



# EAST CARROLL

## PARISH HAZARD MITIGATION

### UPDATE – 2016



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# EAST CARROLL PARISH HAZARD MITIGATION PLAN UPDATE

*Prepared for:*

**East Carroll Parish**



*Prepared by:*

**Stephenson Disaster Management Institute**

**Ms. Lauren Stevens**

**Mr. Chris Rippetoe**

**Mr. Joseph Harris**

**Mr. Brant Mitchell**

**Mr. Stuart Nolan**

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

Louisiana State University - Business Education Complex  
Baton Rouge, LA 70803



October 27, 2016

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## ACKNOWLEDGMENTS

This 2016 East Carroll Parish Hazard Mitigation Plan Update was coordinated by the East 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:

Unincorporated East Carroll Parish  
Town of Lake Providence

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

WYDETTE WILLIAMS, SHERIFF	EAST CARROL SHERIFF DEPT.
RUDY THREATS, CHIEF OF POLICE	EAST CARROLL POLICE DEPT.
MELINDA STUTTS, ADMIN - HOSPITAL	EAST CARROL PARISH HOSPITAL
BOBBY AMACKER, MAYOR	TOWN OF LAKE PROVIDENCE
KENDRICK HALEY, FIRE CHIEF	TOWN OF LAKE PROVIDENCE FIRE DEPT
TIM BRASWELL, FIRE CHIEF	PARISH FIRE DEPT
DEBRA HOPKINS, 911 DIRECTOR	EAST CARROLL SHERIFF DEPT.
LEE DENNY, PARISH PRESIENT	EAST CARROLL POLICE JURY
FRED THREATS, PARISH MANAGER	EAST CARROLL POLICE JURY
HOSIE LAYTON, PUBLIC WORKS SUPERINTENDANT	TOWN OF LAKE PROVIDENCE
JAMES SHAW, ROAD SUPERINTENDANT	EAST CARROLL POLICE JURY
NATOSHA DAVIS, ASSISTANT DIRECTOR	EAST CARROLL POLICE JURY
LEEKEITHA REED, OEP DIRECTOR	EAST CARROLL POLICE JURY
WYLY GILFOIL, PORT DIRECTOR	LAKE PROVIDENCE PORT COMMISSION
FRANCIS LENSING, PRESIDENT OF THE LAKE COMMISSION	EAST CARROLL POLICE JURY
PEGGY ROBINSON, OHSEP DIRECTOR	WEST CARROLL PARISH OHSEP

The 2016 East Carroll Parish Hazard Mitigation Plan Update was written by the Stephenson Disaster Management Institute, Louisiana State University. Further comments should be directed to the East Carroll Parish Office of Homeland Security and Emergency Preparedness: 400 First Street, Lake Providence, LA, 71254.

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## 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 East 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 East Carroll Parish less vulnerable and more disaster resistant. It also includes mitigation project scoping to further identify the extent 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 East Carroll Parish Hazard Mitigation Plan is a multi-jurisdictional plan that includes the following jurisdictions which participated in the planning process:

- Unincorporated East Carroll Parish
- Town of Lake Providence

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 East 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.

## Location, Demography, and Economy

### Location

East Carroll Parish is situated at the eastern extreme of the Louisiana-Arkansas border on the Mississippi River. The area is a flat, delta country, made up of rich alluvial soil. Ridges characterize the surface of the land, and swales and swampy areas left by meanders of old streams are prevalent. The parish lies entirely within the Ouachita-Black River drainage basin. Generally speaking, all streams flow to the southwest in the parish. East Carroll is 29 miles long, north and south, and 10 to 18 miles wide, east and west, depending on the variations of Bayou Macon and Mississippi River boundaries. It is bordered by West Carroll Parish on the west, Madison Parish on the south, the Mississippi River on the east, and Arkansas on the north.



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

From its beautiful lake to its vast area of woodlands and bayous, East Carroll Parish offers the avid sportsman many opportunities to take advantage of Louisiana's Sportsman's Paradise. An abundance of deer, turkey, ducks, and other wild game draws residents from northeast Louisiana to participate in the many hunting clubs located within the parish. Recently, the Louisiana Wildlife and Fisheries purchased a large tract of woodlands that should enhance this bountiful resource.

The Lake Providence itself is one of the most beautiful oxbow lakes of its kind in Louisiana. It is approximately 7 miles long and is lined with large cypress trees. This large body of water offers many recreational activities such as swimming, boating, water skiing, and fishing. Motel accommodations, recreational vehicle hook-ups, and picnic areas are available on the lake.

East Carroll Parish is located in Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) Region 8.

As noted above, East Carroll Parish is located in the northeast region of Louisiana.

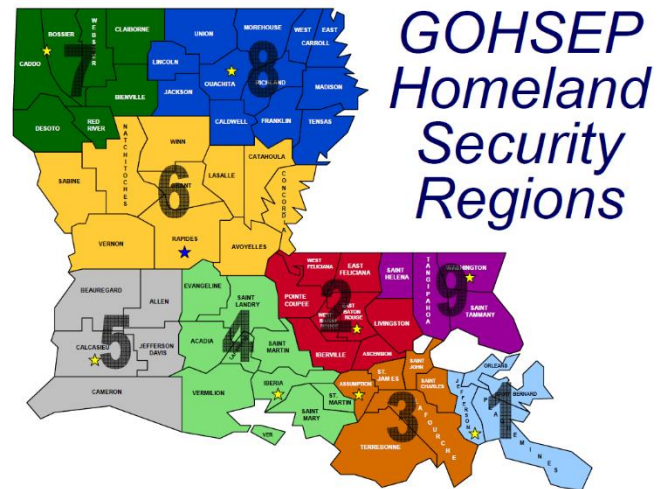


Figure 1-2: Louisiana Homeland Security Regions

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

	2010 Census	2014 Census	Current Year (If Available)	Percent Change 2010 - 2014
Total Population	7,759	7,487	—	-3.50%
Population Density (Pop/Sq. Mi.)	18.4	—	—	—
Total Households	2,904	2,899	—	—

### Economy

Because of its location in the fertile, southern Mississippi Valley Delta, about 74% of the land in East Carroll Parish is dedicated to agriculture. The agriculture industry ranges from aquaculture and forestry to row crops. The primary row crops grown in East Carroll include cotton, corn, rice, and soybeans.

Also located in the northeast corner of East Carroll Parish on the Mississippi River is the Port of Lake Providence. The port is a shallow draft port with a Corps of Engineers maintained channel depth of 9 feet, situated on 284 acres with 25 acres of flood free hydraulic fill and four berths. Inbound cargoes include aggregates, coal, dry & liquid fertilizer, forest products, lime, and tire chips. Outbound cargoes include cottonseed and various grain.

Tourism and recreation are beginning to have a bigger impact on the East Carroll Parish economy as well. With a plethora of historical elements in the parish, ranging from cultural memorials such as the Louisiana State Cotton Museum to Civil War related icons like Grant's Canal, more people are visiting East Carroll Parish each year. Lake Providence, which provides recreation throughout the year for fishing, skiing, birdwatching, and boating, as well as the fertile hunting grounds of the Bayou Macon Wildlife Management Area, also bring outdoor enthusiasts to the parish.

Industry data for business patterns in East Carroll Parish can be found in the table below:

*Table 1-2: Business Patterns in East Carroll Parish*  
(Source: <http://censtats.census.gov/cgi-bin/cbpnaic/cbpsect.pl>)

Business Description	Number of Employees	Number of Establishments	Annual Payroll (\$1,000)
Retail Trade	100-249	23	2,803
Manufacturing	108	5	3,534
Health Care and Social Assistance	303	12	9,756
Transportation and Warehousing	54	6	3,861
Construction	16	8	480
Administration and Support and Waste Management and Remediation Services	0-19	3	—
Real Estate and Rental and Leasing	0-19	4	—
Wholesale Trade	249	12	13,602
Other Services (except Public Administration)	37	13	493
Accommodation and Food Services	20-99	12	785
Financial and Insurance	33	7	1,562
Professional, Scientific, and Technical Services	21	5	577
Information	0-19	2	—
Educational Services	20-99	2	—
Arts, Entertainment, and Recreation	0-19	2	—
Agriculture, Forestry, Fishing and Hunting	20-99	8	1,169
Utilities	0-19	2	—

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 East 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 East 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 property. The two storms highlighted a hurricane season that spawned 28 storms—unparalleled in American history. The 2005



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

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 2016 East Carroll Parish Hazard Mitigation Plan maintains much of the information from the 2006 and 2011 plan versions, but it now reflects the order and methodologies of the 2011 Louisiana State Hazard Mitigation Plan. The sections in the 2011 East Carroll Hazard Mitigation Plan were as follows:

- Section One            Prerequisites
- Section Two           Planning Process
- Section Three        Risk Assessment
- Section Four         Mitigation Strategies
- Section Five         Plan Maintenance
- Appendices

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 East 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.



## 2016 Plan Update

This 2016 plan update proceeds with the previous goals of the East Carroll Parish Hazard Mitigation Plan. The current goals are as follows:

- Protect life and property
- Ensure emergency services
- Increase public preparedness
- Establish and strengthen partnerships for implementation
- Preserve or restore natural resources
- Promote a sustainable economy
- Improve data collection, use, and sharing to reduce the risk from disasters

This plan update makes a number of textual changes throughout, but the most obvious changes are data related and structural edits. First, the Spatial Hazard Events and Losses Database for the United States (SHELDUS) was 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 four sections and five appendices. The most significant changes are the newly developed hazard profiles and risk assessments, as well as the removal of repetition between sections from the previous plan updates. The 2016 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 Strategy
- 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*

2011 Plan	Revised Plan (2016)
Section 1: Prerequisites	Section 1: Introduction, Appendix D: Plan Adoption
Section 2: Planning Process	Appendix A: Planning Process
Section 3: Risk Assessment	Section 2: Hazard Identification and Risk Assessment, Section 3: Capability Assessment
Section 4: Mitigation Strategy	Section 4: Mitigation Strategy
Section 5: Plan Maintenance	Appendix B: Plan Maintenance
Appendices	Appendices

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 East Carroll Parish and its municipalities. The extent of this risk is dictated primarily by its geographic location. Most significantly, East Carroll Parish remains at high risk of water inundation from various sources, including flooding, tornadoes, and tropical cyclone activity. All of the parish is also at high risk of damages from high winds and wind-borne debris caused by various meteorological phenomena. 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.



## 2. Hazard Identification and Parish-Wide Risk Assessment

This section assesses the various hazard risks that East 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 East Carroll Parish Hazard Mitigation Plan published in 2011, 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 2016 Update
Subsidence/Coastal Land Loss			
Drought	X		X
Earthquakes	X		*
Expansive Soils			
Fog			
Flooding	X	X	X
Extreme Heat			
Sinkholes		X	
Thunderstorms (Hail, Lightning, & Wind)	X	X	X
Tornadoes	X	X	X
Tropical Cyclones	X	X	X
Tsunamis			
Wildfires	X		X
Winter Storms	X		X
Dam Failure	*		*
Levee Failure	X		X

\* Hazard was profiled but discounted

### 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. Earthquake hazards were discounted due to the hazard having no impact on the parish in the past 25 years.

The following hazards have been selected to be included in this risk assessment:

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

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

- Flooding from rivers and waterways, rain storms, tropical cyclones, 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
- Property and crop damage resulting from drought and wildfires

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 East Carroll Parish has received resulted from either tropical cyclones (4 declarations) or flooding (5 declarations), which validates these as the most significant hazards. Therefore, the issues of hurricanes and floods will both serve as the main focus during the mitigation planning process. Hurricanes present risks from the potential for flooding, primarily resulting from storm surge, and high wind speeds. While storm surge is considered the hazard with the most destructive potential, the risk assessment will also assess non-storm surge flooding as well. Flooding can also occur from non-hurricane events, as 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 East Carroll Parish is included in the hurricane risk assessment.

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

### Previous Occurrences

*Table 2-2* summarizes federal disaster declarations for East Carroll Parish since 1965. Information includes names, dates, and types of disaster.

*Table 2-2: East Carroll Parish Major Disaster Declarations*

Disaster Declaration Number	Date	Type of Disaster
374	4/27/1973	Severe Storms and Flooding
904	5/3/1991	Severe Storms, Tornadoes, and Flooding
1264	1/21/1999	Severe Ice Storm
1603	8/29/2005	Tropical Cyclone – Hurricane Katrina
1607	9/24/2005	Tropical Cyclone – Hurricane Rita
1786	9/2/2008	Tropical Cyclone – Hurricane Gustav
3322	5/6/2011	Flooding
4015	8/18/2011	Flooding
4080	8/19/2012	Tropical Cyclone – Hurricane Isaac
4102	2/22/2013	Severe Storms and Flooding

### Probability of Future Hazard Events

The probability of a hazard event occurring in East Carroll Parish is estimated in the table on the following page. 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 assess 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 (1990 – 2015) in order to determine future probability of a hazard occurring. While the 25-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-Multi-Hazard (MH) wasn’t available to determine losses. This full record was used to provide a more extensive record to determine 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. This was used due to it containing specific data for cities, whereas the data within 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	
	East Carroll Parish (Unincorporated)	Lake Providence
Drought	24%	24%
Earthquake	<1%	<1%
Flooding	36%	60%
Levee Failure	<1%	<1%
Thunderstorms (Hail)	48%	48%
Thunderstorms (Lightning)	8%	8%
Thunderstorms (Wind)	100%	100%
Tornadoes	28%	28%
Tropical Cyclones	12%	12%
Wildfires	<1%	<1%
Winter Storms	44%	44%

As shown in [Table 2-3](#), thunderstorm winds for the entire planning area, have the highest annual chance of occurrence in the parish (100%). Flood events for the incorporated area of Lake Providence has a 60% chance of occurrence, followed by hailstorms at 48%, and winter storms at 44%. The unincorporated areas of East Carroll Parish have a slightly lower chance of flooding annually at 36%. Tornadoes have a 28% annual chance of reoccurrence, followed by drought (24%), tropical cyclones (12%), and lightning (8%). Wildfires (<1%) have the lowest annual chance of occurrence in East Carroll Parish. Earthquakes were discounted since the annual chance of occurrence was calculated at less than 1% and the hazard has no impact on the parish.

### 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 \$943,925,000 in structures throughout the parish. The table below provides the total estimated value for each type of structure by occupancy.

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

Occupancy	East Carroll Parish	Unincorporated East Carroll	Lake Providence
Agricultural	\$18,944,000	\$10,446,000	\$8,498,000
Commercial	\$147,259,000	\$42,576,000	\$104,683,000
Government	\$23,104,000	\$5,112,000	\$17,992,000
Industrial	\$11,427,000	\$8,668,000	\$2,759,000
Religion	\$62,556,000	\$18,224,000	\$44,332,000
Residential	\$661,283,000	\$347,580,000	\$313,703,000
Education	\$19,352,000	\$4,586,000	\$14,766,000
<b>Total</b>	<b>\$943,925,000</b>	<b>\$437,192,000</b>	<b>\$506,733,000</b>

### Essential Facilities of the Parish

The following figures show the locations and names of the essential facilities within the parish:

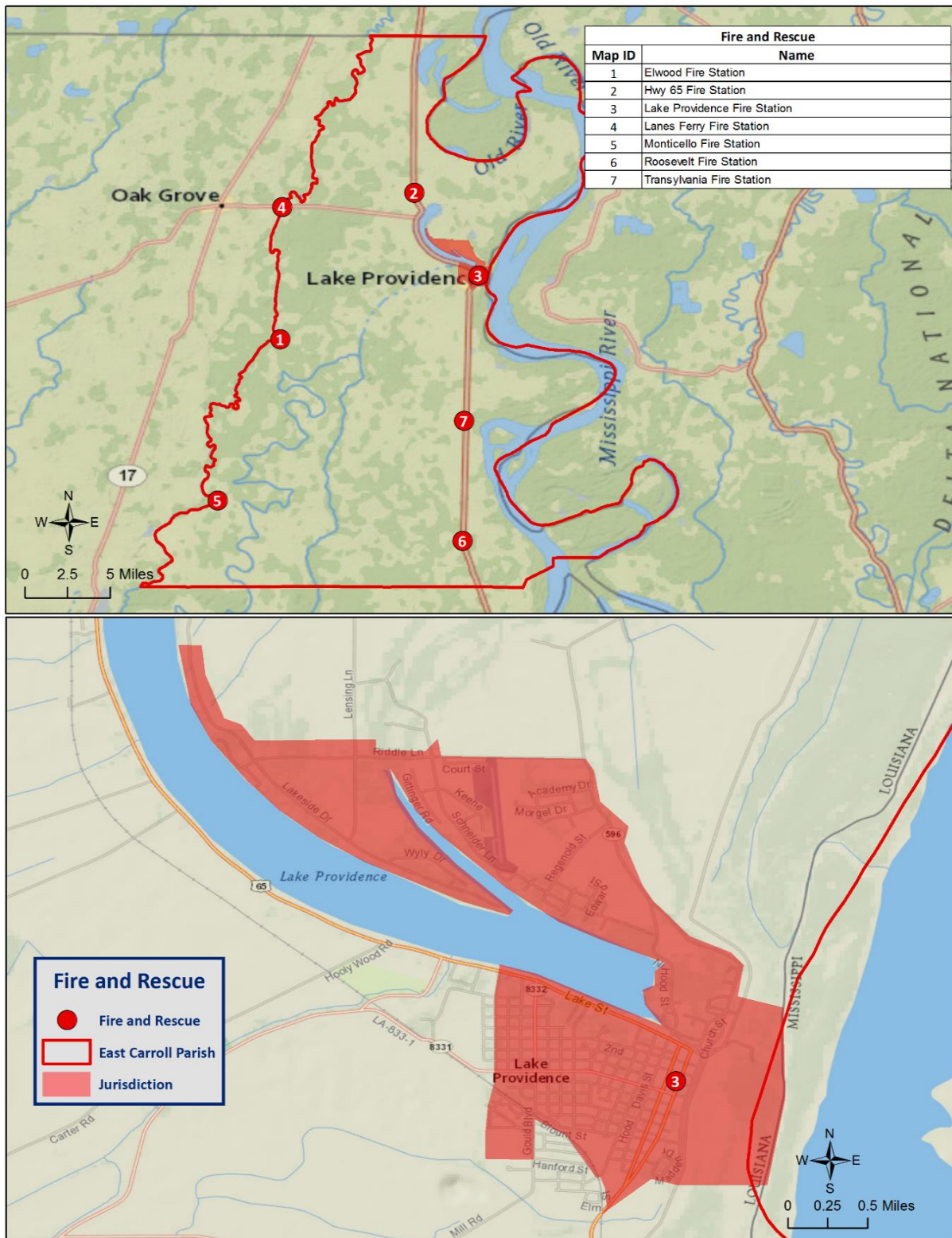
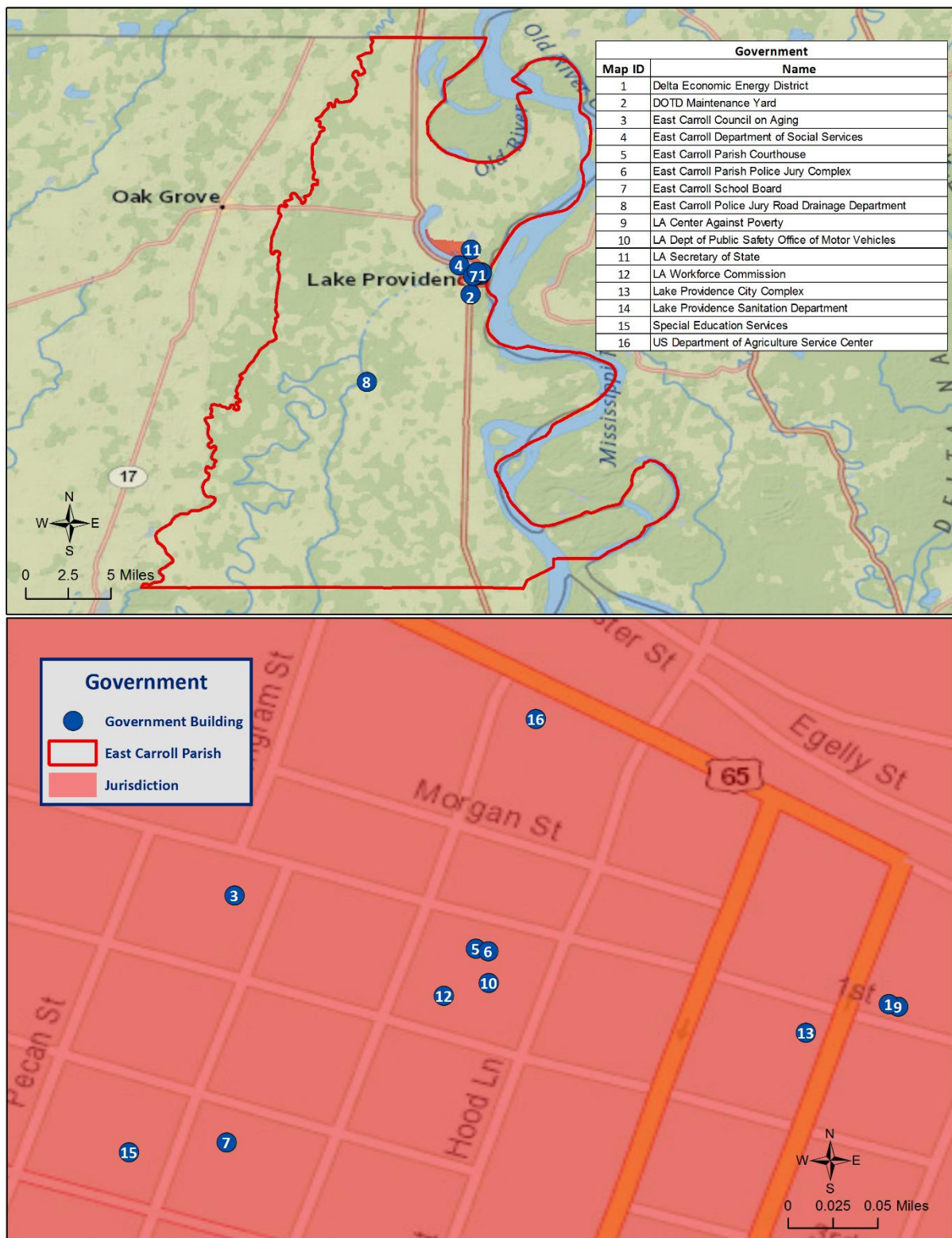
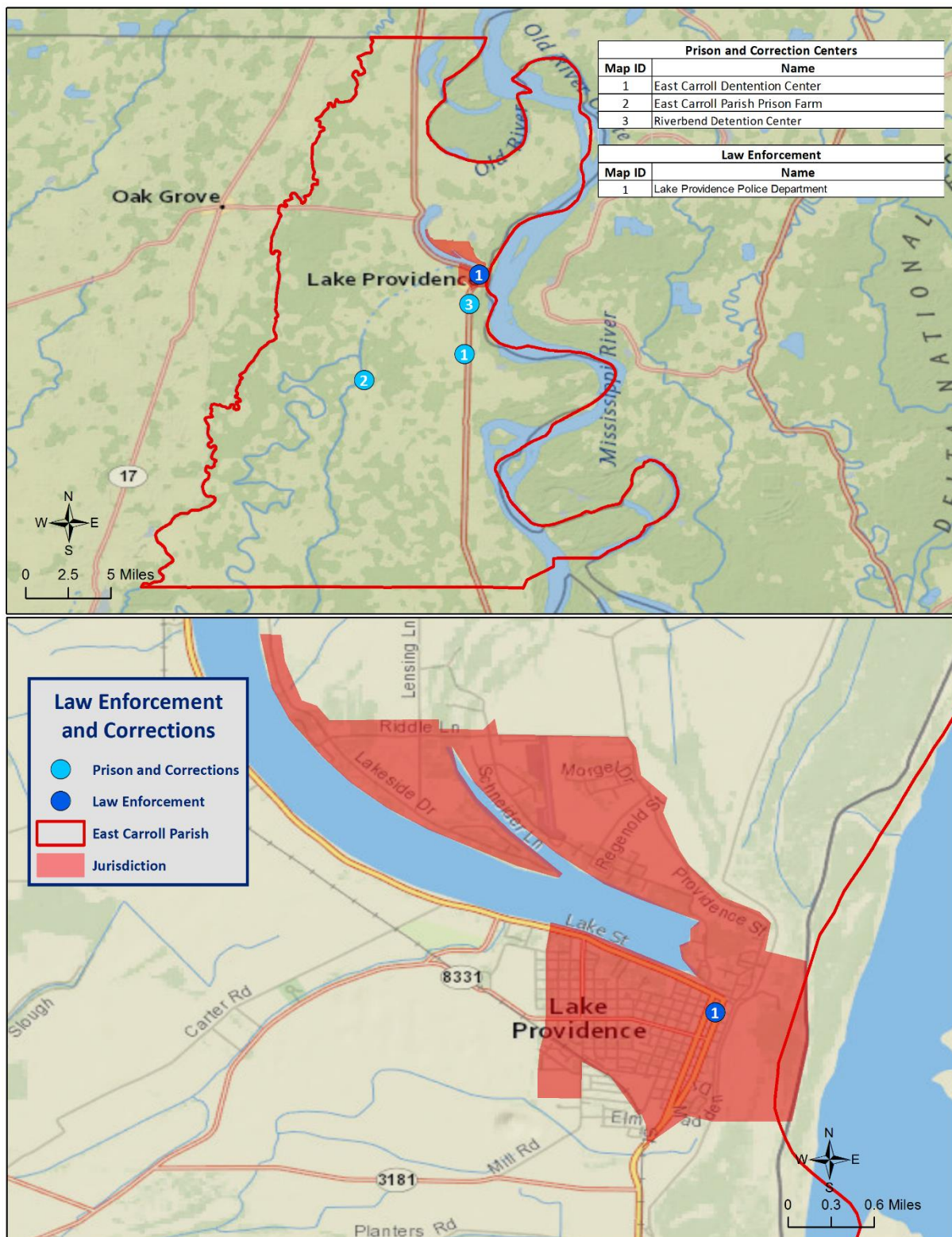


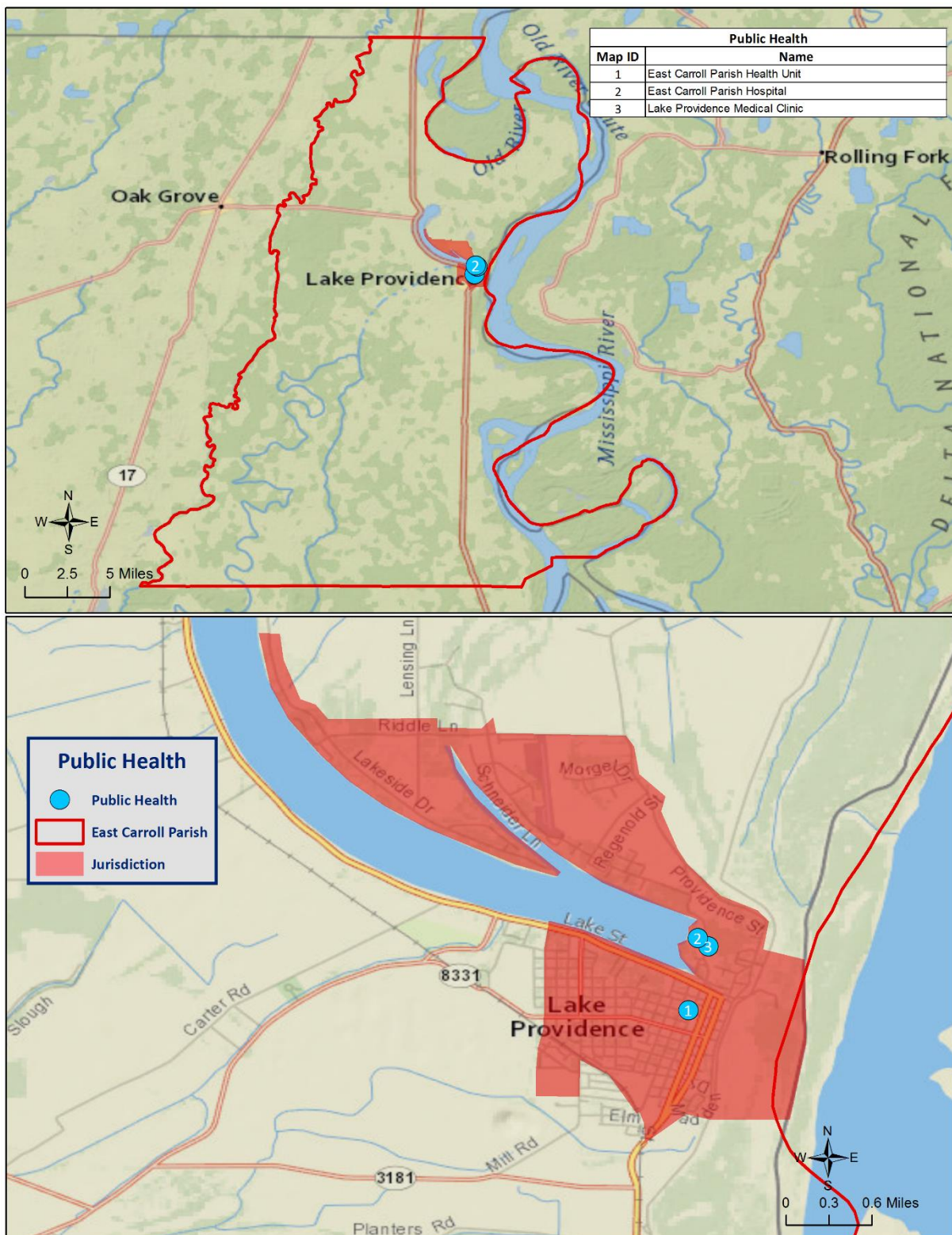
Figure 2-1: Fire and Rescue Facilities in East Carroll Parish











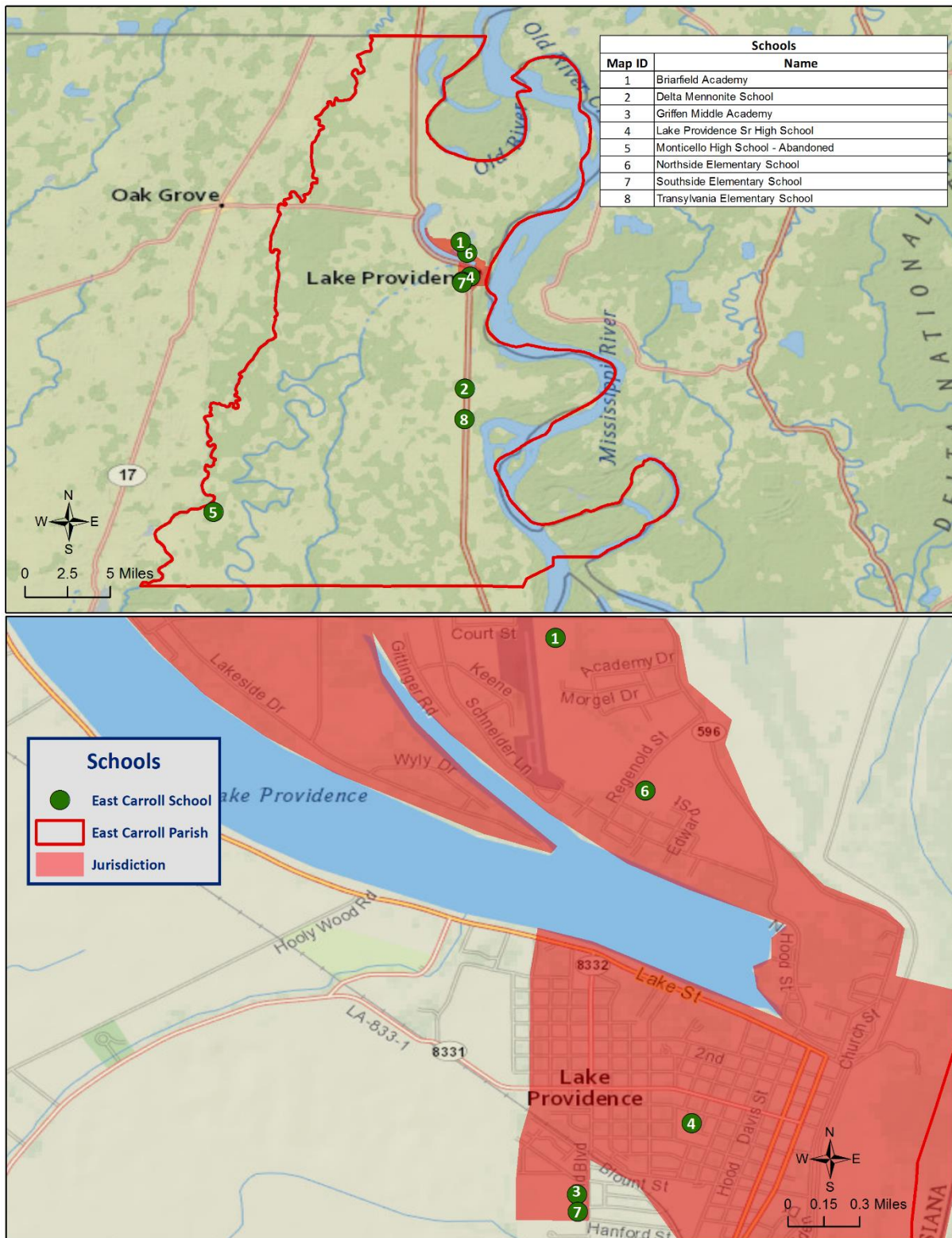


Figure 2-5: Schools in East Carroll Parish

### Future Development Trends

East Carroll Parish experienced a decline in population and housing between the years of 2000 and 2014, growing from a population of 9,384 with 3,303 housing units in 2000 to a population of 7,487 with 2,999 housing units in 2014. This decline in population was largely in the incorporated area of Lake Providence Parish from the years 2000 to 2010. This decline continued during the period of 2010 to 2014 for the incorporated area of Lake Providence. The future population and number of buildings can be estimated using U.S. Census Bureau housing and population data. The following tables show population and housing unit estimates from 2000 to 2014:

*Table 2-5: Population Growth Rate for East Carroll Parish*

Total Population	East Carroll Parish	East Carroll (Unincorporated)	Lake Providence
1-Apr-00	9,384	4,275	5,109
1-Apr-10	7,731	3,757	3,974
1-Jul-13	7,487	3,666	3,821
Population Growth between 2000 – 2010	-17.6%	-12.1%	-22.2%
Average Annual Growth Rate between 2000 – 2010	-1.8%	-1.2%	-2.2%
Population Growth between 2010 – 2013	-3.2%	-2.4%	-3.9%
Average Annual Growth Rate between 2010 – 2013	-0.79%	-0.61%	-0.96%

*Table 2-6: Housing Growth Rate for East Carroll Parish*

Total Housing Units	East Carroll Parish	East Carroll (Unincorporated)	Lake Providence
1-Apr-00	3,303	1,425	1,878
1-Apr-10	2,904	1,257	1,647
1-Jul-13	2,999	1,250	1,749
Housing Growth between 2000 – 2010	-12.1%	-11.8%	-12.3%
Average Annual Growth Rate between 2000 – 2010	-1.2%	-1.2%	-1.2%
Housing Growth between 2010 – 2013	3.3%	-0.6%	6.2%
Average Annual Growth Rate between 2010 – 2013	0.8%	-0.1%	1.5%



As shown in the previous tables, East Carroll Parish has experienced a decline in both population and housing units. Housing growth rates declined at -1.2% annually from 2000 to 2010, and grew at 0.8% annually from 2010 to 2014. Population growth rates for the parish declined at -1.8% annually from 2000 to 2010, and -0.79% annually from 2010 to 2014. From 2000 to 2010, the incorporated area of Lake Providence had the largest decrease in population overall at -12.3%. The incorporated area of Lake Providence also had the largest decrease in population from 2010 to 2014 with an overall decrease of -3.9%.

The incorporated area of Lake Providence experienced the largest decrease in housing units from 2000 to 2010 at -12.3%. From 2010 to 2014, Lake Providence had the largest increase in housing units at 6.2%. The unincorporated area of East Carroll Parish had an overall increase of 3.3% during the same time period.

### 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 will decline slightly within East 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%. No changes in development have impacted the community's vulnerability since the plans last update.

*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)
<b>Flood Damage</b>				
Structures	3,024	767	799	825
Value of Structures	\$961,351,549	\$243,838,104	\$267,193,126	\$287,477,758
# of People	7,428	1,884	1,811	1,754
<b>Tropical Cyclones</b>				
Structures	3,024	3,024	3,149	3,253
Value of Structures	\$961,351,549	\$961,351,549	\$1,053,430,624	\$1,133,404,432
# of People	7,428	7,428	7,139	6,917

### Land Use

The East Carroll Parish Land Use table is provided on the following page. Residential, commercial, and industrial areas account for only 4% of the parish's land use. Agricultural land is the largest category at 205,032 acres, accounting for 74% of parish land. At 42,356 acres, wetlands account for 15% of parish lands, while 15,256 acres of open water account for 5% of parish lands. The parish also consists of 5,617 acres of forested areas, accounting for 2% of all parish lands.

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

Land Use	Acres	Percentage
Agricultural Land, Cropland, and Pasture	205,032	74%
Wetlands	42,356	15%
Forest Land (not including forested wetlands)	5,617	2%
Urban/Development	10,008	4%
Water	15,256	5%

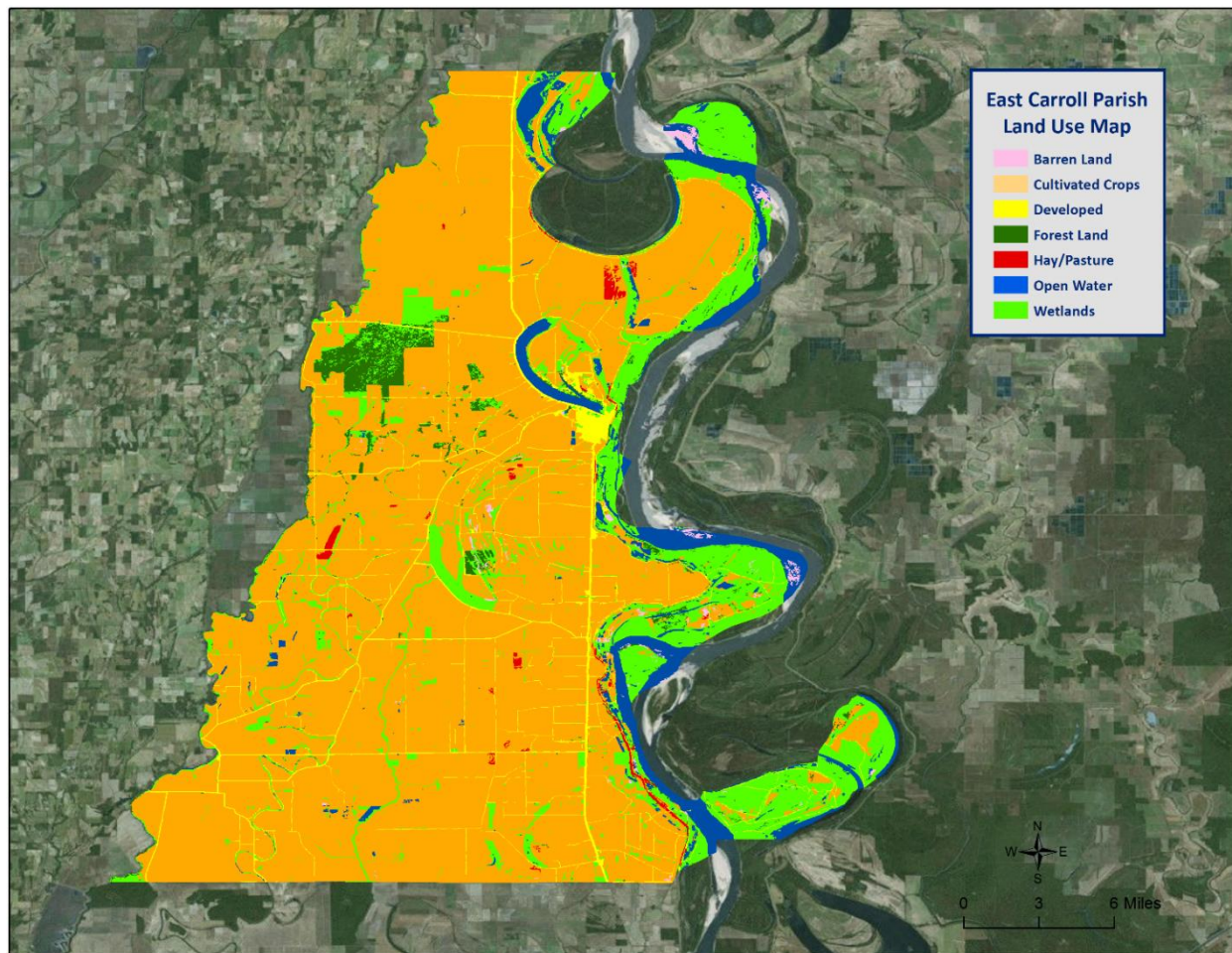


Figure 2-6: East Carroll Parish Land Use Map  
(Source: USGS Land Use Map)

## 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 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. But 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. 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 also 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, crop loss, and livestock and wildlife mortality rates 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 the 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 range and Palmer classifications of the PDSI index. [Figure 2-7](#) 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. 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 East Carroll Parish at the time this plan went to publication ( *Figure 2-7*).

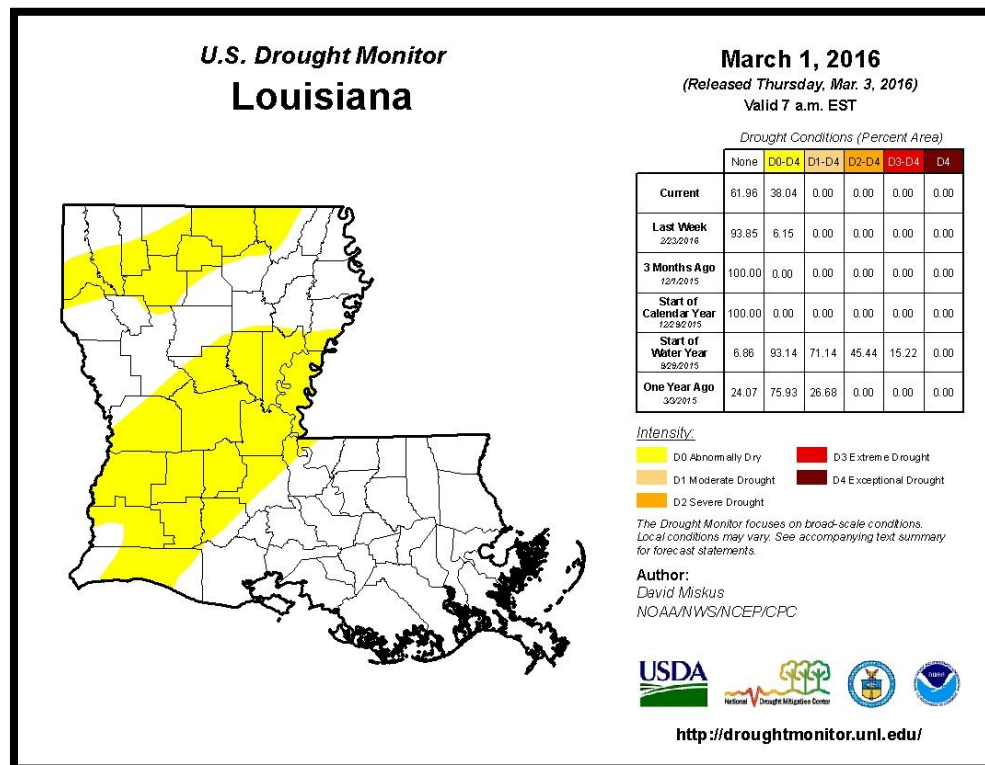


Figure 2-7: United States Drought Monitor for the State of Louisiana and its Parishes  
(Source: The National Drought Mitigation Center)

### 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 East Carroll Parish is on the agricultural community.

### Previous Occurrences / Extents

The SHELDUS database reports a total of six drought events occurring within the boundaries of East Carroll Parish between the years of 1990 to 2015. *Table 2-10* identifies the date of occurrence, estimated crop damage, and severity of the events that have occurred in East Carroll Parish. Based on previous occurrences, and in accordance with the Palmer Drought Index, the worst case scenario for drought in East Carroll Parish would be a severe drought event.

*Table 2-10: Drought Events with Crop Damage Totals for East Carroll Parish  
(Source: SHELDUS)*

Date	Crop Damage	Palmer Classification
October 2006	\$965,524	Moderate Drought
June 2010	\$108,567	Moderate Drought
July 2010	\$1,085,666	Severe Drought
August 2010	\$542,833	Moderate Drought
September 2010	\$542,833	Moderate Drought
October 2010	\$542,833	Moderate 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 SHELDUS database, there have been six drought events that have caused some level of crop damage. The total agricultural damage from these events is \$3,788,256, with an average cost of \$631,376 per drought event. When annualizing the total cost over the 25-year record, total annual losses based on drought is estimated to be \$151,530. *Table 2-11* presents an analysis of agricultural exposure that is susceptible to drought by major crop type for East Carroll Parish.

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

Agricultural Exposure by Type for Drought						
Soybeans	Corn	Cotton	Rice	Forestry	Wheat	Total
\$107,633,459	\$22,839,131	\$6,371,485	\$2,958,671	\$2,764,517	\$1,289,050	\$143,856,313

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



## Earthquakes

An earthquake is a sudden motion or trembling of the Earth caused by an abrupt release of stored energy in the rocks beneath the Earth's surface. The energy released results in vibrations which are known as seismic waves. Ground motion from seismic waves is expressed as peak ground acceleration (PGA), the fastest measured change in speed for a particle at ground level that is moving because of an earthquake. PGA is commonly measured as a percentage of acceleration due to Earth's gravity (%g). This measurement is relied upon to determine seismic load engineering design and construction requirements. Earthquakes are typically described in terms of magnitude and intensity. Magnitude is the measure of the amplitude of the seismic wave and is often expressed by the Richter scale, and intensity is a measure of how strong the shock was felt at a particular location, indexed by the Modified Mercalli Intensity (MMI) scale. The Richter scale is a logarithmic measurement whereby an increase in the scale by one whole number represents a tenfold increase in measured ground motion of the earthquake (and an increase in energy released of more than 30 times). An increase by two whole numbers represents a 102 (or 100-fold) increase in ground motion, and thus more than 302 (or 900) times the energy released. [Table 2-12](#) shows the rough correlation between the Richter scale, PGA, and the MMI. The relationship between these is approximate and depends upon such specifics as the depth of the focus (the location of the actual rock movement) and distance from the epicenter (the location on the Earth's surface above the earthquake focus) of the earthquake.

*Table 2-12: Comparison of Earthquake Magnitudes for PGA, Richter, and MMI*  
(Source: USGS Earthquake Hazards Program)

COMPARISON OF EARTHQUAKE METRICS			
PGA (%g)	Magnitude (Richter)	Intensity (MMI)	Description (MMI)
<0.17	1.0 - 3.0	I	<b>I.</b> Not felt except by a very few under especially favorable conditions.
0.17 - 1.4	3.0 - 3.9	II - III	<b>II.</b> Felt only by a few persons at rest, especially on upper floors of buildings. <b>III.</b> Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motorcars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
1.4 - 9.2	4.0 - 4.9	IV - V	<b>IV.</b> Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motorcars rock noticeably. <b>V.</b> Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
9.2 - 34	5.0 - 5.9	VI - VII	<b>VI.</b> Felt by all. Some heavy furniture moved; a few instances of fallen plaster. Damage slight. <b>VII.</b> Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.

COMPARISON OF EARTHQUAKE METRICS			
PGA (%g)	Magnitude (Richter)	Intensity (MMI)	Description (MMI)
34 - 124	6.0 - 6.9	VII - IX	<b>VIII.</b> Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, and walls. Heavy furniture overturned. <b>IX.</b> Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
>124	7.0 and higher	<b>VIII</b> or higher	<b>X.</b> Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent. <b>XI.</b> Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly. <b>XII.</b> Damage total. Lines of sight and level are distorted. Objects thrown into the air.

The system of subsidence faults in southern Louisiana developed due to accelerated land subsidence and rapid sediment deposition from the Mississippi River. The system stretches across the southern portion of the state from Beauregard Parish in the west to West Baton Rouge Parish in the east and it includes every parish south of this line. This system is thought to be responsible for many of the recorded earthquakes from 1843 to the present. All of the earthquakes that occurred over this period of time were of low magnitude, resulting mostly in limited property damage (such as broken windows, damaged chimneys, and cracked plaster). While faults throughout the northwestern parishes are thought to be inactive, the New Madrid seismic zone lies just to the north of Louisiana and originates in the region of New Madrid, Missouri. The magnitude of historic earthquakes originating in the New Madrid seismic zone is far greater than that generated by the subsidence fault system in coastal Louisiana. A significant seismic event from the New Madrid seismic zone is more likely to have a greater impact on Louisiana than a seismic event from the subsidence fault system.

#### Location

An earthquake event is a geological hazard that occurs along fault lines. East Carroll Parish has no fault lines that run through the borders of the parish, but several fault lines are located parishes near East Carroll Parish (*Figure 2-8*). Effects of an earthquake may be felt throughout the parish.

#### Previous Occurrences / Extents

Both the SHELUS and National Climatic Data Center report no earthquake events occurring within the boundaries of East Carroll Parish between the years of 1990 – 2015. The National Oceanic and Atmospheric Administration's National Geophysical Data Center reports 1 earthquake event occurring within the boundaries of Parish Name between the years 1811 – 2015. *Table 2-13* summarizes the earthquake event that occurred within East Carroll Parish. *Figure 2-8* displays the location and intensity of each earthquake event in East Carroll Parish and surrounding parishes. Based on the previous earthquake event presented in the following table, an earthquake with an intensity level of MMI 4 could occur within the planning area. This intensity of an earthquake would only be felt by many indoors, but by few who are outside.

*Table 2-13: Summary of Earthquakes in East Carroll Parish*

Date	Location	Intensity (MMI)
June 4, 1967	Lake Providence	4

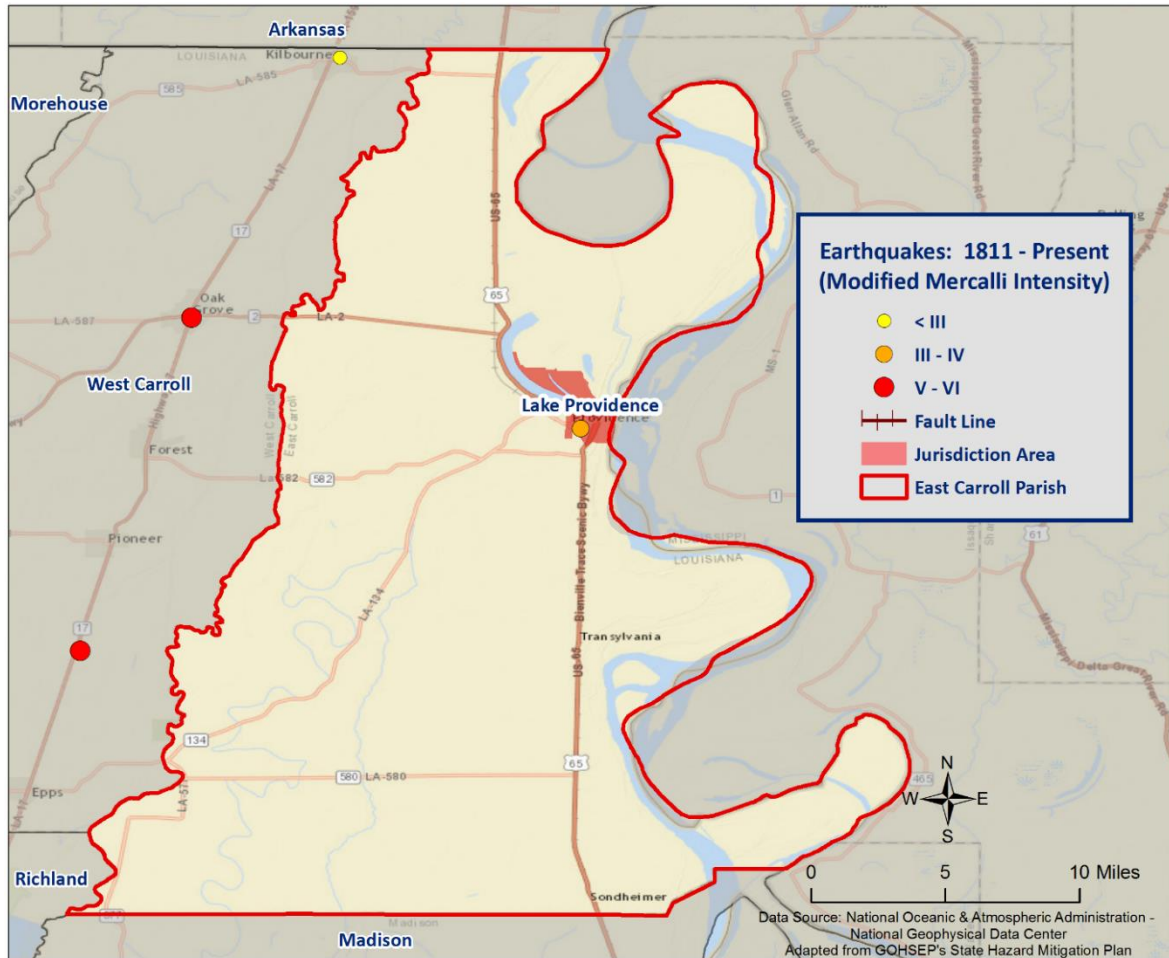


Figure 2-8: Location and Intensity (MMI) of Earthquakes in East Carroll Parish

Frequency / Probability

Earthquakes are an extremely rare occurrence in the State of Louisiana and East Carroll Parish, with one occurrence of an earthquake event within the boundaries of the parish from the years 1811 – 2015. Based on this historical record and Louisiana’s State Hazard Mitigation Plan, it is determined that an earthquake event has less than a 1% annual chance of occurrence in the East Carroll Parish planning area, and is therefore discounted due to the hazard having no impact on the parish in 25-years. As a result, earthquakes are not carried forward into risk assessment.

## 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 ten 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, as well as the shape and land cover of its drainage basin. The smaller the river, the faster that 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 River, 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, or gradual sea level rise.

For purposes of this assessment, ponding, flash flood, 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:

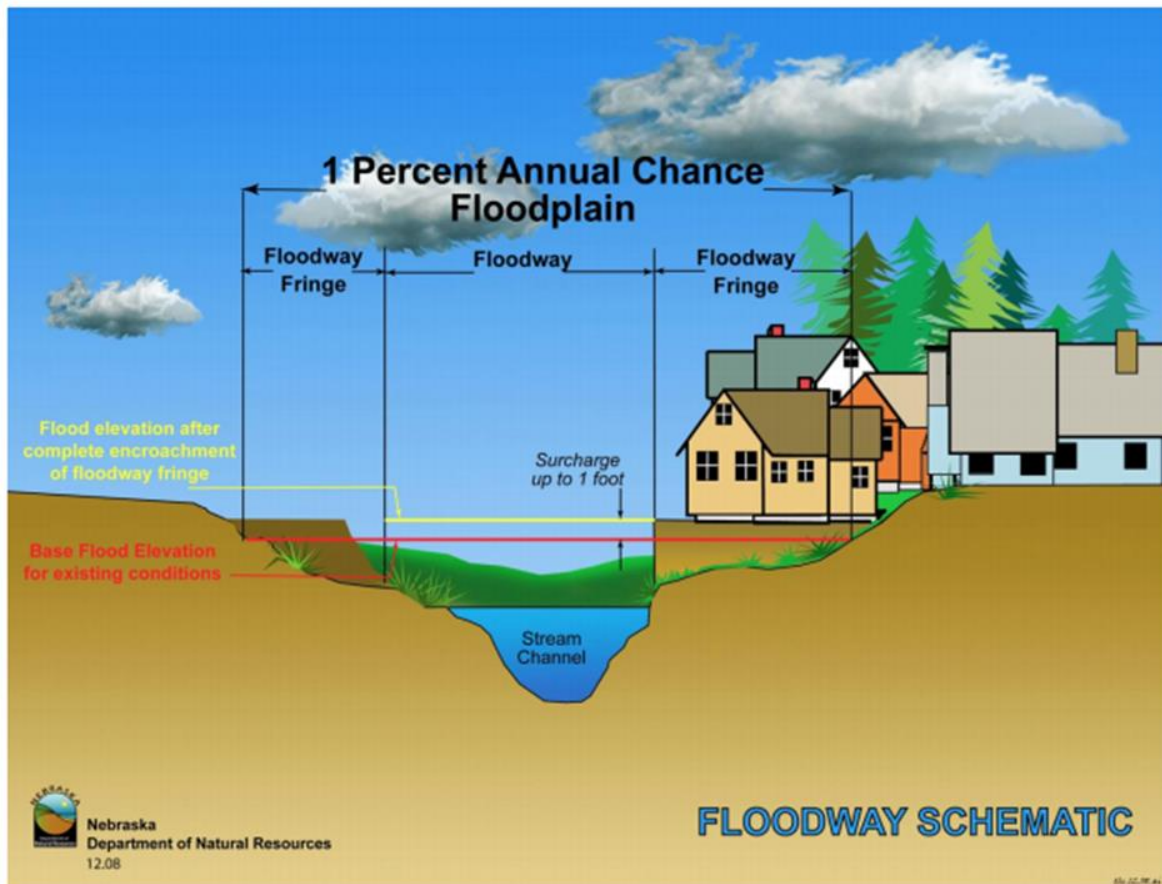
- **Flood Categories**
  - Minor Flooding: Minimal or no property damage, but possibly some public threat.
  - Moderate Flooding: Some inundation of structures and roads near streams. Some evacuations of people and/or transfer of property to higher elevations.
  - Major Flooding: Extensive inundation 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 hydrometeorological 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 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 ( $\text{ft}^3/\text{s}$ ) 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 Program (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 some 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 are usually 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 two occasions, in which the cost of the repair, on 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:

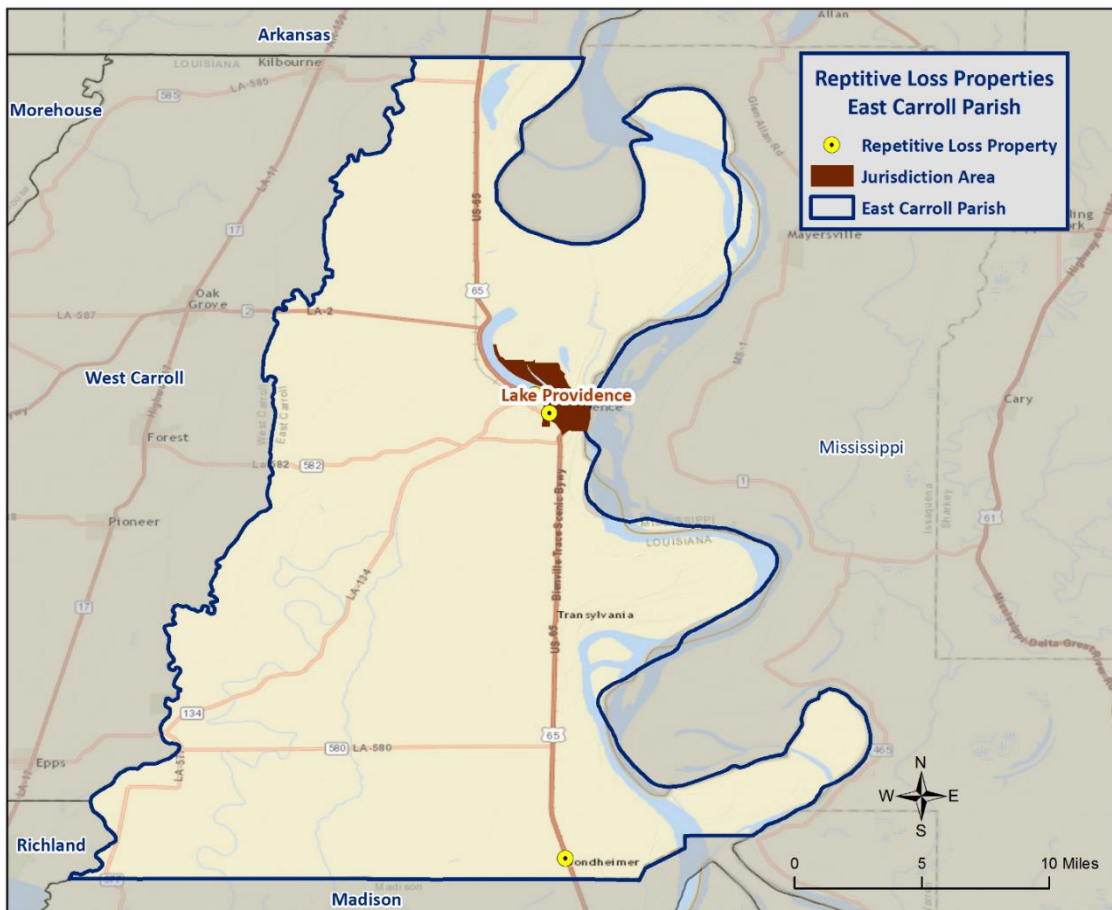
- a. It is covered under a contract for flood insurance made available under the NFIP; and
- b. It has incurred flood related damage –
  - 1) For which four or more separate claims payments have been made under flood insurance coverage with the amount of each claim exceeding \$5,000 and with the cumulative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

Figures regarding repetitive loss structures for East Carroll Parish are provided in the table below:

*Table 2-14: Repetitive Loss Structures for East Carroll Parish*

Jurisdiction	Number of Structures	Residential	Commercial	Government	Total Claims	Total Claims Paid	Average Claim Paid
East Carroll Parish (Unincorporated)	11	7	4	0	31	337,544	\$10,889
Lake Providence	1	1	0	0	2	\$37,151	\$18,576
<b>Total</b>	<b>12</b>	<b>8</b>	<b>4</b>	<b>0</b>	<b>33</b>	<b>\$374,695</b>	<b>\$11,354</b>

Of the 12 repetitive loss structures, 10 were able to be geocoded in order to provide an overview of where the repetitive loss structures were located throughout the parish. *Figure 2-10* shows the approximate location of the 10 structures, while *Figure 2-11* shows where the highest concentration of repetitive loss structures are located. Through the repetitive loss map, it is clear that the primary concentrated area of repetitive loss structures is focused in and around the incorporated areas of Lake Providence.



*Figure 2-10: Repetitive Loss Properties in East Carroll Parish*



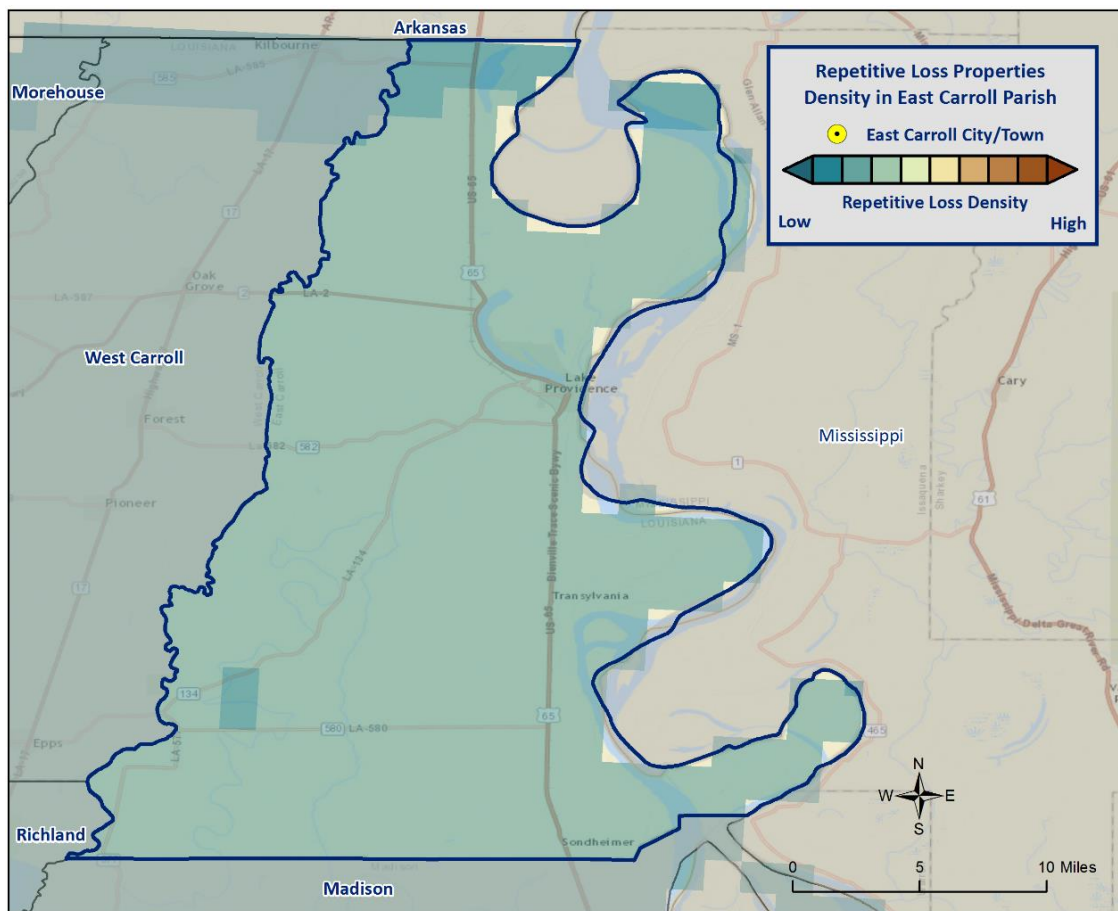


Figure 2-11: Repetitive Loss Property Densities in East Carroll Parish

#### National Flood Insurance Program

Flood insurance statistics indicate that East Carroll Parish has 225 flood insurance policies with the NFIP, with total annual premiums of \$143,473. East Carroll Parish and the jurisdiction of Lake Providence are participants in the NFIP. East Carroll Parish and each of the incorporated jurisdictions will continue to adopt and enforce floodplain management requirements, including regulating new construction Special Flood Hazard Areas, and will continue to monitor activities including local requests for new map updates. Flood insurance statistics and additional NFIP participation details for East Carroll Parish are provided in the tables on the following page

East Carroll Parish and the community listed above will continue their active participation in the NFIP through various education and outreach activities. These activities will include community outreach on the availability of flood insurance within the parish and incorporated municipality. The Parish Floodplain Manager will continue to work in coordination with the Town of Lake Providence to ensure floodplain management regulations are adopted and enforced. The Parish Floodplain Manager will continue to seek and attend floodplain management and NFIP continuing education.

Table 2-15: Summary of NFIP Policies for East Carroll Parish

Location	No. of Insured Structures	Total Insurance Coverage Value	Annual Premiums Paid	No. of Insurance Claims Filed Since 1978	Total Loss Payments
East Carroll Parish (Unincorporated)	148	\$33,670,500	\$92,017	125	\$1,547,407
Lake Providence	77	\$21,034,300	\$51,456	20	\$191,844
<b>Total</b>	<b>225</b>	<b>\$54,704,800</b>	<b>\$143,473</b>	<b>145</b>	<b>\$1,739,251</b>

Table 2-16: Summary of Community Flood Maps for East Carroll Parish

CID	Community Name	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Date Joined the NFIP	Tribal
220062	East Carroll (Unincorporated)	8/2/1977	11/15/1985	11/15/1985 (M)	11/15/1985	No
220063#	Lake Providence	3/29/1974	10/16/1979	10/16/1979 (M)	10/16/1979	No

According to the Community Rating System (CRS) list of eligible communities dated June 1, 2014, East Carroll Parish and the jurisdiction of Lake Providence do not 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 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 East 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 types of flooding that East Carroll Parish experiences.

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

**Local Drainage or High Groundwater Levels:** Locally 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.

**Backwater Flooding:** Backwater flooding is normally associated with riverine flooding and connotes minimal velocity. All low lying areas are at risk. A heavy rainfall event coupled with a swollen river, canal, bayou, or marsh hinders drainage outflow, causing backwater flooding to the same areas susceptible to storm surge.

**Riverine Flooding:** Riverine flooding is, by definition, river-based. Most of the riverine flooding problems occur when the Mississippi River crests at flood stage levels, causing extensive flooding in low-lying areas.

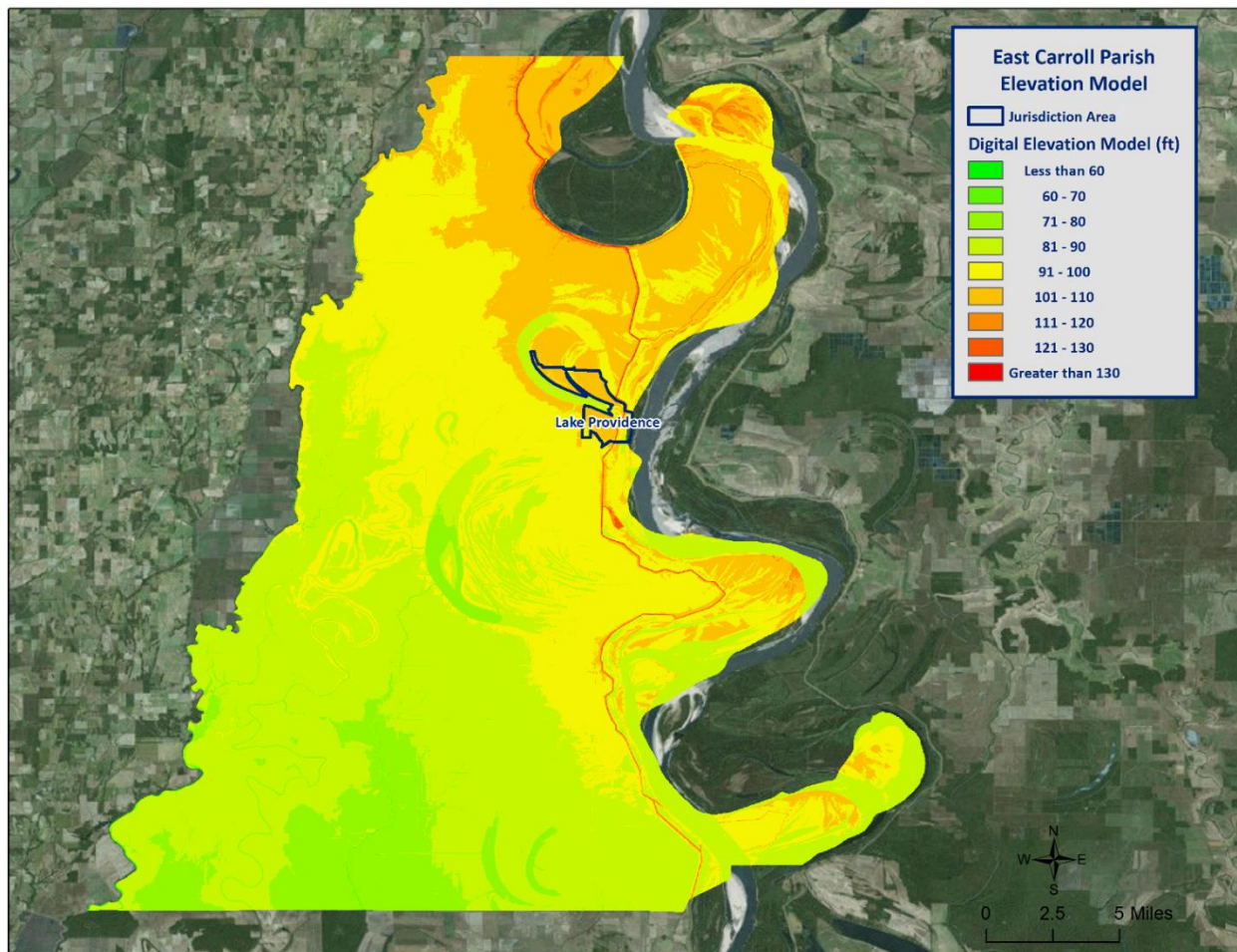


Figure 2-12: Elevation throughout East Carroll Parish

Looking at the digital elevation model (DEM) in the figure above for East Carroll Parish is instructive in visualizing where the low lying and high risk areas are for the parish. Elevations in the parish range from less than 60 feet to over 130 feet. The highest elevations in the parish are approximately 130 feet, located in the unincorporated areas of the parish. The incorporated area of Lake Providence has an average elevation of approximately 105 feet.



### Location

East Carroll Parish has experienced significant flooding in its history and can expect more in the future. East Carroll Parish and the town of Lake Providence are located in a low-lying and flat region of northeastern Louisiana. In addition, the parish and town lie entirely within the Ouachita-Black River drainage basin, which drains approximately 8,000 square miles in north Louisiana.

The following are enlarged maps of the incorporated areas showing the areas within each jurisdiction that are at risk of flooding:

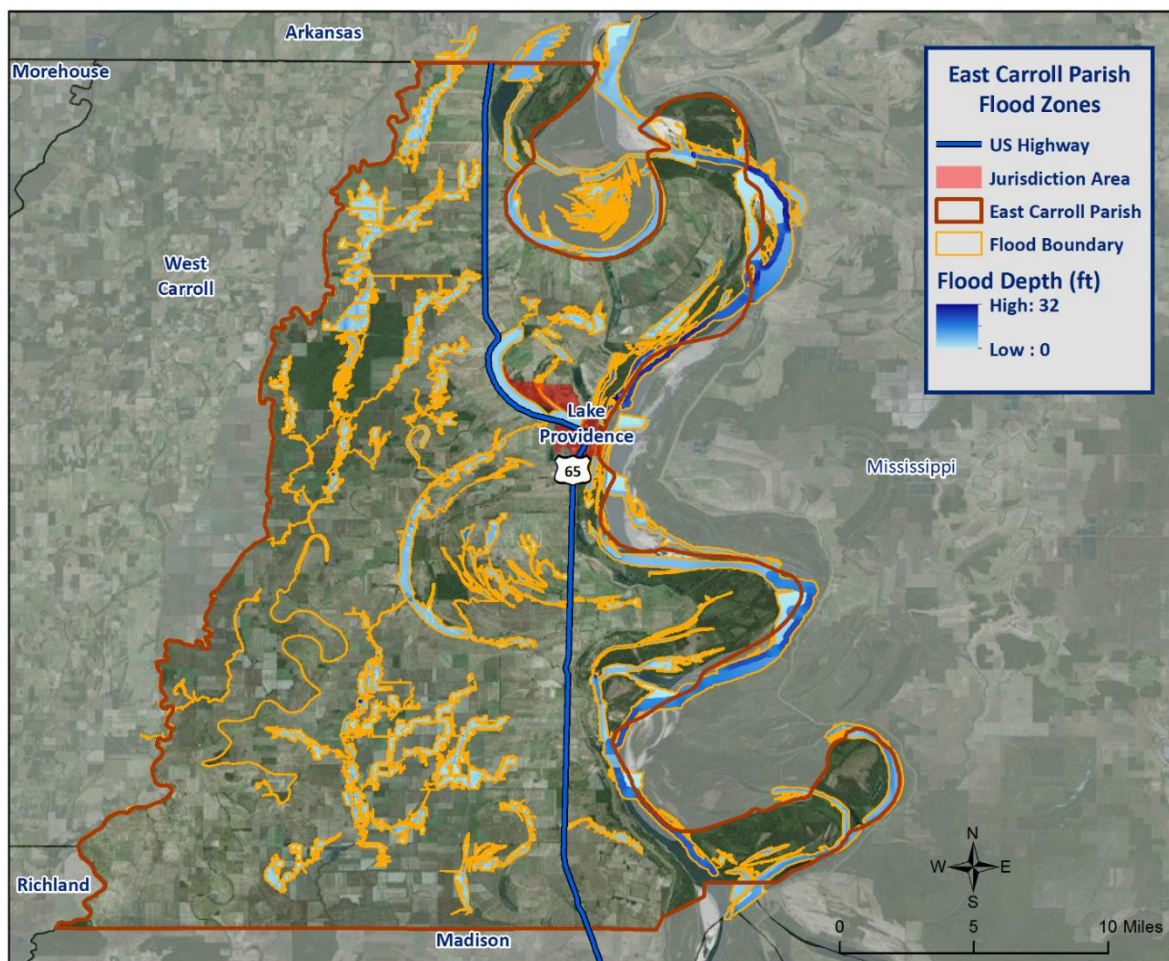


Figure 2-13: East Carroll Parish Areas within the Flood Zones  
(Source: Hazus MH 2.2)



Figure 2-14: Town of Lake Providence Areas within the Flood Zones  
(Source: Hazus MH 2.2)



*Previous Occurrences / Extents*

Historically, there have been 17 flooding events that have created significant flooding in East Carroll Parish between 1990 and 2015. Below is a brief synopsis of the five flooding events that have occurred since 2010, including flooding events that have occurred since the parish's last planning update.

*Table 2-17: Historical Floods in East Carroll Parish with Locations from 2010 - 2015*

Date	Extents	Type of Flooding	Estimated Damages	Location
May 6, 2011	Flooding along the Mississippi River caused extensive flooding of low lying farmland around the river. All of the flood waters were within the mainline levee. The secondary levee at Bunches Bend failed causing extensive damage inside the levee. Twenty camps and three homes were either damaged or destroyed. Several roads sustained minor to major damage.	Flood	\$12,644,335	GASSOWAY
October 31, 2013	A band of locally heavy rains impacted the region. Extensive street flooding occurred in Lake Providence.	Flash Flood	\$0	LAKE PROVIDENCE
April 6, 2014	Widespread rainfall totaling 2 to 4 inches with areas of 5 to 7 inches produced many instances of flash flooding and significant river flooding.	Flash Flood	\$0	LAKE PROVIDENCE
April 14, 2014	Lake Providence was coming out of its banks. There was large areas of lowland flooding and street flooding. No streets were closed at this time. The rainfall amount of 2.93 inches was recorded.	Flash Flood	\$20,024	LAKE PROVIDENCE
April 14, 2014	There were reports of water near Sparrow Street Apartments and two homes. One home was on Artuard Street and the other on Brannum Street.	Flash Flood	\$10,012	LAKE PROVIDENCE

The worst-case scenarios are based on several different types of flooding events. Storm water excesses and riverine flooding primarily affect the low-lying areas of the parish, and flood depths of up to five feet can be expected in the unincorporated areas of the parish. The incorporated areas of Lake Providence can expect flood depths from three to five feet.

### *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 East Carroll Parish having multiple jurisdictions, it was necessary to assess the historical data found in the National Climatic Data Center for East Carroll Parish and its jurisdictions to properly determine probability for future flood events. The table below shows the probability and return frequency for each jurisdiction.

*Table 2-18: Annual Flood Probabilities for East Carroll Parish*

Jurisdiction	Annual Probability	Return Frequency
East Carroll Parish (Unincorporated)	36%	2 – 3 years
Lake Providence	60%	1 – 2 years

Based on historical record, the overall flooding probability for the entire East Carroll Parish planning area is 68%, with 17 events occurring over a 25-year period.

### *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 2-19* shows the total economic losses that would result from this occurrence.

*Table 2-19: Estimated Losses in East Carroll Parish from a 100-Year Flood Event  
(Source: Hazus 2.2)*

Jurisdiction	Estimated Total Losses from 100-Year Flood Event
East Carroll Parish (Unincorporated)	\$16,489,000
Lake Providence	\$855,000
<b>Total</b>	<b>\$17,344,000</b>

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 on the next page.

*Table 2-20: Estimated 100-Year Flood Losses for Unincorporated East Carroll Parish by Sector  
(Source: Hazus 2.2)*

East Carroll Parish (Unincorporated)	Estimated Total Losses from 100-Year Flood Event
Agricultural	\$147,000
Commercial	\$394,000
Government	\$14,000
Industrial	\$132,000
Religious / Non-Profit	\$304,000
Residential	\$15,435,000
Schools	\$63,000
<b>Total</b>	<b>\$16,489,000</b>

*Table 2-21: Estimated 100-Year Flood Losses for Lake Providence by Sector  
(Source: Hazus 2.2)*

Lake Providence	Estimated Total Losses from 100-Year Flood Event
Agricultural	\$89,000
Commercial	\$56,000
Government	\$0
Industrial	\$23,000
Religious / Non-Profit	\$542,000
Residential	\$145,000
Schools	\$0
<b>Total</b>	<b>\$855,000</b>

#### *Threat to People*

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

*Table 2-22: 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
East Carroll Parish (Unincorporated)	<b>3,768</b>	<b>1,790</b>	<b>47.5%</b>
Lake Providence	<b>3,991</b>	<b>178</b>	<b>4.5%</b>
<b>Total</b>	<b>7,759</b>	<b>1,968</b>	<b>25.4%</b>

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

*Table 2-23: Vulnerable Populations Susceptible to a 100-Year Flood Event in Unincorporated East Carroll Parish*  
(Source: Hazus 2.2)

East Carroll Parish (Unincorporated)		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	1,790	47.5%
Persons Under 5 Years	131	7.3%
Persons Under 18 Years	460	25.7%
Persons 65 Years and Over	224	12.5%
White	542	30.3%
Minority	1,248	69.7%

*Table 2-24: Vulnerable Populations Susceptible to a 100-Year Flood Event in Lake Providence*  
(Source: Hazus 2.2)

Lake Providence		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	178	4.5%
Persons Under 5 Years	18	9.9%
Persons Under 18 Years	42	23.6%
Persons 65 Years and Over	22	12.5%
White	30	16.8%
Minority	148	83.2%

#### *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 flooding, and high-speed winds called downbursts. Nevertheless, given the criteria, the National Oceanic and Atmospheric Administration (NOAA) characterizes a thunderstorm as severe when it produces one or more of the following:

- Hail of one 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 initially develops in the upper atmosphere 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 fall partially to a level in the cloud where the temperature exceeds the freezing point, melt partially, and then 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 allow more massive hailstones to be supported by updrafts, leaving them suspended longer. This longer suspension time results in larger hailstone sizes. The tables on the following page display the TORRO Hailstorm Intensity Scale, along with a spectrum of hailstone diameters and their everyday equivalents.

Table 2-25: 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 2-26: Spectrum of Hailstone Diameters and their Everyday Descriptions

(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"	Nickle
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 the following table.

*Table 2-27: 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 hilly 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.

The following table 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 2-28: 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 and 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 following table outlines the lightning activity level that is a measurement of lightning activity.

*Table 2-29: 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 East Carroll Parish is equally at risk for hailstorms.

*Previous Occurrences / Extents*

The SHELDUS database reports 12 significant hailstorm events occurring within the boundaries of East Carroll Parish between the years of 1990-2015. According to the National Climatic Data Center, hailstorm diameters experienced in East Carroll Parish have ranged from 0.75 inches to 2.75 inches since 1990. The most frequently recorded hail size has been 1 inch diameters. *Figure 2-15* displays the density of hailstorms in East Carroll Parish and adjacent parishes. Based on the National Climatic Data Center dataset, *Table 2-30* provides an overview of hailstorms that have impacted the East Carroll Parish planning area since 2010. East Carroll Parish can expect to experience hail up to 2.75 inches in diameter for future events.

*Table 2-30: Previous Occurrences of Hailstorms in East Carroll Parish*  
(Source: NCDC)

Date	Recorded Hail Size (inches)	Location
April 4, 2011	1.5	BOWIE
April 15, 2011	1	ROOSEVELT
April 15, 2011	0.75	TRANSYLVANIA
March 18, 2013	2.75	BOWIE
March 28, 2014	1	LAKE PROVIDENCE
April 28, 2014	1	GRIMES
February 1, 2015	1	TRANSYLVANIA
April 19, 2015	1.75	SHELBURN

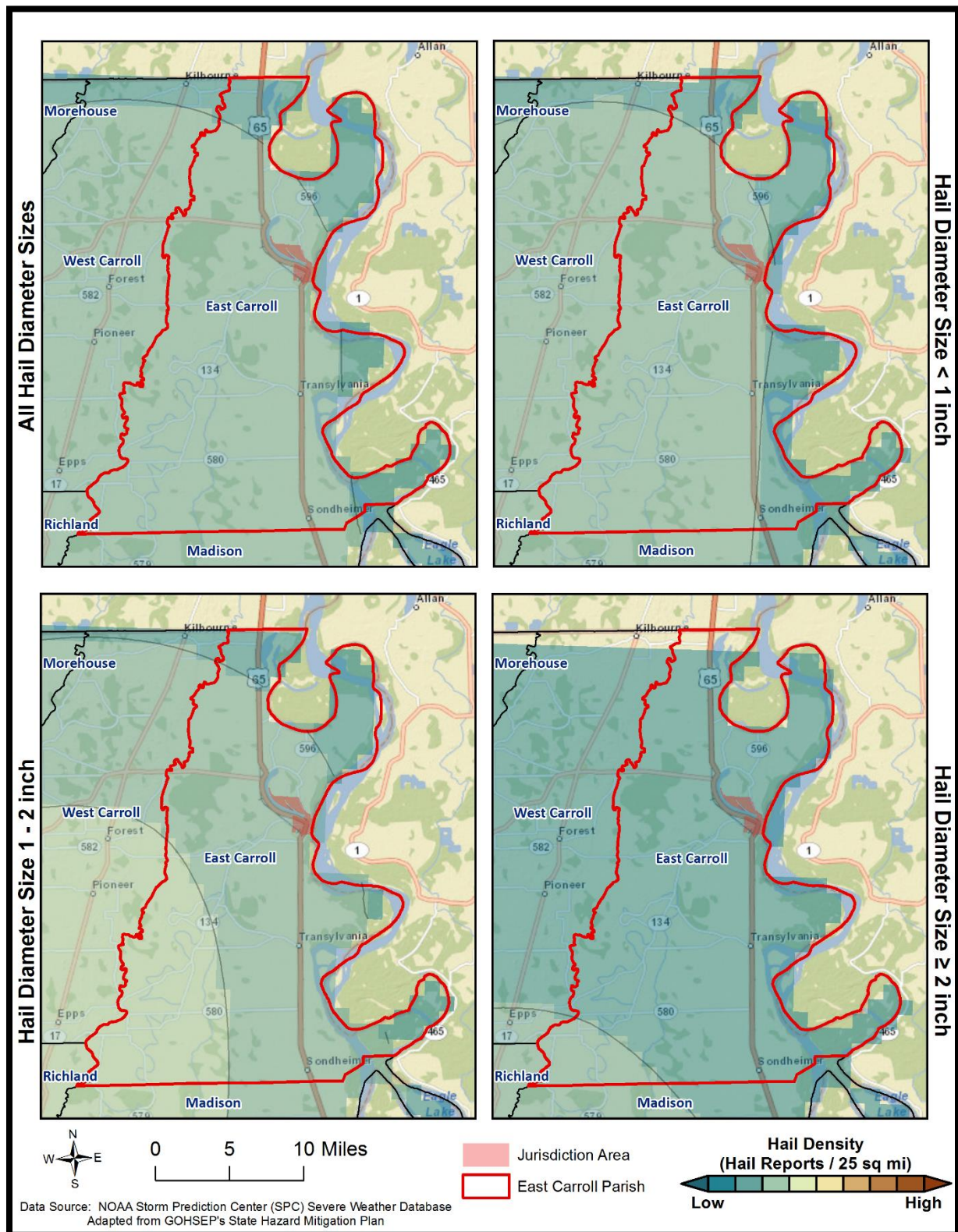


Figure 2-15: Density of Hailstorms by Diameter from 1950-2012  
(Source: State of Louisiana Hazard Mitigation Plan 2014)

### 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 48%. The probability was determined based on a review of significant hail data that has caused damages in the last 25 years, in which East Carroll Parish has had 12 recorded events.

### Estimated Potential Losses

According to the SHELUS database, property damage due to hailstorms in East Carroll Parish have totaled approximately \$175,651 since 1990. To estimate the potential losses of a hail event on an annual basis, the total damages recorded for hail events was divided by the total number of years of available hail data in SHELUS (1990 – 2015). This provides an annual estimated potential loss of \$7,026. [Table 2-31](#) provides an estimate of potential property losses for East Carroll Parish.

*Table 2-31: Estimated Annual Property Losses in East Carroll Parish from Hailstorms*

Estimated Annual Potential Losses from Hailstorms for East Carroll Parish	
Unincorporated East Carroll Parish (48.6% of Population)	Lake Providence (51.4% of Population)
\$3,412	\$3,614

There have been no deaths or injuries due to hailstorms from 1990 – 2015 in East Carroll Parish.

### 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 East Carroll Parish is equally at risk for high winds.

### Previous Occurrences / Extents

The SHELUS database reports a total of 67 thunderstorm wind events occurring within the boundaries of East Carroll Parish between the years of 1990 to 2015. The significant thunderstorm wind events experienced in East Carroll Parish have ranged in wind speed from 46 mph to 81 mph. East Carroll Parish can expect to receive thunderstorm winds up to 81 mph for future high wind events. The table on the following page provides an overview of significant high wind events over the last five years.

Table 2-32: Previous Occurrences for Thunderstorm High Wind Events

Location	Date	Recorded Wind Speeds (mph)	Property Damage	Crop Damage
ALSATIA	August 9, 2010	58	\$2,714	\$0
BOWIE	October 24, 2010	58	\$1,629	\$0
SHELBURN	February 24, 2011	61	\$2,105	\$0
GASSOWAY	April 4, 2011	62	\$2,107	\$0
TRANSYLVANIA	April 15, 2011	55	\$526	\$0
LAKE PROVIDENCE	June 13, 2011	58	\$526	\$0
TRANSYLVANIA ARPT	March 11, 2012	58	\$6,194	\$0
SHELBURN	March 11, 2012	58	\$2,065	\$0
LAKE PROVIDENCE	April 2, 2012	58	\$516	\$0
ALSATIA	May 7, 2012	46	\$516	\$0
LAKE PROVIDENCE	December 20, 2012	58	\$516	\$0
LAKE PROVIDENCE	March 23, 2013	63	\$7,622	\$0
MILLIKIN	April 18, 2013	58	\$2,541	\$0
TRANSYLVANIA ARPT	May 21, 2013	58	\$5,081	\$0
LAKE PROVIDENCE	October 31, 2013	58	\$1,016	\$0
ROOSEVELT	December 21, 2013	58	\$10,162	\$0
LAKE PROVIDENCE	June 9, 2014	61	\$3,000	\$0
ROOSEVELT	October 13, 2014	60	\$0	\$0
BOWIE	April 24, 2015	58	\$8,000	\$0
LAKE PROVIDENCE	April 24, 2015	66	\$15,000	\$0
GRIMES	June 24, 2015	58	\$5,000	\$0
LAKE PROVIDENCE	June 24, 2015	58	\$5,000	\$0
TRANSYLVANIA ARPT	July 5, 2015	58	\$2,000	\$0
LAKE PROVIDENCE	July 25, 2015	58	\$4,000	\$0

### Frequency

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

### Estimated Potential Losses

Since 1990, there have been 67 significant wind events that have resulted in property damages according to the SHELDUS database. The total property damages associated with those storms have totaled \$387,079,214. 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 SHELDUS (1990 – 2015). This provides an annual estimated potential loss of \$15,483,169. The table on the following page provides an estimate of potential property losses for East Carroll Parish.

*Table 2-33: Estimated Annual Property Losses in East Carroll Parish Resulting from High Winds*

Estimated Annual Potential Losses from Thunderstorm Winds for East Carroll Parish	
Unincorporated East Carroll Parish (48.6% of Population)	Lake Providence (51.4% of Population)
\$7,519,085	\$7,964,084

There has been one reported injury and no fatalities as a result of a thunderstorm wind event over the 25-year record.

#### *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 East Carroll Parish.

##### *Previous Occurrences / Extents*

The SHELDUS database reports a total of two lightning events occurring within the boundaries of East Carroll Parish between the years of 1990-2015. 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 East Carroll Parish, which occur on a nearly monthly basis. The planning area can expect to have a lightning density of 11-12 flashes per sq. mile per year. The table below provides an overview of significant lightning strikes over the last 25 years:

*Table 2-34: Previous Occurrences of Significant Lightning Strikes in East Carroll Parish from 1990 – 2015  
(Source: NCDC and SHELDUS)*

Location	Date	Summary	Property Damage
LAKE PROVIDENCE	June 18, 2007	Lightning struck four houses, causing fires in each one.	\$171,265
SONDHEIMER	March 9, 2010	A lightning strike was reported and caused a house fire. This resulted in the total loss of the structure.	\$108,567

Since 2010, there have been no lightning events that have caused property damage or loss of life in the incorporated area of Lake Providence.



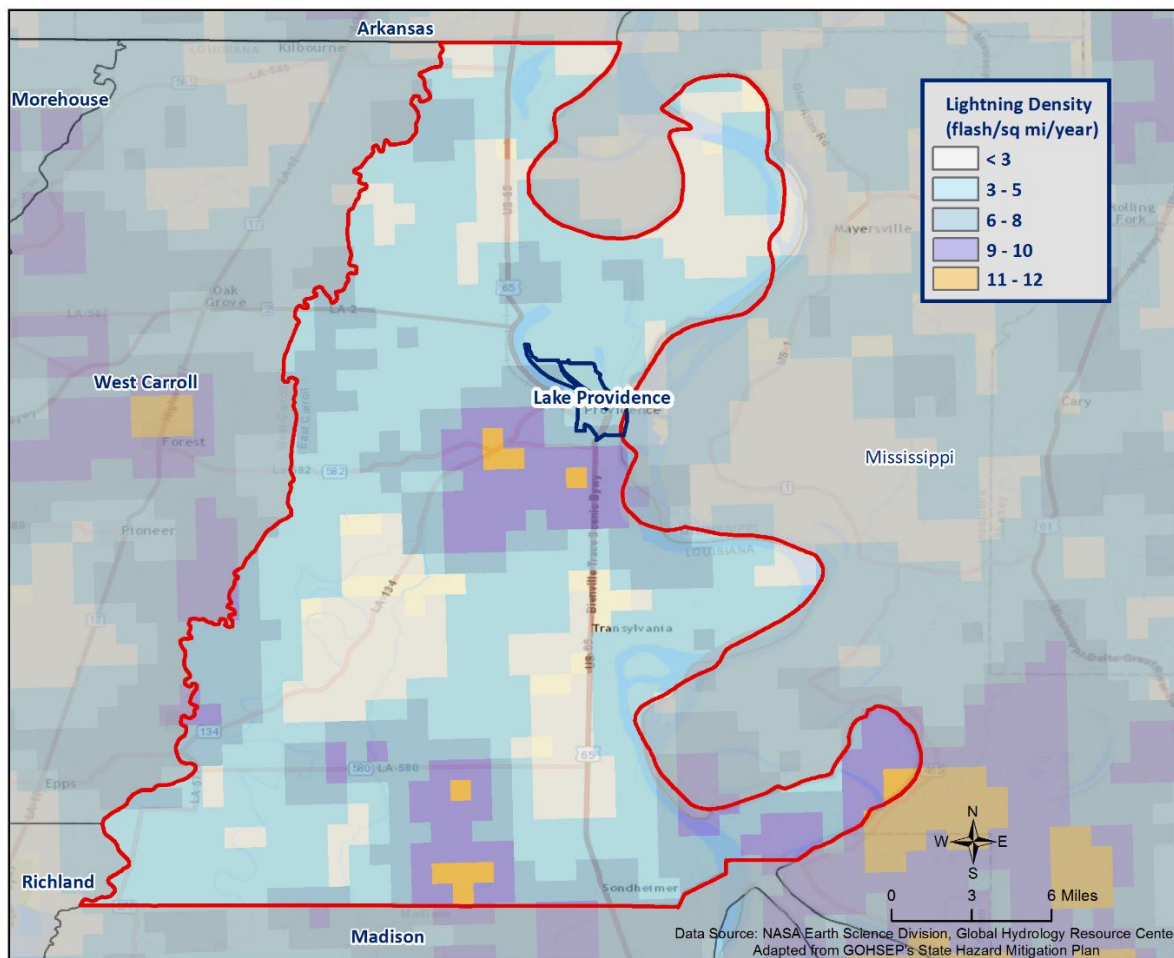


Figure 2-16: Lightning Density Reports for East Carroll Parish

### Frequency

Lightning can strike anywhere and is produced by every thunderstorm, so the chance of lightning occurring in East 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 is a less likely event. According to SHELDUS, there have been two lightning events that have caused property damages or injuries over the last 25 years, establishing an annual probability of 8%.

### Estimated Potential Losses

Since 1990, there have been two significant lightning events that have resulted in property damages according to the SHELDUS database. The total property damages associated with lightning events totaled \$279,831. 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 (1990-2015). This provides an annual estimated potential loss of \$11,193. The table on the next page provides an estimate of potential property losses for East Carroll Parish.

*Table 2-35: Estimated Annual Property Losses in East Carroll Parish from Lightning*

Estimated Annual Potential Losses from Thunderstorm Lightning for East Carroll Parish	
Unincorporated East Carroll Parish (48.6% of Population)	Lake Providence (51.4% of Population)
\$5,436	\$5,757

There have been no reported injuries or fatalities in East 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 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 rotation 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 2-36* 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 2-36: 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 2-37: 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 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 East Carroll Parish with actual locations, tornadoes in general are a climatological based hazard and have the same approximate probability of occurring in East Carroll Parish as all of its jurisdictions. Because a tornado has a similar probability of striking anywhere within the planning area for East Carroll Parish, all jurisdictions are equally at risk for tornadoes.

#### *Previous Occurrences / Extents*

SHELDUS reports a total of seven tornadoes or waterspouts occurring within the boundaries of East Carroll Parish between the years of 1990-2015. The tornadoes experienced in East Carroll Parish have from ranged EF1 to EF2 on the EF scale, and ranged from F0 to F2 on the F scale. The worst case scenario East Carroll Parish can expect in the future is an EF2 tornado.

The tornado that caused the most damage to property occurred on November 19, 1991. The F2 tornado destroyed two homes, a new car dealership, and caused heavy damage to a state high maintenance barn just across the street from the new car dealership. A 77 year old woman was pulled from the debris of her destroyed home; she died from a heart attack that evening. The woman’s husband and four grandchildren were treated for injuries and released from a local hospital. Another child suffered minor contusions after escaping the tornado which destroyed another Lake Providence home. The automobile dealer said that the tornado destroyed 40 new cars and did an estimated \$1 million damage to his business.

Table 2-38: Historical Tornadoes in East Carroll Parish with Locations from 1990-2015

Date	Impacts	Property Damage	Location	Magnitude
November 19, 1991	0.8 mile path with a width of 100 yards. Destroyed two homes and a new car dealership. Caused 6 injuries.	\$1,738,150	UNINCORPORATED AREA	F2
March 9, 1992	0.7 mile path with a width of 75 yards. A tornado took the roof off a restaurant and drug store in Lake Providence while destroying two gas stations.	\$84,368	UNINCORPORATED AREA	F1
May 2, 1997	13 mile path with a width of 400 yards. Destroyed several sheds and two grain bins. Many trees and power lines were blown down.	\$147,499	LAKE PROVIDENCE	F1
January 8, 1999	1 mile path with a width of 50 yards. A few trees were blown down by a weak tornado.	\$4,263	LAKE PROVIDENCE	F0
June 18, 2007	1.8 mile path with a width of 400 yards. Numerous trees were uprooted, snapped, or had limbs torn off. Many power lines were also taken down. The roof of a patio was peeled back. A trampoline was mangled and deposited into a tree some 25 feet up.	\$799,236	LAKE PROVIDENCE	EF1
April 26, 2011	6.64 mile path with a width of 880 yards. Eight power poles were snapped and several sheds/barns had roof damage with two destroyed. Two grain storage bins were severely damaged and siding damage occurred to a volunteer fire department building in Bowie.	\$420,978	BOWIE	EF2
April 18, 2013	2.87 mile path with a width of 75 yards. Destroyed a large farm outbuilding, downed a couple of power poles, and caused minor damage to nearby structures.	\$50,811	SONDHEIMER	EF1

The incorporated area of Lake Providence has not experienced a tornado event from 2010 to the present. Since 2010, the year in which the last update to this hazard mitigation plan was written, East Carroll Parish has had two tornadoes touch down in the unincorporated areas of the parish. The following is a brief synopsis of these events:

#### April 26, 2011 – EF2 Tornado near Bowie

A tornado touched down in the Darnell Community and tracked into East Carroll Parish before dissipating. Eight power poles were snapped and several sheds/barns had roof damage with two destroyed. Two grain storage bins were severely damaged and siding damage occurred to a volunteer fire department building in the Bowie Community. Additionally, numerous trees and power lines were snapped and uprooted along the path. Maximum winds were around 115 mph.



#### April 18, 2013 – EF1 Tornado near Sondheimer

The tornado started in an open field just west of US Highway 65, about 2 miles northwest of the Sondheimer community. As it crossed Highway 65 near the intersection with Henderson Loop Road, it destroyed a large farm outbuilding, downed a couple of power poles, and caused some minor damage to nearby structures. The tornado continues east northeast along the north side of Henderson Loop Road, and snapped a large tree and caused shingle damage to two homes near the intersection with Sand Field Road. The tornado then turned a bit more toward the north along that road, causing some minor tree damage before dissipating. Maximum sustained winds were estimated at 95 mph.

#### Frequency / Probability

Tornadoes are a sporadic occurrence within East Carroll Parish, with an annual chance of occurrence calculated at 28% based on the records for the past 25 years (1990-2015). The figure below displays the density of tornado touch downs in East Carroll Parish and neighboring parishes.

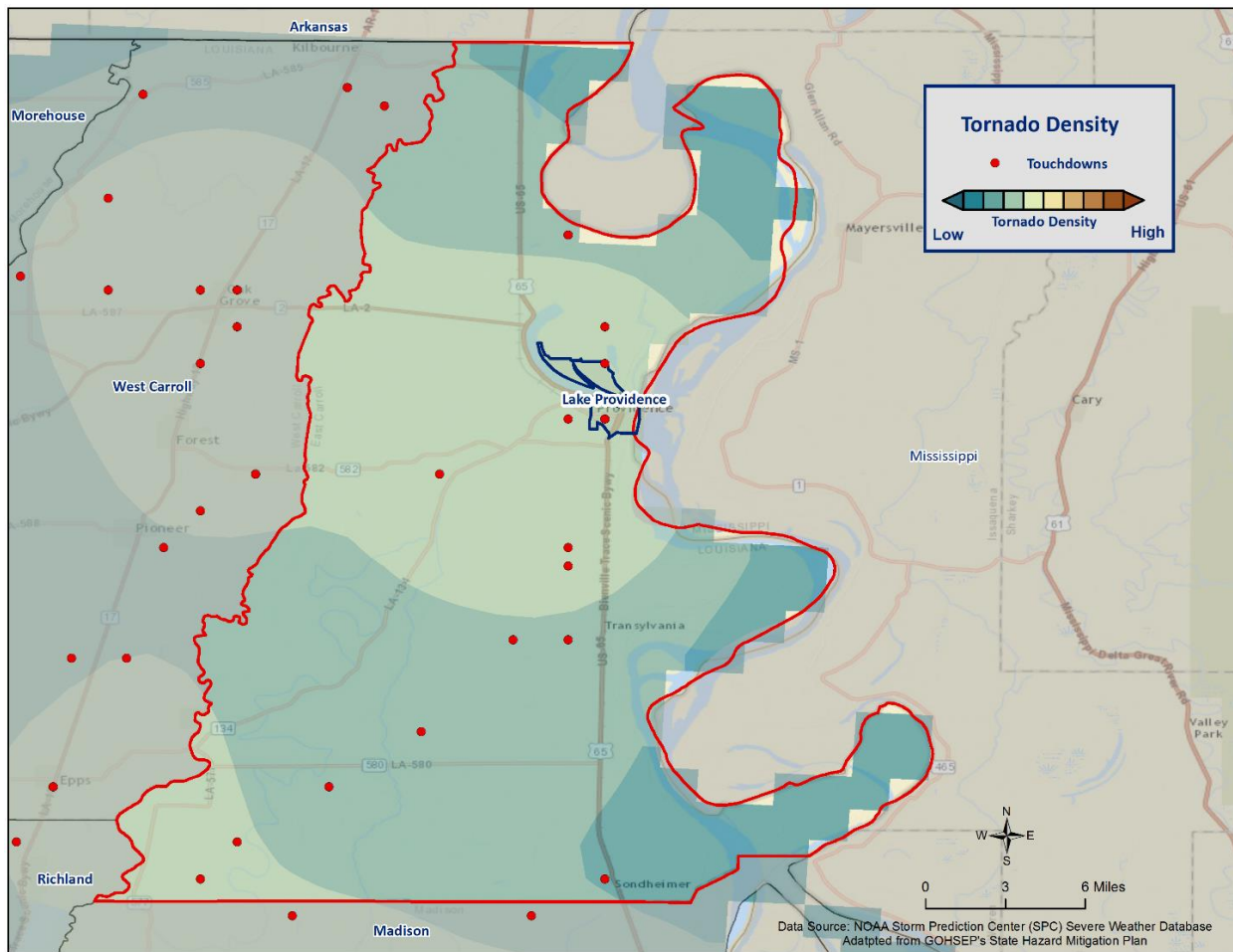


Figure 2-17: Location and Density of Tornadoes to Touch Down in East Carroll Parish  
(Source: NOAA/SPC Severe Weather Database)

### *Estimated Potential Losses*

According to the SHELUS database, there have been seven tornadoes that have caused some level of property damage. The total damage from the actual claims for property is \$3,245,305, with an average cost of \$463,615 per tornado strike. When annualizing the total cost over the 25-year record, total annual losses based on tornadoes are estimated to be \$129,812. To provide an estimated annual estimated 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, the following table provides an annual estimate of potential losses for East Carroll Parish.

*Table 2-39: Estimated Annual Losses from Tornadoes in East Carroll Parish*

Estimated Annual Potential Losses from Tornadoes for East Carroll Parish	
Unincorporated East Carroll Parish (48.6% of Population)	Lake Providence (51.4% of Population)
\$63,041	\$66,772

*Table 2-40* presents an analysis of building exposure that is susceptible to tornadoes by general occupancy type for East Carroll Parish, along with the percentage of building stock that are mobile homes.

*Table 2-40: Building Exposure by General Occupancy Type for Tornadoes in East 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 (%)
661,283	147,259	11,427	18,944	62,556	23,104	19,352	14.8%

The parish has suffered through a total of two days in which tornadoes or waterspouts have accounted for 11 injuries and no fatalities during this 25-year period (*Table 2-41*). The average number of injuries per event for East Carroll Parish is 1.57 per tornado, with an average of 0.44 per year for the 25-year period.

*Table 2-41: Tornadoes in East Carroll Parish by Magnitude that Caused Injuries or Deaths*

Date	Magnitude	Deaths	Injuries
November 19, 1991	F2	0	6
March 9, 1992	F1	0	5

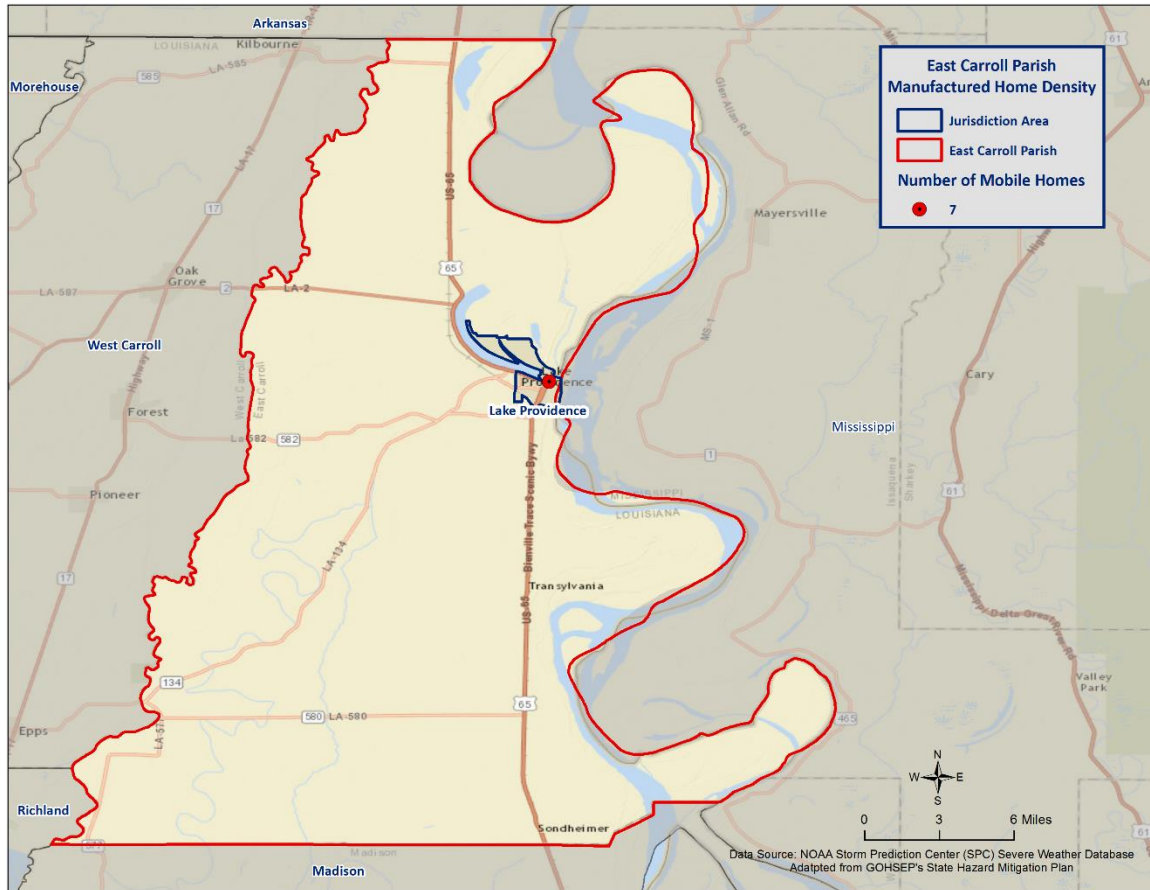
In assessing the overall risk to population, the most vulnerable population throughout the parish are those residing in manufacturing housing. Approximately 14.8% of all housing in East Carroll Parish consists of manufactured housing. Based on location data collected in a previous hazard mitigation project, there is one known locations where manufactured housing is concentrated. The one location has an overall number of manufactured houses of seven. The location and density of manufactured houses can be seen in *Figure 2-18*.

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 incorporated area of Lake

Providence ([Table 2-42](#)). 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 2-42: Manufactured Home Distribution throughout East Carroll Parish*

Location	Number of Manufactured Home Parks	% of Manufactured Home Parks
Unincorporated Area	0	0%
Lake Providence	1	100%



*Figure 2-18: Location and Approximate Number of Units in Manufactured Housing Locations throughout East 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, moving 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 Cyclone (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). On the next page, [Table 2-43](#) presents the Saffir-Simpson Hurricane Wind Scale, which categorizes tropical cyclones based on sustained winds.

Table 2-43: 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 Cyclone	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 will likely 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 may 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; so a fast-moving storm (20 mph) might be expected to drop five 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 the storm surge resulting from these storms so much that this 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 ten 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 cyclone. 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 pressure 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 mean bigger waves. Extended pounding by waves can demolish any poorly or improperly designed structures. The waves also erode sand beaches, roads, and foundations. When foundations are compromised, 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 East Carroll Parish. As such, all jurisdictions are equally at risk for tropical cyclones.

#### *Previous Occurrences / Extents*

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 SHELUDS database reports a total of three tropical cyclone events occurring within the boundaries of East Carroll Parish between the years 2002 and 2015 (*Table 2-44*). The tropical cyclone events experienced in East Carroll Parish include depressions, storms, and hurricanes. As a worst case scenario, East Carroll Parish can expect to experience hurricanes at the Category 1 level in the future.

*Table 2-44: Historical Tropical Cyclone Events in East Carroll Parish from 2002- 2015*  
(Source: SHELUDS)

Date	Name	Storm Type At Time of Impact
August 29, 2005	Katrina	Hurricane – Category 1
September 24, 2005	Rita	Hurricane – Category 1
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 tracked to the east side of East Carroll Parish, sparing the parish of much of the destruction associated with the storm. Wind gusts reached near-tropical storm forces, and a few trees and power poles were knocked down. Some residents lost power during the storm.

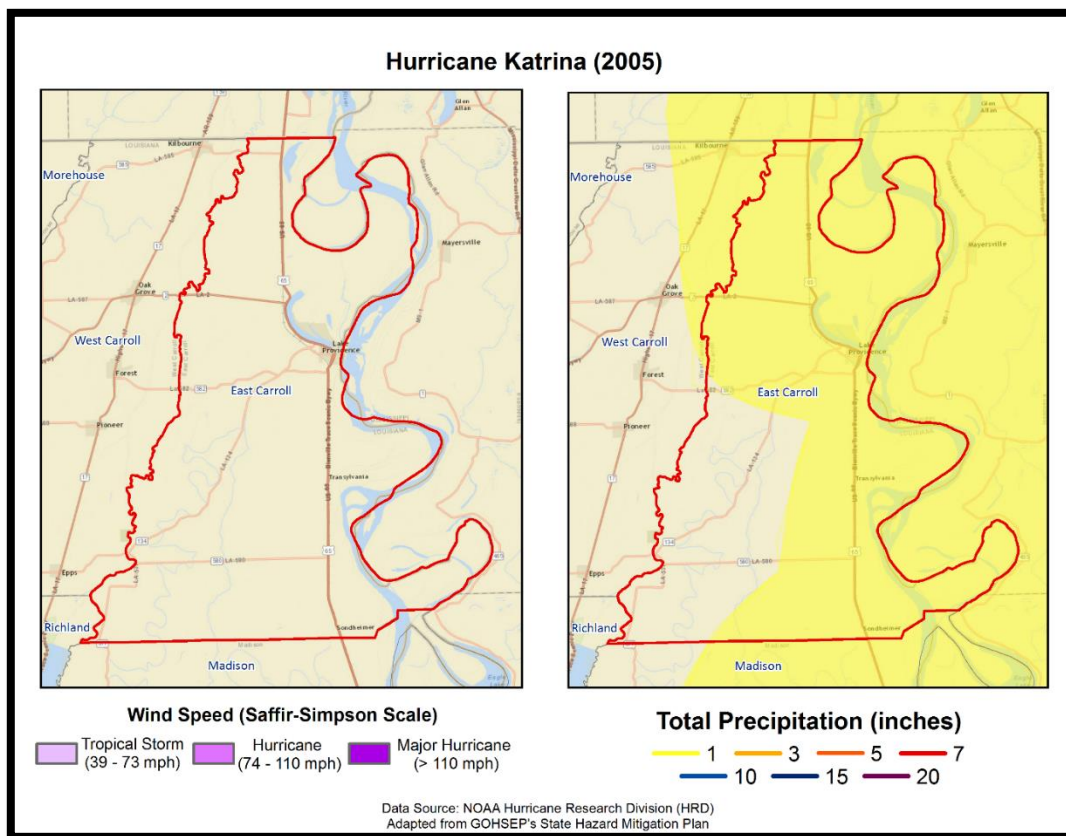
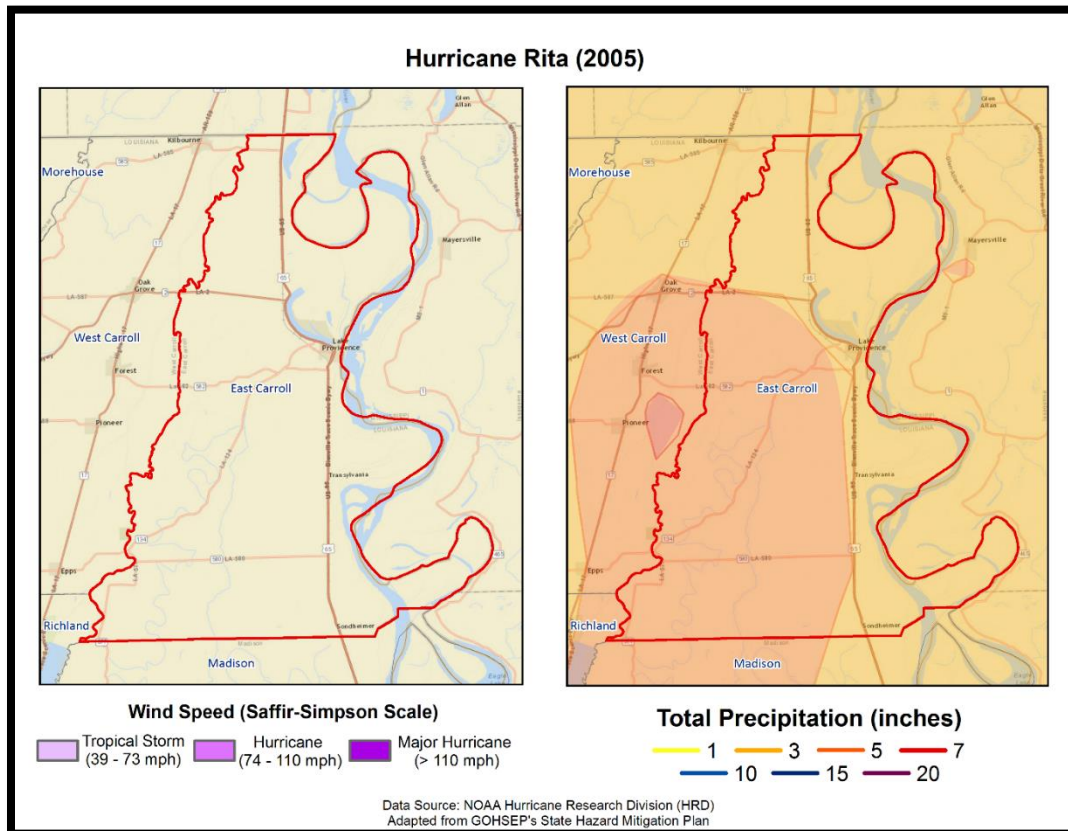


Figure 2-19: Wind Speed and Precipitation Totals in East Carroll Parish for Hurricane Katrina

### 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 five to seven feet above normal overtopped or breached local drainage levees, inundating many small communities. Newspaper accounts indicated that 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, affecting homes and businesses 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 2-20: Wind Speed and Precipitation Totals in East 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 those losses 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.

Hurricane Rita was responsible for the largest tornado outbreak in recorded history. Several of these tornadoes affected areas within East Carroll Parish. The outer bands of Rita also passed over East Carroll Parish producing sustained winds between 25 and 35 mph and gusts up to 50 mph. Portions of the affected area also received over 7 inches of rain.

### Hurricane Isaac (2012)

Tropical Depression Nine formed in the Atlantic, east of the Lesser Antilles, on the morning of August 21, 2012. Twelve hours later, Tropical Depression Nine had strengthened into Tropical Storm Isaac. Isaac continued to track through the eastern Caribbean Sea and Florida Straits while maintaining high end tropical storm strength. Just before noon central time on the 28th, Isaac was located about 75 miles south-southeast of the mouth of the Mississippi River (or about 160 miles southeast of New Orleans) and was found to have reached hurricane strength with winds of 75 mph. An outer rain band from Isaac brought some showers to portions of the Ark-La-Miss during the afternoon of the 28th, while the center of Isaac was still churning in the Gulf of Mexico. At 6:45pm on August 28th, Hurricane Isaac made a brief landfall along the coast of Southeast Louisiana in Plaquemines Parish. Maximum sustained winds were 80mph at this landfall. Isaac did not remain over land for long as he was back over water again by 9:00pm that same evening. Isaac made his second landfall along the coast of southeast Louisiana, just to the west of Port Fourchon, around 2:15am August 29th, again with maximum sustained winds of 80 mph.

Isaac moved very slowly to the north and northwest over the course of August 29th, which made for prolonged impacts. Forward motion of about 5 mph lead to tremendous flooding issues for both Louisiana and portions of Mississippi south of I-20. Around noon on August 29th, Isaac was downgraded to a Tropical Storm, but this was not much relief to the many residents who were being inundated with rain and wind. Storm total rainfall across portions of Marion County indicated at least 10 to 15 inches fell. Numerous homes and buildings were flooded and some water rescues occurred in Lamar, Marion and Clarke counties. Further to the north, flooding issues were not quite as bad with about 5 to 7 inches of rain falling from the I-20 corridor and north. Tropical storm force wind gusts were noted as far north as Bolivar County, with the Golden Triangle region not seeing winds reach more than tropical depression strength. The worst of the wind was felt generally along and south of an axis from Marion County to Adams County. Numerous trees were down in Adams County, leaving many without power for several days. Eighty percent of the roads were blocked in Franklin County due to downed trees.

With all of the rain that fell, some of the area rivers filled quickly. Minor flooding was recorded on the lower Pearl River at Rockport and Monticello, as well as on Bouie Creek at Hattiesburg and Tallahala Creek at Laurel. The biggest river impact in the Jackson Hydrologic Service Area was on Black Creek at Brooklyn. Black Creek entered moderate flooding and finally crested at 26.71 feet on August 31st at 5pm. This will go down as the second highest crest in history for this particular river and forecast point. This river flooding caused damage to 15 homes both upstream and downstream of the river gage.

The winds and flooding were not all Isaac brought as a couple of tornadoes touched down in eastern Mississippi. Two tornadoes, one in Clarke County and one in Lauderdale County, occurred during the morning of August 30th. Both were rated EF-1 with winds around 100 mph. The tornado in Clarke County, near Crandall, resulted in 3 injuries to residents of a mobile home. One death attributed to Isaac occurred in Holmes County when a 64 year old woman was killed by a tree falling on her car. Isaac finally moved out of the region by the afternoon of the 30th, and was downgraded to a tropical depression by late afternoon on the 30th as it continued to track to the northwest into Missouri and the Ohio Valley.

Overall, there were minimal reports of damage to residences or infrastructure in East Carroll Parish. Strong winds downed multiple trees all across the parish between the afternoon of the 29<sup>th</sup> and mid-day on the 30<sup>th</sup>.

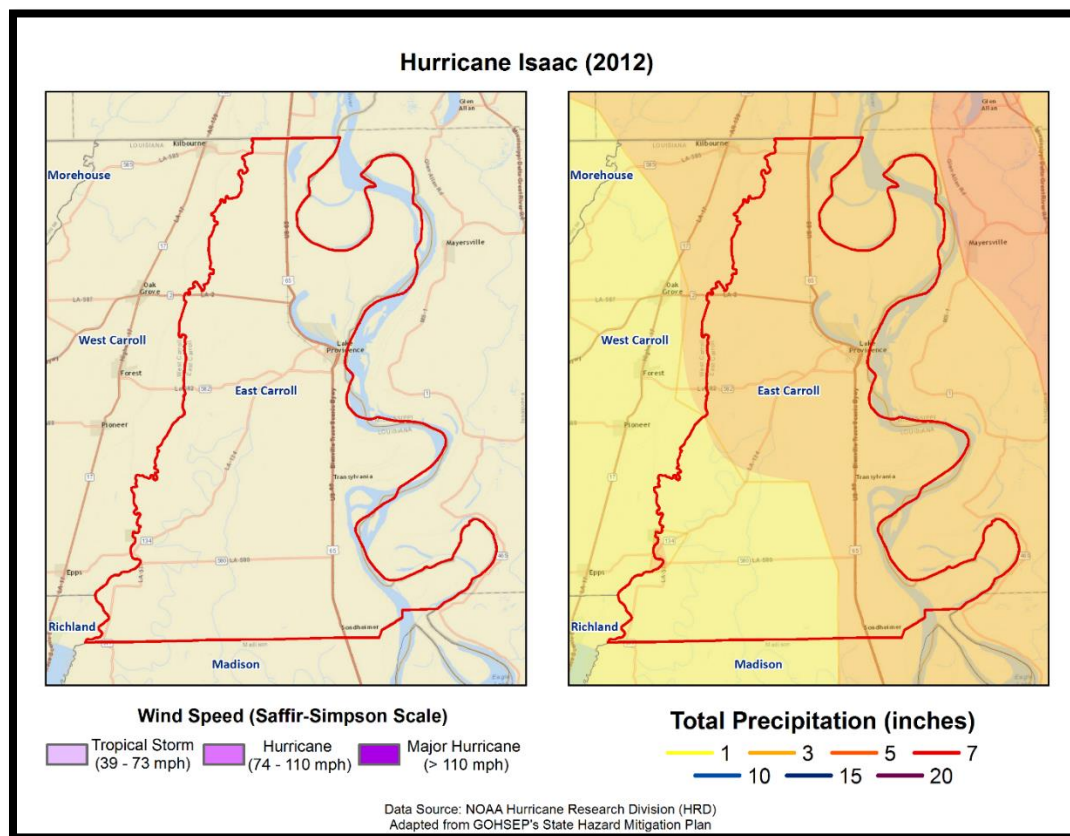


Figure 2-21: Wind Speed and Precipitation Totals in East Carroll Parish for Hurricane Isaac



The following figure displays the wind zones that affect East Carroll Parish in relation to critical facilities throughout the parish.

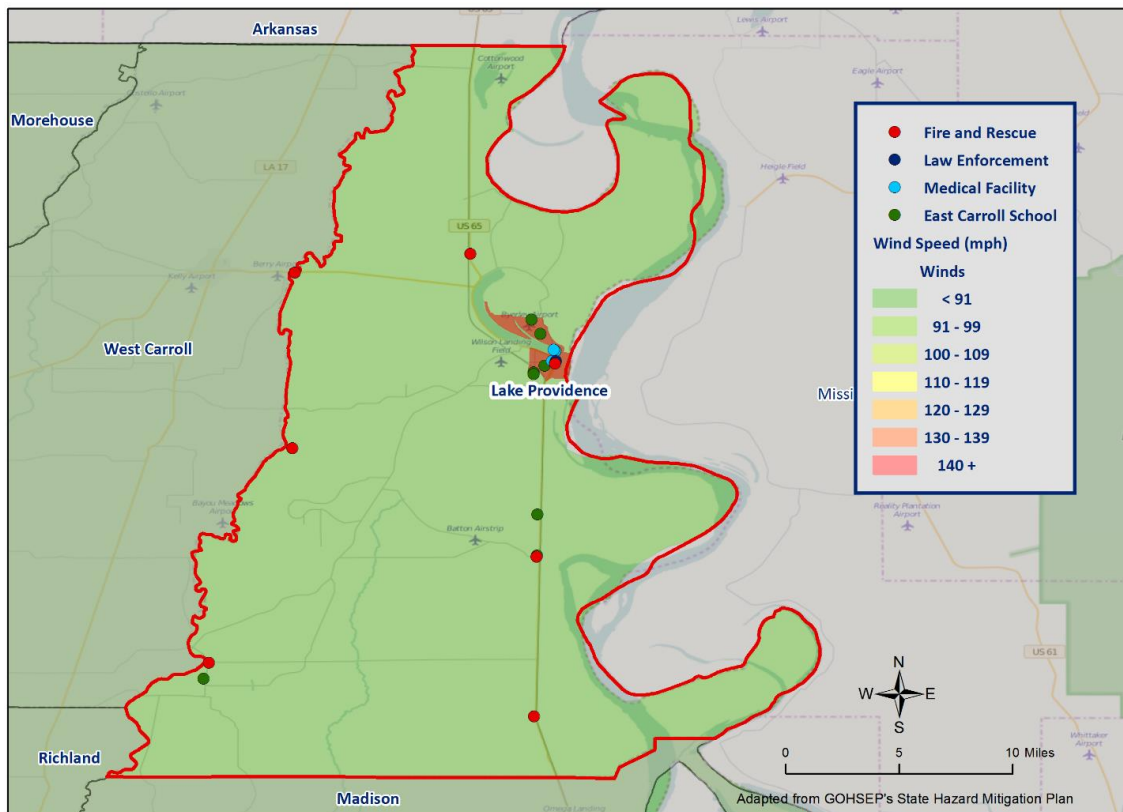


Figure 2-22: Winds Zones for East Carroll Parish in Relation to Critical Facilities

#### Frequency / Probability

Tropical cyclones are large natural hazard events that regularly impact East Carroll Parish. The annual chance of occurrence for a tropical cyclone is estimated at 12% for East Carroll Parish and its municipalities, with three events occurring within 25 years. The tropical cyclone season for the Atlantic Basin is from June 1st through November 30<sup>th</sup>, with most of the major hurricanes (Saffir-Simpson Categories 3, 4, & 5) occurring between the months of August and October.

#### Estimated Potential Losses

Using Hazus 2.2 100-Year Hurricane Model, the 100-year hurricane scenario was analyzed to determine losses from this worst-case scenario. The table below shows the total economic losses that would result from this occurrence.

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

Jurisdiction	Estimated Total Losses from 100-Year Hurricane Event
East Carroll Parish (Unincorporated)	\$200,193
Lake Providence	\$212,040
<b>Total</b>	<b>\$412,233</b>

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

*Table 2-46: Ratio of Total Losses to Total Estimated Value of Assets for each Jurisdiction in East Carroll Parish*

*(Source: Hazus 2.2)*

Jurisdiction	Estimated Total Losses from 100-Year Hurricane Event	Total Estimated Value of Assets	Ratio of Estimated Losses to Total Value
Unincorporated	\$200,193	\$437,192,000	< 0.1%
Lake Providence	\$212,040	\$506,733,000	< 0.1%

Based on the Hazus 2.2 Hurricane Model, estimated total losses are less than 0.1% of the total estimated value of all assets for the unincorporated area of East Carroll Parish, and the incorporated area of Lake Providence.

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 following tables.

*Table 2-47: Estimated Losses in Unincorporated East Carroll Parish for a 100-Year Hurricane Event*

*(Source: Hazus 2.2)*

East Carroll Parish (Unincorporated)	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	\$155
Commercial	\$1,567
Government	\$116
Industrial	\$4
Religious / Non-Profit	\$715
Residential	\$197,370
Schools	\$265
<b>Total</b>	<b>\$200,193</b>

*Table 2-48: Estimated Losses in Lake Providence for a 100-Year Hurricane Event*

*(Source: Hazus 2.2)*

Lake Providence	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	\$164
Commercial	\$1,660
Government	\$123
Industrial	\$4
Religious / Non-Profit	\$757
Residential	\$209,051
Schools	\$281
<b>Total</b>	<b>\$212,040</b>

*Threat to People*

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

*Table 2-49: Number of People Susceptible to a 100-Year Hurricane Event in East Carroll Parish  
(Source: Hazus 2.2)*

Number of People Exposed to Hurricane Hazards			
Location	# in Community	# in Hazard Area	% in Hazard Area
Parish (Unincorporated)	3,768	3,768	100.0%
Lake Providence	3,991	3,991	100.0%
<b>Total</b>	<b>192,768</b>	<b>192,768</b>	<b>100.0%</b>

The HAZUS-MH Hurricane Model was also extrapolated to provide an overview of vulnerable populations throughout the jurisdictions. These populations are illustrated in the following tables:

*Table 2-50: Vulnerable Populations in Unincorporated East Carroll Parish for a 100-Year Hurricane Event  
(Source: Hazus 2.2)*

East Carroll Parish (Unincorporated)		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	3,768	100.0%
Persons Under 5 Years	276	7.3%
Persons Under 18 Years	968	25.7%
Persons 65 Years and Over	471	12.5%
White	1,090	28.9%
Minority	2,678	71.1%

*Table 2-51: Vulnerable Populations in Lake Providence for a 100-Year Hurricane Event  
(Source: Hazus 2.2)*

Lake Providence		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	3,991	100.0%
Persons Under 5 Years	393	9.9%
Persons Under 18 Years	1,336	33.5%
Persons 65 Years and Over	499	12.5%
White	669	16.8%
Minority	3,322	83.2%

*Vulnerability*

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

### Wildfires

A wildfire is combustion in a natural setting, marked by flames or intense heat. Most frequently, wildfires are ignited by lightning or unintentionally by humans. Fires set purposefully (but lawfully) are referred to as controlled fires or burns. There are three different types of wildfires: (1) **Ground fires** burn primarily in the thick layers of organic matter directly on the forest floor and even within the soil. Ground fires destroy root networks, peat, and compact litter. These fires spread extremely slowly and can smolder for months. (2) **Surface fires** burn litter and vegetative matter in the underbrush of a forest. (3) **Crown fires** spread rapidly by wind and move quickly by jumping along the tops of trees. There are two types of crown fires: (a) *passive (or dependent)* crown fires rely on heat transfer from surface fire, whereas (b) *active (or independent)* crown fires do not require any heat transfer from below. Active crown fires tend to occur with greater tree density and drier conditions. A firestorm is a mass, crown fire (also called a running crown fire, area fire, or conflagration). They are large, continuous, intense fires that lead to violent convection. They are characterized by destructively violent surface in-drafts near and beyond their perimeter. Crown fires are the most damaging and most difficult to contain. The intensity of crown fires enables the fire to produce its own wind gusts. These so-called *fire whirls* can move embers ahead of the fire front and ignite new fires. Fire whirls are spinning vortex columns of ascending hot air and gases rising from the fire. Large fire whirls have the intensity of a small tornado.

The conditions conducive to the occurrence of wildfires are not distributed equally across the United States. Wildfires have a much greater likelihood of occurring in the western part of the country. Although less frequent than in other areas, wildfires do occur in Louisiana. Wildfire danger can vary greatly season to season, and is exacerbated by dry weather conditions. Factors that increase susceptibility to wildfires are the availability of fuel (e.g., litter and debris), topography (i.e., slope and elevation affect various factors like precipitation, fuel amount, and wind exposure), and specific meteorological conditions (e.g., low rainfall, high temperatures, low relative humidity, and winds). The potential for wildfire is often measured by the Keetch–Byram Drought Index (KBDI), which represents the net effect of evapotranspiration and precipitation in producing cumulative moisture deficiency in the soil. The KBDI tries to measure the amount of precipitation needed to return soil to its full field capacity, with KBDI values ranging from 0 (moist soil) to 800 (severe drought).

According to the State of Louisiana Forestry Division, most forest fires in Louisiana are caused by intentional acts (arson) or carelessness and negligence committed by people, exacerbated by human confrontation with nature. The wildland–urban interface is the area in which development meets wildland vegetation, where both vegetation and the built environment provide fuel for fires. As development near wildland settings continues, more people and property are exposed to wildfire danger. [Figure 2-23](#) displays the areas of wildland-urban interaction in East Carroll Parish.

The Southern Group of State Foresters developed the Southern Wildfire Risk Assessment Portal to create awareness among the public and government sectors about the threat of wildfires in their areas. The Southern Wildfire Assessment Portal allows users to identify areas that are most prone to wildfires. The table on the next page summarizes the intensity levels assigned to areas in the Southern Wildfire Assessment Portal.

*Table 2-52: Southern Group of State Foresters Wildfire Risk Assessment Fire Intensity Scale  
(Source: Southern Wildfire Assessment Portal)*

Fire Intensity Scale	
Level	Definition
1	Lowest Intensity: Minimal direct wildfire impacts. Location has a minimal chance of being directly impacted by a wildfire.
2	Low Intensity: Small flames usually less than two feet long; small amount of very short range spotting possible. Fires are easy to suppress.
3	Moderate Intensity: Flames up to eight feet in length; short-range spotting is possible.
4	High Intensity: Large flames up to 30 feet in length; short-range spotting common; medium range spotting possible.
5	Highest Intensity: Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire induced winds.

## Location

Wildfires impact areas that are populated with forests and grasslands. The following figure displays the areas of wildland-urban interface and intermix in East Carroll Parish and its jurisdictions.

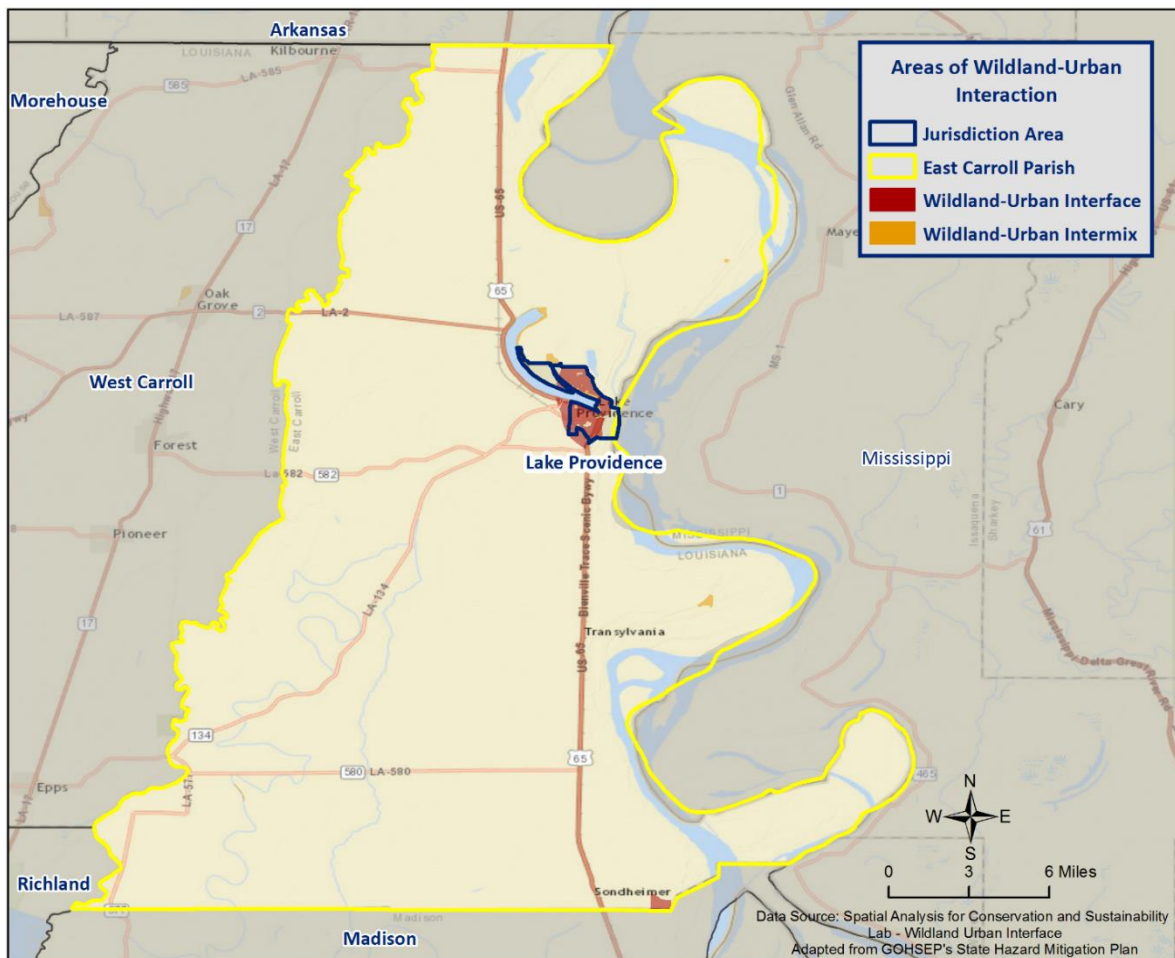


Figure 2-23: Wildland-Urban Interaction in East Carroll Parish



### *Previous Occurrences / Extents*

There have been no reported wildfire events that have occurred within the boundaries of East Carroll Parish between the years of 1990 and 2015. Since 2010, there have been no reported wildfire events in the incorporated area of Lake Providence and the unincorporated areas of the parish.

Based on the Southern Group of State Foresters Risk Assessment Portal, the following table outlines the intensity that each jurisdictional area within East Carroll Parish could potential experience due to a wildfire event.

*Table 2-53: Potential Wildfire Intensity Levels for East Carroll Parish  
(Source: Southern Wildfire Assessment Portal)*

Potential Wildfire Intensity	
East Carroll Parish (Unincorporated)	Moderate to High Intensity Level 3.5
Lake Providence	Moderate to High Intensity Level 3.5

### *Frequency / Probability*

With no recorded events in 25 years, wildfire events within the boundaries of East Carroll Parish have an annual chance of occurrence calculated at less than 1% based on the SHELUDS dataset.

### *Estimated Potential Losses*

There have been no wildfire events that have caused property damage, crop damage, injuries, or fatalities in East Carroll Parish. In assessing the overall risk to population, the most vulnerable population throughout the parish consists of those residing in areas of wildland-urban interaction. *Figure 2-23* displays the areas of wildland-urban interaction in East Carroll Parish.

Using Hazus 2.2, along with wildland-urban interaction areas, the following table presents an analysis of total building exposure that is located within the wildland-urban interaction areas.

*Table 2-54: Total Building Exposure by Wildland-Urban Interaction Areas  
(Source: Hazus 2.2)*

Jurisdiction	Estimated Total Building Exposure
East Carroll Parish (Unincorporated)	\$148,358,000
Lake Providence	\$505,596,000
<b>Total</b>	<b>\$653,954,000</b>

Hazus 2.2 also provides a breakdown by jurisdiction for seven primary sectors (Hazus occupancy) throughout the parish. Utilizing this information with the wildland-urban interaction areas allows for identifying the total exposure by jurisdiction. The total exposure for each jurisdiction by sector is listed in the tables on the next page.

*Table 2-55: Estimated Exposure for Unincorporated East Carroll Parish by Sector  
(Source: Hazus 2.2)*

East Carroll Parish (Unincorporated)	Estimated Total Building Exposure by Sector
Agricultural	\$5,386,000
Commercial	\$15,898,000
Government	\$606,000
Industrial	\$5,924,000
Religious / Non-Profit	\$9,308,000
Residential	\$108,650,000
Schools	\$2,586,000
<b>Total</b>	<b>\$148,358,000</b>

*Table 2-56: Estimated Exposure for Lake Providence by Sector  
(Source: Hazus 2.2)*

Lake Providence	Estimated Total Building Exposure by Sector
Agricultural	\$7,388,000
Commercial	\$102,725,000
Government	\$18,316,000
Industrial	\$2,523,000
Religious / Non-Profit	\$39,966,000
Residential	\$319,912,000
Schools	\$14,766,000
<b>Total</b>	<b>\$505,596,000</b>

#### *Threat to People*

The total population within the parish that is located within a wildland-urban interaction area is shown in the table below:

*Table 2-57: Populations Located within a Wildland-Urban Interaction Area  
(Source: 2010 U.S. Census Data)*

Number of People Located in Wildland-Urban Interaction Areas.			
Location	# in Community	# in Area	% in Area
East Carroll Parish (Unincorporated)	<b>3,768</b>	<b>678</b>	<b>18%</b>
Lake Providence	<b>3,991</b>	<b>3,674</b>	<b>92.1%</b>
<b>Total</b>	<b>7,759</b>	<b>4,352</b>	<b>56.1%</b>

The 2010 U.S. Census data was also extrapolated to provide an overview of populations located within wildland-urban interaction areas throughout the jurisdictions. That data is illustrated in the following tables:

*Table 2-58: Population in Unincorporated East Carroll Parish Located within a Wildland-Urban Interaction Area*

*(Source: 2010 U.S. Census Data)*

East Carroll Parish (Unincorporated)		
Category	Total Numbers	Percentage of People in Wildland-Urban Interaction Area
Number in Hazard Area	678	18.0%
Persons Under 5 Years	49	7.3%
Persons Under 18 Years	174	25.7%
Persons 65 Years and Over	85	12.5%
White	205	30.3%
Minority	473	69.7%

*Table 2-59: Population in Lake Providence Located within a Wildland-Urban Interaction Area*

*(Source: 2010 U.S. Census Data)*

Lake Providence		
Category	Total Numbers	Percentage of People in Wildland-Urban Interaction Area
Number in Hazard Area	3,674	92.1%
Persons Under 5 Years	362	9.9%
Persons Under 18 Years	868	23.6%
Persons 65 Years and Over	459	12.5%
White	616	16.8%
Minority	3,058	83.2%

### *Vulnerability*

See Appendix C for parish and municipality facilities that could potentially be exposed to a wildfire hazard. Buildings were determined based on whether or not they fall within the wildfire-urban interface and/or intermix.

### 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 southern Louisiana, include extreme temperatures which can cause waterlines to freeze and sewer lines to rupture. This is especially true with elevated or 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 table on the next page 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 2-60: 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 East Carroll Parish as all of the adjacent parishes, the entire planning area for East Carroll Parish is equally at risk for winter storms.

*Previous Occurrences / Extents*

According to SHEL DUS, there have been 11 reported winter storm events that have occurred within the boundaries of East Carroll Parish between the years of 1990 and 2015. The table on the following page provides a brief synopsis of each event. Based on historic data, East Carroll Parish can expect an ice damage index of 2 on the Sperry-Piltz Ice Accumulation Index.



Table 2-61: Previous Occurrences for Winter Storm Events

Date	Synopsis	Property Damage	Crop Damage
March 13, 1993	Winds associated with a rapidly strengthening extratropical storm moved quickly through southeast Louisiana. There were numerous press reports of large trees, power lines, and power poles being blown down by these strong winds. Thousands of homes and businesses lost power.	\$0	\$227,828
February 10, 1994	A severe ice storm developed over Louisiana. Freezing rain spread across much of the north third of Louisiana and at times was accompanied by thunderstorms which produced the most severe icing problems. The greatest damage occurred on elevated objects. The combination of gusty winds and icing of one to two inches thick snapped power lines and tree limbs. The weight from ice accumulations was also heavy enough to collapse a number of chicken houses.	\$1,540,359	\$0
February 1, 1996	Freezing rain fell across East Carroll parish. Widespread damage was done to trees and power lines. Accumulations of up to one inch were common over the area. Most roads and bridges were impassable. Many thousand customers were without power.	\$150,883	\$0
December 22, 1998	A shallow dome of arctic air spread across northern Louisiana while low pressure formed in the Gulf of Mexico pulled in warm moist air. The result was widespread freezing rain, sleet, and freezing drizzle. The ice accumulated mainly across exposed surfaces such as trees and powerlines as well as bridges and overpasses. Over a quarter million people were without power, some for over a week. I-20, I-220, and I-49 were shut down for a period.	\$850,673	\$0
January 27, 2000	A winter storm brought a mixture of freezing rain, sleet, and snow to much of northeast Louisiana. Significant damage from ice occurred as much of the precipitation fell in the form of freezing rain. Ice accumulations of one to two inches were common with the largest accumulations falling close to the Arkansas border. Some parishes were declared federal disaster areas by President Clinton. Several thousand people were without power as the weight of the ice brought trees and power lines down. Many vehicles ran off of the ice coated roads.	\$101,733	\$0
January 25, 2008	Around one quarter of an inch of ice accumulated slowly through the day with icing being worst across area roads. Accidents were plentiful across the parish with some icing in trees and on power lines.	\$109,955	\$0
January 1, 2010	A prolonged cold snapped, caused by a couple of strong arctic air masses affected East Carroll Parish during the first two weeks of January. There were reports of broken water lines to homes around the parish.	\$108,567	\$0

Date	Synopsis	Property Damage	Crop Damage
February 11, 2010	Heavy snow affected a large portion of East Carroll Parish. Up to three inches of snow fell in the parish, though totals of up to six inches were reported around much of the region.	\$54,283	\$0
February 3, 2011	An ice storm developed across the area and had a major impact on travel. Thousands of accidents occurred from slick roads. A quarter inch to four tenths of ice and sleet accumulated across the parish. Bridges and overpasses were iced over and roadways were slick.	\$210,489	\$0
February 9, 2011	A continued cold air mass remained in place over the region thanks to several rounds of cold air intrusions. Portions of northeast Louisiana, including East Carroll Parish, received 1-2 inches of snow. The wintry weather resulted in hazardous driving conditions and many accidents were reported.	\$136,818	\$0
January 15, 2013	A strong cold front brought a shallow and very chilly air mass southward. The cold air undercut relatively mild air aloft, allowing for freezing rain over northwest portions of Louisiana. Up to a half inch of ice accumulated on trees and power lines causing a few power outages.	\$30,487	\$0

Based on previous winter storm events, the worst-case scenario for the unincorporated area of East Carroll Parish and the incorporated area of Lake Providence is approximately one to two inches of ice accumulation and approximately three to six inches of snow accumulation.

#### *Frequency / Probability*

With 11 recorded events in 25 years, winter storm events within the boundaries of East Carroll Parish have an annual chance of occurrence calculated at 44% based on the SHELUDS dataset.

#### *Estimated Potential Losses*

Since 1990, there have been 11 reported winter weather events that have resulted in property and/or crop damages according to the SHELUDS database. The total property damages associated with these storms have totaled \$3,294,246. 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 SHELUDS (1990 – 2015). This provides an annual estimated potential loss of \$131,770. To assess potential losses to the participating jurisdictions, the 2010 Census population was used to assign the estimated potential losses proportionally across the jurisdictions. The table on the following page provides an estimate of potential property losses for East Carroll Parish based on the 2010 Census data.

*Table 2-62: Estimated Annual Losses for Winter Weather Events in East Carroll Parish*

Estimated Annual Potential Losses from Winter Storms for East Carroll Parish	
Unincorporated East Carroll Parish (48.6% of Population)	Lake Providence (51.4% of Population)
\$63,991	\$67,779

From 1990 - 2015, there have been no injuries or fatalities as a result of winter weather in East Carroll Parish.

#### *Vulnerability*

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

### Dam Failure

Dams are water storage, control, or diversion barriers that impound water upstream in reservoirs. Dams are a vital part of our nation's infrastructure, providing drinking water, flood protection, renewable hydroelectric power, navigation, irrigation, and recreation. These critical daily benefits are also inextricably linked to the potential harmful consequences of a dam failure.

Dam failure is a collapse or breach in the structure. A dam failure can result in severe loss of life, economic disaster, and extensive environmental damage. While most dams have storage volumes small enough that failures have few repercussions, dams with large storage volumes can cause significant flooding downstream. Dam failures often have a rapid rate of onset, leaving little time for evacuation. The first signs of the failure may go unnoticed upon visual inspection of the dam structure. However, continual maintenance and inspection of dams often provide the opportunity to identify possible deficiencies in their early stages and can prevent a possible catastrophic failure event.

The duration of the flooding event caused by the failure depends largely on the amount of water and downstream topography. Given smaller volumes of water and a topography suited for transporting the water rapidly downstream, the event may only last hours. Because of the lack of seasonality and other predictive factors, a predictive frequency or likelihood of dam failures cannot be determined. However, the National Dam Safety Program (NDSP) produces hazard rankings (high, significant, and low) and definitions of dam structures, based on potential impact.

Dam/reservoir failures can result from any one of or a combination of the following causes:

- Prolonged periods of rainfall and flooding, which cause most failures;
- Inadequate spillway capacity, resulting in excess overtopping flows;
- Internal erosion caused by embankment or foundation leakage or piping;
- Improper maintenance, including failure to remove trees, repair internal seepage problems, replace lost material from the cross-section of the dam and abutments, or maintain gates, valves, and other operational components;
- Improper design, including the use of improper construction materials and construction practices;
- Negligent operation, including the failure to remove or open gates or valves during high flow periods;
- Failure of upstream dams on the same waterway;
- Landslides into reservoirs, which cause surges that result in overtopping;
- High winds, which can cause significant wave action and result in substantial erosion; and
- Earthquakes, which typically cause longitudinal cracks at the tops of the embankments that can weaken entire structures.

### Location

There are no dams located within East Carroll Parish or the Town of Lake Providence. As in the 2011 Plan Update, dam failure remains discounted.

### Levee Failure

Levees and floodwalls are flood control barriers constructed of earth, concrete, or other materials. For the purposes of this plan, levees are distinguished from smaller flood barriers (such as berms) by their size and extent. Berms are barriers that only protect a small number of structures, or at times only a single structure. Levees and floodwalls are barriers that protect significant areas of residential, commercial, or industrial development; at a minimum, they protect a neighborhood or small community. Levee failure involves the overtopping, breach, or collapse of the levee. Levee failure is especially destructive to nearby development during flood and hurricane events.

The northern half of Louisiana is protected by levees on the Ouachita River, under the authority of the Vicksburg District of the United States Army Corp of Engineers (USACE). The Vicksburg District encompasses 68,000 mi<sup>2</sup> in the states of Arkansas, Mississippi and Louisiana. They manage seven drainage basins, including the Yazoo, Pearl, Big Black, Red, Ouachita, and Mississippi Rivers; 12 locks and dams on the Pearl, Red, and Ouachita Rivers; 1,808 miles of levees, including 468 miles along the Mississippi River; and multiple lakes with 1,709 miles of shoreline.

Coastal and southern Louisiana are protected by an extensive levee system under the authority of the New Orleans District of the USACE. This system includes 30,000 mi<sup>2</sup> of Louisiana south of Alexandria, including 961 miles of river levees in the Mississippi River and Tributaries Project, 449 miles of river levees in the Atchafalaya Basin, and 340 miles of hurricane-protection levees. Other levees have been built along stretches of rivers throughout Louisiana by local levee districts and private citizens. The data regarding these non-federal levees are managed by the individual entity responsible for construction and subsequent maintenance and are not kept in a consistent format for comprehensive hazard analysis.

The effects of a levee failure on property is similar to that of a flood, as discussed in the flooding section. One major difference is that the velocity of the water is increased in the area of the breach, so the potential for property damage is higher in these areas.

A levee failure occurs during high water events, so the populace is normally alerted to the potential danger. Levees are normally monitored during these events and the population in danger is alerted to a possible levee failure. However, if people consider themselves safe once a levee has been breached and do not evacuate, the results could be deadly.

### Location

The primary Mississippi Levee extends along the entire eastern border of East Carroll Parish as well as the eastern side of Lake Providence.

### Previous Occurrences / Extents

There have been no reported levee failures in East Carroll Parish from 1990 to 2015. Levee information including the extent of a levee failure has been requested from the U.S Army Corps of Engineers. East Carroll Parish is awaiting a response from the USACE, and will continue to work to update this information as new data is received.

### Frequency / Probability

Based on the 25-year record, it is determined that a levee failure has less than a 1% annual chance of occurrence in the East Carroll Parish planning area. East Carroll Parish is awaiting a response from the USACE, and will continue to work to update this information as new data is received.



### 3. Capability Assessment

This section summarizes the results of the East Carroll Parish 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, East 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

East 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. They take an integrated and strategic look holistically at hazard mitigation in East 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 East Carroll Parish and its jurisdictions are shown in the table on the following page.

Table 3-1: East Carroll Parish Planning and Regulatory Capabilities

**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.

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

**Building Codes, Permitting, Land Use Planning and Ordinances**

The East Carroll Parish Police Jury provides oversight for building permits and codes, floodplain ordinances, and the Flood Insurance Rate Maps for both the incorporated and unincorporated areas of East Carroll Parish, as well as the land use planning/zoning ordinances in the Town of Lake Providence. They are also responsible for the administration of land acquisition projects for the unincorporated areas of East Carroll Parish.

As of the 2016 update, East Carroll Parish and its jurisdictions ensure that all adopted building codes are enforced and in compliance relating to the construction of any structure within the boundaries of the parish. Building permits are required prior to beginning any type of construction or renovation projects, installation of electrical wiring, plumbing or gas piping, moving manufactured/modular or portable buildings, and reroofing or demolitions.

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

The East Carroll Parish Police Jury meets regularly to consider any proposed ordinance changes, and to take final actions on proposed changes.

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

Some programs and policies, such as the above described, 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, East 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 table below shows examples of resources in place in East Carroll Parish and its jurisdictions.

*Table 3-2: East Carroll Parish Administrative and Technical Capabilities*

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.		
	East Carroll Parish	Lake Providence
Administration	Yes / No	
Planning Commission	NO	YES
Mitigation Planning Committee	YES	YES
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	NO	YES
Mutual Aid Agreements		
Staff	Yes / No; FT/PT; % Hazard Mitigation	
Chief Building Official	NO	YES
Floodplain Administrator	YES	YES
Emergency Manager	YES	YES
Community Planner	NO	NO
Civil Engineer	NO	NO
GIS Coordinator	YES	NO
Grant Writer	NO	NO
Other	N/A	
Technical	Yes / No	
Warning Systems / Service (Reverse 911, outdoor warning signals)	YES	YES
Hazard Data & Information	YES	YES
Grant Writing	NO	NO
Hazus Analysis	NO	NO

Financial capabilities are the resources that East 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/no cost actions, such as outreach efforts, to substantial action costs such acquisition of flood prone properties. The following resources are available to fund mitigation actions in East Carroll Parish and its jurisdictions:

*Table 3-3: East Carroll Parish Financial Capabilities*

Financial		
Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.		
	East Carroll Parish	Lake Providence
Funding Resource	Yes / No	
Capital Improvements project funding	YES	YES
Authority to levy taxes for specific purposes	NO	YES
Fees for water, sewer, gas, or electric services	NO	YES
Impact fees for new development	NO	NO
Stormwater Utility Fee	NO	NO
Community Development Block Grant (CDBG)	YES	YES
Other Funding Programs	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.

East 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. The existing programs are outlined in the table on the following page.

Table 3-4: East Carroll Parish Education and Outreach Capabilities

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.		
	East Carroll Parish	Lake Providence
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
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	YES	YES
Natural Disaster or safety related school program	NO	YES
Storm Ready certification	NO	NO
Firewise Communities certification	NO	NO
Public/Private partnership initiatives addressing disaster-related issues	NO	NO

In some cases, the jurisdictions rely on East Carroll Parish OHSEP and/or East 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 Appendix E in the jurisdictional specific worksheets.

As reflected in the aforementioned existing regulatory mechanisms, programs, and resources within each jurisdiction, East Carroll Parish and its jurisdiction remains committed to expanding and improving on the existing capabilities within the parish. Both participating jurisdictions 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 help to 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 East 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:

- Unincorporated East Carroll Parish
- Town of Lake Providence

### Flood Insurance and Community Rating System

East Carroll Parish is not a participant in the Community Rating System (CRS), nor is the Town of Lake Providence. 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 NFIP minimum requirements.



Under the Federal Emergency Management Agency (FEMA), the National Flood Insurance Program (NFIP) administers the Community Rating System. 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.

During the last update, 38 Louisiana communities participated. Mandeville, Shreveport, and Jefferson and East Baton Rouge Parishes had the best classifications in the state, class 7. As of the 2016 update, Jefferson, East Baton Rouge, and Terrebonne Parishes all lead the state with best classifications, class 6.

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)

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 2011<sup>1</sup>, the National Flood Insurance Program (NFIP) completed a comprehensive review of the Community Rating System that will result in the release of a new CRS Coordinator's Manual.

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

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 in order 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 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 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 manual will impact their community.

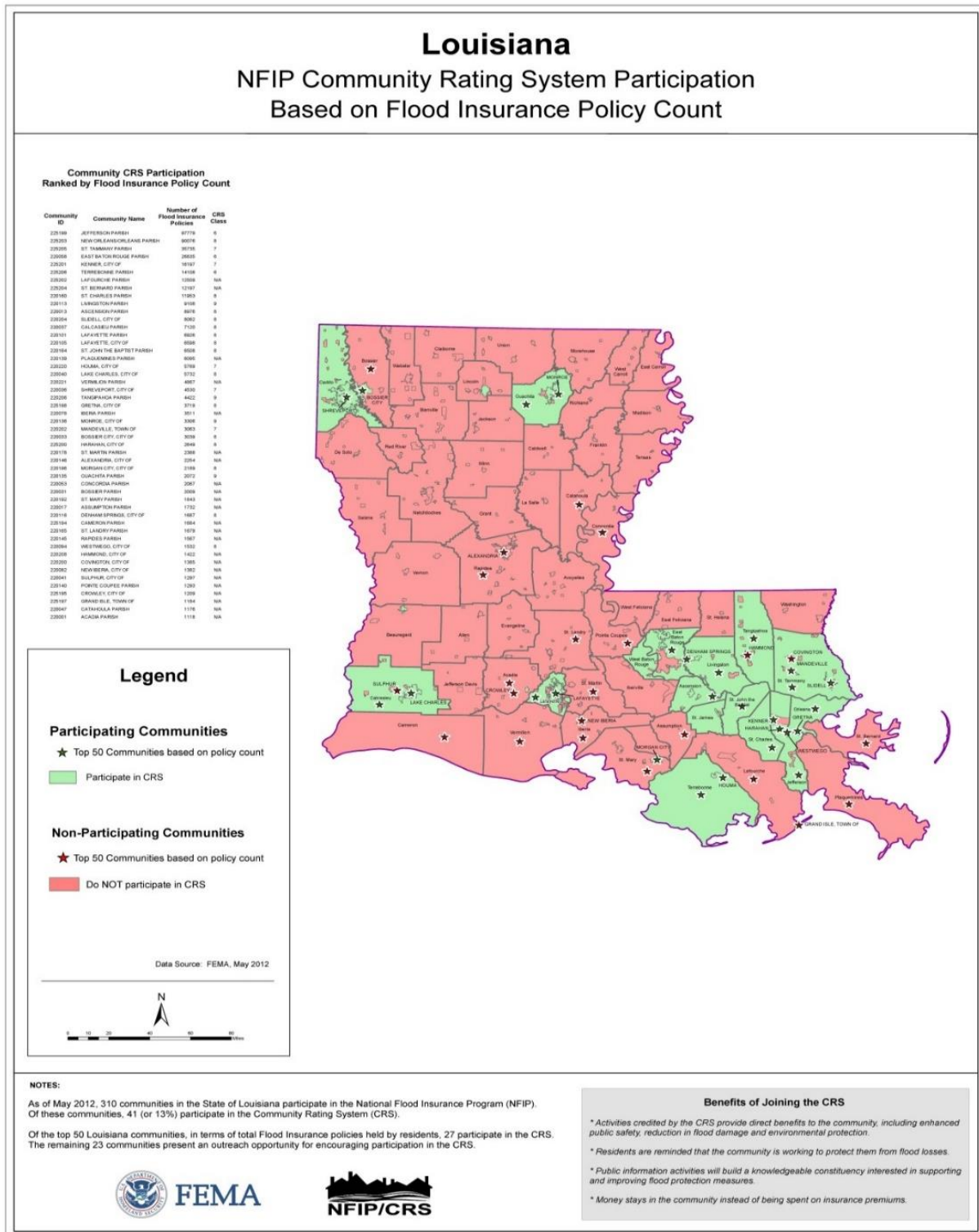


Figure 3-2: Louisiana CRS NFIP Participation  
(Source: FEMA<sup>2</sup>)

<sup>2</sup> [http://www.fema.gov/media-library-data/20130726-2128-31471-9581/ks\\_ky\\_la\\_crs\\_may\\_2012\\_508.zip](http://www.fema.gov/media-library-data/20130726-2128-31471-9581/ks_ky_la_crs_may_2012_508.zip)

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 programs 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](http://www.fema.gov/nfip/crs.shtm)\*\***

### NFIP Worksheets

Parish and participating jurisdiction NFIP worksheets can be found in Appendix E: State Required Worksheets.

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## 4. Mitigation Strategy

### Introduction

East Carroll Parish's Hazard Mitigation Strategy has a common guiding principle and is the demonstration of the parish's 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.

East 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 2016 update are a product of analysis and review of the East Carroll Parish Hazard Mitigation Plan Steering Committee, under the coordination of the East Carroll Parish Office of Homeland Security and Emergency Preparedness. The committee was presented a list of projects and actions, new and from the 2011 plan, for review from January 2016 – May 2016

An online public opinion survey was conducted of East Carroll Parish residents between January and May 2016. The survey was designed to capture public perceptions and opinions regarding natural hazards in East Carroll Parish. In addition, the survey sought to collect information regarding the methods and techniques preferred by the respondents for reducing the risks and losses associated with local hazards.

This activity was created in an effort to confirm that the goals and action items developed by the East Carroll Parish Hazard Mitigation Plan Steering Committee are representative of the outlook of the community at large. However, because there were no responses to the survey, this public feedback could not be incorporated into the plan. The full East Carroll Parish survey can be found at the following link:

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

During the public meeting in May, the committee provided a status of the projects from 2011 and the proposed actions for the 2016 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 East 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, East 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 East 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 seven goals remain valid.

The goals are as follows:

- Protect life and property
- Ensure emergency services
- Increase public preparedness
- Establish and strengthen partnerships for implementation
- Preserve or restore natural resources
- Promote a sustainable economy
- Improve data collection, use, and sharing to reduce the risk from disasters

The Mitigation Action Plan focuses on actions to be taken by East 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.

### [2016 Mitigation Actions and Update on Previous Plan Actions](#)

The East Carroll Parish Hazard Mitigation Plan Steering Committee and participating jurisdictions each identified actions that would reduce and/or prevent future damage within East 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.

East Carroll Parish 2011 Hazard Mitigation Action Update

East Carroll Parish Action Update					
Jurisdiction-Specific Action	Action Description	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
E1: All Hazard Education Program	Incorporate an all-hazard education program into all East Carroll Parish's school curriculums.	Local budget, State grants, HMGP, additional grant sources	East Carroll Parish School Board	Flooding, Tropical Cyclone, Tornadoes, Wildfires, Thunderstorms (lightning, high wind, hail), Winter Storms, Drought, Levee Failure	Ongoing
E2: Community Warning Sirens	Obtain community warning sirens to alert the community during hazard events.	Local government budget, HMGP	East Carroll Parish Public Works and East Carroll Parish Engineer	Flooding, Tropical Cyclone, Tornadoes, Wildfires, Thunderstorms (lightning, high wind, hail), Winter Storms, Drought, Levee Failure	Ongoing
E3: EOC Requirements	Develop a plan and evaluate funding requirements for an EOC.	Local government budget, EOC Grant Program	East Carroll Parish Communications District, East Carroll Parish Public Works	Flooding, Tropical Cyclone, Tornadoes, Wildfires, Thunderstorms (lightning, high wind, hail), Winter Storms, Drought, Levee Failure	Ongoing

East Carroll Parish Action Update					
Jurisdiction-Specific Action	Action Description	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
E4: Storm Ready Program	Meet the guidelines and apply for the National Weather Service's "Storm Ready Program"	Local government budget, EOC Grant Program, HMGP	East Carroll Parish Communications District, East Carroll Parish Homeland Security & Emergency Preparedness, Department East Carroll Parish Public Works	Flooding, Tropical Cyclone, Tornadoes, Wildfires, Thunderstorms (lightning, high wind, hail), Winter Storms, Drought, Levee Failure	In Progress
E5: Shelter Plan	Develop a comprehensive post-disaster shelter plan.	Local Budget, Pre-Disaster Mitigation Grant Program	East Carroll Parish Homeland Security & Emergency Preparedness	Flooding, Tropical Cyclone, Tornadoes, Wildfires, Thunderstorms (lightning, high wind, hail), Winter Storms, Drought, Levee Failure	In Progress
E6: Disaster Mitigation Informational Seminar	Host a disaster mitigation informational seminar and invite all regional parishes, cities and towns.			Flooding, Tropical Cyclone, Tornadoes, Wildfires, Thunderstorms (lightning, high wind, hail), Winter Storms, Drought, Levee Failure	Deleted
E7: Attend Mitigation Seminars	Attend all relevant disaster mitigation seminars and meetings within regional parishes, cities and towns.	Local budget	East Carroll Parish Office of Homeland Security and Emergency Preparedness	Flooding, Tropical Cyclone, Tornadoes, Wildfires, Thunderstorms (lightning, high wind, hail), Winter Storms, Drought, Levee Failure	Ongoing
E8: Monitoring and Communications	Develop and implement systems to increase effective monitoring and communications during all phases of emergency events.	HMGP; FMA; ODP	East Carroll Parish Office of Homeland Security and Emergency Preparedness and The Town of Lake Providence Mayor's Office	Flooding, Tropical Cyclone, Tornadoes, Wildfires, Thunderstorms (lightning, high wind, hail), Winter Storms, Drought, Levee Failure	Ongoing

East Carroll Parish Action Update					
Jurisdiction-Specific Action	Action Description	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
E9: Flood Control Ordinance	Adoption and enforcement of a flood control ordinance requiring the rebuilding of structures damaged by a flood event in excess of 50 percent of the structure's market value to have its lowest floor elevated above the 100year flood level.	Local budget or State and Federal grants	East Carroll Police Jury	Flooding	Deleted
E10: Community Rating System	Apply for enrollment for in NFIP's Community Rating System.	Local Budget, HMGP	East Carroll Parish Office of Homeland Security and Emergency Preparedness and East Carroll Police Jury	Flooding	Completed
E11: Drainage Ditch Debris	Clear debris from dedicated drainage ditches.	Local Budget or State and Federal Grants	East Carroll Police Jury Highway Department and Town of Lake Providence Public Works	Flooding	Ongoing
E12: Culvert Resizing	Resize inadequate culverts throughout the Parish and Town.	HMGP; FMA; LADOT	East Carroll Parish Police Jury Highway Department and The Town of Lake Providence Public Works	Flooding	In Progress
E13: Relocation Incentives	Provide relocation incentives to current flood hazard area residents and businesses.			Flooding	Deleted
E14: Community Program for	Implement a community program to	HMGP and FMA	East Carroll Parish Office of Homeland	Flooding	Deleted



East Carroll Parish Action Update					
Jurisdiction-Specific Action	Action Description	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
Repetitive Loss Structures	acquire, elevate and pilot reconstruct repetitive flood loss structures identified by FEMA.		Security and Emergency Preparedness and The Town of Lake Providence Mayor's Office		
E15: Flood Insurance Rate Maps	Work with FEMA to update East Carroll Parish's Flood Insurance Rate Maps	FEMA Map Modernization Program; HMGP; FMA	East Carroll Parish Office of Homeland Security and Emergency Preparedness and The Town of Lake Providence Mayor's Office respectively	Flooding	In Progress
E16: Development Restriction	Implement new floodplain development regulations to restrict development in flood hazard areas.	TBD	East Carroll Parish Office of Homeland Security and Emergency Preparedness and The Town of Lake Providence Mayor's Office	Flooding	Deleted
E17: Local Emergency Response Plan	Implement the local emergency response plan and update all emergency water program plans.			Flooding	Ongoing
E18: Flood Response Efforts	Coordinate with other volunteer, local, state and federal agencies to review and update flood response efforts.	EMPG; HMGP, and FMA. Funding could be obtained through local budget or grants.	East Carroll Parish Office of Homeland Security and Emergency Preparedness and The Town of Lake Providence Mayor's Office respectively	Flooding	Ongoing
E19: Mail Flood Prevention Information	Mail residents in flood hazard areas information regarding flood			Flooding	Deleted

East Carroll Parish Action Update					
Jurisdiction-Specific Action	Action Description	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
	prevention and NFIP insurance.				
E20: Farm Service Agency's Insurance	Outreach to farmers and business owners on flood mitigation efforts and benefits of benefits of The Farm Service Agency's Insurance plan.			Flooding	Deleted
E21: Flood Event Advertising Campaign	Implement a general advertising campaign addressing the potential dangers of flood events and how to mitigate its effects to property and general welfare.	HMGP; FMA; ODP	East Carroll Parish Office of Homeland Security & Emergency Preparedness	Flooding	Deleted
E22: Fifth Louisiana Levee District Support	Support Fifth Louisiana Levee District in all hazard mitigation initiatives.	N/A	East Carroll Parish Office of Homeland Security and Emergency Preparedness, East Carroll Police Jury and The Town of Lake Providence Mayor's Office	Flooding	Ongoing
E23: Hydrological Study	Perform a hydrological study to highlight the required culvert and drainage system needed to adequately drain storm water.	Local budget, HMGP	East Carroll Public Works and Engineer	Flooding	Deleted
E24: Storm Water Pump Installation	Perform a feasibility analysis for the installation of a storm water pump station in the most flood	Local budget, HMGP	East Carroll Public Works and Engineer	Flooding	Deleted

East Carroll Parish Action Update					
Jurisdiction-Specific Action	Action Description	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
	prone affordable housing area.				
E25: Thunderstorm Warning Sirens	Obtain community thunderstorm warning sirens to alert the community during a thunderstorm events.	Local government budget, HMGP	East Carroll Parish Public Works and East Carroll Parish Engineer	Thunderstorms	Ongoing
E26: Auxiliary Power Sources for Thunderstorms	Acquire auxiliary power sources for critical infrastructure and facilities for thunderstorms.	Local budget, State and Federal Grants	East Carroll Parish Office of Homeland Security and Emergency Preparedness and The Town of Lake Providence Mayor's Office	Thunderstorms	Deleted
E27: Retrofitting Critical Facilities	Retrofit all critical facilities to withstand wind speeds of 250 mph.	Local budget, HMGP, other grant programs	East Carroll Public Works and Engineer	Tornadoes	Deleted
E28: Auxiliary Power Sources for Tornadoes	Acquire auxiliary power sources for critical infrastructure and facilities.	Local budget, State and Federal Grants	East Carroll Parish Office of Homeland Security and Emergency Preparedness and The Town of Lake Providence Mayor's Office	Tornadoes	In Progress
E29: Auxiliary Power Sources for Hurricanes/Tropical Storms	Acquire auxiliary power sources for critical infrastructure and facilities.	Local budget, State and Federal Grants	East Carroll Parish Office of Homeland Security and Emergency Preparedness and The Town of Lake Providence Mayor's Office	Hurricanes / Tropical Storms	In Progress
E30: Insurance Partnerships	Create partnerships with insurance companies to	Local budget, State and Federal grants.	East Carroll Parish Office of Homeland Security and	Hurricanes / Tropical Storms	Deleted

East Carroll Parish Action Update					
Jurisdiction-Specific Action	Action Description	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
	promote the adoption of building codes in the community.		Emergency Preparedness and The Town of Lake Providence Mayor's Office respectively		
E31: Hail proof Public Buildings	Hail-proof all public buildings in East Carroll and Lake Providence.	Local budget, HMGP, other grants	East Carroll Parish Public Works	Hailstorms	Deleted
E32: Hail proof Public Vehicles	Hail-proof new and existing public vehicles in East Carroll and Lake Providence	State and Federal grants, Stimulus Grant	East Carroll Parish Public Works	Hailstorms	Deleted
E33: New Construction Projects	Require all utilities for new construction projects to be installed underground.	Local Budget State and Federal grants, Stimulus Grant	East Carroll Parish Office of Homeland Security and Emergency Preparedness and The Town of Lake Providence Mayor's Office	Winter Storms	Deleted
E34: Weatherization Education Program	Implement a weatherization education program.	Local budget, State and Federal Grants	East Carroll Parish Office of Homeland Security and Emergency Preparedness and The Town of Lake Providence Mayor's Office respectively	Winter Storms	Deleted
E35: Drought Education Brochures	Order FEMA, USDA brochures on drought education and distribute them at Public Buildings.	Local budget or State and Federal grants.	East Carroll Parish Office of Homeland Security and Emergency Preparedness and The Town of Lake Providence Mayor's Office respectively	Droughts	Deleted
E36: Water Resource Identification	Identify existing water resources as well as potential	Local budget or State and	East Carroll Public Works and Engineer	Droughts	FIRE SERVICE PROVIDED

East Carroll Parish Action Update					
Jurisdiction-Specific Action	Action Description	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
	sites for reservoir development.	Federal grants.			A TANKER IF NEEDED
E37: Water Control Ordinance	Implement water control ordinance based on seasonal changes in risk.	Local budget	East Carroll Parish Police Jury and Town of Lake Providence	Droughts	Deleted
E38: Mosquito Abatement Programs	Implement and maintain new and existing mosquito abatement programs including spraying, outreach, monitoring, and increasing drainage capacity.	Local budget, State and Federal grants, other grants	East Carroll Parish Public Works	Mosquito-Borne Disease	Deleted
E39: Culvert Resizing	Resize culverts at five sites located on Hudson Blvd; one on Scott St; five on first St; one on Hood St; one on 8th St and one on Virgle.	HMGP; FMA; LADOT	East Carroll Parish Police Jury Highway Department and The Town of Lake Providence Public Works	Mosquito-Borne Disease	Deleted
E40: Transportation Chemical Commodity Flow Study	Conduct a transportation chemical commodity flow study.	Local budget, State and Federal grants, other grants	East Carroll Parish Office of Homeland Security and Emergency Preparedness and The Town of Lake Providence Mayor's Office	Chemical Spills	Deleted
E41: Chemical Spill Education	Implement a business-based education program that highlights the potential for chemical spill disasters, prevention and response.	N/A	N/A	Chemical Spills	Deleted
E42: Business Incentives for Mitigation Education	Provide incentives to businesses that implement the industrial-based education program	Local budget, State and Federal grants, other grants	East Carroll Parish Office of Homeland Security and Emergency	Chemical Spills	Deleted

East Carroll Parish Action Update					
Jurisdiction-Specific Action	Action Description	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
	into their employee orientation process.		Preparedness and The Town of Lake Providence Mayor's Office		
E43: School Terrorism Program	Implement a school-based program to inform students on terrorism risk and prevention.	Local budget, State and Federal grants, other grants	East Carroll Parish Office of Homeland Security and Emergency Preparedness and The Town of Lake Providence Mayor's Office	Terrorism	Deleted
E44: Parish-Wide Terrorism Exercise	Conduct a Parish-Wide terrorism exercise to measure evacuation preparedness.	Local budget, State and Federal grants, other grants	East Carroll Parish Office of Homeland Security and Emergency Preparedness and The Town of Lake Providence Mayor's Office	Terrorism	Deleted



## Unincorporated East Carroll New Mitigation Actions

East Carroll Unincorporated - 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 HMGP	1-5 years	East Carroll Parish OHSEP	High Winds, Tropical Cyclones, Tornadoes	1,2,6	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 HMGP	1-5 years	East Carroll Parish OHSEP	Flooding, High Winds, Tropical Cyclones	1,2,6	New
E3: Mitigation of repetitive loss and severe repetitive loss properties and other hazard prone structures	Elevation, acquisition-demolition, acquisition-relocations, and reconstruction of repetitive loss or	FEMA HMGP	1-5 years	East Carroll Parish OHSEP	Flooding, Tropical Cyclones, Levee Failure	1,2,5,6	New

East Carroll Unincorporated - New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
	flooding or other hazard prone properties.						
E4: Safe Room Projects	Construction of a safe room for first responders located in East Carroll Parish. Other locations will be identified based on funding availability.	FEMA HMGP	1-5 years	East Carroll Parish OHSEP	Tornadoes, High Winds, Tropical Cyclones, Wildfires	1,2,6	New
E5: Education and Outreach	Enhance the public outreach programs for the parish and all communities by increasing awareness of risks and safety through mail outs and training opportunities for Flooding, Tropical Cyclone, tornados, wildfire, thunderstorms (lightning, high wind, hail), drought, levee failure and winter storm hazards 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 HMGP	1-5 years	East Carroll Parish OHSEP	Flooding, Tropical Cyclone, Tornadoes, Wildfires, Thunderstorms (lightning, high wind, hail), Winter Storms, Drought, Levee Failure	1,2,3,4, 5,6,7	New

East Carroll Unincorporated - New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
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 HMGP	1-5 years	East Carroll Parish OHSEP	Tornadoes, Winter Storms, Tropical Cyclones, Thunderstorms (lightning, high wind, hail)	1,2,5,6	New
E7: Lightning Mitigation	Procurement and Installation of Lightning rods and surge protectors for public buildings to preserve life and property	FEMA HMGP	1-5 years	East Carroll Parish OHSEP	Lightning	1,2,5,6	New
E8: Warning Systems	Update/upgrade public warning system components throughout East Carroll Parish as necessary. Install audible and/or reverse 911 warning system(s)	FEMA HMGP	1-5 years	East Carroll Parish OHSEP	Winter Storms, Wildfires, Tornadoes, Tropical Cyclones, Levee Failure	1,2,5,6	New
E9: Potable Water	Create redundancy of potable water supply to critical facilities, especially hospitals in Parish, and provide protection of potable water supply by acquisition/installation of backflow preventers at appropriate critical locations.	FEMA HMGP	1-5 years	East Carroll Parish OHSEP	Tropical Cyclone, Thunderstorms (lightning, high wind, hail), Tornadoes, Drought, Levee Failure	1,2,5,6	New

East Carroll Unincorporated - New Mitigation Actions							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
E10: Control Structure Updates	Procure and complete necessary updates to, or replace the control structures located on Tensas River and Baxter River. Updating the structures will allow them to function properly during high water events. Structures currently do not operate adequately during high rain/water events, causing backwater flooding in the affected areas.	FEMA HMGP	1-5 years	East Carroll Parish Police Jury	Tropical Cyclones, Flooding, Levee Failure	1,2,5,6	New
E11: Promote Flood Insurance	Promote the purchase of flood insurance. Advertise the availability, cost, and coverage of flood insurance through the National Flood Insurance Program (NFIP).	FEMA HMGP	1-5 years	East Carroll Parish OHSEP	Tropical Cyclones, Flooding, Levee Failure	1,2,4,5,6	New
E12: Dam/Levee Failure Working Group	Create a working group in order to assess the extent and determine the possible effects of a dam and/or levee failure.	FEMA HMGP	1-5 Years	East Carroll Parish OHSEP	Dam Failure, Levee Failure	1,2,3,5,7	New

## Town of Lake Providence - New Mitigation Actions

Town of Lake Providence							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
L1: 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 HMGP	1-5 years	Mayor's Office - Town of Lake Providence/East Carroll Parish OHSEP	High Winds, Tropical Cyclones, Tornadoes	1,2,6	New
L2: Drainage Improvements	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 HMGP	1-5 years	Mayor's Office - Town of Lake Providence/East Carroll Parish OHSEP	Flooding, High Winds, Tropical Cyclones	1,2,6	New
L3: Mitigation of repetitive loss and severe repetitive loss properties and other hazard prone structures	Elevation, acquisition-demolition, acquisition-relocations, and reconstruction of repetitive loss or flooding or other hazard prone properties.	FEMA HMGP	1-5 years	Mayor's Office - Town of Lake Providence/East Carroll Parish OHSEP	Flooding, Tropical Cyclones, Levee Failure	1,2,5,6	New

Town of Lake Providence							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
L4: Safe Room Projects	Construction of a safe room for first responders located in East Carroll. Other locations will be identified based on funding availability.	FEMA HMGP	1-5 years	Mayor's Office - Town of Lake Providence/East Carroll Parish OHSEP	Tornadoes, High Winds, Tropical Cyclones, Wildfires	1,2,6	New
L5: Education and Outreach	Enhance the public outreach programs for the parish and all communities by increasing awareness of risks and safety through mail outs and training opportunities for Flooding, Tropical Cyclone, tornados, wildfire, thunderstorms (lightning, high wind, hail), drought, levee failure and winter storm hazards 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 HMGP	1-5 years	Mayor's Office - Town of Lake Providence/East Carroll Parish OHSEP	Flooding, Tropical Cyclones, Tornadoes, Wildfires, Thunderstorms (lightning, high wind, hail), Winter Storms, Drought, Levee Failure	1,2,3,4,5,6,7	New
L6: Generators for continuity of operations and government	Procurement and Installation of generators at public facilities to ensure continued operations during and after events.	FEMA HMGP	1-5 years	Mayor's Office - Town of Lake Providence/East Carroll Parish OHSEP	Tornadoes, Winter Storms, Tropical Cyclones, Thunderstorms (lightning, high wind, hail)	1,2,5,6	New
L7:Lightning Mitigation	Procurement and Installation of Lightning rods and surge protectors for public buildings to preserve life and property	FEMA HMGP	1-5 years	Mayor's Office - Town of Lake Providence/East Carroll Parish OHSEP	Lightning	1,2,5,6	New



Town of Lake Providence							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
L8: Warning Systems	Update/upgrade public warning system components throughout East Carroll as necessary. Install audible and/or reverse 911 warning system(s)	FEMA HMGP	1-5 years	Mayor's Office - Town of Lake Providence/East Carroll Parish OHSEP	Winter Storms, Wildfires, Tornadoes, Tropical Cyclones, Levee Failure	1,2,5,6	New
L9: Potable Water	Create redundancy of potable water supply to critical facilities, especially hospitals in Parish, and provide protection of potable water supply by acquisition/installation of backflow preventers at appropriate critical locations.	FEMA HMGP	1-5 years	Mayor's Office - Town of Lake Providence/East Carroll Parish OHSEP	Tropical Cyclones, Thunderstorms (lightning, high wind, hail), Tornadoes, Drought, Levee Failure	1,2,5,6	New
L10: Promote Flood Insurance	Promote the purchase of flood insurance. Advertise the availability, cost, and coverage of flood insurance through the National Flood Insurance Program (NFIP).	FEMA HMGP	1-5 years	Mayor's Office - Town of Lake Providence/East Carroll Parish OHSEP	Tropical Cyclones, Flooding, Levee Failure	1,2,4, 5,6	New
L11: Control Structure Updates	Procure and complete necessary updates to, or replace the control structures located on Tensas River and Baxter River. Updating the structures will allow them to function properly during high water events. Structures currently do not operate adequately during high rain/water events, causing backwater flooding in the affected areas.	FEMA HMGP	1-5 years	Mayor's Office - Town of Lake Providence/East Carroll Parish OHSEP	Tropical Cyclones, Flooding, Levee Failure	1,2,5,6	New

Town of Lake Providence							
Jurisdiction-Specific Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
E12: Dam/Levee Failure Working Group	Create a working group in order to assess the extent and determine the possible effects of a dam and/or levee failure.	FEMA HMGP	1-5 Years	East Carroll Parish OHSEP	Dam Failure, Levee Failure	1,2,3,5,7	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 East Carroll Parish and the jurisdiction's 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. There have been no changes in financial, legal, and political priorities within the past 5 years, with the methodology and prioritization process remaining the same.

East 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.

## 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 East Carroll Parish Hazard Mitigation Plan Update

The East Carroll Parish Hazard Mitigation Plan Update process began in January 2016 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.

East Carroll Parish includes one incorporated municipality that participated in the plan update process – the Town of Lake Providence. East 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
1/22/2016	Initial Coordination	Telephone/ Email	No	Discuss with Parish HM coordinator and any Steering Committee members expectations and requirements of the project.
2/2/2016	Kick-Off Meeting	East Carroll Parish, Lake Providence, LA	No	Discuss with the plan steering committee expectations and requirements of the project. Assign plan worksheets to jurisdictions.
5/12/2016	Risk Assessment Overview	East Carroll Parish, Lake Providence, LA	No	Discuss and review the risk assessment with the steering committee discuss and review expectations for public meeting.
5/12/2016	Public Meeting	East Carroll Parish, Lake Providence, 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 East Carroll Parish communities were provide 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 East Carroll Parish. In addition, we asked about the methods and techniques preferred for reducing the risks and losses associated with these hazards. Survey Results: <a href="https://www.surveymonkey.com/r/EastCarroll">https://www.surveymonkey.com/r/EastCarroll</a>
2 Week Period	Public Plan Review (Digital)		Yes	Parish Website and East Carroll Parish OHSEP

## Planning

The plan update process consisted of several phases:

Phase	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Plan Revision						
Data Collection						
Risk Assessment						
Public Input						
Mitigation Strategy and Actions						
Plan Review by GOHSEP and FEMA						
Plan Adoption						
Plan Approval						

## Coordination

The East Carroll Parish OHSEP oversaw the coordination of the 2016 Hazard Mitigation Plan Update Steering Committee during the update process. The East Carroll 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 all planned meetings and activities by email invitations and calendar invites. SDMI assisted the Parish Director with meeting notices, website 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 2016 Hazard Mitigation Plan Update Steering Committee consisted of representatives from the following parish, municipal, or community stakeholders:

- East Carroll Parish Government
- East Carroll Office of Homeland Security and Emergency Preparedness
- Town of Lake Providence
- East Carroll Sheriff's Department
- East Carroll Parish Police Jury
- East Carroll Public Works

The Parish of West Carroll was invited by the East Carroll Parish OHSEP to participate in all meetings and activities as well in an effort to collaborate with neighboring communities. In addition, the participation of the GOHSEP Region 8 Coordinator during the process also contributed to neighboring community representation. West Carroll Parish OHSEP Director attended the kick off meeting and stayed engaged throughout the process.

As part of the coordination and planning process, the single jurisdiction and the parish was provided the State Required Hazard Mitigation Plan Update Worksheet. Jurisdictions with the capability to complete and return these worksheets quickly returned them to assist with the 2016 update. The completed worksheets can be found in Appendix E – State Required Plan Update Worksheets.

Below is a detailed list of the 2016 Hazard Mitigation Plan Update Steering Committee:

Name	Title	Agency	Email
WYDETTE WILLIAMS	SHERIFF	EAST CARROL SHERIFF DEPT.	<a href="mailto:wwilliams@ecsheriff.com">wwilliams@ecsheriff.com</a>
RUDY THREATS	CHIEF OF POLICE	EAST CARROLL POLICE DEPT.	<a href="mailto:lpcpolice@bellsouth.net">lpcpolice@bellsouth.net</a>
MELINDA STUTTS	ADMIN-HOSPITAL	EAST CARROL PARISH HOSPITAL	<a href="mailto:mstutts@ecphosp.com">mstutts@ecphosp.com</a>
BOBBY AMACKER	MAYOR	TOWN OF LAKE PROVIDENCE	<a href="mailto:lakeprovidence@bellsouth.net">lakeprovidence@bellsouth.net</a>
KENDRICK HALEY	FIRE CHIEF	TOWN OF LAKE PROVIDENCE FIRE DEPT	<a href="mailto:kendricsr@hotmail.com">kendricsr@hotmail.com</a>
TIM BRASWELL	FIRE CHIEF	PARISH FIRE DEPT	<a href="mailto:braswellt@gmail.com">braswellt@gmail.com</a>
DEBRA HOPKINS	911 DIRECTOR	EAST CARROLL SHERIFF DEPT.	N/A

Name	Title	Agency	Email
LEE DENNY	PARISH PRESIDENT	EAST CARROLL POLICE JURY	<a href="mailto:leedenny@bellsouth.net">leedenny@bellsouth.net</a>
FRED THREATS	PARISH MANAGER	EAST CARROLL POLICE JURY	<a href="mailto:levertrepair@yahoo.com">levertrepair@yahoo.com</a>
HOSIE LAYTON	PUBLIC WORKS SUPERINTENDANT	TOWN OF LAKE PROVIDENCE	<a href="mailto:townoflakeprovidence@bellsouth.net">townoflakeprovidence@bellsouth.net</a>
JAMES SHAW	ROAD SUPERINTENDANT	EAST CARROLL POLICE JURY	<a href="mailto:ecpj400@att.net">ecpj400@att.net</a>
NATOSHA DAVIS	ASSISTANT DIRECTOR	EAST CARROLL POLICE JURY	<a href="mailto:ecpj400@att.net">ecpj400@att.net</a>
LEEKEITHA REED	OEP DIRECTOR	EAST CARROLL POLICE JURY	<a href="mailto:ecpioep@bayou.com">ecpioep@bayou.com</a>
WYLY GILFOIL	PORT DIRECTOR	LAKE PROVIDENCE PORT COMMISSION	<a href="mailto:wyly_gilfoil@msn.com">wyly_gilfoil@msn.com</a>
FRANCIS LENSING	PRESIDENT OF THE LAKE COMMISSION	EAST CARROLL POLICE JURY	<a href="mailto:francisllch@bayou.com">francisllch@bayou.com</a>
PEGGY ROBINSON	OHSEP DIRECTOR	WEST CARROLL PARISH	<a href="mailto:wcpoep@bellsouth.net">wcpoep@bellsouth.net</a>

### 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 East 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 East 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 2005 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:

- Emergency Operations Plan
- State of Louisiana Hazard Mitigation Plan
- 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 East Carroll Parish.

#### Meeting #1: Coordination Discussion

**Date:** January 22, 2016

**Location:** Email/Phone

**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:** East Carroll Parish OHSEP, SDMI Staff, GOHSEP Region 8 Coordinator

## Meeting #2: Hazard Mitigation Plan Update Kick-Off

**Date:** February 2, 2016**Location:** Lake Providence, LA

**Purpose:** Discuss the expectations and requirements of the Hazard Mitigation Plan Update process and to establish and 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:** No**Invitees Included:**

Name	Title	Agency	Email
WYDETTE WILLIAMS	SHERIFF	EAST CARROLL SHERIFF DEPT.	<a href="mailto:wwilliams@ecsheriff.com">wwilliams@ecsheriff.com</a>
RUDY THREATS	CHIEF OF POLICE	EAST CARROLL POLICE DEPT.	<a href="mailto:lpcpolice@bellsouth.net">lpcpolice@bellsouth.net</a>
MELINDA STUTTS	ADMIN-HOSPITAL	EAST CARROLL PARISH HOSPITAL	<a href="mailto:mstutts@ecphosp.com">mstutts@ecphosp.com</a>
BOBBY AMACKER	MAYOR	TOWN OF LAKE PROVIDENCE	<a href="mailto:lakeprovidence@bellsouth.net">lakeprovidence@bellsouth.net</a>
KENDRICK HALEY	FIRE CHIEF	TOWN OF LAKE PROVIDENCE FIRE DEPT	<a href="mailto:kendricsr@hotmail.com">kendricsr@hotmail.com</a>
TIM BRASWELL	FIRE CHIEF	PARISH FIRE DEPT	<a href="mailto:braswellt@gmail.com">braswellt@gmail.com</a>
DEBRA HOPKINS	911 DIRECTOR	EAST CARROLL SHERIFF DEPT.	N/A
LEE DENNY	PARISH PRESIDENT	EAST CARROLL POLICE JURY	<a href="mailto:leedenny@bellsouth.net">leedenny@bellsouth.net</a>
FRED THREATS	PARISH MANAGER	EAST CARROLL POLICE JURY	<a href="mailto:levertrepair@yahoo.com">levertrepair@yahoo.com</a>
HOSIE LAYTON	PUBLIC WORKS SUPERINTENDANT	TOWN OF LAKE PROVIDENCE	<a href="mailto:townoflakeprovidence@bellsouth.net">townoflakeprovidence@bellsouth.net</a>
JAMES SHAW	ROAD SUPERINTENDANT	EAST CARROLL POLICE JURY	<a href="mailto:ecpj400@att.net">ecpj400@att.net</a>
NATOSHA DAVIS	ASSISTANT DIRECTOR	EAST CARROLL POLICE JURY	<a href="mailto:ecpj400@att.net">ecpj400@att.net</a>
LEEKEITHA REED	OEP DIRECTOR	EAST CARROLL POLICE JURY	<a href="mailto:ecpjoe@bayou.com">ecpjoe@bayou.com</a>
WYLY GILFOIL	PORT DIRECTOR	LAKE PROVIDENCE PORT COMMISSION	<a href="mailto:wyly_gilfoil@msn.com">wyly_gilfoil@msn.com</a>
FRANCIS LENSING	PRESIDENT OF THE LAKE COMMISSION	EAST CARROLL POLICE JURY	<a href="mailto:francisllch@bayou.com">francisllch@bayou.com</a>
PEGGY ROBINSON	OHSEP DIRECTOR	WEST CARROLL PARISH	<a href="mailto:wcpoe@bellsouth.net">wcpoe@bellsouth.net</a>

## Meeting #3: Risk Assessment Overview

**Date:** May 12, 2016**Location:** Lake Providence, LA

**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:** No**Invitees Included:**

Name	Title	Agency	Email
WYDETTE WILLIAMS	SHERIFF	EAST CARROLL SHERIFF DEPT.	<a href="mailto:wwilliams@ecsheriff.com">wwilliams@ecsheriff.com</a>
RUDY THREATS	CHIEF OF POLICE	EAST CARROLL POLICE DEPT.	<a href="mailto:lpcpolice@bellsouth.net">lpcpolice@bellsouth.net</a>
MELINDA STUTTS	ADMIN-HOSPITAL	EAST CARROLL PARISH HOSPITAL	<a href="mailto:mstutts@ecphosp.com">mstutts@ecphosp.com</a>
BOBBY AMACKER	MAYOR	TOWN OF LAKE PROVIDENCE	<a href="mailto:lakeprovidence@bellsouth.net">lakeprovidence@bellsouth.net</a>
KENDRICK HALEY	FIRE CHIEF	TOWN OF LAKE PROVIDENCE FIRE DEPT	<a href="mailto:kendricsr@hotmail.com">kendricsr@hotmail.com</a>
TIM BRASWELL	FIRE CHIEF	PARISH FIRE DEPT	<a href="mailto:braswellt@gmail.com">braswellt@gmail.com</a>
DEBRA HOPKINS	911 DIRECTOR	EAST CARROLL SHERIFF DEPT.	N/A
LEE DENNY	PARISH PRESIDENT	EAST CARROLL POLICE JURY	<a href="mailto:leedenny@bellsouth.net">leedenny@bellsouth.net</a>
FRED THREATS	PARISH MANAGER	EAST CARROLL POLICE JURY	<a href="mailto:levertrepair@yahoo.com">levertrepair@yahoo.com</a>
HOSIE LAYTON	PUBLIC WORKS SUPERINTENDANT	TOWN OF LAKE PROVIDENCE	<a href="mailto:townoflakeprovidence@bellsouth.net">townoflakeprovidence@bellsouth.net</a>
JAMES SHAW	ROAD SUPERINTENDANT	EAST CARROLL POLICE JURY	<a href="mailto:ecpj400@att.net">ecpj400@att.net</a>
NATOSHA DAVIS	ASSISTANT DIRECTOR	EAST CARROLL POLICE JURY	<a href="mailto:ecpj400@att.net">ecpj400@att.net</a>
LEEKEITHA REED	OEP DIRECTOR	EAST CARROLL POLICE JURY	<a href="mailto:ecpjoep@bayou.com">ecpjoep@bayou.com</a>
WYLY GILFOIL	PORT DIRECTOR	LAKE PROVIDENCE PORT COMMISSION	<a href="mailto:wyly_gilfoil@msn.com">wyly_gilfoil@msn.com</a>
FRANCIS LENSING	PRESIDENT OF THE LAKE COMMISSION	EAST CARROLL POLICE JURY	<a href="mailto:francisllch@bayou.com">francisllch@bayou.com</a>
PEGGY ROBINSON	OHSEP DIRECTOR	WEST CARROLL PARISH	<a href="mailto:wcpoep@bellsouth.net">wcpoep@bellsouth.net</a>

## Meeting #4: Public Meeting

**Date:** May 12, 2016**Location:** Lake Providence, LA

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

**Public Initiation:** Yes**Invitees Included:**

Name	Title	Agency	Email
WYDETTE WILLIAMS	SHERIFF	EAST CARROLL SHERIFF DEPT.	<a href="mailto:wwilliams@ecsheriff.com">wwilliams@ecsheriff.com</a>
RUDY THREATS	CHIEF OF POLICE	EAST CARROLL POLICE DEPT.	<a href="mailto:lpcpolice@bellsouth.net">lpcpolice@bellsouth.net</a>
MELINDA STUTTS	ADMIN-HOSPITAL	EAST CARROLL PARISH HOSPITAL	<a href="mailto:mstutts@ecphosp.com">mstutts@ecphosp.com</a>
BOBBY AMACKER	MAYOR	TOWN OF LAKE PROVIDENCE	<a href="mailto:lakeprovidence@bellsouth.net">lakeprovidence@bellsouth.net</a>
KENDRICK HALEY	FIRE CHIEF	TOWN OF LAKE PROVIDENCE FIRE DEPT	<a href="mailto:kendricsr@hotmail.com">kendricsr@hotmail.com</a>
TIM BRASWELL	FIRE CHIEF	PARISH FIRE DEPT	<a href="mailto:braswellt@gmail.com">braswellt@gmail.com</a>
DEBRA HOPKINS	911 DIRECTOR	EAST CARROLL SHERIFF DEPT.	N/A
LEE DENNY	PARISH PRESIDENT	EAST CARROLL POLICE JURY	<a href="mailto:leedenny@bellsouth.net">leedenny@bellsouth.net</a>
FRED THREATS	PARISH MANAGER	EAST CARROLL POLICE JURY	<a href="mailto:levertrepair@yahoo.com">levertrepair@yahoo.com</a>
HOSIE LAYTON	PUBLIC WORKS SUPERINTENDANT	TOWN OF LAKE PROVIDENCE	<a href="mailto:townoflakeprovidence@bellsouth.net">townoflakeprovidence@bellsouth.net</a>
JAMES SHAW	ROAD SUPERINTENDANT	EAST CARROLL POLICE JURY	<a href="mailto:ecpj400@att.net">ecpj400@att.net</a>
NATOSHA DAVIS	ASSISTANT DIRECTOR	EAST CARROLL POLICE JURY	<a href="mailto:ecpj400@att.net">ecpj400@att.net</a>
LEEKEITHA REED	OEP DIRECTOR	EAST CARROLL POLICE JURY	<a href="mailto:ecpjoe@bayou.com">ecpjoe@bayou.com</a>
WYLY GILFOIL	PORT DIRECTOR	LAKE PROVIDENCE PORT COMMISSION	<a href="mailto:wyly_gilfoil@msn.com">wyly_gilfoil@msn.com</a>
FRANCIS LENSING	PRESIDENT OF THE LAKE COMMISSION	EAST CARROLL POLICE JURY	<a href="mailto:francisllch@bayou.com">francisllch@bayou.com</a>
PEGGY ROBINSON	OHSEP DIRECTOR	WEST CARROLL PARISH	<a href="mailto:wcpoe@bellsouth.net">wcpoe@bellsouth.net</a>

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



## Meeting Public Notice



EAST CARROLL PARISH OFFICE OF HOMELAND SECURITY & EMERGENCY PREPAREDNESS

MEETING NOTICE – May 12, 2016

### East Carroll Parish to hold Public Meetings for Hazard Mitigation Plan Update

Lake Providence, LA – East Carroll Parish Office of Homeland Security & Emergency Preparedness is in the process of updating the East Carroll Parish Hazard Mitigation Plan and are required to hold public meetings on the plan update. The Public meeting will be held on May 12th, in the East Carroll Parish Courthouse located at 400 First Street, Lake Providence, LA 71254, 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.

East Carroll Parish is in the stages of updating its hazard mitigation plan. Public meeting will be held on May 12<sup>th</sup> for all citizens interested in learning about and participating in discussions concerning the East Carroll Parish Hazard Mitigation Plan.

Residents of East 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/EastCarroll>

For more information, please contact: East Carroll OHSEP Office – LeeKeitha Reed, Director (318)559-2256

#### Outreach Activity #1: Public Opinion Survey

**Date:** Ongoing throughout planning process

**Location:** Web Survey

**Public Initiation:** Yes

#### Outreach Activity #2: Incident Questionnaire

**Date:** Public Meeting Activity

**Location:** Public Meeting

**Public Initiation:** Yes

#### 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 provide valuable input on areas that may flood repeatedly during rain events that may not get reported to local emergency managers as significant events.

#### Public Plan Review Documentation

The East Carroll Parish Hazard Mitigation Draft Plan was placed in the Parish Courthouse to collect comments and feedback from the public. No public comments were received during this time. This outreach provided the public an opportunity to comment on the plan during the drafting stage and prior to plan approval.

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## 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

The East Carroll Parish Planning Committee will be responsible for monitoring, evaluating, and documenting the plan's progress throughout the year. Part of the plan maintenance process should include a system by which local governing bodies incorporate the HMP into the parish's comprehensive or capital improvement plans. This process provides for continued public participation through the diverse resources of the parish to help in achieving the goals and objectives of the plan. Public participation will be achieved through availability of copies of HMP in parish public library and parish website. This section describes the whole update process which includes the following:

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

### Responsible Parties

East 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 committee members in this plan will remain active in the steering committee.

Although the people filling the positions may change from year to year, the parish and its stakeholders will have representatives 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 OHSEP Director to be assigned as deemed appropriate.

### Methods for Monitoring and Evaluating the Plan and Plan Evaluation Criteria

East Carroll Parish has developed a method to ensure monitoring, evaluating, and updating of the HMP occurs during the five-year cycle of the plan. The planning committee will become a permanent body and will be responsible for monitoring, evaluating, and updating of the plan. The planning committee meeting will be held annually in order to monitor, evaluate, and update the plan. The East Carroll Parish OHSEP Director will be responsible for conducting the annual planning committee meetings.

The lead person of the agency responsible for the implementation of a specific mitigation action will submit a progress report to the Director at least thirty days prior to the planning committee meeting. The progress report will provide project status monitoring to include the following: whether the project has started; if not started, reason for not starting; if started, status of the project; if the project is completed, whether it has eliminated the problem; and any changes recommended to improve the implementation of the project etc. In addition, the progress report will provide status monitoring on the plan evaluation, changes to the hazard profile, changes to the risk assessment, and public input on the Hazard Mitigation Plan updates and reviews.

Progress on the mitigation action items and projects will be reviewed during the annual planning committee meeting. The criteria that would be utilized in the project review will include the following:

- 1) Whether the action was implemented and reasons, if the action was not implemented
- 2) What were the results of the implemented action
- 3) Were the outcomes as expected, and reasons if the outcomes were not as expected
- 4) Did the results achieve the stated goals and objectives
- 5) Was the action cost-effective
- 6) What were the losses avoided after completion of the project
- 7) In case of a structural project, did it change the hazard profile

In addition to monitoring and evaluating the progress of the mitigation plan actions and projects, the mitigation plan is required to be maintained and monitored annually, and updated every five years. The annual maintenance, monitoring and evaluation of the plan will be conducted in the annual planning committee meeting. The planning committee will review each goal and objective to determine their relevance to changing situations in the parish, as well as changes to state or federal policy, and to ensure that they are addressing current and expected conditions. The planning committee will evaluate if any change in hazard profile and risk in the parish occurred during the past year. In addition, the evaluation will include the following criteria in respect of plan implementation:

- 1) Any local staffing changes that would warrant inviting different members to the planning committee
- 2) Any new organizations that would be valuable in the planning process or project implementation need to be included in the planning committee
- 3) Are there any procedures that can be done more efficiently
- 4) Are there more ways to gain more diverse and widespread cooperation
- 5) Are there any different or additional funding sources available for mitigation planning and implementation

The HMP will be updated every five years to remain eligible for continued HMGP funding. The planning committee will be responsible for updating the HMP. The OHSEP Director will be the lead person for the HMP update. The HMP update process will commence at least one year prior to the expiration of the plan. The HMP will be updated after a major disaster if an annual evaluation of the plan indicate a substantial change in hazard profile and risk assessment in the parish.

Additionally, the public will be canvassed to solicit public input to continue East Carroll Parish's dedication to involving the public directly in review and updates of the Hazard Mitigation Plan. Meetings will be scheduled as needed by the plan administrator to provide a forum for which the public can express their concerns, opinions, and/or ideas about the plan. The plan administrator will be responsible for using parish resources to publicize the annual public meetings and maintain public involvement through the newspapers, radio, and public access television channels. Copies of the plan will be catalogued and kept at all appropriate agencies in the city government, as well as at the Public Library.

The review by the steering committee and input from the public will determine whether a plan update is needed prior to the required five-year update.

Annual Reports on the progress of actions, plan maintenance, monitoring, evaluation, incorporation into existing planning programs, and continued public involvement will be documented at each annual meeting of the committee and kept by the Parish OHSEP Director. The Steering Committee will work together as a team, with each member sharing responsibility for completing the monitoring, evaluation and updates. It is the responsibility of the Parish OHSEP Director for contacting committee members, organizing the meeting and providing public noticing for the meeting to solicit public input.

#### 2016 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 2016 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 East 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 East Carroll Parish Hazard Mitigation Plan into each jurisdiction's planning documents, processes, or mechanisms as follows:

- Ordinances, Resolutions, Regulations
- Floodplain Ordinances (Parish and Jurisdictions)
- Emergency Operations Plan
- Continuity of Operations Plan

Opportunities to integrate the requirements of this plan into other local planning mechanisms will continue to be identified through future meetings of the East 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 meet with Department Heads to discuss what should be included in the changes that are necessary before the changes are introduced to the city council or police jury meetings. Steering committee members 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 East 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 jurisdiction 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 jurisdiction of the Unincorporated East Carroll Parish and Town of Lake Providence, East 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 HMP Update as follows through steering committee member and jurisdiction representation throughout the planning process as described above:

**Unincorporated East Carroll Parish**

Capital Improvement Plan/Updated as needed/East Carroll Parish Government  
Local Emergency Operations Plan/Updated as needed/East Carroll Parish OHSEP  
Economic Development Plan/Updated as needed/East Carroll Parish Police Jury  
Continuity of Operations Plan/Updated as needed/East Carroll Parish OHSEP  
Transportation Plan/Updated as needed/East Carroll Parish Police Jury

**Town of Lake Providence**

Local Emergency Operations Plan/Updated as needed/East Carroll Parish OHSEP & Mayor of Lake Providence  
Continuity of Operations Plan/Updated as needed/East Carroll Parish OHSEP & Mayor of Lake Providence  
Evacuation Plan/Updated annually/Mayor of Lake Providence

**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 will include at least one of the following:

- 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

## Appendix C: Essential Facilities

## East Carroll Parish Essential Facilities – All Jurisdictions

East Carroll Parish Unincorporated Essential Facilities										
Type	Name	Drought*	Flooding*	Hail	Lightning	Wind	Tornado	Tropical Cyclone	Wildfire	Winter Storms*
Fire and Rescue	Elwood Fire Station			X	X	X	X	X		
	Hwy 65 Fire Station			X	X	X	X	X		
	Lanes Ferry Fire Station			X	X	X	X	X		
	Monticello Fire Station			X	X	X	X	X		
	Roosevelt Fire Station			X	X	X	X	X		
	Transylvania Fire Station			X	X	X	X	X		
Government	DOTD Maintenance Yard			X	X	X	X	X		
	Department of Social Services			X	X	X	X	X	X	
	Police Jury Road Drainage Department			X	X	X	X	X		
Law Enforcement	Lake Providence Police Department			X	X	X	X	X	X	
Corrections	East Carroll Detention Center			X	X	X	X	X		
	East Carroll Parish Prison Farm									
	Riverbend Detention Center			X	X	X	X	X		
Schools	Delta Mennonite School			X	X	X	X	X		
	Monticello High School - Abandoned									
	Transylvania Elementary School			X	X	X	X	X		

Lake Providence Essential Facilities										
Type	Name	Drought*	Flooding*	Hail	Lightning	Wind	Tornado	Tropical Cyclone	Wildfire	Winter Storms*
Fire and Rescue	Lake Providence Fire Station			X	X	X	X	X	X	
Government	Delta Economic Energy District			X	X	X	X	X	X	
	East Carroll Council on Aging			X	X	X	X	X	X	
	East Carroll Parish Courthouse			X	X	X	X	X		
	East Carroll Parish Police Jury Complex			X	X	X	X	X		
	East Carroll Parish School Board			X	X	X	X	X	X	
	LA Center Against Poverty			X	X	X	X	X	X	
	LA Dept of Public Safety Office of Motor Vehicles			X	X	X	X	X		
	LA Secretary of State			X	X	X	X	X	X	
	LA Workforce Commission			X	X	X	X	X		
	Lake Providence City Complex			X	X	X	X	X	X	
	Lake Providence Sanitation Department			X	X	X	X	X	X	
	Special Education Services			X	X	X	X	X	X	
	US Dept of Ag Service Center			X	X	X	X	X		
Public Health	East Carroll Parish Health Unit			X	X	X	X	X		
	East Carroll Parish Hospital			X	X	X	X	X	X	
	Lake Providence Medical Clinic			X	X	X	X	X	X	
Schools	Briarfield Academy			X	X	X	X	X	X	
	Griffen Middle Academy			X	X	X	X	X	X	
	Lake Providence Sr High School			X	X	X	X	X		
	Northside Elementary School			X	X	X	X	X	X	
	Southside Elementary School			X	X	X	X	X	X	

\*No critical facilities are vulnerable to the hazard.

## Appendix D: Plan Adoption

UNITED STATES OF AMERICA  
STATE OF LOUISIANA  
PARISH OF EAST CARROLL

**RESOLUTION****A RESOLUTION ADOPTING THE  
EAST CARROLL PARISH HAZARD MITIGATION PLAN 2016**

**WHEREAS**, the Parish of East Carroll has prepared a multi-hazard mitigation plan hereby known as the EAST CARROLL PARISH HAZARD MITIGATION PLAN 2016 in accordance with the Disaster Mitigation Act of 2000; and

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

**WHEREAS**, East 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 meeting notices, 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 East Carroll Parish Police Jury does hereby adopt the East Carroll Parish Hazard Mitigation Plan Update 2016.

ADOPTED by a vote of 4 in favor and 0 against, and 0 abstaining, and 1 absent, on this the 13th day of September, 2016.

  
S. Lee Denny, President

ATTEST:

  
Natasha G. Davis, Secretary-Treasurer

# Town of Lake Providence

Robert N. Amacker, Jr.  
Mayor

Lee Ann W. Clement  
Clerk

EXECUTIVE DEPARTMENT  
201 SPARROW STREET

LAKE PROVIDENCE, LOUISIANA 71254

TELEPHONE: 318-559-2288

FAX: 318-559-3442

Aldermen:  
John Frantom  
Nathaniel Madere  
Barbara McDaniel  
Karl Magee  
Donald B. Meadows  
Attorney: Kenneth  
"Andy" Brister, Jr.

## RESOLUTION # 8-2016

### A Resolution adopting the Town of Lake Providence Hazard Mitigation Plan 2016

**WHEREAS**, the Town of Lake Providence has prepared a multi-hazard mitigation plan hereby known as the East Carroll Parish Hazard Mitigation Plan 2016 in accordance with the Disaster Mitigation Act of 2000; and

**WHEREAS**, the Town of Lake Providence 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 Town of Lake Providence is participating in the Hazard Mitigation Plan prepared by the East Carroll Parish Government under the oversight of the Steering Committee comprised of Parish-wide representatives;

**WHEREAS**, East 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 meeting notices, 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 and Flood Mitigation Assistance Program;

**NOW THEREFORE, BE IT RESOLVED** that during the regular council meeting held October 20, 2016, does hereby adopt the East Carroll Parish Hazard Mitigation Plan Update 2016.

This resolution having been submitted to a vote, the votes were as follows:


Yeas: Alderman Magee, Frantom, Meadows, McDaniel

Nays: None

Absent: Alderman Madere

Thus done this 20<sup>th</sup> day of October, 2016.

Attest

  
\_\_\_\_\_  
Lee Ann W. Clement, Clerk  
\_\_\_\_\_  
Robert N. Amacker, Jr., Mayor

## 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.

### Mitigation Planning Team

Name	Title	Agency	Email
WYDETTE WILLIAMS	SHERIFF	EAST CARROL SHERIFF DEPT.	<a href="mailto:wwilliams@ecsheriff.com">wwilliams@ecsheriff.com</a>
RUDY THREATS	CHIEF OF POLICE	EAST CARROLL POLICE DEPT.	<a href="mailto:lpcpolice@bellsouth.net">lpcpolice@bellsouth.net</a>
MELINDA STUTTS	ADMIN-HOSPITAL	EAST CARROL PARISH HOSPITAL	<a href="mailto:mstutts@ecphosp.com">mstutts@ecphosp.com</a>
BOBBY AMACKER	MAYOR	TOWN OF LAKE PROVIDENCE	<a href="mailto:lakeprovidence@bellsouth.net">lakeprovidence@bellsouth.net</a>
KENDRICK HALEY	FIRE CHIEF	TOWN OF LAKE PROVIDENCE FIRE DEPT	<a href="mailto:kendricsr@hotmail.com">kendricsr@hotmail.com</a>
TIM BRASWELL	FIRE CHIEF	PARISH FIRE DEPT	<a href="mailto:braswellt@gmail.com">braswellt@gmail.com</a>
DEBRA HOPKINS	911 DIRECTOR	EAST CARROLL SHERIFF DEPT.	N/A
LEE DENNY	PARISH PRESIDENT	EAST CARROLL POLICE JURY	<a href="mailto:leedenny@bellsouth.net">leedenny@bellsouth.net</a>
FRED THREATS	PARISH MANAGER	EAST CARROLL POLICE JURY	<a href="mailto:levertsrepair@yahoo.com">levertsrepair@yahoo.com</a>
HOSIE LAYTON	PUBLIC WORKS SUPERINTENDANT	TOWN OF LAKE PROVIDENCE	<a href="mailto:townoflakeprovidence@bellsouth.net">townoflakeprovidence@bellsouth.net</a>
JAMES SHAW	ROAD SUPERINTENDANT	EAST CARROLL POLICE JURY	<a href="mailto:ecpj400@att.net">ecpj400@att.net</a>
NATOSHA DAVIS	ASSISTANT DIRECTOR	EAST CARROLL POLICE JURY	<a href="mailto:ecpj400@att.net">ecpj400@att.net</a>
LEEKEITHA REED	OEP DIRECTOR	EAST CARROLL POLICE JURY	<a href="mailto:ecpjoep@bayou.com">ecpjoep@bayou.com</a>
WYLY GILFOIL	PORT DIRECTOR	LAKE PROVIDENCE PORT COMMISSION	<a href="mailto:wyly_gilfoil@msn.com">wyly_gilfoil@msn.com</a>
FRANCIS LENSING	PRESIDENT OF THE LAKE COMMISSION	EAST CARROLL POLICE JURY	<a href="mailto:francisllch@bayou.com">francisllch@bayou.com</a>
PEGGY ROBINSON	OHSEP DIRECTOR	WEST CARROLL PARISH	<a href="mailto:wcpoep@bellsouth.net">wcpoep@bellsouth.net</a>

## Capability Assessment

East Carroll Unincorporated

Worksheet 4.1: Capability Assessment Worksheet		
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.		
<b>East Carroll - Unincorporated</b>		
Plans	Yes/No	Comments
Comprehensive / Master Plan	NO	
Capital Improvements Plan	YES	
Economic Development Plan	YES	
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 zone management)	NO	
Building Code, Permitting and Inspections		
Building Code	YES	
Building Code Effectiveness Grading Schedule (BCEGS) Score	NO	
Fire Department ISO/PIAL rating	YES	PARISH AND TOWN EACH HAS OWN PLAN
Site plan review requirements	YES	
Land Use Planning and Ordinances		
Zoning Ordinance	NO	
Subdivision Ordinance	NO	
Floodplain Ordinance	YES	



Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	NO	
Flood Insurance Rate Maps	YES	
Acquisition of land for open space and public recreation uses	YES	
Other		
<b>Administration and Technical</b>		
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.		
<b>Administration</b>	<b>Yes/No</b>	<b>Comments</b>
Planning Commission	NO	
Mitigation Planning Committee	YES	Pemac Committee
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	NO	
<b>Staff</b>		
Chief Building Official	NO	Have an approved official in Monroe
Floodplain Administrator	YES	
Emergency Manager	YES	
Community Planner	NO	
Civil Engineer	NO	Hired for specific
GIS Coordinator	YES	
Grant Writer	NO	
Other	N/A	
<b>Technical</b>		
Warning Systems / Service (Reverse 911, outdoor warning signals)	YES	Code Red
Hazard Data & Information	YES	Inside of Plans
Grant Writing	NO	
Hazus Analysis	NO	

Other		
<b>Financial</b>		
Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.		
<b>Funding Resource</b>	<b>Yes/No</b>	<b>Comments</b>
Capital Improvements project funding	YES	
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	
Other Funding Programs	YES	SHSP and EMPG-HOMELAND SECURITY GRANT
<b>Education and Outreach</b>		
Identify education and outreach programs and methods, already in place that could be used to implement mitigation activities and communicate hazard-related information.		
<b>Program / Organization</b>	<b>Yes/No</b>	<b>Comments</b>
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	NO	
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	YES	
Natural Disaster or safety related school program	NO	
Storm Ready certification	NO	
Firewise Communities certification	NO	
Public/Private partnership initiatives addressing disaster-related issues	NO	

## Town of Lake Providence

Worksheet 4.1: Capability Assessment Worksheet		
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.		
<b>Town of Lake Providence</b>		
Plans	Yes/No	Comments
Comprehensive / Master Plan	NO	
Capital Improvements Plan	NO	
Economic Development Plan	NO	
Local Emergency Operations Plan	YES-Parish Plan	
Continuity of Operations Plan	YES-Parish Plan	
Transportation Plan	NO	
Stormwater Management Plan	NO	
Community Wildfire Protection Plan	NO	
Other plans (redevelopment, recovery, coastal zone management)	YES	Evacuation Plan
Building Code, Permitting and Inspections		
Building Code	YES	
Building Code Effectiveness Grading Schedule (BCEGS) Score	NO	
Fire Department ISO/PIAL rating	YES	
Site plan review requirements	YES	
Land Use Planning and Ordinances		
Zoning Ordinance	YES	
Subdivision Ordinance	NO	
Floodplain Ordinance	YES	
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	NO	

Flood Insurance Rate Maps	YES	
Acquisition of land for open space and public recreation uses	NO	
Other		
<b>Administration and Technical</b>		
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.		
<b>Administration</b>	<b>Yes/No</b>	<b>Comments</b>
Planning Commission	YES	
Mitigation Planning Committee	YES	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	YES	
<b>Staff</b>		
Chief Building Official	YES - Parish Official	
Floodplain Administrator	YES - Parish Official	
Emergency Manager	YES - Parish Official	
Community Planner	NO	
Civil Engineer	NO	
GIS Coordinator	NO	
Grant Writer	NO	
Other		
<b>Technical</b>		
Warning Systems / Service (Reverse 911, outdoor warning signals)	YES	
Hazard Data & Information	YES	
Grant Writing	NO	

Hazus Analysis	NO	
Other		
<b>Financial</b>		
Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.		
<b>Funding Resource</b>	<b>Yes/No</b>	<b>Comments</b>
Capital Improvements project funding	YES	
Authority to levy taxes for specific purposes	YES	
Fees for water, sewer, gas, or electric services	YES	
Impact fees for new development	NO	
Stormwater Utility Fee	NO	
Community Development Block Grant (CDBG)	YES	
Other Funding Programs	YES	
<b>Education and Outreach</b>		
Identify education and outreach programs and methods, already in place that could be used to implement mitigation activities and communicate hazard-related information.		
<b>Program / Organization</b>	<b>Yes/No</b>	<b>Comments</b>
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	NO	
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	YES	
Natural Disaster or safety related school program	YES	
Storm Ready certification	NO	
Firewise Communities certification	NO	
Public/Private partnership initiatives addressing disaster-related issues	NO	

## National Flood Insurance Program - NFIP

**ELEMENT F: STATE REQUIREMENT****National Flood Insurance Program (NFIP)**

<b>East Carroll Parish</b>		
	<b>East Carroll</b>	<b>Lake Providence</b>
<b>Insurance Summary</b>		
How many NFIP policies are in the community? What is the total premium and coverage?	163 policies Total premium is 96,703 and the coverage is 37,587,900	Premium 55,489 Coverage 22,169,300
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?	125 Claims and Paid claims is 1,547,407 Not sure how many were substantial damage	20 Claims 191,844
How many structures are exposed to flood risk with in the community?	None	Mostly residential
Describe any areas of flood risk with limited NFIP policy coverage.	n/a	None
<b>Staff Resources</b>		
Is the Community FPA or NFIP Coordinator certified?	No	NO
Is flood plain management an auxiliary function?	Yes	YES
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Issue Permits	Issues Permit

What are the barriers to running an effective NFIP program in the community, if any?	N/a	None
<b>Compliance History</b>		
Is the community in good standing with the NFIP?	Yes	YES
Are there any outstanding compliance issues(i.e., current violations)?	Not to my knowledge	NO
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?	Not sure	Unknown
Is a CAV or CAC scheduled or needed? If so when?	No	NO
<b>Regulation</b>		
When did the community enter the NFIP?	May 11, 1973-No maps Joined the regular NFIP ON Nov. 15, 1985	6/7/1905
Are the FIRMs digital or paper?	Paper	Paper
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	No	NO
<b>Community Rating System (CRS)</b>		
Does the community participate in CRS?	No	NO
What is the community's CRS Class Ranking?	No	No
Does the plan include CRS planning requirements?	No	No



## Vulnerable Populations

# Vulnerable Populations Worksheet

## East Carroll Parish

Name	Street	City	Zip Code	Latitude	Longitude
<b>All Hospitals (Private or Public)</b>					
East Carroll Parish Hospital	336 North Hood Street	Lake Providence	71254	32.81054171	-91.1723643
<b>Nursing Homes (Private or Public)</b>					
Shady Lake Nursing Home	5976 HWY 65 N	Lake Providence	71254	32.8430644	-91.2241621
Seasoned Citizen's Senior Center	Nearby: 214 Brown Street	Lake Providence	71254	32.80421042	-91.17532967
<b>Mobile Home Parks</b>					
Unknown Trailer Park	Nearby: 301 Church Street	Lake Providence	71254	32.80623471	-91.16824073

## Building Inventory

## East Carroll Parish – Unincorporated Areas

Critical Facility (If Yes, Mark X)	Name of Building	Purpose of Building	Address	City	Latitude	Longitude	Assessed Value	Date Built	Construction Type
Unincorporated									
X	Monticello Fire Station	Fire Search and Rescue	Nearby: Louisiana 580	Epps	32.61075358	-91.39243002	\$100,000.00	1989	Metal
X	Roosevelt Fire Station	Fire Search and Rescue	Nearby: Par Road 1132	Sondheimer	32.57652462	-91.18470978	\$100,000.00	1988	Metal
X	East Carroll Police Jury Road Drainage Department	Civil Government	Nearby: Louisiana 581	Transylvania	32.71222064	-91.26635324	\$150,000.00		Metal
	East Carroll Parish Prison Farm	Prisons and Correctional Facilities	Nearby: Louisiana 581	Transylvania	32.71372021	-91.26849344	\$177,000.00	19	Metal
	Monticello High School - Abandoned	Education	Nearby: Louisiana 577	Epps	32.60060475	-91.39598806	\$30,000.00		Concrete
	Delta Mennonite School	Education	162 Baerg Ln	Transylvania	32.70540846	-91.18265582	\$20,000.00	1996	Concrete
X	Highland Fire Station	Fire Search and Rescue	HWY 65 N	Lake Providence			\$100,000.00	1989	Metal
X	Lanes Ferry Fire Station	Fire Search and Rescue	HWY 2	Lake Providence			\$60,000.00	1989	Metal
X	Elmwood Fire Station	Fire Search and Rescue	Lanes Ferry	Lake Providence			\$60,000.00	1989	Metal
X	Bowie Fire Station	Fire Search and Rescue	HWY 134	Lake Providence			\$60,000.00	1989	Metal
	Transylvania Elementary School	Fire Search and Rescue	HWY 581	Transylvania	32.67924752	-91.18301488	\$60,000.00	1989	Metal

## East Carroll Parish – Lake Providence

Critical Facility (If Yes, Mark X)	Name of Building	Purpose of Building	Address	City	Latitude	Longitude	Assessed Value	Date Built	Construction Type
Lake Providence									
X	Lake Providence Fire Station	Fire Search and Rescue	311 Sparrow Street	Lake Providence	32.80164557	-91.17137174			
X	Hwy 65 Fire Station	Fire Search and Rescue	Nearby: U.S. 65	Lake Providence	32.87177143	-91.22560561			
X	Transylvania Fire Station	Fire Search and Rescue	311 Sparrow Street	Lake Providence	32.67824296	-91.18324321			
X	Elmwood Fire Station	Fire Search and Rescue	Nearby: Lanes Ferry Road	Lake Providence	32.74754256	-91.33931053			
X	Lanes Ferry Fire Station	Fire Search and Rescue	Nearby: Louisiana 2	Lake Providence	32.85962897	-91.3375953			
	DOTD Maintenance Yard	Civil Government	Nearby: U.S. 65	Lake Providence	32.78661009	-91.17840724			
	Lake Providence City Complex	Civil Government	163 Ripley Street	Lake Providence	32.80309729	-91.17071544			
	LA Center Against Poverty	Civil Government	116 Sparrow Street	Lake Providence	32.80330959	-91.16997056			
	Delta Economic Energy District	Civil Government	Nearby: 308 1st Street	Lake Providence	32.80332882	-91.17004704			
	LA Workforce Commission	Civil Government	Nearby: 2nd Street	Lake Providence	32.80339744	-91.17364297			
	LA Dept Of Public Safety Office of Motor Vehicle	Civil Government	Nearby: 106 Hood Street	Lake Providence	32.80349967	-91.1732804			
X	East Carroll Parish Courthouse	Civil Government	400 1st Street #6	Lake Providence	32.80377722	-91.17338154			
X	East Carroll Parish Police Jury Complex	Civil Government	Nearby: 400-498 1st Street	Lake Providence	32.80375692	-91.17328359			
	East Carroll Council on Aging	Civil Government	600 1st Street	Lake Providence	32.80420743	-91.17533157			
	East Carroll Parish School Board	Civil Government	East Carroll Parish School Board	Lake Providence	32.80221193	-91.17539525			
	East Carroll Department of Social Services	Civil Government	209 North Hood Street	Lake Providence	32.81126748	-91.18781618			
X	Lake Providence Sanitation Department	Civil Government	Nearby: 213-251 Church Street	Lake Providence	32.80495946	-91.16864565			
	Special Education Services	Civil Government	603 4th Street	Lake Providence	32.80213396	-91.17618696			
	LA Secretary of State	Civil Government	Nearby: Regenold Street	Lake Providence	32.82466727	-91.1777936			
	U S Department of Agriculture Service Center	Civil Government	502 1st Street	Lake Providence	32.80563203	-91.17289821			
X	Lake Providence Police Department	Law Enforcement	Nearby: 308 1st Street	Lake Providence	32.80319297	-91.17079693			
	East Carroll Detention Center	Prisons and Correctional Facilities	Nearby: Hollybrook Road	Lake Providence	32.73558481	-91.18332586			
	Riverbend Detention Center	Prisons and Correctional Facilities	Nearby: U.S. 65	Lake Providence	32.77810019	-91.179297			
	Byerley Airport	Airports and Airfields	Nearby: 617 Schneider Lane	Lake Providence	32.82111852	-91.18597477			
	Lake Providence Sr High School	Education		Lake Providence	32.80043477	-91.17811362			
	LA Delta Community College	Education	Nearby: 1708 4th Street	Lake Providence	32.80382944	-91.19012165			
	Griffen Middle Academy	Education	1205 Gould Street	Lake Providence	32.79610749	-91.18506346			
	Southside Elementary School	Education		Lake Providence	32.79506061	-91.18501689			
	Northside Elementary School	Education	Nearby: Regenold Street	Lake Providence	32.82058014	-91.18091902			
	Briarfield Academy	Education	301 Par Road 3346	Lake Providence	32.82982405	-91.1863676			
	East Carroll Ambulance Service	Emergency Medical Services	Nearby: 506 Lake Street	Lake Providence	32.80667137	-91.17371972			
X	East Carroll Parish Hospital	Hospital or Medical Center	336 North Hood Street	Lake Providence	32.81054171	-91.1723643			