



West Carroll

PARISH HAZARD MITIGATION

UPDATE - 2015



This Page Left Intentionally Blank

WEST CARROLL HAZARD MITIGATION PLAN UPDATE

Prepared for:

West Carroll Parish

Prepared by:

Stephenson Disaster Management Institute

Ms. Lauren Stevens

Ms. Alexa Andrews

Dr. Carol J. Friedland, P.E., Ph.D., C.F.M.

Mr. Joseph B. Harris

Mr. Brant Mitchell

Louisiana State University - Business Education Complex
Baton Rouge, LA 70806



January 6, 2016

This Page Left Intentionally Blank

ACKNOWLEDGMENTS

This 2015 West Carroll Parish Hazard Mitigation Plan Update was coordinated by the West Carroll Parish Hazard Mitigation Plan Update Steering Committee, in collaboration with the participating jurisdictions as well as community stakeholders and the general public. The participating jurisdictions are made up of the following communities:

West Carroll Parish
Town of Oak Grove
Village of Epps
Village Forest
Village of Kilborne
Village of Pioneer

Special thanks is directed to all of those who assisted in contributing feedback and expertise on this document, especially the West Carroll Parish Office of Homeland Security and Emergency Management. These combined efforts have made this project possible. The Parish Steering Committee consists of the following individuals, who are credited in the creation of this document:

Peggy Robinson
Rebecca Reemes
Myrl Sistrunk
Adam Holland
Richie Allen
Wesley Copeland
Jason Cowden
Jack L. Madden
Bill Ellerbe
Martha Stephens
Dennis Seamans
Johnny Moss
Lewis Russell
Allen Irby
Shirly Gibson
Larry Demon
Toni Shumate
Sonia Copes-Reiter

West Carroll OHSEP
West Carroll OHSEP
Oak Grove Fire
Mayor of Oak Grove
West Carroll Ambulance District
West Carroll Parish Government
West Carroll Parish Government
West Carroll Policy Jury
West Carroll Police Jury
West Carroll Police Jury
West Carroll Ambulance District
Oak Grove Police Department
Oak Grove Police Department
West Carroll Sheriff's Department
Mayor of Epps
Mayor of Forest
Mayor of Kilbourne
Mayor of Pioneer

The 2015 West Carroll Parish Hazard Mitigation Plan Update was written by the Stephenson Disaster Management Institute, Louisiana State University. Further comments should be directed to the West Carroll Parish Police Jury: 107 South Briggs Street, Oak Grove, LA.

Contents

1	Introduction	1-1
	History	1-2
	Location, Demography, and Economy	1-3
	Location.....	1-3
	Economy.....	1-5
	Hazard Mitigation	1-6
	General Strategy	1-7
	2015 Plan Update.....	1-8
2	Hazard Identification and Parishwide Risk Assessment.....	2-1
	Prevalent Hazards to the Community	2-1
	Previous Occurrences	2-2
	Probability of Future Hazard Events	2-3
	Inventory of Assets for the Entire Parish	2-4
	Essential Facilities of the Parish	2-5
	Future Development Trends	2-12
	Future Hazard Impacts.....	2-13
	Land Use.....	2-14
	Hazard Identification.....	2-16
	Drought	2-16
	Flooding.....	2-20
	Thunderstorms.....	2-37
	Tornadoes	2-54
	Tropical Cyclones	2-62
	Winter Storms.....	2-77
3	Capability Assessment	3-1
	Policies, Plans, and Programs.....	3-1
	Building Codes, Permitting, Land Use Planning and Ordinances	3-2
	Administration, Technical, and Financial	3-3
	Education and Outreach	3-4
	Flood Insurance and Community Rating System	3-5
	NFIP Worksheets.....	3-9
4	Mitigation Strategy	4-1

Introduction	4-1
Goals	4-1
2015 Mitigation Actions and Update on Previous Plan Actions	4-2
West Carroll 2010 Hazard Mitigation Action Update	4-3
Unincorporated West Carroll New Mitigation Actions	4-7
Village of Epps New Mitigation Actions	4-11
Village of Forest New Mitigation Actions	4-13
Village of Kilbourne New Mitigation Actions	4-15
Town of Oak Grove New Mitigation Actions	4-17
Village of Pioneer New Mitigation Actions	4-19
Action Prioritization	4-21
Appendix A: Planning Process	A-1
Purpose	A-1
The West Carroll Parish Hazard Mitigation Plan Update	A-1
Planning	A-3
Coordination	A-3
Neighboring Community, Local and Regional Planning Process Involvement	A-3
Program Integration	A-5
Meeting Documentation and Public Outreach Activities	A-6
Meeting #1: Coordination Conference Call	A-6
Meeting #2: Hazard Mitigation Plan Update Kick-Off	A-7
Meeting #3: Risk Assessment Overview	A-8
Meeting #4: Public Meeting	A-9
Outreach Activity #1: Public Opinion Survey	A-11
Outreach Activity #2: Incident Questionnaire	A-12
Outreach Activity #3: Mapping Activities	A-13
Public Plan Review Documentation	A-14
Appendix B: Plan Maintenance	B-1
Purpose	B-1
Monitoring, Evaluating, and Updating the Plan	B-1
Responsible Parties	B-1
Methods for Monitoring and Evaluating the Plan and Plan Evaluation Criteria	B-2
2015 Plan Version Plan Method and Schedule Evaluation	B-5

Incorporation into Existing Planning Programs	B-5
Continued Public Participation	B-7
Appendix C: Essential Facilities	C-1
West Carroll Parish Essential Facilities – All Jurisdictions	C-1
Appendix D: Plan Adoption	D-1
Appendix E: State Required Worksheets	E-1
Capability Assessment	E-2
West Carroll Unincorporated	E-2
Village of Epps	E-5
Village of Forest	E-8
Village of Kilbourne	E-10
Village of Pioneer	E-11
Town of Oak Grove	E-14
Building Inventory	E-17
Vulnerable Populations	E-19
National Flood Insurance Program (NFIP)	E-20
West Carroll Parish	E-20

1 Introduction

Hazard Mitigation is defined as sustained actions taken to reduce or eliminate long-term risk from hazards and their effects. Hazard Mitigation Planning is the process through which natural hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies that would lessen the impacts are determined, prioritized, and implemented.

In that regard, this plan (a) documents the West Carroll Parish Hazard Mitigation Plan Update process; (b) identifies natural hazards and risks within the parish; and (c) identifies the parish's hazard mitigation strategy to make West Carroll Parish less vulnerable and more disaster resistant. It also includes mitigation project scoping to further identify scopes of work, estimated costs, and implementation timing requirements of proposed selected mitigation projects. Information in the plan will be used to help guide and coordinate mitigation activities and local policy decisions affecting future land use.

The West Carroll Parish Hazard Mitigation Plan is a multi-jurisdictional plan that includes the following jurisdictions which participated in the planning process:

West Carroll Parish
Town of Oak Grove
Village of Epps
Village Forest
Village of Kilborne
Village of Pioneer

The Federal Emergency Management Agency (FEMA), now under the Department of Homeland Security, has made reducing losses from natural disasters one of its primary goals. The Hazard Mitigation Plan (HMP) and subsequent implementation of recommended projects, measures, and policies is the primary means to achieving these goals. Mitigation planning and project implementation has become even more significant in a post-Katrina and Rita environment in south Louisiana.

This hazard mitigation plan is a comprehensive plan for disaster resiliency in West Carroll Parish. The parish is subject to natural hazards that threaten life and health and have caused extensive property damage. To better understand these hazards and their impacts on people and property, and to identify ways to reduce those impacts, the parish's Office of Homeland Security and Emergency Preparedness undertook this Natural Hazards Mitigation Plan.

"Hazard mitigation" does not mean that all hazards are stopped or prevented. It does not suggest complete elimination of the damage or disruption caused by such incidents. Natural forces are powerful and most natural hazards are well beyond our ability to control. Mitigation does not mean quick fixes. It is a long term approach to reduce hazard vulnerability. As defined by FEMA, "hazard mitigation" means any sustained action taken to reduce or eliminate the long-term risk to life and property from a hazard event.

Why this plan? Every community faces different hazards and every community has different resources and interests to bring to bear on its problems. Because there are many ways to deal with natural hazards and many agencies that can help, there is no one solution or cookbook for managing or mitigating their effects.

Planning is one of the best ways to correct these shortcomings and produce a program of activities that will best mitigate the impact of local hazards and meet other local needs. A well-prepared plan will ensure that all possible activities are reviewed and implemented so that the problem is addressed by the most appropriate and efficient solutions. It can also ensure that activities are coordinated with each other and with other goals and programs, preventing conflicts and reducing the costs of implementing each individual activity.

Mitigation activities need funding. Under the Disaster Mitigation Act of 2000 (42 USC 5165), a mitigation plan is a requirement for federal mitigation funds. Therefore, a mitigation plan will both guide the best use of mitigation funding and meet the prerequisite for obtaining such funds from FEMA. FEMA also recognizes plans through its Community Rating System, a program that reduces flood insurance premiums in participating communities. This program is described at the end of this chapter.

This plan identifies activities that can be undertaken by both the public and the private sectors to reduce safety hazards, health hazards, and property damage caused by natural hazards. It fulfills the federal mitigation planning requirements, qualifies for Community Rating System credit and provides the parish and its municipalities with a blueprint for reducing the impacts of these natural hazards on people and property.

History



Figure 1-1: Location of West Carroll Parish within the State of Louisiana

When the Territory of Orleans was divided into counties, in 1805, the present-day West Carroll Parish was part of Ouachita County. The parishes of East Carroll and West Carroll were part of the Baron de Bastrop's grant and Lake Providence was the main entry point for pioneers from the east, many of them coming from the Carolinas and Georgia, some from Tennessee, but mostly from Mississippi.

The area was named Carroll Parish in 1832 in honor of Charles Carroll, a philanthropist, statesman, and signer of the Declaration of Independence. Lake Providence became the first seat of government of the new parish. Carroll Parish was divided into two parishes in 1877. The division solved a feud over the site of the seat of government. Lake Providence was named the parish seat of East Carroll. Bayou

Macon formed the boundary between the two parishes. Floyd initially became the parish seat of West Carroll Parish.

The Village of Epps was named after a nearby plantation. It was located in an area that benefited from the timber and railroad booms late in the 19th century. Epps is the closest community to the Poverty Point State Commemorative Area, site of a Native American community more than 2,700 years ago.

The Village of Forest was the site of an early plantation nearby called the Forest Home Plantation. The Village of Kilbourne was incorporated in 1957. It has existed as a community since the early 19th century, being populated by pioneers from Georgia, Alabama, the Carolinas, and Tennessee.

The parish seat was moved from the community of Floyd to Oak Grove by popular vote in 1915, and the parish records were transferred there in 1917 when the new courthouse was completed. It was laid out as a town in 1906 and was incorporated January 13, 1909.

The Pioneer Cooperage Company purchased a 40,000 acre tract of timber land in the area and built a large stave mill at the present site of the Village of Pioneer.

Location, Demography and Economy

Location



Figure 1-2: Louisiana Homeland Security Regions

West Carroll Parish is located in Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) Region 8, in northeastern Louisiana. Its location near Monroe and Interstate I-20 makes it an ideal location for light industry and distribution. The Boeuf River forms the watery western border with Morehouse Parish. Arkansas is to the north and Richland Parish is to the south. To the east is East Carroll Parish, located along Bayou Macon. The parish is 29 miles long, north to south, and ten to eighteen miles wide, east to west, depending on variations of Bayou Macon boundaries. West Carroll Parish consists of an area of 360 square miles, or 230,399 acres.

West Carroll Parish contains five incorporated communities: Town of Oak Grove, and the Villages of Epps, Kilbourne, Forest, and Pioneer. All five participated in this plan update.

The main transportation arteries through West Carroll Parish are Louisiana State Highways 2, 17, 134, 577, and 585. Interstate Highway 20, which runs a few miles south of the border of West Carroll Parish, allows easy access to the east or west. State Highway 2 winds through the central portion of the parish toward the

eastern and western borders. State Highway 17 connects all the incorporated communities. It runs north and south through the parish. South of West Carroll Parish, State Highway 17 connects with I-20 and continues to Winnsboro, where it intersects with State Highway 15. This highway is well used and maintained for commercial traffic toward I-20 and the southern part of the state. State Highway 134 runs east-west through Epps in the southern portion of the parish. State Highway 577 runs east-west through Darnell in the southern portion of the parish. State Highway 585 runs north-south and starts at the Richland Parish line at the southwest corner of West Carroll, goes north, and leaves at the northeast corner outside of Kilbourne.

Some of these roadways are significant evacuation routes for West Carroll Parish, as well as surrounding parishes, during states of emergency.

Kelly Airport is located in Oak Grove and has a 3,000 foot paved, lighted runway, which can accommodate some business jets. The runway is lighted for night flying. Fuel, storage and maintenance are available on the premises.

Fifty-five miles to the south in Monroe, Monroe Regional Airport serves West Carroll Parish. It is accessible via I-20 and connects to State Highway 17 in Delhi.

While West Carroll Parish has no navigable rivers, its location near the Port of Lake Providence on the Mississippi River should not be overlooked. This port, which is only twelve miles away, can contribute significantly to the parish's economic potential.

The closest international waterway port is located 190 miles to the south in Baton Rouge at the Port of Baton Rouge, with a channel depth of 55 feet.

*Table 1-1: West Carroll Parish Population
(Source: U.S. Census Bureau)*

	2010 Census	2013 Census	(Current Yr) Estimate	Percent Change 2010 - 2013	Percent Change 2013 - (Current Year)
Total Population	11,604	11,467	11,525	-1.20%	0.70%
Population Density (Pop/Sq Mi)	32.3	—	—	—	—
Total Households	4,103	4,103	—	—	—

While West Carroll Parish is faced with a variety of natural hazards and all the problems that accompany growth and decline in growth, it also has the potential to mitigate their adverse effects through current and new programs and projects.

Economy

In the midst of economic growth, West Carroll Parish has managed to retain its traditional community spirit and easygoing lifestyle. West Carroll Parish, as with most of northeast Louisiana, is grounds for the flourishing of many major companies and small to medium businesses.

Entertainment and retail shopping have become major parts of the economy in West Carroll. In 2004 the Thomas Jason Lingo Community Center opened with a 1,000-seat auditorium; it has many live events each year. The Fiske Theatre has been renovated and returned to regular operation as a first-run movie theatre. Both of these venues bring families from all over Northeast Louisiana and Southeast Arkansas to the parish for entertainment. The opening of the Super Wal-Mart in 2006 contributed to West Carroll becoming a regional retail hub.

West Carroll parish has a substantial amount of agriculture in the parish; the main crops are corn, rice, cotton, and sweet potatoes, but the largest employers are West Carroll Health Systems, West Carroll School Board, Ruffin Building Systems and Wal-Mart.

*Table 1-2: Business Patterns in West Carroll Parish
(Source: enstats.census.gov)*

Business Description	Number of Employees	Number of Establishments	Annual Payroll (\$1,000)
Retail Trade	437	32	8,683
Manufacturing	20-99	3	—
Health Care, Social Assistance	555	17	16,177
Mining, Oil and Gas Extraction	0-19	2	—
Transportation / Warehousing	35	9	1,797
Construction	97	18	2,720
Administration, Support, Waste Management, Remediation Services	0-19	2	—
Real Estate, Rental, Leasing	10	4	230
Wholesale Trade	22-99	5	—
Other Services, Except Public Administration	—	38	2,157
Accommodation, Food Services	183	11	1,935
Financial and Insurance	65	17	2,009
Professional, Scientific, Technical Services	38	12	12
Information	22-99	4	287
Educational Services	20-99	2	—
Arts, Entertainment, Recreation	0-19	1	—

Table 1-3: Major Employers
(Source: louisianasiteselection.com)

Major Employers	Product/Service	Number of Employees
LA Dept. of Health and Hospitals	Administration of public health programs	217
Wal-Mart Stores, Inc.	Department stores	202
West Carroll Health System LLC	General medical and surgical hospitals	150
Ruffin Building Systems, Inc.	Prefabricated metal buildings	100
Carroll Nursing Home, Inc	Skilled nursing care facilities	100

While nature has presented the parish with a variety of hazards, the parish has the human resources that can face those hazards and manage the impact they have on people and property. This plan will discuss hazards affecting West Carroll Parish. Hazard Profiles (see Section Two) contain detailed information on the likelihood of occurrence, possible magnitude or intensity, areas of the parish that could be affected, and conditions that could influence the manifestation of the hazard.

Hazard Mitigation

To fully understand hazard mitigation efforts in West Carroll Parish and throughout Louisiana, it is first crucial to understand how hazard mitigation relates to the broader concept of emergency management. In the early 1980s, the newly-created Federal Emergency Management Agency (FEMA) was charged with developing a structure for how the federal, state, and local governments would respond to disasters. FEMA developed the *four phases of emergency management*, an approach which can be applied to all disasters. The four phases are as follows:

- **Hazard Mitigation**—described by FEMA and the Disaster Mitigation Act of 2000 (DMA 2000) as “any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event.” The goal of mitigation is to save lives and reduce property damage. Besides significantly aiding in the obviously desirous goal of saving human lives, mitigation can reduce the enormous cost of disasters to property owners and all levels of government. In addition, mitigation can protect critical community facilities and minimize community disruption, helping communities return to usual daily living in the aftermath of disaster. Examples of mitigation involve a range of activities and actions including the following: land-use planning, adoption and enforcement of building codes, and construction projects (e.g., flood proofing homes through elevation, or acquisition or relocation away from floodplains).
- **Emergency Preparedness**—includes plans and preparations made to save lives and property and to facilitate response operations before a disaster event.
- **Disaster Response**—includes actions taken to provide emergency assistance, save lives, minimize property damage, and speed recovery immediately following a disaster.
- **Disaster Recovery**—includes actions taken to return to a normal or improved operating condition following a disaster.

Figure 1-3 illustrates the basic relationship between these phases of emergency management. While hazard mitigation may occur both before and after a disaster event, it is significantly more effective when

implemented before an event occurs. This is one of the key elements of this plan and its overall strategy: reduce risk before disaster strikes in order to minimize the need for post-disaster response and recovery.

As [Figure 1-3](#) demonstrates, mitigation relies on updating in the wake of disaster. This can give the appearance that mitigation is only reactive rather than proactive. In reality, however, post-disaster revision

is a vital component of improving mitigation. Each hazardous event affords an opportunity to reduce the consequences of future occurrences.

Unfortunately, this cycle can be painful for a community. For instance, the risks of disasters that could create catastrophic incidents in Louisiana were thought to be relatively well-understood prior to 2005. However, the impact of the 2005 hurricane season on the Gulf Coast region of the United States prompted a new level of planning and engagement related to disaster response, recovery, and hazard mitigation. Hurricanes Katrina and Rita hit three weeks apart and together caused astonishing damage to human life and to



*Figure 1-3: The Four Phases of Emergency Management and their Relation to Future Hazard Mitigation
(Source: Louisiana State Hazard Mitigation Plan 2014)*

property. The two storms highlighted a hurricane season that spawned 28 storms—unparalleled in American history. The 2005 hurricane season confirmed Louisiana’s extreme exposure to natural disasters and both the positive effects and the concerns resulting from engineered flood-protection solutions.

The catastrophic events of 2005 had profound impacts on emergency management and hazard mitigation throughout Louisiana. As detailed later in this document, significant funding has been made available to the State of Louisiana and its parishes for the purpose of hazard mitigation planning. The storms also raised awareness of the importance of hazard mitigation among decision-makers and the general population, which has been particularly important since natural hazards will likely be increasing in frequency, magnitude, and impact in the coming years due to climate change.

General Strategy

During the last update to the Louisiana State Hazard Mitigation Plan, the State Hazard Mitigation Team (SHMT) began a long-term effort to better integrate key components of all plans with hazard mitigation implications in Louisiana to ensure that the programs, policies, recommendations, and implementation strategies are internally consistent. As each of these documents has been adopted by various agencies within the state, the SHMT has worked to incorporate this information into the decision process.

Part of the ongoing integration process is that GOHSEP encourages the parishes and the local municipalities with independent hazard mitigation plans to utilize the same plan format and methodologies as the State Hazard Mitigation Plan in order to create continuity of information from local to state mitigation plans and programs.

The 2015 West Carroll Parish Hazard Mitigation Plan maintains much of the information from the 2006 and 2010 plan versions, but it now reflects the order and methodologies of the 2011 Louisiana State Hazard Mitigation Plan. The sections in the 2010 West Carroll Hazard Mitigation Plan were as follows:

- Section One Introduction
- Section Two Parish Profile
- Section Three Planning Process
- Section Four Risk Assessment
- Section Five Mitigation Strategy
- Section Six Plan Maintenance
- Section Seven Action Plan
- Tables
- Maps
- Appendix

This plan update now also coheres with the Plain Writing Act of 2010, which requires federal agencies to use clear communication that is accessible, consistent, understandable, and useful to the public. While the State of Louisiana and its political subdivisions are not required to meet such standards, the Act aligns with best practices in hazard mitigation. Since successful hazard mitigation relies on full implementation and cooperation at all levels of government and community, a successful hazard mitigation plan must also be easily used at all of these levels. Nevertheless, the West Carroll Parish Hazard Mitigation Steering Committee was not ignorant or dismissive of the successful analysis and mitigation planning executed in previous plan updates. This plan update remains coherent with those documents, retaining language and content when needed, deleting it when appropriate, and augmenting it when constructive.

2015 Plan Update

This 2015 plan update proceeds with the four previous goals of the West Carroll Parish hazard mitigation plan. The current goals are as follows:

- Identify and pursue preventative measures that will reduce future damages from hazards
- Enhance public awareness and understanding of disaster preparedness and mitigation
- Reduce repetitive losses in the parish and municipalities
- Facilitate sound development in the parish and municipalities so as to reduce or eliminate the potential impact of hazards

This plan update makes a number of textual changes throughout. But the most obvious changes are data related and structural. First, the Spatial Hazard Events and Losses Database for the United States (SHELDUS) is used as a data source for hazard identification because it incorporates all storm event data from the National Climatic Data Center (NCDC) Storm Events Database used in previous plans, as well as storm event data from other sources including the NOAA Storm Prediction Center, National Hurricane Center, and U.S. Fire Administration. Furthermore, all of the sections were updated to reflect the most current information and the most current vision of the plan update. Second, instead of eleven, separate sections for numerous tables, maps and appendices, the present plan update has five sections and five appendices. The most significant changes are the newly developed hazard profiles and risk assessments, as well as the removal of much repetition between sections from the previous plan updates.

The 2015 plan update is organized generally as follows:

- Section One Introduction
- Section Two Hazard Identification and Parish-Wide Risk Assessment
- Section Three Capability Assessment
- Section Four Mitigation Strategies
- Appendix A Planning Process
- Appendix B Plan Maintenance
- Appendix C Essential Facilities
- Appendix D Plan Adoption
- Appendix E State Required Worksheets

Table 1-4: Plan Crosswalk

2010 Plan	Revised Plan (2015)
Section 1: Introduction	Section 1: Introduction
Section 2: Parish Profile	Section 2: Risk Assessment
Section 3: Planning Process	Appendix A: Planning Process
Section 4: Risk Assessment	Section 2: Risk Assessment
Section 5: Mitigation Strategy	Section 4: Mitigation Strategy
Section 6: Plan Maintenance	Appendix B: Plan Maintenance
Section 7: Action Plan	Section 4: Mitigation Strategy
Tables	Appendix C, E
Maps	Section 2: Risk Assessment
Appendix	Appendix C, E

Despite changes in this plan update, the plan remains consistent in its emphasis on the few types of hazards that pose the most risk to loss of life, injury, and property in West Carroll Parish and its municipalities. The extent of this risk is dictated primarily by its geographic location. Most significantly, West Carroll Parish remains at high risk of water inundation from various sources, including flooding, tornadoes, winter storms, and severe thunderstorms (high wind, hail and lightning). Other hazards threaten the parish and/or its municipalities, although not to such great degrees and not in such widespread ways. In all cases, the relative social vulnerability of areas threatened and affected plays a significant role in how governmental agencies and their partners (local, parish, state, and federal) prepare for and respond to disasters.

Mitigation efforts related to particular hazards are highly individualized by jurisdiction. Flexibility in response and planning is essential. The most important step forward to improve hazard management capability is to improve coordination and information sharing between the various levels of government regarding hazards.

This Page Left Intentionally Blank

2 Hazard Identification and Parish-Wide Risk Assessment

This section assesses the various hazard risks that West Carroll Parish faces in order to identify a strategy for mitigation. Having identified the categories of hazards, emergencies, disasters, and catastrophes, this section details the major climatological and natural/human-influenced hazards by (1) defining them, (2) explaining how they are measured, (3) describing their geographic extent, (4) surveying their previous occurrences, and (5) evaluating their future likelihood of occurrences.

The table below provides an overview of the hazards that had been previously profiled in the West Carroll Parish Hazard Mitigation Plan published in 2010, as well as the hazards that were identified in the state's 2014 Hazard Mitigation Plan that were considered to be of high or medium risk for the parish by the state. Those hazards identified as high or medium risk by the state or previously identified as a risk by the parish have been determined to provide a risk to the parish and will be profiled in this section.

Table 2-1: Hazard Profile Summary

Hazard	Profiled in Last Plan	Considered Medium or High Risk in the State's HM Plan	Profiled in the 2015 Update
Coastal Land Loss			
Drought	X		X
Earthquakes			
Expansive Soils			
Fog			
Flooding	X	X	X
Extreme Heat			
Sinkholes			
Termites			
Thunderstorms (Hail, Lightning & Wind)	X	X	X
Tornadoes	X	X	X
Tropical Cyclones	X	X	X
Tsunamis			
Wildfires			
Winter Storms	X		X

Prevalent Hazards to the Community

While many of the hazards identified in *Table 2-1* occur in the parish, their occurrence was not merited for further study by the planning committee. The determination was made to focus attention and resources on the most prevalent hazards which include the hazards previously profiled, along with sinkholes.

The following hazards have been selected for inclusion in this risk assessment:

- a) Drought
- b) Flooding (backwater, riverine, localized stormwater event)
- c) Thunderstorms (hail, lightning, wind)
- d) Tornadoes
- e) Tropical Cyclones (flooding and high winds)
- f) Winter Storms

For analysis purposes, the impact of the critical and prevalent hazards is summarized as follows:

- Flooding from rivers and waterways, rain storms, tropical storms, and hurricanes in the following forms:
 - a) Riverine
 - b) Stormwater
 - c) Surge
 - d) Backwater flooding (as the result of river flooding and surge)
- High wind damage most commonly resulting from hurricanes, thunderstorms and tornadoes

The potential destructive power of tropical cyclones and flooding were determined to be the most prevalent hazards to the parish. Nine of the ten Presidential Declarations that West Carroll Parish has received have resulted from either tropical cyclones (5 declarations) or flooding (4 declarations), which validates these as the most significant hazards. Therefore, the potential threat of hurricanes and flooding will both serve as the main focus during the mitigation planning process. Hurricanes present risks for the potential for flooding, primarily resulting from heavy precipitation, and high wind speeds. Flooding can also occur from non-hurricane events, and flash floods are a common occurrence due to heavy rainfall.

Hurricanes, tropical storms, and heavy storms are fairly common occurrences, and resultant wind damage is of utmost concern. Damage from high winds can include roof damage, destruction of homes and commercial buildings, downed trees and power lines, and damage and disruption to services caused by heavy debris. A wind map for West Carroll Parish is included in the hurricane risk assessment.

West Carroll Parish is also susceptible to tornadoes. Tornadoes can spawn from tropical cyclones or severe weather systems that pass through West Carroll Parish. High winds produced by tornadoes have the potential to destroy residential and commercial buildings, as well as create windborne objects from the debris produced from the destruction of the natural and human environment.

Previous Occurrences

Table 2-2 summarizes federal disaster declarations for West Carroll Parish since 1977. Information includes names, dates, and types of disaster.

Table 2-2: West Carroll Parish Major Disaster Declarations

Disaster Declaration Number	Date	Type of Disaster
3031	1/31/1977	Severe Storm, Flood
829	6/16/1989	Severe Storm, Flood
902	4/23/1991	Severe Storm, Flood
904	4/29/1991	Severe Storm, Flood
1264	12/23/1998	Winter Storm
1603	8/29/2005	Tropical Cyclone – Hurricane Katrina
1607	9/24/2005	Tropical Cyclone – Hurricane Rita
1786	8/1/2008	Tropical Cyclone – Hurricane Gustav
1792	9/13/2008	Tropical Cyclone – Hurricane Ike
4080	8/27/2012	Tropical Cyclone – Hurricane Isaac

Probability of Future Hazard Events

The probability of a hazard event occurring in West Carroll Parish is estimated below. The percent chance of an event happening during any given year was calculated by posting past events and dividing by the time period. Unless otherwise indicated, the time period used to access probability followed the method used in the State of Louisiana's most current Hazard Mitigation Plan. The primary source for historical data used throughout the plan is the Spatial Hazards Events and Losses Database (SHELDUS) which provides historical hazard data from 1960 to 2014. In staying consistent with the state plan, the SHELDUS database was evaluated for the last twenty five years (1989 – 2014) in order to determine future probability of a hazard occurring. While the twenty five year record used by the State was adopted for the purpose of determining the overall probability, in order to assist with determining estimated losses, unless otherwise stated, the full 54 year record was used when HAZUS-HM wasn't available to determine losses. This full record was used to provide a more extensive determination of losses. All assessed damages were adjusted for inflation in order to reflect the equivalent amount of damages with the value of the U.S. dollar today. In addition, the National Climatic Data Center (NCDC) was also used to help identify hazard data specific to the municipalities as it contains specific data for cities, whereas SHELDUS is limited to parishes.

The following table shows the annual probability for each hazard occurring across the parish and in separate jurisdictions.

Table 2-3: Probability of Future Hazard Reoccurrence

Hazard	Probability					
	West Carroll Parish (Unincorporated)	Epps	Forest	Kilbourne	Oak Grove	Pioneer
Drought	24%	24%	24%	24%	24%	24%
Flooding	36%	32%	24%	28%	40%	32%
Thunderstorms (Hail)	68%	68%	68%	68%	68%	68%
Thunderstorms (Lightning)	4%	4%	4%	4%	4%	4%
Thunderstorms (Wind)	100%	100%	100%	100%	100%	100%
Tornadoes	32%	32%	32%	32%	32%	32%
Tropical Cyclones	12%	12%	12%	12%	12%	12%
Winter Storms	52%	52%	52%	52%	52%	52%

As shown in [Table 2-3](#), thunderstorm winds have the highest annual chance of occurrence in the parish (100%), followed by hail (68%). Winter storm events have a 52% annual chance of occurrence throughout the parish, followed by flooding at 40% in the town of Oak Grove. Flooding probability percentages decrease for the unincorporated areas (36%), Epps (32%), Pioneer (32%), and Forest (24%). Tornadoes have a 32% annual chance of occurrence within the parish, followed by drought at 24%. Tropical cyclones have a 12% annual chance of occurrence, and lightning has the lowest annual chance of occurrence at 4%.

Inventory of Assets for the Entire Parish

As part of the risk assessment, the planning team identified essential facilities throughout the parish. Several methods were used to assist in identifying all essential facilities, including field data collected by the Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) on critical infrastructure from a previous hazard mitigation project.

Within the entire planning area, there is an estimated value of \$682,652,000 in structures throughout the parish. The table on the following page provides the total estimated value for each structure by occupancy.

Table 2-4: Estimated Total of Potential Losses throughout West Carroll Parish

Occupancy	West Carroll Parish	Unincorporated West Carroll	Epps	Forest	Kilbourne	Oak Grove
Agricultural	\$22,082,000	\$0	\$269,000	\$233,000	\$627,000	\$22,082,000
Commercial	\$37,248,000	\$648,000	\$1,063,000	\$3,925,000	\$47,109,000	\$37,248,000
Government	\$6,720,000	\$208,000	\$618,000	\$461,000	\$2,925,000	\$6,720,000
Industrial	\$37,964,000	\$74,000	\$83,000	\$151,000	\$2,610,000	\$37,964,000
Religion	\$27,807,000	\$682,000	\$1,167,000	\$1,531,000	\$8,054,000	\$27,807,000
Residential	\$538,516,000	\$38,374,000	\$13,699,000	\$29,160,000	\$117,587,000	\$538,516,000
Education	\$12,315,000	\$0	\$0	\$0	\$4,660,000	\$12,315,000
Total	\$682,652,000	\$39,986,000	\$16,899,000	\$35,461,000	\$183,572,000	\$682,652,000

Table 2-4: Estimated Total of Potential Losses (Continued)

Occupancy	Pioneer
Agricultural	\$0
Commercial	\$148,000
Government	\$360,000
Industrial	\$0
Religion	\$409,000
Residential	\$7,182,000
Education	\$0
Total	\$8,099,000

Essential Facilities of the Parish

The following pages contain maps that show the locations and names of the essential facilities within the parish.

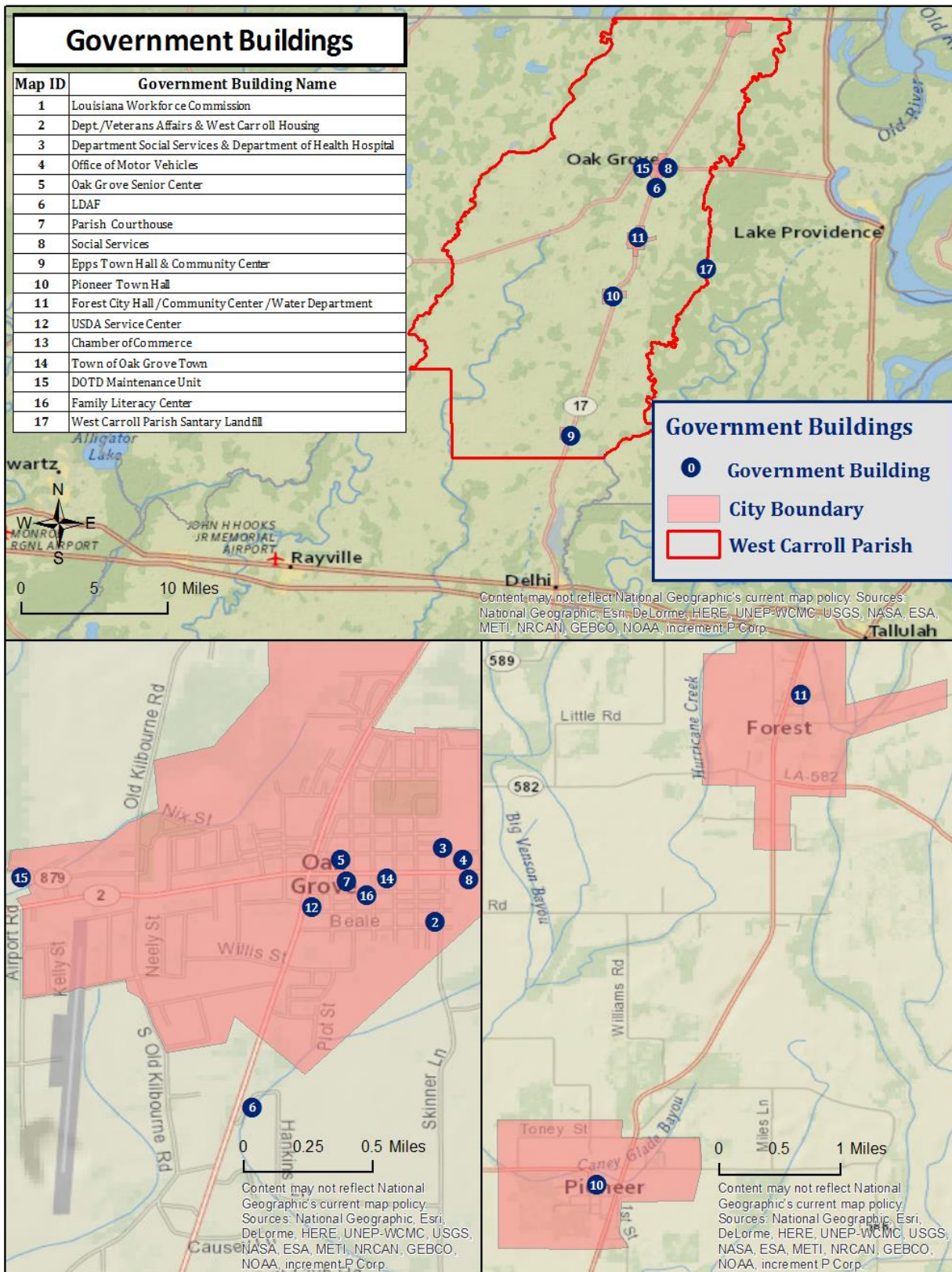


Figure 2-1: Government Buildings located in West Carroll Parish

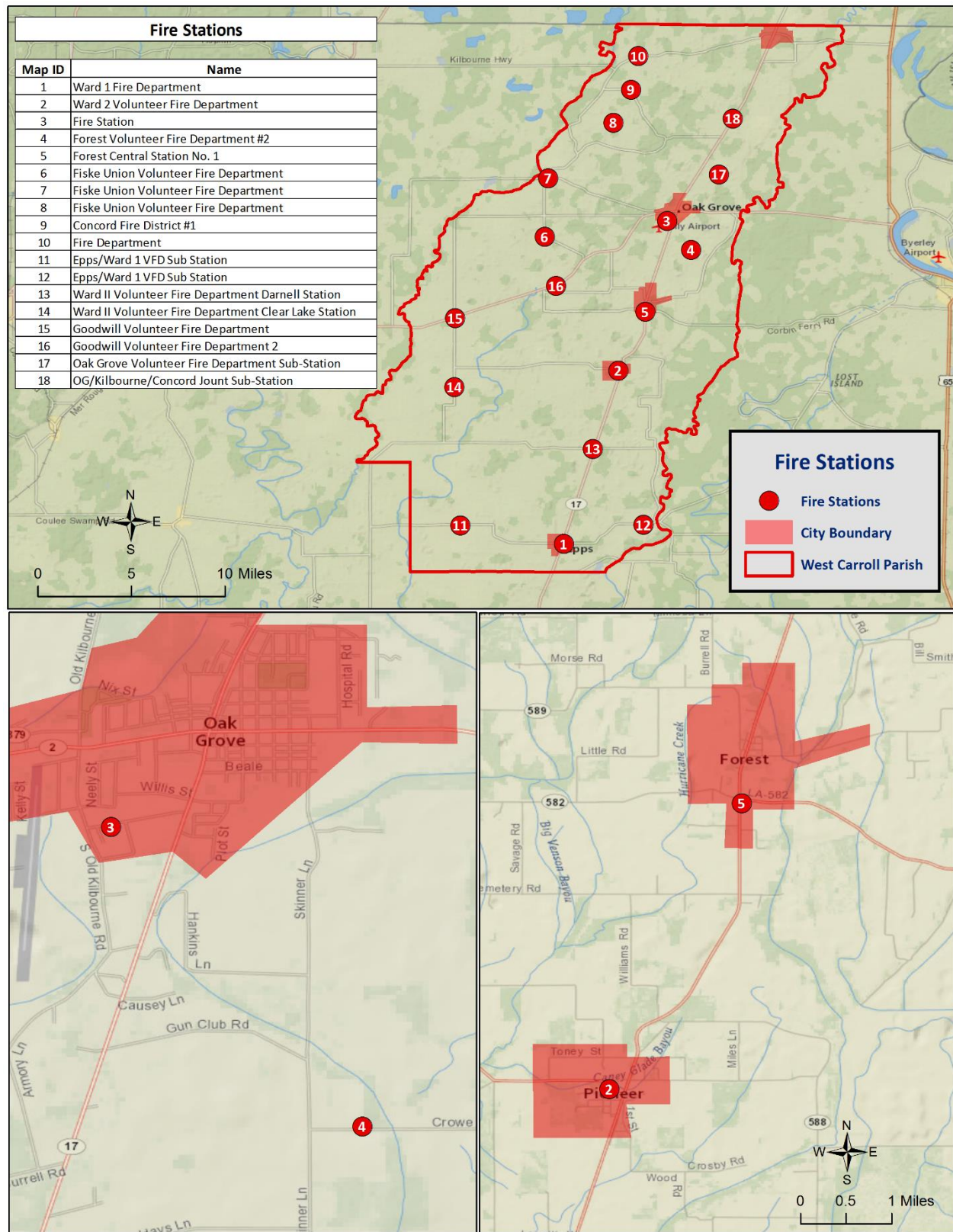


Figure 2-2: Fire Stations throughout West Carroll Parish

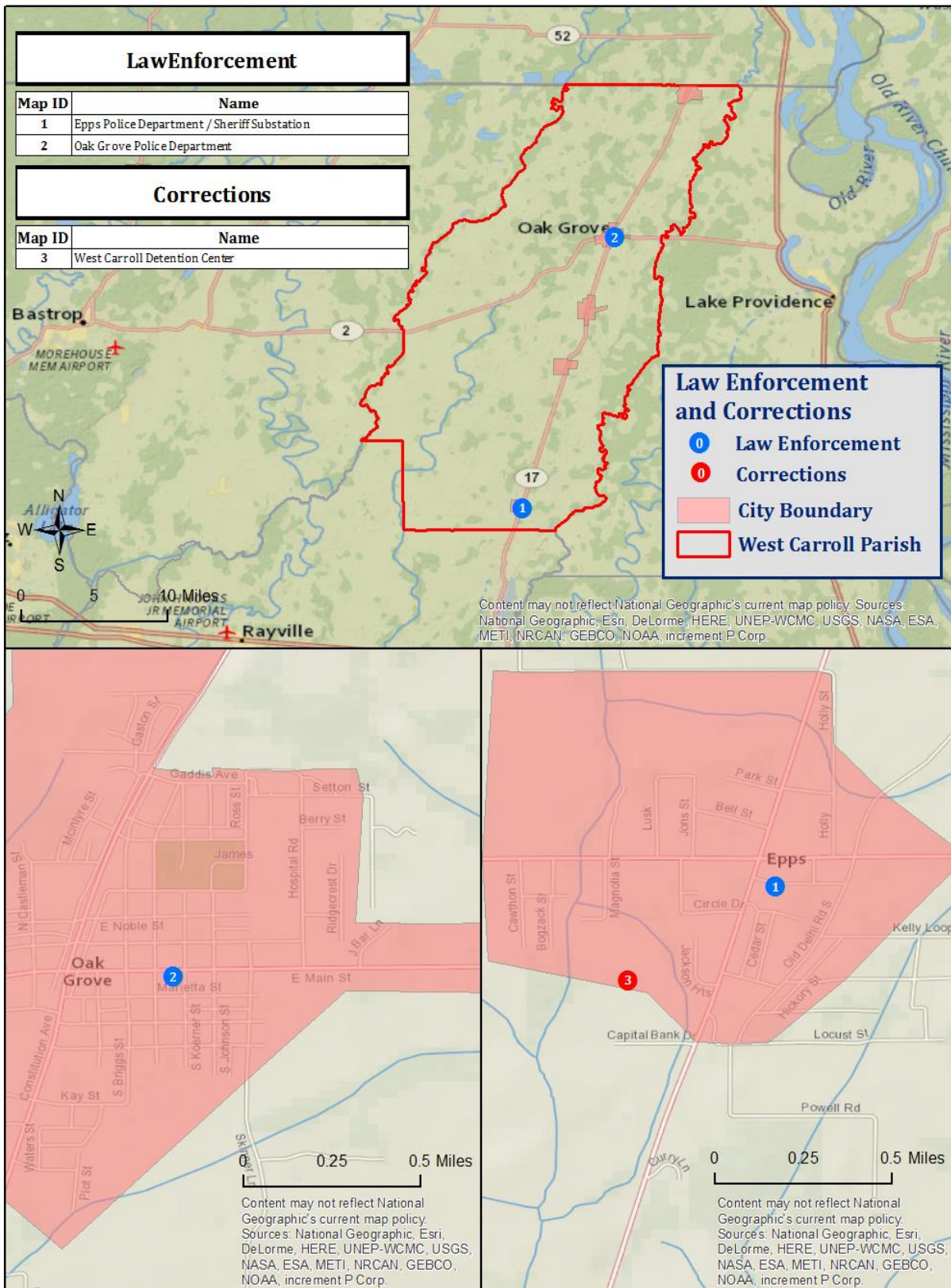


Figure 2-3: Law Enforcement Facilities in West Carroll Parish

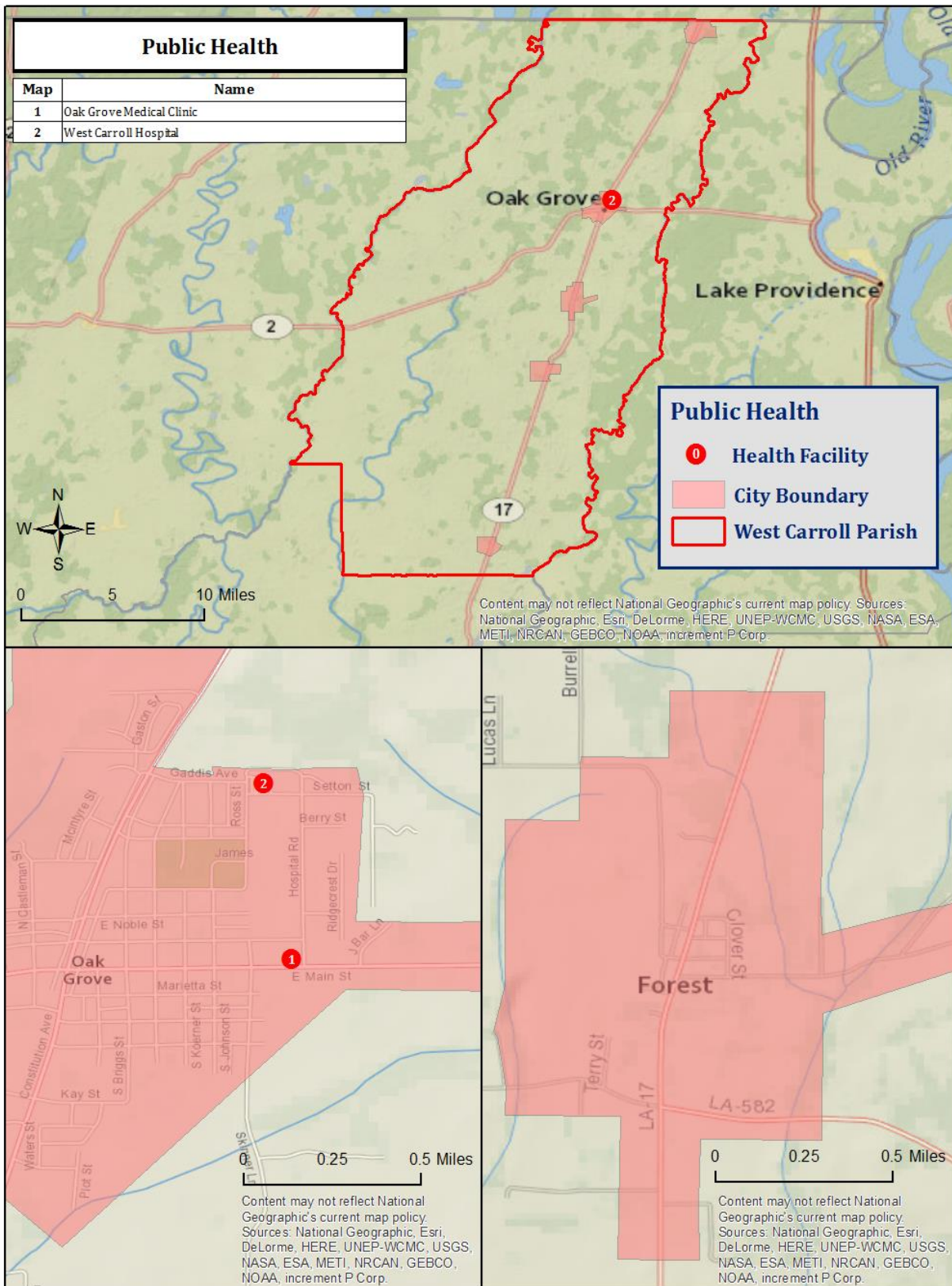


Figure 2-4: Public Health Facilities in West Carroll Parish

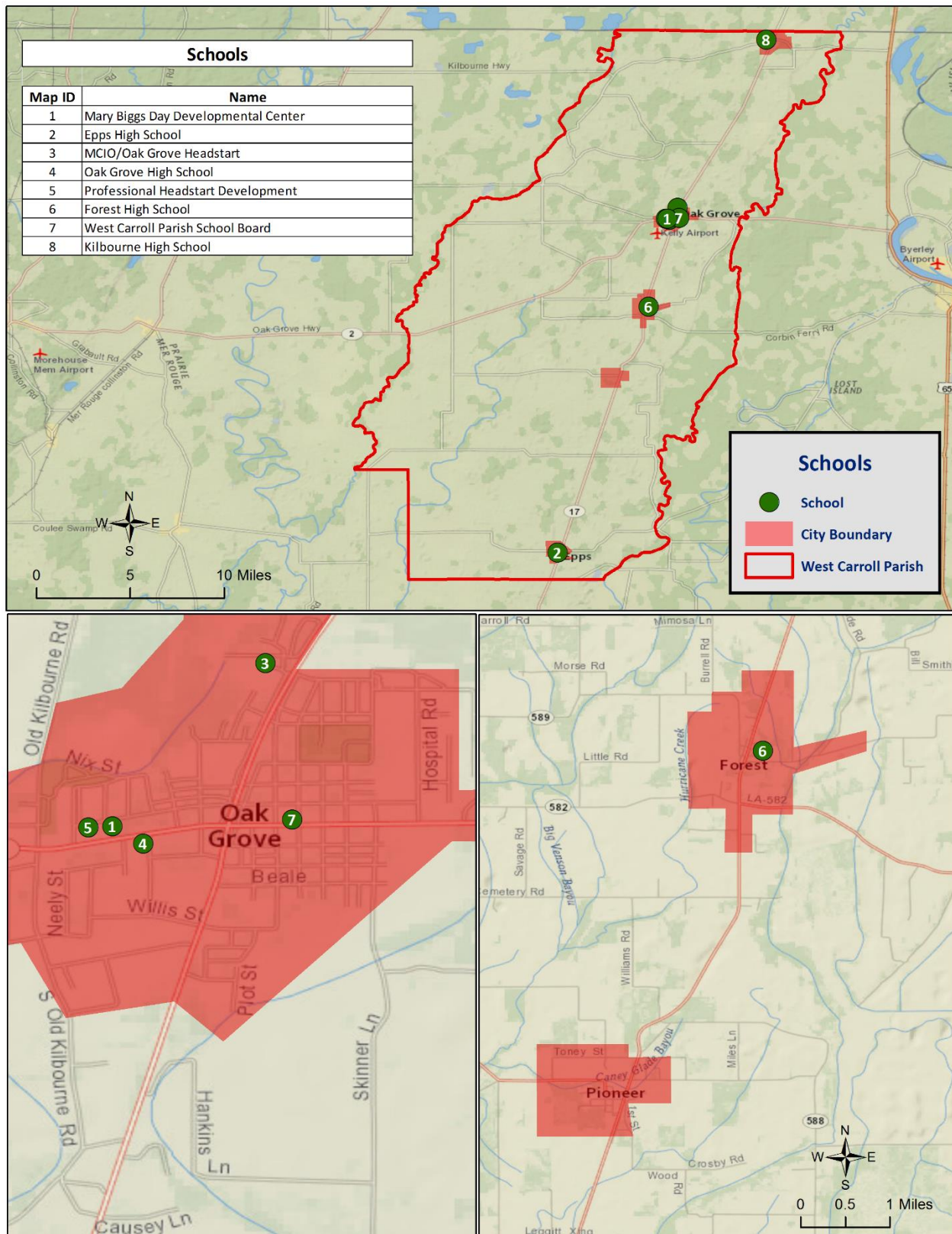


Figure 2-5: Educational Facilities throughout West Carroll Parish

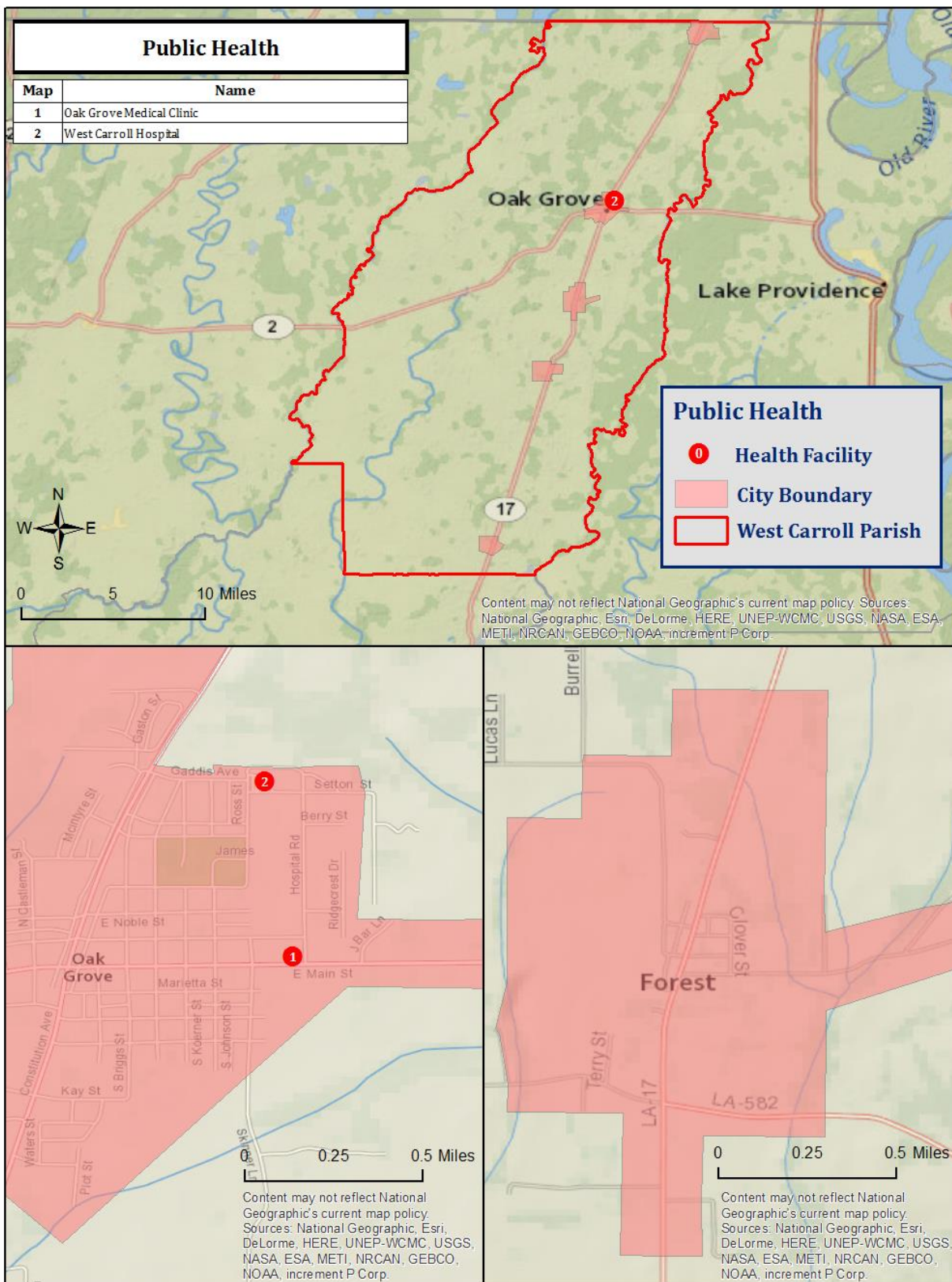


Figure 2-6: Nursing Home Facilities in West Carroll Parish

Future Development Trends

West Carroll Parish experienced a decline in population between the years of 2000 and 2013. Population fell from 12,314 to 11,604 from the years 2000 to 2010, and from 11,604 to 11,540 from the years 2010 to 2013. However, housing units increased during the years of 2000 to 2010 from 4,980 to 5,046, but decreased to 5,042 from the years of 2010 to 2013. The unincorporated areas of West Carroll Parish and all incorporated areas except for Forest experienced a decrease in population from the years of 2000 to 2010. Forest experienced an increase in population during this time period, growing from 275 to 355. However, this changed from the years of 2010 to 2013 when population fell to 272. The incorporated areas of Epps, Kilbourne, Oak Grove, and Pioneer experienced population growth from the years of 2010 to 2013, but the unincorporated areas continued to experience a decline in population, falling from 8,096 to 7,656. The future population and number of buildings can be estimated using U.S. Census Bureau housing and population data. The tables below show population and housing unit estimates from 2000 to 2013.

Table 2-5: Population Growth Rate for West Carroll Parish

Total Population	West Carroll Parish	West Carroll Unincorporated	Epps	Forest	Kilbourne	Oak Grove	Pioneer
1-Apr-00	12,314	8,105	1,153	275	436	2,174	171
1-Apr-10	11,604	8,096	854	355	416	1,727	156
1-Jul-13	11,540	7,656	1,117	272	478	1,796	221
Population Growth between 2000 – 2010	-5.8%	-0.1%	-25.9%	29.1%	-4.6%	-20.6%	-8.8%
Average Annual Growth Rate between 2000 – 2010	-0.6%	0.0%	-2.6%	2.9%	-0.5%	-2.1%	-0.9%
Population Growth between 2010 – 2013	-0.6%	-5.4%	30.8%	-23.4%	14.9%	4.0%	41.7%
Average Annual Growth Rate between 2010 – 2013	-0.18%	-1.81%	10.27%	-7.79%	4.97%	1.33%	13.89%

Table 2-6: Housing Growth Rate for West Carroll Parish

Total Housing Units	West Carroll Parish	West Carroll Unincorporated	Epps	Forest	Kilbourne	Oak Grove	Pioneer
1-Apr-00	4,980	3,486	237	108	185	894	70
1-Apr-10	5,046	3,596	227	134	196	829	64
1-Jul-13	5,042	3,592	247	123	192	787	101
Housing Growth between 2000 – 2010	1.3%	3.2%	-4.2%	24.1%	5.9%	-7.3%	-8.6%
Average Annual Growth Rate between 2000 – 2010	0.1%	0.3%	-0.4%	2.4%	0.6%	-0.7%	-0.9%
Housing Growth between 2010 – 2013	-0.1%	-0.1%	8.8%	-8.2%	-2.0%	-5.1%	57.8%
Average Annual Growth Rate between 2010 – 2013	0.0%	0.0%	2.9%	-2.7%	-0.7%	-1.7%	19.3%

As shown in [Table 2-5](#) and [Table 2-6](#), West Carroll Parish has experienced little to no growth in both population and housing units. Population declined at a rate of 0.86% annually from 2000 to 2010, and further declined at a rate of 0.18% annually from 2010 to 2013. Housing growth rates grew slightly from 2000 to 2010, but became fairly stagnant from 2010 to 2013. From 2000 to 2010, the incorporated area of Forest had the largest increase in population with an annual rate of 2.9%, while the remaining incorporated and unincorporated areas experienced a decline. From 2010 to 2013, the incorporated area of Pioneer experienced an annual growth rate of 13.89%, followed by the incorporated area of Epps at 10.27%. Kilbourne experienced an annual growth rate of 4.97%, followed by Oak Grove at 1.33%. Population rates in the unincorporated area continued to decline at an annual rate of 1.81%.

Housing growth from 2000 to 2010 increased at an annual rate of 0.1%, but declined from 2010 to 2013 by 0.1% overall. The incorporated area of Pioneer experienced the largest housing growth from 2010 to 2013, increasing at an annual rate of 19.3%. The incorporated area of Forest is the only other area within the parish that experienced a growth in housing during the same time period, with an annual growth rate of 2.9%.

Future Hazard Impacts

Hazard impacts were estimated for five years and ten years in the future (2019 and 2024). Yearly population and housing growth rates were applied to parish inventory assets for composite flood and tropical cyclones. Based on a review of available information, it is assumed that population and housing units will continue to grow slightly within West Carroll Parish from the present until 2024. A summary of

estimated future impacts is shown in the table below. Dollar values are expressed in future costs and assume an annual rate of inflation of 1.02%.

Table 2-7: Estimated Future Impacts, 2019-2024
(Source: HAZUS, US Census Bureau)

Hazard / Impact	Total in Parish (2014)	Hazard Area (2014)	Hazard Area (2019)	Hazard Area (2024)
Flood Damage				
Structures	5,041	851	850	849
Value of Structures	\$976,270,990	\$164,899,271	\$173,253,374	\$183,838,834
# of People	11,519	1,946	1,928	1,907
Tropical Cyclone				
Structures	5,041	1,109	1,107	1,106
Value of Structures	\$976,270,990	\$214,779,618	\$225,660,751	\$239,448,206
# of People	11,519	2,534	2,511	2,483

Land Use

The West Carroll Parish Land Use table is provided below. Residential, commercial, and industrial areas account for only 5% of the parish's land use. Agricultural land is the largest category at 178,050 acres, accounting for 78% of parish land. At 27,384 acres, wetlands account for 12% of parish lands, while 12,604 acres of forested areas account for 5% of parish lands. The parish also consists of 702 acres of water areas, accounting for less than 1% of all parish lands.

Table 2-8: West Carroll Parish Land Use
(Source: USGS Land Use Map)

Land Use	Acres	Percentage
Agricultural Land, Cropland, and Pasture	178,050	78%
Wetlands	27,384	12%
Forest land (not including forested wetlands)	12,604	5%
Urban/Development	12,009	5%
Water	702	0%

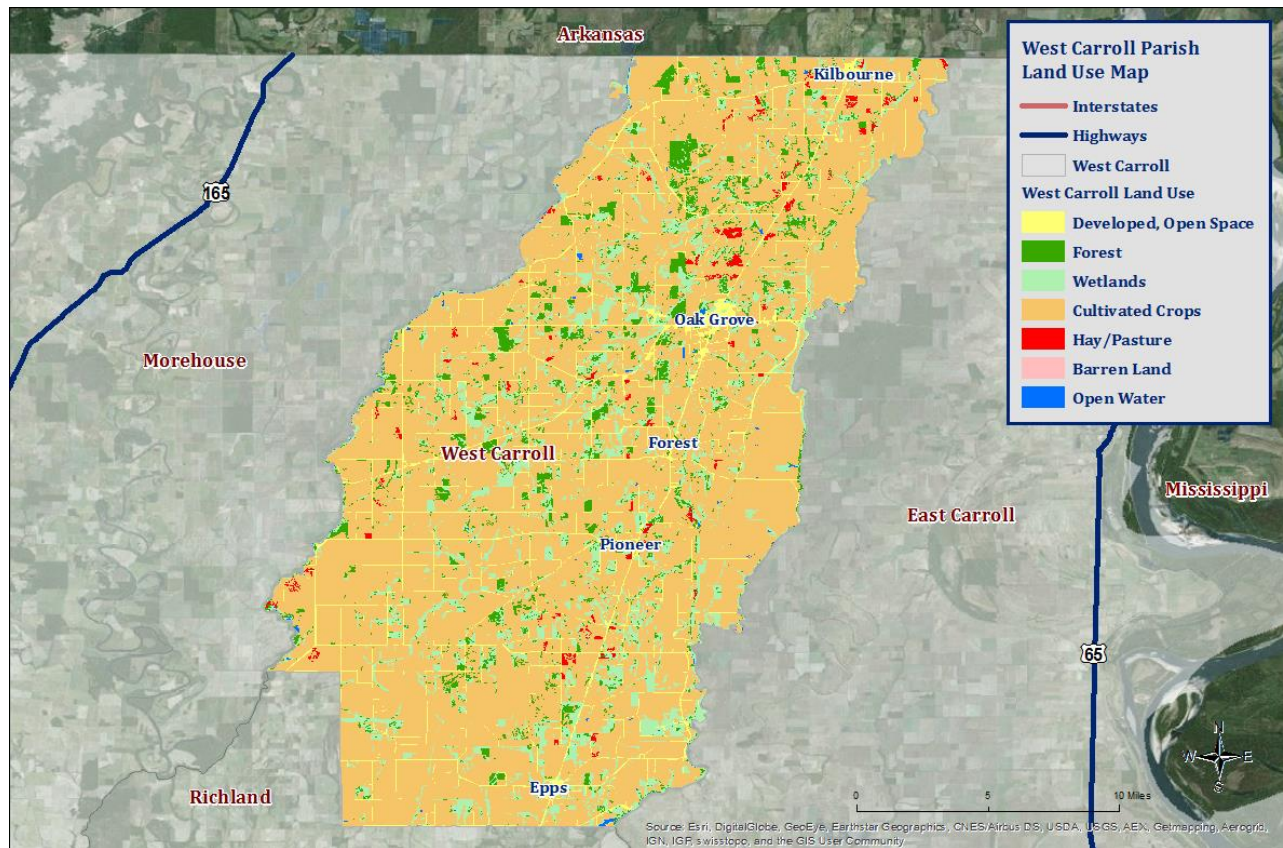


Figure 2-7: West Carroll Parish Land Use Map
(Source: USGS Land Use Map)

Hazard Identification

Drought

A drought is a deficiency in water availability over an extended period of time, caused by precipitation totals and soil water storages that do not satisfy the environmental demand for water, either by evaporation or transpiration through plant leaves. It is important to note that the lack of precipitation alone does not constitute drought; the season during which the precipitation is lacking has a major impact on whether or not drought occurs. For example, a week of no precipitation in July, when the solar energy to evaporate water and vegetation's need for water to carry on photosynthesis are both high, may trigger a drought, while a week of no precipitation in January may not initiate a drought.

Drought is a unique and insidious hazard. Unlike other natural hazards, no specific threshold of "dryness" exists for declaring a drought. In addition, the definition of drought depends on stakeholder needs. For instance, the onset (and demise) of agricultural drought is quick, as crops need water every few days; once they get rainfall, they improve. However, hydrologic drought sets in (and is alleviated) only over longer time periods. A few dry days will not drain a reservoir, but a few rain showers cannot replenish it either. Moreover, different geographical regions define drought differently based on the deviation from local, normal precipitation. And drought can occur anywhere, triggered by changes in the local-to-regional-scale atmospheric circulation over an area, or by broader-scale circulation variations such as the expansion of semi-permanent oceanic high-pressure systems or the stalling of an upper-level atmospheric ridge in place over a region. The severity of a drought depends upon the degree and duration of moisture deficiency, as well as the size of the affected area. Periods of drought tend to be associated with other hazards, such as wildfires and/or heat waves.

Lastly, drought is a slow onset event, causing less direct—but tremendous indirect—damage. Depletion of aquifers, increases in livestock and wildlife mortality rates, and crop loss are examples of direct impacts. Since the groundwater found in aquifers is the source of about 38% of all county and city water supplied to households (and comprises 97% of the water for all rural populations that are not already supplied by cities and counties), droughts can potentially have direct, disastrous effects on human populations. The indirect consequences of drought, such as unemployment, reduced tax revenues, increased food prices, reduced outdoor recreation opportunities, higher energy costs as water levels in reservoirs decrease and consumption increases, and water rationing, are not often fully known. This complex web of impacts causes drought to affect people and economies well beyond the area physically experiencing the drought.

This hazard is often measured using the Palmer Drought Severity Index (PDSI, also known operationally as the Palmer Drought Index). The PDSI, first developed by Wayne Palmer in a 1965 paper for the U.S. Weather Bureau, measures drought through recent precipitation and temperature data with regard to a basic supply-and-demand model of soil moisture. It is most effective in long-term calculations. Three other indices used to measure drought are the Palmer Hydrologic Drought Index (PHDI), the Crop Moisture Index (CMI), which is derived from the PDSI, and the Keetch-Byram Drought Index (KBDI), created by John Keetch and George Byram in 1968 for the U.S. Forest Service. The KBDI is used mainly for predicting likelihood of wildfire outbreaks. As a compromise, the PDSI is used most often for droughts since it is a medium-response drought indicator. The objective of the PDSI is to provide measurements of moisture conditions that are standardized so that comparisons using the index can be made between locations and between months. [Table 2-9](#) displays the ranges and Palmer classifications of the PDSI index. [Figure 2-8](#) displays the current drought monitor for the state of Louisiana and its parishes.

Table 2-9: Palmer Drought Severity Index Classification and Range

Range	Palmer Classifications
4.0 or more	Extremely Wet
3.0 to 3.9	Very Wet
2.0 to 2.9	Moderately Wet
1.0 to 1.99	Slightly Wet
0.5 to 0.99	Incipient Wet Spell
0.49 to -0.49	Near Normal
-0.5 to -0.99	Incipient Dry Spell
-1.0 to -1.99	Mild Drought
-2.0 to -2.99	Moderate Drought
-3.0 to -3.99	Severe Drought
-4.0 or less	Extreme Drought

The PDSI best measures the duration and intensity of drought-inducing circulation patterns at a somewhat long-term time scale, although not as long term as the PHDI. Long-term drought is cumulative, so the intensity of drought during the current month is dependent on the current weather patterns in addition to the effects of cumulative patterns of previous months or years. Although weather patterns can change almost overnight from a long-term drought pattern to a long-term wet pattern, as a medium-response indicator, the PDSI responds relatively rapidly. Data compiled by the National Drought Mitigation Center indicates normal conditions exist in West Carroll Parish at the time this plan went to publication ([Figure 2-8](#)).

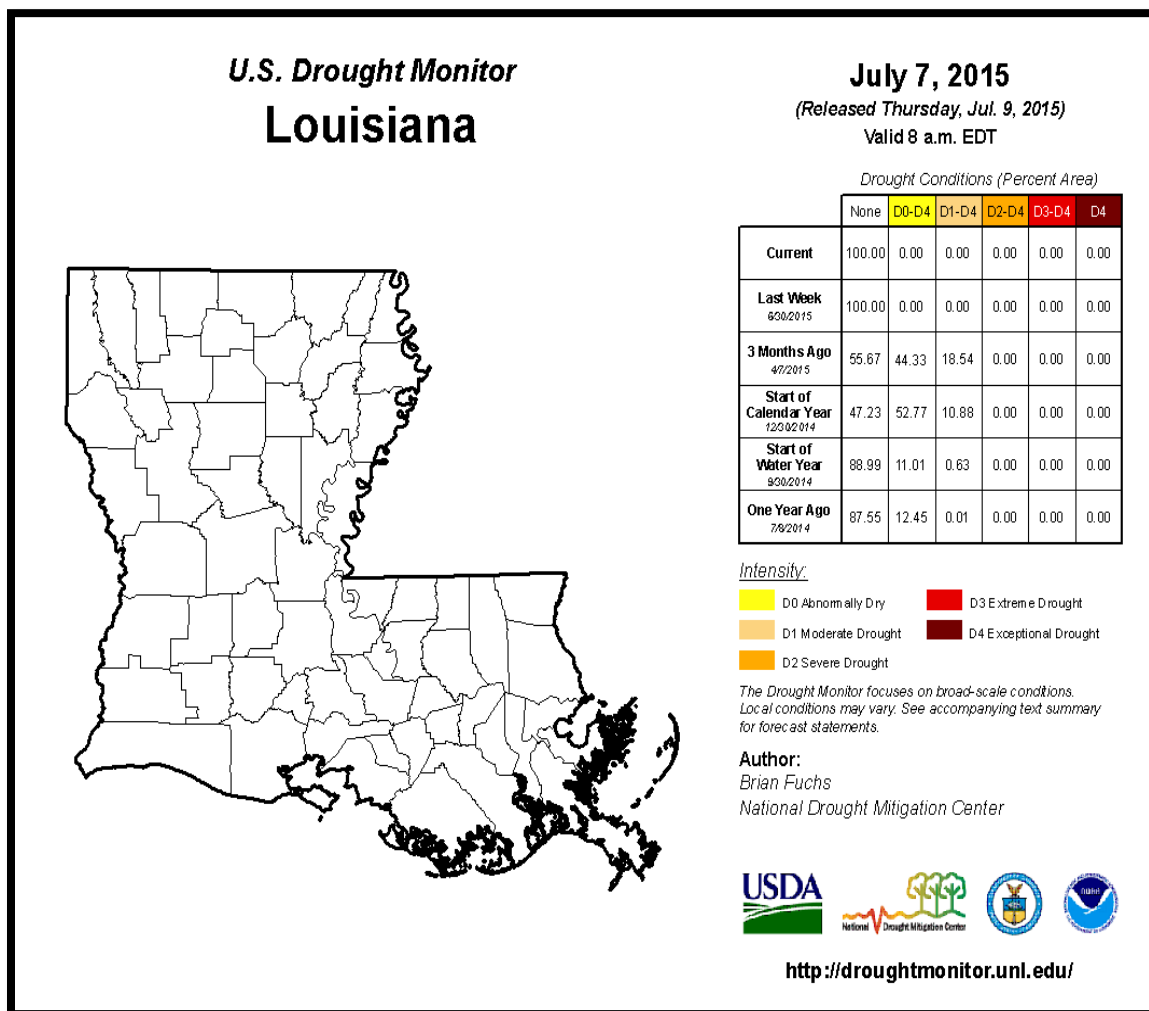


Figure 2-8 : United States Drought Monitor for the State of Louisiana and its Parishes
(Source: The National Drought Mitigation Center)

Location

Drought typically impacts a region and not one specific parish or jurisdiction. While the entire planning area can experience drought, the major impact of a drought event in West Carroll Parish is on the agricultural community.

Previous Occurrences / Extents

The SHELDS database reports a total of six drought events occurring within the boundaries of West Carroll Parish between the years of 1989 – 2014. [Table 2-10](#) identifies the date of occurrence, estimated crop damage, and severity of the drought events that have occurred in West Carroll Parish. Based on previous occurrences, and in accordance with the PDSI, the worst case scenario for drought in West Carroll Parish would be a severe drought event.

*Table 2-10: Drought Events with Crop Damage Totals for West Carroll Parish
(Source: SHEL DUS)*

Date	Crop Damage	Palmer Classification
October 2006	\$950,111	Moderate Drought
June 2010	\$106,834	Severe Drought
July 2010	\$1,068,336	Severe Drought
August 2010	\$534,168	Severe Drought
September 2010	\$534,168	Severe Drought
October 2010	\$534,168	Severe Drought

Frequency / Probability

Based on previous occurrences of six drought events in 25 years, the probability of drought occurrence in the planning area in any given year is 24%.

Estimated Potential Losses

According to the SHEL DUS database, there have been 6 droughts that have caused some level of crop damage. The total agricultural damage from these events is \$3,727,784, with an average cost of \$621,297 per drought event. When annualizing the total cost over the 25 year record, total annual losses based on drought is estimated to be \$149,111. *Table 2-11* presents an analysis of agricultural exposure that is susceptible to drought by major crop type for West Carroll Parish.

*Table 2-11: Agricultural Exposure by Crop Type for Droughts in West Carroll Parish
(Source: LSU Ag Center 2014 Parish Totals)*

Agricultural Exposure by Type for Drought						
Cotton	Soybeans	Sweet Potatoes	Tomatoes	Feed Grains	Rice	Total
\$156,628	\$39,495,600	\$12,305,664	\$148,225	\$16,250,524	\$2,816,786	\$71,173,427

There have been no reported injuries or deaths as a direct result to drought in West Carroll Parish.

Flooding

A flood is the overflow of water onto land that is usually not inundated. The National Flood Insurance Program defines a flood as:

A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties from overflow of inland or tidal waves, unusual and rapid accumulation or runoff of surface waters from any source, mudflow, or collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood as defined above.

Factors influencing the type and severity of flooding include natural variables such as precipitation, topography, vegetation, soil texture, and seasonality, as well as anthropogenic factors such as urbanization (extent of impervious surfaces), land use (agricultural and forestry tend to remove native vegetation and accelerate soil erosion), and the presence of flood-control structures such as levees and dams.

Excess precipitation produced from thunderstorms or hurricanes is often the major initiating condition for flooding, and Louisiana can have high rainfall totals at any time of day or year. During the cooler months, slow-moving frontal weather systems produce heavy rainfalls, while the summer and autumn seasons produce major precipitation in isolated thunderstorm events (often on warm afternoons) that may lead to localized flooding. During these warmer seasons, floods are overwhelmingly of the flash flood variety, as opposed to the slower-developing river floods caused by heavy stream flow during the cooler months.

In cooler months, particularly in the spring, Louisiana is in peak season for severe thunderstorms. The fronts that cause these thunderstorms often stall while passing over the state, occasionally producing rainfall totals exceeding 10 inches within a period of a few days. Since soil tends to be nearly saturated at this time (due to relatively low overall evaporation rates), spring typically becomes the period of maximum stream flow across the state. Together, these characteristics increase the potential for high water, with low-lying, poorly drained areas being particularly susceptible to flooding during these months.

In Louisiana, six specific types of flooding are of main concern: riverine, flash, ponding, backwater, urban, and coastal.

- **Riverine flooding** occurs along a river or smaller stream. It is the result of runoff from heavy rainfall or intensive snow or ice melt. The speed with which riverine flood levels rise and fall depends not only on the amount of rainfall, but even more on the capacity of the river itself, including the contour and land cover of its drainage basin. The smaller the river, the faster water levels rise and fall. Thus, the Mississippi River levels rise and fall slowly due to its large capacity. Generally, elongated and intensely-developed drainage basins will reach faster peak discharges and faster falls than circular-shaped and forested basins of the same area.
- **Flash flooding** occurs when locally intense precipitation inundates an area in a short amount of time, resulting in local stream flow and drainage capacity being overwhelmed.

- **Ponding** occurs when concave areas (e.g., parking lots, roads, and clay-lined natural low areas) collect water and are unable to drain.
- **Backwater flooding** occurs when water slowly rises from a normally unexpected direction where protection has not been provided. A model example is the flooding that occurred in LaPlace during Hurricane Isaac in 2012. Although the town was protected by a levee on the side facing the Mississippi, floodwaters from Lake Maurepas and Lake Pontchartrain crept into the community on the side of town opposite the Mississippi River.
- **Urban flooding** is similar to flash flooding but is specific to urbanized areas. It takes place when storm water drainage systems cannot keep pace with heavy precipitation, and water accumulates on the surface. Most urban flooding is caused by slow-moving thunderstorms or torrential rainfall.
- **Coastal flooding** can appear similar to any of the other flood types, depending on its cause. It occurs when normally dry coastal land is flooded by seawater, but may be caused by direct inundation (when the sea level exceeds the elevation of the land), overtopping of a natural or artificial barrier, or the breaching of a natural or artificial barrier (i.e., when the barrier is broken down by the sea water). Coastal flooding is typically caused by storm surge, tsunamis, and gradual sea level rise.

In West Carroll Parish, all six types of flooding have historically been observed. For purposes of this assessment, ponding, flash flooding, and urban flooding are considered to be flooding as a result of storm water from heavy precipitation thunderstorms.

Based on stream gauge levels and precipitation forecasts, the National Weather Service (NWS) posts flood statements, watches, and warnings. The NWS issues the following weather statements with regard to flooding:

- **Flood Categories**
 - Minor Flooding: Minimal or no property damage, but possibly some public threat.
 - Moderate Flooding: Some inundation of structures and roads near streams. Some evacuations of people and/or transfer of property to higher elevations.
 - Major Flooding: Extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations.
 - Record Flooding: Flooding which equals or exceeds the highest stage or discharge at a given site during the period of record keeping.
- **Flood Warning**
 - Issued along larger streams when there is a serious threat to life or property.
- **Flood Watch**
 - Issued when current and developing hydro meteorological conditions are such that there is a threat of flooding, but the occurrence is neither certain nor imminent.

Floods are measured mainly by probability of occurrence. A 10-year flood event, for example, is an event of small magnitude (in terms of stream flow or precipitation), but with a relatively high annual probability of recurrence (10%). A 100-year flood event is larger in magnitude, but it has a smaller chance of

recurrence (1%). A 500-year flood is significantly larger than both a 100-year event and a 10-year event, but it has a lower probability than both to occur in any given year (0.2%). It is important to understand that an X-year flood event does not mean an event of that magnitude occurs only once in X years. Instead, it just means that on average, we can expect a flood event of that magnitude to occur once every X years. Given that such statistical probability terms are inherently difficult for the general population to understand, the Association of State Floodplain Managers (ASFPM) promotes the use of more tangible expressions of flood probability. As such, the ASFPM also expresses the 100-year flood event as having a 25% chance of occurring over the life of a 30-year mortgage.

It is essential to understand that the magnitude of an X-year flood event for a particular area depends on the source of flooding and the area's location. The size of a specific flood event is defined through historic data of precipitation, flow, and discharge rates. Consequently, different 100-year flood events can have very different impacts. The 100-year flood event in two separate locations have the same likelihood to occur, but they do not necessarily have the same magnitude. For example, a 100-year event for the Mississippi River means something completely different in terms of discharge values (ft^3/s) than for the Amite River. Not only are the magnitudes of 100-year events different between rivers, they can be different along any given river. A 100-year event upstream is different from one downstream due to the variation of river characteristics (volume, discharge, and topography). As a result, the definition of what constitutes a 100-year flood event is specific to each location, river, and time, since floodplain and river characteristics temporally fluctuate. Finally, it is important to note that each flood event is unique. Two hypothetical events at the same location, given the same magnitude of stream flow, may still produce substantially different impacts if there were different antecedent moisture characteristics, different times of day of occurrence (which indicates the population's probable activities at the flood's onset), or other characteristic differences.

The 100-year flood event is of particular significance since it is the regulatory standard that determines the obligation (or lack thereof) to purchase flood insurance. Flood insurance premiums are set depending on the flood zone, as modeled by National Flood Insurance (NFIP) Rate Maps. The NFIP and FEMA suggest insurance rates based on Special Flood Hazard Areas (SFHAs), as diagrammed in [Figure 2-9](#).

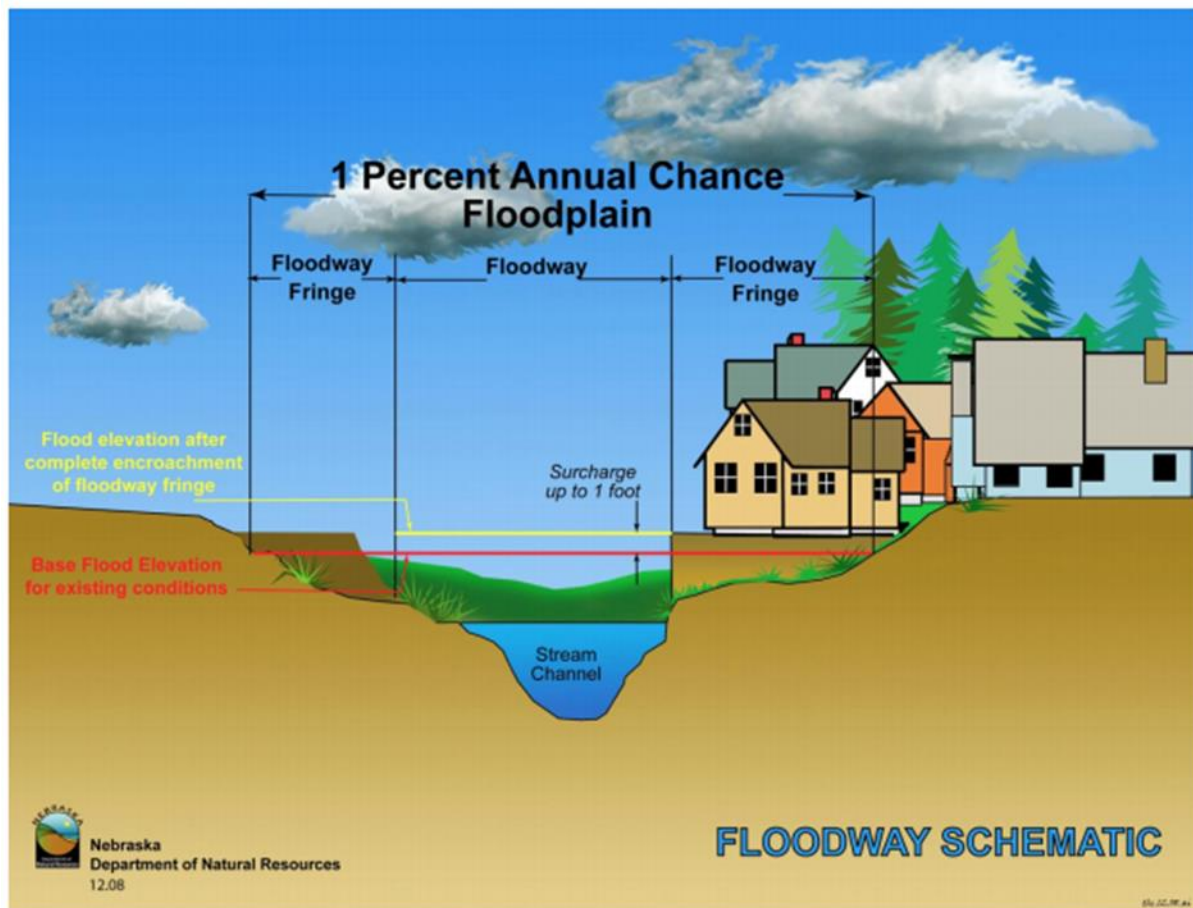


Figure 2-9: Schematic of 100-Year Floodplain. The Special Flood Hazard Area (SFHA) extends to the end of the floodway fringe.

(Source: Nebraska Department of Natural Resources)

A SFHA is the land area covered by the floodwaters of the base flood (red line in *Figure 2-9*), where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies.

Property Damage

The depth and velocity of flood waters are the major variables in determining property damage. Flood velocity is important because the faster water moves, the more pressure it puts on a structure and the more it will erode stream banks and scour the earth around a building's foundation. In a few situations, deep and fast moving waters can push a building off its foundation. Structural damage can also be caused by the weight of standing water (hydrostatic pressure).

Another threat to property from a flood is called "soaking". When soaked, many materials change their composition or shape. Wet wood will swell, and if dried too quickly, will crack, split, or warp. Plywood can come apart and gypsum wallboard can deteriorate if it is bumped before it has time to completely dry. The longer these materials are saturated, the more moisture, sediment, and pollutants they absorb.

Soaking can also cause extensive damage to household goods. Wooden furniture may become warped, making it unusable, while other furnishings such as books, carpeting, mattresses, and upholstery usually are not salvageable. Electrical appliances and gasoline engines will flood, making them worthless until they are professionally dried and cleaned.

Many buildings that have succumbed to flood waters may look sound and unharmed after a flood, but water has the potential to cause severe property damage. Any structure that experiences a flood should be stripped, cleaned, and allowed to dry before being reconstructed. This can be an extremely expensive and time consuming effort.

Repetitive Loss Properties

Repetitive loss structures are structures covered by a contract for flood insurance made available under the NFIP that:

- a. Have incurred flood-related damage on 2 occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and
- b. At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.

Severe repetitive loss (SRL) is defined by the Flood Insurance Reform Act of 2004 and updated in the Biggert-Waters Flood Insurance Reform Act of 2012. For a property to be designated SRL, the following criteria must be met:

- a. Is covered under a contract for flood insurance made available under the NFIP; and
- b. Has incurred flood related damage –
 - 1) For which 4 or more separate claims payments have been made under flood insurance coverage with the amount of each claim exceeding \$5,000 and with the cumulative amount of such claims payments exceeding \$20,000; or
 - 2) For which at least 2 separate claims payments have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.

Repetitive loss properties for West Carroll Parish are provided below:

Table 2-12 : Repetitive Loss Structures for West Carroll Parish

Jurisdiction	Number of Structures	Residential	Commercial	Government	Total Claims	Total Claims Paid	Average Claim Paid
West Carroll Parish (Unincorporated)	0	0	0	0	0	0	\$0
Epps	1	1	0	0	5	\$111,178	\$22,236
Forest	0	0	0	0	0	\$0	\$0
Kilbourne	0	0	0	0	0	\$0	\$0
Oak Grove	0	0	0	0	0	\$0	\$0
Pioneer	0	0	0	0	0	\$0	\$0
Total	1	1	0	0	5	\$111,178	\$22,236

The one repetitive loss structure located in West Carroll Parish was able to be geocoded to provide an overview of where the repetitive loss structures were located throughout the parish. [Figure 2-10](#) shows the approximate location of the structure, while [Figure 2-11](#) shows where the highest concentration of repetitive loss structures are located.

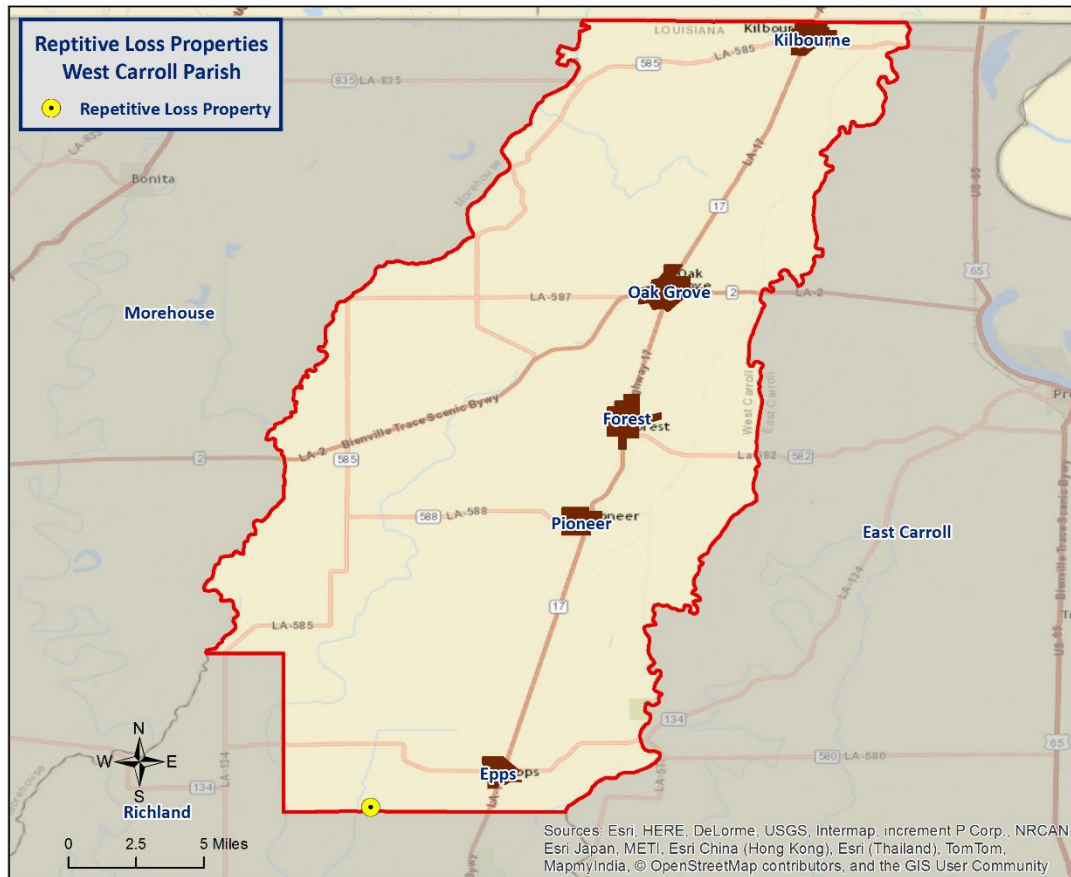


Figure 2-10: Repetitive Loss Properties in West Carroll Parish

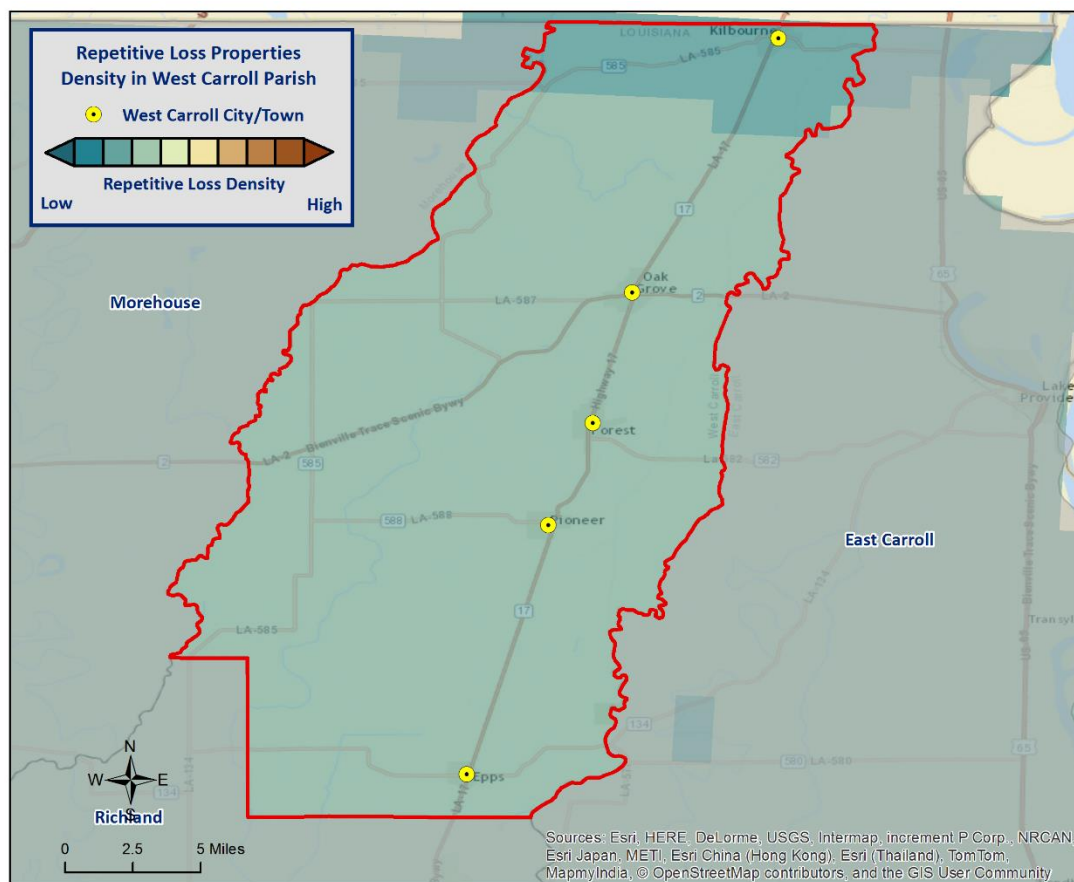


Figure 2-11: Repetitive Loss Property Densities in West Carroll Parish

National Flood Insurance Program

Flood insurance statistics indicate that West Carroll Parish has 135 flood insurance policies with the NFIP, with total annual premiums of \$68,006. West Carroll Parish and the villages of Epps and Pioneer are all participants in the NFIP. West Carroll Parish and each of the incorporated jurisdictions will continue to adopt and enforce floodplain management requirements, including regulating new construction in Special Flood Areas, and will continue to monitor activities including local requests for new map updates. Flood insurance statistics and additional NFIP participation details for West Carroll Parish are provided in the tables to follow.

Table 2-13: Summary of NFIP Policies for West Carroll Parish

Location	No. of Insured Structures	Total Insurance Coverage Value	Annual Premiums Paid	No. of Insurance Claims Filed Since 1978	Total Loss Payments
West Carroll Parish (Unincorporated)	130	\$20,578,100	\$66,195	18	\$286,809
Epps	4	\$471,000	\$1,477	1	\$8,223
Forest	0	\$0	\$0	0	\$0
Kilbourne	0	\$0	\$0	0	\$0
Oak Grove	0	\$0	\$0	0	\$0
Pioneer	1	\$175,000	\$334	0	\$0
Total	135	\$21,224,100	\$68,006	19	\$295,032

Table 2-14: Summary of Community Flood Maps for West Carroll Parish

CID	Community Name	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Date Joined the NFIP	Tribal
220243	West Carroll (Unincorporated)	6/17/1977	3/1/1987	3/1/1987 (L)	3/1/1987	No
220283	Epps, Village of	6/4/1976	3/1/2010	3/1/2010	3/1/2010	No
220286	Forest, Village of	11/26/1976	-	(NSFHA)	2/6/2009	No
220342	Oak Grove, Town of	5/21/1976	-	(NSFHA)	8/18/1997	No
220244	Pioneer, Village of	6/4/1976	-	(NSFHA)	7/11/1997	No

According to the Community Rating System (CRS) list of eligible communities dated June 1, 2014, none of the jurisdictions within the West Carroll Parish planning area participate in the CRS.

Threat to People

Just as with property damage, depth and velocity are major factors in determining the threat posed to people by flooding. It takes very little depth or velocity for flood waters to become dangerous. A car will float in less than two feet of moving water, and can be swept downstream into deeper waters, trapping the passengers within the vehicle. Victims of flooding have often put themselves in perilous situations by entering flood waters that they believe to be safe, or by ignoring travel advisories.

Major health concerns are also associated with floods. Flood waters can transport materials such as dirt, oil, animal waste, and chemicals (e.g., farm, lawn and industrial) that may cause illnesses of various degrees when coming in contact with humans. Flood waters can also infiltrate sewer lines and inundate wastewater treatment plants, causing sewage to backup and creating a breeding ground for dangerous bacteria. This infiltration may also cause water supplies to become contaminated and undrinkable.

Flooding in West Carroll Parish

By definition, flooding is caused when an area receives more water than the drainage system can convey. The following is a synopsis of the different types of flooding that West Carroll Parish experiences.

Flash Flooding: Flash floods are characterized by a rapid rise in water level, high velocity, and large amounts of debris. They are capable of tearing out trees, undermining buildings and bridges, and scouring new channels. Major factors in flash flooding are the high intensity and short duration of rainfall and the steepness of watershed and stream gradients.

Local Drainage or High Groundwater Levels: Local heavy precipitation may produce flooding in areas other than delineated floodplains or along recognizable drainage channels. If local conditions cannot accommodate intense precipitation through a combination of infiltration and surface runoff, water may accumulate and cause flooding problems.

Fluctuating Lake Levels: Water levels in U.S. lakes can fluctuate on a short-term, seasonal basis or on a long-term basis over periods of months or years. Heavy seasonal rainfall can cause high lake levels for short periods of time. Not only does this cause the lake levels to rise, but it prevents natural drainage and causes flooding. An example of this is Lakes Maurepas and Pontchartrain, as well as Lac des Allemands.

Riverine Flooding: Over-bank flooding of rivers and streams is the most common type of flood event. Riverine floodplains range from narrow, confined channels in the steep valleys of hilly and mountainous areas to wide, flat areas in the plains states and low-lying coastal regions. In relatively flat floodplains, areas may remain inundated for days or even weeks, but floodwaters are typically slow moving and relatively shallow, and may accumulate over long periods. Flooding in large rivers usually results from large-scale weather systems that generate prolonged rainfall over wide areas.

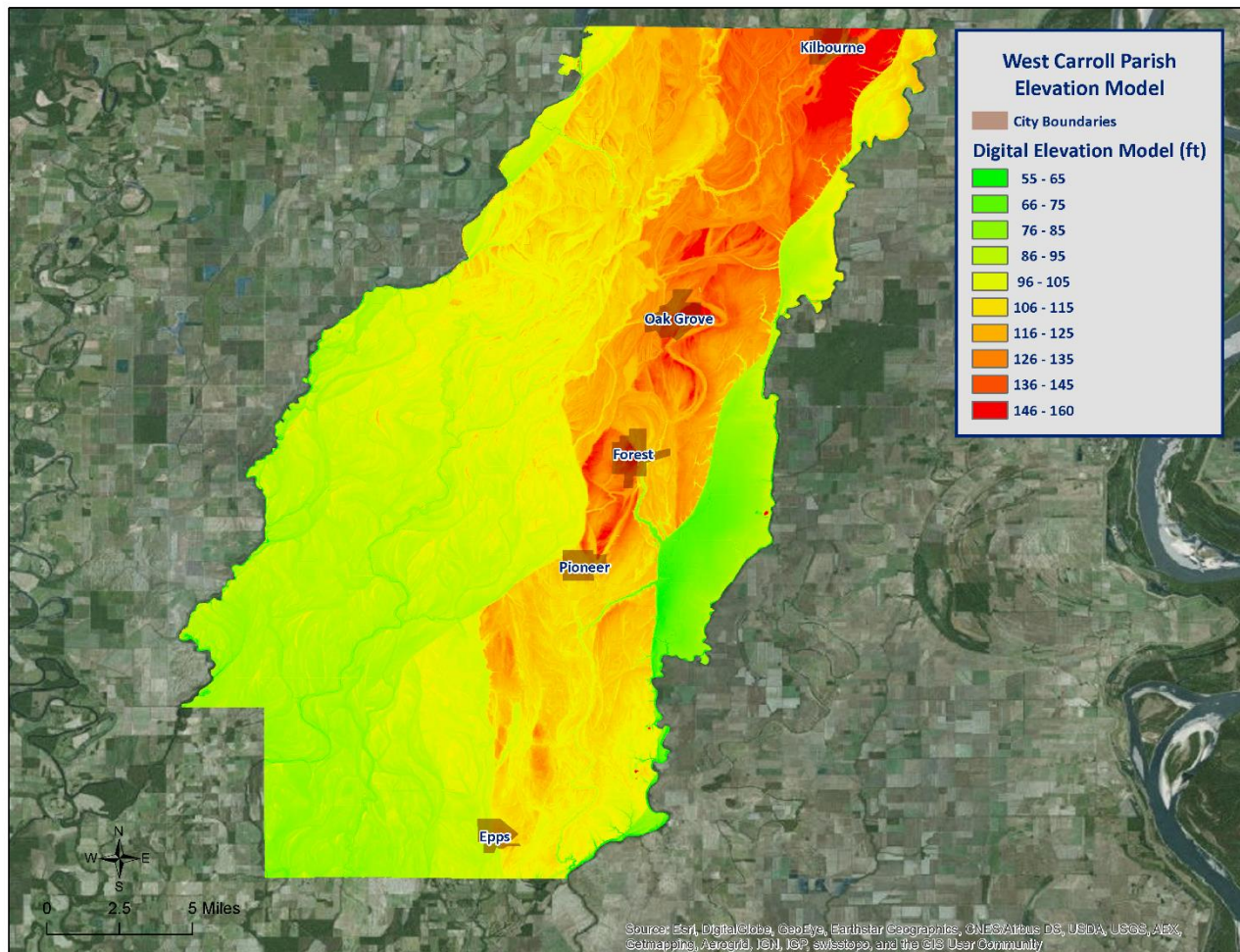


Figure 2-12: Elevation throughout West Carroll Parish

Looking at the digital elevation model (DEM) in [Figure 2-12](#) for West Carroll Parish is instructive in visualizing where the low lying and high risk areas are for the parish. The most obvious landform is the Macon Ridge that extends west of Bayou Macon from Arkansas to Franklin Parish. The contour of the land slopes from north to south and east to west. Elevations on the western side of the parish are on average 20 feet lower than the eastern side. Elevations in the southern part of the parish are 90 to 95 feet above mean sea level, and at the Arkansas state line, they are approximately 115 to 120 feet above mean sea level.

Location

West Carroll Parish has experienced significant flooding in its history and can expect more in the future. West Carroll Parish lies wholly within the Tensas Basin. Most of the parish lies on the Macon Ridge and is bounded by Bayou Macon on the east and on the west by Boeuf River. Drainage is generally north to south. The Boeuf River, Colewa Creek, and Bayou Macon are the major drainage outlets. Colewa Creek drains approximately 60% of the parish. Boeuf River flows into the Ouachita River and Bayou Macon flows into the Tensas River. West Carroll Parish is mainly impacted by riverine flooding and localized drainage problems, resulting in pockets of backwater flooding where water moving from north to south from higher to lower elevations does not flow adequately.

Below are maps showing the areas within West Carroll Parish and the Village of Epps that are located within flood zones. There are currently no flood insurance rate maps (FIRM) for the town of Oak Grove, nor for the villages of Pioneer, Kilbourne, and Forest.

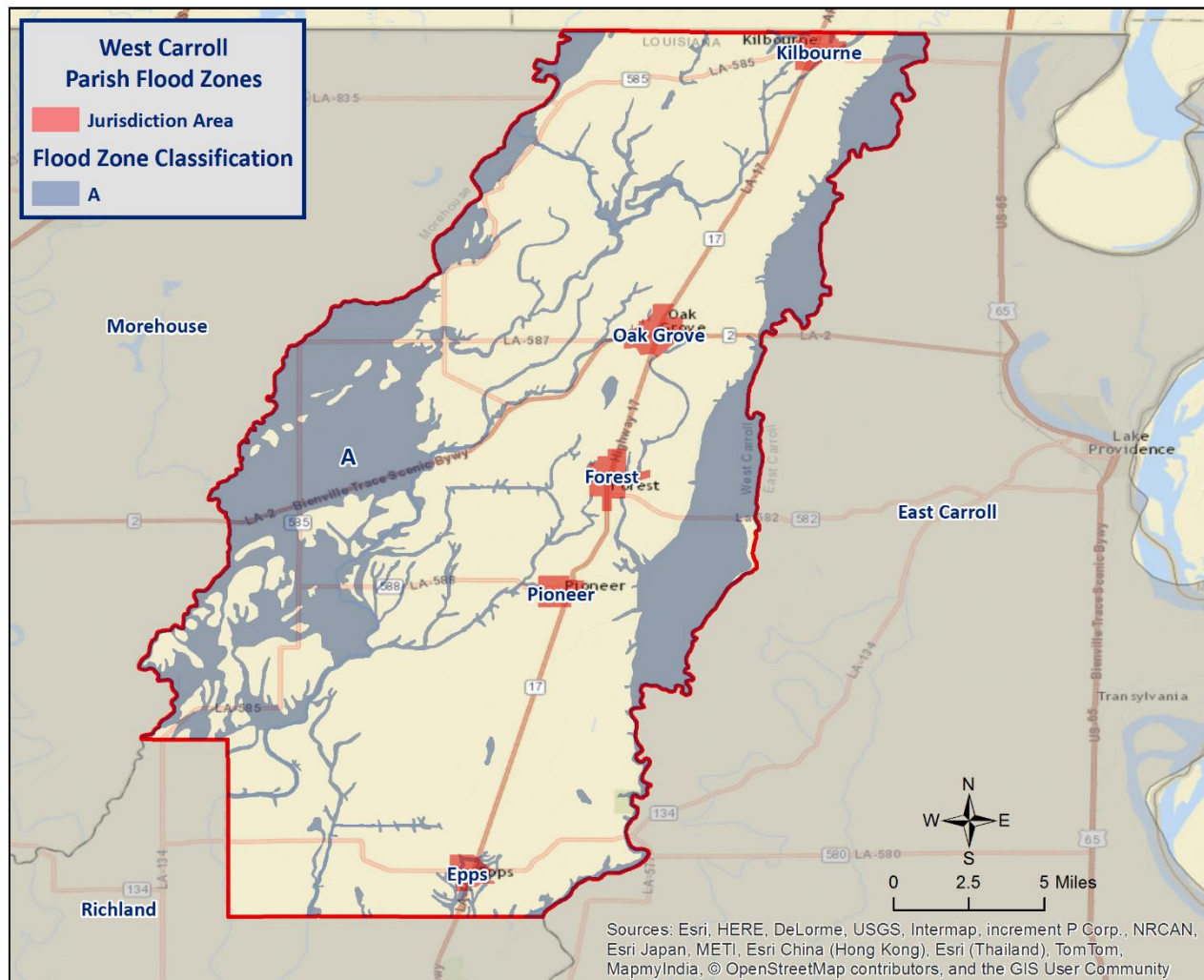


Figure 2-13: West Carroll Parish Areas within the Flood Zones

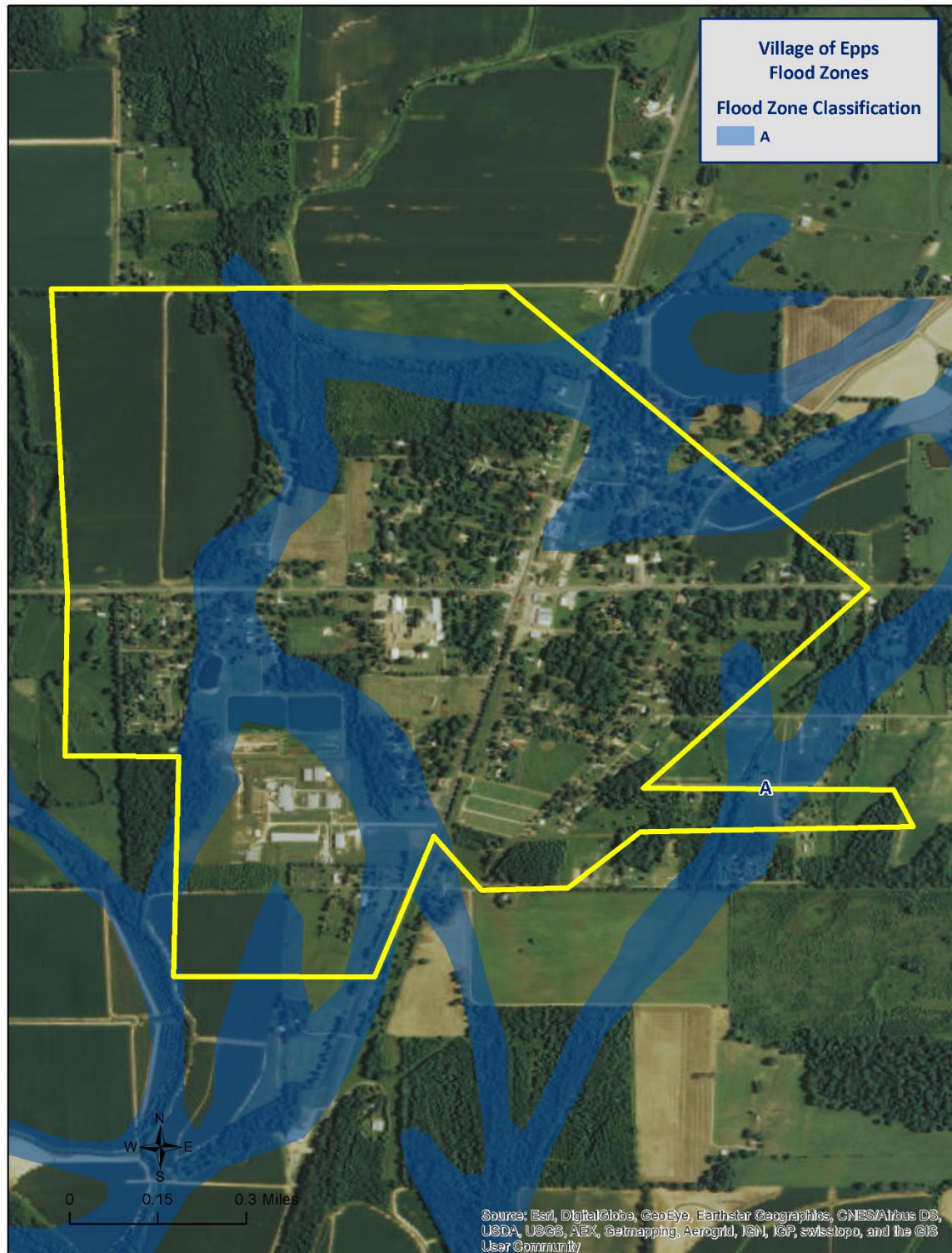


Figure 2-14: Village of Epps Areas within the Flood Zones

Previous Occurrences and Extents

Historically, there have been 12 flooding events that have created significant flooding in West Carroll Parish between 1989 and 2014. Below is a brief synopsis of the 5 flooding events that have occurred since 2009, including those that have occurred since the parish's last planning update.

Table 2-15: Historical Floods in West Carroll Parish with Locations from 2009 - 2014

Date	Extents	Type of Flooding	Estimated Damages	Location
October 7, 2009	Heavy rain and thunderstorms cause flash flooding. Rain totals were between 4 and 5 inches, causing approximately 1 inch of water to cover roadways.	Flash Flood	\$3,000	EPPS
September 27, 2011	Eastward moving storms caused a few roads to be inundated with flood waters and impassable.	Flash Flood	\$10,000	CHICKASAW
March 11, 2012	Showers and thunderstorms developed in association with a frontal system. Rain from storms caused flooding on Hill Church Road and Armfield Road.	Flash Flood	\$0	OAK GROVE
April 11, 2013	Minor street flooding occurred in the communities of Oak Grove and Pioneer areas.	Flash Flood	\$0	OAK GROVE AND PIONEER AREAS
October 31, 2013	A band of heavy rains caused minor flooding on Skinner Lane.	Flash Flood	\$0	OAK GROVE

Worst-case scenarios are based on previous flood events that have impacted West Carroll Parish. Storm water excesses and riverine flooding primarily affect the low lying areas of the parish, and flood depths of up to 3 feet can be expected in the unincorporated areas of the parish. The villages of Epps, Pioneer, Kilbourne, and Forest, as well as the town of Oak Grove, can expect minor street flooding with flood depths of approximately 1 foot in the future.

Frequency / Probability

While other parts of this plan, along with the state's Hazard Mitigation Plan, have relied on the SHELUS database to provide the annual probability, due to West Carroll Parish having multiple jurisdictions, it was necessary to assess the historical data found in the National Climatic Data Center for West Carroll Parish and its jurisdictions to properly determine probability for future flood events. The table on the following page shows the probability and return frequency for each jurisdiction.

Table 2-16: Flood Annual Probabilities for West Carroll Parish

Jurisdiction	Annual Probability	Return Frequency
West Carroll Parish (Unincorporated)	36%	2 – 3 years
Epps	32%	3 – 4 years
Forest	24%	4 – 5 years
Kilbourne	28%	3 – 4 years
Oak Grove	40%	2 – 3 years
Pioneer	32%	3 – 4 years

Based on historical record, the overall probability of a flooding event for the entire West Carroll Parish planning area is 48%, with 12 events occurring over a 25 year period. Based on the state's Hazard Mitigation Plan and the amount of significant flooding events that have taken place throughout the parish, the West Carroll Parish planning area can anticipate having less than one flooding event every 2 years.

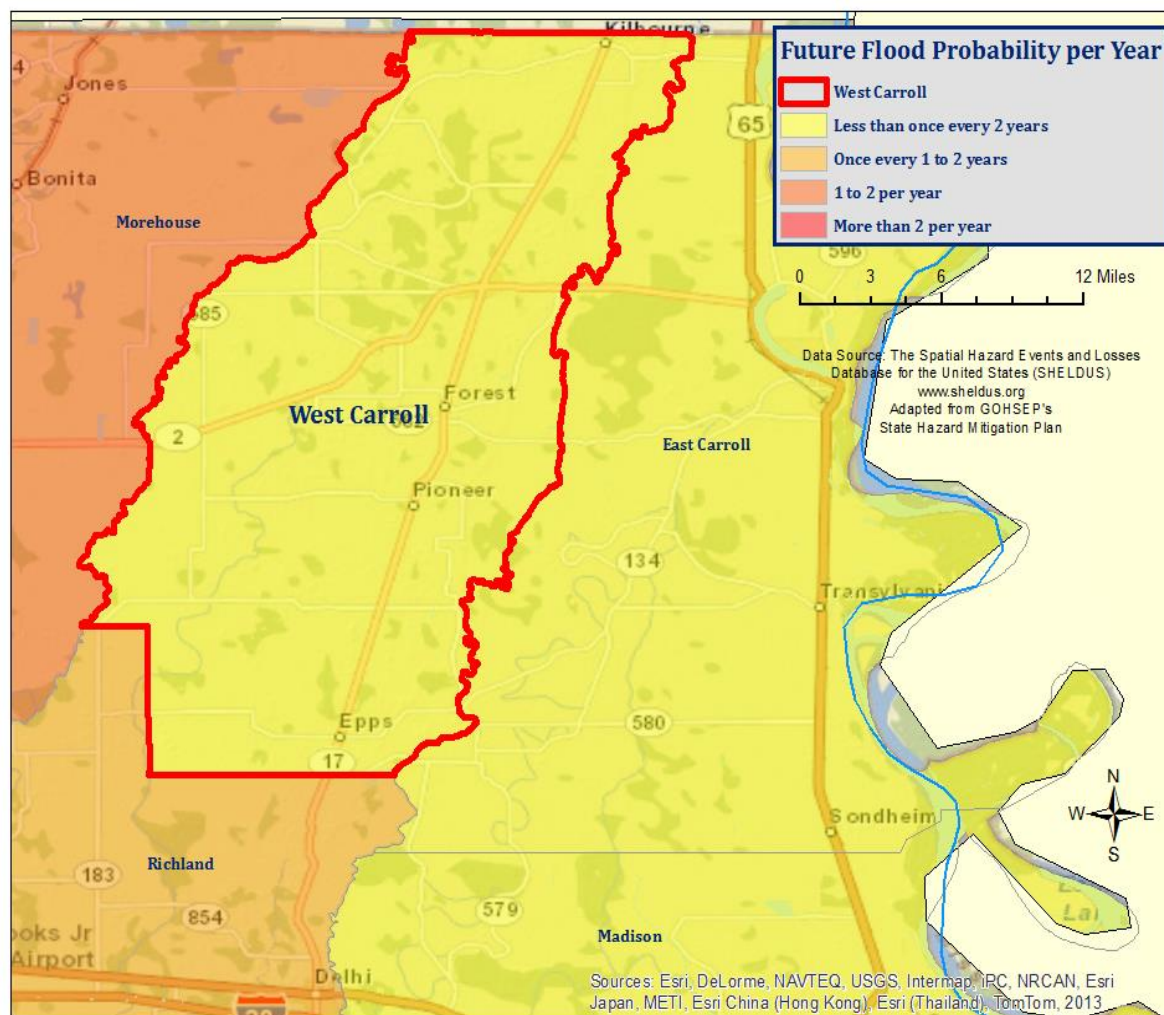


Figure 2-15: Flood Probability for West Carroll Parish

Estimated Potential Losses

Using the Hazus 2.2 Flood Model, along with the parish DFIRM, the 100-year flood scenario was analyzed to determine losses from this worst-case scenario. *Table 2-17* shows the total economic losses that would result from this occurrence.

*Table 2-17: Estimated Losses in West Carroll Parish from a 100-Year Flood Event
(Source: Hazus 2.2)*

Jurisdiction	Estimated Total Losses from 100-Year Flood Event
West Carroll Parish (Unincorporated)	\$2,442,000
Epps	\$0
Forest	\$0
Kilbourne	\$0
Oak Grove	\$0
Pioneer	\$0
Total	\$2,442,000

The Hazus 2.2 Flood Model also provides a breakdown by jurisdiction for seven primary sectors (Hazus occupancy) throughout the parish. The losses for each jurisdiction by sector are listed in the tables below.

*Table 2-18: Estimated 100-Year Flood Losses for Unincorporated West Carroll Parish by Sector
(Source: Hazus 2.2)*

West Carroll Parish (Unincorporated)	Estimated total Losses from 100 Year Flood Event
Agricultural	\$66,000
Commercial	\$193,000
Government	\$74,000
Industrial	\$75,000
Religious / Non-Profit	\$164,000
Residential	\$1,870,000
Schools	\$0
Total	\$2,442,000

Threat to People

The total population within the parish that is susceptible to a flood hazard are shown in the table below.

*Table 2-19: Vulnerable Populations Susceptible to a 100-Year Flood Event
(Source: Hazus 2.2)*

Number of People Exposed to Flood Hazards			
Location	# in Community	# in Hazard Area	% in Hazard Area
West Carroll Parish (Unincorporated)	8,096	1,960	24.2%
Epps	854	0	0.0%
Forest	355	0	0.0%
Kilbourne	416	0	0.0%
Oak Grove	1,727	0	0.0%
Pioneer	156	0	0.0%
Total	11,604	1,960	16.9%

The Hazus 2.2 Flood Model was also extrapolated to provide an overview of vulnerable populations throughout the jurisdictions in the tables below:

*Table 2-20: Vulnerable Populations Susceptible to a 100-Year Flood Event in Unincorporated West Carroll Parish
(Source: Hazus 2.2)*

West Carroll Parish (Unincorporated)		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	1,960	24.2%
Persons Under 5 Years	118	6.0%
Persons Under 18 Years	472	24.1%
Persons 65 Years and Over	345	17.6%
White	1,609	82.1%
Minority	351	17.9%

Vulnerability

See Appendix C for parish and municipality buildings that are susceptible to flooding due to proximity within the 100-year floodplain.

Thunderstorms

The term “thunderstorm” is usually used as a catch-all term for several kinds of storms. Here, “thunderstorm” is defined to include any precipitation event in which thunder is heard or lightning is seen. Thunderstorms are often accompanied by heavy rain and strong winds, and depending on conditions, occasionally by hail or snow. Thunderstorms form when humid air masses are heated, which causes them to become convectively unstable. Consequently, the air masses rise. Upon rising, the air masses’ water vapor condenses into liquid water and/or deposits directly into ice when they rise sufficiently to cool to the dew-point temperature.

Thunderstorms are classified into four main types (single-cell, multi-cell, squall line, and supercell), depending on the degree of atmospheric instability, the change in wind speed with height (called wind shear), and the degree to which the storm’s internal dynamics are coordinated with those of adjacent storms. There is no such interaction for single-cell thunderstorms, but there is significant interaction with clusters of adjacent thunderstorms in multi-cell thunderstorms, and with a linear “chain” of adjacent storms in squall line thunderstorms. Though supercell storms have no significant interactions with other storms, they have very well-organized and self-sustaining internal dynamics, which allows them to be the longest-lived and most severe of all thunderstorms.

The life of a thunderstorm proceeds through three stages: the developing (or cumulus) stage, the mature stage, and the dissipation stage. During the developing stage, the unstable air mass is lifted as an updraft into the atmosphere. This sudden lift rapidly cools the moisture in the air mass, releasing latent heat as condensation and/or deposition occurs, which warms the surrounding environment, thus making it less dense than the surrounding air. This process intensifies the updraft and creates a localized lateral rush of air from all directions into the area beneath the thunderstorm to feed continued updrafts. At the mature stage, the rising air is accompanied by downdrafts caused by the shear of falling rain (if melted completely), or hail, freezing rain, sleet, or snow (if not melted completely). The dissipation stage is characterized by the dominating presence of the downdraft as the hot surface that gave the updrafts their buoyancy is cooled by precipitation. During the dissipation stage, the moisture in the air mass largely empties out.

The Storm Prediction Center, in conjunction with the National Weather Service (NWS), has the ability to issue advisory messages based on forecasts and observations. The following are the advisory messages that may be issued, along with definitions of each:

- *Severe Thunderstorm Watch:* Issued to alert people to the possibility of a severe thunderstorm developing in the area. Expected time frame for these storms is three to six hours.
- *Severe Thunderstorm Warning:* Issued when severe thunderstorms are imminent. This warning is highly localized and covers parts of one to several parishes (counties).

A variety of hazards might be produced by thunderstorms, including lightning, hail, tornadoes or waterspouts, flash floods, and high-speed winds called downbursts. Nevertheless, given all of these

criteria, the National Oceanic and Atmospheric Administration (NOAA) characterizes a thunderstorm as severe when it produces one or more of the following:

- Hail of 1 inch in diameter or larger
- Wind gusts to 58 mph or greater
- One or more tornadoes

Tornadoes and flooding hazards have been profiled within this report; therefore, for the purpose of thunderstorms, the sub-hazards of hail, high winds, and lightning will be profiled.

Thunderstorms occur throughout Louisiana at all times of the year, although the types and severity of those storms vary greatly, depending on a wide variety of atmospheric conditions. Thunderstorms generally occur more frequently during the late spring and early summer when extreme variations exist between ground surface temperatures and upper atmospheric temperatures.

Hazard Description

Hailstorms

Hailstorms are severe thunderstorms in which balls or chunks of ice fall along with rain. Hail develops in the upper atmosphere initially as ice crystals that are bounced about by high-velocity updraft winds. The ice crystals grow through deposition of water vapor onto their surface. They then fractionally fall to a level in the cloud where the temperature exceeds the freezing point, melt partially, get caught in another updraft, whereupon re-freezing and deposition grows another concentric layer of ice. After several trips up and down the cloud, they develop enough weight to fall. The size of hailstones varies depending on the severity and size of the thunderstorm. Higher surface temperatures generally mean stronger updrafts, which allows more massive hailstones to be supported by updrafts, leaving them suspended longer. This longer suspension time results in larger hailstone sizes. The following tables display the TORRO Hailstorm Intensity Scale along with a spectrum of hailstone diameters and their everyday equivalents.

Table 2-21: TORRO Hailstorm Intensity Scale

Intensity Category		Hail Diameter (mm)	Probable Kinetic Energy	Typical Damage Impacts
H0	Hard Hail	5	0 - 20	No damage
H1	Potentially Damaging	5 - 15	>20	Slight general damage to plant, crops
H2	Significant	10 - 20	>100	Significant damage to fruit, crops, vegetation
H3	Severe	20 - 30	>300	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	25 - 40	>500	Widespread glass damage, vehicle body work
H5	Destructive	30 - 50	>800	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40 - 60		Bodywork of grounded aircraft dented, brick walls pitted
H7	Destructive	50 - 75		Severe roof damage, risk of serious injuries
H8	Destructive	60 - 90		Severe damage to aircraft bodywork
H9	Super Hailstorms	75 - 100		Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	>100		Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Table 2-22: Spectrum of Hailstone Diameters and their Everyday Equivalents
(Source: National Weather Service)

Spectrum of Hailstone Diameters	
Hail Diameter Size	Description
1/4"	Pea
1/2"	Plain M&M
3/4"	Penny
7/8"	Nickel
1" (severe)	Quarter
1 1/4"	Half Dollar
1 1/2"	Ping Pong Ball / Walnut
1 3/4"	Golf Ball
2"	Hen Egg / Lime
2 1/2"	Tennis Ball
2 3/4"	Baseball
3"	Teacup / Large Apple
4"	Softball
4 1/2"	Grapefruit
4 3/4" – 5"	Computer CD-DVD

Hailstorms can cause widespread damage to structures, automobiles, and crops. While the damage to individual structures or vehicles is often minor, the cumulative cost to communities, especially across large metropolitan areas, can be quite significant. Hailstorms can also be devastating to crops. Thus, the severity of hailstorms depends on the size of the hailstones, the length of time the storm lasts, and where it occurs.

Hail rarely causes loss of life, although large hailstones can cause bodily injury.

High Winds

In general, high winds can occur in a number of different ways, within and without thunderstorms. The Federal Emergency Management Agency (FEMA) distinguishes these as shown in *Table 2-23*.

Table 2-23: High Winds Categorized by Source, Frequency, and Duration
(Source: *Making Critical Facilities Safe from High Wind, FEMA*)

High Winds Categories			
High Wind Type	Description	Relative Frequency in Louisiana	Relative Maximum Duration in Louisiana
Straight-line Winds	Wind blowing in straight line; usually associated with intense low-pressure area	High	Few-minutes – 1 day
Downslope Winds	Wind blowing down the slope of a mountain; associated with temperature and pressure gradients	N/A	N/A
Thunderstorm Winds	Wind blowing due to thunderstorms, and thus associated with temperature and pressure gradients	High (especially in the spring and summer)	Few minutes – several hours
Downbursts	Sudden wind blowing down due to downdraft in a thunderstorm; spreads out horizontally at the ground, possibly forming horizontal vortex rings around the downdraft	Medium-to-High (~5% of all thunderstorms)	~15 – 20 minutes
Northeaster (nor'easter) Winds	Wind blowing due to cyclonic storm off the east coast of North America; associated with temperature and pressure gradients between the Atlantic and land	N/A	N/A
Hurricane Winds	Wind blowing in spirals, converging with increasing speed toward eye; associated with temperature and pressure gradients between the Atlantic and Gulf and land	Low-to-Medium	Several days
Tornado Winds	Violently rotating column of air from base of a thunderstorm to the ground with rapidly decreasing winds at greater distances from center; associated with extreme temperature gradient	Low-to-Medium	Few minutes – few hours

The only high winds of present concern are thunderstorm winds and downbursts. Straight-line winds are common but are a relatively insignificant hazard (on land) compared to other high winds. Downslope

winds are common but relatively insignificant in the mountainous areas of Louisiana where they occur. Nor'easters are cyclonic events that have at most a peripheral effect on Louisiana, and none associated with high winds. Winds associated with hurricanes and tornadoes will be considered in their respective sections.

Table 2-24 presents the Beaufort Wind Scale, first developed in 1805 by Sir Francis Beaufort, which aids in determining relative force and wind speed based on the appearance of wind effects.

Table 2-24: Beaufort Wind Scale
(Source: NOAA's SPC)

Beaufort Wind Scale			
Force	Wind (MPH)	WMO Classification	Appearance of Wind Effects on Land
			Calm, smoke rises vertically
1	1-3	Light Air	Smoke drift indicates wind direction, still wind vanes
2	4-7	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	8-12	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	13-17	Moderate Breeze	Dust, leaves, and loose paper lifted, small tree branches move
5	18-24	Fresh Breeze	Small trees in leaf begin to sway
6	25-30	Strong Breeze	Larger tree branches moving, whistling in wires
7	31-38	Near Gale	Whole trees moving, resistance felt walking against wind
8	39-46	Gale	Twigs breaking off trees, generally impedes progress
9	47-54	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	55-63	Storm	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	54-73	Violent Storm	N/A
12	74+	Hurricane	N/A

Major damage directly caused by thunderstorm winds is relatively rare, while minor damage is common, pervasive, and most noticeable when it contributes to power outages. These power outages can have major negative impacts such as increased tendency for traffic accidents, loss of revenue for businesses, increased vulnerability to fire, food spoilage, and other losses that might be sustained by a loss of power. Power outages may pose a health risk for those requiring electric medical equipment and/or air conditioning.

Lightning

Lightning is a natural electrical discharge in the atmosphere that is a by-product of thunderstorms. Every thunderstorm produces lightning. There are three primary types of lightning: intra-cloud, cloud-to-ground, and cloud-to-cloud. Cloud-to-ground lightning has the potential to cause the most damage to property and crops, while also posing as a health risk to the populace in the area of the strike.

Damage caused by lightning is usually to homes or businesses. These strikes have the ability to damage electrical equipment inside the home or business, and can also ignite a fire that could destroy homes or crops.

Lightning continues to be one of the top three storm-related killers in the United States per FEMA, but it also has the ability to cause negative long-term health effects to the individual that is struck. The table below outlines the lightning activity level which is a measurement of lightning activity.

Table 2-25: Lightning Activity Level (LAL) Grids

LAL	Cloud and Storm Development	Lightning Strikes/15 Min
1	No thunderstorms.	-
2	Cumulus clouds are common but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but light rain will occasionally reach the ground. Lightning is very infrequent.	1-8
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation. Light to moderate rain will reach the ground, and lightning is infrequent.	9-15
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than three must occur within the observation area. Moderate rain is common and lightning is frequent.	16-25
5	Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy and lightning is frequent.	>25
6	Similar to LAL 3 except thunderstorms are dry	

*Hazard Profile**Hailstorms**Location*

Because hailstorms are a climatological based hazard, the entire planning area for West Carroll Parish is equally at risk for hailstorms.

Previous Occurrences / Extents

The SHELATUS database reports 17 significant hailstorm events occurring within the boundaries of West Carroll Parish between the years of 1989-2014. According to the National Climatic Data Center (NCDC), the hailstorm diameters experienced in West Carroll Parish have ranged from 0.75 inches to 2.75 inches since 1989. The most frequently recorded hail size has been 1 inch in diameter. *Figure 2-16* displays the density of hailstorms in West Carroll Parish and adjacent parishes. Based on the NCDC dataset, *Table 2-26* provides an overview of hailstorms that have impacted the West Carroll Parish planning area since 2009. West Carroll Parish can expect to experience hail up to 2.75 inches for future events.

Table 2-26: Previous Occurrences of Hailstorms in West Carroll Parish
(Source: NCDC)

Date	Recorded Hail Size (inches)	Location
May 2, 2009	1	PIONEER
May 10, 2009	1.75	FOREST
May 10, 2009	1	OG KELLY-DUMAS AR
October 12, 2010	1.75	BEAR SKIN
October 24, 2010	1	BEAR SKIN
April 4, 2011	0.88	OG KELLY-DUMAS AR
April 4, 2011	1	OG KELLY-DUMAS AR
April 26, 2011	1	BEAR SKIN
March 2, 2012	1	OG KELLY-DUMAS AR
March 2, 2012	1.75	OG KELLY-DUMAS AR
April 5, 2012	1.75	BEAR SKIN
April 5, 2012	1	EPPS
August 9, 2012	0.88	KILBOURNE
December 8, 2012	1.75	GOODWILL
March 18, 2013	1.75	OAK GROVE
March 18, 2013	1.75	EPPS
March 23, 2013	2.75	OG KELLY-DUMAS AR
April 10, 2013	1	GOODWILL
March 28, 2014	1.25	OAK GROVE

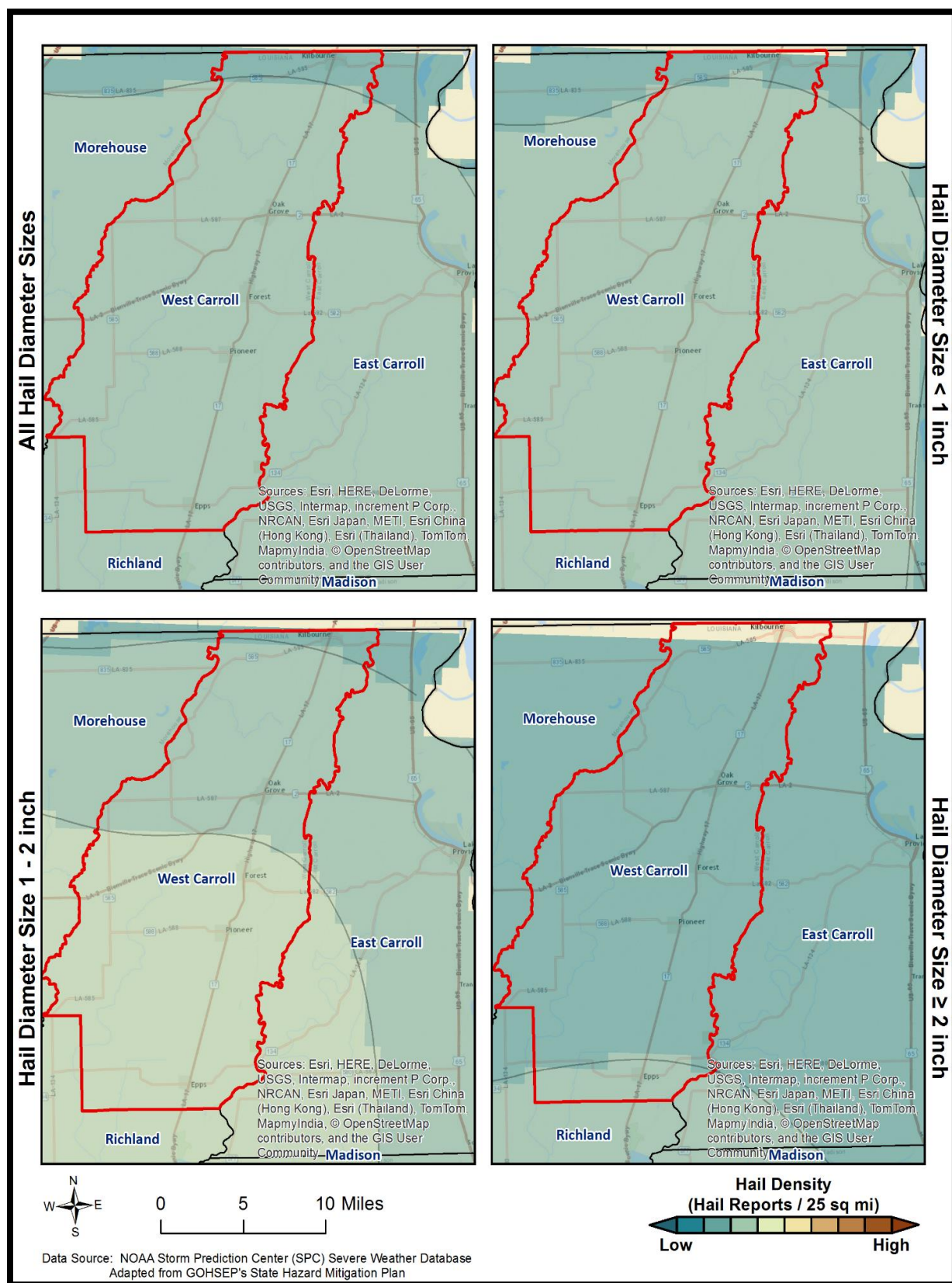


Figure 2-16 : Density of Hailstorms by Diameter from 1950-2012
(Source: State of Louisiana Hazard Mitigation Plan 2014)

Frequency

Based on historical data from SHELUS for the past 25 years, it is estimated the probability of occurrence for a significant hailstorm event is approximately 68%, with a return frequency of more than once every 2 years. The probability was determined based on a review of significant hail data that has caused damages in the last 25 years, in which West Carroll Parish has had 17 recorded events (*Figure 2-17*).

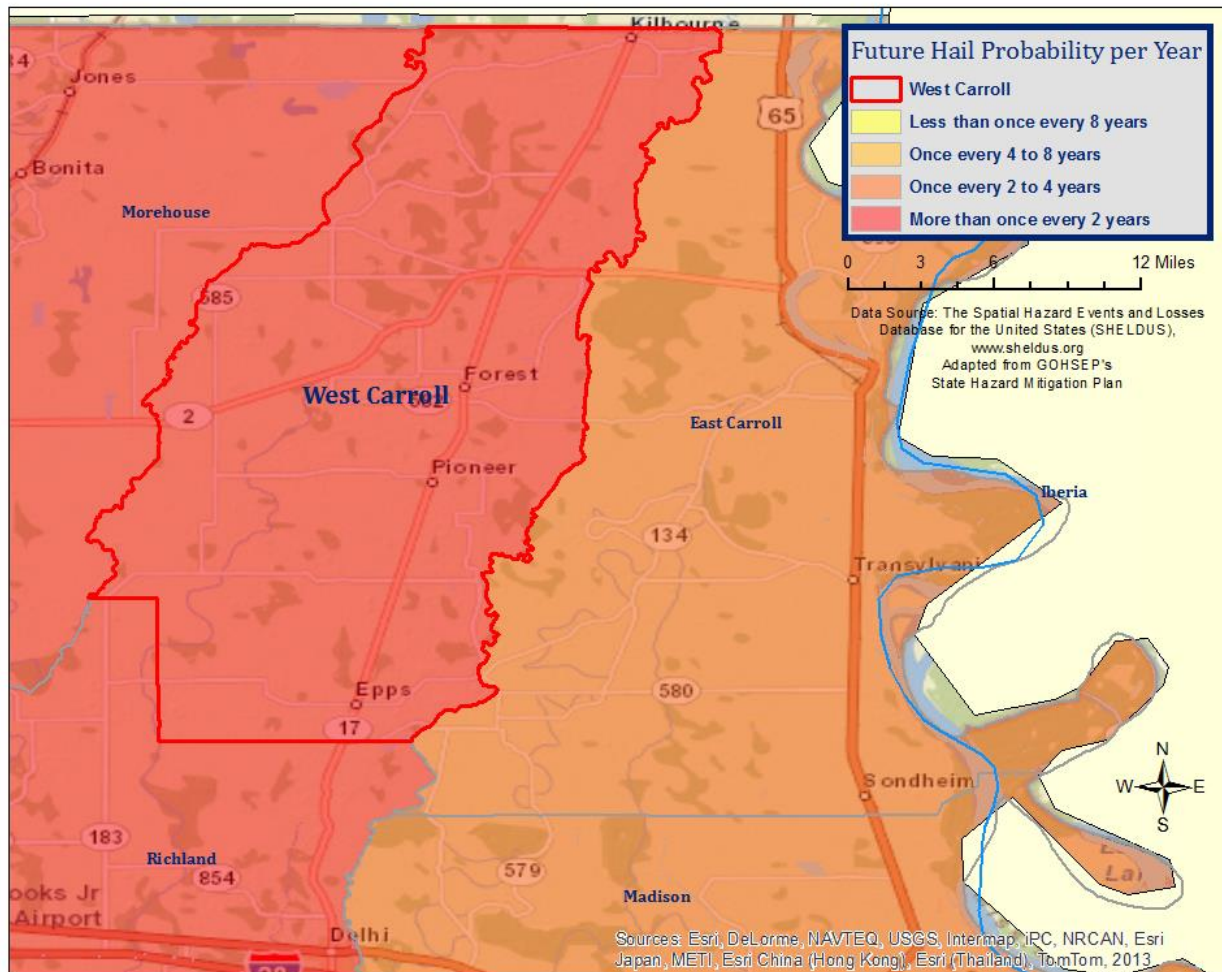


Figure 2-17: Probability of Hailstorm Events in West Carroll Parish from 1987-2012
(Source: State of Louisiana Hazard Mitigation Plan 2014)

Estimated Potential Losses

According to the SHELUS database, property damage due to hailstorms in West Carroll Parish has totaled approximately \$322,213 since 1989. A list of total damages by event can be found in *Table 2-27*. To estimate the potential losses of a hail event on an annual basis, the total damages recorded for wind events was divided by the total number of years of available wind data in SHELUS (1989 – 2014). This provides an annual estimated potential loss of \$12,889. The table on the following page provides an estimate of potential property losses for West Carroll Parish.

Table 2-27: Property Damage Caused by Hailstorms in West Carroll Parish
(Source: SHELUDS)

Date	Property Damage
April 1991	\$570
June 1994	\$262
June 1998	\$78,605
March 2000	\$33,821
April 2003	\$13,927
November 2003	\$6,330
May 2007	\$16,853
May 2009	\$43,434
March 2012	\$13,190
December 2012	\$15,220
March 2013	\$100,000

Table 2-28: Estimated Annual Property Losses in West Carroll Parish from Hailstorms

Estimated Annual Potential Losses from Hailstorms for West Carroll Parish					
Unincorporated West Carroll (69.8% of Population)	Epps (7.4% of Population)	Forest (3.1% of Population)	Kilbourne (3.6% of Population)	Oak Grove (14.9% of Population)	Pioneer (1.3% of Population)
\$8,992	\$949	\$394	\$462	\$1,918	\$173

The parish has suffered no deaths or injuries due to hailstorms from 1989 – 2014.

Vulnerability

See Appendix C for parish and municipality buildings that are susceptible to hailstorms.

High Winds

Location

Because high winds are a climatological based hazard, the entire planning area for West Carroll Parish is equally at risk for high winds.

Previous Occurrences / Extents

The SHELATUS database reports a total of 55 thunderstorm wind events occurring within the boundaries of West Carroll Parish between the years of 1989-2014. The significant thunderstorm wind events experienced in West Carroll Parish have ranged from a wind speed of 58 mph to 81 mph. West Carroll Parish can expect to receive thunderstorm winds up to 81 mph for future high wind events.

Table 2-29: Previous Occurrences for Thunderstorm High Wind Events

Location	Date	Recorded Wind Speeds (mph)	Property Damage	Crop Damage
GOODWILL	May 2, 2009	75	\$50,000	\$0
BEAR SKIN	May 2, 2009	75	\$50,000	\$0
OAK GROVE	July 16, 2009	58	\$0	\$0
PIONEER	August 22, 2010	69	\$30,000	\$0
DARNELL	October 24, 2010	60	\$3,000	\$0
PIONEER	October 24, 2010	60	\$10,000	\$0
GOODWILL	November 29, 2010	58	\$10,000	\$0
FISKE	April 15, 2011	63	\$5,000	\$0
OAK GROVE	April 15, 2011	63	\$3,000	\$0
OAK GROVE	April 26, 2011	63	\$15,000	\$0
OG KELLY-DUMAS AR	May 21, 2011	58	\$0	\$0
KILBOURNE	June 13, 2011	58	\$150,000	\$0
OG KELLY-DUMAS AR	March 2, 2012	63	\$35,000	\$0
FISKE	March 11, 2012	69	\$25,000	\$0
FOREST	April 2, 2012	69	\$100,000	\$0
EPPS	May 7, 2012	58	\$1,000	\$0
PIONEER	August 9, 2012	58	\$6,000	\$0
OAK GROVE	December 20, 2012	58	\$5,000	\$0
PIONEER	January 29, 2013	63	\$10,000	\$0
FOREST	March 23, 2013	63	\$25,000	\$0
KILBOURNE	March 28, 2014	61	\$20,000	\$0
OG KELLY-DUMAS AR	April 4, 2014	60	\$5,000	\$0
EPPS	April 14, 2014	63	\$10,000	\$0

Location	Date	Recorded Wind Speeds (mph)	Property Damage	Crop Damage
OG KELLY-DUMAS AR	April 14, 2014	58	\$1,000	\$0
PIONEER	April 14, 2014	58	\$6,000	\$0
FOREST	June 8, 2014	60	\$0	\$0
OAK GROVE	June 9, 2014	61	\$15,000	\$0
GOODWILL	October 13, 2014	58	\$750	\$0
OG KELLY-DUMAS AR	October 13, 2014	62	\$1,000	\$0

Frequency

High winds are a fairly common occurrence within West Carroll Parish, with an annual chance of occurrence calculated at 100%.

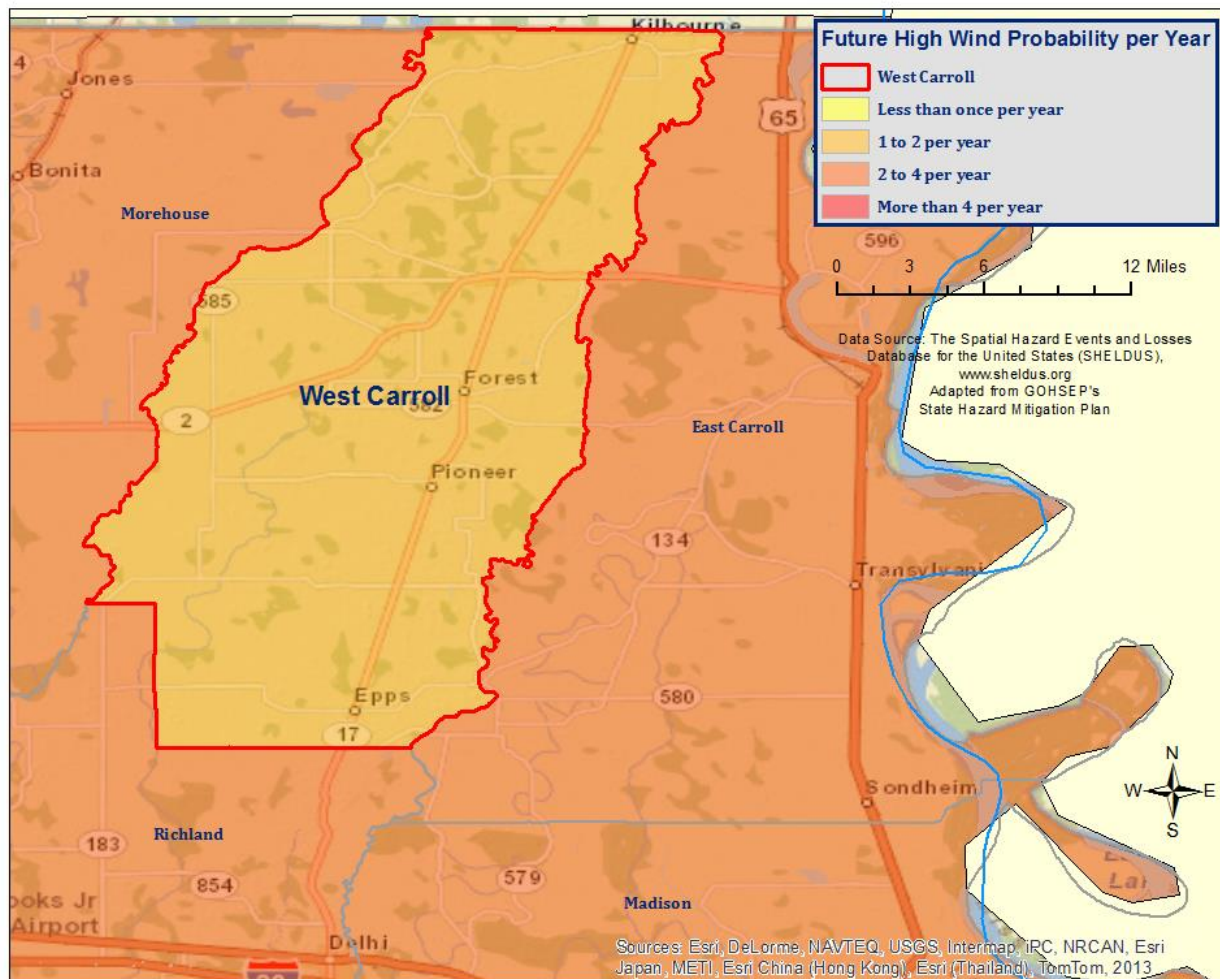


Figure 2-18: Probability of High Wind Events in West Carroll Parish and Adjacent Parishes
(Source: State of Louisiana 2014 Hazard Mitigation Plan)

Estimated Potential Losses

Since 1989, there have been 55 significant wind events that have resulted in property damages according to the SHEL DUS database. The total property damages associated with those storms have totaled \$892,851. To estimate the potential losses of a wind event on an annual basis, the total damages recorded for wind events was divided by the total number of years of available wind data in SHEL DUS (1989 – 2014). This provides an annual estimated potential loss of \$35,714. The following table provides an estimate of potential property losses for West Carroll Parish:

Table 2-30: Estimated Annual Property Losses in West Carroll Parish Resulting from Wind Damage

Estimated Annual Potential Losses from Wind for West Carroll Parish					
Unincorporated West Carroll (69.8% of Population)	Epps (7.4% of Population)	Forest (3.1% of Population)	Kilbourne (3.6% of Population)	Oak Grove (14.9% of Population)	Pioneer (1.3% of Population)
\$24,917	\$2,628	\$1,093	\$1,280	\$5,315	\$480

There have been 2 reported injuries as a result of a thunderstorm wind event over the 25 year record and no reported fatalities.

Vulnerability

See appendix C for parish and municipality buildings that are susceptible to high winds.

Lightning

Location

Like hail and high winds, lightning is a climatological based hazard and has the same probability of occurring throughout the entire planning area for West Carroll Parish.

Previous Occurrences / Extent

The SHELDUS database reports 1 lightning event occurring within the boundaries of West Carroll Parish between the years of 1989-2014. The SHELDUS database only records lightning events that cause death, injuries, crop damage, and/or property damage, so these numbers do not accurately reflect the number of lightning events in West Carroll Parish, which occur on a nearly monthly basis. The table below provides an overview of significant lightning strikes over the last five years.

Table 2-31: Previous Occurrences of Significant Lightning Strikes in West Carroll Parish from 2009 – 2014
(Source: NCDC and SHELDUS)

Location	Date	Summary	Property Damage
OG KELLY-DUMAS AR	July 16, 2009	A lightning strike occurred along Highway 586 that caused a house fire.	\$13,030

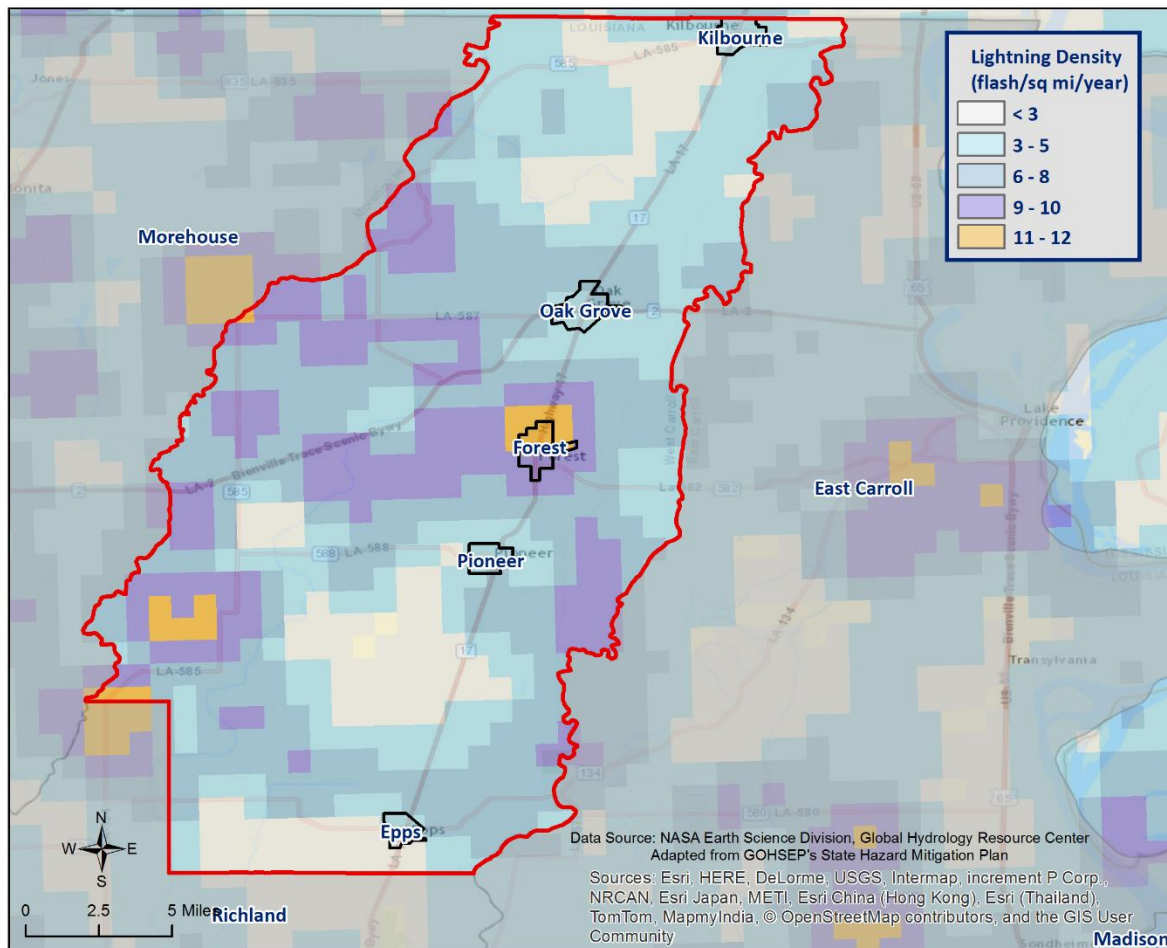


Figure 2-19: Lightning Density Reports for West Carroll Parish

Frequency

Lightning can strike anywhere and is produced by every thunderstorm, so the chance of lightning occurring in West Carroll Parish is high. However, lightning that meets the definition that is used by SHELDUS and the NCDC that actually results in damages to property and injury or death to people is a less likely event. According to the State Hazard Mitigation Plan, a major lightning strike in West Carroll Parish is likely to occur less than once every 8 years, as depicted in Figure 2-20. This is consistent with SHELDUS, which has one lightning event that has caused property damages or injuries over the last 25 years, establishing an annual probability of 4%.

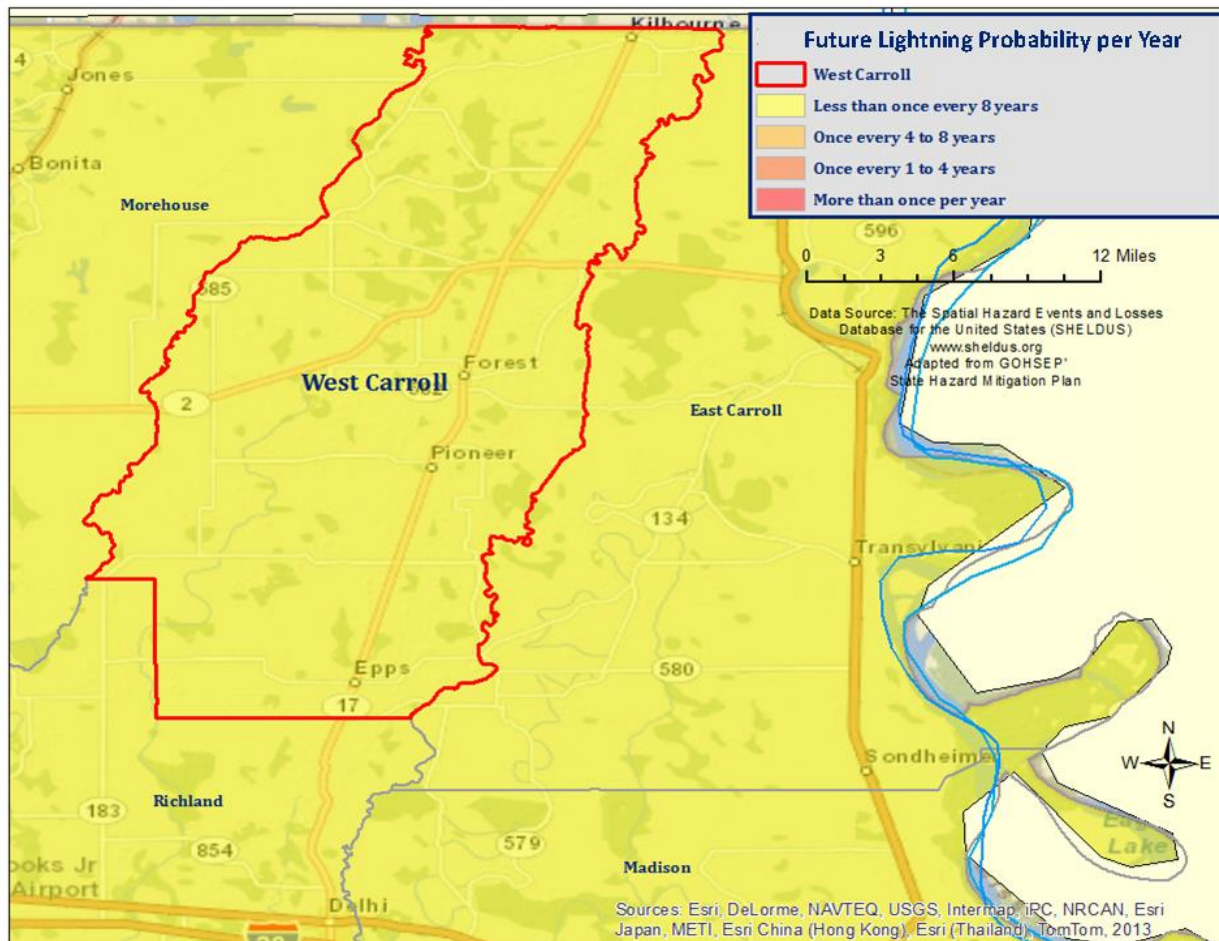


Figure 2-20: Probability of Lightning Events in West Carroll Parish and Adjacent Parishes
(Source: State of Louisiana Hazard Mitigation Plan 2014)

Estimated Potential Losses

According to the SHELDUS database, there has been one significant lightning event that has resulted in property damages since 1989. The total property damages associated with the lightning event totaled \$13,030. To estimate the potential losses of a lightning event on an annual basis, the total damages recorded for lightning events was divided by the total number of years of available major lightning strike data in SHELDUS (1989 – 2014). This provides an annual estimated potential loss of \$521. The following table provides an estimate of potential property losses for West Carroll Parish:

Table 2-32: Estimated Annual Property Losses in West Carroll Parish from Lightning

Estimated Annual Potential Losses from Lightning for West Carroll Parish					
Unincorporated West Carroll (69.8% of Population)	Epps (7.4% of Population)	Forest (3.1% of Population)	Kilbourne (3.6% of Population)	Oak Grove (14.9% of Population)	Pioneer (1.3% of Population)
\$364	\$38	\$16	\$19	\$78	\$7

There have been no reported injuries or fatalities in West Carroll Parish as a result of a lightning strikes over the 25 year record.

Vulnerability

See Appendix C for parish and municipality building exposure to lightning hazards.

Tornadoes

Tornadoes (also called twisters or cyclones) are rapidly rotating funnels of wind extending between storm clouds and the ground. For their size, tornadoes are the most severe storms, and 70% of the world's reported tornadoes occur within the continental United States, making them one of the most significant hazards that Americans face. Tornadoes and waterspouts form 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. This usually results in a counterclockwise direction in the northern hemisphere. The updraft of air in tornadoes always rotates because of wind shear (differing speeds of moving air at various heights), and it can rotate in either a clockwise or counterclockwise direction; clockwise rotations (in the northern hemisphere) will sustain the system, at least until other forces cause it to die seconds to minutes later.

Since February 1, 2007, the Enhanced Fujita (EF) Scale has been used to classify tornado intensity. The EF Scale classifies tornadoes based on their damage pattern rather than wind speed; wind speed is then derived and estimated. This contrasts with the Saffir-Simpson scale used for hurricane classification, which is based on measured wind speed. *Table 2-33* shows the EF scale in comparison with the old Fujita (F) Scale, which was used prior to February 1, 2007. When discussing past tornadoes, the scale used at the time of the hazard is used. Damage and adjustment between scales can be made using the following tables.

Table 2-33: Comparison of the Enhanced Fujita (EF) Scale to the Fujita (F) Scale

Wind speed (mph)	Enhanced Fujita Scale					
	EF0	EF1	EF2	EF3	EF4	EF5
	65-85	86-110	111-135	136-165	166-200	>200
	Fujita Scale					
	F0	F1	F2	F3	F4	F5
	<73	73-112	113-157	158-206	207-260	>261

Table 2-34: Fujita and Enhanced Fujita Tornado Damage Scale

Scale	Typical Damage
F0/EF0	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1/EF1	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2/EF2	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; light-object missiles generated; cars lifted off ground.
F3/EF3	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4/EF4	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5/EF5	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yards); trees debarked; incredible phenomena will occur.

The National Weather Service (NWS) has the ability to issue advisory messages based on forecasts and observations. The following are the advisory messages that may be issued, along with definitions of each:

- *Tornado Watch:* Issued to alert people to the possibility of a tornado developing in the area. A tornado has not been spotted but the conditions are favorable for tornadoes to occur.
- *Tornado Warning:* Issued when a tornado has been spotted or when Doppler radar identifies a distinctive “hook-shaped” area within a thunderstorm line.

Structures within the direct path of a tornado vortex are often reduced to rubble. Structures adjacent to the tornado’s path are often severely damaged by high winds flowing into the tornado vortex, known as inflow winds. It is here, adjacent to the tornado’s path, that the building type and construction techniques are critical to the structure’s survival. Although tornadoes strike at random, making all buildings vulnerable, mobile homes, homes with crawlspaces, and buildings with large spans are more likely to suffer damage.

The major health hazard from tornadoes is physical injury from flying debris, or being in a collapsed building or mobile home. Within a building, flying debris or projectiles are generally stopped by interior walls. However, if a building has no partitions, any glass, brick, or other debris blown into the interior is life threatening. Following a tornado, damaged buildings are a potential health hazard due to instability, electrical system damage, and gas leaks. Sewage and water lines may also be damaged.

Peak tornado activity in Louisiana occurs during the spring, as it does in the rest of the United States. Nearly one-third of observed tornadoes in the United States occur during April. About half of those in Louisiana, including many of the strongest, occur between March and June. Fall and winter tornadoes are less frequent, but the distribution of tornadoes throughout the year is more uniform in Louisiana than in locations farther north.

Location

While there is a significant tornado record in West Carroll Parish with actual locations, tornadoes in general are a climatological based hazard and have the same approximate probability of occurring in West Carroll Parish as all of its jurisdictions. Because a tornado has a similar probability of striking anywhere within the planning area for West Carroll Parish, all jurisdictions are equally at risk for tornadoes.

Previous Occurrences / Extent

SHELDUS reports a total of 8 tornadoes or waterspouts occurring within the boundaries of West Carroll Parish between the years of 1989-2014. The tornadoes experienced in West Carroll Parish have ranged from EF0 to EF2 on the EF scale, and ranged from F0 to F3 on the F scale. The worst case scenario that West Carroll Parish can expect in the future is an EF5 tornado.

The tornado that caused the most injuries and damage to property occurred on March 20, 1976. The F3 tornado was responsible for over \$2 million in damage and caused 32 injuries. The tornado touched down near the small town of Kilbourne, where it caused extensive damage. Seventeen homes and six

trailer homes were demolished. Eight commercial buildings, including a grocery store and a post office, as well as a new 250,000 gallon water tank were also demolished by the tornado. An additional eight homes, three churches, and a parsonage were heavily damaged. Approximately 70 buildings in Kilbourne sustained some form of damage due to the tornado. There have been no fatalities in West Carroll Parish as a result of tornadoes.

Table 2-35: Historical Tornadoes in West Carroll Parish with Locations from 1989-2014

Date	Impacts	Property Damage	Location	Magnitude
January 8, 1999	2 mile path with a width of 50 yards. Caused minor structural damage to several buildings.	\$8,390	OAK GROVE	F0
January 21, 1999	2 mile path with a width of 50 yards. Downed several trees.	\$5,593	KILBOURNE	F0
April 24, 2003	11 mile path with a width of 75 yards. Destroyed one home and caused minor damage to several mobile homes.	\$506,428	EPPS	F2
November 28, 2005	0.5 mile path with a width of 30 yards. Damaged a section of a tin roof off on a commercial building and removed the shingles from a home.	\$59,641	PIONEER	F0
February 24, 2011	6.5 mile path with a width of 75 yards. Overturned a grain truck and severely damaged the roof of a church. Overturned and damaged several mobile homes. Caused severe damage to several homes.	\$776,734	OG KELLY-DUMAS AR	EF1
April 26, 2011	4.35 mile path with a width of 880 yards. Severely damaged two grain storage bins and the siding on a volunteer fire department building. Downed several trees and powerlines.	\$258,911	DARNELL	EF2
March 11, 2012	2.6 mile path with a width of 100 yards. Caused shingle damage to several homes and	\$25,366	FISKE	EFO

Date	Impacts	Property Damage	Location	Magnitude
	downed multiple trees and powerlines.			
January 29, 2013	5.37 mile path with a width of 100 yards. Removed a roof and knocked down the walls of a home. Flipped several trailers and caused minor roof damage to numerous buildings.	\$250,000	GOODWILL	EF2

Since 2010, the year in which the last update to this hazard mitigation plan was written, West Carroll Parish has had 4 tornadoes touch down. The following is a brief synopsis of these events:

February 24, 2011 – EF1 Tornado in Oak Grove

A tornado touched down near the intersection of Louisiana Highways 585 and 835 in the northwest part of West Carroll Parish. A grain truck was overturned and significant damage occurred to the roof of a church and to the nearby parsonage. The tornado continued to travel east-northeast, causing damage to several sheds and breaking out windows in a home. Several structures including trailers and mobile homes sustained damage from the tornado. Maximum winds were estimated at approximately 95 mph.

April 26, 2011 – EF2 Tornado in Darnell

A tornado touched down in the Darnell community and tracked into East Carroll Parish before dissipating. Two grain storage buildings were severely damaged and the siding on a volunteer fire department building sustained minor damage. Numerous trees and powerlines were downed along the tornado path. Maximum winds were estimated at approximately 115 mph.

March 11, 2012 – EF0 Tornado in Fiske

A tornado touched down along Bar K Road near Fiske. The tornado passed through the community near the junction of Louisiana Highways 585 and 879. Several trees and powerlines were downed along the path of the tornado. Several homes sustained shingle damage and part of the facing was removed from a mobile home. The tornado paralleled Highway 585 for a short distance before dissipating.

January 29, 2013 – EF2 Tornado in Goodwill

Severe weather produced a tornado that touched down near the Goodwill community. The tornado removed the roof and knocked down the walls of a home. Several outbuildings were destroyed by the tornado and several travel trailers were flipped. Maximum wind speeds were estimated at 120 mph.

Frequency / Probability

Tornadoes are a sporadic occurrence within West Carroll Parish, with an annual chance of occurrence calculated at 32% based on the records for the past 25 years (1989-2014). [Figure 2-21](#) displays the density of tornado touch downs in West Carroll Parish and neighboring parishes. Based on the State Hazard

Mitigation Plan, the overall probability of a tornado touching down in West Carroll Parish is once every 2 to 4 years.

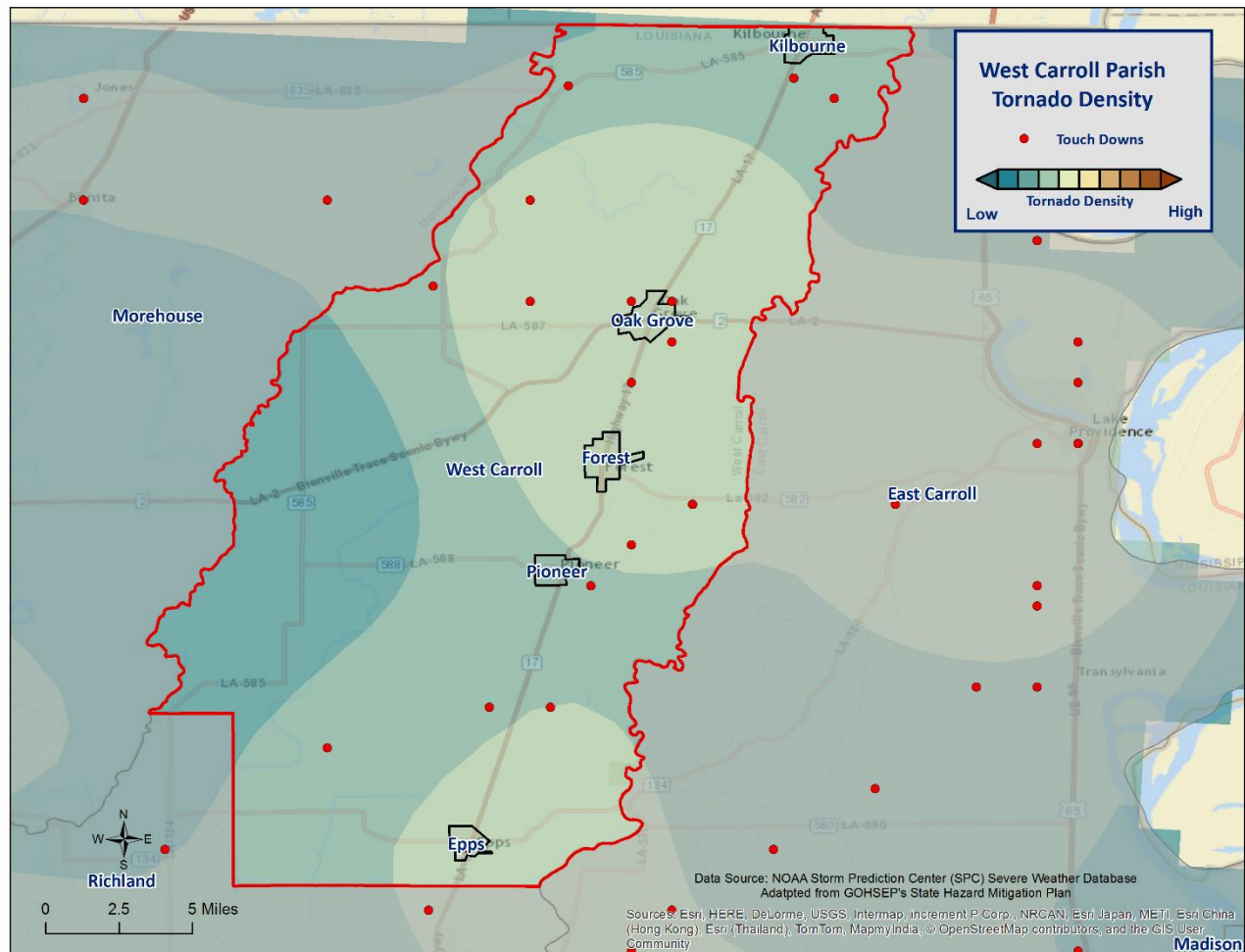


Figure 2-21: Location and Density of Tornadoes to Touchdown in West Carroll Parish
(Source: NOAA/SPC Severe Weather Database)

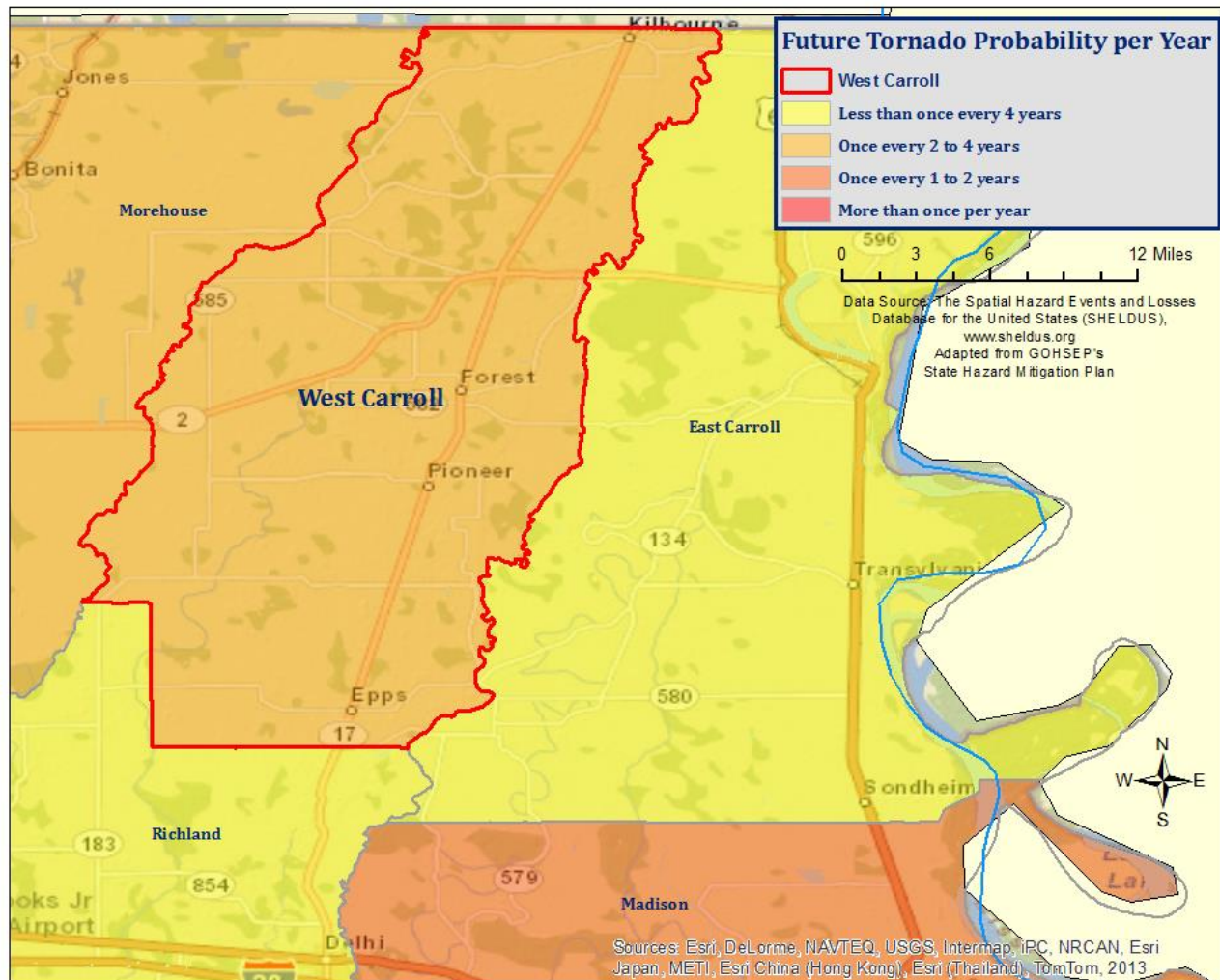


Figure 2-22: Probability of Tornado Events in West Carroll Parish and Adjacent Parishes Based on Data from 1987-2012

(Source: State of Louisiana Hazard Mitigation Plan)

Estimated Potential Losses

According to the SHELDUS database, there have been 8 tornadoes that have caused some level of property damage. The total damage from the actual claims for property is \$1,891,064, with an average cost of \$236,383 per tornado strike. When annualizing the total cost over the 25 year record, total annual losses based on tornadoes are estimated to be \$75,643. To provide an estimated annual potential loss per jurisdiction, the 2010 Census population was used to assign the estimated potential losses proportionally across the jurisdictions. Based on the 2010 Census data, [Table 2-36](#) provides an estimate of annual potential losses for West Carroll Parish.

Table 2-36: Estimated Annual Losses for Tornadoes in West Carroll Parish

Estimated Annual Potential Losses from Tornadoes for West Carroll Parish					
Unincorporated West Carroll (69.8% of Population)	Epps (7.4% of Population)	Forest (3.1% of Population)	Kilbourne (3.6% of Population)	Oak Grove (14.9% of Population)	Pioneer (1.3% of Population)
\$52,775	\$5,567	\$2,314	\$2,712	\$11,258	\$1,017

Table 2-37 presents an analysis of building exposures that are susceptible to tornadoes by general occupancy type for West Carroll Parish, along with the percentage of building stock that are mobile homes.

Table 2-37: Building Exposure by General Occupancy Type for Tornadoes in West Carroll Parish
(Source: FEMA's Hazus 2.2)

Building Exposure by General Occupancy Type for Tornadoes Exposure Types (\$1,000)							
Residential	Commercial	Industrial	Agricultural	Religion	Government	Education	Mobile Homes (%)
744,518	90,141	40,882	23,211	39,650	11,292	16,975	24.1%

The parish has suffered through a total of 1 day in which tornadoes have accounted for 3 injuries and no fatalities during this 25 year period (*Table 2-38*). The average number of injuries per event for West Carroll Parish is 0.38 per tornado, with an average of 0.12 per year for the 25 year period.

Table 2-38: Tornadoes in West Carroll Parish by Magnitude that Caused Injuries or Deaths

Date	Magnitude	Deaths	Injuries
April 24, 2003	F2	0	3

In assessing the overall risk to population, the most vulnerable population throughout the parish are those residing in manufactured housing. Approximately 24.1% of all housing in West Carroll Parish is comprised of manufactured housing. Based on location data collected in a previous hazard mitigation project, there is one known location where manufactured housing is concentrated. This one location has an overall number of 28 manufactured houses. The location and density of manufactured houses can be seen in *Figure 2-23*.

Manufactured housing is more likely to sustain damage from a tornado than any other residential structure. The highest concentration of manufactured home parks is located in the unincorporated area of West Carroll Parish (*Table 2-39*). However, this does not influence the risk associated with a tornado event since they strike at random, making all structures and population within the planning area equally vulnerable.

Table 2-39: Manufactured Home Distribution throughout West Carroll Parish

Location	Number of Manufactured Home Parks	% of Manufactured Home Parks
Unincorporated Area	1	100%
Epps	0	0%
Forest	0	0%
Kilbourne	0	0%
Oak Grove	0	0%
Pioneer	0	0%

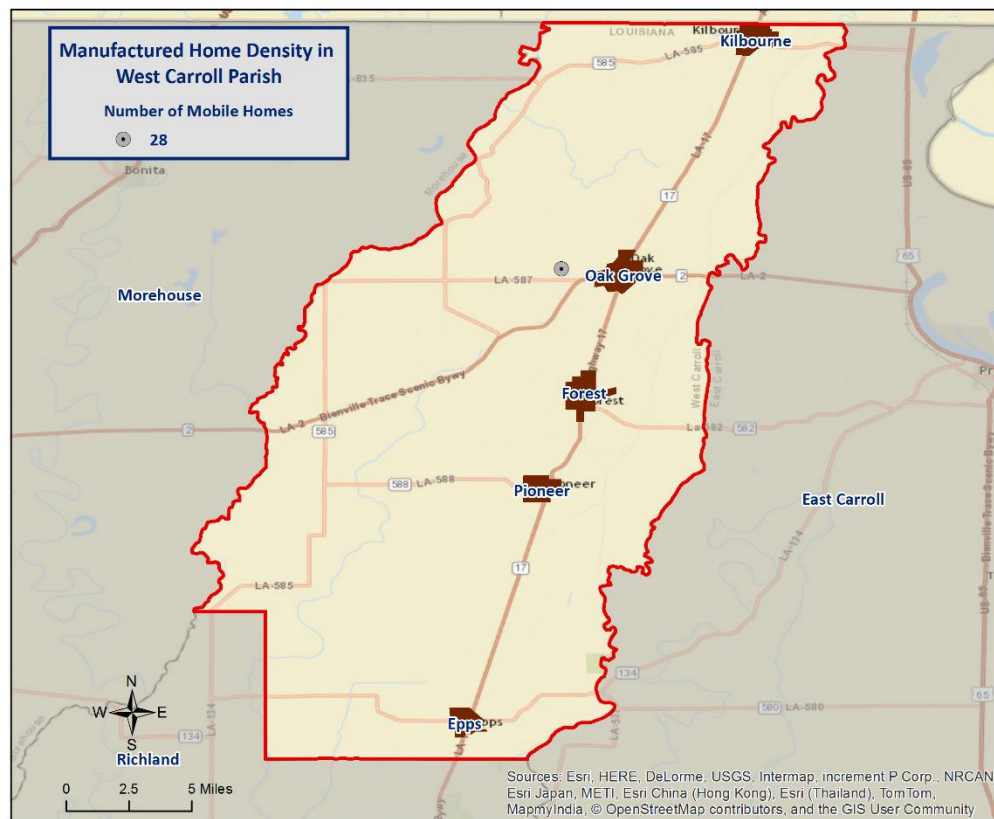


Figure 2-23: Location and Approximate Number of Units in Manufactured Housing Locations throughout West Carroll Parish

Vulnerability

See Appendix C for parish and municipality building exposure to tornado hazards.

Tropical Cyclones

Tropical cyclones are among the worst hazards that Louisiana faces. These spinning, low-pressure air masses draw surface air into their centers and attain strength ranging from weak tropical waves to the most intense hurricanes. Usually, these storms begin as clusters of oceanic thunderstorms off the western coast of Africa and move westward in the trade wind flow. The spinning of these thunderstorm clusters begins because of the formation of low pressure in a perturbation in the westerly motion of the storms associated with differential impacts of the Earth's rotation. The west-moving, counterclockwise-spinning collection of storms, now called a tropical disturbance, may then gather strength as it draws humid air toward its low-pressure center. This results in the formation of a tropical depression (defined when the maximum sustained surface wind speed is 38 mph or less), then a tropical storm (when the maximum sustained surface wind ranges from 39 mph to 73 mph), and finally a hurricane (when the maximum sustained surface wind speeds exceed 73 mph). [Table 2-40](#) presents the Saffir-Simpson Hurricane Wind Scale, which categorizes tropical cyclones based on sustained winds.

Table 2-40: Saffir-Simpson Hurricane Wind Scale

SAFFIR-SIMPSON HURRICANE WIND SCALE			
Category	Sustained Winds	Pressure	Types of Damage Due to Winds
Tropical Depression	<39 mph	N/A	N/A
Tropical Storm	39-73 mph	N/A	N/A
1	74-95 mph	>14.2 psi	Very dangerous winds will produce some damage. Well-constructed frame homes could have damage to roof, shingles, vinyl siding, and gutters. Large branches of trees will snap and shallow-rooted trees may be toppled, especially after the soil becomes waterlogged. Extensive damage to power lines and poles likely will result in power outages that could last several days.
2	96-110 mph	14-14.2 psi	Extremely dangerous winds will cause extensive damage. Well-constructed frame homes could sustain major roof and siding damage. Many shallow-rooted trees will be snapped or uprooted, especially after the soil becomes waterlogged, and block numerous roads. Near total power loss is expected with outages that could last from several days to weeks.
3	111-129 mph	13.7 -14 psi	Devastating damage will occur. Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, especially after the soil becomes waterlogged, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4	130-156 mph	13.3-13.7 psi	Catastrophic damage will occur. Well-built framed homes can sustain severe damage with loss of most of the roof

			structure and/or some exterior walls. Most trees will be snapped or uprooted especially after the soil becomes waterlogged, and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5	157 mph or higher	<13.7 psi	Catastrophic damage will occur. A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks to months.

Many associated hazards can occur during a hurricane, including heavy rains, flooding, high winds, and tornadoes. A general rule of thumb in coastal Louisiana is that the number of inches of rainfall to be expected from a tropical cyclone is approximately 100 divided by the forward velocity of the storm in mph. For example, a fast-moving storm (20 mph) might be expected to drop 5 inches of rain while a slow-moving (5 mph) storm could produce totals of around 20 inches. However, no two storms are alike, and such generalizations have limited utility for planning purposes. Hurricane Beulah, which struck Texas in 1967, spawned 115 confirmed tornadoes. In recent years, extensive coastal development has increased damage amounts from the storm surge so much that it has become the greatest natural hazard threat to property and loss of life in the state. Storm surge is a temporary rise in sea level, generally caused by reduced air pressure and strong onshore winds associated with a storm system near the coast. Although storm surge can technically occur at any time of the year in Louisiana, surges caused by hurricanes can be particularly deadly and destructive. Such storm surge events are often accompanied by large, destructive waves (exceeding 10 meters in some places) that can inflict a high number of fatalities and economic losses. In 2005, Hurricane Katrina clearly demonstrated the destructive potential of this hazard, as it produced the highest modern-day storm surge levels in the state of Louisiana, reaching up to 18.7 feet near Alluvial City in St. Bernard Parish.

Property can be damaged by the various forces that accompany a tropical storm. High winds can directly impact structures in three ways: wind forces, flying debris, and pressure. By itself, the force of the wind can knock over trees, break tree limbs, and destroy loose items such as television antennas and power lines. Many things can be moved by high winds. As winds increase, so does the pressure against stationary objects. Pressure against a wall rises with the square of the wind speed. For some structures, this force is enough to cause failure. The potential for damage to structures is increased when debris breaks the building "envelope" and allows the wind pressures to impact all surfaces (the building envelope includes all surfaces that make up the barrier between the indoors and the outdoors, such as the walls, foundation, doors, windows, and roof). Mobile homes and buildings in need of maintenance are most subject to wind damage. High winds contribute to the formation of larger waves. Extended pounding by waves can demolish any poorly or improperly designed structure. The waves also erode sand beaches, roads, and foundations. When foundations are undermined, the building will collapse.

Nine out of ten deaths during hurricanes are caused by storm surge flooding. Falling tree limbs and flying debris caused by high winds have the ability to cause injury or death. Downed trees and damaged

buildings are a potential health hazard due to instability, electrical system damage, broken pipelines, chemical releases, and gas leaks. Sewage and water lines may also be damaged. Salt water and fresh water intrusions from storm surge send animals, such as snakes, into areas occupied by humans.

Location

Hurricanes are the single biggest threat to all of south Louisiana. With any single hurricane having the potential to devastate multiple parishes at once, the risk of a tropical cyclone has the probability of impacting anywhere within the planning area for West Carroll Parish. As such, all jurisdictions are equally at risk for tropical cyclones.

Previous Occurrences / Extent

The central Gulf of Mexico coastline is among the most hurricane-prone locations in the United States, and hurricanes can affect every part of the state. The SHELDUS database reports a total of 3 tropical cyclone events occurring within the boundaries of West Carroll Parish between the years 2002-2014 (*Table 2-41*). The tropical cyclone events experienced in West Carroll Parish include depressions, storms, and hurricanes. As a worst case scenario, West Carroll Parish can expect to experience tropical cyclones at the tropical storm level in the future.

Table 2-41: Historical Tropical Cyclone Events in West Carroll Parish from 2002- 2014
(Source: SHELDUS)

Date	Name	Storm Type While Impacting West Carroll Parish
August 29, 2005	Katrina	Tropical Storm
September 24, 2005	Rita	Tropical Storm
August 29, 2012	Isaac	Tropical Storm

Hurricane Katrina (2005)

Hurricane Katrina was one of the strongest and most destructive hurricanes on record to impact the coast of the United States. The National Hurricane Center ranked Katrina as the costliest storm (both before and after adjusting for inflation) and the third deadliest in the U.S. since 1851. The hurricane initially made landfall in Plaquemines Parish on August 29, 2005, as a Category 3 storm and continued on a north-northeast track with a second landfall occurring near the Louisiana-Mississippi border. Hurricane Katrina caused widespread devastation along the central Gulf Coast states. Following the passage of Katrina, the flooding of New Orleans was catastrophic, resulting in the displacement of more than 250,000 people.

Hurricane Katrina caused minor flooding within the low-lying areas of West Carroll Parish. Approximately two to three inches of rain fell within a 24 hour period. Poor drainage caused flooding of the Colewa Creek, Bayou Macon, Macon Ridge, and Boeuf River areas.

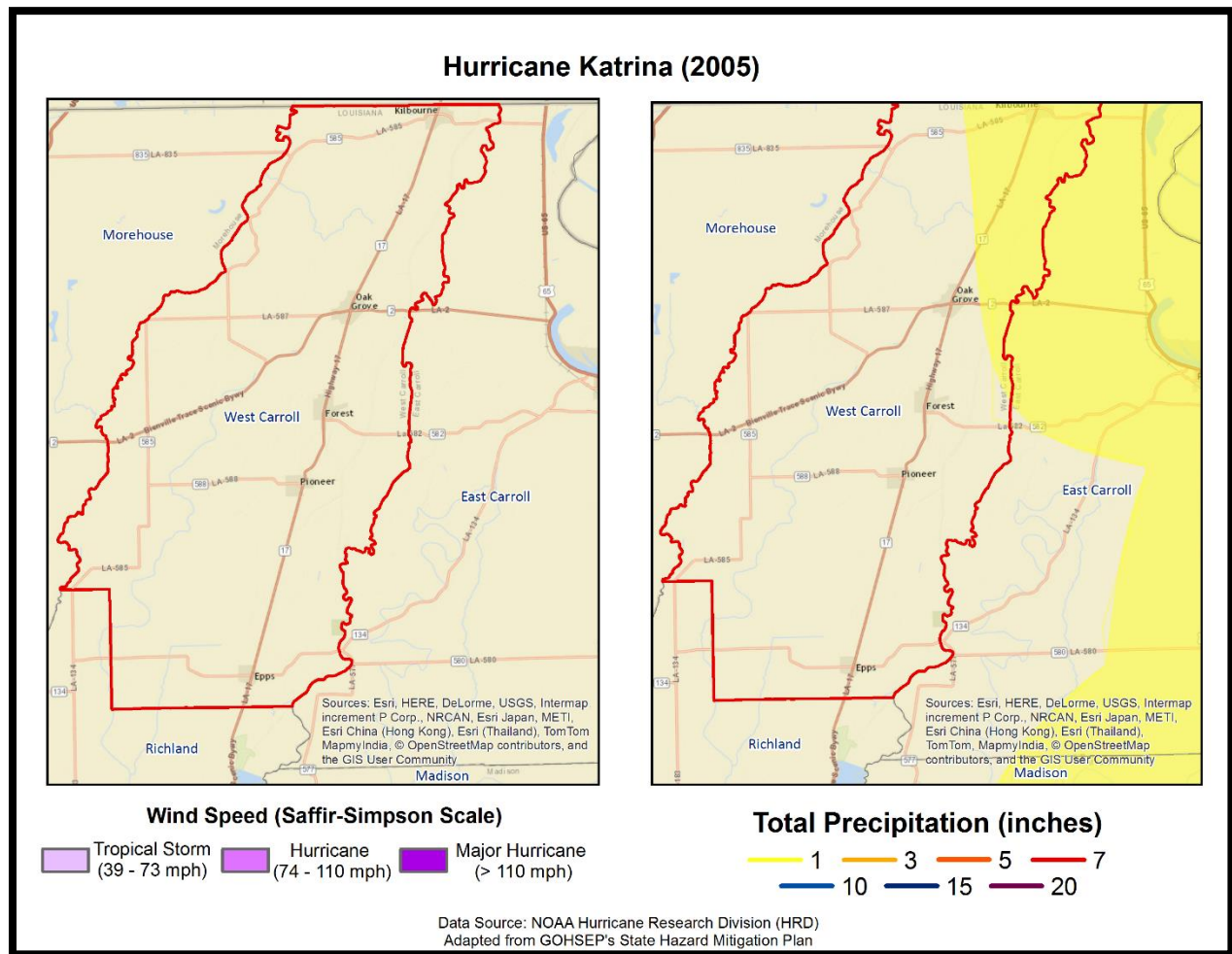


Figure 2-24: Wind Speed and Precipitation Totals in West Carroll Parish for Hurricane Katrina

Hurricane Rita (2005)

While Hurricane Katrina and resulting levee failures captured headlines worldwide, lesser known (but just as destructive) Hurricane Rita wreaked havoc on southwestern Louisiana less than a month later. The storm made landfall as a Category 3 hurricane in Cameron Parish. Across southeast Louisiana, the main effect from Hurricane Rita was the substantial storm surge flooding that occurred in low lying communities across coastal areas of southern Terrebonne, southern Lafourche, and southern Jefferson Parishes, where numerous homes and businesses were flooded. Some of the most substantial damage occurred in southern Terrebonne Parish, where storm surge of 5 to 7 feet above normal overtopped or breached local drainage levees, inundating many small communities. Newspaper accounts indicated approximately 10,000 structures were flooded in Terrebonne Parish. Lafitte and other communities in lower Jefferson Parish also suffered extensive storm surge flooding. Storm surge flooding also occurred in areas adjacent to Lake Pontchartrain and Lake Maurepas, with some homes and businesses flooded from Slidell to Mandeville and Madisonville. Approximately 1,500 structures were reported as flooded in Livingston Parish near Lake Maurepas. Repaired levees damaged by Hurricane Katrina in late August were overtopped or breached along the Industrial Canal in New Orleans, resulting in renewed flooding in adjacent portions of New Orleans and St. Bernard Parish. However, the flooding was much more limited in scope than during Hurricane Katrina.

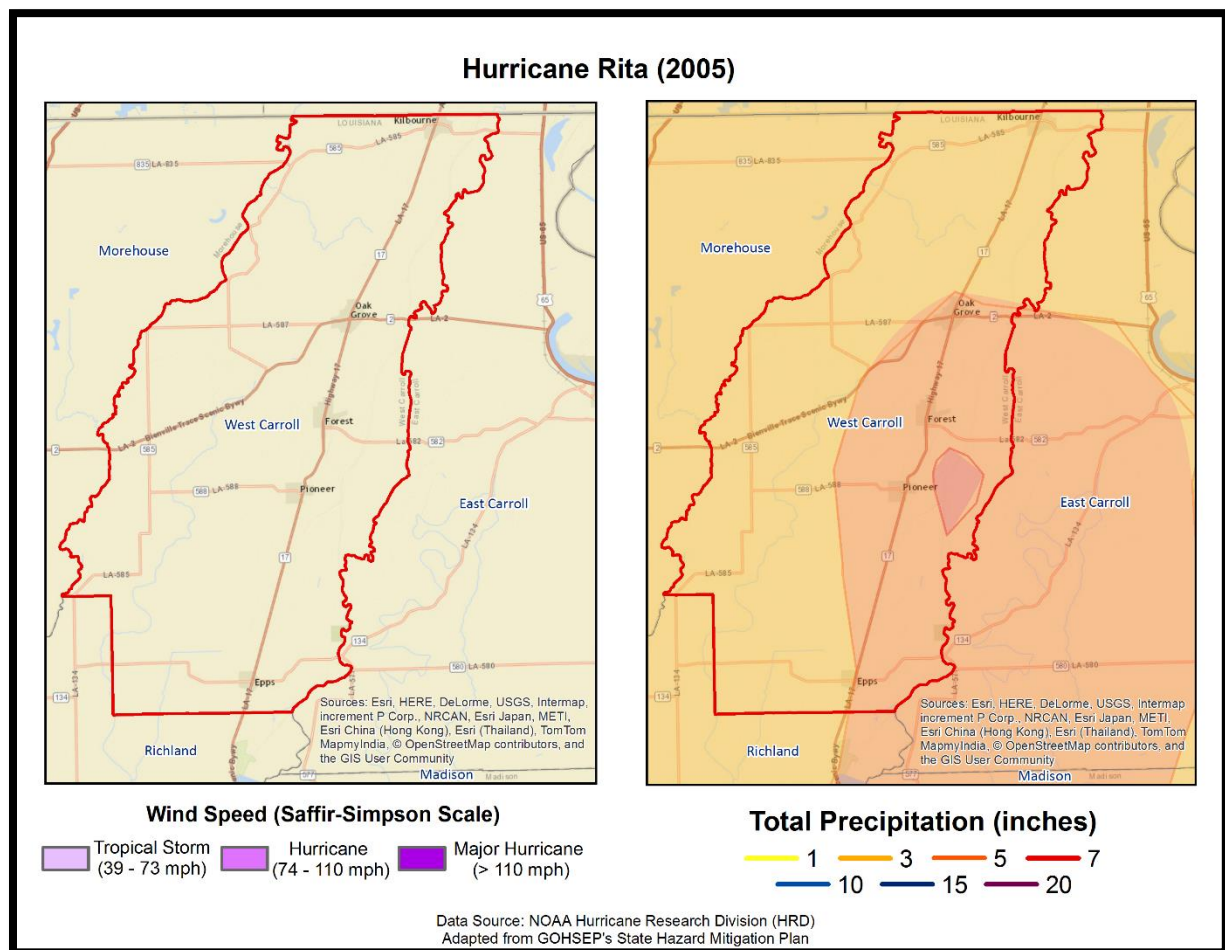


Figure 2-25: Wind Speed and Precipitation Totals in West Carroll Parish for Hurricane Rita

Hurricane Rita was the most powerful hurricane to impact southwestern Louisiana since Hurricane Audrey in 1957. Estimated damages in southwest Louisiana totaled near \$4 billion, with the majority of that loss occurring in Cameron and Calcasieu Parishes. Entire towns were destroyed in Cameron Parish, including downtown Cameron, Creole, Holly Beach, and Grand Chenier. An estimated 90 to 95 percent of the homes in the parish were severely damaged or destroyed. Storm surge values were estimated around 15 feet in parts of Cameron Parish. The storm surge also moved up the Calcasieu ship channel, flooding portions of Calcasieu Parish, including portions of downtown Lake Charles near the civic center. This storm surge was estimated to be between 6 to 8 feet. Disaster response costs in Calcasieu Parish were significant, totaling over \$11 million.

In West Carroll Parish, Hurricane Rita cause localized flooding of low-lying areas throughout the parish. The parish received approximately two to three inches of rain within a 24 hour period.

Hurricane Isaac (2012)

Isaac entered the Gulf of Mexico as a tropical storm on August 26, moving northwest after crossing Haiti, Cuba, and the Florida Straits. Isaac strengthened into a hurricane on the morning of the 28th when it was 75 miles south-southeast of the mouth of the Mississippi River. Isaac made landfall in Plaquemines Parish as a Category 1 Hurricane near Southwest Pass of the Mississippi River on the evening of the 28th. A

second landfall occurred near Port Fourchon the following morning. The storm weakened to a tropical storm on the afternoon of the 29th about 50 miles west southwest of New Orleans, and weakened further to a tropical depression on the afternoon of the 30th near Monroe, Louisiana.

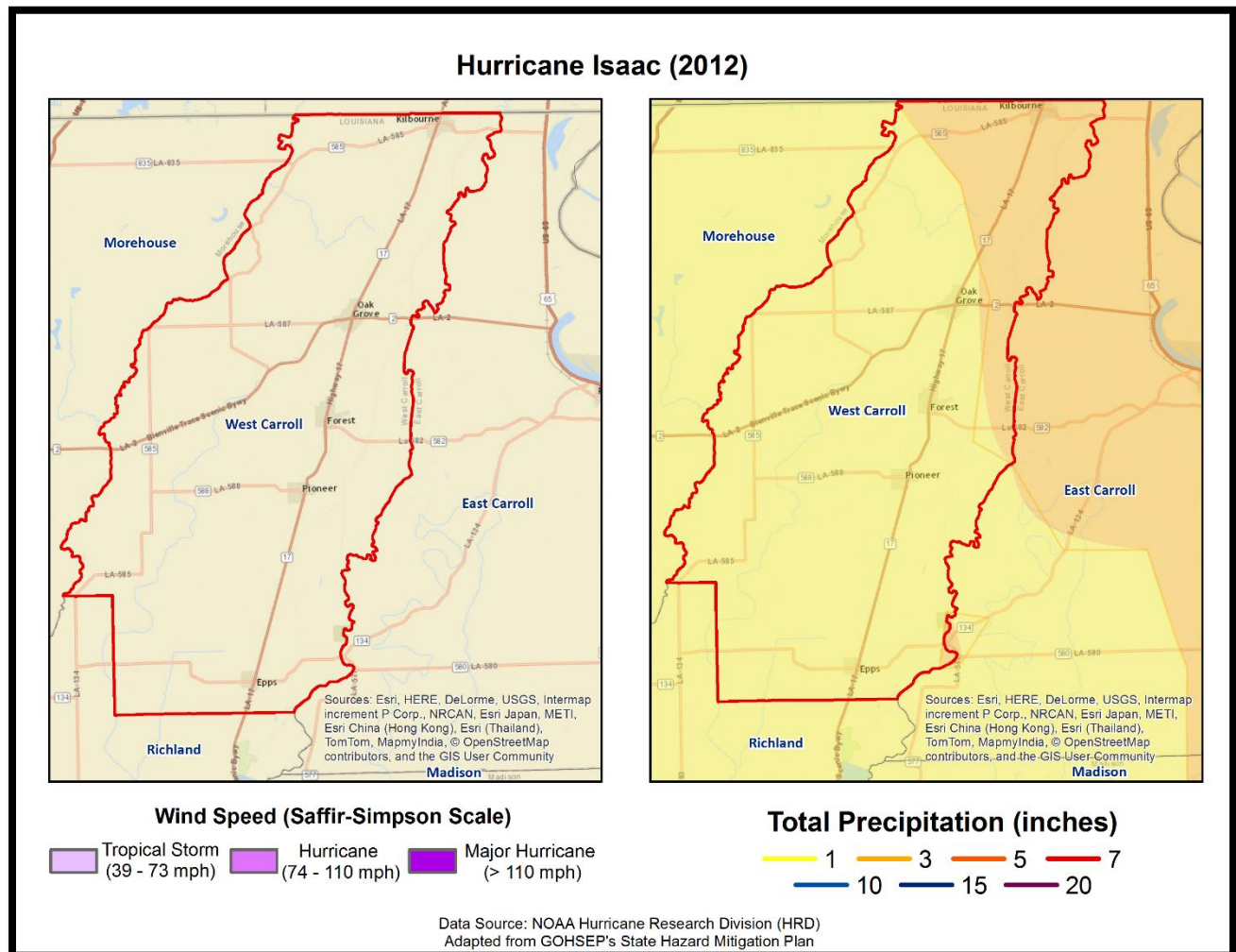


Figure 2-26: Wind Speed and Precipitation Totals for Hurricane Isaac

The highest wind gust recorded on land in Louisiana was 86 mph (75 kts), measured on the evening of August 28 by a Texas Tech University portable weather station located near Buras. The maximum sustained winds in Louisiana were 75 mph (65 kts), recorded at the same portable weather station near Buras on the evening of August 28. There were several marine observations near the coast that had slightly higher wind readings, but their observation heights were generally 80 ft or higher.

Due to Isaac's very large size and slow forward speed, tropical storm force winds lasted in excess of 48 hours in many areas of coastal southeast Louisiana. Occasional hurricane gusts of 70 to 85 mph were recorded across southeast Louisiana, especially south of Lake Pontchartrain, during the night of the Aug 28th and early on the 29th. Interior areas of southeast Louisiana such as around Baton Rouge and northward experienced tropical storm force winds. Widespread power outages occurred across the area. Local utility companies reported over 700,000 customers were without power at the peak of the storm in

southeast Louisiana. Generally, most of the wind damage was limited to downed trees and power lines, as well as roof damage caused by wind and debris.

Significant impact also occurred around Lakes Pontchartrain and Maurepas with a storm tide of 5 to 9 feet. Five to ten thousand homes were flooded in low lying areas of that border the aforementioned lakes of the following parishes: St. Tammany, Tangipahoa, Livingston, Ascension, St James, and St John the Baptist. Laplace, in St. John the Baptist Parish, was especially hard hit with over 5,000 homes flooded by storm surge. An additional storm surge fatality occurred in St. Tammany Parish on the morning of the 30th when a 75 year old man drove his car into a storm surge filled ditch. Storm surge flooding also affected areas south and southwest of New Orleans with a storm tide of 4 to 7 feet. Roadways and low lying property were flooded. Local levees around Lafitte and Myrtle Grove were overtopped and/or breached, resulting in flooding of numerous houses and property in this area.

Many areas of southeast Louisiana received 8 to 12 inches of rain, with a few locations having 15 inches of rain or more. Maximum storm total rainfall was 20.66 inches at the New Orleans Carrollton gauge on the Mississippi River. Rainfall run-off produced moderate to major flooding on the Tangipahoa, Tchefuncte, Tickfaw, Amite, Pearl, Bogue Chitto, and Bogue Falaya Rivers. Storm surge and high tides restricted outflow of the rivers near the coast and lakes, exacerbating flooding in those areas.

Overall impacts of Hurricane Isaac resulted in at least \$600 million in damages in southeast Louisiana, 3 direct fatalities, and 2 indirect fatalities. Storm surge flooding accounted for the bulk of damage, estimated around \$500 million, and the three direct storm surge fatalities in Louisiana. Winds accounted for a much lesser amount of slightly more than a \$100 million.

In West Carroll Parish, strong winds impacted the parish from the afternoon of August 29th through midday of the August 30th. Multiple trees were downed throughout the parish due to the tropical storm force winds. Precipitation totals ranged from one to five inches across the parish.

Figure 2-27 displays the wind zones that affect West Carroll Parish in relation to critical facilities throughout the Parish.

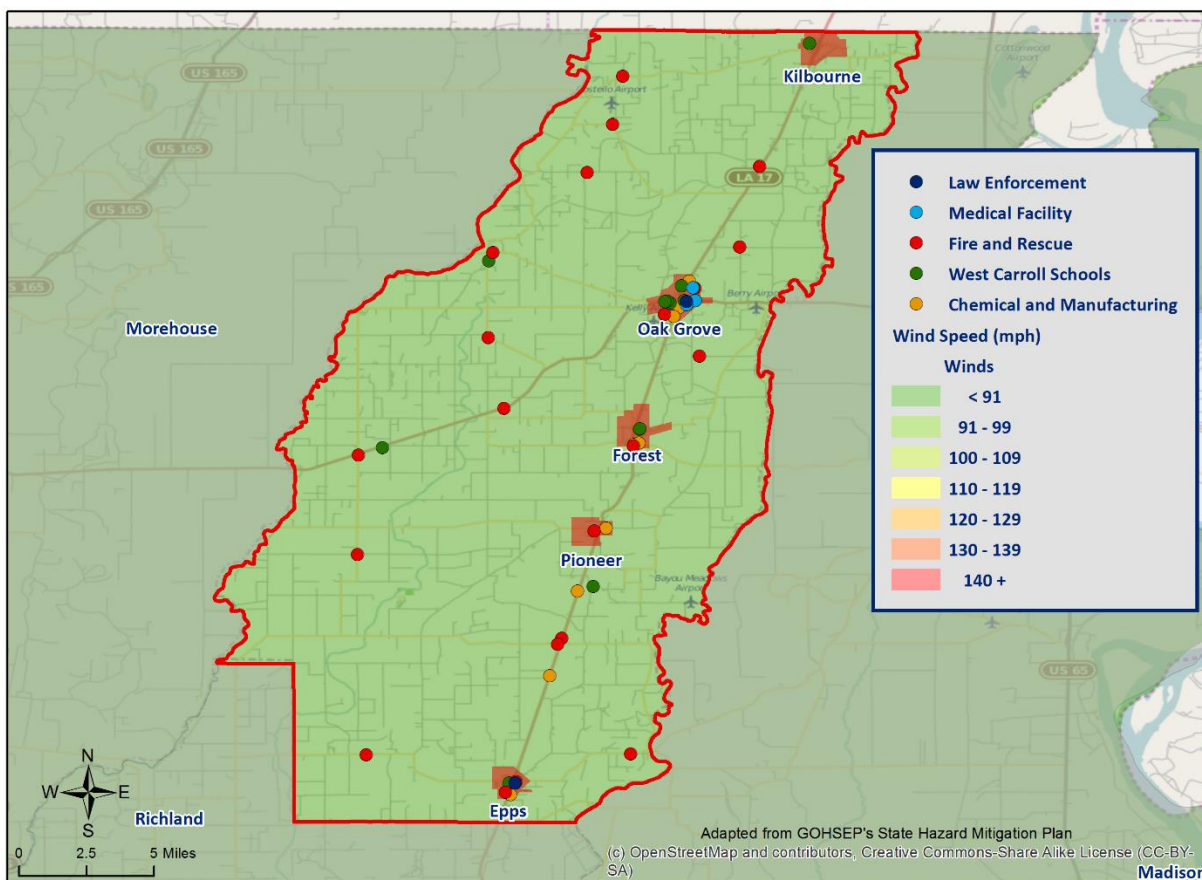
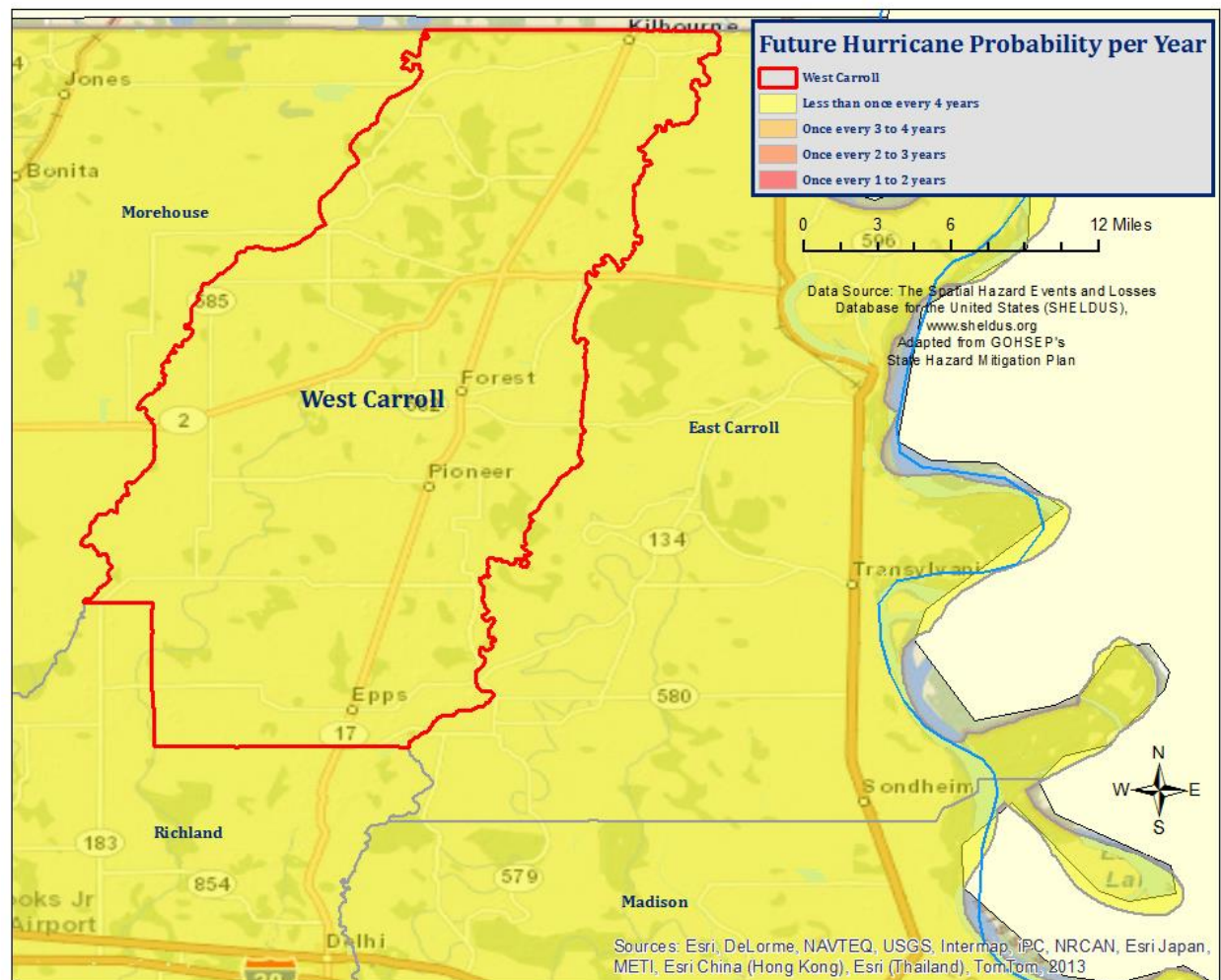


Figure 2-27: Winds Zones for West Carroll Parish in Relation to Critical Facilities

Frequency / Probability

Tropical cyclones are large natural hazard events that regularly impact West Carroll Parish. The annual chance of occurrence for a tropical cyclone occurrence is estimated at 12% for West Carroll Parish and its municipalities, with 3 events occurring within 25 years.



*Figure 2-28: Probability of Tropical Cyclones impacting West Carroll Parish
(Source: State of Louisiana Hazard Mitigation Plan)*

The tropical cyclone season for the Atlantic Basin is from June 1st through November 30th with most of the major hurricanes (Saffir-Simpson Categories 3, 4, & 5) occurring between the months of August and October. Based on a 25 year historical record, the probability of future occurrence of tropical cyclones in West Carroll Parish is less than once every 4 years.

Estimated Potential Losses

Using the Hazus 2.2 100-year Hurricane Model, the 100-year hurricane scenario was analyzed to determine losses from this worst-case scenario. [Table 2-42](#) shows the total economic losses that would result from this occurrence.

*Table 2-42: Total Estimated Losses for a 100-Year Hurricane Event
(Source: Hazus 2.2)*

Jurisdiction	Estimated total Losses from 100 Year Hurricane Event
West Carroll Parish (Unincorporated)	\$146,827,028
Epps	\$5,500,445
Forest	\$5,094,075
Kilbourne	\$122,409,133
Oak Grove	\$34,702,963
Pioneer	\$5,461,338
Total	\$327,761,917

Total losses from a 100-year hurricane event for each jurisdictional area were compared with the total value of assets to determine the ratio of potential damage to total inventory in the table below.

Table 2-43: Ratio of Total Losses to Total Estimated Value of Assets for each Jurisdiction in West Carroll Parish

Jurisdiction	Estimated Total Losses from 100-Year Hurricane Event	Total Estimated Value of Assets	Ratio of Estimated Losses to Total Value
Unincorporated	\$475,142	\$682,652,000	0.07%
Epps	\$50,120	\$39,986,000	0.13%
Forest	\$20,834	\$16,899,000	0.12%
Kilbourne	\$24,414	\$35,461,000	0.07%
Oak Grove	\$101,355	\$183,572,000	0.06%
Pioneer	\$9,155	\$8,099,000	0.11%

Based on the Hazus 2.2 Hurricane Model, estimated total losses are less than 1% of the total estimated value of all assets for the unincorporated area of West Carroll Parish and the incorporated areas of Epps, Forest, Kilbourne, Oak Grove, and Pioneer.

The Hazus 2.2 Hurricane Model also provides a breakdown by jurisdiction for seven primary sectors (Hazus occupancy) throughout the parish. The losses for each jurisdiction by sector are listed in the tables on the following pages.

*Table 2-44: Estimated Losses in West Carroll Parish for a 100-Year Hurricane Event
(Source: Hazus 2.2)*

West Carroll Parish (Unincorporated)	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	\$977
Commercial	\$7,811
Government	\$974
Industrial	\$3,522
Religious / Non-Profit	\$3,436
Residential	\$567,474
Schools	\$1,460
Total	\$585,653

*Table 2-45: Estimated Losses in Epps for a 100-Year Hurricane Event
(Source: Hazus 2.2)*

Epps	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	\$84
Commercial	\$668
Government	\$83
Industrial	\$301
Religious / Non-Profit	\$294
Residential	\$48,564
Schools	\$125
Total	\$50,120

*Table 2-46: Estimated Losses in Forest for a 100-Year Hurricane Event
(Source: Hazus 2.2)*

Forest	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	\$35
Commercial	\$278
Government	\$35
Industrial	\$125
Religious / Non-Profit	\$122
Residential	\$20,188
Schools	\$52
Total	\$20,834

*Table 2-47: Estimated Losses in Kilbourne for a 100-Year Hurricane Event
(Source: Hazus 2.2)*

Kilbourne	Estimated Total Losses from 100 Year Hurricane Event
Agricultural	\$41
Commercial	\$326
Government	\$41
Industrial	\$147
Religious / Non-Profit	\$143
Residential	\$23,657
Schools	\$61
Total	\$24,414

*Table 2-48: Estimated Losses in Oak Grove for a 100-Year Hurricane Event
(Source: Hazus 2.2)*

Oak Grove	Estimated Total Losses from 100 Year Hurricane Event
Agricultural	\$169
Commercial	\$1,352
Government	\$169
Industrial	\$610
Religious / Non-Profit	\$595
Residential	\$98,209
Schools	\$253
Total	\$101,355

*Table 2-49: Estimated Losses in Pioneer for a 100-Year Hurricane Event
(Source: Hazus 2.2)*

Pioneer	Estimated Total Losses from 100 Year Hurricane Event
Agricultural	\$15
Commercial	\$122
Government	\$15
Industrial	\$55
Religious / Non-Profit	\$54
Residential	\$8,871
Schools	\$23
Total	\$9,155

Threat to People

The total population within the parish that is susceptible to a hurricane hazard are shown in the tables below:

*Table 2-50: Number of People Susceptible to a 100-Year Hurricane Event in West Carroll Parish
(Source: Hazus 2.2)*

Number of People Exposed to Hurricane Hazards			
Location	# in Community	# in Hazard Area	% in Hazard Area
Parish (Unincorporated)	8,096	1,756	21.7%
Epps	854	105	12.3%
Forest	355	124	34.9%
Kilbourne	416	102	24.5%
Oak Grove	1,727	423	24.5%
Pioneer	156	49	31.4%
Total	11,604	2,559	22%

The Hazus-MH Hurricane Model was also extrapolated to provide an overview of vulnerable populations throughout the jurisdictions in the tables on the following pages.

*Table 2-51: Vulnerable Populations in Unincorporated West Carroll Parish for a 100-Year Hurricane
(Source: Hazus 2.2)*

West Carroll Parish (Unincorporated)		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	1,756	21.7%
Persons Under 5 Years	105	6.0%
Persons Under 18 Years	423	24.1%
Persons 65 Years and Over	309	17.6%
White	1,442	82.1%
Minority	314	17.9%

*Table 2-52: Vulnerable Populations in Epps for a 100-Year Hurricane
(Source: Hazus 2.2)*

Epps		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	105	12.3%
Persons Under 5 Years	5	4.5%
Persons Under 18 Years	9	9.0%
Persons 65 Years and Over	10	10.0%
White	49	46.5%
Minority	56	53.5%

Table 2-53: Vulnerable Populations in Forest for a 100-Year Hurricane
(Source: Hazus 2.2)

Forest		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	124	34.9%
Persons Under 5 Years	8	6.8%
Persons Under 18 Years	29	23.1%
Persons 65 Years and Over	20	15.8%
White	113	91.3%
Minority	11	8.7%

Table 2-54: Vulnerable Populations in Kilbourne for a 100-Year Hurricane
(Source: Hazus 2.2)

Kilbourne		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	102	24.5%
Persons Under 5 Years	8	7.5%
Persons Under 18 Years	16	16.1%
Persons 65 Years and Over	20	20.0%
White	95	93.0%
Minority	7	7.0%

Table 2-55: Vulnerable Populations in Oak Grove for a 100-Year Hurricane
(Source: Hazus 2.2)

Oak Grove		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	423	24.5%
Persons Under 5 Years	27	6.5%
Persons Under 18 Years	74	17.6%
Persons 65 Years and Over	91	21.6%
White	282	66.8%
Minority	141	33.2%

*Table 2-56: Vulnerable Populations in Pioneer for a 100-Year Hurricane
(Source: Hazus 2.2)*

Pioneer		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	49	31.4%
Persons Under 5 Years	5	10.9%
Persons Under 18 Years	9	19.2%
Persons 65 Years and Over	6	12.2%
White	28	57.7%
Minority	21	42.3%

Vulnerability

See Appendix C for parish and municipality buildings that are susceptible to hurricanes.

Winter Storms

For Louisiana and other parts of the southeastern United States, a severe winter storm occurs when humid air from the Gulf of Mexico meets a cold air mass from the north. Once the cold air mass crosses Louisiana, and the temperature drops, precipitation may fall in the form of snow or sleet. If the ground temperature is cold enough but air temperature is above freezing, rain can freeze instantly on contact with the surface, causing massive ice storms.

The winter storm events that affect the state of Louisiana are ice storms, freezes, and snow events. Of the winter storm types listed above, ice storms are the most dangerous. Ice storms occur during a precipitation event when warm air aloft exceeds 32°F while the surface remains below the freezing point. Ice will form on all surfaces when precipitation originating as rain or drizzle contacts physical structures. These ice storms are usually accompanied by freezing temperatures and occasionally snow.

Winter storms can be accompanied by strong winds, creating blizzard conditions with blinding wind driven snow, severe drifting, and dangerous wind chill. These types of conditions are very rare in Louisiana, even in north Louisiana, but ice storms are more common. The climatic line between snow and rain often stalls over north Louisiana, creating ideal conditions for ice accumulation.

In a typical winter storm event, homes and buildings are damaged by ice accumulation, either directly by the weight of the ice on the roofs or by trees and/or limbs falling on buildings. While it is not very prevalent, this type of damage can occur in Louisiana, particularly in north Louisiana. Effects of winter weather more likely to occur in Louisiana, especially south Louisiana, include extreme temperatures which can cause waterlines to freeze and sewer lines to rupture. This is especially true with mobile homes, since cold air is able to access more of the building's infrastructure. Winter storms can also have a devastating effect on agriculture, particularly on crops (like citrus) that are dependent on warm weather. Long exposures to low temperatures can kill many kinds of crops, and ice storms can weigh down branches and fruit.

Winter storms are not only a direct threat to human health through conditions like frostbite and hypothermia, but they are also an indirect threat to human health due to vehicle accidents and loss of power and heat, which can be disrupted for days. However, these impacts are rarely seen in Louisiana. As people use space heaters and fireplaces to stay warm, the risk of household fires and carbon monoxide poisoning increases.

Winter storm events occur throughout Louisiana usually during the colder calendar months of December, January, and February. Severe weather events do not occur with the same frequency across all parts of Louisiana. The northern quarter of Louisiana has historically experienced the most severe winter events between 1987 and 2012. The central and, to an even greater extent, the southern parts of the state, such as Ascension Parish, have experienced the fewest severe winter events. The following table shows the Sperry-Piltz Ice Accumulation Index which is utilized to predict the potential damage to overhead utility systems from freezing rain and ice storms.

Table 2-57: Sperry-Piltz Ice Accumulation Index

Ice Damage Index	Damage and Impact Descriptions
0	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
2	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
3	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 – 5 days.
4	Prolonged and widespread utility interruptions with extensive damage to main distribution feeder lines and some high voltage transmission lines/structure. Outages lasting 5 – 10 days.
5	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.

Location

Because a winter storm is a climatological based hazard and has the same probability of occurring in West Carroll Parish as all of the adjacent parishes, the entire planning area for West Carroll Parish is equally at risk for winter storms.

Previous Occurrences / Extents

According to SHELUDS, there have been 13 reported winter storm events that have occurred within the boundaries of West Carroll Parish between the years of 1989-2014. *Table 2-58* provides an overview of winter storm events that have impacted West Carroll Parish planning area since 2009 based on the NCDC dataset. Based on historic data, West Carroll Parish can expect an ice damage index of 2 on the Sperry-Piltz Ice Accumulation Index.

Table 2-58: Previous Occurrences for Winter Storm Events

Date	Type	Property Damage	Crop Damage
February 1, 1996	Ice Storm	\$100,000	\$0
December 22, 1998	Ice Storm	\$600,000	\$0
January 27, 2000	Ice Storm	\$120,000	\$0
January 25, 2008	Ice Storm	\$100,000	\$0
December 16, 2008	Winter Weather	\$0	\$0
January 1, 2010	Cold/Wind Chill	\$150,000	\$0
February 11, 2010	Heavy Snow	\$40,000	\$0
January 9, 2011	Winter Weather	\$0	\$0
February 3, 2011	Ice Storm	\$200,000	\$0

February 9, 2011	Heavy Snow	\$160,000	\$0
January 14, 2013	Ice Storm	\$75,000	\$0
January 15, 2013	Ice Storm	\$15,000	\$0
February 11, 2014	Ice Storm	\$0	\$0
February 25, 2015	Heavy Snow	\$0	\$0
March 5, 2015	Sleet	\$0	\$0

Since 2010, the year in which the last update to this hazard mitigation plan was written, West Carroll Parish has had 8 winter storm events. The following is a brief synopsis of these events:

January 9, 2011 – Winter Weather

A strong cold high pressure system settled over northeast Louisiana, causing sleet and freezing rain to fall across the parish. Approximately 0.1 inches of ice accumulated over the parish by the early evening of January 9th.

February 3, 2011 – Ice Storm

An ice storm developed across the parish on February 3rd and lasted until the early hours of February 4th. A quarter inch to four tenths of an inch of ice and sleet accumulated across the parish. Bridges and overpasses were iced over and most of the roadways were slick.

February 9, 2011 – Heavy Snow

A continued cold air mass remained in place over the parish due to several rounds of cold air intrusions. Temperatures slowly began to fall over the region, and the rain transitioned to snow across the I-20 corridor by mid-afternoon of February 9th. Around two inches of snow fell across the parish, with the heaviest accumulations occurring in the northern portions of the parish. Roads were extremely slick, which resulted in numerous accidents throughout the parish.

January 14, 2013 – Ice Storm

A strong cold front brought a shallow and very chilly air mass southward into the parish on the night of January 13th. The cold air undercut relatively mild air aloft, thus setting the stage for freezing rain over the parish on January 14th. Heavy ice accumulation on trees brought down a number of limbs and power lines across the parish.

January 15, 2013 – Ice Storm

Another round of ice storms occurred after the January 14th ice storm. Periods of moderate freezing rain accompanied by thunder occurred with temperatures hovering near or just below 32 degrees Fahrenheit. Ice accumulated on trees and power lines in the northern portion of the parish.

February 11, 2014 – Ice Storm

A strong cold front moved into the parish during the late afternoon to evening hours of February 9th, causing temperatures to drop from the upper 60s into the mid 40s along the I-20 corridor. Strong 1036 mb surface high pressure continued to build into the northern and central Great Plains, aiding in northerly surface winds and colder air moving into the area. Temperatures by the evening of February 10th fell to near freezing along the I-20 interstate corridor, causing between one quarter and one half inch of ice to fall across the parish. Most of the ice accumulation occurred on trees and power lines.

February 25, 2015 – Heavy Snow

A strong upper level disturbance moved across the region, which induced a low pressure system to move east across the northern Gulf of Mexico. With a cold air system already in place, this disturbance brought the needed moisture and atmospheric lift needed to generate precipitation. Approximately five inches of snow fell across the parish.

March 5, 2015 – Sleet

The region again experienced another winter weather event a little over a week after the heavy snow was experienced on the February 25th. Fortunately, most of the area had begun to warmup significantly, which aided in alleviating many of the road issues associated with a sleet event. Approximately one inch of heavy sleet accumulated in the area of Pioneer on March 5th.

Frequency / Probability

With 13 recorded events in 25 years, winter storm events within the boundaries of West Carroll Parish have an annual chance of occurrence calculated at 52% based on the SHELDUS dataset.

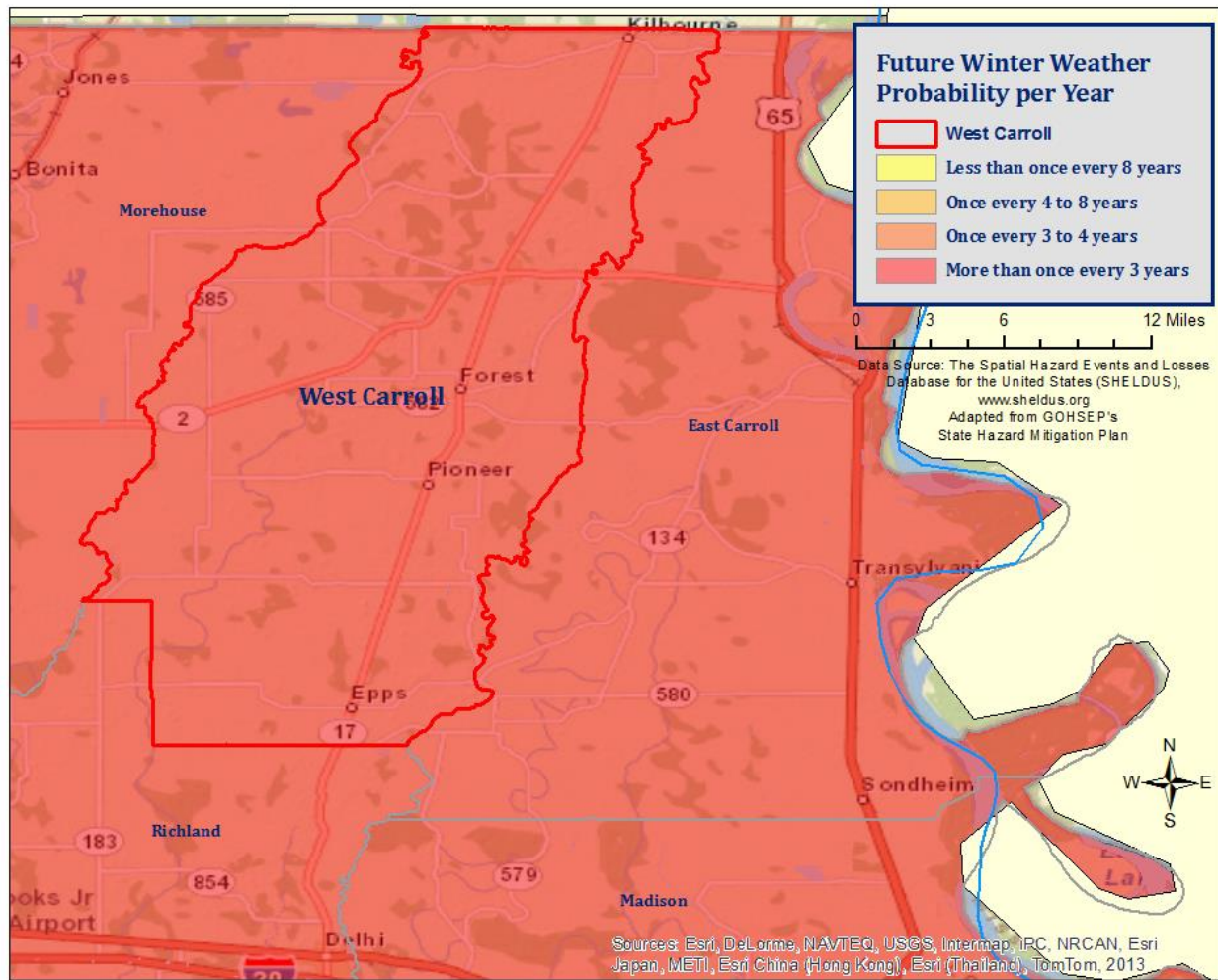


Figure 2-29 : Probability of Winter Storm Events in West Carroll Parish and Adjacent Parishes Based on Data from 1987-2012

(Source: State of Louisiana Hazard Mitigation Plan)

Estimated Potential Losses

Since 1989, there have been 13 reported winter weather events that have resulted in property and/or crop damages according to the SHELDUS database. The total property damages associated with these storms have totaled \$2,855,254. To estimate the potential losses of a winter weather event on an annual basis, the total damage recorded for winter weather events was divided by the total number of years of available winter weather data in SHELDUS (1989 – 2014). This provides an annual estimated potential loss of \$114,210. To assess potential losses to the participating jurisdictions, the 2010 Census population was used to assign the estimated potential losses proportionally across the jurisdictions. Based on the 2010 Census data, the following table provides an estimate of potential property losses for West Carroll Parish.

Table 2-59: Estimated Annual Losses for Winter Weather Events in West Carroll Parish

Estimated Annual Potential Losses from Winter Weather for West Carroll Parish					
Unincorporated West Carroll (69.8% of Population)	Epps (7.4% of Population)	Forest (3.1% of Population)	Kilbourne (3.6% of Population)	Oak Grove (14.9% of Population)	Pioneer (1.3% of Population)
\$79,683	\$8,405	\$3,494	\$4,094	\$16,998	\$1,535

There have been no injuries or fatalities as a result of winter weather in West Carroll Parish from the years 1989 to 2014.

Vulnerability

See Appendix C for parish and municipality building exposure to winter weather hazards.

3 Capability Assessment

This section summarizes the results of the West Carroll Parishes jurisdictions and other agency efforts to develop policies, programs, and activities that directly or indirectly support hazard mitigation. It also provides information on resources and gaps in the parish's infrastructure, as well as relevant changes in its law since the last plan update, in order to suggest a mitigation strategy.

Through this assessment, West Carroll Parish and the participating jurisdictions are able to identify strengths that could be used to reduce losses and reduce risk throughout the community. It also identifies areas where mitigation actions might be used to supplement current capabilities and create a more resilient community before, during and after a hazard event.

Policies, Plans and Programs

West Carroll Parish capabilities are unique to the parish, including planning, regulatory, administrative, technical, financial, and education and outreach resources. There are a number of mitigation-specific acts, plans, executive orders, and policies that lay out specific goals, objectives, and policy statements which already support or could support pre- and post-disaster hazard mitigation. Many of the ongoing plans and policies hold significant promise for hazard mitigation, and take an integrated and strategic look holistically at hazard mitigation in West Carroll Parish to propose ways to continually improve it. These tools are valuable instruments in pre- and post-disaster mitigation as they facilitate the implementation of mitigation activities through the current legal and regulatory framework. Examples of existing documents in West Carroll Parish and its jurisdictions can be found on the following page.

Worksheet 4.1: Capability Assessment Worksheet

Local mitigation capabilities are existing authorities, policies and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible.

Planning and Regulatory

Please indicate which of the following plans and regulatory capabilities your jurisdiction has in place.

	West Carroll Parish	Epps	Forest	Kilborne	Oak Grove	Pioneer
Plans	Yes / No					
Comprehensive / Master Plan	no	no	no	no	no	no
Capital Improvements Plan	yes	yes	yes	yes	yes	yes
Economic Development Plan	yes	yes	yes	yes	yes	yes
Local Emergency Operations Plan	yes	yes	yes	yes	yes	yes
Continuity of Operations Plan	yes	yes	yes	yes	yes	yes
Transportation Plan	yes	yes	yes	yes	yes	yes
Stormwater Management Plan	no	no	no	no	no	no
Community Wildfire Protection Plan	no	no	no	no	no	no
Other plans (redevelopment, recovery, coastal zone management)	no	no	no	no	no	no
Building Code, Permitting and Inspections	Yes / No					
Building Code	yes	yes	yes	yes	yes	yes
Building Code Effectiveness Grading Schedule (BCEGS) Score	no	no	no	no	no	no
Fire Department ISO/PIAL rating	yes	yes	yes	yes	yes	yes
Site plan review requirements	yes	yes	yes	yes	yes	yes
Land Use Planning and Ordinances	Yes / No					
Zoning Ordinance	yes	yes	yes	yes	yes	yes
Subdivision Ordinance	no	no	no	no	no	no
Floodplain Ordinance	yes	yes	yes	yes	yes	yes
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	no	no	no	no	no	no
Flood Insurance Rate Maps	yes	yes	yes	yes	yes	yes
Acquisition of land for open space and public recreation uses	yes	yes	yes	yes	yes	yes
Other						

Building Codes, Permitting, Land Use Planning and Ordinances

As of the 2015 update, the Office of Floodplain Management & the 911 Addressing Office make sure that new construction and / or mobile home setups follow the state codes for electrical service. If anything is located in a flood zone, they must elevate to at least one foot above the BFE for their location.

The West Carroll Parish Government is responsible for enforcing the Parish Ordinances relating to health and safety, property maintenance standards, condemnation of unsafe structures, and zoning compliance.

Additionally, the Parish Health Officer checks for compliance for sewer or septic system use.

While local capabilities for mitigation can vary from community to community, West Carroll Parish as a whole has a system in place to coordinate and share these capabilities through West Carroll Parish Government and through this Parish Hazard Mitigation Plan.

Some programs and policies, such as those described above, might use complementary tools to achieve a common end, but fail to coordinate with or support each other. Thus, coordination among local mitigation policies and programs is essential to hazard mitigation.

Administration, Technical, and Financial

As a community, West Carroll Parish has administrative and technical capabilities in place that may be utilized in reducing hazard impacts or implementing hazard mitigation activities. Such capabilities include staff, skillset, and tools available in the community that may be accessed to implement mitigation activities and to effectively coordinate resources. The ability to access and coordinate these resources is also important. The following are examples of resources in place in West Carroll Parish and its jurisdictions:

Administration and Technical						
Identify whether your community has the following administrative and technical capabilities. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, indicate so in your comments.						
	West Carroll Parish	Epps	Forest	Kilborne	Oak Grove	Pioneer
Administration	Yes / No					
Planning Commission	no	no	no	no	no	no
Mitigation Planning Committee	yes	yes	yes	yes	yes	yes
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	yes	yes	yes	yes	yes	yes
Staff	Yes / No; FT/PT; % Hazard Mitigation					
Chief Building Official	no	no	no	no	no	no
Floodplain Administrator	yes	yes	yes	yes	yes	yes
Emergency Manager	yes	yes	yes	yes	yes	yes
Community Planner	no	no	no	no	no	no
Civil Engineer	no	no	no	no	no	no
GIS Coordinator	no	no	no	No	no	no
Grant Writer	no	no	no	no	no	no
Other						
Technical	Yes / No					
Warning Systems / Service (Reverse 911, outdoor warning signals)	yes	yes	yes	yes	yes	yes
Hazard Data & Information	yes	yes	yes	yes	yes	yes
Grant Writing	no	no	no	no	no	no
Hazus Analysis	no	no	no	no	no	no
Other	no	no	no	no	no	no

Financial capabilities are the resources that West Carroll Parish and its incorporated jurisdictions have access to or are eligible to use in order to fund mitigation actions. Costs associated with implementing the actions identified by the jurisdictions may vary from little to no cost actions, such as outreach efforts, or substantial action costs such acquisition of flood prone properties.

The table on the following page outlines resources that are available to fund mitigation actions in West Carroll Parish and its jurisdictions.

Financial

Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.

	West Carroll Parish	Epps	Forest	Kilborne	Oak Grove	Pioneer
Funding Resource	Yes / No					
Capital Improvements project funding	no	no	no	no	no	no
Authority to levy taxes for specific purposes	no	no	no	no	no	no
Fees for water, sewer, gas, or electric services	no	no	no	no	no	no
Impact fees for new development	no	no	no	no	no	no
Stormwater Utility Fee	no	no	no	no	no	no
Community Development Block Grant (CDBG)	yes	yes	yes	yes	yes	yes
Other Funding Programs	yes	yes	yes	yes	yes	yes

Education and Outreach

A key element in hazard mitigation is promoting a safer, more disaster resilient community through education and outreach activities and/or programs. Successful outreach programs provide data and information that improves overall quality and accuracy of important information for citizens to feel better prepared and educated with mitigation activities. These programs enable the individual jurisdictions and parish as a whole to maximize opportunities for implementation of activities through greater acceptance and consensus of the community.

West Carroll Parish and its jurisdictions have existing education and outreach programs to implement mitigation activities, as well as to communicate risk and hazard related information to its communities. Specifically focusing on advising repetitive loss property owners of ways they can reduce their exposure to damage by repetitive flooding remains a priority for the entire parish. The existing programs are as follows below:

Education and Outreach

Identify education and outreach programs and methods, already in place that could be used to implement mitigation activities and communicate hazard-related information.

	West Carroll Parish	Epps	Forest	Kilborne	Oak Grove	Pioneer
Program / Organization	Yes / No					
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	no	no	no	no	no	no
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	yes	yes	yes	yes	yes	yes
Natural Disaster or safety related school program	yes	yes	yes	yes	yes	yes
Storm Ready certification	no	no	no	no	no	no
Firewise Communities certification	yes	yes	yes	yes	yes	yes
Public/Private partnership initiatives addressing disaster-related issues	yes	yes	yes	yes	yes	yes
Other						

In some cases, the jurisdictions rely on the West Carroll Parish Office of Homeland Security and Emergency Preparedness (OHSEP) and/or West Carroll Parish Government Agencies for the above listed planning and regulatory, administrative and technical, financial, and education and outreach capabilities. Comments regarding the jurisdictions utilization or intentions to utilize and leverage the capabilities of the parish government can be found in the jurisdictional specific worksheets in Appendix E.

As reflected in the previously mentioned existing regulatory mechanisms, programs and resources within each jurisdiction, West Carroll Parish and each jurisdiction remains committed to expanding and improving upon the existing capabilities within the parish. Each participating jurisdiction will work toward increased participation in funding opportunities and available mitigation programs. Should funding become available, the hiring of additional personnel to dedicate to hazard mitigation initiatives and programs, as well as increasing ordinances within the jurisdictions, will all enhance and expand risk reduction measures within the parish.

With the sharing of these capabilities, the following municipalities and entities are recognized by the Parish of West Carroll under the Hazard Mitigation Plan, allowing them to apply for available hazard mitigation funding for as long as these municipalities and entities notify the parish of their intentions and the parish concurs.

- West Carroll Parish
- Town of Oak Grove
- Village of Epps
- Village Forest
- Village of Kilborne
- Village of Pioneer

Flood Insurance and Community Rating System

West Carroll Parish is not a participant in the Community Rating System (CRS). Obtaining the CRS rating for the parish and participating jurisdictions is recognized as an eventual goal by the Hazard Mitigation Steering Committee. Participation in the CRS strengthens local capabilities by lowering flood insurance premiums for jurisdictions that exceed National Flood Insurance Program (NFIP) minimum requirements.

The Federal Emergency Management Agency's NFIP administers the CRS. Under the CRS, flood insurance premiums for properties in participating communities are reduced to reflect the flood protection activities that are being implemented. This program can have a major influence on the design and implementation of flood mitigation activities, so a brief summary is provided here.

A community receives a CRS classification based upon the credit points it receives for its activities. It can undertake any mix of activities that reduce flood losses through better mapping, regulations, public information, flood damage reduction and/or flood warning and preparedness programs.

There are ten CRS classes: class 1 requires the most credit points and gives the largest premium reduction; class 10 receives no premium reduction (see [Figure 3-1](#)). A community that does not apply for the CRS or that does not obtain the minimum number of credit points is a class 10 community.

CLASS	DISCOUNT	CLASS	DISCOUNT
1	45%	6	20%
2	40%	7	15%
3	35%	8	10%
4	30%	9	5%
5	25%	10	—
SFHA (Zones A, AE, A1-A30, V, V1-V30, AO, and AH): Discount varies depending on class.			
SFHA (Zones A99, AR, AR/A, AR/AE, AR/A1-A30, AR/AH, and AR/AO): 10% discount for Classes 1-6; 5% discount for Classes 7-9.*			
Non-SFHA (Zones B, C, X, D): 10% discount for Classes 1-6; 5% discount for Classes 7-9.			

* In determining CRS Premium Discounts, all AR and A99 Zones are treated as non-SFHAs.

*Figure 3-1: CRS Discounts by Class
(Source: FEMA)*

During the last update, Thirty-eight Louisiana communities participate, including Lake Charles, Mandeville, Shreveport, and Jefferson and East Baton Rouge Parishes had the best classifications in the state, Class 7. As of the 2015 update, Jefferson, East Baton Rouge, and Terrebonne Parishes all lead the state with best classifications, Class 6.

As of May 2012, 310 communities in the State of Louisiana participate in the Federal

Emergency Management Agency's NFIP. Of these communities, 41 (or 13%) participate in the Community Rating System (CRS). Of the top fifty Louisiana communities, in terms of total flood insurance policies held by residents, 27 participate in the CRS. The remaining 23 communities present an outreach opportunity for encouraging participation in the CRS.

The CRS provides an incentive not just to start new mitigation programs, but to keep them going. There are two requirements that "encourage" a community to implement flood mitigation activities.

First, the Parish will receive CRS credit for this plan when it is adopted. To retain that credit though, the parish must submit an evaluation report on progress toward implementing this plan to FEMA by October 1st of each year. That report must be made available to the media and the public.

Second, the parish must annually recertify to FEMA that it is continuing to implement its CRS credited activities. Failure to maintain the same level of involvement in flood protection can result in a loss of CRS credit points and a resulting increase in flood insurance rates to residents.

In 2011¹, the National Flood Insurance Program (NFIP) completed a comprehensive review of the Community Rating System (CRS) that will result in the release of a new CRS Coordinator's Manual.

The changes to the 2013 CRS Coordinator's Manual are the result of a multi-year program evaluation that included input from a broad group of contributors to evaluate the CRS and refine the program to meet its stated goals.

The upcoming changes will drive new achievements in the following six core flood loss reduction areas important to the NFIP: (1) reduce liabilities to the NFIP Fund; (2) improve disaster resiliency and sustainability of communities; (3) integrate a whole community approach to addressing emergency management; (4) promote natural and beneficial functions of floodplains; (5) increase understanding of risk, and; (6) strengthen adoption and enforcement of disaster-resistant building codes.

The 2013 CRS Coordinator's Manual changes will impact each CRS community differently. Some communities will see an increase in the points they receive since points for certain activities have increased (e.g., Activity 420 Open Space Preservation). Other communities will receive fewer points for

¹ <https://www.fema.gov/national-flood-insurance-program-community-rating-system>

certain activities (e.g., Activity 320 Map Information Service). It is likely that some communities with marginal CRS class 9 programs will have to identify new CRS credits in order to remain in the CRS.

Typically, CRS communities do not request credit for all the activities they are currently implementing unless it would earn enough credit to advance the community to a higher CRS Class. A community that finds itself losing CRS credit with the 2013 CRS Coordinator's Manual could likely identify activities deserving credit they had not previously received.

Due to the changes in both activities and CRS points, community CRS coordinators should speak with their ISO/CRS Specialist to understand how and when the 2013 CRS Coordinator's Manual will impact their community.

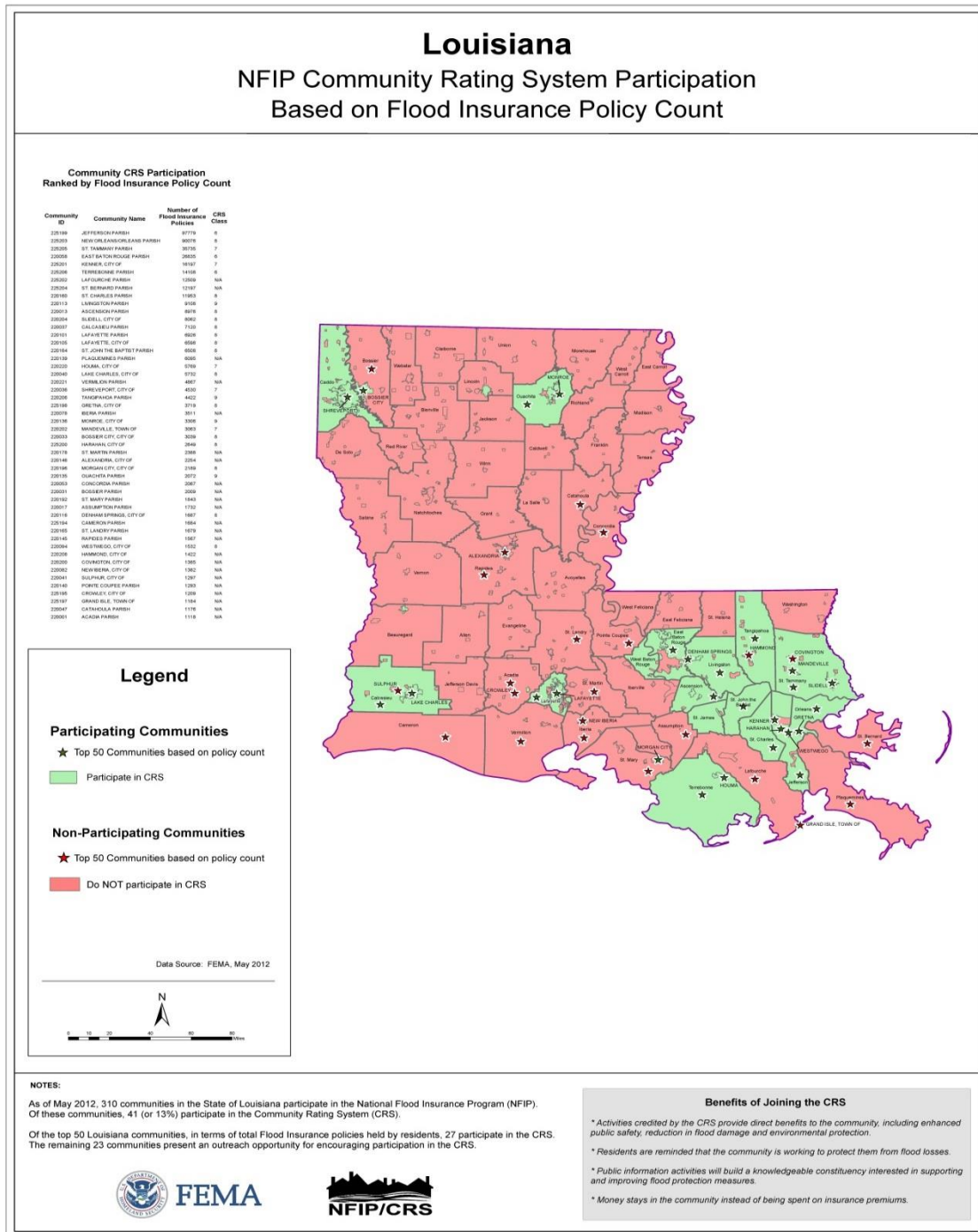


Figure 3-2: Louisiana CRS NFIP Participation
(Source: FEMA)

In addition to the direct financial reward for participating in the Community Rating System, there are many other reasons to participate in the CRS. As FEMA staff often say, “If you are only interested in saving premium dollars, you’re in the CRS for the wrong reason.”

The other benefits that are more difficult to measure in dollars include:

1. The activities credited by the CRS provide direct benefits to residents, including:
 - Enhanced public safety
 - A reduction in damage to property and public infrastructure
 - Avoidance of economic disruption and losses
 - Reduction of human suffering
 - Protection of the environment
2. A community’s flood programs will be better organized and more formal. Ad hoc activities, such as responding to drainage complaints rather than an inspection program, will be conducted on a sounder, more equitable basis.
3. A community can evaluate the effectiveness of its flood program against a nationally recognized benchmark.
4. Technical assistance in designing and implementing a number of activities is available at no charge from the Insurance Services Office.
5. The public information activities will build a knowledgeable constituency interested in supporting and improving flood protection measures.
6. A community would have an added incentive to maintain its flood programs over the years. The fact that its CRS status could be affected by the elimination of a flood related activity or a weakening of the regulatory requirements for new developments would be taken into account by the governing board when considering such actions.
7. Every time residents pay their insurance premiums, they are reminded that the community is working to protect them from flood losses, even during dry years.

****More information on the Community Rating System can be found at www.fema.gov/nfip/crs.shtm****

NFIP Worksheets

Parish and Participating Jurisdiction NFIP worksheets can be found in Appendix E: State Required Worksheets

***This page left intentionally blank**

4 Mitigation Strategy

Introduction

West Carroll Parish's Hazard Mitigation Strategy has a common guiding principle and is the demonstration of the parish and participating jurisdictions commitment to reduce risks from hazards. The strategy also serves as a guide for parish and local decision makers as they commit resources to reducing the effects of hazards.

West Carroll Parish confirmed the goals, objectives, actions, and projects over the period of the Hazard Mitigation Plan Update process. The mitigation actions and projects in this 2015 update are a product of analysis and review of the West Carroll Parish Hazard Mitigation Plan Steering Committee, under the coordination of the West Carroll Parish Office of Homeland Security and Emergency Preparedness. The committee was presented a list of projects and actions, new and from the 2009 plan, for review from May 2015 – September 2015.

An online public opinion survey was conducted of West Carroll Parish residents between August 2015 and September 2015. The survey was designed to capture public perceptions and opinions regarding natural hazards in West Carroll Parish. In addition, the survey collected information regarding the methods and techniques preferred by the respondents for reducing the risks and losses associated with local hazards.

This activity confirms that the goals and action items developed by the West Carroll Parish Hazard Mitigation Plan Steering Committee are representative of the outlook of the community at large. Full survey results can be found here:

<https://www.surveymonkey.com/r/WestCarroll>

During the public meeting in August, the committee provided a status of the projects from 2009 and the proposed actions for the 2015 update. Committee members then agreed on the submission of each project based on feasibility for funding, ease of completion and other community specific factors. The actions were later prioritized.

Goals

The goals represent the guidelines that the parish and its communities want to achieve with this plan update. To help implement the strategy and adhere to the mission of the Hazard Mitigation Plan, the preceding section of the Plan Update was focused on identifying and quantifying the risks faced by the residents and property owners in West Carroll Parish from natural and manmade hazards. By articulating goals and objectives based on the previous plans, the risk assessment results, and intending to address those results, this section sets the stage for identifying, evaluating, and prioritizing feasible, cost effective, and environmentally sound actions to be promoted at the parish and municipal level – and to be undertaken by the state for its own property and assets. By doing so, West Carroll Parish and its jurisdictions can make progress toward reducing identified risks.

For the purposes of this plan update, goals and action items are defined as follows:

- **Goals** are general guidelines that explain what the parish wants to achieve. Goals are expressed as broad policy statements representing desired long-term results.
- **Action Items** are the specific steps (projects, policies, and programs) that advance a given Goal. They are highly focused, specific, and measurable.

The current goals of the West Carroll Parish Hazard Mitigation Plan Update Steering Committee represent long-term commitments by the parish and its jurisdictions. After assessing these goals, the committee decided that the current four goals remain valid.

The goals are as follows:

- Identify and pursue preventative measures that will reduce future damages from hazards
- Enhance public awareness and understanding of disaster preparedness and mitigation
- Reduce repetitive losses in the parish and municipalities
- Facilitate sound development in the parish and municipalities so as to reduce or eliminate the potential impact of hazards

The Mitigation Action Plan focuses on actions to be taken by West Carroll Parish and its jurisdictions. All of the activities in the Mitigation Action Plan will be focused on helping the parish and its municipalities in developing and funding projects that are not only cost effective, but also meet the other DMA 2000 criteria of environmental compatibility and technical feasibility.

The Hazard Mitigation Plan Steering Committee and each jurisdiction reviewed and evaluated the potential action and project lists in which consideration was given to a variety of factors. Such factors include determining a project's eligibility for federal mitigation grants as well as its ability to be funded. This process required evaluation of each project's engineering feasibility, cost effectiveness, and environmental and cultural factors.

2015 Mitigation Actions and Update on Previous Plan Actions

The West Carroll Parish Hazard Mitigation Plan Steering Committee and participating jurisdictions each identified actions that would reduce and/or prevent future damage within West Carroll Parish and their respective communities. In that effort, each jurisdiction focused on a comprehensive range of specific mitigation actions. These actions were identified in thorough fashion by the consultant team, the committee, and the individual jurisdictions by way of frequent and open communications and meetings held throughout the planning process.

As outlined in the Local Mitigation Planning Handbook, the following are eligible types of Mitigation Actions:

- **Local Plans and Regulations** – These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.
- **Structure and Infrastructure Projects** – These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area, and also includes projects to construct manmade structures to reduce the impact of hazards.
- **Natural System Protection** – These actions minimize the damage and losses and also preserve or restore the functions of natural systems.

- **Education and Awareness Programs** – These actions inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them.

The established and agreed upon parish and jurisdiction actions relative to the parish-wide goals are below. Additionally, action updates from the previous plan updates can be found in the first table below.

West Carroll 2010 Hazard Mitigation Action Update

West Carroll Parish Mitigation Action Update					
Jurisdiction-Specific Action	Action Description	Funding	Responsible Party, Agency, or Department	Hazard	Status
W1: Enlarging Drainage Culverts and Canals	Improve parish drainage capacity by improving and/or enlarging drainage culverts and canals along the major drainage laterals and/or other flood-prone locations within each jurisdiction.	Federal	US Army Corps of Engineers (USACE)	Severe Storms, Floods	Ongoing
W2: Master Drainage Plan	Develop a master drainage plan which will evaluate drainage projects at major drainage laterals and other drainage ways with each jurisdiction to determine the best method of increasing drainage capacity.	Drainage Board Budget	Parish Engineer and/or Parish Department of Public Works	Severe Storms, Floods	Removed
W3: Implement Master Drainage Plan	Implement recommended drainage improvement/flood mitigation projects resulting from master drainage plan.	Drainage Board Budget	Parish Engineer and/or Parish Department of Public Works	Severe Storms, Floods	Removed
W4: Harden Critical Facilities	Harden all West Carroll Parish critical facilities by utilizing FEMA-approved wind and flood proofing techniques and add back up power supply/generators at all locations. NOTE: West Carroll Parish Care Center, West Carroll Parish Hospital, and the Parish Courthouse have new generators funded through 1603 funding.	Parish Budget	OHLS/EP Director	Severe Storms, Floods, Tornadoes	Courthouse Retrofit is In Progress

West Carroll Parish Mitigation Action Update					
Jurisdiction-Specific Action	Action Description	Funding	Responsible Party, Agency, or Department	Hazard	Status
W5: Flood Insurance	Promote the purchase of flood insurance. Advertise the availability, cost, and coverage of flood insurance through the National Flood Insurance Program (NFIP).	Parish Budget	Parish Emergency Manager	Severe Storms, Floods	Completed
W6: Public Awareness	Increase public awareness of hazards and hazardous areas. Distribute public awareness information regarding wind and flood-related hazards and drought. Potential methods include: the local newspaper, utility bill inserts, inserts in the phone book, parish website, an educational program for school age children, a "How To" class in retrofitting provided by local merchants, a "Disaster Resistance Education" program in the public school curriculum. Also focus on public education on the importance of maintaining the ditches.	Parish Budget	Parish School Board and Parish Emergency Manager	Severe Storms, Floods, Drought, and Tornadoes	Completed
W7: Public Notification System	Expand the public notification system to reach all citizens in the parish, such as a siren or a call down system with a backup communication system. NOTE: The system is now in place at the EOC, Parish Police Jury and School Board buildings, Sheriff's Office and hospital.	Parish Budget	Parish School Board and Parish Emergency Manager	Severe Storms, Floods, Tornadoes	Carried Over
W8: Multi-Hazard Awareness Week	Implement a public education program, such as a "Multi-Hazard Awareness Week", to educate the public on severe storms, tornadoes, droughts and flooding.	Parish and Town Budgets, Business and Industry	Mayors and Parish Emergency Manager	Severe Storms, Floods, Drought, and Tornadoes	Completed

West Carroll Parish Mitigation Action Update					
Jurisdiction-Specific Action	Action Description	Funding	Responsible Party, Agency, or Department	Hazard	Status
W9: Flood Mitigation	Pursue flood mitigation of Repetitive Loss properties and/or other known flood prone structures in the parish such as elevation, acquisition, and/or flood proofing of the parish's 1 NFIP Repetitive Loss structure. Annually review the NFIP Repetitive Loss list and submit correction worksheets to FEMA as needed.	Parish Budget	Floodplain Manager	Severe Storms, Floods	4 homes bought and demolished by parish, awaiting closeout. Completed.
W10: Localized Interior Drainage Projects	Implement localized interior drainage projects throughout the parish such as Louisiana Highways 2, 585, and/or those parish roads in flood-prone areas to reduce the potential impact of flooding.	CDBG, FMA HMGP, SBA, USACE, State & Local Funds	Parish and Town Floodplain Managers/ Public Works Director	Severe Storms, Floods	Ongoing
W11: Community Rating System	Participate in the NFIP "Community Rating System" (CRS). Inform the public about the CRS program and the fact that it could result in a discount in flood insurance premiums.	Parish Budget	Floodplain Manager	Severe Storms, Floods	Deleted
W12: Floodplain Management Ordinance Standards	Continue to enhance/improve the parish's existing Floodplain Management Ordinance standards. NOTE: Current ordinance is set at one foot above the Base Flood Elevation.	Parish Budget	Floodplain Manager	Severe Storms, Floods	Ongoing
W13: Building Ordinances	Adopt building ordinances which exceed the requirements of the International Building Code (IBC). NOTE: The parish has adopted ordinances which exceed the current requirements of the 2006 IBC.	Parish Budget	Parish Police Jury	Severe Storms, Floods, Tornadoes	Ongoing

West Carroll Parish Mitigation Action Update					
Jurisdiction-Specific Action	Action Description	Funding	Responsible Party, Agency, or Department	Hazard	Status
W14: Improve Regulations	Improve existing land-use regulations and implement additional development regulations that would help reduce flooding through improved drainage methods such as adequate sloping, stormwater retention ponds, dikes, and floodwalls. Encourage new developments to install underground utilities, which would help reduce the chances of power outages during high winds and other severe storms.	Parish Budget	Planning Director	Severe Storms, Floods, Tornadoes	Ongoing

Unincorporated West Carroll New Mitigation Actions

Unincorporated West Carroll New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
WC1: Building Retrofits	Retrofit public buildings exterior shell to maintain use during and after storm events. Benefits: Reduces damage from high winds, and helps assure that the public buildings can be used, occupied and operable during or after storms.	FEMA, Local	2-5 years	West Carroll Parish OHSEP	High Wind, Tornado, Hail, Tropical Cyclones	1	New
WC2: Drainage Improvement	Will relieve flooding problems, reduce flood damage and costs of damage, overtopping of roads with drain water, while also keeping open roadways during periods of high precipitation. Benefits: Relieves parish or local government and property owners of the continual flooding problems, with closed roadways (loss of function). Saves public funds for road repairs, drainage ditch repairs, sandbagging and blocking of roadways during storm periods.	FEMA, Local	1-10 years	West Carroll Parish OHSEP	Flooding, Tropical Cyclone	1,3	New

Unincorporated West Carroll New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
WC3: Flood Mitigation of Repetitive Loss Properties and Other Flood Prone Structures	Elevation, acquisition-demolition, acquisition-relocations, and reconstruction of repetitive loss or flood prone properties. Benefits: Relieves property owners of the continual flooding problems. Saves flood relief and damage repayment for each property.	FEMA, Local	1-5 years	West Carroll Parish OHSEP	Flooding, Tropical Cyclones	1,3	New
WC4: Safe Room Projects	Construction of a safe room for first responders located in West Carroll Parish. Other locations will be identified based on funding availability.	FEMA, Local	1-10 years	West Carroll Parish OHSEP	Tornado	1	New
WC5: Education and Outreach	Enhance the public outreach programs for the parish and all communities by increasing awareness of risks and safety for flooding, tornadoes, wildfire, drought, thunderstorms (lightning, high wind, hail), winter storms as well as providing information on high risk areas. Informing communities, business and citizens on proper mitigation efforts and activities will create resiliency within the parish and its communities.	FEMA, Local	1-5 years	West Carroll Parish OHSEP	Flooding, Tornadoes, Drought, Thunderstorms (lightning, high wind, hail), Winter Storms, Tropical Cyclones	2,3	New

Unincorporated West Carroll New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
WC6: Generators for Continuity of Operations and Government	Procurement and Installation of generators at public facilities to ensure continued operations during and after events.	FEMA, Local	1-5 years	West Carroll Parish OHSEP	Tornadoes, Winter Storms, Tropical Cyclones	1,3	New
WC7: Lightning Mitigation	Procurement and Installation of lightning rods and surge protectors for public buildings to preserve life and property.	FEMA, Local	1-5 years	West Carroll Parish OHSEP	Lightning	1	New
WC8: Drought Ordinances	Adopt ordinance requiring water-saving measures in time of drought.	FEMA, Local	1-5 years	West Carroll Parish OHSEP	Drought	1	New
WC9: Public Notification System	Expand the public notification system to reach all citizens in the parish, such as a siren or a call down system with a backup communication system.	Parish Budget	1-5 years	West Carroll Parish OHSEP	Flooding, Tornadoes, Thunderstorms (lightning, high wind, hail), Winter Storms, Tropical Cyclones	1,2	New
WC10: Floodplain Management Ordinance Standards	Continue to enhance/improve the parish's existing Floodplain Management Ordinance standards. Current ordinance is set at one foot above the Base Flood Elevation.	Parish Budget	1-5 years	West Carroll Parish OHSEP	Flooding, Tropical Cyclones	1,4	New

Unincorporated West Carroll New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
WC11: Building Ordinances	Adopt building ordinances which exceed the requirements of the International Building Code (IBC). The parish has adopted ordinances which exceed the current requirements of the 2006 IBC.	Parish Budget	1-5 years	West Carroll Parish OHSEP	Flooding, Tropical Cyclone, Tornado, Thunderstorms (high wind, lightning, hail)	1,4	New
WC12: Improve Regulations	Improve existing land-use regulations and implement additional development regulations that would help reduce flooding through improved drainage methods such as adequate sloping, stormwater retention ponds, dikes, and floodwalls. Encourage new developments to install underground utilities, which would help reduce the chances of power outages during high winds and other severe storms.	Parish Budget	1-5 years	West Carroll Parish OHSEP	Flooding, Tropical Cyclone, Tornado, Thunderstorms (high wind, lightning, hail)	1,4	New

Village of Epps New Mitigation Actions

Village of Epps New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
E1: Building Retrofits	Retrofit public buildings exterior shell to maintain use during and after storm events. Benefits: Reduces damage from high winds, and helps assure that the public buildings can be used, occupied and operable during or after storms.	FEMA, Local	2-5 years	Village of Epps	High Wind, Tornado, Hail, Tropical Cyclones	1	New
E2: Drainage Improvement	Will relieve flooding problems, reduce flood damage and costs of damage, overtopping of roads with drain water, while also keeping open roadways during periods of high precipitation. Benefits: Relieves parish or local government and property owners of the continual flooding problems, with closed roadways (loss of function). Saves public funds for road repairs, drainage ditch repairs, sandbagging and blocking of roadways during storm periods.	FEMA, Local	1-10 years	Village of Epps	Flooding, Tropical Cyclones	1,3	New
E3: Flood Mitigation of Repetitive Loss Properties and Other Flood Prone Structures	Elevation, acquisition-demolition, acquisition-relocations, and reconstruction of repetitive loss or flood prone properties. Benefits: Relieves property owners of the continual flooding problems. Saves flood relief and damage repayment for each property.	FEMA, Local	1-5 years	Village of Epps	Flooding, Tropical Cyclones	1,3	New

Village of Epps New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
E4: Safe Room Projects	Construction of a safe room for first responders located in the Village of Epps. Other locations will be identified based on funding availability.	FEMA, Local	1-10 years	Village of Epps	Tornadoes	1	New
E5: Education and Outreach	Enhance the public outreach programs for the parish and all communities by increasing awareness of risks and safety for flooding, tornadoes, wildfire, drought, thunderstorms (lightning, high wind, hail), winter storms as well as providing information on high risk areas. Informing communities, business and citizens on proper mitigation efforts and activities will create resiliency within the parish and its communities.	FEMA, Local	1-5 years	Village of Epps	Flooding, Tornadoes, Drought, Thunderstorms (lightning, high wind, hail), Winter Storms, Tropical Cyclones	2,3	New
E6: Generators for Continuity of Operations and Government	Procurement and Installation of generators at public facilities to ensure continued operations during and after events.	FEMA, Local	1-5 years	Village of Epps	Tornadoes, Winter Storms, High Wind, Lightning, Tropical Cyclones	1,3	New
E7: Lightning Mitigation	Procurement and Installation of lightning rods and surge protectors for public buildings to preserve life and property	FEMA, Local	1-5 years	Village of Epps	Lightning	1	New
E8: Drought Ordinances	Adopt ordinance requiring water-saving measures in time of drought	FEMA, Local	1-5 years	Village of Epps	Drought	1	New

Village of Forest New Mitigation Actions

Village of Forest New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
F1: Building Retrofits	Retrofit public buildings exterior shell to maintain use during and after storm events. Benefits: Reduces damage from high winds, and helps assure that the public buildings can be used, occupied and operable during or after storms.	FEMA, Local	2-5 years	Village of Forest	High Wind, Tornadoes, Hail, Tropical Cyclones	1	New
F2: Drainage Improvement	Will relieve flooding problems, reduce flood damage and costs of damage, overtopping of roads with drain water, while also keeping open roadways during periods of high precipitation. Benefits: Relieves parish or local government and property owners of the continual flooding problems, with closed roadways (loss of function). Saves public funds for road repairs, drainage ditch repairs, sandbagging and blocking of roadways during storm periods.	FEMA, Local	1-10 years	Village of Forest	Flooding, Tropical Cyclones	1,3	New
F3: Flood Mitigation of Repetitive Loss Properties and Other Flood Prone Structures	Elevation, acquisition-demolition, acquisition-relocations, and reconstruction of repetitive loss or flood prone properties. Benefits: Relieves property owners of the continual flooding problems. Saves flood relief and damage repayment for each property.	FEMA, Local	1-5 years	Village of Forest	Flooding, Tropical Cyclones	1,3	New

Village of Forest New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
F4: Safe Room Projects	Construction of a safe room for first responders located in the Village of Forest. Other locations will be identified based on funding availability.	FEMA, Local	1-10 years	Village of Forest	Tornadoes	1	New
F5: Education and Outreach	Enhance the public outreach programs for the parish and all communities by increasing awareness of risks and safety for flooding, tornadoes, wildfire, drought, thunderstorms (lightning, high wind, hail), winter storms as well as providing information on high risk areas. Informing communities, business and citizens on proper mitigation efforts and activities will create resiliency within the parish and its communities.	FEMA, Local	1-5 years	Village of Forest	Flooding, Tornadoes, Drought, Thunderstorms (lightning, high wind, hail), Winter Storms, Tropical Cyclones	2,3	New
F6: Generators for Continuity of Operations and Government	Procurement and Installation of generators at public facilities to ensure continued operations during and after events.	FEMA, Local	1-5 years	Village of Forest	Tornadoes, Winter Storms, High Wind, Lightning, Tropical Cyclones	1,3	New
F7: Lightning Mitigation	Procurement and Installation of lightning rods and surge protectors for public buildings to preserve life and property.	FEMA, Local	1-5 years	Village of Forest	Lightning	1	New
F8: Drought Ordinances	Adopt ordinance requiring water-saving measures in time of drought.	FEMA, Local	1-5 years	Village of Forest	Drought	1	New

Village of Kilbourne New Mitigation Actions

Village of Kilbourne New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
K1: Building Retrofits	Retrofit public buildings exterior shell to maintain use during and after storm events. Benefits: Reduces damage from high winds, and helps assure that the public buildings can be used, occupied and operable during or after storms.	FEMA, Local	2-5 years	Village of Kilbourne	High Wind, Tornado, Hail, Tropical Cyclones	1	New
K2: Drainage Improvement	Will relieve flooding problems, reduce flood damage and costs of damage, overtopping of roads with drain water, while also keeping open roadways during periods of high precipitation. Benefits: Relieves parish or local government and property owners of the continual flooding problems, with closed roadways (loss of function). Saves public funds for road repairs, drainage ditch repairs, sandbagging and blocking of roadways during storm periods.	FEMA, Local	1-10 years	Village of Kilbourne	Flooding, Tropical Cyclones	1,3	New
K3: Flood Mitigation of Repetitive Loss Properties and Other Flood Prone Structures	Elevation, acquisition-demolition, acquisition-relocations, and reconstruction of repetitive loss or flood prone properties. Benefits: Relieves property owners of the continual flooding problems. Saves flood relief and damage repayment for each property.	FEMA, Local	1-5 years	Village of Kilbourne	Flooding, Tropical Cyclones	1,3	New

Village of Kilbourne New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
K4: Safe Room Projects	Construction of a safe room for first responders located in the Village of Kilbourne. Other locations will be identified based on funding availability.	FEMA, Local	1-10 years	Village of Kilbourne	Tornadoes	1	New
K5: Education and Outreach	Enhance the public outreach programs for the parish and all communities by increasing awareness of risks and safety for flooding, tornadoes, wildfire, drought, thunderstorms (lightning, high wind, hail), winter storms as well as providing information on high risk areas. Informing communities, business and citizens on proper mitigation efforts and activities will create resiliency within the parish and its communities.	FEMA, Local	1-5 years	Village of Kilbourne	Flooding, Tornadoes, Drought, Thunderstorms (lightning, high wind, hail), Winter Storms, Tropical Cyclones	2,3	New
K6: Generators for Continuity of Operations and Government	Procurement and Installation of generators at public facilities to ensure continued operations during and after events.	FEMA, Local	1-5 years	Village of Kilbourne	Tornadoes, Winter Storms, High Wind, Lightning, Tropical Cyclones	1,3	New
K7: Lightning Mitigation	Procurement and Installation of lightning rods and surge protectors for public buildings to preserve life and property	FEMA, Local	1-5 years	Village of Kilbourne	Lightning	1	New
K8: Drought Ordinances	Adopt ordinance requiring water-saving measures in time of drought	FEMA, Local	1-5 years	Village of Kilbourne	Drought	1	New

Town of Oak Grove New Mitigation Actions

Town of Oak Grove New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
OG1: Building Retrofits	Retrofit public buildings exterior shell to maintain use during and after storm events. Benefits: Reduces damage from high winds, and helps assure that the public buildings can be used, occupied and operable during or after storms.	FEMA, Local	2-5 years	Town of Oak Grove	High Wind, Tornadoes, Hail, Tropical Cyclones	1	New
OG2: Drainage Improvement	Will relieve flooding problems, reduce flood damage and costs of damage, overtopping of roads with drain water, while also keeping open roadways during periods of high precipitation. Benefits: Relieves parish or local government and property owners of the continual flooding problems, with closed roadways (loss of function). Saves public funds for road repairs, drainage ditch repairs, sandbagging and blocking of roadways during storm periods.	FEMA, Local	1-10 years	Town of Oak Grove	Flooding, Tropical Cyclones	1,3	New
OG3: Flood Mitigation of Repetitive Loss Properties and Other Flood Prone Structures	Elevation, acquisition-demolition, acquisition-relocations, and reconstruction of repetitive loss or flood prone properties. Benefits: Relieves property owners of the continual flooding problems. Saves flood relief and damage repayment for each property.	FEMA, Local	1-5 years	Town of Oak Grove	Flooding, Tropical Cyclones	1,3	New

Town of Oak Grove New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
OG4: Safe Room Projects	Construction of a safe room for first responders located in the Town of Oak Grove. Other locations will be identified based on funding availability.	FEMA, Local	1-10 years	Town of Oak Grove	Tornadoes	1	New
OG5: Education and Outreach	Enhance the public outreach programs for the parish and all communities by increasing awareness of risks and safety for flooding, tornadoes, wildfire, drought, thunderstorms (lightning, high wind, hail), winter storms as well as providing information on high risk areas. Informing communities, business and citizens on proper mitigation efforts and activities will create resiliency within the parish and its communities.	FEMA, Local	1-5 years	Town of Oak Grove	Flooding, Tornadoes, Drought, Thunderstorms (lightning, high wind, hail), Winter Storms, Tropical Cyclones	2,3	New
OG6: Generators for Continuity of Operations and Government	Procurement and Installation of generators at public facilities to ensure continued operations during and after events.	FEMA, Local	1-5 years	Town of Oak Grove	Tornadoes, Winter Storms, High Wind, Lightning, Tropical Cyclones	1,3	New
OG7: Lightning Mitigation	Procurement and Installation of lightning rods and surge protectors for public buildings to preserve life and property.	FEMA, Local	1-5 years	Town of Oak Grove	Lightning	1	New
OG8: Drought Ordinances	Adopt ordinance requiring water-saving measures in time of drought.	FEMA, Local	1-5 years	Town of Oak Grove	Drought	1	New

Village of Pioneer New Mitigation Actions

Village of Pioneer New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
P1: Building Retrofits	Retrofit public buildings exterior shell to maintain use during and after storm events. Benefits: Reduces damage from high winds, and helps assure that the public buildings can be used, occupied and operable during or after storms.	FEMA, Local	2-5 years	Village of Pioneer	High Wind, Tornado, Hail, Tropical Cyclones	1	New
P2: Drainage Improvement	Will relieve flooding problems, reduce flood damage and costs of damage, overtopping of roads with drain water, while also keeping open roadways during periods of high precipitation. Benefits: Relieves parish or local government and property owners of the continual flooding problems, with closed roadways (loss of function). Saves public funds for road repairs, drainage ditch repairs, sandbagging and blocking of roadways during storm periods.	FEMA, Local	1-10 years	Village of Pioneer	Flooding, Tropical Cyclones	1,3	New
P3: Flood Mitigation of Repetitive Loss Properties and Other Flood Prone Structures	Elevation, acquisition-demolition, acquisition-relocations, and reconstruction of repetitive loss or flood prone properties. Benefits: Relieves property owners of the continual flooding problems. Saves flood relief and damage repayment for each property.	FEMA, Local	1-5 years	Village of Pioneer	Flooding, Tropical Cyclones	1,3	New

Village of Pioneer New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
P4: Safe Room Projects	Construction of a safe room for first responders located in the Village of Pioneer. Other locations will be identified based on funding availability.	FEMA, Local	1-10 years	Village of Pioneer	Tornadoes	1	New
P5: Education and Outreach	Enhance the public outreach programs for the parish and all communities by increasing awareness of risks and safety for flooding, tornadoes, wildfire, drought, thunderstorms (lightning, high wind, hail), winter storms as well as providing information on high risk areas. Informing communities, business and citizens on proper mitigation efforts and activities will create resiliency within the parish and its communities.	FEMA, Local	1-5 years	Village of Pioneer	Flooding, Tornadoes, Drought, Thunderstorms (lightning, high wind, hail), Winter Storms, Tropical Cyclones	2,3	New
P6: Generators for Continuity of Operations and Government	Procurement and Installation of generators at public facilities to ensure continued operations during and after events.	FEMA, Local	1-5 years	Village of Pioneer	Tornadoes, Winter Storms, High Wind, Lightning, Tropical Cyclones	1,3	New
P7: Lightning Mitigation	Procurement and Installation of lightning rods and surge protectors for public buildings to preserve life and property.	FEMA, Local	1-5 years	Village of Pioneer	Lightning	1	New
P8: Drought Ordinances	Adopt ordinance requiring water-saving measures in time of drought.	FEMA, Local	1-5 years	Village of Pioneer	Drought	1	New

Action Prioritization

During the prioritization process, each jurisdiction and the Steering Committee considered the costs and relative benefits of each new action. Costs can usually be listed in terms of dollars, although at times it involves staff time rather than the purchase of equipment or services that can be readily measured in dollars. In most cases, benefits, such as lives saved or future damage prevented, are hard to measure in dollars, many projects were prioritized with these factors in mind.

In all cases, the jurisdictions concluded that the benefits (in terms of reduced property damage, lives saved, health problems averted and/or economic harm prevented) outweighed the costs for the recommended action items.

The Steering Committee met internally for mitigation action meetings to review and approve West Carroll Parish and each jurisdictions mitigation actions. On-going actions, as well as actions which can be undertaken by existing parish or local staff without need for additional funding, were given high priority. The actions with high benefit and low cost, political support, and public support but require additional funding from parish or external sources were given medium priority. The actions that require substantial funding from external sources with relatively longer completion time were given low priority.

West Carroll Parish and the participating jurisdictions will implement and administer the identified actions based off of the proposed timeframes and priorities for each reflected in the portions of this section where actions are summarized. The inclusion of any specific action item in this document does not commit the parish to implementation. Each action item will be subject to availability of staff and funding. Certain items may require regulatory changes or other decisions that must be implemented through standard processes, such as changing regulations. This plan is intended to offer priorities based on an examination of hazards.

This Page Left Intentionally Blank

Appendix A: Planning Process

Purpose

The Hazard Mitigation Plan Update process prompts local jurisdictions to keep their hazard mitigation plan current and moving toward a more resilient community. The plan update builds on the research and planning efforts of previous plans while reviewing recent trends. The Steering Committee followed FEMA's hazard mitigation planning process per the FEMA Local Mitigation Planning Handbook. This planning process assured public involvement and the participation of interested agencies and private organizations. Documentation of the planning process for the updated plan is addressed in this section.

The West Carroll Parish Hazard Mitigation Plan Update

The West Carroll Parish Hazard Mitigation Plan Update process began in December 2014 with a series of meetings and collaborations between the contractor (SDMI) and the participating jurisdictions. Update activities were intended to give each jurisdiction the opportunity to shape the plan to best fit their community's goals. Community stakeholders and the general public were invited to attend and contribute information to the planning process during specific time periods or meetings.

West Carroll Parish includes five incorporated municipalities: the town of Oak Grove and the Villages of Epps, Forest, Kilbourne, and Pioneer. All five municipalities participated in the plan update process. West Carroll Parish Office of Homeland Security and Emergency Preparedness (OHSEP) invited communities' representatives to meetings, where they supplied critical infrastructure data and reviewed work-in-progress for the plan update.

Similar to the development of the original hazard mitigation plan, the role of the steering committee members during the plan update was to attend the planning meetings and provide valuable information on the parish, develop parts of the plan update, and review the results of research conducted by SDMI. Tasks completed by the steering committee include:

- Reviewing and revising the list of potential hazards included in the plan update
- Assembling a list of critical facilities, such as hospitals, police stations, and shelters
- Updating mitigation goals and objectives
- Determining prudent mitigation measures
- Prioritization of identified mitigation measures

The table below details the meeting schedule and purpose for the planning process:

Date	Meeting or Outreach	Location	Public Invited	Purpose
12/17/2015	Initial Coordination	Telephone/ Email	No	Discuss with Parish HM coordinator and any steering committee members expectations and requirements of the project.
1/29/2015	Kick-Off Meeting	West Carroll OHSEP, Oak Grove, LA	No	Discuss with the plan steering committee expectations and requirements of the project. Assign plan worksheets to jurisdictions.
8/25/2015	Risk Assessment Overview	Police Jury, Oak Grove, LA	No	Discuss and review the risk assessment with the steering committee. Discuss and review expectations for public meeting.
8/25/2015	Public Meeting	Police Jury, Oak Grove, LA	Yes	The public meeting allowed the public and community stakeholders to participate and provide input into the hazard mitigation planning process. Maps of the West Carroll Parish communities were provided for the meeting attendees to identify specific areas where localized hazards occur.
Ongoing	Public Survey Tool	Online	Yes	This survey asked participants about public perceptions and opinions regarding natural hazards in West Carroll Parish. In addition, we asked about the methods and techniques preferred for reducing the risks and losses associated with these hazards. Survey Results: https://www.surveymonkey.com/r/WestCarrollHMPU
2 Week Period	Public Plan Review	Government Buildings	Yes	West Carroll Parish Government Buildings

Planning

The plan update process consisted of several phases

	Month 1-2	Month 3-4	Month 5-6	Month 7	Month 8	Month 9	Month 10	Month 11
Plan Revision								
Data Collection								
Risk Assessment								
Public Input								
Mitigation Strategy and Actions								
Plan Review by GOHSEP and FEMA								
Plan Adoption								
Plan Approval								

Coordination

The West Carroll Parish Office of Homeland Security and Emergency Preparedness (OHSEP) oversaw the coordination of the 2015 Hazard Mitigation Plan Update Steering Committee during the update process. The parish OHSEP and participating jurisdictions were responsible for identifying members for the committee.

The Parish Director and SDMI were jointly responsible for inviting the steering committees and key stakeholders to planned meetings and activities. SDMI assisted the Parish Director with press releases and social media statements for notification to the media and general public for public meetings and public outreach activities.

SDMI was responsible for facilitating meetings and outreach efforts during the update process.

Neighboring Community, Local, and Regional Planning Process Involvement

From the outset of the planning process, the Hazard Mitigation Team encouraged participation from a broad range of jurisdictional entities. The involvement of representatives from the city, state, and regional agencies provided diverse perspectives and mitigation ideas.

Formal participation in this plan includes but is not limited to the following activities:

- Participation in Hazard Mitigation Team meetings at the local and parish level
- Sharing local data and information
- Local action item development
- Plan document draft review
- Formal adoption of the Hazard Mitigation Plan document by each jurisdiction following provisional approval by The State of Louisiana and FEMA

The 2015 Hazard Mitigation Plan Update Steering Committee consisted of representatives from the following parish, municipal, or community stakeholders:

- West Carroll Parish Government
- West Carroll Office of Homeland Security and Emergency Preparedness
- Town of Oak Grove
- Village of Epps
- Village of Kilbourne
- Village of Forest
- Village of Pioneer

The Parish Director of East Carroll was invited by the West Carroll Parish OHSEP Director to participate in all meetings and activities as well in an effort to collaborate with neighboring communities through phone calls and other regional meetings. West Carroll Parish is also a sheltering parish with a point to point partner parish from South Louisiana. Any mitigation actions involving facilities used as shelters during events involving their point to point partners will continue to be collaborated on. The participation of the GOHSEP Region 8 Coordinator during the process also contributed to neighboring community representation.

As part of the coordination and planning process, each jurisdiction was provided the State Required Hazard Mitigation Plan Update Worksheet. Jurisdictions with the capability to complete and return these worksheets returned them to assist with the 2015 update. The completed worksheets can be found in Appendix E – State Required Plan Update Worksheets

Below is a detailed list of the 2015 Hazard Mitigation Plan Update Steering Committee:

Member/Title	Jurisdiction/Entity	Address	Phone/Email
Peggy Robinson – 911 Coordinator, OHSEP Director, Floodplain Manager	West Carroll Parish	310 Skinner Ln., PO Drawer 630, Oak Grove, LA 71263	318-428-8020 / wcpoep@bellsouth.net & wcpoep2@att.net
Rebecca Reemes – 911 Coordinator, Floodplain Manager	West Carroll Parish	310 Skinner Ln., PO Drawer 630, Oak Grove, LA 71263	318-428-8020 / wcpoep@bellsouth.net & wcpoep2@att.net
Myrl Sistrunk – Oak Grove Fire Chief	Town of Oak Grove	PO Box 711, Oak Grove, LA 71263	318-267-6712 / myrldianne@bellsouth.net
Adam Holland – Mayor of Oak Grove	Town of Oak Grove	PO Box 1014, Oak Grove, LA 71263	318-428-3275 / adam@townof oakgrove.com
Richie Allen – West Carroll Ambulance District	West Carroll Parish	PO Box 684, Oak Grove, LA 71263	318-428-8979 / richiewcems@bellsouth.net
Wesley Copeland – Parish Public Foreman	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-28-4990 / beoufriverkennels@yahoo.com
Jason Cowden – Parish Public Foreman	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-28-4990 / beoufriverkennels@yahoo.com
Jack L. Madden – Police Jury President	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-428-3390 / wcpj@bellsouth.net
Bill Ellerbe – Police Jury	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-428-3390 / wcpj@bellsouth.net
Martha Stephens – Police Jury	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-428-3390 / wcpj@bellsouth.net
Dennis Seamans – West Carroll Ambulance District	West Carroll Parish	PO Box 684, Oak Grove, LA 71263	318-428-8979 / wcems@bellsouth.net
Johnny Moss/Lewis Russell – Oak Grove Police Chief	Town of Oak Grove	PO Box 1014 Oak Grove, LA 71263	318-428-4556 / ogpd@bellsouth.net
Allen Irby – West Carroll Sherriff's Office Deputy	West Carroll Parish	PO Box 744 Oak Grove, LA 71263	318-428-2331 / alan@westcarrollsheriff.net
LeeKeitha Reed – East Carroll Parish OHSEP Director	East Carroll Parish	Lake Providence, LA	318-559-1502
Shirly Gibson – Mayor of Epps	Village of Epps	PO Box 73 Epps, Louisiana 71237	eppsvillage@gmail.com
Larry Demon – Mayor of Forest	Village of Forest	137 Walnut Street	Ldemon1240@gmail.com
Toni Shumate – Mayor of Kilbourne	Village of Kilbourne	PO Box 395, Kilbourne, LA	Shutmate.toni@yahoo.com
Sonia Copes-Reiter – Mayor of Pioneer	Village of Pioneer	PO Box 153 Pioneer, LA	Villageofpioneer@yahoo.com

Program Integration

Local governments are required to describe how their mitigation planning process is integrated with other ongoing local and area planning efforts. This subsection describes West Carroll Parish programs and planning.

A measure of integration and coordination is achieved through the Hazard Mitigation Plan participation of steering committee members and community stakeholders who administer programs such as floodplain management under the National Flood Insurance Program (NFIP) and parish planning and zoning and building code enforcement.

Opportunities to integrate the requirements of this Hazard Mitigation Plan into other local planning mechanisms will continue to be identified through future meetings of the parish and jurisdictions and through the five-year review process described in the Plan Maintenance Section. The primary means for integrating mitigation strategies into other local planning mechanisms will be through the revision, update, and implementation of each jurisdiction's individual city/town plans that require specific planning and administrative tasks (e.g. risk assessment, plan amendments, ordinance revisions, capital improvement projects, etc.).

The members of the West Carroll Parish Hazard Mitigation Steering Committee will remain charged with ensuring that the goals and strategies of new and updated local planning documents for their jurisdictions or agencies are consistent with the goals and actions of the Hazard Mitigation Plan, and will not contribute to increased hazard vulnerability in the parish. Existing plans, studies, and technical information were incorporated in the planning process. Examples include flood data from FEMA, the U.S. Army Corps of Engineers (USACE or Corps), and the U.S. Geological Survey. Much of this data was incorporated into the risk assessment component of the plan relative to plotting historical events and the magnitude of damages that occurred. The parish's previous Hazard Mitigation Plan was also used in the planning process. Other existing parish and jurisdiction data and plans reviewed and/or incorporated into the planning process include those listed below.

- Floodplain Ordinances
- Emergency Operations Plans
- Debris Removal Plan
- Economic Plans
- Stormwater Management Plans
- Flood Insurance Rate Maps

Further information on other plans and capabilities reviewed can be found in the Capabilities Assessment, Section 3.

Meeting Documentation and Public Outreach Activities

The following pages contain information from the meetings and public outreach activities conducted during this hazard mitigation plan update for West Carroll Parish.

Meeting #1: Coordination Conference Call

Date: December 17, 2014

Location: Teleconference

Purpose: Discuss with the hazard mitigation lead for the parish (OHSEP director) the expectations and requirements of the hazard mitigation plan update process and to establish an initial project timeline.

Public Initiation: No

Invitees included:

SDMI Staff – Margaret Pierce, Project Lead

West Carroll OHSEP – Parish Director, OHSEP Staff

Meeting #2: Hazard Mitigation Plan Update Kick-Off

Date: January 29, 2015**Location:** Oak Grove, Louisiana

Purpose: Discuss the expectations and requirements of the Hazard Mitigation Plan Update process and to establish an initial project timeline with the Parish's Hazard Mitigation Plan Steering Committee. Assign each individual jurisdiction and the parish data collection for the plan update.

Public Initiation: All parish government meetings are open to the public**Invitees Included:**

Member/Title	Jurisdiction/Entity	Address	Phone/Email
Peggy Robinson – 911 Coordinator, OHSEP Director, Floodplain Manager	West Carroll Parish	310 Skinner Ln., PO Drawer 630, Oak Grove, LA 71263	318-428-8020 / wcpoep@bellsouth.net & wcpoep2@att.net
Rebecca Reemes – 911 Coordinator, Floodplain Manager	West Carroll Parish	310 Skinner Ln., PO Drawer 630, Oak Grove, LA 71263	318-428-8020 / wcpoep@bellsouth.net & wcpoep2@att.net
Myrl Sistrunk – Oak Grove Fire Chief	Town of Oak Grove	PO Box 711, Oak Grove, LA 71263	318-267-6712 / myrldianne@bellsouth.net
Adam Holland – Mayor of Oak Grove	Town of Oak Grove	PO Box 1014, Oak Grove, LA 71263	318-428-3275 / adam@townofoakgrove.com
Richie Allen – West Carroll Ambulance District	West Carroll Parish	PO Box 684, Oak Grove, LA 71263	318-428-8979 / richiewcems@bellsouth.net
Wesley Copeland – Parish Public Foreman	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-28-4990 / beoufriverkennels@yahoo.com
Jason Cowden – Parish Public Foreman	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-28-4990 / beoufriverkennels@yahoo.com
Jack L. Madden – Police Jury President	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-428-3390 / wcpj@bellsouth.net
Bill Ellerbe – Police Jury	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-428-3390 / wcpj@bellsouth.net
Martha Stephens – Police Jury	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-428-3390 / wcpj@bellsouth.net
Dennis Seamans – West Carroll Ambulance District	West Carroll Parish	PO Box 684, Oak Grove, LA 71263	318-428-8979 / wcems@bellsouth.net
Johnny Moss/Lewis Russell – Oak Grove Police Chief	Town of Oak Grove	PO Box 1014 Oak Grove, LA 71263	318-428-4556 / ogpd@bellsouth.net
Allen Irby – West Carroll Sherriff's Office Deputy	West Carroll Parish	PO Box 744 Oak Grove, LA 71263	318-428-2331 / alan@westcarrollsheriff.net
LeeKeitha Reed – East Carroll Parish OHSEP Director	East Carroll Parish	Lake Providence, LA	318-559-1502
Shirly Gibson – Mayor of Epps	Village of Epps	PO Box 73 Epps, Louisiana 71237	eppsvillage@gmail.com
Larry Demon – Mayor of Forest	Village of Forest	137 Walnut Street	Ldemon1240@gmail.com
Toni Shumate – Mayor of Kilbourne	Village of Kilbourne	PO Box 395, Kilbourne, LA	Shutmte.toni@yahoo.com
Sonia Copes-Reiter – Mayor of Pioneer	Village of Pioneer	PO Box 153 Pioneer, LA	Villageofpioneer@yahoo.com

Meeting #3: Risk Assessment Overview

Date: August 25, 2015**Location:** Oak Grove, Louisiana

Purpose: Members of the Hazard Mitigation Plan Update Steering Committee were invited and were presented the results of the most recent risk assessment and an overview of the public meeting presentation during this overview. The assessment was conducted based on hazards identified during previous plans.

Public Initiation: All Parish Government Meetings are Open to the Public

Invitees Included:

Member/Title	Jurisdiction/Entity	Address	Phone/Email
Peggy Robinson – 911 Coordinator, OHSEP Director, Floodplain Manager	West Carroll Parish	310 Skinner Ln., PO Drawer 630, Oak Grove, LA 71263	318-428-8020 / wcpoep@bellsouth.net & wcpoep2@att.net
Rebecca Reemes – 911 Coordinator, Floodplain Manager	West Carroll Parish	310 Skinner Ln., PO Drawer 630, Oak Grove, LA 71263	318-428-8020 / wcpoep@bellsouth.net & wcpoep2@att.net
Myrl Sistrunk – Oak Grove Fire Chief	Town of Oak Grove	PO Box 711, Oak Grove, LA 71263	318-267-6712 / myrldianne@bellsouth.net
Adam Holland – Mayor of Oak Grove	Town of Oak Grove	PO Box 1014, Oak Grove, LA 71263	318-428-3275 / adam@townofoakgrove.com
Richie Allen – West Carroll Ambulance District	West Carroll Parish	PO Box 684, Oak Grove, LA 71263	318-428-8979 / richiewcems@bellsouth.net
Wesley Copeland – Parish Public Foreman	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-28-4990 / beoufriverkennels@yahoo.com
Jason Cowden – Parish Public Foreman	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-28-4990 / beoufriverkennels@yahoo.com
Jack L. Madden – Police Jury President	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-428-3390 / wcpj@bellsouth.net
Bill Ellerbe – Police Jury	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-428-3390 / wcpj@bellsouth.net
Martha Stephens – Police Jury	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-428-3390 / wcpj@bellsouth.net
Dennis Seamans – West Carroll Ambulance District	West Carroll Parish	PO Box 684, Oak Grove, LA 71263	318-428-8979 / wcems@bellsouth.net
Johnny Moss/Lewis Russell – Oak Grove Police Chief	Town of Oak Grove	PO Box 1014 Oak Grove, LA 71263	318-428-4556 / ogpd@bellsouth.net
Allen Irby – West Carroll Sherriff's Office Deputy	West Carroll Parish	PO Box 744 Oak Grove, LA 71263	318-428-2331 / alan@westcarrollsheriff.net
LeeKeitha Reed – East Carroll Parish OHSEP Director	East Carroll Parish	Lake Providence, LA	318-559-1502
Shirly Gibson – Mayor of Epps	Village of Epps	PO Box 73 Epps, Louisiana 71237	eppsvillage@gmail.com
Larry Demon – Mayor of Forest	Village of Forest	137 Walnut Street	ldemon1240@gmail.com
Toni Shumate – Mayor of Kilbourne	Village of Kilbourne	PO Box 395, Kilbourne, LA	Shutmate.toni@yahoo.com
Sonia Copes-Reiter – Mayor of Pioneer	Village of Pioneer	PO Box 153 Pioneer, LA	Villageofpioneer@yahoo.com

Meeting #4: Public Meeting

Date: August 25, 2015**Location:** Oak Grove, Louisiana

Purpose: The public meeting allowed the public and community stakeholders to participate and provide input into the hazard mitigation planning process. Maps of the West Carroll Parish communities were provided for the meeting attendees to identify specific areas where localized hazards occur.

Public Initiation: Yes**Invitees Included:**

Member/Title	Jurisdiction/Entity	Address	Phone/Email
Peggy Robinson – 911 Coordinator, OHSEP Director, Floodplain Manager	West Carroll Parish	310 Skinner Ln., PO Drawer 630, Oak Grove, LA 71263	318-428-8020 / wcpoep@bellsouth.net & wcpoep2@att.net
Rebecca Reemes – 911 Coordinator, Floodplain Manager	West Carroll Parish	310 Skinner Ln., PO Drawer 630, Oak Grove, LA 71263	318-428-8020 / wcpoep@bellsouth.net & wcpoep2@att.net
Myrl Sistrunk – Oak Grove Fire Chief	Town of Oak Grove	PO Box 711, Oak Grove, LA 71263	318-267-6712 / myrldianne@bellsouth.net
Adam Holland – Mayor of Oak Grove	Town of Oak Grove	PO Box 1014, Oak Grove, LA 71263	318-428-3275 / adam@townofoakgrove.com
Richie Allen – West Carroll Ambulance District	West Carroll Parish	PO Box 684, Oak Grove, LA 71263	318-428-8979 / richiewcems@bellsouth.net
Wesley Copeland – Parish Public Foreman	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-28-4990 / beoufriverkennels@yahoo.com
Jason Cowden – Parish Public Foreman	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-28-4990 / beoufriverkennels@yahoo.com
Jack L. Madden – Police Jury President	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-428-3390 / wcpj@bellsouth.net
Bill Ellerbe – Police Jury	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-428-3390 / wcpj@bellsouth.net
Martha Stephens – Police Jury	West Carroll Parish	PO Drawer 630, Oak Grove, LA 71263	318-428-3390 / wcpj@bellsouth.net
Dennis Seamans – West Carroll Ambulance District	West Carroll Parish	PO Box 684, Oak Grove, LA 71263	318-428-8979 / wcems@bellsouth.net
Johnny Moss/Lewis Russell – Oak Grove Police Chief	Town of Oak Grove	PO Box 1014 Oak Grove, LA 71263	318-428-4556 / ogpd@bellsouth.net
Allen Irby – West Carroll Sherriff's Office Deputy	West Carroll Parish	PO Box 744 Oak Grove, LA 71263	318-428-2331 / alan@westcarrollsheriff.net
LeeKeitha Reed – East Carroll Parish OHSEP Director	East Carroll Parish	Lake Providence, LA	318-559-1502
Shirly Gibson – Mayor of Epps	Village of Epps	PO Box 73 Epps, Louisiana 71237	eppsvillage@gmail.com
Larry Demon – Mayor of Forest	Village of Forest	137 Walnut Street	Ldemon1240@gmail.com
Toni Shumate – Mayor of Kilbourne	Village of Kilbourne	PO Box 395, Kilbourne, LA	Shutmate.toni@yahoo.com
Sonia Copes-Reiter – Mayor of Pioneer	Village of Pioneer	PO Box 153 Pioneer, LA	Villageofpioneer@yahoo.com

****Subject Matter Experts from parish government were present to answer specific questions about proposed projects from any citizens.**

Meeting Public Notices

Public Meeting notices were posted throughout the parish on bulletin boards at all five town halls, as well as on the front door of the Police Jury office and the inside hall bulletin board in the courthouse.



WEST CARROLL PARISH OFFICE OF HOMELAND SECURITY & EMERGENCY PREPAREDNESS

PUBLIC MEETING NOTICE

West Carroll Parish to hold Public Meetings for Hazard Mitigation Plan Update

Oak Grove, LA – West Carroll Parish Office of Homeland Security & Emergency Preparedness is in the process of updating the West Carroll Parish Hazard Mitigation Plan and are required to hold public meetings on the plan update. The Public meeting will be held on August 25th, 2015 in the West Carroll Parish Policy Jury Meeting Room located at 107 S. Briggs St., Oak Grove, LA, from 9:30AM to 10:30AM.

Natural hazards have the potential to cause property loss, loss of life, economic hardship, and threats to public health and safety. While an important aspect of emergency management deals with disaster recovery (the actions that a community takes to repair damages), an equally important aspect of emergency management involves hazard mitigation - sustained actions taken to reduce long-term risk to life and property. They are things we do today to be more protected in the future. For example, elevating buildings in flood hazard areas, installing hurricane clips and storm shutters, relocating critical facilities out of hazard areas, using fire-resistant construction materials in wildfire hazard areas, etc. Hazard mitigation actions are essential to breaking the typical disaster cycle of damage, reconstruction, and repeated damage. With careful selection, they can be long-term, cost-effective means of reducing risk and helping to create a more sustainable and disaster-resilient community.

A hazard mitigation plan describes an area's vulnerability to the various natural hazards that are typically present, along with an array of actions and projects for reducing key risks. While natural disasters cannot be prevented from occurring, the continued implementation of mitigation strategies identified in the plan will gradually, but steadily, make our communities more sustainable and disaster-resilient.

The Disaster Mitigation Act of 2000 (DMA 2000) requires all states and local governments to have a hazard mitigation plan in order to be eligible to apply for certain types of federal hazard mitigation project grants. Hazard mitigation plans must be: (a) implemented on an ongoing basis, and (b) updated every five years to ensure that they remain applicable representations of local risk and locally-preferred risk reduction strategies.

West Carroll Parish is in the beginning stages of updating its hazard mitigation plan. Public meeting will be held on August 25th, 2015 for all citizens interested in learning about and participating in discussions concerning the West Carroll Parish Hazard Mitigation Plan.

Residents of West Carroll Parish are asked to participate in a survey about public perceptions and opinions regarding natural hazards in the parish. The survey results will be used in the development of the plan. This short web-based survey can be found at <https://www.surveymonkey.com/r/WestCarroll>.

For more information, please contact: Peggy Robinson, OHSEP Director – West Carroll Parish

Outreach Activity #1: Public Opinion Survey

Date: Ongoing throughout planning process

Location: Web survey <https://www.surveymonkey.com/r/WestCarroll>

Public Initiation: Yes

Outreach Activity #2: Incident Questionnaire

Date: Public Meeting Activity**Location:** Public Meeting**Public Initiation:** Yes

**Public Meeting
Incident/Issue Questionnaire**

1. Hazard Type(s):
 - a. Flooding
 - i. Riverine
 - ii. Storm Surge
 - iii. Street
 - iv. Other (describe):
 - b. High winds (not tropical)
 - c. Coastal
 - i. Saltwater Intrusion
 - ii. Erosion
 - iii. Other (describe):
 - d. Tropical Systems
 - e. Winter Weather
 - f. Other: _____
2. Describe incident or issue:

3. Location:
 - a. City: _____
 - b. Address or Area: _____
 - c. Localized or dispersed: _____
4. Intensity:
 - a. Depth (flooding) or Size (hail, etc.) _____
 - b. Wind strength
5. Re-occurring or one-time
 - a. If re-occurring, how often? _____
6. What type of interruptions does/did the incident or issue cause? (business closure, damage, evacuation, etc.) _____

7. How long was the interruption (hours, days, weeks, etc.)? _____
8. How could this problem or impact be prevented, fixed or alleviated?

9. Can we contact you if we have further questions about this incident? Yes/No
10. Contact Information (optional)
 - a. Name: _____
 - b. City: _____
 - c. Phone: (_____) _____
 - d. Email: _____

Outreach Activity #3: Mapping Activities

Public meeting attendees were asked to identify areas on jurisdictional maps provided that were “problem areas”. They were also asked to indicate any areas of new development. This activity gave the public an opportunity to interact with SDMI’s GIS Mapping section, as well as to provide valuable input on areas that may flood repeatedly during rain events that may not get reported to local emergency managers a significant events.



Public Plan Review Documentation



Appendix B: Plan Maintenance

Purpose

The section of the Code of Federal Regulations (CFR) pertaining to Local Mitigation Plans lists five required components for each plan: a description of the planning process; risk assessments; mitigation strategies; a method and system for plan maintenance; and documentation of plan adoption. This section details the method and system for plan maintenance, following the CFR's guidelines that the plan update must include (1) "a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle," (2) "a process by which local governments incorporated the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans" and (3) "discussion on how the community will continue public participation in the plan maintenance process."

Monitoring, Evaluating, and Updating the Plan

By law, the plan must be updated every five years prior to re-submittal to the Federal Emergency Management Agency (FEMA) for re-approval. The first part of this subsection describes the whole update process, including the responsible parties, methods to be used, evaluation criteria to be applied, and, scheduling for monitoring and evaluating the plan. These descriptions are followed by an explanation of how and when the plan will be periodically updated. The plan must be updated every five years prior to re-submittal to the Federal Emergency Management Agency (FEMA) for re-approval. The first part of this subsection describes the whole update process, including sections on the following:

- Responsible parties
- Methods to be used
- Evaluation criteria to be applied
- Scheduling for monitoring and evaluating the plan

Responsible Parties

West Carroll Parish has developed a method to ensure that a regular review and update of the Hazard Mitigation Plan occurs. This will be the responsibility of the steering committee, which consists of representatives from governmental organizations, local businesses, and private citizens, who will be involved in the process of monitoring, evaluating and updating the plan. All jurisdictions participating in this plan will remain active in the steering committee. Each of the jurisdictions are listed below:

- West Carroll Unincorporated
- Town of Oak Grove
- Village of Epps
- Village of Kilbourne
- Village of Forest
- Village of Pioneer

Although the people filling the positions may change from year to year, each jurisdiction will have a representative on the Steering Committee. The future Steering Committee will continue to be comprised of

the same job functions as currently evident in the Steering Committee. However, the decision of specific job duties will be left to the Parish Emergency Manager to be assigned as deemed appropriate.

Methods for Monitoring and Evaluating the Plan and Plan Evaluation Criteria

Review and revision of the Hazard Mitigation Plan will be directed by the Director of the West Carroll Parish Office of Homeland Security and Emergency Preparedness (OHSEP).

Progress on the mitigation action items will be monitored continuously as part of each key staff member's official responsibilities and evaluated annually by the Director of the West Carroll Parish OHSEP. As part of the annual evaluation, the Lead Manager for each action item and other staff involved in the action's implementation will complete an annual Progress Report to be submitted to the Director of the West Carroll Parish OHSEP for review.

The Progress Report contains a set of monitoring and evaluation criteria designed both to monitor the ongoing status of each action or project and to annually evaluate the success of each mitigation action according to the process and time-line discussed above.

The Monitoring and Evaluation criteria are as follows:

1. Has the project been initiated? If so, is it on schedule and have key personnel been committed to the project's completion? If not, why not?
2. Is adequate funding and staff in place to ensure project oversight and completion? If not, have alternate strategies been identified for continuing with the project?
3. Will any new ordinances or upcoming changes in local ordinances affect the continued implementation of the project? If so, what measures can be taken to ensure ongoing implementation?
4. Is the project complete or nearing completion? If so, did it mitigate or eliminate the risk-related problem? If not, why not, and are there measures in place to achieve the desired mitigation benefit?
5. Are changes needed in the local jurisdiction's technical, legal, political, environmental, or economic expertise or resources in order to better implement the mitigation actions in the future?
6. Are there any organizational or coordination processes that can improve implementation?

Completed reports will be reviewed by the Director of the West Carroll Parish OHSEP in consultation with the Lead Manager for details involving each mitigation item. Copies of the Annual Progress Reports will also be sent to the mayors of each jurisdiction.

If during this process of reviewing the Annual Progress Report, the Director of the West Carroll Parish OHSEP determines that the Steering Committee should be reconvened for discussion, she/he will use the following criteria to determine if a meeting needs to be held:

- Are there any changes in mitigation plan or mitigation project requirements that will affect the availability of grant funding for the current projects underway?
- Are any Scope of Work changes or revisions needed to implement the current mitigation Action items which may affect their eligibility for continued grant funding?
- Have any action items been completed?
- Does a review of the Progress Reports indicate any changes to implementation processes are necessary?
- Are there any changes within the Steering Committee membership?

Although not required, FEMA recommends an annual meeting of the Steering Committee. If the Director determines that this annual meeting needs to be conducted, she is responsible for contacting committee members, organizing the meeting and providing public noticing for the meeting to solicit public input.

Updating The Plan

In addition to monitoring and evaluating the progress of the mitigation plan's actions or projects, the mitigation plan is required to be updated, and the plan update approved by GOHSEP and FEMA within five-years from the date of the plan's original FEMA approval. If a disaster occurs or as action items are completed, the plan will be reviewed, revised, and updated sooner than the required five years, using the process outlined in this section.

The Steering Committee will be reconvened approximately one year before the five-year deadline to begin evaluating the Hazard Mitigation Plan. The above Monitoring and Evaluation criteria and the following key topics and questions below will be addressed at the meeting.

- Hazard ID - Are there new hazards that affect your community? Has a disaster occurred? Has a previously Low ranking hazard become more risky?
- Profiling Hazards and Assessing Risks - Are new maps, risk assessment tools, risk data or new hazard studies available? Have probabilities of future events, or hazard locations, magnitude or severity changed? Has existing and/or future development in the community been checked for their effect on hazard areas?
- Inventory Assets - Have inventories of existing buildings, critical facilities and infrastructure in hazard areas been updated? Are there any new special high risk populations? Is future land development accounted for in the inventories?
- Estimate Losses - Have potential dollar losses been updated to account for any recent changes (above)?

If the answer to any of the above questions is a "Yes", then the plan will be updated accordingly.

The plan review and update will be accomplished by also reviewing each mitigation goal and action item to determine their relevance to any changing situations in the parish and in each municipality (as identified above), as well as changes to State or Federal policy, and to ensure that they are addressing current and expected conditions.

The Steering Committee will work together as a team, with each member sharing responsibility for completing the evaluation and updates. Each member of the Steering Committee is an equal member of the

process. It will be the responsibility of the representative from each community to ensure that their section of this plan is updated to meet the required deadline.

During the revision process, the Director of the West Carroll Parish will send a status report (meeting minutes) to the Parish Police Jury and Mayors of the incorporated communities after each Steering Committee meeting.

After all revisions to the plan update are completed, the final plan will be submitted to the GOHSEP's Hazard Mitigation Officer for review and then on to FEMA for review and approval to remain eligible for continued HMGP funding.

Note: FEMA, LA DOTD, and GOHSEP have the authority to evaluate the progress of existing mitigation plans to determine if the plan is fulfilling program requirements

2015 Plan Version Plan Method and Schedule Evaluation

For the current plan update, the previously approved plan's method and schedule were evaluated to determine if the elements and processes involved in the required 2015 update. Based on this analysis, the method and schedule were deemed to be acceptable, and nothing was changed for this update.

Incorporation into Existing Planning Programs

It is and has been the responsibility of the West Carroll Parish Hazard Mitigation Plan Steering Committee and participating jurisdictions to determine additional implementation procedures when appropriate. This may include integrating the requirements of the West Carroll Parish Hazard Mitigation Plan into each jurisdiction's planning documents, processes, or mechanisms as follows:

- Ordinances, Resolutions, Regulations
- Floodplain Ordinances
- Emergency Operations Plans
- Comprehensive Master Plans
- Economic Development Plans
- Stormwater Management Plans
- Continuity of Operations Plans

Opportunities to integrate the requirements of this plan into other local planning mechanisms will continue to be identified through future meetings of the West Carroll Parish Hazard Mitigation Steering Committee and through the five-year review process described herein. The primary means for integrating mitigation strategies into other local planning mechanisms will be through the revision, update, and implementation of each jurisdiction's individual plans that require specific planning and administrative tasks (e.g. risk assessment, plan amendments, ordinance revisions, capital improvement projects, etc.). The members of the Steering Committee will remain charged with ensuring that the goals and strategies of new and updated local planning documents for their jurisdictions or agencies are consistent with the goals and actions of the West Carroll Parish Hazard Mitigation Plan, and will not contribute to increased hazard vulnerability within the parish.

During the planning process for new and updated local planning documents at the parish and jurisdiction level, such as a risk assessment, comprehensive plan, capital improvements plan, or emergency operations plan, the jurisdictions will provide a copy of the Parish Hazard Mitigation Plan to the appropriate parties and recommend that all goals and strategies of new and updated local planning documents are consistent with and support the goals of the Parish Hazard Mitigation Plan and will not contribute to increased hazards.

Although it is recognized that there are many possible benefits to integrating components of this plan into other parish and jurisdiction planning mechanisms, the development and maintenance of this stand-alone Hazard Mitigation Plan is deemed by the Steering Committee to be the most effective and appropriate method to ensure implementation of Parish and local hazard mitigation actions.

On behalf of the jurisdictions of Village of Epps, Village of Forest, Village of Kilbourne, Town of Oak Grove, and Village of Pioneer, West Carroll Parish has the authority to incorporate the contents of the Hazard

Mitigation Plan into the parish's existing regulatory mechanisms. Agreements are currently in place with jurisdictions to allow for the parish incorporation mechanisms to take place.

The following parish and local plans incorporate requirements of this update as follows through steering committee member and jurisdiction representation throughout the planning process as described above:

West Carroll Unincorporated

Capital Improvement Plan/Updated annually/West Carroll Parish Government
Economic Development Plan/Updated as needed/West Carroll Parish Government
Local Emergency Operations Plan/Updated every five years/West Carroll OHSEP
Continuity of Operations Plan/Updated annually/West Carroll Parish Government
Transportation Plan/Updated as needed/West Carroll Parish Government

Village of Epps

Capital Improvement Plan/Updated annually/West Carroll Parish Government
Economic Development Plan/Updated as needed/West Carroll Parish Government
Local Emergency Operations Plan/Updated every five years/West Carroll OHSEP
Continuity of Operations Plan/Updated annually/West Carroll Parish Government
Transportation Plan/Updated as needed/West Carroll Parish Government

Village of Forest

Capital Improvement Plan/Updated annually/West Carroll Parish Government
Economic Development Plan/Updated as needed/West Carroll Parish Government
Local Emergency Operations Plan/Updated every five years/West Carroll OHSEP
Continuity of Operations Plan/Updated annually/West Carroll Parish Government
Transportation Plan/Updated as needed/West Carroll Parish Government

Village of Kilbourne

Capital Improvement Plan/Updated annually/West Carroll Parish Government
Economic Development Plan/Updated as needed/West Carroll Parish Government
Local Emergency Operations Plan/Updated every five years/West Carroll OHSEP
Continuity of Operations Plan/Updated annually/West Carroll Parish Government
Transportation Plan/Updated as needed/West Carroll Parish Government

Village of Pioneer

Capital Improvement Plan/Updated annually/West Carroll Parish Government
Economic Development Plan/Updated as needed/West Carroll Parish Government
Local Emergency Operations Plan/Updated every five years/West Carroll OHSEP
Continuity of Operations Plan/Updated annually/West Carroll Parish Government
Transportation Plan/Updated as needed/West Carroll Parish Government

Town of Oak Grove

Capital Improvement Plan/Updated annually/West Carroll Parish Government

Economic Development Plan/Updated as needed/West Carroll Parish Government

Local Emergency Operations Plan/Updated every five years/West Carroll OHSEP

Continuity of Operations Plan/Updated annually/West Carroll Parish Government

Transportation Plan/Updated as needed/West Carroll Parish Government

Continued Public Participation

Public participation is an integral component of the mitigation planning process and will continue to be essential as this Plan evolves over time. Significant changes or amendments to the plan require a public hearing prior to any adoption procedures. Other efforts to involve the public in the maintenance, evaluation, and revision process will be made as necessary. These efforts may include:

- Advertising meetings of the Mitigation Committee in the local newspaper, public bulletin boards, and/or city and county office buildings
- Designating willing and voluntary citizens and private sector representatives as official members of the Mitigation Committee
- Utilizing local media to update the public of any maintenance and/or periodic review activities taking place
- Utilizing city and parish web sites to advertise any maintenance and/or periodic review activities taking place
- Keeping copies of the plan in appropriate public locations

This Page Left Intentionally Blank

DRAFT

Appendix C: Essential Facilities

West Carroll Parish Essential Facilities – All Jurisdictions

West Carroll Unincorporated Essential Facilities									
Type	Name	Drought	Flood	Hail	Lightning	Wind	Tornado	Tropical Cyclone	Winter Storm
Fire and Rescue	Concord Fire District #1			X	X	X	X	X	
	Fire Department			X	X	X	X	X	
	Fiske Union Volunteer Fire Department		X	X	X	X	X	X	
	Fiske Union Volunteer Fire Department			X	X	X	X	X	
	Fiske Union Volunteer Fire Department			X	X	X	X	X	
	Forest Volunteer Fire Department #2			X	X	X	X	X	
	Goodwill Volunteer Fire Department		X	X	X	X	X	X	
	Goodwill Volunteer Fire Department 2			X	X	X	X	X	
	Epps/Ward I VFD Sub-Station			X	X	X	X	X	
	Epps/Ward I VFD Sub-Station			X	X	X	X	X	
	OG/Kilbourne/Concord Joint Sub-Station			X	X	X	X	X	
	Ward II Volunteer Fire Department Clear Lake Station		X	X	X	X	X	X	
	Ward II Volunteer Fire Department Darnell Station			X	X	X	X	X	
Government	LDAF			X	X	X	X	X	

West Carroll Unincorporated Essential Facilities

Type	Name	Drought	Flood	Hail	Lightning	Wind	Tornado	Tropical Cyclone	Winter Storm
	West Carroll Parish Sanitary Landfill		X	X	X	X	X	X	

Epps Essential Facilities

Type	Name	Drought	Flood	Hail	Lightning	Wind	Tornado	Tropical Cyclone	Winter Storm
Fire and Rescue	Ward 1 Fire Department			X	X	X	X	X	
Government	Epps Town Hall & Community Center			X	X	X	X	X	
Law Enforcement	Epps Police Department / Sheriff Substation			X	X	X	X	X	
Corrections	West Carroll Detention Center			X	X	X	X	X	
Schools	Epps High School			X	X	X	X	X	

Forest Essential Facilities

Type	Name	Drought	Flood	Hail	Lightning	Wind	Tornado	Tropical Cyclone	Winter Storm
Fire and Rescue	Forest Central Station No. 1			X	X	X	X	X	
Government	Forest City Hall / Community Center / Water Department			X	X	X	X	X	
Schools	Forest High School			X	X	X	X	X	

Kilbourne Essential Facilities									
Type	Name	Drought	Flood	Hail	Lightning	Wind	Tornado	Tropical Cyclone	Winter Storm
Schools	Kilbourne High School			X	X	X	X	X	

Pioneer Essential Facilities									
Type	Name	Drought	Flood	Hail	Lightning	Wind	Tornado	Tropical Cyclone	Winter Storm
Fire and Rescue	Ward Two Volunteer Fire Department			X	X	X	X	X	
Government	Pioneer Town Hall			X	X	X	X	X	

Oak Grove Essential Facilities									
Type	Name	Drought	Flood	Hail	Lightning	Wind	Tornado	Tropical Cyclone	Winter Storm
Fire and Rescue	Oak Grove Volunteer Fire Department Sub-Station			X	X	X	X	X	
Government	Chamber of Commerce			X	X	X	X	X	
	Department Social Services & Department of Health Hospital			X	X	X	X	X	
	Dept./Veterans Affairs & West Carroll Housing			X	X	X	X	X	
	DOTD Maintenance Unit			X	X	X	X	X	
	Family Literacy Center			X	X	X	X	X	

Oak Grove Essential Facilities									
Type	Name	Drought	Flood	Hail	Lightning	Wind	Tornado	Tropical Cyclone	Winter Storm
	Louisiana Workforce Commission			X	X	X	X	X	
	Oak Grove Senior Center			X	X	X	X	X	
	Office of Motor Vehicles			X	X	X	X	X	
	Parish Courthouse			X	X	X	X	X	
	Social Services			X	X	X	X	X	
	Town of Oak Grove Town			X	X	X	X	X	
	USDA Service Center			X	X	X	X	X	
Law Enforcement	Oak Grove Police Department			X	X	X	X	X	
Public Health	Oak Grove Medical Clinic			X	X	X	X	X	
	West Carroll Hospital			X	X	X	X	X	
Schools	Mary Biggs Day Developmental Center			X	X	X	X	X	
	MCIO/Oak Grove Headstart			X	X	X	X	X	
	Oak Grove High School			X	X	X	X	X	
	Professional Headstart Development			X	X	X	X	X	
	West Carroll Parish School Board			X	X	X	X	X	
Nursing Homes	Carroll Nursing Home			X	X	X	X	X	
	Premier Hospice			X	X	X	X	X	

Appendix D: Plan Adoption

TOWN OF OAK GROVE**RESOLUTION 12-8-15****A RESOLUTION ADOPTING THE
WEST CARROLL PARISH HAZARD MITIGATION PLAN 2015**

WHEREAS the West Carroll Parish OHSEP has prepared a multi-hazard mitigation plan hereby known as the WEST CARROLL PARISH HAZARD MITIGATION PLAN 2015 in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS Town of Oak Grove has participated in the process to prepare a DMA compliant Hazard Mitigation Plan based in the FEMA guidance available in the How to Guides;

WHEREAS Town of Oak Grove is participating in the Hazard Mitigation Plan prepared by the West Carroll Parish Government under the oversight of a Steering Committee comprised of Parish-Wide representatives;

WHEREAS West Carroll Parish and local city representatives and governments have participated in the mitigation planning process;

WHEREAS appropriate opportunity for input by public and community officials has been provided through press releases, open meetings and availability of draft documents;

WHEREAS the Plan has been recommended for adoption by the steering committee;

WHEREAS adoption of the Plan is required prior to further consideration for FEMA funding under the following programs:

- Pre-Disaster Mitigation
- Hazard Mitigation Grant Program
- Flood Mitigation Assistance Program
-

Therefore, the Town of Oak Grove does hereby adopt the West Carroll Parish Hazard Mitigation Plan 2015.

ADOPTED by a vote of 3 in favor and 0 against, and 0 abstaining, on this the 8th day of December, 2015.

TOWN OF EPPSRESOLUTION Dec 2015**A RESOLUTION ADOPTING THE
WEST CARROLL PARISH HAZARD MITIGATION PLAN 2015**

WHEREAS the West Carroll Parish OHSEP has prepared a multi-hazard mitigation plan hereby known as the WEST CARROLL PARISH HAZARD MITIGATION PLAN 2015 in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS Town of Epps has participated in the process to prepare a DMA compliant Hazard Mitigation Plan based in the FEMA guidance available in the How to Guides;

WHEREAS Town of Epps is participating in the Hazard Mitigation Plan prepared by the West Carroll Parish Government under the oversight of a Steering Committee comprised of Parish-Wide representatives;

WHEREAS West Carroll Parish and local city representatives and governments have participated in the mitigation planning process;

WHEREAS appropriate opportunity for input by public and community officials has been provided through press releases, open meetings and availability of draft documents;

WHEREAS the Plan has been recommended for adoption by the steering committee;

WHEREAS adoption of the Plan is required prior to further consideration for FEMA funding under the following programs:

- Pre-Disaster Mitigation
- Hazard Mitigation Grant Program
- Flood Mitigation Assistance Program
-

Therefore, the Town of Epps does hereby adopt the West Carroll Parish Hazard Mitigation Plan 2015.

ADOPTED by a vote of 3 in favor and 0 against, and 0 abstaining, on this the 30 day of December, 2015.

VILLAGE OF PIONEERRESOLUTION Pioneer 127/15**A RESOLUTION ADOPTING THE
WEST CARROLL PARISH HAZARD MITIGATION PLAN 2015**

WHEREAS the West Carroll Parish OHSEP has prepared a multi-hazard mitigation plan hereby known as the WEST CARROLL PARISH HAZARD MITIGATION PLAN 2015 in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS the Village of Pioneer has participated in the process to prepare a DMA compliant Hazard Mitigation Plan based in the FEMA guidance available in the How to Guides;

WHEREAS the Village of Pioneer is participating in the Hazard Mitigation Plan prepared by the West Carroll Parish Government under the oversight of a Steering Committee comprised of Parish-Wide representatives;

WHEREAS West Carroll Parish and local city representatives and governments have participated in the mitigation planning process;


WHEREAS appropriate opportunity for input by public and community officials has been provided through press releases, open meetings and availability of draft documents;

WHEREAS the Plan has been recommended for adoption by the steering committee;

WHEREAS adoption of the Plan is required prior to further consideration for FEMA funding under the following programs:

- Pre-Disaster Mitigation
- Hazard Mitigation Grant Program
- Flood Mitigation Assistance Program
-

Therefore, the Village of Pioneer does hereby adopt the West Carroll Parish Hazard Mitigation Plan 2015.

 ADOPTED by a vote of 3 in favor and 0 against, and 0 abstaining, on this the Dec. 8 day of Dec, 2015.

VILLAGE OF KILBOURNERESOLUTION Kilb 2015A RESOLUTION ADOPTING THE
WEST CARROLL PARISH HAZARD MITIGATION PLAN 2015

WHEREAS the West Carroll Parish OHSEP has prepared a multi-hazard mitigation plan hereby known as the WEST CARROLL PARISH HAZARD MITIGATION PLAN 2015 in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS Village of Kilbourne has participated in the process to prepare a DMA compliant Hazard Mitigation Plan based in the FEMA guidance available in the How to Guides;

WHEREAS Village of Kilbourne is participating in the Hazard Mitigation Plan prepared by the West Carroll Parish Government under the oversight of a Steering Committee comprised of Parish-Wide representatives;

WHEREAS West Carroll Parish and local city representatives and governments have participated in the mitigation planning process;

WHEREAS appropriate opportunity for input by public and community officials has been provided through press releases, open meetings and availability of draft documents;

WHEREAS the Plan has been recommended for adoption by the steering committee;

WHEREAS adoption of the Plan is required prior to further consideration for FEMA funding under the following programs:

- Pre-Disaster Mitigation
- Hazard Mitigation Grant Program
- Flood Mitigation Assistance Program
-

Therefore, the Village of Kilbourne does hereby adopt the West Carroll Parish Hazard Mitigation Plan 2015.

ADOPTED by a vote of 3 in favor and 0 against, and 0 abstaining, on this the 14th day of September, 20 15.

VILLAGE OF FORESTRESOLUTION 314A RESOLUTION ADOPTING THE
WEST CARROLL PARISH HAZARD MITIGATION PLAN 2015

WHEREAS the West Carroll Parish OHSEP has prepared a multi-hazard mitigation plan hereby known as the WEST CARROLL PARISH HAZARD MITIGATION PLAN 2015 in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS Village of Forest has participated in the process to prepare a DMA compliant Hazard Mitigation Plan based in the FEMA guidance available in the How to Guides;

WHEREAS Village of Forest is participating in the Hazard Mitigation Plan prepared by the West Carroll Parish Government under the oversight of a Steering Committee comprised of Parish-Wide representatives;

WHEREAS West Carroll Parish and local city representatives and governments have participated in the mitigation planning process;

WHEREAS appropriate opportunity for input by public and community officials has been provided through press releases, open meetings and availability of draft documents;

WHEREAS the Plan has been recommended for adoption by the steering committee;

WHEREAS adoption of the Plan is required prior to further consideration for FEMA funding under the following programs:

- Pre-Disaster Mitigation
- Hazard Mitigation Grant Program
- Flood Mitigation Assistance Program
-

Therefore, the Village of Forest does hereby adopt the West Carroll Parish Hazard Mitigation Plan 2015.

ADOPTED by a vote of 2 in favor and 0 against, and 0 abstaining, on this the 7 day of Dec., 2015.

JACK L. MADDEN - PRESIDENT

BILL ELLERBE - VICE PRESIDENT

West Carroll Parish Police Jury

P. O. Drawer 630 • Oak Grove, Louisiana 71263

Telephone (318) 428-3390

Fax (318) 428-4835

DISTRICT A - JOHNNY SIMMS
DISTRICT B - BILL ELLERBE
DISTRICT C - JACK L. MADDENMARTHA STEPHENS
SECRETARY - TREASURERDISTRICT D - EUGENE "Pop" CROSBY
DISTRICT E - EDDIE RUSSELL

EXCERPT OF THE MINUTES OF THE WEST CARROLL PARISH POLICE JURY'S DECEMBER 8, 2015 REGULAR MEETING

On a motion by Juror Crosby, second by Juror Russell the following resolution was offered for adoption:

RESOLUTION

WHEREAS the West Carroll Parish OHSEP has prepared a multi-hazard mitigation plan hereby known as the WEST CARROLL PARISH HAZARD MITIGATION PLAN 2015 in accordance with the Disaster Mitigation Act of 2000; and

Whereas WEST CARROLL PARISH POLICE JURY has participated in the process to prepare a DMA compliant Hazard Mitigation Plan based in the FEMA guidance available in the

WHEREAS WEST CARROLL PARISH POLICE JURY is participating in the Hazard Mitigation Plan prepared by the West Carroll Parish Government under the oversight of a Steering Committee comprised of Parish-Wide representatives;

WHEREAS West Carroll Parish and local city representatives and governments have participated in the mitigation planning process;

WHEREAS appropriate opportunity for input by public and community officials has been provided through press releases, open meetings and availability of draft documents;

WHEREAS the Plan has been recommended for adoption by the steering committee;

WHEREAS adoption of the Plan is required prior to further consideration for FEMA funding under the following programs:

- Pre-Disaster Mitigation
- Hazard Mitigation Grant Program
- Flood Mitigation Assistance Program

Home of Poverty Point State Park

Therefore, the WEST CARROLL PARISH POLICE JURY does hereby adopt the West Carroll Parish Hazard Mitigation Plan 2015.

ADOPTED by a vote of 5 in favor and 0 against, and 0 abstaining, on this the 8th day of December, 2015.

CERTIFICATION

I, Martha Stephens, Secretary-Treasurer, West Carroll Parish Police Jury, do hereby certify the above and forgoing to be a true and correct copy of an excerpt of the minutes of a meeting held by said body on December 8, 2015, in Oak Grove, Louisiana.


Martha Stephens
Secretary-Treasurer

DRAFT

This Page Left Intentionally Blank

DRAFT

Appendix E: State Required Worksheets

During the planning process (Appendix A) the Hazard Mitigation Plan Update Steering Committee was provided state-required plan update process worksheets to be filled out by each jurisdiction. The worksheets were presented at the Kickoff Meeting by the contractor as tools for assisting in the update of the Hazard Mitigation Plan. The plan update worksheets allowed for collection of information such as planning team members, community capabilities, critical infrastructure and vulnerable populations and NFIP information. The following pages contain documentation of the worksheets.

Capability Assessment

West Carroll Unincorporated

Worksheet 4.1

Capability Assessment Worksheet - Unincorporated

Local mitigation capabilities are existing authorities, policies and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible.

Planning and Regulatory

Please indicate which of the following plans and regulatory capabilities your jurisdiction has in place.

Plans	Yes / No	How often is the plan updated?
Comprehensive / Master Plan	no	
Capital Improvements Plan	yes	Annual
Economic Development Plan	yes	Annual
Local Emergency Operations Plan	yes	5 years
Continuity of Operations Plan	yes	Annual
Transportation Plan	yes	As needed
Stormwater Management Plan	no	
Community Wildfire Protection Plan	no	
Other plans (redevelopment, recovery, coastal)	no	
Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code	yes	Version / Year
Building Code Effectiveness Grading Schedule	no	Score
Fire Department ISO rating	yes	Rating - 8 VFD each have own rating
Site plan review requirements	yes	yes
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	yes	yes
Subdivision Ordinance	no	
Floodplain Ordinance	yes	yes
Natural Hazard Specific Ordinance (stormwater,	no	
Flood Insurance Rate Maps	yes	yes
Acquisition of land for open space and public	yes	yes
Other		

How can these capabilities be expanded and improved to reduce risk?

Be aware of the increased needs in our communities and address issues as they become evident

Administration and Technical

Identify whether your community has the following administrative and technical capabilities. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, indicate so in your comments.

Administration	Yes / No	Comments
Planning Commission	no	Use North Delta Regional Planning Commission
Mitigation Planning Committee	yes	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	yes	Public Works & Drainage Depts
Mutual Aid Agreements	yes	We have MAA w/ every agency in parish & adjoining parishes
Staff	Yes / No	Percentage of time spent on hazard mitigation
Chief Building Official	no	Have an approved Bldg inspector/official in Monroe
Floodplain Administrator	Yes	50%
Emergency Manager	Yes	50%
Community Planner	no	
Civil Engineer	no	Parish Police jury hires Engineers for projects
GIS Coordinator	No	
Grant Writer	no	We in-house do most of our grants
Other		
Technical	Yes / No	Describe capability
Warning Systems / Service	Yes	Alert FM, One-Call, IPAWS (each is used in certain event)
Hazard Data & Information	Yes	GOHSEP, NWS
Grant Writing	NO	
Hazus Analysis	no	
Other	no	

Financial

Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.

Funding Resource	Yes / No	Could the resource be used to fund future mitigation actions?
------------------	----------	---

Financial

Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.

Funding Resource	Yes / No	Could the resource be used to fund future mitigation actions?
Capital Improvements project funding	no	
Authority to levy taxes for specific purposes	no	
Fees for water, sewer, gas, or electric services	no	
Impact fees for new development	no	
Stormwater Utility Fee	no	
Community Development Block Grant (CDBG)	yes	maybe
Other Funding Programs	yes	maybe

Education and Outreach

Identify education and outreach programs and methods, already in place that could be used to implement mitigation activities and communicate hazard-related information.

Program / Organization	Yes / No	Comments
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional	no	
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental	yes	schools
Natural Disaster or safety related school	yes	schools
Storm Ready certification	no	
Firewise Communities certification	yes	
Public/Private partnership initiatives addressing disaster-related issues	yes	
Other		

Village of Epps

Worksheet 4.1

Capability Assessment Worksheet - Village of Epps

Local mitigation capabilities are existing authorities, policies and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible.

Planning and Regulatory

Please indicate which of the following plans and regulatory capabilities your jurisdiction has in place.

Plans	Yes / No	How often is the plan updated?
Comprehensive / Master Plan	no	
Capital Improvements Plan	yes	Annual
Economic Development Plan	yes	Annual
Local Emergency Operations Plan	yes	5 years
Continuity of Operations Plan	yes	Annual
Transportation Plan	yes	As needed
Stormwater Management Plan	no	
Community Wildfire Protection Plan	no	
Other plans (redevelopment, recovery, coastal)	no	
Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code	yes	Version / Year
Building Code Effectiveness Grading Schedule	no	Score
Fire Department ISO rating	yes	Rating - 8 VFD each have own rating
Site plan review requirements	yes	yes
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	yes	yes
Subdivision Ordinance	no	
Floodplain Ordinance	yes	yes
Natural Hazard Specific Ordinance (stormwater,	no	
Flood Insurance Rate Maps	yes	yes
Acquisition of land for open space and public	yes	yes
Other		

How can these capabilities be expanded and improved to reduce risk?

Be aware of the increased needs in our communities and address issues as they become evident

Administration and Technical

Identify whether your community has the following administrative and technical capabilities. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, indicate so in your comments.

Administration	Yes / No	Comments
Planning Commission	no	Use North Delta Regional Planning Commission
Mitigation Planning Committee	yes	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	yes	Public Works & Drainage Depts
Mutual Aid Agreements	yes	We have MAA w/ every agency in parish & adjoining parishes
Staff	Yes / No	Percentage of time spent on hazard mitigation
Chief Building Official	no	Have an approved Bldg Inspector/official in Monroe
Floodplain Administrator	Yes	50%
Emergency Manager	Yes	50%
Community Planner	no	
Civil Engineer	no	Parish Police jury hires Engineers for projects
GIS Coordinator	No	
Grant Writer	no	We in-house do most of our grants
Other		
Technical	Yes / No	Describe capability
Warning Systems / Service	Yes	Alert FM, One-Call, IPAWS (each is used in certain event)
Hazard Data & Information	Yes	GOHSEP, NWS
Grant Writing	NO	
Hazus Analysis	no	
Other	no	

Financial

Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.

Funding Resource	Yes / No	Could the resource be used to fund future mitigation actions?
Capital Improvements project funding	no	
Authority to levy taxes for specific purposes	no	
Fees for water, sewer, gas, or electric services	no	
Impact fees for new development	no	
Stormwater Utility Fee	no	
Community Development Block Grant (CDBG)	yes	maybe
Other Funding Programs	yes	maybe

Education and Outreach

Identify education and outreach programs and methods, already in place that could be used to implement mitigation activities and communicate hazard-related information.

Program / Organization	Yes / No	Comments
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional	no	
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental	yes	schools
Natural Disaster or safety related school	yes	schools
Storm Ready certification	no	
Firewise Communities certification	yes	
Public/Private partnership initiatives addressing disaster-related issues	yes	
Other		

Village of Forest

Worksheet 4.1

Capability Assessment Worksheet - Village of Forest

Local mitigation capabilities are existing authorities, policies and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible.

Planning and Regulatory

Please indicate which of the following plans and regulatory capabilities your jurisdiction has in place.

Plans	Yes / No	How often is the plan updated?
Comprehensive / Master Plan	no	
Capital Improvements Plan	yes	Annual
Economic Development Plan	yes	Annual
Local Emergency Operations Plan	yes	5 years
Continuity of Operations Plan	yes	Annual
Transportation Plan	yes	As needed
Stormwater Management Plan	no	
Community Wildfire Protection Plan	no	
Other plans (redevelopment, recovery, coastal	no	
Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code	yes	Version / Year
Building Code Effectiveness Grading Schedule	no	Score
Fire Department ISO rating	yes	Rating - 8 VFD each have own rating
Site plan review requirements	yes	yes
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	yes	yes
Subdivision Ordinance	no	
Floodplain Ordinance	yes	yes
Natural Hazard Specific Ordinance (stormwater,	no	
Flood Insurance Rate Maps	yes	yes
Acquisition of land for open space and public	yes	yes
Other		

How can these capabilities be expanded and improved to reduce risk?

Be aware of the increased needs in our communities and address issues as they become evident

Administration and Technical

Identify whether your community has the following administrative and technical capabilities. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, indicate so in your comments.

Administration	Yes / No	Comments
Planning Commission	no	Use North Delta Regional Planning Commission
Mitigation Planning Committee	yes	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	yes	Public Works & Drainage Depts
Mutual Aid Agreements	yes	We have MAA w/ every agency in parish & adjoining parishes
Staff	Yes / No	Percentage of time spent on hazard mitigation
Chief Building Official	no	Have an approved Bldg inspector/official in Monroe
Floodplain Administrator	Yes	50%
Emergency Manager	Yes	50%
Community Planner	no	
Civil Engineer	no	Parish Police jury hires Engineers for projects
GIS Coordinator	No	
Grant Writer	no	We in-house do most of our grants
Other		
Technical	Yes / No	Describe capability
Warning Systems / Service	Yes	Alert FM, One-Call, IPAWS (each is used in certain evernt)
Hazard Data & Information	Yes	GOHSEP, NWS
Grant Writing	NO	
Hazus Analysis	no	
Other	no	

Village of Kilbourne

Financial

Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.

Funding Resource	Yes / No	Could the resource be used to fund future mitigation actions?
Capital Improvements project funding	no	
Authority to levy taxes for specific purposes	no	
Fees for water, sewer, gas, or electric services	no	
Impact fees for new development	no	
Stormwater Utility Fee	no	
Community Development Block Grant (CDBG)	yes	maybe
Other Funding Programs	yes	maybe

Education and Outreach

Identify education and outreach programs and methods, already in place that could be used to implement mitigation activities and communicate hazard-related information.

Program / Organization	Yes / No	Comments
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional	no	
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental	yes	schools
Natural Disaster or safety related school	yes	schools
Storm Ready certification	no	
Firewise Communities certification	yes	
Public/Private partnership initiatives addressing disaster-related issues	yes	
Other		

Village of Pioneer

Worksheet 4.1

Capability Assessment Worksheet - Pioneer

Local mitigation capabilities are existing authorities, polices and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible.

Planning and Regulatory

Please indicate which of the following plans and regulatory capabilities your jurisdiction has in place.

Plans	Yes / No	How often is the plan updated?
Comprehensive / Master Plan	no	
Capital Improvements Plan	yes	Annual
Economic Development Plan	yes	Annual
Local Emergency Operations Plan	yes	5 years
Continuity of Operations Plan	yes	Annual
Transportation Plan	yes	As needed
Stormwater Management Plan	no	
Community Wildfire Protection Plan	no	
Other plans (redevelopment, recovery, coastal)	no	
Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code	yes	Version / Year
Building Code Effectiveness Grading Schedule	no	Score
Fire Department ISO rating	yes	Rating - 8 VFD each have own rating
Site plan review requirements	yes	yes
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	yes	yes
Subdivision Ordinance	no	
Floodplain Ordinance	yes	yes
Natural Hazard Specific Ordinance (stormwater,	no	
Flood Insurance Rate Maps	yes	yes
Acquisition of land for open space and public	yes	yes
Other		

How can these capabilities be expanded and improved to reduce risk?

Be aware of the increased needs in our communities and address issues as they become evident

Administration and Technical

Identify whether your community has the following administrative and technical capabilities. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, indicate so in your comments.

Administration	Yes / No	Comments
Planning Commission	no	Use North Delta Regional Planning Commission
Mitigation Planning Committee	yes	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	yes	Public Works & Drainage Depts
Mutual Aid Agreements	yes	We have MAA w/ every agency in parish & adjoining parishes
Staff	Yes / No	Percentage of time spent on hazard mitigation
Chief Building Official	no	Have an approved Bldg Inspector/official in Monroe
Floodplain Administrator	Yes	50%
Emergency Manager	Yes	50%
Community Planner	no	
Civil Engineer	no	Parish Police jury hires Engineers for projects
GIS Coordinator	No	
Grant Writer	no	We in-house do most of our grants
Other		
Technical	Yes / No	Describe capability
Warning Systems / Service	Yes	Alert FM, One-Call, IPAWS (each is used in certain event)
Hazard Data & Information	Yes	GOHSEP, NWS
Grant Writing	NO	
Hazus Analysis	no	
Other	no	

Financial

Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.

Funding Resource	Yes / No	Could the resource be used to fund future mitigation actions?
Capital Improvements project funding	no	
Authority to levy taxes for specific purposes	no	
Fees for water, sewer, gas, or electric services	no	
Impact fees for new development	no	
Stormwater Utility Fee	no	
Community Development Block Grant (CDBG)	yes	maybe
Other Funding Programs	yes	maybe

Education and Outreach

Identify education and outreach programs and methods, already in place that could be used to implement mitigation activities and communicate hazard-related information.

Program / Organization	Yes / No	Comments
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional	no	
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental	yes	schools
Natural Disaster or safety related school	yes	schools
Storm Ready certification	no	
Firewise Communities certification	yes	
Public/Private partnership initiatives addressing disaster-related issues	yes	
Other		

Town of Oak Grove

Worksheet 4.1

Capability Assessment Worksheet - Town of Oak Grove

Local mitigation capabilities are existing authorities, policies and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible.

Planning and Regulatory

Please indicate which of the following plans and regulatory capabilities your jurisdiction has in place.

Plans	Yes / No	How often is the plan updated?
Comprehensive / Master Plan	no	
Capital Improvements Plan	yes	Annual
Economic Development Plan	yes	Annual
Local Emergency Operations Plan	yes	5 years
Continuity of Operations Plan	yes	Annual
Transportation Plan	yes	As needed
Stormwater Management Plan	no	
Community Wildfire Protection Plan	no	
Other plans (redevelopment, recovery, coastal	no	
Building Code, Permitting and Inspections	Yes / No	Are the codes adequately enforced?
Building Code	yes	Version / Year
Building Code Effectiveness Grading Schedule	no	Score
Fire Department ISO rating	yes	Rating - 8 VFD each have own rating
Site plan review requirements	yes	yes
Land Use Planning and Ordinances	Yes / No	Is the ordinance adequately administered and enforced?
Zoning Ordinance	yes	yes
Subdivision Ordinance	no	
Floodplain Ordinance	yes	yes
Natural Hazard Specific Ordinance (stormwater,	no	
Flood Insurance Rate Maps	yes	yes
Acquisition of land for open space and public	yes	yes
Other		

How can these capabilities be expanded and improved to reduce risk?

Be aware of the increased needs in our communities and address issues as they become evident

Administration and Technical

Identify whether your community has the following administrative and technical capabilities. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, indicate so in your comments.

Administration	Yes / No	Comments
Planning Commission	no	Use North Delta Regional Planning Commission
Mitigation Planning Committee	yes	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	yes	Public Works & Drainage Depts
Mutual Aid Agreements	yes	We have MAA w/ every agency in parish & adjoining parishes
Staff	Yes / No	Percentage of time spent on hazard mitigation
Chief Building Official	no	Have an approved Bldg inspector/official in Monroe
Floodplain Administrator	Yes	50%
Emergency Manager	Yes	50%
Community Planner	no	
Civil Engineer	no	Parish Police jury hires Engineers for projects
GIS Coordinator	No	
Grant Writer	no	We in-house do most of our grants
Other		
Technical	Yes / No	Describe capability
Warning Systems / Service	Yes	Alert FM, One-Call, IPAWS (each is used in certain evernt)
Hazard Data & Information	Yes	GOHSEP, NWS
Grant Writing	NO	
Hazus Analysis	no	
Other	no	

Financial

Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.

Funding Resource	Yes / No	Could the resource be used to fund future mitigation actions?
Capital Improvements project funding	no	
Authority to levy taxes for specific purposes	no	
Fees for water, sewer, gas, or electric services	no	
Impact fees for new development	no	
Stormwater Utility Fee	no	
Community Development Block Grant (CDBG)	yes	maybe
Other Funding Programs	yes	maybe

Financial

Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.

Funding Resource	Yes / No	Could the resource be used to fund future mitigation actions?
Capital Improvements project funding	no	
Authority to levy taxes for specific purposes	no	
Fees for water, sewer, gas, or electric services	no	
Impact fees for new development	no	
Stormwater Utility Fee	no	
Community Development Block Grant (CDBG)	yes	maybe
Other Funding Programs	yes	maybe

Education and Outreach

Identify education and outreach programs and methods, already in place that could be used to implement mitigation activities and communicate hazard-related information.

Program / Organization	Yes / No	Comments
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional	no	
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental	yes	schools
Natural Disaster or safety related school	yes	schools
Storm Ready certification	no	
Firewise Communities certification	yes	
Public/Private partnership initiatives addressing disaster-related issues	yes	
Other		

Building Inventory

Critical Facility (If Yes, Mark X)	Name of Building	Purpose of Building	Address	City	Latitude	Longitude	Assessed Value	Date Built	Construction Type
Unincorporated West Carroll									
X	West Carroll Parish Courthouse (Original)	Gov't Offices & Sheriff Dept	305 E. Main St	Oak Grove	32.8604	-91.3874	\$ 3,500,000.00	1916	Reinforced Masonry
	West Carroll Parish Courthouse (new addition)	Gov't Offices	305 E. Main St	Oak Grove	32.8605	-91.3872	\$ 1,000,000.00	1960	Reinforced Masonry
	West Carroll Courthouse Annex	Gov't Offices	310 Skinner Ln.	Oak Grove	32.8682	-91.3834	\$ 590,000.00	1963	Reinforced Masonry
	West Carroll Health Unit	Public Health Nurse & Officer	416 Beale St.	Oak Grove	32.8591	-91.3861	\$ 80,000.00	1956	Reinforced Masonry
	West Carroll Police Jury Office	Police Jury Administrative offices	107 S. Briggs St	Oak Grove	32.8601	-91.3883	\$ 409,000.00	2012	Reinforced Masonry
	West Carroll Parish Library	Public use of Books & Computers	101 Marietta At	Oak Grove	32.8595	-91.3901	\$ 925,000.00	1977	Reinforced Masonry
	Combs-McIntyre School	Head-Start Program	410 Combs St	Oak Grove	32.8691	-91.3885	\$ 700,000.00	1950	Reinforced Masonry
	Combs-McIntyre cafeteria	Head-Start Program-feeding	410 Combs St	Oak Grove	32.8689	-91.3888	\$ 235,000.00	1955	Reinforced Masonry
	West Carroll Parish Road Dept	Parish Road Maintenance	8770 Hwy 17	Oak Grove	32.8061	-91.4085	\$ 290,000.00	1973	Metal
	West Carroll Parish Garbage & Recycling Dept	Parish Garbage pick-up & Recycling	451 & 461 Landfill Rd	Oak Grove	32.7641	-91.3438	\$ 492,000.00	1991	Metal
	West Carroll Parish Landfill Office	Landfill Management	448 Landfill Rd	Oak Grove	32.7628	-91.3445	\$ 65,000.00	1987	Metal
	West Carroll Landfill Shop	Vehicle Maintenance	470 Landfill Rd	Oak Grove	32.7627	-91.3445	\$ 175,480.00	2009	Metal
	West Carroll Memorial Hospital	Patient Care and Rehabilitation	706 Ross St	Oak Grove	32.8681	-91.3823	\$ 2,258,095.00	1964	Reinforced Masonry
	West Carroll Medical Clinic	Doctors' Office	502 Ross St	Oak Grove	32.8652	-91.3826	\$ 200,000.00	1956	Reinforced Masonry
	West Carroll Parish Fair Exhibit Bldg	4-H Exhibit & Livestock Showing	1218 N. Old Kilbourne Rd	Oak Grove	32.8847	-91.3988	\$ 64,327.00	1981	Concrete
	West Carroll Parish Jail	Houses Prisoners	309 E. Main St.	Oak Grove	32.8603	-91.3874	\$ 230,293.00	1973	Concrete
	Kelly-Dumas Airport Bldg & Flight Facility	Offices for WC Airport	530 S. Old Kilbourne Rd.	Oak Grove	32.8525	-91.4004	\$ 515,000.00	2002	Metal
	Kelly-Dumas Airport Hangers	Hangers for local airplanes	580 S. Old Kilbourne Rd.	Oak Grove	32.8504	-91.4013	\$ 490,000.00	2010	Metal
	Fiske-Union Fire Station	Houses Fire Equipment	229 Hwy 879	Oak Grove	32.8869	-91.4898	\$ 94,000.00	1996	Metal
	Epps Fire Station	Houses Fire Equipment	4150 Hwy 134	Epps	32.6039	-91.4761	\$ 135,485.00	1996	Metal
Epps									
	Administrative Building	Former detention center	180 Capital Bank Dr.	Epps	32.5964	-91.4823	\$ 1,000,000.00	2004	Metal
X	Epps Town Hall & Community Center	Municipal gov't offices & meetings	120 Maple St.	Epps	32.6031	-91.4781	\$ 140,000.00	1981	Reinforced Masonry
	Epps Police Department	Municipal Law Enforcement office	128 Maple St.	Epps	32.6031	-91.4778	\$ 85,000.00	1986	Wood
	Town Mtc Building	Maintenance Equipment	980 Hwy 17	Epps	32.6047	-91.4786	\$ 15,000.00	2009	Metal
Forest									
X	Forest Community Center	Water/Town Hall/police	137 Walnut st	Forest	32.7943	-91.4114	\$ 100,000.00	2008	Steel
	Forest Town Hall/Former Bldg	Rental	117 Clover St	Forest	32.7915	-91.4113	\$ 10,000.00	1980	Concrete

Kilbourne									
X	Kilbourne City Hall	City Government office	125 Carnell St	Kilbourne	32.9946	-91.3161	\$ 60,000.00	1976	Reinforced Masonry
	Rental Property	Income for City	463 Kilbourne Ave	Kilbourne	32.9951	-91.3158	\$ 1,000,000.00	1960	Reinforced Masonry
Oak Grove									
X	Town of Oak Grove City Hall	Municipal gov't offices	407 E. Main St.	Oak Grove	32.8606	-91.3861	\$ 300,000.00	1964	Concrete
	Town of Oak Grove Mtc. Barn	Town Mtc Equipment & Office	400 Lamont St.	Oak Grove	32.8629	-91.3965	\$ 100,000.00	1975	Metal
	American Legion Hut	Rental Community Meetings	414 James St	Oak Grove	32.8651	-91.3849	\$ 500,000.00	1932	Wood
	Industrial Factory Bldg	Economic Development	710 W. Jefferson St.	Oak Grove	32.8619	-91.3975	\$ 1,000,000.00	1963	Concrete
	Old Water Plant	Equipment Storage	311 W. Noble St.	Oak Grove	32.8626	-91.3926	\$ 30,000.00	1972	Metal
	New Water Plant	Water treatment	221 Newman St.	Oak Grove	32.8513	-91.3969	\$ 100,000.00	1997	Metal
	Sewer Treatment Plant	Sewer treatment	503 Lamont St.	Oak Grove	32.8641	-91.3951	\$ 50,000.00	2000	Metal
Pioneer									
X	Pioneer Town Hall	Gov't office & meeting room	318 Cherry St	Pioneer	32.7377	-91.4359	\$ 30,000.00	1999	Wood
	Old Pioneer School	Needs torn down	5877 Broadway St. aka Hwy 1	Pioneer	32.7328	-91.4352	\$ 30,000.00	1942	Unreinforced Masonry

Vulnerable Populations

Vulnerable Populations Worksheet					
West Carroll Parish					
Name	Street	City	Zip Code	Latitude	Longitude
All Hospitals (Private or Public)					
West Carroll Hospital	706 Ross St	Oak Grove	71263	32.8681	-91.3825
Nursing Homes (Private or Public)					
None					
Mobile Home Parks					
See maps					
Shelters					
Thomas Jason Lingo Community Center	10284 Hwy 17	Oak Grove	71263	32.8455	-91.3922
Schools					
Oak Grove High School	501 W. Main St	Oak Grove	71263	32.8601	-91.395
Oak Grove Elementary School	206 Tiger Dr.	Oak Grove	71263	32.8586	-91.3953
Epps Elementary & High School	4044 Hwy 134	Epps	71237	32.6031	-91.4814
Forest Elementary & High School	158 Clover St	Forest	71242	32.7925	-91.4108
Kilbourne Elementary & High School	229 W. Louisiana Ave	Kilbourne	71253	32.9983	-91.3191
Day Cares					
First Baptist Church Wee Care	E. Main St	Oak Grove	71263	32.8613	-91.3837
Bridges/ Dams					
Bayou Macon Bridge	9085 Hwy 2 East	Oak Grove	71263	32.8599	-91.3438
Boeuf River Bridge	153 Hwy 2 West	Oak Grove	71263	32.7711	-91.5957
Bayou Macon Steel Bridge	6600 Hwy 134	Epps	71237	32.6203	-91.4053
NO DAMS					

National Flood Insurance Program (NFIP)

West Carroll Parish

ELEMENT F: STATE REQUIREMENT

National Flood Insurance Program (NFIP)

Parish: West Carroll Parish

	West Carroll Parish	Epps	Forest	Kilborne	Oak Grove	Pioneer
Insurance Summary						
How many NFIP policies are in the community? What is the total premium and coverage?	130; \$20,578,100	4; \$471,000	0	0	0	1
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	19; \$286,809	1; \$8,223	0	0	0	0
How many people are exposed to flood risk with in the community?	11,604	854	355	416	1,727	156
Describe any areas of flood risk with limited NFIP policy coverage.	Aware of none	None	None	None	None	None
Staff Resources						
Is the Community FPA or NFIP Coordinator certified?	No	No	No	No	No	No
Is flood plain management an auxiliary function?	Conducted in the same office as the 911 addressing & Emergency Management.	Conducted in the same office as the 911 addressing & Emergency Management.	Conducted in the same office as the 911 addressing & Emergency Management.	Conducted in the same office as the 911 addressing & Emergency Management.	Conducted in the same office as the 911 addressing & Emergency Management.	Conducted in the same office as the 911 addressing & Emergency Management.
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	When a parish calls for a new 911 address we locate the proposed site on our Floodplain maps and determine if it will or will not be in a flood zone. If it is we obtain a BFE for the location from Corps of Engineers and require an Elevation Certificate of the location before issuing a building permit.	When a parish calls for a new 911 address we locate the proposed site on our Floodplain maps and determine if it will or will not be in a flood zone. If it is we obtain a BFE for the location from Corps of Engineers and require an Elevation Certificate of the location before issuing a building permit.	When a parish calls for a new 911 address we locate the proposed site on our Floodplain maps and determine if it will or will not be in a flood zone. If it is we obtain a BFE for the location from Corps of Engineers and require an Elevation Certificate of the location before issuing a building permit.	When a parish calls for a new 911 address we locate the proposed site on our Floodplain maps and determine if it will or will not be in a flood zone. If it is we obtain a BFE for the location from Corps of Engineers and require an Elevation Certificate of the location before issuing a building permit.	When a parish calls for a new 911 address we locate the proposed site on our Floodplain maps and determine if it will or will not be in a flood zone. If it is we obtain a BFE for the location from Corps of Engineers and require an Elevation Certificate of the location before issuing a building permit.	When a parish calls for a new 911 address we locate the proposed site on our Floodplain maps and determine if it will or will not be in a flood zone. If it is we obtain a BFE for the location from Corps of Engineers and require an Elevation Certificate of the location before issuing a building permit.

What are the barriers to running an effective NFIP program in the community, if any?	Funding and staff resources	Funding	Funding	Funding	Funding	Funding
Compliance History						
Is the community in good standing with the NFIP?	Yes Our parish ordinance adopted on 10-9-97 any structures to be at least 1 ft. above BFE as designated by Corps of Engineers	Yes State NFIP Coordinatorr, FEMA NFIP Specialist, community records	Yes State NFIP Coordinatorr, FEMA NFIP Specialist, community records	Yes State NFIP Coordinatorr, FEMA NFIP Specialist, community records	Yes State NFIP Coordinatorr, FEMA NFIP Specialist, community records	Yes State NFIP Coordinatorr, FEMA NFIP Specialist, community records
Are there any outstanding compliance issues(i.e., current violations)?	no	no	no	no	no	no
When was the most recent Community Assistance Visit (CAV) or Community Is a CAV or CAC scheduled or needed? If so when?	2014	2014	2014	2014	2014	2014
Regulation						
When did the community enter the NFIP?	7/8/1997	7/8/1997	7/8/1997	7/8/1997	7/8/1997	7/8/1997
Are the FIRMs digital or paper?	Paper	Paper	Paper	Paper	Paper	Paper
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Yes Our parish ordinance adopted on 10-9-97 any structures to be at least 1 ft. above BFE as designated by Corps of Engineers	Yes	Yes	Yes	Yes	Yes
Community Rating System (CRS)						
Does the community participate in CRS?	No	No	No	No	No	No
What is the community's CRS Class Ranking?	N/A	N/A	N/A	N/A	N/A	N/A
Does the plan include CRS planning requirements?	N/A	N/A	N/A	N/A	N/A	N/A