RICHLAND

PARISH HAZARD MITIGATION UPDATE – 2016

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RICHLAND PARISH

HAZARD MITIGATION PLAN UPDATE

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Richland Parish

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ACKNOWLEDGMENTS

This 2016 Richland Parish Hazard Mitigation Plan Update was coordinated by the Richland 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 Richland Parish
Town of Rayville
Town of Delhi
Town of Mangham

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

Name	Title	Agency
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The 2016 Richland Parish Hazard Mitigation Plan Update was written by the Stephenson Disaster Management Institute, Louisiana State University. Further comments should be directed to the Richland Parish Office of Homeland Security and Emergency Preparedness: 708 N. Julia Street, Rayville, LA, 71269.

Contents

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

- Unincorporated Richland Parish
- Town of Rayville
- Town of Delhi
- Town of Mangham

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 Richland 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

Richland Parish is located in northeast Louisiana in the area known as the North Louisiana Delta County. It lies in the center of a circle of seven parishes with similar geographic characteristics. Starting with Morehouse to the north, and proceeding clockwise, the parishes are West Carroll, East Carroll, Madison, Franklin, and Caldwell, ending with Ouachita Parish to the west. While Richland Parish offers all of the business amenities and services that appeal to commercial establishments, it also affords its residents a high quality of life with good schools, low crime rates and abundant recreational opportunities.

Figure 1-1: Location of Richland Parish within the State of Louisiana

The topography of the Richland Parish is slightly rolling with drainage diverging into many small streams, which feed into the four major streams in the parish: Bayous Macon, Lafourche, Big Creek and the Boeuf River. Richland Parish's land is located above the Mississippi River Aquifer, which enhances agricultural production. The western half of the parish is part of the Ouachita and Boeuf Rivers floodplain, which varies from 60 to 75 feet above mean sea level. The eastern half of the parish lies on the Macon Ridge, which rises about 30 feet above the plain.

The reddish soils of the flood plain are mainly deposits of alluvium that the Arkansas River carried down through the Boeuf River, and are very fine sandy loams. Waxy clay soils predominate along Bayou Lafourche. The terrace soils of the Macon Ridge in the eastern half of the parish are mainly silt loams, yellowish to buff in color.

A portion of the Russell Sage Wildlife Management Area is located in Richland Parish, approximately 10 miles west of Rayville. Access is provided by U.S. Highway 80 and Interstate 20, which bisect the area. Interior all-weather roads are maintained, as well. Located within the Bayou Lafourche floodplain, this wildlife management area is flat and poorly drained. Elevations range from 58 feet to 63 feet above mean sea level. Numerous sloughs and shallow bayous meander throughout, and backwater flooding occurs annually.

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

As noted above, Richland Parish is located in the northeastern region of Louisiana.

Figure 1-2: Louisiana Homeland Security Regions

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

	2010 Census	2014 Census	Current Year (If Available)	Percent Change 2010 - 2014
Total Population	20,725	20,740	____	0.10%
Population Density (Pop/Sq Mi)	37.1	____	____	____
Total Households	8,621	8,833	____	____

Economy

The economic base of Richland Parish consists of companies in the garment manufacturing, cotton processing, livestock, and lumber production industries. Its hard-working labor force, excellent transportation network, abundant raw materials, and land for commercial and industrial development make Richland Parish an ideal prospect for business investment. It is also home to the Franklin Farms Mega Site that consists of 1,440 acres and is located on I-20. There are roughly 4,000 additional acres located all around the primary site, all with one owner, perfect for supplier locations. Industry data for business patterns in Richland Parish can be found in the table below:

Table 1-2: Business Patterns in Richland 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	778	66	19,459
Manufacturing	1000-2499	11	___
Health Care and Social Assistance	1,793	76	45,148
Mining, Quarrying, Oil and Gas Extraction	20-99	3	___
Transportation and Warehousing	123	20	5,703
Construction	305	31	8,830
Administration and Support and Waste Management and Remediation Services	126	13	2,373
Real Estate and Rental and Leasing	20-99	19	2,197
Wholesale Trade	322	22	17,199
Other Services (except Public Administration)	155	35	2,619
Accommodation and Food Services	343	26	4,125
Financial and Insurance	188	32	7,814
Professional, Scientific, and Technical Services	93	29	3,080
Information	29	5	808
Educational Services	100-249	3	___
Arts, Entertainment, and Recreation	20-99	6	314
Management of Companies and Enterprises	111	3	2,280
Agriculture, Forestry, Fishing and Hunting	22	7	880
Utilities	20-99	6	1,642

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 Richland 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 Richland 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.

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

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 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 Richland 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 Richland 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
- Section Six References
- 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 Richland 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 Richland Parish Hazard Mitigation Plan. The current goals are as follows:

- Identify and pursue preventative measures that will reduce future damages from hazards
- Enhance public awareness and understanding of disaster preparedness
- Reduce repetitive flood losses in the parish and towns
- Facilitate sound development in the parish and towns to reduce or eliminate hazard damages
- Improve data collection, use, and sharing

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
Section 6: References	N/A
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 Richland Parish and its municipalities. The extent of this risk is dictated primarily by its geographic location. Most significantly, Richland 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 Richland 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 Richland 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			
Expansive Soils			
Fog			
Flooding	X	X	X
Extreme Heat			
Sinkholes			
Thunderstorms (Hail, Lightning, & Wind)	X	X	X
Tornadoes	X	X	X
Tropical Cyclones	X	X	X
Tsunamis			
Wildfires			
Winter Storms	X		X
Dam Failure	X		+
Levee Failure	X		+

+ Data deficiency

Prevalent Hazards to the Community

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

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

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

The potential destructive power of tropical cyclones and flooding were determined to be the most prevalent hazards to the parish. Twelve of the fifteen Presidential Declarations that Richland Parish has received resulted from either tropical cyclones (5 declarations) or flooding (7 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 asses 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 Richland Parish is included in the hurricane risk assessment.

Richland Parish is also susceptible to tornadoes. Tornadoes can spawn from tropical cyclones or severe weather systems that pass through Richland 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 Richland Parish since 1965. Information includes names, dates, and types of disaster.

Table 2-2: Richland Parish Major Disaster Declarations

Disaster Declaration Number	Date	Type of Disaster
208	9/10/1965	Tropical Cyclone – Hurricane Betsy
374	4/27/1973	Severe Storms and Flooding
3031	2/22/1977	Drought and Freezing
565	9/20/1978	Severe Storms and Flooding
675	1/11/1983	Severe Storms and Flooding
829	5/20/1989	Severe Storms and Flooding
904	5/3/1991	Severe Storms, Tornadoes, and Flooding
1264	1/21/1999	Severe Ice Storm
1314	2/15/2000	Severe Winter Storm
1603	8/29/2005	Tropical Cyclone – Hurricane Katrina
1607	9/24/2005	Tropical Cyclone – Hurricane Rita
1668	11/2/2006	Severe Storms and Flooding
1786	9/2/2008	Tropical Cyclone – Hurricane Gustav
3322	5/6/2011	Flooding
4080	8/29/2012	Tropical Cyclone – Hurricane Isaac

Probability of Future Hazard Events

The probability of a hazard event occurring in Franklin 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 access probability followed the method used in the State of Louisiana's most current Hazard Mitigation Plan. The primary source for historical data used throughout the plan is the Spatial Hazards Events and Losses Database (SHELDUS), which provides historical hazard data from 1960 to 2014. In staying consistent with the state plan, the SHELDUS database was evaluated for the last twenty-five years (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			
	Richland Parish (Unincorporated)	Delhi	Mangham	Rayville
Drought	24%	24%	24%	24%
Flooding	44%	44%	44%	56%
Thunderstorms (Hail)	100%	100%	100%	100%
Thunderstorms (Lightning)	< 1%	< 1%	< 1%	< 1%
Thunderstorms (Wind)	100%	100%	100%	100%
Tornadoes	8%	8%	8%	8%
Tropical Cyclones	20%	20%	20%	20%
Winter Storms	36%	36%	36%	36%
Dam Failure	< 1%	< 1%	< 1%	< 1%
Levee Failure	< 1%	< 1%	< 1%	< 1%

As shown in *Table 2-3*, thunderstorm winds and hailstorms for the entire planning area, have the highest annual chance of occurrence in the parish (100%), followed by flood events for the incorporated area of Rayville (56%). Flood events in the remaining incorporated areas have a slightly lower chance of occurring annually. Winter storms have a 36% annual chance of reoccurrence, followed by drought (24%), tropical cyclones (20%), and tornadoes (8%). Lightning has the lowest annual chance of occurrence in Richland Parish at less than 1% annual occurrence. Dam and levee failure hazards claim a data deficiency.

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 $2,842,476,000 in structures throughout the parish. The table on the next page provides the total estimated value for each type of structure by occupancy.

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

Occupancy	Richland Parish	Unincorporated Richland Parish	Delhi	Mangham	Rayville
Agricultural	$42,630,000	$33,944,000	$1,580,000	$746,000	$6,360,000
Commercial	$377,652,000	$177,593,000	$73,981,000	$9,395,000	$116,683,000
Government	$36,501,000	$10,319,000	$4,841,000	$1,418,000	$19,923,000
Industrial	$112,434,000	$68,523,000	$15,195,000	$6,405,000	$22,311,000
Religion	$125,500,000	$75,340,000	$18,038,000	$3,228,000	$28,894,000
Residential	$2,116,303,000	$1,354,907,000	$334,580,000	$61,048,000	$365,768,000
Education	$31,456,000	$8,254,000	$5,202,000	$2,234,000	$15,766,000
Total	$2,842,476,000	$1,728,880,000	$453,417,000	$84,474,000	$575,705,000

Essential Facilities of the Parish

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

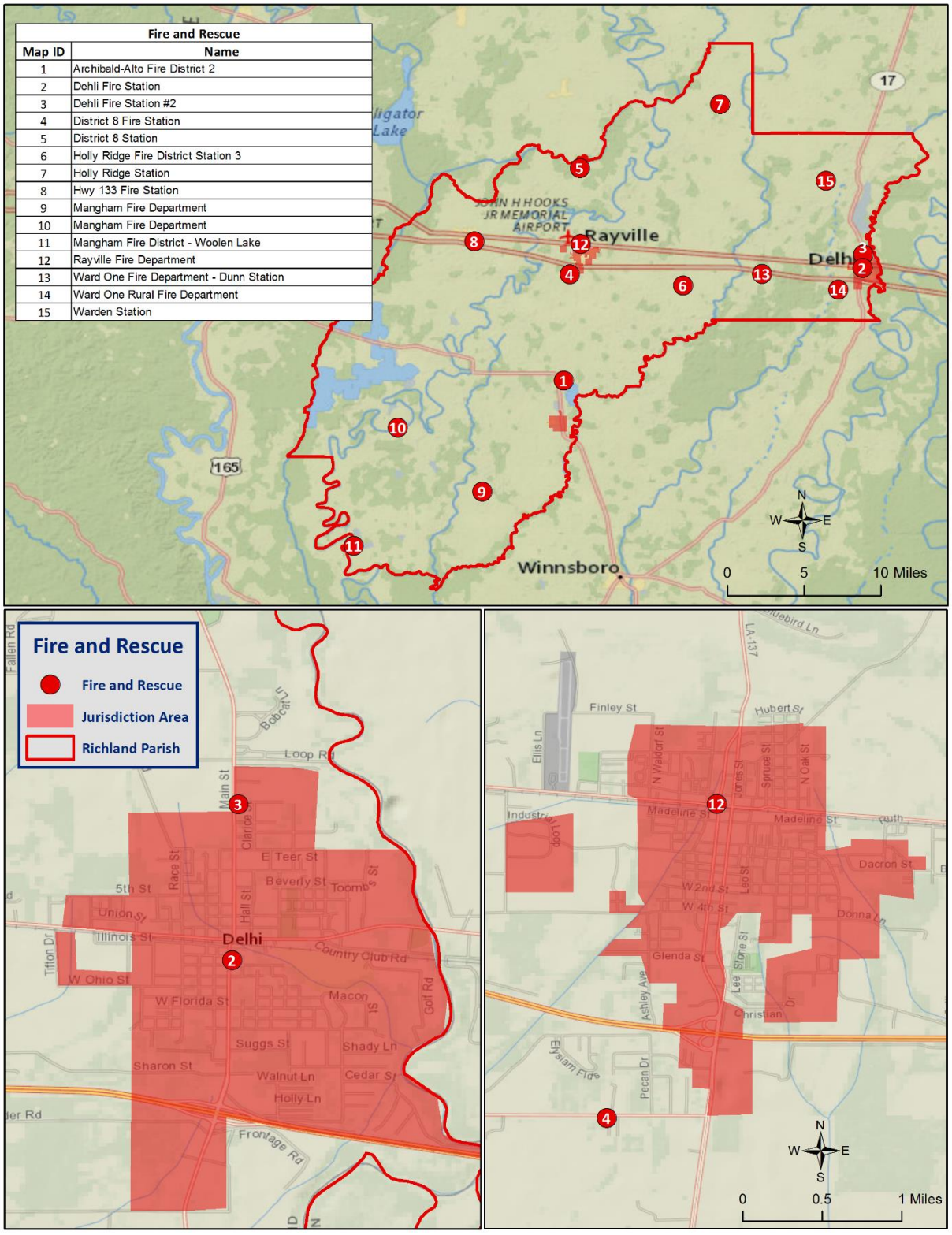

Figure 2-1: Fire and Rescue Buildings in Richland Parish

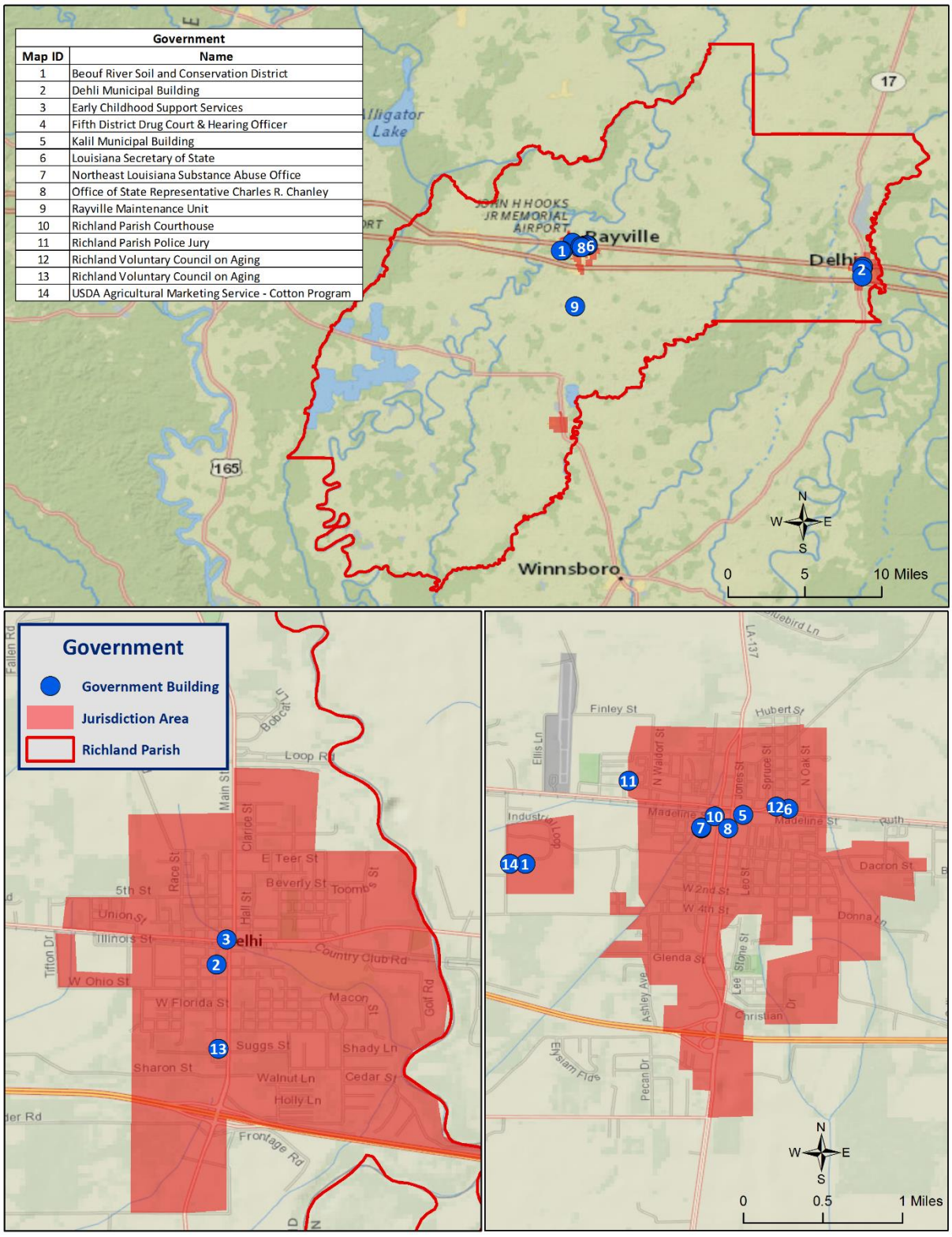

Figure 2-2: Government Buildings in Richland Parish

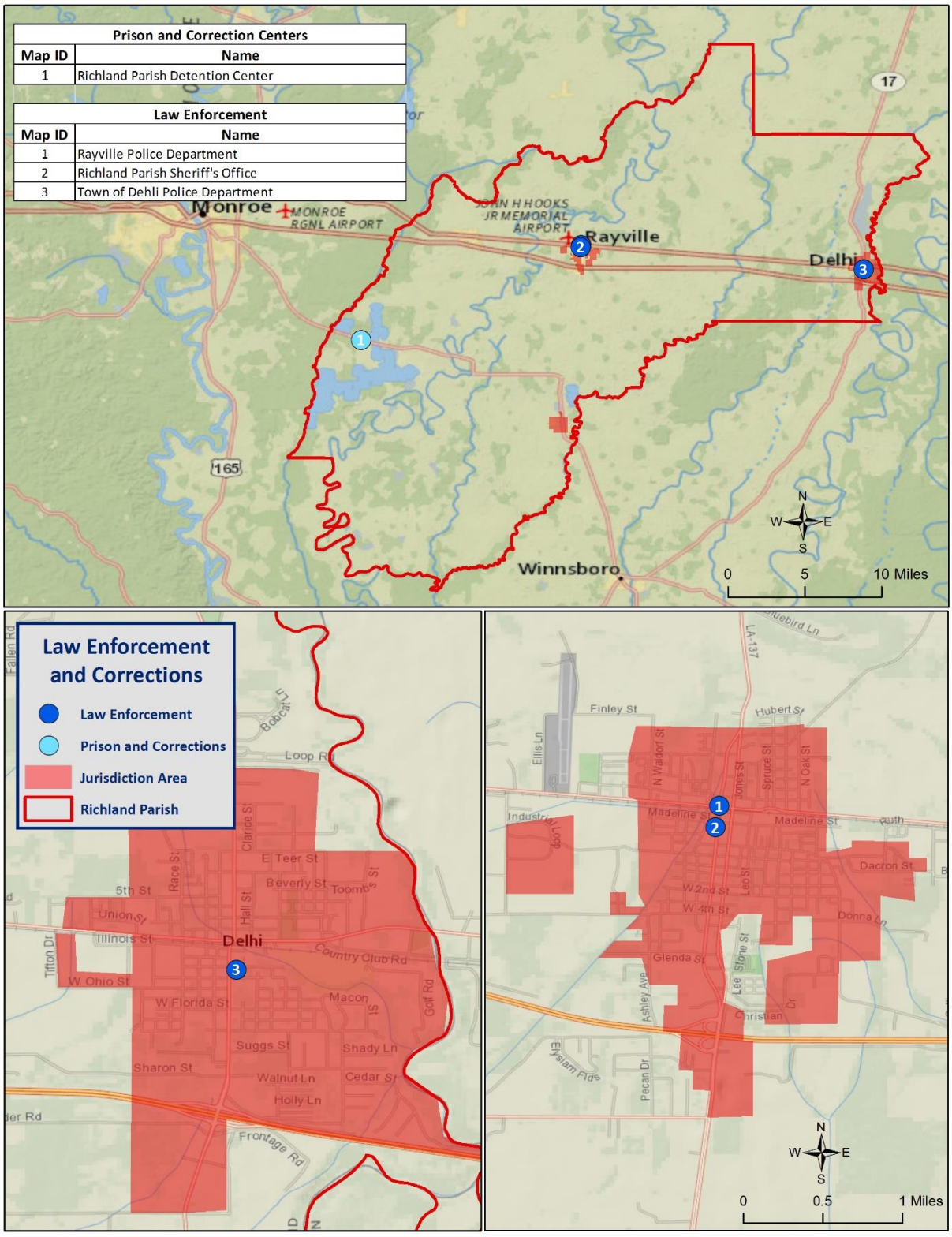

Figure 2-3: Law Enforcement and Correction Buildings in Richland Parish

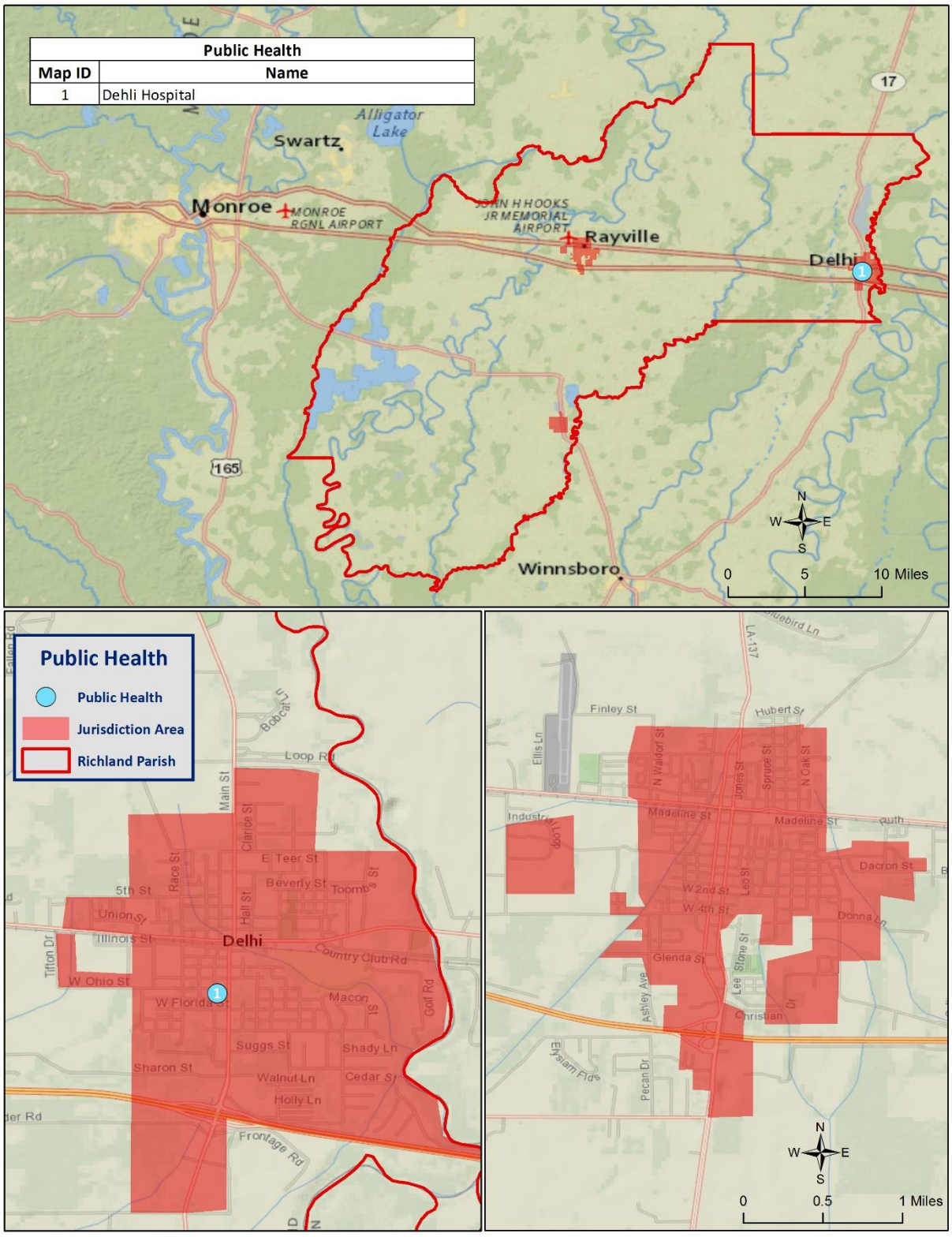

Figure 2-4: Public Health Buildings in Richland Parish

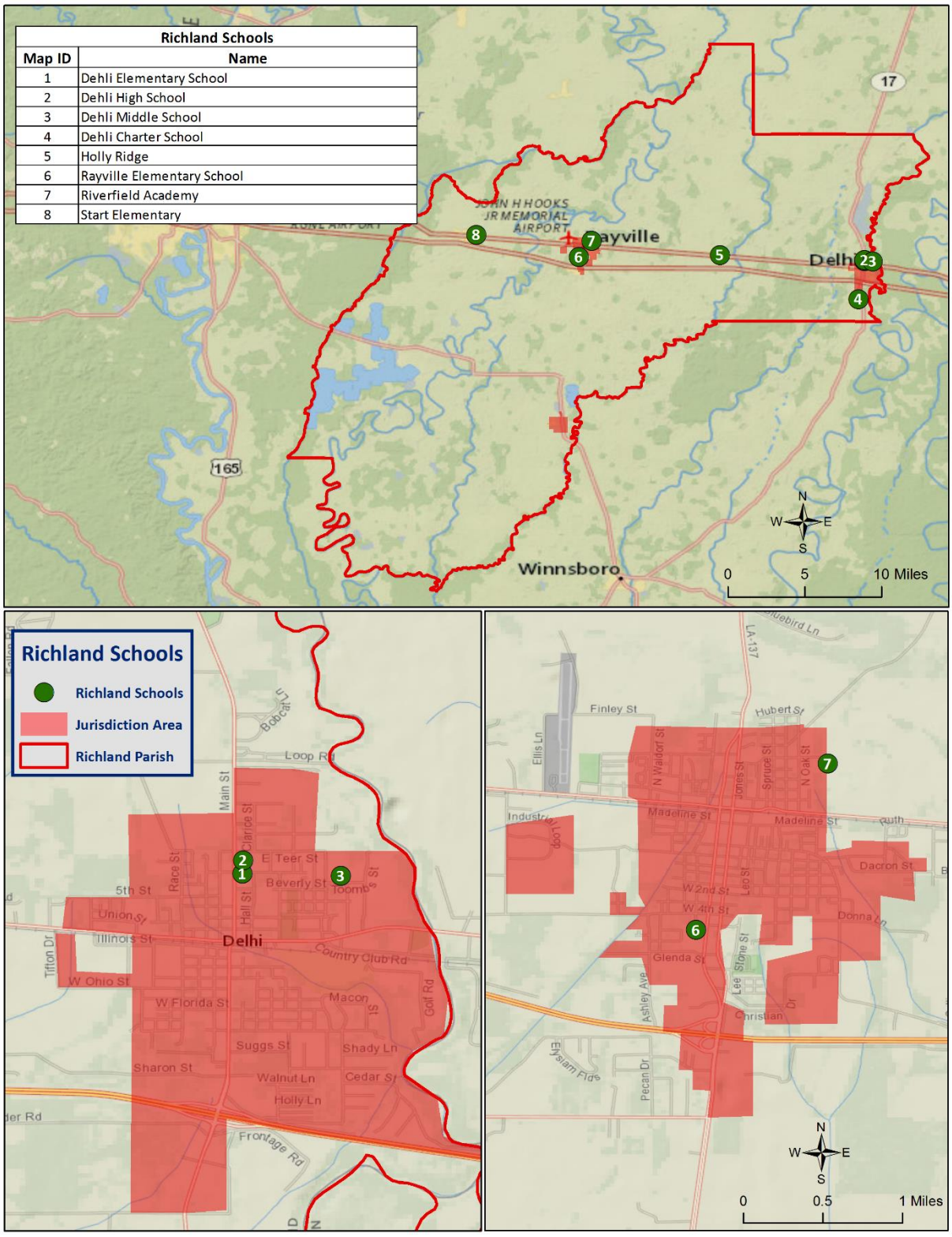

Figure 2-5: School Buildings in Richland Parish

Future Development Trends

Richland Parish experienced a small decline in population and a slight growth in housing between the years of 2000 and 2014, going from a population of 20,935 with 8,335 housing units in 2000 to a population of 20,740 with 8,751 housing units in 2014. This decline was largely in the incorporated areas of Rayville and Delhi from the years 2000 to 2010, and in the incorporated area of Mangham from 2010 to 2014. The incorporated area of experienced a growth in population from the years of 2000 to 2010, and the incorporated area of Delhi and Rayville experienced a growth from 2010 to 2014. 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 Richland Parish

Total Population	Richland Parish	Unincorporated Richland Parish	Delhi	Mangham	Rayville
1-Apr-00	20,935	12,867	3,229	616	4,223
1-Apr-10	20,736	13,446	2,921	672	3,697
1-Jul-14	20,740	13,423	2,941	656	3,720
Population Growth between 2000 – 2010	-1.0%	4.5%	-9.5%	9.1%	-12.5%
Average Annual Growth Rate between 2000 – 2010	-0.1%	0.4%	-1.0%	0.9%	-1.2%
Population Growth between 2010 – 2014	0.0%	-0.2%	0.7%	-2.4%	0.6%
Average Annual Growth Rate between 2010 – 2014	0.00%	-0.04%	0.17%	-0.60%	0.16%

Table 2-6: Housing Growth Rate for Richland Parish

Total Housing Units	Richland Parish	Unincorporated Richland Parish	Delhi	Mangham	Rayville
1-Apr-00	8,335	5,485	1,253	268	1,329
1-Apr-10	8,621	5,568	1,215	283	1,555
1-Jul-14	8,751	5,714	1,263	353	1,421
Housing Growth between 2000 – 2010	3.4%	1.5%	-3.0%	5.6%	17.0%
Average Annual Growth Rate between 2000 – 2010	0.3%	0.2%	-0.3%	0.6%	1.7%
Housing Growth between 2010 – 2014	1.5%	2.6%	4.0%	24.7%	-8.6%
Average Annual Growth Rate between 2010 – 2014	0.4%	0.7%	1.0%	6.2%	-2.2%

As shown in the previous tables, Richland Parish has experienced a decline in population and a growth in housing units. Housing growth rates grew at 0.3% annually from 2000 to 2010, and at 0.4% annually from 2010 to 2014. Population declined at -0.1% annually from 2000 to 2010, and remained almost stagnant from 2010 to 2014. From 2000 to 2010, the incorporated area of Mangham had the largest increase in population with a 9.1% increase overall. The incorporated area of Delhi had the largest increase in population during from 2010 to 2014, increasing its population by 0.7% overall.

The incorporated area pf Rayville experienced the largest increase in housing units from 2000 to 2010 at 17% overall, followed by the incorporated area of Mangham at 5.6% overall. From 2010 to 2014, the incorporated area of Mangham experienced the largest increase in housing units at 24.7% overall, followed by the incorporated area of Delhi at 4% overall. The incorporated area of Rayville experienced a decline in housing units during this time period at an annual rate of -2.2%.

Future Hazard Impacts

Hazard impacts were estimated for five years and ten years in the future (2019 and 2024). Yearly population and housing growth rates were applied to parish inventory assets for composite flood and tropical cyclones. Based on a review of available information, it is assumed that population and housing units will continue to grow slightly within Richland 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)
Flood Damage				
Structures	8,784	3,922	3,996	4,057
Value of Structures	$2,882,294,305	$1,286,845,317	$1,379,538,839	$1,458,478,396
# of People	20,741	9,260	9,262	9,264
Tropical Cyclone				
Structures	8,784	8,784	8,951	9,087
Value of Structures	$2,882,294,305	$2,882,294,305	$3,089,910,563	$3,266,720,497
# of People	20,741	20,741	20,746	20,750

Land Use

The Richland Parish Land Use table is provided on the following page. Residential, commercial, and industrial areas account for only 15% of the parish's land use. Agricultural land is the largest category at 220,462 acres, accounting for 31% of parish land. At 195,187 acres, wetlands account for 28% of parish lands, while 154,215 acres of forested areas account for 22% of parish lands. The parish also consists of 27,292 acres of water areas, accounting for 4% of all parish lands.

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

Land Use	Acres	Percentage
Agricultural Land, Cropland, and Pasture	220,462	31%
Wetlands	195,187	28%
Forest Land (not including forested wetlands)	154,215	22%
Urban/Development	103,115	15%
Water	27,292	4%

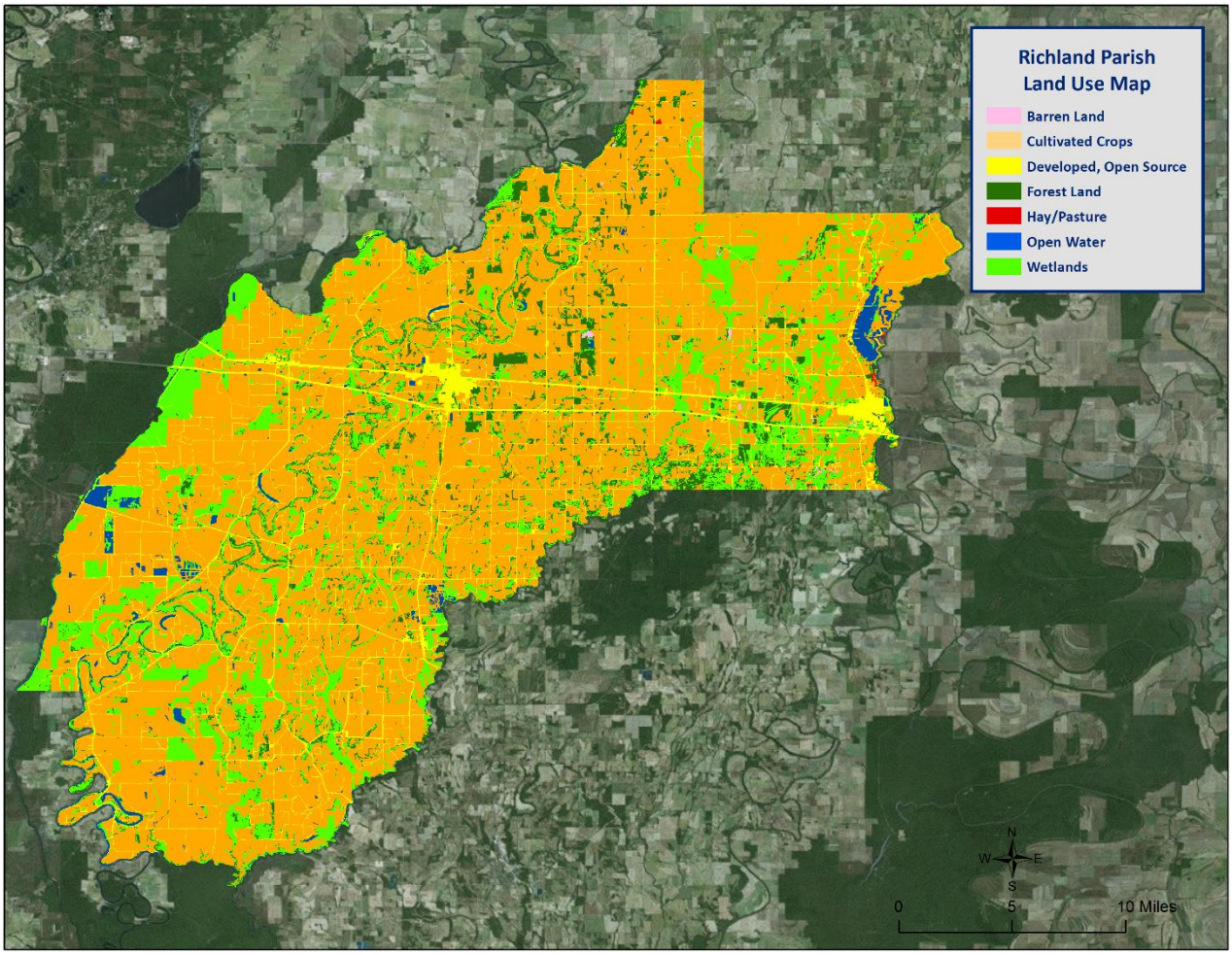

Figure 2-6: Richland Parish Land Use Map
(Source: USGS Land Use Map)

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 Richland Parish at the time this plan went to publication (*Figure 2-7*).

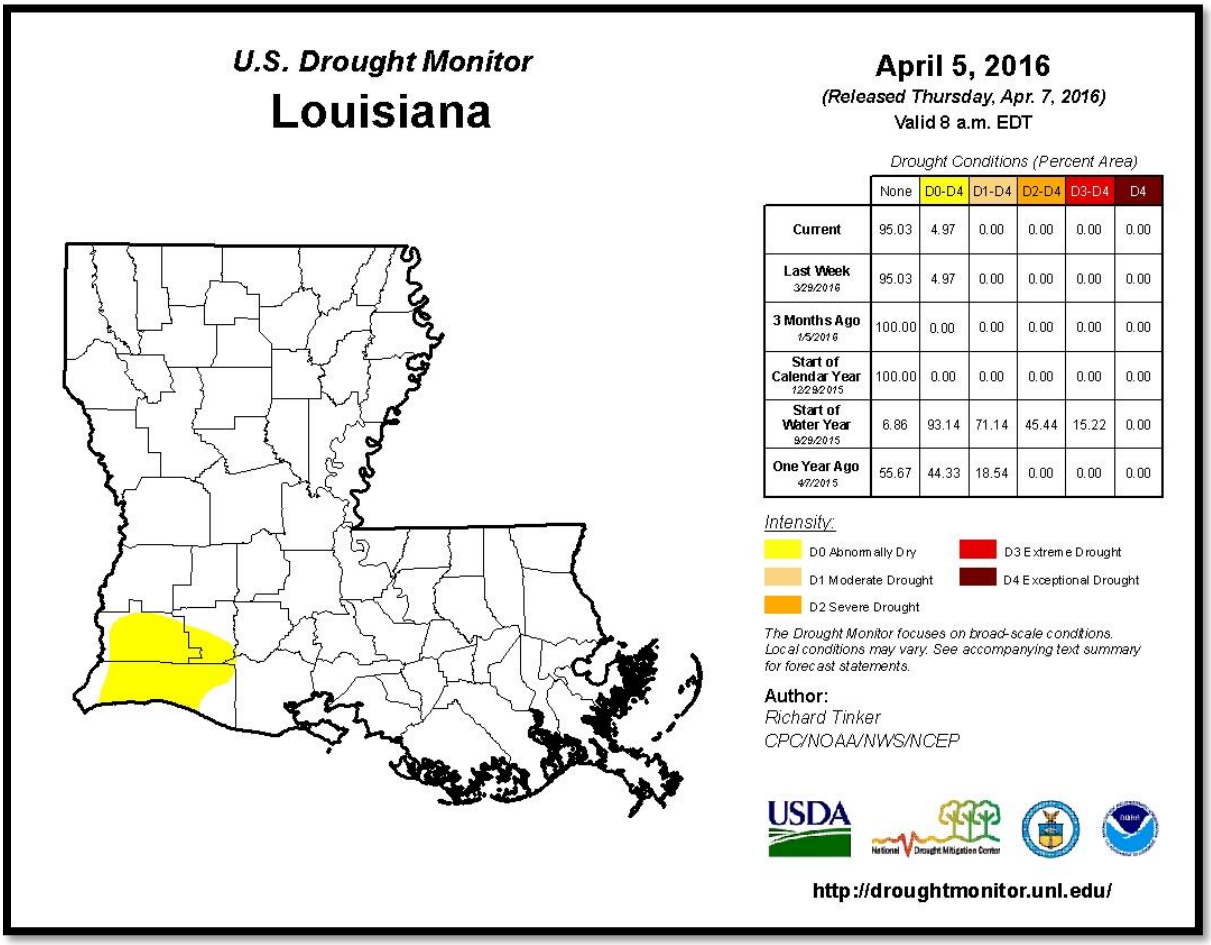

Figure 2-7: United States Drought Monitor for the State of Louisiana and its Parishes (Source: The National Drought Mitigation Center)

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 Richland Parish is on the agricultural community.

Previous Occurrences / Extents

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

Table 2-10: Drought Events with Crop Damage Totals for Richland 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 Richland Parish.

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

Agricultural Exposure by Type for Drought in Richland Parish						
Soybeans	Corn	Hay	Rice	Wheat	Cotton	Total
$54,056,063	$26,819,811	$11,968,000	$6,789,607	$6,536,207	$4,068,386	$110,238,074

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

Flooding

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

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

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

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

In cooler months, particularly in the spring, Louisiana is in peak season for severe thunderstorms. The fronts that cause these thunderstorms often stall while passing over the state, occasionally producing rainfall totals exceeding 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 (ft^3/s) than for the Amite River. Not only are the magnitudes of 100-year events different between rivers, they can be different along any given river. A 100-year event upstream is different from one downstream due to the variation of river characteristics (volume, discharge, and topography). As a result, the definition of what constitutes a 100-year flood event is specific to each location, river, and time, since floodplain and river characteristics temporally fluctuate. Finally, it is important to note that each flood event is unique. Two hypothetical events at the same location, given the same magnitude of stream flow, may still produce substantially different impacts if there were different antecedent moisture characteristics, different times of day of occurrence (which indicates the population's probable activities at the flood's onset), or other characteristic differences.

The 100-year flood event is of particular significance since it is the regulatory standard that determines the obligation (or lack thereof) to purchase flood insurance. Flood insurance premiums are set depending on the flood zone, as modeled by National Flood Insurance Program (NFIP) Rate Maps. The NFIP and FEMA suggest insurance rates based on Special Flood Hazard Areas (SFHAs), as diagrammed in *Figure 2-8*.

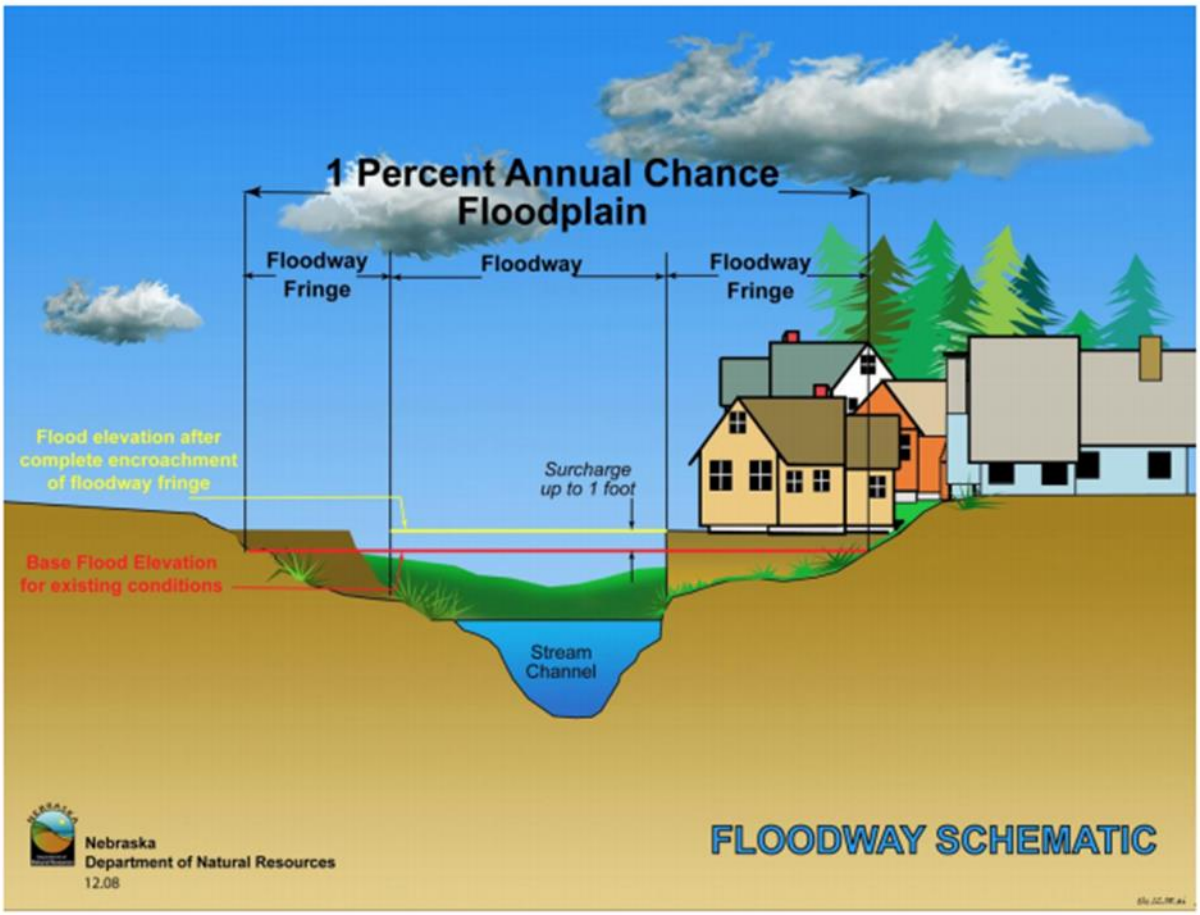

Figure 2-8: Schematic of 100-Year Floodplain. The Special Flood Hazard Area (SFHA) extends to the end of the floodway fringe.
(Source: Nebraska Department of Natural Resources)

A SFHA is the land area covered by the floodwaters of the base flood (red line in *Figure 2-8*), 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 Richland Parish are provided in the table below:

Table 2-12: Repetitive Loss Structures for Richland Parish

Jurisdiction	Number of Structures	Residential	Commercial	Government	Total Claims	Total Claims Paid	Average Claim Paid
Richland Parish (Unincorporated)	24	24	0	0	60	$1,705,071	$28,418
Delhi	4	3	1	0	12	$62,285	$5,190
Mangham	0	0	0	0	0	$0	$0
Rayville	20	20	0	0	57	$1,464,937	$25,701
Total	48	47	1	0	129	$3,232,293	$25,057

All 48 repetitive loss structures were able to be geocoded in order to provide an overview of where the repetitive loss structures were located throughout the parish. *Figure 2-9* shows the approximate location of the 48 structures, while *Figure 2-10* 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 area of Rayville.

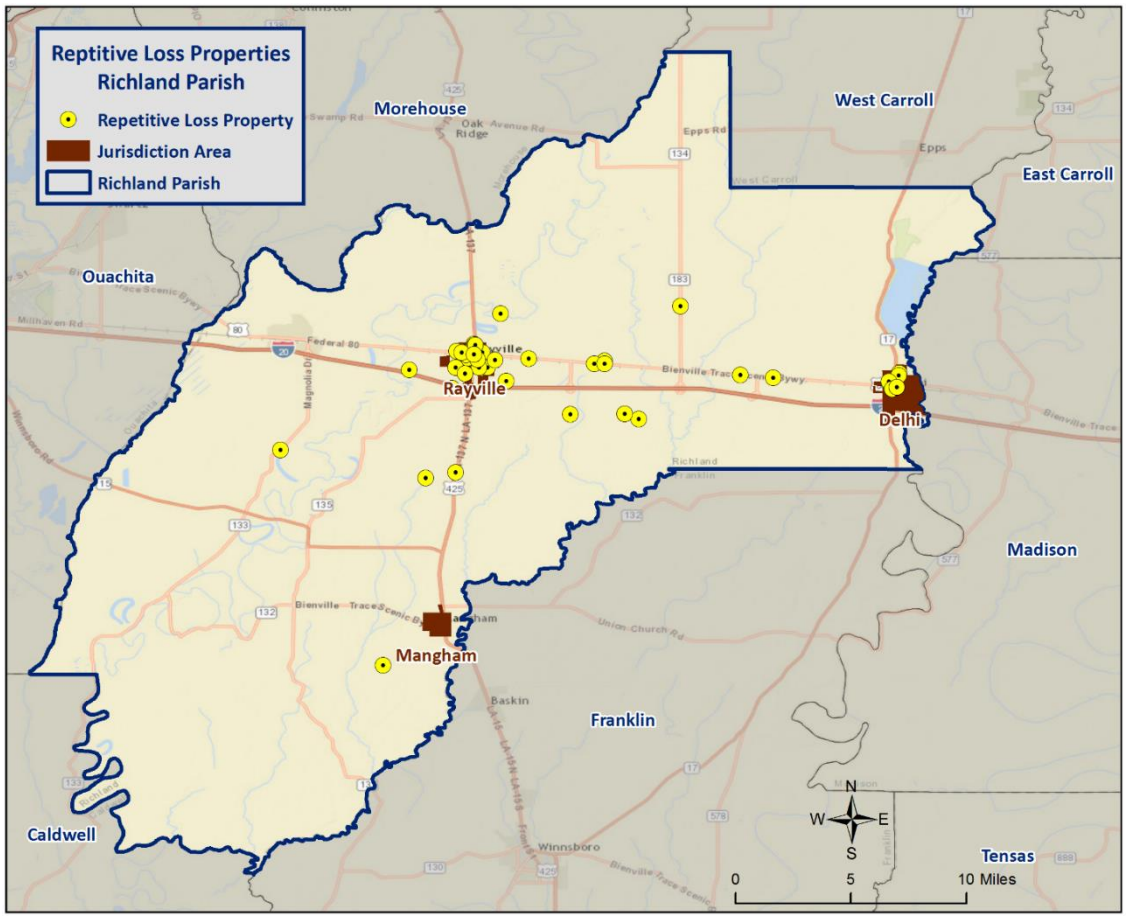

Figure 2-9: Repetitive Loss Properties in Richland Parish

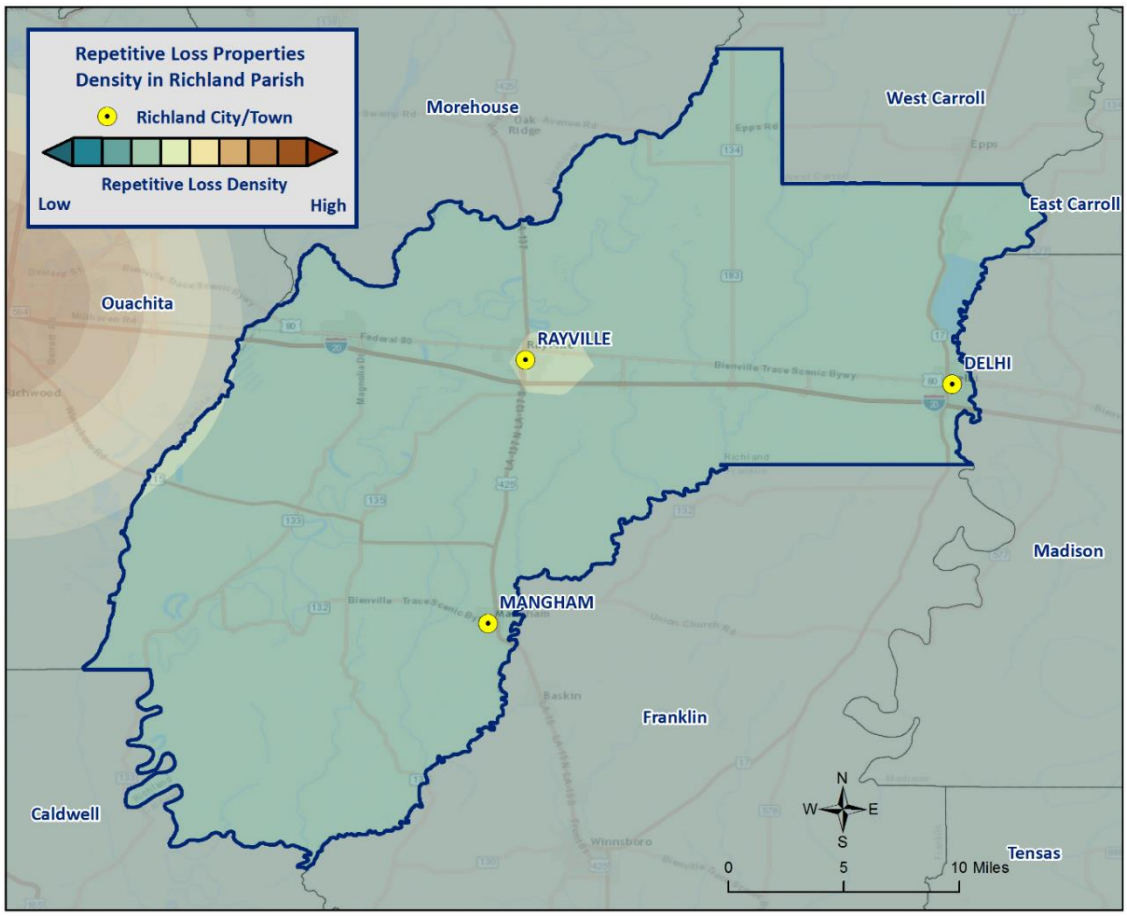

Figure 2-10: Repetitive Loss Property Densities in Richland Parish

National Flood Insurance Program

Flood insurance statistics indicate that Richland Parish has 507 flood insurance policies with the NFIP, with total annual premiums of $280,927. Richland Parish and the incorporated areas of Delhi, Mangham, and Rayville are all participants in the NFIP. Richland 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 Richland Parish are provided in the tables to follow.

Richland Parish and the communities 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 municipalities, as well as flood safe building initiatives throughout the parish. The Parish Floodplain Manager will continue to work in coordination with each community to ensure floodplain management regulations are adopted and enforced. The Parish Floodplain Manager will continue to work with each community and seek and attend floodplain management and NFIP continuing education.

Table 2-13: Summary of NFIP Policies for Richland Parish

Location	No. of Insured Structures	Total Insurance Coverage Value	Annual Premiums Paid	No. of Insurance Claims Filed Since 1978	Total Loss Payments
Richland Parish (Unincorporated)	358	$69,494,400	$189,769	149	$2,790,315
Delhi	20	$3,990,100	$10,480	29	$189,021
Mangham	6	$1,183,000	$1,823	1	$72,493
Rayville	123	$18,485,000	$78,855	103	$1,975,992
Total	507	$93,152,500	$280,927	282	$5,027,821

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

CID	Community Name	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Date Joined the NFIP	Tribal
220155#	Delhi	3/29/1974	1/8/1980	9/18/2013	1/8/1980	No
220156#	Mangham	12.7/1973	10/9/1979	9/18/2013	10/9/1979	No
220157#	Rayville	5/10/1974	9/3/1980	9/18/2013	9/3/1980	No
220154#	Richland Parish*	6/28/1977	8/1/1987	9/18/2013	8/1/1987	No

According to the Community Rating System (CRS) list of eligible communities dated June 1, 2014, Richland Parish and its incorporated areas 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 Richland 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 Richland 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 Boeuf River crests at flood stage levels, causing extensive flooding in low-lying areas.

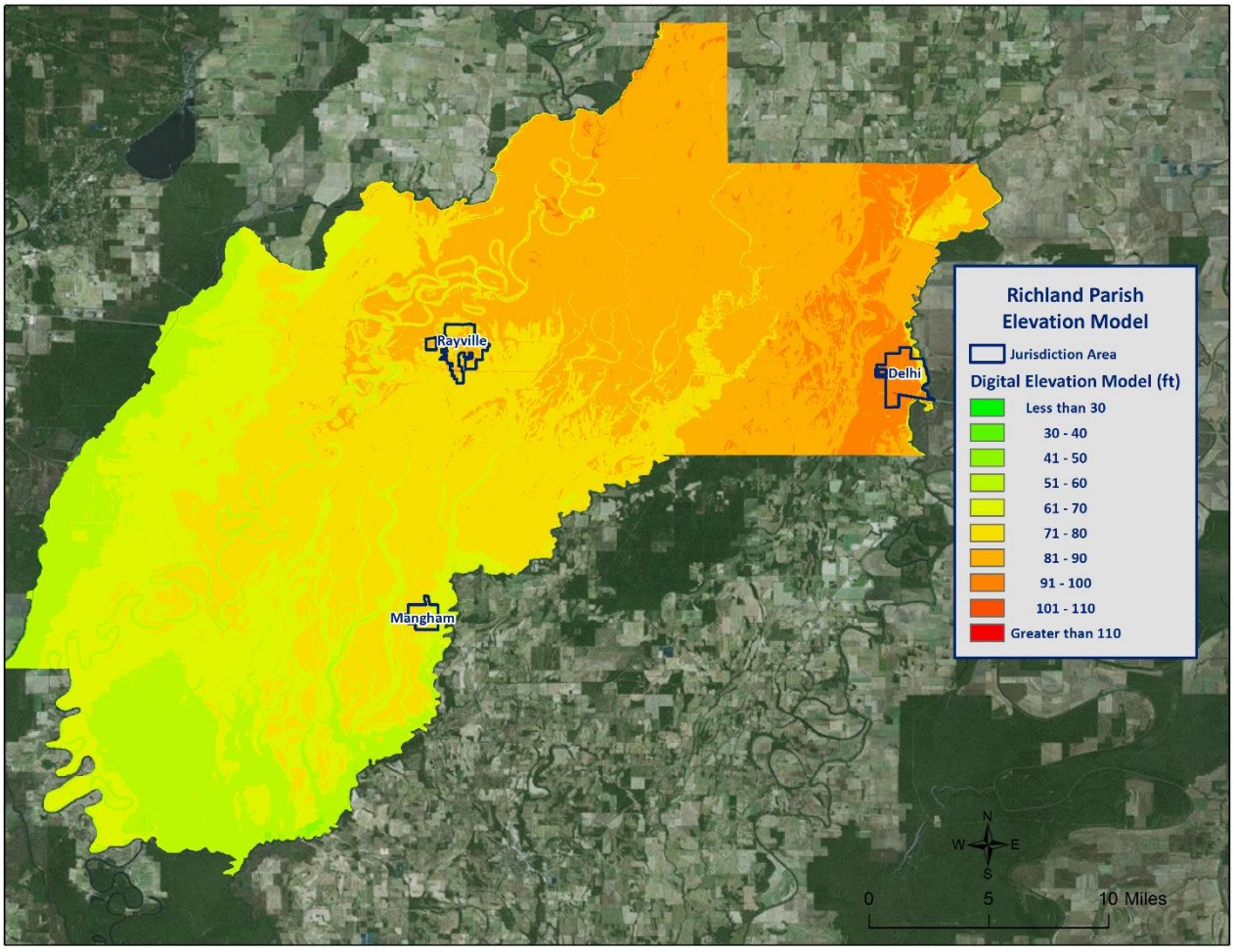

Figure 2-11: Elevation throughout Richland Parish

Looking at the digital elevation model (DEM) in the figure above for Richland 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 30 feet to over 110 feet. The highest elevations in the parish are approximately 125 feet, located in the northeastern portions of the parish in and around Delhi. The incorporated areas range in elevation from 75 to 89 feet, with Mangham averaging 75 feet, Rayville averaging 82 feet, and Delhi averaging 89 feet.

Location

Richland Parish has experienced significant flooding in its history and can expect more in the future. Many parts of the parish are located in the 100-year floodplain. Frequent flooding of agriculture occurs throughout Richland Parish. Increased agricultural development within the bottomland areas of the parish have caused several problems – higher vulnerability to damage from flood events, increases in peak discharges in local streams caused by increased water runoff, and greater demand on local drainage capacity. Areas with inadequate drainage capacity may be at an increased risk of structural and agricultural flooding.

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

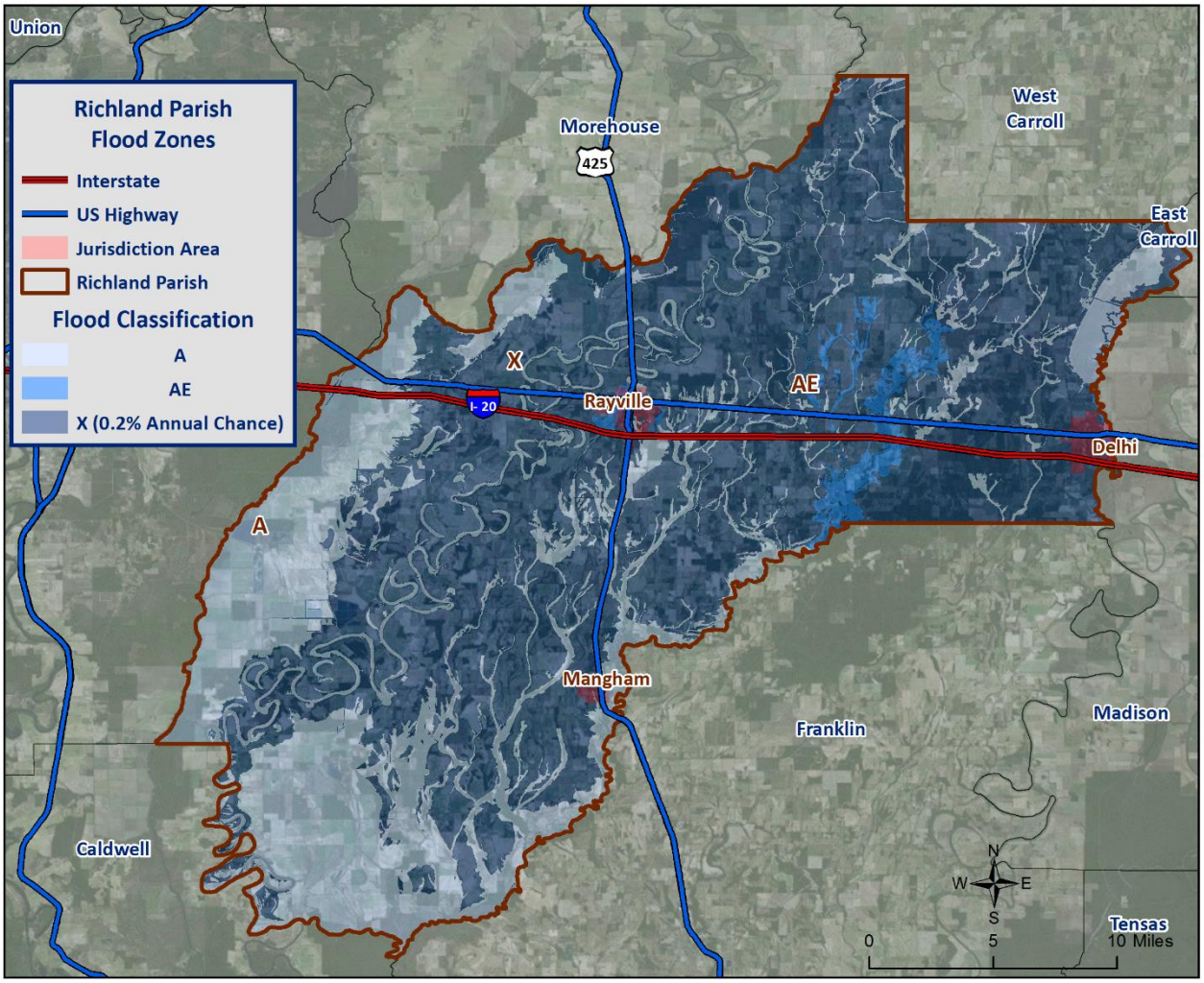

Figure 2-12: Richland Parish Areas within the Flood Zones

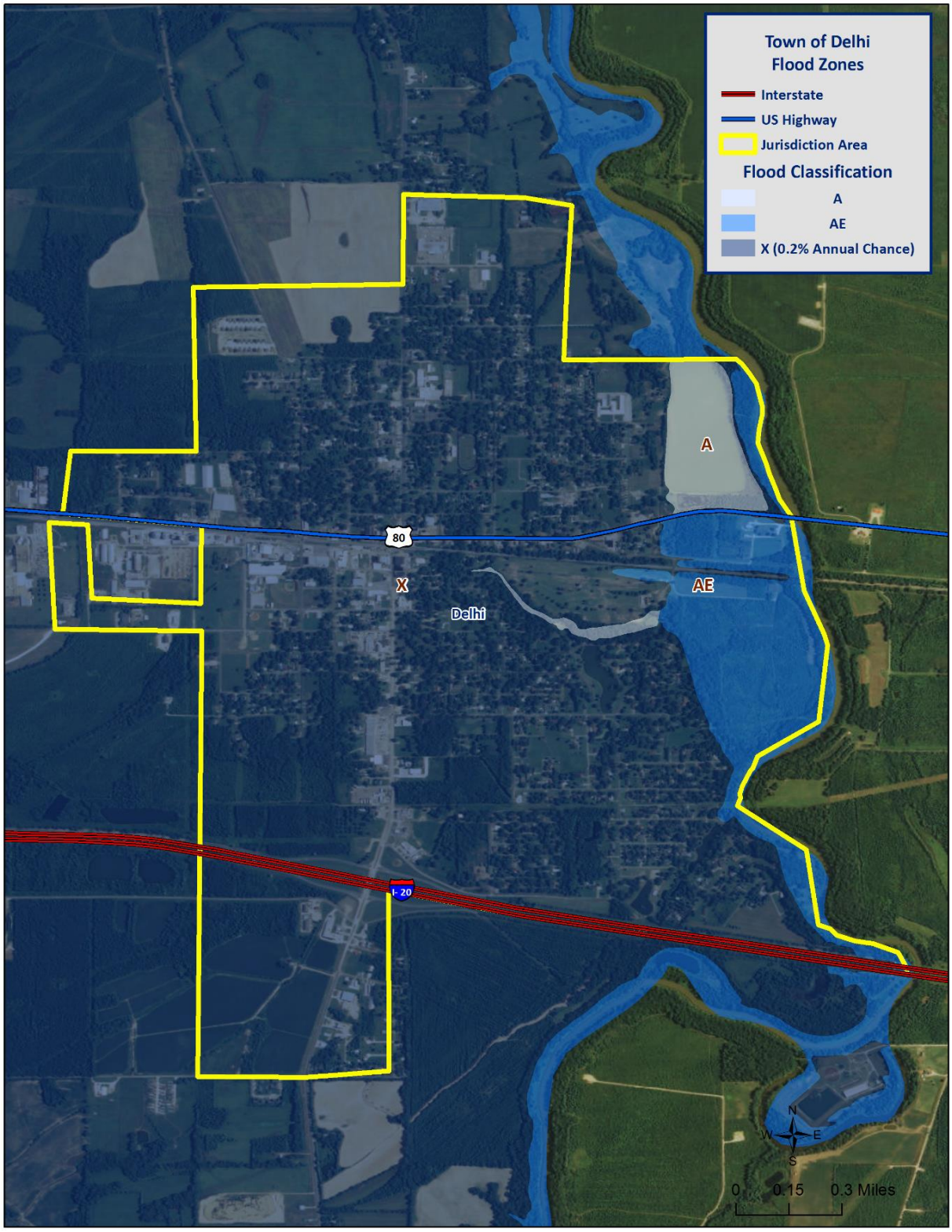

Figure 2-13: Town of Delhi Areas within the Flood Zones

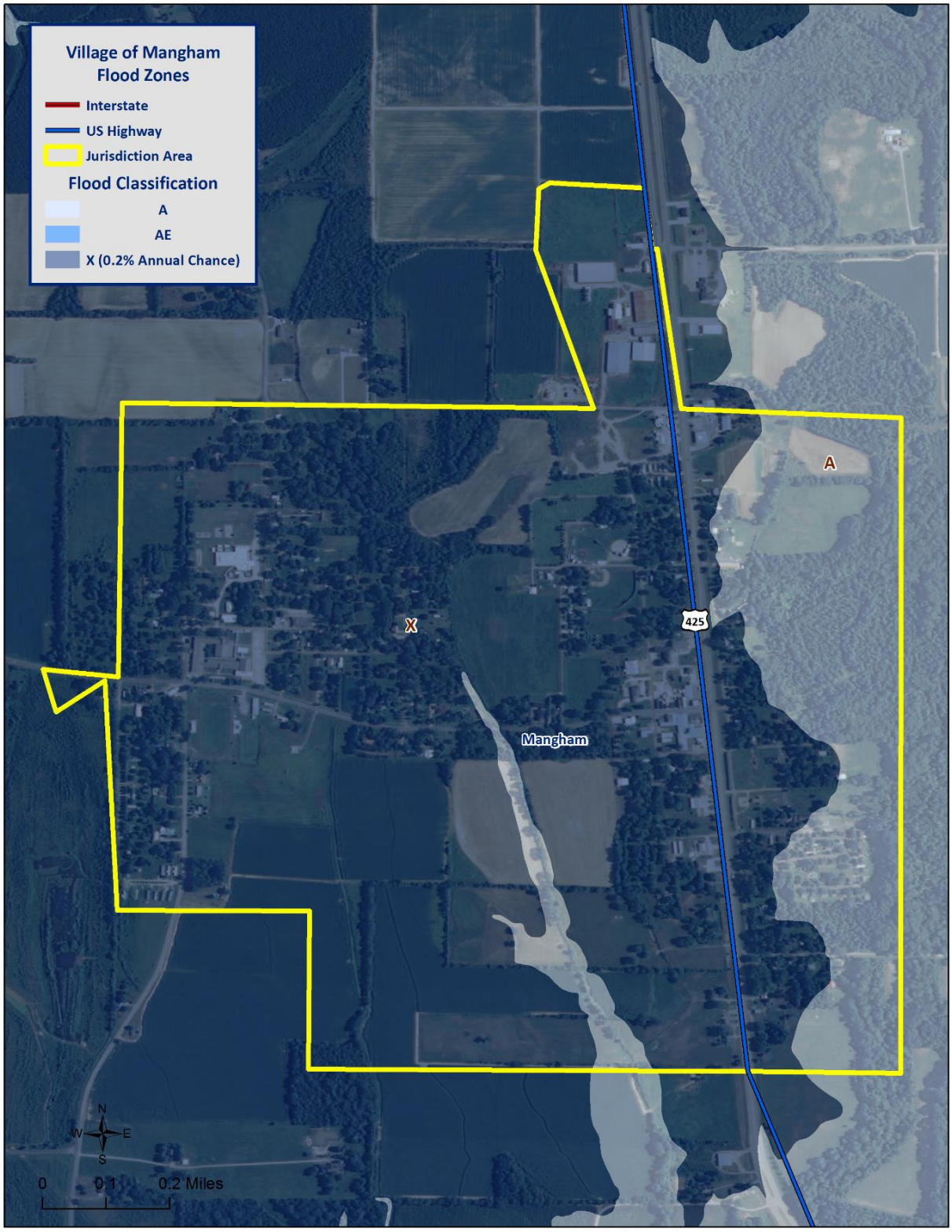

Figure 2-14: Village of Mangham Areas within the Flood Zones

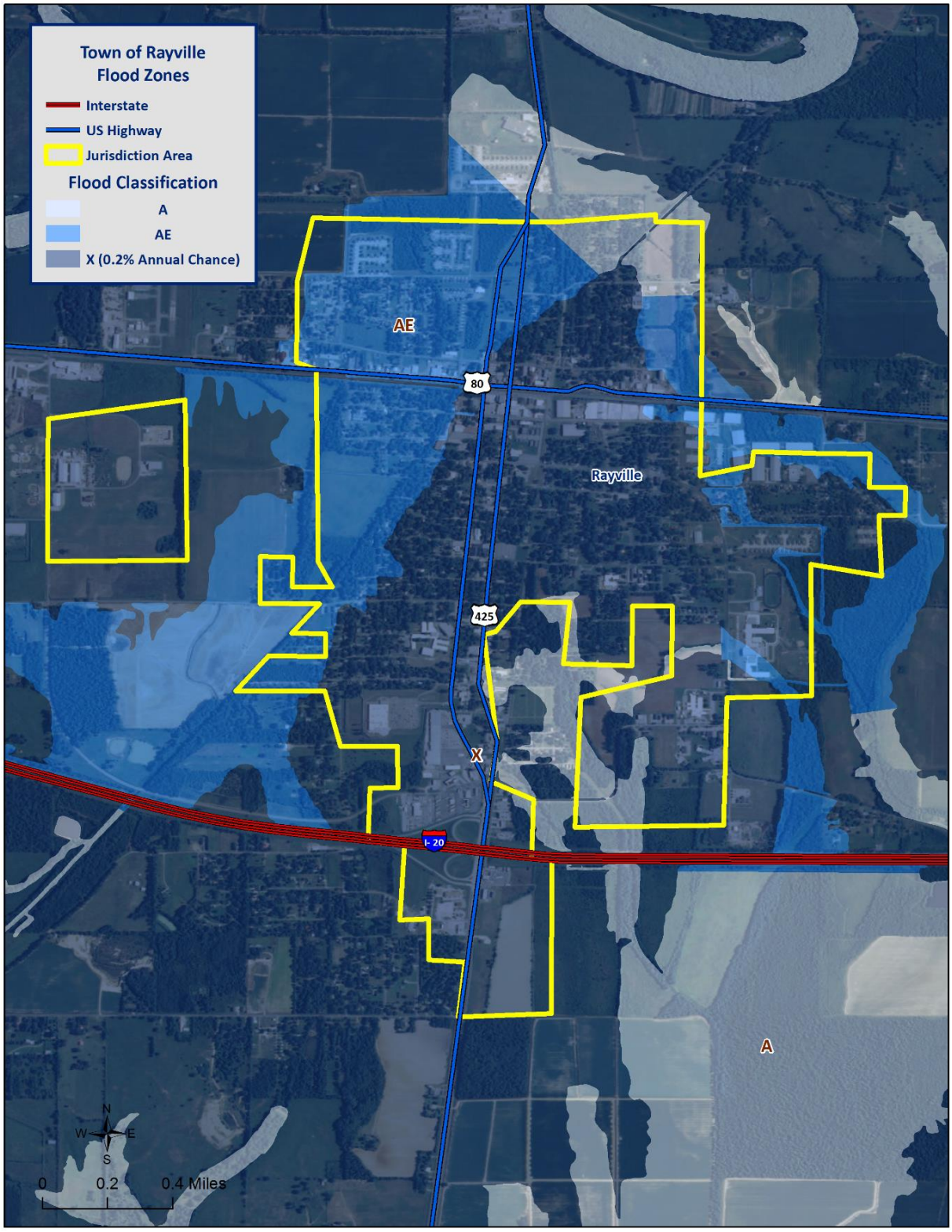

Figure 2-15: Town of Rayville Areas within the Flood Zones

Previous Occurrences / Extents

Historically, there have been 29 flooding events that have created significant flooding in Richland Parish between 1990 and 2015. Below is a brief synopsis of the seven flooding events that have occurred since 2010, including flooding events that have occurred since the parish's last planning update.

Table 2-15: Historical Floods in Richland Parish with Locations from 2010 - 2015

Date	Extents	Type of Flooding	Estimated Damages	Location
March 11, 2012	Several small bayous and creeks were flooded.	Flash Flood	$0	HOLLY RIDGE
March 21, 2012	Numerous roads were flooded across Richland Parish.	Flash Flood	$5,162	RAYVILLE MUNI ARPT
October 21, 2013	Street flooding occurred in Start. Several streets and low lying areas were flooded in and around Rayville as well. US Highway 80 had water across it in a few spots.	Flash Flood	$0	START
July 11, 2014	Some roads flooded in town during the heaviest rainfall.	Flash Flood	$1,001	DELHI
July 23, 2014	The south bound lane of Highway 135 was under water.	Flash Flood	$0	CHARLIEVILLE
September 5, 2014	Street flooding occurred in Rayville	Flash Flood	$1,001	RAYVILLE MUNI ARPT
May 18, 2015	Streets were flooded and ditches were overflowing in Mangham. Several roads were flooded around Alto, some of which were barricaded.	Flash Flood	$20,000	MANGHAM

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 Rayville, Delhi, and Mangham can expect flood depths from one to four feet.

Frequency / Probability

While other parts of this plan, along with the State's Hazard Mitigation Plan, have relied on the SHELDUS database to provide the annual probability, due to Richland Parish having multiple jurisdictions, it was necessary to assess the historical data found in the National Climatic Data Center for Richland 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 2-16: Annual Flood Probabilities for Richland Parish

Jurisdiction	Annual Probability	Return Frequency
Richland Parish (Unincorporated)	44%	2 – 3 years
Delhi	44%	2 – 3 years
Mangham	44%	2 – 3 years
Rayville	56%	1 – 2 years

Based on historical record, the overall flooding probability for the entire Richland Parish planning area is 100%, with 29 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 2-22* shows the total economic losses that would result from this occurrence.

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

Jurisdiction	Estimated Total Losses from 100-Year Flood Event
Richland Parish (Unincorporated)	$10,490,000
Delhi	$306,000
Mangham	$0
Rayville	$4,398,000
Total	$15,194,000

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

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

Richland Parish (Unincorporated)	Estimated Total Losses from 100-Year Flood Event
Agricultural	$286,000
Commercial	$1,093,000
Government	$12,000
Industrial	$189,000
Religious / Non-Profit	$953,000
Residential	$7,934,000
Schools	$23,000
Total	$10,490,000

Table 2-19: Estimated 100-Year Flood Losses for Delhi by Sector (Source: Hazus 2.2)

Delhi	Estimated Total Losses from 100-Year Flood Event
Agricultural	$2,000
Commercial	$57,000
Government	$0
Industrial	$0
Religious / Non-Profit	$0
Residential	$247,000
Schools	$0
Total	$306,000

Table 2-20: Estimated 100-Year Flood Losses for Rayville by Sector (Source: Hazus 2.2)

Rayville	Estimated Total Losses from 100-Year Flood Event
Agricultural	$80,000
Commercial	$670,000
Government	$14,000
Industrial	$22,000
Religious / Non-Profit	$695,000
Residential	$2,917,000
Schools	$0
Total	$4,398,000

Threat to People

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

Table 2-21: 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**
Richland Parish (Unincorporated)	**13,439**	**7,436**	**55.3%**
Delhi	**2,919**	**197**	**6.7%**
Mangham	**672**	**0**	**0%**
Rayville	**3,695**	**1,620**	**43.8%**
Total	**20,725**	**9,253**	**44.6%**

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

Table 2-22: Vulnerable Populations Susceptible to a 100-Year Flood Event in Unincorporated Richland Parish (Source: Hazus 2.2)

Richland Parish (Unincorporated)		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	7,436	55.3%
Persons Under 5 Years	525	7.1%
Persons Under 18 Years	1,371	18.4%
Persons 65 Years and Over	1,071	14.4%
White	4,621	62.1%
Minority	2,815	37.9%

Table 2-23: Vulnerable Populations Susceptible to a 100-Year Flood Event in Delhi (Source: Hazus 2.2)

Delhi		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	197	6.7%
Persons Under 5 Years	17	8.7%
Persons Under 18 Years	42	21.3%
Persons 65 Years and Over	26	13.1%
White	70	35.6%
Minority	127	64.4%

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

Rayville		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	1,620	43.8%
Persons Under 5 Years	129	8.0%
Persons Under 18 Years	327	20.2%
Persons 65 Years and Over	254	15.7%
White	462	28.5%
Minority	1,158	71.5%

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 next 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 Description (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 table below outlines the lightning activity level, which 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 Richland Parish is equally at risk for hailstorms.

Previous Occurrences / Extents

The SHELDUS database reports 26 significant hailstorm events occurring within the boundaries of Richland Parish between the years of 1990 - 2015. According to the National Climatic Data Center, hailstorm diameters experienced in Richland 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 2-16* displays the density of hailstorms in Richland Parish and adjacent parishes. Based on the National Climatic Data Center dataset, *Table 2-30* provides an overview of hailstorms that have impacted the Richland Parish planning area since 2010. Richland Parish can expect to experience hail up to 2.75 inches in diameter for future events.

Table 2-30: Previous Occurrences of Hailstorms in Richland Parish (Source: NCDC)

Date	Recorded Hail Size (inches)	Location
March 29, 2011	0.88	MANGHAM
March 2, 2012	1	BUCKNER
April 10, 2012	1.75	JONESBURG
May 21, 2012	1	BEE BAYOU
August 9, 2012	1.25	GIRARD
August 9, 2012	1.75	ALTO
August 9, 2012	1.25	MANGHAM
August 15, 2012	1	RAYVILLE MUNI ARPT
March 28, 2014	1	CREW LAKE
March 28, 2014	0.88	RAYVILLE MUNI ARPT
April 8, 2014	0.75	GIRARD
April 8, 2014	1	RAYVILLE MUNI ARPT
April 19, 2015	1	MANGHAM
April 19, 2015	1.25	ALTO
April 19, 2015	1	RAYVILLE MUNI ARPT
April 19, 2015	1	NEW LIGHT

Since 2010, there have been no significant hailstorm events in the incorporated area of Delhi.

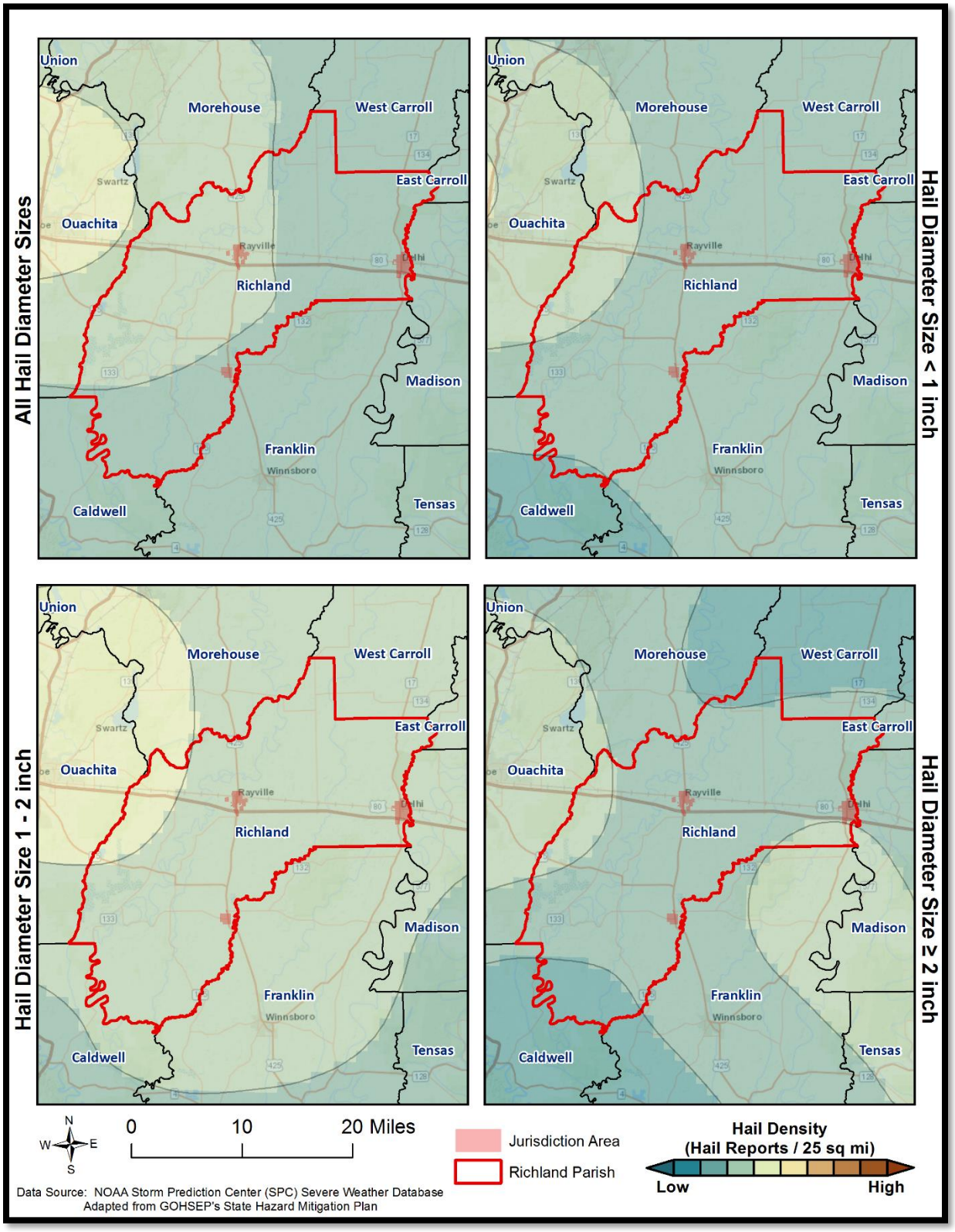

Figure 2-16: Density of Hailstorms by Diameter from 1950-2012
(Source: State of Louisiana Hazard Mitigation Plan 2014)

Frequency

Based on historical data from SHELDUS for the past 25 years, it is estimated the probability of occurrence for a significant hailstorm event is approximately 100%. The probability was determined based on a review of significant hail data that has caused damages in the last 25 years, in which Richland Parish has had 26 recorded events.

Estimated Potential Losses

According to the SHELDUS database, property damage due to hailstorms in Richland Parish have totaled approximately $813,298 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 SHELDUS (1990 – 2015). This provides an annual estimated potential loss of $32,532. *Table 2-31* provides an estimate of potential property losses for Richland Parish.

Table 2-31: Estimated Annual Property Losses in Richland Parish from Hailstorms

Estimated Annual Potential Losses from Hailstorms for Richland Parish			
Unincorporated Richland Parish (64.8% of Population)	Delhi (14.1% of Population)	Mangham (3.2% of Population)	Rayville (17.8% of Population)
$21,095	$5,800	$4,582	$1,055

There have been no deaths or injuries due to hailstorms from 1990 – 2015 in Richland 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 Richland Parish is equally at risk for high winds.

Previous Occurrences / Extents

The SHELDUS database reports a total of 86 thunderstorm wind events occurring within the boundaries of Richland Parish between the years of 1990 to 2015. The significant thunderstorm wind events experienced in Richland Parish have ranged in wind speed from 50 mph to 86 mph. Richland Parish can expect to receive thunderstorm winds up to 86 mph for future high wind events. The table on the next 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
CHARLIEVILLE	May 20, 2010	57	$0	$0
RAYVILLE MUNI ARPT	May 20, 2010	57	$0	$0
DELHI	May 20, 2010	57	$0	$0
ALTO	June 20, 2010	57	$0	$50k
GIRARD	November 29, 2010	57	$0	$0
MANGHAM	April 4, 2011	63	$0	$150k
CHARLIEVILLE	June 5, 2011	57	$21,074	$0
MANGHAM	April 2, 2012	57	$6,194	$0
BEE BAYOU	May 21, 2012	57	$10,323	$0
DEHLCO	June 12, 2012	57	$3,097	$0
RAYVILLE MUNI ARPT	July 1, 2012	57	$10,323	$0
GIRARD	August 9, 2012	57	$0	$0
ALTO	August 9, 2012	63	$10,323	$0
RAYVILLE MUNI ARPT	December 20, 2012	57	$41,293	$0
CUTHBERT	December 25, 2012	60	$25,808	$0
START	January 29, 2013	57	$3,052	$0
MANGHAM	January 30, 2013	57	$10,174	$0
RAYVILLE MUNI ARPT	June 28, 2013	57	$3,052	$0
RAYVILLE MUNI ARPT	December 21, 2013	57	$6,105	$0
RAYVILLE MUNI ARPT	June 9, 2014	57	$3,004	$0
RAYVILLE MUNI ARPT	October 13, 2014	69	$15,018	$0
BEE BAYOU	October 13, 2014	64	$0	$0
BARDEL	April 22, 2015	75	$200,000	$0
RAYVILLE MUNI ARPT	May 24, 2015	63	$40,000	$0
BUCKNER	May 25, 2015	50	$3,000	$0
HOLLY RIDGE	June 24, 2015	57	$5,000	$0
RAYVILLE MUNI ARPT	June 24, 2015	60	$12,000	$0

Frequency

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

Estimated Potential Losses

Since 1990, there have been 86 significant wind events that have resulted in property damages according to the SHELDUS database. The total property damages associated with those storms have totaled $1,153,891. 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 $46,156. The following table provides an estimate of potential property losses for Richland Parish:

Table 2-33: Estimated Annual Property Losses in Richland Parish Resulting from High Winds

Estimated Annual Potential Losses from Thunderstorm Winds for Richland Parish			
Unincorporated Richland Parish (64.8% of Population)	Delhi (14.1% of Population)	Mangham (3.2% of Population)	Rayville (17.8% of Population)
$29,929	$6,501	$1,497	$8,229

There have been no reported injuries or 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 Richland Parish.

Previous Occurrences / Extents

There have been no significant lightning events occurring within the boundaries of Richland Parish between the years of 1990 – 2015. The SHELDUS and NCDC databases 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 Richland 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.

Since 2010, there have been no lightning events that have caused property damage or loss of life in Richland Parish Planning area.

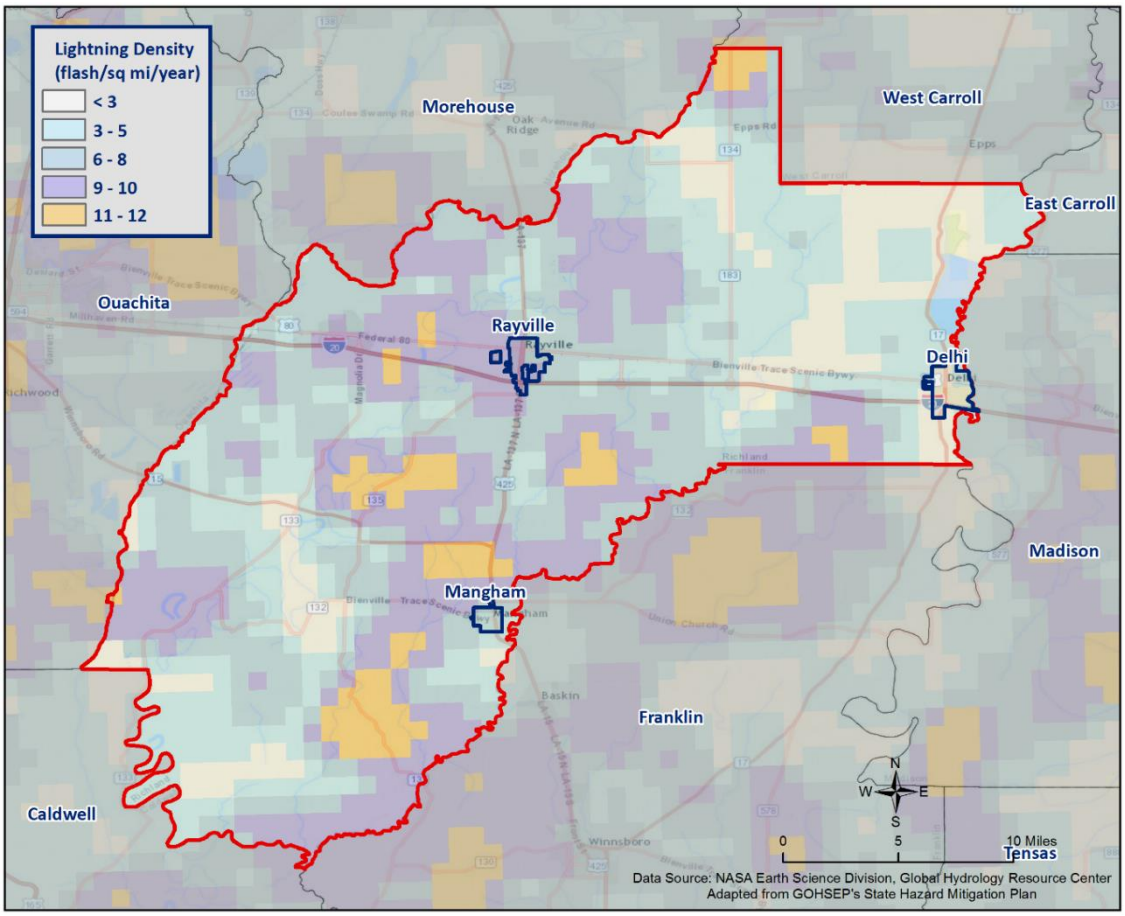

Figure 2-17: Lightning Density Reports for Richland Parish

Frequency

Lightning can strike anywhere and is produced by every thunderstorm, so the chance of lightning occurring in Richland 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 and NCDC, there have been no lightning events that have caused property damages or injuries over the last 25 years, establishing an annual probability of less than 1%.

Estimated Potential Losses

Since 1990, there have been no significant lightning events that have resulted in property damages according to the SHELDUS and NCDC databases. Because there have been no significant lightning events, the total property damages associated with lightning events totaled $0. 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). At this time, the annual estimated potential losses for lightning are unknown. However, this hazard will be evaluated as events occur.

There have been no reported injuries or fatalities in Richland 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 2-34* 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 2-34: Comparison of the Enhanced Fujita (EF) Scale to the Fujita (F) Scale

	Enhanced Fujita Scale					
	EF0	**EF1**	**EF2**	**EF3**	**EF4**	**EF5**
Wind Speed (mph)	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 2-35: 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 of 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 Richland Parish with actual locations, tornadoes in general are a climatological based hazard and have the same approximate probability of occurring in Richland Parish as all of its jurisdictions. Because a tornado has a similar probability of striking anywhere within the planning area for Richland Parish, all jurisdictions are equally at risk for tornadoes.

Previous Occurrences / Extents

SHELDUS reports a total of two tornadoes or waterspouts occurring within the boundaries of Richland Parish between the years of 1990 - 2015. The tornadoes experienced in Richland Parish were EF1 on the EF scale, and F1 on the F scale. The worst case scenario Richland Parish can expect in the future is an EF1 tornado.

The tornado that caused the most damage to property occurred on April 10, 2009. The tornado started just west southwest of Delhi and downed a few trees. As the tornado passed just south of Delhi, shingles and roofing were taken off a couple of apartment buildings and several trees were downed. The tornado then crossed I-20 and entered Madison Parish. A few more trees were blown down before it dissipated. Maximum winds were around 90 mph.

Table 2-36: Historical Tornadoes in Richland Parish with Locations from 1990 - 2015

Date	Impacts	Property Damage	Location	Magnitude
March 7, 1995	0.5 mile path with a width of 30 yards. Flattened a mobile home near Alto. The family was asleep when the tornado hit and threw two small children across the road. Miraculously, only one minor injury occurred.	$0	ALTO	F1
April 10, 2009	3.46 mile path with a width of 100 yards. Downed a few trees and tore shingles and roofing off of buildings.	$10,000	DELHI	EF1

Richland Parish Planning area has not experienced a tornado event from 2010 to the present.

Frequency / Probability

Tornadoes are a sporadic occurrence within Richland Parish, with an annual chance of occurrence calculated at 8% based on the records for the past 25 years (1990 - 2015). The figure on the next page displays the density of tornado touch downs in Richland Parish and neighboring parishes.

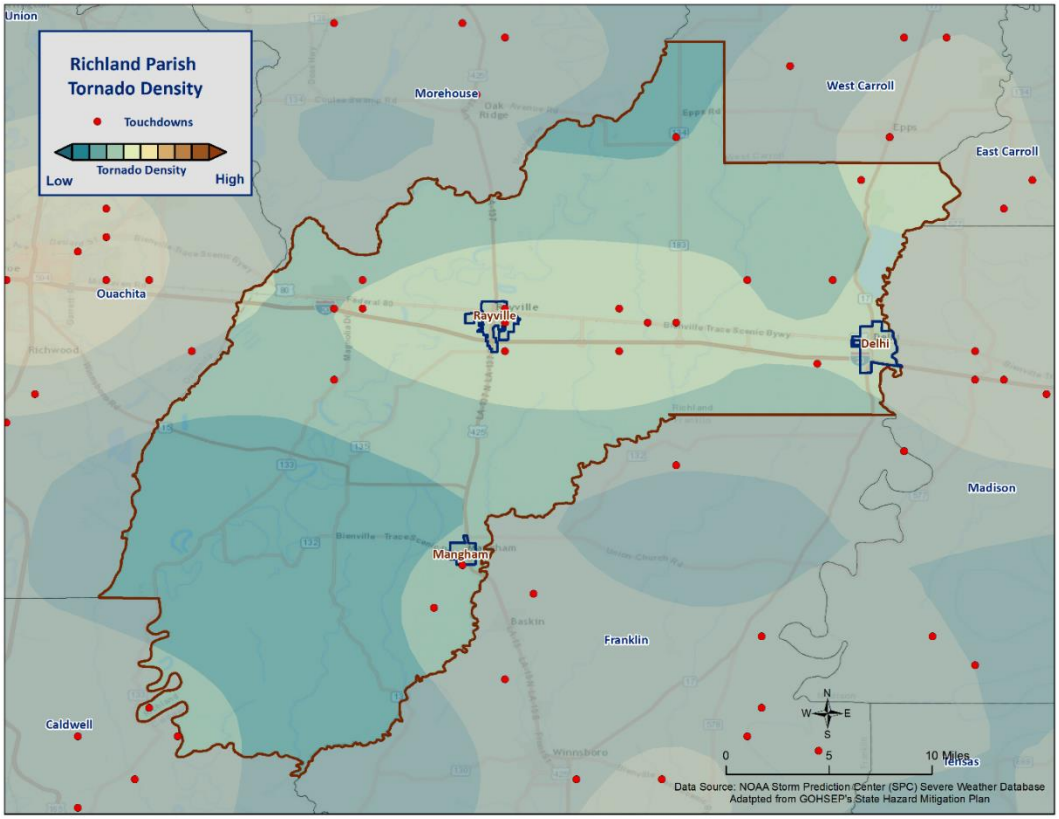

Figure 2-18: Location and Density of Tornadoes to Touch Down in Richland Parish (Source: NOAA/SPC Severe Weather Database)

Estimated Potential Losses

According to the SHELDUS database, there have been two tornadoes that have caused some level of property damage. The total damage from the actual claims for property is $11,035, with an average cost of $5,518 per tornado strike. When annualizing the total cost over the 25-year record, total annual loses based on tornadoes are estimated to be $441. 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 Richland Parish.

Table 2-37: Estimated Annual Losses from Tornadoes in Richland Parish

Estimated Annual Potential Losses from Tornadoes for Richland Parish			
Unincorporated Richland Parish (64.8% of Population)	Delhi (14.1% of Population)	Mangham (3.2% of Population)	Rayville (17.8% of Population)
$286	$62	$14	$79

Table 2-38 presents an analysis of building exposure that is susceptible to tornadoes by general occupancy type for Richland Parish, along with the percentage of building stock that are mobile homes.

Table 2-38: Building Exposure by General Occupancy Type for Tornadoes in Richland 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 (%)
2,116,303	377,652	112,434	42,630	125,500	36,501	31,456	20.1%

The parish has suffered through a total of one day in which tornadoes or waterspouts have accounted for one injury and no fatalities during this 25-year period (*Table 2-39*). The average number of injuries per event for Richland Parish is 0.50 per tornado, with an average of 0.04 per year for the 25-year period.

Table 2-39: Tornadoes in Richland Parish by Magnitude that Caused Injuries or Deaths

Date	Magnitude	Deaths	Injuries
March 7, 1995	F1	0	1

In assessing the overall risk to population, the most vulnerable population throughout the parish are those residing in manufacturing housing. Approximately 20.1% of all housing in Richland Parish consists of manufactured housing. Based on location data collected in a previous hazard mitigation project, there are no known locations where manufactured housing is concentrated.

Manufactured housing is more likely to sustain damage from a tornado than any other residential structure. 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.

Vulnerability

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

Tropical Cyclones

Tropical cyclones are among the worst hazards 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, the table presents the Saffir-Simpson Hurricane Wind Scale, which categorizes tropical cyclones based on sustained winds.

Table 2-40: Saffir-Simpson Hurricane Wind Scale

Saffir-Simpson Hurricane Wind Scale			
Category	**Sustained Winds**	**Pressure**	**Types of Damage Due to Winds**
Tropical Depression	<39 mph	N/A	N/A
Tropical 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 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 Richland 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 SHELDUS database reports a total of five tropical cyclone events occurring within the boundaries of Richland Parish between the years 2002 and 2014 (*Table 2-41*). The tropical cyclone events experienced in Richland Parish include depressions, storms, and hurricanes. As worst case scenario, Richland Parish can expect to experience hurricanes at the Category 1 level in the future.

Table 2-41: Historical Tropical Cyclone Events in Richland Parish from 2002-2015 (Source: SHELDUS)

Date	Name	Storm Type At Time of Impact
August 29, 2005	Katrina	Hurricane – Category 1
September 24, 2005	Rita	Hurricane – Category 1
September 13, 2007	Humberto	Tropical Depression
September 1, 2008	Gustav	Tropical Storm
August 29, 2012	Isaac	Tropical Storm

Hurricane Katrina (2005)

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

Portions of Richland Parish experienced tropical storm force gusts, but no major damage was reported within the parish. Rainfall estimates exceeded two inches for much of the parish.

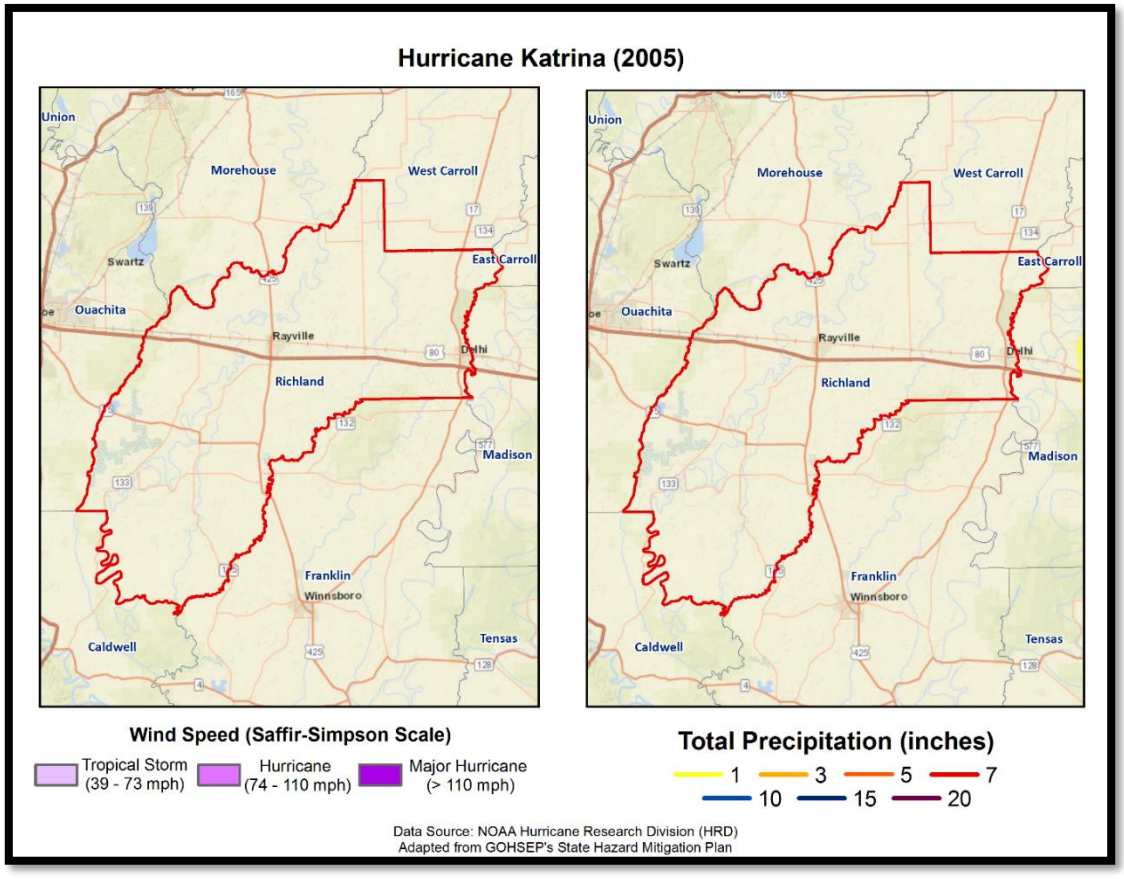

Figure 2-19: Wind Speed and Precipitation Totals in Richland Parish for Hurricane Katrina

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.

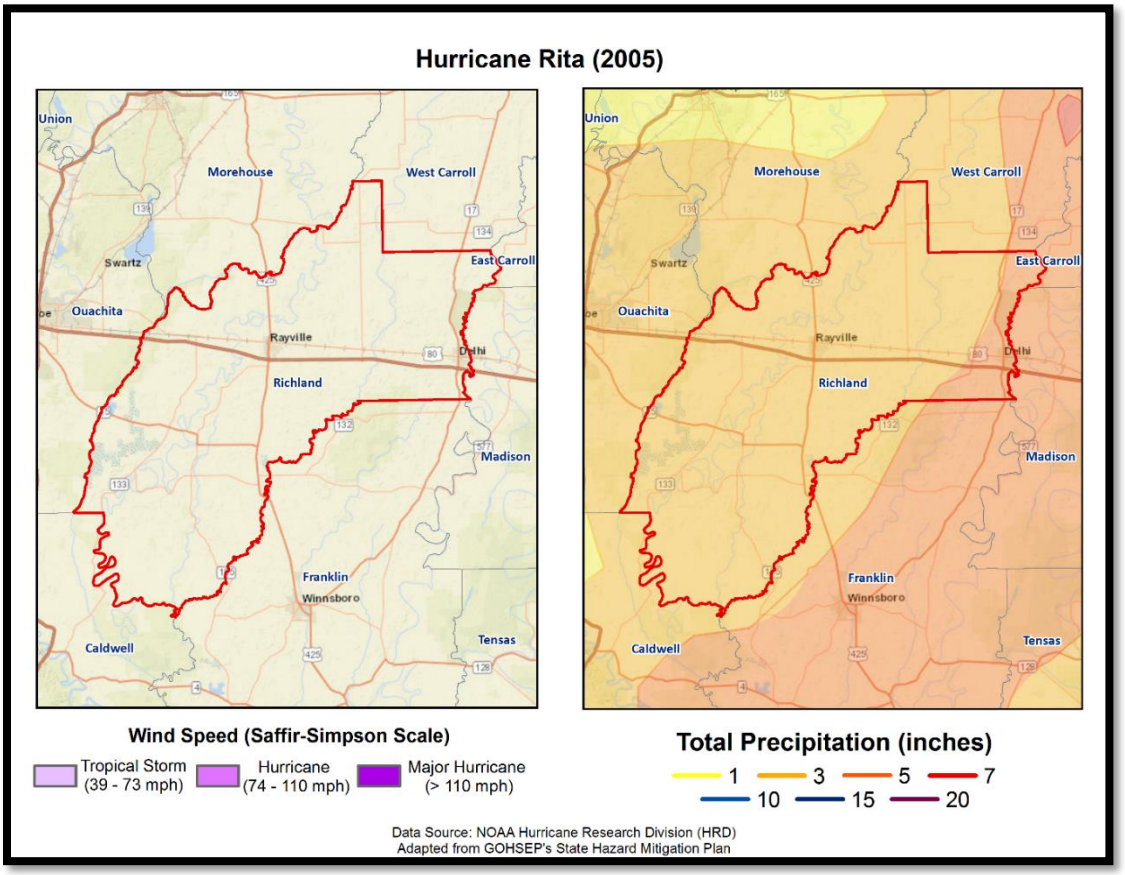

Figure 2-20: Wind Speed and Precipitation Totals in Richland Parish for Hurricane Rita

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.

In Richland Parish, peak wind gusts reached tropical storm force, but no major damage was recorded. Rainfall estimates could not be found.

Hurricane Humberto (2007)

In 2007, southeastern Texas and southwestern Louisiana were impacted by Hurricane Humberto, which was a rapidly developing storm that made landfall on September 13th as a Category 1 hurricane. Hurricane Humberto tracked into a northeasterly direction along the Texas coastline between High Island, Texas and Sea Rim State Park, then onward into the state of Louisiana. The most significant damages occurred in Jefferson, Orange, and Newton counties in Texas.

In Richland Parish, the tropical depression brought 25 to 30 mph wind gusts. No damage was reported, though a few inches of rain were recorded.

Hurricane Gustav (2008)

Hurricane Gustav entered the southeast Gulf of Mexico as a major Category 3 hurricane on August 31, 2008, after developing in the Caribbean Sea and moving across western Cuba. Gustav tracked northwestward across the Gulf toward Louisiana and made landfall as a Category 2 hurricane near Cocodrie, Louisiana, during the morning of September 1st. Gustav continued to move northwest across south Louisiana and weakened to a Category 1 storm over south central Louisiana later that day. The storm diminished to a tropical depression over northwestern Louisiana on September 2nd.

The highest wind gust recorded was 117 mph (102 kts) at a USGS site at the Houma Navigational Canal and at the Pilot Station East C-MAN near the Southwest Pass of the Mississippi River. The highest sustained wind of 91 mph was recorded at the Pilot's Station East C-MAN site. However, due to the failure of equipment at some observation sites during the storm, higher winds may have occurred. The minimum sea level pressure measured was 951.6 millibars at a USGS site at Caillou Lake, southwest of Dulac, and 954.5 millibars at the LUMCON facility near Dulac. Rainfall varied considerably across southeast Louisiana, ranging from around four inches to just over 11 inches.

Gustav produced widespread wind damage across southeast Louisiana, especially in the area from Houma and Thibodaux through the greater Baton Rouge area. Hurricane force wind gusts occurred also across the inland areas, including the Baton Rouge area and surrounding parishes. A peak wind gust of 91 mph was recorded at the Baton Rouge (Ryan Field) Airport at 1:12 PM CST. This was only one mph less than the highest wind gust recorded during Hurricane Betsy in 1965. After the storm, the electric utility serving most of southeast Louisiana reported 75 to 100 percent of utility customers were without power, in areas ranging from Lafourche and Terrebonne Parishes northwest through the Baton Rouge area to central Louisiana and southwest Mississippi. Considerable damage occurred to many houses and structures as large tree limbs and trees were toppled by the hurricane force winds. Preliminary estimates from the American Red Cross indicated that around 13,000 single family dwellings were damaged by the hurricane in southeast Louisiana, and several thousand more apartments and mobile homes were also damaged. Early estimates from Louisiana Economic Development indicated that Gustav caused at least $4.5 billion in property damage in Louisiana, including insured and uninsured losses.

Tropical storm force winds occurred across Richland Parish as the outer edges of Hurricane Gustav moved across southern and central Louisiana. Numerous trees and power lines were blown down. Tree damage was widespread across the parish as wind gusts peaked between 40 and 50 mph for several hours. Many roads were blocked by downed trees and the power outages were extensive.

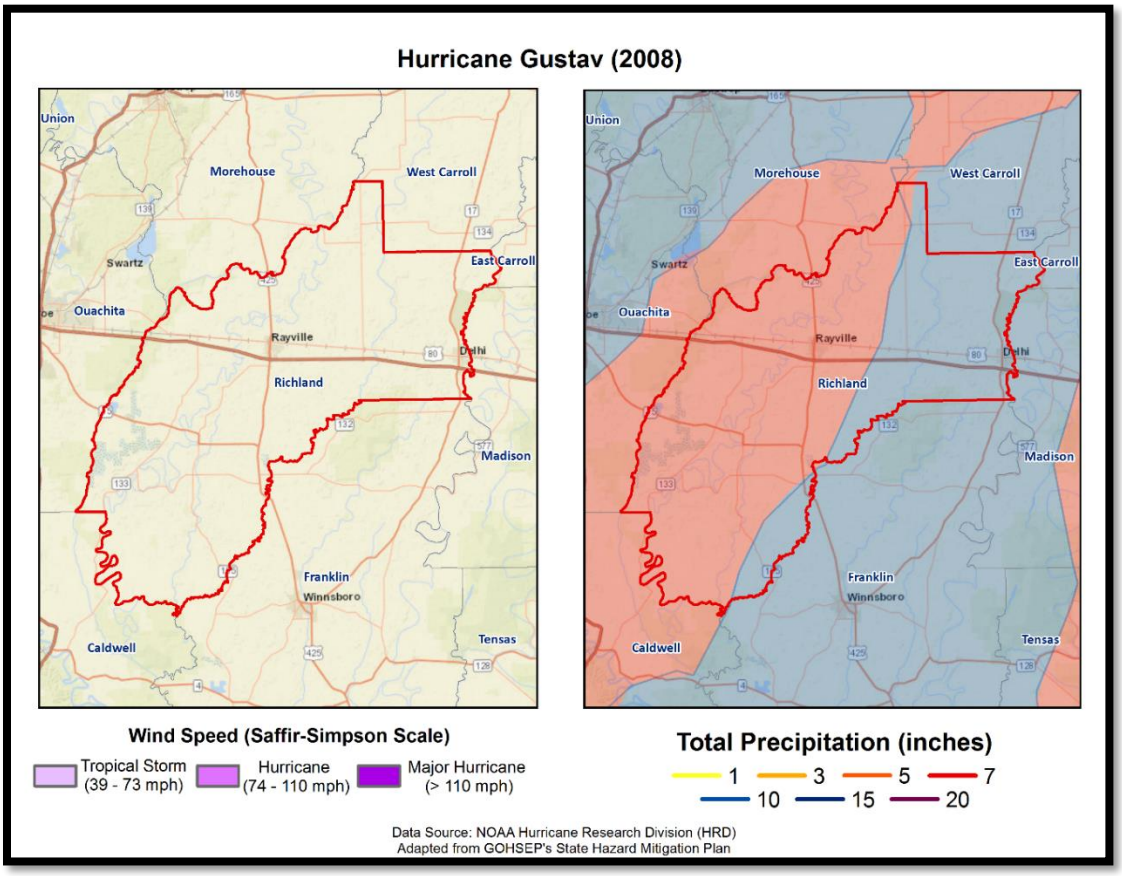

Figure 2-21: Wind Speed and Precipitation Totals in Richland Parish for Hurricane Gustav

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 ArkLaMiss 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.

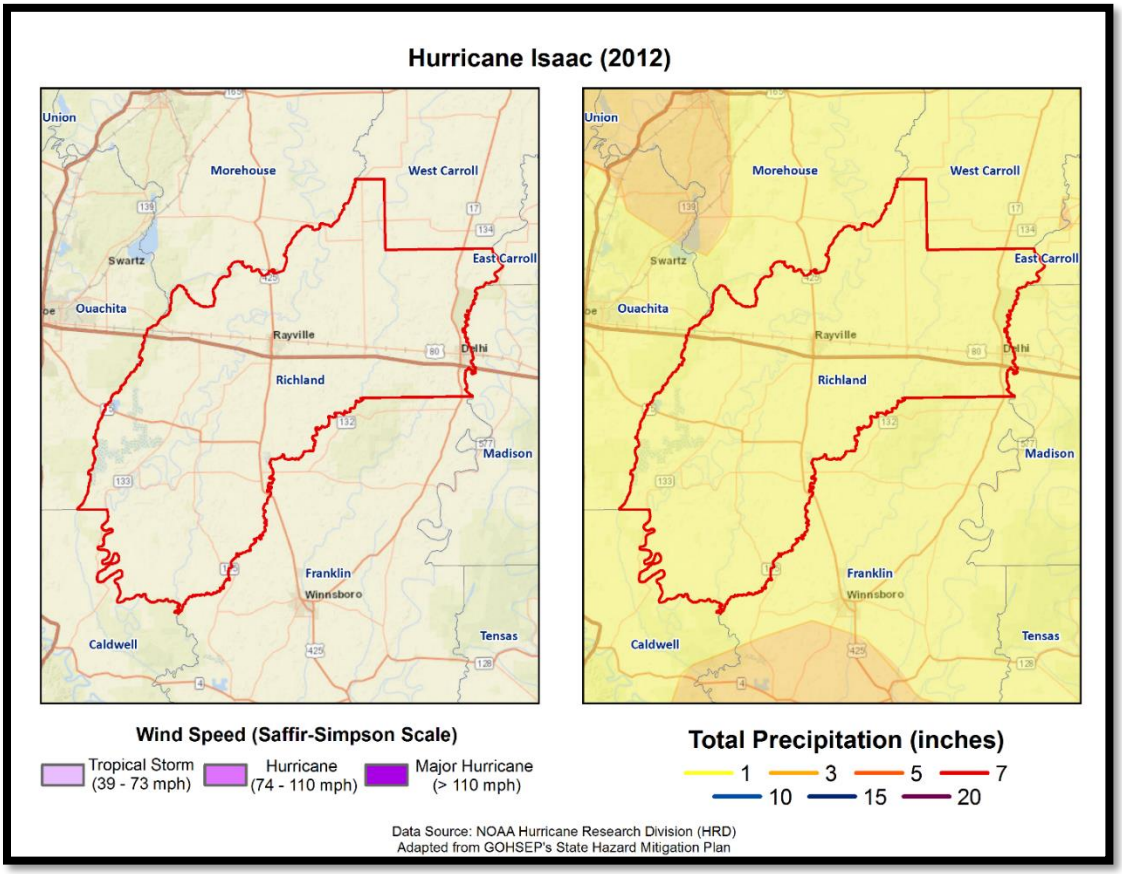

Figure 2-22: Wind Speed and Precipitation Totals in Richland Parish for Hurricane Isaac

With all of the rain that fell, some of the area's 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.

Strong winds downed multiple trees all across the parish between the afternoon of the 29th and midday on the 30th. Rainfall and wind gusts were not high enough to produce extensive damage in Richland Parish.

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

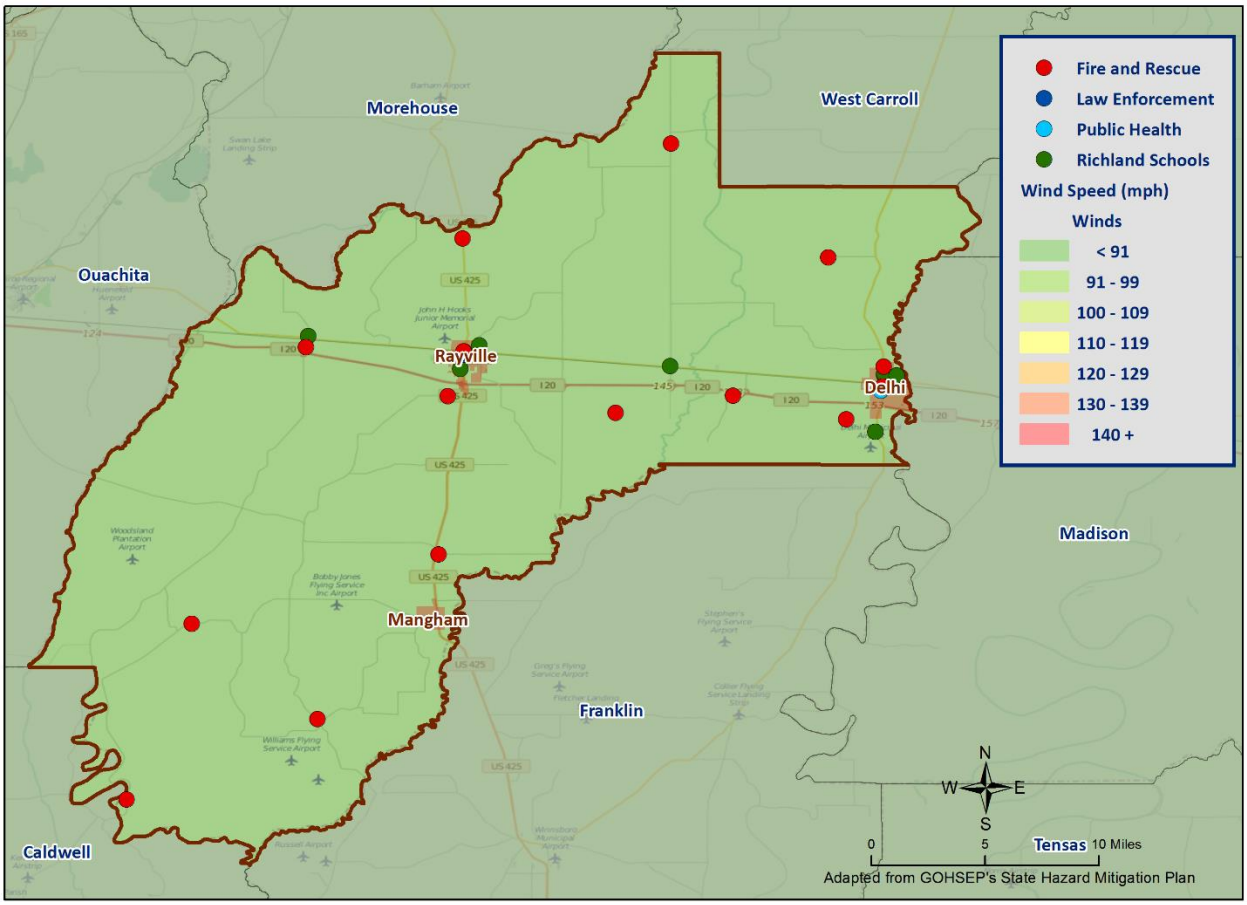

Figure 2-23: Winds Zones for Richland Parish in Relation to Critical Facilities

Frequency / Probability

Tropical cyclones are large natural hazard events that regularly impact Richland Parish. The annual chance of occurrence for a tropical cyclone is estimated at 20% for Richland Parish and its municipalities, with five events occurring within 25 years. The tropical cyclone season for the Atlantic Basin is from June 1st through November 30th, with most of the major hurricanes (Saffir-Simpson Categories 3, 4, & 5) occurring between the months of August and October. Based on geographical location alone, Richland Parish is highly vulnerable to tropical cyclones. This area has experienced several tropical cyclone events in the past and can expect more in the future.

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 following table shows the total economic losses that would result from this occurrence.

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

Jurisdiction	Estimated Total Losses from 100-Year Hurricane Event
Richland Parish (Unincorporated)	$994,151
Delhi	$215,933
Mangham	$49,711
Rayville	$273,338
Total	$1,533,134

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 2-43: Ratio of Total Losses to Total Estimated Value of Assets for each Jurisdiction in Richland 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	$994,151	$1,728,880,000	0.1%
Delhi	$215,933	$453,417,000	0.0%
Mangham	$49,711	$84,474,000	0.1%
Rayville	$273,338	$575,705,000	0.0%

Based on the Hazus 2.2 Hurricane Model, estimated total losses range from 0.0% to 0.1% of the total estimated value of all assets for Richland Parish and its jurisdictions.

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

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

Richland Parish (Unincorporated)	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$1,069
Commercial	$14,962
Government	$1,193
Industrial	$4,413
Religious / Non-Profit	$4,378
Residential	$967,181
Schools	$955
Total	$994,151

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

Delhi	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$232
Commercial	$3,250
Government	$259
Industrial	$958
Religious / Non-Profit	$951
Residential	$210,075
Schools	$208
Total	$215,933

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

Mangham	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$53
Commercial	$748
Government	$60
Industrial	$221
Religious / Non-Profit	$219
Residential	$48,363
Schools	$48
Total	$49,711

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

Rayville	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$294
Commercial	$4,114
Government	$328
Industrial	$1,213
Religious / Non-Profit	$1,204
Residential	$265,923
Schools	$263
Total	$273,338

Threat to People

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

Table 2-48: Number of People Susceptible to a 100-Year Hurricane Event in Richland Parish (Source: Hazus 2.2)

Number of People Exposed to Hurricane Hazards			
Location	**# in Community**	**# in Hazard Area**	**% in Hazard Area**
Parish (Unincorporated)	**13,439**	**13,439**	**100.0%**
Delhi	**2,919**	**2,919**	**100.0%**
Mangham	**672**	**672**	**100.0%**
Rayville	**3,695**	**3,695**	**100.0%**
Total	**20,725**	**20,725**	**100.0%**

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 2-49: Vulnerable Populations in Unincorporated Richland Parish for a 100-Year Hurricane Event (Source: Hazus 2.2)

Richland Parish (Unincorporated)		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	13,439	100.0%
Persons Under 5 Years	949	7.1%
Persons Under 18 Years	2,478	18.4%
Persons 65 Years and Over	1,935	14.4%
White	8,351	62.1%
Minority	5,088	37.9%

Table 2-50: Vulnerable Populations in Delhi for a 100-Year Hurricane Event (Source: Hazus 2.2)

Delhi		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	2,919	100.0%
Persons Under 5 Years	255	8.7%
Persons Under 18 Years	622	21.3%
Persons 65 Years and Over	383	13.1%
White	1,039	35.6%
Minority	1,880	64.4%

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

Mangham		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	672	100.0%
Persons Under 5 Years	60	8.9%
Persons Under 18 Years	154	22.9%
Persons 65 Years and Over	81	12.1%
White	386	57.4%
Minority	286	42.6%

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

Rayville		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	3,695	100.0%
Persons Under 5 Years	294	8.0%
Persons Under 18 Years	745	20.2%
Persons 65 Years and Over	579	15.7%
White	1,053	28.5%
Minority	2,642	71.5%

Vulnerability

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

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 2-53: 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 Richland Parish as all of the adjacent parishes, the entire planning area for Richland Parish is equally at risk for winter storms.

Previous Occurrences / Extents

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

Table 2-54: Previous Occurrences for Winter Storm Events

Date	Synopsis	Property Damage	Crop Damage
March 14, 1993	A widespread damaging freeze occurred. Temperatures fell into the upper teens across the northern parishes and into the 20s elsewhere. Total agricultural losses are estimated to be about $8.9 million. Due to the relatively mild winter, many crops were in early bloom. The peach crop which is grown in the northern part of the state suffered a 60% loss valued around $2 million.	$0	$227,828

Date	Synopsis	Property Damage	Crop Damage
February 1, 1996	Freezing rain fell across Richland 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 norther Gulf of Mexico. The result was widespread freezing rain, sleet, and freezing drizzle. The ice accumulated mainly across exposed surfaces such as trees and power lines as well as bridges and overpasses. Over a quarter million people were without power, some for over a week.	$850,673	$0
January 27, 2000	Significant damage from ice occurred as 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. Several thousand people were without power as the weight of the ice brought trees and power lines down.	$101,733	$0
February 20, 2006	Portions of the region saw periods of freezing rain. The core of the heaviest freezing rain occurred from southwest Richland Parish across Northern Franklin Parish and into the west half of Madison Parish. Here, one quarter to four tenths inches of ice occurred and caused bridges and overpasses to freeze over and ice to weigh down trees and power lines.	$97,857	$0
January 1, 2010	A prolonged cold snap caused a great deal of damage to the water line infrastructure around the region. The issues from the hard freeze were as follows: water line breaks, frozen water pipes, wells freezing up, and water valves being stuck. There was a report of a broken water line to a school in Rayville.	$54,283	$0
February 11, 2010	Around 4.2 inches of snow was reported in Rayville with over five inches reported across southern portions of the parish.	$108,567	$0
January 9, 2011	Sleet and freezing rain fell across the parish. By evening, enough ice had accumulated to freeze all the overpasses in the parish causing several traffic accidents.	$42,098	$21,049
February 3, 2011	A quarter inch to four tenths of ice and sleet accumulated across the parish. Bridges and overpasses were iced over and roadways were slick.	$315,734	$0

Based on previous winter storm events, the worst-case scenario for Richland Parish Planning area is approximately five inches of snow accumulation and approximately one to two inches of ice accumulation.

Frequency / Probability

With nine recorded events in 25 years, winter storm events within the boundaries of Richland Parish have an annual chance of occurrence calculated at 36% based on the SHELDUS dataset.

Estimated Potential Losses

Since 1990, there have been nine reported winter weather events that have resulted in property and/or crop damages according to the SHELDUS database. The total property damages associated with these storms have totaled $1,721,828. To estimate the potential losses of a winter weather event on an annual basis, the total damage recorded for winter weather events was divided by the total number of years of available winter weather data in SHELDUS (1990 – 2015). This provides an annual estimated potential loss of $68,873. 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 following table provides an estimate of potential property losses for Richland Parish based on the 2010 Census data:

Table 2-55: Estimated Annual Losses for Winter Weather Events in Richland Parish

Estimated Annual Potential Losses from Winter Weather for Richland Parish			
Unincorporated Richland Parish (64.8% of Population)	**Delhi (14.1% of Population)**	**Mangham (3.2% of Population)**	**Rayville (17.8% of Population)**
$44,660	$9,700	$2,233	$12,279

From 1990 - 2015, there have been no injuries or fatalities as a result of winter weather in Richland 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

Richland Parish is awaiting a response from the U.S. Army Corps of Engineers on dam locations within the Richland Parish Planning area. Currently, a data deficiency exists for dam failure in Richland Parish.

Previous Occurrences / Extents

There have been no reported dam failures in Richland Parish from 1990 to 2015. Dam information including the extent of dam failures has been requested from the USACE. Richland 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 dam failure has less than a 1% annual chance of occurrence in the Richland Parish planning area. Richland Parish is awaiting a response from the USACE, and will continue to work to update this information as new data is received.

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^2 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^2 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

Richland Parish is awaiting a response from the U.S. Army Corps of Engineers on levee locations within the Richland Parish Planning area. Currently, a data deficiency exists for levee failure in Richland Parish.

Previous Occurrences / Extents

There have been no reported levee failures in Richland 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. Richland Parish is awaiting a response from the USACE, and will continue 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 Richland Parish planning area. Richland Parish is awaiting a response from the USACE, and will continue to work to update this information as new data is received.

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3. Capability Assessment

This section summarizes the results of the Richland 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, Richland 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

Richland 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 Richland 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 Richland Parish and its jurisdictions are shown in the table on the following page.

Table 3-1: Richland Parish Planning and Regulatory Capabilities

Planning and Regulatory					
Please indicate which of the following plans and regulatory capabilities your jurisdiction has in place.					
	Richland Parish	Delhi	Mangham	Rayville	Comments
Plans	Yes / No				
Comprehensive / Master Plan	YES	NO	NO	NO	
Capital Improvements Plan	YES	NO	NO	YES	
Economic Development Plan	YES	NO	NO	YES	
Local Emergency Operations Plan	YES	NO	NO	YES	
Continuity of Operations Plan	YES	NO	NO	YES	
Transportation Plan	YES	NO	NO	YES	
Stormwater Management Plan	NO	NO	NO	NO	
Community Wildfire Protection Plan	NO	NO	NO	NO	
Other plans (redevelopment, recovery, coastal zone management)	YES	NO	NO	NO	
Building Code, Permitting and Inspections	Yes / No				
Building Code	YES	NO	NO	YES	
Building Code Effectiveness Grading Schedule (BCEGS) Score	YES	NO	NO	YES	
Fire Department ISO/PIAL rating	YES	YES	YES	YES	
Site plan review requirements	YES	NO	NO	YES	
Land Use Planning and Ordinances	Yes / No				
Zoning Ordinance	YES	YES	YES	YES	
Subdivision Ordinance	YES	NO	NO	YES	
Floodplain Ordinance	YES	YES	YES	YES	
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	NO	NO	NO	NO	
Flood Insurance Rate Maps	YES	YES	YES	YES	
Acquisition of land for open space and public recreation uses	NO	YES	YES	YES	
Other	NO	NO	NO	NO	

Building Codes, Permitting, Land Use Planning and Ordinances

The Richland Parish Police Jury provides oversight for land use planning throughout every jurisdiction and the unincorporated areas, building permits and codes for the unincorporated areas and the Town of Rayville, and all parish ordinances.

As of the 2016 update, Richland 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 Richland 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 Richland 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, Richland Parish as a whole has a system in place to coordinate and share these capabilities through Richland 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, Richland 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 Richland Parish and its jurisdictions.

Table 3-2: Richland 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.					
	Richland Parish	Delhi	Mangham	Rayville	Comments
Administration	Yes / No				
Planning Commission	YES	NO	NO	YES	
Mitigation Planning Committee	YES	NO	NO	YES	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	YES	YES	NO	YES	
Staff	Yes / No; FT/PT; % Hazard Mitigation				
Chief Building Official	YES	NO	NO	YES	
Floodplain Administrator	YES	NO	NO	YES	
Emergency Manager	YES	NO	YES	YES	
Community Planner	NO	NO	NO	YES	
Civil Engineer	YES	NO	NO	YES	
GIS Coordinator	YES	NO	NO	NO	
Grant Writer	NO	NO	NO	NO	
Other	NO	NO	NO	NO	
Technical	Yes / No				
Warning Systems / Service (Reverse 911, outdoor warning signals)	YES	NO	YES	YES	
Hazard Data & Information	YES	YES	YES	YES	
Grant Writing	NO	YES	YES	NO	
Hazus Analysis	YES	NO	NO	NO	
Other	NO	NO	NO	NO	

Financial capabilities are the resources that Richland 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 Richland Parish and its jurisdictions:

Table 3-3: Richland Parish Financial Capabilities

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

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.

Richland 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 as follows:

Table 3-4: Richland 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.					
	Richland Parish	Delhi	Mangham	Rayville	Comments
Program / Organization	Yes / No				
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	YES	NO	NO	NO	
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	YES	NO	NO	YES	
Natural Disaster or safety related school program	YES	NO	NO	YES	
Storm Ready certification	YES	NO	NO	NO	
Firewise Communities certification	YES	NO	NO	NO	
Public/Private partnership initiatives addressing disaster-related issues	YES	NO	NO	YES	
Other	NO	NO	NO	NO	

In some cases, the jurisdictions rely on Richland Parish OHSEP and/or Richland 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, Richland Parish and its jurisdiction remains committed to expanding and improving on the existing capabilities within the parish. All 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 Richland 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 Richland Parish
- Town Rayville
- Town of Delhi
- Town of Mangham

Flood Insurance and Community Rating System

Richland Parish is not a participant in the Community Rating System (CRS), nor are any of its jurisdictions. 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[1], 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.

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.

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

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.

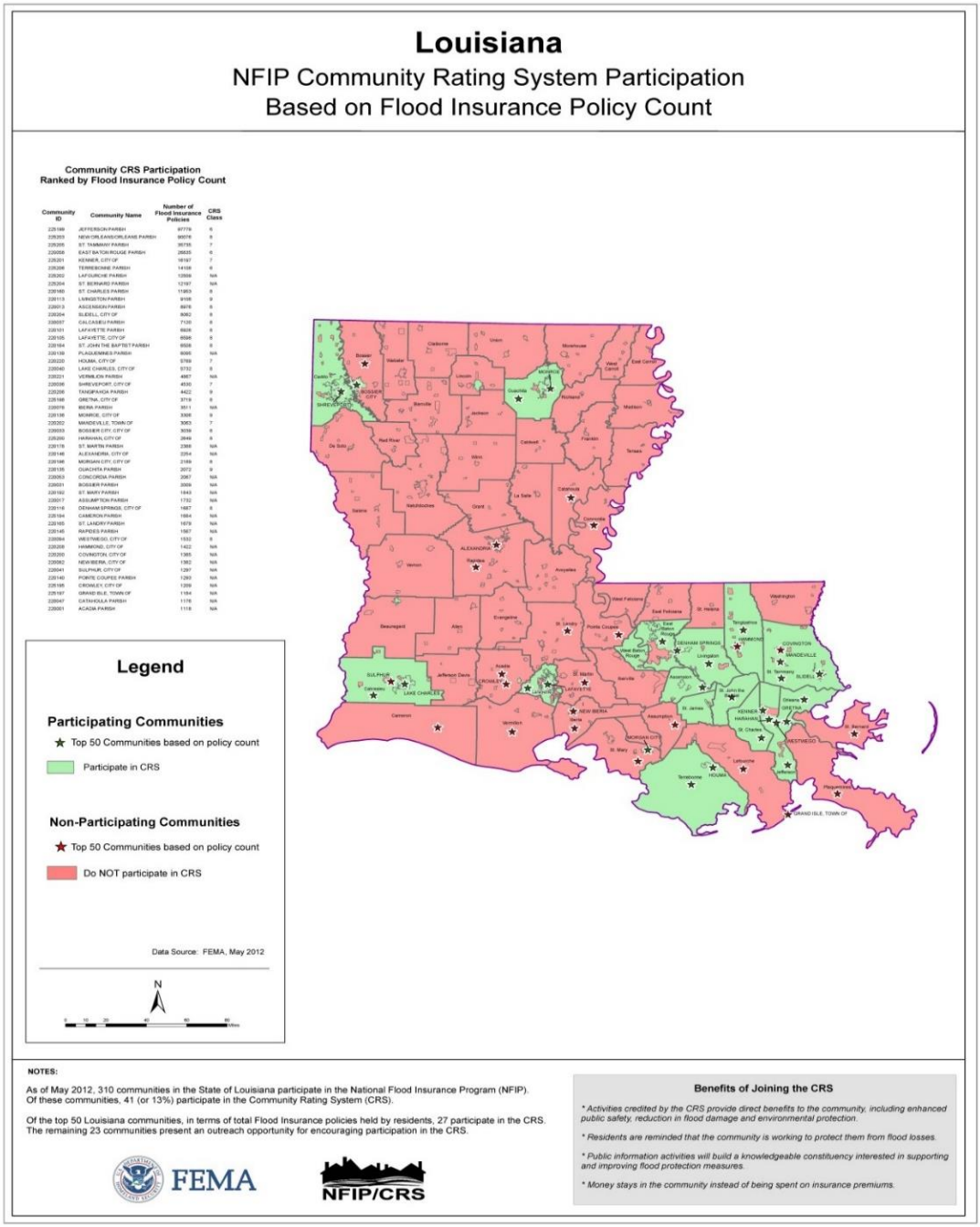

Figure 3-2: Louisiana CRS NFIP Participation
(Source: FEMA[2])

[2] 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

NFIP Worksheets

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

4. Mitigation Strategy

Introduction

Richland 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.

Richland 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 Richland Parish Hazard Mitigation Plan Steering Committee, under the coordination of the Richland 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 – September 2016.

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

This activity was created in an effort to confirm that the goals and action items developed by the Richland 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 Richland Parish survey can be found at the following link:

https://www.surveymonkey.com/r/RichlandParish

During the public meeting in August, 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 Richland 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, Richland 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 Richland 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 five goals remain valid.

The goals are as follows:

- Identify and pursue preventative measures that will reduce future damages from hazards
- Enhance public awareness and understanding of disaster preparedness
- Reduce repetitive flood losses in the parish and towns
- Facilitate sound development in the parish and towns to reduce or eliminate hazard damages
- Improve data collection, use, and sharing

The Mitigation Action Plan focuses on actions to be taken by Richland 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 Richland Parish Hazard Mitigation Plan Steering Committee and participating jurisdictions each identified actions that would reduce and/or prevent future damage within Richland 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.

Richland 2011 Hazard Mitigation Action Update

Richland Parish					
Jurisdiction-Specific Action	**Action Description**	**Funding Source**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
R1: Implement an all-hazard education program into all Richland Parish's school curriculums	Disaster and emergency preparedness education for Richland Parish's youth population is an important tool for reducing hazard vulnerability in Richland Parish. Richland Parish School Board shall integrate an all-hazard education program into all grade levels. The Red Cross program "Masters of Disaster" is a useful program model for establishing the curriculum-based education program for Richland Parish's schools.	Local Budget, State Grants, Hazard Mitigation Grant Program (HMGP), and Additional Grant Sources	Richland Parish Superintendent	Flood, Thunderstorm, Tornado, Hurricane/Tropical Storm, Hailstorm, Winter Storm, Drought, Mosquito-borne Disease, Chemical Spill, Dam Failure, and Levee Failure	Ongoing

R2: Identify and pursue preventative measures that will reduce future damages from hazards.	Send Richland Parish Office of Emergency Preparedness representative to relevant State and National hazard mitigation meetings to identify and pursue grants and project funding sources and measures that will mitigate future damages from hazards.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Office of Emergency Preparedness	Flood, Thunderstorm, Tornado, Hurricane/Tropical Storm, Hailstorm, Winter Storm, Drought, Mosquito-borne Disease, Chemical Spill, Dam Failure, and Levee Failure	Carried Over
R3: Install new generators at all existing and new shelters and critical facilities.	Install new generators at all existing and new shelters and critical facilities to mitigate risk associated with power outages during hazard events.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Office of Emergency Preparedness and Richland Parish Manager	Flood, Thunderstorm, Tornado, Hurricane/Tropical Storm, Winter Storm, Chemical Spill, Dam Failure, and Levee Failure	Carried Over
R4: Adopt the current international building codes by ordinance.	An adoption of the current international building code would require all new structures to be built with specified materials, fire protection systems, foundations, finishes, and heights to mitigate many hazard risks.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Police Jury	Flood, Thunderstorm, Tornado, Hurricane/Tropical Storm, Hailstorm, Winter Storm, Chemical Spill, Dam Failure, and Levee Failure	Complete
R5: Develop and pass ordinances to help regulate new development in the Parish, such as requiring proper drainage with adequate sloping, stormwater retention ponds, dikes, levees, and floodwalls if appropriate,	This ordinance reduces the risk of flood damage to structures within Richland Parish through evaluating and expanding inadequate drainage capacity in development areas.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Police Jury	Flood, Dam Failure, and Levee Failure	In Progress

and requiring freeboard above the Base Flood Elevation in flood-prone areas.					
R6: Install a call-down system via the 9-1-1 phone system.	The call down system, via the 9-1-1 phone system, would alert and assist parish the preparedness of residents from all hazard events.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Sheriff's Office	Flood, Thunderstorm, Tornado, Hurricane/Tropical Storm, Hailstorm, Winter Storm, Drought, Mosquito-borne Disease, Chemical Spill, Dam Failure, and Levee Failure	Completed
R7: Pursue elevation / acquisition / flood-proofing projects for Repetitive Loss structures and Pilot Reconstruction.	Elevate, acquire, or flood proof Repetitive Loss structures throughout the Parish.	State Grants, HMGP, FMA, and Additional Grant Sources	Richland Parish Police Jury	Flood, Dam Failure, and Levee Failure	Carried Over
R8: Replace all school windows with shatterproof windows.	Replace all school windows with shatterproof windows to reduce damages and injury from wind related hazards.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Superintendent	Thunderstorm, Tornado, Hurricane/Tropical Storm, Hailstorm, Winter Storm	Carried Over
R9: Add generators to all existing and new water and sewer district plants in Rayville, Delhi, Mangham, and unincorporated Richland Parish.	Installing generators to all water and sewer district plants would reduce the risk of water and sewer infrastructure down-time during power outages.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Manager and Engineer	Flood, Thunderstorm, Tornado, Hurricane/Tropical Storm, Winter Storm, Chemical Spill, Dam Failure, and Levee Failure	Completed one town/carried over for others
R10: Structurally harden all existing and future critical facilities to withstand strong winds in Rayville, Delhi, Mangham, and	The hardening of critical facilities will mitigate potential damages associated with high wind events, including thunderstorms, tornadoes, and hurricanes/tropical storms. Hardening	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Manager and Engineer	Thunderstorm, Tornado, Hurricane/Tropical Storm, Winter Storm, and Hailstorm	Carried Over

unincorporated Richland Parish.	can include shatter-proof windows, reinforced walls, and reinforced foundations.				
R11: Investigate and implement localized interior drainage projects, especially along U.S. Highway 80 near Delhi and Rayville, Carson Drive, Greer Road and Rosa Street, which are Repetitive Loss areas.	Localized interior drainage projects can begin mitigate property damage associate by flood by increasing the drainage capacity within high risk areas. Projects should be prioritized based on the Master Drainage Plan (Hazard Mitigation Action 16).	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Manager and Engineer	Flood, Dam Failure, and Levee Failure	Carried Over
R12: Establish a documented program to maintain and improve drainage ways along Bayou Macon in the Delhi area and along Burns Bayou in the Rayville vicinity and Big and Colewa Creeks and the Steep Bayou area, by enlarging any inferior culverts and replacing any substandard bridges along the major drainage laterals.	A program that will continue to maintain and improve drainage ways along Bayou Macon in the Delhi area and along Burns Bayou in the Rayville vicinity and Big and Colewa Creeks and the Steep Bayou area will mitigate the potential flood damages within these areas. This program can be implemented through the Capital Improvement Program and the Master Drainage Plan (Hazard Mitigation Action 16).	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Manager and Engineer	Flood, Dam Failure, and Levee Failure	Carried Over

R13: Distribute information regarding flood hazards, including information on NFIP, flood mitigation measures, CRS, and flood insurance.	Distribute information regarding flood hazard to residents throughout the Parish. This general advertising campaign will inform the public about flood risks, activities, and programs that could mitigate flood damage risk. Library resources and other educational outreach resources should be utilized in implementing Action 13.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Office of Emergency Preparedness	Flood, Dam Failure, and Levee Failure	Ongoing
R14: Apply for and improve participation in the Community Rating System (CRS).	Apply for enrollment and improve participation once within the CRS to reduce flood insurance rates for all flood insurance holders within Richland Parish.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Office of Emergency Preparedness	Flood, Dam Failure, and Levee Failure	Carried Over
R15: Implement burn bans.	Put in place an objective plan based on U.S. Drought Monitor Index to mitigate risks associated with drought events. The plan should give officials the authority to implement ban burns or to take reasonable necessary action to mitigate drought risk.	Local Budget, State Grants, HMGP, and Additional grant sources	Richland Parish Office of Emergency Preparedness and LSU Ag Center	Drought	Completed
R16: Implement a Master Drainage Plan	Implement a Master Drainage Plan that will evaluate drainage projects at major drainage laterals to determine the best method to increase drainage capacity. The Master Drainage Plan will be used to prioritize drainage projects based on engineer's	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Office of Emergency Preparedness	Flood, Dam Failure, and Levee Failure	Ongoing

	expertise on drainage capacity needs.				
R17: Obtain all-hazard community warning sirens to alert the community during all hazard events.	Obtain and implement all-hazard community warning sirens in all Towns to alert residents about impending hazard events and the need to seek shelter or evacuate.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Manager and Sheriff's Office	Flood, Thunderstorm, Tornado, Hurricane/Tropical Storm, Hailstorm, Winter Storm, Chemical Spill, Dam Failure, and Levee Failure	Carried Over
R18: Meet the guidelines and apply for the National Weather Service's "Storm Ready Program".	The National Weather Service "Storm Ready Program" provides a framework to assist communities in enhancing their ability to monitor storm damage and alert the public of imminent disasters.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Office of Emergency Preparedness	Flood, Thunderstorm, Tornado, Hurricane/Tropical Storm, Hailstorm, Winter Storm, Dam Failure, and Levee Failure	Carried Over
R19: Work with FEMA to update and adopt Richland Parish's Digital Flood Insurance Rate Maps (D-FIRMs).	The Richland Parish Police Jury and the Towns of Rayville, Mangham, and Delhi will work with FEMA to update and adopt or appeal the D-FIRMs. This action increases the accuracy of floodplain identification and appropriate regulations.	FEMA Map Modernization Program, HMGP, and Flood Mitigation Assistance	Richland Parish Office Emergency Preparedness and Richland Parish Police Jury	Flood, Dam Failure, and Levee Failure	Completed
R20: Outreach to Agriculture Landowners on information regarding benefits of the Farm Service Agency's Noninsured Crop Disaster Assistance.	The Farm Service Agency's Noninsured Crop Disaster Assistance Program insures crops that will not be insured by the private sector. This includes crops grown for food, livestock, consumption, cotton, flax, and seeds.	No potential funding source can be readily identified	Richland Parish Office Emergency Preparedness and LSU Ag Center	Thunderstorm, Tornado, Hurricane/Tropical Storm, Winter Storm, Hailstorm, Drought, Flood, Dam Failure, and Levee Failure	Carried Over

R21: Encourage underground installation of all new utility construction projects.	The Parish will encourage all new construction projects to build utilities underground where available. This will reduce the Parish's vulnerability to utility damage and power outages during wind events and winter storms.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Manager and Engineer	Thunderstorm, Tornado, Hurricane/Tropical Storm, and Winter Storm	Completed
R22: Construct a Community Wind Shelter.	Community Wind Shelters are usually built near large public buildings to protect residents who lack shelter. Community Wind Shelters can withstand 250-mph winds and are intended to house people for up to 36 hours.	State Grants, HMGP, and Additional Grant Sources	Richland Parish Manager and Engineer	Thunderstorm, Tornado, and Hurricane/Tropical Storm	Carried Over
R23: Implement a Weatherization Education Program.	Weatherization Education Program would educate homeowners on how to make homes less vulnerable to winter storm events and provide information on individual assistance funding opportunities.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Office of Emergency Preparedness	Winter Storm	Completed
R24: Implement a water restriction ordinance.	Implement a water restriction ordinance during drought hazard events.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Office of Emergency Preparedness	Drought	Deleted
R25: Implement a Mosquito-borne Disease Education Outreach Program	Distribute brochures on population risk and mitigation activities for mosquito-borne disease.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Office of Emergency Preparedness and Dept of Health and Hospitals	Mosquito-borne Disease	Deleted
R26: Implement a Mosquito-borne Disease Abatement Program.	Spray and monitor mosquito habitats during high mosquito breeding seasons.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Office of Emergency Preparedness and Dept of Health and Hospitals	Mosquito-borne Disease	Deleted

R27: Conduct a Commodity Flow Study	A Commodity Flow Study identifies the types and amounts of chemical commodities transported through areas within the Parish, including pipelines and rail transportation.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Office of Emergency Preparedness	Chemical Spills	Deleted
R28: Provide information to new and existing homeowners on their home's proximity to pipelines.	Send letters to residents on their home's proximity to pipelines and chemicals. Also, incorporate a disclosure policy to newly developed buildings constructed near pipelines and chemical holding facilities.	Local Budget, State Grants, HMGP, and Additional Grant Sources	Richland Parish Office of Emergency Preparedness and Police Jury	Chemical Spills	Deleted

Unincorporated Richland New Mitigation Actions

Richland Unincorporated - New Mitigation Actions							
Jurisdiction-Specific Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
R1: 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 HGMP, Local	1-5 years	Richland Parish OHSEP	Wind, Tropical Cyclone, Tornado, Hail	1,4	New
R2: 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 HGMP, Local	1-5 years	Richland Parish OHSEP	Flooding, Tropical Cyclone	1,2,3,4	New
R3: 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 HGMP, Local	1-5 years	Richland Parish OHSEP	Flooding, tropical cyclone, Dam Failure, Levee Failure	1,2,3,4	New
R4: Safe Room Projects	Construction of a safe room for first responders located in Richland Parish. Other locations will be identified based on funding availability.	FEMA HGMP, Local	1-5 years	Richland Parish OHSEP	Tornado, wind, tropical cyclone	1,2,4	New

R5: Education and Outreach	Enhance the public outreach programs for the parish and all communities by increasing awareness of risks and safety for Flooding, Tropical Cyclone, tornados, thunderstorms (lightning, high wind, hail), drought, dam and 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 HGMP, Local	1-5 years	Richland Parish OHSEP	Flooding, Tropical Cyclone, tornados, thunderstorms (lightning, high wind, hail), winter storms, drought, Dam Failure, Levee Failure	1,2,3,4,5	New
R6: Generators for continuity of operations and government	Procurement and Installation of generators at public facilities to ensure continued operations during and after events.	FEMA HGMP, Local	1-5 years	Richland Parish OHSEP	Tornados, winter storms, tropical cyclone, thunderstorms (lightning, high wind, hail)	1,2	New
R7:Lightning Mitigation	Procurement and Installation of Lightning rods and surge protectors for public buildings to preserve life and property	FEMA HGMP, Local	1-5 years	Richland Parish OHSEP	Lightning	1,2	New
R8: Warning Systems	Update/upgrade public warning system components throughout Richland Parish as necessary. Install audible and/or reverse 911 warning system(s)	FEMA HGMP, Local	1-5 years	Richland Parish OHSEP	Winter storm, tornados, tropical cyclone, Dam Failure, Levee Failure	1,2,3	New
R9: 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 HGMP, Local	1-5 years	Richland Parish OHSEP	Tropical Cyclone, thunderstorms (lightning, high wind, hail), tornados, drought,	1,2	New
R10: 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 HGMP, Local	1-5 years	Richland Parish OHSEP	Tropical Cyclone, Flooding, Dam Failure, Levee Failure	1,2,3	New
R11: Dam and Levee Failure Working Group	Create a working group in order to assess the extent and determine the possible effects of a dam or levee failure.	FEMA HGMP, Local	1-5 years	Richland Parish OHSEP and Mayors	Dam Failure, Levee Failure, Flooding	1,2,3,4	New
R12: Drought Ordinances	Adopt ordinances requiring water-saving measures in time of drought	FEMA HGMP, Local	1-5 years	Richland Parish OHSEP	Drought	1,2	New

Town of Delhi - New Mitigation Actions

Town of Delhi							
Jurisdiction-Specific Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
D1: 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, Local	1-5 years	Town of Delhi/Richland Parish OHSEP	Wind, Tropical Cyclone, Tornado, Hail	1,4	New
D2: 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, Local	1-5 years	Town of Delhi/Richland Parish OHSEP	Flooding, Tropical Cyclone	1,2,3,4	New
D3: 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, Local	1-5 years	Town of Delhi/Richland Parish OHSEP	Flooding, tropical cyclone, Dam Failure, Levee Failure	1,2,3,4	New
D4: Safe Room Projects	Construction of a safe room for first responders located in Richland Parish. Other locations will be identified based on funding availability.	FEMA HMGP, Local	1-5 years	Town of Delhi/Richland Parish OHSEP	Tornado, wind, tropical cyclone	1,2,4	New

D5: Education and Outreach	Enhance the public outreach programs for the parish and all communities by increasing awareness of risks and safety for Flooding, Tropical Cyclone, tornados, thunderstorms (lightning, high wind, hail), drought, dam and 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, Local	1-5 years	Town of Delhi/Richland Parish OHSEP	Flooding, Tropical Cyclone, tornados, thunderstorms (lightning, high wind, hail), winter storms, drought, Dam Failure, Levee Failure	1,2,3,4,5	New
D6: 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, Local	1-5 years	Town of Delhi/Richland Parish OHSEP	Tornados, winter storms, tropical cyclone, thunderstorms (lightning, high wind, hail)	1,2	New
D7:Lightning Mitigation	Procurement and Installation of Lightning rods and surge protectors for public buildings to preserve life and property	FEMA HMGP, Local	1-5 years	Town of Delhi/Richland Parish OHSEP	Lightning	1,2	New
D8: Warning Systems	Update/upgrade public warning system components throughout Richland Parish as necessary. Install audible and/or reverse 911 warning system(s)	FEMA HMGP, Local	1-5 years	Town of Delhi/Richland Parish OHSEP	Winter storm, tornados, tropical cyclone, Dam Failure, Levee Failure	1,2,3	New
D9: 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, Local	1-5 years	Town of Delhi/Richland Parish OHSEP	Tropical Cyclone, thunderstorms (lightning, high wind, hail), tornados, drought,	1,2	New
D10: 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, Local	1-5 years	Town of Delhi/Richland Parish OHSEP	Tropical Cyclone, Flooding, Dam Failure, Levee Failure	1,2,3	New
D11: Dam and Levee Failure Working Group	Create a working group in order to assess the extent and determine the possible effects of a dam or levee failure.	FEMA HMGP, Local	1-5 years	Richland Parish OHSEP and Mayors	Dam Failure, Levee Failure, Flooding	1,2,3,4	New
D12: Drought Ordinances	Adopt ordinances requiring water-saving measures in time of drought	FEMA HGMP, Local	1-5 years	Town of Delhi/Richland Parish OHSEP	Drought	1,2	New

Town of Mangham - New Mitigation Actions

Town of Mangham							
Jurisdiction-Specific Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
M1: 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, Local	1-5 years	Town of Mangham/Richland Parish OHSEP	Wind, Tropical Cyclone, Tornado, Hail	1,4	New
M2: 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, Local	1-5 years	Town of Mangham/Richland Parish OHSEP	Flooding, Tropical Cyclone	1,2,3,4	New
M3: 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, Local	1-5 years	Town of Mangham/Richland Parish OHSEP	Flooding, tropical cyclone, Dam Failure, Levee Failure	1,2,3,4	New
M4: Safe Room Projects	Construction of a safe room for first responders located in Richland Parish. Other locations will be identified based on funding availability.	FEMA HMGP, Local	1-5 years	Town of Mangham/Richland Parish OHSEP	Tornado, wind, tropical cyclone	1,2,4	New
M5: Education and Outreach	Enhance the public outreach programs for the parish and all communities by increasing awareness of risks and safety for Flooding, Tropical Cyclone, tornados, thunderstorms (lightning, high wind, hail), drought, dam and 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, Local	1-5 years	Town of Mangham/Richland Parish OHSEP	Flooding, Tropical Cyclone, tornados, thunderstorms (lightning, high wind, hail), winter storms, drought, Dam Failure, Levee Failure	1,2,3,4,5	New

M6: 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, Local	1-5 years	Town of Mangham/Richland Parish OHSEP	Tornados, winter storms, tropical cyclone, thunderstorms (lightning, high wind, hail)	1,2	New
M7:Lightning Mitigation	Procurement and Installation of Lightning rods and surge protectors for public buildings to preserve life and property	FEMA HMGP, Local	1-5 years	Town of Mangham/Richland Parish OHSEP	Lightning	1,2	New
M8: Warning Systems	Update/upgrade public warning system components throughout Richland Parish as necessary. Install audible and/or reverse 911 warning system(s)	FEMA HMGP, Local	1-5 years	Town of Mangham/Richland Parish OHSEP	Winter storm, tornados, tropical cyclone, Dam Failure, Levee Failure	1,2,3	New
M9: 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, Local	1-5 years	Town of Mangham/Richland Parish OHSEP	Tropical Cyclone, thunderstorms (lightning, high wind, hail), tornados, drought,	1,2	New
M10: 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, Local	1-5 years	Town of Mangham/Richland Parish OHSEP	Tropical Cyclone, Flooding, Dam Failure, Levee Failure	1,2,3	New
M11: Dam and Levee Failure Working Group	Create a working group in order to assess the extent and determine the possible effects of a dam or levee failure.	FEMA HMGP, Local	1-5 years	Richland Parish OHSEP and Mayors	Dam Failure, Levee Failure, Flooding	1,2,3,4	New
M12: Drought Ordinances	Adopt ordinances requiring water-saving measures in time of drought	FEMA HGMP, Local	1-5 years	Town of Mangham/Richland Parish OHSEP	Drought	1,2	New

Town of Rayville - New Mitigation Actions

Town of Rayville							
Jurisdiction-Specific Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
R1: 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, Local	1-5 years	Town of Rayville/Richland Parish OHSEP	Wind, Tropical Cyclone, Tornado, Hail	1,4	New
R2: 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, Local	1-5 years	Town of Rayville/Richland Parish OHSEP	Flooding, Tropical Cyclone	1,2,3,4	New
R3: 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, Local	1-5 years	Town of Rayville/Richland Parish OHSEP	Flooding, tropical cyclone, Dam Failure, Levee Failure	1,2,3,4	New
R4: Safe Room Projects	Construction of a safe room for first responders located in Richland Parish. Other locations will be identified based on funding availability.	FEMA HMGP, Local	1-5 years	Town of Rayville/Richland Parish OHSEP	Tornado, wind, tropical cyclone	1,2,4	New
R5: Education and Outreach	Enhance the public outreach programs for the parish and all communities by increasing awareness of risks and safety for Flooding, Tropical Cyclone, tornados, thunderstorms (lightning, high wind, hail), drought, dam and 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, Local	1-5 years	Town of Rayville/Richland Parish OHSEP	Flooding, Tropical Cyclone, tornados, thunderstorms (lightning, high wind, hail), winter storms, drought, Dam Failure, Levee Failure	1,2,3,4,5	New

R6: 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, Local	1-5 years	Town of Rayville/Richland Parish OHSEP	Tornados, winter storms, tropical cyclone, thunderstorms (lightning, high wind, hail)	1,2	New
R7:Lightning Mitigation	Procurement and Installation of Lightning rods and surge protectors for public buildings to preserve life and property	FEMA HMGP, Local	1-5 years	Town of Rayville/Richland Parish OHSEP	Lightning	1,2	New
R8: Warning Systems	Update/upgrade public warning system components throughout Richland Parish as necessary. Install audible and/or reverse 911 warning system(s)	FEMA HMGP, Local	1-5 years	Town of Rayville/Richland Parish OHSEP	Winter storm, tornados, tropical cyclone, Dam Failure, Levee Failure	1,2,3	New
R9: 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, Local	1-5 years	Town of Rayville/Richland Parish OHSEP	Tropical Cyclone, thunderstorms (lightning, high wind, hail), tornados, drought	1,2	New
R10: 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, Local	1-5 years	Town of Rayville/Richland Parish OHSEP	Tropical Cyclone, Flooding, Dam Failure, Levee Failure	1,2,3	New
R11: Dam and Levee Failure Working Group	Create a working group in order to assess the extent and determine the possible effects of a dam or levee failure.	FEMA HMGP, Local	1-5 years	Richland Parish OHSEP and Mayors	Dam Failure, Levee Failure, Flooding	1,2,3,4	New
R12: Drought Ordinances	Adopt ordinances requiring water-saving measures in time of drought	FEMA HGMP, Local	1-5 years	Town of Rayville/Richland Parish OHSEP	Drought	1,2	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 Richland 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, or political priorities within the past 5 years, with the methodology and prioritization process remaining the same.

Richland 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.

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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 Richland Parish Hazard Mitigation Plan Update

The Richland 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.

Richland Parish includes the unincorporated area of the parish, as well as three incorporated municipalities that participated in the plan update process – the Town of Rayville, Town of Delhi, and Town of Mangham. Richland 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.
2/3/2016	Kick-Off Meeting	Rayville, LA	No	Discuss with the plan steering committee expectations and requirements of the project. Assign plan worksheets to jurisdictions.
8/25/2016	Risk Assessment Overview	Rayville, LA	No	Discuss and review the risk assessment with the steering committee discuss and review expectations for public meeting.
8/25/2016	Public Meeting	Rayville, 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 Richland 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 Richland Parish. In addition, we asked about the methods and techniques preferred for reducing the risks and losses associated with these hazards. Survey Results: https://www.surveymonkey.com/r/RichlandParish
2 Week Period	Public Plan Review (Digital)		Yes	Parish Website and Richland Parish OHSEP

Planning

The plan update process consisted of several phases:

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

Coordination

The Richland Parish OHSEP oversaw the coordination of the 2016 Hazard Mitigation Plan Update Steering Committee during the update process. The Richland 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:

- Richland Parish Police Jury
- Richland Office of Homeland Security and Emergency Preparedness
- Town of Delhi
- Town of Mangham
- Town of Rayville

The Parish of Morehouse was invited by the Richland 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.

As part of the coordination and planning process, each jurisdiction was provided the State Required Hazard Mitigation Plan Update Worksheet. Jurisdictions with the capability to complete and return these worksheets returned them to assist with the 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	Address
Perry Fleming	Chief of Police	Town of Mangham	pfleming@yahoo.com	306 Main Street Mangham, LA
Harry Lewis	Mayor	Town of Rayville	mayor@bayou.com	109 Benedette St. Rayville, LA
Jesse Washington	Mayor	Town of Delhi	jesse.washington@att.net	209 Broadway St. Delhi, LA
Dawn Williams	Director	Richland Parish OHSEP	dawnw@rppj.org	708 Julia Street Rayville, LA
Joe Stewart	Regional Coordinator	GOHSEP	joe.stewart@la.gov	7667 Independence Blvd. Baton Rouge, LA
James Mardis	Director	Morehouse Parish OHSEP	jmardis@mpso.net	351 S Franklin St, Bastrop, LA
Peggy Robinson	Director	West Carroll Parish OHSEP	wcpoep@bellsouth.net	107 South Briggs St. Oak Grove, LA

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 Richland 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 Richland 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 (Parish and Jurisdictions)
- 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 Richland Parish.

Meeting #1: Coordination Discussion

Date: January 22, 2016
Location: Email
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 and initial project timeline.
Public Initiation: No
Invitees Included: Richland Parish OHSEP, SDMI Staff

Meeting #2: Hazard Mitigation Plan Update Kick-Off

Date: February 3, 2016
Location: Rayville, 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	Address
Perry Fleming	Chief of Police	Town of Mangham	pfleming@yahoo.com	306 Main Street Mangham, LA
Harry Lewis	Mayor	Town of Rayville	mayor@bayou.com	109 Benedette St. Rayville, LA
Jesse Washington	Mayor	Town of Delhi	jesse.washington@att.net	209 Broadway St. Delhi, LA
Dawn Williams	Director	Richland Parish OHSEP	dawnw@rppj.org	708 Julia Street Rayville, LA
Joe Stewart	Regional Coordinator	GOHSEP	joe.stewart@la.gov	7667 Independence Blvd. Baton Rouge, LA
James Mardis	Director	Morehouse Parish OHSEP	jmardis@mpso.net	351 S Franklin St, Bastrop, LA
Peggy Robinson	Director	West Carroll Parish OHSEP	wcpoep@bellsouth.net	107 South Briggs St. Oak Grove, LA

Meeting #3: Risk Assessment Overview

Date: August 25, 2016

Location: Rayville, 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	Address
Perry Fleming	Chief of Police	Town of Mangham	pfleming@yahoo.com	306 Main Street Mangham, LA
Harry Lewis	Mayor	Town of Rayville	mayor@bayou.com	109 Benedette St. Rayville, LA
Jesse Washington	Mayor	Town of Delhi	jesse.washington@att.net	209 Broadway St. Delhi, LA
Dawn Williams	Director	Richland Parish OHSEP	dawnw@rppj.org	708 Julia Street Rayville, LA
Joe Stewart	Regional Coordinator	GOHSEP	joe.stewart@la.gov	7667 Independence Blvd. Baton Rouge, LA
James Mardis	Director	Morehouse Parish OHSEP	jmardis@mpso.net	351 S Franklin St, Bastrop, LA
Peggy Robinson	Director	West Carroll Parish OHSEP	wcpoep@bellsouth.net	107 South Briggs St. Oak Grove, LA

Meeting #4: Public Meeting

Date: August 25, 2016

Location: Rayville, 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 Richland 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	Address
Perry Fleming	Chief of Police	Town of Mangham	pfleming@yahoo.com	306 Main Street Mangham, LA
Harry Lewis	Mayor	Town of Rayville	mayor@bayou.com	109 Benedette St. Rayville, LA
Jesse Washington	Mayor	Town of Delhi	jesse.washington@att.net	209 Broadway St. Delhi, LA
Dawn Williams	Director	Richland Parish OHSEP	dawnw@rppj.org	708 Julia Street Rayville, LA
Joe Stewart	Regional Coordinator	GOHSEP	joe.stewart@la.gov	7667 Independence Blvd. Baton Rouge, LA
James Mardis	Director	Morehouse Parish OHSEP	jmardis@mpso.net	351 S Franklin St, Bastrop, LA
Peggy Robinson	Director	West Carroll Parish OHSEP	wcpoep@bellsouth.net	107 South Briggs St. Oak Grove, LA

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

Meeting Public Notice

RICHLAND PARISH
OFFICE OF HOMELAND SECURITY & EMERGENCY PREPAREDNESS

MEETING NOTICE – August 25, 2016

Richland Parish to hold Public Meetings for Hazard Mitigation Plan Update

Rayville, LA – Richland Parish Office of Homeland Security & Emergency Preparedness is in the process of updating the Richland Parish Hazard Mitigation Plan and are required to hold public meetings on the plan update. The Public meeting will be held on August 25, 2016 in the Richland OEP Office Meeting Room located at 708 Julia Street 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.

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

Residents of Richland 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/RichlandParish

For more information, please contact: Dawn Williams, Richland Parish OHSEP Director

Stephenson Disaster Management Institute
Louisiana State University • 3000 Business Education Complex • Baton Rouge, Louisiana 70803

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 Richland Parish Hazard Mitigation Draft Plan was placed on the Richland Parish website to collect comments and feedback from the public. This outreach provided the public an opportunity to comment on the plan during the drafting stage and prior to plan approval. No feedback or public comment was received during this time.

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 Richland 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

Richland 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

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

- Ordinances, Resolutions, Regulations
- Floodplain Ordinances
- Emergency Operations Plan
- Comprehensive Master Plan
- Economic Development Plan
- Continuity of Operations Plan
- Capital Improvements Plan
- Transportation Plan

Opportunities to integrate the requirements of this plan into other local planning mechanisms will continue to be identified through future meetings of the Richland 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 Richland Parish Hazard Mitigation Plan, and will not contribute to increased hazard vulnerability within the parish.

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

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

On behalf of the jurisdictions of Unincorporated Richland Parish, as well as the Town of Rayville, Town of Delhi, and Town of Mangham, Richland Parish 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 Richland Parish
Comprehensive Master Plan/Updated as needed/Richland Parish Police Jury
Capital Improvements Plan/Updated as needed/Richland Parish Police Jury
Economic Development Plan/Updated as needed/Richland Parish Police Jury
Local Emergency Operations Plan/Updated as needed/Richland Parish OHSEP
Continuity of Operations Plan/Update as needed/Richland Parish OHSEP
Transportation Plan/Updated as needed/Richland Parish Police Jury

Town of Delhi
There are no additional plans within this jurisdiction for the Hazard Mitigation Plan to be integrated.

Town of Mangham
There are no additional plans within this jurisdiction for the Hazard Mitigation Plan to be integrated.

Town of Rayville
Capital Improvements Plan/Updated as needed/Richland Parish Police Jury and Mayor of Rayville
Economic Development Plan/Updated as needed/Richland Parish Police Jury and Mayor of Rayville
Local Emergency Operations Plan/Updated as needed/Richland Parish OHSEP
Continuity of Operations Plan/Update as needed/Richland Parish OHSEP
Transportation Plan/Updated as needed/Richland Parish Police Jury and Mayor of Rayville

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

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Appendix C: Essential Facilities

Richland Parish Essential Facilities – All Jurisdictions

Richland Unincorporated Essential Facilities											
Type	**Name**	**Drought***	**Flooding**	**Hail**	**Lightning**	**Wind**	**Tornado**	**Tropical Cyclone**	**Winter Storms***	**Dam Failure+**	**Levee Failure+**
Fire and Rescue	Archibald-Alto Fire District 2			X	X	X	X	X			
	District 8 Fire Station			X	X	X	X	X			
	District 8 Station			X	X	X	X	X			
	Holly Ridge Fire District Station 3			X	X	X	X	X			
	Holly Ridge Station			X	X	X	X	X			
	Hwy 133 Fire Station			X	X	X	X	X			
	Mangham Fire Department			X	X	X	X	X			
	Mangham Fire Department			X	X	X	X	X			
	Mangham Fire District - Woolen Lake			X	X	X	X	X			
	Ward One Fire Department - Dunn Station			X	X	X	X	X			
	Ward One Rural Fire Department			X	X	X	X	X			
	Warden Station			X	X	X	X	X			
Government	Rayville Maintenance Unit		X	X	X	X	X	X			
Corrections	Richland Parish Detention Center		X	X	X	X	X	X			
Schools	Delhi Charter School			X	X	X	X	X			
	Riverfield Academy			X	X	X	X	X			
	Start Elementary			X	X	X	X	X			
	Holly Ridge			X	X	X	X	X			

Delhi Essential Facilities									
Type	Name	Drought*	Flooding	Hail	Lightning	Wind	Tornado	Tropical Cyclone	Winter Storms*
Fire and Rescue	Dehli Fire Station			X	X	X	X	X	
	Dehli Fire Station #2								
Government	Dehli Municipal Building			X	X	X	X	X	
	Early Childhood Support Services								
	Richland Voluntary Council on Aging			X	X	X	X	X	
Law Enforcement	Town of Dehli Police Department			X	X	X	X	X	
Public Health	Dehli Hospital			X	X	X	X	X	
Schools	Dehli Elementary School			X	X	X	X	X	
	Dehli High School			X	X	X	X	X	
	Dehli Middle School			X	X	X	X	X	

Mangham Essential Facilities									
Type	Name	Drought*	Flooding	Hail	Lightning	Wind	Tornado	Tropical Cyclone	Winter Storms*
Fire and Rescue	Mangham Fire Station			X	X	X	X	X	
	Mangham Fire Department			X	X	X	X	X	
Government	Mangham Town Hall			X	X	X	X	X	
Law Enforcement	Mangham Police Station			X	X	X	X	X	
Schools	Mangham Elementary School			X	X	X	X	X	
	Mangham Junior/High School			X	X	X	X	X	

Rayville Essential Facilities									
Type	Name	Drought*	Flooding	Hail	Lightning	Wind	Tornado	Tropical Cyclone	Winter Storms*
Fire and Rescue	Rayville Fire Department			X	X	X	X	X	
Government	Beouf River Soil and Conservation District			X	X	X	X	X	
	Fifth District Drug Court and Hearing Officer		X	X	X	X	X	X	
	Kalil Municipal Building			X	X	X	X	X	
	LA Secretary of State			X	X	X	X	X	
	Northeast LA Substance Abuse Office		X	X	X	X	X	X	
	Office of State Representative			X	X	X	X	X	
	Richland Parish Courthouse			X	X	X	X	X	
	Richland Parish Police Jury			X	X	X	X	X	
	Richland Voluntary Council on Aging			X	X	X	X	X	
	USDA Ag Marketing Service - Cotton Program			X	X	X	X	X	
Law Enforcement	Rayville Police Department								
	Richland Parish Sheriff's Office			X	X	X	X	X	
Schools	Rayville Elementary School			X	X	X	X	X	

*No critical facilities are vulnerable to the hazard

+Unknown due to data deficiency

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Appendix D: Plan Adoption

A RESOLUTION ADOPTING THE
RICHLAND PARISH HAZARD MITIGATION PLAN UPDATE 2016

WHEREAS, the Richland Parish Police Jury has prepared a multi-hazard mitigation plan hereby known as the PARISH HAZARD MITIGATION PLAN 2016 in accordance with the Disaster Mitigation Act of 2000; and

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

WHEREAS, the Richland 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;

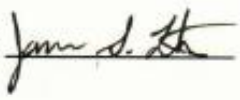
WHEREAS the Plan has been recommended for adoption by the steering committee;

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 Richland Parish Police Jury does hereby adopt the Richland Parish Hazard Mitigation Plan Update 2016.

ADOPTED by a vote of 7 in favor and 0 against, and 0 abstaining, on this 7th day of November, 2016.

President, Richland Parish Police Jury 
11/11/2016

RESOLUTION 2016-9

A RESOLUTION ADOPTING THE
RICHLAND PARISH HAZARD MITIGATION PLAN 2016

WHEREAS **Town of Rayville** has prepared a multi-hazard mitigation plan hereby known as the RICHLAND PARISH HAZARD MITIGATION PLAN 2016 in accordance with the Disaster Mitigation Act of 2000; and

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

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

WHEREAS Richland 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 Town of Rayville does hereby adopt the Richland Parish Hazard Mitigation Plan Update 2016.

ADOPTED by a vote of **All** in favor and **None** against, and **None** abstaining, on this the **12th** day of **December**, 2016.

ATTEST:

Deborah T. Nealon, LCMC
Town Clerk

TOWN OF RAYVILLE

Harry Lewis
Harry Lewis, Mayor

RESOLUTION

THEREAS the Town of Delhi recognizes the threat that a natural hazards pose to people and property within the Town of Delhi; and

WHEREAS the Town of Delhi has prepared a multi-hazard mitigation plan, hereby known as THE TOWN OF DELHI MITIGATION PLAN – UPDATE 2016 in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS THE TOWN OF DELHI MITIGATION PLAN – UPDATE 2016 identifies mitigation goals and action to reduce or eliminate long-term risk to people and property in the Town of Delhi from the impacts of future hazards and disasters; and

WHEREAS adopting by the Town of Delhi Council demonstrates their commitment to the hazard mitigation and achieving the goals outlined in THE TOWN OF DELHI HAZARD MITIGATION PLAN – 2016 UPATE.

NOW THEREFORE, BE IT RESOLVED BY THE TOWN OF DELHI COUNCIL THAT:

Section 1. In accordance with the Town of Delhi Lawrason Act, the Town of Delhi Council adopts THE TOWN OF DELHI HAZARD MITIGATION PLAN – UPDATE 2016.

That this resolution shall be in full force and effect from and after its adoption.

A MOTION TO ADOPT the above resolution was made by Alderman Benson, seconded by Alderman Washington and resulted in the following vote:

YEAS (4)
NAYS (0)
ABSENT (0)
ABSTAINING (0)

CERTIFICATE

We the undersigned do certify that the foregoing resolution is a true and correct copy of a resolution adopted at a meeting held on the 24th day of October, 2016, at which meeting a quorum was present and voting.

Jesse Washington
Jesse Washington, Mayor

ATTEST:

Nandeaner McDowell, Town Clerk

UNITED STATES OF AMERICA
STATE OF LOUISIANA
TOWN OF MANGHAM

A RESOLUTION OF THE TOWN OF MANGHAM ADOPTING THE TOWN OF MANGHAM HAZARD MITIGATION PLAN - UPDATE 2016

WHEREAS, the Town of Mangham recognizes the threat that natural hazards pose to people and property within the Town of Mangham located in Richland Parish; and

WHEREAS, the Town of Mangham has prepared a multi-hazard mitigation plan, hereby known as the TOWN OF MANGHAM MITIGATION PLAN - UPDATE 2016 in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS, the Town of Mangham Hazard Mitigation Plan - update 2016 indentifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Richland Parish from the impacts of future hazards and disasters; and

WHEREAS, adoption by the council of the Town of Mangham demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the TOWN OF MANGHAM MITIGATION PLAN - UPDATE 2016.

NOW THEREFORE, BE IT RESOLVED BY THE MANGHAM TOWN COUNCIL THAT:

Section 1. In accordance with the Richland Parish Home Rule Charter, the Mangham Town Council adopts the TOWN OF MANGHAM HAZARD MITIGATION PLAN - UPDATE 2016.

I hereby certify that I am the duly acting and qualified Mayor of the Town of Mangham and that the above foregoing constitutes a true and correct copy of the Resolution duly adopted at a meeting of the Council held on November 14, 2016, at which meeting a quorum was present and voted in favor of said Resolution, said Resolution never having been modified or rescinded and is still in full force and effect.

Mayor, Town of Mangham Johnny L Nutt
Date: November 14, 2016

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	Address
Perry Fleming	Chief of Police	Town of Mangham	pfleming@yahoo.com	306 Main Street Mangham, LA
Harry Lewis	Mayor	Town of Rayville	mayor@bayou.com	109 Benedette St. Rayville, LA
Jesse Washington	Mayor	Town of Delhi	jesse.washington@att.net	209 Broadway St. Delhi, LA
Dawn Williams	Director	Richland Parish OHSEP	dawnw@rppj.org	708 Julia Street Rayville, LA
Joe Stewart	Regional Coordinator	GOHSEP	joe.stewart@la.gov	7667 Independence Blvd. Baton Rouge, LA
James Mardis	Director	Morehouse Parish OHSEP	jmardis@mpso.net	351 S Franklin St, Bastrop, LA
Peggy Robinson	Director	West Carroll Parish OHSEP	wcpoep@bellsouth.net	107 South Briggs St. Oak Grove, LA

Capability Assessment

Richland Unincorporated

Planning and Regulatory		

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

Richland Unincorporated		
Plans	Yes/No	Comments
Comprehensive / Master Plan	YES	
Capital Improvements Plan	YES	
Economic Development Plan	YES	
Local Emergency Operations Plan	YES	
Continuity of Operations Plan	YES	
Transportation Plan	YES	
Stormwater Management Plan	NO	
Community Wildfire Protection Plan	NO	
Other plans (redevelopment, recovery, coastal zone management)	YES	
Building Code, Permitting and Inspections		
Building Code	YES	
Building Code Effectiveness Grading Schedule (BCEGS) Score	YES	
Fire Department ISO/PIAL rating	YES	
Site plan review requirements	YES	
Land Use Planning and Ordinances		
Zoning Ordinance	YES	
Subdivision Ordinance	YES	
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	NO	

Administration and Technical		

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

Administration	Yes/No	Comments
Planning Commission	YES	
Mitigation Planning Committee	YES	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	YES	
Staff		
Chief Building Official	YES	
Floodplain Administrator	YES	
Emergency Manager	YES	
Community Planner	NO	
Civil Engineer	YES	
GIS Coordinator	YES	
Grant Writer	NO	
Other	NO	
Technical		
Warning Systems / Service (Reverse 911, outdoor warning signals)	YES	
Hazard Data & Information	YES	
Grant Writing	NO	
Hazus Analysis	YES	
Other	NO	

Financial

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

Funding Resource	Yes/No	Comments
Capital Improvements project funding	YES	
Authority to levy taxes for specific purposes	YES	
Fees for water, sewer, gas, or electric services	NO	
Impact fees for new development	NO	
Stormwater Utility Fee	NO	
Community Development Block Grant (CDBG)	NO	
Other Funding Programs	NO	

Education and Outreach

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

Program / Organization	Yes/No	Comments
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	YES	
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	YES	
Firewise Communities certification	YES	
Public/Private partnership initiatives addressing disaster-related issues	YES	
Other	NO	

Town of Delhi

Planning and Regulatory		
Please indicate which of the following plans and regulatory capabilities your of jurisdiction		
DELHI		
Plans	Yes/No	Comments
Comprehensive / Master Plan	No	Small Town
Capital Improvements Plan	No	"
Economic Development Plan	No	"
Local Emergency Operations Plan	No	"
Continuity of Operations Plan	No	"
Transportation Plan	No	Relies on parish capabilities
Stormwater Management Plan	No	
Community Wildfire Protection Plan	No	
Other plans (redevelopment, recovery, coastal zone management)	No	
Building Code, Permitting and Inspections		
Building Code	No	Small Town
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	"
Fire Department ISO/PIAL rating	Yes	"
Site plan review requirements	No	"
Land Use Planning and Ordinances		
Zoning Ordinance	Yes	Small Town
Subdivision Ordinance	No	"
Floodplain Ordinance	Yes	"
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	No	"
Flood Insurance Rate Maps	Yes	Relies on parish capabilities
Acquisition of land for open space and public recreation uses	Yes	

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

Financial		
Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.		
Funding Resource	Yes/No	Comments
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	No	
Education and Outreach		
Identify education and outreach programs and methods, already in place that could be used to implement mitigation		
activities and communicate hazard-related information.		
Program / Organization	Yes/No	Comments
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	No	
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	No	
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	
Other	No	

Town of Mangham

Planning and Regulatory		

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

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

Administration and Technical		

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

Administration	Yes/No	Comments
Planning Commission	No	Relies on parish capabilities
Mitigation Planning Committee	No	Relies on parish capabilities
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	No	
Staff		
Chief Building Official	No	
Floodplain Administrator	No	Relies on parish capabilities
Emergency Manager	Yes	Relies on parish capabilities
Community Planner	No	
Civil Engineer	No	
GIS Coordinator	No	
Grant Writer	No	
Other		
Technical		
Warning Systems / Service (Reverse 911, outdoor warning signals)	Yes	Alert FM
Hazard Data & Information	Yes	
Grant Writing	Yes	
Hazus Analysis	No	
Other	No	

Financial

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

Funding Resource	Yes/No	Comments
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	No	

Education and Outreach

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

Program / Organization	Yes/No	Comments
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	No	
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	No	
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	
Other	No	

Town of Rayville

Planning and Regulatory		

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

Rayville		
Plans	Yes/No	Comments
Comprehensive / Master Plan	No	
Capital Improvements Plan	yes	
Economic Development Plan	yes	
Local Emergency Operations Plan	Yes	
Continuity of Operations Plan	Yes	
Transportation Plan	yes	
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	Yes	
Fire Department ISO/PIAL rating	Yes	4,5
Site plan review requirements	Yes	
Land Use Planning and Ordinances		
Zoning Ordinance	Yes	
Subdivision Ordinance	Yes	
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	no	

Administration and Technical		

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

Administration	Yes/No	Comments
Planning Commission	Yes	
Mitigation Planning Committee	Yes	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	
Staff		
Chief Building Official	Yes	On contract
Floodplain Administrator	Yes	On contract
Emergency Manager	Yes	
Community Planner	Yes	
Civil Engineer	Yes	
GIS Coordinator	No	
Grant Writer	No	
Other	No	
Technical		
Warning Systems / Service (Reverse 911, outdoor warning signals)	Yes	
Hazard Data & Information	Yes	
Grant Writing	No	
Hazus Analysis	No	
Other	No	

Financial

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

Funding Resource	Yes/No	Comments
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)	No	
Other Funding Programs	No	

Education and Outreach

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

Program / Organization	Yes/No	Comments
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional 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	Yes	
Other	No	

Building Inventory

Critical Facility (If Yes, Mark X)	Name of Building	Purpose of Building	Address	City	Latitude	Longitude	Assessed Value	Date Built	Construction Type
Richland Parish									
	Start Elementary	Education	883 Charleston Drive	Start	32.4874434	-91.85762285	$ 8,541,310	1960	Concrete
X	Mangham Fire District - Woolen Lake	Fire Search and Rescue	Nearby: 2816 Louisiana 561	Columbia	32.19322094	-91.97290433	$ 243,915	2000	Metal
X	Delhi Fire Station	Fire Search and Rescue	209 Broadway Street	Delhi	32.4554098	-91.492652	$ 441,840	1970	Concrete
	Delhi High School	Education	413 Main Street	Delhi	32.46350064	-91.49168774	$ 7,931,655	1960	Concrete
	Delhi Elementary School	Education	509 Main Street	Delhi	32.46214958	-91.4921692	$ 6,480,000	1960	Concrete
	Delhi Middle School	Education	106 Toombs Street	Delhi	32.46192779	-91.48385972	$ 8,946,115	1960	Concrete
X	Mangham Fire Station	Fire Search and Rescue	511 Horace Street	Mangham	32.308368	-91.776896	$ 274,155	1960	Metal
X	Mangham Junior/High School	Education	810 McConnel Street	Mangham	32.310274	-91.786534	$ 9,728,505	1960	Concrete
X	Mangham Elementary School	Education	419 Hixon Street	Mangham	32.312369	-91.786213	$ 4,747,545	1960	Concrete

X	Mangham Fire Department	Fire Search and Rescue	Nearby: Louisiana 135	Mangham	32.24420976	-91.8517206	$ 274,155	1950	Concrete
	Rayville Elementary School	Education	#1 Learning Place	Rayville	32.46657005	-91.76087612	$ 15,600,735	1950	Concrete
	Holly Ridge School	Education	Nearby: State Route 183	Rayville	32.46847217	-91.62772647	$ 7,068,870	1960	Concrete
X	District 8 Fire Station	Fire Search and Rescue	Nearby: Louisiana 135	Rayville	32.44930919	-91.76890254	$ 1,235,115	1980	Metal
X	Archibald-Alto Fire District 2	Fire Search and Rescue	Nearby: Long Street	Rayville	32.34900009	-91.77470802	$ 269,640	1980	Metal
	Holly Ridge Fire District Station 3	Fire Search and Rescue	Nearby: Mengel Road	Rayville	32.43875713	-91.66221001	$ 100,000	1980	Metal
X	Rayville Fire Department	Fire Search and Rescue	902 Harrison Street	Rayville	32.47786782	-91.75893939	$ 191,730	1950	Concrete
X	Dehli Fire Station #2	Fire Search and Rescue	Nearby: Superior Drive	Rayville	32.46809769	-91.49209462	$ 150,000	1960	Concrete
X	Holly Ridge Station	Fire Search and Rescue	Nearby: 72 Clack Road	Rayville	32.60977132	-91.62715731	$ 79,000	1980	Metal
X	Mangham Fire Department	Fire Search and Rescue	Nearby: Louisiana 132	Rayville	32.30472477	-91.93152575	$ 274,155	1980	Metal
X	Hwy 133 Fire Station	Fire Search and Rescue	37 Solon Bennett Rd	Rayville	32.48039927	-91.85902891	$ 110,000	1980	Metal
X	Richland Parish Sheriff's Office - Criminal and Narcotics	Law Enforcement	Nearby: 822-898 U.S. 425	Rayville	32.47588557	-91.75910092	$ 300,000	2002	Concrete

	Investigations Unit								
X	Richland Parish Detention Center	Prisons and Correctional Facilities	Nearby: Louisiana 15	Rayville	32.38828454	-91.96634724	$ 620,595	1950	Concrete
X	Richardson Medical Center	Hospital or Medical Center	254 LA Hwy 3048	Rayville	32.463187	-91.749179	$ 11,761,800	1940	Concrete
	Fifth District Drug Court & Hearing Officer	Civil Government	Nearby: 613 South Eugene Street	Rayville	32.47576681	-91.76038341	$ 100,000	2000	Concrete
	Richland Parish Police Jury	Civil Government	708 Julia Street Ste 402	Rayville	32.48008518	-91.76698362	$ 1,079,730	1930	Concrete
	Richland Voluntary Council on Aging	Civil Government	Nearby: 901-909 Spruce Street	Rayville	32.4777495	-91.75355697	$ 981,990	1990	Concrete
X	Richland Parish Courthouse	Civil Government	708 Julia Street	Rayville	32.47686753	-91.75914869	$ 1,022,625	1930	Concrete
X	District 8 Station	Fire Search and Rescue	Nearby: U.S. 425	Oak Ridge	32.54941192	-91.75956134	$ 381,255	2000	Metal
Delhi									
X	Delhi Town Hall	Civil Government	210 Broadway Street	Delhi	32.45520158	-91.49271101	$ 471,960	1950	Concrete
X	Delhi Police Station	Law Enforcement	304 East Tennessee Street	Delhi	32.45478966	-91.49229258	$ 362,880	1950	Unreinforced Masonry
Mangham									
X	Mangham Town Hall	Civil Government	306 Main Street	Mangham	32.309064	-91.775956	$ 324,675	1950	Concrete
X	Mangham Police Station	Law Enforcement	306 Main Street	Mangham	32.309046	-91.776039	$ 301,995	1950	Concrete

Rayville									
X	Rayville Police Department	Law Enforcement	Nearby: 900 Harrison Street	Rayville	32.47782813	-91.75876206	$ 356,535	1950	Concrete
X	Kalil Municipal Building	Civil Government	Nearby: 706 Harrison Street	Rayville	32.47701165	-91.75657469	$ 550,000	1980	Concrete

Vulnerable Populations

Vulnerable Populations Worksheet

Richland Parish

Name	Street	City	Zip Code	Latitude	Longitude
All Hospitals (Private or Public)					
Richland Parish Hospital	407 Cincinnati Street	Delhi	71232	32.45377118	-91.49397701
Richardson Medical Center	254 LA Hwy 3048	Rayville	71269	32.463187	-91.749179
Nursing Homes (Private or Public)					
Deerfield Nursing Home	522 Main Street	Delhi	71232	32.46043865	-91.49252862
Richardson Medical Center Homecare	1612 Julia St.	Rayville	71269	32.46304086	-91.76068832
Richland Centre I - Elderly Housing	Nearby: 401-423 Madeline Street	Rayville	71269	32.4759503	-91.75676946
Richland Hospice LLC	403 Spencer Street # B	Rayville	71269	32.47206991	-91.75823528
Richardson Medical Center Home Care	1612 Julia St.	Rayville	71269	32.46732099	-91.76006972
Mobile Home Parks					
Broadway Street Mobile Home Park	916 Broadway Street	Delhi	71232	32.44728428	-91.49302885
Chicago Street Mobile Home Park	406 Chicago Street	Delhi	71232	32.45385266	-91.49669006
Second Street Mobile Home Park	102 Second Steet	Delhi	71232	32.45821848	-91.48882583

National Flood Insurance Program (NFIP)

Richland Parish

ELEMENT F: STATE REQUIREMENT

National Flood Insurance Program (NFIP)

Jurisdiction: Richland Parish

	Richland Parish	Delhi	Mangham	Rayville
Insurance Summary				
How many NFIP polices are in the community? What is the total premium and coverage?	358;Coverage $69,494,400; Premium $189,769	20; Coverage $3,990,100; Premium $10,480	6; Coverage $1,183,000; premium $1,823	123; Coverage $18,485,000; premium
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?	149; $2,790,315	29; $189,021	1; $72,493	103; $1,975,992
How many structures are exposed to flood risk with in the community?	358	20	6	123
Describe any areas of flood risk with limited NFIP policy coverage.	None	None	None	none
Staff Resources				
Is the Community FPA or NFIP Coordinator certified?	YES	YES	YES	YES
Is flood plain management an auxiliary function?	YES	YES	YES	YES
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Permit review, outreach, inspections	Yes. Permit review and inspections	Education, inspections, permit review	Permit review, engineering, inspections

What are the barriers to running an effective NFIP program in the community, if any?	Funding and man power	Limited staffing and funding	Staffing, funding, resources	Manpower and funding
Compliance History				
Is the community in good standing with the NFIP?	YES	YES	YES	YES
Are there any outstanding compliance issues(i.e., current violations)?	NO	NO	NO	NO
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?	2013	Yes, none needed at this time	Recently	YES
Is a CAV or CAC scheduled or needed? If so when?	NO	None needed	None needed at this time	None needed at this time
Regulation				
When did the community enter the NFIP?	8/1/1987	1/8/1980	10/9/1979	9/3/1980
Are the FIRMs digital or paper?	Both	Both	Both	Both
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Meet	Meet	Meet	Meet
Community Rating System (CRS)				
Does the community participate in CRS?	N/A	N/A	N/A	N/A
What is the community's CRS Class Ranking?	N/A	N/A	N/A	N/A
Does the plan include CRS planning requirements?	N/A	N/A	N/A	N/A