

2012 Jackson County Multi-Jurisdictional Hazard Mitigation Plan

GAUTIER • VANCLEAVE • ESCATAWPA • HURLEY



DEVELOPED BY THE
JACKSON COUNTY
HAZARD MITIGATION COUNCIL

IN ASSOCIATION WITH

NEEL-SCHAFFER, INC AND
WITT GROUP HOLDINGS, LLC

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Chapter One--Introduction

1 Introduction and Background to Hazard Mitigation Planning

1.1 Hazard Mitigation Planning

Hazard mitigation can be defined as the use of short- and long-term strategies that will permanently reduce or alleviate the loss of injuries, life, and property resulting from hazards. A comprehensive mitigation approach addresses hazard vulnerabilities that exist today and in the foreseeable future. Implementation strategies include structural changes such as strengthening or protecting buildings and infrastructure from the destructive forces of potential hazards as well as non-structural strategy such as 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 level, where decisions on the regulation and control of development are ultimately made. 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 as needed a local hazard mitigation plan. A hazard mitigation plan establishes the broad community vision and guiding principles for reducing hazard risks and further proposes specific mitigation actions to eliminate or reduce identified vulnerabilities.

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

Mitigation planning and activities provides jurisdictions with a number of benefits such as:

- Reduced loss of life, property, essential services, critical facilities and economic hardship
- Reduced short-term and long-term recovery and reconstruction costs
- Increased cooperation and communication within the community through the planning process
- Increased potential for state and federal funding for recovery and reconstruction projects

Figure 1.1 Understanding Risk



Figure 1.1 illustrates the concepts of risk reduction.

Chapter One--Introduction

1.2 The Disaster Mitigation Act and the Flood Insurance Reform Act

In an effort to reduce mounting natural disaster losses, the U.S. Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) amending the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Section 322 of DMA 2000 emphasizes the need for state and local government entities to closely coordinate mitigation planning activities and makes the development of a hazard mitigation plan a specific eligibility requirement for any local government applying for federal 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.

The Flood Insurance Reform Act of 2004 (P.L. 108-264) created two grant programs, Severe Repetitive Loss (SRL) and Repetitive Flood Claim (RFC), and modified the existing Flood Mitigation Assistance (FMA) program. This act requires completion of a FEMA-approved Hazard Mitigation Plan in order for communities to be eligible for these FEMA mitigation programs. 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.

The Jackson County Multi-Jurisdictional Hazard Mitigation Plan meets all applicable FEMA and state requirements for hazard mitigation plans and has been prepared in coordination with FEMA Region IV and the Mississippi Emergency Management Agency (MEMA).

1.3 Purpose and Mission Statement

The purpose of the plan is to document specific natural hazards that are most probable to occur within the study area, evaluate the anticipated risks and potential damage, and identify feasible and cost-effective pre-disaster actions that will reduce risks. In accordance with the purpose of the Hazard Mitigation Plan, the following mission statement was adopted to guide the planning process:

"The mission of the Jackson County Multi-jurisdictional Hazard Mitigation Plan is to plan for and reduce the impact of identified hazards on the community by means of sustainable and resilient measures and activities."

Chapter One--Introduction

1.4 Authority and Adoption

Requirement §201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan. For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

1.4.1 Authority

The Jackson County Board of Supervisors and the City of Gautier City Council initiated development of this Multi-Jurisdictional Hazard Mitigation Plan (“the Plan”). The County applied for and received a grant through the Hazard Mitigation Grant Program (HMGP) to prepare an update to the November 2005 Hazard Mitigation Plan. The HMGP is sponsored by the Federal Emergency Management Agency (FEMA) and administered by the Mississippi Emergency Management Agency (MEMA). A copy of the grant approval letter is provided in Appendix 8.1-A.

1.4.2 Plan Adoption

A public meeting was held on August 15, 2012 for citizens to formally review and accept this Plan prior to sending to MEMA and FEMA for state and federal approval. As a multi-jurisdictional effort, the Jackson County Multi-Jurisdictional Hazard Mitigation Plan meets the requirements of Section 201.6(c)(5) and was approved by FEMA on January 14, 2013. Each jurisdiction then proceeded to adopt this Plan as demonstrated by the executed Resolutions provided in Appendix 8.1-B along with the approval letter and copy of completed crosswalk.

1.5 Multi-Jurisdictional Planning Participation

Requirement §201.6(a)(3): Multi-jurisdictional plans may be accepted, as appropriate, as long as each jurisdiction has participated in the process.

The 2005 plan included the jurisdictions of Gautier, Moss Point, Ocean Springs, Pascagoula and Jackson County. However, the cities of Moss Point, Ocean Springs and Pascagoula elected to each participate in separate hazard mitigation plans for 2012 that were under development during the update of this plan.

Gautier and Jackson County participated as planning partners for the 2012 update. Both jurisdictions designated representatives to serve on the Hazard Mitigation Council (HMC) in an effort to provide specific planning guidance relevant to their needs. Chapter Three identifies the individuals who served on the planning committees and also stakeholders who were invited to participate in public meetings held during the planning process.

Chapter One--Introduction

1.6 Summary of Contents

The contents of this plan are designed to coordinate with the layout of the State of Mississippi's Hazard Mitigation Plan. Below is a summary of the contents presented in chapters 2 through 7.

Chapter 2: **Community Profiles** of the participating jurisdictions include demographic, geographic, and economic characteristics. This information sets the stage for defining the special characteristics that are useful in understanding their unique vulnerabilities.

Chapter 3: **Planning Process** describes a complete account of the Council, subcommittee, and public meetings held during the planning process and who these individuals are.

Chapter 4: **Hazard Mitigation and Risk Assessment** contains five areas of study for each participating jurisdiction: **Risk Assessment, Hazard Identification, Vulnerability Assessment, Estimating Potential Losses, and Analyzing Development Trends**. Historical data is used to identify and prioritize appropriate mitigation actions that will reduce/eliminate losses from potential hazards. HAZUS-MH software was also utilized to assist with estimating potential losses from future impacts.

Chapter 5: **Mitigation Strategy** includes the goals and objectives that were developed to provide a strong foundation for implementing hazard mitigation strategies in each of the participating jurisdictions. Individual **Actions** were identified by goal and objective and include a mitigation group and priority. An **implementation** process is also defined which includes how **priorities** were established. **Funding Sources** and Hazard Mitigation Assistance eligibility criteria are also included.

Chapter 6: **Capability Assessment** on the ability of the jurisdictions to implement strategies and **incorporate mitigation principles into other planning initiatives**.

Chapter 7: **Plan Maintenance** presents the process in which the Council and other identified departments will ensure that the Plan is integrated with all other planning documents, regulations, and ordinances and that the public is engaged in any and all updates. Procedures are also defined in evaluating the effectiveness of mitigation actions and the status of pending/in process projects.

Chapter Two -- Community Profile

2 Community Profile

2.1 General Description of Study Area

The study area for the Jackson County Multi-Jurisdictional Hazard Mitigation Plan includes all unincorporated land within Jackson County, land incorporated within the City of Gautier, and certain facilities the County maintains or for which it is responsible. This includes county facilities located in Moss Point, Ocean Springs and Pascagoula, Mississippi.

Jackson County is one of three coastal counties along the Mississippi Gulf Coast and, along with George County, comprises the Pascagoula Metropolitan Statistical Area (SMA). The county was founded by the State of Mississippi in 1812 and is bordered by Alabama on the east, Harrison County on the west, and George County on the north.

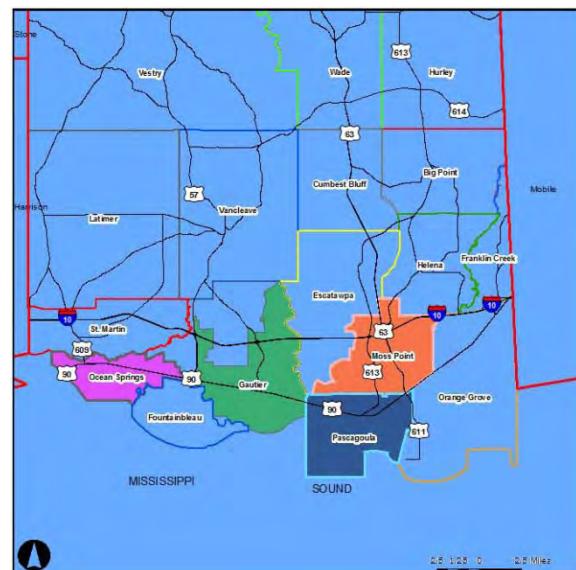
The county is comprised of 722.75 square miles with one-half of the land mass undeveloped or in agricultural use. There are four incorporated jurisdictions in Jackson County: Gautier, Moss Point, Ocean Springs, and Pascagoula all of which are located in the southern portion of the county. Pascagoula is the county seat.

The City of Gautier has a land area of 32 square miles and is located on the eastern side of the West Pascagoula River. Gautier was incorporated in 1986 and subsequently annexed substantial land mass to the west and north into the city limits in 2002 increasing their population forty-seven (47) percent.

The dominate surface water resource in Jackson County is the Mississippi Sound, which forms the southern border of the county. The Pascagoula River, a State of Mississippi Scenic Stream and the largest (by volume) unimpeded river system in the contiguous 48 states, flows through the county, as does the Escatawpa River.

The Pascagoula River is formed in northwestern George County by the confluence of the Leaf and Chickasawhay Rivers and flows generally southward through swampy bottomlands in George and Jackson Counties. In its lower course, the river forms several channels and bayous with its largest distributary being the West Pascagoula River, which flows into the Mississippi Sound at Gautier. The main channel of the Pascagoula passes Escatawpa and Moss Point and flows into the sound at Pascagoula.

The Escatawpa River begins in southwest Alabama and flows in a southerly direction from Alabama into Mississippi near Latonia, Mississippi in George County. The river continues until it nears the town of Moss Point where it empties into Robertson Lake. Robertson Lake empties into a series of other water bodies which form the mouth of the Pascagoula River. The entire length of the river is approximately 80 miles.



Chapter Two -- Community Profile

2.2 Climate

Mississippi's subtropical climate is characterized by long, humid summers, moderated in coastal counties by coastal breezes from the Mississippi Sound and the Gulf of Mexico. Winters are short and usually mild. There can be extremes in temperature particularly in winter and spring with occasional short periods of freezing temperature along the coast. Average spring temperature range from 57 to 77 degrees Fahrenheit; average winter temperatures range from 41 degrees to 62 degrees Fahrenheit. Summer temperatures range from 85 to 95 degrees Fahrenheit, with an average July/August temperature of 91 degrees. Average annual rainfall is between 55 and 64 inches. October is typically the driest month and September the wettest. The prevailing wind direction is typically east-southeast to southeast at 6 to 12 knots. Winds often increase during thunderstorms, which occur frequently and are sometimes accompanied by strong to severe winds, including tornadoes.

The coastal climate is conducive to strong weather events especially tropical storms and thunderstorms. Coastal surge, flash flooding and river flooding is also a concern to low lying communities located close to major rivers or the Mississippi Sound.

2.3 Population and Demographics

According to the 2010 census, the total population of Jackson County was 139,668, which is an increase of 5.91% from the 2000 census count of 131,420. Population was negatively impacted during this decade by Hurricane Katrina due to temporary displacement of residents; however, as evidenced by the latest census figures, this trend has reversed.

The county saw significant growth during the 1970s and 1990s with increases of 34.1% and 14% respectively. The overall population growth from 1970 to 2010 was 37%, a net increase of 51,693 people. These figures reflect growth patterns of the entire county including incorporated areas. Population growth of all jurisdictions and areas within the study area has been extrapolated and is presented in Table No. 2-1.

The City of Gautier has shown significant population growth primarily due to the annexation of large areas of land to the west and north of the city tripling the size of the city. This action positioned the city for additional growth along the Mississippi Highway 57 and U. S. Highway 90 corridors.

Table No. 2-1: County and Municipal Population Trends

Area	1980 Population	1990 Population	% Increase or Decrease	2000 Population	% Increase or Decrease	2010 Population	% Increase or Decrease
Total County Area	118,015	115,243	-2.41%	131,420	12%	139,668	5.91%
Gautier	8,137	10,088	*19.34%	11,681	14%	18,572	*37.10%
Unincorporated County Area	76,376	72,660	-5.11%	86,663	16%	89,950	3.65%

Chapter Two -- Community Profile

Table No. 2-1: County and Municipal Population Trends							
Area	1980 Population	1990 Population	% Increase or Decrease	2000 Population	% Increase or Decrease	2010 Population	% Increase or Decrease
Moss Point	18,998	17,837	-6.51%	15,851	-13%	13,704	-15.67%
Ocean Springs	14,504	14,658	1.05%	17,225	15%	17,442	1.24%
Pascagoula	26,318	25,899	-1.62%	26,200	1%	22,392	-17.01%

*Annexation of land from county into City of Gautier
Source: U. S. Census Bureau and Neel-Schaffer, Inc.

Based on the 2010 Census, the median age of Jackson County residents is 37.2.

Approximately 25.5% are under 18 years of age and 12.4% are over 65 years of age. The age brackets that comprise the highest percentage of the overall population are the 45 to 49 year bracket (7.6%), the 50 to 54 year bracket (7.5%), and the 15 to 19 year bracket (7.2%). The majority (70.6%) of the population is over 21 years of age.

Population density is defined as the number of people per square mile in a certain area. As discussed in Section 2.4, certain areas of the county contain a large amount of undeveloped land, lessening the overall population density of the county. A breakdown of population density of the county and cities therein is shown in Table No. 2-2.

Table No. 2-2: Population Density			
Area	2010 Population	Land Area in Square Miles	Persons per sq. mile 2010
Total County Area	139,668	722.75	193.25
Gautier	18,572	32.0	614.36
Unincorporated County Area	89,950	656.84	NA
Moss Point	13,704	24.16	567.22
Ocean Springs	17,442	11.52	1,513.06
Pascagoula	22,392	15.38	1455.92

Source: U. S. Census Bureau and Neel-Schaffer, Inc.

2.4 Land Use

2.4.1 Undeveloped and Conservation Land

A significant amount of land in Jackson County is used for agriculture or consists of natural areas that are in permanent conservation areas. According to the Jackson County Comprehensive Plan, 209,675 acres or 47.67% of the total land mass is vacant land used for agriculture. Considerable land mass is located within the boundaries of the Desoto National

Chapter Two -- Community Profile

Forest, Sandhill Crane National Wildlife Refuge, Pascagoula River Wildlife Management Area, Escatawpa River Marsh Preserve, Grand Bay National Wildlife Refuge, or other types of conservation or public areas.

The Grand Bay National Estuary Refuge (NERR) is a marine protected area comprised of approximately 18,000 acres, found chiefly within the Grand Bay National Wildlife Refuge and the Grand Bay Savanna Coastal Preserve. This reserve contains a variety of wetland habitats, both tidal and non-tidal, such as pine savannas, salt marshes, saltpans, bays and bayous, as well as terrestrial habitats that are unique to the coastal zone such as maritime forests. NERR promotes estuarine research and education within Mississippi's Coastal Zone and its adjacent ecosystems.

2.4.2 Developed Land

The majority of developed land consists of residential uses, including single-family residential (11%) mobile homes (3.63%) and commercial and industrial uses. A breakdown of land use as shown in the Jackson County 2007 Comprehensive Plan can be found in Table No. 2-3.

Table No. 2-3: Jackson County Land Use Categories		
Category	Acreage	Percentage
Single Family Residential	50,288	11.43%
Mobile Home	15,944	3.63
Duplex	21	0.00
Apartment	144	0.03
Industrial	1,020	0.23
Commercial	2,197	0.50
Church / Related	652	0.15
Vacant Land – Agricultural	209,679	47.67
Governmental, Conservation, Federal, State, Public	75,146	17.08
Municipalities	35,701	8.12
Other Land Outside Planning Areas	49,045	11.15
Total	439,860	100%

Source: Jackson County Comprehensive Plan, 2007

The City of Gautier also contains a significant amount of undeveloped and conservation land, including portions of the Mississippi Sandhill Crane Natural Wildlife Refuge, low-lying land adjacent to the Pascagoula River and land set aside as mitigation banks for developed wetlands. Single-family residential land use constitutes the majority of land use in developed areas of the city; however, there are several manufactured home communities, recreational vehicle parks, and fishing camps.

Chapter Two -- Community Profile

2.5 Housing

According to the 2010 Census, there were 38,012 housing units in the unincorporated areas of Jackson County and 8,046 housing units within the City of Gautier. For the county, this is an increase of 11.42% or 4,340 units since the 2000 census. The percentage of increase during this period for the City of Gautier was 42.28%, a net increase of 3,402 units.

The 2010 American Community Survey estimates that 72.3% of housing products are one-unit, detached. This estimate is for the entire county and includes all incorporated cities. Table 2-4 shows a breakdown of the number of housing units in all jurisdictions in the county as well as the percentage of units that are detached single-family, three-unit or more, or mobile homes.

Table No. 2-4: Housing Units							
Area	HU 2000	HU 2010	% One Unit Detached 2010	% Three or more Units 2010	% Mobile Homes 2010	Net Increase or Decrease of Total HU	% Increase or Decrease of Total HU
Total County Area	51,678	60,067	72.3%	10.8%	12.1%	8,389	13.97%
Gautier	4,645	8,047	67.9	14.0%	12.7%	3,402	42.28%
Unincorporated County Areas	33,672	38,012	ND	ND	ND	4,340	11.42%
Moss Point	6269	6,194	85.4%	5.1%	4.7%	-75	-1.21%
Ocean Springs	7092	7,814	80.3%	11.70%	5%	722	9.24%
Pascagoula	10,931	10,224	61.4%	26.7%	3.8%	-707	-6.92%

ND Not Determined
Source: U. S. Census Bureau

2.6 Infrastructure

2.6.1 Transportation

Jackson County has several major vehicular transportation routes as well as airports, commercial railroad service, and private and industrial sea access to the Mississippi Sound and Gulf of Mexico.

Interstate Highway 10 (I-10) is a major east-west corridor in the county and is the fourth longest interstate in the United States running 2,460 miles from Los Angeles, California, to Jacksonville, Florida.

For many years the primary east-west highway along the coast was U. S. Highway 90 which runs from Van Horn Texas, to Jacksonville Beach, Florida. It continues to serve as a major arterial for coastal areas, including Jackson County.

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Major vehicular routes from south to north include the following:

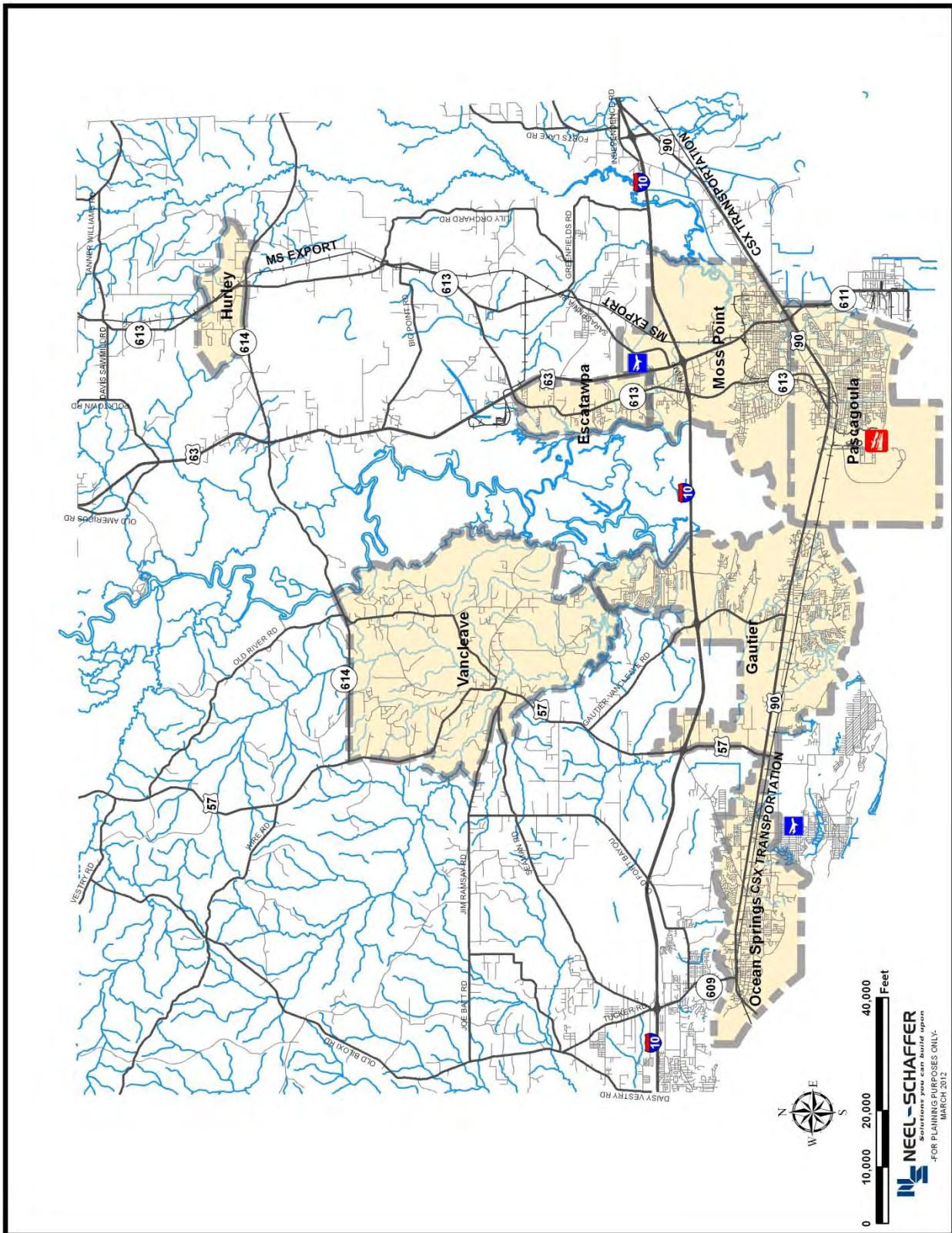
- Mississippi State Highway 63 begins at U. S. Highway 90 and runs to U. S. Highway 84 in Waynesboro.
- Mississippi State Highway 57 begins at U. S. 90 in southern Jackson County and runs to Mississippi State Highway 42 in State Line.
- Mississippi State Highway 613 runs from U. S. 90 in Pascagoula to Mississippi State Highway 63 in Lucedale.

The Port of Pascagoula in Jackson County is the largest seaport in Mississippi and ranks nationally in the top 20 ports in foreign cargo volume.

Table 2-5 lists major transportation facilities in Jackson County and a map identifying their location is on the following page.

Table 2.5: Major Transportation Facilities		
Direction/Type of Service or User	Name and Type/Location	
Ground Transportation		
East/West	Interstate Highway 10 (I-10) U. S. Highway 90	
North/South	U. S. Highway 63 State Highway 609	State Highway 613 State Highway 57
East/West	CSX Transportation Rail Road	
North/South	Mississippi Export (Short-line RR)	
Air Transportation		
Public	Trent Lott International Airport, Moss Point	
Private	Ocean Springs Airport, Ocean Springs	
Waterways and Ports		
Recreational	Pascagoula River Escatawpa River	
Industrial	Ingalls, Pascagoula Chevron, Pascagoula Mississippi Phosphates, Pascagoula Gulf LNP, Pascagoula	
Commercial Port	Port of Pascagoula - Pascagoula River Port of Pascagoula – Bayou Casotte	

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Chapter Two -- Community Profile

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Chapter Three -- Planning Process

3 The Planning Process

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

Requirement §:201.6(c)(1) Plan content. To be effective, the plan must include the following elements: 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.

According to the Federal Emergency Management Agency (FEMA), any successful planning activity, such as the development of a comprehensive mitigation plan, involves bringing together a cross-section of the public to reach consensus on how to achieve a desired outcome or resolve a community problem.

Jackson County and the City of Gautier supported and embraced this concept and reached out to the community in order to develop a mitigation plan that addresses concerns of a broad spectrum of the community. By inviting participation from surrounding counties, cities, businesses, and organizations in the mitigation planning process, the plan will move closer to achieving its objective of saving lives and reducing future losses resulting from natural disasters.

3.1 Documentation of the Planning Process

The Jackson County Hazard Mitigation Plan was prepared in accordance with the planning process outlined in the "How To" guidance documents produced by FEMA. The State of Mississippi's Hazard Mitigation Plan was also referenced for guidance to facilitate an efficient roll up of this planning initiative. The planning process also relied on lessons learned by emergency responders, government officials, businesses, medical providers, academia, volunteers, and residents who call Jackson County home.



Members of the HMC

The Jackson County Board of Supervisors contracted planning consultant's Neel-Schaffer, Inc. and Witt Associates, LLC to assist Jackson County and Gautier with their plan update.

Persons who serve in a leadership role in the community or have specialized knowledge of hazard mitigation and emergency response such as city and county staff, utility providers, medical providers, and business entities were invited to assume a leadership role for this effort by becoming members of a Hazard Mitigation Council (HMC). (See Appendix 8.3-A for a copy of the letter inviting participation to this committee.) The HMC's primary responsibility was to guide the development of the Plan and recruit participation from key stakeholders. The HMC

Chapter Three -- Planning Process

served in the capacity of a steering committee and approved all material found in the plan as well outreach events and public meetings. HMC members are listed in Table 3.1.

Table 3.1: Hazard Mitigation Council Members	
Name and Title	Department/Organization
Donald Langham, Director	Jackson County Emergency Management Agency
Michele Coats, Director	Jackson County Planning Department
George Sholl, Projects Manager	Jackson County E-911
Robert Sema, Director	Jackson County GIS
Mike Byrd, Sheriff	Jackson County
Earl Etheridge, Fire Chief, Homeland Security Coordinator	Jackson County
John McKay, President	Jackson County Board of Supervisors
Samantha Abell, City Manager	City of Gautier
Ray Frair, Fire Chief and EMA Director	City of Gautier
Barry Amacker, Superintendent of Education	Jackson County School District
Carl Cloer, Special Projects Consultant	Singing River Health System
Jerry Hubbard, LEPC President	Jackson County LEPC

Subsequent to the organization meeting held on February 29, 2012, certain Hazard Mitigation Council members appointed representatives from their organization to serve in their place. New members include:

- Paul Tristani, GIS Analyst (Serving for Robert Sema, Jackson County)
- Michael Atkinson, GIS Technician (Representing City of Gautier)
- Eric Meyer, Director of Economic Development and Planning (City of Gautier)

A Hazard Mitigation Subcommittee was formed by the HMC in order to further embrace a broad-based, team approach for guiding the Plan's development. The subcommittee helped identify and rank specific projects and initiatives and made recommendations to the HMC.

Subcommittee members are shown in Table 3.2 below:

Table No. 3.2: Hazard Mitigation Subcommittee	
Name	Entity
Donald Langham, Director	Jackson County Emergency Management Agency
Michele Bishop-Coats, Director	Jackson County Planning Department
Eric Meyer, Director	City of Gautier Economic Development and Planning
Joe O'Neal, Road Manager	Jackson County
Butch Loper, Assistant Road Manager	Jackson County

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Table No. 3.2: Hazard Mitigation Subcommittee

Name	Entity
Scott Karcher, Facilities Manager	Jackson County
Barbara Dumas, Grants Coordinator	Jackson County
Dennis Reeves, Director	City of Gautier Public Works
Pattie Huffman, Grants Coordinator	City of Gautier
Tommie Fairfield, Jr, Executive Director	Jackson County Utility Authority

Additional stakeholder input was achieved by development of a board-based Focus Group. Information was sought from certain Focus Group Agencies which provided the planning team with data for further analysis. Focus Group members were invited to participate in all public participation meetings. Technical information was obtained from agencies during the planning process. Table 3.3 lists the Focus Group by agency.

Table 3.3: Jackson County Hazard Mitigation Focus Group

State Agencies:	
Mississippi Emergency Management Agency	Mississippi Department of Transportation
Mississippi State Department of Health	Mississippi Insurance Department
Mississippi Department of Marine Resources	
Business Community and Quasi-Governmental:	
Gulf Regional Planning Commission	South Mississippi Planning & Development District
Red Cross	Jackson County Economic Development Foundation
Jackson County Chamber of Commerce	Jackson County Port Authority
Jackson County Utility Authority	Mississippi Export Railroad
Representatives from City and County Offices:	
Mayors of Gautier, Moss Point, Ocean Springs and Pascagoula	City Councilmen of Gautier, Moss Point, Ocean Springs and Pascagoula
Supervisors of Jackson County	City and County Administrators of Jackson County and City of Gautier
Neighboring Emergency Coordinators, Responders and Associations	
Emergency Management Agencies of George, Hancock and Harrison Counties	
Jackson County Local Emergency Planning Committee (LEPC)	
Medical Communities	
Jackson County Health Department	Ocean Springs and Singing River Hospital
Utility Providers	
CenterPoint Energy	Mississippi Power Company
Singing River Electric Power Association	

Chapter Three -- Planning Process

Table 3.3: Jackson County Hazard Mitigation Focus Group	
Educational Institutions	
Gautier and Jackson County School Districts	Mississippi Gulf Coast Community College

3.2 Planning Team Review and Analysis of the 2005 Plan

The Planning Team and Hazard Mitigation Council reviewed each section of the 2005 plan to determine the best approach for updating the plan to meet the current and future needs of the participating jurisdictions. A unanimous decision was made to basically develop a new plan as the 2005 plan was developed following the impact of Hurricane Katrina and lacked in depth the data and analysis needed to address existing and future needs. In general, the following changes/enhancements were made:

- Enhanced Chapter 1 – Introduction to include a description of plan, purpose, authority, participation, adoption and summary of contents.
- Added Chapter 2 - Community Profile to better describe the planning area
- Enhanced Chapter 3 – Planning Process to include more detail
- Enhanced Chapter 4 – HIRA to include more detail on hazards and potential impacts supported with maps and tables.
- Chapter 5 – Mitigation Strategy combined Chapters V (community goals and objectives) and VI (mitigation strategies and action plan) in the 2005 plan. References on completed actions and reorganization of the goals are described within that chapter.
- Added Chapter 6 – Capability Assessment that includes inventory of existing plans/regulations and how they related to this plan.
- Enhanced Chapter 7 – Plan Maintenance to include user-friendly forms and process to evaluate, monitor and update the plan going forward.

3.3 Hazard Mitigation Council Meetings

3.3.1 Planning Sessions

February 29, 2012--First HMC Meeting

The first planning session was held on February 29, 2012, at the Sheriff's Reserve Building in Pascagoula, Mississippi. (See Appendix 8.3-B for a copy of the agenda, the meeting summary, copies of the sign-in sheets, and PowerPoint presentation.) This meeting served as the official kickoff of the planning process and presented an overview of hazard mitigation planning, hazard identification and ranking, assessment of population groups and structures, goal setting, implementation strategies, and plan maintenance.

A brief overview of the purpose and need for a comprehensive hazard mitigation plan was discussed. Mitigation planning is a process for identifying risks and vulnerabilities associated with disasters for states, communities, and universities. Policies, activities, and tools for implementing mitigation actions are developed through this analysis. Mitigation is any

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sustainable action plan to reduce or eliminate long-term risk to life and property from a hazardous event.

Mitigation Planning in Mississippi

The State of Mississippi updates the state plan every three years. It considers local and multi-jurisdictional mitigation goals, strategies and critical infrastructure. County, City and Multi-jurisdictional plans are updated every five years. The Jackson County Plan will be a multi-jurisdictional plan which will include unincorporated areas of the county, the City of Gautier and any facilities owned or maintained by the county in other incorporated areas of the county. Once approved by FEMA the plan will qualify Jackson County and Gautier for grant funding. The plan will integrate critical facilities, local goals and strategies which will be considered during the process of updating the state plan. Specific risks and vulnerabilities will be identified based on historic data. The plan will also help guide future mitigation actions which will lessen the impact of future disasters. Goals, strategies and actions listed in the HMP should be also be considered in future updates of local or county comprehensive plans, capital improvements plans, ordinances and governmental policies.

The Process and Plan

The process and subsequent plan is designed to be accomplished in a systematic and participatory manner with strategically scheduled events, and stakeholder and governmental involvement. Goals should be realistic with actions identified that will accomplish the goals. The hazard identification and risk assessment section will identify specific hazards prevalent or likely to occur in Jackson County with an estimate of possible impact. The ultimate purpose is to create a usable plan with achievable actions that will help Jackson County become more disaster resistant.

Mary Merck, Neel-Schaffer, presented a tentative schedule and informed the group that typically four Hazard Mitigation Council workshops are conducted and a minimum of two public meetings. One public meeting will be for initial comments and the second to give the public an opportunity to review the draft plan.

The Plan Consultants recommended that a mission statement be developed to articulate how the plan is to be used, what the plan is, who participated in plan preparation and where the plan is applicable. The HMC reviewed suggested mission statements and approved the statement presented in Chapter One of this plan.

A proposed base map for the county was presented by Matt Stanley, Witt Associates, and comments were requested and incorporated. The maps are presented in Chapter Four with overlays of historic occurrences to assist with planning scenarios to determine future estimated losses.

An overview of documented hazards prone to Mississippi was presented to assist the HMC in determining which hazards have historically caused the most damage. The HMC determined the following hazards in Table 3.4 that should be studied for the 2012 plan.

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Table 3.4: Jackson County Hazard Identification Worksheet

	MS State Plan	2005 Jackson County Plan	2012 Jackson County Plan
Coastal Erosion	✓		✓
Drought			✓
Earthquake	✓		
Expansive Soils	✓		
Extreme Heat	✓		
Flood	✓	✓	✓
Fog			
Hailstorm			
Hurricane/Coastal Storms	✓	✓	✓
Land Subsidence			
Levee/Dam Failure			
Landslide			
Salt Water Intrusion			
Sea Level Rise			✓
Severe Winter Storm/Extreme Cold/Ice Storms	✓		
Storm Surge			✓
Thunderstorm/High-wind/Lightning	✓	✓	✓
Tornado	✓	✓	✓
Tsunami	✓		
Volcano	✓		
Wildfire	✓	✓	✓

Qualitative Hazard Ranking Assessment

The Qualitative Hazard Ranking Assessment worksheet was presented to assist in ranking the possible impact to people, buildings, and infrastructure for the hazards selected. Categories of low, moderate and high were defined and agreed upon by the Council and are presented in Table 3.5. The following criteria were used:

- Probability of each hazard event within the planning area
- Possible impacts to buildings and critical infrastructure based on characteristics and type of buildings
- Historic events and expertise of committee members

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Table 3.5: Qualitative Hazard Assessment		
People	Buildings	Infrastructure
Coastal Erosion		
Low	High/Low*	Moderate/Low*
Drought		
Low	Low	Low
Flood		
Low	Moderate/Low ⁺	High
Hurricane/Coastal Storm		
High	High	High
Sea Level Rise		
To be determined	To be determined	To be determined
Storm Surge		
High	High	High
Thunderstorm/High Wind/Lightning		
Low	Moderate	Moderate
Tornado		
Moderate	Moderate	High
Wildfire		
Low	Moderate/Low ⁺	Low

* Ranking for Gautier

+ Ranking for Critical Facilities (over privately owned, not critical buildings)

2005 Hazard Mitigation Plan Goals and Actions

Copies of the 2005 Plan Mitigation Goals and Actions for specific hazards were distributed and the group discussed certain actions that they believed had been successful, unsuccessful or unattainable. This information was used to facilitate the identification of new/revised goals and actions that address current concerns. Chapter Four presents revisions approved by the HMC.

May 24, 2012—Second HMC Meeting

The second planning meeting was held on Thursday, May 24, 2012, at the Sheriff's Reserve Building in Pascagoula, Mississippi. (See Appendix 8.3-C for a copy of the agenda, the meeting summary, copies of the sign-in sheets, and PowerPoint presentation.)

A brief overview of progress on the plan was given. Ms. Merck informed the group that a draft of chapter one had been completed and is ready for the HMC to review and provide comments.

The April 30, 2012 public meeting was discussed as well as feed-back from the on-line questionnaire. The public meeting was held at the Kathleen McIlwain Library in Gautier for the purpose of receiving comments on hazards of concern to the public and suggested mitigation strategy. Ms. Merck informed the group that public participation had been minimal and asked

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members to help get the word out by posting notices about the on-line questionnaire. Of the results received to date, respondents ranked disasters as follows:

Table 3.6: Public Meeting and Questionnaire Results, May 24, 2012

	Moderate Threat	Low Threat
<ul style="list-style-type: none">• Hurricane/Coastal Storms• Thunderstorms, High Wind, Lightning	<ul style="list-style-type: none">• Tornado• Wildfire	<ul style="list-style-type: none">• Land Subsidence• Sea Level Rise• Salt Water Intrusion

HIRA and Vulnerabilities Assessment

Matt Stanley, Witt Associates, presented the qualitative risk assessment results and ranking probably impact from hazards to people, buildings and infrastructure. An exercise to determine the qualitative risk assessment for sea-level rise was conducted (The HMC elected to add this hazard after the initial meeting on February 20, 2012). Council members agreed that probably risks to people, buildings and infrastructure from sea-level rise was "low."

Preliminary Building Ranking

Preliminary building ranking results were presented which indicates Jackson County has 32 Level One buildings and the City of Gautier, 10. Jackson County has 18 Level Two buildings and Gautier has 8. Jackson County has 3 Level Three buildings and Gautier has 1. The methodology for ranking of buildings is presented in Table 3.7 below.

Table 3.7: Building Ranking Methodology

Rank	Description
Level 1	Public safety buildings (Police, Fire, EMS, EMA/EOC), shelters, hospitals, urgent care centers, and other buildings that MUST remain operational during a disaster event.
Level 2	Buildings that provide essential government services and must be operational within 12 to 24 hours of a disaster. These facilities include pharmacies, public works facilities, and buildings used for response/recovery operations (schools, airports, etc).
Level 3	Buildings that must be functional during recovery operations such as government administrative buildings and courthouses.
Level 4	Buildings that support normal living, commerce, and tourism such as museums, vacation cabins, and service stations.
Level 5	Support buildings and facilities that do not meet any of the other criteria such as pole barns, pavilions, and storage sheds.

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Hazard Profile Maps

Hazard Profile Maps depicting the location of critical facilities and the historic path of hurricanes and tornados that have occurred between 1852 and 2009 were shown and discussed. Maps were also shown modeling the possible inundation of water on land from a range of one to six feet of sea level rise. Drought, thunderstorms, lightning and high-wind do not have definable boundaries for mapping and were therefore not included.

Mitigation Goals and Actions

Rebecca Boone, Neel-Schaffer Inc., presented an update on goals, objectives and projects which have been reorganized to better reflect the hierarchy of actions. Council members agreed with the reorganized items. A Mitigation Subcommittee meeting was discussed with the HMC as a means to gather information on completed actions and identify new actions that should be included in this plan update. The HMC will be updated as the Subcommittee continues to work on this process.

Third HMC Meeting, June 21, 2012

The HMC began this meeting by reviewing Chapter One - Introduction, Chapter Two – Community Profile and Chapter Five - Plan Maintenance in which comments were received and noted by the planning team. (See Appendix 8.3-D for a copy of the agenda, the meeting summary, copies of the sign-in sheets, and PowerPoint presentation.)

HIRA and Vulnerabilities Assessment

Mr. Stanley presented the results of the risk assessment to the HMC. He explained that each hazard selected by the council had been ranked using an assigned value based on the qualitative analysis exercise. An assigned rank of 3 is considered “high,” a rank of 2 is considered “medium,” and a rank of 1 is considered “low.” Scores were tallied with totals between 3 and 9.

- Hurricane/Coastal Storm (9)
- Storm Surge (9)
- Tornado (7)
- Flood (6/5) (Excluding Government Buildings)
- Coastal Erosion (6/3) (Jackson County Only)

Risk assessments for critical infrastructure were presented for each of the above hazards and can be reviewed in Chapter Four.

Mitigation Goals and Actions

Rebecca Boone reminded the Council of the mitigation goals that were approved at the last Council meeting then proceeded to walk through the preliminary list of actions. Several meetings and interviews with various County and City officials have been conducted to identify mitigation actions that have been completed or are in progress. Through these discussions, new mitigation actions have also been gathered. She informed the group that additional

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meetings had been scheduled with the Gautier Public Works Department and Jackson County Road Department.

Plan Maintenance

The final chapter of the Hazard Mitigation Plan describes how the participating jurisdictions will ensure that the mitigation strategies are moving forward and are incorporated into other planning documents, regulations and ordinances. Rebecca provided a proposed draft of Chapter Seven to the HMC and gathered comments to incorporate into this section as a means to improve how this plan will be implemented over the next five years.

July 26, 2012, Fourth HMC Meeting

The final planning meeting was held on Thursday, July 26, 2012, at the Sheriff's Reserve Building in Pascagoula, Mississippi. (See Appendix 8.3-E for a copy of the agenda, the meeting summary, copy of the sign-in sheet and ranking exercise).

The HMC walked through each of the 62 mitigation actions identified for inclusion in the plan update and provided minor revisions to the wording on a few of the actions for clarification of intent. These projects were then ranked using a basic methodology based upon the following five factors: risk to people, risk to facility/infrastructure (loss of function), cost effectiveness, increase public awareness, and availability of funds (likelihood). Actions were assigned a number between 1 and 3, with 1 being the lowest and 3 the highest. The factors were combined for an overall priority for the action with the highest possible score of 15 as defined below. The final results of the rankings is provided in Appendix 8.5-B:

Low – total score of 1-5 Moderate – total score of 6-10 High – total score of 11-15

The planning team will incorporate the rankings into Chapter Five of the plan and prepare for the public meeting to be scheduled on August 15 at both locations of the Singing River Health Systems (Ocean Springs and Pascagoula).

3.4 Mitigation Subcommittee Workshops

Meetings, interviews and correspondence between the planning team and the Mitigation Subcommittee provided valuable insight into past mitigation projects and new or incomplete projects that are needed to effectively mitigate future hazards.

The mitigation subcommittee met on June 6, 2012 from 2:00 to 4:00 p.m. to review the results gathered from the HMC meetings and to further explore mitigation strategies for inclusion in the plan.

Information regarding the Unified Hazard Mitigation Assistance Grant Programs was presented to facilitate in the identification of projects that could be implemented at Jackson County. The subcommittee also identified objectives to meet the mitigation goals previously selected by the HMC. (See Appendix 8.3-F for the agenda and sign in sheet.)

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Subsequent meetings and interviews were conducted with members of the mitigation subcommittee to obtain accurate and up-to-date information on mitigation projects. Chapter Five provides the results of the update to Jackson County and Gautier's mitigation strategies.

3.5 Public Participation Meetings/Survey

Requirement §:201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (1) an opportunity for the public to comment on the plan during the drafting stage and prior to Plan approval; (2) an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and non-profit interest to be involved in the planning process.

The Jackson County and City of Gautier public engagement process provided an opportunity for persons most affected by hazards to voice their opinions, make suggestions about future mitigation actions, and gain a better understanding of the hazard mitigation challenges and actions. An engaged public is often a key component in building support for the use of financial, technical, and human resources dedicated to preparedness and actions. "Come and Go" public meetings and online questionnaire were used to allow the public's input for the Jackson County Plan.



First Public Meeting, April 30, 2012

The first public meeting was held at the Kathleen McIlwain Library in Gautier between the hours of 5:00 and 7:00 p.m. on April 30,

2012. The meeting was advertised through a variety of methods including newspaper ads, flyers posted on bulletin boards in public buildings and on the Jackson County and City of Gautier webpages. Letters and e-mails were sent to all members of the Hazard Mitigation Council, the Mitigation Subcommittee, and the Focus Group. (See Appendix 8.3-G for the public notice, newspaper advertisement, sign in sheets, survey form and FEMA preparedness brochures.)

Members of the public as well as HMC and focus group members were encouraged to participate by completing an online survey, filling out comment sheets and interaction with hazard mitigation planners on site. Handouts about hazard preparation and safety were available.

Although several members of the HMC, subcommittee and focus group were present, unfortunately no residents attended the first public meeting. The meeting still provided the opportunity for attendees and the consulting team to discuss hazard related concerns, including lessons learned from past events and possible projects.

Public Survey

The Jackson County Hazard Mitigation Planning Survey was prepared and disseminated on the Jackson County and City of Gautier Internet sites and were available at the initial public meeting

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and the local Neel-Schaffer office in Pascagoula. Multi-choice and open-ended questions were included. The questionnaire consisted of ten questions designed to solicit information about respondent's concerns and experience in dealing with hazards. A copy of the responses received is provided in Appendix 8.3-G.

3.5.1 Draft Plan Review Prior to Approval

Second Public Meeting, August 15, 2012

In an effort to reach as many citizens and neighboring communities to participate in the review of the draft Jackson County Multi-Jurisdictional Hazard Mitigation Plan, two identical meetings were conducted on August 15, 2012. Singing Rivers Health Systems provided their two facilities in Jackson County to serve as the venue for the events. The meetings were staged near the cafeterias so that the plan would be easily accessible to the visitors and guests of the facilities.

MEMA provided All-Hazard Preparation handbooks and hurricane tracking maps to the participants of both meetings. (See Appendix 8.3-H for the meeting notifications sent via US mail, Facebook and email; comments and sign in sheets.)

The first meeting was held at the Ocean Springs Hospital from 11:00 a.m. to 1:00 p.m. with a total of 59 visitors and staff members stopping by the display area to review the plan and graphic images on display. The comments received by the participants were supportive of the plan. One comment received reported issues with drainage/flooding in the Escatawpa area. The comment was passed on to the Jackson County Public Works Department for further investigation.

The second meeting was held at the Singing River Hospital in Pascagoula from 5:00 to 7:00 p.m. with a total of 36 visitors and staff members stopping by the display area to review the plan and graphic images on display. The comments received by the participants were supportive of the plan.

The meetings were set in accordance with both FEMA and MEMA requirements to allow the public an opportunity to review the draft of the Jackson County Multi-Jurisdictional Hazard Mitigation Plan and make comments. The purpose of the review was to give the public a chance to review the plan prior to its submittal for approval by MEMA who in turn will submit it to FEMA for federal approval. The public and members of the HMC, subcommittee, and focus group/stakeholders were notified of the meeting through various communication methods including Facebook, email, US Mail and web sites for Jackson County, City of Gautier and Singing River Health Systems.



Ocean Springs Hospital



Singing River Hospital

Chapter Four -- Hazard Identification and Risk Assessment

4 Hazard Identification and Risk Assessment

4.1 Overview of the Risk Assessment Process

Requirement CFR §201.6(2) A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

Risk assessment requires the collection and analysis of hazard-related data in order to enable the participating jurisdictions to identify and prioritize appropriate mitigation actions that will reduce/eliminate losses from potential hazards. The eight following risk assessment steps have been integrated where applicable for each hazard identified as a threat to Jackson County and the City of Gautier served under this planning effort:

- Identifying hazards
- Profiling hazards
- Assessing Vulnerability: Overview
- Assessing Vulnerability: Identifying Structures
- Assessing Vulnerability: Addressing Repetitive Loss Properties
- Assessing Vulnerability: Estimating Potential Losses
- Assessing Vulnerability: Analyzing Development Trends
- Multi-Jurisdictional Risk Assessment

4.2 Risk Assessment

Section 4.2 incorporates all the related steps of the risk assessment for Jackson County and the City of Gautier. The section is organized by CFR regulations. The Multi-Jurisdictional Hazard Mitigation Steering Committee conducted an exercise to review 36 natural and human-caused hazards. They then narrowed the list to nine hazards that are profiled in this plan. For the purpose of this plan, the basic components and products of thunderstorms (thunderstorm, high wind, and lightning) are combined into a single hazard. The hazards are identified as:

- Coastal Erosion
- Drought
- Flood
- Hurricane/Coastal Storms
- Sea Level Rise
- Storm Surge
- Thunderstorm/High Wind/Lightning
- Tornado
- Wildfire

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The following four hazards were selected for a full risk assessment based on their high and moderate rankings as defined in the Vulnerability Assessment Section of this plan (Section 4.4.1):

- Flood
- Hurricane/Coastal Storm
- Storm Surge
- Tornado

There are no historical records of damage to property or life from earthquakes, landslides or tsunamis. Due to the lack of historical records and limited future risks of these events, they will be eliminated from further discussion in this plan. Winter storms are infrequent in the subtropical climate of the area with freezing of exposed pipes under older, raised houses being the largest concern. Due to the limited number of occurrences and limited impact of winter storms, it will also be eliminated from further discussion in this plan.

The nine hazards that will be examined further in the hazard profile and vulnerability assessment are those that posed the greatest risk to the jurisdictions participating in the planning process. This assessment will be updated in the future to incorporate changes in zoning laws, land uses, or hazard conditions. The 2005 plan had limited data available due to damage and loss from Hurricane Katrina. The vulnerability assessment incorporates the best available new and existing critical facility, infrastructure, and building information at this time. For this update, information by jurisdiction; including estimates of potential dollar losses for each hazard, are incorporated into the plan. There is reasonable expectation that some data was not recoverable post Katrina.

4.3 Identifying and Profiling Hazards

Requirement CFR §201.6(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.

Hazard identification is the process of recognizing risk-related events that threaten a community. Events are described as natural or human-caused hazards that inflict harm on people or property, or interfere with commerce or human activities. Such events would include, but are not limited to hurricanes, floods, tornadoes, and other incidents that can affect populated areas. The Steering Committee decided to not include human-caused hazards in the update of the Jackson County Multi-Jurisdictional Hazard Mitigation Plan.

Hazard profiling involves describing the physical characteristics of the hazards through analysis of past occurrences, location, extent and probability. This process was accomplished by creating base maps of Jackson County and City of Gautier facilities, then collecting, documenting, and analyzing hazard data obtained from various sources. The degree to which hazards are profiled was dependent on the availability of data. Data limitations are addressed

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per hazard. The level of risk for each hazard was also estimated and assigned a rank of high, medium or low by the Steering Committee and was based upon factors unique to that particular hazard.

For each identified hazard where sufficient data is available to make a determination, a probability ranking was given as high, moderate, or low, based on the Table 4.1 below:

Table 4.1
Methodology for Probability of Hazard Occurrence

Annualized Frequency	Probability Ranking
At least every two years	High
Every two to five years	Moderate
Greater than five years	Low

4.3.1 Coastal Erosion

4.3.1.1 Description of the Hazard

The National Oceanographic and Atmospheric Administration (NOAA) defines coastal erosion as a phenomenon of land loss precipitated by large storms, flooding, strong wave action, sea level rise, and human activities, that wear away the beaches and bluffs along the U.S. coasts. Contributing human activities include inappropriate land use, alterations, and shore protection structures. Coastal erosion can damage or destroy homes, businesses, and public infrastructure with long-term economic and social consequences.

4.3.1.2 Hazard Profile

Coastal erosion is a local concern that is often associated with storm surge. Beach erosion is the most common type of erosion, which can impact tourism, undermine foundations of water front structures, and wash out low-lying roads and bridges. Erosion can also be a result of heavy rainfall that often comes with hurricanes and tropical storms. Severe storms can erode wide beaches and sand dunes in a single, acute event.

Heavy or significant development in the coastal zone places more people and property at risk to coastal erosion and negatively impacts the natural environment by reducing or eliminating natural buffer zones that protect inland areas and communities. Seawalls may reduce surface erosion, but they accelerate beach erosion, inhibit the beach's ability to absorb storm energy, and can cause undermining that damage or destroy local buildings and infrastructure.

Nationally, coastal erosion is responsible for approximately \$500 million per year in coastal property loss (including damage to structures and loss of land). The federal government spends an average of \$150 million every year on beach nourishment and other shoreline erosion control

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measures. Despite these mitigation efforts, a 2000 Heinz Center study found that erosion may claim one out of four houses within 500 feet of the U.S. shoreline by mid-century.¹

The U.S. Army Corps of Engineers (USACE) has worked to develop, extend, and re-nourish beaches in Pascagoula as a post-Katrina mitigation project. New beaches were created in areas where sea walls formerly protected the shoreline. Hurricane Katrina's storm surge caused undermining of the sea walls and damaged waterfront infrastructure. The new and re-nourished beaches are expected to reduce the impacts of coastal erosion and storm surge during coastal storm events. These beaches fall under the authority and jurisdiction of the Jackson County Government.

Much of the Mississippi coastline is protected by barrier islands that are part of the Gulf Islands National Seashore. Horn Island and Petit Bois Island sit approximately 8 miles off shore and serve as a wave and water break for Jackson County. These islands are managed through the U.S. National Park Service and are vital in the reduction of coastal erosion in Jackson County.

4.3.1.3 Assessing Vulnerabilities

Development can destroy wetlands that serve as important buffers against storm surge and other types of flooding. While nothing can be done to prevent coastal hazard events, their adverse impacts can be reduced through proper planning. Channel management and stewardship can reduce and, in some cases, reverse coastal erosion. Harbor and channel widening and/or deepening removes natural sediment that settles around the mouths of rivers. When this sediment is allowed to build-up along the shorelines, coastal land loss is reduced. However, sediment can also negatively impact navigable waterways and dredging activity is required to maintain the channels. Dredge spoils may be pumped beyond the gulf shelf or dumped inland in landfills.

If used properly, dredge spoils can reduce or reverse coastal erosion through beach nourishment or land reclamation.

¹ National Oceanic and Atmospheric Administration, Coastal Resource Management

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4.3.1.4 Previous Occurrences

The Mississippi Department of Environmental Quality, Mississippi Office of Geology studies tracks coastal change along the state's shoreline. A study of coastal change from 1850 to 1986 reveals the following changes for areas south of U.S. 90 in Jackson County:

Table 4.2
Jackson County Mainland Shoreline Change (Acres), 1850-1986

(Source: Mississippi Department of Environmental Quality, Office of Geology)

Period (years)	1850 to 1917	1917 to 1950	1950 to 1986	1850 to 1986
Total Loss	1344	993	726	3063
Total Gain	654	847	1076	2577
Net Change	-690	-146	350	-486

Map 4.1
Jackson County Mainland Shoreline Change, 1850-1986

(Source: Mississippi Department of Environmental Quality, Office of Geology)

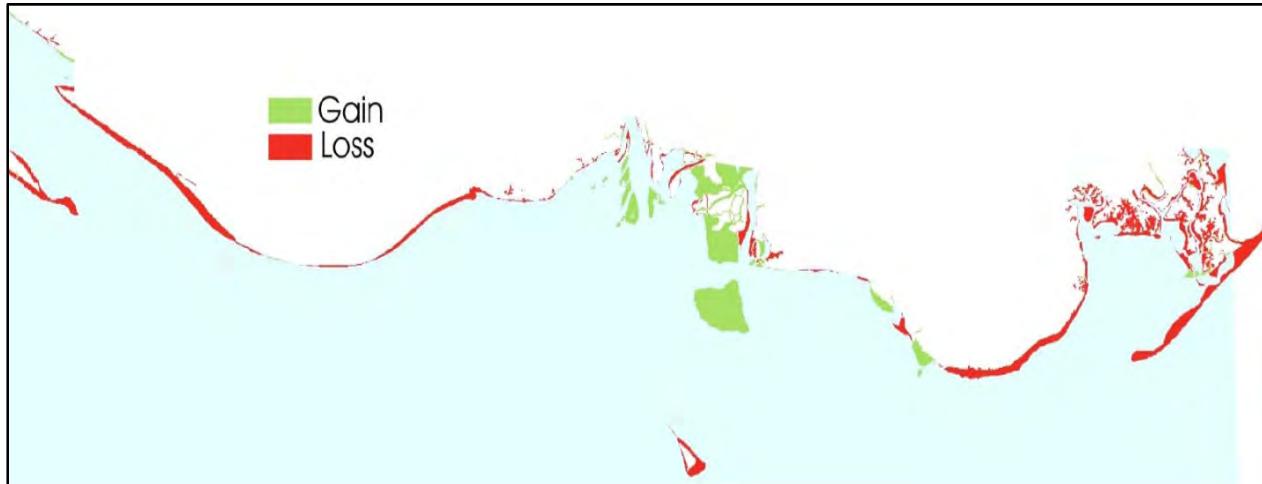


Table 4.3
Jackson County Mainland Shoreline Change by Cause (Acres), 1850-1986

(Source: Mississippi Department of Environmental Quality, Office of Geology)

Man-Made Loss	Man-Made Gain	Natural Loss	Natural Gain
166	1311	1929	318

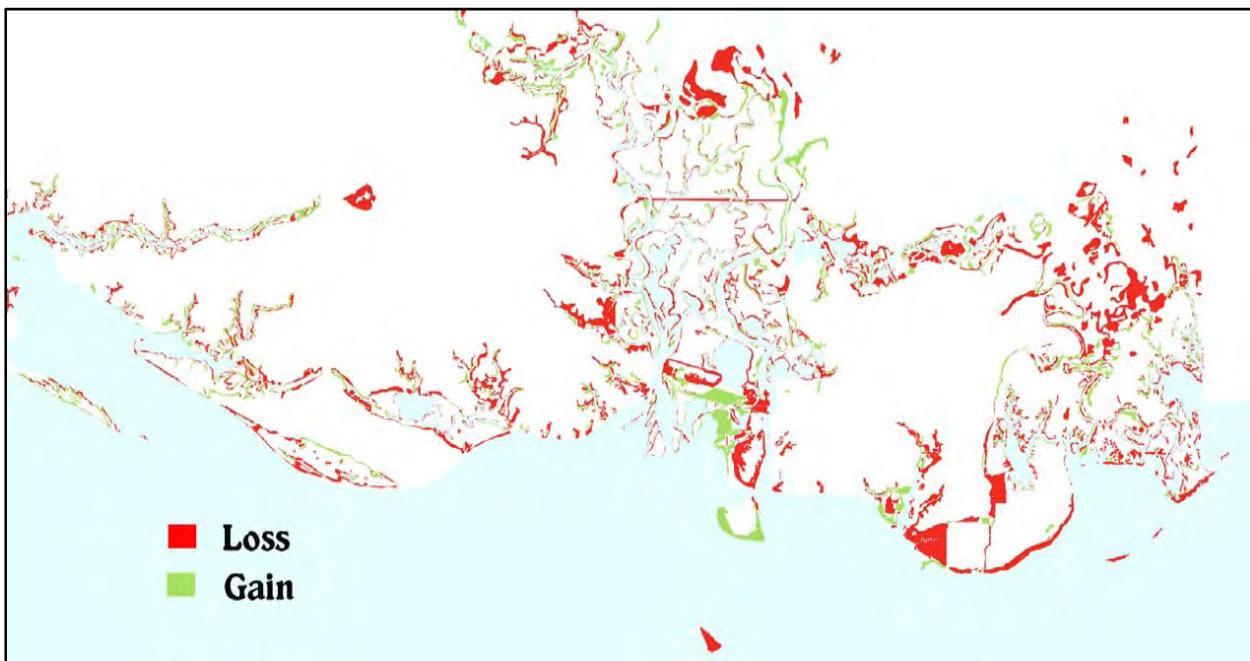
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Table 4.4
Island Shoreline Change (Acres), 1850-1986
(Source: Mississippi Department of Environmental Quality, Office of Geology)

Island Name	Horn	Petit Bois
Total Loss	1863	1404
Total Gain	1252	635
Net Change	-611	-769

Marsh changes between 1950 and 1992 were recorded in wetlands mainly south of Interstate 10 in areas of less than 15 feet of elevation. Emphasis was given to tidal marshes in the coastal erosion study by the MDEQ, Office of Geology. In the 1950's, Jackson County had approximately 36,005 acres of marsh. By the 1990's, the marshes were reduced to 31,390 acres for a net loss of 4,615 acres.

Map 4.2
Jackson County Marsh Change, 1850-1986
(Source: Mississippi Department of Environmental Quality, Office of Geology)



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4.3.1.5 Probability

Given the historical data provided, an average annualized mainland shoreline loss of 15.4 acres, and the knowledge that development and dredging will continue at least annually along the Jackson County coast, the probability of continued coastal erosion and recurrence is high.

4.3.2 Drought

4.3.2.1 Description of the Drought Hazard

Drought is a normal hazard occurrence in virtually all climactic regions, including areas with high and low average rainfall. Drought is a result of significantly lower amounts of precipitation received in a region over an extended period of time (usually a season or more in length).

Drought occurs under differing conditions, based on the reference points:

- **Meteorological** drought is defined by a period of substantially diminished precipitation duration and/or intensity. The commonly used definition of meteorological drought is an interval of time, generally on the order of months or years, during which the actual moisture supply at a given place consistently falls below the average moisture supply.
- **Agricultural** drought occurs when there is inadequate soil moisture to meet the needs of a particular crop at a particular time. Agricultural drought usually occurs after or during meteorological drought, but before hydrological drought and can affect livestock and other dry-land agricultural operations.
- **Hydrological** drought refers to deficiencies in surface and subsurface water supplies from deficiencies in precipitation. It is measured as stream flow, snow pack, and as lake, reservoir, and groundwater levels. There is usually a delay between lack of rain or snow and less measurable water in streams, lakes, and reservoirs. Therefore hydrological measurements tend to lag behind other drought indicators.
- **Socio-economic** drought occurs when physical water shortages start to affect the health, well-being, and quality of life of the people, or when the drought starts to affect the supply and demand of an economic product.

4.3.2.2 Hazard Profile

A drought's severity depends on numerous factors, including duration, intensity, and geographic extent as well as regional water demands by humans, livestock, crops, and vegetation. The severity of drought can be aggravated by other climatic factors such as prolonged high winds and low relative humidity. Due to its multi-dimensional nature, drought is difficult to define in exact terms and also poses difficulties in terms of comprehensive risk assessments.

In 1965, Wayne Palmer developed an index to "measure the departure of the moisture supply." This index was based on the supply-and-demand concept of the water balance equation, taking into account more than merely the precipitation deficit at specific locations. The objective of the

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Palmer Drought Severity Index (PDSI) was to provide a measurement of moisture conditions that were “standardized” so that comparisons using the index could be made between locations and between time periods. While Palmer’s indices are water balance indices that consider water supply (precipitation), demand (evapotranspiration) and loss (runoff), another commonly used drought index, the Standardized Precipitation Index (SPI), is a probability index that considers only precipitation. Therefore and for the purposes of this plan, drought will be analyzed using the PDSI.

The PDSI varies roughly between -4.0 and +4.0. Weekly Palmer Index values are calculated for the Climate Divisions during every growing season and are available from the Climate Prediction Center. ICC could expect to experience the entire range of drought severity and classification. Table 4.5 lists the Palmer Drought Severity Index.

Table 4.5
Palmer Drought Severity Index
(Source: <http://drought.unl.edu/whatis/indices.htm>)

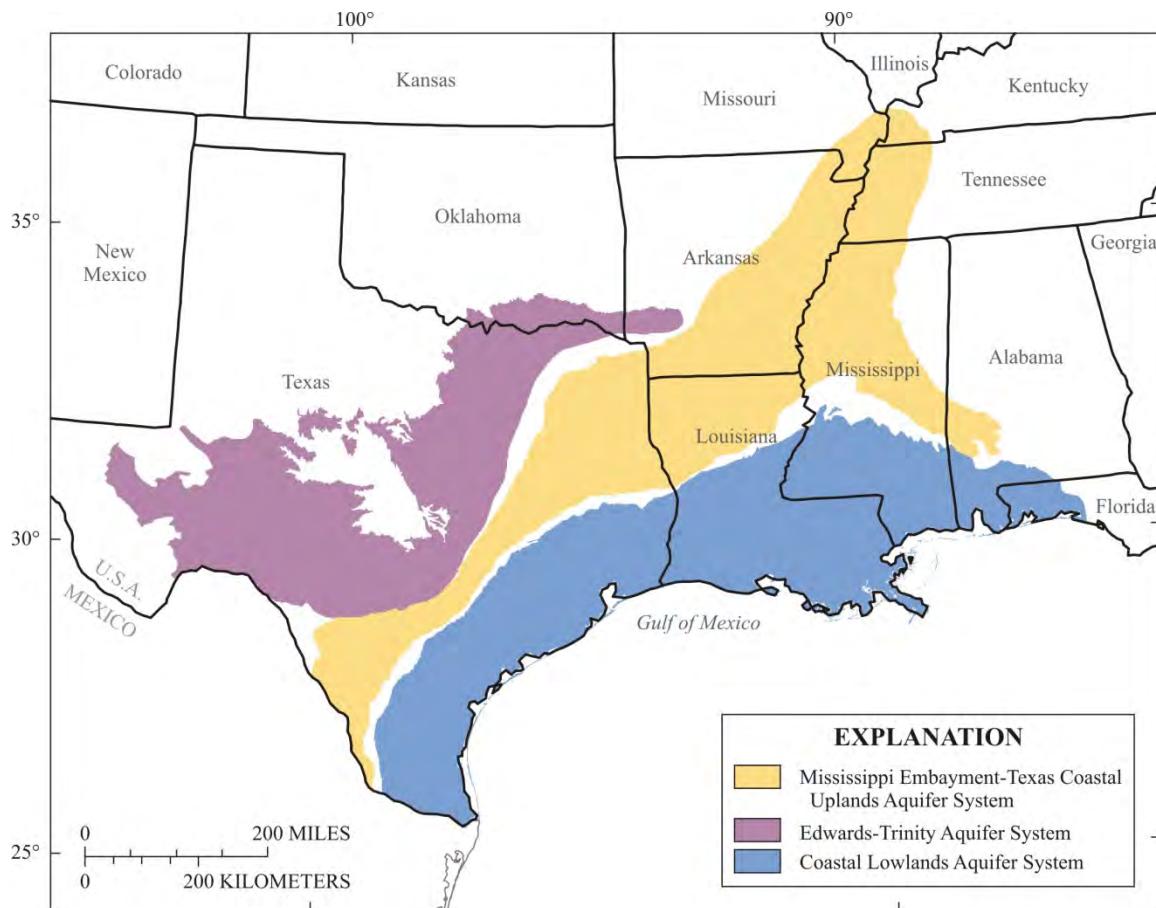
Index Value	Classification
4.00 or more	Extremely wet
3.00 to 3.99	Very wet
2.00 to 2.99	Moderately wet
1.00 to 1.99	Slightly wet
0.50 to 0.99	Incipient wet spell
0.49 to -0.49	Near normal
-0.50 to -0.99	Incipient dry spell
-1.00 to -1.99	Mild drought
-2.00 to -2.99	Moderate drought
-3.00 to -3.99	Severe drought
-4.00 or less	Extreme drought

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4.3.2.3 Assessing Vulnerabilities

Drought is not a location-specific hazard. Both Jackson County and the City of Gautier are equally vulnerable to drought. Map 4.3 shows the location of the Coastal Lowlands Aquifer System which includes Jackson County.

Map 4.3
Southern Coastal Aquifer System
(Source: USGS)



A severe, prolonged drought could have negative and lasting impacts on residents, agriculture, industry and infrastructure in Jackson County and the City of Gautier. When available water tables decline and potable water becomes harder to obtain, the residents, commuting population, and visitors are exposed to greater health risks. Any water-dependent functions in Jackson County are also exposed to greater risk.

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4.3.2.4 Previous Occurrences

The current conditions across southern Mississippi show Jackson County and the City of Gautier outside any drought condition zone. Historically, Mississippi is the third wettest state in the nation behind Hawaii and Louisiana, receiving an average of 59.23' of rain per year. Since the forecast period is a snapshot of current or foreseeable conditions over a reasonably long planning period, seasonal weather trends and use of the U.S. Drought Monitor can provide indicators of oncoming drought conditions.

There have been no recorded droughts for Jackson County or the City of Gautier.

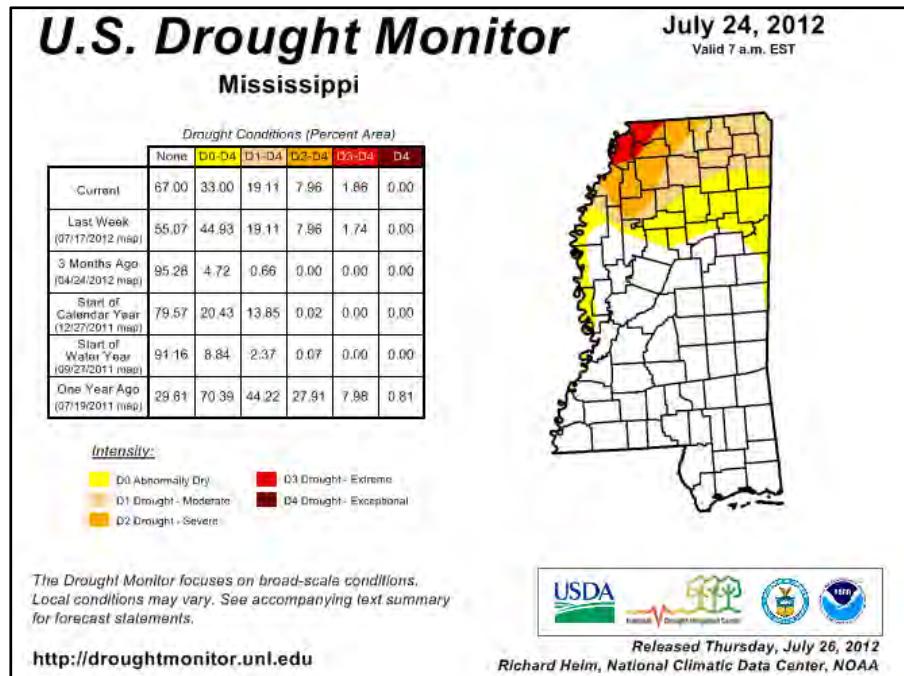
4.3.2.5 Probability

A lack of recorded historical drought data and forecasting limitations makes estimating probability of drought unrealistic within the context of this plan. Given statewide drought indices, the probability of future drought conditions is considered to be low as determined by the U.S. seasonal drought outlook. However, it is important to note that the seasonal drought outlook is a forecast through October, 2012 and is a much shorter timeframe than the 5 year planning horizon of this plan. Continuous monitoring of drought indices and forecasts are recommended.

Figure 4.1 shows current drought data for Mississippi (the smallest unit of data available); Figure 4.2 shows current national drought data; Figure 4.3 shows the U.S. Seasonal Drought Outlook.

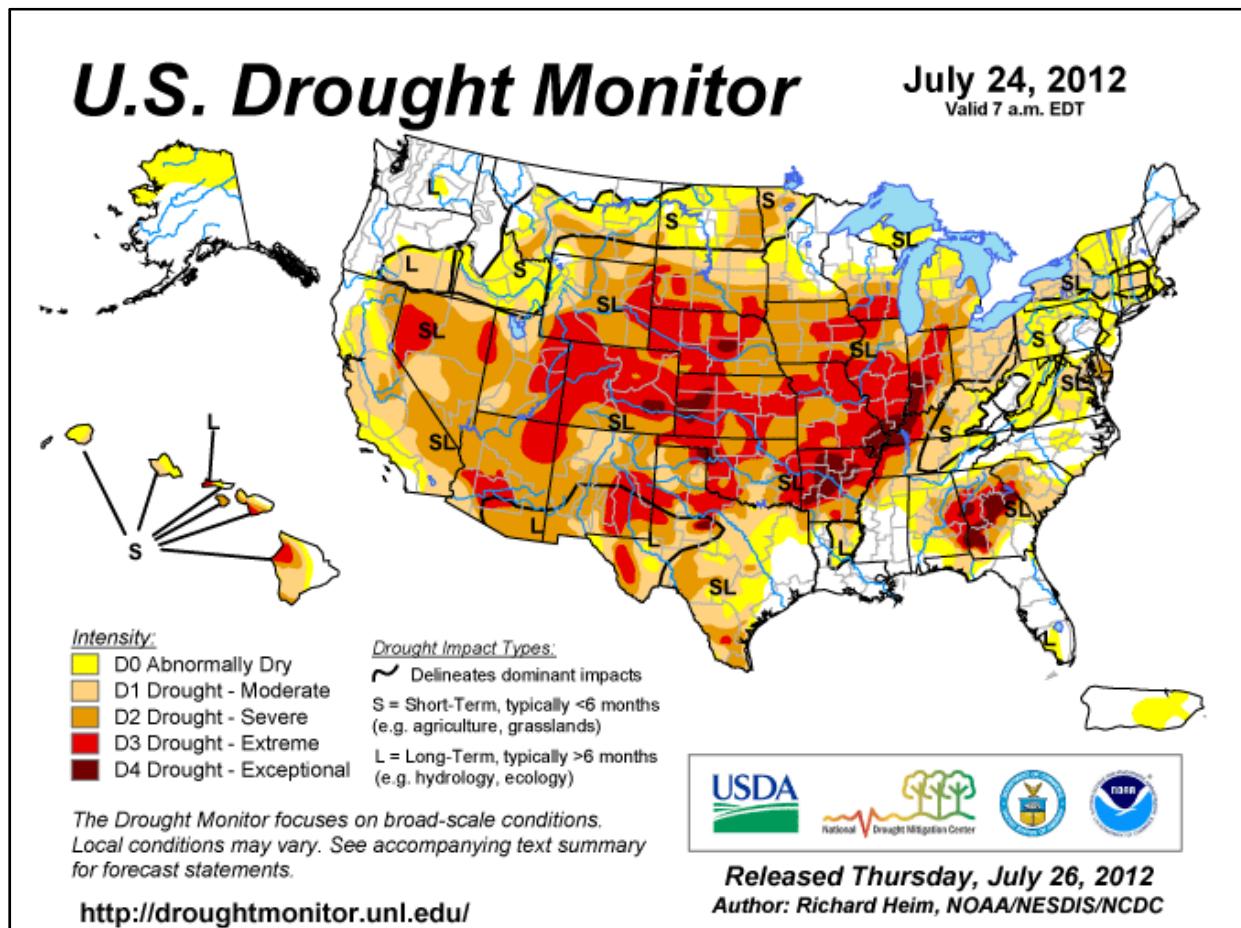
**Figure 4.1
Drought Monitor Data for Mississippi**

(Source: USDA)



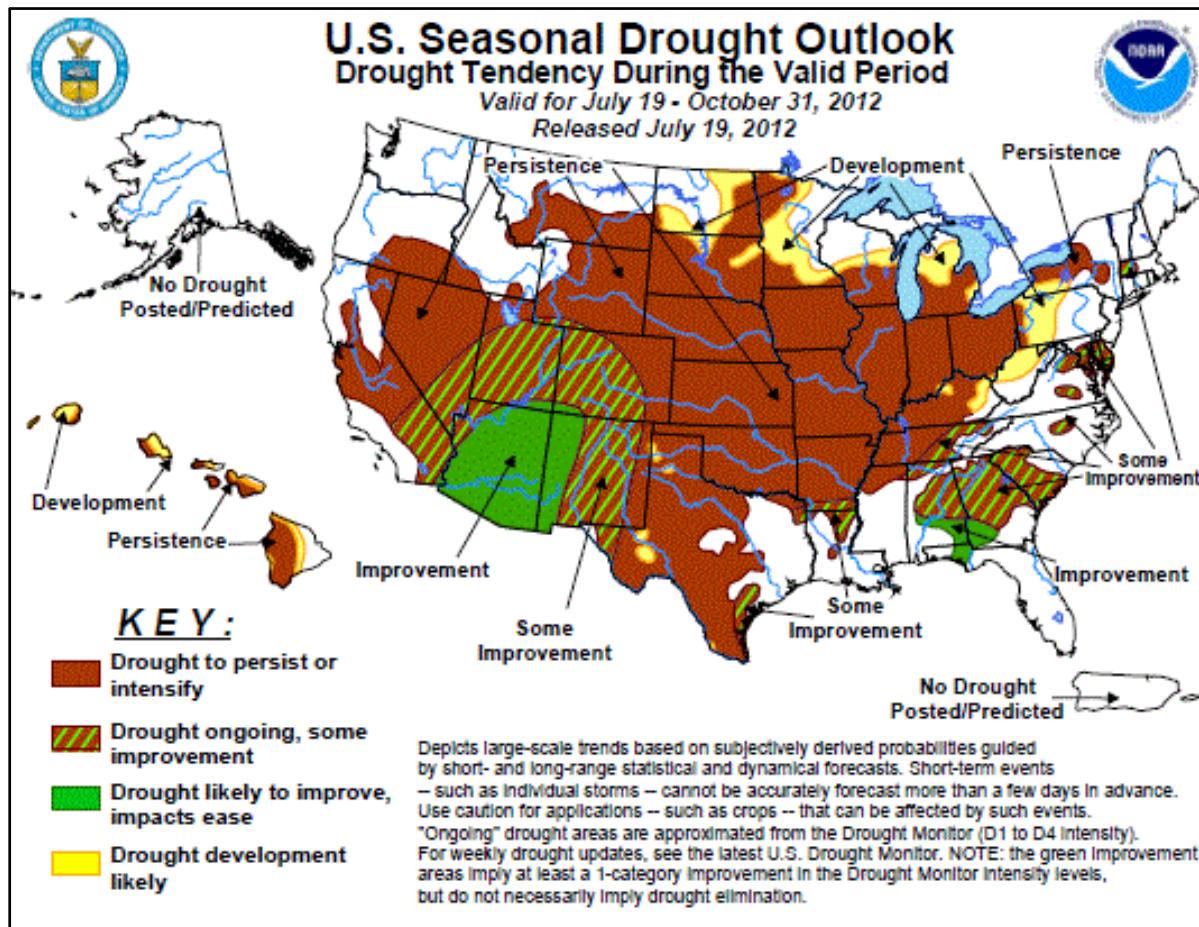
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Figure 4.2
Drought Monitor Data for United States
(Source: USDA)



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Figure 4.3
U.S. Seasonal Drought Outlook
(Source: USDA)



4.3.3 Flood

4.3.3.1 Description of the Flooding Hazard

A flood is a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties from:

- Overflow of inland or tidal waters,
- Unusual and rapid accumulation or runoff of surface waters from any source, or a mudflow.

Flooding occurs not only with coastal storms, but also with seasonal rainfall. The majority of properties having repetitive flood insurance claims over the past two decades made at least one of those claims due to rainfall not associated with a hurricane. The flooding of structures occurred because of localized drainage problems, which the participating jurisdictions have been addressing over the past years.

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The flood prone areas located in the participating jurisdictions are identified on the maps within the subsection of this chapter. With the vast amount of waterfront property in the communities, portions of many properties are within the floodplain. The flooding of homes has generally been because of obstructed drainage channels causing water to back up onto property.

The Jackson County Zoning Ordinance regulates the development of those areas that are subject to periodic or occasional inundation from stream overflows and tide conditions. All lands lying within this district are subject to inundation by the base (or 100 year) flood as defined on the Flood Insurance Rate Maps (FIRM) of Jackson County, Mississippi. The FEMA Flood Insurance Rate Maps estimate the amount of risk associated with flood hazard areas within the community. Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the Flood Hazard Factor (FHF), respectively. A unique zone number is associated with each possible FHF and varies from a 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

- **Zone A (1% annual chance flooding).** Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas, no depths or base flood elevations are shown within these areas.
- **Zone AE (1% annual chance of flooding).** Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. In most instances, base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
- **Zone AH (1% annual chance of flooding).** Areas with a 1% annual chance of flooding where shallow flooding (usually areas of ponding) can occur with average depths between one and three feet.
- **Zone AO (1% annual chance of flooding).** Areas with a 1% annual chance of flooding, where shallow flooding average depths are between one and three feet.
- **X500 (0.2% annual chance of flooding).** Represents areas between the limits of the 1% annual chance flooding and 0.2% chance flooding.
- **Zone X.** Areas outside of the 1% annual chance floodplain and 0.2% annual chance floodplain, areas of 1% annual chance sheet flow flooding where average depths are less than one (1) foot, areas of 1% annual chance stream flooding where the contributing drainage area is less than one (1) square mile, or areas protected from the 1% annual chance flood by levees. No Base Flood Elevation or depths are shown within this zone.

As expected the areas that pose the greatest probability of flooding are located within the A and V zones. Areas within the X500 are less likely to flood but still pose a 0.2% possibility of flooding in any given year.

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4.3.3.2 Hazard Profile

Historical documentation of flooding indicates that flooding may occur during any season of the year. For the planning area, the most damaging floods have occurred in April, June, and July. Based on historical analysis, floods are most likely to occur between March and September. Floods are least likely to occur in autumn and winter months, but two floods have been recorded in January (1993 and 1998).

Flooding is a relatively frequent hazard in the planning area. Severity ranges from localized to county-wide and regional events. Flood events can last from a few hours to a few days, leaving roads and bridges rendered impassible. The primary flooding sources for the planning area are flash flooding from torrential rains. The most costly flood was reported on April 1, 2005, with recorded property damage of \$200,000. The April 1, 2005 flood event was caused by torrential rains that started on the evening of March 31 and resulted in the flooding of numerous roadways and homes in sections of coastal and south Mississippi. The hardest hit area was Jackson County where 8 to 12 inches of rain fell during the night and morning hours. The heavy rain also resulted in significant flooding in lower portions of several rivers and streams in south Mississippi, particularly along major rivers in Harrison and Jackson Counties, such as the Escatawpa, Biloxi and Tchoutacabouffa Rivers. Overall 250 homes and numerous roadways were flooded across Jackson County.

Beyond using standardized DFIRM zones, it is difficult to predict the extent of flood depth without performing detailed land surveys because depth is variable based on topography and the amount of water entering the floodplains and planning area. The DFIRMs are provided as Maps 4.4 through 4.5 for the planning area and show the Special Hazard Flood Areas, their expected extent of flooding beyond the river basins, and their relation to Jackson County/City of Gautier critical facility locations within the planning area. Flood depth is estimated in Section 4.5.3, *Estimating Potential Losses – Flood*. The maps show four Jackson County facilities and one City of Gautier facility in the AE zone. There are also 11,867 privately-owned properties across Jackson County within the SFHA (A, AE, AH, and V zones combined).

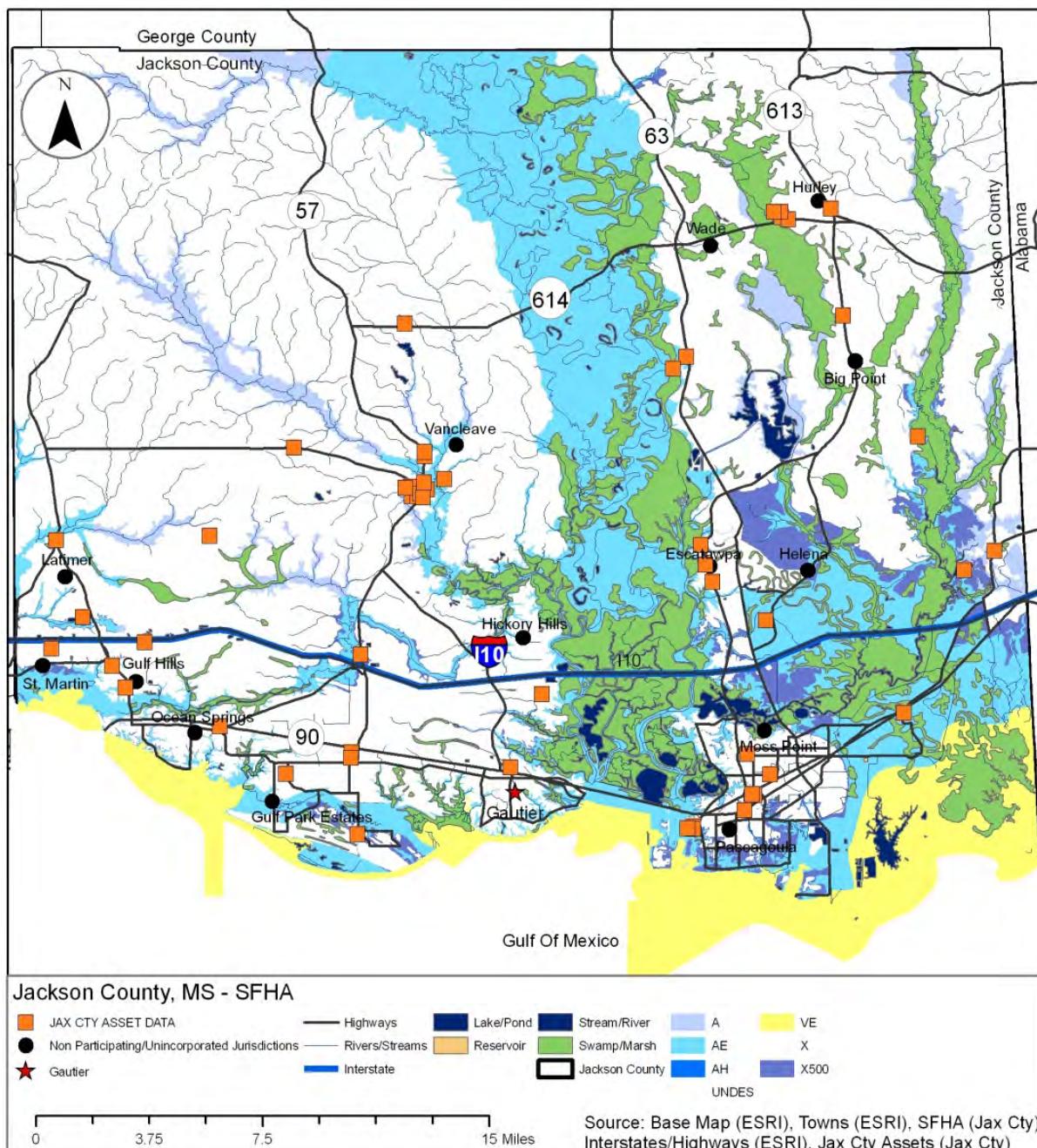
There are three Jackson County facilities and 6,977 privately-owned properties within the X500 zone. Those buildings have a 0.2 percent chance of annual flooding. Depths and base flood elevations are not provided.

4.3.3.3 Assessing Vulnerabilities

Jackson County and the City of Gautier currently participate in the NFIP. The Jackson County Utility Authority – Gautier, Jackson County Utility Authority – Pascagoula, the Jackson County Airport, Presley's Outing, the River Pump Station, and the Woodland Park Mobile Home Village are located in the designated 1% flood zone. It is important to consider that floods, especially flash floods, can occur outside the floodplain. Several county-owned facilities also lie in the 0.2% flood zone (X500) and include the Jackson County Complex, the EOC Radio Communications Tower, and the Jackson County EOC.

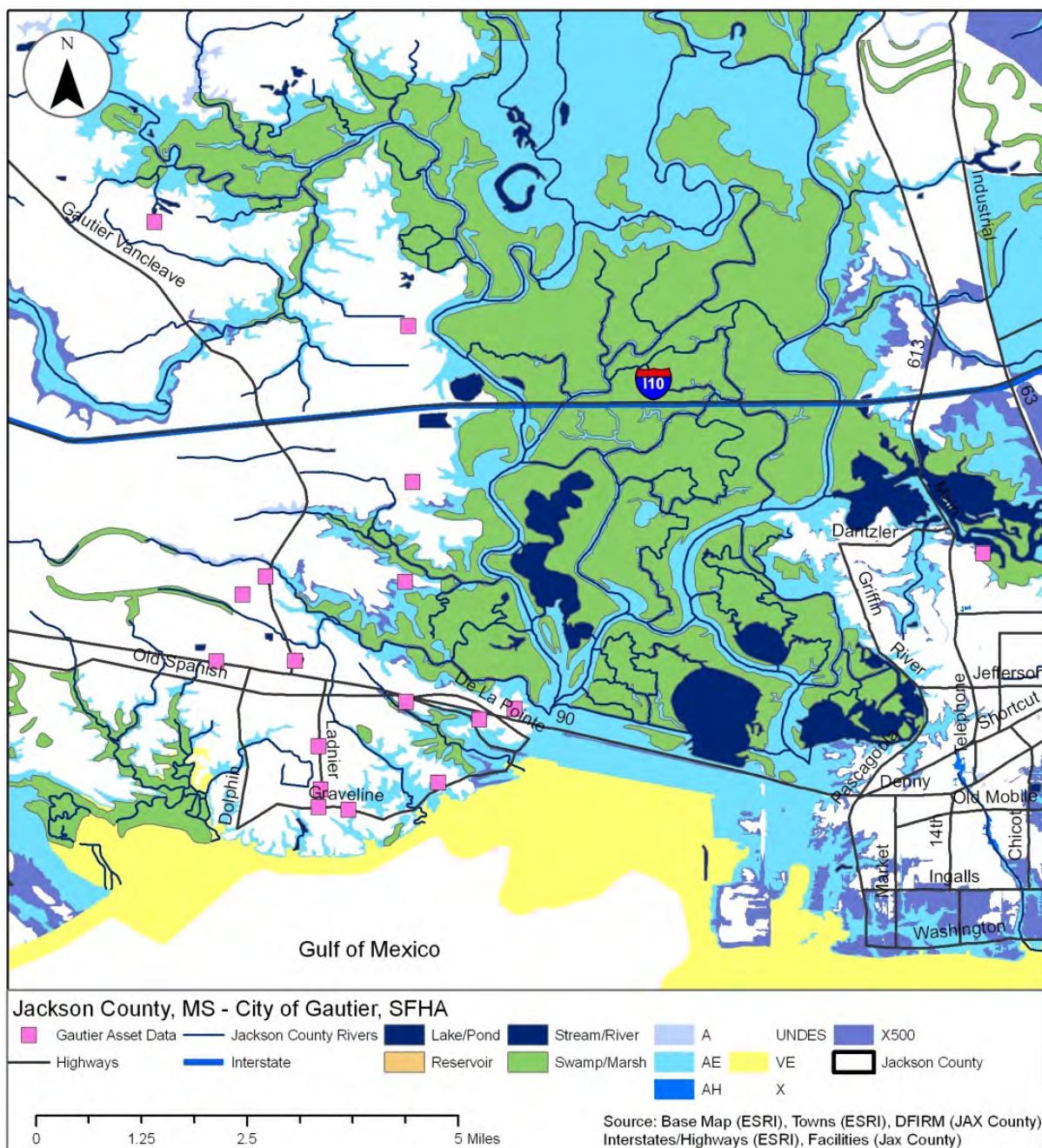
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Map 4.4
Jackson County Special Flood Hazard Area
(Source: ESRI, Jackson County)



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Map 4.5
Gautier Special Hazard Flood Area
(Source: ESRI, Jackson County)



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4.3.3.4 Previous Occurrences

The following is a list of flooding events gathered from the NCDC U.S. Storm Events Database:

Table 4.6
Previous Occurrences of Flooding in Jackson County
(Source: NCDC, Jackson County)

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
Escatawpa	01/20/1993	0000	Flood	N/A	0	0	50K	0
Jackson Co.	05/09/1995	0100	Flash Flood	N/A	0	0	0	0
Coastal Roadways	07/29/1995	1200	Coastal Flood	N/A	0	0	0	0
Gautier	12/18/1995	0700	Urban Flood	N/A	0	0	0	0
Pecan	04/15/1996	0600	Flash Flood	N/A	0	0	0	0
Pascagoula /Helena	01/07/1998	0500	Flash Flood	N/A	0	0	50K	0
Countywide	03/07/1998	1200	Flash Flood	N/A	0	0	0	0
Jackson Co.	03/08/1998	0100	Flood	N/A	0	0	0	0
Countywide	06/11/2001	0235	Flash Flood	N/A	0	0	150K	0
Moss Point	08/05/2002	0900	Flash Flood	N/A	0	0	50K	0
Jackson Co.	07/01/2003	1200	Flood	N/A	0	0	1.0M	0
Countywide *Moss Point hardest hit*	04/01/2005	0430	Flash Flood	N/A	0	0	200K	0
Countywide *Moss Point hardest hit*	04/01/2005	0930	Flood	N/A	0	0	325K	0
Ocean Springs	04/06/2005	1445	Flash Flood	N/A	0	0	0	0
Jackson County	03/28/2009	0100	Flash Flood	N/A	0	0	0	0
Jackson County	09/22/2009	2200	Flash Flood	N/A	0	0		0
Jackson County	09/03/2011	1440	Flash Flood	N/A	0	0	25K	0
TOTALS:					0	0	1.850M	0

Table 4.7
Previous Occurrences of Flooding in the City of Gautier
(Source: NCDC, Jackson County)

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
Gautier	12/18/1995	0700	Urban Flood	N/A	0	0	0	0

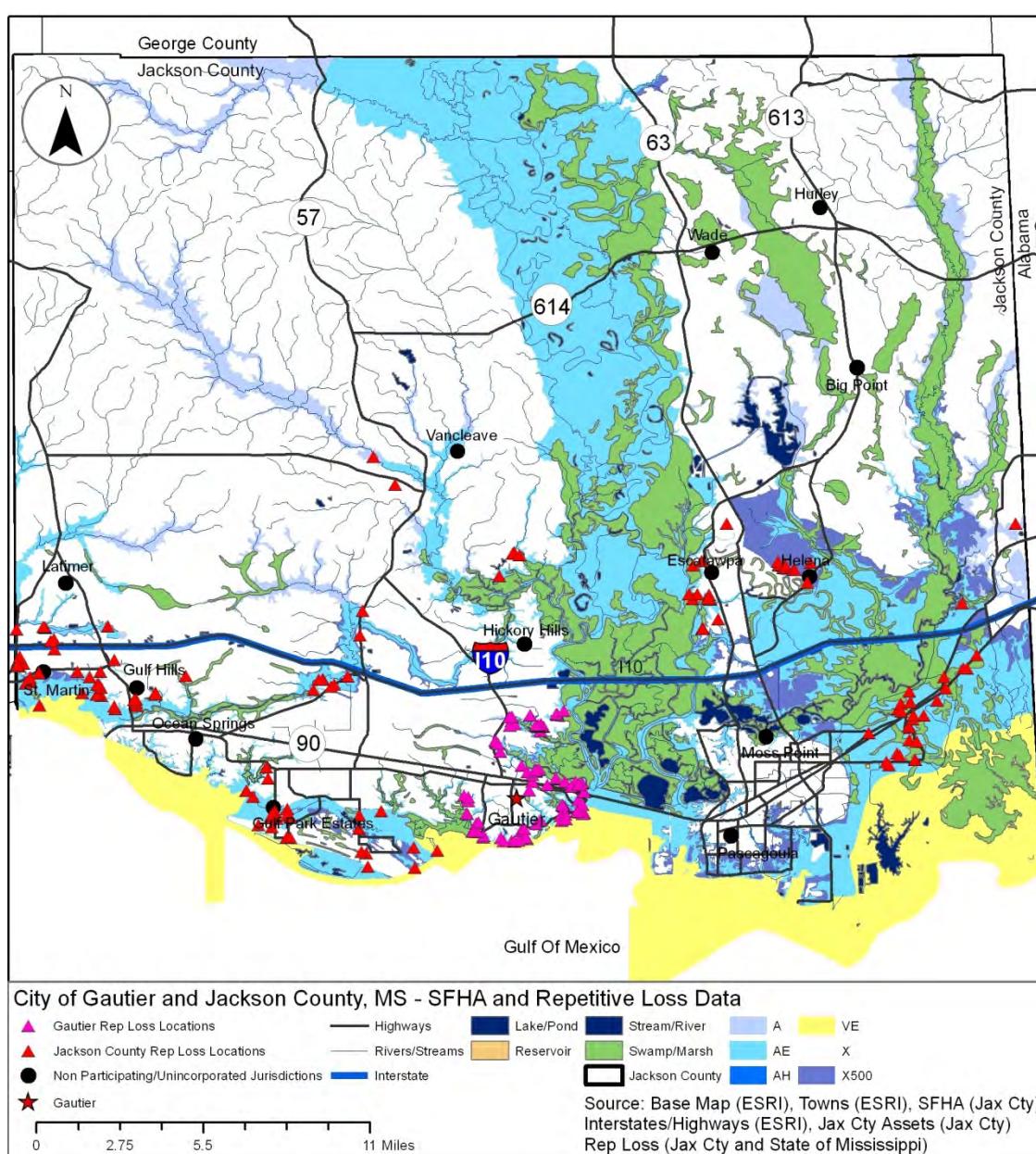
Repetitive Loss Properties-The NFIP/CRS defines a repetitive loss property as a property that is currently insured for which two or more NFIP losses (occurring more than ten days apart) of at least \$1000 each have been paid within any 10-year period since 1978. To assist in the reduction of the number of flooded structures, Jackson County requires all new structures within the floodplain to be constructed above the base flood elevation with the building owner providing an elevation certificate. Even with this precaution, there are currently 271 properties

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categorized as repetitive loss structures according to the NFIP/CRS in the jurisdictions participating in the plan. These properties break down as follows (listing of properties provided in Appendix 8.5-C is provided for Official Use Only):

- Jackson County (Unincorporated)-173
- City of Gautier-98

Map 4.6
City of Gautier and Jackson County Repetitive Loss Structures
(Source: ESRI, MEMA, Jackson County)



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4.3.3.5 Probability

The planning area is subject to flash, coastal, and riverine flooding. An annualized average of 0.89 flood events can be expected with varying degrees of impact in Jackson County. Gautier can expect an annualized average of 0.05 flooding events per year. Based on historical data, the probability of a future occurrence of the flooding hazard in Jackson County is high and for the City of Gautier, it is low.

4.3.4 Hurricane/Coastal Storm

4.3.4.1 Description of the Hazard

Hurricanes and Coastal Storms: A hurricane is a tropical storm with winds that have reached a constant speed of 74 miles per hour or more. Hurricane winds blow in a large spiral around a relative calm center known as the "eye." The "eye" is generally 20 to 30 miles wide, and the storm may extend outward 400 miles or more. As a hurricane approaches, the skies will begin to darken and winds will grow in strength. As a hurricane nears land, it can bring torrential rains, high winds, and storm surges. A single hurricane can last for more than 2 weeks over open waters and can run a path across the entire length of the eastern seaboard.

Hurricanes are the strongest natural hazard threat to human life and property on a recurrent basis. Tropical storms and hurricanes threaten the participating jurisdictions with winds, rain and storm surge. Jackson County Emergency Preparedness participates with local media in educating the public of the dangers of hurricanes. Due to the size of hurricanes and coastal storms any portion of Jackson County including Gautier can be affected to some degree by these storms.

4.3.4.2 Hazard Profile

The Atlantic hurricane season begins June 1 and ends on November 30, but hurricanes have developed outside of the designated season.

Hurricane wind intensity is measured with the Saffir-Simpson Hurricane Scale. The Saffir-Simpson Hurricane Scale is a 1-5 rating based on the hurricane's present intensity. This is used to give an estimate of the potential property damage expected along the coast from a hurricane landfall. Wind speed is the determining factor in the scale. Note that all winds are using the U.S. 1-minute average.

The following excerpt from the National Hurricane Center explains revised definition of the Saffir-Simpson Hurricane Scale and the separation of storm surge from storm category:

Earlier versions of the Saffir-Simpson Hurricane Scale incorporated central pressure and storm surge as components of the categories. The central pressure was used during the 1970s and 1980s as a proxy for the winds as accurate wind speed intensity measurements from aircraft reconnaissance were not routinely available for hurricanes until 1990. Storm surge was also

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quantified by category in the earliest published versions of the scale dating back to 1972. However, hurricane size (extent of hurricane-force winds), local bathymetry (depth of near-shore waters), topography, the hurricane's forward speed and angle to the coast also affect the surge that is produced. For example, the very large Hurricane Ike (with hurricane force winds extending as much as 125 mi from the center) in 2008 made landfall in Texas as a Category 2 hurricane and had peak storm surge values of about 20 ft. In contrast, tiny Hurricane Charley (with hurricane force winds extending at most 25 mi from the center) struck Florida in 2004 as a Category 4 hurricane and produced a peak storm surge of only about 7 ft. These storm surge values were substantially outside of the ranges suggested in the original scale. Thus to help reduce public confusion about the impacts associated with the various hurricane categories as well as to provide a more scientifically defensible scale, the storm surge ranges, flooding impact and central pressure statements are removed from the Saffir-Simpson Hurricane Scale and only peak winds are employed in this revised version.

The Saffir Simpson Hurricane Scale no longer predicts storm surge on a grand scale. Storm surge is predicted by the NOAA Weather Field Office (WFO) for each storm and is updated as the storm approaches landfall but to date, storm surge remains classified by storm category. (See Storm Surge, Section 4.3.6).

Table 4.8 depicts the Saffir-Simpson Scale by category, associated wind speeds and expected damages from a particular event.

Table 4.8
Saffir-Simpson Hurricane Scale
(Source: National Hurricane Center)

Category	Winds	Effects on Land
One	74-95 mph	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees.
Two	96-110 mph	Some roofing material, door, and window damage to buildings. Considerable damage to vegetation, mobile homes, and piers.
Three	111-130 mph	Some structural damage to small residences and utility buildings with a minor amount of curtain wall failures. Mobile homes are destroyed.
Four	131-155 mph	More extensive curtain wall failures with some complete roof structure failure on small residences. Major erosion of beach. Major damage to structures near the shore.
Five	greater than 155 mph	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Major damage to all structures located within 500 yards of the shoreline.

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The following terms are used to describe Tropical Systems / Hurricanes:

Tropical Wave: A Tropical Wave is a trough or cyclonic curvature maximum in the trade-wind easterlies. The wave may reach maximum amplitude in the lower middle troposphere.

Tropical Depression: A Tropical Depression is a tropical cyclone in which the maximum sustained surface wind speed (using the U.S. 1-minute average) is 33 kt (38 mph or 62 km/hr) or less.

Tropical Storm: A tropical cyclone in which the maximum sustained surface wind speed (using the U.S. 1-minute average) ranges from 34 kt (39 mph or 63 km/hr) to 63 kt (73 mph or 118 km/hr).

Hurricane: A tropical cyclone in which the maximum sustained surface wind (using the U.S. 1-minute average) is 64 kt (74 mph or 119 km/hr) or more.

4.3.4.3 Assessing Vulnerabilities

Jackson County and the City of Gautier are subject to the threat of hurricanes. A direct or indirect impact from these systems can produce damage from surge (See Section 4.3.6) and flooding along the coastal areas, to high wind and isolated tornadoes across all of Jackson County. The entirety of Jackson County can be affected by a hurricane.

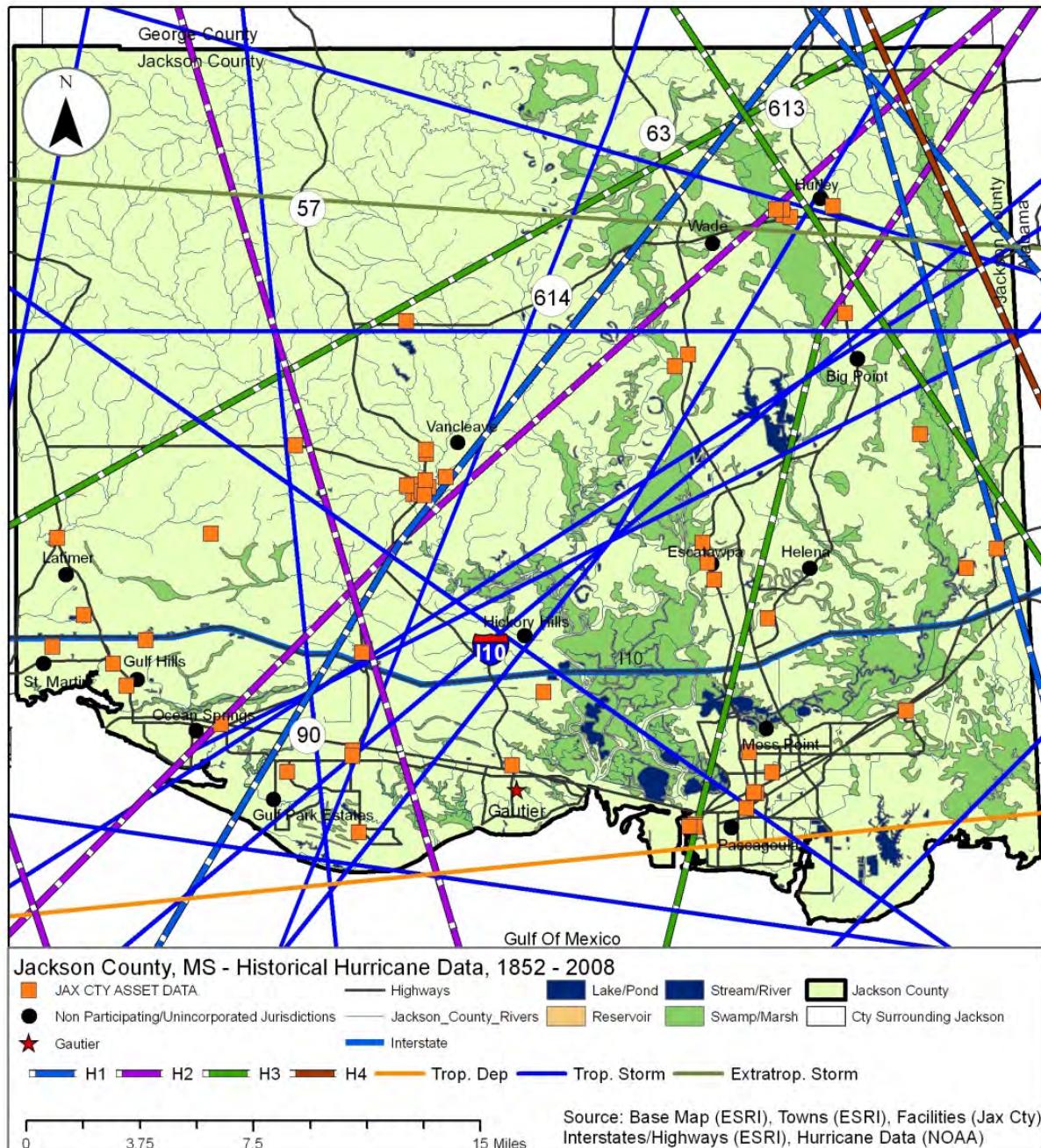
The NCDC database indicates that Jackson County has experienced 14 hurricane and coastal storm-related events between 1995 and 2012. During this period there were 17 deaths, 105 injuries, and over \$8.0 Billion in property damage. In 2005, Hurricane Katrina made landfall in on the eastern Louisiana shore and caused \$7.4 Billion in damages.

This information reflects a significant part of the recovery costs from strong winds and storm surge. However, there are also very significant costs associated with interrupted business, lost wages, and utility disruption that are very difficult to quantify but are nevertheless important metrics for determining the impact.

The most recent hurricane/coastal storm impact in Jackson County was in September, 2008. Maps 4.7 through 4.8 show the tropical impacts from 1852-2008:

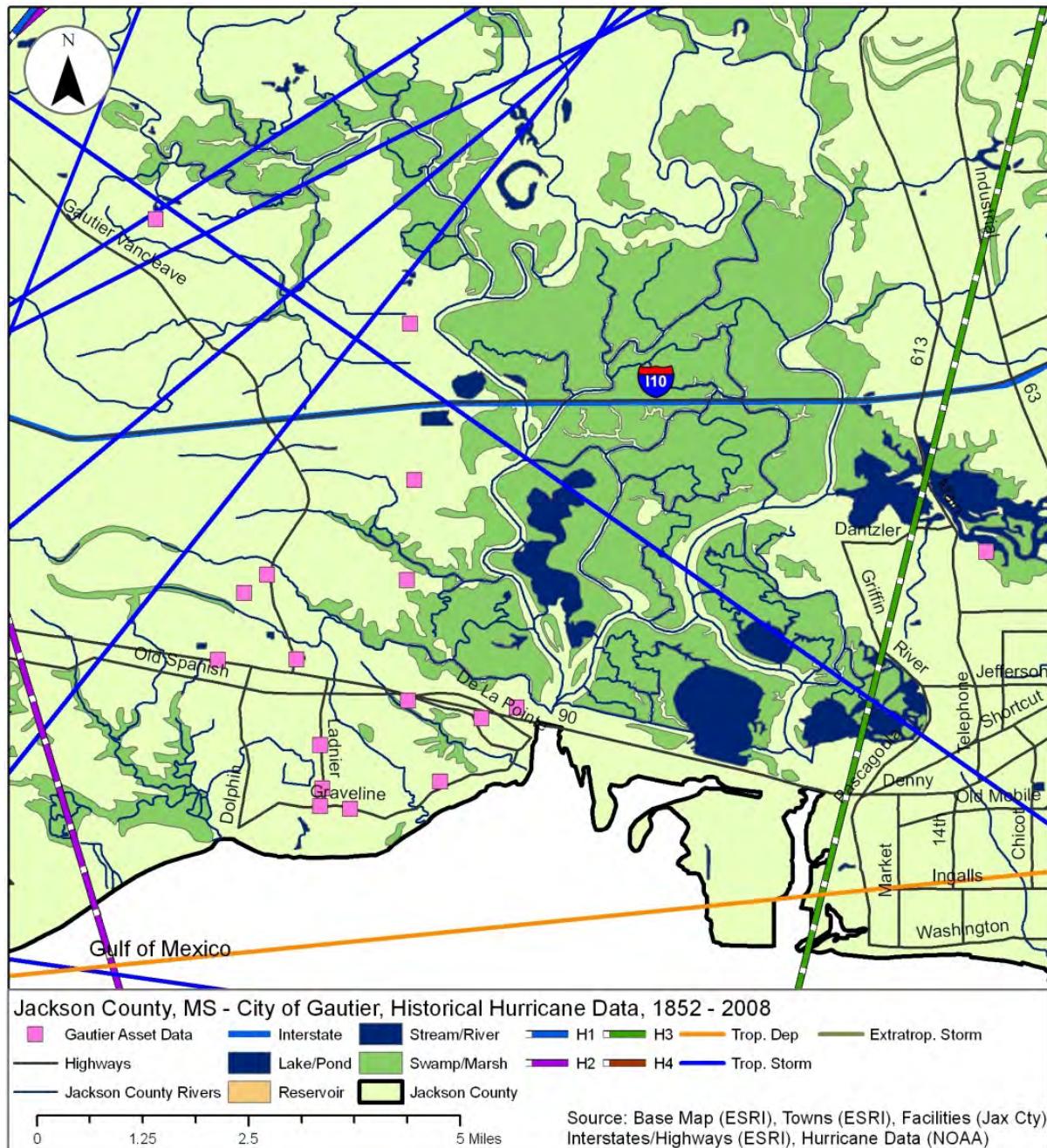
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Map 4.7
Jackson County Hurricane Tracks
(Source: ESRI, Jackson County, NOAA)



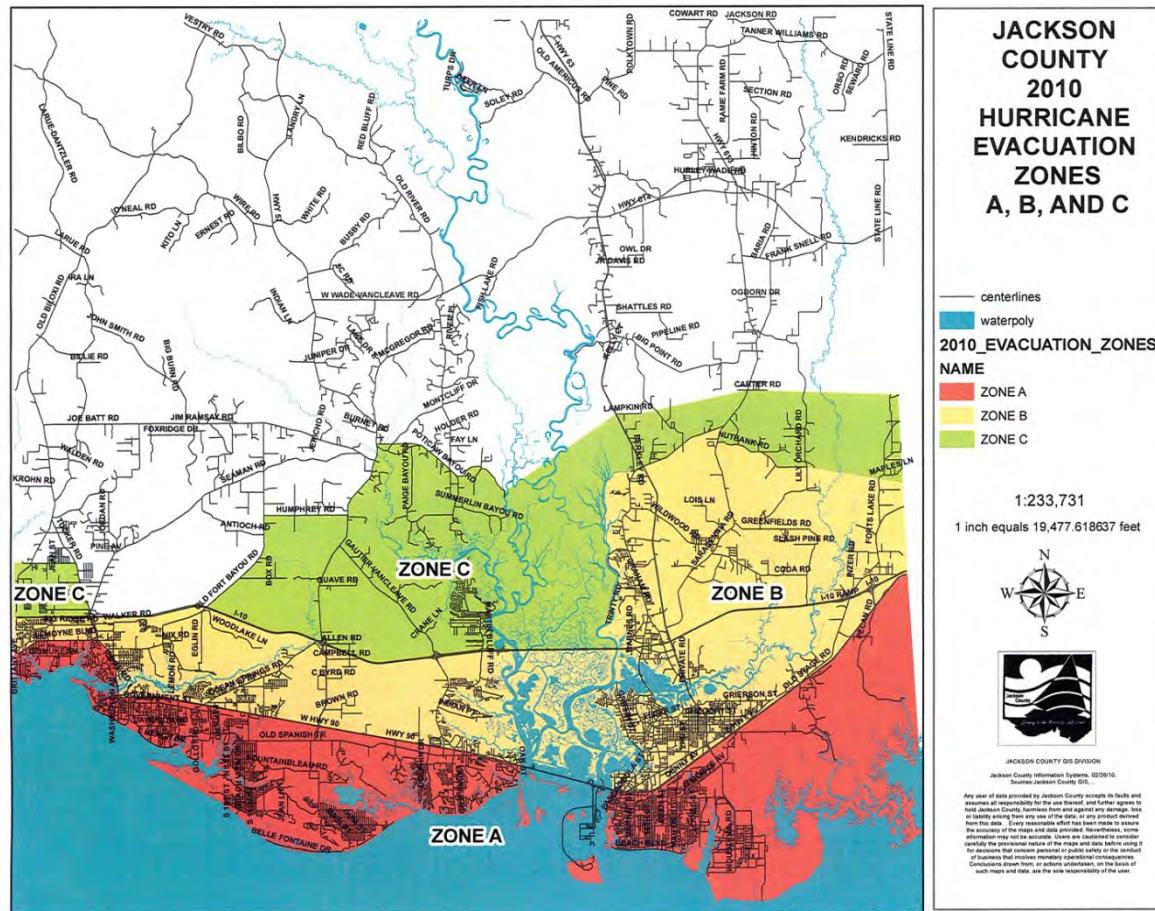
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Map 4.8
City of Gautier Hurricane Tracks
(Source: ESRI, Jackson County, NOAA)

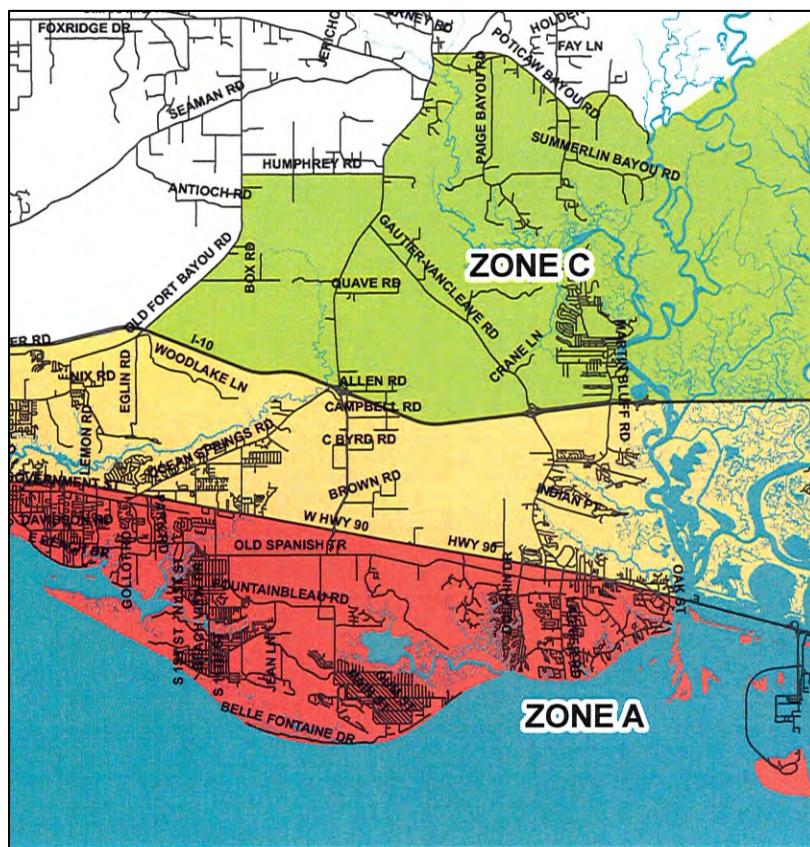


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Map 4.9
Jackson County Hurricane Evacuation Zones
(Source: Jackson County)



Map 4.10
Gautier Hurricane Evacuation Zones
(Source: Jackson County)



4.3.4.4 Previous Occurrences

The Mississippi Gulf Coast, including Jackson County has experienced numerous hurricanes over the past century. Each year there is a ten percent chance that a hurricane or a tropical storm will impact the Mississippi Gulf Coast, and a three percent that a major hurricane will impact the area².

Hurricanes that made landfall along the Mississippi Coast over the past 40 years include:

- Hurricane of 1901 - Category 4
- Hurricane of 1906 - Category 3
- Hurricane of 1916 - Category 3
- Hurricane of 1926 - Category 4
- Hurricane Camille (1969) – Category 5
- Hurricane Frederick (1979) – Category 3
- Hurricane Elena (1985) – Category 3
- Hurricane Katrina (2005) – Category 3

² Hurricane Watch - Forecasting the Deadliest Storms on Earth; Jack Williams and Bob Sheets; 2001.

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In addition to the above major storms, Hurricane Georges (1998), Hurricane Isidore (2002), Tropical Storm Allison (2001), Hurricane Ivan (2004), and Hurricane Gustav (2008) recently impacted the Mississippi Gulf Coast. All four resulted in Presidential disaster declarations. In addition to the previously mentioned storms the following storms also impacted the participating jurisdictions to some degree.

Table 4.9
Previous Occurrences of Hurricanes/Coastal Storms
(Source: NCDC)

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1. Jackson Co.	10/04/1995	02:00 AM	Hurricane Opal	N/A	0	1	75K	0
2. Jackson Co.	07/17/1997	06:00 PM	Hurricane	N/A	0	0	0	0
3. Jackson Co.	09/02/1998	06:00 AM	Tropical Storm	N/A	0	0	0K	0
4. Jackson Co.	09/19/1998	06:00 PM	Tropical Storm	N/A	0	0	85K	0
5. Jackson Co.	08/04/2002	06:00 PM	Tropical Storm	N/A	0	0	50K	0
6. Jackson Co.	09/14/2002	12:00 AM	Tropical Storm	N/A	0	0	0	0
7. Jackson Co.	10/02/2002	06:00 PM	Tropical Storm	N/A	0	0	13.4M	0
8. Jackson Co.	06/30/2003	08:00 AM	Tropical Storm	N/A	0	0	1.0M	0
9. Jackson Co.	09/15/2004	03:00 PM	Hurricane/typhoon	N/A	0	0	8.0M	0
10. Jackson Co.	06/10/2005	12:00 PM	Tropical Storm	N/A	0	0	0	0
11. Jackson Co.	07/05/2005	03:00 PM	Tropical Storm	N/A	0	0	10.0M	0
12. Jackson Co.	07/10/2005	01:00 AM	Hurricane/typhoon	N/A	0	0	0	0
13. Jackson Co.	08/28/2005	11:00 AM	Hurricane/typhoon	N/A	0	0	7.4B	0
14. Jackson Co.	09/11/2008	5:00 AM	Tropical Storm	N/A	0	0	0	0
Totals:					1	1	8.059B	0

Notable Hurricane events over the past ten years are summarized below:

September 2002-Tropical Storm Isidore: Tropical Storm Isidore made landfall near Grand Isle, Louisiana during the early morning of September 26th. The tropical storm moved north across southeast Louisiana and by the evening of the 26th was located in central Mississippi where it was downgraded to a tropical depression. Tropical Storm Isidore had a large circulation with tropical storm force winds extending several hundred miles from its center. Tide levels were generally 4 to 7 feet above normal, with locally higher levels, across much of coastal Mississippi. Significant beach erosion occurred along the coast and on the barrier islands. The

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maximum storm surge reading on the Mississippi Coast was 7.61 ft NGVD at the Corps of Engineers tide gage at Gulfport Harbor, and 6.86 ft NGVD in Biloxi Bay at Point Cadet. There were two fatalities on the Mississippi Coast related to the tropical storm; one direct and another indirect. Rainfall amounts associated with Isidore were generally 5 to 8 inches and resulted in some river flooding and flash flooding. Approximately 2,500 homes in Hancock County, 1,400 homes in Harrison County and 50 homes and business in Jackson County were flooded, primarily as the result of storm surge, with river flooding and flash flooding causing some of the flood damage.

August 28, 2005-Hurricane Katrina: Hurricane Katrina was one of the strongest and most destructive hurricanes on record to impact the coast of the United States. It was recorded as one the worst natural disasters 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. 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. 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 as a Category 3 storm with maximum sustained winds estimated around 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. 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. Excluding losses covered by the National 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. 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. 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.

September 1, 2008–Hurricane Gustav: Hurricane Gustav made landfall as a Category 2 hurricane near Cocodrie Louisiana during the morning of September 1st. Gustav continued to move northwest and weakened to a Category 1 storm over south central Louisiana later that day. The highest wind gust recorded in south Mississippi was 74 mph at the Gulfport-Biloxi Regional Airport while the highest sustained wind of 54 mph was recorded at the Waveland Yacht Club. No official wind observations were available in far southwest Mississippi; however

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wind gusts to hurricane force may have occurred. Rainfall varied considerably ranging from around 4 to 10 inches. Gustav produced mainly light wind damage across coastal Mississippi, although more significant and concentrated damage occurred in southwest Mississippi closer to the track of center of the storm. Widespread power outages occurred in southern Mississippi.

4.3.4.5 Probability

Numerous hurricanes and coastal storms have impacted southern Mississippi including Jackson County and the City of Gautier. An annualized average of 0.82 hurricane events can be expected with varying degrees of impact in Jackson County making the probability of hurricane impacts high.

4.3.5 Sea Level Rise

4.3.5.1 Description Hazard

Sea-level rise is a phenomenon that affects coastal and tidal areas, and land areas with elevations close to sea level. Land subsidence, caused by the compaction of loose soils such as that found in river delta areas, will affect land elevation. Relative sea-level rise in these areas will be greater.

4.3.5.2 Hazard Profile

Jackson County areas adjacent to the Pascagoula River, marsh lands, and the shoreline are at risk to impact from sea level rise. Specific local studies have not been conducted in Jackson County or the City of Gautier, but the Steering Committee recognizes that climate change is affecting the mean sea level along the Gulf Coast and will eventually impact low elevation areas of Jackson County.

4.3.5.3 Assessing Vulnerabilities

Land use and urban planning in coastal areas must take into account the phenomenon of sea level rise. Sea levels are currently rising along the Gulf Coast as a result of climate change. Rising sea levels inundate low areas, erode beaches and wetlands, increase flooding from storm surges and rainstorms, and enable saltwater to advance upstream.

As coastal population densities increase, greater numbers of people and assets are at risk. For example, increased storm surges due to rising sea levels could impact low-lying roadways, inland marshes along the Pascagoula River, and areas south of US 90.

Rising sea level affects both the natural and the human-made environment. Future sea level rise could result in the disappearance of a large percentage of coastal wetlands which are already stressed by development and other activities. Saltwater advancing upstream can alter the point at which flocculation leads to sedimentation and the creation of shoals. Storm surges from hurricanes can reach further inland as mean sea levels rise.

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As sea level rises, drainage systems become less effective. Rainstorms will have the potential to cause greater flooding. Jackson County and the City of Gautier already experience problems with inadequate storm drainage in low-lying areas. As the sea level rises, these areas may experience increased flooding and slowed recovery from flood waters.

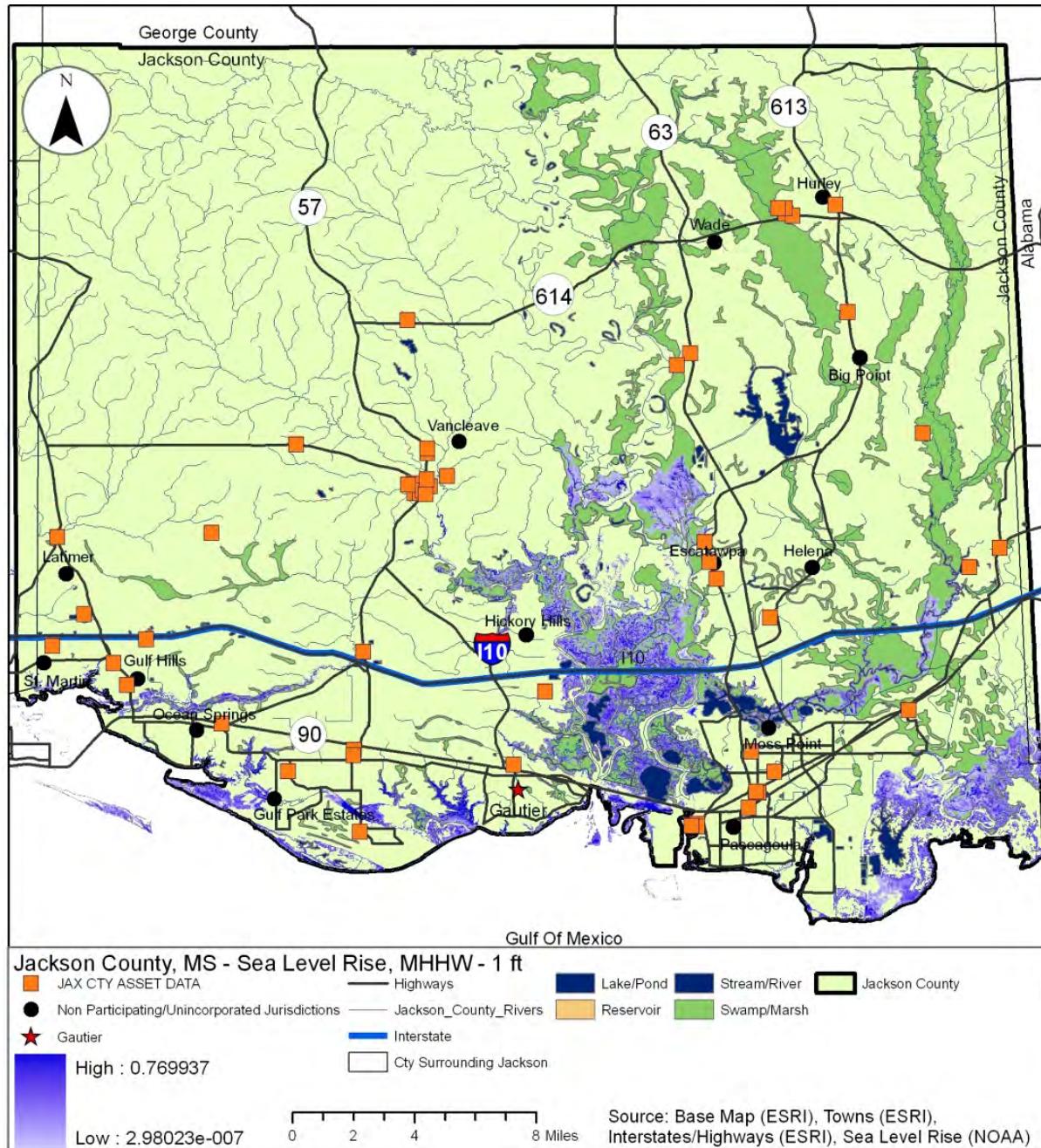
Port facilities on the water's edge are particularly susceptible to sea level rise. Docks, jetties, and other facilities are deliberately set at an optimal elevation relative to the water level, and therefore a rise in sea level leaves them at a suboptimal elevation. However, these facilities tend to be rebuilt relatively frequently compared with the time it takes for a substantial rise in sea level.

Commercial, industrial, and residential properties along the coastline that are currently at risk to flooding and storm surge are also vulnerable to sea level rise.

Maps 4.11 through 4.16 show modeled potential changes to Jackson County and the City of Gautier with sea level rise on the subsequent pages:

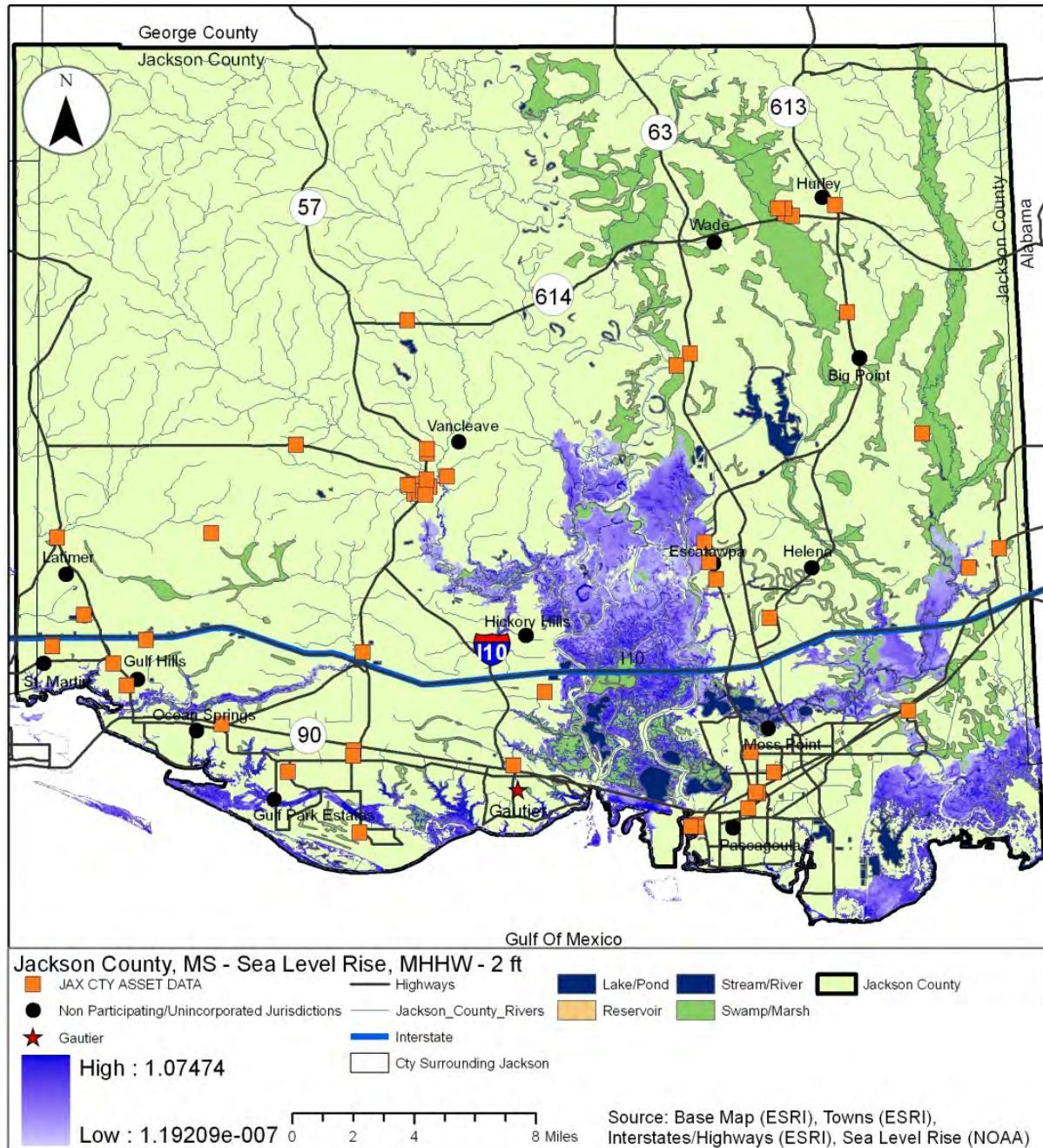
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Map 4.11
Sea Level Rise – 1 Foot, Mean Higher High Water
(Source: Jackson County, ESRI, NOAA)



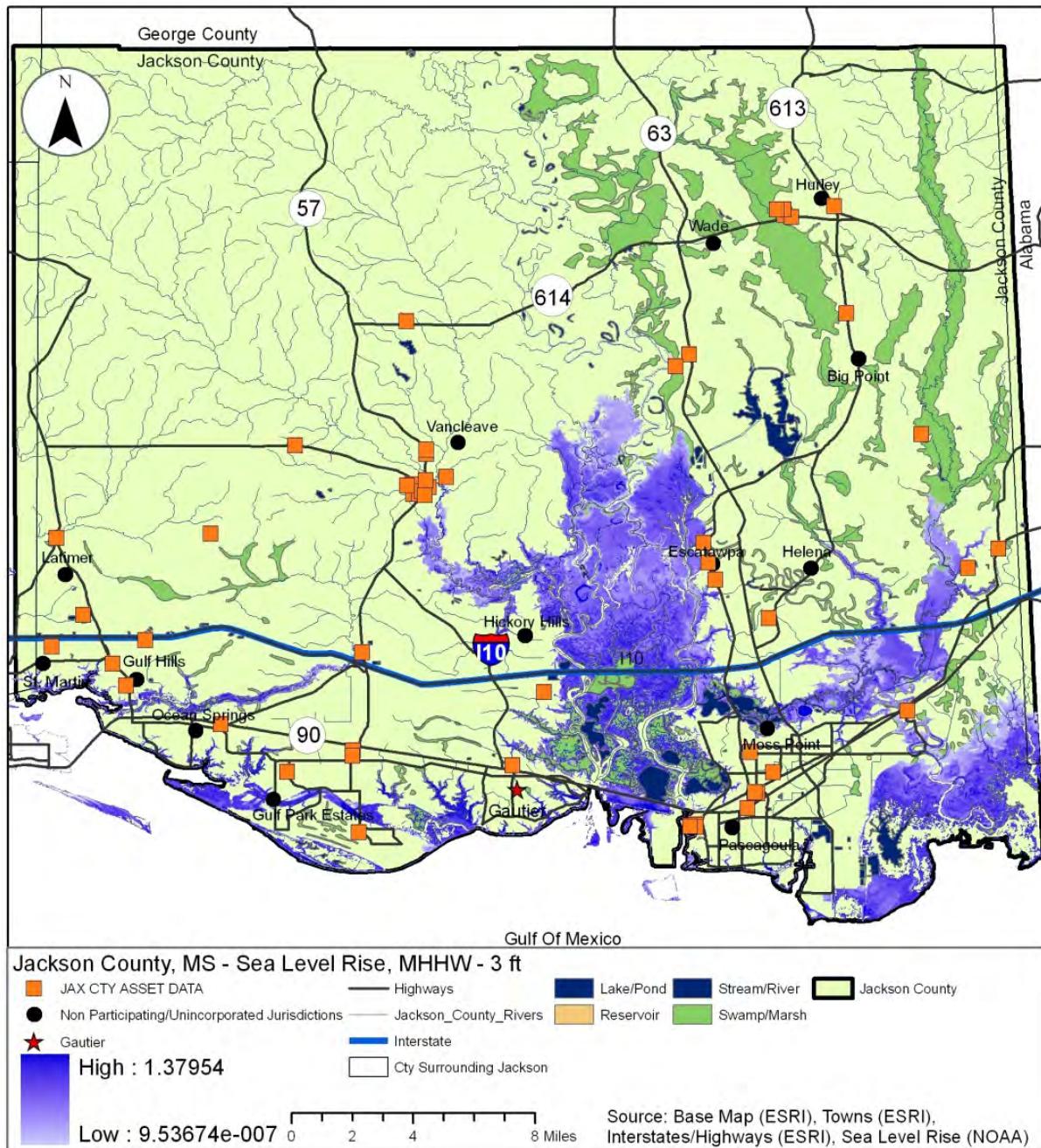
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Map 4.12
Sea Level Rise – 2 Feet, Mean Higher High Water
(Source: Jackson County, ESRI, NOAA)



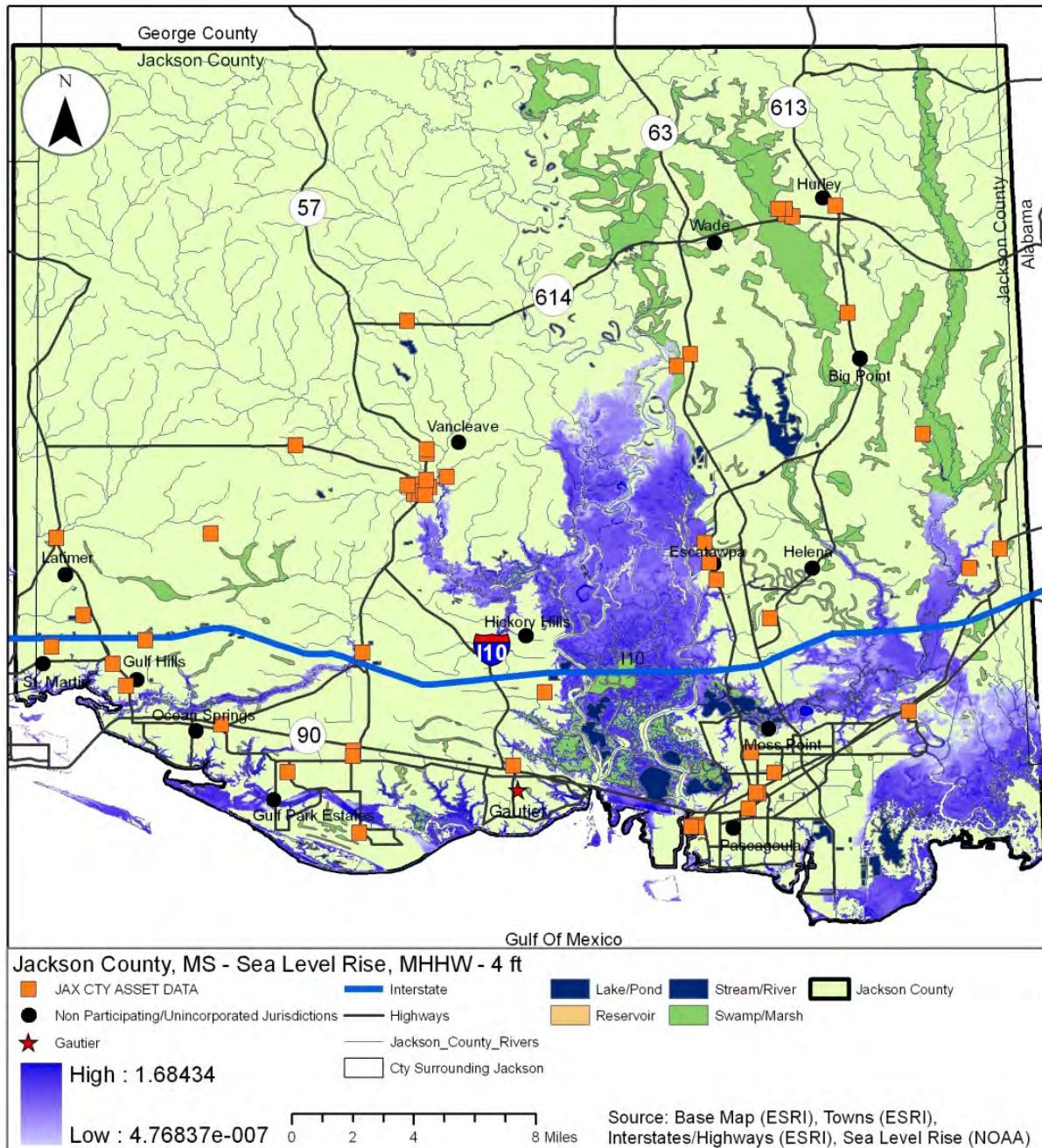
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Map 4.13
Sea Level Rise – 3 Feet, Mean Higher High Water
(Source: Jackson County, ESRI, NOAA)



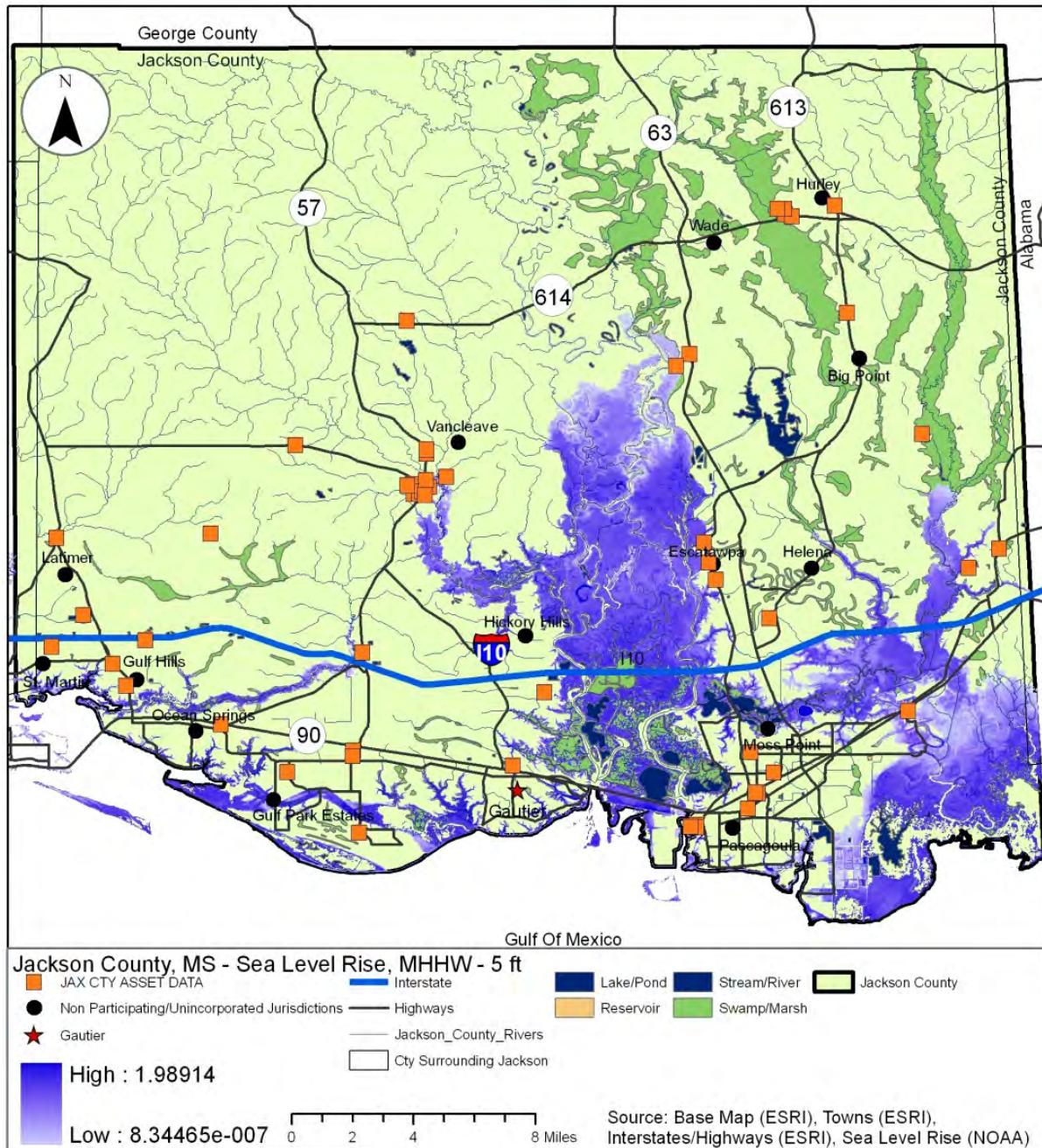
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Map 4.14
Sea Level Rise – 4 Feet, Mean Higher High Water
(Source: Jackson County, ESRI, NOAA)



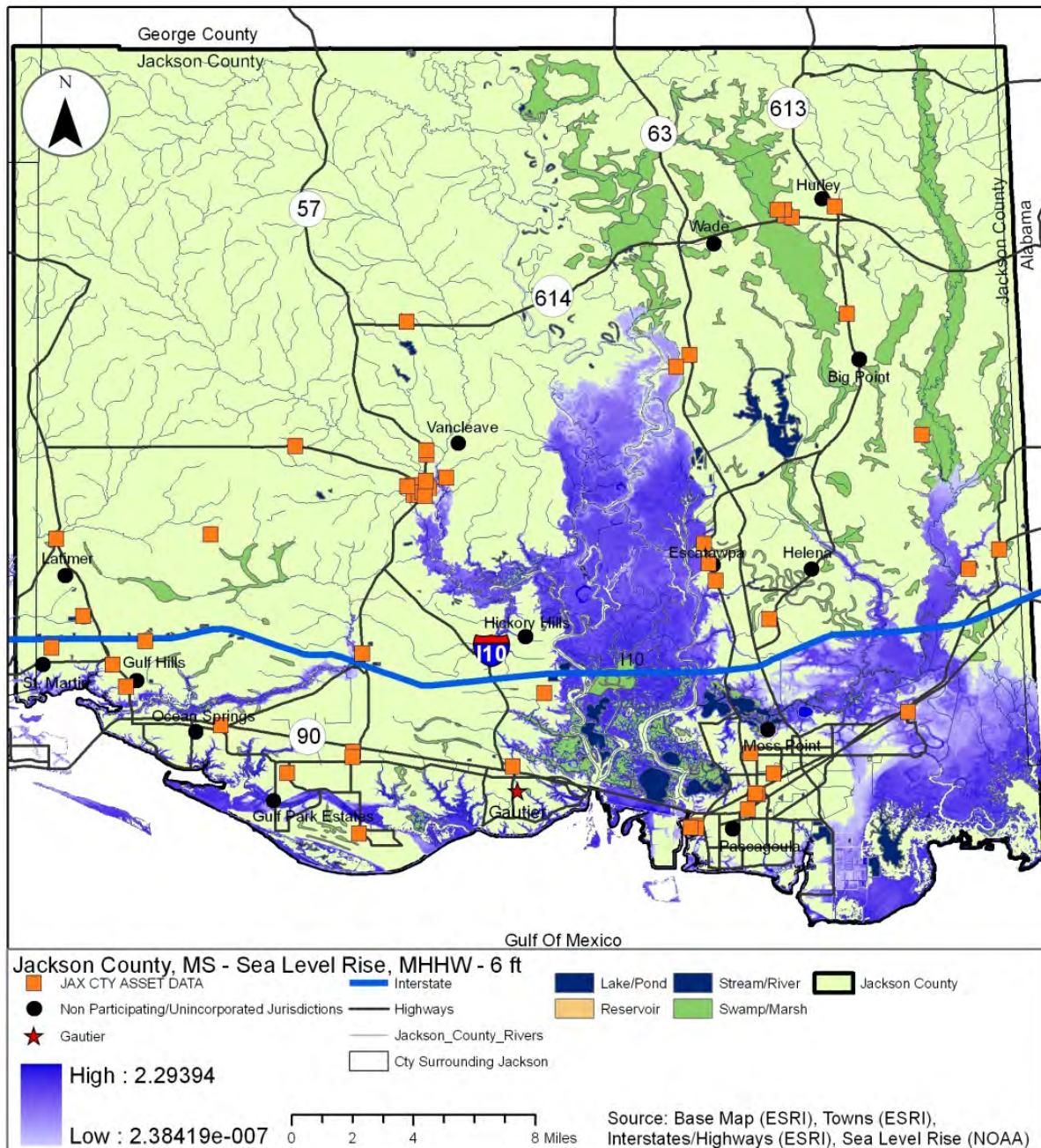
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Map 4.15
Sea Level Rise – 5 Feet, Mean Higher High Water
(Source: Jackson County, ESRI, NOAA)



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Map 4.16
Sea Level Rise – 6 Feet, Mean Higher High Water
(Source: Jackson County, ESRI, NOAA)



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4.3.5.4 Previous Occurrences

The Intergovernmental Panel on Climate Change (IPCC) concludes that there has been a global mean rise in sea level between 10 and 25 cm (approximately 4 to 10 inches) over the last 100 years

4.3.5.5 Probability

The IPCC estimates that global sea level will rise 9 to 88 centimeters during the 21st century making the probability of realized sea-level rise low during the next 5 years.

4.3.6 Storm Surge

4.3.6.1 Description of the Hazard

Storm surge is an abnormal rise of water generated by a storm, over and above the predicted astronomical tides. Storm surge should not be confused with storm tide, which is defined as the water level rise due to the combination of storm surge and the astronomical tide. This rise in water level can cause extreme flooding in coastal areas particularly when storm surge coincides with normal high tide, resulting in storm tides reaching up to 20 feet or more in some cases.³

4.3.6.2 Hazard Profile

The storm surge is potentially the most devastating factor associated with hurricanes. Within the boundaries of Jackson County those properties adjacent to areas affected by tides are the most susceptible to damage from storm surge with heavy flooding as the most common result. There were watermarks as high as 21.6 NGVD (National Geodetic Vertical Datum) were measured along the Mississippi Coast after Hurricane Camille. In extreme cases such as hurricane Camille, the incoming wall of water and wind could destroy well-built buildings along the immediate coastline.

4.3.6.3 Assessing Vulnerabilities

Storm surges are caused primarily by high winds pushing on the ocean's surface. The wind causes the water to pile up higher than ordinary tidal levels. Historically, storm surge from hurricanes causes significant damages. Jackson County and the City of Gautier are subject to the threat of storm surge, particularly in areas south of U.S. 90.

³ Storm surge as defined by the National Hurricane Center.

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4.3.6.4 Previous Occurrences

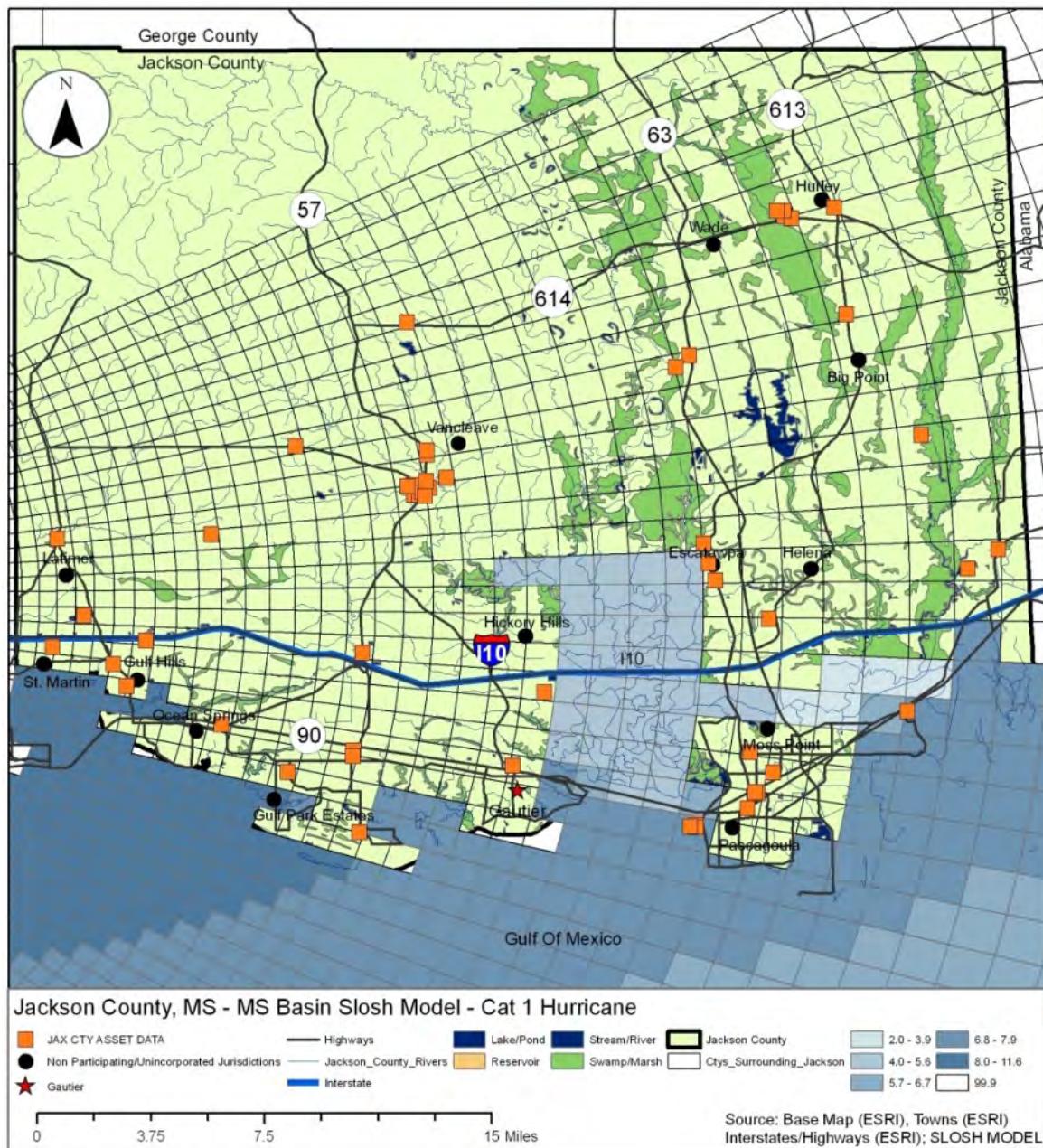
The NCDC database indicates that Jackson County experienced five storm surge events between 2005 and 2012 causing over \$11 Billion in property damage. As with the Hurricane hazard, this information reflects a significant part of the recovery costs from strong winds and storm surge. However, there are also very significant costs associated with interrupted business, lost wages, and utility disruption that are very difficult to quantify but are nevertheless important metrics for determining the impact.

Maps 4.17 through 4.19 show storm surge effects to the Jackson County and the City of Gautier from storm surge models created by the National Hurricane Center. The surge models are depicted as Maximum of Maximum (MOM) events for each category of storm.

In 2010, the National Hurricane Center separated storm surge from storm categories, but for planning purposes they currently have not released separate storm surge modeling. It is important to note that a Category 1 storm could produce a Category 5 surge, and a Category 5 storm may produce a Category 1 surge.

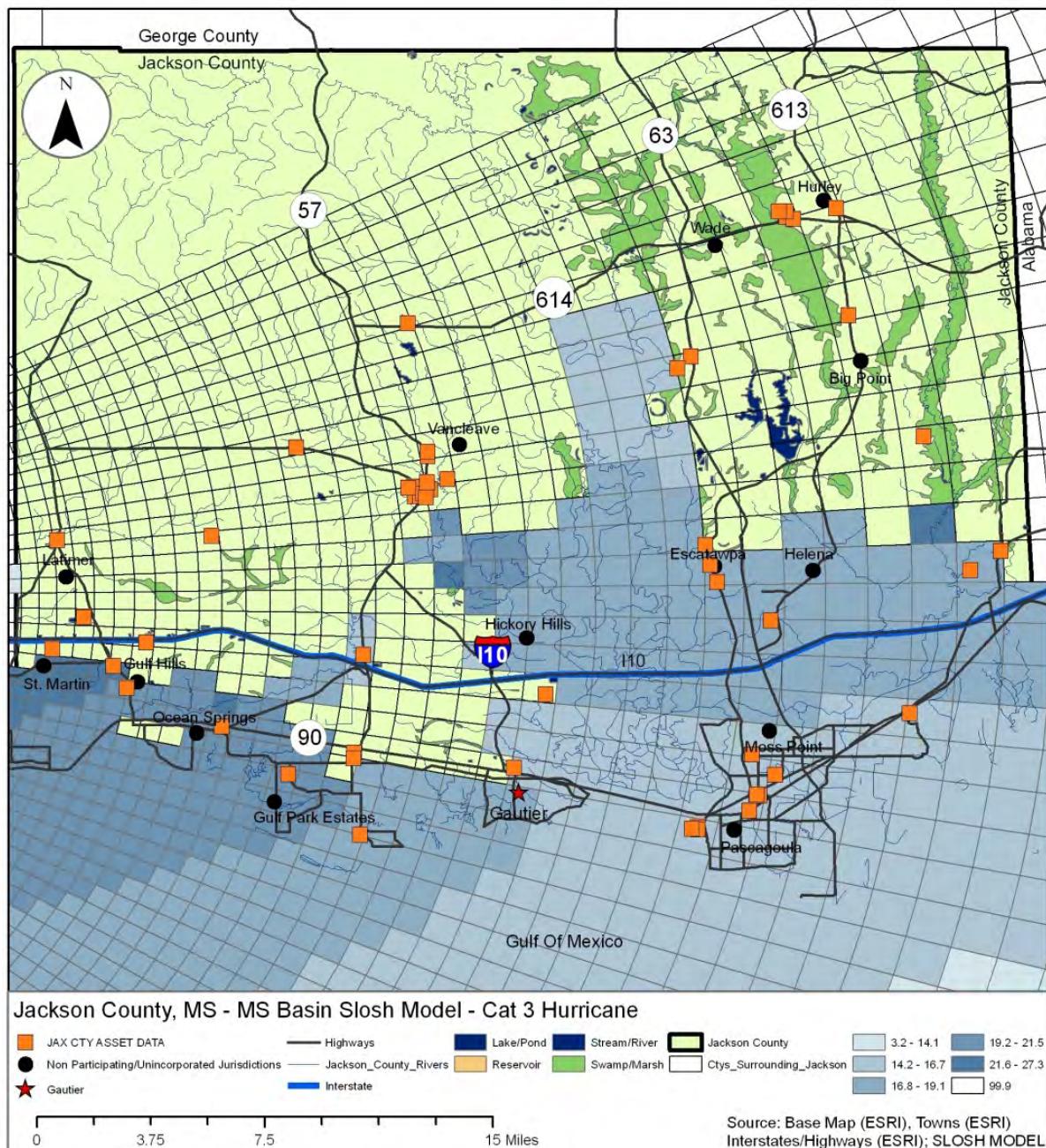
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Map 4.17:
Category 1 Storm Surge Exposure
(Source: ESRI and NOAA)



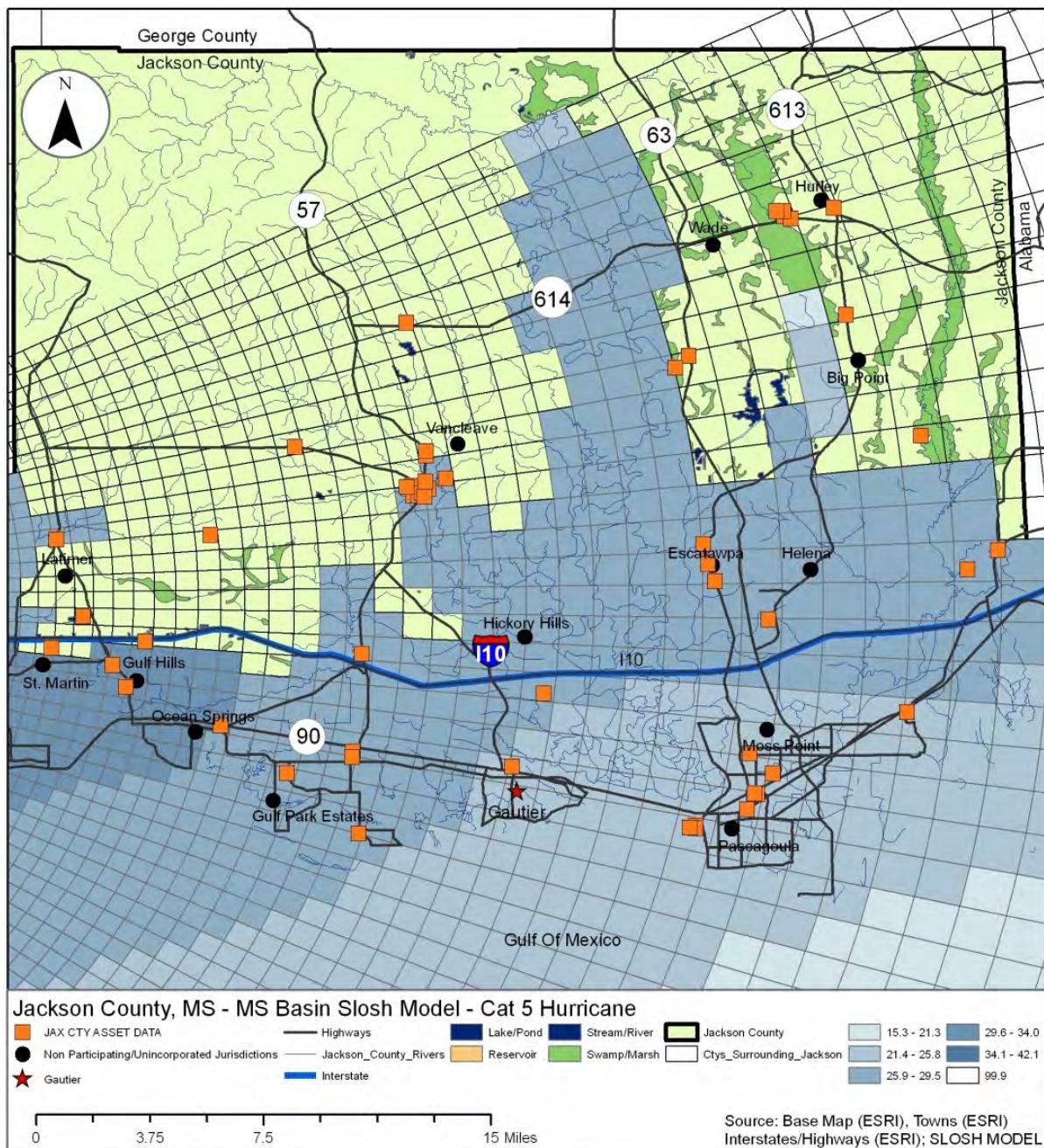
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Map 4.18
Category 3 Storm Surge Exposure
(Source: ESRI and NOAA)



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Map 4.19
Category 5 Storm Surge Exposure
(Source: ESRI and NOAA)



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4.3.6.5 Probability

There have been eight recorded storm surge events impacting the Jackson County coast since 1998. Based on that data, the planning area experiences storm surge every 1.75 years, making the probability of future storm surge impact high.

4.3.7 Thunderstorm/High Wind/Lightning

4.3.7.1 Description of the Hazard

Thunderstorms are defined by the National Weather Service (NWS) as “a local storm produced by a cumulonimbus cloud and accompanied by lightning and thunder”. The storms alone don’t cause losses to life or property, but the components of a thunderstorm can be devastating. Thunderstorms can include high winds, lightning, tornadoes, heavy rain (flash flood) and hail. The NWS further defines a thunderstorm that produces a tornado, winds of at least 58 mph (50 knots), and/or hail at least $\frac{3}{4}$ ” in diameter as a “severe thunderstorm”. Structural wind damage may imply the occurrence of a severe thunderstorm. This hazard section focuses on the high wind and lightning hazards associated with thunderstorms. Flood and tornadoes are discussed as separate hazards in Sub-sections 4.3.3 (Flood) and 4.3.8 (Tornado).

High winds are a general term associated with sustained or gusting winds of significant strength to cause risk or damage to crops, vegetation, buildings, infrastructure or transportation. High winds are typically associated with weather frontal systems that often bring other severe weather products such as hail and lightning.

Lightning is a visible electrical discharge produced by a thunderstorm. The discharge may occur within or between clouds, between the cloud and air, between a cloud and the ground or between the ground and a cloud. Lightning is created by static electrical energy and can generate enough electricity to set buildings on fire, and electrocute people.

For the purposes of this plan, high wind and lightning are analyzed together as products of thunderstorms.

4.3.7.2 Hazard Profile

High wind and lightning have the potential to cause significant impacts in Jackson County and the City of Gautier. High winds can damage property by carrying projectile debris or by breaking building envelopes as wind buffets weak points around doors, windows, and roof structures. Winds can increase speed as they pass between closely situated buildings through a venturi effect that may increase the potential for damage. Metal buildings and tall structures, open fields, and swimming pools are at greater risk of lightning strikes.

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The National Weather Service recognizes and defines three levels of wind events:

- Wind Advisory – Sustained winds of 30mph or more or gusts of 45mph or greater for a duration for one hour or longer.
- High Winds – Sustained winds of 40mph or greater for at least one hour, or frequent gusts of wind to 58mph or greater.
- Extreme Wind Warnings – Sustained winds of 115 miles per hour or greater during a land-falling hurricane.

Winds and related damages can also be defined through the Beaufort Wind Scale as shown in Table 4.10:

Table 4.10
Beaufort Wind Scale
(Source: NOAA Storm Prediction Center)

Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 ft taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-20 ft, white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (13-20 ft) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Whole trees in motion, resistance felt walking against wind
9	41-47	Strong Gale	High waves (20 ft), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs

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Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	On Land
10	48-55	Storm	Very high waves (20-30 ft) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Exceptionally high (30-45 ft) waves, foam patches cover sea, visibility more reduced	
12	64+	Hurricane	Air filled with foam, waves over 45 ft, sea completely white with driving spray, visibility greatly reduced	

The strongest high wind event recorded in the planning area on June 15, 1992 at nearly 74 mph (64 kts). The most costly thunderstorm wind event was recorded on November 9, 2000 causing \$40,000 in property damages around the Pascagoula area where wind gusts damaged the roof of a motel and retail store, blew out several automobile windows, and downed a few trees.

Lightning can strike anywhere and anytime thunderstorms are present. Almost all lightning will occur within 10 miles of the parent thunderstorm, but in rare cases it can strike as much as 50 miles away. There are two major categories of lightning:

- Cloud Flashes – Cloud Flashes sometimes have visible channels that extend out into the air around the storm but do not strike the ground. This is often further defined as cloud-to-air, cloud-to-cloud, or intra-cloud lightning.
- Ground Flashes – Lightning channels that travel from cloud-to-ground or ground-to-cloud. There are two categories of ground flashes: natural and artificially initiated/triggered. Artificially initiated lightning includes strikes to tall structures, airplanes, rockets, and towers on mountains. Artificially initiated lightning goes from ground to cloud while natural lightning goes from cloud to ground.

4.3.7.3 Assessing Vulnerabilities

High wind and lightning are not location-specific hazards; all areas within the planning area are vulnerable to these hazards. People, buildings, and property are at risk from the effects of high wind and lightning. Buildings, automobiles, and infrastructural components (such as electrical feed lines) can suffer damage from high wind and lightning; outdoor populations are vulnerable to injury or death from lightning. High winds can carry cause debris to strike people, buildings and property, which in turn can cause significant injuries, death, and property damage.

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4.3.7.4 Previous Occurrences

On June 7, 1996, lightning struck and destroyed a home near Escatawpa. Property damages were estimated at \$100,000. Another lightning strike on July 31, 2011 was reported to have killed a person on the Pascagoula Beach Pier.

Table 4.11 shows the summary of high wind events that include high winds/thunderstorm winds for the planning area. High winds associated with thunderstorms and other frontal systems may or may not include rain, hail, snow, or lightning. High wind events occur during all seasons in the planning area. The entire planning area is assumed to be at equal risk from high wind events.

Table 4.11
Occurrence and Magnitude of Historical High Wind Events
(Source: NCDC, Jackson County)

Jurisdiction	<40 kts	40-60 kts	>60 kts	Injuries	Deaths	Damage
Jackson County	2	1	0	1	0	\$36,000
City of Gautier	0	1	0	0	0	\$6,000

Table 4.12 shows the summary of lightning events for the planning area. Lightning is typically associated with thunderstorms and severe thunderstorms which occur regularly and during all seasons in the planning area. The entire planning area is assumed to be at equal risk from lightning events.

Table 4.12
Occurrence of Historical Lightening Events
(Source: NCDC, Jackson County)

Jurisdiction	Events	Injuries	Deaths	Damages
Jackson County	17	0	1	\$223,750
City of Gautier	0	0	0	\$0

4.3.7.5 Probability

Potential impacts to life are low, as high wind and lightning are primarily a threat to property. Vulnerable populations, such as those who congregate outdoors for activities and sporting events may be at risk. Early warning systems that are in place and activated prior to a hazard event may reduce this risk. Impacts to property are designated as low and are equal across the planning area.

Though there has been some effort to develop a model to predict future occurrences of high wind and lightning events, no efforts have yet been successful at predicting future probabilities.

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There have been 57 recorded high wind events between 1991 and 2012. This means that the high wind hazard occurs, on average, 2.7 times per year. There have been 17 recorded lightning events between 1996 and 2012. This means that the lightning hazard occurs, on average, 1.06 times per year. Lightning strike and high wind events have high annualized averages; therefore the probability of occurrence is determined to be high.

4.3.8 Tornado

4.3.8.1 Description of the Hazard

Tornadoes are defined as a violently rotating column of air in contact with the ground and extending from the base of a thunderstorm. A debris cloud beneath a thunderstorm is all that is needed to confirm the presence of a tornado, even in the total absence of a condensation funnel. Most of the time, vortices remain suspended in the atmosphere. When the lower tip of a vortex touches earth, the tornado becomes a force of destruction. They are created during severe weather events such as thunderstorms and hurricanes, when cold air overrides a layer of warm air, causing the warm air to rise rapidly. The instability created results in the rotation of air and formation of the tornado.

4.3.8.2 Hazard Profile

Tornado damage severity is currently measured by the Enhanced Fujita Tornado Scale. Prior to February 1, 2007, severity was measured by the Fujita Scale. The Fujita Scale assigns numerical values based on wind speeds and categorizes tornadoes from 0 to 6. The letter "F" often precedes the numerical value. On February 1, 2007, the Fujita scale was decommissioned in favor of the more accurate Enhanced Fujita Scale. None of the tornadoes recorded on or before January 31, 2007 were re-categorized. Therefore maintaining the Fujita Scale will be necessary when referring to previous events.

The Enhanced Fujita Scale, or EF Scale, is the scale for rating the strength of tornadoes in the United States estimated via the damage they cause. Implemented in place of the Fujita Scale, it was used starting February 1, 2007. The scale has the same basic design as the original Fujita Scale, six categories from zero to five representing increasing degrees of damage. It was revised to reflect better examinations of tornado damage surveys, so as to align wind speeds more closely with associated storm damage. The new scale takes into account how most structures are designed, and is thought to be a much more accurate representation of the surface wind speeds in the most violent tornadoes.

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Table 4.13 describes the Fujita Scale in use prior to February 2007.

Table 4.13
Pre-2007 Fujita Scale
(Source: NOAA)

F-Scale Number	Intensity Phrase	Wind Speed	Type of Damage
F0	Gale tornado	40-72 mph	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages 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 reinforced 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

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Table 4.14 describes the Enhanced Fujita Scale ratings in use today.

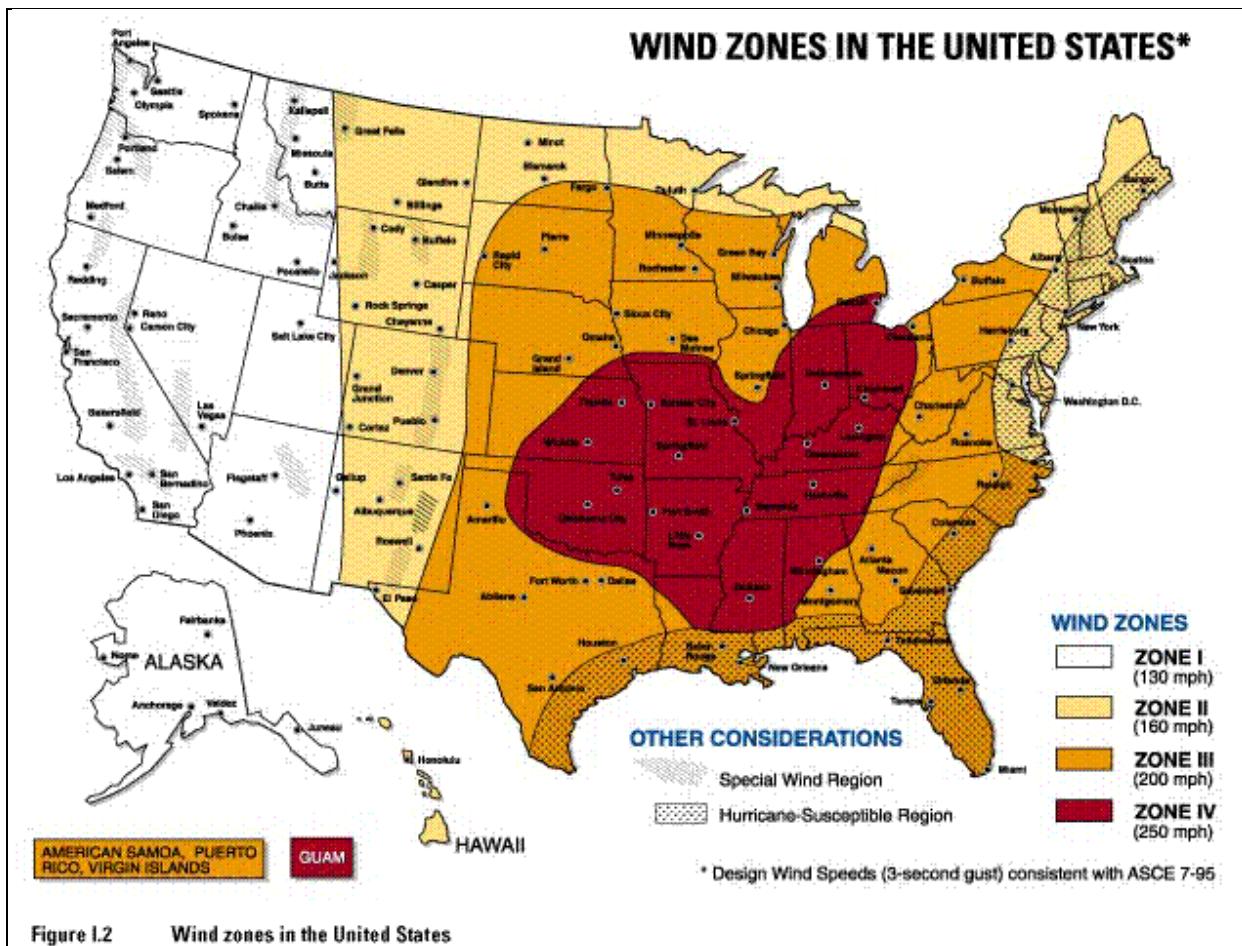
Table 4.14
Enhanced Fujita Scale
(Source: NOAA)

Enhanced Fujita Category	Wind Speed (mph)	Potential Damage
EF0	65-85	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1	86-110	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166-200	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	>200	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yd); high-rise buildings have significant structural deformation; incredible phenomena will occur.

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Figure 4.4 shows wind zones across the United States; note that the planning area falls in Zone 3 (200MPH). Figure 4.5 shows tornado activity nationwide.

Figure 4.4
Wind Zones in the United States
(Source: FEMA)

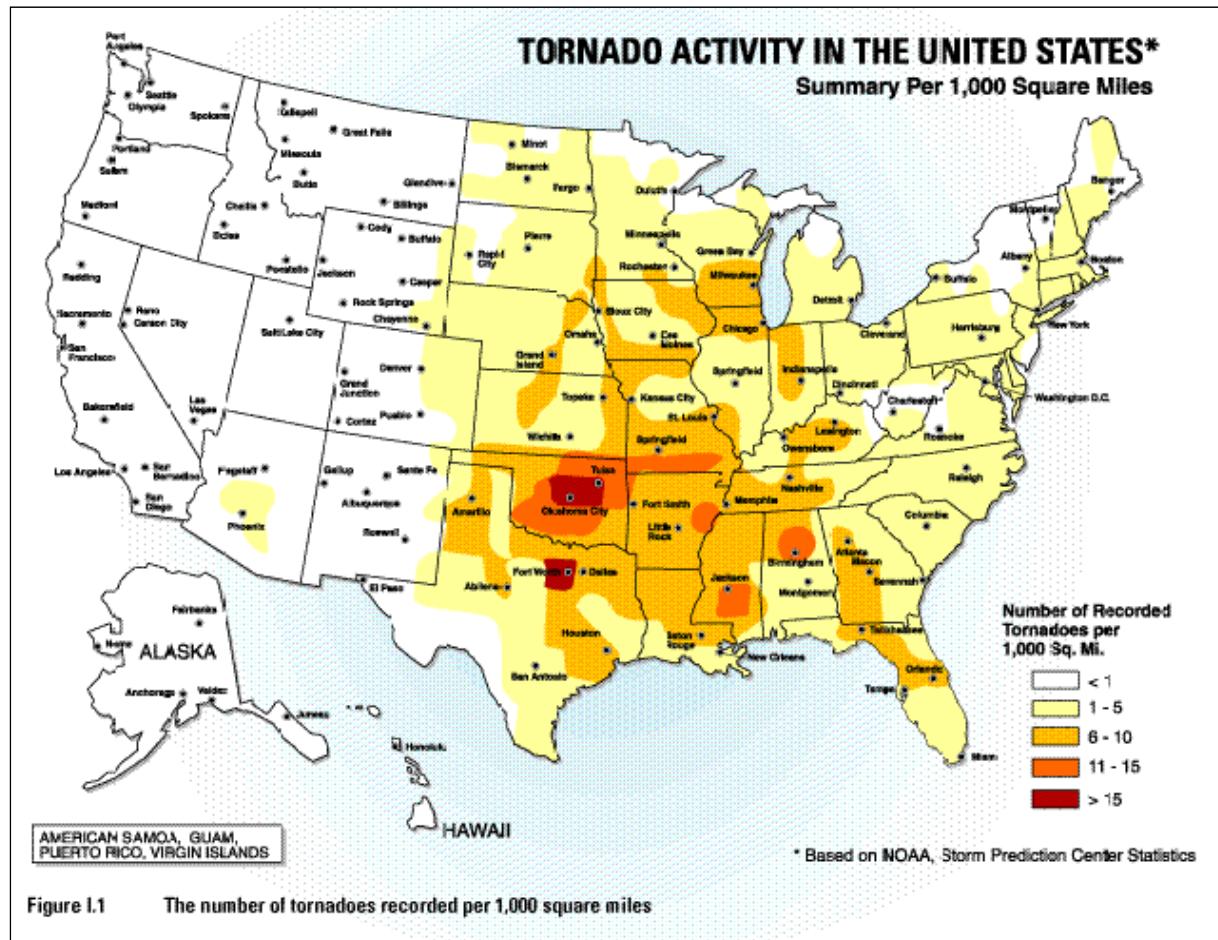


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Figure 4.5

Tornado Activity in the United States

(Source: FEMA)

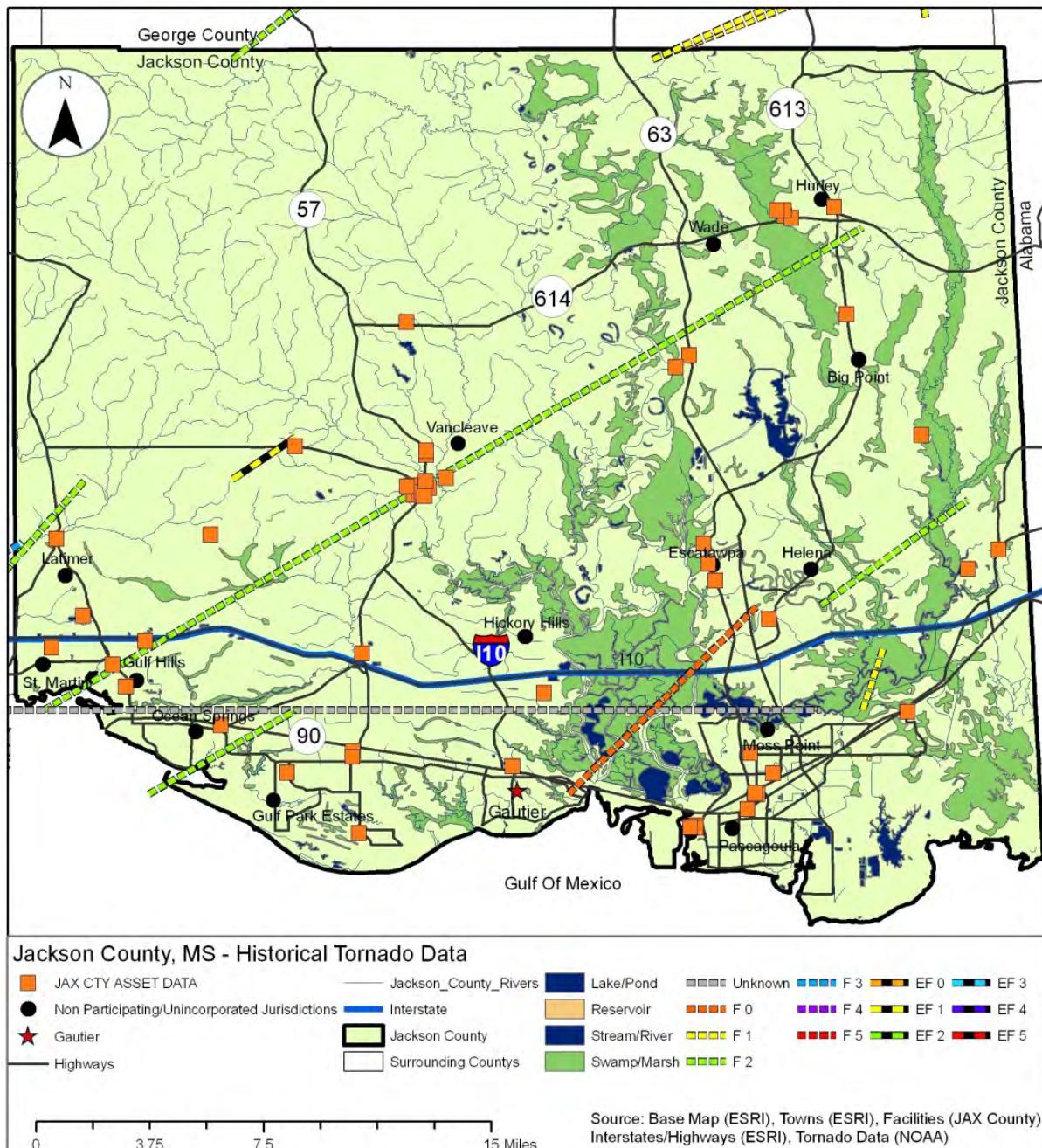


4.3.8.3 Assessing Vulnerabilities

All locations within the planning area are subject to tornadoes. Maps 4.20 through 4.21 show the tracks of recorded, confirmed tornadoes in Jackson County and the City of Gautier.

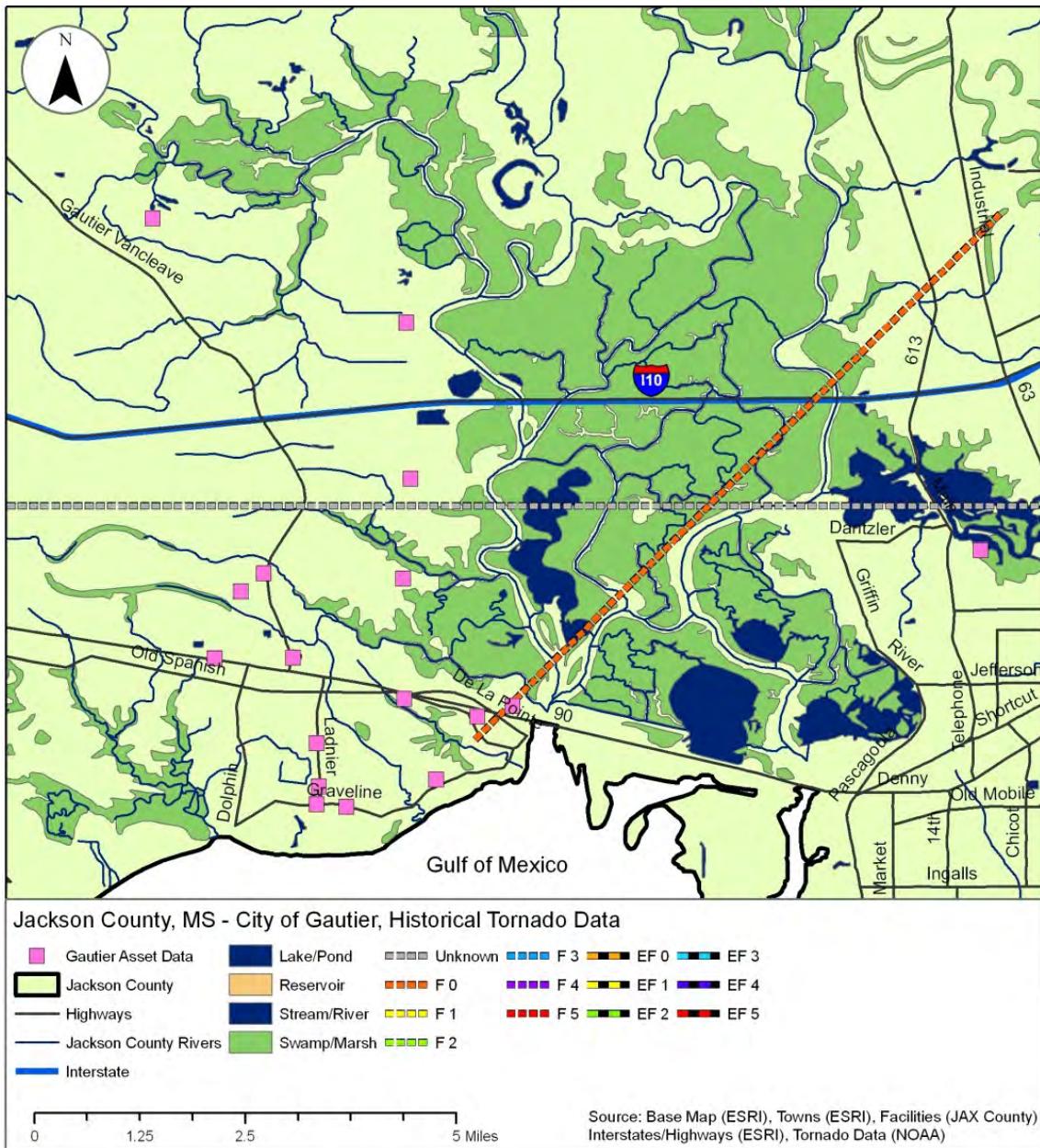
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Map 4.20
Location of Tornado Touchdowns in Jackson County
(Source: ESRI, NOAA, Jackson County)



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Map 4.21
Location of Tornado Touchdowns in the City of Gautier
(Source: ESRI, NOAA, Jackson County)



4.3.8.4 Previous Occurrences

According to the National Climatic Data Center, Jackson County has experienced tornadic activity 57 times since 1958. Some tornadic activity is often associated with coastal storms or hurricanes and goes unrecorded. With the random nature of tornadoes and the geographic size of coastal storms the entire county is susceptible to tornadoes.

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Table 4.15
Tornado History in Jackson County
 (Source: NCDC, Jackson County)

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 Jackson Co.	02/26/1958	1935	Tornado	F2	0	1	25K	0
2 Jackson Co.	04/06/1963	1045	Tornado	F1	0	3	25K	0
3 Jackson Co.	04/27/1966	0030	Tornado	F2	0	1	25K	0
4 Jackson Co.	05/08/1969	1700	Tornado	F1	0	1	0K	0
5 Jackson Co.	08/09/1969	2300	Tornado	F	0	0	0K	0
6 Jackson Co.	12/21/1969	0745	Tornado	F1	0	0	3K	0
7 Jackson Co.	02/12/1971	0930	Tornado	F1	0	2	3K	0
8 Jackson Co.	05/08/1971	1215	Tornado	F2	0	0	25K	0
9 Jackson Co.	05/08/1971	1225	Tornado	F1	0	0	3K	0
10 Jackson Co.	02/13/1973	2359	Tornado	F1	0	1	3K	0
11 Jackson Co.	06/13/1974	1840	Tornado	F0	0	0	0K	0
12 Jackson Co.	06/20/1974	1410	Tornado	F0	0	0	0K	0
13 Jackson Co.	09/08/1974	0145	Tornado	F0	0	0	0K	0
14 Jackson Co.	11/04/1974	1205	Tornado	F1	0	0	0K	0
15 Jackson Co.	01/10/1975	1425	Tornado	F1	0	0	0K	0
16 Jackson Co.	01/10/1975	1430	Tornado	F2	0	0	250K	0
17 Jackson Co.	05/02/1977	0600	Tornado	F2	0	0	25K	0
18 Jackson Co.	06/01/1977	1743	Tornado	F0	0	0	0K	0
19 Jackson Co.	07/15/1977	1630	Tornado	F0	0	1	250K	0
20 Jackson Co.	07/29/1978	1030	Tornado	F0	0	0	3K	0
21 Jackson Co.	04/23/1979	1740	Tornado	F0	0	0	3K	0
22 Jackson Co.	05/19/1980	2020	Tornado	F2	0	0	250K	0
23 Jackson Co.	02/10/1981	0745	Tornado	F2	0	2	250K	0
24 Jackson Co.	04/25/1982	0500	Tornado	F2	0	3	250K	0
25 Jackson Co.	02/01/1983	0500	Tornado	F1	0	3	250K	0
26 Jackson Co.	05/21/1985	1410	Tornado	F2	0	0	250K	0
27 Jackson Co.	05/21/1985	1420	Tornado	F1	0	1	250K	0
28 Jackson Co.	09/16/1988	1822	Tornado	F0	0	0	25K	0
29 Jackson Co.	02/10/1990	0630	Tornado	F1	0	0	250K	0
30 Vancleave	03/01/1994	1050	Tornado	F0	0	0	5K	0
31 Jackson Co.	12/03/1994	1653	Tornado	F0	0	0	0	0
32 Springs	05/09/1995	0800	Waterspout/ Tornado	N/A	0	0	0	0
33 Moss Point	05/09/1995	0915	Tornado	F1	0	0	0	0
34 Ocean Springs	05/09/1995	1940	Tornado	F1	0	0	0	0
35 Hurley	01/18/1996	0320	Tornado	F0	0	0	0	0
36 Pascagoula	03/13/1999	0553	Tornado	F0	0	0	0	0
37 Pascagoula Jackson Arp	07/16/2000	0620	Tornado	F0	0	0	0	0
38 Escatawpa	08/20/2000	1530	Tornado	F0	0	0	2K	0
39 Hurley	06/11/2001	0535	Tornado	F0	0	0	5K	0
40 Pascagoula	08/07/2001	1130	Tornado	F0	0	0	25K	0
41 Vancleave	08/30/2003	1007	Funnel Cloud	N/A	0	0	0K	0
42 Vancleave	06/06/2005	1135	Funnel Cloud	N/A	0	0	0K	0

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43 Ocean Springs	06/17/2005	1547	Funnel Cloud	N/A	0	0	0K	0
44 Ocean Springs	11/15/2006	0622	Tornado	F1	0	0	50K	0
45 Ocean Springs	02/13/2007	0720	Tornado	F0	0	0	0K	0
46 Vancleave	10/18/2007	0450	Tornado	EF1	0	0	90K	0
47 Pascagoula	03/26/2009	0535	Tornado	EF0	0	0	18K	0
48 Ocean Springs	04/02/2009	1348	Tornado	EF0	0	0	50K	0
49 Vancleave	12/24/2009	1553	Tornado	EF0	0	0	2K	0
50 Fontainebleau	04/04/2011	1945	Tornado	EF1	0	0	35K	0
51 Helena	05/26/2011	1430	Tornado	EF0	0	0	20K	0
TOTALS:					0	19	2.645M	0

Table 4.16
Tornado History in the City of Gautier
(Source: NCDC, Jackson County)

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
01 Gautier	04/29/1996	0120	Tornado	F0	0	0	100K	0

The strongest and most damaging confirmed tornado in Jackson County was an F-2 tornado on April 25, 1982, injuring 3 people, and causing an estimated \$250,000 in property damages.

The tornado reports to the NCDC for the planning area ranged in severity from funnel clouds reported on three occasions to nine F2 tornadoes on one occasion. Since 1954, NCDC reports list 52 tornadoes for Jackson County and the City of Gautier.

The unpredictable nature of tornadoes results in minimal, if any, warning time which can result in higher injury and fatality rates. People are less able to protect themselves when they have little or no warning time to prepare for the arrival of tornadoes.

4.3.8.5 Probability

The State of Mississippi is ranked 12th in the nation for tornado occurrences, with an average of 23.6 tornadoes per year. Jackson County has experienced 52 confirmed tornadoes since 1958, which equates to an average of .96 tornadoes every year giving a high probability of occurrence. Gautier has experienced 1 confirmed tornado since 1958, which equates to an average of 0.018 tornadoes every year giving a low probability of occurrence.

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4.3.9 Wildfire

4.3.9.1 Description of the Hazard

Fire is a natural process of forests, including the pine savannahs located in Jackson County. Fire clears the underbrush and allows new growth to occur. As the county becomes more populated, the impact of wildfire increases. Homes can become threatened by the fire itself (from both flames and ash) and people are affected by the smoke that invades neighborhoods and obstructs vision on the roadways. An effort to control the outbreak of wildfire has been undertaken throughout the county by the use of prescribed burns. By allowing fire on a scheduled basis, the forest managers hope to minimize the impact on the human population compared to out-of-control blazes. The presence of natural barriers such as bayous and drainage basins further limit the participating jurisdictions vulnerability to wildfires. Even with periodic controlled burns, and the area's natural barriers, wildfires continue to strike.

4.3.9.2 Hazard Profile

Table 4.17 demonstrates the Fire Danger Rating System, from the US Forest Service's Wildland Fire Assessment System.

Table 4.17
Fire Danger Rating System
(Source: USFS via <http://www.wfas.net/content/view/34/51/>)

Rating	Basic Description	Detailed Description
CLASS 1: Low Danger (L) Color Code: Green	Fires not easily started	Fuels do not ignite readily from small firebrands. Fires in open or cured grassland may burn freely a few hours after rain, but wood fires spread slowly by creeping or smoldering and burn in irregular fingers. There is little danger of spotting.
CLASS 2: Moderate Danger (M) Color Code: Blue	Fires start easily and spread at a moderate rate	Fires can start from most accidental causes. Fires in open cured grassland will burn briskly and spread rapidly on windy days. Woods fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel - especially draped fuel - may burn hot. Short-distance spotting may occur, but is not persistent. Fires are not likely to become serious and control is relatively easy.
CLASS 3: High Danger (H) Color Code: Yellow	Fires start easily and spread at a rapid rate	All fine dead fuels ignite readily and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly and short-distance spotting is common. High intensity burning may develop

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Rating	Basic Description	Detailed Description
		on slopes or in concentrations of fine fuel. Fires may become serious and their control difficult, unless they are hit hard and fast while small.
CLASS 4: Very High Danger (VH) Color Code: Orange	Fires start very easily and spread at a very fast rate	Fires start easily from all causes and immediately after ignition, spread rapidly and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high-intensity characteristics - such as long-distance spotting - and fire whirlwinds, when they burn into heavier fuels. Direct attack at the head of such fires is rarely possible after they have been burning more than a few minutes.
CLASS 5: Extreme (E) Color Code: Red	Fire situation is explosive and can result in extensive property damage	Fires under extreme conditions start quickly, spread furiously and burn intensely. All fires are potentially serious. Development into high-intensity burning will usually be faster and occur from smaller fires than in the Very High Danger class (4). Direct attack is rarely possible and may be dangerous, except immediately after ignition. Fires that develop headway in heavy slash or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions, the only effective and safe control action is on the flanks, until the weather changes or the fuel supply lessens.

4.3.9.3 Assessing Vulnerabilities

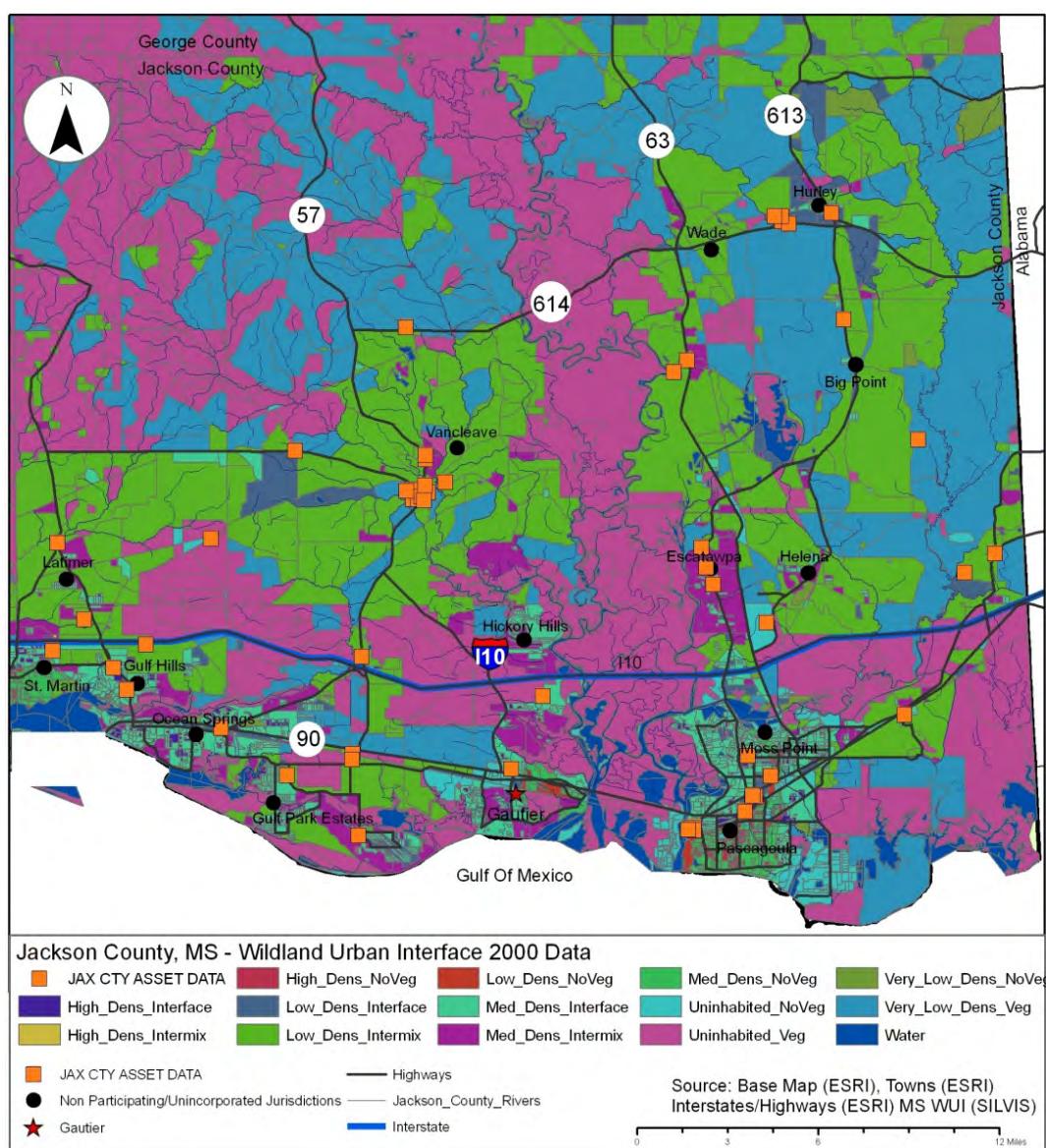
Parts of Jackson County, located on Mississippi's Gulf coast, have a high wildfire risk due to years of fire suppression in the native open pine savannah. In the early 1990s, the casino industry moved into Jackson County, and over just one decade, the county's population grew by 14 percent. This growth pushed development northward, from the coast into the forest. As more and more houses were built in fire-susceptible areas, a wildland-urban interface (WUI) problem emerged. One particular region of fire susceptibility in Jackson County is the area surrounding the 19,000-acre Mississippi Sandhill Crane National Wildlife Refuge (MSCNWR). The future growth in the urban interface will require further attention to the threat of wildfire.

Wildland Urban Interface (WUI) studies make a best case judgment on a list of factors including forestation and vegetative growth as they relate to distance from developed areas. Interface maps in Jackson County and the City of Gautier show moderate risk. Portions of Jackson County and the City of Gautier have buildings that are located in High Density Wildland

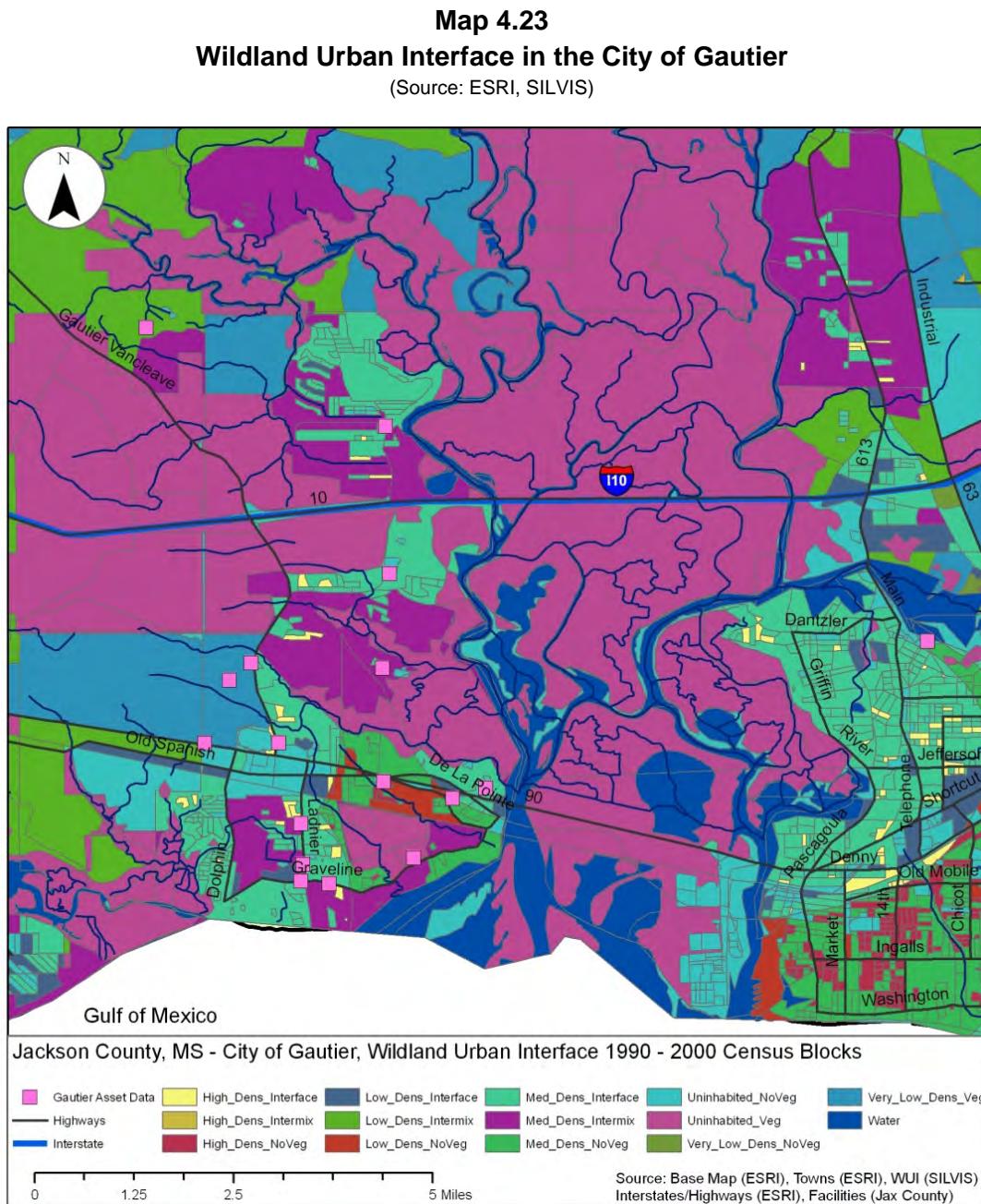
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Interface areas, specifically the Fort Bayou Volunteer Fire Department – Station 1 and the Gautier 6th Grade Academy. Interface communities are areas with housing in the vicinity of contiguous vegetation. Interface areas have more than 1 house (or building) per 40 acres, have less than 50 percent vegetation, and are within 1.5 mi of an area over 1,325 acres that is more than 75% vegetated. The minimum size limit ensures that areas surrounding small urban parks are not classified as interface WUI. Map 4.22 and Map 4.23 show the Wildland Urban Interface for Jackson County and the City of Gautier.

Map 4.22
Wildland Urban Interface in Jackson County
(Source: ESRI, SILVIS)



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4.3.9.4 Previous Occurrences

The primary objectives of the Mississippi Forestry Commission are the detection, suppression and prevention of wildfires in the forestlands of Mississippi. There are, on average, 3,391 wildfires each year in Mississippi burning over 58,790 acres. In addition to the destruction of valuable forestland and the impacts on the economy through the loss of this important natural resource, wildfires threaten structures and equipment on a daily basis. Millions of dollars' worth of property is severely threatened by wildfire, but damage can be minimized by timely and effective wildfire suppression and mitigation actions.

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In 1987, Vancleave had a 1,800-acre fire, but fortunately no homes or lives were lost. In 1999, a wildfire endangered several homes in Ocean Springs. The area around and within the wildlife refuge has numerous smaller fires (100 acres or less) each year; an example is the Grand Bay Refuge fire (part of the Gulf Coast Refuge Complex). Today, land managers in coastal Mississippi are trying to restore the open pine savanna and reduce fuel loads by using prescribed fire.

4.3.9.5 Probability

With only two recorded wildfire events in the planning area since 1987, the probability of recurrence is low.

4.4 Vulnerability Assessment

4.4.1 Overview of Vulnerability Assessment

Requirement CFR §201.6(2)(ii) [the risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described and shall include an overall summary of each hazard and its impact on the community.

Vulnerability is susceptibility to physical injury, harm, damage or economic loss and is dependent on location, construction, contents, and the value of the function of a facility. Understanding vulnerability is essential in mitigation planning for Jackson County and the City of Gautier as it leads to an understanding of the types and costs of injury and damages that may result from a future hazard event.

For each hazard addressed in the plan, the Steering Committee was asked to provide qualitative damage/loss estimates, using low/medium/high designations and based upon their knowledge of the county, participating municipalities, and facilities. Committee members looked at potential risk to people/life safety (loss of life or injury), risk to buildings and critical facilities (primarily damage to the physical structure), and risk to infrastructure (utilities and roads). Table 4.18 shows the methodology used to determine the qualitative assessment results.

Table 4.18
Qualitative Hazard Ranking Assessment Methodology

Impacts to People	
Low	Some injury possible but unlikely
Moderate	Injury expected some deaths possible
High	Several deaths expected

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Impacts to Business		
Low	Cosmetic damages to structures, < 1 day LOF	
Moderate	Some structural damages, 1-2 days LOF	
High	Some structures irreparably damaged, > 3-5 days LOF	
Impacts to Infrastructure		
Low	Some roads/bridges temporarily blocked, temporary power loss	
Moderate	road/bridge closures, power and utility loss	
High	Long-term closures, long term power/utility loss	

While specific areas of concern or increased vulnerability are discussed in the hazard profile section, the overall impacts to Jackson County and the City of Gautier were determined and are shown in Table 4.19:

Table 4.19
Summary of Qualitative Risk Assessment

People	Buildings	Infrastructure
Coastal Erosion		
Low	High/Low*	Moderate/Low*
Drought		
Low	Low	Low
Flood		
Low	Moderate/Low ⁺	High
Hurricane/Coastal Storm		
High	High	High
Sea Level Rise		
Low	Low	Low
Storm Surge		
High	High	High
Thunderstorm/High Wind/Lightning		
Low	Moderate	Moderate
Tornado		
Moderate	Moderate	High
Wildfire		
Low	Moderate/Low ⁺	Low

* Ranking for Gautier

⁺ Ranking for Critical Facilities (over privately owned, not critical buildings)

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To help determine which hazards would receive a full risk assessment, the qualitative analysis was used by giving each hazard ranking a value. One point was given for each “low” ranking, two points for “moderate”, and 3 points for “high”. Those hazards scoring 6 points or more were considered significant enough for a full risk assessment, provided data was available to support one. The result of the risk analysis follows in Table 4.20.

Table 4.20
Qualitative Risk Assessment Analysis

People	Buildings	Infrastructure	Score
Coastal Erosion			
Low	Moderate/Low	Moderate/Low	5/3
Drought			
Low	Low	Low	3
Flood			
Low	Moderate/Low	High	6/5
Hurricane/Coastal Storm			
High	High	High	9
Sea Level Rise			
Low	Low	Low	3
Storm Surge			
High	High	High	9
Thunderstorm/High Wind/Lightning			
Low	Moderate	Moderate	5
Tornado			
Moderate	Moderate	High	7
Wildfire			
Low	Moderate/Low	Low	4/3

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Hazards are ranked by priority in Table 4.21:

Table 4.21
List of Hazards by Priority

Hazard	Priority
Hurricane/Coastal Storm	High
Storm Surge	High
Flood	Moderate
Thunderstorm/High Wind/Lightning	Moderate
Tornado	Moderate
Coastal Erosion	Moderate/Low
Drought	Low
Wildfire	Low
Sea Level Rise	Low

4.4.2 Identifying Structures

Requirement CFR §201.6(2)(ii)(A) The plan should describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas.

The risk assessment describes and analyzes the risks and vulnerabilities from the profiled hazards. The assessment includes a vulnerability description and information about the identified risk to assets where data is available.

For the risk assessment, Jackson County identified 53 county-owned critical facilities that are located throughout the county and in the municipalities of Fontainebleau (1), Gautier (1), Moss Point (4), Pascagoula (1), St. Martin (1), and Vancleave (10).

The City of Gautier initially identified 19 facilities for the risk assessment. An additional 31 assets were provided after the initial risk assessment and mapping were complete. Those facilities were not added to the Gautier maps, but were included in the risk assessment for structural loss. A listing of these facilities is included in Appendix 8.4-A.

The Steering Committee looked at each building and prioritized them for mitigation actions based on a series of criteria from Level 1 to Level 5, with Level 1 being the most critical buildings (The asset lists are provided in Appendix 8.4-A). Table 4.22 lists the methodology and results for building ranking.

Table 4.22

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Building Ranking Methodology

Criticality Level	Description	Number of Jackson County Critical Facilities	Number of Gautier Critical Facilities
Level 1	Public safety buildings (Police, Fire, EMS, EMA/EOC), shelters, hospitals, urgent care centers, and other buildings that MUST remain operational during a disaster event.	32	11
Level 2	Buildings that provide essential government services and must be operational within 12 to 24 hours of a disaster. These facilities include pharmacies, public works facilities, and buildings used for response/recovery operations (schools, airports, etc.).	18	15
Level 3	Buildings that must be functional during recovery operations such as government administrative buildings and courthouses.	3	3
Level 4	Buildings that support normal living, commerce, and tourism such as museums, vacation cabins, and service stations.	0	13
Level 5	Support buildings and facilities that do not meet any of the other criteria such as pole barns, pavilions, and storage sheds.	0	8

Quantitative Risk Assessments were conducted based on the best data available at this time. Based on available data and for this planning horizon, the coastal erosion and thunderstorm/high wind/lightning hazards will be excluded from further risk assessment. There is not enough data available to perform a reasonable quantitative analysis. The remaining assessments are summarized in Table 4.23 and Table 4.24.

Table 4.23
Summary of Jackson County Quantitative Risk Assessment

Hazard Type	Exposed Buildings	Exposed Facilities	Level 1	Level 2	Level 3	Level 4	Level 5
Hurricane/Coastal Storm	81,545	53	32	18	3	0	0
Storm Surge	81,545	36	24	9	3	0	0
Flood	13,152	8	4	3	1	0	0
Tornado	81,545	53	32	18	3	0	0

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Table 4.24
Summary of Gautier Quantitative Risk Assessment

Hazard Type	Exposed Buildings	Exposed Facilities	Level 1	Level 2	Level 3	Level 4	Level 5
Hurricane/Coastal Storm	10,480	50	11	15	3	13	8
Storm Surge	10,480	50	11	15	3	13	8
Flood	530	1	0	2	0	0	0
Tornado	10,480	50	11	15	3	13	8

4.5 Estimating Potential Losses

Requirement CFR §201.6(2)(ii)(B) [the plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified and a description of the methodology used to prepare the estimate.

The following hazards identified for the risk assessment discuss the methodology and results for the given hazard. Each of the loss calculations is based on the best available data, but they must be considered estimates only, as highly detailed engineering study was not performed as part of the planning process.

Given data available at this time, it is only possible to assess the location of Jackson County and the City of Gautier critical facilities as either “in” or “out” of hazards area. The hazard subsections include the methodology for determining the hazard impact areas for the facilities that fall within them. (Asset inventories; tornado buffer, SFHA and surge private assets are found in Appendix 8.4-A)

4.5.1 Hurricane/Coastal Storm

In order to better understand the risks and vulnerability of the participating jurisdictions to hurricanes HAZUS-MH was used to estimate the wind fields created by a Hurricane Camille, Category 5 event making landfall directly in Jackson County. Because this is a modeled hazard event, there may be significant differences between the modeled results contained in this plan and the actual social and economic losses following a specific hurricane. These results can be improved by using enhanced inventory data.

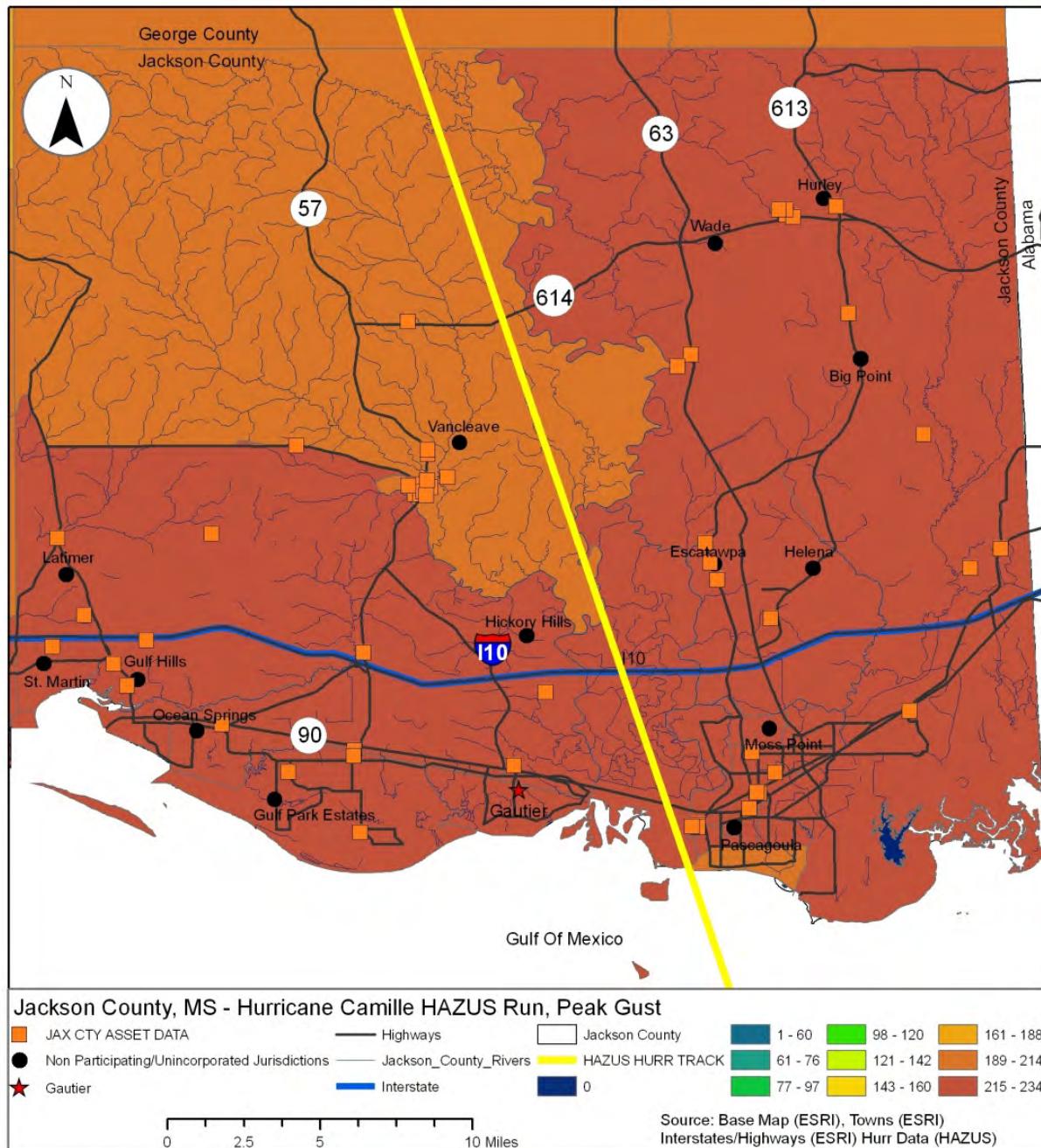
Using this scenario, damage estimates were attained by assuming a 60% damage function to building stock in the buffer zone. Since population estimates are variable and not known for the buildings impacted by the scenario, impacts to human lives cannot be accurately defined.

It should be noted that this scenario shows one possibility, and is not all-inclusive of the risk to Jackson County or the City of Gautier. County and Gautier facilities are mapped with model

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wind field data that depicts the potential wind speed impacts across Jackson County during a Category 5 storm. The wind fields are shown in Maps 4.24 through 4.25.

Map 4.24
City of Gautier, Hurricane Camille HAZUS Model – Peak Wind Gusts
(Source: ESRI, HAZUS)

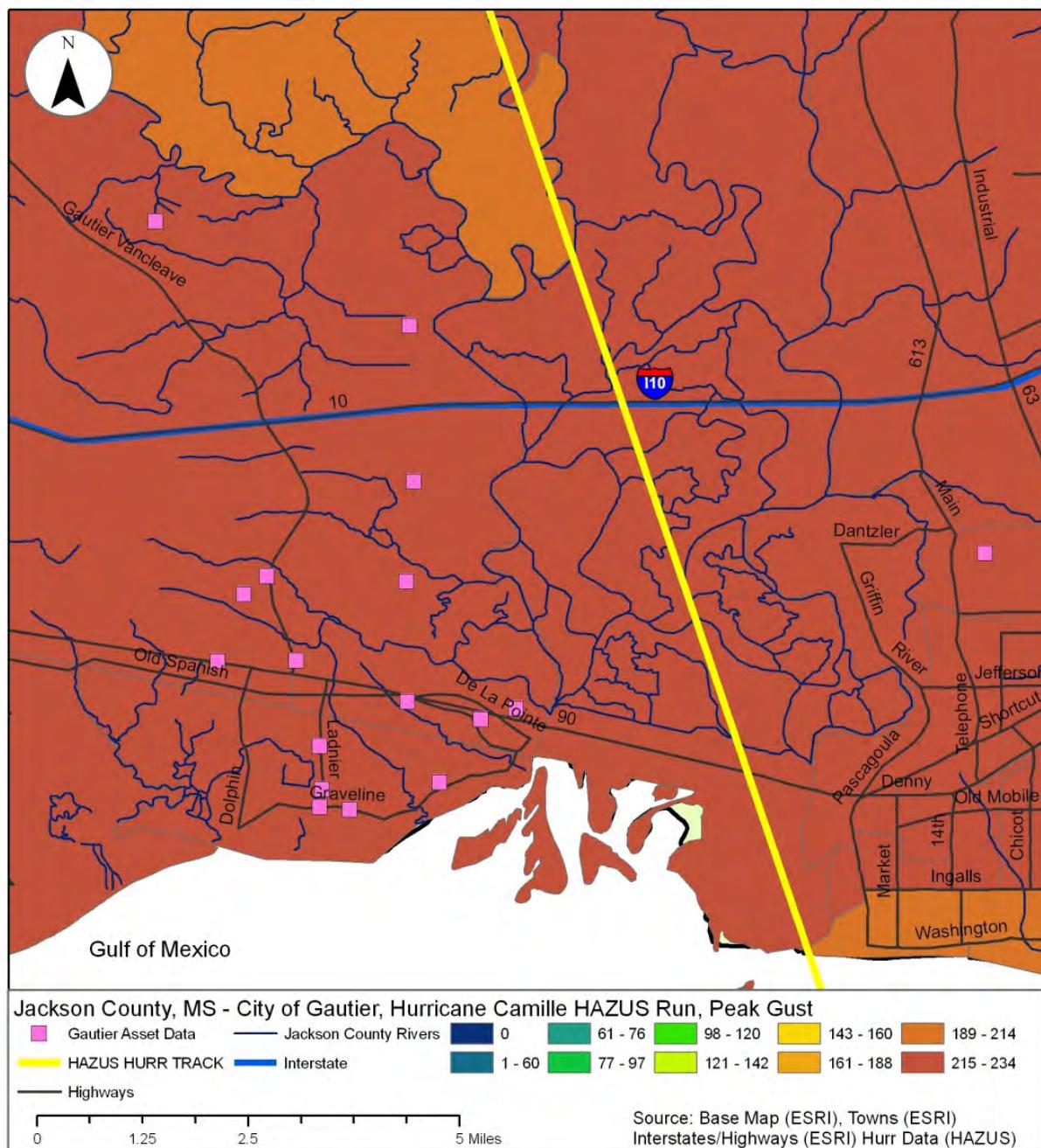


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Map 4.25

City of Gautier, Hurricane Camille HAZUS Model – Peak Wind Gusts

(Source: ESRI, HAZUS)



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Table 4.25
Hurricane Wind Damages to Jackson County Facilities
and Building Stock from a Category 5 Hurricane

Building Type	Number of Buildings Impacted	60% Estimated Loss
Level 1	24	\$49,678,572
Level 2	7	\$51,423,729
Level 3	3	\$12,455,388
Level 4	0	\$0
Level 5	0	\$0
Private Buildings	81,545	\$2,849,799,402

Table 4.26
Hurricane Wind Damages to City of Gautier Facilities
and Building Stock from a Category 5 Hurricane

Building Type	Number of Buildings Impacted	60% Estimated Loss
Level 1	11	\$1,192,629.60
Level 2	15	\$3,458,367.60
Level 3	3	\$918,663.60
Level 4	13	\$650,833.80
Level 5	8	\$825,231.60

4.5.2 Storm Surge

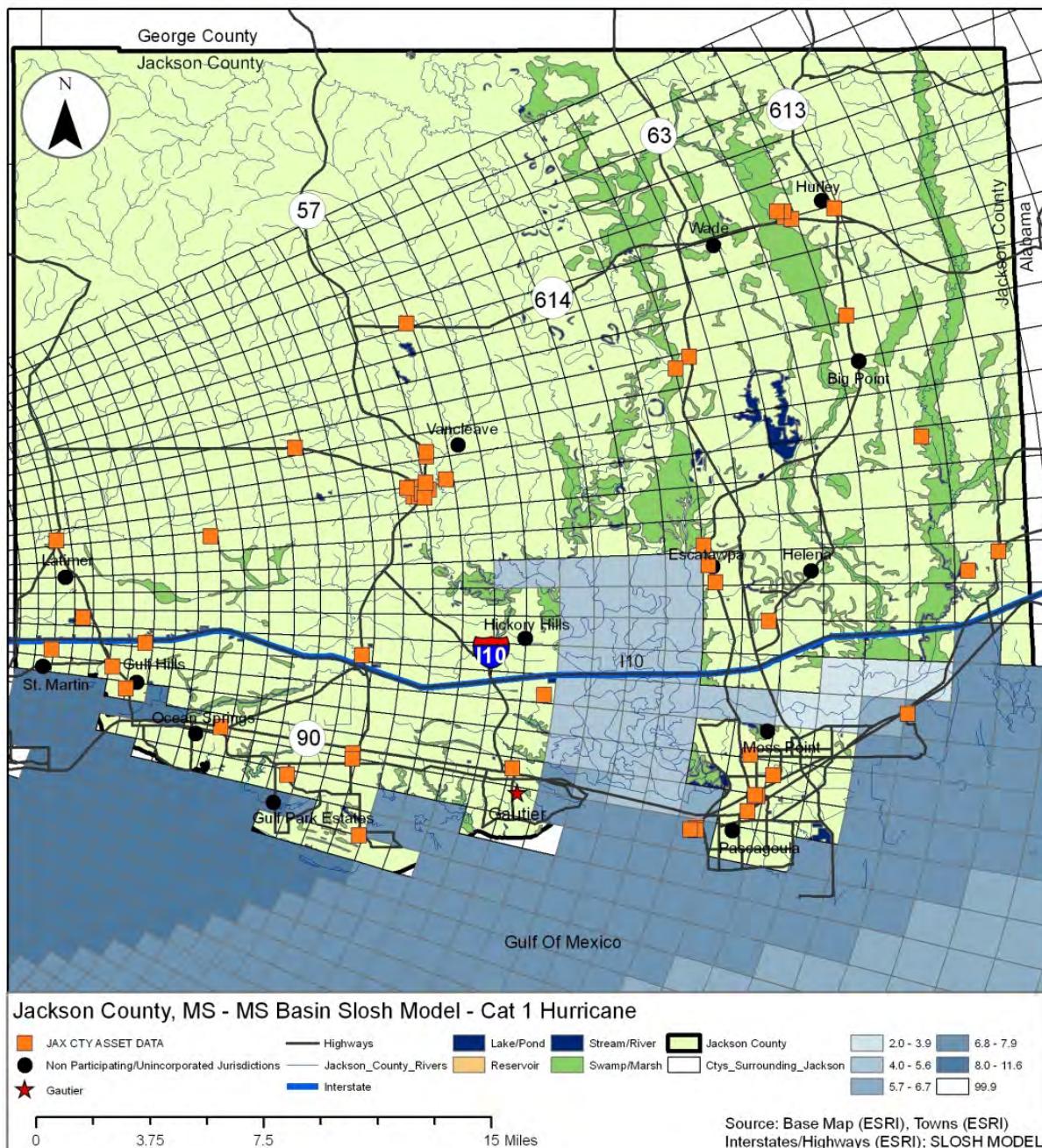
Storm Surge risk assessment models were developed using the National Hurricane Center's SLOSH data based on maximum modeled surge inundation for future hurricane events. Maps 4.26 through 4.28 show the storm surge inundation models for Jackson County and the City of Gautier.

The storm surge scenarios were developed using "maximum of maximums" (MOMs) models for the worst case scenario of storm surge for each cell noted in the basin and for Category 1, 3, and 5 storm surges in Jackson County. Data and loss analysis focused on the Category 5 storm surge using the assumption that a Category 5 is the worst possible damage scenario. Property loss was estimated with a 50% damage function to building stock in the buffer zone. Since population estimates are variable and not known for the buildings impacted by the scenario, impacts to human lives cannot be accurately defined.

It should be noted that this scenario shows one possibility, and is not all-inclusive of the risk to Jackson County or the City of Gautier.

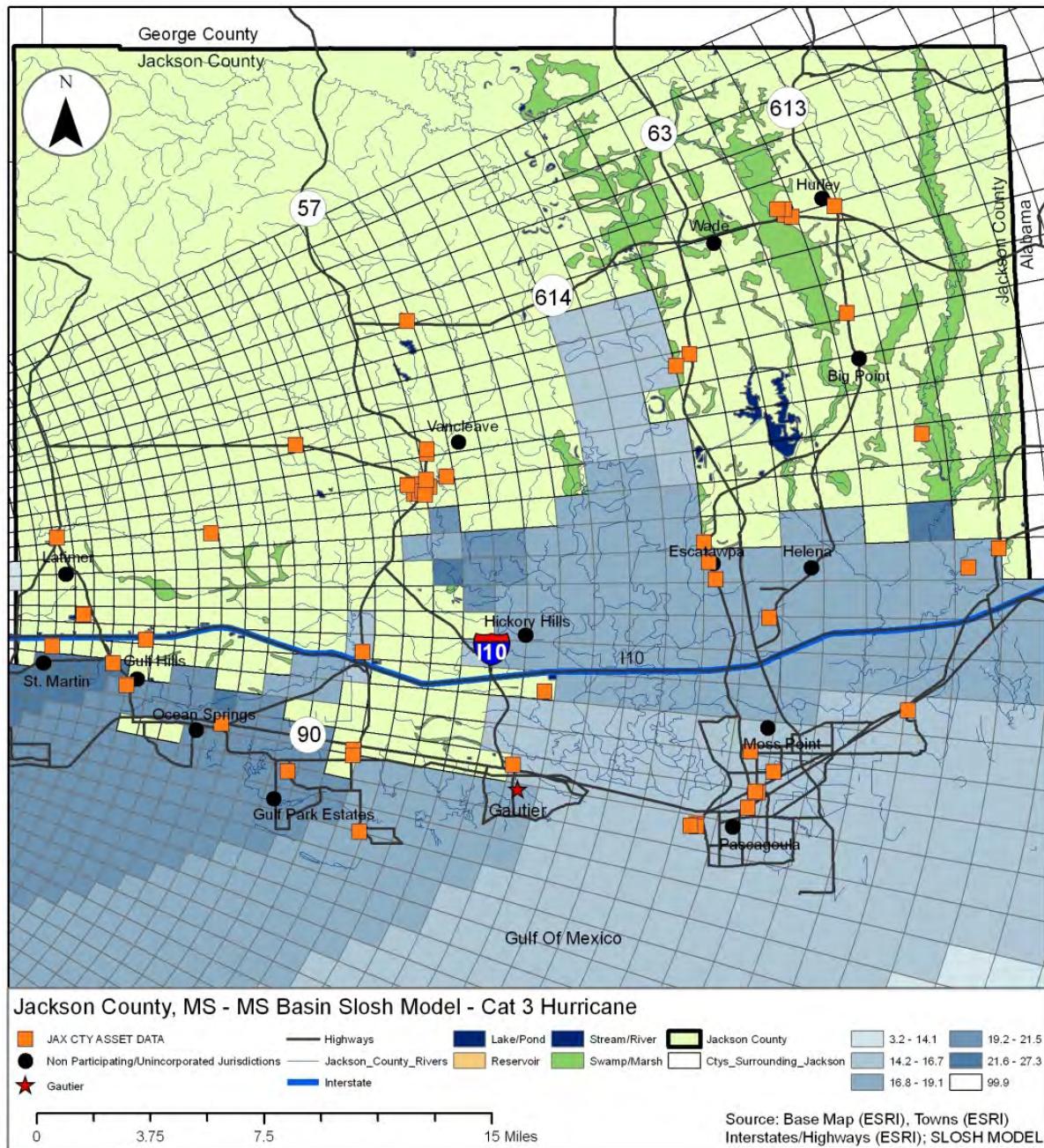
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Map 4.26
Category 1 Storm Surge Exposure
(Source: ESRI and NOAA)



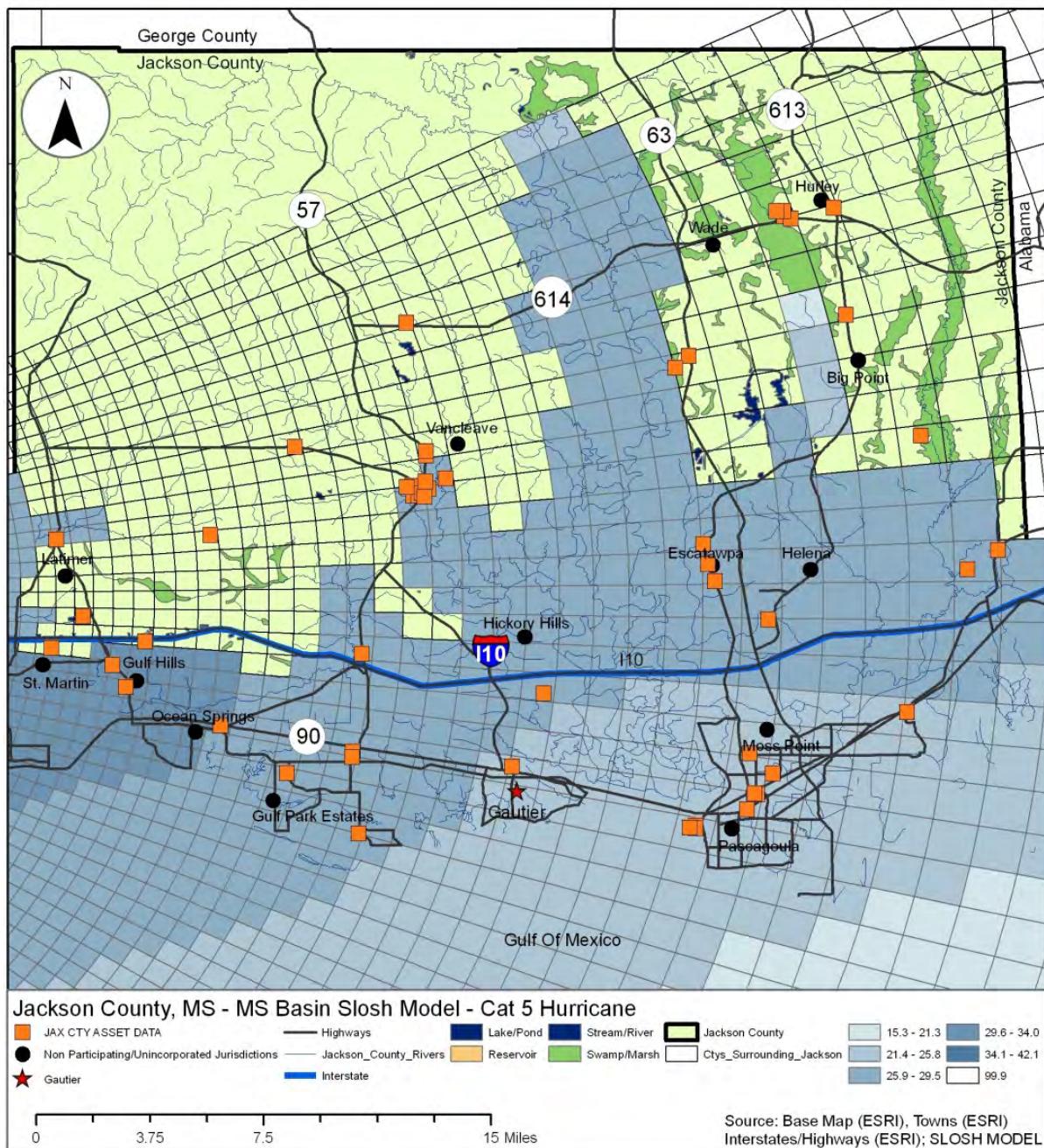
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Map 4.27
Category 3 Storm Surge Exposure
(Source: ESRI and NOAA)



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Map 4.28
Category 5 Storm Surge Exposure
(Source: ESRI and NOAA)



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Table 4.27
**Storm Surge Damages to Jackson County Facilities
and Building Stock from a Category 5 Surge**

Building Type	Number of Buildings Impacted	50% Estimated Loss
Level 1	24	\$36,396,485
Level 2	9	\$30,913,021
Level 3	3	\$10,379,490
Level 4	0	\$0
Level 5	0	\$0
Private Buildings	81,545	\$2,374,832,835

Table 4.28
**Storm Surge Damages to City of Gautier Facilities
and Building Stock from a Category 5 Surge**

Building Type	Number of Buildings Impacted	50% Estimated Loss
Level 1	11	\$993,858
Level 2	15	\$2,881,973
Level 3	3	\$765,553
Level 4	13	\$542,361.5
Level 5	8	\$687,693

4.5.3 Flood

The flood risk assessment for Jackson County and the City of Gautier was developed through the incorporation of the SFHA 1% flood zones. The flood zones were intersected with existing buildings to determine the areas at risk from this hazard. The SFHA is depicted on Map 4.29 and 4.30. Flood depth range is estimated in Table 4.29.

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Table 4.29
Flood Depth Estimates

Jurisdiction	FIS Effective Date	Est. Lower End of 1% Flood Depth Range	Est. Higher End of 1% Flood Depth Range	Notes
Jackson County	November 16, 2007	1 foot	1 foot+	A significant portion of the SFHA within the area is designated as Zone A or X, indicating that no base flood elevations or flood depths have been determined.

Using the SHFA and depth estimates, damage was assumed at 20% to building stock in the flood zone. Since population estimates are variable and not known for the buildings impacted by the scenario, impacts to human lives cannot be accurately defined.

Table 4.30
Flood Damages to Jackson County Facilities and Building Stock

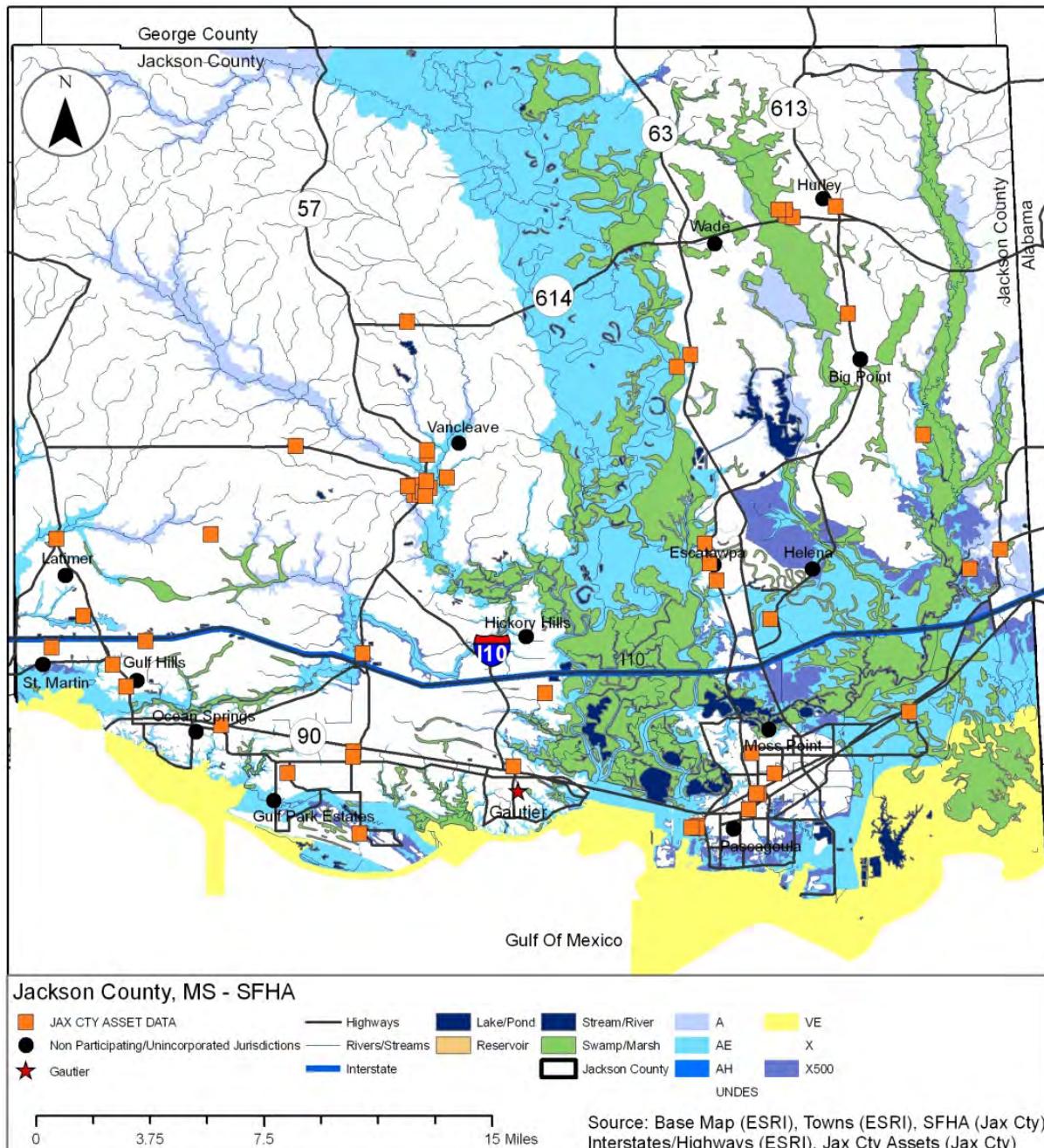
Building Type	Number of Buildings Impacted	20% Estimated Loss
Level 1	4	\$334,796
Level 2	3	\$7,064,315
Level 3	1	\$2,800,000
Level 4	0	\$0
Level 5	0	\$0
Private Buildings	10,480	\$44,016,835

Table 4.31
Flood Damages to City of Gautier Facilities and Building Stock

Building Type	Number of Buildings Impacted	20% Estimated Loss
Level 1	0	\$0
Level 2	1	\$432,789.20
Level 3	0	\$0
Level 4	0	\$0
Level 5	0	\$0

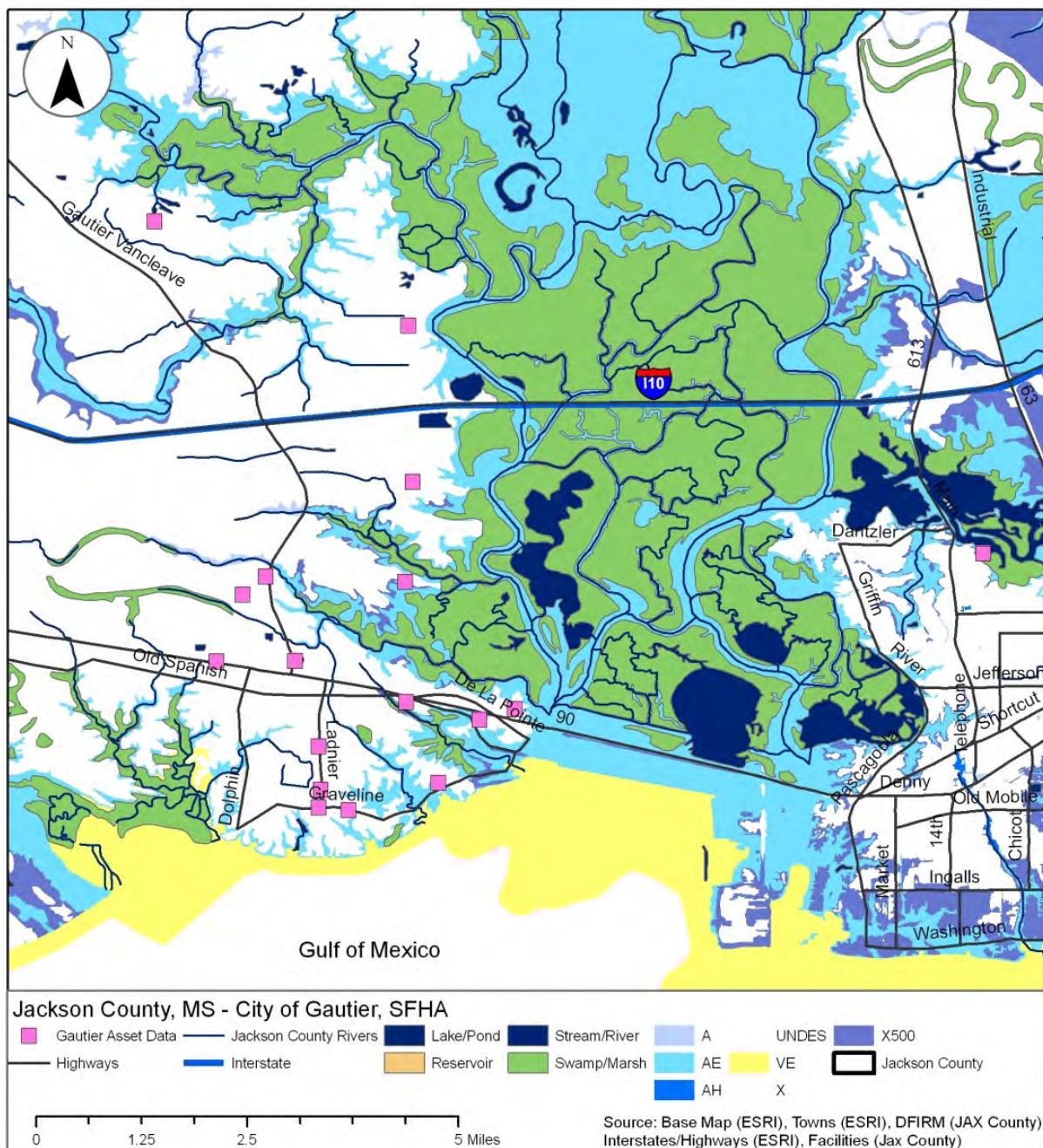
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Map 4.29
Jackson County Special Flood Hazard Area
(Source: ESRI, Jackson County)



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Map 4.30
Gautier Special Hazard Flood Area
(Source: ESRI, Jackson County)



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4.5.4 Tornado

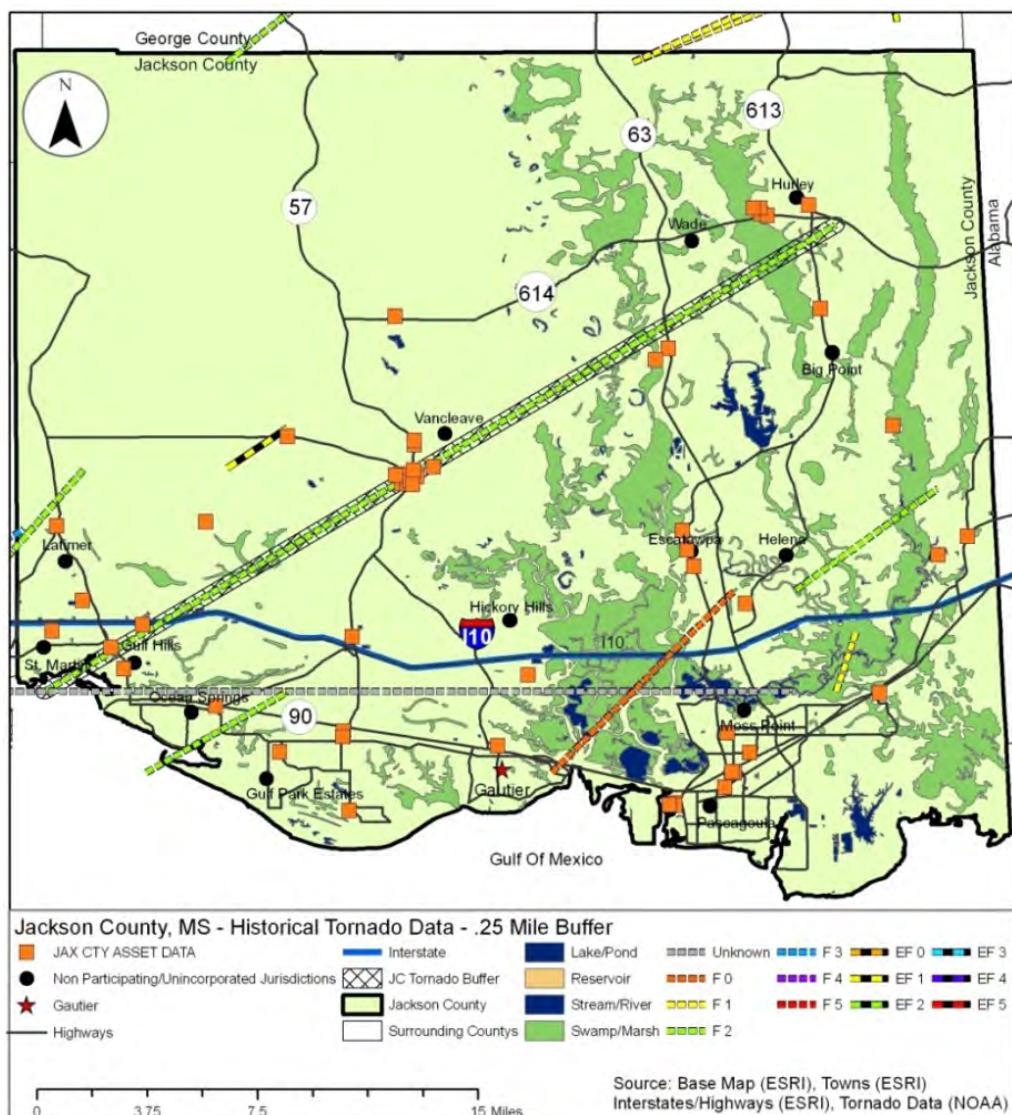
To estimate vulnerability in Jackson County and the City of Gautier, a tornado scenario was developed using historic tornado tracks with a .25 mile damage swath. In the Jackson County scenario, an F2 tornado touched down and moved across the county. Using this scenario, damage estimates were attained by assuming a 50% damage function to building stock in the buffer zone. The scenario used for the City of Gautier models an F0 tornado and estimates 20% damage to buildings in the buffer zone. Since population estimates are variable and not known for the buildings impacted by the scenario, impacts to human lives cannot be accurately defined.

It should be noted that this scenario shows one possibility, and is not all-inclusive of the risk to Jackson County or the City of Gautier. The entire planning area is at an equal risk from the potentially devastating effects of tornadoes.

Map 4.31 depicts the EF-2 tornado scenario, with county facilities noted. Map 4.32 shows the EF-0 tornado scenario, with City of Gautier facilities noted.

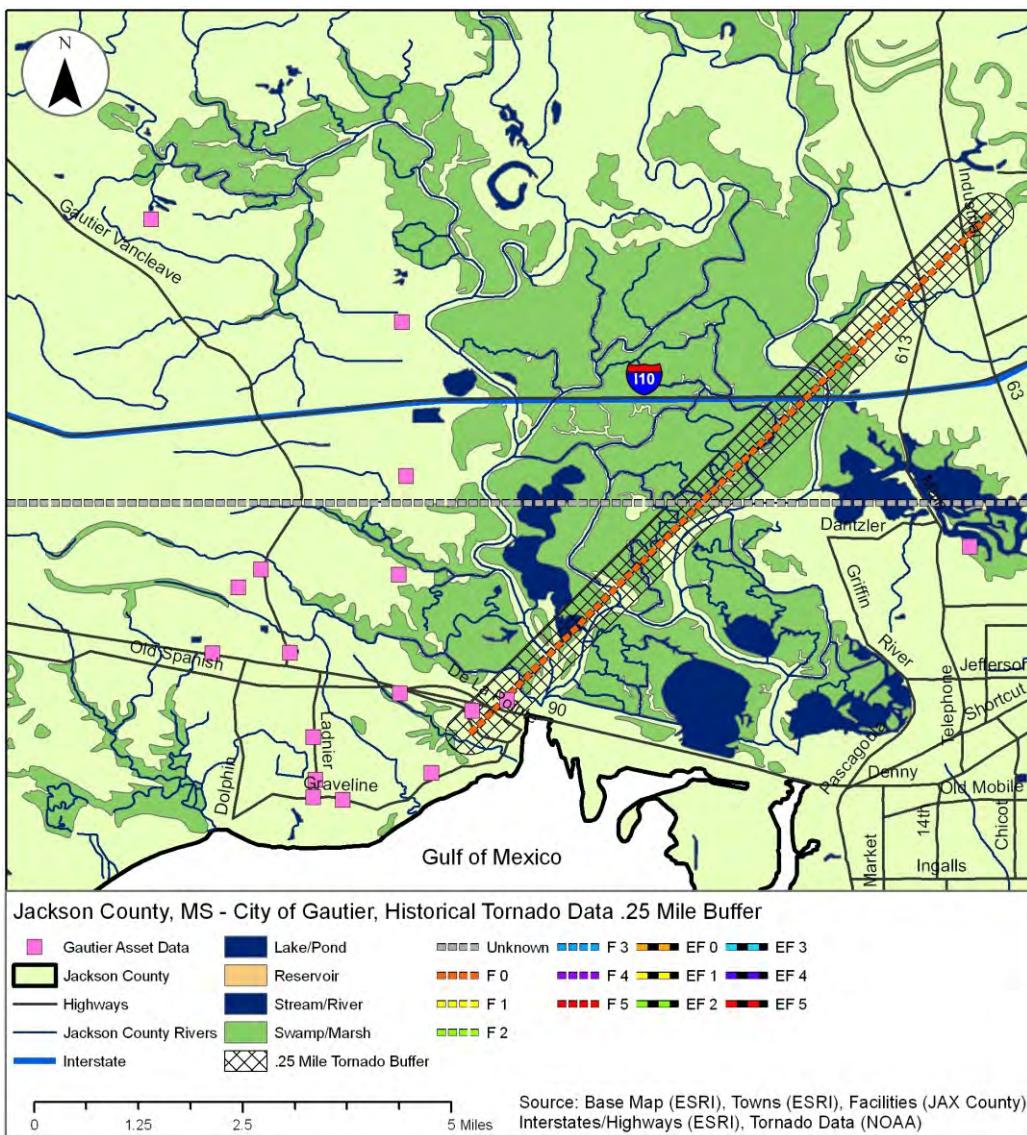
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Map 4.31
Jackson County Tornado Scenario
(Source: ESRI, Jackson County)



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Map 4.32
Gautier Tornado Scenario
(Source: ESRI, Jackson County)



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Table 4.32
Tornado Scenario Damages to Jackson County Facilities
and Building Stock from an F-2 Touchdown

Building Type	Number of Buildings Impacted	50% Estimated Loss
Level 1	6	\$1,388,666
Level 2	3	\$0 ⁴
Level 3	0	\$0
Level 4	0	\$0
Level 5	0	\$0
Public Buildings	1283	\$44,016,835

Table 4.33
Tornado Scenario Damages to City of Gautier Facilities
and Building Stock from an F-0 Touchdown

Building Type	Number of Buildings Impacted	50% Estimated Loss
Level 1	1	\$0 ⁵
Level 2	1	\$0 ⁶
Level 3	0	\$0
Level 4	0	\$0
Level 5	0	\$0
Commercial Buildings	490	\$4,928,306

⁴ School Property Values were not available during the analysis of this hazard.

⁵ Fairchilds Mobile Home Park property values were not available during the analysis of this hazard.

⁶ Gautier Elementary School property value was not available during the analysis of this hazard.

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4.6 Analyzing Development Trends

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

4.6.1 Population Growth

Population growth is an indicator of development trends. Jackson County's population loss of 4.7% during the years of 2005 and 2006 were reversed in 2007 when 1.6% increase in population occurred. Population has continued to grow as evidenced by the 2010 census and 2011 estimated population (see Chapter One for details) It is expected that this slow but steady growth trend will continue in the immediate future.

Map 4.33 illustrates the percentage of population growth for the entire county from 2000 to 2010 by census blocks. The map includes all municipal areas which are outlined in purple. The highest growth areas are shown in green and areas that experience population decline in other colors. The highest growth areas were north of the incorporated areas. Within the City of Gautier, the area north of I-10 and south of State Highway 90 experienced positive growth.

Population Projections

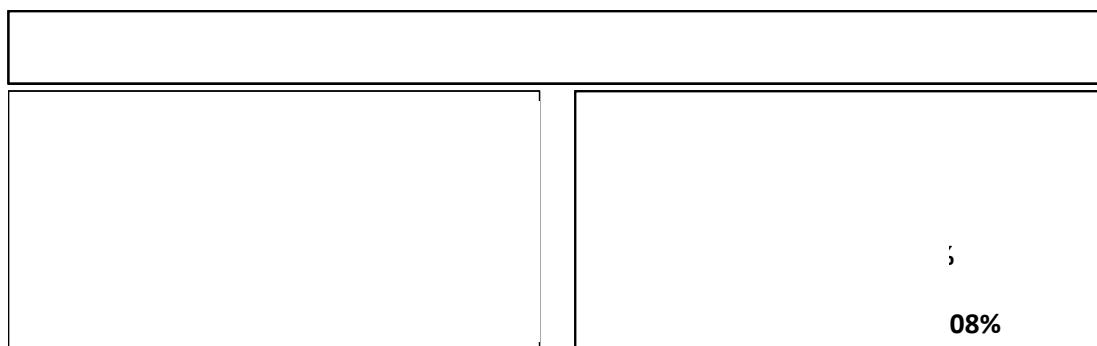
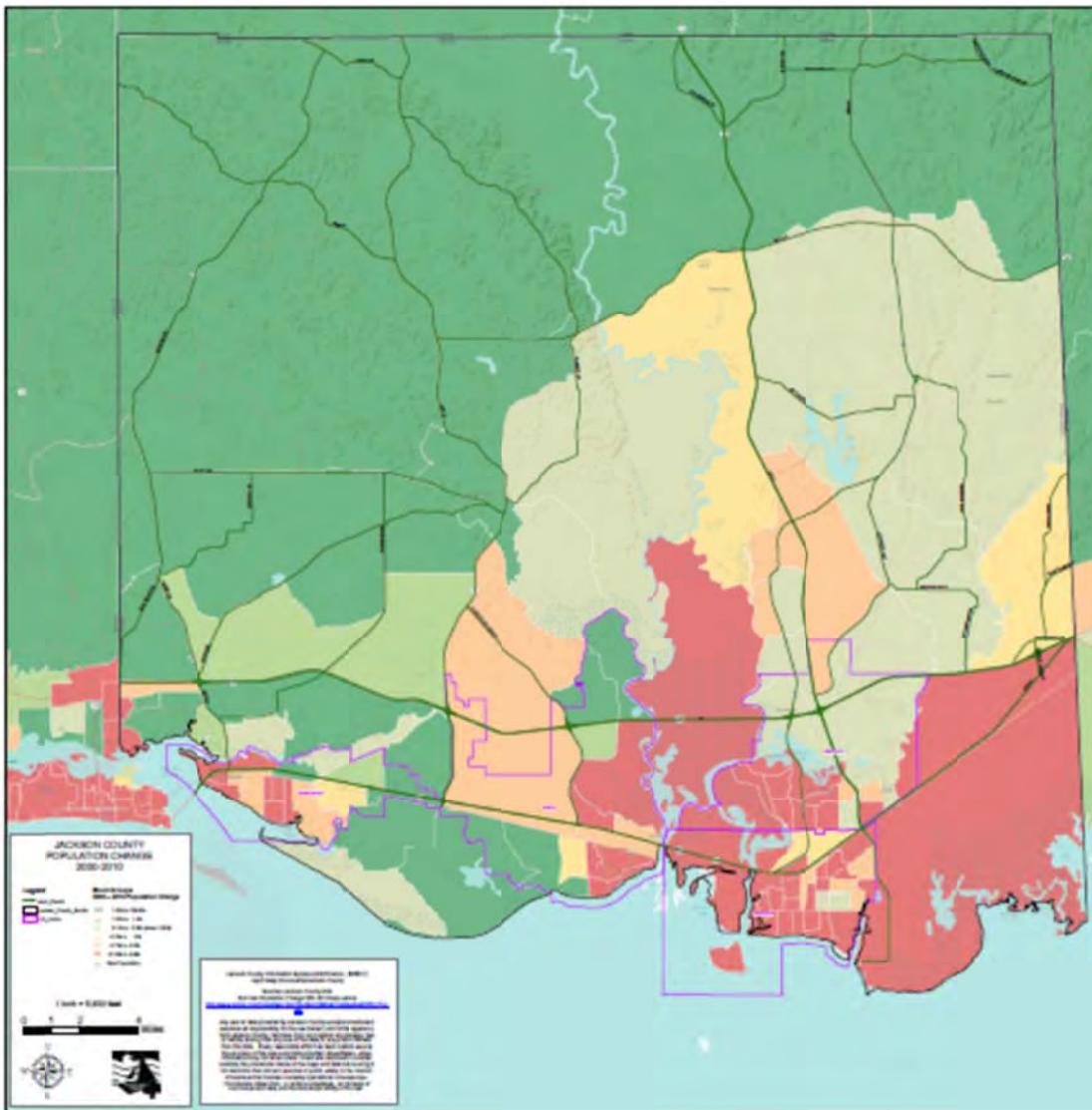
Population projections developed for Jackson County's Comprehensive Plan predicted a midrange population of 157,236 people in year 2025. The 2000 census counts for area within the existing city limits of Gautier was 16,695. This includes land that was within the city at that time and land that was annexed in 2002. Census 2010 the population was 18,572. A population of 22,788 is projected by the year 2025 according to the City of Gautier Comprehensive Plan. Obviously factors affecting population are greatly affected by unknown future events such as new or closing employment centers and natural and man-made disasters.

4.6.2 Housing

According to information provided by Jackson County, a total of 1,601 residential building permits were issued by the county from January 2007 through July, 2012. The areas where the majority of residential development occurred are St. Martin, Latimer, Vancleave, and Hurley. Within the City of Gautier, census information indicates that 389 residential building permits were issued from January 2007 through December 2011. This includes reconstruction after Hurricane Katrina as well as new construction.

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Map 4.33
Jackson County Population Growth 2000-2010
(Source: Jackson County)



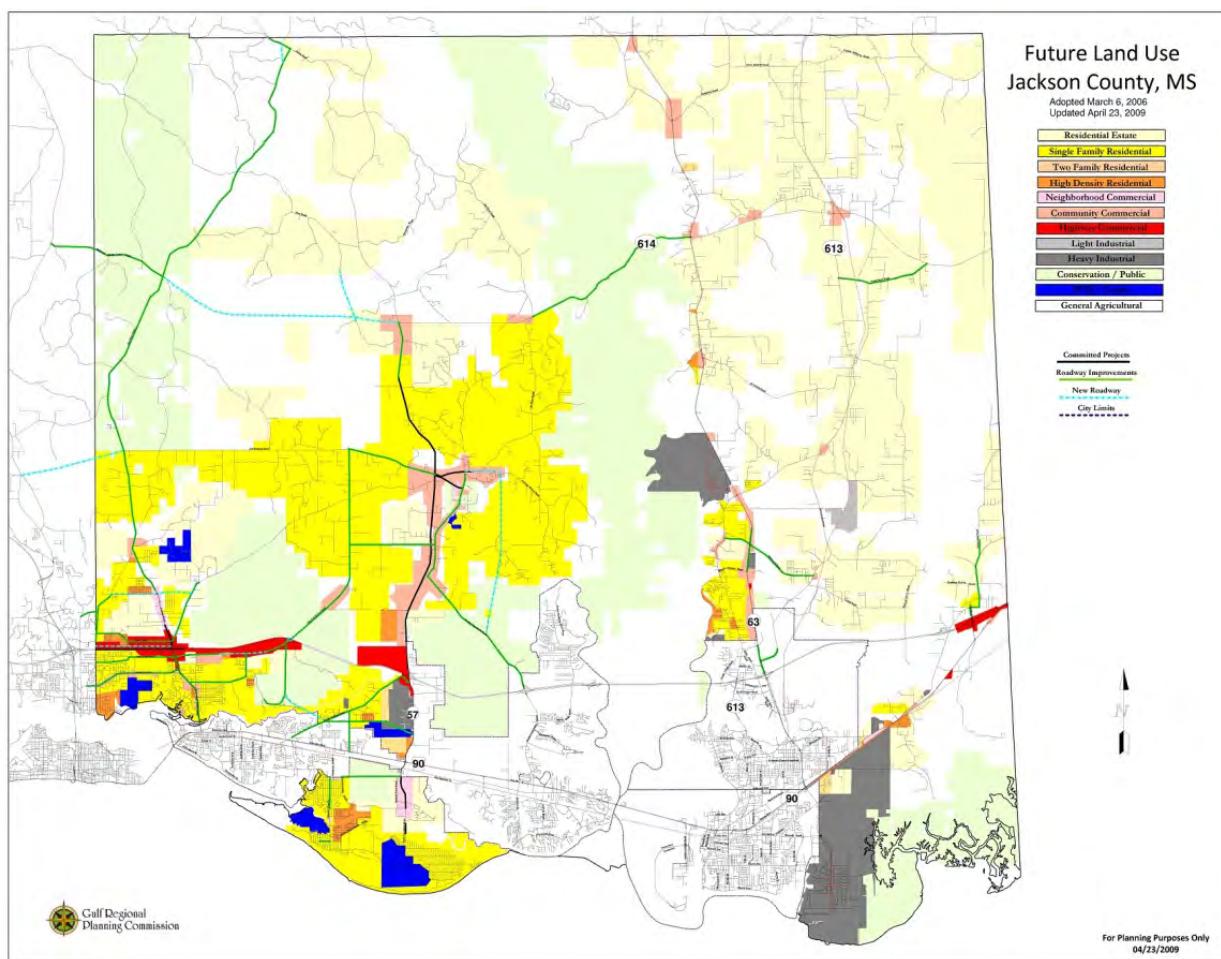
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4.6.3 Land Available for Development

Jackson County

Approximately 48% of the land in the unincorporated portion of the county or 209,679 acres is vacant or agricultural land. Most of this land is located north of the major population centers. Map 4.34 below from the Comprehensive Plan shown below indicates by category the type of development appropriate for specific areas. Land shown in white is classified as general agricultural and yellow indicates residential.

Map 4.34
Jackson County Future Land Use
(Source: Jackson County 2007 Comprehensive Plan)

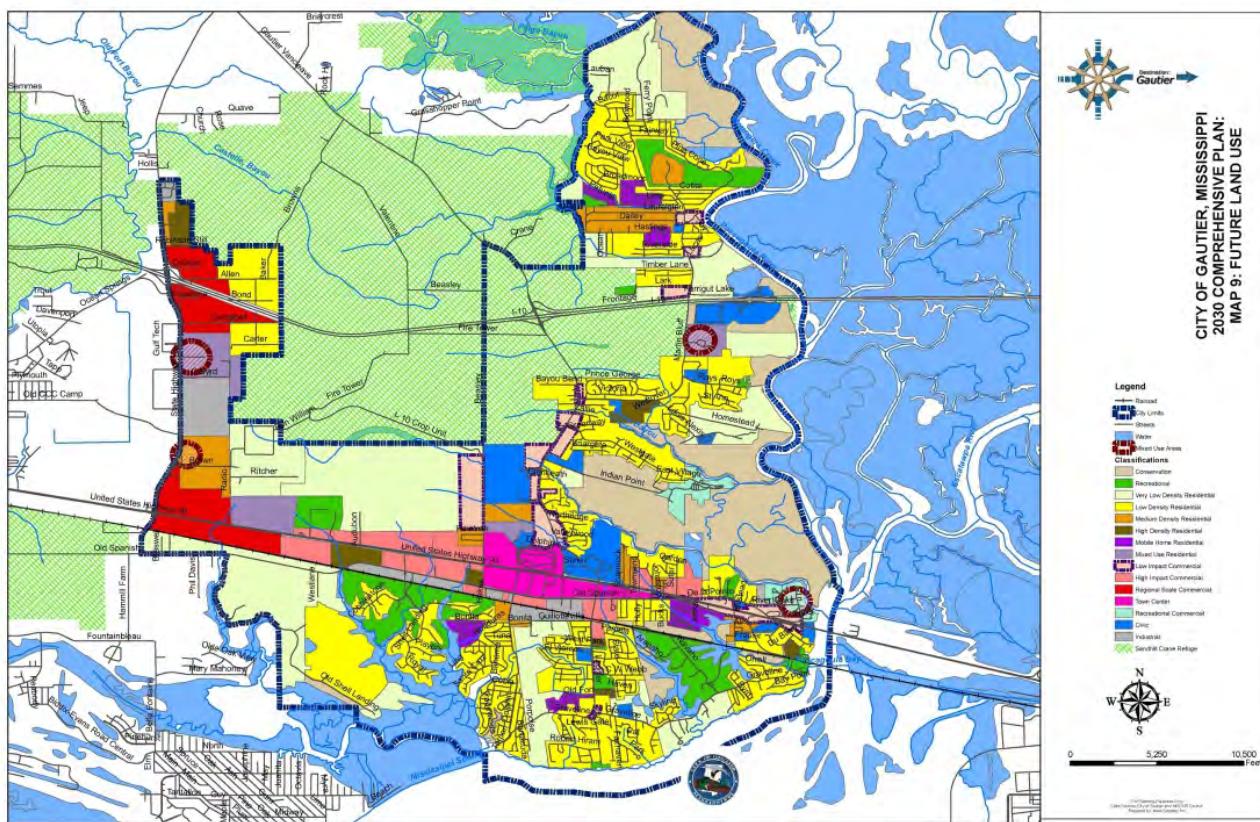


Chapter Four -- Hazard Identification and Risk Assessment

City of Gautier

Based on data provided in the City of Gautier Comprehensive Plan 2030, dated June 2009, 40% of the jurisdiction, or 14 square miles, remains to be developed. Map 4.34 below from the Comprehensive Plan shown below indicates by category the type of development appropriate for specific areas. Areas shown in striped green are within the boundaries of the Sandhill Crane National Wildlife Refuge and those in light brown are conservation land and are not available for development.

Map 4.35
City of Gautier Future Land Use
(Source: Gautier 2009 Comprehensive Plan)



Chapter Four -- Hazard Identification and Risk Assessment

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Chapter Five -- Mitigation Strategies

5 Mitigation Strategies

The purpose of the Jackson County Multi-Jurisdiction Hazard Mitigation Plan is to avoid, minimize and mitigate the impacts of natural and human disasters on both people and properties within the community. Activities to achieve this end are currently achieved through established building and zoning codes and other regulations and activities. The careful review of city and county policy must be undertaken on a regular basis to ensure that the goals of providing a safe livable community continue to be met in the face of hazards.

Since Hurricane Katrina in 2005, Jackson County and the City of Gautier have continued to complete recovery projects to improve their jurisdictions vulnerabilities from natural disasters. Even though seven years have passed, there is still much to do. Both participating jurisdictions in this plan update have been proactive in establishing priorities, securing funding, and implementing actions. Measures have been taken with this update to include a process for monitoring the progress made on mitigation actions to facilitate an improved documentation process for reporting completed projects over the next five years (see Chapter Six). Table 5.1 represents a list of projects that have been completed by each participating jurisdiction.

5.1 Mitigation Goals and Objectives

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

Throughout the planning process the HMC reflected on appropriate and effective mitigation planning goals and objectives for the participating jurisdictions. The Council elected to redevelop the goals from the 2005 plan into four broad-based goals with objectives to better organize their strategies. They also reviewed the goals and objectives of the 2010 State of Mississippi Hazard Mitigation Plan and the local plans within Jackson County as a means of integrating the plans for effectively supporting those planning initiatives. The HMC reached consensus and formally approved the following goals and objectives for the 2012 Hazard Mitigation Plan update:

Goal 1: Promote strategies to minimize the loss of life, injury, and damage to existing/new property, infrastructure, and natural systems from natural hazards

Objectives:

- 1.1: Retrofit/Relocate existing critical facilities/infrastructure to resist all hazard impacts
- 1.2: Ensure all new critical facilities/infrastructure and developments are built to resist all hazard impacts
- 1.3: Minimize flooding impacts
- 1.4: Minimize wildfire impacts
- 1.5: Minimize impacts caused by coastal storms/hurricanes/Sea Level Rise/Coastal Erosion

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- 1.6: Minimize impacts caused by drought
- 1.7: Minimize impacts caused by tornado, thunderstorm, high wind and Lightning
- 1.8: Preserve/Maintain natural resources

Goal 2: Foster an on-going community education/awareness program for all hazards

Objectives:

- 2.1: Develop/Improve outreach programs and materials to increase public awareness
- 2.2: Develop tailored outreach strategies for vulnerable populations, such as tourists, physically challenged, children and the elderly, non-English communities and low-income residents

Goal 3: Enhance response procedures and capabilities

Objectives:

- 3.1: Update/develop planning and response procedures
- 3.2: Transportation Development/Improvements

Goal 4: Utilize local ordinances and policies to implement recommendations/findings of the hazard mitigation plan

Objective:

- 4.1: Incorporate/enforce hazard mitigation strategies into city/county ordinances and plans

Chapter Five -- Mitigation Strategies

5.2 Identification and Analysis of Mitigation Actions

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

The HMC reviewed the mitigation goals and actions identified in the 2005 plan as presented in Appendix 8.5-A. Many of the actions were implemented into projects such as acquisition/demolition of repetitive loss properties, hardening of critical facilities and infrastructure and numerous enforcement activities.

Table 5.1 reflects a summary of the mitigation activities that have been completed or are still in progress since the 2005 plan was adopted. (This list is not inclusive but merely represents a sample of the significant improvements that have been made throughout the planning area.)

Table 5.1: Completed Projects since 2005

Generators to support critical facilities and infrastructure	
Jackson County	
<ul style="list-style-type: none">• Martin Bluff Rd Lift Station• Lark Street Well• Six portable units (80kw)• Courthouse• Old Courthouse• Cooling Towers• Emergency Operation Center• East Central (Vancleave) High School• East Central Community Center• Latimer Community Center• Sheriff's Reserve Bldg (Fairgrounds)• Larue Community Center• Vestry Community Center• St. Martin High School (*see Appendix 8.4-B for details)	<ul style="list-style-type: none">• St. Martin Middle School• St. Martin Library/Community Center• Adult Detention Center• Central Road Department• East Road Department• Youth Court Complex• Task Force• Civic Center (Fairgrounds)• Supervisors Dist III/Maint. Dept• Sheriff's Mechanic Shop• Airport Hangar #1• Airport Workshop• FAA Control Tower• Recreation Office Complex
City of Gautier	
<ul style="list-style-type: none">• City hall• Public works• Five Trailer Mounted Units<ul style="list-style-type: none">○ Mall well, Senior Bldg well and three units on standby	<ul style="list-style-type: none">• Fire departments• Police department• Gautier Convention Center
Upgrade/harden water and waste water facilities	
City of Gautier	Jackson County
Upgrade water lines and install new lines Hickory Hills, Gautier (\$4,518,223) Gulf Regional Disaster Recovery grant	Relocate JCUA laboratory to Vancleave <u>In Progress:</u> COE 592 wholesale water to Ocean Springs Estates, St. Andres and areas south of Hwy 90 along Hwy 57 corridor

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Harden critical facilities	
City of Gautier	Jackson County
<ul style="list-style-type: none">• Gautier City Hall• Senior Center• Gautier Fire Stations	<ul style="list-style-type: none">• Forts Lake Fire Department• Jackson County Road Office
Back up water service	
JCUA provided wholesale water to the western areas of Ocean Springs and West Jackson County Utility District. This system may be capable of providing water to the city of Gautier if needed	
Construct Community Safe Rooms	
Jackson County Completed	Jackson County In Progress
<ul style="list-style-type: none">• St Martin High School• Fontainebleau First Responder Safe Room	<ul style="list-style-type: none">• Vancleave Central• St. Martin-West Jackson County• Hurley-East Jackson County
Acquisition/Demolition of Repetitive Loss Properties	
Jackson County Completed	Jackson County In Progress
See Appendix 8.5-B for list of properties completed	Approximately 12 homes in progress under the current grant award
Storm Water Control and Household Waste Awareness Campaigns	
Illicit Discharge Jackson County & Gautier	December 3, 2007 December 16, 2009 November 17, 2010 November 2, 2011
Stormwater Program Jackson County & Gautier	December 3, 2007 April 22, 2008 June 28, 2011
Household Hazardous Waste Collection Jackson County & Gautier	April 18, 2009 November 14, 2010 October 16, 2010 April 16, 2011 October 15, 2011
Roll-off Dumpster Days Gautier	April 2011 April 2012

5.3 Identification and Analysis of Mitigation Actions - National Flood Insurance Program Compliance

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

Jackson County and the City of Gautier are participants in the National Flood Insurance Program (NFIP). Jackson County and Gautier continue to mitigate properties that are classified as Repetitive Flood Claim (RFC). Appendix 8.5-C contains a list of properties that have been mitigated through acquisition/demolition and a separate list of properties that remain on the RFC list. Jackson County received a Hazard Mitigation Assistance grant and is currently completing

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the properties that were identified as a priority for acquisition and/or demolition. At the time of this plan update, approximately 12 properties are in the process of being completed.

Jackson County and Gautier remain dedicated to seeking opportunities to mitigate RFC properties. Remaining properties will be prioritized to assist with applying for FMA when funding is available. Chapter Six - Capabilities Assessment contains information from both jurisdictions regarding their Flood Damage Prevention Ordinances.

Community Rating System

The Community Rating System (CRS) is a voluntary program for National Flood Insurance Program (NFIP) participating communities. The goals of the CRS are to reduce flood damages to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management.

The CRS has been developed to provide incentives in the form of premium discounts for communities to go beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding. Table 5.2 provides the current CRS status for Jackson County and the municipalities within its jurisdiction.

Table 5.2: CRS Ratings for Jackson County and Municipalities							
Community Number	Community Name	CRS Entry Date	Current Effective Date	Current Class	% Discount for SFHA	% Discount for Non-SFHA	Status
280332	Gautier	10/1/94	10/1/10	7	15	5	C
285256	Jackson County	10/1/11	10/1/11	9	5	5	C
285259	Ocean Springs	10/1/92	05/1/08	7	15	5	C
285260	Pascagoula	10/1/07	10/1/11	5	25	10	C

Classification of Mitigation Actions

With the revised goals and objectives in place, the HMC identified specific actions that will help accomplish the participating jurisdiction's overall mitigation strategies. The projects identified in Table 5.3 under Section 5.5 include projects that will require substantial funding and may be difficult for the jurisdictions to commit to due to tight budget constraints caused by the current economy.

Particular attention will be paid to actions that are designed to reduce the effects of hazards on new buildings and infrastructure. Jackson County and the City of Gautier will refer to the data presented in Chapter Four of this plan and utilize current technology and/or products for future additions throughout its jurisdiction.

Furthermore, they will also seek to reduce the effects of natural hazards on existing buildings and infrastructure. For example, retrofitting a safe room within an existing building can provide increased protection to those seeking shelter. Each jurisdiction will utilize the best approach for improving existing conditions for buildings and infrastructure where practical.

All of the mitigation actions identified in this plan may not be implemented. They merely represent actions that Jackson County and the City of Gautier has deemed as potentially viable.

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Each mitigation action identified in this plan has been sorted into identified mitigation groups as defined below:

Prevention: Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.

Property Protection: Actions that involve the modification of existing buildings or infrastructure to protect them from a hazard or remove from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, flood proofing, storm shutters, and shatter-resistant glass.

Public Education and Awareness: Actions that inform and educate citizens, elected officials, and property owners about potential risks from hazards and potential ways to mitigate said risks. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

Natural Resource Protection: Actions that not only minimize hazard losses but also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

Emergency Services: Actions that protect people before, during, and after a hazard event. Certain critical facilities such as administrative and emergency operations offices that provide critical and vital services; coordinate warnings, responses, and recovery from a disaster are identified. Actions include protection of warning system capability, protection or hardening of critical facilities, and protection of infrastructure needed for emergency response.

Structural Projects: Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include storm water controls (*i.e.* culverts), floodwalls, seawalls, retaining walls, and safe rooms.

Technical Assistant Projects: Actions that involve support/education from federal, state and local agencies as required, data collection for GIS mapping and technology upgrades.

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5.4 Implementation of Mitigation Actions

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

Priorities

The HMC elected to use a basic methodology to prioritize their projects based upon the following five factors: risk to people, risk to facilities/infrastructure (loss of function), cost effectiveness, increase public awareness, and availability of funds (likelihood). Actions were assigned a number between 1 and 3, with 1 being the lowest and 3 the highest. The factors were combined for an overall priority for the action with the highest possible score of 15 as defined below:

Low – score of 1-5

Moderate – score of 6-10

High – score of 11-15

Table 5.3 in Section 5.5 includes the results of the priority ranking approved by the HMC. (A copy of the completed ranking exercise is provided in Appendix 8.5-D.)

Implementation

As funding is identified and the justification is determined, the mitigation actions will be developed into projects. For those projects that are eligible for mitigation funding, a cost-benefit analyses will be used. The costs of the proposed projects (money, time, etc) will be weighed with the potential benefits (reduced losses, improved safety, etc.) in order for the participating jurisdictions to determine the appropriate action required. Special priorities will be given to initiatives addressing critical facilities and infrastructure that are required for them to carry out their mission and provide safety to the population they serve.

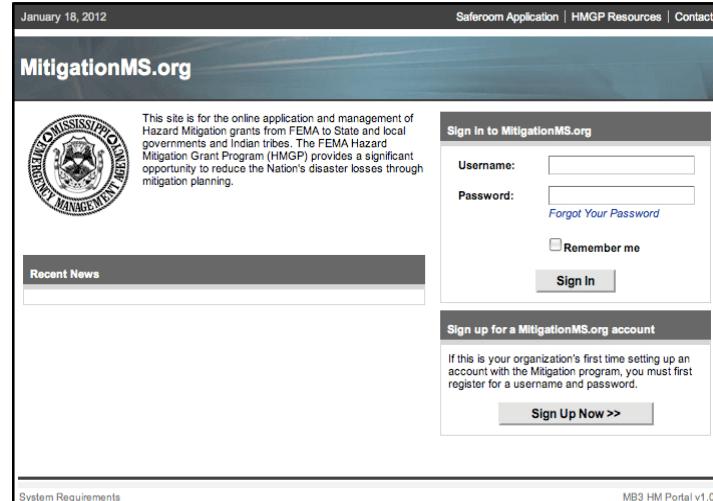
While cost-benefit analyses are fundamental to the decision-making process for Jackson County and Gautier, project cost is an overriding factor when determining which projects should be pursued. Both jurisdictions operate under tight budget conditions in which they must use prudence in how they allocate funds. They will seek to justify implementation based on long-term financial implications regarding potential mitigation projects.

Once mitigation actions are identified and resources have been secured, Jackson County and Gautier will implement and administer their projects. Some projects may be coordinated with a support agency such as the Mississippi Emergency Management Agency (MEMA) through the Unified Hazard Mitigation Assistance program. Jackson County will coordinate with MEMA and refer to the FEMA Hazard Mitigation Assistance Unified Guidance (June 2010) as further development of applications for the identified mitigation actions in this plan that are eligible under the program.

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Administration

The Jackson County and City of Gautier Grant Departments will be responsible for the administration of mitigation actions as they are implemented. Administration will include completing grant applications including www.mitigationms.org or other grant sources and applicable quarterly progress reports.



5.5 Mitigation Actions

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

Throughout the planning process, the HMC and Mitigation Subcommittee identified mitigation actions to further reduce their vulnerabilities to disasters. The HMC attempted to identify potential funding, support agency and timeframe estimate for each action based on current issues and recommendations for improving the issues known. The HMC will continue to develop and enhance the projects listed in Table 5.3 as they implement the plan maintenance process as described in Chapter Seven.

Mitigation Actions

It is important to note that these actions should not be construed as being the final list of actions. This list will be updated in the future as zoning laws, land uses, hazard conditions change, or other needs/solutions arise. In order to effectively reduce the effects of the identified hazards, the HMC identified the following mitigation actions by mitigation goal and objective. Each action identifies the participating jurisdiction, responsible and support agencies, estimated timeframe, mitigation group, funding source and priority.

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Table No. 5.3: Mitigation Actions

Goal 1: Promote strategies to minimize the loss of life, injury, and damage to existing/new property, infrastructure, and natural systems from natural hazards

Objective 1.1: Retrofit/Relocate existing critical facilities/infrastructure to resist all hazard impacts

Action Name and Description	<i>Action 1: Generators to support critical facilities and infrastructure</i> Identify and prioritize portable generator hook ups or permanent mount units for wells, lift stations and facilities
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Jackson County, City of Gautier, Jackson County Utility
Support Agencies	MEMA, FEMA
Estimated Timeframe	Ongoing
Mitigation Group	Emergency Services
Funding Source	HMA
Priority	High

Action Name and Description	Action 2: Retrofit critical facilities with safe rooms Identify and construct areas suitable to retrofit a safe room in the following Gautier critical facilities to protect staff members during events: Fire, Police, Public works, City Hall
Jurisdiction	City of Gautier
Responsible Agency	City of Gautier
Support Agencies	Jackson County, MEMA, FEMA
Estimated Timeframe	TBD
Mitigation Group	Structural Projects
Funding Source	HMA
Priority	Moderate

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Action Name and Description	Action 3: Upgrade/harden water and waste water facilities Gautier water towers/wells lightning and high wind protection Shell Landing Wastewater Collection Systems (\$97,325.00) FY08 CIAP JCUA-upgrade motor control centers OS #4, #8 and MP #15 JCUA-Upgrade sanitary generators OS #6 & 21 and Gautier WWTP
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	City of Gautier, Jackson County Utility Authority
Support Agencies	TBD
Estimated Timeframe	Ongoing
Mitigation Group	Property Protection
Funding Source	TBD
Priority	High

Action Name and Description	Action 4: Harden existing critical facilities Gautier Police Depart-(grant approval pending) Gautier Public Works-shutters/windows Gautier Maintenance shop-roll up door Singing River Hospital and Ocean Springs Hospital-roof replacements (grant approval pending) Singing River Hospital-Wind Retrofit (grant approval pending) Schools – retrofit safe room areas Gautier Fire Departments roofing supports for high wind resistance JCUA relocate/improve Pascagoula/Moss Point WWTF, admin/maint. facilities and Escatawpa WWRF out of the floodplain
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	City of Gautier, Jackson County, Singing River Health
Support Agencies	TBD
Estimated Timeframe	Ongoing
Mitigation Group	Property Protection
Funding Source	HMA
Priority	High

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Action Name and Description	Action 5: Elevate/improve roads and bridges that are below base flood elevation Continue to explore areas throughout City and County to identify areas of concern.
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Jackson County Road Dept, Gautier Public Works
Support Agencies	MDOT, FHWA
Estimated Timeframe	Ongoing
Mitigation Group	Property Protection
Funding Source	TBD
Priority	High

Action Name and Description	Action 6: Back up water supply system/service for Ocean Springs and Singing River Hospitals Explore options for connecting to alternate water source or construct well on site
Jurisdiction	Jackson County, Ocean Springs and Pascagoula
Responsible Agency	Singing River Health Systems
Support Agencies	Cities of Ocean Springs and Pascagoula, Jackson County Utility Authority
Estimated Timeframe	2017
Mitigation Group	Emergency Services
Funding Source	TBD
Priority	High

Action Name and Description	Action 7: Develop agreements/process for providing tie-ins and back up water services for Jackson County Utility Authority and Gautier
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Jackson County Utility Authority, Gautier Public Works
Support Agencies	TBD
Estimated Timeframe	2017
Mitigation Group	Property Protection
Funding Source	TBD
Priority	High

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Action Name and Description	Action 8: Relocate Jackson County Emergency Operation Center Move to county-owned property on Jim Ramsey Rd. May also include Jackson Co Sheriff Dispatch/E-911 in building design. Current location is vulnerable to a storm surge
Jurisdiction	Jackson County
Responsible Agency	Jackson County
Support Agencies	MEMA, FEMA
Estimated Timeframe	2017
Mitigation Group	Emergency Services
Funding Source	HMA
Priority	High

Action Name and Description	Action 9: Relocate Jackson County Sheriff Dispatch/E-911 Move with EOC on Jim Ramsey Rd or relocate to existing EOC on Convent Ave. Current location is vulnerable to a storm surge
Jurisdiction	Jackson County
Responsible Agency	Jackson County
Support Agencies	MEMA, FEMA
Estimated Timeframe	2017
Mitigation Group	Emergency Services
Funding Source	HMA
Priority	High

Action Name and Description	Action 10: Relocate Emergency Operation Center for Gautier Current location in City Hall is vulnerable to a storm surge
Jurisdiction	City of Gautier
Responsible Agency	City of Gautier
Support Agencies	Jackson County, MEMA, FEMA
Estimated Timeframe	2017
Mitigation Group	Emergency Services
Funding Source	HMA
Priority	High

Chapter Five -- Mitigation Strategies

Objective 1.2: Ensure all new critical facilities/infrastructure and developments are built to resist all hazard impacts

Action Name and Description	Action 11: Encourage use of underground utilities in higher elevation areas
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Planning Departments
Support Agencies	Local utility providers
Estimated Timeframe	Ongoing
Mitigation Group	Property Protection
Funding Source	Internal
Priority	Moderate

Action Name and Description	Action 12: Construct all new critical facilities and infrastructure with materials designed to minimize impacts from all hazards
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Planning Departments
Support Agencies	City and County Building Departments
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	Internal
Priority	High

Action Name and Description	Action 13: Construct Community Safe Rooms Identify location for community safe rooms in Gautier and Jackson County to accommodate the remaining population not covered in the existing safe rooms
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier City Council, Jackson County Board of Supervisors
Support Agencies	Jackson County EMA, Red Cross
Estimated Timeframe	TBD
Mitigation Group	Emergency Services
Funding Source	HMA
Priority	High

Action Name and Description	Action 14: Enforce building codes
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Planning Departments
Support Agencies	Jackson County Building Department
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	Internal
Priority	High

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Action Name and Description	Action 15: Coordinate with applicable agencies on constructing new roadways and bridges above the base flood elevation
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier Public Works, Jackson County Road Department
Support Agencies	MDOT, FHWA
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	TBD
Priority	High

Objective 1.3: Minimize flooding impacts

Action Name and Description	Action 16: Maintain debris program to clear drainage ways from existing properties and critical facilities
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier Street Division, Jackson County Road Department
Support Agencies	Gautier Public Works, Jackson County Public Works
Estimated Timeframe	Ongoing
Mitigation Group	Natural Resources Protection
Funding Source	Internal
Priority	High

Action Name and Description	Action 17: Maintain debris program to clear roadside ditches and culverts
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier Street Division, Jackson County Road Department
Support Agencies	Gautier Public Works, Jackson County Public Works
Estimated Timeframe	Ongoing
Mitigation Group	Natural Resources Protection
Funding Source	Internal
Priority	High

Action Name and Description	Action 18: Develop/Enforce landscaping requirements to provide absorption of average volumes of rainfall on property
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Planning Departments
Support Agencies	Gautier Public Works, Jackson County Public Works
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	Internal
Priority	Moderate

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Action Name and Description	Action 19: Acquisition / demolition of Severe Repetitive Loss (SRL) and Repetitive Flood Claim (RFC) properties Prioritize RFC/SRL properties and continue applying for FMA to mitigate when practical
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Planning Departments
Support Agencies	MEMA, FEMA
Estimated Timeframe	Ongoing
Mitigation Group	Property Protection
Funding Source	FMA
Priority	High

Action Name and Description	Action 20: Enforce storm water ordinances and encourage use of pervious surfaces and natural absorption of rainwater
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Planning Departments
Support Agencies	Gautier and Jackson County Building Departments
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	Internal
Priority	High

Action Name and Description	Action 21: Enforce the revised Digital Flood Insurance Rate Map (DFIRM)
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Planning Departments
Support Agencies	MEMA, FEMA, Jackson County EMA
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	Internal
Priority	High

Action Name and Description	Action 22: Raise lift stations and other critical infrastructure above base flood plain where feasible Review and determine which facilities can be elevated/relocated and set priorities to mitigate when feasible.
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Jackson County Utility Authority, City of Gautier
Support Agencies	MEMA, FEMA, MDEQ
Estimated Timeframe	Ongoing
Mitigation Group	Property Protection
Funding Source	TBD
Priority	High

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Objective 1.4: Minimize wildfire impacts

Action Name and Description	Action 23: Control vegetation growth around critical facilities and infrastructure
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier Street Division, Jackson County Road Department
Support Agencies	TBD
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	Internal
Priority	High

Action Name and Description	Action 24: Coordinate prescribed burns in heavily forest areas with state and federal agencies Due to the location of numerous natural resource areas within the County, prescribed burns conducted in these areas can increase the ozone cap.
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Fire Departments
Support Agencies	State and Federal Agencies
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	Internal
Priority	High

Objective 1.5: Minimize impacts caused by coastal storms/hurricanes/Sea Level Rise/Coastal Erosion

Action Name and Description	Action 25: Develop/maintain a beach erosion and renourishment program
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Public Works
Support Agencies	TBD
Estimated Timeframe	Ongoing
Mitigation Group	Natural Resource Protection
Funding Source	Internal
Priority	Moderate

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Action Name and Description	Action 26: Conduct a study of the affects of sea level rise and develop mitigation strategies to minimize those effects
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	TBD
Support Agencies	TBD
Estimated Timeframe	TBD
Mitigation Group	Structural Projects
Funding Source	TBD
Priority	Low

Action Name and Description	Action 27: Encourage private land owners on waterfronts to implement erosion control measures
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Planning Departments
Support Agencies	Land Owners
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	Internal
Priority	Low

Objective 1.6: Minimize impacts caused by drought

Action Name and Description	Action 28: Develop/enforce water use ordinance to address drought condition procedures
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Planning Departments
Support Agencies	Gautier and Jackson County Fire Departments
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	Internal
Priority	High

Action Name and Description	Action 29: JCUA conduct study on aquifers Determine impacts on public and private well
Jurisdiction	Jackson County
Responsible Agency	Jackson County Utility Authority
Support Agencies	Gautier and Jackson County Public Works
Estimated Timeframe	TBD
Mitigation Group	Prevention
Funding Source	TBD
Priority	Moderate

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Objective 1.7: Minimize impacts caused by tornado, thunderstorm, high wind and Lightning

Action Name and Description	Action 30: Encourage existing and new developments to include surge and lightning protectors and use of enhanced construction materials
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Planning Departments
Support Agencies	TBD
Estimated Timeframe	Ongoing
Mitigation Group	Property Protection
Funding Source	Internal
Priority	High

Action Name and Description	Action 31: Implement mast arm traffic signal improvements
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier Street Division, Jackson County Road Department
Support Agencies	MDOT, FHWA
Estimated Timeframe	Ongoing
Mitigation Group	Emergency Services
Funding Source	TBD
Priority	High

Action Name and Description	Action 32: Mount street signs to existing mast arm traffic signals
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier Street Division, Jackson County Road Department
Support Agencies	MDOT, FHWA
Estimated Timeframe	Ongoing
Mitigation Group	Emergency Services
Funding Source	TBD
Priority	High

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Objective 1.8: Preserve/Maintain natural resources

Action Name and Description	Action 33: Implement dredging program for the Bayou areas to improve affects of sediment buildup caused by storm surge Funding is an issue for this type of project. Removal of sedimentation from Graveline Bayou in Gautier (FY2013) Tideland Funding Countywide
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier Public Works, Jackson County Public Works
Support Agencies	TBD
Estimated Timeframe	TBD
Mitigation Group	Natural Resource Protection
Funding Source	MDMR, USACE, NRCS, CIAP, Tideland
Priority	Moderate

Action Name and Description	Action 34: Acquisition of Natural Wetlands City of Gautier Land Conservation 32 acre parcel north of Singing River Mall to be used as Town Green
Jurisdiction	City of Gautier
Responsible Agency	Gautier Planning Department
Support Agencies	Jackson County
Estimated Timeframe	August 2012
Mitigation Group	Natural Resource Protection
Funding Source	CIAP
Priority	Low

Action Name and Description	Action 35: Land Acquisition City of Gautier City Park Community Center-Phase 1 Improvements to City Park along Mary Walker Bayou
Jurisdiction	City of Gautier
Responsible Agency	Gautier Planning Department
Support Agencies	MDMR
Estimated Timeframe	April 2013
Mitigation Group	Natural Resource Protection
Funding Source	Tideland Funding FY2010
Priority	Low

Chapter Five -- Mitigation Strategies

Goal 2: Foster an on-going community education/awareness program for all hazards

Objective 2.1: Develop/Improve outreach programs and materials to increase public awareness

Action Name and Description	Action 36: Educate the public on all hazard preparedness
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Jackson County EMA
Support Agencies	Gautier and Jackson County Planning Departments
Estimated Timeframe	Ongoing
Mitigation Group	Public Education and Awareness
Funding Source	TBD
Priority	High

Action Name and Description	Action 37: Educate the public on all hazard mitigation programs (safe rooms, wind retrofit, etc.)
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Jackson County EMA
Support Agencies	Gautier and Jackson County Planning Departments
Estimated Timeframe	Ongoing
Mitigation Group	Public Education and Awareness
Funding Source	TBD
Priority	High

Action Name and Description	Action 38: Educate the public about the benefits of flood mitigation of homes and businesses
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Jackson County EMA
Support Agencies	Gautier and Jackson County Planning Departments
Estimated Timeframe	Ongoing
Mitigation Group	Public Education and Awareness
Funding Source	TBD
Priority	High

Chapter Five -- Mitigation Strategies

Action Name and Description	Action 39: Continue to deliver programs to residents, business owners and developers regarding best management practices for storm water control and Household Hazardous Waste
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Planning Departments
Support Agencies	Solid Waste, MDEQ, EPA, etc.
Estimated Timeframe	Ongoing
Mitigation Group	Public Education and Awareness
Funding Source	TBD
Priority	High

Action Name and Description	Action 40: Improve notification procedures of impending hazards and evacuation procedures
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Jackson County EMA
Support Agencies	MEMA, FEMA, MDOT
Estimated Timeframe	Ongoing
Mitigation Group	Public Education and Awareness
Funding Source	TBD
Priority	High

Action Name and Description	Action 41: Develop education materials for water conservation
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Planning Departments
Support Agencies	MDEQ, EPA, etc.
Estimated Timeframe	Ongoing
Mitigation Group	Public Education and Awareness
Funding Source	TBD
Priority	High

Action Name and Description	Action 42: Promote <i>Firewise</i> program to home owners, builders/contractors and developers
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Fire Departments
Support Agencies	MFC
Estimated Timeframe	Ongoing
Mitigation Group	Public Education and Awareness
Funding Source	TBD
Priority	High

Chapter Five -- Mitigation Strategies

Objective 2.2: Develop tailored outreach strategies for vulnerable populations, such as tourists, physically challenged, children and the elderly, non-English communities and low-income residents

Action Name and Description	Action 43: Develop outreach strategies for non-English communities
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Applicable state and federal agencies and local agencies/associations
Support Agencies	Gautier and Jackson County Planning Departments, Jackson County Emergency Management Agency, Hazard Mitigation Council
Estimated Timeframe	Ongoing
Mitigation Group	Public Education and Awareness
Funding Source	TBD
Priority	High

Action Name and Description	Action 44: Develop outreach strategies for tourists (<i>i.e.</i> part-time residents, RV campers, vacationers etc.)
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Applicable state and federal agencies and local agencies/associations
Support Agencies	Gautier and Jackson County Planning Departments, Jackson County Emergency Management Agency, Hazard Mitigation Council
Estimated Timeframe	Ongoing
Mitigation Group	Public Education and Awareness
Funding Source	TBD
Priority	High

Action Name and Description	Action 45: Develop outreach strategies for elderly and low-income residents
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Applicable state and federal agencies and local agencies/associations
Support Agencies	Gautier and Jackson County Planning Departments, Jackson County Emergency Management Agency, Hazard Mitigation Council
Estimated Timeframe	Ongoing
Mitigation Group	Public Education and Awareness
Funding Source	TBD
Priority	High

Chapter Five -- Mitigation Strategies

Action Name and Description	Action 46: Develop outreach strategies for the physically challenged
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Applicable state and federal agencies and local agencies/associations
Support Agencies	Gautier and Jackson County Planning Departments, Jackson County Emergency Management Agency, Hazard Mitigation Council
Estimated Timeframe	Ongoing
Mitigation Group	Public Education and Awareness
Funding Source	TBD
Priority	High

Action Name and Description	Action 47 Develop outreach strategies for those with mental health disabilities
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Applicable state and federal agencies and local agencies/associations
Support Agencies	Gautier and Jackson County Planning Departments, Jackson County Emergency Management Agency, Hazard Mitigation Council
Estimated Timeframe	Ongoing
Mitigation Group	Public Education and Awareness
Funding Source	TBD
Priority	High

Action Name and Description	Action 48: Develop outreach strategies and implement school programs for children
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	All School Districts and daycare providers within the County
Support Agencies	MEMA, FEMA, Jackson County EMA, MSDE, Red Cross
Estimated Timeframe	Ongoing
Mitigation Group	Public Education and Awareness
Funding Source	TBD
Priority	High

Chapter Five -- Mitigation Strategies

Goal 3: Enhance preparedness and response procedures and capabilities

Objective 3.1: Update/develop planning and response procedures

Action Name and Description	Action 49: Develop Continuity of Operation Plans
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Jackson County and City of Gautier
Support Agencies	TBD
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	Internal
Priority	High

Action Name and Description	Action 50: Maintain Emergency Response Plans
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Jackson County and City of Gautier
Support Agencies	TBD
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	Internal
Priority	High

Action Name and Description	Action 51: Develop/Update and conduct exercises on response procedures
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Jackson County and City of Gautier
Support Agencies	TBD
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	Internal
Priority	High

Action Name and Description	Action 52: Develop Capital Improvement Plans
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Planning Departments
Support Agencies	Gautier City Council, Jackson County Board of Supervisors
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	Internal
Priority	High

Chapter Five -- Mitigation Strategies

Objective 3.2: Transportation Development/Improvements

Action Name and Description	Action 53: Increase evacuation route options and Coordination of activation by working with State/Federal agencies Increase capacity and adequate notification times for evacuations
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Jackson County EMA
Support Agencies	MDOT, FHWA
Estimated Timeframe	Ongoing
Mitigation Group	Emergency Services
Funding Source	TBD
Priority	High

Action Name and Description	Action 54: Improve signage/traffic control devices for evacuations
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Jackson County EMA
Support Agencies	MDOT, FHWA
Estimated Timeframe	Ongoing
Mitigation Group	Emergency Services
Funding Source	TBD
Priority	High

Objective 3.3: Utilization of technology to further preparedness and recovery efforts

Action Name and Description	Action 55: Develop/enhance asset inventories into GIS Critical facilities, infrastructure, equipment
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Planning Departments
Support Agencies	Jackson County GIS Department
Estimated Timeframe	Ongoing
Mitigation Group	Technical Assistant Projects
Funding Source	Internal
Priority	High

Chapter Five -- Mitigation Strategies

Action Name and Description	Action 56: Upgrade devices used for damage assessments and communication as technology improves/changes
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Jackson County EMA
Support Agencies	TBD
Estimated Timeframe	Ongoing
Mitigation Group	Technical Assistant Projects
Funding Source	Internal
Priority	High

Goal 4: Utilize local ordinances and policies to implement recommendations/findings of the hazard mitigation plan

Objective 4.1: Incorporate/enforce hazard mitigation strategies into city/county ordinances and plans

Action Name and Description	Action 57: Seek opportunities to continue to lower the CRS rating (and insurance rate)
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Planning Departments
Support Agencies	City Council / Supervisors, MEMA, ISO (NFIP-CRS)
Estimated Timeframe	Ongoing
Mitigation Group	Property Protection
Funding Source	TBD
Priority	High

Action Name and Description	Action 58: Incorporate the goals and objectives of the hazard mitigation plan into all planning documents and ordinances
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Gautier and Jackson County Planning Departments
Support Agencies	Hazard Mitigation County, Jackson County EMA
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	Internal
Priority	High

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Objective 4.2: Document and review post-disaster damage assessments and implemented mitigation strategies

Action Name and Description	Action 59: Conduct an annual review of the hazard mitigation plan
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Hazard Mitigation Council, Gautier and Jackson County Planning Departments
Support Agencies	MEMA, FEMA
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	Internal
Priority	High

Action Name and Description	Action 60: Conduct evaluation of mitigation strategies and projects following a hazard impact
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Hazard Mitigation Council, Jackson County EMA
Support Agencies	MEMA, FEMA
Estimated Timeframe	Ongoing
Mitigation Group	Prevention
Funding Source	Internal
Priority	High

Action Name and Description	Action 61: Document damages/losses sustained from natural hazards
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Jackson County EMA
Support Agencies	Gautier and Jackson County Public Works, Street/Road
Estimated Timeframe	Ongoing
Mitigation Group	Technical Assistant Projects
Funding Source	TBD
Priority	High

Action Name and Description	Action 62: Conduct After Action Reviews (AAR) following events to capture lessons learned, reassess damages incurred and complete damage assessment forms with accurate information
Jurisdiction	Jackson County and City of Gautier
Responsible Agency	Hazard Mitigation Council
Support Agencies	Jackson County EMA
Estimated Timeframe	Ongoing
Mitigation Group	Technical Assistant Projects
Funding Source	Internal
Priority	High

Chapter Five -- Mitigation Strategies

5.6 Grant Sources

Federal Hazard Mitigation Assistance Grants

The Federal Emergency Management Agency (FEMA) provides funding for five Hazard Mitigation Assistance grant programs. These programs, described in detail in FEMA's *Hazard Mitigation Assistance Unified Guidance, June 1, 2010*, are summarized here for future reference as mitigation activities are implemented. The grant programs are administered within the State of Mississippi by the Mississippi Emergency Management Agency, Office of Mitigation. Listed below is a brief description of each program:

Hazard Mitigation Grant Program (HMGP) is authorized by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. The key purpose of HMGP is to ensure that the opportunity to take critical mitigation measures to reduce the risk of loss of life and property from future disasters is not lost during the reconstruction process following a disaster. (*HMGP funds are available when authorized under a Presidential disaster declaration in the areas of the State requested by the Governor.*)

Pre-Disaster Mitigation Program (PDM) is authorized by Section 203 of the Stafford Act to assist States, Indian Tribal governments, and local communities to implement a sustained pre-disaster natural hazard mitigation program to reduce risk to the population and structures from future hazard events and to reduce reliance on Federal funding from future disasters. (*Funds provided annually subject to the availability of appropriation funding*)

Flood Mitigation Assistance (FMA) is authorized by Section 1366 of the National Flood Insurance Act of 1968 (NFIA) with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). (*Funds provided annually subject to the availability of appropriation funding*)

Repetitive Flood Claims Program (RFC) is authorized by Section 1323 of the NFIA with the goal of reducing flood damages to individual properties for which one or more claim payments for losses have been made under flood insurance coverage and that will result in the greatest savings to the National Flood Insurance Fund (NFIF) in the shortest period of time. (*Funds provided annually subject to the availability of appropriation funding*)

Severe Repetitive Loss Pilot Program (SRL) is authorized by Section 1361 of the NFIA with the goal of reducing flood damages to residential properties that have experienced severe repetitive losses under flood insurance coverage and that will result in the greatest savings to the NFIF in the shortest period of time. (*Funds provided annually subject to the availability of appropriation funding.*)

Chapter Five -- Mitigation Strategies

Eligibility

The Table 5.1 lists activities that are eligible in each Program listed above.

Table No. 5.1: Eligible Activities by Program

Eligible Activities	HMGCP	PDM	FMA	RFC	SRL
1. Mitigation Projects	X	X	X	X	X
Property Acquisition and Structure Demolition	X	X	X	X	X
Property Acquisition and Structure Relocation	X	X	X	X	X
Structure Evaluation	X	X	X	X	X
Mitigation Reconstruction					X
Dry Floodproofing of Historic Residential Structures	X	X	X	X	X
Dry Floodproofing of Non-Residential Structures	X	X	X	X	
Minor Localized Flood Reduction Projects	X	X	X	X	X
Structural Retrofitting of Existing Buildings	X	X			
Non-Structural Retrofitting of Existing Buildings and Facilities	X	X			
Safe Room Construction	X				
Infrastructure Retrofit	X	X			
Soil Stabilization	X	X			
Wildfire Mitigation	X	X			
Post-Disaster Code Enforcement	X				
5% Initiative Projects	X				
2. Hazard Mitigation Planning	X	X	X		
3. Management Costs	X	X	X	X	X

Source: FEMA Hazard Mitigation Assistance Unified Guidance, June 1, 2010

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Examples of Eligible Mitigation Projects:

Property Acquisition and Structure Demolition – Voluntary acquisition of an existing at-risk structure and conversion of the land to open space through demolition of the structure.

Property Acquisition and Structure Relocation – Voluntary physical relocation of an existing structure to an area outside of a hazard-prone area.

Structure Elevation – Physically raising an existing structure to the Base Flood Elevation (BFE) or higher if required by FEMA or local ordinance.

Mitigation Reconstruction – Construction of an improved, elevated building on the same site where an existing building and/or foundation has been partially or completely demolished or destroyed.

Dry Floodproofing – Techniques applied to keep structures dry by sealing the structure to keep floodwaters out.

Dry Floodproofing of Historic Residential Structures – permissible only when other techniques that would mitigate to the BFE would cause the structure to lose its status as a Historic Structure.

Dry Floodproofing of Non-residential Structures – must be performed in accordance with NFIP Technical Bulletin (TB) 3-93, *Non-Residential Floodproofing—Requirements and Certification*, and the requirements pertaining to dry floodproofing of non-residential structures found in 44 CFR Sections 60.3(b)(5) and (c)(4).

Minor Localized Flood Reduction Projects – Projects to lessen the frequency or severity of flooding and decrease predicted flood damages, such as the installation or modification of culverts and stormwater management activities such as creating retention and detention basins.

Structural Retrofitting of Existing Buildings – Modifications to the structural elements of a building to reduce or eliminate the risk of future damage and to protect inhabitants.

Non-structural Retrofitting of Existing Buildings and Facilities – Modifications to the non-structural elements of a building or facility to reduce or eliminate the risk of future damage and to protect inhabitants.

Safe Room Construction – Safe room construction projects are designed to provide immediate life-safety protection for people in public and private structures from tornado and severe wind events, including hurricanes.

Infrastructure Retrofit – Measures to reduce risk to existing utility systems, roads, and bridges.

Soil Stabilization – Projects to reduce risk to structures or infrastructure from erosion and landslides, including installing geo-textiles, stabilizing sod, installing vegetative buffer strips, preserving mature vegetation, decreasing slope angles, and stabilizing with rip rap and other means of slope anchoring.

Wildfire Mitigation – Projects to mitigate the risk to at-risk structures and associated loss of life from the threat of future wildfire.

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Post-Disaster Code Enforcement – Projects designed to support the post-disaster rebuilding effort by ensuring that sufficient expertise is on hand to ensure appropriate codes and standards, including NFIP local ordinance requirements, are utilized and enforced.

5% Initiative Projects – Provide an opportunity to fund mitigation actions that are consistent with the goals and objectives of the State or Tribal (Standard or Enhanced) and local mitigation plans and meet all HMGP program requirements, but for which it may be difficult to conduct a standard benefit/cost analysis to prove cost effectiveness.

Hazard Mitigation Planning

Mitigation plans are the foundation for effective hazard mitigation. A mitigation plan is a demonstration of the commitment to reduce risks from natural hazards and serves as a strategic guide for decision makers as they commit resources. The mitigation planning process includes hazard identification and risk assessment leading to the development of a comprehensive mitigation strategy for reducing risks to life and property. The mitigation strategy section of the plan identifies a range of specific mitigation actions and projects being considered to reduce risks to new and existing buildings and infrastructure.

Management Costs

Management costs are any indirect costs and administrative expenses that are reasonably incurred by a Grantee or Subgrantee in administering a grant or subgrant award.

For more information concerning applications for FEMA Hazard Mitigation Assistance Grants, contact:

*Mississippi Emergency Management Agency
Office of Mitigation
601-933-6362*

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Other Grant Sources:

Listed below are agencies that provide programs to support communities with the development and implementation of various projects. Jackson County and the City of Gautier will utilize these agencies and other sources when possible to further their mitigation goals.

<i>Mississippi Development Authority</i> 601-359-3179
<i>Mississippi Department of Environmental Quality</i> 601- 961-5171
<i>Mississippi Office of Homeland Security</i> 601-346-1500
<i>Mississippi State Department of Health</i> 601-576-7400
<i>USDA Rural Development</i> 601- 965-4316
<i>Mississippi Department of Marine Resources</i> 228-374-5000
<i>Mississippi Department of Transportation</i> 601-359-7025
<i>Mississippi Department of Wildlife, Fisheries and Parks</i> 601-432-2400
<i>US Army Corps of Engineers</i> Mobile District 334-690-2495
<i>Mississippi Forestry Commission</i> 601-359-1386
<i>USDA Natural Resources Conservation Service</i> National NRCS Office – 202-720-8851 State NRCS Conservationist – 601-965-5196

Chapter Six -- Capability Assessment

6 Capability Assessment

This section of the Plan discusses the capability of Jackson County and the City of Gautier to implement hazard mitigation activities. Thus far, the planning process has identified the natural hazards posing a threat to the Jackson County planning area and described and quantified the vulnerability of the community to these risks. A capability assessment helps determine which mitigation actions are practical and likely to be implemented over time given the community's planning and regulatory framework, level of administrative and technical support, and other factors.

The capability assessment has two components: an inventory of relevant plans, ordinances or programs already in place; and an analysis of its capacity to carry them out. Such analysis will help identify positive and negative aspects of existing processes and procedures as they pertain to mitigation of the effect of hazards.

6.1 Planning and Regulatory Capability

Requirement §201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (3) review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Planning and regulatory capability is based on the preparation of plans and studies and effective implementation strategy through ordinances, policies and programs. The commitment of the community to guiding and managing growth, development, and redevelopment is often demonstrated through the preparation and use of such documents. In addition to emergency response and mitigation planning, other types of planning initiatives present significant opportunities to integrate comprehensive hazard mitigation principles and practices into the local decision-making process. Implementation of plans is achieved through capital improvement projects, ordinances and land development.

The Jackson County Multi-Jurisdictional Hazard Mitigation Plan will become an Annex to the plans and ordinances (where applicable) outlined within this section.

6.1.1 Summary of Existing Plans, Ordinances and Programs

Table 6.1 provides a summary of the relevant local and regional plans, ordinances and programs in place or under development. A checkmark indicates that the given item is currently in place and being implemented or that it is being developed for future implementation. As these are updated, the Planning Departments for Jackson County and Gautier will make the Jackson County Hazard Mitigation Plan available so that the goals and strategies identified are integrated where applicable.

Chapter Six -- Capability Assessment

Table No. 6.1: Relevant Plans, Ordinances and Programs

Plan Category/Name	Jackson County	City of Gautier	Regional / State
Emergency Management			
Hazard Mitigation Plan	✓	✓	✓
Comprehensive Emergency Operations Plan	✓		
Emergency Response Plan for Hazardous Materials Incidents	✓		
General Plans			
Comprehensive Plan	✓	✓	
Vancleave Neighborhood Plan	✓		
Fontainebleau Neighborhood Plan	✓		
Eastern Jackson County Neighborhood Plan	✓		
Western Jackson County Neighborhood Plan	✓		
Jackson County Wildfire Protection Plan	✓		
Local Codes and Regulations			
Unified Land Development Ordinance: (Zoning and Subdivision Regulations)		✓	
Zoning Ordinance	✓		
Subdivision Ordinance	✓		
Building & Fire Codes	✓	✓	
Landscape Ordinance	✓	✓	
Tree Protection Ordinance		✓	
Floodplain Management	✓	✓	
Storm Water Management	✓	✓	
National Flood Insurance Program	✓	✓	
NFIP Community Rating System	✓	✓	
Other Plans and Programs			
Long-Range Transportation Plan			✓
Coastal Zone Management Plan			✓
Evacuation Plan			✓

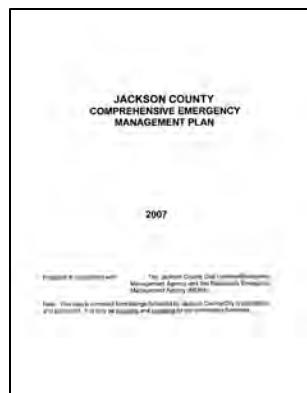
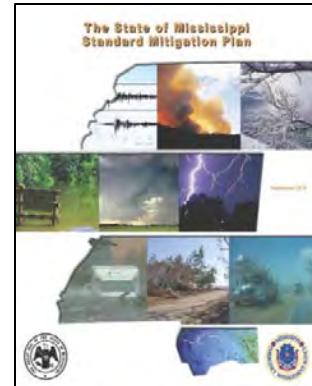
Chapter Six -- Capability Assessment

6.1.2 Emergency Management

Mitigation is recognized as one of the four primary phases of emergency management. The other three phases include preparedness, response and recovery. The hazard mitigation plan represents a community's blueprint for how it intends to reduce the impact of hazards on people and the built environment. The essential elements of a hazard mitigation plan include risk assessment, capability assessment and a mitigation strategy. During the update of the Jackson County plan, the cities of Ocean Springs, Pascagoula and Moss Point were in the process of updating or receiving approval from FEMA on their Hazard Mitigation Plans.

State of Mississippi Standard Hazard Mitigation Plan, 2010

Developed by the Mississippi Emergency Management Agency, the State Hazard Mitigation Plan outlines risks, mitigation capabilities, strategies and actions on a state-wide level and is updated every three years. The updated Jackson County multi-jurisdiction plan will roll up to future revisions of the state plan to ensure their mitigation needs are addressed in future planning initiatives.

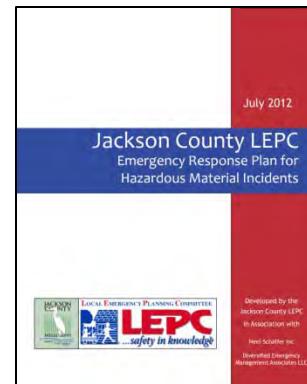


Jackson County Comprehensive Emergency Management Plan (CEMP), 2007

The CEMP provides a framework in which Jackson County and its political subdivisions can plan and perform their respective emergency functions before, during, and after disasters or a national emergency.

Jackson County LEPC Emergency Response Plan for Hazardous Materials Incidents, 2012

The Jackson County Local Emergency Planning Committee (LEPC), comprised of industrial and local/state agencies, developed an emergency response plan for hazardous material incidents. This plan coordinates response procedures with the Jackson County CEMP and is used as a tool for response and training procedures for the industries represented in the Jackson County planning area.



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6.1.3 General Plans

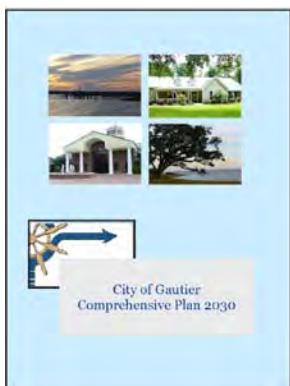
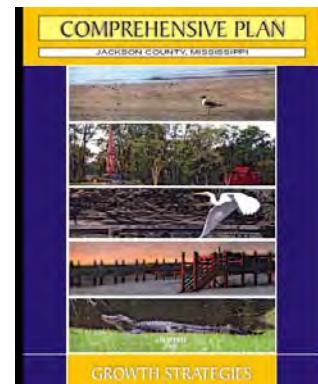
Comprehensive Plans

Comprehensive Plans are so called because they are long-range plans that include the entire geographical area of the county or municipality and all elements of the built environment. The following elements are required by state statute in Comprehensive Plans: Goals and Objectives, Land Use, Transportation and Community Facilities (including housing). There are common themes in Hazard Mitigation Plans and Comprehensive Plans including appropriate use of land in relation to natural barriers such as flood areas; protection of natural and historic resources; and adequate transportation, community facilities and infrastructure. Comprehensive plans are implemented through capital improvement projects, local ordinances, and private development.

Funding was made available to local municipalities and counties located in the lower six counties along the Mississippi Gulf Coast after Hurricane Katrina for long-range planning efforts. Both Jackson County and the City of Gautier prepared such plans.

Jackson County, 2009

Jackson County adopted their most recent Comprehensive Plan in 2009. Prior to finalization of the plan, neighborhood plans were developed for four planning areas: Vancleave, Fontainebleau, Eastern Jackson County, and Western Jackson County.



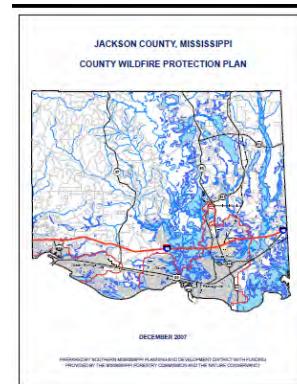
City of Gautier, 2009

The City of Gautier adopted a Comprehensive Plan in 2009.

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Jackson County Wildfire Protection Plan, 2007

In late 2006, the Mississippi Forestry Commission and The Nature Conservancy commissioned the preparation of wildfire protection plans for a fifteen-county south Mississippi region. The plan addressed changes to the Wildland-Urban Interface (WUI) brought about by Hurricane Katrina as well as from increased development in many parts of the region. The Plan includes several components: Geographic Information System (GIS) produced maps, a County Risk Assessment, a Mitigation Projects List, Structure Ignitability Recommendations and an Action Plan and Assessment Strategy.



6.1.4 Local Codes and Regulations

Zoning Ordinances control the use of land, height and setback of structures, off-street parking and loading, open space requirements and other restrictions for the purpose of protection of the public health, safety and welfare of those in the jurisdiction and are allowed as a part of the police power of the state.

- Jackson County adopted their most recent Zoning Ordinance in June, 2012.
- The City of Gautier adopted a new Unified Development Ordinance that includes zoning regulations in 2010.

Subdivision Ordinances regulate the development of land that requires the division of land into two or more parcels. It regulates required infrastructure such as new streets, sanitary sewer, stormwater facilities and other utilities. Property that has been legally subdivided is recorded at the Chancery Clerk's office in the form of plats.

- Jackson County adopted their most recent Subdivision Ordinance in 2009.
- The City of Gautier adopted a new Unified Development Ordinance that includes subdivision regulations in 2010.

Building and Fire Codes regulate the standards whereby structures are constructed and maintained. The International Code Council (ICC), established in 1994, is non-profit organization dedicated to developing a single set of comprehensive and coordinated national model construction codes. The MS Building Code Council has adopted the 2006 complete family of International Codes (I-codes) as the minimum codes for the State of Mississippi. This means that if a jurisdiction chooses to adopt a code or update their current codes they must be in compliance with whichever set of codes the jurisdiction elects to adopt. Optional codes include the following:

- 2006 International Building Code
- 2006 International Residential Code for One & Two-Family Dwellings
- 2006 International Existing Building code

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- 2006 International Plumbing Code
- 2006 International Mechanical Code
- 2006 International Fuel Gas Code
- 2006 International Fire Code

Once adopted by the local or county jurisdiction, a process for issuance of building permits, inspections, and issuance of certificates before occupancy or use of buildings is established.

- Jackson County has adopted the 2006 International Building Code and the Residential Code for One- and Two-Family Dwellings.
- The City of Gautier has adopted the following: 2003 International Building Code, 2003 International Single Family and Multi-Family Dwelling, 2003 International Mechanical Code, 2003 International Fuel Gas Code, 2003 International Plumbing Code, 2003 International Fire Code

Floodplain Management

The National Flood Insurance Program (NFIP) is a federal program enabling property owners and renters to purchase flood insurance. It is based on an agreement between communities and the federal government in which a community adopts and enforces certain floodplain regulations so that the federal government will make flood insurance available in that community.

Jackson County and the City of Gautier participate in the NFIP and have adopted local ordinances that govern development in flood zones. Flood Insurance Maps (FIRMs) have been adopted post-Hurricane Katrina.

Communities have an opportunity to participate in the Community Rating System (CRS) that helps measure flood management capability. The CRS is an incentive-based program that encourages pre-defined flood mitigation activities that go beyond the minimum requirements of the NFIP. Jackson County and Gautier participate in this program and have expressed a desire to improve their rankings which will help reduce insurance premiums for NFIP policy holders. To further support floodplain management in the Hazard Mitigation Plan update, copies of both Jackson County and City of Gautier Flood Prevention Ordinances are provided in the Appendix 8.6-A and 8.6-B respectively.

Storm Water Management

Storm water management seeks to limit non-source pollution of streams, rivers, aquifers and other water bodies by managing water run-off as a result of rain or other types of precipitation. It includes pre- and post-construction measures and best management practices that are intended to prevent erosion and flooding.

- Jackson County regulates storm water as a part of their Zoning Ordinance and enforces the regulations through site plan review and platting of subdivisions.
- The City of Gautier has adopted a Storm Water Management Ordinance and enforces the provisions through site plan review and the platting of subdivisions.

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Landscaping Ordinance and Tree Protection Ordinance

A basic landscaping ordinance requires minimal landscaping on sites to be retained or planted on commercial, industrial and multi-family development sites. Protection of certain types or sizes of trees may be a part of the Landscaping Ordinance or a separate ordinance. Both ordinances are beneficial in maintaining and creating natural materials that help with storm water management and flooding.

- Jackson County requires landscaping on development sites as a part of their Zoning Ordinance.
- The City of Gautier requires landscaping and tree protection as a part of their Unified Development Ordinance.

6.1.5 Other Plans and Programs

Long-Range Transportation Plan (Metropolitan Planning Organization)

Long-range planning for major transportation routes is required by federal statute for urbanized areas with a population greater than 50,000. The Gulf Regional Planning Commission coordinates the preparation of this plan for the Gulfport-Biloxi and the Pascagoula-Moss Point urbanized areas.

Coastal Resource Management Plan (CRMP)

The Mississippi Department of Marine Resources sponsored a regional plan for the coastal counties that helps them comply with the Environmental Protection Agency Phase II stormwater guidelines. The focus of CRMP is mitigation through stormwater control and reduction of flood hazards. Participants of the plan include Hancock, Harrison, Jackson, Pearl River, Stone and George counties. CRMP makes funding available for projects that support the mission of the CRMP.

Evacuation Plan (State of Mississippi)

The Mississippi Department of Transportation (MDOT) has developed hurricane evacuation plans including provision for contra-flow of traffic lanes during evacuation procedures. MDOT works with the states of Louisiana and Alabama to coordinate this plan.

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6.2 Administrative and Technical Capabilities

Plans, ordinances and policies establish legal requirements by local and county governments; however, administration and enforcement of such requirements is the key to successful implementation. This is greatly affected by the availability of trained staff and established processes and procedures. Table 6.2 provides the results of the capability assessment in regard to this aspect.

Table 6.2: Staff/Personnel Resources

Staff or Consultant	In Place		Department	
	Jackson County	Gautier	Jackson County	Gautier
Emergency Manager	✓		Jackson County Emergency Management Agency	
Staff with education and expertise to assess the community's vulnerability to hazards	✓	✓	Public Works	Public Works
Floodplain Manager	✓	✓	Planning Department	Economic Development and Planning
Building Inspector	✓	✓	Planning Department	Economic Development and Planning
Planners with knowledge of land development, site plan review and subdivision review	✓	✓	Planning Department	Economic Development and Planning
Engineers with knowledge of storm water controls and infrastructure	✓	✓	Consulting Engineer	Consulting Engineer
Personnel skilled in GIS	✓	✓	GIS	Economic Development and Planning
Grant Writers	✓	✓	Planning Department	Economic Development and Planning

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7 Plan Maintenance

This section outlines an efficient and effective process to guide the HMC in tracking the progress made on mitigation strategies, document events that may occur, and integrate concepts identified with existing and new planning/ordinance documents. The desire of this process is to use this plan as a tool for improving the vulnerabilities and strategies identified during the plan update.

7.1 Monitoring, Evaluating and Updating the Plan

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

Monitoring the Plan

The HMC will be responsible for ensuring that the Plan is monitored for effectiveness and when necessary provide updates to the plan. At minimum, the plan will be reviewed on an annual basis. Monitoring will include, but is not limited to, the following processes:

- Annual review of mitigation actions identified in the plan
- Address any issues that may not have been identified during the plan update
- Assess events that impact the participating jurisdictions to determine if changes in the plan are required
- Evaluate the effectiveness of the planning team

Evaluating the Plan

On an annual basis, the HMC will develop a yearly report detailing the status of mitigation activities undertaken over the past year as well as document any mitigation activities that have been completed. The report should address the points listed below:

- Evaluate the goals and objectives to ensure they address current and expected conditions
- Determine if the nature or magnitude of risks identified in the plan has changed
- Evaluate whether the current resources are adequate for implementing the plan
- Document any implementation problems such as technical, political, legal or coordination issues with other agencies
- Discuss whether the outcomes that have occurred are as expected

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To assist in monitoring, evaluating and updating the plan, the following worksheets taken from FEMA's 386-4 "Bringing the Plan to Life" guidance is included in Appendix 8.7-A:

- Evaluation of the Planning Team
- Evaluation of Mitigation Actions

Updating the Plan

The Jackson County Multi-Jurisdictional Plan will be updated every five years, in accordance with federal regulations. In the event of a significant disaster or any other substantial changes in land use planning or regulations that could impact the mitigation goals and actions identified within this plan, more frequent updates will be made.

The HMC will strive to complete a yearly mitigation action implementation report (see Appendix 8.7-C) to assist with improving the documentation of the progress made on projects identified in the plan. In doing so, the plan will become more of a "living document" that is proactive and integrates with the participating jurisdictions standard operating procedures.

If a significant event should warrant an update within the plan life, the HMC will follow the same procedures as developing the original plan and will incorporate opportunities for the public to have input and provide comments.

Any amendments made to the plan during its planning cycle will be coordinated through the Jackson County and Gautier Planning Departments and Jackson County Emergency Management Agency. Appendix 8.7-D will contain any documentation of amendments, if developed, which will be given to MEMA and FEMA for review during the life of the plan.

7.1.1 Documentation of Future Impacts

The Jackson County Emergency Management Agency will coordinate with City and County Departments to assess damages incurred following an event. The Mississippi Emergency Management Agency has developed the following damage assessment forms to assist with collecting data. Guidelines and samples of these reports are provided in Appendix 8.7-B:

- DAG-1 – Individual and Public Assistance Guidelines
- DA-1 – Individual Assistance Damage Assessment Report
- DA-2 – Business and Agricultural Damage Assessment Report
- DA-5 – Damage Assessment Summary Report

These reports will be evaluated by the HMC against the mitigation strategies that are included in this plan and incorporated as necessary. Meetings will be scheduled by the HMC Chairman as deemed necessary.

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7.1.2 Hazard Mitigation Council Chairman and Co-Chairman

During the planning process, the HMC defined a process for rotating the position of Chairman to allow for continued collaboration between the participating jurisdictions. It was agreed that the Chairman and Co-Chairman would serve three year terms as presented in the schedule below. The HMC will review the effectiveness of this schedule and update/change accordingly during the next plan update.

Term	Jurisdiction
January 2012 – December 2014	Jackson County
January 2015 – December 2017	City of Gautier

The role of the Chairman and Co-Chairman positions includes the following tasks:

- Develop meeting agendas
- Invitation of other agencies/departments to participate in meetings
- Schedule at minimum biannual meetings with the HMC (May and October)
- Schedule post-disaster event meetings with the HMC
- Coordinate Plan Updates every five years or more frequently if a need is determined by the HMC

7.2 Incorporation into Existing Planning Mechanisms

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

Jackson County and the participating jurisdictions currently utilize emergency operations planning, Land Use/Zoning Codes, Comprehensive Land Use Plan, Fire or Life Safety Codes, hurricane plans, Building Code, and Subdivision Ordinance. The Hazard Mitigation Plan's strategies are integrated into enforcement or regulating practices.

The Floodplain Manager will be tasked with assuring that the building codes and floodplain ordinance are enforced in accordance to the Hazard Mitigation Plan. Recognizing the importance of proper building techniques as outlined in the current building codes, safe structures play an integral role in life and safety concerns. The Building Official and Floodplain Manager will attend available workshops to insure that County/City codes remain up to date and

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that they have a full understanding of the codes they are authorized to enforce. This will result in a reduction in the losses of property, injuries, and/or deaths resulting from identified hazard.

Jackson County and Gautier will continue to evaluate and review items detailed in the Hazard Mitigation Plan for consideration of the other local planning mechanisms. On an annual basis, components of the Hazard Mitigation Plan may be added or omitted as deemed necessary by the HMC and respective County/City officials. This process will cover a five-year period; which allows prioritizing of long-term goals and it allows more accurate tracking and forecasting of needs.

When a new plan is being developed in any of the participating jurisdictions the HMC will provide a copy of the hazard mitigation plan to the agency responsible for its development.

7.3 Continued Public Involvement

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

The participating jurisdictions appreciate the importance of continued public involvement in the evolution of this plan. Several opportunities will be presented to the community to ensure that the public continues its participation, and to encourage ongoing activities to ensure the health and well being of their community.

If changes are required of the plan, the HMC will notify the public and encourage their participation in meetings to review changes made. These meeting will be advertised in the local newspaper, local television and on the radio.

Copies of the Hazard Mitigation Plan as well as amendments and other information concerning the plan, updates or changes made to the plan will be available at the Jackson County and City of Gautier Planning Departments and the Jackson County Emergency Management Agency.

During the next five years, the HMC will strive to meet with various local and state agencies/organizations to strengthen relationships, identify partnering opportunities to address mitigation actions identified, and increase awareness of the capabilities the groups can provide to the participating jurisdictions. Below is a suggested listing of agencies/organizations that the HMC will reach out to. This listing is not inclusive of all the agencies/organizations they are interested in pursuing but rather a starting point.

- Mississippi State Department of Health – District 9
- Mississippi Emergency Management Agency
- Mississippi Department of Environmental Quality
- Mississippi Department of Marine Resources
- Mississippi Department of Transportation

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- Mississippi Department of Finance and Administration
- Federal Emergency Management Agency
- American Red Cross
- Medical Facilities
- Jackson County Civic Action
- Steps Coalition
- Centers for Environmental and Economic Justice
- Asian Americans for Change

A meeting documentation form was developed to assist the HMC in documenting any public/agency involvement activities for this plan cycle, as well as provide valuable information that will be needed in future plan updates. This form is provided in Appendix 8.7-E.

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MISSISSIPPI EMERGENCY MANAGEMENT
AGENCY AND FEDERAL EMERGENCY
MANAGEMENT AGENCY



Rebecca Boone, Project Manager
601-948-3071

