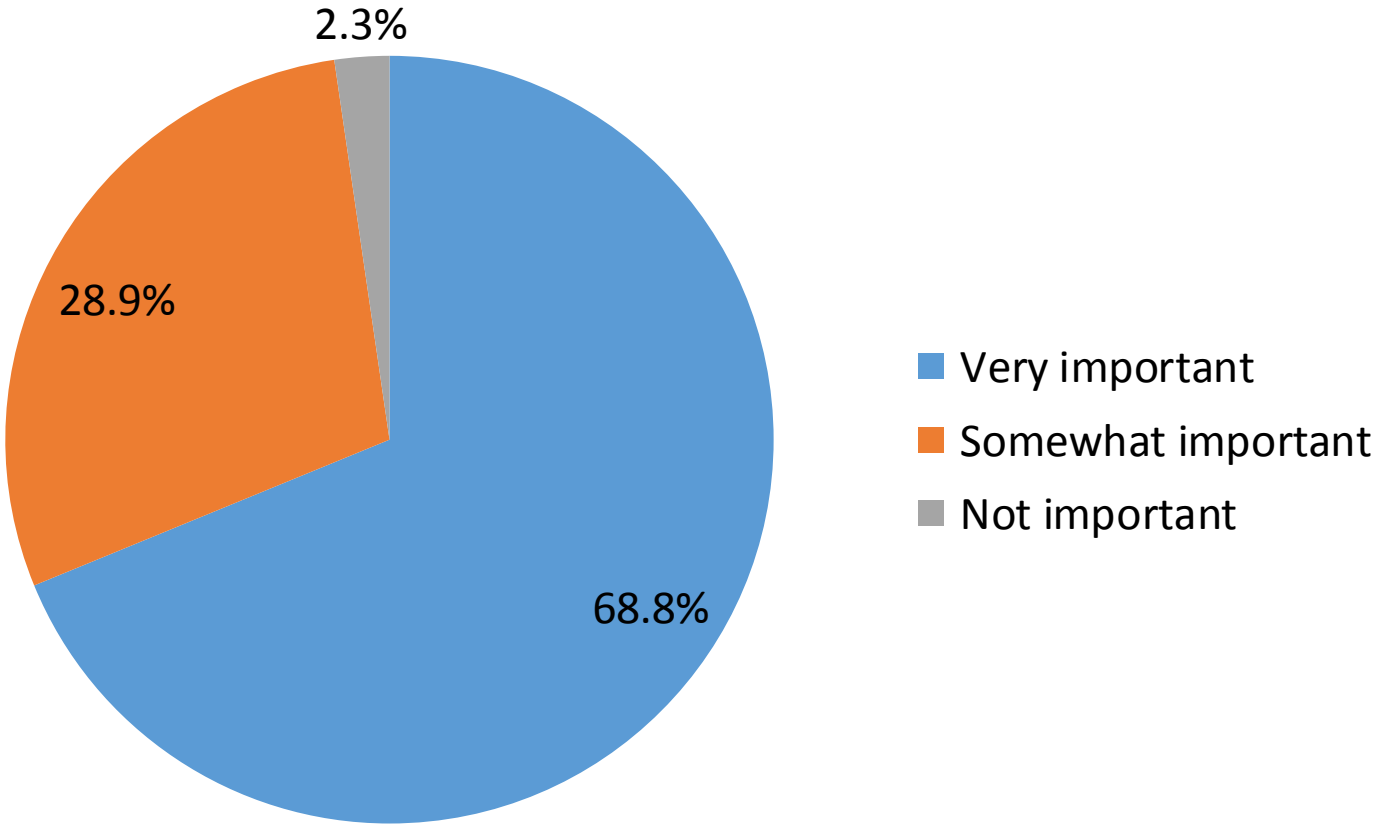
ATKINS

16. Mitigation Actions: Property Protection



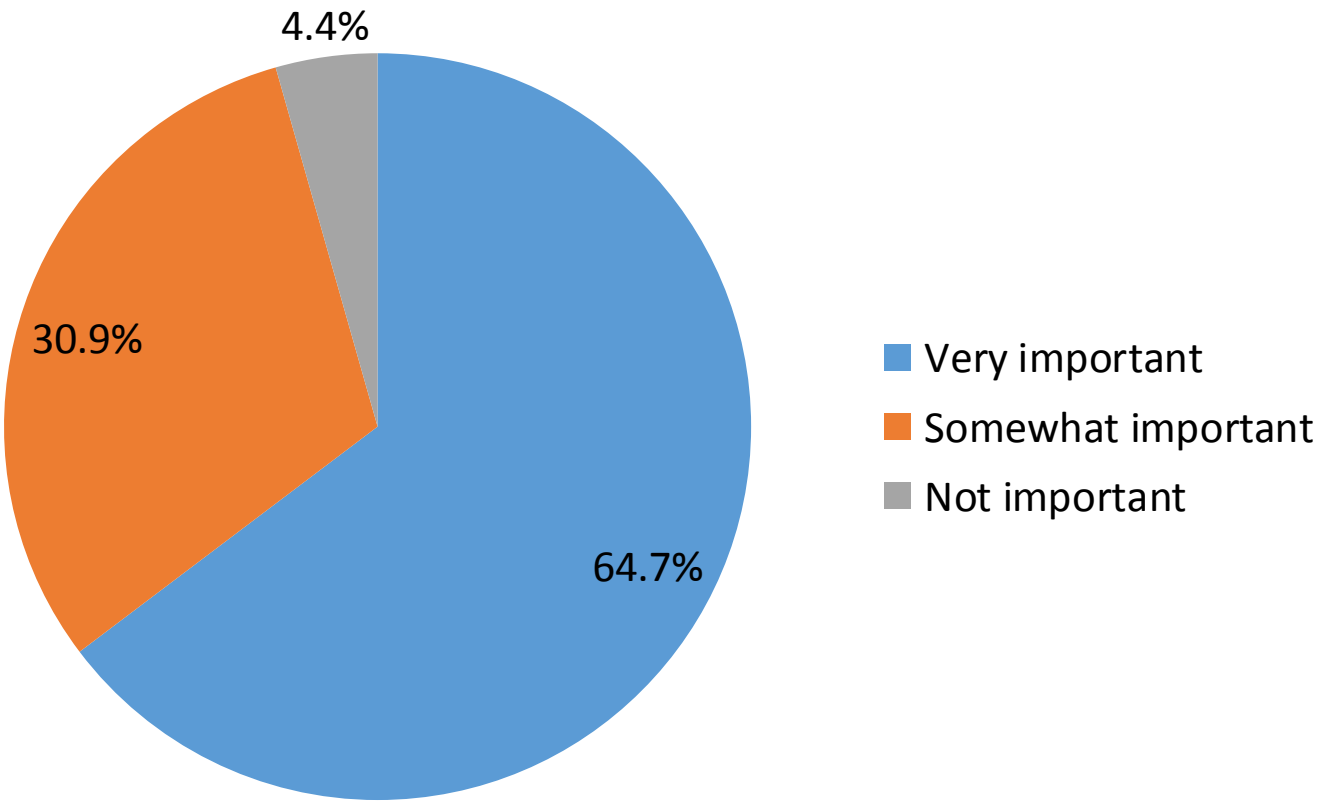
ATKINS

16. Mitigation Actions: Natural Resource Protection



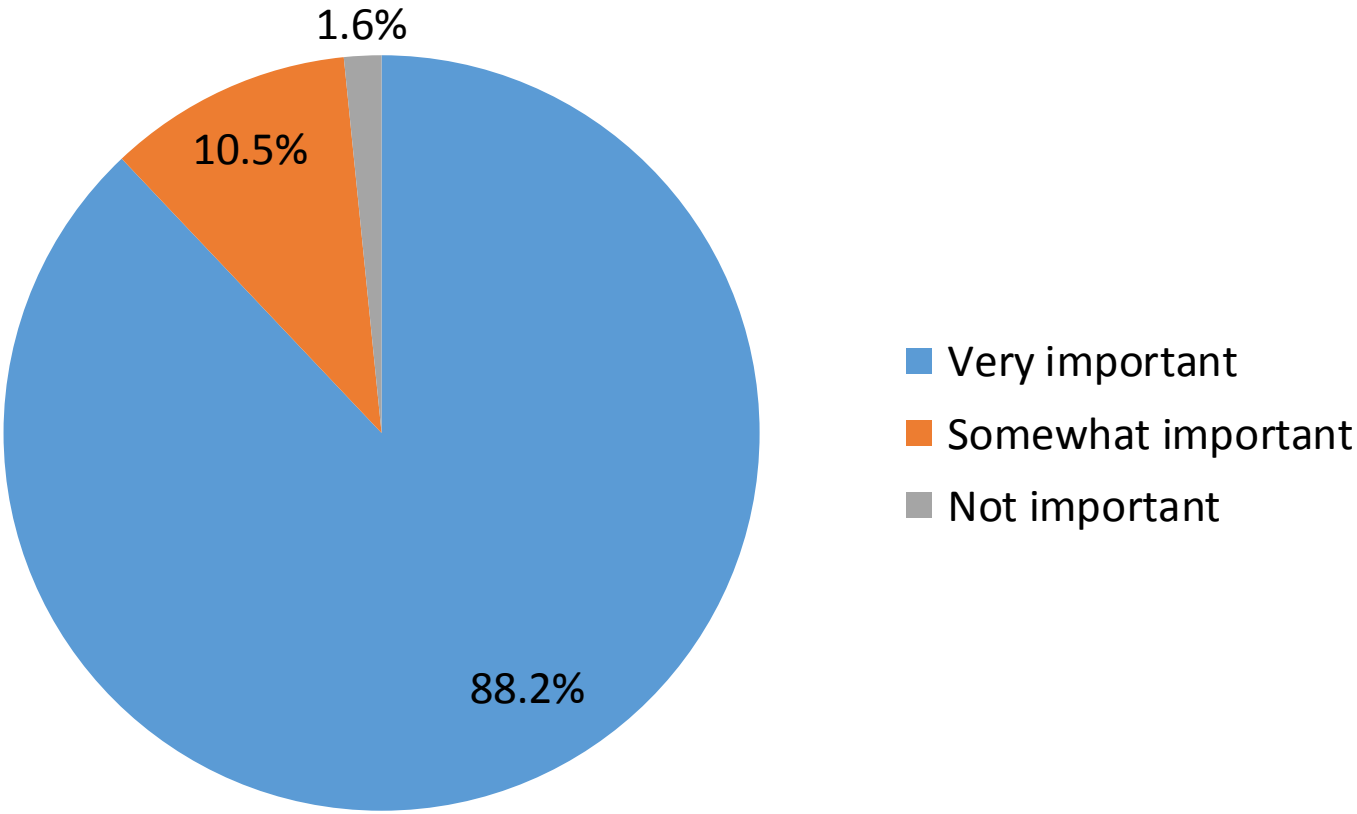
ATKINS

16. Mitigation Actions: Structural Projects



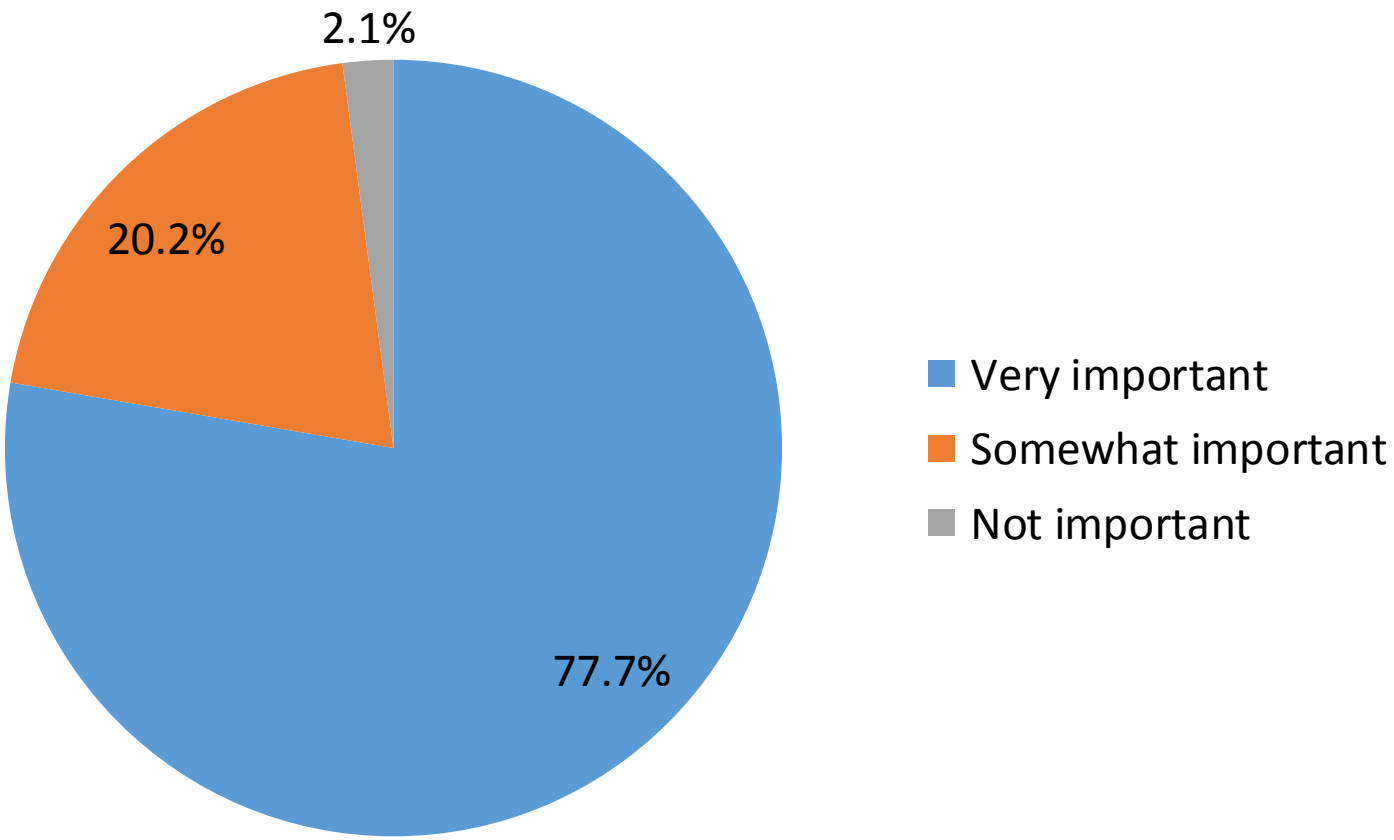
ATKINS

16. Mitigation Actions: Emergency Services



ATKINS

16. Mitigation Actions: Public Education & Awareness



ATKINS

16. Mitigation Actions: Summary

- Highest importance
  - Emergency Services
  - Public Education & Awareness
  - Prevention
- Moderate importance
  - Natural Resource Protection
  - Structural Projects
- Lowest importance
  - Property Protection

ATKINS

Photo Source: FEMA Media Library

MEMA District 9
Regional Hazard Mitigation Plan

Public Participation Survey Results

ATKINS