CALCASIEU PARISH HAZARD MITIGATION PLAN UPDATE

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Calcasieu Parish
City of Lake Charles
City of DeQuincy
City of Sulphur
City of Westlake
Town of Iowa
Town of Vinton

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The 2020 Calcasieu Parish Hazard Mitigation Plan Update was updated by the staff of the Calcasieu Parish Police Jury Division of Planning and Development. Further comments should be directed to the Calcasieu Parish Division of Planning and Development: 901 Lakeshore Drive, Suite 500, Lake Charles, LA 70601.

Contents

Section 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.

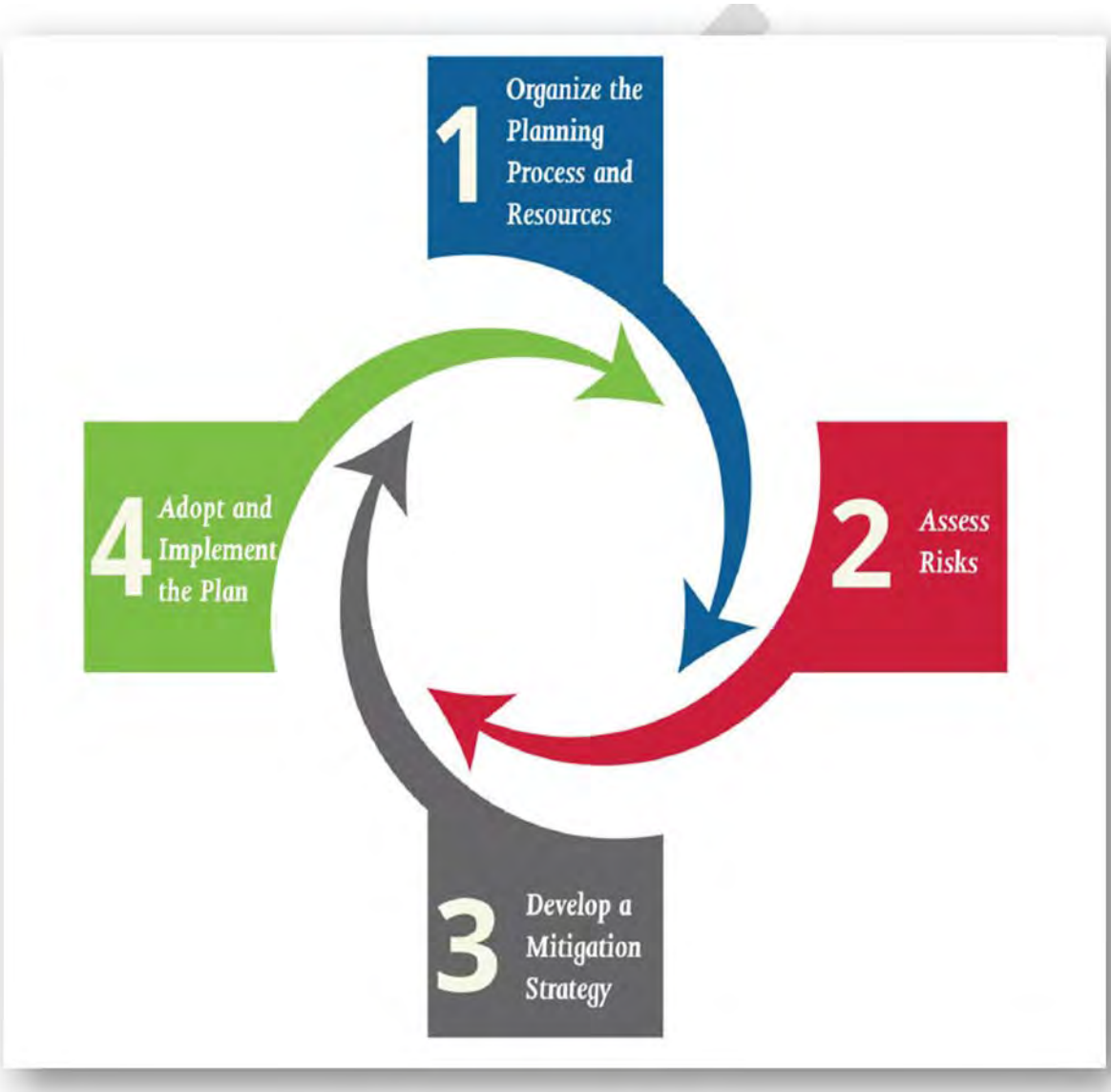


Figure 1-1 Hazard Mitigation Planning Process
SOURCE: STATE OF LOUISIANA HAZARD MITIGATION PLAN UPDATE 2019

This plan consists of three main objectives:

1. Documents the Calcasieu Parish Hazard Mitigation Plan Update process
2. Identifies natural hazards and risks within the parish
3. Identifies the parish's hazard mitigation strategy to make Calcasieu Parish less vulnerable and more disaster resistant.

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

- City of Lake Charles
- City of DeQuincy
- City of Sulphur
- City of Westlake
- Town of Iowa
- Town of Vinton

The Federal Emergency Management Agency (FEMA), 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-hurricane Katrina, Rita, and Laura environment in southwest Louisiana.

This hazard mitigation plan is a comprehensive plan for disaster resiliency in Calcasieu 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 Planning and Development 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 the FEMA, "hazard mitigation" means any sustained action taken to reduce or eliminate the long-term risk to life and property from a hazard event.

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 section.

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

History

Calcasieu Parish is in Southwest Louisiana along the Interstate 10 corridor halfway between Houston and New Orleans. Calcasieu Parish is rich with culture, history, and citizens whose families have resided in Southwest Louisiana for many generations. The topography is generally flat with ground elevations near zero in some southern areas. Large and small waterways weave through the entire parish. The planning area covers approximately 1,094 square miles, including roughly 23 square miles of water area. Calcasieu Parish is bordered by Beauregard Parish to the north, Jefferson Davis Parish to the east, Cameron Parish to the south, and the Sabine River / Newton and Orange County, Texas, to the west.

Figure 1-2 Location of Calcasieu Parish within the State of Louisiana

The parish includes six incorporated municipalities - Iowa, Lake Charles, Sulphur, Vinton, Westlake, and DeQuincy. Vinton is located on the western boundary of the parish; Sulphur, Westlake and Lake Charles near the center of the parish, DeQuincy on the northern boundary, and Iowa on the eastern boundary of the parish. Calcasieu Parish was formed out of St. Landry Parish by an act of the State Legislature on March 24, 1840. The name Calcasieu comes from the Atakapan word, *"quelqueshue",* meaning 'the call of a hunting eagle'. It was originally the name of an Atakapa tribal chief who led charges into battle with a piercing yell like the scream of an eagle.

European settlement of the area began around 1815 along the Calcasieu River. As quoted from the legislative act of formation, when the parish was formed, its boundaries were "...all the territory in the parish of St. Landry, within the following boundaries, to-wit: Commencing at the mouth of the River Mermentau, thence up said river to the mouth of the Bayou Nez Pique, thence up said bayou to the mouth of Cedar Creek, thence due north to the dividing line between the parishes of St. Landry and Rapides, thence along said line to the Sabine River, thence down the said river to the mouth, thence along the sea coast to the place of beginning...".

Calcasieu Parish is governed by an elected body known as the Police Jury. There are 15 single member Police Jury districts. Each district has one juror elected for representation. This is in line with the decision of the U.S. Supreme Court of the "one man, one vote" theory. The U.S. Department of Justice requires redistricting of the parish following each official census to ensure that each juror represents approximately the same number in population.

A one mile, four-lane bridge with 135 foot vertical clearance links downtown Lake Charles and western Calcasieu Parish. Just south of Lake Charles, a magnificent curving bridge spans the Calcasieu Ship Channel. Unique in design, the bridge itself is an object of engineering beauty and provides a vital link between Lake Charles and the area's industrial complex. The Port of Lake Charles is accessible to ocean-going vessels and is only 34 miles from the Gulf of Mexico, the shortest distance of any deep-water port in Louisiana. Lake Charles is the home of McNeese State University, a four-year, fully accredited institution which offers courses in liberal arts, commerce, science, agriculture, and engineering. Sowela Technical Community College, also located in Lake Charles, is one of the state's largest vocational schools and is nationally recognized for its fine training program. An abundance of streams, rivers, and lakes, along with museums, art galleries, and festivals, make the parish a true paradise.

Location, Demography, and Economy

Location

Calcasieu Parish is located in Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) Region 5.

As noted above, Calcasieu Parish is in the south western region of Louisiana.

Figure 1-3 Louisiana Homeland Security Regions

	2010 Census	2013 Census	2020 Estimate	Percent Change 2010 -	Percent Change 2013 -
Total Population	192,768	195,782	203,436	1.56%	3.90%
Total Households	----	73,726	77,232	----	4.50%

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

Economy

During economic growth, Calcasieu Parish has managed to retain its traditional community spirit and easygoing lifestyle. Calcasieu Parish is ground for the flourishing of many major companies and small to medium businesses.

The petrochemical industry is the mainstay economically for the parish, and the past several years has seen the aerospace and gaming industries broaden that base. The Port of Lake Charles is accessible to ocean-going vessels and is only 34 miles from the Gulf of Mexico, the closest of any deep-water port in Louisiana. Chennault International Airpark is a major feature for the area with more than 10,000 feet of runway, capable of handling most commercial aircraft.

The Southwest Louisiana Alliance Foundation and the Southwest Louisiana Economic Development Alliance serves Calcasieu Parish to facilitate and support programs of economic and industrial development to create new job opportunities for the people of the parish. The mission of the Chamber Southwest is to develop Southwest Louisiana by creating economic opportunity and demanding responsible government and quality education.

Photo Source: CameronLNG.com

Business Description	Number of Employees	Number of Establishments	Annual Payroll ($1,000)
Retail Trade	11,048	785	288,338
Manufacturing	8904	140	871.674
Health Care, Social Assistance	14,151	549	599,212
Mining, Oil and Gas Extraction	280	21	18,333
Transportation / Warehousing	2,527	177	123,611
Construction	5,365	377	318,188
Administration, Support, Waste Management, Remediation Services	3,781	212	159,190
Real Estate, Rental, Leasing	1,386	250	64,687
Wholesale Trade	2,829	222	157,179
Other Services, except Public Administration	3,544	452	99,852
Accommodation, Food Services	14,829	468	317,093
Financial and Insurance	2,109	327	110,622
Professional, Scientific, Technical Services	4,521	465	327,277
Information	780	54	35,932
Educational Services	1,158	52	32,999
Arts, Entertainment, Recreation	542	69	10,253
Management of Companies and Enterprises	374	13	13,942

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

Major Employers	Product/Service	Number of Employees
Calcasieu Parish School Board	Public Elementary and Secondary Schools	4,963
Lake Charles Memorial Health System	General Medical & Surgical Hospital	2,301
Westlake Chemical Corporation	Chlorine, Caustic, Plastic, Paint & Coating Manufacturing	2,108
Turner Industries	Contractor	1,650
Golden Nugget, LLC	Casino/Hotel/Entertainment	1,514
L'auberge – Lake Charles	Casino/Hotel/Entertainment	1,300
Sasol Chemicals, LLC	Chemicals	1,084
Christus St. Patrick Hospital	Hospital	1,042
Citgo Petroleum Corporation	Petroleum Refinery	1,032

Table 1-3: Major Employers (Source: allianceswla.org)

Calcasieu Parish is also home to the SEED Center (The Southwest Louisiana Entrepreneurial and Economic Development Center). The SEED Center project nurtures entrepreneurship and further diversifies the economic base of SWLA and is part of the Parishes Long Term Community Recovery Plan.

In other words, 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 Calcasieu 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 Calcasieu 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 1-4 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.

Figure 1-4: The four phases of emergency management and their relation to future hazard mitigation
(Source: Louisiana State Hazard Mitigation Plan 2014)

As Figure 1-4 demonstrates, mitigation relies on updating in the wake of disaster. This can give the appearance that mitigation is only reactive rather than proactive. In reality, however, post-disaster revision is a vital component of improving mitigation. Each hazardous event affords an opportunity to reduce the consequences of future occurrences.

Unfortunately, this cycle can be painful for a community. For instance, the risks of disasters that could create catastrophic incidents in Louisiana were thought to be relatively well-understood prior to 2005. However, the impact of the 2005 hurricane season on the Gulf Coast region of the United States prompted a new level of planning and engagement related to disaster response, recovery, and hazard mitigation. Hurricanes Katrina and Rita hit three weeks apart and together caused astonishing damage to human life and to property. The two storms highlighted a hurricane season that spawned 28 storms—unparalleled in American history– until recently. As of the writing of this update, Calcasieu Parish sits surrounded by the rubble of Hurricanes Laura and Delta, that devastated the area just 6 weeks apart. The 2020 hurricane season eclipsed the record setting season of 2005 with 30 named storms and 13 hurricanes, 6 of which hit Category 3 status or greater. The 2005 and now 2020 hurricane seasons confirmed Louisiana's extreme exposure to natural disasters and both the positive effects and the concerns resulting from engineered flood-protection solutions.

General Strategy

The 2020 Calcasieu Parish Hazard Mitigation Plan maintains much of the information from the 2015 plan and reflects the order and methodologies of the 2019 Louisiana State Hazard Mitigation Plan. The sections in the 2015 Calcasieu Hazard Mitigation Plan were as follows and remain:

- Section One Introduction
- Section Two Hazard Identification and Parish-Wide Risk Assessment
- Section Three Capability Assessment
- Section Four Mitigation Strategy
- Appendices

This plan update continues to cohere 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 Calcasieu 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.

2020 Plan Update

This 2020 plan update proceeds with the seven previous goals of the Calcasieu Parish Hazard Mitigation Plan. The current goals are as follows:

- Reduce or prevent injury and loss of life
- Reduce or prevent damage to property and material assets
- Reduce or prevent future damage to critical facilities (fire, rescue, law enforcement, communications, command and control) essential for protection and public safety
- Reduce or prevent future damage to special facilities including: schools, nursing homes, health care facilities, prisons, historical and cultural resources
- Reduce or prevent future damage to infrastructure including: stormwater conveyance structures, utility systems, pipelines, railroads, highways, bridges, and navigable waterways
- Reduce or prevent future damage to commercial facilities
- Reduce or prevent future damage to higher risk facilities that, if damaged, may result in significant loss of human life, damage to the environment

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 Calcasieu Parish and its municipalities. The extent of this risk is dictated primarily by its geographic location. Most significantly, Calcasieu Parish remains at high risk of water inundation from various sources, including flooding, failure of dams/levees and forced drainage systems, 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.

Capital One Tower in Lake Charles after Hurricane Laura

Section 2: Hazard Identification and Parish-Wide Risk Assessment

This section assesses the various hazard risks Calcasieu 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 Calcasieu Parish Hazard Mitigation plan published in 2015, as well as data reported in the state's 2019 Hazard Mitigation Plan - Local Risk Assessment for the parish. Those hazards reporting top 10 loss results 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 (2015)	Calcasieu Parish Ranked Top 10 in State's HM Plan (2019)	Profiled in the 2020 Update
Subsidence/Coastal Land Loss	X		X
Drought	X		X
Earthquakes		X	
Expansive Soils		X	
Fog			
Flooding	X		X
Extreme Heat	X		X
Sinkholes	X	X	X
Thunderstorms (Hail, Lightning, & Wind)	X	X	X
Tornadoes	X	X	X
Tropical Storms	X	X	X
Tsunamis	X		
Wildfires	X	X	X
Winter Storms	X	X	X

Prevalent Hazards to the Community

While many of the hazards identified in Table 2-1 occur in the parish, the determination was made to focus attention and resources on the most prevalent hazards, which include the hazards previously profiled, along with earthquakes. Earthquakes, expansive soils, fog, and tsunamis are not profiled in this plan due to the extremely low risk and likelihood of occurring.

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

a) Flooding (backwater, riverine, localized stormwater event)
b) Tropical Storms (flooding and high winds)
c) Wildfires
d) Tornadoes
e) Sinkholes
f) Extreme Heat
g) Thunderstorms (Hail, Lightning, Wind)
h) Drought
i) Winter Storms
j) Subsidence/Coastal Land Loss

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

- Flooding from rivers and waterways, rainstorms, 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, extreme heat, and wildfires

The potential destructive power of tropical storms and flooding were determined to be the most prevalent hazards to the parish. Sixteen of the seventeen presidential declarations Calcasieu Parish has received resulted from either tropical cyclones (10 declarations) or flooding (6 declarations), which validates these as the most significant hazards. This elevates the importance of hurricane and flood impacts during the mitigation planning process. The risk of flooding during a hurricane event, primarily results from storm surge, and high wind speeds. While storm surge is a considerable hazard with immense destructive potential, flooding can also occur from non-hurricane events, such as flash flooding a common occurrence in heavy rainfall.

Hurricanes, tropical storms, and heavy storms present common occurrences, and associated wind damage is an additional threat. 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 Calcasieu Parish is included in the hurricane risk assessment.

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

Table 2-2: Calcasieu Parish Major Disaster Declarations

Disaster Declaration Number	Declaration Date	Type of Disaster
315	10/13/1971	Tropical Cyclone - Hurricane Edith
604	9/25/1979	Severe Storm, Flood
622	5/21/1980	Severe Storm, Flood
675	1/11/1983	Severe Storm, Flood
829	5/20/1989	Severe Storm, Flood
835	7/17/1989	Tropical Cyclone – Tropical Cyclone Allison
956	8/26/1992	Tropical Cyclone – Hurricane Andrew
1169	3/18/1997	Severe Winter Storm
1603	8/29/2005	Tropical Cyclone – Hurricane Katrina
1607	9/24/2005	Tropical Cyclone – Hurricane Rita
1668	11/2/2006	Severe Storm, Flood
1786	9/2/2008	Tropical Cyclone – Hurricane Gustav
1792	9/13/2008	Tropical Cyclone – Hurricane Ike
4263	3/13/2016	Severe Storm, Flood
4345	10/16/2017	Tropical Storm - Harvey
4559*	8/28/2020	Hurricane Laura
3547*	10/16/2020	Hurricane Delta

**Note: The full extent of the disaster's impact is being determined*

Probability of Future Hazard Events

The probability of a hazard event occurring in Calcasieu Parish is estimated on the following page. The percent chance of an event happening during any given year was calculated using occurrence of past events and dividing by 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 2019. To remain consistent with the 2015 Parish plan, the SHELDUS database was evaluated for the last thirty years (1989 – 2019) to determine future probability of a hazard occurring. To assist with determining estimated losses, unless otherwise stated, the full 60-year record was used when Hazus was not available to determine losses. This record was used to provide a more extensive record to determine losses. All assessed damages were adjusted for inflation to reflect the equivalent amount of damages with the value of the U.S. dollar today. The National Oceanic and Atmospheric Administration (NOAA) was used to provide jurisdiction specific data via the National Center for Climatic Center (NCDC) 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						
	Calcasieu Parish (Unincorporated)	DeQuincy	Iowa	Lake Charles	Sulphur	Vinton	Westlake
Drought	12%	12%	12%	12%	12%	12%	12%
Subsidence/Coastal Land Loss	100%	<1%	<1%	<100%	100%	100%	100%
Expansive Soils	<1%	< 1%	< 1%	<1%	<1%	<1%	<1%
Extreme Heat	4%	4%	4%	4%	4%	4%	4%
Flooding	100%	32%	24%	100%	60%	40%	32%
Sinkholes	<1%	<1%	<1%	<1%	<1%	<1%	<1%
Thunderstorms (Hail)	32%	32%	32%	32%	32%	32%	32%
Thunderstorms (Lightning)	60%	60%	60%	60%	60%	60%	60%
Thunderstorms (Wind)	100%	100%	100%	100%	100%	100%	100%
Tornadoes	88%	88%	88%	88%	88%	88%	88%
Tropical Cyclones	36%	36%	36%	36%	36%	36%	36%
Tsunamis	<1%	< 1%	< 1%	<1%	<1%	<1%	<1%
Wildfires	8%	8%	8%	8%	8%	8%	8%
Winter Storms	16%	16%	16%	16%	16%	16%	16%

As shown in Table 2-3, flooding events for unincorporated Calcasieu Parish and Lake Charles; subsidence/coastal land loss for unincorporated Calcasieu Parish, Lake Charles, Sulphur, Vinton, and West Lake; along with thunderstorm winds for the entire planning area, have the highest annual chance of occurrence in the parish (100%). Flood events and subsidence/coastal land loss in the remaining incorporated areas have a slightly lower chance of occurring annually. Tornadoes have an 88% annual chance of reoccurrence, followed by lightning (60%), tropical cyclones (36%), and hail (32%). Winter storms (16%), drought (12%), wildfires (8%), and extreme heat (4%) have the lowest annual chance of occurrence in Calcasieu Parish. Both expansive soils and tsunamis were discounted since the annual chance of occurrence was calculated at less than 1% for both hazards.

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 on critical infrastructure included in the previous hazard mitigation plan.

Within the entire planning area, there is an estimated value of $18,499,202 in structures throughout the parish. The predominant Parish occupancy type is residential, accounting for 78% of dollar exposure. The following tables provide damage estimates to residential property under varying storming conditions:

Table 2-4: Residential Buildings Damaged in Parish 100-year scenario

Return Period	Minor	Moderate	Severe	Destruction	Total
10yr	16	1	0	0	16
20yr	774	70	3	5	853
50yr	5,930	573	19	34	6,555
100yr	13,441	2,429	166	221	16,256
200yr	18,655	5,421	721	756	25,554
500yr	23,730	10,623	2,366	2,099	38,819
1000yr	25,633	15,835	4,964	4,189	50,621

(Source: Hazus)

A Pre-FIRM building is a building for which construction or substantial improvement occurred on or before December 31, 1974, or before the effective date of an initial Flood Insurance Rate Map (FIRM). The following tables provide damage estimates to those buildings by occupancy type:

Table 2-5: Parish Building Damage Count by General Occupancy Pre-FIRM in 100-year scenario

Occupancy	<1	1-10	11-20	21-30	31-40	41-50	Substantial	Total
Residential	126	167	200	59	30	16	34	632
Education	0	0	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0
Commercial	1	1	4	0	0	0	0	0
Government	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0
Agriculture	0	0	0	0	0	0	0	0
Total	127	168	204	59	30	16	34	638

(Source: Hazus)

A Post-FIRM building is a building for which construction or substantial improvement occurred after December 31, 1974, or on or after the effective date of an initial Flood Insurance Rate Map (FIRM), whichever is later. The following tables provide damage estimates to those buildings by occupancy type:

Table 2-6: Parish Building Damage Count by General Occupancy Post-FIRM in 100-year scenario

Occupancy	<1	1-10	11-20	21-30	31-40	41-50	Substantial	Total
Residential	153	54	129	55	32	14	45	482
Education	0	0	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0
Agriculture	0	0	0	0	0	0	0	0
Total	153	54	129	55	32	14	45	482

(Source: Hazus)

Essential Facilities of the Parish

The maps provided in this section provide locations of the essential facilities within the parish:

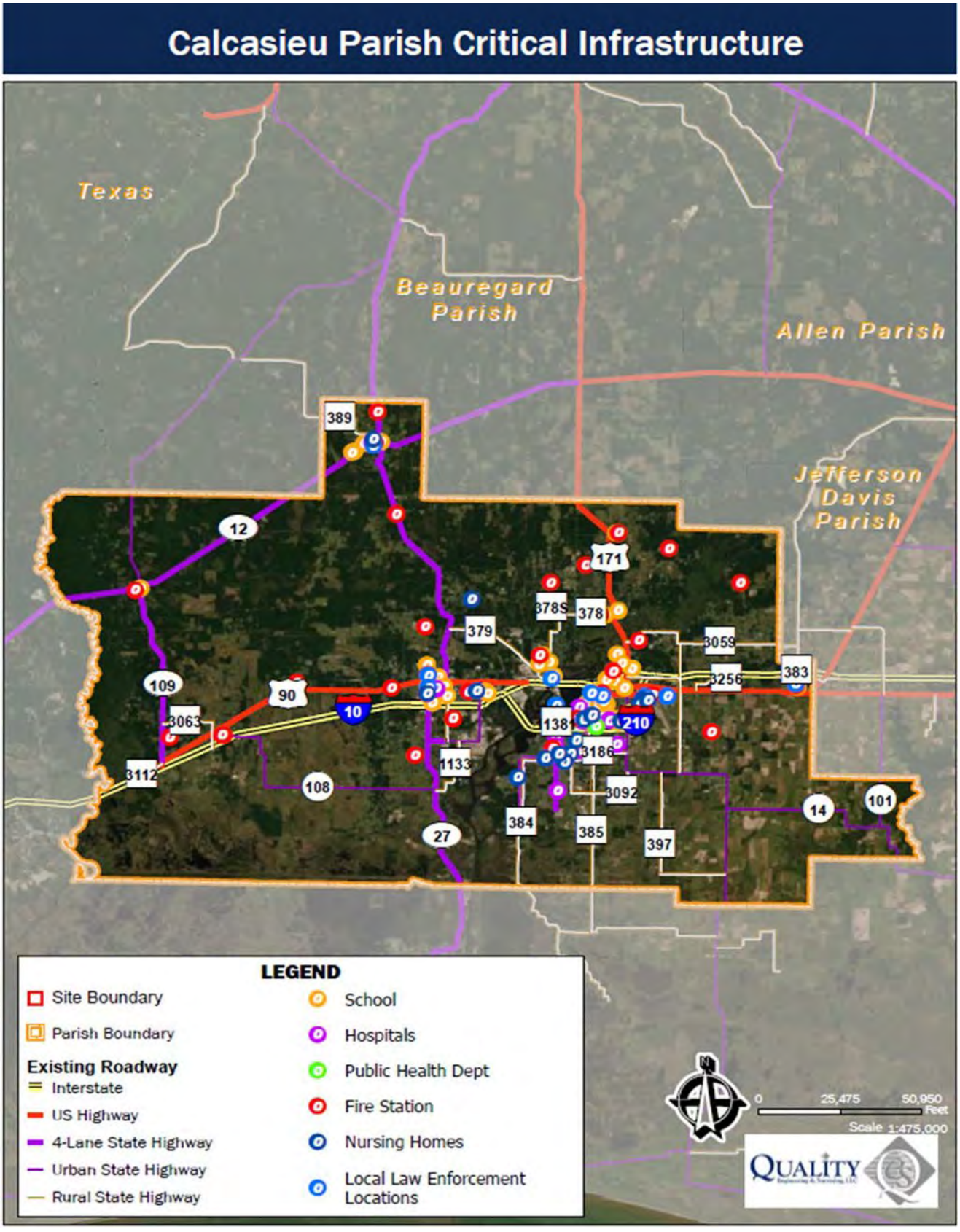


Figure 2-1: Essential building locations in Calcasieu Parish

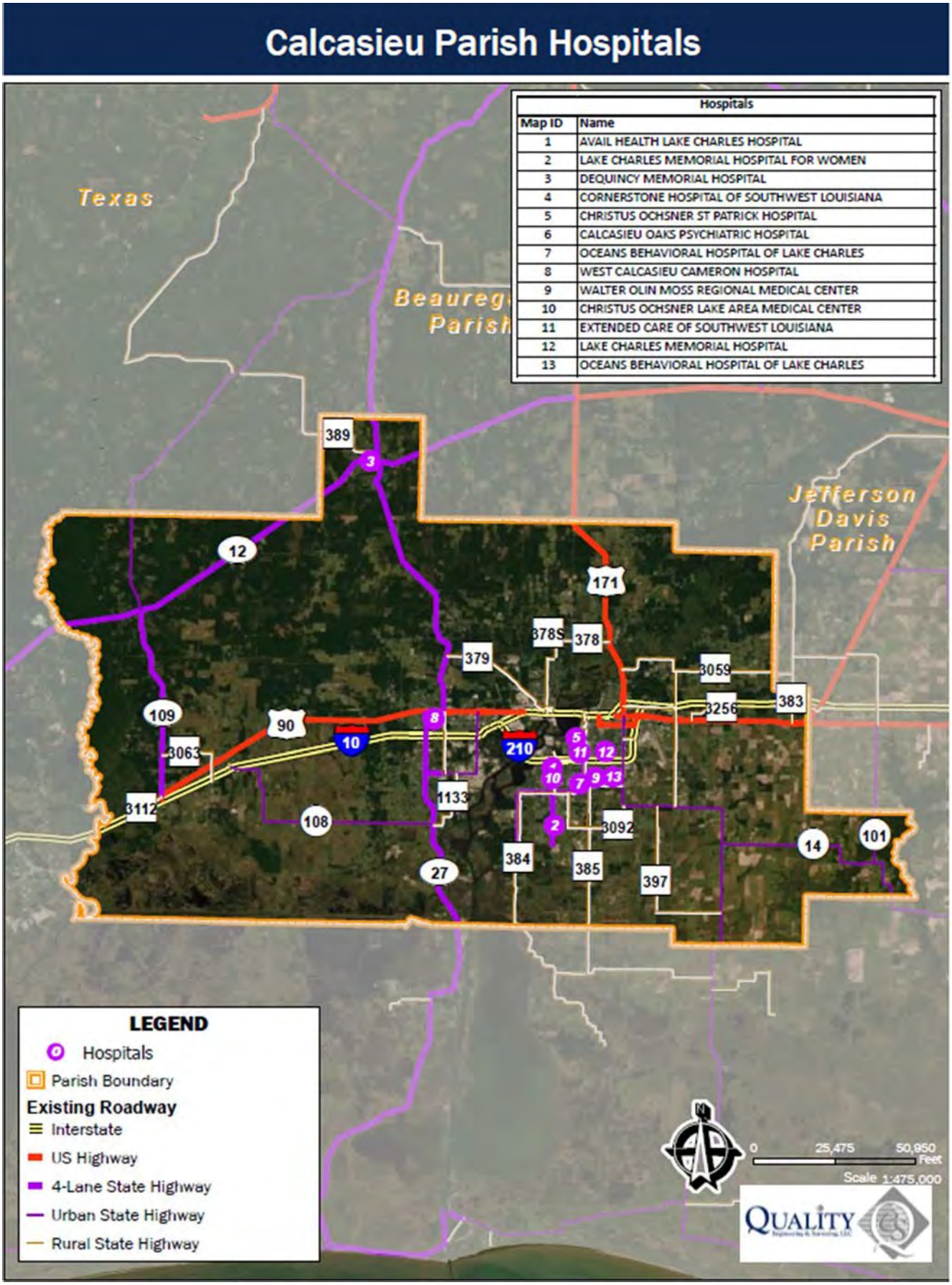


Figure 2-2: Hospital locations in Calcasieu Parish

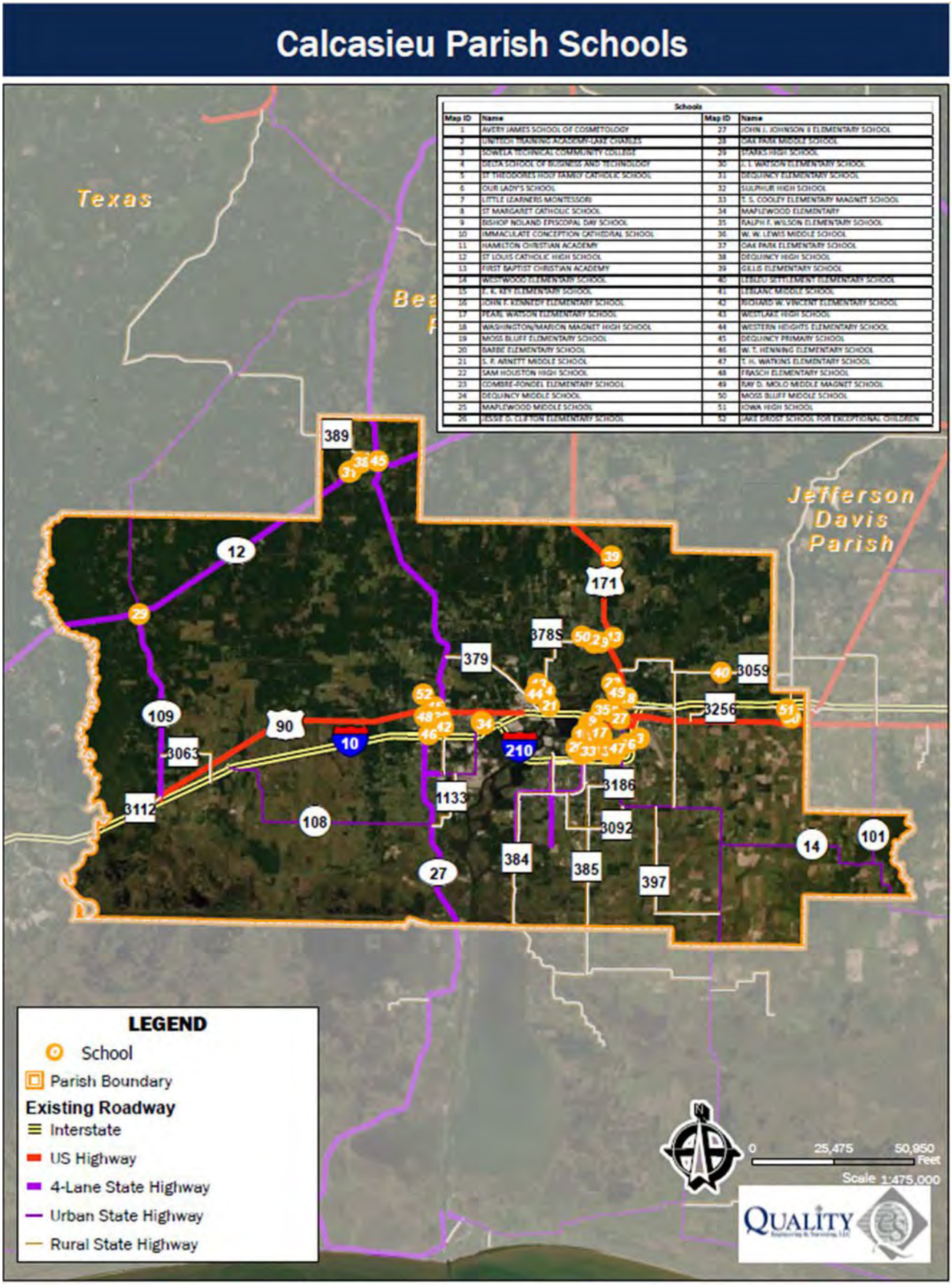


Figure 2-3: School locations in Calcasieu Parish

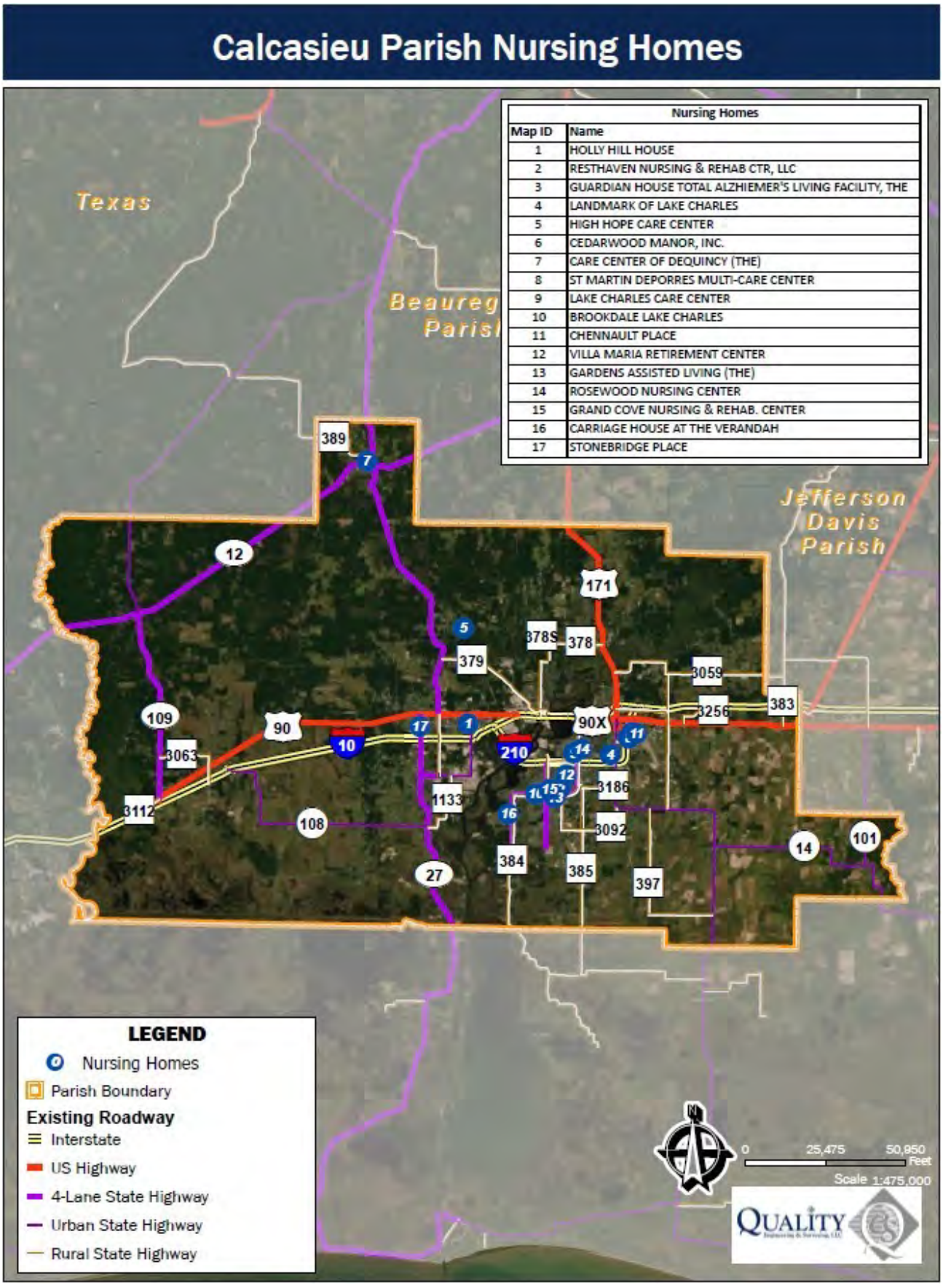


Figure 2-4: Nursing Home locations in Calcasieu Parish

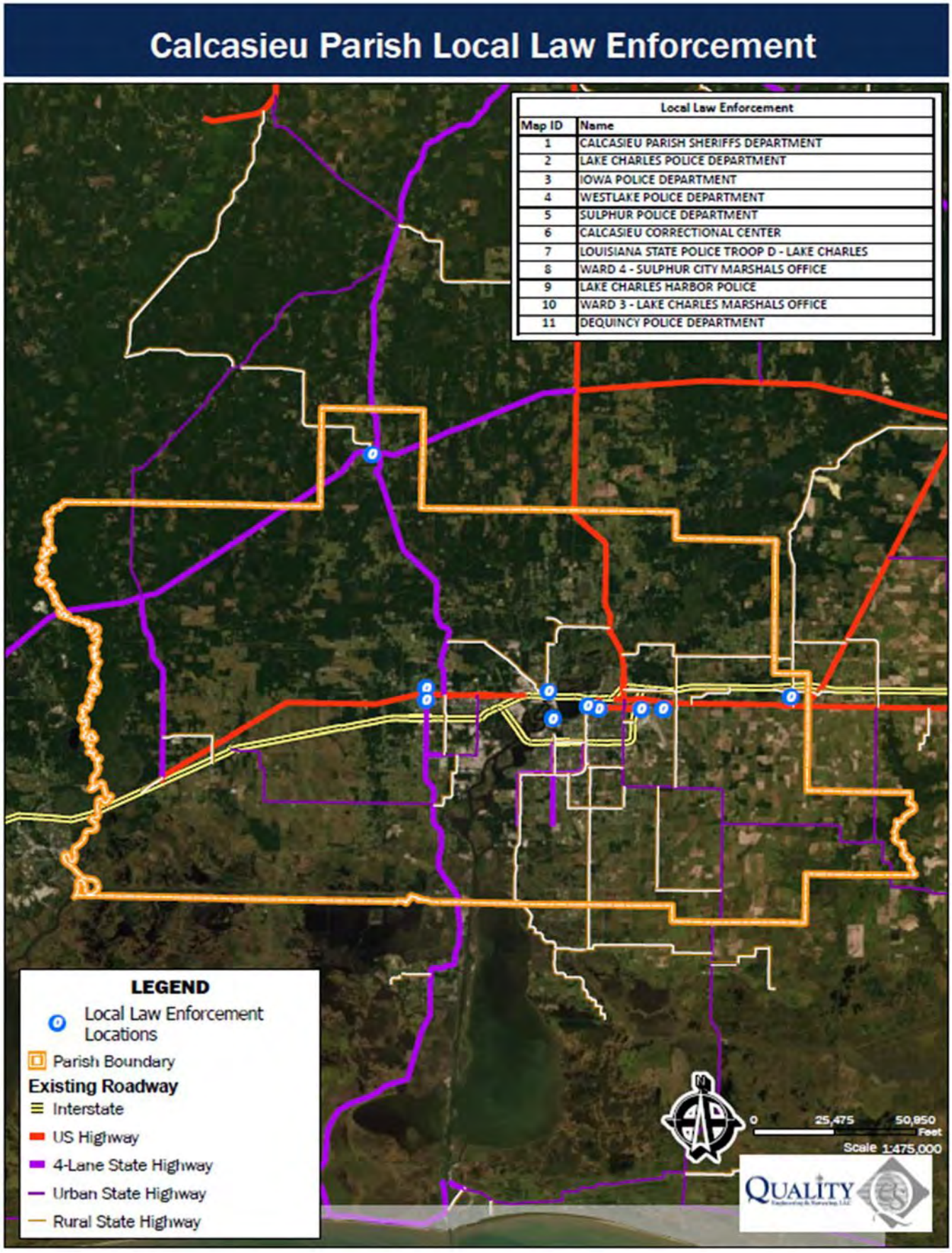


Figure 2-5: Law Enforcement Agencies located in Calcasieu Parish

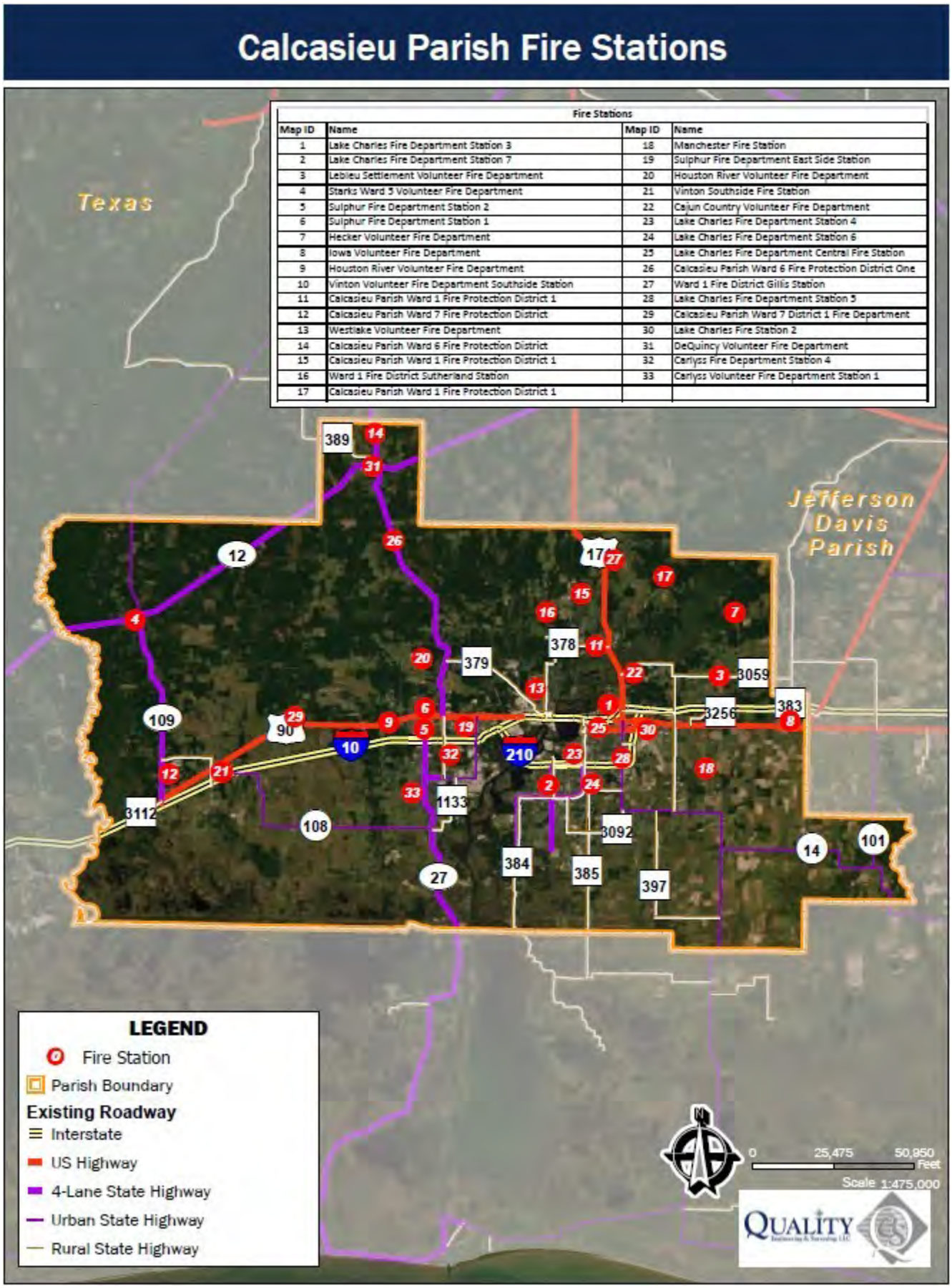


Figure 2-6: Fire Stations throughout Calcasieu Parish

Future Development Trends

Over the past 20 years Calcasieu Parish has experienced continuous growth in population and housing. Between the years of 2013 and 2018, the Parish grew from a population of 193,528 with 82,998 housing units in 2013 to a population of 200,182 with 88,830 housing units in 2018. This growth was largely in the unincorporated areas of Calcasieu Parish and in the incorporated areas of Iowa and Lake Charles from the years 2013 to 2018. Lake Charles from 2013-2018. The incorporated areas of Sulphur and DeQuincy, experienced a decline in population from the years of 2010 to 2013. This decline continued during the period of 2013 to 2018 for DeQuincy and Sulphur. The future population and number of housing units were estimated using U.S. Census Bureau American Community Survey 5-year estimates housing and population data. The following tables show jurisdiction population and housing unit estimates from 2000 to 2018:

Table 2-7: Population Growth Rate for Calcasieu Parish
(Source: Census, ACS 5Yr)

Total Population	Calcasieu Parish	Calcasieu (Unincorporated)	DeQuincy	Iowa	Lake Charles	Sulphur	Vinton	Westlake
1-Apr-00	183,577	77,241	3,398	2,663	71,757	20,512	3,338	4,668
1-Apr-10	192,768	86,354	3,235	2,996	71,993	20,410	3,212	4,568
1-Jul-13	193,528	86,389	3,213	3,028	72,826	20,279	3,221	4,572
1-Dec-20	200,182	89,316	3,125	3,229	76,267	20,241	3,343	4,661
Population Growth between 2000 –2010	5.0%	11.8%	-4.8%	12.5%	0.3%	-0.5%	-3.8%	-2.1%
Population Growth between 2010 –2013	0.4%	0.0%	-0.7%	1.1%	1.2%	-0.6%	0.3%	0.1%
Population Growth between 2013 –2018	3.4%	3.4%	-2.7%	6.6%	4.7%	-0.2%	3.8%	2.0%

As shown in Table 2-7 and Table 2-8, Calcasieu Parish has experienced growth in both population and housing units from 2013-2018. Previously the unincorporated area of Calcasieu Parish, DeQuincy, Sulphur and Vinton experienced decline in housing units from 2010 to 2013. Other i ncorporated areas such as Westlake experienced a housing spike with units increasing by 11%, Iowa units grew by 6.8%, and Lake Charles housing units increased by 3.6% between 2010-2013. Census Data shows continuous housing growth between the years of 2013-2018 for the Parish overall, with significant growth occurring in Iowa at 14.8%, Lake Charles 9.2%, Vinton 6.6%, and the unincorporated parish area at 6.3%. Westlake was the only incorporated area to experience housing decline from 2013-2018 at -2.8%.

Overall, changes in development in Calcasieu Parish and its municpalities have not impacted the community's vulnerability since the local harzard mitigation plan was previously approved.

Table 2-8: Housing Growth Rate for Calcasieu Parish
(Source: Hazus, 100 year Scenario)

Total Housing Units	Calcasieu Parish	Calcasieu (Unincorporated)	DeQuincy	Iowa	Lake Charles	Sulphur	Vinton	Westlake
1-Apr-00	75,995	29,972	1,500	1,041	31,429	8,665	1,452	1,936
1-Apr-10	82,058	34,432	1,465	1,173	32,469	9,053	1,487	1,979
1-Jul-13	82,998	34,222	1,371	1,253	33,640	8,867	1,448	2,197
1-Dec-20	88,830	36,381	1,381	1,438	36,744	9,207	1,543	2,136
Housing Growth between 2000 –2010	8.0%	14.9%	-2.3%	12.7%	3.3%	4.5%	2.4%	2.2%
Housing Growth between 2010 –2013	1.1%	-0.6%	-6.4%	6.8%	3.6%	-2.1%	-2.6%	11.0%
Housing Growth between 2013 –2018	7.0%	6.3%	0.7%	14.8%	9.2%	3.8%	6.6%	-2.8%

Future Hazard Impacts

Hazard impacts were estimated for multiple return periods shown in Table 2-9. The data shows damage to residential buildings in a 100-year scenario measured in severity from minor to complete unit destruction. The return period was model at 10, 20, 50, 100, 200, 500, and 1,000-year increments. A summary of estimated future impacts to residential units is shown in the table below:

Table 2-9: Number of Residential Damaged
(Source: Hazus)

Return Year Period	Return Period Probability	Minor	Moderate	Severe	Destruction	Total
10	10%	16	1	0	0	16
20	18%	774	70	3	5	853
50	40%	5,930	573	19	34	6,555
100	63%	13,441	2,429	166	221	16,256
200	87%	18,655	5,421	721	756	25,554
500	99%	23,730	10,623	2,366	2,099	38,819
1,000	100%	25,633	15,835	4,964	4,189	50,621

Hazard impacts were estimated for multiple return periods shown in Table 2-10. The data shows damage to buildings in a 100-year scenario measured in severity from minor to complete unit destruction. The return period was model at 10, 20, 50, 100, 200, 500, and 1,000-year increments. A summary of estimated future impacts to all building types is shown in the table below:

Table 2-10: Numbers of Buildings Damage
(Source: Hazus)

Return Year Period	Return Period Probability	Minor	Moderate	Severe	Destruction	Total
10	10%	30	1	0	0	31
20	18%	830	77	4	5	917
50	40%	6,285	644	26	34	6,989
100	63%	14,266	2,738	207	223	17,433
200	87%	19,776	6,071	869	762	27,479
500	99%	25,086	11,755	2,819	2,115	41,774
1,000	100%	27,023	17,375	5,868	4,218	54,485

Shelter requirements were estimated for multiple return periods shown in Table 2-11. The data shows the number of displaced households in a 100-year scenario and additionally the number of people needing short term shelter. The return period was model at 10, 20, 50, 100, 200, 500, and 1,000-year increments. A summary of estimated shelter requirements is shown in the table below:

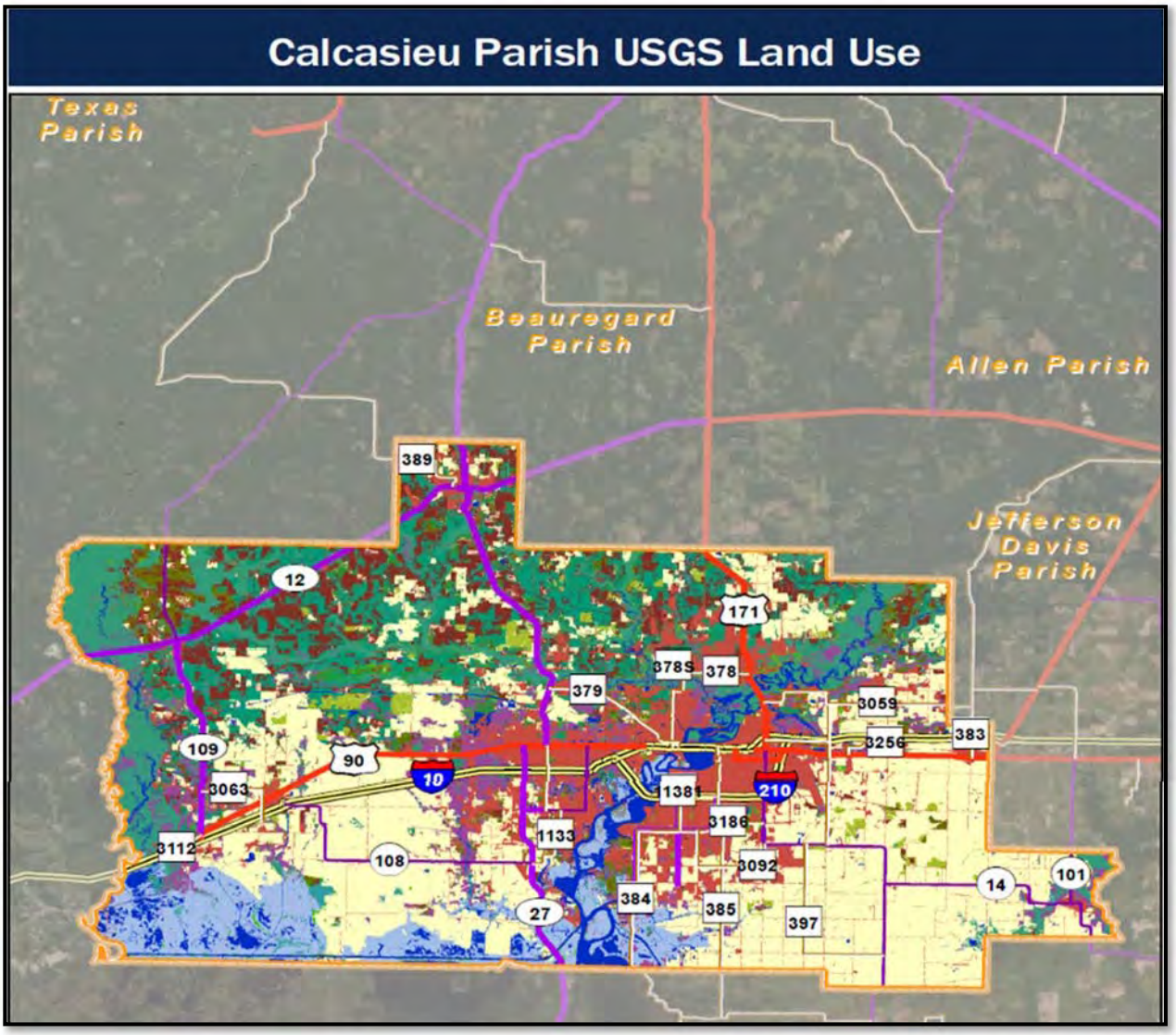
Table 2-11: Shelter Requirements
(Source: Hazus)

Return Year Period	Return Period Probability	Displaced Households Number	Short Term Shelter
10	10%	0	0
20	18%	0	0
50	40%	8	6
100	63%	76	51
200	87%	464	303
500	99%	2,000	1,285
1,000	100%	4,981	3,438

Land Use

The Calcasieu 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.

Figure 2-7: Calcasieu Parish Land Use Map (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%

Table 2-10: Calcasieu Parish Land Use

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. And drought can occur anywhere, triggered by changes in the local-to-regional-scale atmospheric circulation over an area, or by broader-scale circulation variations such as the expansion of semi-permanent oceanic high-pressure systems or the stalling of an upper-level atmospheric ridge in place over a region. The severity of a drought depends upon the degree and duration of moisture deficiency, as well as the size of the affected area. Periods of drought 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 2-11 displays the current drought monitor for the state of Louisiana and its parishes.

Table 2-11: 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 Calcasieu Parish at the time this plan went to publication (Figure 2-11).

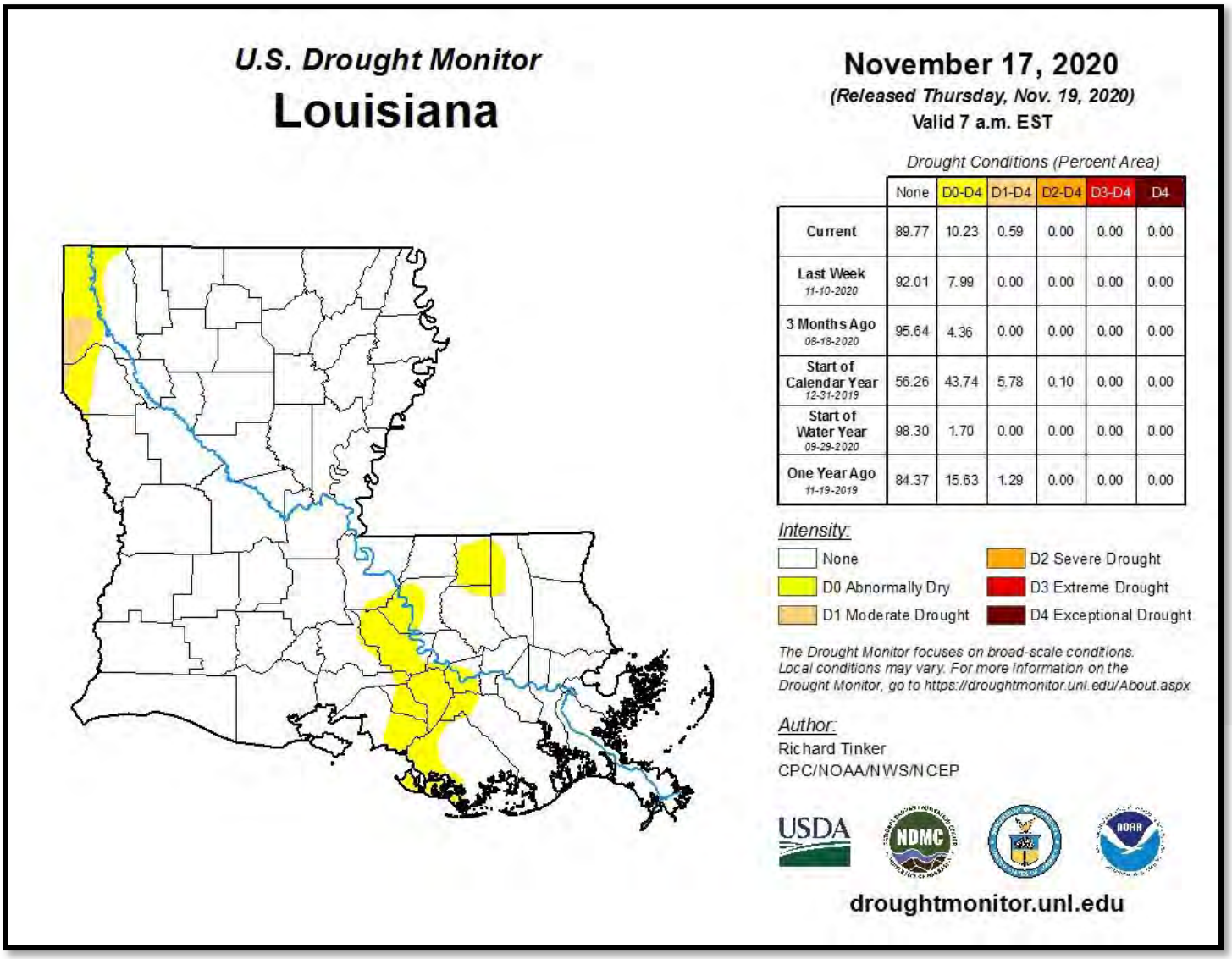


Figure 2-8: United States Drought Monitor for the State of Louisiana and its Parishes (Source: The National Drought Mitigation Center)

Location

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

Previous Occurrences / Extents

The SHELDUS database reports a total of three drought events occurring within the boundaries of Calcasieu Parish between the years of 1989 to 2019. Table 2-10 identifies the date of occurrence, estimated crop damage, and severity of the events that have occurred in Calcasieu Parish. Based on previous occurrences, and in accordance with the Palmer Drought Index, the worst case scenario for drought in Calcasieu Parish would be a severe drought event.

Table 2-12: Drought Events with Crop Damage Totals for Calcasieu Parish (Source: SHELDUS)

Date	Crop Damage	Palmer Classification
May 1996	$92,797	Moderate Drought
August 1998	$15,160,345	Severe Drought
December 2000	$14,339,978	Severe Drought

Frequency / Probability

Based on previous occurrences of three drought events in 30 years, the probability of drought occurrence in the planning area in any given year is 10%.

Estimated Potential Losses

According to the SHELDUS database, there have been three drought events that have caused some level of crop damage. The total agricultural damage from these events is $29,593,120, with an average cost of $9,864,373 per drought event. When annualizing the total cost over the 30-year record, total annual losses based on drought is estimated to be $1,183,725. Table 2-11 presents an analysis of agricultural exposure that is susceptible to drought by major crop type for Calcasieu Parish.

Table 2-13: Agricultural Exposure by Crop Type for Droughts in Calcasieu Parish (Source: Calcasieu Parish HM Plan 2014)

Agricultural Exposure by Type for Drought						
Rice	Soybeans	Sugarcane	Pecans	Forestry	Wheat	Total
$9,347,963	$3,526,038	$394,588	$143,044	$11,135,000	$85,566	$24,632,199

There have been no reported injuries as a direct result to drought in Calcasieu Parish.

Extreme Heat

There is no operational definition for defining heat or a heat wave. Heat waves are the consequence of the same weather pattern as drought, and therefore both hazards often occur concurrently. A heat wave is an extended period of oppressive and above normal temperatures over a given period of time. The World Meteorological Organization recommends the declaration of a heat wave when the daily maximum temperature exceeds the average maximum temperatures by 9 °F and lasts for a period of at least five days.

However, temperature alone is insufficient to describe the stress placed on humans (as well as flora and fauna) in hot weather. It is crucial to consider the effect of relative humidity since it is essential to the body's ability to perspire and cool. Once air temperature reaches 95 °F, perspiration becomes a very significant biophysical mechanism to ensure heat loss. Perspiration is ineffective as a cooling mechanism if the water cannot evaporate (i.e., sweating in high relative humidity is reduced as compared to during dry conditions). To communicate this relationship between temperature and humidity, the National Weather Service (NWS) developed the Heat Index (HI), which provides a warning system based on a combination of air temperature and relative humidity. The HI is presented in Table 2-12, and Table 2-13 summarizes the HI risk levels and protective measures. The NWS devised the index for shady, light wind conditions, and thus advises that the HI value can be increased by as much as 15 °F if a person is in direct sunlight with strong, hot winds present.

Most heat disorders (e.g., sunburn, heat cramps, heat exhaustion, and heat stroke) occur because the victim has been overexposed to heat, or has over-exercised in relation to their age and physical condition. Other circumstances that can induce heat-related illnesses include stagnant atmospheric conditions and poor air quality. Seniors and children are most at risk from adverse heat effects. Extreme heat can also damage roads, bridges, pipelines, utilities, and railroads. High temperatures can be partially responsible for deflection of rails and related railroad accidents.

According to NOAA, extreme heat is the leading weather-related cause of death in the United States. And while heat-related deaths in Louisiana are not common, due in part to the consistency and predictability of high seasonal temperatures, they do occur and are still very intense and dangerous. Such deaths happen in a variety of circumstances, often in ways that are not easily categorized due to their unexpectedness. For instance, although exposure to heat is higher at the beach than usual, NOAA does not track heat-related deaths there because such deaths happen infrequently.

Table 2-12: Heat Index Advisor based on Air Temperature (°F) and Relative Humidity (Source: National Weather Service)

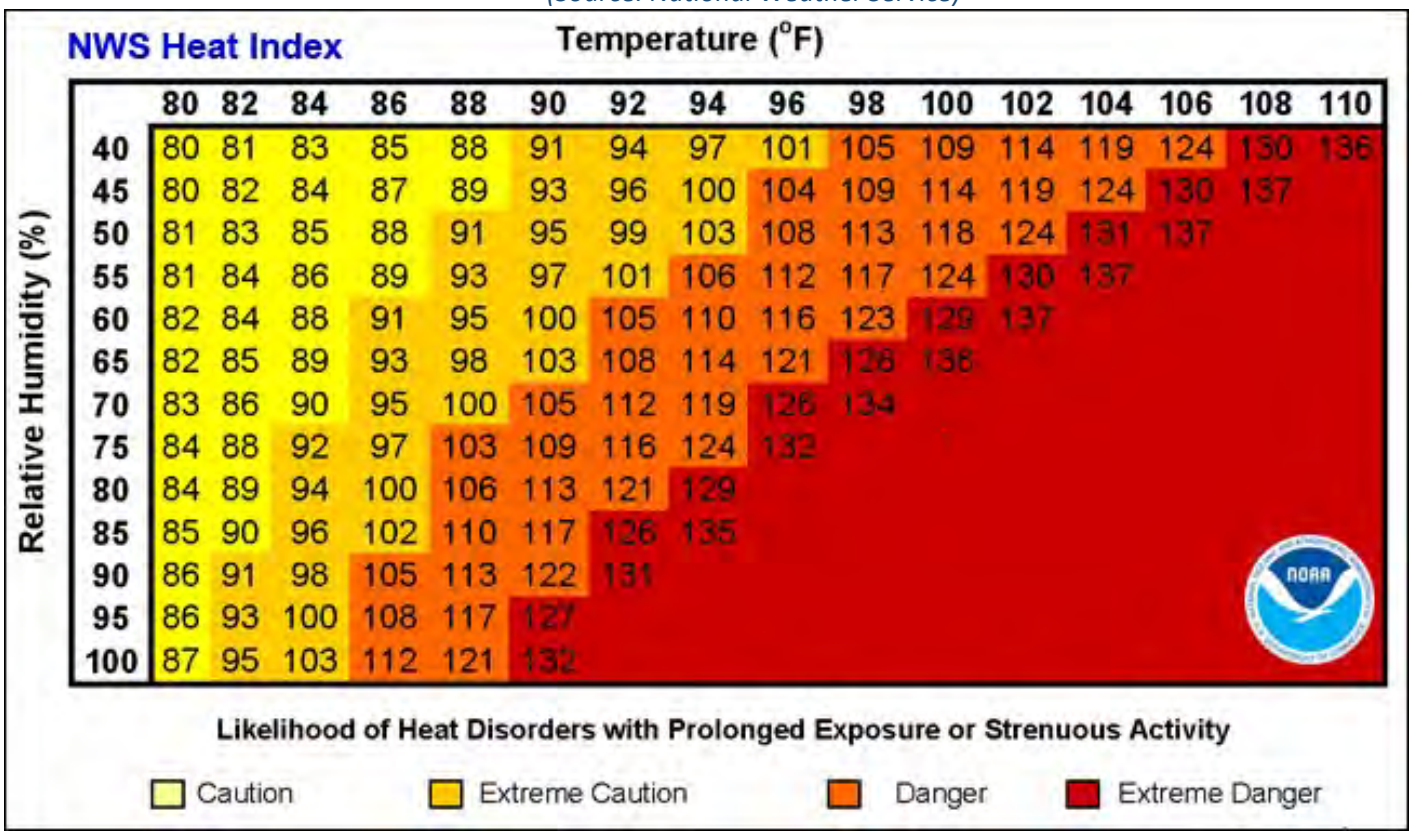


Table 2-13: Summary of Heat Index Risk Levels with Protective Measures (Source: National Weather Service)

Heat Index	Risk Level	Protective Measures
Less than 91°F	Lower (Caution)	Basic heat safety and planning.
91°F to 103°F	Moderate	Implement precautions and heighten awareness.
103°F to 115°F	High	Additional precautions to protect workers.
Greater than 115°F	Very High to Extreme	Triggers even more aggressive protective measures.

Location

Extreme heat typically impacts a region and not one specific parish or jurisdiction. Extreme heat is a known climatological based hazard and has the same probability of occurring in Calcasieu Parish as adjacent parishes, the entire planning area for Calcasieu Parish is equally at risk for extreme heat.

Previous Occurrences / Extents

The SHELDUS database reports a total of two significant extreme heat events occurring within the boundaries of Calcasieu Parish between the years of 1960 to 2020. Table 2-14 provides an overview of extreme heat events that have impacted the Calcasieu Parish planning area since 1960. Based on historical data, the worst case scenario for Calcasieu Parish involving extreme heat would be a high risk level event on the HI scale with temperatures ranging from 103°F to 115°F.

Table 2-14: Previous Occurrences of Extreme Heat in Calcasieu Parish (Source: SHELDUS)

Date	Crop Damage	Risk Level
May 1963	$594,764	Moderate
July 1980	$22,087	High

Frequency / Probability

Based on the geographical location of the State of Louisiana, and Calcasieu Parish in particular, extreme heat events occur frequently. However, extreme heat events that meet the definition used by SHELDUS (events resulting in damages to property or crops or injury or death to people) are less likely to occur. Based on a review of significant extreme heat data that has caused damages in the last 59 years, in which Calcasieu Parish has had two recorded events, the probability of occurrence is estimated at approximately 3%.

Estimated Potential Losses

According to the SHELDUS database, crop damage due to extreme heat in Calcasieu Parish has totaled approximately $616,851 since 1960. To estimate the potential losses of an extreme heat event on an annual basis, the total damages recorded for an extreme event is divided by the total number of years of available extreme heat data in SHELDUS (1960 – 2019). This provides an annual estimated potential loss of $10,455. The following table, based on the 2018 ACS Census data, provides an estimate of potential crop losses for Calcasieu Parish:

Table 2-15: Estimated Annual Crop Losses in Calcasieu Parish for Extreme Heat

Estimated Annual Potential Losses from Extreme Heat for Calcasieu Parish						
Unincorporated Calcasieu Parish (44.8% of Population)	DeQuincy (1.6% of Population)	Iowa (1.6% of Population)	Lake Charles (38.1% of Population)	Sulphur (10.1% of Population)	Vinton (1.7% of Population)	Westlake (2.3% of Population)
$4,684	$167	$167	$3,983	$1,056	$178	$240

There have been no reported injuries or deaths as a direct result of extreme heat in Calcasieu 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.

Historically, in Calcasieu Parish, all six types of flooding have historically been observed. 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.

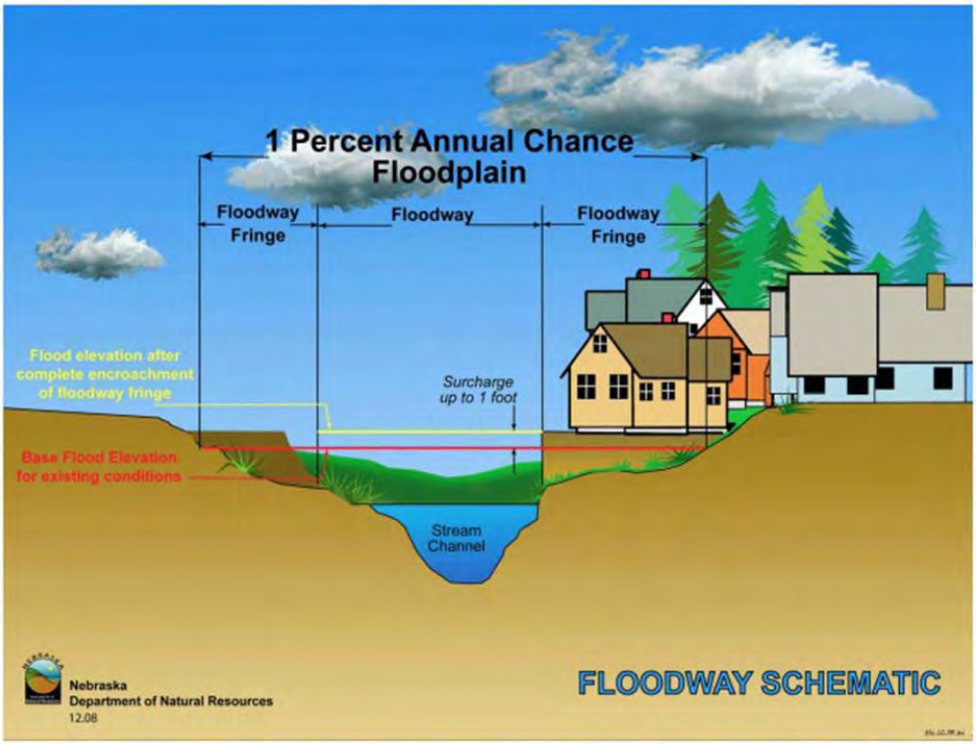
Floods are measured mainly by probability of occurrence. A 10-year flood event, for example, is an event of small magnitude (in terms of stream flow or precipitation) but with a relatively high annual probability of recurrence (10%). A 100-year flood event is larger in magnitude, but it has a smaller 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 change 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 change over time. 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 2-11.

Figure 2-11: 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 2-11), 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 usually are not salvageable. Electrical appliances and gasoline engines will flood, making them worthless until they are professionally dried and cleaned.

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

Repetitive Loss Properties

The definitions of Repetitive Loss (RL) differ when utilizing different programs such as NFIP (National Flood Insurance Program) or FMA (Flood Mitigation Assistance) classifications.

FMA defines 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.

NFIP defines a RL property as any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978.

a. A RL property may or may not be currently insured by the NFIP.

Severe repetitive loss (SRL) is defined by the Flood Insurance Reform Act of 2004 and was 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 claim 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.

FEMA defines severe repetitive loss as a single-family property that is covered under flood insurance by the NFIP, incurring flood-related damage, with four (4) or more separate insurance claim payments exceeding $5,000. Additionally, SRL properties meet the following:

a. Cumulative amount of claim payments exceeding $20,000; or
b. At least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

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

Table 2-16: Repetitive Loss Structures for Calcasieu Parish

Jurisdiction	Number of Structures	Residential	Commercial	Government	Total Claims	Total Claims Paid	Average Claim Paid
Calcasieu Parish (Unincorporated)	470	466	0	4	1,435	44,045,682	$30,694
DeQuincy	0	0	0	0	0	$0	$0
Iowa	15	15	0	0	39	$1,399,860	$35,894
Lake Charles	306	288	1	17	781	$31,447,218	$40,265
Sulphur	94	93	1	0	366	$8,821,299	$24,102
Vinton	1	1	0	0	2	$16,874	$8,437
Westlake	20	20	0	0	64	$1,986,349	$31,037
Total	906	883	2	21	2,687	$87,717,282	$32,645

The repetitive loss structures were able to be geocoded to provide an overview of where the repetitive loss structures were located throughout the parish. Figure 2-12 shows the approximate location of the structures. The repetitive loss property map shows a concentrated area of repetitive loss structures focused in and around the incorporated areas of Lake Charles, Sulphur, and Westlake.

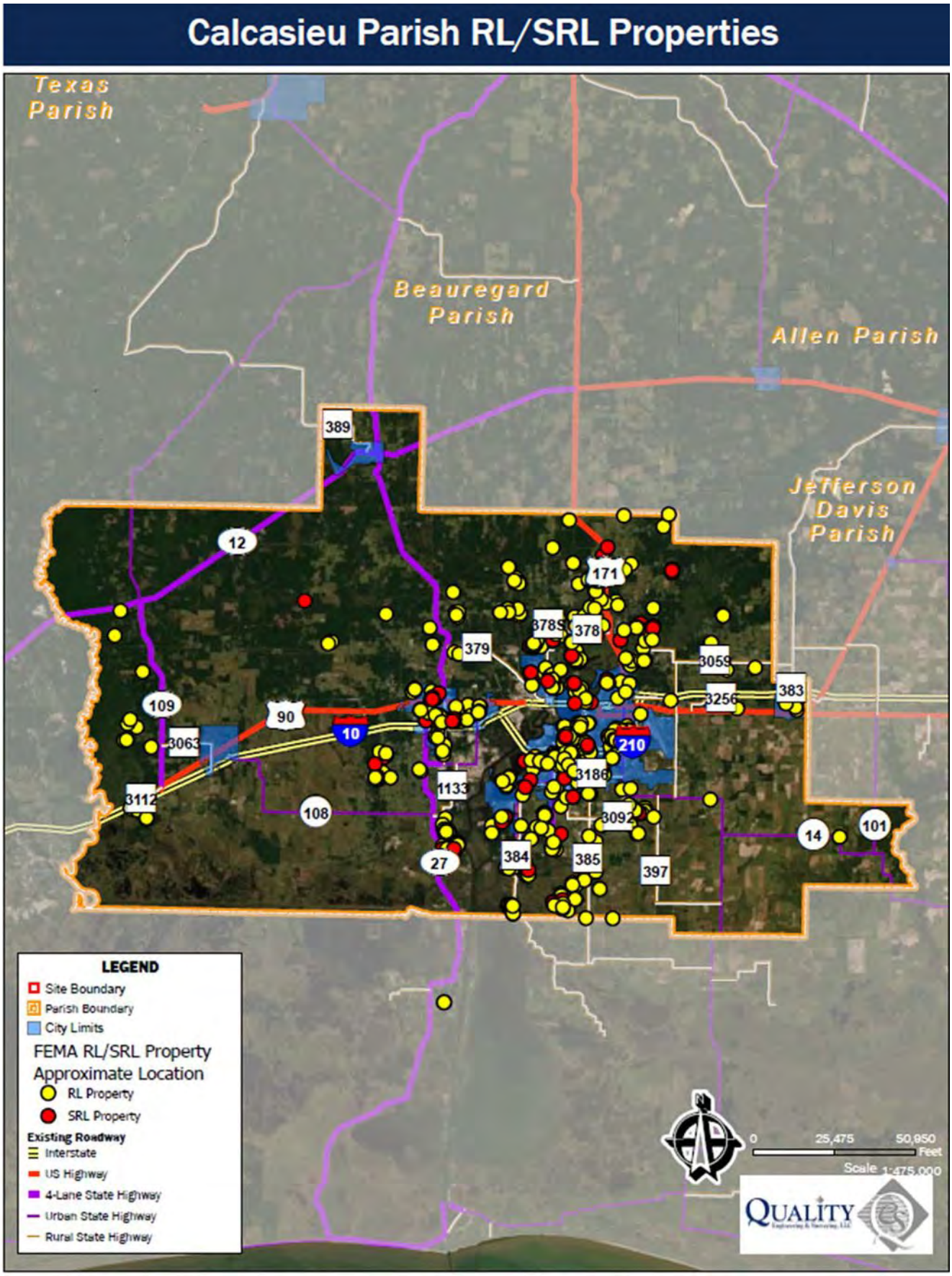


Figure 2-12: Repetitive Loss Properties in Calcasieu Parish

National Flood Insurance Program

Flood insurance statistics indicate that Calcasieu Parish has 13,707 flood insurance policies with the NFIP, with total annual premiums of $8,751,754. Calcasieu Parish, the cities of DeQuincy, Lake Charles, Sulphur, and Westlake, and the towns of Iowa and Vinton are all participants in the NFIP. Calcasieu 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 Calcasieu Parish are provided in the tables to follow.

Table 2-17: Summary of Community Flood Maps for Calcasieu Parish

CID	Community Name	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Date Joined the NFIP	Tribal
220037	Calcasieu (Unincorporated)	9/13/1974	9/29/1978	2/18/2011	9/29/1978	No
220038	DeQuincy, City of	1/16/1974	4/2/1979	2/18/2011	4/2/1979	No
220039	Iowa, Town of	5/24/1974	2/4/1988	2/18/2011	2/4/1988	No
220040	Lake Charles, City of	11/1/1974	10/16/1979	2/18/2011	10/16/1979	No
220041	Sulphur, City of	5/24/1976	8/16/1988	2/18/2011	8/16/1988	No
220042	Vinton, Town of	5/24/1974	7/16/1981	2/18/2011	7/16/1981	No
220043	Westlake, City of	5/17/1974	2/3/1982	2/18/2011	2/3/1982	No

Table 2-18: Summary of NFIP Policies for Calcasieu Parish

Location	No. of Insured Structures	Total Insurance Coverage Value	Annual Premiums Paid	No. of Insurance Claims Filed Since 1978	Total Loss Payments
Calcasieu Parish (Unincorporated)	6,881	$1,610,990,900	$4,304,424	2,885	$68,278,525
DeQuincy	53	$10,648,400	$40,503	19	$319,252
Iowa	169	$30,468,300	$81,786	58	$763,632
Lake Charles	5,139	$1,272,002,200	$3,341,711	2,412	$56,960,487
Sulphur	1,178	$263,992,300	$800,334	502	$9,211,507
Vinton	61	$15,701,200	$55,350	7	$34,488
Westlake	226	$46,890,100	$127,646	164	$3,808,705
Total	13,707	$3,250,693,400	$8,751,754	6,047	$139,376,596

According to the Community Rating System (CRS) list of eligible communities dated June 1, 2014, Calcasieu Parish and the city of Lake Charles participate in the CRS, while the cities of DeQuincy, Sulphur, and Westlake, and the towns of Iowa and Vinton, do not participate.

Table 2-19: List of Areas within Calcasieu Parish that Participate in the Community Rating System

Community Number	Name	CRS Entry Date	Current Effective Date	Current Class	% Discount for SFHA	% Discount for Non-SFHA	Status
220037	Calcasieu Parish	10/1/1991	10/1/2007	8	10	5	C
220040	Lake Charles, City of	10/1/2004	5/1/2015	9	5	5	C

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 floods 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 Calcasieu 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 Calcasieu Parish experiences.

Flash Floods: Flash floods are characterized by a rapid rise in water level, high velocity, and large amounts of debris. They are 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, by definition, is river-based. Most of the riverine flooding problems occur when the Sabine River crests at flood stage levels, causing extensive flooding in low-lying areas.

Coastal Flooding: Coastal flooding occurs when ocean water is pushed inland by hurricane winds and/or high tides. The severity of coastal flooding can be compounded by the riverine flooding that typically accompanies major tropical cyclone systems.

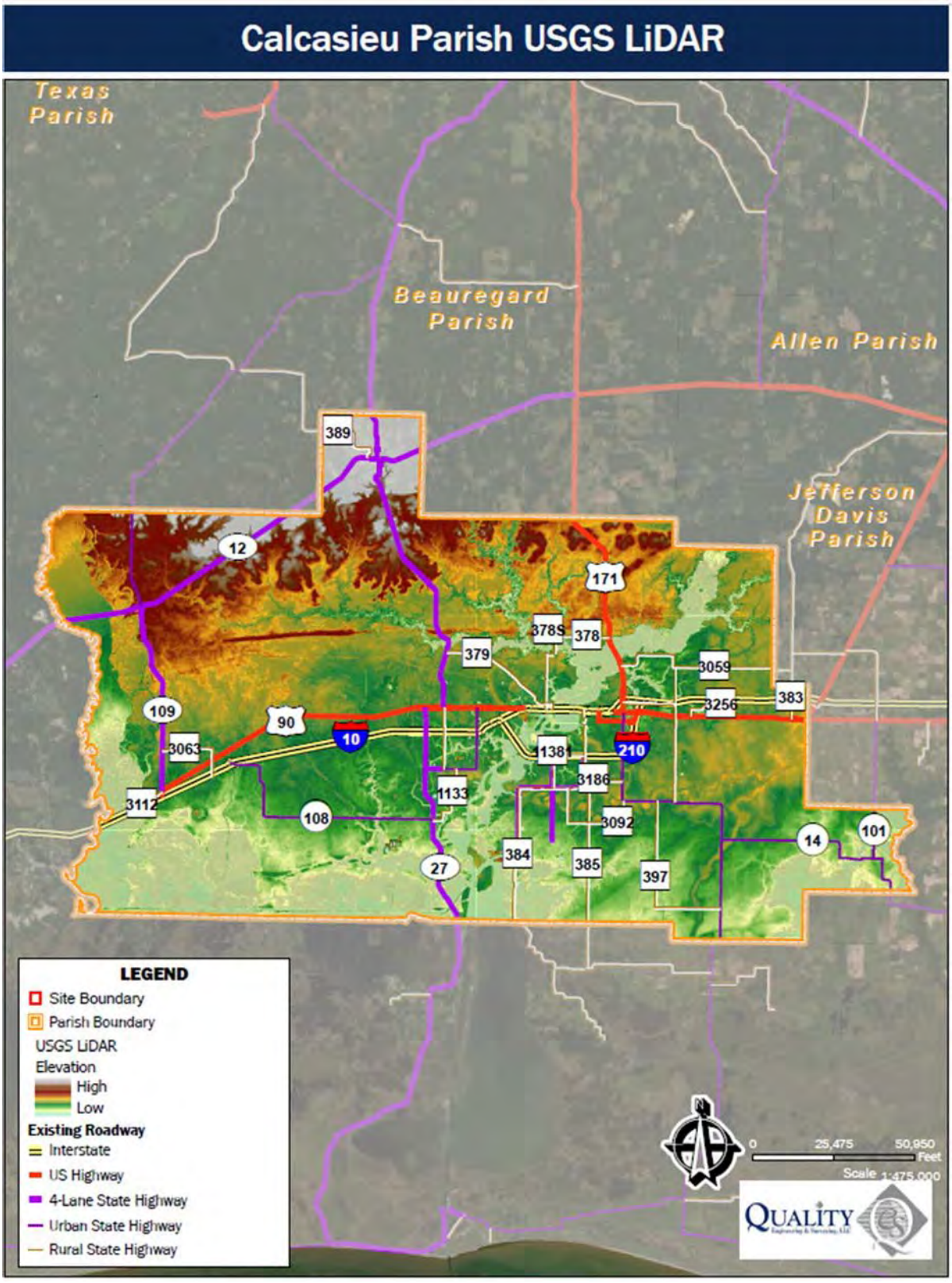


Figure 2-13: Elevation throughout Calcasieu Parish

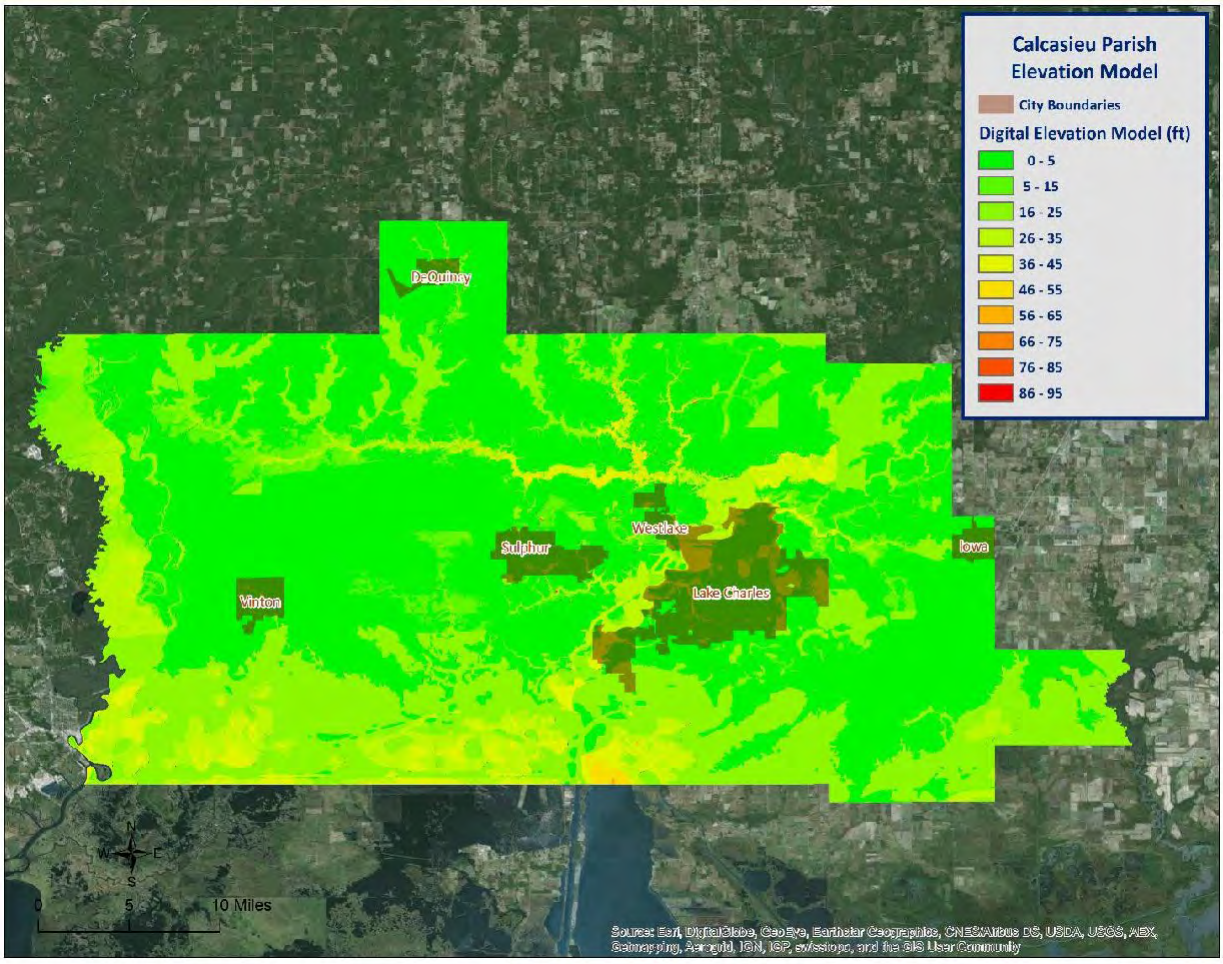


Figure 2-14: Elevation throughout Calcasieu Parish

Looking at the digital elevation model (DEM) in Figure 2-14 for Calcasieu Parish is instructive in visualizing where the low lying and high-risk areas are for the parish. Elevations in the parish range from near sea level to 95 feet. The highest elevations in the parish are approximately 95 feet, located in the DeQuincy area. These higher elevations are sporadic throughout the parish and are not common for most of the area. The other incorporated areas ranged in elevation from 13 to 21 feet, with the town of Iowa averaging 21 feet, the city of Sulphur averaging 15 feet, the town of Vinton averaging 13 feet, and the city of Westlake averaging 16 feet. The lowest elevations of the parish average between one and five feet and are in the unincorporated areas of Calcasieu Parish.

Location

Calcasieu 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. Of the 1,094 square miles of land in the parish, 423 square miles are considered “special flood hazard areas”, constituting 38.7% of the total land area. In general, the southern half of the planning area has notable vulnerability to flooding, either due to riverine flooding or flooding related to hurricanes and Tropical Cyclones. Areas in the northern portion of the parish that are known to have special vulnerability to flooding include the unincorporated area of Moss Bluff and the incorporated city of Westlake.

Another area of increased vulnerability to riverine flooding in Calcasieu Parish is the Sabine River Basin. The Sabine River forms the western boundary of the parish. It flows for 555 miles and has a total drainage basin area of 9,756 square miles (2,330 square miles in Louisiana). The river's basin is characterized by flat slopes and wide, timbered floodplains, and the extreme southern portion of the river is subject to coastal flooding. High rainfall rates produce frequent flooding of low-lying areas and large floods occur on average every five years. During a flooding event, the lowest part of the basin usually remains inundated for many days and sometimes for several weeks. The unincorporated areas of Toomey, Starks, and Niblett's Bluff are communities in the western portion of the planning area with significant histories of impacts due to Sabine River flooding.

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

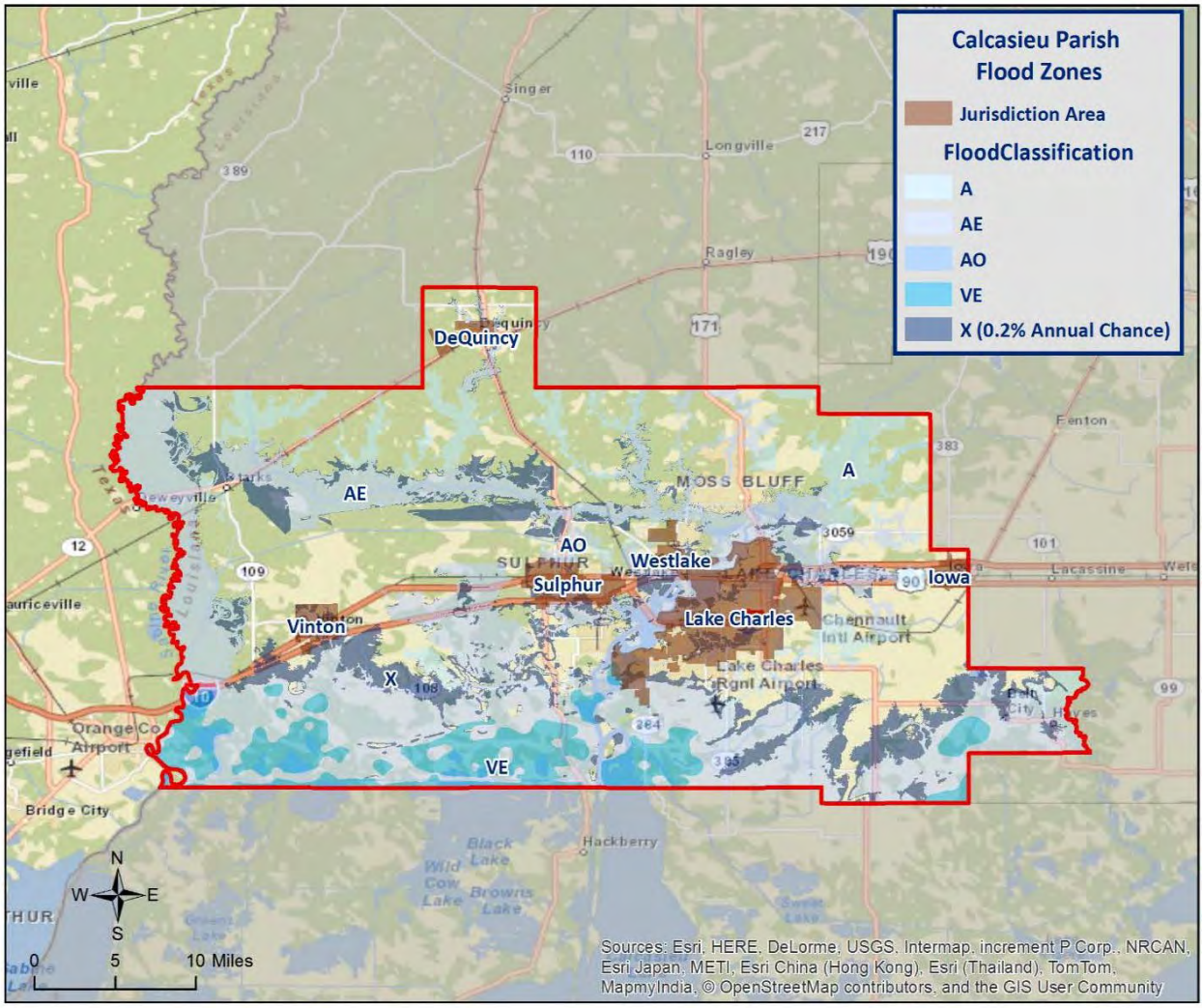


Figure 2-15: Calcasieu Parish Areas within the Flood Zones

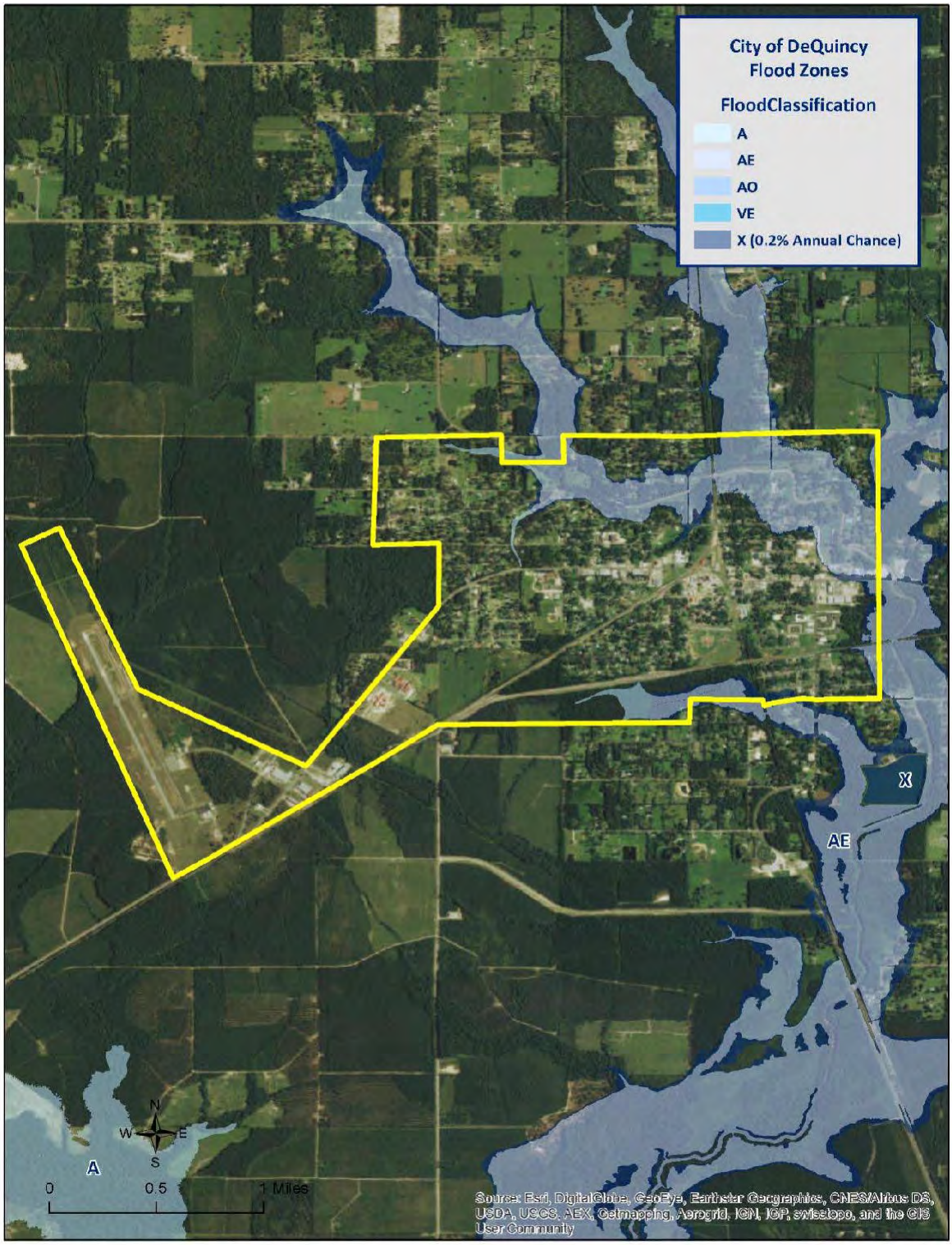


Figure 2-16: City of DeQuincy Areas within the Flood Zones

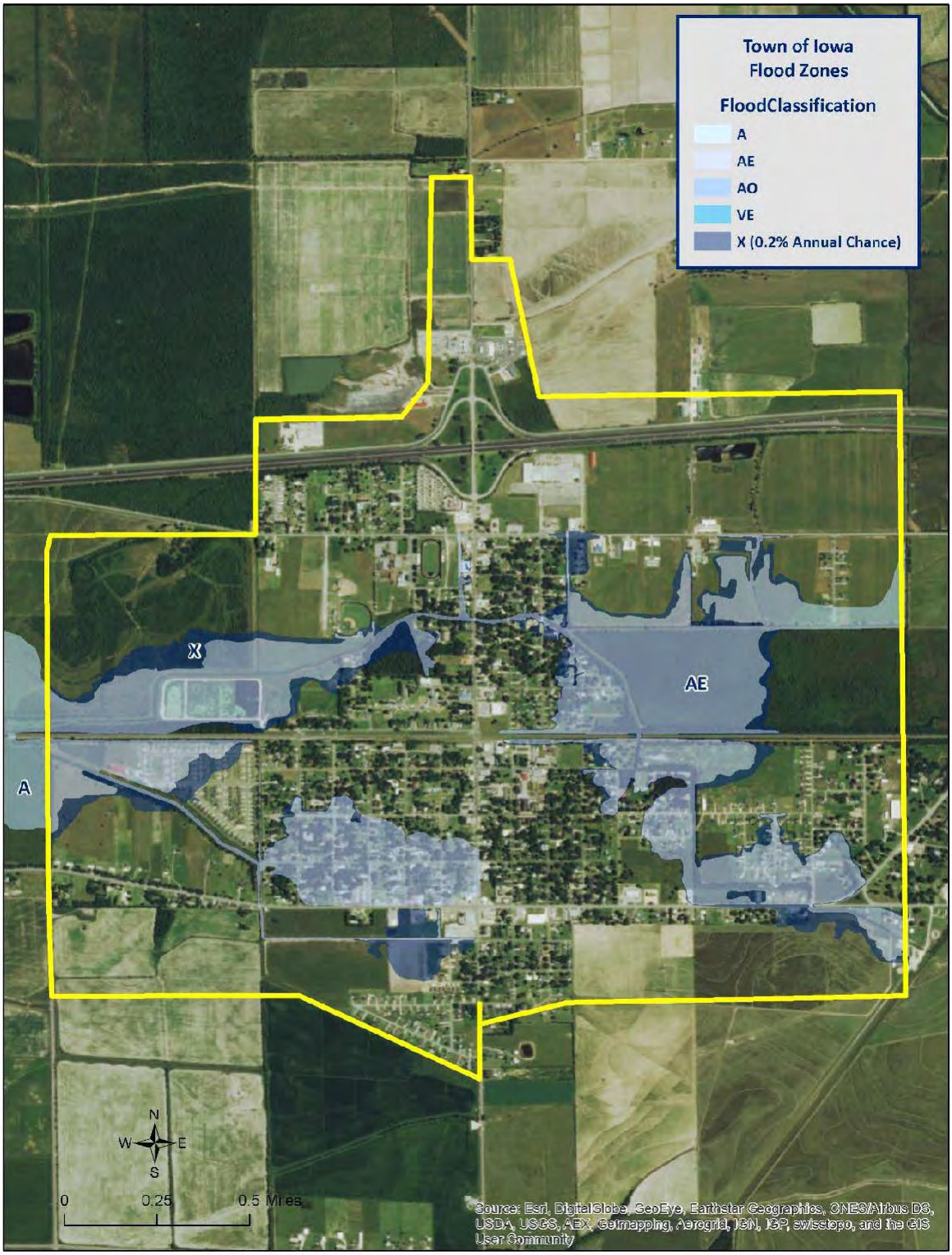


Figure 2-17: Town of Iowa Areas within the Flood Zones

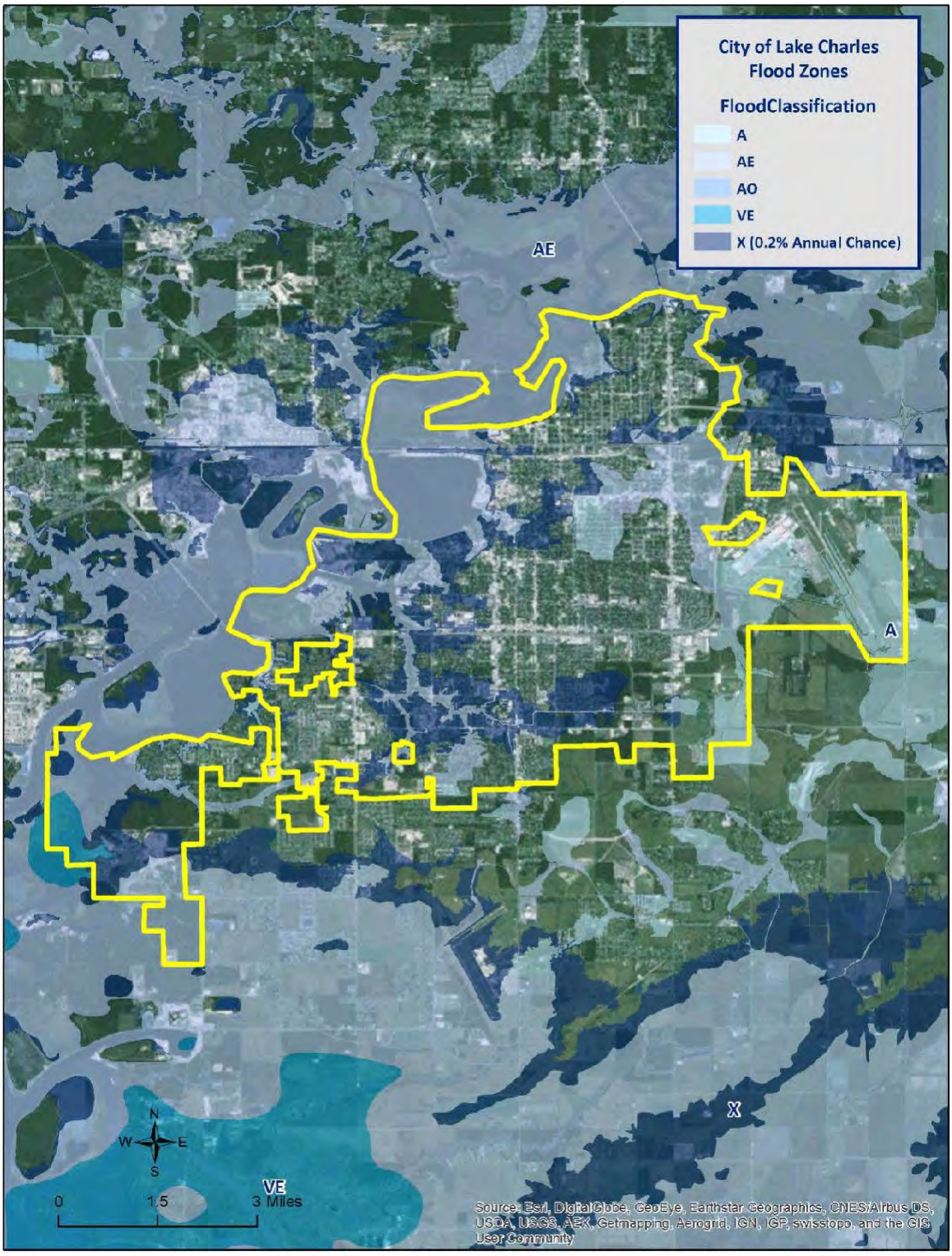


Figure 2-18: City of Lake Charles Areas within the Flood Zones

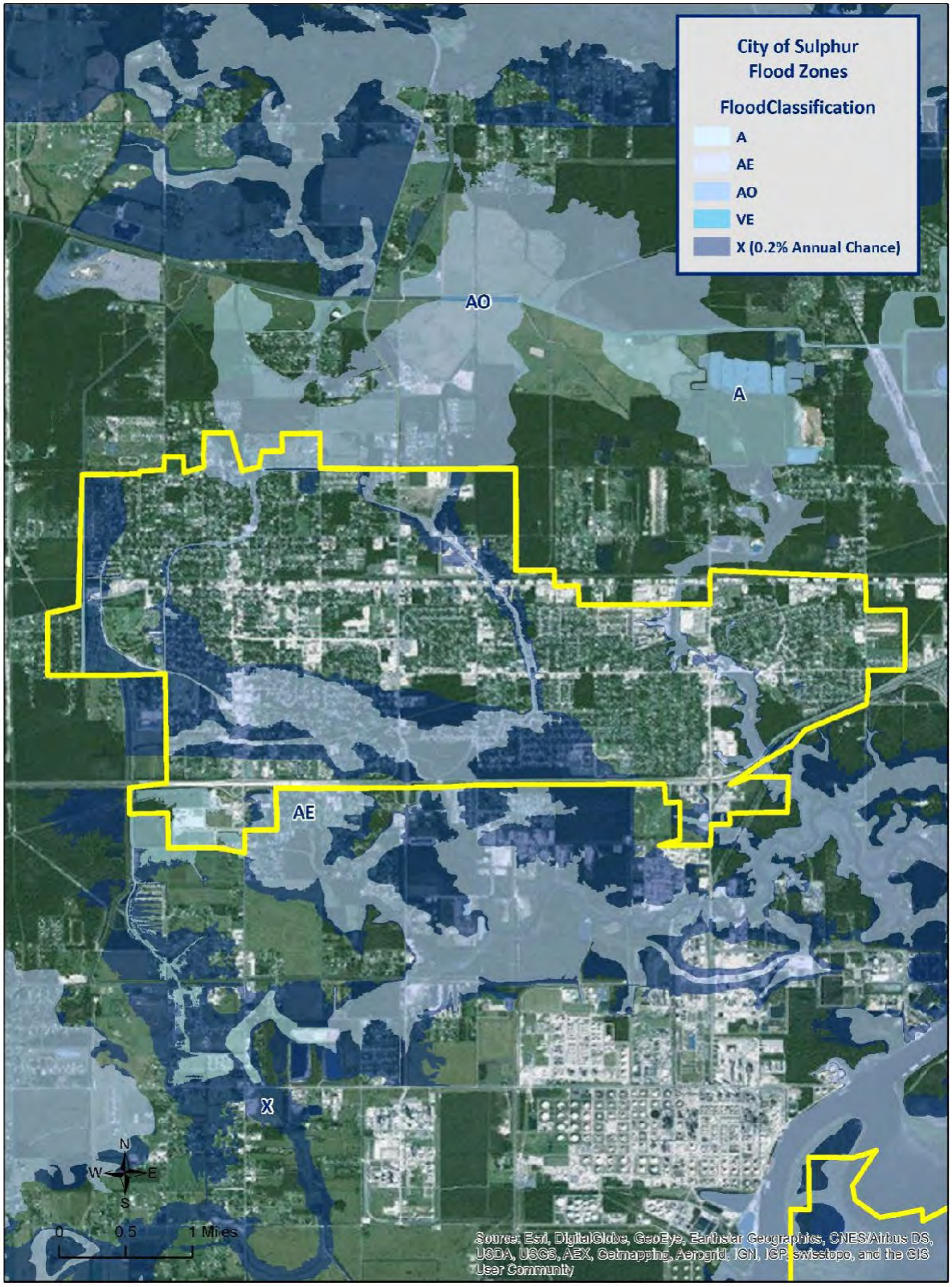


Figure 2-19: City of Sulphur Areas within the Flood Zones

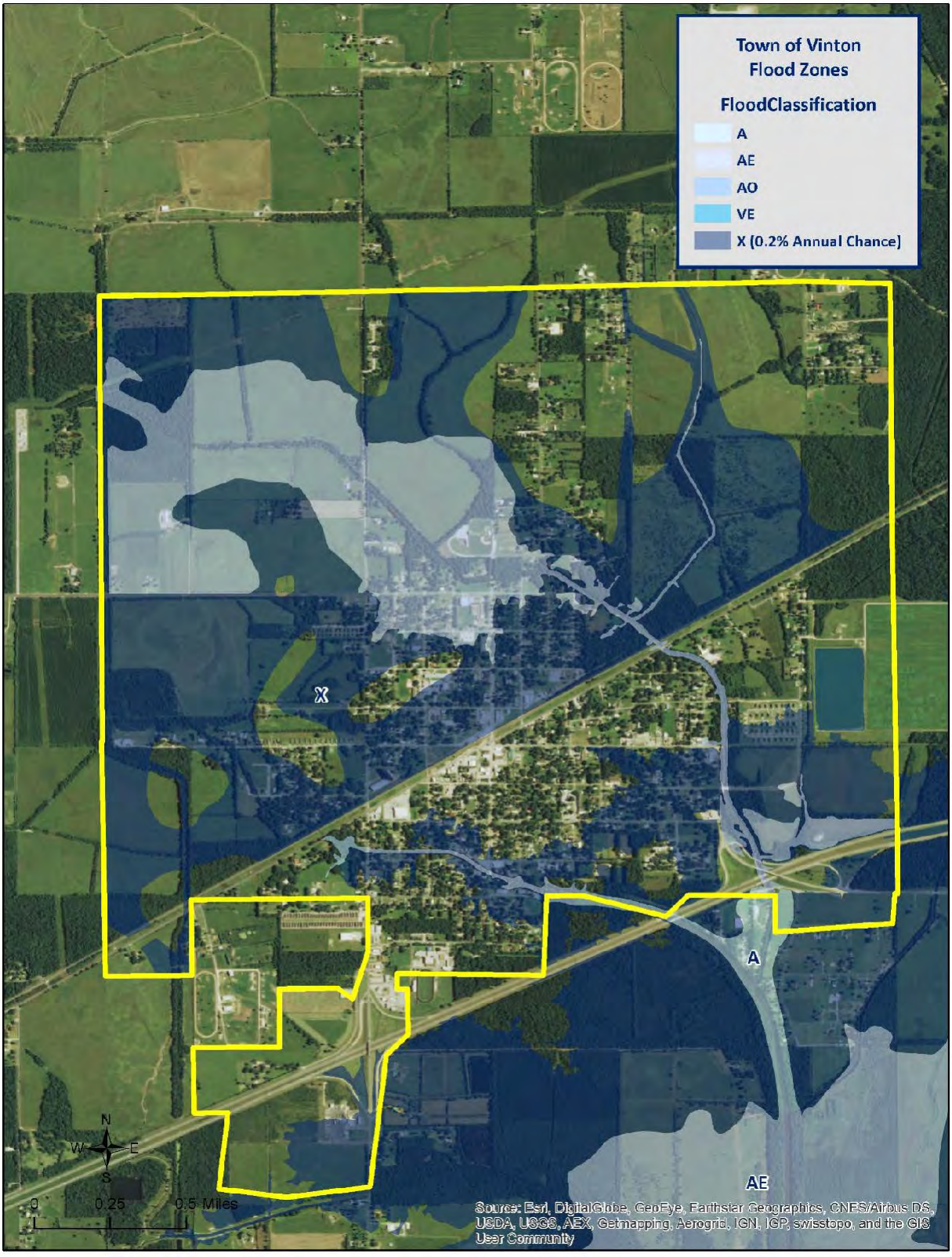


Figure 2-20: Town of Vinton Areas within the Flood Zones

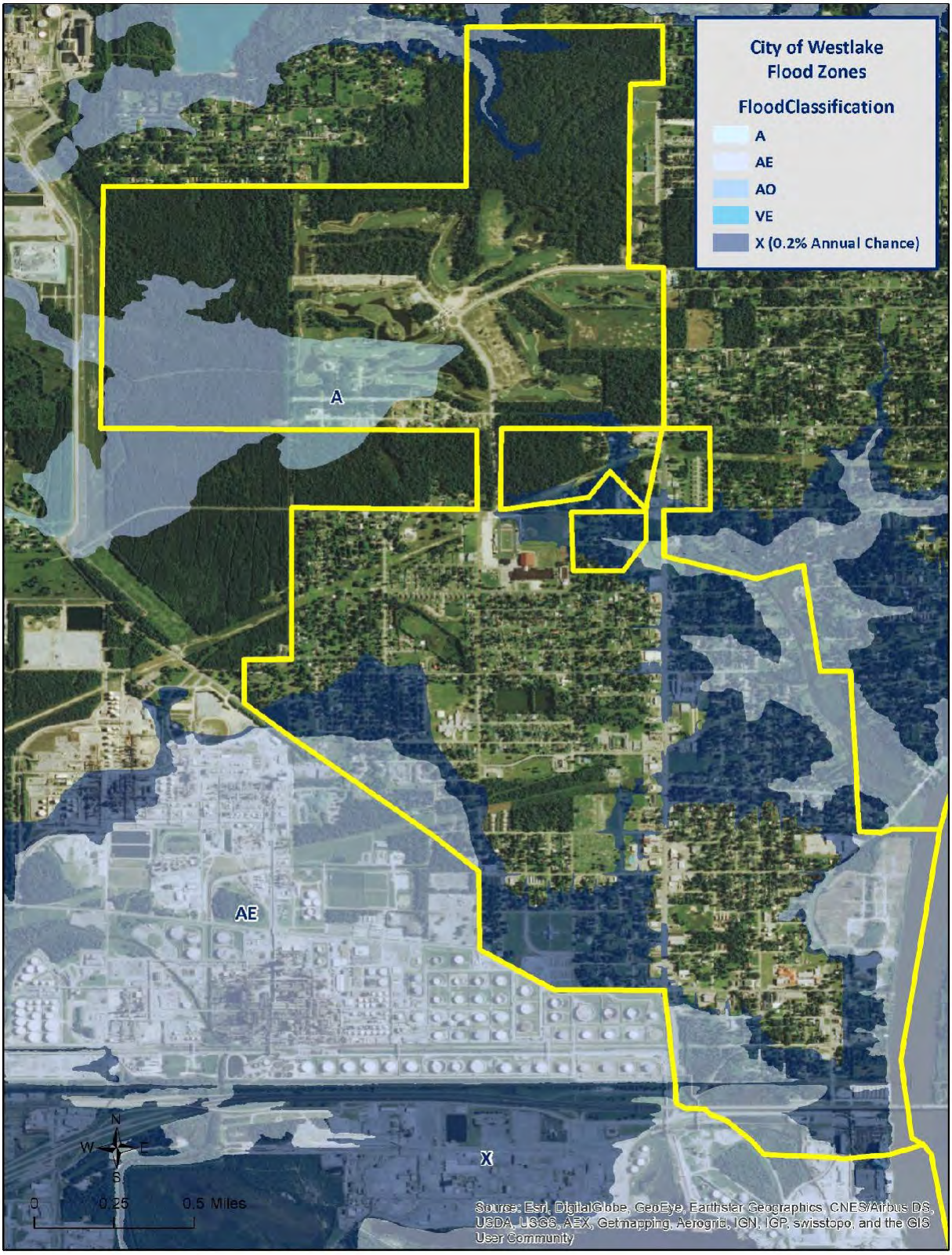


Figure 2-21: City of Westlake Areas within the Flood Zones

Previous Occurrences / Extents

Historically, there have been 75 flooding events that have created significant flooding in Calcasieu Parish between 1989 and 2019. Below is a brief synopsis of the 38 flooding events that have occurred since 2009, including flooding events that have occurred since the parish's last planning update.

Table 2-20: Historical Floods in Calcasieu Parish with Locations from 2009 - 2019

Date	Extents	Type of Flooding	Estimated Damages	Location
April 18, 2009	Heavy rainfall between 4 to 6 inches caused flash flooding in Lake Charles and Sulphur. Ryan Street and Common Street in Lake Charles were impassable due to flood waters, and numerous streets in Sulphur had to be closed due to flood waters.	Flash Flood	$5,000	LAKE CHARLES AND SULPHUR
May 24, 2009	Scattered thunderstorms in the Lake Charles area caused minor street flooding in Lake Charles on Enterprise Boulevard, Creole Street, and Alamo Street. Lake Street was impassable due to flooding.	Flood	$0	LAKE CHARLES
July 8, 2009	Scattered thunderstorms caused flooding in the Lake Charles area. Canal Street was flooded, with cars barely able to drive through the floodwaters.	Flood	$0	LAKE CHARLES
September 28, 2009	Minor street flooding occurred in Lake Charles due to scattered thunderstorms.	Flood	$0	LAKE CHARLES

Date	Extents	Type of Flooding	Estimated Damages	Location
	Minor street flooding occurred around the intersection of Lake Street and Country Club Road.			
October 22, 2009	Widespread street flooding occurred across the central and northern portions of Lake Charles. Several major roadways were flooded, including Ryan Street and Enterprise Boulevard.	Flash Flood	$10,000	LAKE CHARLES
October 26, 2009	Major flash flooding occurred in the cities of Sulphur, Westlake, and Lake Charles, as well as the unincorporated areas of the parish, when a slow moving front produced heavy rainfall.	Flash Flood	$500,000	SULPHUR, WESTLAKE, LAKE CHARLES, AND UNINCORPORATED AREAS
October 27, 2009	Heavy rains caused flooding in the Lake Charles area. Several roadways were closed, including Ward Line Road and Tom Hebert Road.	Flood	$100,000	LAKE CHARLES
November 3, 2009	Due to heavy rainfall, the Sabine River Authority was forced to release water from a swollen Toledo Bend Reservoir, causing extensive flooding in Alligator Park and Niblett's Bluff.	Flood	$500,000	UNINCORPORATED AREAS

Date	Extents	Type of Flooding	Estimated Damages	Location
	Damage to roads in the area was extensive.			
December 14, 2009	Rain showers and thunderstorms caused widespread street flooding. Numerous roadways were covered by 4 to 8 inches of water. In Sulphur, 2.67 inches of rain fell in a 3 hour period.	Flood	$10,000	VINTON, SULPHUR, AND UNINCORPORATED AREAS
December 14, 2009	Flash floods occurred in the eastern section of the parish due to scattered showers and thunderstorms. Numerous roads were completely underwater across Lake Charles. Some vehicles were stranded in flood waters.	Flash Flood	$10,000	LAKE CHARLES, IOWA, AND UNINCORPORATED AREAS
January 29, 2010	Minor street flooding occurred in the unincorporated area of Moss Bluff.	Flood	$0	UNINCORPORATED AREAS
May 30, 2010	Widespread street flooding occurred across south Lake Charles. Most entrance and exit ramps to Interstate 210 were closed due to high water. One home along Ernest Street and another on Common Street were flooded.	Flash Flood	$20,000	LAKE CHARLES
July 27, 2010	Rain from thunderstorms covered roadways	Flash Flood	$2,000	LAKE CHARLES

Date	Extents	Type of Flooding	Estimated Damages	Location
	along Tom Hebert Road and in the Fairview Mobile Home Park.			
February 18, 2012	Flooding occurred in a trailer park, with a water depth of 1 to 2 feet.	Flash Flood	$10,000	LAKE CHARLES
March 20, 2012	Over 10 inches of rain fell from Vinton to Starks, causing roadways to flood. Water also covered roadways in DeQuincy, making them nearly impassable or closed. Water entered multiple homes in the Starks and DeQuincy areas.	Flash Flood	$1,750,000	VINTON, DEQUINCY, AND UNINCORPORATED AREAS
March 21, 2012	Water from the previously mentioned storm continued to drain throughout the Vinton and DeQuincy areas, causing flooding.	Flood	$1,000	VINTON, DEQUINCY, AND UNINCORPORATED AREAS
January 9, 2013	Slow moving thunderstorms caused parish-wide flash flooding. Multiple homes flooded and numerous roadways had to be closed due to flood waters.	Flash Flood	$8,000,000	PARISH-WIDE
September 20, 2013	Thunderstorms moved across Moss Bluff, Sulphur, and Westlake for several hours, causing flash flooding in the area. Cars stalled as they attempted to cross	Flash Flood	$1,710,000	SULPHUR, WESTLAKE, AND UNINCORPORATED AREAS

Date	Extents	Type of Flooding	Estimated Damages	Location
	inundated roads. One elderly woman had to be rescued from her car when she attempted to cross an inundated roadway.			
May 28, 2014	Slow moving thunderstorms caused flash flooding in Lake Charles, Sulphur, and surrounding areas. Numerous vehicles were flooded, and one home was flooded.	Flash Flood	$30,000	LAKE CHARLES, SULPHUR, AND UNINCORPORATED AREAS
June 27, 2014	Heavy rain in the parish caused extensive flooding throughout the area. People were reportedly kayaking in the streets near LaGrange High School due to the height of the flood waters. Water entered several homes and apartments.	Flash Flood	$200,000	PARISH-WIDE
August 19, 2014	Heavy rains fell across portions of Lake Charles, causing flash floods. Two feet deep water was reported along Enterprise Boulevard and at the entrance of Highland Meadows subdivision. Lake Charles Regional Airport reported 2.77 inches of rain fell during the event.	Flash Flood	$0	LAKE CHARLES

Date	Extents	Type of Flooding	Estimated Damages	Location
August 30, 2014	Heavy rain fell throughout the parish. Portions of Interstate 10 and 210 were temporarily closed due to high water. Five homes along Dogwood Avenue were flooded, and a few homes were flooded in the Hunters Grove subdivision in Iowa.	Flash Flood	$100,000	PARISH-WIDE
April 10, 2015	A slow-moving thunderstorm developed over South Lake Charles and produced heavy rainfall. Flood water flooded at least one home on Sundale Drive near Common Street. Numerous roads were flooded along with cars stalled along Prien Lake, Derek, Kirkman, and Sale Roads and Streets.	Flash Flood	$10,000	PARISH-WIDE
September 10, 2015	The first reports of flooding came from social media where pictures of flooded cars and streets were posted to Facebook. Reports later came from Broadcast media reporting street flooding and cars stalled as well.	Flash Flood	$100,000	
March 10, 2016	Flood water from the heavy rain event on the 9th and 10th pushed into western sections of Calcasieu Parish flooding areas generally along and west of Highway 109. This flooded sections of Starks and Vinton.	Flash Flood	$50,000,000	PARISH WIDE
May 1, 2016	Heavy rain fell across Calcasieu Parish from early morning through the afternoon during the 1st. Flooding was first reported along the exits of Interstate 210 with water rising to near 3 feet deep. Lake Charles Regional Airport set a daily rainfall record with 5.20 inches and 3 to 6 inches of rainfall was common from Vinton to Iowa.	Flash Flood	$75,000	PARISH WIDE

Date	Extents	Type of Flooding	Estimated Damages	Location
August 13, 2016	Numerous roads were reported flooded during the heavy rain with some structures taking on water as well. An estimated 22 structures flooded during the event.	Flash Flood	$500,000	PARISH WIDE
September 5, 2016	Several streets flooded in Southeast Lake Charles from heavy rain. Some vehicles were flooded with a few roadways having hip deep water.	Flash Flood	$15,000	LAKE CHARLES
December 3, 2016	Several homes and many streets between and along Burton Street and Highway 90 flooded during prolonged heavy rain.	Flash Flood	$100,000	PARISH WIDE
March 29, 2017	Many streets in Sulphur, Lake Charles, and Moss Bluff flooded and became impassable after 4 to 8 inches of rain fell. At least 69 homes in Sulphur and Lake Charles had minor flooding.	Flash Flood	$150,000	PARISH WIDE
April 18, 2017	A quick 3 inches from an isolated thunderstorm produced flooding of at least 1 structure and flooded streets near the intersection of Houston River Road and Dunne Street.	Flash Flood	$10,000	
May 3, 2017	Heavy rain caused street flooding across a large portion of Calcasieu Parish with many reported impassable.	Flash Flood	$750,000	PARISH WIDE

Date	Extents	Type of Flooding	Estimated Damages	Location
June 21, 2017	Heavy rain from Tropical Storm Cindy produced flooding around the City of Lake Charles. Knee-deep water was reported by the emergency manager along the on ramps near Interstate 210.	Flash Flood	$10,000	PARISH WIDE
June 29, 2017	Media and the public reported numerous streets flooded around north Lake Charles, Moss Bluff, and Sulphur with many being impassable. One home on Urban Street was also reported flooded in Sulphur.	Flash Flood	$50,000	PARISH WIDE
August 27, 2017	Harvey produced 15 to 30 inches of rain across Calcasieu Parish. One rain band set up on the east side of Lake Charles during the 27th and produced a quick foot of rainfall flooding numerous homes. Total flooded homes was estimated at 1,572.	Flash Flood	$60,000,000	PARISH WIDE
January 27, 2018	Three to 6 inches of rain fell over a few hours from near Vinton to Lake Charles. Several streets were flooded in the area. One mobile home was reported flooded.	Flash Flood	$15,000	PARISH WIDE
June 21, 2018	Several inches of rain in a short period of time produced street flooding around the city, Numerous roads were flooded with several cars stalled.	Flash Flood	50,000	PARISH WIDE
April 4, 2019	Media reported flooding along Nelson Road including water in at least one home on South Tallowood Road.	Flash Flood	10,000	LAKE CHARLES
JULY 14, 2019	Heavy rain in a stalled feeder band from the remnants of Hurricane Barry produced flooding north of Interstate 10 and affected Starks, Sulphur, Moss Bluff, Dequincy, and Gillis. The worst flooding occurred in the Gillis to Ragley area after 10 to 20 inches of rain fell.	Flash Flood	25,000,000	PARISHWIDE

Based on previous flood events, the worst-case scenarios are based on historical flooding events. Storm water excesses and riverine flooding primarily affect the low lying areas of the parish, and flood depths of up to six feet can be expected in the unincorporated areas of the parish. The incorporated areas of Lake Charles, Sulphur, and Westlake can expect flood depths from three to five feet, while the incorporated area of Iowa can expect flooding levels of approximately two to four feet. The incorporated areas of Vinton and DeQuincy can expect flood levels of approximately one to three 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 Calcasieu Parish having multiple jurisdictions, it was necessary to assess the historical data found in the National Climatic Data Center's for Calcasieu 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 2-21: Annual Flood Probabilities for Calcasieu Parish

Jurisdiction	Annual Probability	Return Frequency
Calcasieu Parish (Unincorporated)	100%	Less than once a year
DeQuincy	32%	3 – 4 years
Iowa	24%	4 – 5 years
Lake Charles	100%	Less than once a year
Sulphur	60%	1 – 2 years
Vinton	40%	2 – 3 years
Westlake	32%	3 - 4 years

Based on historical record, the overall flooding probability for the entire Calcasieu Parish Planning area is 100% with 59 events occurring over a 25-year period. Based on the State's Hazard Mitigation Plan and the amount of significant flooding events that have taken place throughout the parish, the Calcasieu Parish Planning area can anticipate having more than two flooding events each year.

Estimated Potential Losses

Using the Hazus Flood Model, the 100-year flood scenario, along with the Parish DFIRM, 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 2-22: Estimated Losses in Calcasieu Parish from a 100-year Flood Event (Source: Hazus)

Jurisdiction	Estimated Total Losses from 100-Year Flood Event
Calcasieu Parish (Unincorporated)	$1,903,740,000
DeQuincy	$22,631,000
Iowa	$26,456,000
Lake Charles	$916,875,000
Sulphur	$128,807,000
Vinton	$8,285,000
Westlake	$38,769,000
Total	$3,045,563,000

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 following tables:

Table 2-23: Estimated 100-year Flood Losses for Unincorporated Calcasieu Parish by Sector (Source: Hazus)

Calcasieu Parish (Unincorporated)	Estimated Total Losses from 100-Year Flood Event
Agricultural	$9,278,000
Commercial	$275,031,000
Government	$10,950,000
Industrial	$200,227,000
Religious / Non-Profit	$29,906,000
Residential	$1,352,777,000
Schools	$25,571,000
Total	$1,903,740,000

Table 2-24: Estimated 100-year Flood Losses for DeQuincy by Sector (Source: Hazus)

DeQuincy	Estimated Total Losses from 100-Year Flood Event
Agricultural	$0
Commercial	$3,367,000
Government	$19,000
Industrial	$258,000
Religious / Non-Profit	$831,000
Residential	$16,268,000
Schools	$1,888,000
Total	$22,631,000

Table 2-25: Estimated 100-year Flood Losses for Iowa by Sector (Source: Hazus)

Iowa	Estimated Total Losses from 100-Year Flood Event
Agricultural	$0
Commercial	$2,921,000
Government	$117,000
Industrial	$178,000
Religious / Non-Profit	$2,438,000
Residential	$20,614,000
Schools	$188,000
Total	$26,456,000

Table 2-26: Estimated 100-year Flood Losses for Lake Charles by Sector (Source: Hazus)

Lake Charles	Estimated Total Losses from 100-Year Flood Event
Agricultural	$2,760,000
Commercial	$270,439,000
Government	$9,141,000
Industrial	$27,677,000
Religious / Non-Profit	$26,976,000
Residential	$571,575,000
Schools	$8,307,000
Total	$916,875,000

Table 2-27: Estimated 100-year Flood Losses for Sulphur by Sector (Source: Hazus)

Sulphur	Estimated total Losses from 100-Year Flood Event
Agricultural	$127,000
Commercial	$28,895,000
Government	$156,000
Industrial	$6,483,000
Religious / Non-Profit	$939,000
Residential	$91,004,000
Schools	$1,203,000
Total	$128,807,000

Table 2-28: Estimated 100-year Flood Losses for Vinton by Sector (Source: Hazus)

Vinton	Estimated total Losses from 100-Year Flood Event
Agricultural	$0
Commercial	$511,000
Government	$0
Industrial	$110,000
Religious / Non-Profit	$381,000
Residential	$6,652,000
Schools	$631,000
Total	$8,285,000

Table 2-29: Estimated 100-year Flood Losses for Westlake by Sector (Source: Hazus)

Westlake	Estimated total Losses from 100-Year Flood Event
Agricultural	$100,000
Commercial	$5,037,000
Government	$485,000
Industrial	$6,779,000
Religious / Non-Profit	$524,000
Residential	$25,699,000
Schools	$145,000
Total	$38,769,000

Threat to People

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

Table 2-30: Vulnerable Populations Susceptible to a 100-year Flood Event (Source: Hazus)

Number of People Exposed to Flood Hazards			
Location	**# in Community**	**# in Hazard Area**	**% in Hazard Area**
Calcasieu Parish (Unincorporated)	**86,354**	**59,634**	**69.1%**
DeQuincy	**3,235**	**1,070**	**33.1%**
Iowa	**2,996**	**2,032**	**67.8%**
Lake Charles	**71,993**	**27,025**	**37.5%**
Sulphur	**20,410**	**7,780**	**38.1%**
Vinton	**3,212**	**1,205**	**37.5%**
Westlake	**4,568**	**1,307**	**28.6%**
Total	**192,768**	**100,053**	**51.9%**

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

Table 2-31: Vulnerable Populations Susceptible to a 100-year Flood Event in Unincorporated Calcasieu Parish (Source: Hazus)

Calcasieu Parish (Unincorporated)		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	59,634	69.1%
Persons Under 5 Years	4,055	6.8%
Persons Under 18 Years	14,849	24.9%
Persons 65 Years and Over	8,051	13.5%
White	42,459	71.2%
Minority	17,175	28.8%

Table 2-32: Vulnerable Populations Susceptible to a 100-year Flood Event in DeQuincy (Source: Hazus)

DeQuincy		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	1,070	33.1%
Persons Under 5 Years	78	7.3%
Persons Under 18 Years	210	19.7%
Persons 65 Years and Over	184	17.2%
White	826	77.2%
Minority	244	22.8%

Table 2-33: Vulnerable Populations Susceptible to a 100-year Flood Event in Iowa (Source: Hazus)

Iowa		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	2,032	67.8%
Persons Under 5 Years	148	7.3%
Persons Under 18 Years	447	22.0%
Persons 65 Years and Over	227	11.2%
White	1,415	69.6%
Minority	617	30.4%

Table 2-34: Vulnerable Populations Susceptible to a 100-year Flood Event in Lake Charles (Source: Hazus)

Lake Charles		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	27,025	37.5%
Persons Under 5 Years	1,894	7.0%
Persons Under 18 Years	4,451	16.5%
Persons 65 Years and Over	3,765	13.9%
White	12,696	47.0%
Minority	14,329	53.0%

Table 2-35: Vulnerable Populations Susceptible to a 100-year Flood Event in Sulphur (Source: Hazus)

Sulphur		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	7,780	38.1%
Persons Under 5 Years	591	7.6%
Persons Under 18 Years	1,400	18.0%
Persons 65 Years and Over	1,109	14.3%
White	6,988	89.8%
Minority	792	10.2%

Table 2-36: Vulnerable Populations Susceptible to a 100-year Flood Event in Vinton (Source: Hazus)

Vinton		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	1,205	37.5%
Persons Under 5 Years	95	7.9%
Persons Under 18 Years	210	17.4%
Persons 65 Years and Over	181	15.0%
White	908	75.3%
Minority	297	24.7%

Table 2-37: Vulnerable Populations Susceptible to a 100-year Flood Event in Westlake (Source: Hazus)

Westlake		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	1,307	28.6%
Persons Under 5 Years	104	8.0%
Persons Under 18 Years	239	18.3%
Persons 65 Years and Over	187	14.3%
White	1,009	77.2%
Minority	298	22.8%

Vulnerability

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

Sinkholes

Sinkholes are areas of ground with no natural external surface drainage. They can vary in size from a few square feet to hundreds of acres, and can reach depths of more than 100 feet. Sinkholes are usually found in karst terrain—that is, areas where limestone, carbonate rock, salt beds, and other water-soluble rocks lie below the Earth's surface. Karst terrain is marked by the presence of other uncommon geologic features, such as springs, caves, and dry streambeds that lose water into the ground. In general, sinkholes form gradually (in the case of cover subsidence sinkholes), but they can also occur suddenly (in the case of cover-collapse sinkholes).

Sinkhole formation is a very simple process. Whenever water is absorbed through soil, it encounters water-soluble bedrock. The water then begins to dissolve the bedrock, forming sinkholes. The karst rock dissolves along cracks; as the fissures grow, soil and other particles fill the gaps, loosening the soil above the bedrock. As the soil sinks from the surface, a depression forms, which draws in more water, funneling it down to the water-soluble rock. The increase of water and soil in the rock pushes open the cracks, again drawing more soil and water into it. This positive feedback loop continues, unless clay plugs into the cracks in the bedrock, at which time a pond may form. A sudden cover-collapse sinkhole occurs when the top soil above dissolving bedrock does not sink, but forms a bridge over the soil that is sinking beneath it. The underground soil continues to fill the bedrock fissures, until finally the soil bridge collapses and fills the void beneath it.

Both kinds of sinkholes can occur naturally or through human influence. While sinkholes tend to form naturally in karst areas, sinkholes can form in other geological areas that have been altered by humans, by processes such as mining, sewers, hydraulic fracture drilling, groundwater pumping, irrigation, or storage ponds. In all of these cases, and others, the cause for the sinkhole is that support for surface soil has been weakened or substantially removed.

In the United States, 20% of the land is susceptible to sinkholes. Most of this area lies in Florida, Texas, Alabama, Missouri, Kentucky, Tennessee, and Pennsylvania. In Louisiana, most of the sinkholes are precipitated by the human-influenced collapse of salt dome caverns. The collapse of a salt dome is usually a slow process; however, it may occur suddenly and without any advance warning.

Location

Currently, there are nine identifiable salt dome locations in Calcasieu Parish. In addition, there is one salt dome in which its two-mile buffer extends into Calcasieu Parish. Figure 2-25 displays the locations of these salt domes with their relative location to the nearest jurisdiction. As depicted in Figure 2-25, the sink holes are dispersed throughout Calcasieu Parish. While the majority of sinkholes are located in unincorporated areas of the parish, a two-mile buffer around each of the Sulphur Mines, Lockport, Calcasieu 1, and Iowa salt domes encompass parts of Sulphur, Westlake, and Iowa respectively.

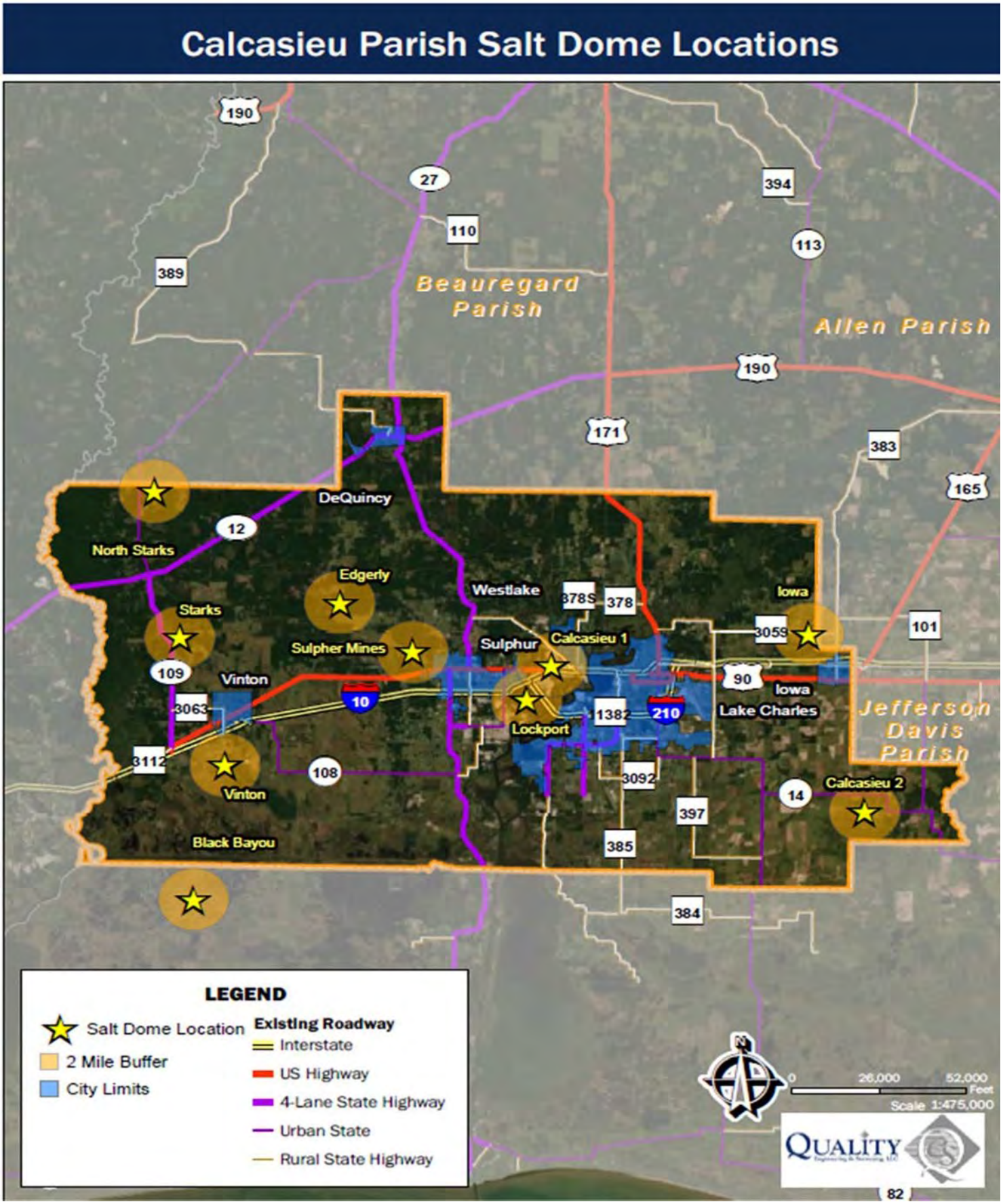


Figure 2-22a: Salt Dome Locations in Calcasieu Parish Relative to Jurisdictions

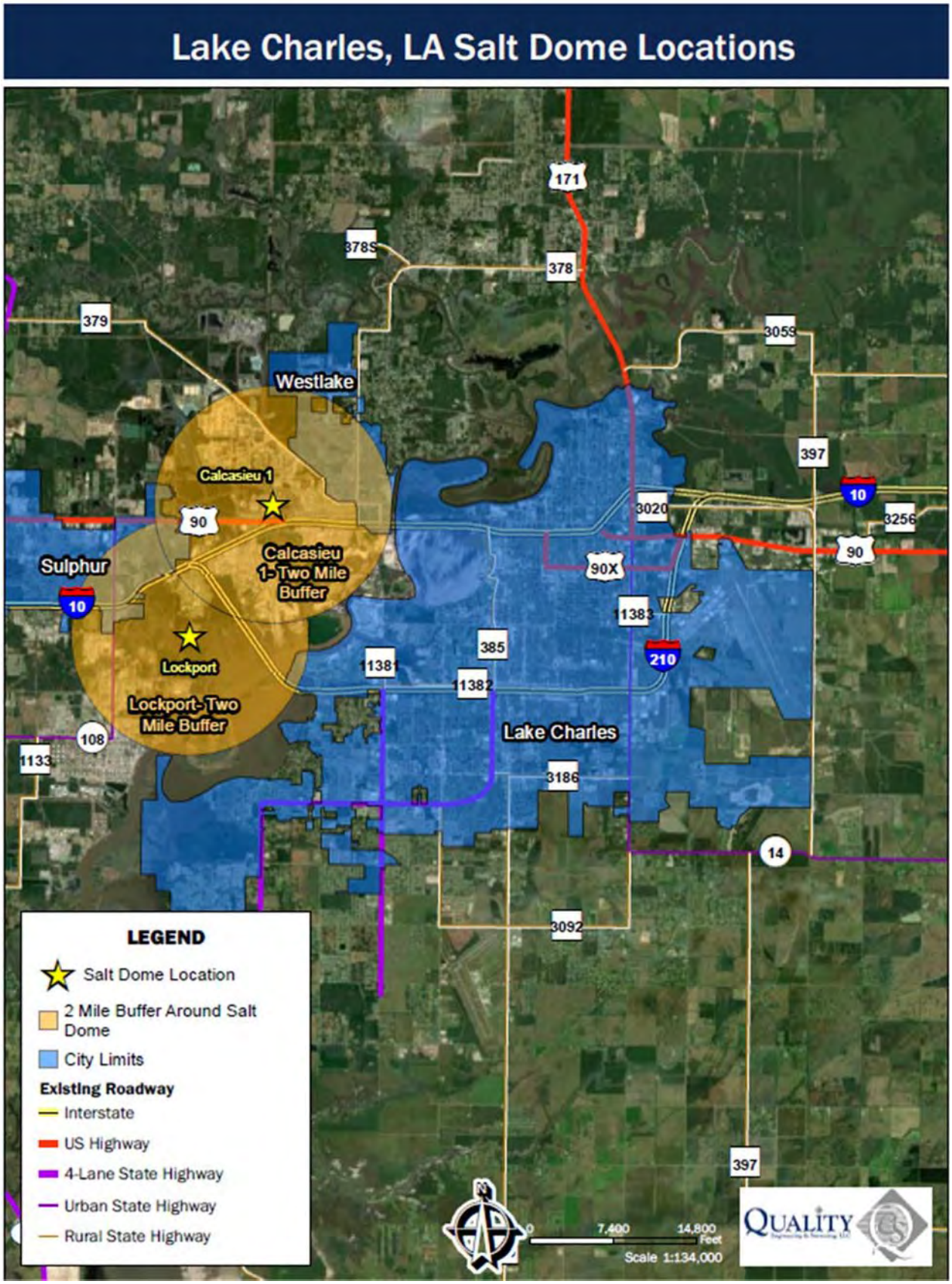


Figure 2-22b: Lake Charles, LA Salt Dome Locations

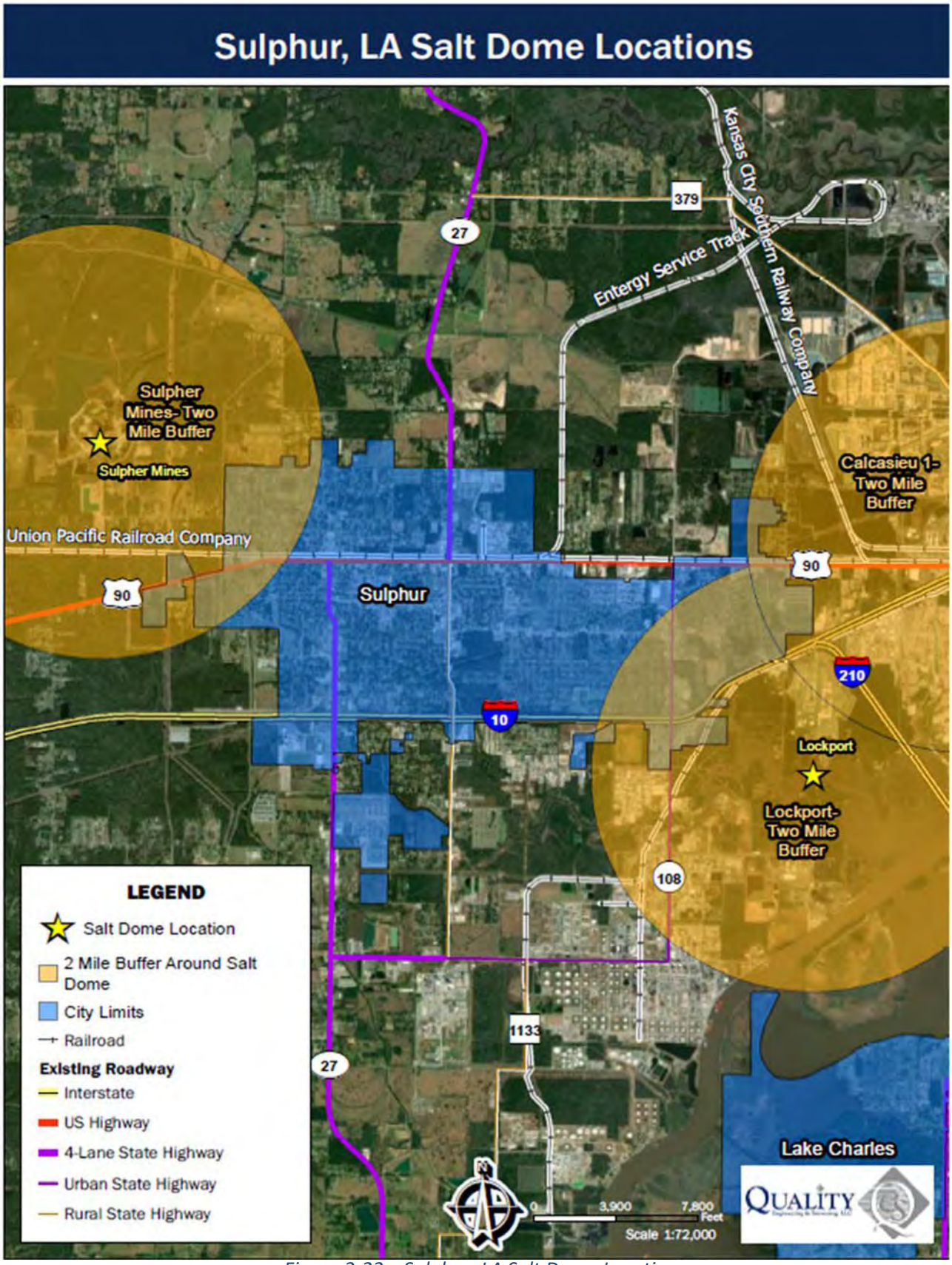


Figure 2-22c: Sulphur, LA Salt Dome Locations

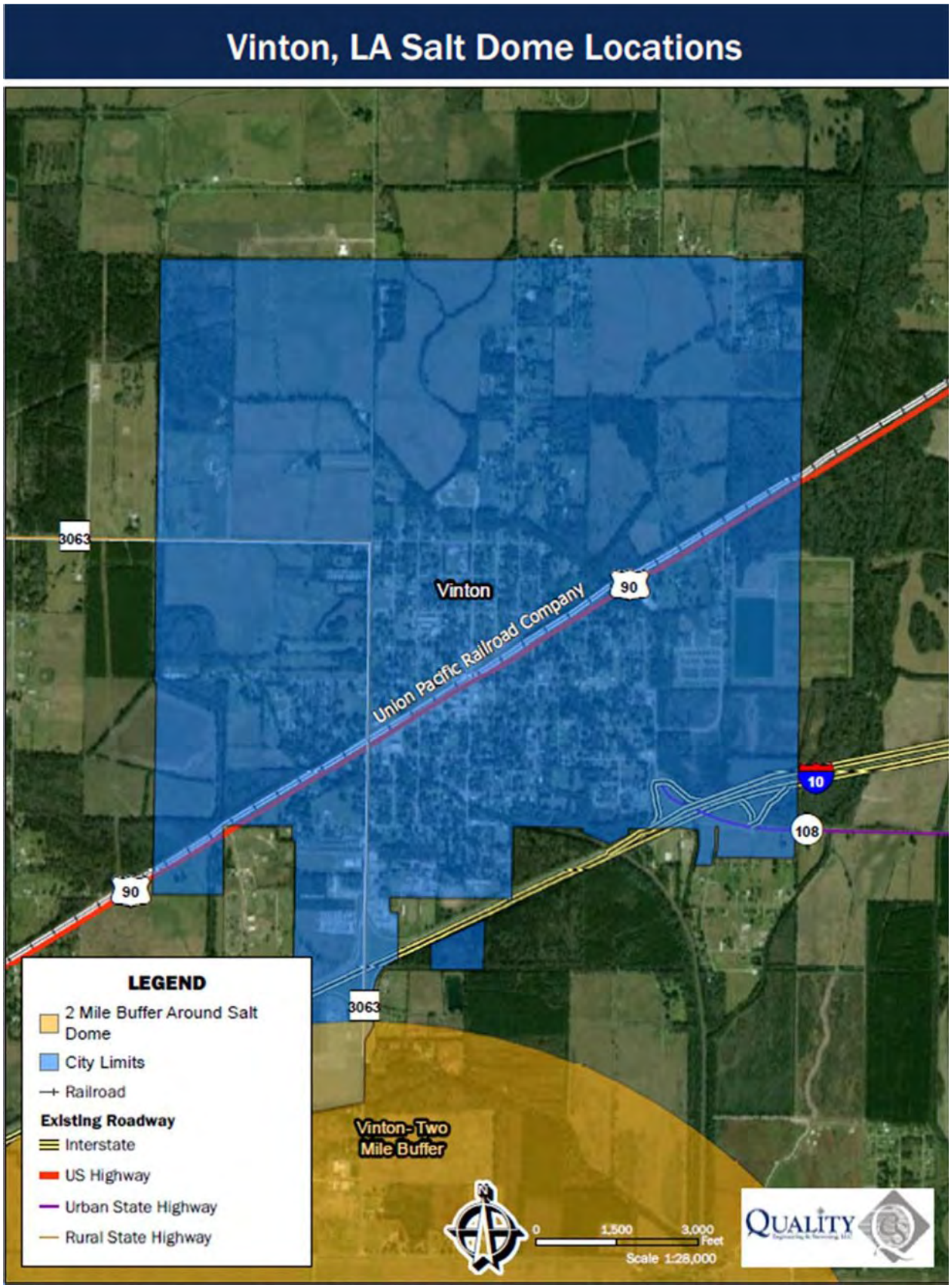


Figure 2-22d: Vinton, LA Salt Dome Locations

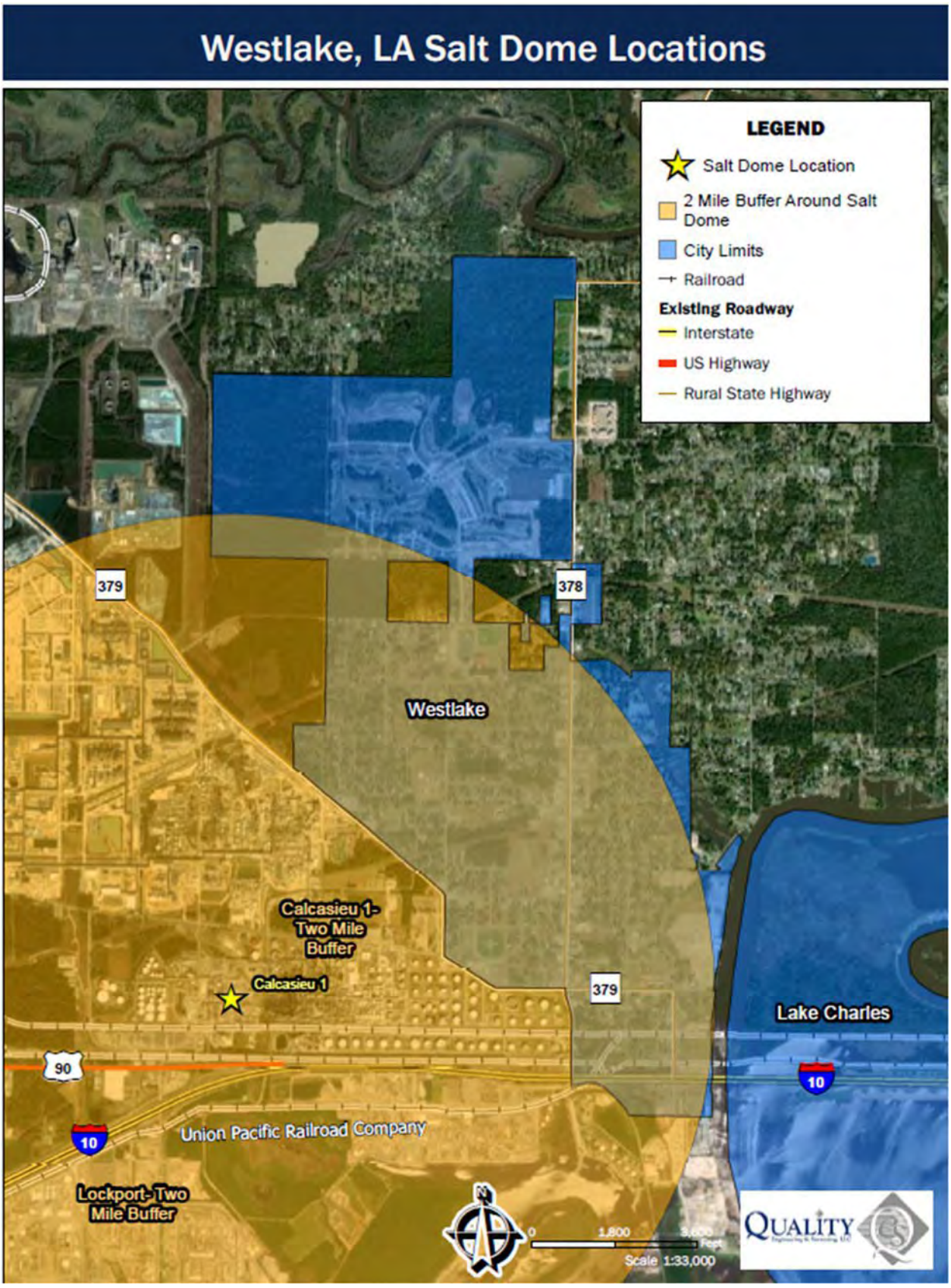


Figure 2-22e: Westlake, LA Salt Dome Locations

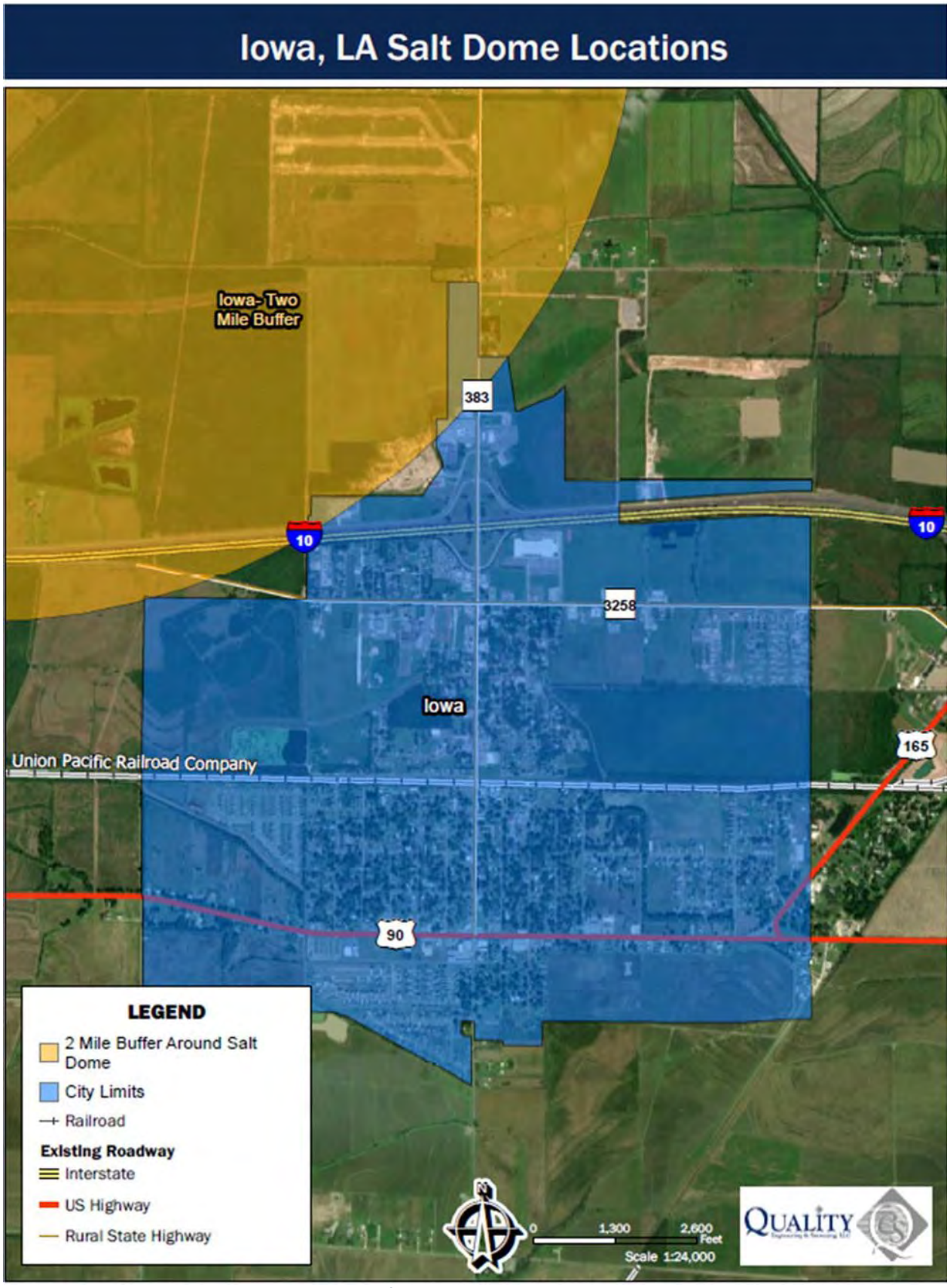


Figure 2-22f: Iowa, LA Salt Dome Locations

Previous Occurrences / Extents

There have been no recorded incidents of sinkholes or salt dome collapses in Calcasieu Parish to date. While the exact length and depth of a sinkhole caused by a salt dome collapse is unknown, based on the average size of salt domes and past collapses of salt domes in the state of Louisiana, one could expect to see a sinkhole approximately 35 acres in size and approximately 750 feet deep.

Frequency / Probability

Since there has been no recorded incidents of sinkhole or salt dome collapse in Calcasieu Parish, the annual chance of occurrence is calculated at less than 1%.

Estimated Potential Losses

Of the ten salt domes that influence Calcasieu Parish, nine were analyzed to determine the number of people and houses that are potentially susceptible to losses from a sink hole materializing from one of the salt domes. The remainder was discounted due to it not being located near any populated areas of the parish. The following tables are based on conducting a two-mile buffer around the center of the salt dome. The values were determined by querying the 2010 U.S. Census block data to determine the number of houses and people located within two miles of each salt dome. Critical facilities were also analyzed to

determine if they fell within the two-mile buffer of a salt dome. Total value for all occupancy groups from Hazus was used to estimate a total loss of all facilities that were within two miles of a salt dome.

The salt dome that poses the greatest risk to Calcasieu Parish is the Lockport Salt Dome. The Lockport Salt Dome contains a total of 3,879 homes and 9,467 people within its two-mile buffer.

Table 2-38: Estimated Potential Losses from a Sinkhole Formation
(Source: U.S. 2010 Census Data and Hazus)

Salt Dome Name	Total Building Exposure	Critical Infrastructure Exposure	Number of People Exposed	Number of Houses Exposed
Calcasieu 1	$604,784,000	7	5,217	2,153
Calcasieu 2	$82,997,000	3	1,031	430
Edgerly	$20,333,000	0	363	137
Iowa	$67,171,000	0	918	393
Lockport	$1,195,816,000	7	9,467	3,879
North Starks	$2,724,000	0	185	83
Starks	$5,520,000	0	123	46
Sulphur Mines	$251,574,000	3	4,105	1,846
Vinton	$29,248,000	0	367	144

Due to the isolated locations of the sinkholes, there is little to no risk to people, with the exceptionbeing the residents within two miles of the Calcasieu 1, Calcasieu 2, Lockport, and Sulphur Mines Salt Domes. The remaining five salt domes that were analyzed also pose some risk, but not nearly to the same degree as the Lockport Salt Dome.

Vulnerability

See Appendix C for parish and municipality building exposure to a sinkhole hazard.

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.

Thunderstorms - 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 means larger hailstone sizes. Table 2-39 displays a spectrum of hailstone diameters and their everyday equivalents.

Table 2-39: 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

Spectrum of Hailstone Diameters	
Hail Diameter Size	**Description**
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.

Thunderstorms - High Winds

In general, high winds can occur in a number of different ways, within and without thunderstorms. The Federal Emergency Management Agency (FEMA) distinguishes these as shown in Table 2-40.

Table 2-40: 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

High Winds Categories			
High Wind Type	**Description**	**Relative Frequency in Louisiana**	**Relative Maximum Duration in Louisiana**
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 wind**s** and downbursts. Straight-line winds are common but are a relatively insignificant hazard (on land) compared to other high winds. Downslope winds are common but relatively insignificant in the mountainous areas of Louisiana where they occur. Nor'easters are cyclonic events that have at most a peripheral effect on Louisiana, and none associated with high winds. Winds associated with hurricanes and tornadoes will be considered in their respective sections.

Table 2-41 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 2-41: 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

Beaufort Wind Scale			
Force	Wind (MPH)	WMO Classification	Appearance of Wind Effects on Land
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.

Thunderstorms - 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 in the strike vicinity.

Damage caused by lightning is usually to homes or businesses. These strikes can 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 can cause negative long-term health effects to the individual that is struck.

Thunderstorms - Hailstorms

Location

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

Previous Occurrences / Extents

The SHELDUS database reports nine significant hailstorm events occurring within the boundaries of Calcasieu Parish between the years of 1989-2019. According to the National Climatic Data Center, hailstorm diameters experienced in Calcasieu Parish have ranged from 0.75 inches to 3 inches since

1989. The most frequently recorded hail size has been 0.75 inch diameters. Figure 2-23 displays the density of hailstorms in Calcasieu Parish. Based on the National Climatic Data Center dataset, Table 2-42 provides an overview of hailstorms that have impacted the Calcasieu Parish Planning area since 2009. Calcasieu Parish can expect to experience hail up to 2.75 inches in diameter for future events.

Table 2-42: Previous Occurrences of Hailstorms in Calcasieu Parish (Source: NCDC)

Date	Recorded Hail Size (inches)	Location
March 25, 2009	1	SULPHUR
March 25, 2009	1	VINCENT
March 26, 2009	0.75	LAKE CHARLES
March 27, 2009	1	VINTON
March 27, 2009	0.75	BUHLER
March 31, 2009	0.75	(LCH)LK CHARLES MUNI
March 31, 2009	0.88	(LCH)LK CHARLES MUNI
April 12, 2009	0.75	BUHLER
April 12, 2009	1	LAKE CHARLES
April 12, 2009	0.88	VINCENT LNDG
April 12, 2009	1	LAKE CHARLES LAKE
April 12, 2009	0.75	LAKE CHARLES MUNI AR
April 12, 2009	0.88	DEQUINCY
July 8, 2009	0.88	CHENNAULT INDUS AIRP
July 25, 2009	1.75	BUHLER
August 26, 2009	0.75	VINTON
August 26, 2009	0.88	VINTON
August 26, 2009	0.88	VINTON
December 15, 2009	0.88	VINTON
December 15, 2009	0.75	SULPHUR
March 25, 2010	1	CHENNAULT INDUS AIRP
March 25, 2010	0.88	(LCH)LK CHARLES MUNI
March 25, 2010	1	(LCH)LK CHARLES MUNI
May 17, 2010	1	MOSS BLUFF
May 26, 2010	1	GILLIS
May 30, 2010	1	LAKE CHARLES LAKE
March 29, 2011	1	(LCH)LK CHARLES MUNI
March 29, 2011	1	LAKE CHARLES
March 29, 2011	0.75	(LCH)LK CHARLES MUNI
March 30, 2011	1	(LCH)LK CHARLES MUNI
March 30, 2011	0.88	(LCH)LK CHARLES MUNI
March 30, 2011	0.88	VINCENT
March 30, 2011	1.75	VINCENT LNDG
March 30, 2011	1.5	(LCH)LK CHARLES MUNI

Date	Recorded Hail Size (inches)	Location
March 30, 2011	1.25	LAKE CHARLES
June 6, 2011	0.88	(LCH)LK CHARLES MUNI
June 6, 2011	0.75	VINTON
June 6, 2011	0.88	VINTON
June 6, 2011	1	TOOMEY
August 14, 2011	0.88	IOWA
April 4, 2012	1	DEQUINCY
November 5, 2012	1	BUHLER
November 5, 2012	1.25	WESTLAKE
February 25, 2013	1.75	NIBLETTS BLUFF
February 25, 2013	1	VINTON
February 25, 2013	1.75	VINTON
May 9, 2013	0.88	VINTON
May 9, 2013	1	VINCENT
May 10, 2013	1.25	(LCH)LK CHARLES MUNI
June 8, 2013	0.88	SULPHUR
June 8, 2013	0.88	VINCENT
June 14, 2013	0.75	SULPHUR
May 9, 2019	2.5-3.0	SULPHUR, VINTON

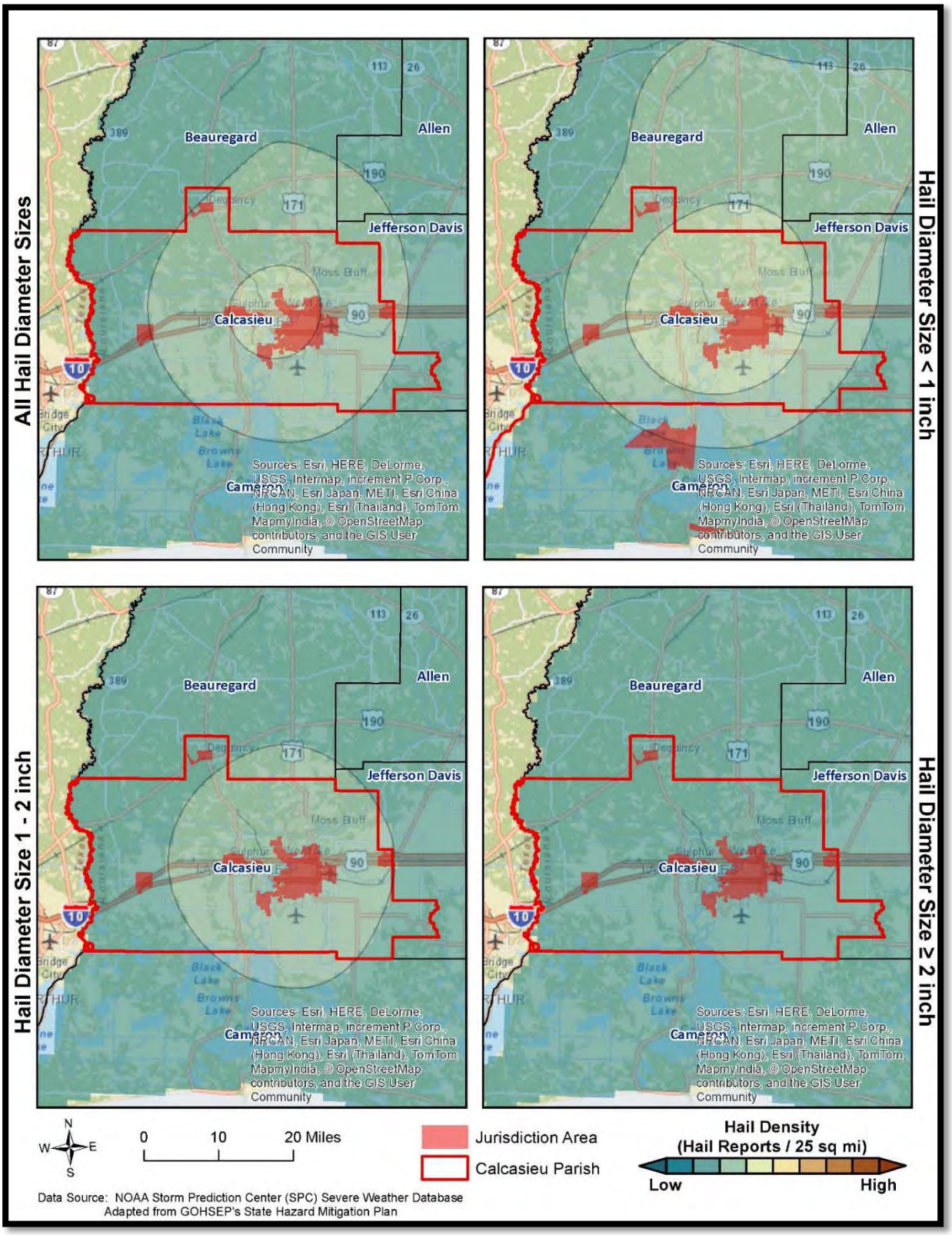


Figure 2-23: Density of Hailstorms by Diameter from 1950-2012
(Source: State of Louisiana Hazard Mitigation Plan 2014)

Frequency

Based on historical data from SHELDUS for the past 30 years, it is estimated the probability of occurrence for a significant hailstorm event is approximately 27%, with a return frequency of less than once every two to four years. The probability was determined based on a review of significant hail data that has caused damages in the last 30 years, in which Calcasieu Parish has had nine recorded events.

Estimated Potential Losses

According to the SHELDUS database, property damage due to hailstorms in Calcasieu Parish have totaled approximately $46,081,350 since 1989. A list of total damages by event can be found in Table 2-43. 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 (1989 – 2019). This provides an annual estimated potential loss of $1,536,045. Table 2-44 provides an estimate of potential property losses for Calcasieu Parish.

Table 2-43: Property Damage Caused by Hailstorms in Calcasieu Parish (Source: SHELDUS)

Date	Property Damage
April 1991	$100
May 1991	$2,750
June 1991	$2,500
January 1999	$50,000
June 2007	$5,000
April 2009	$1,000
May 2013	$20,000
May 2019	$46,000,000

Table 2-44: Estimated Annual Property Losses in Calcasieu Parish from Hailstorms

Estimated Annual Potential Losses from Hailstorms for Calcasieu Parish						
Unincorporated Calcasieu Parish (44.8% of Population)	DeQuincy (1.7% of Population)	Iowa (1.6% of Population)	Lake Charles (37.3% of Population)	Sulphur (3.1% of Population)	Vinton (1.7% of Population)	Westlake (2.4% of Population)
$688,148	$26,113	$24,577	$572,945	$47,617	$26,113	$36,865

There have been no deaths or injuries due to hailstorms from 1989 – 2019 in Calcasieu Parish.

Vulnerability

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

Thunderstorms - High Winds

Location

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

Previous Occurrences / Extents

The SHELDUS database reports a total of 198 thunderstorm wind events occurring within the boundaries of Calcasieu Parish between the years of 1989 to 2019. The significant thunderstorm wind events experienced in Calcasieu Parish have ranged in wind speed from 50 mph to 87 mph. Calcasieu Parish can expect to receive thunderstorm winds up to 87 mph for future high wind events.

Table 2-45: Previous Occurrences for Thunderstorm High Wind Events

Location	Date	Recorded Wind Speeds (mph)	Property Damage	Crop Damage
DEQUINCY ARPT	March 25, 2009	81	$100,000	$0
BUHLER	March 25, 2009	70	$25,000	$0
GILLIS	March 25, 2009	58	$1,000	$0
MOSS BLUFF	March 25, 2009	58	$3,000	$0
(LCH)LK CHARLES MUNI	March 25, 2009	60	$2,000	$0
(LCH)LK CHARLES MUNI	March 25, 2009	60	$0	$0
VINCENT LNDG	March 26, 2009	60	$0	$0
STARKS	May 26, 2009	60	$5,000	$0
DEQUINCY	May 26, 2009	60	$3,000	$0
EDGERLY	May 26, 2009	60	$3,000	$0
LAKE CHARLES	May 26, 2009	60	$2,000	$0
LAKE CHARLES LAKE	May 26, 2009	60	$0	$0
(LCH)LK CHARLES MUNI	June 29, 2009	58	$0	$0
IOWA	July 8, 2009	60	$5,000	$0
LAKE CHARLES LAKE	July 8, 2009	60	$1,000	$0
IOWA	July 8, 2009	60	$2,000	$0
MOSS BLUFF	July 18, 2009	60	$1,000	$0
LAKE CHARLES	July 18, 2009	60	$1,000	$0
VINTON	July 18, 2009	70	$0	$0
CHENNAULT INDUS AIRP	July 18, 2009	60	$3,000	$0

Location	Date	Recorded Wind Speeds (mph)	Property Damage	Crop Damage
(LCH)LK CHARLES MUNI	March 25, 2010	70	$20,000	$0
MOSS BLUFF	May 17, 2010	60	$3,000	$0
LAKE CHARLES LAKE	May 17, 2010	60	$0	$0
LAKE CHARLES MUNI AR	May 17, 2010	63	$0	$0
HOUSTON RIVER	May 26, 2010	100	$5,000,000	$0
WESTLAKE	May 26, 2010	60	$5,000	$0
LAKE CHARLES LAKE	May 26, 2010	60	$1,000	$0
HOLMWOOD	May 26, 2010	60	$3,000	$0
PERKINS	May 30, 2010	60	$15,000	$0
LAKE CHARLES	May 30, 2010	60	$25,000	$0
VINTON	June 3, 2010	60	$3,000	$0
STARKS	February 1, 2011	60	$3,000	$0
VINCENT LNDG	March 30, 2011	70	$20,000	$0
(LCH)LK CHARLES MUNI	March 30, 2011	70	$5,000	$0
VINCENT LNDG	March 30, 2011	96	$0	$0
STARKS	April 26, 2011	60	$3,000	$0
MOSS BLUFF	April 26, 2011	60	$30,000	$0
MALLARD	April 26, 2011	60	$5,000	$0
VINCENT	April 26, 2011	60	$2,000	$0
HOLMWOOD	June 5, 2011	70	$40,000	$0
NIBLETTS BLUFF	June 6, 2011	58	$10,000	$0
CHENNAULT INDUS AIRP	July 5, 2011	67	$0	$0
LAKE CHARLES LAKE	August 18, 2011	58	$5,000	$0
DEQUINCY	December 22, 2011	58	$5,000	$0
SULPHUR	December 22, 2011	58	$10,000	$0
LAKE CHARLES	December 22, 2011	58	$20,000	$0
SULPHUR	February 18, 2012	58	$5,000	$0
CHENNAULT INDUS AIRP	April 2, 2012	58	$50,000	$0
DEQUINCY	May 31, 2012	58	$5,000	$0
BELL CITY	June 7, 2012	58	$1,000	$0
HOLMWOOD	July 20, 2012	63	$5,000	$0

Location	Date	Recorded Wind Speeds (mph)	Property Damage	Crop Damage
LAKE CHARLES LAKE	July 20, 2012	58	$0	$0
LAKE CHARLES LAKE	July 20, 2012	69	$900,000	$0
LAKE CHARLES LAKE	July 20, 2012	58	$0	$0
LAKE CHARLES	July 20, 2012	72	$0	$0
LAKE CHARLES MUNI AR	July 20, 2012	58	$0	$0
LAKE CHARLES	July 21, 2012	58	$1,000	$0
LAKE CHARLES MUNI AR	July 21, 2012	62	$0	$0
DEQUINCY	August 10, 2012	58	$1,000	$0
BUHLER	November 5, 2012	58	$1,000	$0
(LCH)LK CHARLES MUNI	November 5, 2012	69	$1,000	$0
DEQUINCY	December 25, 2012	58	$2,000	$0
WESTLAKE	March 31, 2013	58	$5,000	$0
MAPLEWOOD	May 9, 2013	58	$0	$0
(LCH)LK CHARLES MUNI	May 10, 2013	75	$100,000	$0
ARARET	June 6, 2013	58	$2,000	$0
DEQUINCY	June 6, 2013	58	$2,000	$0
VINTON	June 6, 2013	58	$0	$0
SULPHUR	June 6, 2013	58	$4,000	$0
LAKE CHARLES	June 6, 2013	90	$15,000	$0
LAKE CHARLES MUNI AR	October 31, 2013	70	$5,000	$0
DEQUINCY	April 4, 2014	59	$15,000	$0
HOLLYWOOD	June 27, 2014	58	$1,000	$0
LAKE CHARLES	April 27, 2015	52	$55,500	$0
LAKE CHARLES	May 27, 2015	50	$2,500	$0
GILLIS	October 31, 2015	50	$1,500	$0
DE QUINCY	November 17, 2015	50	$500	$0
(LCH)LK CHARLES MUNI	April 27, 2016	50	$1,500	$0
DE QUINCY	May 27, 2016	50	$1,000	$0
GOSS	July 10, 2016	50	$1,500	$0
VINCENT	November 29, 2016	50	$1,000	$0
VINTON	March 25, 2017	50	$4,000	$0
CHENNAULT INDUS AIRP	April 30, 2017	50	$5,000	$0

Location	Date	Recorded Wind Speeds (mph)	Property Damage	Crop Damage
LAKE CHARLES MUNI AR	April 14, 2018	52	$10,000	$0
TOOMEY	June 19, 2018	50	$500.00	
VINCENT	April 7, 2019	53	$1,000.00	
SULPHUR	May 31, 2019	50	$3,000.00	

Frequency

High winds are a fairly common occurrence within Calcasieu Parish, with an annual chance of occurrence calculated at 100%. According to the State Hazard Mitigation Plan, Calcasieu Parish has a future probability of experiencing two to four wind events annually.

Estimated Potential Losses

Since 1989, there have been 198 significant wind events that have resulted in property damages according to the SHELDUS database. The total property damages associated with those storms have totaled $5,928,591. 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 (1989 – 2019). This provides an annual estimated potential loss of $197,620. The following table provides an estimate of potential property losses for Calcasieu Parish:

Table 2-46: Estimated Annual Property Losses in Calcasieu Parish Resulting from Wind Damage

Estimated Annual Potential Losses from Thunderstorm Winds for Calcasieu Parish						
Unincorporated Calcasieu Parish (44.8% of Population)	DeQuincy (1.7% of Population)	Iowa (1.6% of Population)	Lake Charles (37.3% of Population)	Sulphur (3.1% of Population)	Vinton (1.7% of Population)	Westlake (2.4% of Population
$88,534	$3,360	$3,162	$73,712	$6,126	$3,892	$4,743

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-1 to C-2 for parish and municipality buildings that are susceptible to high winds.

Thunderstorms - 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 Calcasieu Parish.

Previous Occurrences / Extents

The SHELDUS database reports a total of 18 lightning events occurring within the boundaries of Calcasieu Parish between the years of 1989-2019. The SHELDUS database only records lightning events that cause death, injuries, crop damage, and/or property damage, so these numbers do not accurately reflect the number of lightning events in Calcasieu Parish, which occur on a nearly monthly basis. Per the State Hazard Mitigation Plan the planning area can expect to have a lightning density between 12.1-24 flash/sq mile/year. The table below provides an overview of significant lightning strikes over the last ten years:

Table 2-47: Previous Occurrences of Significant Lightning Strikes in Calcasieu Parish from 2009 – 2019 (Source: NCDC and SHELDUS)

Location	Date	Summary	Property Damage
LAKE CHARLES	September 5, 2009	Lightning struck two boaters fishing on Black Bayou at the Intracoastal Waterway, killing one and injuring the other.	$5,429
MOSS BLUFF	May 2, 2011	Lightning struck a house on Suburban Street, causing it to catch fire.	$103,565
GILLIS	June 8, 2012	A lightning strike downed a tree onto Joe Miller Road.	$1,014
LAKE CHARLES LAKE	August 7, 2012	Lightning struck Veterans Memorial Park in Lake Charles, blasting apart brick work near a flag pole.	$507
STARKS	August 11, 2014	A lightning strike started a forest fire in the Starks area. The fire was suppressed after a few hours.	$1,000
LAKE CHARLES LAKE	September 10, 2015	Lightning struck a home igniting a small fire in a wall. The fire damaged a wall in the laundry room and shorted out some wiring.	$1,000.00
WESTLAKE	August 5, 2016	A pedestrian was struck by lightning	$-
(LCH)LK CHARLES MUNI	September 15, 2018	Broadcast media reported lightning struck an apartment building and started a fire which produced extensive damage.	$25,000.00

Since 2009, there have been no lightning events that have caused property damage or loss of life in the incorporated areas of DeQuincy, Sulphur, Iowa, and Vinton.

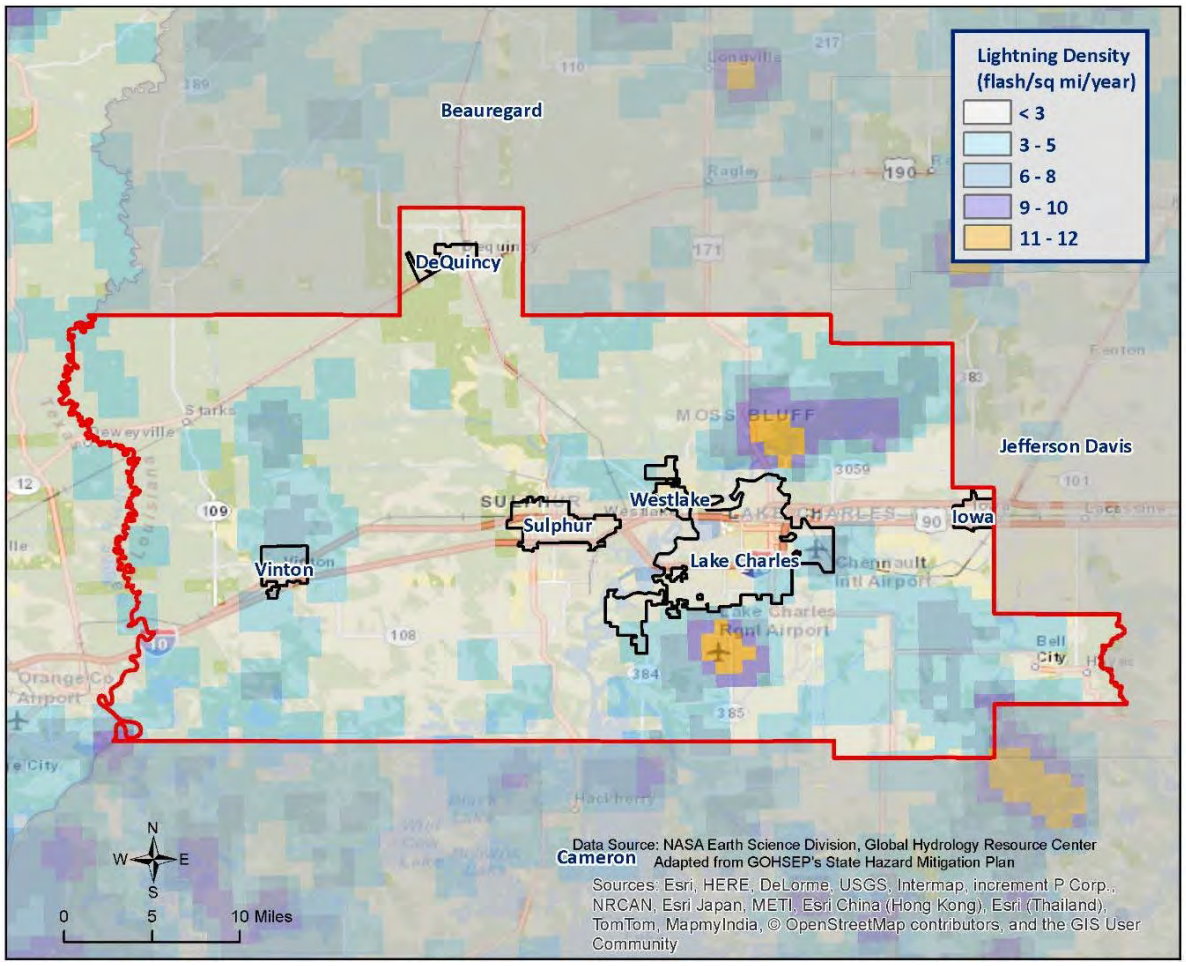


Figure 2-24: Lightning Density Reports for Calcasieu Parish

Frequency

Lightning can strike anywhere and is produced by every thunderstorm, so the chance of lightning occurring in Calcasieu Parish is high. However, lightning that meets the definition that is used by SHELDUS and the NCDC that results in damages to property and injury or death is a less likely event. According to the State Hazard Mitigation Plan, a major lightning strike in Calcasieu Parish is likely to occur every 1 to 4 years. This is consistent with SHELDUS, which has 18 lightning events that have caused property damages or injuries over the last 30 years, establishing an annual probability of 60%.

Estimated Potential Losses

Since 1989, there have been 18 significant lightning events that have resulted in property damages according to the SHELDUS database. The total property damages associated with lightning events totaled $522,948. To estimate the potential losses of a lightning event on an annual basis, the total damages recorded for lightning events was divided by the total number of years of available major lightning strike data in SHELDUS (1989 – 2019). This provides an annual estimated potential loss of $17,432. The following table provides an estimate of potential property losses for Calcasieu Parish:

Table 2-48: Estimated Annual Property Losses in Calcasieu Parish from Lightning

Estimated Annual Potential Losses from Thunderstorm Winds for Calcasieu Parish						
Unincorporated Calcasieu Parish (44.6% of Population)	**DeQuincy (1.6% of Population)**	**Iowa (1.6% of Population)**	**Lake Charles (38.1% of Population)**	**Sulphur (10.1% of Population)**	**Vinton (1.7% of Population)**	**Westlake (2.3% of Population)**
$7,775	$279	$279	$6,642	$1,761	$296	$400

There have been eight reported injuries and three fatalities in Calcasieu Parish as a result of a lightning strikes over the 30-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 2-49 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.

Table 2-49: 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

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

Previous Occurrences / Extents

SHELDUS reports a total of 27 tornadoes or waterspouts occurring within the boundaries of Calcasieu Parish between the years of 1989-2019. The tornadoes experienced in Calcasieu Parish have from ranged EF0 to EF1 on the EF scale, and ranged from F0 to F2 on the F scale. The worst case scenario Calcasieu Parish can expect in the future is an EF1 tornado.

The tornado that caused the most damage to property occurred on December 30, 2002. The F1 tornado was responsible for over $9 million in damage. The tornado touched down on the west side of the incorporated area of Iowa, destroying two homes and heavily damaging a small mall. The tornado responsible for the most injuries occurred on April 3, 2000. The tornado destroyed a mobile home, trapping five people inside who sustained minor injuries. There have been no fatalities in Calcasieu Parish as a result of tornadoes.

Table 2-50: Historical Tornadoes in Calcasieu Parish with Locations from 1989-2019

Date	Impacts	Property Damage	Location	Magnitude
December 21, 1990	1 mile path with a width of 200 yards. Destroyed one mobile home, a second story of a home, and caused minor damage to 20 other homes.	$89,119	UNINCORPORATED AREA	F1
May 5, 1991	0.2 mile path with a width of 17 yards. A small tornado was reported by a pilot near Stark.	$855	UNINCORPORATED AREA	F0
June 5, 1991	0.5 mile path with a width of 13 yards. Destroyed a mobile home and blew over a building that was currently under construction.	$4,276	UNINCORPORATED AREA	F0
June 26, 1992	0.2 mile path with a width of 20 yards. Damaged the roof of four hangars at the old Chennault Air Force Base.	$8,310	UNINCORPORATED AREA	F1
June 30, 1992	0.5 mile path with a width of 20 yards. Destroyed the canopy at a gas station and overturned some portable business signs.	$822	UNINCORPORATED AREA	F1
April 7, 1993	5 mile path with a width of 30 yards. Destroyed a few barns in its path.	$8,061	STARKS	F0
January 12, 1998	0.5 mile path with a width of 10 yards. One barn was destroyed, and a race horse was killed by flying debris.	$71,459	SULPHUR	F0
October 6, 1998	0.5 mile path with a width of 10 yards. Ripped the roof off of a camper, which landed on the neighbor's truck and trailer.	$71,459	LAKE CHARLES	F0
January 2, 1999	2.5 mile path with a width of 100 yards. Downed several trees and power lines.	$34,258	SULPHUR	F0

Date	Impacts	Property Damage	Location	Magnitude
January 2, 1999	2.5 mile path with a width of 50 yards. Damaged several buildings at a local gas plant, as well as numerous homes and businesses.	$102,775	SULPHUR	F1
January 2, 1999	4 mile path with a width of 400 yards. Destroyed several homes and one farm. Lifted a home in the air and moved it 75 yards from its original location.	$352,372	HAYES	F2
March 2, 1999	4 mile path with a width of 75 yards. Destroyed one home and downed several trees.	$104,873	SULPHUR	F2
April 3, 2000	5 mile path with a width of 20 yards. Destroyed one mobile home and trapped five people inside. Two businesses and five other homes received minor damage.	$135,283	LAKE CHARLES	F1
November 28, 2001	1 mile path with a width of 10 yards. Tops of trees were removed by the tornado.	$658	VINTON	F0
October 29, 2002	1 mile path with a width of 20 yards. Downed several trees and power lines.	$12,949	DEQUINCY	F0
December 30, 2002	3 mile path with a width of 20 yards. Destroyed two homes, one business, and heavily damaged a small mall.	$9,064,475	IOWA	F1
November 22, 2004	1 mile path with a width of 20 yards. Destroyed a brick dugout at a high school and damaged a shed and porch at nearby homes.	$30,831	IOWA	F0
January 25, 2012	5.8 mile path with a width of 25 yards. Damaged the roofs of several homes and blew down several trees.	$101,465	LOCKMOOR	EF1

Date	Impacts	Property Damage	Location	Magnitude
July 20, 2012	8.23 mile path with a width of 150 yards. Multiple mobile homes were damaged and several trees were downed. Multiple homes received roof damage.	$101,454	CHENNAULT INDUS AIRP	EF1
July 20, 2012	1.49 mile path with a width of 100 yards. Patio furniture was damaged and superficial tree damage was sustained.	$1,025	HOLMWOOD	EF0
October 31, 2013	7.12 mile path with a width of 150 yards. Caused minor roof and fence damage. Downed several trees.	$30,000	PERKINS	EF1
October 31, 2013	1.39 mile path with a width of 30 yards. One home sustained minor damage and two sheds were destroyed.	$10,000	VINCENT LNDG	EF0
April 4, 2014	1.84 mile path with a width of 100 yards. Snapped or uprooted numerous trees, which resulted in several road closures.	$5,000	GILLIS	EF1
March 24, 2016	A cold front moved through the region with severe weather along the boundary.	$7,000	LAKE CHARLES	F0
December 20, 2017	An EF-1 tornado touched down near the Industrial Airpark west, damaging a hangar door. An industrial site nearby. Max wind speed was estimated at 100 mph	$250,000	DE QUINCY	F1
March 29, 2018	A moist and unstable air mass moved into the region ahead of a cold front while an upper level disturbance pushed over the area. Heavy rain and severe weather occurred through the morning as the front moved through.	$210,000	VINTON	F1

Date	Impacts	Property Damage	Location	Magnitude
October 31, 2018	The tornado began near Shelby Lane north of HWY 108, continued east northeast for several miles crossing Choupique road, Thompson road, and Johnny Jones roads before ending around HWY 27. Estimated peak winds were 109 MPH.	$30,000	(LCH)LK CHARLES MUNI	F1
October 16, 2019	The tornado touched down on Hecker Road, moved further southeast on River Road, several trees were snapped at the base. Trees were also blown down on Dennison Road and Sidney Leger Road, before the tornado dissipated. The max wind speed was estimated at 110 MPH.	$500,000	IOWA	F1

The incorporated areas of Iowa, Sulphur, and Westlake have not experienced a tornado event from 2009 to the present. Since 2014, Calcasieu Parish has had four tornadoes touchdown in the unincorporated areas of the parish.

Frequency / Probability

Tornadoes are a sporadic occurrence within Calcasieu Parish with an annual chance of occurrence calculated at 90% based on the records for the past 30 years (1989-2019). Figure 2-28 displays the density of tornado touch downs in Calcasieu Parish and neighboring parishes. Based on the State Hazard Mitigation Plan, the overall probability of a tornado touching down in Calcasieu Parish is once every one to two years.

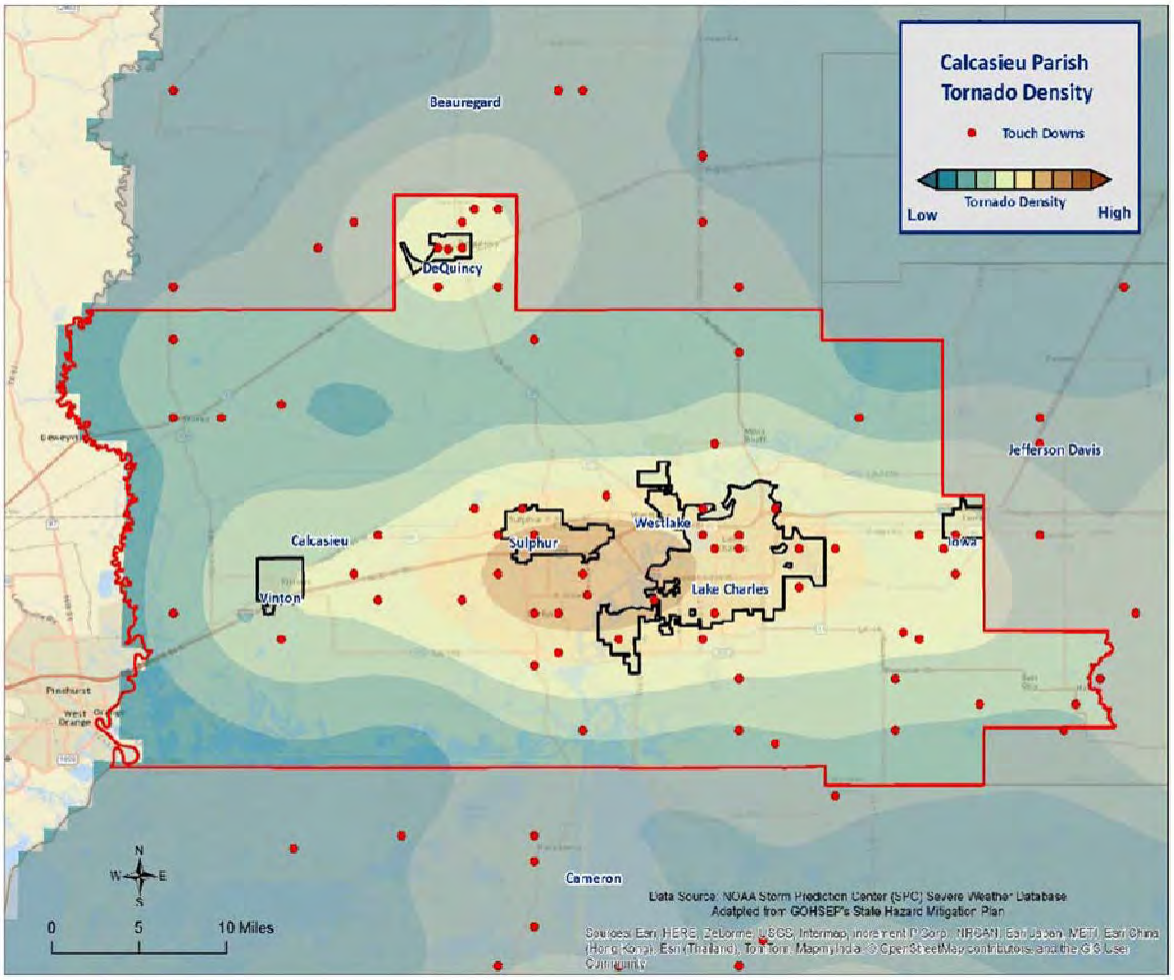


Figure 2-25: Location and Density of Tornadoes to Touch Down in Calcasieu Parish (Source: NOAA/SPC Severe Weather Database)

Estimated Potential Losses

According to the SHELDUS database, there have been 27 tornadoes that have caused some level of property damage. The total property damage for claims throughout the Parish is $11,333,779, with an average cost of $419,770 per tornado strike. When annualizing the total cost over the 30-year record, total annual loses based on tornadoes are estimated to be $377,793. To provide an estimated annual estimated potential loss per jurisdiction, the 2018 Census ACS 5-Yr Estimates population was used to assign the estimated potential losses proportionally across the jurisdictions. Based on the 2018 ACS, Table 2-51 provides an annual estimate of potential losses for Calcasieu Parish.

Table 2-51: Estimated Annual Losses for Tornadoes in Calcasieu Parish

Estimated Annual Potential Losses from Tornadoes for Calcasieu Parish						
Unincorporated Calcasieu Parish (44.6% of Population)	DeQuincy (1.6% of Population)	Iowa (1.6% of Population)	Lake Charles (38.1% of Population)	Sulphur (3.1% of Population)	Vinton (10.1% of Population)	Westlake (2.3% of Population)
$168,496	$6,045	$6,045	$143,939	$11,712	$38,157	$8,689

Table 2-52 presents an analysis of building exposure that is susceptible to tornadoes by general occupancy type for Calcasieu Parish, along with the percentage of building stock that are mobile homes.

Table 2-52: Building Exposure by General Occupancy Type for Tornadoes in Calcasieu Parish (Source: FEMA's Hazus)

Building Exposure by General Occupancy Type for Tornadoes Exposure Types ($1,000)							
Residential	Commercial	Industrial	Agricultural	Religion	Government	Education	Mobile Homes (%)
14,769,798	2,613,894	562,260	34,779	375,372	91,657	163,965	18.9%

The parish has suffered through a total of three days in which tornadoes or waterspouts have accounted for eight injuries and no fatalities during this 25-year period (Table 2-53). The average number of injuries per event for Calcasieu Parish is 0.36 per tornado, with an average of 0.32 per year for the 25-year period.

Table 2-53: Tornadoes in Calcasieu Parish by Magnitude that Caused Injuries or Deaths

Date	Magnitude	Deaths	Injuries
January 2, 1992	F2	0	2
April 3, 2000	F1	0	5
December 30, 2002	F1	0	1

In assessing the overall risk to population, the most vulnerable population throughout the parish are those residing in manufacturing housing. Approximately 18.9% of all housing in Calcasieu Parish consists of manufactured housing. Based on location data collected in a previous hazard mitigation project, there are 72 known locations where manufactured housing is concentrated. Each of those 72 locations have an overall number of manufactured houses ranging from one to 375. The location and density of manufactured houses can be seen in Figure 2-29.

Manufactured housing is more likely to sustain damage from a tornado than any other residential structure. The highest concentration of manufactured home parks is located in the unincorporated area of Calcasieu Parish (Table 2-54). However, this does not influence the risk associated with a tornado event since they strike at random, making all structures and population within the planning area equally vulnerable.

Table 2-54: Manufactured Home Distribution throughout Calcasieu Parish

Location	Number of Manufactured Home Parks	% of Manufactured Home Parks
Unincorporated Area	44	61.1%
DeQuincy	1	1.4%
Iowa	3	4.2%
Lake Charles	16	22.2%
Sulphur	1	1.4%
Vinton	5	6.9%
Westlake	2	2.8%

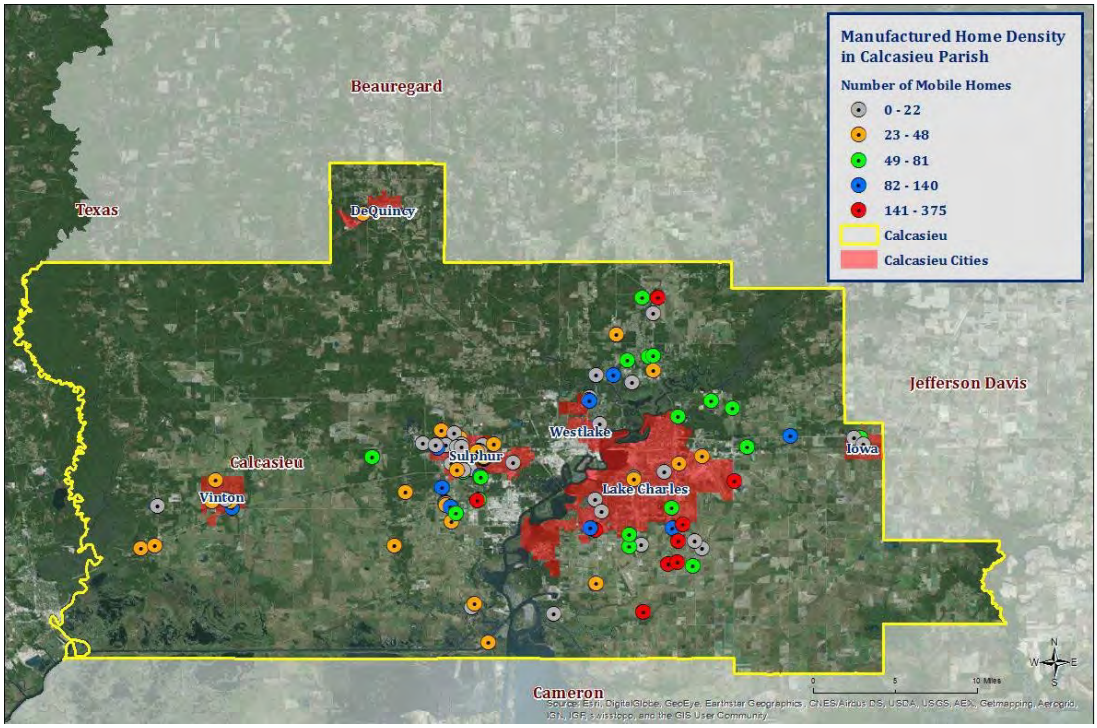


Figure 2-26: Location and Approximate Number of Units in Manufactured Housing Locations throughout Calcasieu Parish

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, Table 2-55 presents the Saffir-Simpson Hurricane Wind Scale, which categorizes tropical cyclones based on sustained winds.

Source: abcnews.com

Table 2-55: 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 surgeevents 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 andflying 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 freshwater intrusions from storm surge send animals, such as snakes, into areas occupied byhumans.

Location

Hurricanes are the single biggest threat to all of south Louisiana. With any single hurricane having the potential to devastate multiple parishes at once, the risk of a tropical cyclone has the probability of impacting anywhere within the planning area for Calcasieu 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 nine tropical cyclone events occurring within the boundaries of Calcasieu Parish between the years 2002 and 2019. The tropical cyclone events experienced in Calcasieu Parish include depressions, storms, and hurricanes. As a worst-case scenario, Calcasieu Parish can expect to experience hurricanes at the category 4 level in the future.

Table 2-56: Historical Tropical Cyclone Events in Calcasieu Parish from 2002- 2019 (Source: SHELDUS)

Date	Name	Storm Type At Time of Impact
October 3, 2002	Lili	Hurricane –Category 1
September 23, 2005	Rita	Hurricane – Category 3
September 13, 2007	Humberto	Hurricane – Category 1
August 5, 2008	Edouard	Tropical Storm
September 1, 2008	Gustav	Tropical Storm
September 12, 2008	Ike	Tropical Storm
September 3, 2011	Lee	Tropical Storm
June 2017	Harvey	Tropical Storm
July 2019	Barry	Tropical Storm

Hurricane Audrey (1957)

Hurricane Audrey made landfall on June 27, 1957 near the Texas/Louisiana border, causing a disastrous storm surge. The highest storm surge measured was 12.4 feet in Cameron Parish. Waves associated with the storm were monstrous. In the Gulf of Mexico, seas of 45 to 50 feet were reported, and waves in Cameron Parish reached as high as 20 feet above mean sea level. Approximately 526 people died due to Hurricane Audrey, and damages in Louisiana totaled approximately $120 million.

In Calcasieu Parish, Hurricane Audrey dropped 7.57 inches of rain, and produced 75 mph sustained winds and gusts up to 97 mph. Storm surge associated with Audrey registered seven feet above mean sea level around Lake Charles and 6.5 feet around the Moss Bluff area.

Tropical Storm Allison (2001)

Tropical Storm Allison ravaged U.S. coastal areas with torrential rain and flooding for nearly two weeks in June of 2001. Fifty fatalities are attributed to Tropical Storm Allison. Insured losses totaled $2.5 billion, with total damages exceeded $6 billion. The heavy rain from Tropical Storm Allison initially hit southeastern Texas and eventually moved into Calcasieu Parish, resulting in widespread street flooding on June 6.

Hurricane Lili (2002)

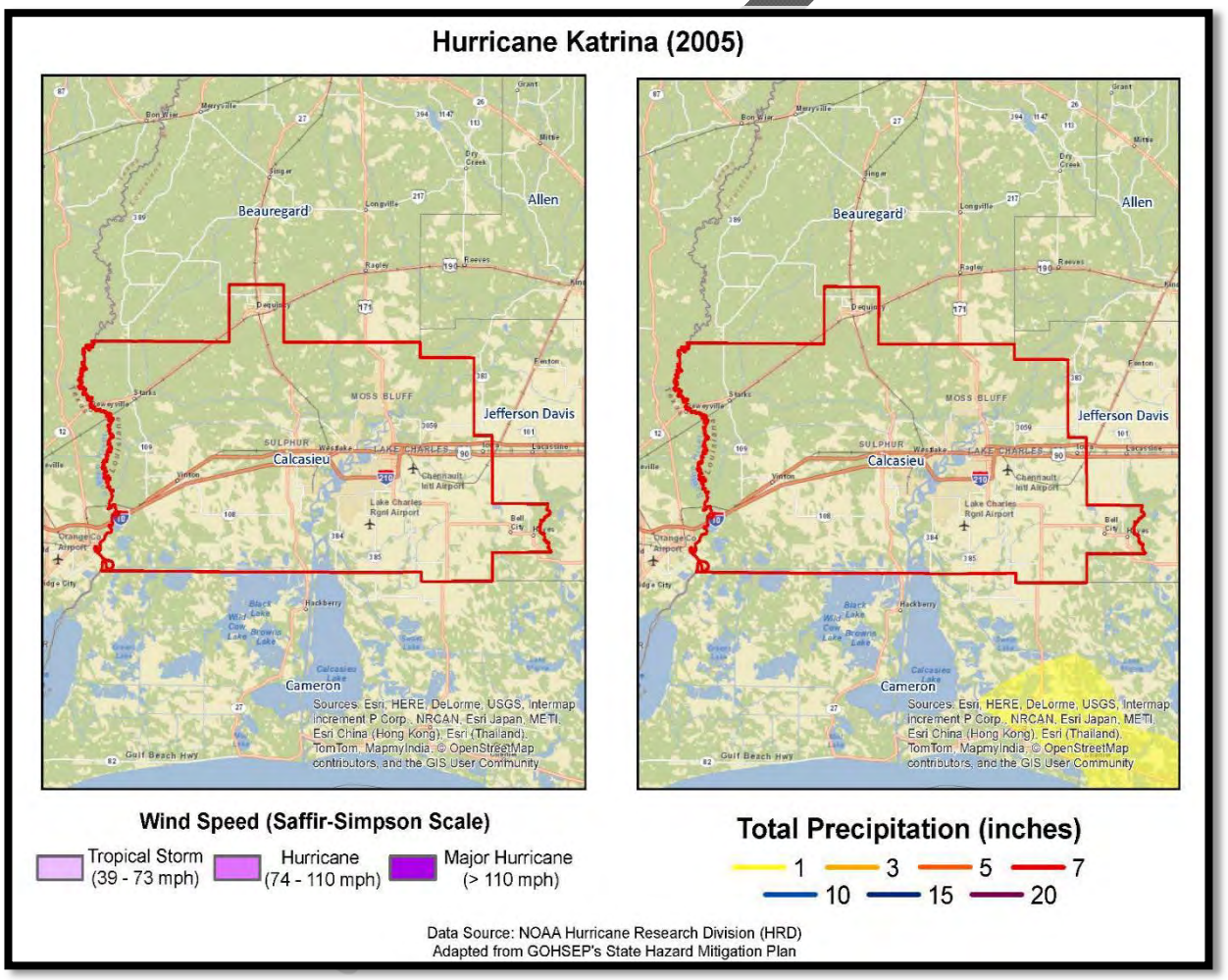
Hurricane Lili made landfall on the Louisiana coast on October 3, 2002 with an estimated intensity of 80 knots. Although Lili weakened considerably before making landfall on the central Louisiana coast, it caused significant wind and flood damage in the area. Strong winds toppled trees onto houses and into roadways, stripped shingles from roofs, and blew out windows. The wind and driving rain flattened sugar cane fields throughout southern Louisiana. A combination of storm surge and rain caused levees to fail in Montegut and Franklin, Louisiana. Lili also temporarily curtailed oil production in the Gulf of Mexico.

The primary impact in Calcasieu Parish was flooding, with evacuations being required for residents in low-lying areas. Major power interruptions occurred along with downed trees and wind damage to structures. Three injuries were reported in Calcasieu Parish as a result of Hurricane Lili.

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 beforeand 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.

Figure 2-27: Wind Speed and Precipitation Totals in Calcasieu Parish for Hurricane Katrina



The most significant impact of Hurricane Katrina on Calcasieu Parish was the large number of evacuees leaving New Orleans and surrounding areas in southeastern Louisiana. Nearly 2,000 evacuees were housed at the Lake Charles Civic Center, and 4,730 hotel rooms in Calcasieu Parish were filled with people fleeing Hurricane Katrina. Disaster response costs in Calcasieu Parish were related to providing emergency sheltering to evacuees.

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.

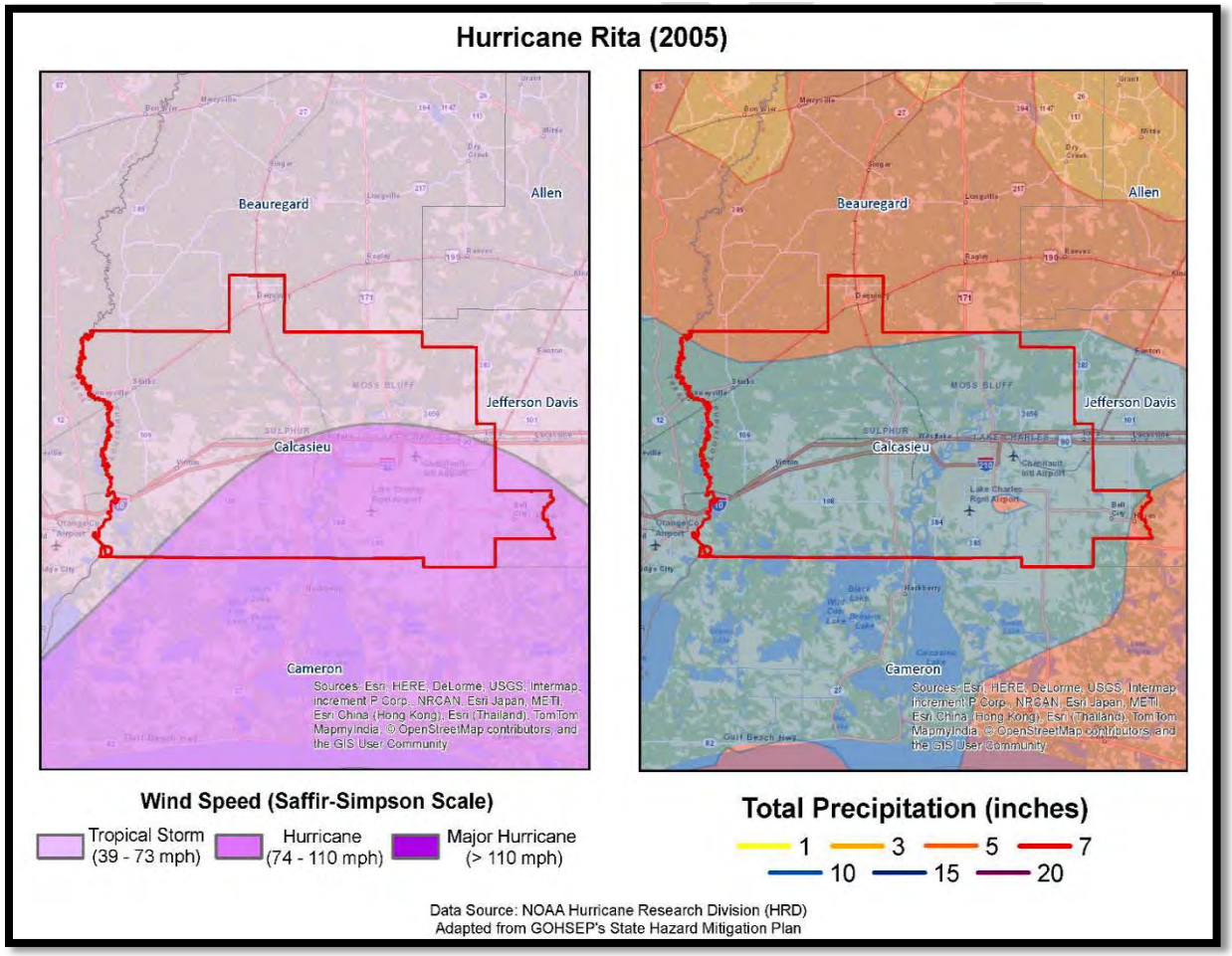


Figure 2-28: Wind Speed and Precipitation Totals in Calcasieu Parish for Hurricane Rita

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. The storm surge also moved up the Calcasieu ship channel, flooding portions of Calcasieu Parish, including portions of downtown Lake Charles near the civic center. This storm surge was estimated to be between six to eight feet. Disaster response costs in Calcasieu Parish were significant, totaling over $11 million.

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, with moderate wind and flooding damage in Calcasieu Parish.

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 southwest Mississippi and central Louisiana. 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.

In Calcasieu Parish, Hurricane Gustav had a much smaller impact than Hurricane Ike, which came a few days later, though there were two fatalities associated with the hurricane. Hurricane Gustav caused a 3.2 foot peak storm surge in Calcasieu Parish, and the Moss Bluff area received 3.26 inches of rain.

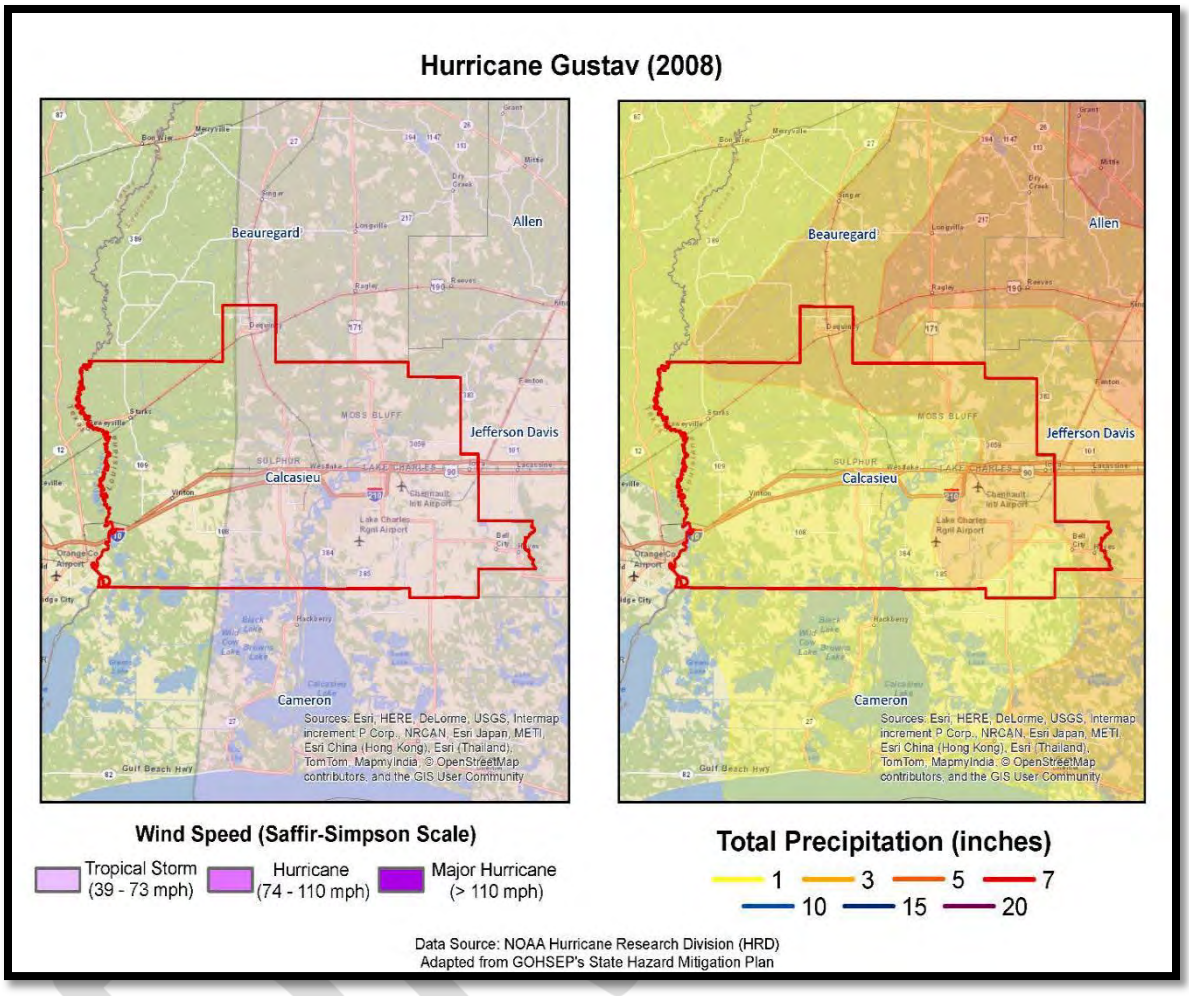


Figure 2-29: Wind Speed and Precipitation Totals in Calcasieu Parish for Hurricane Gustav

Hurricane Ike (2008)

Hurricane Ike caused wind damage, storm surge flooding, and tornadoes across southwest Louisiana. Ike made landfall near Galveston, TX early in the morning on September 13th as a strong category 2 hurricane. Sustained hurricane force winds were confined to extreme western Cameron Parish. The highest recorded winds in southwest Louisiana were experienced at Lake Charles Regional Airport, with sustained winds of 53 mph (46 kts) and gusts of 77 mph (67 kts). The lowest pressure reading occurred at Southland Field near Sulphur, LA, with a low of 994.6 millibars. Several tornadoes were reported across southwest Louisiana. The most significant one was near Mamou, where ten to fifteen homes were damaged, including one that lost its roof. Storm surge was a significant event. Water levels ranged from 14 feet in western Cameron Parish, to eight feet in St. Mary Parish. This resulted in widespread flooding of the same areas that flooded during Hurricane Rita in 2005. Most of Cameron Parish was under water. Over 3,000 homes were flooded. This extended north into Calcasieu Parish, where another 1,000 homes flooded in Lake Charles, Westlake, and Sulphur. In Vermilion Parish, at least 1,000 homes flooded in Pecan Island, Forked Island, Intracoastal City, and Henry. This extended east into Iberia Parish, where another 1,000

homes flooded south of Highway 14 and Highway 90. In St. Mary Parish, some of the worst flooding occurred in Franklin, where a man-made levee failed, flooding over 450 homes. Maximum storm total rainfall ranged from six to eight inches across Cameron, Calcasieu, and Beauregard Parishes. No fatalities were reported in southwest Louisiana. Total property damages, however, were high. Losses were estimated to be almost $420 million across southwest Louisiana. Agricultural losses were over $225 million.

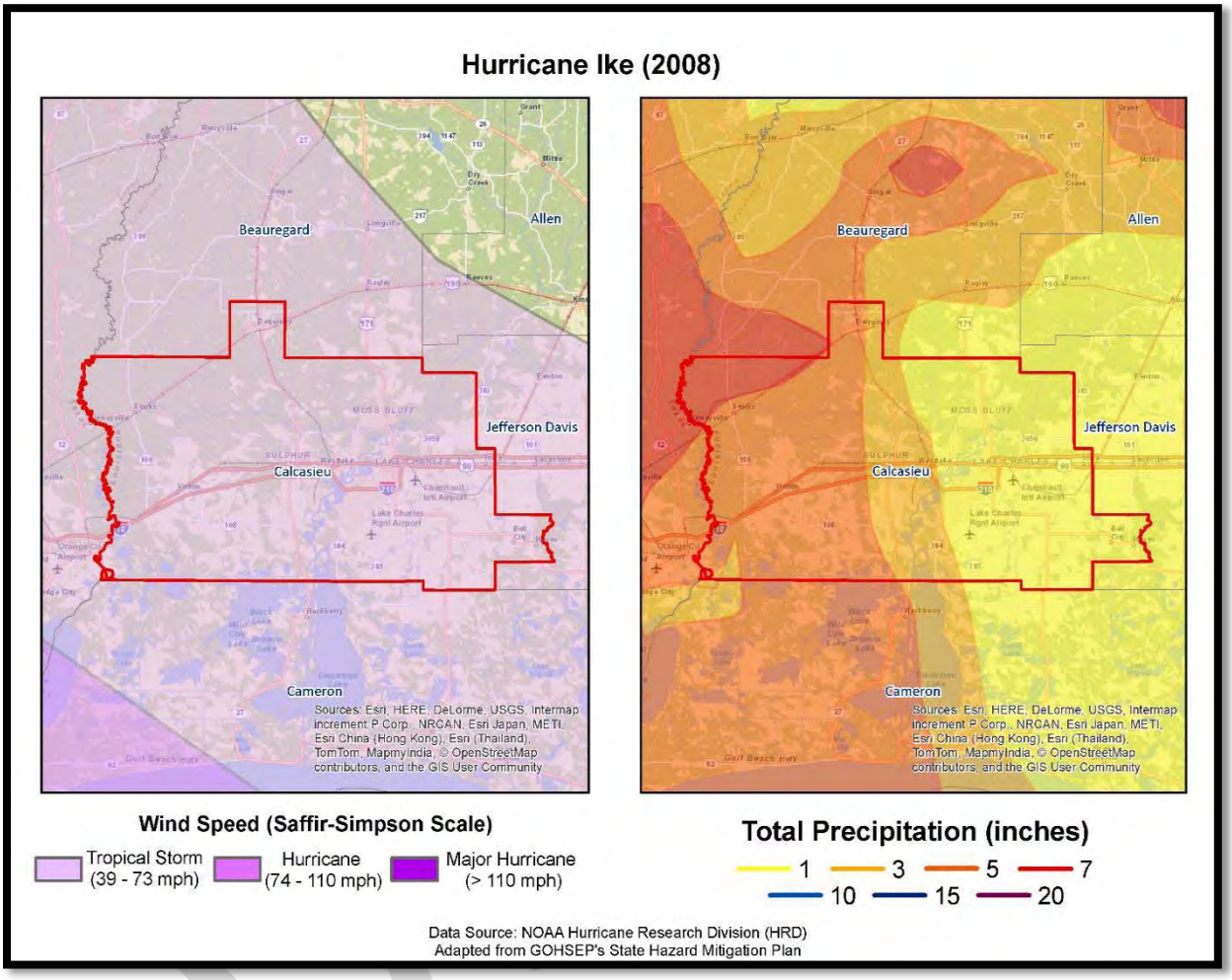


Figure 2-30: Wind Speed and Precipitation Totals for Hurricane Ike in Calcasieu Parish

In Calcasieu Parish, the storm surge reached north of Interstate 10 in Lake Charles. High water elevation near downtown Lake Charles crested at over ten feet. Near the southwest corner of Moss Bluff and Sam Houston Jones State Park, the high water elevations reached 9.5 feet. High water elevations in southwestern Calcasieu Parish along the Sabine River crested between 7.7 and 8.3 feet, while north of Interstate 10 crested at 8.7 feet, and between 9.3 and 10.5 feet south of Interstate 10.

Tropical Storm Lee (2011)

Tropical Storm Lee initially developed as Tropical Depression Thirteen in the middle of the Gulf of Mexico on the evening of Thursday, September 1, 2011. The depression moved slowly north and gradually strengthened, eventually reaching Tropical Storm strength just south of the Louisiana coast on Friday afternoon September 2, 2011. Tropical Storm Lee made only slow and haltingly northward progress over

the next 24 hours, eventually moving onshore at the Louisiana coast Saturday night, September 3, 2011, with a maximum sustained wind estimated around 60 mph. Lee moved slowly inland to the north of Baton Rouge late Sunday September 4, 2011, and eventually weakened to a tropical depression Sunday evening. Tropical Depression Lee then moved steadily northeast throughout Monday, September 5, 2011, taking on extra-tropical characteristics over the next 24 hours as it interacted with an upper level disturbance moving through the region. The maximum winds observed in Louisiana were a southerly wind of 46 mph (40 kts) sustained, with a 58 mph (50 kts) gust at New Orleans Lakefront Airport on September 4, 2012. The lowest minimum central pressure was 993.2 millibars, recorded at Baton Rouge Ryan Field on September 4, 2012. As Tropical Depression Lee was moving northeast and taking on mid- latitude characteristics, strong northerly winds were experienced across the region, occasionally gusting to higher levels than experienced when Lee was characterized as a tropical cyclone. No fatalities or injuries were associated with any Tropical Storm Lee hazards.

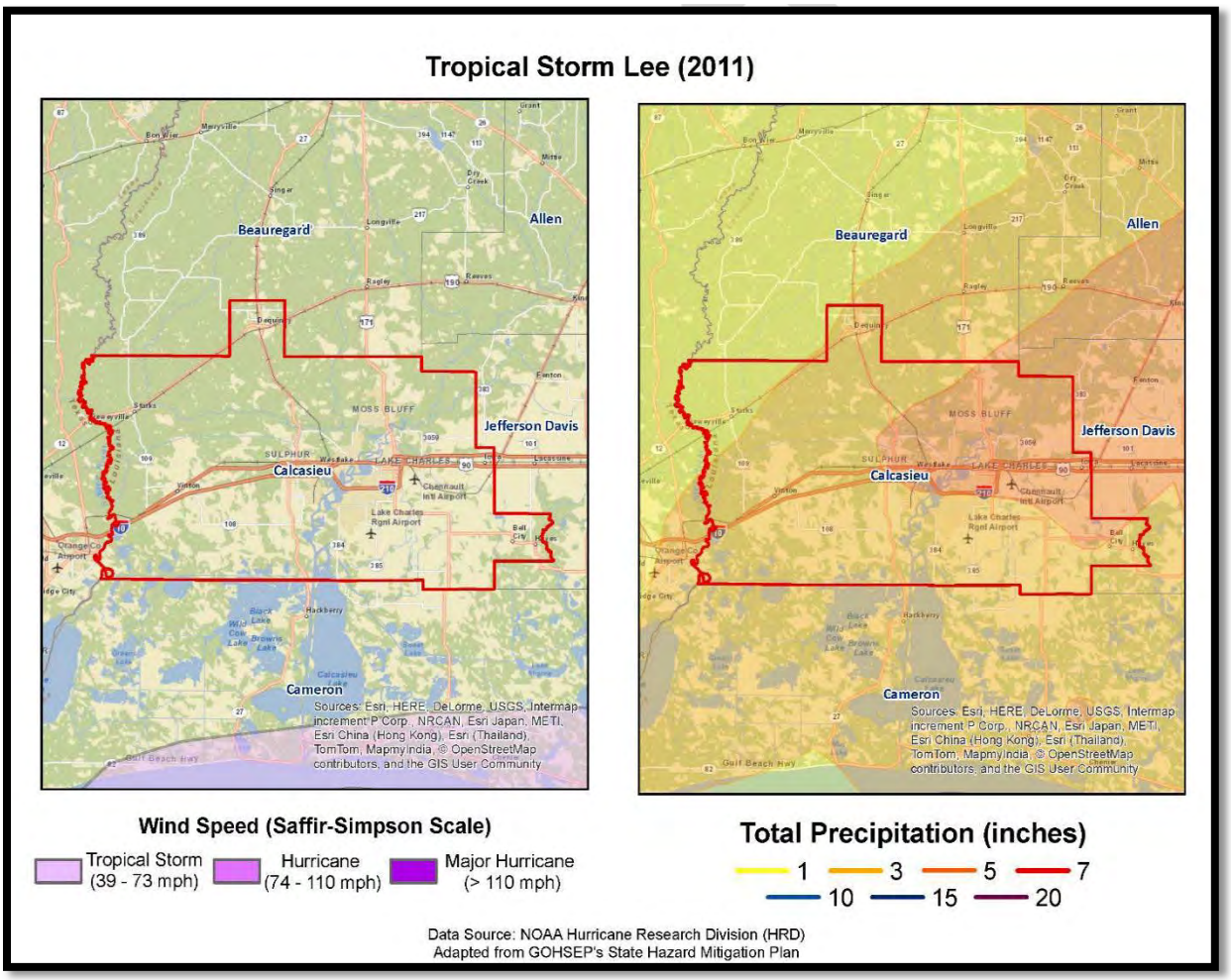


Figure 2-31: Wind Speed and Precipitation Totals in Calcasieu Parish for Tropical Storm Lee

The main impacts associated with Tropical Storm Lee were storm surge and rainfall. Both of these impacts were related to its slow speed as it crossed the region, which allowed the circulation to linger over the area for several days. Storm surge associated with Lee caused storm tides three to five feet above normal,

resulting in lowland flooding. Additional detailed information about Tropical Storm Lee's storm surge is contained in the separate storm surge report. Four day rainfall totals ranged from seven to 15 inches across the area. A maximum of 15.48 inches was recorded near Holden in Livingston Parish. Due to dry antecedent conditions, river flooding was minimal for the amount of rainfall that occurred. Wind impacts were generally minimal due to only tropical cyclone strength winds being recorded, resulting in tree limbs being blown down and weak trees toppling, causing power outages.

Overall, there were minimal reports of damage to residences or infrastructure in Calcasieu Parish. Localized flooding was experienced in low-lying areas of the parish, but flood damage was minimal. Isolated power outages due to a few downed trees were also reported across the parish.

Figure 2-35 displays the wind zones that affect Calcasieu Parish in relation to critical facilities throughout the parish.

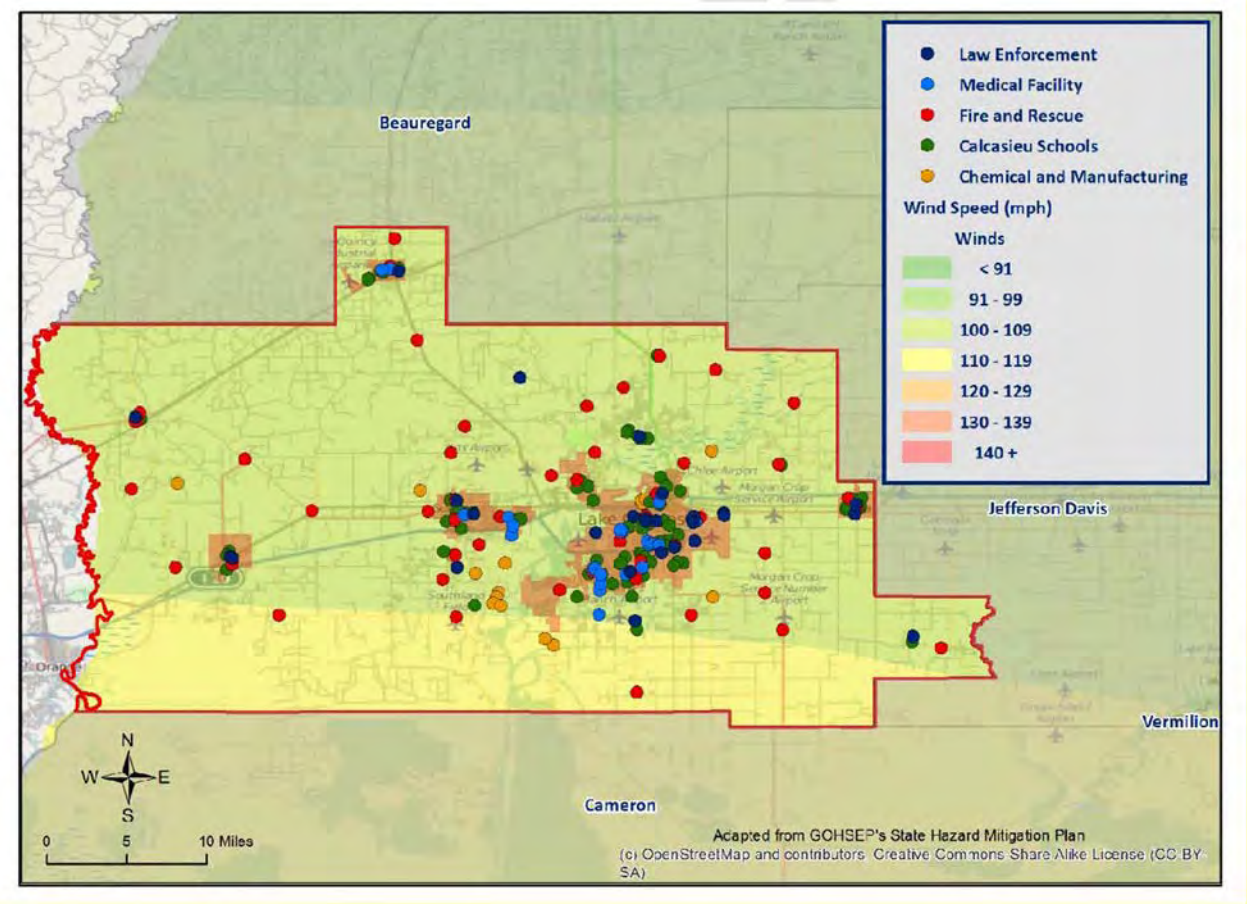


Figure 2-32: Winds Zones for Calcasieu Parish in Relation to Critical Facilities

Frequency / Probability

Tropical cyclones are large natural hazard events that regularly impact Calcasieu Parish. The annual chance of occurrence for a tropical cyclone is estimated at 45% for Calcasieu Parish and its municipalities, with nine events occurring within 20 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, Calcasieu

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. Based on a 20-year historical record, the probability of future occurrence of tropical cyclones in Calcasieu Parish is approximately once every two to three years.

Estimated Potential Losses

Using Hazus 100-Year Hurricane model, the 100-Year Hurricane scenario was analyzed to determine losses from this worst-case scenario. Table 2-57 shows the total economic losses that would result from this occurrence.

Table 2-57: Total Estimated Losses for a 100-Year Hurricane Event (Source: Hazus)

Jurisdiction	Estimated total Losses from 100-Year Hurricane Event
Calcasieu Parish (Unincorporated)	$146,827,028
DeQuincy	$5,500,445
Iowa	$5,094,075
Lake Charles	$122,409,133
Sulphur	$34,702,963
Vinton	$5,461,338
Westlake	$7,766,935
Total	$327,761,917

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 2-58: Ratio of Total Losses to Total Estimated Value of Assets for each Jurisdiction in Calcasieu Parish (Source: Hazus)

Jurisdiction	Estimated Total Losses from 100-Year Hurricane Event	Total Estimated Value of Assets	Ratio of Estimated Losses to Total Value
Unincorporated	$146,827,028	$7,095,197,000	2.1%
DeQuincy	$5,500,445	$343,471,000	1.6%
Iowa	$5,094,075	$281,566,000	1.8%
Lake Charles	$122,409,133	$8,097,337,000	1.5%
Sulphur	$34,702,963	$2,046,321,000	1.7%
Vinton	$5,461,338	$268,289,000	2.0%
Westlake	$7,766,935	$479,544,000	1.6%

Based on the Hazus hurricane model, estimated total losses range from 1.5% to 2.1% of the total estimated value of all assets for the unincorporated area of Calcasieu Parish and the incorporated areas of DeQuincy, Iowa, Lake Charles, Sulphur, Vinton, and Westlake.

The Hazus 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 2-59: Estimated Losses in Unincorporated Calcasieu Parish for a 100-Year Hurricane Event (Source: Hazus)

Calcasieu Parish (Unincorporated)	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$575,808
Commercial	$20,027,124
Government	$1,148,984
Industrial	$3,056,907
Religious / Non-Profit	$2,135,502
Residential	$166,826,389
Schools	$987,550
Total	$194,758,264

DeQuincy	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$16,262
Commercial	$565,614
Government	$32,450
Industrial	$86,334
Religious / Non-Profit	$60,312
Residential	$4,711,581
Schools	$27,891
Total	$5,500,445

Iowa	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$15,061
Commercial	$523,827
Government	$30,053
Industrial	$79,956
Religious / Non-Profit	$55,856
Residential	$4,363,492
Schools	$25,830
Total	$5,094,075

Table 2-62: Estimated Losses in Lake Charles for a 100-Year Hurricane Event (Source: Hazus)

Lake Charles	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$361,906
Commercial	$12,587,414
Government	$722,158
Industrial	$1,921,322
Religious / Non-Profit	$1,342,202
Residential	$104,853,438
Schools	$620,693
Total	$122,409,133

Sulphur	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$102,600
Commercial	$3,568,529
Government	$204,732
Industrial	$544,694
Religious / Non-Profit	$380,514
Residential	$29,725,927
Schools	$175,966
Total	$34,702,963

Vinton	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$16,147
Commercial	$561,593
Government	$32,219
Industrial	$85,721
Religious / Non-Profit	$59,883
Residential	$4,678,083
Schools	$27,693
Total	$5,461,338

Table 2-65: Estimated Losses in Westlake for a 100-Year Hurricane Event (Source: Hazus)

Westlake	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$22,963
Commercial	$798,679
Government	$45,821
Industrial	$121,909
Religious / Non-Profit	$85,164
Residential	$6,653,015
Schools	$39,383
Total	$7,766,935

Threat to People

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

Table 2-66: Number of People Susceptible to a 100-Year Hurricane Event in Calcasieu Parish (Source: Hazus)

Number of People Exposed to Hurricane Hazards			
Location	**# in Community**	**# in Hazard Area**	**% in Hazard Area**
Parish (Unincorporated)	**86,354**	**86,354**	**100.0%**
DeQuincy	**3,235**	**3,235**	**100.0%**
Iowa	**2,996**	**2,996**	**100.0%**
Lake Charles	**71,993**	**71,993**	**100.0%**
Sulphur	**20,410**	**20,410**	**100.0%**
Vinton	**3,212**	**3,212**	**100.0%**
Westlake	**4,568**	**4,568**	**100.0%**
Total	**192,768**	**192,768**	**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 2-67: Vulnerable Populations in Unincorporated Calcasieu Parish for a 100-Year Hurricane Event (Source: Hazus 2.2)

Calcasieu Parish (Unincorporated)		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	86,354	100.0%
Persons Under 5 Years	5,872	6.8%
Persons Under 18 Years	21,502	24.9%
Persons 65 Years and Over	11,658	13.5%
White	61,484	71.2%
Minority	24,870	28.8%

Table 2-68: Vulnerable Populations in DeQuincy for a 100-Year Hurricane Event (Source: Hazus 2.2)

DeQuincy		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	3,235	100.0%
Persons Under 5 Years	235	7.3%
Persons Under 18 Years	636	19.7%
Persons 65 Years and Over	556	17.2%
White	2,498	77.2%
Minority	737	22.8%

Iowa		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	2,996	100.0%
Persons Under 5 Years	218	7.3%
Persons Under 18 Years	659	22.0%
Persons 65 Years and Over	335	11.2%
White	2,086	69.6%
Minority	910	30.4%

Lake Charles		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	71,993	100.0%
Persons Under 5 Years	5,047	7.0%
Persons Under 18 Years	11,857	16.5%
Persons 65 Years and Over	10,029	13.9%
White	33,822	47.0%
Minority	38,171	53.0%

Table 2-71: Vulnerable Populations in Sulphur for a 100-Year Hurricane Event (Source: Hazus 2.2)

Sulphur		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	20,410	100.0%
Persons Under 5 Years	1,551	7.6%
Persons Under 18 Years	3,674	18.0%
Persons 65 Years and Over	2,910	14.3%
White	18,332	89.8%
Minority	2,078	10.2%

Vinton		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	3,212	100.0%
Persons Under 5 Years	254	7.9%
Persons Under 18 Years	559	17.4%
Persons 65 Years and Over	481	15.0%
White	2,420	75.3%
Minority	792	24.7%

Westlake		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	4,568	100.0%
Persons Under 5 Years	365	8.0%
Persons Under 18 Years	836	18.3%
Persons 65 Years and Over	655	14.3%
White	3,525	77.2%
Minority	1,043	22.8%

Vulnerability

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

Wildfires

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

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

According to the State of Louisiana Forestry Division, most forest fires in Louisiana are caused by intentional acts (arson) or carelessness and negligence committed by people, exacerbated by human confrontation with nature. The wildland–urban interface is the area in which development meets wildland vegetation, where both vegetation and the built environment provide fuel for fires. As development near wildland settings continues, more people and property are exposed to wildfire danger. Figure 2-37 displays the areas of wildland-urban interaction in Calcasieu Parish.

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

Table 2-74: Southern Group of State Foresters Wildfire Risk Assessment Fire Intensity Scale (Source: Southern Wildfire Assessment Portal)

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

Location

Wildfires impact areas that are populated with forests and grasslands. All jurisdictional areas in Calcasieu Parish has some form of wildland-urban interface or wildland-urban intermix. The following figures display wildfire probability throughout the parish.

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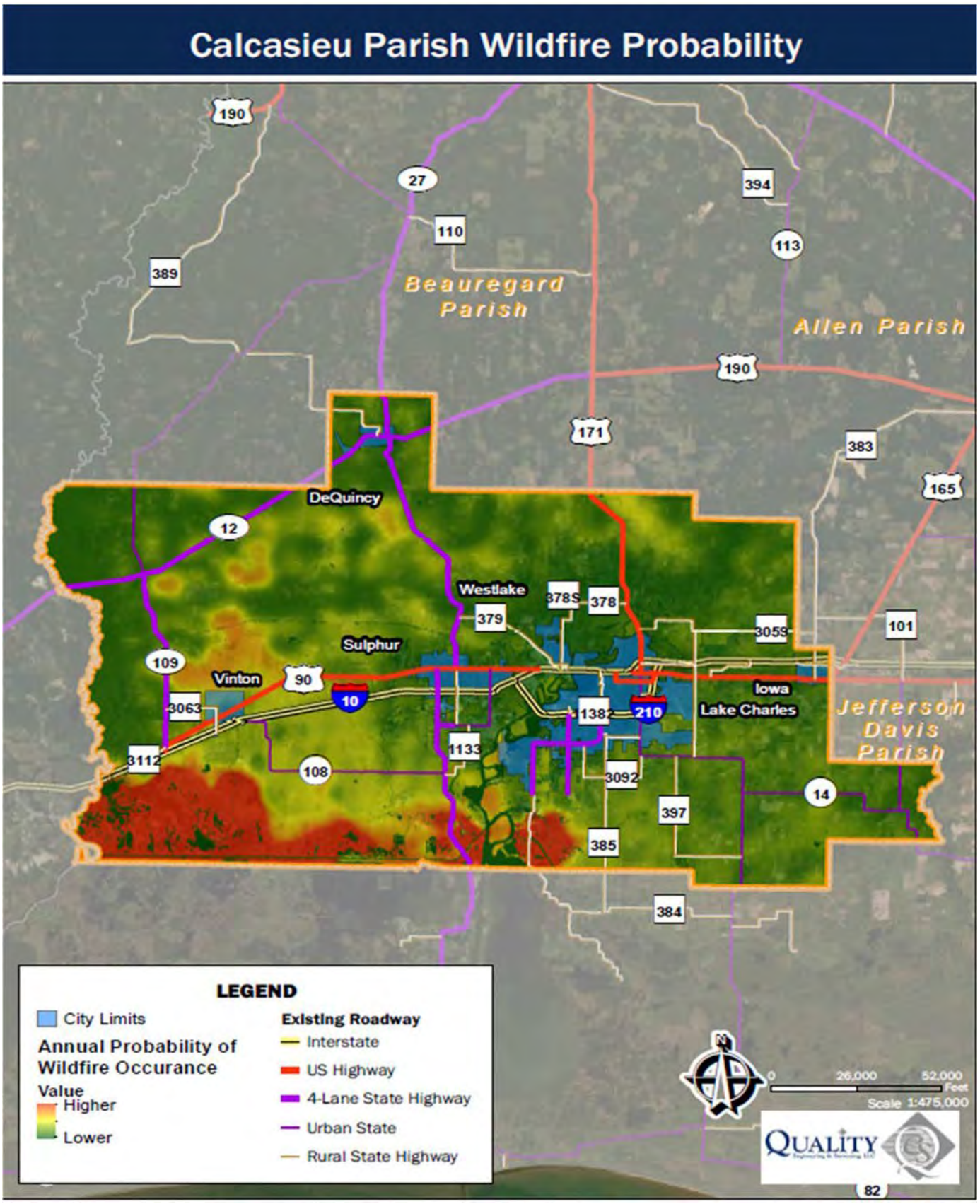


Figure 2-34a: Calcasieu Parish Wildfire Probability

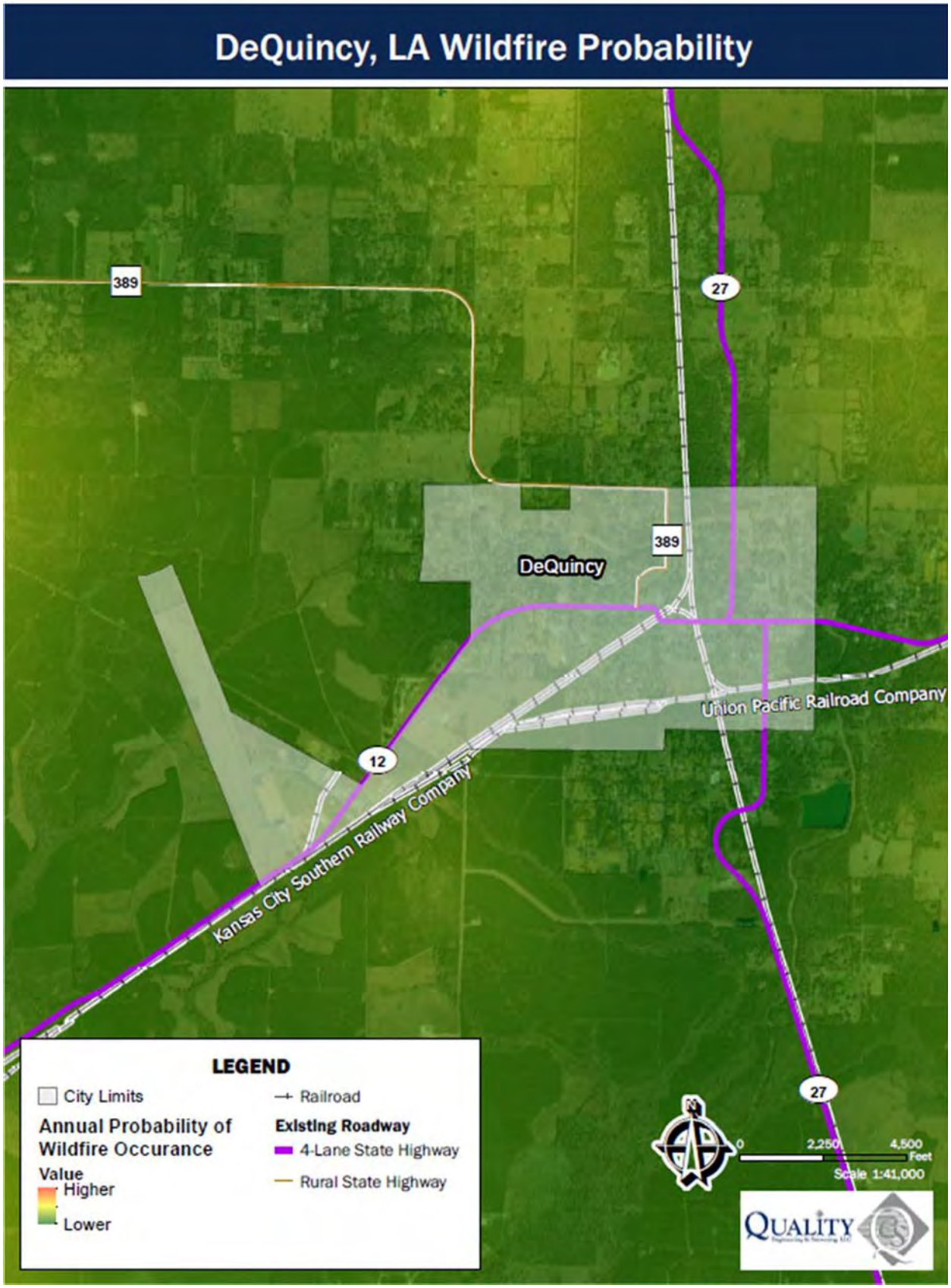


Figure 2-34b: DeQuincy, LA Wildfire Probability

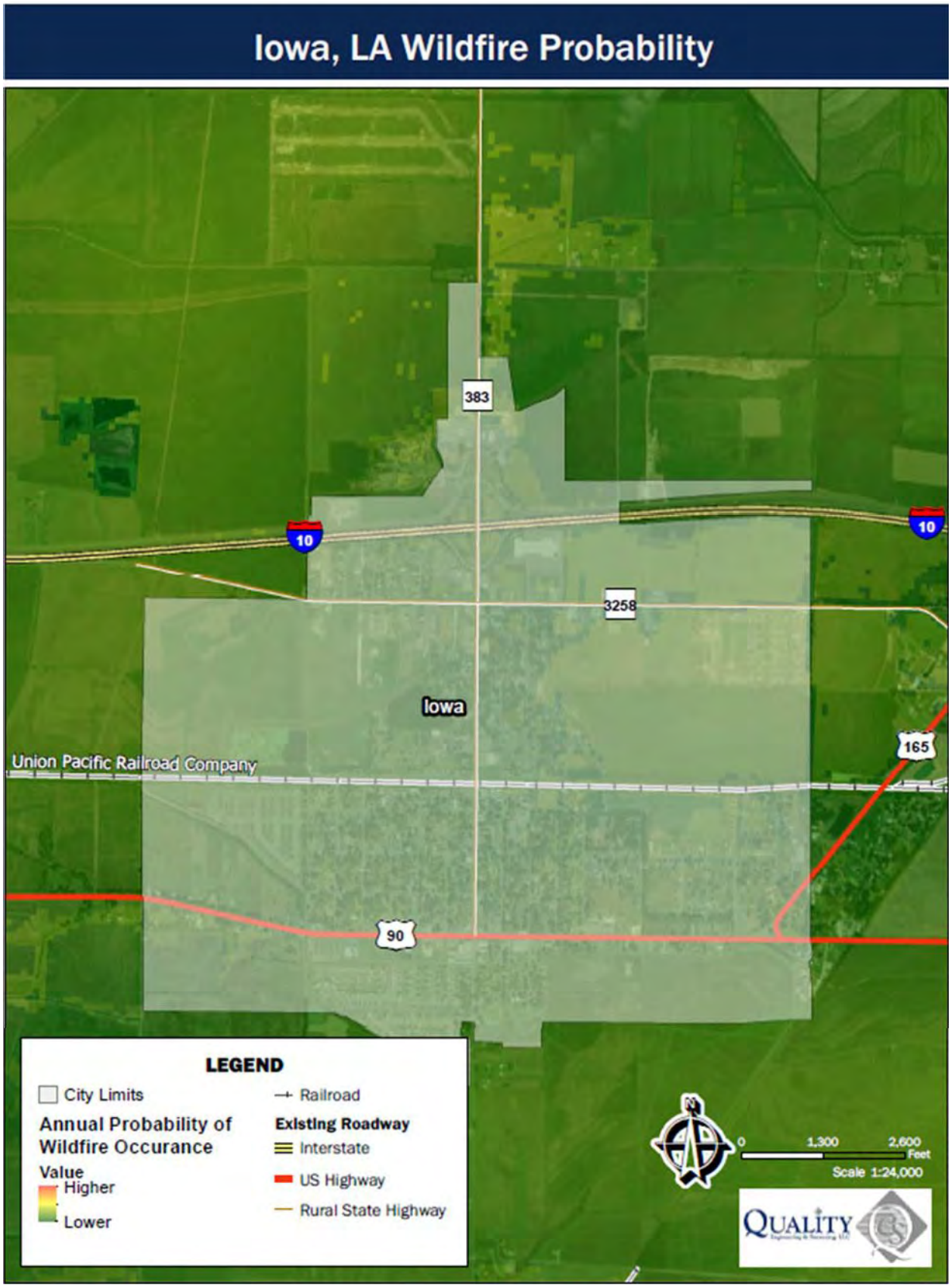


Figure 2-34c: Iowa, LA Wildfire Probability

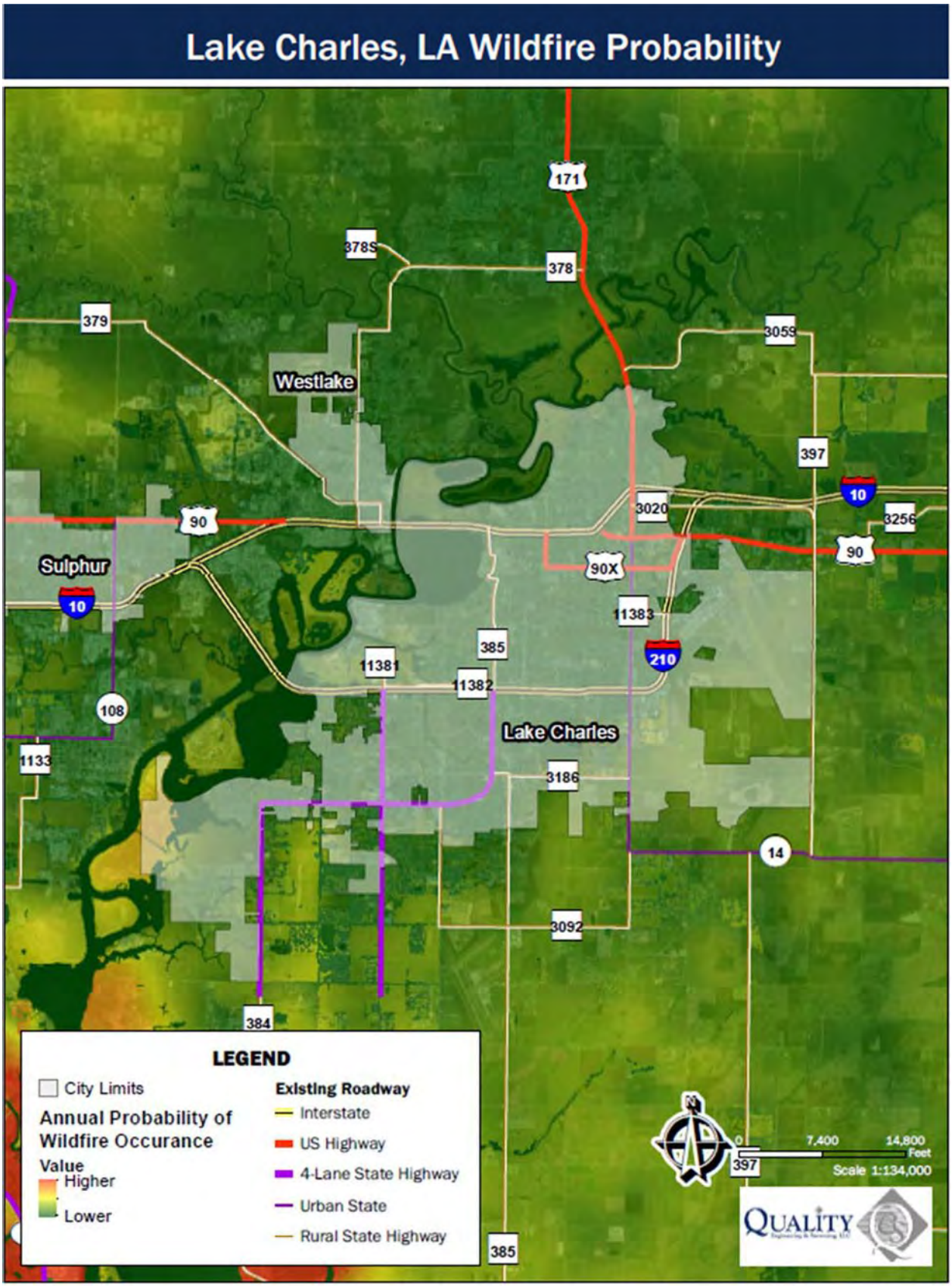


Figure 2-34d: Lake Charles, LA Wildfire Probability

Figure 2-34e: Sulphur, LA Wildfire Probability

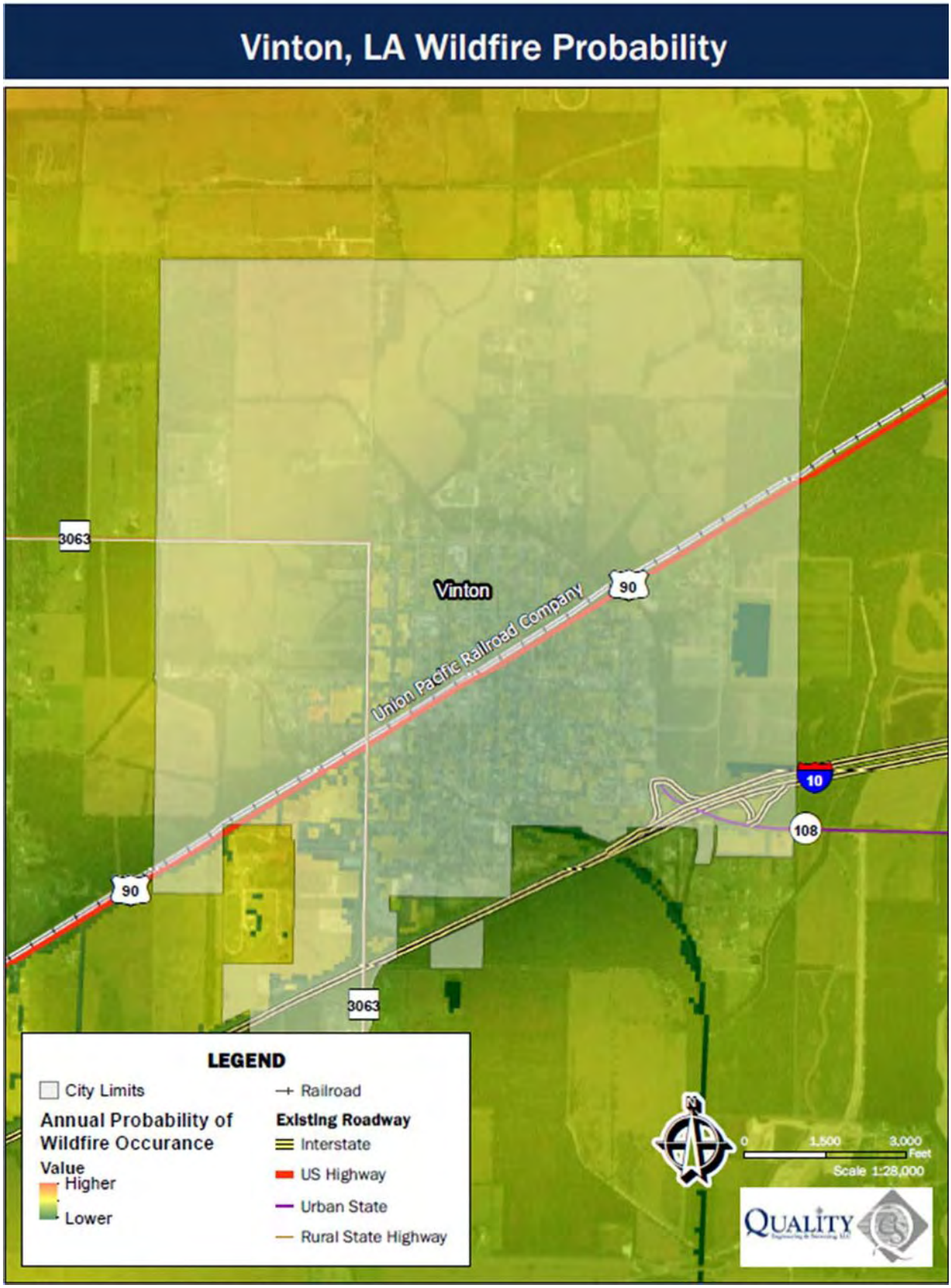


Figure 2-34f: Vinton, LA Wildfire Probability

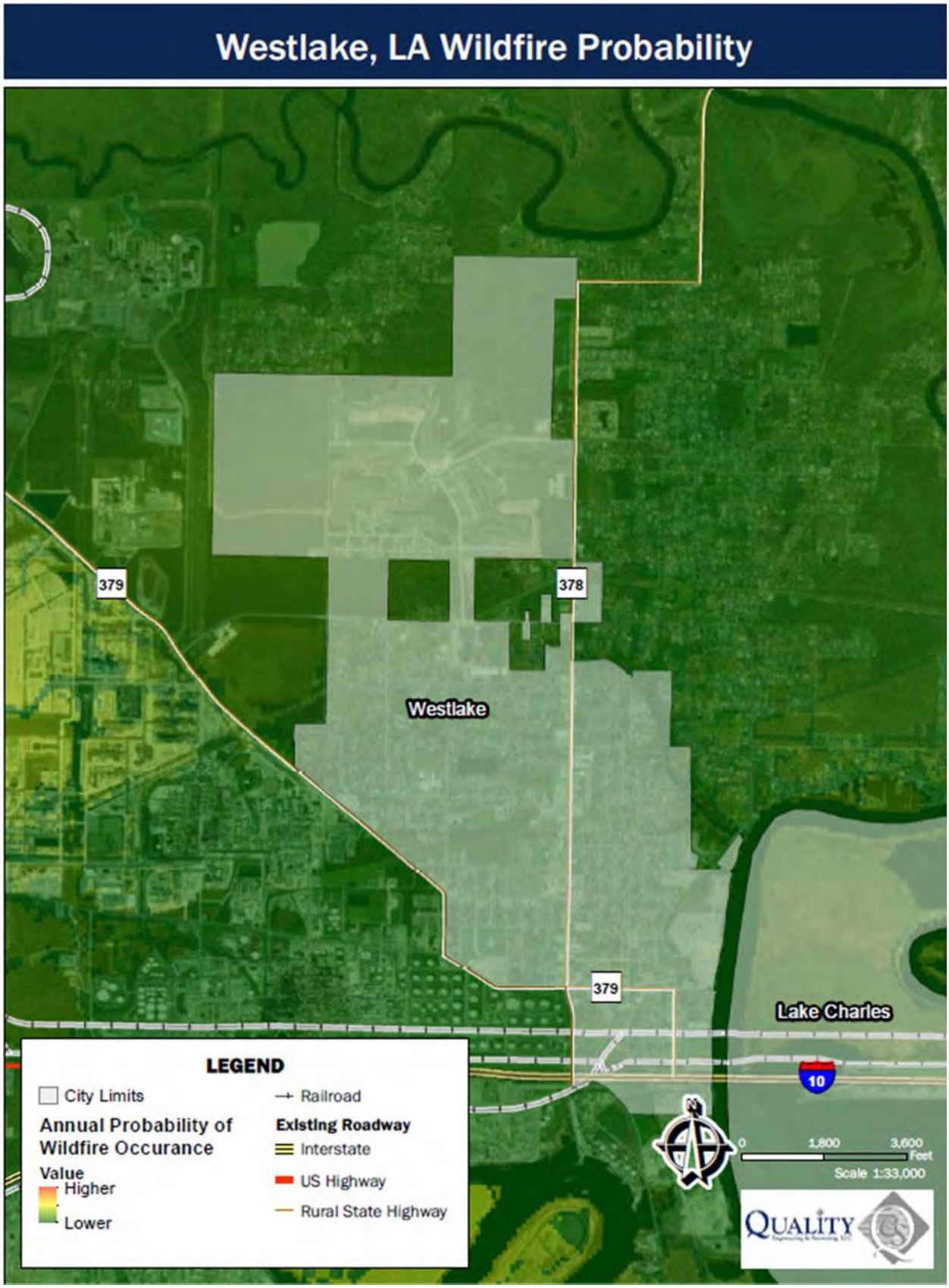


Figure 2-34g: Westlake, LA Wildfire Probability

Previous Occurrences / Extents

According to SHELDUS, there have been two reported wildfire events that have occurred within the boundaries of Calcasieu Parish between the years of 1989 and 2014. Table 2-75 provides a brief synopsis of each event.

Table 2-75: Previous Occurrences for Wildfire Events

Date	Synopsis	Property Damage	Crop Damage
April 17, 2011	A wildfire burned approximately 300 acres near Holbrook Road, approximately 5 miles southeast of DeQuincy. Several homes were threatened and evacuated as a precaution.	$0	$31,069
June 12, 2011	Extreme drought conditions contributed to a wildfire in the unincorporated northern portion of Calcasieu Parish. Nearly 700 acres burned, resulting in lost timber.	$0	$258,911

Since 2009, there have been no reported wildfire events in the incorporated areas of DeQuincy, Iowa, Lake Charles, Sulphur, Vinton, and Westlake.

Based on the Southern Group of State Foresters Risk Assessment Portal, Table 2-76 outlines the intensity that each jurisdictional area within Calcasieu Parish could potential experience due to a wildfire event.

Table 2-76: Potential Wildfire Intensity Levels for Calcasieu Parish (Source: Southern Wildfire Assessment Portal)

Potential Wildfire Intensity	
Calcasieu Parish (Unincorporated)	Highest Intensity Level 5
DeQuincy	Lowest Intensity Level 1
Iowa	Lowest Intensity Level 1
Lake Charles	Moderate to High Intensity Level 3.5
Sulphur	Low Intensity Level 2
Vinton	Moderate Intensity Level 3
Westlake	Low Intensity Level 2

Frequency / Probability

With two recorded events in 30 years, wildfire events within the boundaries of Calcasieu Parish have an annual chance of occurrence calculated at 7% based on the SHELDUS dataset.

Estimated Potential Losses

According to the SHELDUS database, there have been two wildfire events that have caused property damage, crop damage, injuries, or fatalities in Calcasieu Parish. In assessing the overall risk to population, the most vulnerable population throughout the parish consists of those residing in areas of wildland-urban interaction. Figure 2-37 displays the areas of wildland-urban interaction in Calcasieu Parish.

Using Hazus, along with wildland-urban interaction areas, Table 2-77 presents an analysis of total building exposure that is located within the wildland-urban interaction areas.

Table 2-77: Total Building Exposure by Wildland-Urban Interaction Areas
(Source: Hazus)

Jurisdiction	Estimated Total Building Exposure
Calcasieu Parish (Unincorporated)	$4,760,599,000
DeQuincy	$279,224,000
Iowa	$680,000
Lake Charles	$459,565,000
Sulphur	$568,109,000
Vinton	$3,938,000
Westlake	$24,748,000
Total	$6,096,863,000

Hazus also provides a breakdown by jurisdiction for seven primary sectors (Hazus occupancy) throughout the parish. Utilizing this information with the wildland-urban interaction areas allows for

identifying the total exposure by jurisdiction. The total exposure for each jurisdiction by sector is listed in the following tables:

Table 2-78: Estimated Exposure for Unincorporated Calcasieu Parish by Sector
(Source: Hazus)

Calcasieu Parish (Unincorporated)	Estimated Total Building Exposure by Sector
Agricultural	$9,415,000
Commercial	$409,321,000
Government	$20,296,000
Industrial	$122,131,000
Religious / Non-Profit	$72,679,000
Residential	$4,109,192,000
Schools	$17,565,000
Total	$4,760,599,000

Table 2-79: Estimated Exposure for DeQuincy by Sector
(Source: Hazus)

DeQuincy	Estimated Total Building Exposure by Sector
Agricultural	$339,000
Commercial	$13,050,000
Government	$1,443,000
Industrial	$13,084,000
Religious / Non-Profit	$12,321,000
Residential	$232,548,000
Schools	$6,439,000
Total	$279,224,000

Table 2-80: Estimated Exposure for Iowa by Sector
(Source: Hazus)

Iowa	Estimated Total Building Exposure by Sector
Agricultural	$0
Commercial	$0
Government	$0
Industrial	$0
Religious / Non-Profit	$0
Residential	$680,000
Schools	$0
Total	$680,000

Table 2-81: Estimated Exposure for Lake Charles by Sector
(Source: Hazus)

Lake Charles	Estimated Total Building Exposure by Sector
Agricultural	$1,697,000
Commercial	$53,722,000
Government	$6,723,000
Industrial	$11,740,000
Religious / Non-Profit	$3,953,000
Residential	$381,730,000
Schools	$0
Total	$459,565,000

Table 2-82: Estimated Exposure for Sulphur by Sector
(Source: Hazus)

Sulphur	Estimated Total Building Exposure by Sector
Agricultural	$382,000
Commercial	$91,643,000
Government	$1,012,000
Industrial	$9,650,000
Religious / Non-Profit	$5,680,000
Residential	$457,773,000
Schools	$1,969,000
Total	$568,109,000

Table 2-83: Estimated Exposure for Vinton by Sector
(Source: Hazus)

Vinton	Estimated Total Building Exposure by Sector
Agricultural	$0
Commercial	$0
Government	$0
Industrial	$0
Religious / Non-Profit	$0
Residential	$3,938,000
Schools	$0

Total	$3,938,000

Table 2-84: Estimated Exposure for Westlake by Sector
(Source: Hazus)

Westlake	Estimated Total Building Exposure by Sector
Agricultural	$62,000
Commercial	$4,157,000
Government	$1,156,000
Industrial	$17,000
Religious / Non-Profit	$365,000
Residential	$17,053,000
Schools	$1,938,000
Total	$24,748,000

Threat to People

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

Table 2-85: Populations Located within a Wildland-Urban Interaction Area
(Source: 2010 U.S. Census Data)

Number of People Located in Wildland-Urban Interaction Areas.			
Location	**# in Community**	**# in Area**	**% in Area**
Calcasieu (Unincorporated)	**86,354**	**34,717**	**40.2%**
DeQuincy	**3,235**	**3,164**	**97.8%**
Iowa	**2,996**	**18**	**0.6%**
Lake Charles	**71,993**	**298**	**0.4%**
Sulphur	**20,410**	**4,101**	**20.1%**
Vinton	**3,212**	**24**	**0.7%**
Westlake	**4,568**	**14**	**0.3%**
Total	**192,768**	**10,129**	**28.4%**

Vulnerability

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

Winter Storms

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

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

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

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

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

Winter storm events occur throughout Louisiana usually during the colder calendar months of December, January, and February. Severe weather events do not occur with the same frequency across all parts of Louisiana. The northern quarter of Louisiana has historically experienced the most severe winter events between 1987 and 2012. The central, and to an even greater extent the southern parts of the state, such as Ascension Parish, have experienced the fewest severe winter events.

Location

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

Previous Occurrences / Extents

According to SHELDUS, there have been four reported winter storm events that have occurred within the boundaries of Calcasieu Parish between the years of 1989 and 2019. Table 2-93 provides a brief synopsis of each event.

Table 2-93: Previous Occurrences for Winter Storm Events

Date	Synopsis	Property Damage	Crop Damage
January 12, 1997	A record ice storm hit southwest Louisiana and southeast Texas. The hardest hit area was Calcasieu Parish. Over 40,000 electric customers were without power for up to six days due to the number of downed trees and power lines. Numerous traffic accidents were attributed to icy roadways. Millions of tons of debris was removed, which took over two months to pick up in some areas. Hundreds of homes received minor roof damage due to trees and tree limbs falling on them.	$1,966,667	$2,854,509
December 11, 2008	A rare snow event occurred that produced snowflakes the size of half dollars in some areas. The event lasted 5 to 7 hours and produced snow accumulation totals of 1.5 inches in Vinton, 0.4 inches in Lake Charles, and 1.2 inches in Moss Bluff. For Lake Charles, this was the earliest measurable snowfall on record for the fall/winter season.	$3,571	$3,864
January 8, 2010	Several record low temperatures were set when a cold Artic air mass moved through the area. Calcasieu Parish Coroner's Office reported that a Mossville man died of exposure to freezing temperatures. All Calcasieu Parish schools were closed due to the cold temperatures and low wind chill readings. Sporadic power outages affected much of the parish throughout the event.	$25,000	$26,708
February 3, 2011	A mix of freezing rain, sleet, and snow fell across the area. Calcasieu Parish received around one tenth to nearly one quarter of an inch of ice accumulation. Scattered power outages occurred and dozens of car accidents were reported around the parish. Several major roadways, including Interstate 10, had to be closed.	$10,000	$10,356

While winter storms are climatological events that impact an entire region, there have been no report of damages or loss of life due to winter storms in the incorporated areas of DeQuincy, Sulphur, Westlake, Iowa, and Vinton since 2009. Based on previous winter storm events, the worst-case scenario for the unincorporated area of Calcasieu Parish and the incorporated area of Vinton is approximately one to two inches of snow accumulation and approximately one tenth to one quarter inch of ice accumulation. The incorporated areas of Lakes Charles, DeQuincy, Westlake, Iowa, and Sulphur can expect snow accumulation up to approximately one inch and ice accumulation from approximately one tenth to one quarter inch.

Frequency / Probability

With four recorded events in 30 years, winter storm events within the boundaries of Calcasieu Parish have an annual chance of occurrence calculated at 13% based on the SHELDUS dataset.

Estimated Potential Losses

Since 1989, there have been four reported winter weather events that have resulted in property and/or crop damages according to the SHELDUS database. The total property damages associated with these storms have totaled $2,895,439. To estimate the potential losses of a winter weather event on an annual basis, the total damage recorded for winter weather events was divided by the total number of years of available winter weather data in SHELDUS (1989 – 2019). This provides an annual estimated potential loss of $115,818. To assess potential losses to the participating jurisdictions, the 2018 ACS 5-Year Estimates population was used to assign the estimated potential losses proportionally across the jurisdictions. The following table provides an estimate of potential property losses for Calcasieu Parish based on the 2018 ACS data:

Table 2-94: Estimated Annual Losses for Winter Weather Events in Calcasieu Parish

Estimated Annual Potential Losses from Tornadoes for Calcasieu Parish						
Unincorporated Calcasieu Parish (44.6% of Population)	**DeQuincy (1.6% of Population)**	**Iowa (1.6% of Population)**	**Lake Charles (38.1% of Population)**	**Sulphur (10.1% of Population)**	**Vinton (1.7% of Population)**	**Westlake (2.4% of Population)**
$51,655	$1,944	$1,853	$44,127	$11,698	$1,969	$2,780

From 1989 - 2019, there have been three injuries and one fatality as a result of winter weather in Calcasieu Parish.

Vulnerability

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

Subsidence/Coastal Land Loss

Coastal land loss is the loss of land (especially beach, shoreline, or dune material) by natural and/or human influences. Coastal land loss occurs through various means, including erosion, subsidence (the sinking of land over time as a result of natural and/or human-caused actions), saltwater intrusion, coastal storms, littoral drift, changing currents, manmade canals, rates of accretion, and sea level rise. The effects of these processes are difficult to differentiate because of their complexity and because they often occur simultaneously, with one influencing each of the others.

Some of the worst recent contributors to coastal land loss in the state are the tropical cyclones of the past decade. Two storms that stand out in this regard are Hurricanes Katrina and Rita. These powerful cyclones completely covered large tracts of land in a very brief period, permanently altering the landscape. The disastrous legacy of these storms concentrated already ongoing efforts to combat coastal land loss. The 2019 State Hazard Mitigation Plan Update states in coastal Louisiana, subsidence and sea level rise, plus the threat of hurricanes and flooding, combine to create one of the highest rates of relative sea level rise in the world.

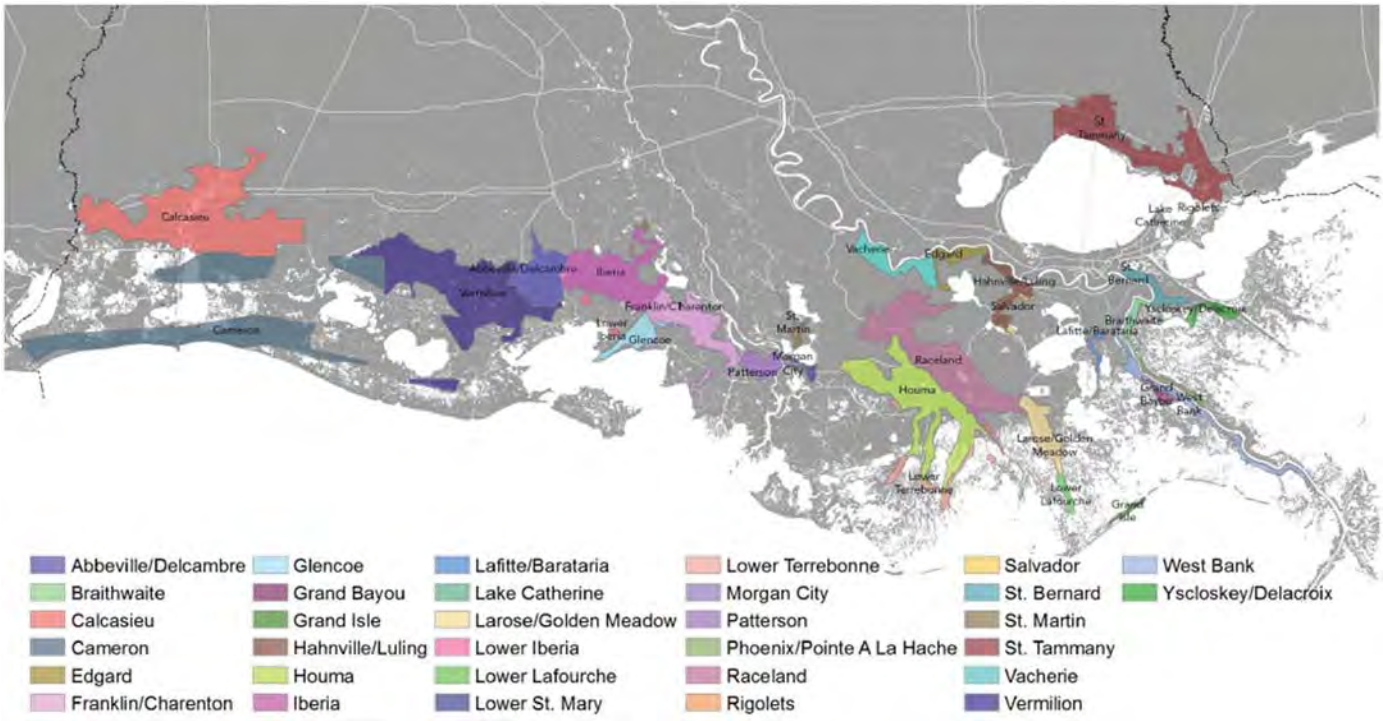


Figure 2-35 (Source; State of Louisiana Hazard Mitigation Plan 2019)

Sea level rise and subsidence impact Louisiana in a similar manner—again making it difficult to separate impacts. Together, rising sea level and subsidence—known together as relative sea level rise—can accelerate coastal erosion and wetland loss, exacerbate flooding, and increase the extent and frequency of storm impacts. According to NOAA, global sea level rise refers to the upward trend currently observed in the average global sea level. Local sea level rise is the level that the sea rises relative to a specific location (or, benchmark) at the coastline. The most prominent causes of sea level rise are thermal expansion, tectonic actions (such as sea floor spreading), and the melting of the Earth's glacial ice caps. The current U.S. Environmental Protection Agency (EPA) estimate of global sea level rise is 10–12 in. per century, while future sea level rise could be within the range of 1–4 ft. by 2100. According to the U.S. Geological Survey (USGS), the Mississippi Delta plain is subject to the highest rate of relative sea level rise of any region in the nation largely due to rapid geologic subsidence.

Subsidence results from multiple factors including:

- Compaction/consolidation of shallow strata caused by the weight of sediment deposits, soil oxidation, and aquifer draw-down (shallow component)
- Gas/oil/resource extraction (shallow & intermediate component)
- Consolidation of deeper strata (intermediate components)
- Tectonic effects (deep component)

For the most part, subsidence is a slow-acting process with effects that are not as evident as hazards associated with discrete events. Although the impacts of subsidence can be readily seen in coastal parishes over the course of decades, subsidence is a "creeping" hazard. The highest rate of subsidence is occurring at the Mississippi River Delta (estimated at greater than 3.5 ft./century). Subsidence rates tend to decrease inland, and they also vary across the coast.

Overall, subsidence creates three distinct problems in Louisiana:

- By lowering elevations in coastal Louisiana, subsidence accelerates the effects of saltwater intrusion and other factors that contribute to land loss .
- By lowering elevations, subsidence may make structures more vulnerable to flooding.
- By destabilizing elevations, subsidence undermines the accuracy of surveying benchmarks (including those affecting levee heights, coastal restoration programs, surge modeling, BFEs, and other engineering inputs), which can contribute to additional flooding problems if construction occurs at lower elevations than anticipated or planned.

Location

Historic areas of coastal land loss and gain (Figure 2-38) and subsidence rates (Figure 2-39) have been quantified for Calcasieu Parish using data from the U.S. Geologic Survey and Louisiana Coastal Protection and Restoration Authority (CPRA). Since 1932, the average annual land loss in Louisiana is 35 mi^2, while the average annual land gain has been 3 mi^2 for a net loss of 32 mi^2 per year. Land loss is primarily currently occurring in the southern unincorporated areas and portions of the northern unincorporated areas of Calcasieu Parish and in some portions of Lake Charles, Vinton, Westlake, and Sulphur (Figure 2- 38). Subsidence is occurring in the southern unincorporated areas of Calcasieu Parish and in the incorporated areas of Lake Charles, Westlake, and Sulphur (Figure 2-39).

Previous Occurrences / Extent

Coastal land loss is an ongoing process, including discrete (hurricanes) and continuous (subsidence, sea level rise) processes. While historic flood loss data undoubtedly include the effects of coastal land loss, specific previous occurrences have not been identified as a source of direct disaster damage in Louisiana. Rather, the effects of the underlying flood or hurricane storm surge hazard are recorded. Land loss is a significant hazard, however, and assessment of the added flood impacts caused by land loss is quantified in the following sections. The unincorporated area of Calcasieu Parish can expect to experience subsidence rates of approximately 25mm annually while the incorporated areas of Westlake, Vinton, Lake Charles, and Sulphur can expect subsidence rates of approximately 6mm annually. The incorporated areas of DeQuincy and Iowa are currently not susceptible to land loss and subsidence.

For the most part, subsidence is a slow-acting process with effects that are not as evident as hazards associated with discrete events. Although the impacts of subsidence can be readily seen in coastal parishes over the course of decades, subsidence is a "creeping" hazard.

Frequency / Probability

Subsidence, sea level rise, and coastal land loss are ongoing hazards. Based on historical subsidence rates and land loss/gain trends, the probability of future land loss in Louisiana is 100% certain, but actual rates of subsidence and land loss/gain vary along the coast based on various meteorological, geological, and human-influenced dynamics (e.g., water/resource extraction, canal dredging, saltwater intrusion, marsh restoration projects, etc.).

Table 2-95: Annual Probability of Coastal Land Loss in Calcasieu Parish

Coastal Land Loss Probability Calcasieu Parish						
Unincorporated Calcasieu Parish	**DeQuincy**	**Iowa**	**Lake Charles**	**Sulphur**	**Vinton**	**Westlake**
100%	<1%	<1%	100%	100%	100%	100%

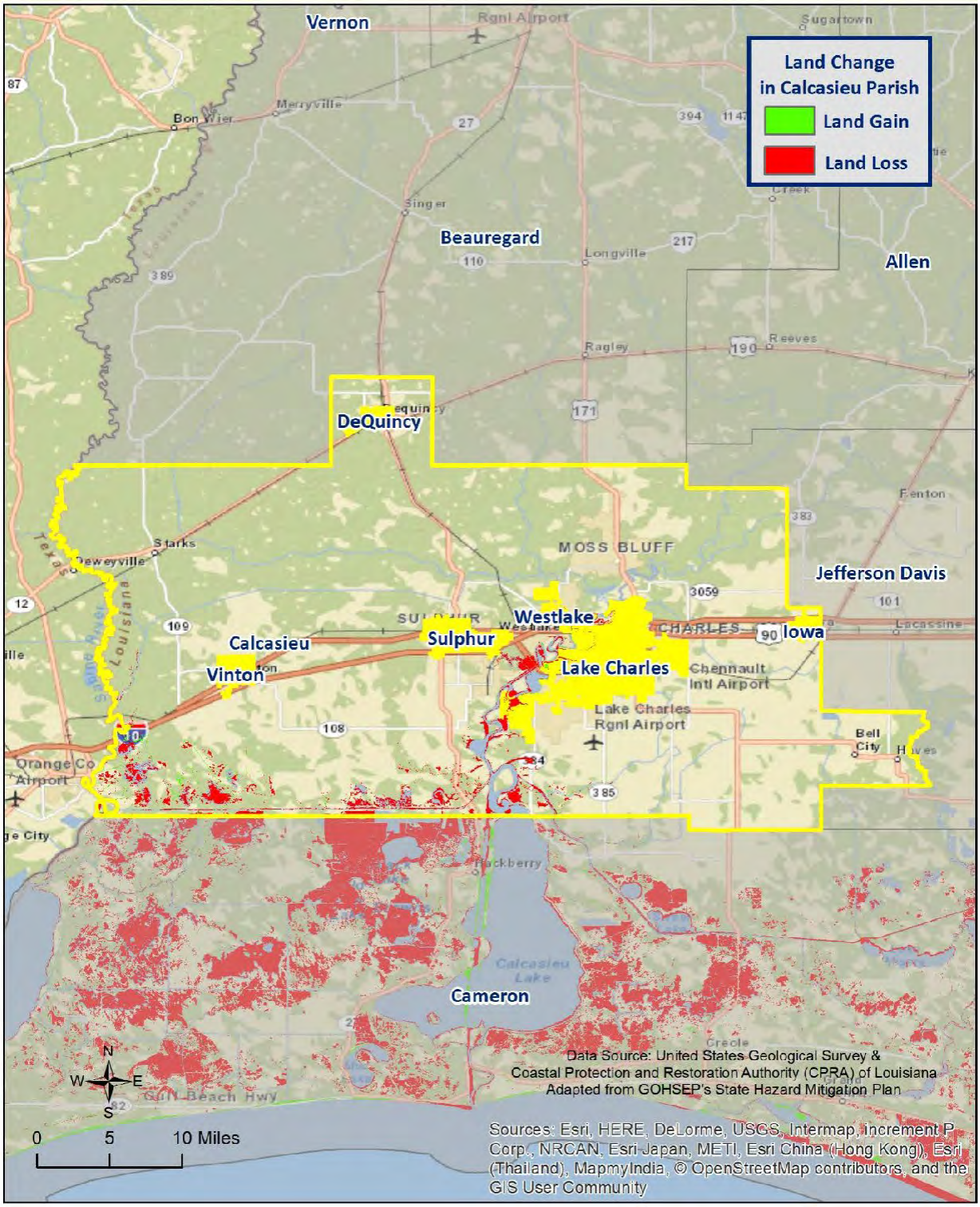


Figure 2-36: Historical Areas of Land Loss and Gain between 1932 and 2010 (Source: State of Louisiana Hazard Mitigation Plan 2014)

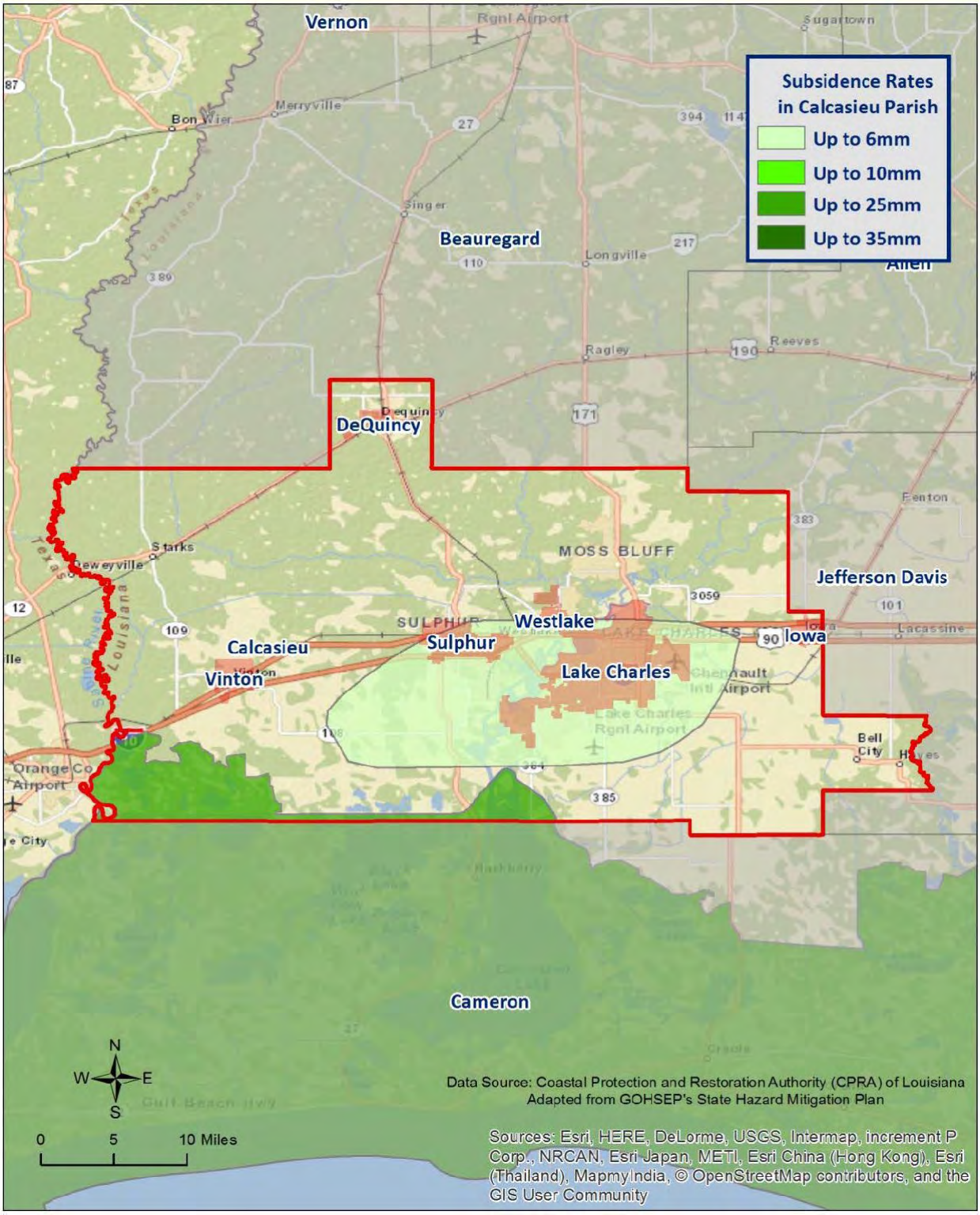


Figure 2-37: Maximum Annual Subsidence Rates Based on Subsidence Zones in Coastal Louisiana. (Source: State of Louisiana Hazard Mitigation Plan 2014)

Estimated Potential Loses

To determine the estimated potential losses, the methodology implemented in the 2014 Louisiana State Plan Update was used. In the state plan, two parameters were considered to estimate the projected increase in coastal flood losses from storm surge scenarios – global sea level rise and subsidence. A timeframe of 10 years was used for evaluation of future effects of sea level rise and subsidence for comparison with current conditions. The NOAA Sea, Lake and Overland Surges from Hurricanes (SLOSH) model was used to estimate the maximum of maximum (MOM) storm surge elevations for a Category 1 hurricane at mean tide along the coast of Louisiana. The MOM scenario is not designed to describe the storm surge that would result from a particular event, but rather evaluates the impacts of multiple hurricane scenarios with varying forward speeds and storm track trajectories to create the maximum storm surge elevation surface that would occur given the simultaneous occurrence of all hurricane events for a given category.

There are many global sea level rise scenarios from which to select; however, within a 10-year timeframe, methods that predict accelerating sea level rise rates do not deviate significantly from straight line methods. Therefore, a linear sea level rise projection for the sea level rise occurring in 10 years (SLR2024) using a linear global sea level rise rate of 3.1 mm/year was used (IPCC, 2007), which is also in accordance with the CPRA Coastal Master Plan. This resulted in an increase of 0. 1 feet, which was applied to the NOAA MOM storm surge elevation results over the model output domain.

$$SLR_{2024} = 0.0031 \frac{m}{year} x\ 10\ years$$

$$SLR_{2024} = 0.031\ meters = 0.10\ ft\ in\ 2024$$

To estimate the effects of subsidence, the elevation profile for southern Louisiana was separated into sections based on subsidence zones. The 20th percentile values for subsidence were used, in accordance with the CPRA Master Plan, and subtracted from the digital elevation model (DEM) for each zone and re-joined to create a final subsided ground elevation layer.

To perform the economic loss assessment, depth grids were created for current conditions (SLOSH MOM Results – Current Land Elevation) and for projected 2024 conditions ([SLOSH MOM Results + 0.1 ft sea level rise] – [Current Land Elevation – Subsidence]). HAZUS-MH was used to calculate economic loss for the current and future depth grids.

Figure 2-40 shows the projected increase in total flood loss resulting from a SLOSH Category 1 MOM in the year 2014, with many areas, primarily in unincorporated Calcasieu Parish, expecting increase in losses. Some areas that would be currently unaffected by a SLOSH Category 1 MOM would be impacted in ten years based on subsidence and sea level rise projections (Figure 2-41).

To determine annual potential loss estimates for coastal land loss, increased exposure estimates over the next 10 years calculated using HAZUS-MH were annualized at the parish level (Figure 2-42). To provide an annual estimated potential loss per jurisdiction, the total loss for the census block groups within each jurisdiction were calculated. Based on hazard exposure, Table 2-14 provides an estimate of annual potential losses for Calcasieu Parish.

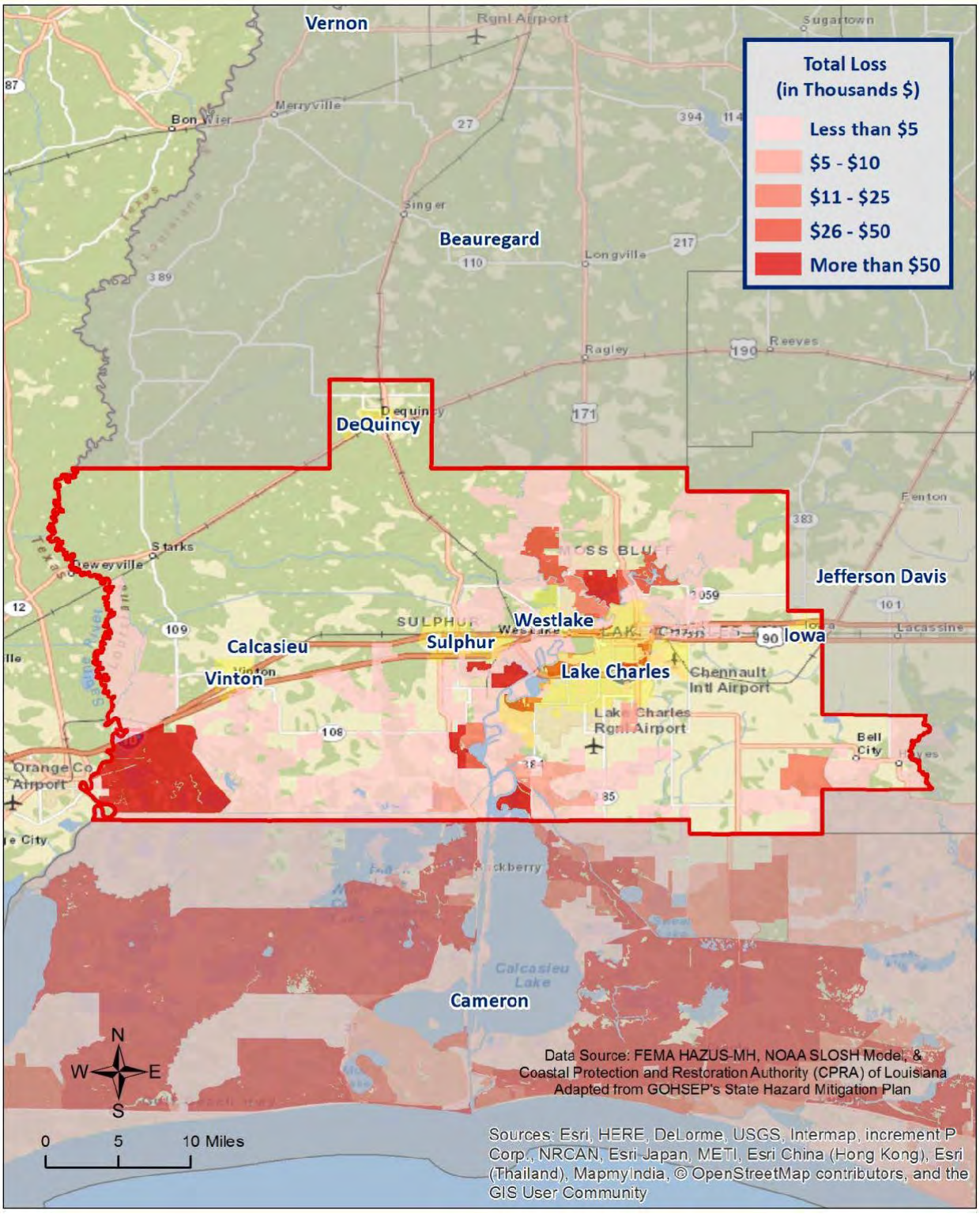


Figure 2-38: Increase in Total Loss Estimates in 2024 by Census Block Group Based on the HAZUS-MH Flood Model and NOAA SLOSH model.
(Source: State of Louisiana Hazard Mitigation Plan 2014)

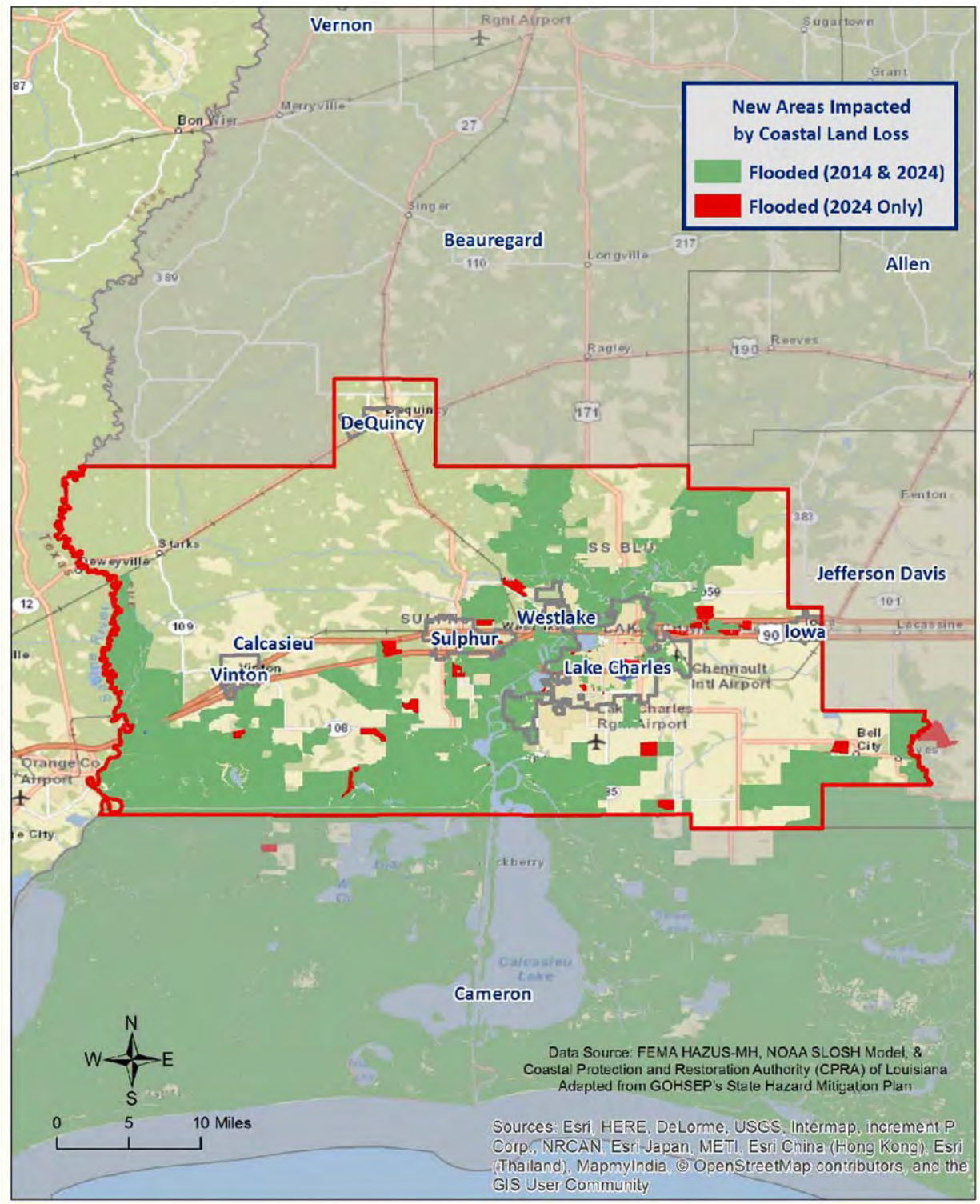


Figure 2-39: Census Block Groups not Currently Impacted by Category 1 Hurricane Storm Surge but Expected to be Impacted in 2024 are Shown in Red.
(Source: State of Louisiana Hazard Mitigation Plan 2014)

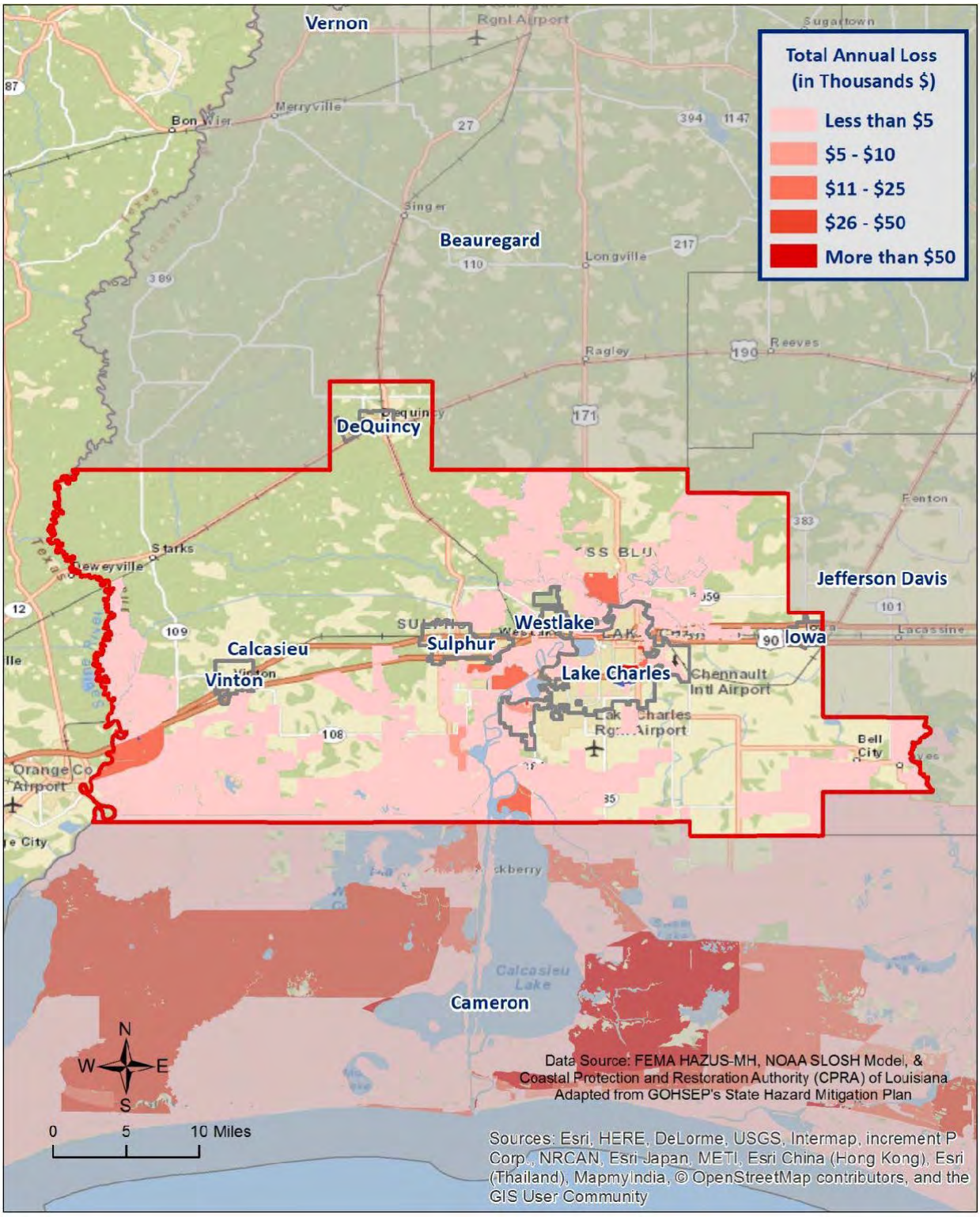


Figure 2-40: Estimated Annual Losses for Coastal Land Loss by Census Block Group.
(Source: State of Louisiana Hazard Mitigation Plan 2014)

The following table shows the current and future exposure potential based on the HAZUS-MH 2.2 inventory database.

Table 2-96: Estimated Annual Losses for Coastal Land Loss in Calcasieu Parish. (Source: HAZUS-MH)

Coastal Land Loss Estimated Annual Potential Losses for Calcasieu Parish						
Unincorporated Calcasieu Parish	DeQuincy	Iowa	Lake Charles	Sulphur	Vinton	Westlake
$122,800	$0	$0	$107,000	$1,000	$200	$60,000

Threat to People

Coastal land loss can impact all demographics and age groups. Buildings located within highly vulnerable coastal land loss areas could be eventually permanently shut down and forced to re-locate. Long-term sheltering and permanent relocation could be a concern for communities that are at the highest risk for future coastal land loss. The total population within the parish that is susceptible to the effects of coastal land loss are shown in Table 2-97.

Figure 2-97: Number of People Susceptible to Coastal Land Loss in Calcasieu Parish. (Source: Census 2010)

Number of People Exposed to Hurricane Hazards			
Location	**# in Community**	**# in Hazard Area**	**% in Hazard Area**
Parish (Unincorporated)	**86,354**	**17,482**	**20.2%**
DeQuincy	**3,235**	**0**	**0%**
Iowa	**2,996**	**0**	**0%**
Lake Charles	**71,993**	**8.445**	**11.7%**
Sulphur	**20,410**	**0**	**0%**
Vinton	**3,212**	**0**	**0%**
Westlake	**4,568**	**412**	**9%**
Total	**192,768**	**26,339**	**13.7%**

The HAZUS-MH hurricane model was used to identify populations vulnerable to coastal land loss throughout the jurisdictions in the tables below:

Table 2-98: Population Vulnerable to Coastal Land Loss in Unincorporated Calcasieu Parish.

Calcasieu Parish (Unincorporated)		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	17,482	20.2%
Persons Under 5 years	1,189	6.8%
Persons Under 18 years	4,353	24.9%
Persons 65 Years and Over	2,360	13.5%
White	12,447	71.2%
Minority	5,035	28.8%

Table 2-99: Population Vulnerable to Coastal Land Loss in Lake Charles. (Source: HAZUS-MH)

Lake Charles		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	33	100%
Persons Under 5 years	2	6.1%
Persons Under 18 years	9	27.3%
Persons 65 Years and Over	4	12.1%
White	21	63.6%
Minority	12	36.4%

Table 2-100: Population Vulnerable to Coastal Land Loss in Lake Charles. (Source: HAZUS-MH)

Lake Charles		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	8,445	11.7%
Persons Under 5 years	592	7.0%
Persons Under 18 years	1,391	16.5%
Persons 65 Years and Over	1,176	13.9%
White	3,967	47.0%
Minority	4,478	53.0%

Table 2-101: Population Vulnerable to Coastal Land Loss in Westlake. (Source: HAZUS-MH)

Westlake		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	412	9.0%
Persons Under 5 years	33	8.0%
Persons Under 18 years	75	18.3%
Persons 65 Years and Over	59	14.3%
White	318	77.2%
Minority	94	22.8%

Vulnerability

See Appendix C for parish and municipality buildings that are susceptible to coastal land loss and subsidence.

Section 3: Capability Assessment

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

Calcasieu 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 Calcasieu 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.

Marsh washed up against the sea wall of Lake Charles after Hurricane Delta, October 2020
Photo Credit: Jennifer Wallace

Existing documents in Calcasieu Parish and its jurisdictions include the following:

Planning and Regulatory							
Please indicate which of the following plans and regulatory capabilities your jurisdiction has in place.							
	Calcasieu Parish	DeQuincy	Lake Charles	Sulphur	Westlake	Vinton	Iowa
Plans			**Yes/No**				
Comprehensive/Master Plan	No	No	Yes	Yes	No	No	No
Capital Improvements Plan	Yes	Yes	Yes	Yes	Yes	Yes	No
Economic Development Plan	Yes	Yes	Yes	No	No	Yes	No
Local Emergency Operations Plan	Yes	No	Yes	Yes	Yes	Yes	Yes
Continuity of Operations Plan	Yes	No	Yes	Yes	Yes	No	Yes
Transportation Plan	Yes	No	Yes	No	No	No	No
Stormwater Management Plan	Yes	Yes	Yes	Yes	Yes	No	No
Community Wildfire Protection Plan	No	No	No	No	No	No	No
Other plans (redevelopment, recovery, coastal zone management)	Yes	N/A	Yes	N/A	N/A	N/A	N/A
Building Code, Permitting and Inspections			**Yes/No**				
Building Code	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Building Code Effectiveness Grading Schedule (BCEGS) Score	Yes	Yes	No	No	No	No	No
Fire Department ISO/PIAL rating	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Site Plan Review Requirements	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Land Use Planning and Ordinances			**Yes/No**				
Zoning Ordinance	Yes	Yes	Yes	Yes	Yes	No	No
Subdivision Ordinance	Yes	Yes	Yes	Yes	Yes	No	Yes
Floodplain Ordinance	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Natural Hazard Specific Ordinance (stormwater, steep slop, wildfire	Yes	Yes	Yes	Yes	Yes	No	No
Flood Insurance Rate Maps	Yes	Yes	Yes	Yes	Yes	No	Yes
Acquisition of land for open space and public recreation uses	Yes	Yes	Yes	Yes	No	No	No
Other (please list)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Building Codes, Permitting, Land Use Planning and Ordinances

The Calcasieu Office of Planning and Development administers land-use regulations and infrastructure, recovery and environmental grants as well as facilitating economic development projects.

As of the 2020 Update, Calcasieu 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, mechanical equipment, plumbing piping, or gas piping, moving manufactured/modular or portable buildings, and reroofing or demolitions.

The Calcasieu Parish Code Enforcement for Property Standards is responsible for enforcing the Parish Ordinances related to health and safety, property maintenance standards, condemnation of unsafe structures and zoning compliance. Code Enforcement ensures safe and desirable living and working environments and also help maintain property values.

The Planning and Zoning Board meet regularly to consider any proposed ordinance changes, and to take final actions on these changes at scheduled Police Jury Meetings.

While local capabilities for mitigation can vary from community to community, Calcasieu Parish has a system in place to coordinate and share these capabilities through Calcasieu 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, Calcasieu 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. On the following page are examples of resources in place in Calcasieu Parish and its jurisdictions.

Administration and Technical

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

	Calcasieu Parish	DeQuincy	Lake Charles	Sulphur	Westlake	Vinton	Iowa
Funding Source			**Yes/No**				
Planning Commission	Yes	No	Yes	Yes	No	No	No
Mitigation Planning Committee	Yes	No	Yes	No	No	No	No
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Staff			**Yes/No**				
Chief Building Official	Yes	No	Yes	Yes	No	Yes	No
Floodplain Administrator	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Emergency Manager	Yes	No	Yes	Yes	Yes	Yes	No
Community Planner	Yes	No	Yes	No	No	No	No
Civil Engineer	Yes	No	Yes	Yes	Yes	No	No
GIS Coordinator	Yes	No	Yes	Yes	No	No	No
Grant Writer	Yes	Yes	Yes	Yes	No	Yes	No
Other	Yes	N/A	Yes	N/A	N/A	N/A	N/A
Technical			**Yes/No**				
Warning Systems/Service (Reverse 911, outdoor warning systems)	Yes	No	Yes	Yes	No	Yes	No
Hazard Data & Information	Yes	Yes	Yes	Yes	No	No	No
Grant Writing	Yes	Yes	Yes	Yes	No	Yes	No
Hazus Analysis	No	No	No	No	No	No	No
Other	N/A	N/A	Yes	N/A	N/A	N/A	N/A

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

Financial							
Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.							
	Calcasieu Parish	DeQuincy	Lake Charles	Sulphur	Westlake	Vinton	Iowa
Funding Source	**Yes/No**						
Capital Improvements Project Funding	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Authority to levy taxes for specific purposes	Yes	Yes	Yes	Yes	Yes	No	Yes
Fees for water, sewer, gas, or electric services	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Impact fees for new development	Yes	No	No	No	No	Yes	No
Community Development Block Grant (CDBG)	Yes	No	Yes	Yes	Yes	No	No
Other Funding Programs	Yes	Yes	Yes	N/A	N/A	N/A	Yes

Education and Outreach

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

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

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							
	Calcasieu Parish	DeQuincy	Lake Charles	Sulphur	Westlake	Vinton	Iowa
Program/Organization	**Yes/No**						
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Yes	Yes	Yes	No	Yes	Yes
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	Yes	No	Yes	Yes	Yes	Yes	Yes
Natural Disaster or safety related school program	Yes	Yes	Yes	Yes	No	No	No
Storm Ready certificate	Yes	No	No	No	No	No	No
Firewise Communities certification	No	No	No	No	No	No	No
Public/Private partnership initiatives addressing disaster related issues	Yes	Yes	Yes	Yes	No	No	No

In some cases, the jurisdictions rely on Calcasieu Parish OHSEP and/or Calcasieu 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 existing regulatory mechanisms, programs, and resources within each jurisdiction, Calcasieu Parish and each jurisdiction remains committed to expanding and improving on the existing capabilities within the parish. Each participating jurisdiction will work toward increased participation in funding opportunities and available mitigation programs. Should funding become available, the hiring of additional personnel to dedicate to hazard mitigation initiatives and programs, as well as increasing ordinances within the jurisdictions, will 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 Calcasieu 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:

- Calcasieu Parish
- City of DeQuincy
- City of Lake Charles
- City of Sulphur
- City of Westlake
- Town of Vinton
- Town of Iowa

Flood Insurance and Community Rating System

Calcasieu Parish is a participant in the Community Rating System (CRS). Maintaining and improving the CRS rating for the parish and participating jurisdictions is recognized as a high priority by the Hazard Mitigation Steering Committee, with the addition of a new goal directly relating to CRS. 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, 41 Louisiana communities participated, including Lake Charles (class 9) and Calcasieu Parish (class 8). Jefferson Parish had the best classification in the state, (class 5). St. James Parish, St. Tammy Parish, East Baton Rouge Parish, and Terrebonne Parish had the second best classifications in the state.

As of August 2020, 317 communities in the State of Louisiana participate in the Federal Emergency

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: EMA)

Management Agency's NFIP. (see Figure 3-2). 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, 30 participate in the CRS. The remaining 20 communities present an outreach opportunity for encouraging participation in the CRS. In Calcasieu Parish, the following communities participate; Lake Charles (Class 9) and Calcasieu Parish (class 8).

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 2017, the National Flood Insurance Program (NFIP) completed a comprehensive review of the Community Rating System that resulted in the release of a new CRS Coordinator's Manual. In 2020 FEMA announced plans to issue a 2021 Addendum to the 2017 CRS Coordinator's Manuel, to be effective January 2021. The 2021 Addendum will include new prerequisite requirements, several new CRS credit opportunities, and some updates modifications aimed at simplifying credit and reporting requirements. The 2021 Addendum to the 2017 CRS Coordinator's Manuel will also feature two new prerequisites requirements:

The *Class 9 prerequisite* for FEMA Elevation Certificates will be changes to require 90% accuracy at a community's annual review, plus requirement for a community to have written Elevation Certificate management procedures (element ECMP). All communities will receive 38 points under Activity 310 (Elevation Certificates) for ECPM. Credit for element Elevation Certificates under Activity 310 will be retired.

A new *Class 8 prerequisite* will require communities to adopt and enforce at least a 1-foot freeboard requirement (including equipment or mechanical items) for all residential buildings constructed, substantially improved, and/or reconstructed due to substantial damage, throughout its Special Flood Hazard Area (SFHA) where base flood elevations have been determined.

Additional Information about the 2021 Addendum's new credit opportunities, simplifications, and modifications / updates can be found at https://www.fema.gov/national-flood-insurance-program-community-rating-system

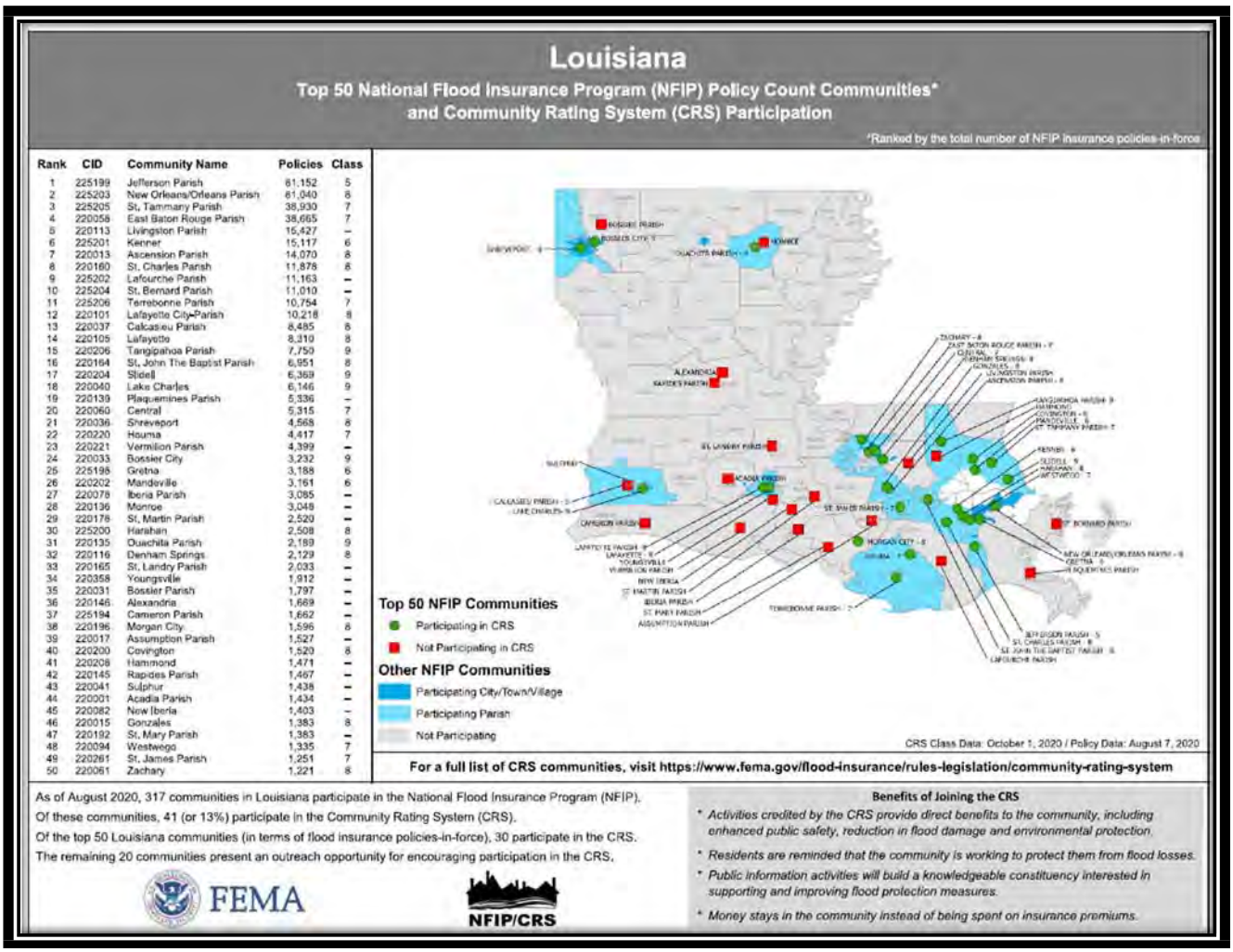


Figure 3-2 Louisiana CRS NFIP Participation
(Source: NFIP/CRS)

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. Training and technical assistance in designing and implementing credited flood protection activities are available through the CRS at no charge.

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

Louisiana Watershed Initiative (LWI)

The historic Louisiana 2016 floods exposed deficiencies in the State's approach to floodplain management at all levels of government, prompting a reassessment of how Louisiana prepares for increasing flood events. In 2018, Louisiana Governor John Bel Edwards formed the Council on Watershed Management to guide the state toward a statewide resilience strategy, and which serves as the programmatic arm for local governments. The Council on Watershed Management is compromised of members of the Office of Community Development, Coastal Protection and Restoration Authority, Governor's Office of Homeland Security and Emergency Preparedness, Department of Transportation and Development and the Wildlife and Fisheries. Louisiana Watershed Initiative serves as the program through which floodplain management responsibilities are coordinated across federal, state and local agencies, supported by experts who serve as advisors in building a foundation of data, projects, policies, standards and guidance. The Louisiana Watershed Initiative principals are using scientific tools and data, enabling transparent objective decision making, maximize the natural functions of floodplains, and establishing regional watershed-based management of flood risk.

Following the launch of The Louisiana Water Initiative, the federal government announced Louisiana will receive a 1.2 billion flood mitigation grant. The Regional Capacity Building Grant program (RCBG) was developed through The Louisiana Water Initiative to provide resources to support improved regional watershed management. The Regional Capacity Building Grant Program is designed to help the state's eight established watershed regions build staff capacity for regional watershed management, as well as provide technical assistance to municipal partners throughout each region. The goal of the program is to support strong and effective governance for each watershed region and ensure each region operated in a way that maximizes flood mitigation efforts and funds for risk-reduction projects as they become available. The Council on Watershed Management agreed to use the eight watershed regions as a starting point to coordinate efforts among parishes and distribute project funds. *(See Figure 3-3)* The nine parishes that fall within Region Four are as follows: Allen, Beauregard, Calcasieu, Cameron, De Soto, Jefferson Davis, Rapides, Sabine and Vernon. *(See Figure 3-4)*

The formation of a regional steering committee is a mandatory aspect of the RCBG Program. On January 15, 2020, The Region 4 Regional Steering Committee was formed. Each of the nine parishes located in Region 4 has a representative on the Region 4 Regional Steering Committee. The Calcasieu Parish Police Jury serves as the fiscal agent.

The Louisiana Watershed Initiative is a new program that is still evolving. For more information and updates on The Louisiana Watershed Initiative's projects and future funding can be at https://www.watershed.la.gov

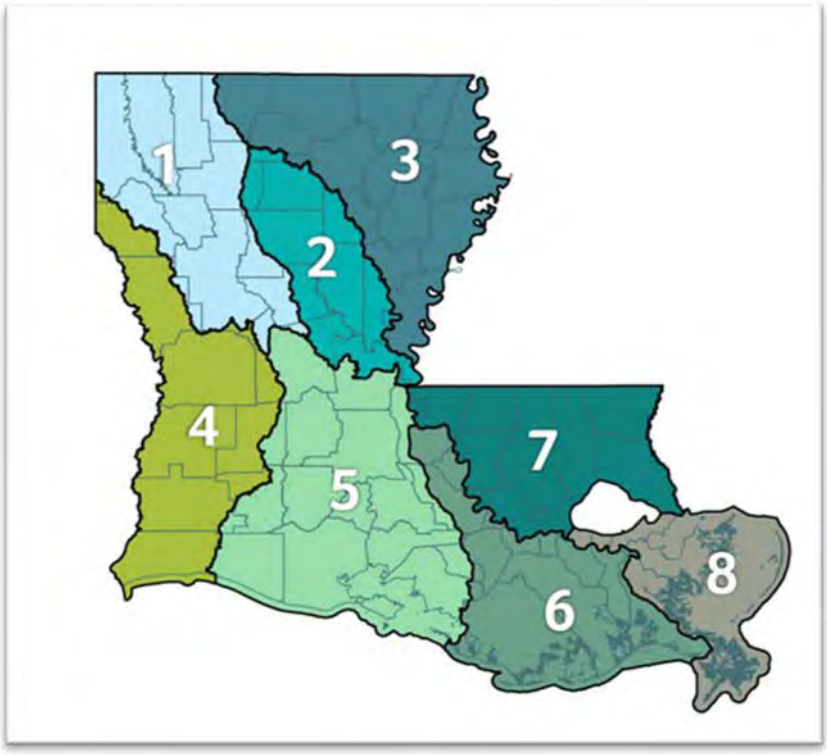


Figure 3-3 - Louisiana Watershed Regions
(Source Watershed.la.gov)

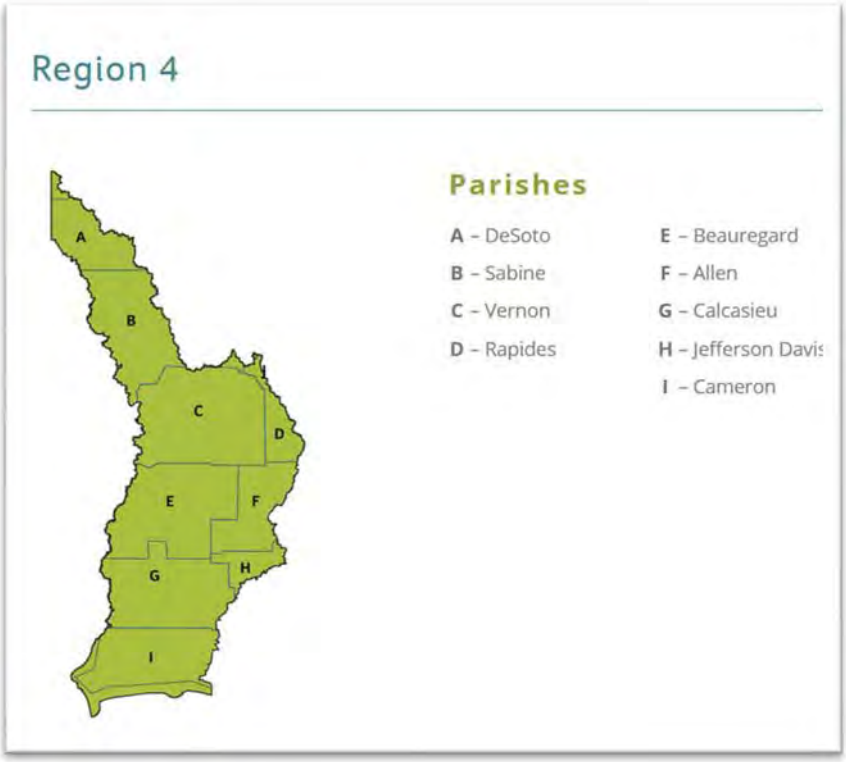


Figure 3-4 Region 4 Louisiana Watershed Region
(Source Watershed.la.gov)

Section 4: Mitigation Strategy

Introduction

Calcasieu 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.

An online public opinion survey was conducted of Calcasieu Parish residents between November and December 2020. The 10-question survey was completed by parish residents over the age of 18.

The survey was designed to capture public perceptions and opinions regarding natural hazards in Calcasieu 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.

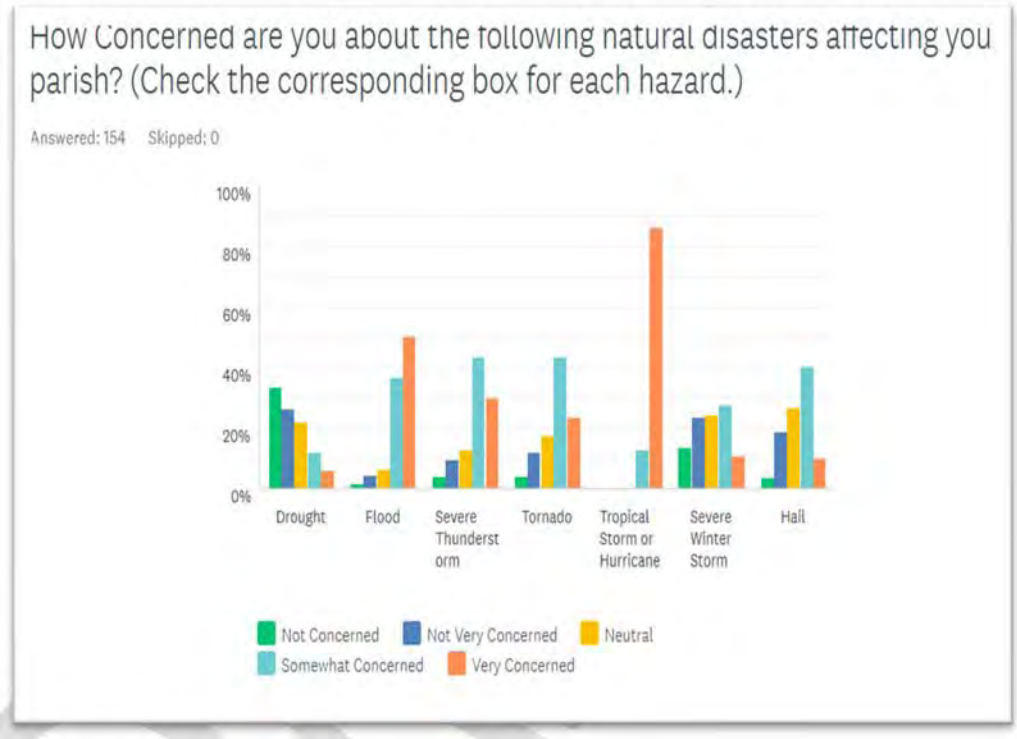
When asked to gauge from a list which categories were more susceptible to impacts caused by natural hazards, the top three categories selected were:

1. Human (Loss of life and/or injuries)
2. Infrastructure (Damage or loss of bridges, utilities, schools, etc.)
3. Economic (business closures and/or job losses)

	1	2	3	4	5	6	TOTAL	SCORE
Human (Loss of Life and/or injuries)	53.62% 74	5.80% 8	9.42% 13	6.52% 9	10.14% 14	14.49% 20	138	4.43
Economic (Business closures and/or job losses)	16.31% 23	32.62% 46	24.11% 34	14.18% 20	7.09% 10	5.67% 8	141	4.20
Infrastructure (Damage or loss of bridges, utilities, schools, etc.)	22.46% 31	31.88% 44	28.99% 40	10.14% 14	4.35% 6	2.17% 3	138	4.51
Culture/Historic (Damage or loss of libraries, museums, historic sites)	1.40% 2	4.90% 7	11.19% 16	18.88% 27	27.27% 39	36.36% 52	143	2.25
Environmental (Damage or loss of forests, pastureland, waterways, etc.)	7.59% 11	6.90% 10	11.72% 17	27.59% 40	31.03% 45	15.17% 22	145	2.87
Governance (Ability to maintain order and/or provide public amenities and services)	5.33% 8	17.33% 26	14.67% 22	21.33% 32	18.67% 28	22.67% 34	150	3.01

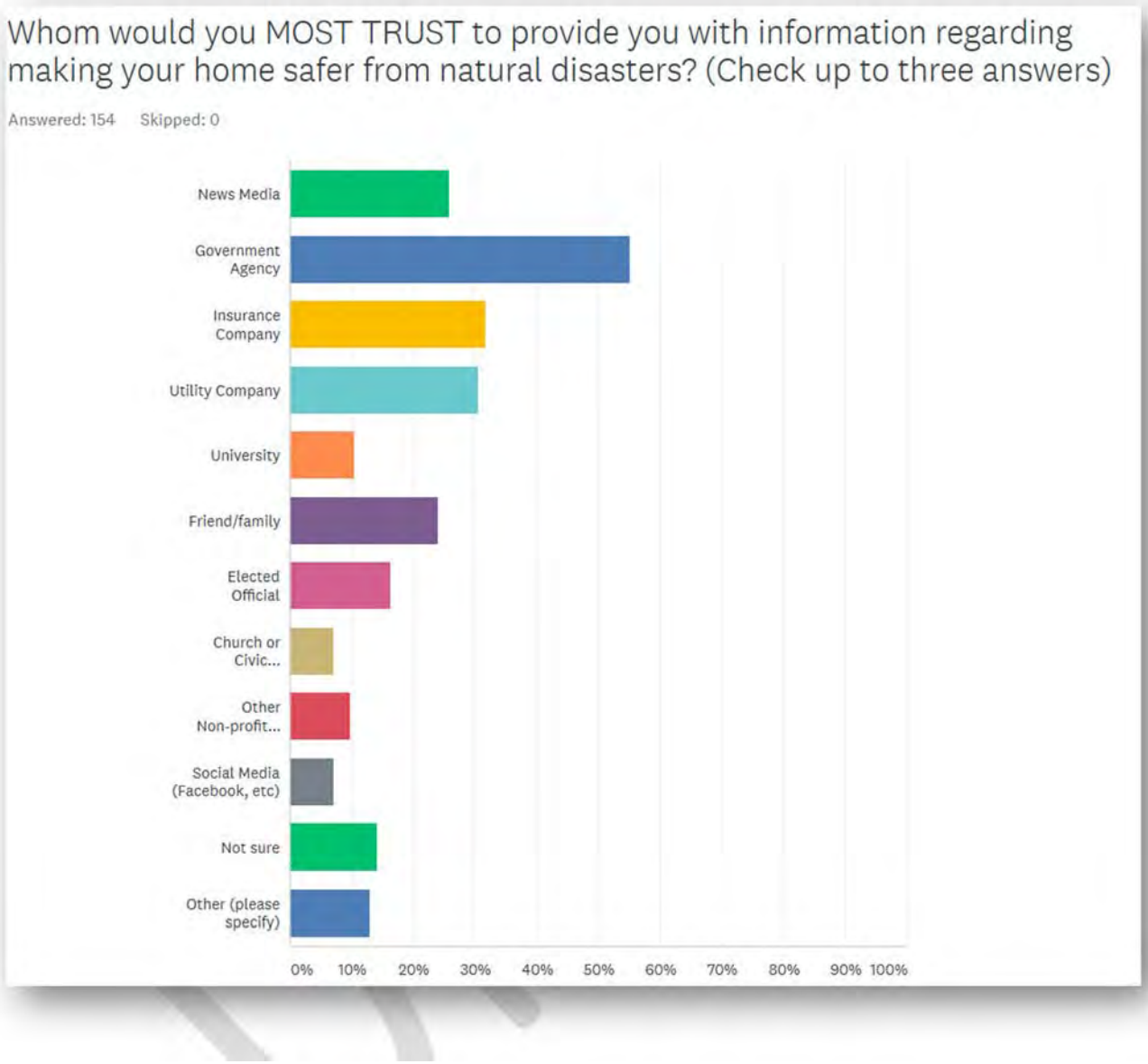
The survey results also indicated which natural disasters citizens were *most concerned* with being affected by in Calcasieu Parish. The top three natural disasters selected were:

1. Tropical Storm or Hurricanes
2. Flooding
3. Severe Thunderstorms



The online survey also showed a level of trust in the parish government for disaster related issues, further highlighting the collaborative relationship between citizen and government agencies. This indicated that the strategies and actions being implemented within the communities is trusted and important to citizens.

Calcasieu Parish reviewed and confirmed the goals, objectives, actions, and projects over the period of the hazard mitigation plan update process. The mitigation actions and projects in this 2020 Hazard Mitigation Plan Update are a product of analysis and review of the Calcasieu Parish Hazard Mitigation Plan Steering Committee The committee was presented a list of projects and actions, both new and from the 2015 plan, for review from October 2020 to December 2020.



During the virtual public meeting (due to Covid-19 restrictions) in October, the committee and participating jurisdictions provided a status of the projects from 2015 and the proposed actions for the 2020 update. There were discussions on the plan update, timeline and time provided for citizens to discuss each project with subject matter experts from the parish.

Committee members then submitted jurisdiction-specific projects based on feasibility for funding, ease of completion, and other community-specific factors. The actions were later prioritized.

This activity confirms that the goals and action items developed by the Calcasieu Parish Hazard Mitigation Plan Steering Committee are representative of the outlook of the community at

large. Full survey results can be found here:

https://www.surveymonkey.com/r/2ZT5MD3

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 focused on identifying and quantifying the risks faced by the residents and property owners in Calcasieu Parish from natural and manmade hazards. By articulating goals and objectives based on the previous plans, the risk assessment results, and the intent 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, Calcasieu 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.

Goals

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

The goals are as follows:

1. Reduce or prevent injury and loss of life
2. Reduce or prevent damage to property and material assets
3. Reduce or prevent future damage to critical facilities (fire, rescue, law enforcement, communications, command and control) essential for protection and public safety
4. Reduce or prevent future damage to special facilities, including schools, nursing homes, health care facilities, prisons, and historical and cultural resources
5. Reduce or prevent future damage to infrastructure, including stormwater conveyance structures, utility systems, pipelines, railroads, highways, bridges, and navigable waterways
6. Reduce or prevent future damage to commercial facilities
7. Reduce or prevent future damage to higher risk facilities that, if damaged, may result in significant loss of human life, damage to the environment, or significant harm to the local Economy. These facilities include hazardous material handling facilities, dams, flood control facilities, and other high security facilities

The Mitigation Action Plan focuses on actions to be taken by Calcasieu Parish and its jurisdictions. Each activity in the Mitigation Action Plan will be focused on helping the parish and its municipalities

in developing and funding projects that are not only cost effective, but also meet the other DMA 2000 criteria of environmental compatibility and technical feasibility.

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

2015 Mitigation Actions and Update on Previous Plan Actions

The Calcasieu Parish Hazard Mitigation Plan Steering Committee and participating jurisdictions each identified actions that would reduce and/or prevent future damage within Calcasieu 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 committee and the individual jurisdictions through 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.

In addition to the established and agreed upon parish and jurisdiction actions relative to the parish-wide goals, the action updates from the previous plan updates can be found in the table on the following pages. The Parish and participating jurisdictions agreed to remove or delete actions which funding was unavailable for, or actions that were low priorities and were not deemed necessary by the steering committee and jurisdictions to carry over.

Sine the last update, the Calcasieu Parish Police Jury implemented a drainage improvement and safe room project with FEMA Hazard Mitigation Grant Program funds. In addition, each year the CPPJ applied for and was awarded FEMA Flood Mitigaiton Assistance grants that avaerage $3M/annually. CPPJ implemented approximately twenty (20) residential mitigation projects annually since the previous harzard mitigation plan update. Municipalities inside the parish worked with CPPJ to identify potential residential mitigation locations and CPPJ applied for and implemented residential mitigation project across parish and municipal boundaries.

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 Calcasieu Parish and each jurisdiction 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.

Calcasieu Parish and the participating jurisdictions will implement and administer the identified actions based off 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.

Calcasieu Parish and the jurisdictions will implement and administer the identified actions based off the proposed timeframes and priorities for each action. There has not been any change to the communities' prioritization or preferences.

Unincorporated Calcasieu Parish Mitigation Actions

Action	Action Description	Anticipated Year of Completion	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
CP1 Critical Facility Retrofits/Hardening	Harden critical facilities to maintain use during and after storm events. Hardening will reduce damage from high winds and other hazard to ensure the critical infrastructure can be used and operable during or after storms.	2026	FEMA HMGP, Local	CPPJ Planning & Development; CPPJ Facilities Management Department	Tropical Cyclone, Thunderstorms, Winter Storms	New
CP2 Drainage Improvement	This will include increasing stormwater capacity through projects that increase capacity of existing drainage laterals, widen of channels, construct detention basins, and increase existing pump station capacity. Improving overall stormwater capacity and drainage 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.	2026	FEMA HMGP, FEMA BRIC, CDBG-DR, CDBG-MIT (LWI)	CPPJ Planning & Development & Public Works Departments; Drainage District #1; Drainage District #2	Flooding, Tropical Cyclone, Subsidence/coastal land loss	New
CP3 Mitigation of Severe Repetitive Loss, Repetitive Loss, Substantially Damaged, and Other Hazard Prone Structures	Elevation, acquisition-demolition, acquisition- relocations, and reconstruction of repetitive loss, severe repetitive loss, substantially damaged, and/or other hazard-prone properties.	2026	FEMA HMGP, FEMA BRIC, CDBG-DR, CDBG-MIT (LWI)	CPPJ Planning & Development	Flooding, Tropical Cyclone, Subsidence/coastal land loss	New
CP4 Safe Room Projects	Construction of a safe room(s) for first responders and critical employees to remain in the parish during an event.	2026	FEMA, Local	CPPJ Planning & Development	Tornado, Tropical Cyclone, Thunderstorms	New
CP5 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, tornadoes, wildfire, wildfire, drought, excessive heat, sinkholes, thunderstorms (lightning, high wind, hail), 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. Also promoting the use of NOAA "All Hazards" radios for early warning and post event information.	2026	FEMA, HUD, LWI, Local	Calcasieu Parish Office of Homeland Security and Emergency Preparedness	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive heat, Sinkholes, Thunderstorms (lightning, high wind, hail), Winter Storms, Subsidence/Coastal Land Loss	New
CP6 Properties at Risk	Conduct and complete a study to determine the effects of risks to parish properties and implement a campaign to alert affected citizens of magnitude potential and provide mitigation suggestions	2026	FEMA, Local, USACE	Calcasieu Parish Office of Homeland Security and Emergency Preparedness	Tropical Cyclone, Hail, Thunderstorms, Flooding, Tornado, Sinkhole, Wildfire, Subsidence/coastal land loss	New
CP7 Flood Proofing of Critical Facilities	Flood-proof critical facilities within the Parish to help promote continuation of critical services during a storm event	2026	FEMA, Local	CPPJ Planning & Development	Flooding, Tropical Cyclone	New
CP8 Water Acquisition and Distribution Plan	Work with local hospitals/water suppliers to develop and implement a water distribution plan for hospitals in the event of a storm. Benefits: helps assures that hospitals can be operable after storms.	2026	FEMA HMGP, Local	Calcasieu Parish Office of Homeland Security and Emergency Preparedness; Water Districts	Tropical Cyclone, Tornado, Flooding, Winter Storms, Excessive Heat, Drought	New
CP9 Community Shelter Construction	Construct or retrofit existing facility to be utilized as a community shelter for the public throughout the parish to shelter public during disasters.	2026	FEMA, HUD, Local	CPPJ OHSEP, Public Works	Flooding, Tropical Cyclone, winter storm, wildfire, tornado, excessive heat	New
CP10 NFIP Initiatives	Continue Calcasieu Parish's participation in the National Flood Insurance Program (NFIP). Identify and implement necessary actions and steps to further the participation of Calcasieu Parish in the NFIP and Community Rating System including but not limited to floodplain mapping, higher regulatory standards, protecting building utilities, stormwater management standards, drainage system maintenance, and flood warning programs.	2026	FEMA, LWI, Local	CPPJ Planning & Development	Flooding, Tropical Cyclone	New

Unincorporated Calcasieu Parish Mitigation Actions

Action	Action Description	Anticipated Year of Completion	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
CP11 Hardening Utilities	Hardening of utility infrastructure. This will included identifying systems most vulnerable during hazard and identifying effective ways to mitigate the utilities. This will allow these utilities to remain operable during hazardous conditions. Examples include hardening of power supply stations, water treatment facilities, sewer pump stations and communication lines.	2026	FEMA, HUD, Local	CPPJ OHSEP	Tropical Cyclone, Tornado, Wildfire, Winter Storms, Thunderstorms	New
CP12 Lightning Protection for Parish Facilities	Installation of lightning rods and surge protectors to facilities. Upgrade critical facilities database and communications systems including data back-up and surge protection to mitigate losses due to lightning strikes and electrical blackouts.	2026	FEMA, Local	CPPJ OHSEP, CPPJ Planning & Development	Thunderstorms	New
CP13 Wildfire Mitigation Plan	Develop and implement a regional interagency wildfire mitigation plan	2026	FEMA, Local	CPPJ OHSEP, Fire Districts	Wildfire	New
CP14 Install Emergency/ Hazard Warning System	Improve communication within the parish by purchasing, installing, and implementing warning systems. This will include interoperabie communications equipment and Incident Management Information Sharing Software. In addition, promoting the use of NOAA "All Hazards" radios for early warning and post event information.	2026	FEMA, Local	CPPJ OHSEP	Thunderstorms, Flooding, Tornado, Sinkhole, Tropical Cyclone, Drought	New
CP15 Hazard Mitigation Planning	Conduct Hazard Mitigation Planning efforts which will include developing a multi-jurisdictional Geographic Information System (GIS) database to support future hazard mitigation planning.	2026	FEMA, Local	CPPJ Planning and Development	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive heat, Sinkholes, Thunderstorms (lightning, high wind, hail), Winter Storms, Subsidence/Coastal Land Loss	New
CP16 Interoperable Communications Plan	Develop an interoperability/communications plan identifying resources and equipment needed to establish a single, interagency, mobile incident and communications command post.	2026	FEMA, Local	Calcasieu Parish Office of Homeland Security and Emergency Preparedness	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive heat, Sinkholes, Thunderstorms (lightning, high wind, hail), Winter Storms, Subsidence/Coastal Land Loss	New
CP17 Generator Installation	Purchase generators and install at critical facilities to continue essential operations parish wide during events.	2026	FEMA, HUD, Local	CPPJ OHSEP	Flooding, Tropical Cyclones, Wildfire, Winter Storms	New
CP18 Evacuation Initiatives	Conduct study of current evacuation routes, maps, and plans to create a revised parish wide evacuation plan. This action will include assessing areas of weakness discovered during Hurricanes Laura and Delta, identifying and constructing infrastructure needed to improve evacuation routes, as well as developing new evacuation route communication options to implement during an event such as new signage and public communication capabilities.	2026	HMGP, Local	CPPJ OHSEP, CPPJ Public Works	Tropical Cyclone	New
CP18 Tornado Mitigation Initiatives	Provide community facilities and government buildings with a tornado preparation checklist. Require each facility to update their existing tornado response plan in accordance with the list and associated recommendations.	2026	FEMA, FEMA 5 percent initiative	CPPJ OHSEP	Tornado	New
CP19 Wildfire Ordinance	Strengthen penalties and improve enforcement capabilities of burn ban ordinance.	2026	FEMA, Local	CPPJ OHSEP	Wildfire	New

Unincorporated Calcasieu Parish Mitigation Actions

Action	Action Description	Anticipated Year of Completion	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
CP20 Continuity of Operations for Parish, Cooperative Agreements, Communications Equipment	Purchase of communications equipment for emergency response personnel and parish buildings so that day to day operations may continue during events to protect the life and safety of residents	2026	FEMA, Local	CPPJ OHSEP	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive heat, Sinkholes, Thunderstorms (lightning, high wind, hail), Winter Storms, Subsidence/Coastal Land Loss	New
CP 21 Increase Open Space Areas	Acquire open space through direct acquisition of property or through conservation easements. This will provide for and/or ensure pervious surface areas to allow for proper drainage and reduce flooding	2026	FEMA, HUD, Local	CPPJ Planning & Development	Flooding	New

City of DeQuincy Mitigation Actions

Action	Action Description	Anticipated Year of Completion	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
D1 Critical Facility Retrofits/Hardening	Harden critical facilities to maintain use during and after storm events. Hardening will reduce damage from high winds and other hazard to ensure the critical infrastructure can be used and operable during or after storms.	2026	FEMA HMGP, Local	Dequincy City Planner	Tropical Cyclone, Thunderstorms, Winter Storms	New
D2 Drainage Improvement	This will include increasing stormwater capacity through projects that increase capacity of existing drainage laterals, widen of channels, construct detention basins, and increase existing pump station capacity. Improving overall stormwater capacity and drainage 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.	2026	FEMA HMGP, FEMA BRIC, CDBG-DR, CDBG-MIT (LWI)	Dequincy City Planner	Flooding, Tropical Cyclone	New
D3 Mitigation of Severe Repetitive Loss, Repetitive Loss, Substantially Damaged, and Other Hazard Prone Structures	Elevation, acquisition-demolition, acquisition- relocations, and reconstruction of repetitive loss, severe repetitive loss, substantially damaged, and/or other hazard-prone properties.	2026	FEMA HMGP, FEMA BRIC, CDBG-DR, CDBG-MIT (LWI)	Dequincy City Planner	Flooding, Tropical Cyclone	New
D4 Safe Room Projects	Construction of a safe room(s) for first responders and critical employees to remain in the parish during an event.	2026	FEMA, Local	Dequincy City Planner	Tornado, Tropical Cyclone, Thunderstorms	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, tornadoes, wildfire, wildfire, drought, excessive heat, sinkholes, thunderstorms (lightning, high wind, hail), 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. Also promoting the use of NOAA "All Hazards" radios for early warning and post event information.	2026	FEMA, HUD, LWI, Local	Dequincy City Planner	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive heat, Thunderstorms (lightning, high wind, hail), Winter Storms,	New
D6 Flood Proofing of Critical Facilities	Flood-proof critical facilities within the city to help promote continuation of critical services during a storm event	2026	FEMA, Local	Dequincy City Planner	Flooding, Tropical Cyclone	New
D7 Water Acquisition and Distribution Plan	Develop a water acquisition and distribution plan to implement during an event to ensure water supply is able to meet demand.	2026	FEMA HMGP, Local	Dequincy City Planner	Tropical Cyclone, Tornado, Flooding, Winter Storms, Excessive Heat, Drought	New
D8 NFIP Initiatives	Continue DeQuincy's participation in the National Flood Insurance Program (NFIP). Identify and implement necessary actions and steps to further the participation of Calcasieu Parish in the NFIP and Community Rating System including but not limited to floodplain mapping, higher regulatory standards, protecting building utilities, stormwater management standards, drainage system maintenance, and flood warning programs.	2026	FEMA, LWI, Local	Dequincy City Planner	Flooding, Tropical Cyclone	New
D9 Hardening Public Utilities	Hardening of utility infrastructure. This will included identifying systems most vulnerable during hazard and identifying effective ways to mitigate the utilities. This will allow these utilities to remain operable during hazardous conditions. Examples include hardening of power supply stations, water treatment facilities, sewer pump stations and communication lines.	2026	FEMA, HUD, Local	Dequincy City Planner	Tropical Cyclone, Tornado, Wildfire, Winter Storms, Thunderstorms	New
D10 Install Emergency/Hazard Warning System	Improve communication within the parish by purchasing, installing, and implementing warning systems. This will include interoperabie communications equipment and Incident Management Information Sharing Software. In addition, promoting the use of NOAA "All Hazards" radios for early warning and post event information.	2026	FEMA, Local	Dequincy City Planner	Thunderstorms, Flooding, Tornado, Tropical Cyclone, Winter storm, Drought	New
D11 Hazard Mitigation Planning	Conduct Hazard Mitigation Planning efforts which will include developing a multi-jurisdictional Geographic Information System (GIS) database to support future hazard mitigation planning.	2026	FEMA, Local	Dequincy City Planner	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive heat, Thunderstorms (lightning, high wind, hail), Winter Storms	New
D12 Generator Installation	Purchase generators and install at critical facilities to continue essential operations during events.	2026	FEMA, HUD, Local	Dequincy City Planner	Flooding, Tropical Cyclones, Wildfire, Winter Storms	New
D13 Community Shelter Construction	Set up of community shelters for the public in the City Of Lake Charles to shelter public during disasters.	2026	FEMA, Local	Dequincy City Planner	Flooding, Tropical Cyclone, winter storm, wildfire, tornado, excessive heat	New
D14 Wildfire Ordinance	Strengthen penalties and improve enforcement capabilities of burn ban ordinance.	2026	FEMA, Local	Dequincy City Planner	Wildfire	New

City of Sulphur Mitigation Actions

Action	Action Description	Anticipated Year of Completion	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
S1 Critical Facility Retrofits/Hardening	Harden critical facilities to maintain use during and after storm events. Hardening will reduce damage from high winds and other hazard to ensure the critical infrastructure can be used and operable during or after storms.	2026	FEMA HMGP, Local	City of Sulphur Public Works	Tropical Cyclone, Thunderstorms, Winter Storms	New
S2 Drainage Improvement	This will include increasing stormwater capacity through projects that increase capacity of existing drainage laterals, widen of channels, construct detention basins, and increase existing pump station capacity. Improving overall stormwater capacity and drainage 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.	2026	FEMA HMGP, FEMA BRIC, CDBG-DR, CDBG-MIT (LWI)	City of Sulphur Public Works	Flooding, Tropical Cyclone, Subsidence/coastal land loss	New
S3 Mitigation of Severe Repetitive Loss, Repetitive Loss, Substantially Damaged, and Other Hazard Prone Structures	Elevation, acquisition-demolition, acquisition- relocations, and reconstruction of repetitive loss, severe repetitive loss, substantially damaged, and/or other hazard-prone properties.	2026	FEMA HMGP, FEMA BRIC, CDBG-DR, CDBG-MIT (LWI)	City of Sulphur Public Works	Flooding, Tropical Cyclone, Subsidence/coastal land loss	New
S4 Safe Room Projects	Construction of a safe room(s) for first responders and critical employees to remain in the parish during an event.	2026	FEMA, Local	City of Sulphur Public Works	Tornado, Tropical Cyclone, Thunderstorms	New
S5 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, tornadoes, wildfire, wildfire, drought, excessive heat, sinkholes, thunderstorms (lightning, high wind, hail), 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. Also promoting the use of NOAA "All Hazards" radios for early warning and post event information.	2026	FEMA, HUD, LWI, Local	City of Sulphur Permit Department	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive heat, Sinkholes, Thunderstorms (lightning, high wind, hail), Winter Storms, Subsidence/Coastal Land Loss	New
S6 Flood Proofing of Critical Facilities	Flood-proof critical facilities within the city to help promote continuation of critical services during a storm event	2026	FEMA, Local	City of Sulphur Public Works	Flooding, Tropical Cyclone,	New
S7 Water Acquisition and Distribution Plan	Develop a water acquisition and distribution plan to implement during an event to ensure water supply is able to meet demand.	2026	FEMA HMGP, Local	City of Sulphur Public Works	Tropical Cyclone, Tornado, Flooding, Winter Storms, Excessive Heat, Drought	New
S8 NFIP Initiatives	Continue Westlake's participation in the National Flood Insurance Program (NFIP). Identify and implement necessary actions and steps to further the participation of Calcasieu Parish in the NFIP and Community Rating System including but not limited to floodplain mapping, higher regulatory standards, protecting building utilities, stormwater management standards, drainage system maintenance, and flood warning programs.	2026	FEMA, LWI, Local	City of Sulphur Permit Department	Flooding, Tropical Cyclone	New
S9 Hardening Public Utilities	Hardening of utility infrastructure. This will included identifying systems most vulnerable during hazard and identifying effective ways to mitigate the utilities. This will allow these utilities to remain operable during hazardous conditions. Examples include hardening of power supply stations, water treatment facilities, sewer pump stations and communication lines.	2026	FEMA, HUD, Local	City of Sulphur Public Works	Tropical Cyclone, Tornado, Wildfire, Winter Storms, Thunderstorms	New
S10 Install Emergency/Hazard Warning System	Improve communication within the parish by purchasing, installing, and implementing warning systems. This will include interoperabie communications equipment and Incident Management Information Sharing Software. In addition, promoting the use of NOAA "All Hazards" radios for early warning and post event information.	2026	FEMA, Local	City of Sulphur Public Works	Thunderstorms, Flooding, Tornado, Sinkhole, Tropical Cyclone, Winter storm, Drought, Sinkhold	New
S11 Hazard Mitigation Planning	Conduct Hazard Mitigation Planning efforts which will include developing a multi-jurisdictional Geographic Information System (GIS) database to support future hazard mitigation planning.	2026	FEMA, Local	City of Sulphur Public Works	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive heat, Sinkholes, Thunderstorms (lightning, high wind, hail), Winter Storms, Subsidence/Coastal Land Loss	New
S12 Generator Installation	Purchase generators and install at critical facilities to continue essential operations during events.	2026	FEMA, HUD, Local	City of Sulphur Public Works	Flooding, Tropical Cyclones, Wildfire, Winter Storms	New
S13 Wildfire Ordinance	Strengthen penalties and improve enforcement capabilities of burn ban ordinance.	2026	FEMA, Local	City of Sulphur Permit Department	Wildfire	New
S14 Lightning Protection for Parish Facilities	Installation of lightning rods and surge protectors to facilities. Upgrade critical facilities database and communications systems including data back-up and surge protection to mitigate losses due to lightning strikes and electrical blackouts.	2026	FEMA, Local	City of Sulphur Public Works	Thunderstorms	New
S15 Evacuation Initiatives	Conduct study of current evacuation routes, maps, and plans to create a revised parish wide evacuation plan. This action will include assessing areas of weakness discovered during Hurricanes Laura and Delta, identifying and constructing infrastructure needed to improve evacuation routes, as well as developing new evacuation route communication options to implement during an event such as new signage and public communication capabilities.	2026	HMGP, Local	City of Sulphur Public Works	Tropical Cyclone	New
S16 Tornado Mitigation Initiatives	Provide community facilities and government buildings with a tornado preparation checklist. Require each facility to update their existing tornado response plan in accordance with the list and associated recommendations.	2026	FEMA, FEMA 5 percent initiative	City of Sulphur Public Works	Tornado	New
S17 Community Shelter Construction	Construct or retrofit existing facility to be utilized as a community shelter for the public throughout the parish to shelter public during disasters.	2026	FEMA, HUD, Local	City of Sulphur Public Works	Flooding, Tropical Cyclone, winter storm, wildfire, tornado, excessive heat	New

Town of Vinton Mitigation Actions

Action	Action Description	Anticipated Year of Completion	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
V1 Critical Facility Retrofits/Hardening	Harden critical facilities to maintain use during and after storm events. Hardening will reduce damage from high winds and other hazard to ensure the critical infrastructure can be used and operable during or after storms.	2026	FEMA HMGP, Local	City of Vinton Public Works	Tropical Cyclone, Thunderstorms, Winter Storms	New
V2 Drainage Improvement	This will include increasing stormwater capacity through projects that increase capacity of existing drainage laterals, widen of channels, construct detention basins, and increase existing pump station capacity. Improving overall stormwater capacity and drainage 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.	2026	FEMA HMGP, FEMA BRIC, CDBG-DR, CDBG-MIT (LWI)	City of Vinton Public Works	Flooding, Tropical Cyclone, Subsidence/coastal land loss	New
V3 Mitigation of Severe Repetitive Loss, Repetitive Loss, Substantially Damaged, and Other Hazard Prone Structures	Elevation, acquisition-demolition, acquisition- relocations, and reconstruction of repetitive loss, severe repetitive loss, substantially damaged, and/or other hazard-prone properties.	2026	FEMA HMGP, FEMA BRIC, CDBG-DR, CDBG-MIT (LWI)	City of Vinton Public Works	Flooding, Tropical Cyclone, Subsidence/coastal land loss	New
V4 Safe Room Projects	Construction of a safe room(s) for first responders and critical employees to remain in the parish during an event.	2026	FEMA, Local	City of Vinton Public Works	Tornado, Tropical Cyclone, Thunderstorms	New
V5 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, tornadoes, wildfire, wildfire, drought, excessive heat, sinkholes, thunderstorms (lightning, high wind, hail), 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. Also promoting the use of NOAA "All Hazards" radios for early warning and post event information.	2026	FEMA, HUD, LWI, Local	City of Vinton Permit Department	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive heat, Sinkholes, Thunderstorms (lightning, high wind, hail), Winter Storms, Subsidence/Coastal Land Loss	New
V6 Flood Proofing of Critical Facilities	Flood-proof critical facilities within the city to help promote continuation of critical services during a storm event	2026	FEMA, Local	City of Vinton Public Works	Flooding, Tropical Cyclone,	New
V7 Water Acquisition and Distribution Plan	Develop a water acquisition and distribution plan to implement during an event to ensure water supply is able to meet demand.	2026	FEMA HMGP, Local	City of Vinton Public Works	Tropical Cyclone, Tornado, Flooding, Winter Storms, Excessive Heat, Drought	New
V8 NFIP Initiatives	Continue Westlake's participation in the National Flood Insurance Program (NFIP). Identify and implement necessary actions and steps to further the participation of Calcasieu Parish in the NFIP and Community Rating System including but not limited to floodplain mapping, higher regulatory standards, protecting building utilities, stormwater management standards, drainage system maintenance, and flood warning programs.	2026	FEMA, LWI, Local	City of Vinton Public Works	Flooding, Tropical Cyclone	New
V9 Hardening Public Utilities	Hardening of utility infrastructure. This will included identifying systems most vulnerable during hazard and identifying effective ways to mitigate the utilities. This will allow these utilities to remain operable during hazardous conditions. Examples include hardening of power supply stations, water treatment facilities, sewer pump stations and communication lines.	2026	FEMA, HUD, Local	City of Vinton Public Works	Tropical Cyclone, Tornado, Wildfire, Winter Storms, Thunderstorms	New
V10 Install Emergency / Hazard Warning System	Improve communication within the parish by purchasing, installing, and implementing warning systems. This will include interoperabie communications equipment and Incident Management Information Sharing Software. In addition, promoting the use of NOAA "All Hazards" radios for early warning and post event information.	2026	FEMA, Local	City of Vinton Public Works	Thunderstorms, Flooding, Tornado, Sinkhole, Tropical Cyclone, Winter storm, Drought, Sinkholes	New
V11 Hazard Mitigation Planning	Conduct Hazard Mitigation Planning efforts which will include developing a multi-jurisdictional Geographic Information System (GIS) database to support future hazard mitigation planning.	2026	FEMA, Local	City of Vinton Public Works	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive heat, Sinkholes, Thunderstorms (lightning, high wind, hail), Winter Storms, Subsidence/Coastal Land Loss	New
V12 Generator Installation	Purchase generators and install at critical facilities to continue essential operations during events.	2026	FEMA, HUD, Local	City of Vinton Public Works	Flooding, Tropical Cyclones, Wildfire, Winter Storms	New
V13 Wildfire Ordinance	Strengthen penalties and improve enforcement capabilities of burn ban ordinance.	2026	FEMA, Local	City of Vinton Public Works	Wildfire	New
V14 Lightning Protection for Parish Facilities	Installation of lightning rods and surge protectors to facilities. Upgrade critical facilities database and communications systems including data back-up and surge protection to mitigate losses due to lightning strikes and electrical blackouts.	2026	FEMA, Local	City of Vinton Public Works	Thunderstorms	New
V15 Evacuation Initiatives	Conduct study of current evacuation routes, maps, and plans to create a revised parish wide evacuation plan. This action will include assessing areas of weakness discovered during Hurricanes Laura and Delta, identifying and constructing infrastructure needed to improve evacuation routes, as well as developing new evacuation route communication options to implement during an event such as new signage and public communication capabilities.	2026	HMGP, Local	City of Vinton Public Works	Tropical Cyclone	New
V16 Tornado Mitigation Initiatives	Provide community facilities and government buildings with a tornado preparation checklist. Require each facility to update their existing tornado response plan in accordance with the list and associated recommendations.	2026	FEMA, FEMA 5 percent initiative	City of Vinton Public Works	Tornado	New
V17 Community Shelter Construction	Construct or retrofit existing facility to be utilized as a community shelter for the public throughout the parish to shelter public during disasters.	2026	FEMA, HUD, Local	City of Vinton Public Works	Flooding, Tropical Cyclone, winter storm, wildfire, tornado, excessive heat	New

City of Westlake Mitigation Actions

Action	Action Description	Anticipated Year of Completion	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
W1 Critical Facility Retrofits/Hardening	Harden critical facilities to maintain use during and after storm events. Hardening will reduce damage from high winds and other hazard to ensure the critical infrastructure can be used and operable during or after storms.	2026	FEMA HMGP, Local	City of Westlake Public Works	Tropical Cyclone, Thunderstorms, Winter Storms	New
W2 Drainage Improvement	This will include increasing stormwater capacity through projects that increase capacity of existing drainage laterals, widen of channels, construct detention basins, and increase existing pump station capacity. Improving overall stormwater capacity and drainage 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.	2026	FEMA HMGP, FEMA BRIC, CDBG-DR, CDBG-MIT (LWI)	City of Westlake Public Works	Flooding, Tropical Cyclone, Subsidence/coastal land loss	New
W3 Mitigation of Severe Repetitive Loss, Repetitive Loss, Substantially Damaged, and Other Hazard Prone Structures	Elevation, acquisition-demolition, acquisition- relocations, and reconstruction of repetitive loss, severe repetitive loss, substanially damaged, and/or other hazard-prone properties.	2026	FEMA HMGP, FEMA BRIC, CDBG-DR, CDBG-MIT (LWI)	City of Westlake Public Works	Flooding, Tropical Cyclone, Subsidence/coastal land loss	New
W4 Safe Room Projects	Construction of a safe room(s) for first responders and critical employees to remain in the parish during an event.	2026	FEMA, Local	City of Westlake Public Works	Tornado, Tropical Cyclone, Thunderstorms	New
W5 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, tornadoes, wildfire, wildfire, drought, excessive heat, sinkholes, thunderstorms (lightning, high wind, hail), 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. Also promoting the use of NOAA "All Hazards" radios for early warning and post event information.	2026	FEMA, HUD, LWI, Local	City of Westlake Permit Department	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive heat, Sinkholes, Thunderstorms (lightning, high wind, hail), Winter Storms,Subsidence/Coastal Land Loss	New
W6 Flood Proofing of Critical Facilities	Flood-proof critical facilities within the city to help promote continuation of critical services during a storm event	2026	FEMA, Local	City of Westlake Public Works	Flooding, Tropical Cyclone,	New
W7 Water Acquisition and Distribution Plan	Devleop a water acquisition and distribution plan to implement during an event to ensure water supply is able to meet demand.	2026	FEMA HMGP, Local	City of Westlake Public Works	Tropical Cyclone, Tornado, Flooding, Winter Storms, Excessive Heat, Drought	New
W8 NFIP Initiatives	Continue Westlake's participation in the National Flood Insurance Program (NFIP). Identify and implement necessary actions and steps to further the participation of Calcasieu Parish in the NFIP and Community Rating System including but not limited to floodplain mapping, higher regulatory standards, protecting building utilities, stormwater management standards, drainage system maintenance, and flood warning programs.	2026	FEMA, LWI, Local	City of Westlake Permits Department	Flooding, Tropical Cyclone	New
W9 Hardening Public Utilities	Hardening of utility infrastructure. This will included identifying systems most vulnerable during hazard and identifying effective ways to mitigate the utilities. This will allow these utilities to remain operable during hazardous conditions. Examples include hardening of power supply stations, water treatment facitlities, sewer pump stations and communication lines.	2026	FEMA, HUD, Local	City of Westlake Public Works	Tropical Cyclone, Tornado, Wildfire, Winter Storms, Thunderstorms	New
W10 Install Emergency / Hazard Warning System	Improve communication within the parish by purchasing, installing, and implementing warning systems. This will include interoperabie communications equipment and Incident Management Information Sharing Software. In addition, promoting the use of NOAA "All Hazards" radios for early warning and post event information.	2026	FEMA, Local	City of Westlake Public Works	Thunderstorms, Flooding, Tornado, Sinkhole, Tropical Cyclone, Winter storm, Drought, Sinkholes	New
W11 Hazard Mitigation Planning	Conduct Hazard Mitigation Planning efforts which will include developing a multi-jurisdictional Geographic Information System (GIS) database to support future hazard mitigation planning.	2026	FEMA, Local	City of Westlake Public Works	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive heat, Sinkholes, Thunderstorms (lightning, high wind, hail), Winter Storms,Subsidence/Coastal Land Loss	New
W12 Generator Installation	Purchase generators and install at critical facilities to continue essential operations during events.	2026	FEMA, HUD, Local	City of Westlake Public Works	Flooding, Tropical Cyclones, Wildfire, Winter Storms	New
W13 Wildfire Ordinance	Strengthen penalties and improve enforcement capabilities of burn ban ordinance.	2026	FEMA, Local	City of Westlake Permits Department	Wildfire	New
W14 Lightning Protection for Parish Facilities	Installation of lightning rods and surge protectors to facilities. Upgrade critical facilities database and communications systems including data back-up and surge protection to mitigate losses due to lightning strikes and electrical blackouts.	2026	FEMA, Local	City of Westlake Public Works	Thunderstorms	New
W15 Evacuation Initiatives	Conduct study of current evacuation routes, maps, and plans to create a revised parishwide evacuation plan. This action will include assessing areas of weakness discovered during Hurricanes Laura and Delta, identifying and constructing infrastructure needed to improve evacuation routes, as well as developing new evacuation route communication options to implement during an event such as new signage and public communication capabilities.	2026	HMGP, Local	City of Westlake Public Works	Tropical Cyclone	New
W16 Tornado Mitigation Initiatives	Provide community facilities and government buildings with a tornado preparation checklist. Require each facility to update their existing tornado response plan in accordance with the list and associated recommendations.	2026	FEMA, FEMA 5 percent initiative	City of Westlake Public Works	Tornado	New
W17 Community Shelter Construction	Construct or retrofit existing facility to be utilized as a community shelter for the public throughout the parish to shelter public during disasters.	2026	FEMA, HUD, Local	City of Westlake Public Works	Flooding, Tropical Cyclone, winter storm, wildfire, tornado, excessive heat	New

Town of Iowa Mitigation Actions

Action	Action Description	Anticipated Year of Completion	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
I1 Critical Facility Retrofits/Hardening	Harden critical facilities to maintain use during and after storm events. Hardening will reduce damage from high winds and other hazard to ensure the critical infrastructure can be used and operable during or after storms.	2026	FEMA HMGP, Local	City of Iowa Public Works	Tropical Cyclone, Thunderstorms, Winter Storms	New
I2 Drainage Improvement	This will include increasing stormwater capacity through projects that increase capacity of existing drainage laterals, widen of channels, construct detention basins, and increase existing pump station capacity. Improving overall stormwater capacity and drainage 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.	2026	FEMA HMGP, FEMA BRIC, CDBG-DR, CDBG-MIT (LWI)	City of Iowa Public Works	Flooding, Tropical Cyclone	New
I3 Mitigation of Severe Repetitive Loss, Repetitive Loss, Substantially Damaged, and Other Hazard Prone Structures	Elevation, acquisition-demolition, acquisition- relocations, and reconstruction of repetitive loss, severe repetitive loss, substanially damaged, and/or other hazard-prone properties.	2026	FEMA HMGP, FEMA BRIC, CDBG-DR, CDBG-MIT (LWI)	City of Iowa Public Works	Flooding, Tropical Cyclone, Subsidence/coastal land loss	New
I4 Safe Room Projects	Construction of a safe room(s) for first responders and critical employees to remain in the parish during an event.	2026	FEMA, Local	City of Iowa Public Works	Tornado, Tropical Cyclone, Thunderstorms	New
I5 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, tornadoes, wildfire, wildfire, drought, excessive heat, sinkholes, thunderstorms (lightning, high wind, hail), 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. Also promoting the use of NOAA "All Hazards" radios for early warning and post event information.	2026	FEMA, HUD, LWI, Local	City of Iowa Permit Department	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive heat, Sinkholes, Thunderstorms (lightning, high wind, hail), Winter Storms	New
I6 Flood Proofing of Critical Facilities	Flood-proof critical facilities within the city to help promote continuation of critical services during a storm event	2026	FEMA, Local	City of Iowa Public Works	Flooding, Tropical Cyclone,	New
I7 Water Acquisition and Distribution Plan	Devleop a water acquisition and distribution plan to implement during an event to ensure water supply is able to meet demand.	2026	FEMA HMGP, Local	City of Iowa Public Works	Tropical Cyclone, Tornado, Flooding, Winter Storms, Excessive Heat, Drought	New
I8 NFIP Initiatives	Continue Westlake's participation in the National Flood Insurance Program (NFIP). Identify and implement necessary actions and steps to further the participation of Calcasieu Parish in the NFIP and Community Rating System including but not limited to floodplain mapping, higher regulatory standards, protecting building utilities, stormwater management standards, drainage system maintenance, and flood warning programs.	2026	FEMA, LWI, Local	City of Iowa Permit Department	Flooding, Tropical Cyclone	New
I9 Hardening Public Utilities	Hardening of utility infrastructure. This will included identifying systems most vulnerable during hazard and identifying effective ways to mitigate the utilities. This will allow these utilities to remain operable during hazardous conditions. Examples include hardening of power supply stations, water treatment facitlities, sewer pump stations and communication lines.	2026	FEMA, HUD, Local	City of Iowa Public Works	Tropical Cyclone, Tornado, Wildfire, Winter Storms, Thunderstorms	New
I10 Install Emergency / Hazard Warning System	Improve communication within the parish by purchasing, installing, and implementing warning systems. This will include interoperabie communications equipment and Incident Management Information Sharing Software. In addition, promoting the use of NOAA "All Hazards" radios for early warning and post event information.	2026	FEMA, Local	City of Iowa Public Works	Thunderstorms, Flooding, Tornado, Sinkhole, Tropical Cyclone, Winter storm Drought, Sinkhole	New
I11 Hazard Mitigation Planning	Conduct Hazard Mitigation Planning efforts which will include developing a multi-jurisdictional Geographic Information System (GIS) database to support future hazard mitigation planning.	2026	FEMA, Local	City of Iowa Public Works	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive heat, Sinkholes, Thunderstorms (lightning, high wind, hail), Winter Storms	New
I12 Generator Installation	Purchase generators and install at critical facilities to continue essential operations during events.	2026	FEMA, HUD, Local	City of Iowa Public Works	Flooding, Tropical Cyclones, Wildfire, Winter Storms	New
I13 Wildfire Ordinance	Strengthen penalties and improve enforcement capabilities of burn ban ordinance.	2026	FEMA, Local	City of Iowa Permit Department	Wildfire	New
I14 Lightning Protection for Parish Facilities	Installation of lightning rods and surge protectors to facilities. Upgrade critical facilities database and communications systems including data back-up and surge protection to mitigate losses due to lightning strikes and electrical blackouts.	2026	FEMA, Local	City of Iowa Public Works	Thunderstorms	New
I15 Evacuation Initiatives	Conduct study of current evacuation routes, maps, and plans to create a revised parishwide evacuation plan. This action will include assessing areas of weakness discovered during Hurricanes Laura and Delta, identifying and constructing infrastructure needed to improve evacuation routes, as well as developing new evacuation route communication options to implement during an event such as new signage and public communication capabilities.	2026	HMGP, Local	City of Iowa Public Works	Tropical Cyclone	New
I16 Tornado Mitigation Initiatives	Provide community facilities and government buildings with a tornado preparation checklist. Require each facility to update their existing tornado response plan in accordance with the list and associated recommendations.	2026	FEMA, FEMA 5 percent initiative	City of Iowa Public Works	Tornado	New
I17 Community Shelter Construction	Construct or retrofit existing facility to be utilized as a community shelter for the public throughout the parish to shelter public during disasters.	2026	FEMA, HUD, Local	City of Iowa Public Works	Flooding, Tropical Cyclone, winter storm, wildfire, tornado, excessive heat	New

City of Lake Charles Mitigation Actions

Action	Action Description	Anticipated Year of Completion	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
LC1 Critical Facility Retrofits/Hardening	Harden critical facilities to maintain use during and after storm events. Hardening will reduce damage from high winds and other hazard to ensure the critical infrastructure can be used and operable during or after storms.	2026	FEMA HMGP, Local	City of Lake Charles Planning & Development	Tropical Cyclone, Thunderstorms, Winter Storms	New
LC2 Drainage Improvement	This will include increasing stormwater capacity through projects that increase capacity of existing drainage laterals, widen of channels, construct detention basins, and increase existing pump station capacity. Improving overall stormwater capacity and drainage 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.	2026	FEMA HMGP, FEMA BRIC, CDBG-DR, CDBG-MIT (LWI)	City of Lake Charles Planning & Development	Flooding, Tropical Cyclone, Subsidence/coastal land loss	New
LC3 Mitigation of Severe Repetitive Loss, Repetitive Loss, Substantially Damaged, and Other Hazard Prone Structures	Elevation, acquisition-demolition, acquisition- relocations, and reconstruction of repetitive loss, severe repetitive loss, substantially damaged, and/or other hazard-prone properties.	2026	FEMA HMGP, FEMA BRIC, CDBG-DR, CDBG-MIT (LWI)	City of Lake Charles Planning & Development	Flooding, Tropical Cyclone, Subsidence/coastal land loss	New
LC4 Safe Room Projects	Construction of a safe room(s) for first responders and critical employees to remain in the parish during an event.	2026	FEMA, Local	City of Lake Charles Planning & Development	Tornado, Tropical Cyclone, Thunderstorms	New
LC5 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, tornadoes, wildfire, wildfire, drought, excessive heat, sinkholes, thunderstorms (lightning, high wind, hail), 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. Also promoting the use of NOAA "All Hazards" radios for early warning and post event information.	2026	FEMA, HUD, LWI, Local	City of Lake Charles Planning & Development	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive heat, Sinkholes, Thunderstorms (lightning, high wind, hail), Winter Storms, Subsidence/Coastal Land Loss	New
LC6 Lift Station Communication Upgrades	Automate sewer lift station and upgrade system to allow for remote monitoring. This provides ability to control and monitor sewer pumps effectively during an event which will prevent damage from sewer backups.	2026	FEMA, Local	City of Lake Charles Public Works	Flooding, Tropical Cyclone, winter storm, thunderstorm	New
LC7 Flood Proofing of Critical Facilities	Flood-proof critical facilities within the Parish to help promote continuation of critical services during a storm event	2026	FEMA, Local	City of Lake Charles Planning & Development	Flooding, Tropical Cyclone, Subsidence/coastal land loss	New
LC8 Water Acquisition and Distribution Plan	Develop a water acquisition and distribution plan to implement during an event to ensure water supply is able to meet demand.	2026	FEMA HMGP, Local	City of Lake Charles Planning & Development	Tropical Cyclone, Tornado, Flooding, Winter Storms, Excessive Heat, Drought	New
LC9 NFIP Initiatives	Continue City of Lake Charles' participation in the National Flood Insurance Program (NFIP). Identify and implement necessary actions and steps to further the participation of Calcasieu Parish in the NFIP and Community Rating System including but not limited to floodplain mapping, higher regulatory standards, protecting building utilities, stormwater management standards, drainage system maintenance, and flood warning programs.	2026	FEMA, LWI, Local	City of Lake Charles Planning & Development	Flooding, Tropical Cyclone	New
LC10Hardening Public Utilities	Hardening of utility infrastructure. This will included identifying systems most vulnerable during hazard and identifying effective ways to mitigate the utilities. This will allow these utilities to remain operable during hazardous conditions. Examples include hardening of power supply stations, water treatment facilities, sewer pump stations and communication lines.	2026	FEMA, HUD, Local	City of Lake Charles Public Works	Tropical Cyclone, Tornado, Wildfire, Winter Storms, Thunderstorms	New
LC11 City Sewer Initiatives	Inspect, repair, and upgrade as needed city mainlines for sewer to mitigate inflow and infiltration from flooding and storm related waters. Reduces loss of life or property by preventing hazardous backups into homes. Protects public facilities and thoroughfares from sanitary sewer overflows, protects natural resources from contamination from overflows.	2026	FEMA, Local	City of Lake Charles Public Works	Flooding, Tropical Cyclone, thunderstorm, winter storm	New
LC12 Plant A Final Clarifier Replacement/ City Wastewater Plant Mitigation	Replace undersized final clarification units at wastewater plant. Provides for fewer suspended solids released into environment during hazardous weather events. Protects public waterways from sanitary sewer treatment exceedances, protects natural resources from contamination. Allows for better plant operation and efficiency by returning solids to plant operations not environment	2026	FEMA, Local	City of Lake Charles Public Works	Flooding, Tropical Cyclone	New
LC13 Water Plant - Retrofits	The City of Lake Charles proposes to harden the water plants of Chennault, Center East, Center West, and McNeese, with siding retrofits, storm shutters, and doors. This will allow the water plants to withstand and minimize damage during natural disaster weather events. The structural integrity of the sites will be improved, thereby lessening the chance of loss of critical services during pre and post disaster events. These facilities are critical to assuring that adequate potable water as well as fire protection is available during these natural disaster weather events.	2026	HMGP, City	City of Lake Charles, Public Works	Flooding, Tropical Cyclone, thunderstorm	New
LC14 Install Emergency / Hazard Warning System	Improve communication within the parish by purchasing, installing, and implementing warning systems. This will include interoperabie communications equipment and Incident Management Information Sharing Software. In addition, promoting the use of NOAA "All Hazards" radios for early warning and post event information.	2026	FEMA, Local	City of Lake Charles, Public Works	Thunderstorms, Flooding, Tornado, Sinkhole, Tropical Cyclone, Winter storm, Drought, Sinkholes	New
LC15 Hazard Mitigation Planning	Conduct Hazard Mitigation Planning efforts which will include developing a multi-jurisdictional Geographic Information System (GIS) database to support future hazard mitigation planning.	2026	FEMA, Local	City of Lake Charles Planning & Development	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive heat, Sinkholes, Thunderstorms (lightning, high wind, hail), Winter Storms, Subsidence/Coastal Land Loss	New
LC16 Generator Installation	Purchase generators and install at critical facilities to continue essential operations during events.	2026	FEMA, HUD, Local	City of Lake Charles Public Works	Flooding, Tropical Cyclones, Winter Storms, Tornados	New
LC17 Generator Retrofit	Retrofit existing emergency generator which supplies the wastewater plant with emergency power during power outages. Retrofit will allow generator to supply both facilities during power outages. Retrofit to include electrical lines, wiring, and control panels. Supplying emergency power generation to site will ensure the operation of the facility during natural disaster weather events. This facility is critical to assuring that adequate potable water as well as fire protection is available during hazardous events.	2026	HMGP, City	City of Lake Charles Public Works	Flooding, Tropical Cyclones, Winter Storms, Tornados	New

City of Lake Charles Mitigation Actions

Action	Action Description	Anticipated Year of Completion	Funding Source	Responsible Party, Agency, or Department	Hazard	Status
LC18 Community Shelter Construction	Set up of community shelters for the public in the City Of Lake Charles to shelter public during disasters.	2026	FEMA, Local	CPPJ OHSEP, City of Lake Charles	Flooding, Tropical Cyclone, winter storm, wildfire, tornado, excessive heat	New
LC19 Wildfire Ordinance	Strengthen penalties and improve enforcement capabilities of burn ban ordinance.	2026	FEMA, Local	City of Lake Charles Planning & Development	Wildfire	New
LC20 Increase Open Space Areas	Acquire open space through direct acquisition of property or through conservation easements. This will provide for and/or ensure pervious surface areas to allow for proper drainage and reduce flooding	2026	FEMA, HUD, Local	City of Lake Charles Planning & Development	Flooding	New

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 Calcasieu Parish Hazard Mitigation Plan Update

The Calcasieu Parish Hazard Mitigation Plan Update process began in early August 2020 with internal discussions about process and timeline with Calcasieu Parish Police Jury staff. The Steering Committee members were identified and initial communications about the planning process began in Summer 2020 and were communicated out via email. Each representative also received a phone call from CPPJ staff to ensure their willingness to participate ahead of time. All persons asked to participate agreed to do so.

However, the process was delayed until October 2020 due to Hurricanes Laura and Delta. Starting in October 2020, we held a series of meetings and collaborations between Planning staff, Steering Committee members, and the participating jurisdictions. Plan update activities were intended to give each jurisdiction the opportunity to shape the plan to best fit their community's goals. This process occurring immediately after a major disaster was timely and beneficial due to anticipated disaster funding as well as the ability to reflect on recent events and identify potential mitigation needs for the future. Community stakeholders and the public were invited to attend and contribute information to the planning process during specific time periods or meetings. Meetings were conducted both in person and virtually. Meetings were advertised online and public attendance was encouraged.

Calcasieu Parish includes six incorporated municipalities: the towns of Iowa and Vinton, and the cities of DeQuincy, Lake Charles, Sulphur, and Westlake. All six municipalities participated in the Plan Update process. The Calcasieu Parish Police Jury 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 to the parish, develop parts of the Plan Update, and review the results of research conducted by QES. 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
10-8-2020	Initial Coordination	Teams Virtual Meeting	Yes	Cancelled due to Hurricane Delta
10-28-2020	Kick-Off Meeting	Teams Virtual Meeting	Yes	Discuss with the plan Steering Committee expectations and requirements of the project. Assign plan worksheets to jurisdictions.
12-01-2020	Risk Assessment Overview	901 Lakeshore Drive, Lake Charles, LA	Yes	Discuss and review the risk assessment with the Steering Committee.. The public meeting allowed the public and community stakeholders to participate and provide input into the hazard mitigation planning process. Maps of the Calcasieu parish communities were provide for the meeting attendees to identify specific areas where localized hazards occur. An Incident Issue Questionnaire was provided for attendees and a roundtable discussion was conducted.
12-15-2020	Review of Final Plan	Teams Virtual Meeting	Yes	Meeting to review the final Draft Plan
Ongoing	Public Survey Tool	Online	Yes	This survey asked participants about public perceptions and opinions regarding natural hazards in Calcasieu 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/2ZT5MD3
2 Week Period	Public Plan Review (Digital)		Yes	Parish Website and Calcasieu Parish Planning and Development

Planning

The plan update process consisted of several phases

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

Coordination

The Calcasieu Parish Police Jury oversaw the coordination of the 2020 Hazard Mitigation Plan Update Steering Committee during the update process. The Calcasieu Parish Police Jury and participating jurisdictions were responsible for identifying members for the committee.

The Calcasieu Parish Police Jury staff members coordinated inviting Steering Committees members and key stakeholders to meetings and activities. The Planning and Development Assistant Director was responsible for meeting notices that included website and social media statements for notification to the media and general public for public meetings and public outreach activities. The Calcasieu Parish Police Jury 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 2020 Hazard Mitigation Plan Update Steering Committee consisted of representatives from the following parish, municipal or community stakeholders:

Dick Gremillion, Director	Calcasieu OHSEP
Paul Destout, Operations Manager	Calcasieu OHSEP
Marc Ferguson, Response Specialist	Calcasieu OHSEP
Cade McLemore, Response Technician	Calcasieu OHSEP
Jennifer Landry, Emergency Planner	Calcasieu OHSEP
Jennifer Cobian, Asst. Planning Director	Calcasieu Parish Police Jury
Laurie Cormier, Program Coordinator	Calcasieu Parish Police Jury
Natasha Willis, Grant Coordinator	Calcasieu Parish Police Jury
Amber Downs, Grant Specialist	Calcasieu Parish Police Jury
Dana Watkins, Permit Manager	Calcasieu Parish Police Jury
Alberto Galan, Asst. to the Administrator	Calcasieu Parish Police Jury
Terry Frelot, Asst. Director	Calcasieu Parish Police Jury
Mary Jo Bayles, City Planner	City of DeQuincy
Keith Berry, Chief Building Inspector	City of Sulphur
Stacy Dowden, Public Works Director	City of Sulphur
Rick Fitts, President	Consolidated Gravity Drainage Dist. #1
Mike Wittler, President	Consolidated Gravity Drainage Dist. #2
Eddie Hebert, Superintendent	Consolidated Gravity Drainage Dist. #2
Mike Naquin, Asst. Superintendent	Consolidated Gravity Drainage Dist. #2
Hannah Borill, Permit Coordinator	City of Westlake
Andrea Mahfouz, City Clerk	City of Westlake
Mary Vice, City Clerk	Town of Vinton
Lori Marinovich, Asst Planning Director	City of Lake Charles
Lennie LaFleur, Grant Specialist	Lake Charles Fire Department
Gene Guidry, Staff Engineer	Sabine River Authority
Cynthia Mallett, City Clerk	Town of Iowa

The Parish of Cameron was invited via email by Calcasieu Parish Police Jury staff members to participate in all meetings in an effort to collaborate with neighboring communities. With the addition of the sinkhole hazard, Beauregard Parish and Calcasieu Parish will collaborate in the future on any mitigation measures necessary to mitigate the area in which the buffer zone of a sinkhole in Calcasieu Parish overlaps the parish line with Beauregard Parish.

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 2020 update. The completed worksheets can be found in Appendix E – State Required Plan Update Worksheets

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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 Calcasieu 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.).

Current ongoing efforts that will ensure the plan is utilized and routinely updated include the HMGP allocation from Hurricane Laura that will present considerable opportunities to fund mitigation measures identified. As disaster recovery meetings are held, this plan will be crucial in determining needs and priorities.

The members of the Calcasieu 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 2015 Hazard Mitigation Plan was also used in the planning process. Other existing parish and jurisdiction data and plans reviewed and/or incorporated into the planning process include those listed below:

- Floodplain Ordinances (Parish and Jurisdictions)
- Emergency Operations Plan (Parish and Jurisdictions)
- Envision Calcasieu 2020 Plan (previously the Comprehensive Plan)
- Debris Removal Plan
- Economic Plan (Parish and Jurisdictions)
- Stormwater Management 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 Calcasieu Parish.

Meeting #1: TEAMS Virtual Kickoff Meeting

Date: 10-28-2020
Location: Teams Virtual Meeting
Purpose: Discuss with the hazard mitigation Steering Committee and the public the expectations and requirements of the hazard mitigation plan update process and to establish and initial project timeline. Assign each individual jurisdiction and the parish data collection for the plan update.

Public Initiation: All parish government meetings are open to the public and notices were posted online
Quality Engineering and Surveying, LLC (QES) Staff – Edward Anthony, Presenter
Calcasieu Parish – Jennifer Cobian, Presenter

Invitees included:

Name	Agency	Email
Dick Gremillion	Calcasieu OHSEP	dgremillion@calcasieuparish.gov
Cade Mclemore	Calcasieu OHSEP	cmclemore@calcasieuparish.gov
Marc Ferguson	Calcasieu OHSEP	mferguson@calcasieuparish.gov
Paul Destout	Calcasieu OHSEP	pdestout@calcasieuparish.gov
Jennifer Cobian	Calcasieu Parish Government	jcobian@calcasieuparish.gov
Laurie Cormier	Calcasieu Parish Government	l cormier@calcasieuparish.gov
Natasha Willis	Calcasieu Parish Government	nwillis@calcasieuparish.gov
Amber Downs	Calcasieu Parish Government	adowns@calcasieuparish.gov
Dana Watkins	Calcasieu Parish Government	dwatkins@calcasieuparish.gov
Alberto Galan	Calcasieu Parish Government	agalan@calcasieuparish.gov
Terry Frelot	Calcasieu Parish Government	tfrelot@calcasieuparish.gov
Mary Jo Bayles	City of DeQuincy	mjbayles@dequincy.org
Keith Berry	City of Sulphur	kberry@sulphur.org
Rick Fitts (President)	Consolidated Gravity Drainage #1	rick.fitts.qbjn@statefarm.com
Mike Wittler (President)	Consolidated Gravity Drainage #2	wranglermike1973@gmail.com
Eddie Hebert	Consolidated Gravity Drainage #2	ehebert@gdd2east.com
Mike Naquin	Consolidated Gravity Drainage #2	Mnaquin@gdd2east.com
Hannah Borill	City of Westlake	permits@cityofwestlake.com
Andrea Mahfouz	City of Westlake	cityclerk@cityofwestlake.com
Mary Vice	Town of Vinton	cityclerk@cityofvinton.com
Lori Marinovich	City of Lake Charles	lmarinovich@cityoflc.us
Lennie LaFleur	Lake Charles Fire Department	lennie.lafleur@cityoflc.us
Gene Guidry	Sabine River Authority	gene.guidry@la.gov
Cynthia Mallett	Town of Iowa	townclerk@iowala.org
Edward Anthony	Quality Engineering and Surveying, LLC	eanthony@qesla.com

Meeting #2 Risk Assessment Overview and Public Meeting

Date: December 1, 2020

Location: Calcasieu Parish Police Jury Meeting Room, Lake Charles, LA

Purpose: Members of the Hazard Mitigation Plan Update Steering Committee and the public were invited and were presented the results of the most recent risk assessment. The assessment was conducted based on hazards identified during previous plans. The public meeting allowed the public and community stakeholders to participate and provide input into the hazard mitigation planning process. Maps of the Calcasieu Parish communities were provided for the meeting attendees to identify specific areas where localized hazards occur.

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

Quality Engineering and Surveying, LLC (QES) Staff – Edward Anthony, Presenter

Calcasieu Parish – Jennifer Cobian, Presenter

Invitees Included:

Name	Agency	Email
Dick Gremillion	Calcasieu OHSEP	dgremillion@calcasieuparish.gov
Cade Mclemore	Calcasieu OHSEP	cmclemore@calcasieuparish.gov
Marc Ferguson	Calcasieu OHSEP	mferguson@calcasieuparish.gov
Paul Destout	Calcasieu OHSEP	pdestout@calcasieuparish.gov
Jennifer Cobian	Calcasieu Parish Government	jcobian@calcasieuparish.gov
Laurie Cormier	Calcasieu Parish Government	lcormier@calcasieuparish.gov
Natasha Willis	Calcasieu Parish Government	nwillis@calcasieuparish.gov
Amber Downs	Calcasieu Parish Government	adowns@calcasieuparish.gov
Dana Watkins	Calcasieu Parish Government	dwatkins@calcasieuparish.gov
Alberto Galan	Calcasieu Parish Government	agalan@calcasieuparish.gov
Terry Frelot	Calcasieu Parish Government	tfrelot@calcasieuparish.gov
Mary Jo Bayles	City of DeQuincy	mjbayles@dequincy.org
Keith Berry	City of Sulphur	kberry@sulphur.org
Rick Fitts (President)	Consolidated Gravity Drainage #1	rick.fitts.qbjn@statefarm.com
Mike Whittler (President)	Consolidated Gravity Drainage #2	wranglermike1973@gmail.com
Eddie Hebert	Consolidated Gravity Drainage #2	ehebert@gdd2east.com
Mike Naquin	Consolidated Gravity Drainage #2	Mnaquin@gdd2east.com
Hannah Borill	City of Westlake	permits@cityofwestlake.com
Andrea Mahfouz	City of Westlake	cityclerk@cityofwestlake.com
Mary Vice	Town of Vinton	cityclerk@cityofvinton.com
Lori Marinovich	City of Lake Charles	lmarinovich@cityoflc.us
Lennie LaFleur	Lake Charles Fire Department	lennie.lafleur@cityoflc.us
Gene Guidry	Sabine River Authority	gene.guidry@la.gov
Cynthia Mallett	Town of Iowa	townclerk@iowala.org
Edward Anthony	Quality Engineering and Surveying, LLC	eanthony@qesla.com

Meeting #3: Steering Committee and Public TEAMS Virtual Meeting

Date: December 15, 2020
Location: Lake Charles, LA
Purpose: The public meeting allowed the public and community stakeholders to participate and provide input into the hazard mitigation planning process. This meeting presented the draft hazard mitigation plan and requested feedback from attendees.

Public Initiation: Yes
Quality Engineering and Surveying, LLC (QES) Staff – Edward Anthony, Presenter
Calcasieu Parish – Jennifer Cobian, Presenter

Invitees Included:

Name	Agency	Email
Dick Gremillion	Calcasieu OHSEP	dgremillion@calcasieuparish.gov
Cade Mclemore	Calcasieu OHSEP	cmclemore@calcasieuparish.gov
Marc Ferguson	Calcasieu OHSEP	mferguson@calcasieuparish.gov
Paul Destout	Calcasieu OHSEP	pdestout@calcasieuparish.gov
Jennifer Cobian	Calcasieu Parish Government	jcobian@calcasieuparish.gov
Laurie Cormier	Calcasieu Parish Government	lcormier@calcasieuparish.gov
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Alberto Galan	Calcasieu Parish Government	agalan@calcasieuparish.gov
Terry Frelot	Calcasieu Parish Government	tfrelot@calcasieuparish.gov
Mary Jo Bayles	City of DeQuincy	mjbayles@dequincy.org
Keith Berry	City of Sulphur	kberry@sulphur.org
Rick Fitts (President)	Consolidated Gravity Drainage #1	rick.fitts.qbjn@statefarm.com
Mike Whittler (President)	Consolidated Gravity Drainage #2	wranglermike1973@gmail.com
Eddie Hebert	Consolidated Gravity Drainage #2	ehebert@gdd2east.com
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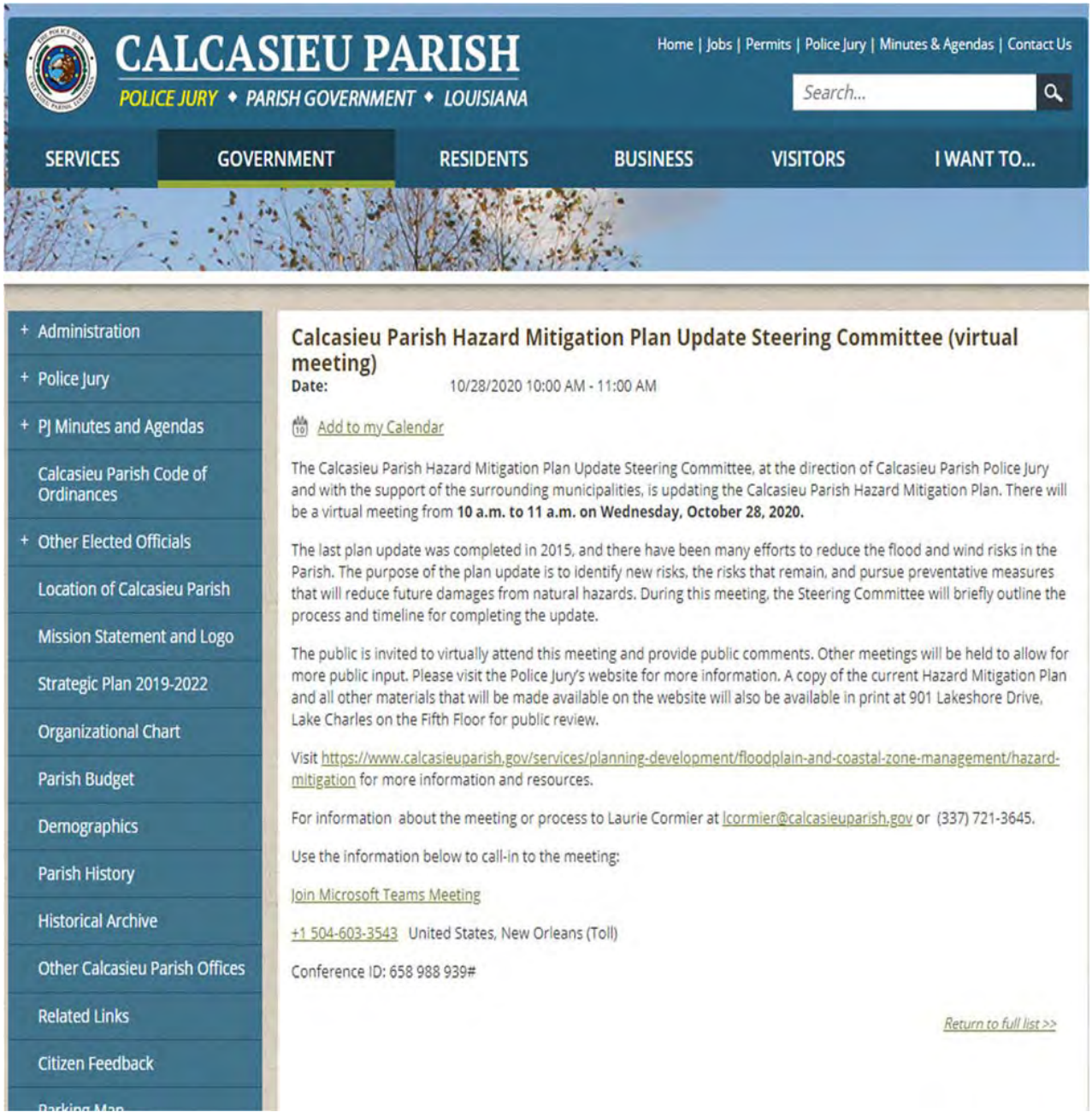
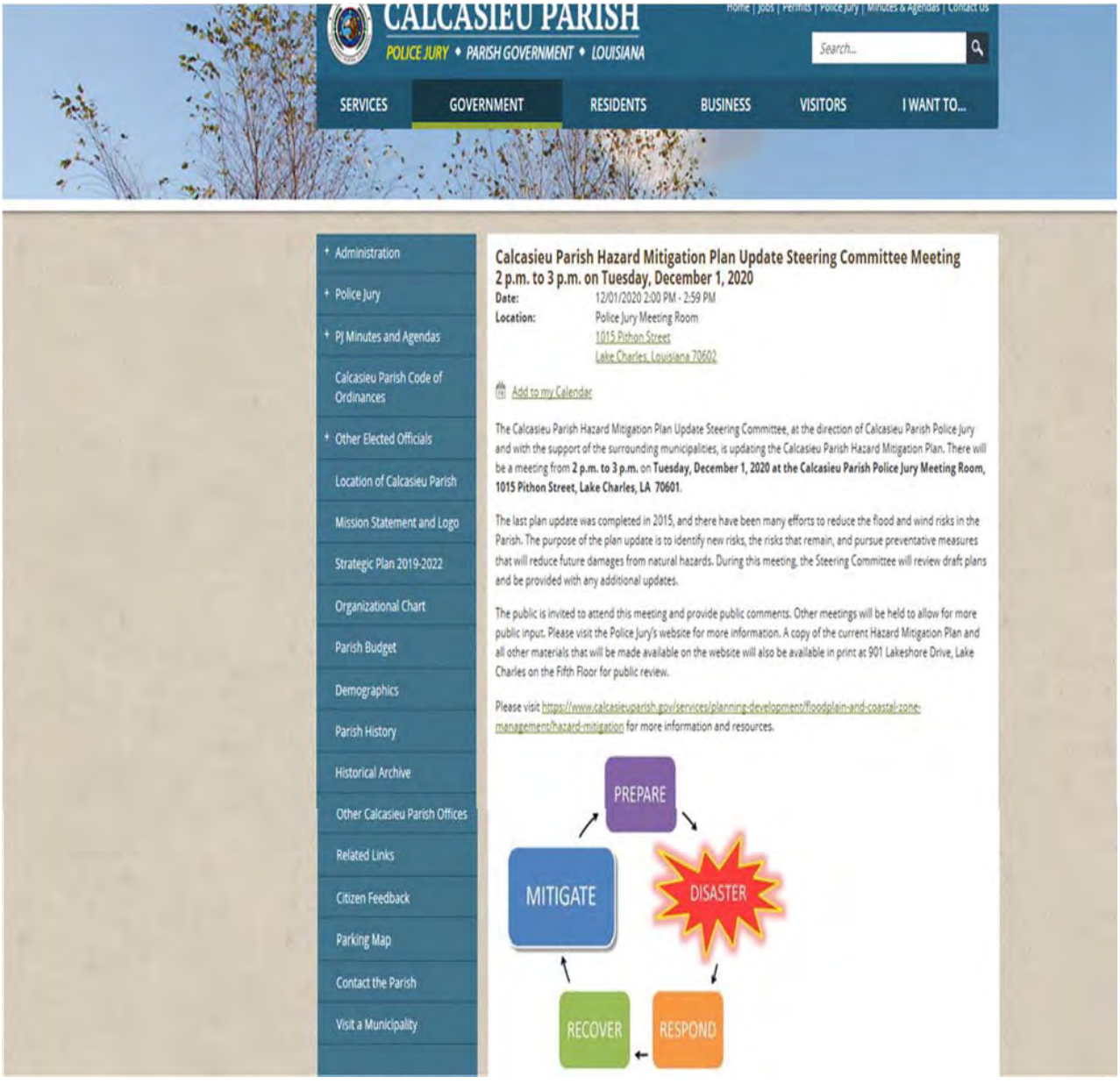
Gene Guidry	Sabine River Authority	gene.guidry@la.gov
Cynthia Mallett	Town of Iowa	townclerk@iowala.org
Edward Anthony	Quality Engineering and Surveying, LLC	eanthony@qesla.com

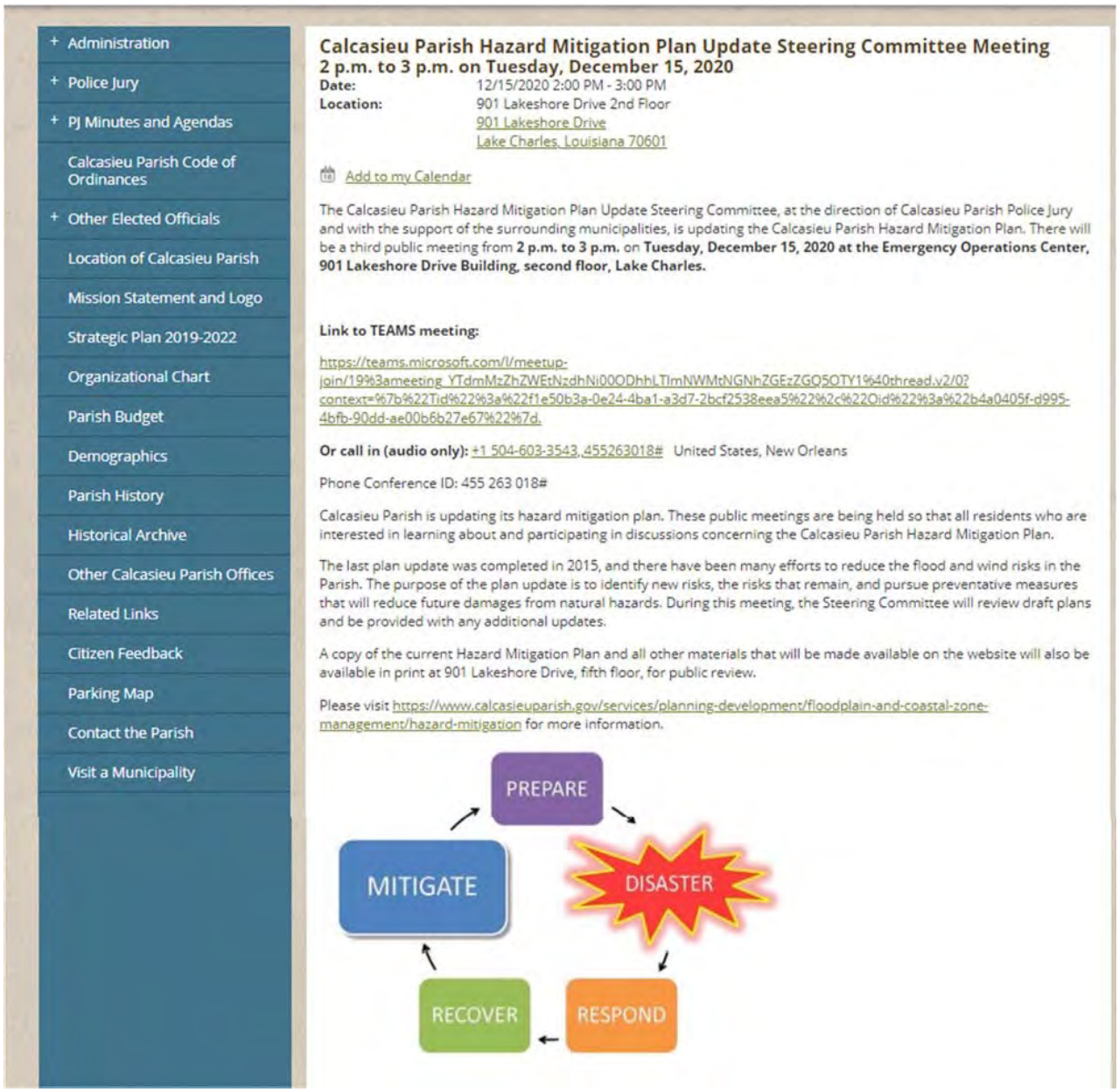
Meeting #1
Public Notice
www.cppj.net



Meeting #2
Public Notice
www.cppj.net



Meeting #3
Public Notice
www.cppj.net



+ Administration
+ Police Jury
+ PJ Minutes and Agendas
Calcasieu Parish Code of Ordinances
+ Other Elected Officials
Location of Calcasieu Parish
Mission Statement and Logo
Strategic Plan 2019-2022
Organizational Chart
Parish Budget
Demographics
Parish History
Historical Archive
Other Calcasieu Parish Offices
Related Links
Citizen Feedback
Parking Map
Contact the Parish
Visit a Municipality

Calcasieu Parish Hazard Mitigation Plan Update Steering Committee Meeting
2 p.m. to 3 p.m. on Tuesday, December 15, 2020

Date: 12/15/2020 2:00 PM - 3:00 PM
Location: 901 Lakeshore Drive 2nd Floor
901 Lakeshore Drive
Lake Charles, Louisiana 70601

Add to my Calendar

The Calcasieu Parish Hazard Mitigation Plan Update Steering Committee, at the direction of Calcasieu Parish Police Jury and with the support of the surrounding municipalities, is updating the Calcasieu Parish Hazard Mitigation Plan. There will be a third public meeting from **2 p.m. to 3 p.m.** on **Tuesday, December 15, 2020 at the Emergency Operations Center, 901 Lakeshore Drive Building, second floor, Lake Charles.**

Link to TEAMS meeting:

https://teams.microsoft.com/l/meetup-join/19%3ameeting_YTdmMzZhZWEtNzdhNi00ODhhLTlmNWMtNGNhZGEzZGQ5OTY1%40thread.v2/0?context=%7b%22Tid%22%3a%22f1e50b3a-0e24-4ba1-a3d7-2bcf2538eea5%22%2c%22Oid%22%3a%22b4a0405f-d995-4bfb-90dd-ae00b6b27e67%22%7d.

Or call in (audio only): +1 504-603-3543,,455263018# United States, New Orleans

Phone Conference ID: 455 263 018#

Calcasieu Parish is updating its hazard mitigation plan. These public meetings are being held so that all residents who are interested in learning about and participating in discussions concerning the Calcasieu Parish Hazard Mitigation Plan.

The last plan update was completed in 2015, and there have been many efforts to reduce the flood and wind risks in the Parish. The purpose of the plan update is to identify new risks, the risks that remain, and pursue preventative measures that will reduce future damages from natural hazards. During this meeting, the Steering Committee will review draft plans and be provided with any additional updates.

A copy of the current Hazard Mitigation Plan and all other materials that will be made available on the website will also be available in print at 901 Lakeshore Drive, fifth floor, for public review.

Please visit https://www.calcasieuparish.gov/services/planning-development/floodplain-and-coastal-zone-management/hazard-mitigation for more information.

Outreach Activity #1: Public Opinion Survey

Date: 10/29/2020 – 11/30/2020

Location: Web Survey

Public Initiation: Yes

Calcasieu Parish Hazard Mitigation Public Opinion and Survey

Calcasieu Parish Hazard Mitigation Public Opinion Survey

This survey is about public perceptions and opinions regarding natural hazards in Calcasieu Parish. Also, we are requesting information regarding methods and techniques you prefer for reducing risk and losses associated with hazards. This questionnaire should be completed by adults (18 years or older). The information you provide will help Calcasieu Parish improve public/private coordination, mitigation and risk reduction efforts.

There are 10 questions and it should take you less than 10 minutes.

1. Which of these natural disasters have you or someone in your household experienced in the past five years? (Check all that apply)

- ☐ Drought
- ☐ Flood
- ☐ Severe Thunderstorm
- ☐ Tornado
- ☐ Tropical Storm or Hurricane
- ☐ Severe Winter Storm
- ☐ Hail

Other (please specify)

2. How Concerned are you about the following natural disasters affecting your parish? (Check the corresponding box for each hazard.)

	Not Concerned	Not Very Concerned	Neutral	Somewhat Concerned	Very Concerned
Drought	○	○	○	○	○
Other (please specify)					
Flood	○	○	○	○	○
Other (please specify)					
Severe Thunderstorm	○	○	○	○	○
Other (please specify)					
Tornado	○	○	○	○	○
Other (please specify)					
Tropical Storm or Hurricane	○	○	○	○	○
Other (please specify)					
Severe Winter Storm	○	○	○	○	○
Other (please specify)					
Hail	○	○	○	○	○
Other (please specify)					

3. Whom would you MOST TRUST to provide you with information regarding making your home safer from natural disasters? (Check up to three answers)

- [ ] News Media
- [ ] Government Agency
- [ ] Insurance Company
- [ ] Utility Company
- [ ] University
- [ ] Friend/family
- [ ] Other (please specify)
- [ ] Elected Official
- [ ] Church or Civic Association
- [ ] Other Non-profit organization
- [ ] Social Media (Facebook, etc)
- [ ] Not sure

4. What is the MOST EFFECTIVE way for you to receive information about how to make your household and home safer from natural disasters (check up to three answers)

- [ ] Newspaper Stories
- [ ] Newspaper Ads
- [ ] TV News
- [ ] TV Ads
- [ ] Radio News
- [ ] Radio Ads
- [ ] Email newsletters
- [ ] Online news outlets
- [ ] Social Media (Facebook, etc)
- [ ] Schools
- [ ] Other (please specify)
- [ ] Billboards
- [ ] Books
- [ ] Mail
- [ ] Fire Department
- [ ] Fact Sheet/brochure
- [ ] Chamber of Commerce
- [ ] Library
- [ ] Public workshops/meetings
- [ ] Displays in public places (mall, grocery, etc.)
- [ ] Universities

5. **COMMUNITY VULNERABILITIES AND HAZARD MITIGATION STRATEGIES**

In order to assess community risk, we need to understand which community assets may be vulnerable to natural hazards in the region. Vulnerable assets are those community features, characteristics, or resources that may be impacted by natural hazards (for example populations with functional or special needs, economic components, environmental resources, etc). The next set of questions focuses on vulnerable assets in your community and your preferred strategies to mitigate risk to those assets.

Community assets are features, characteristics or resource that either make a community unique or allow the community to function. In your opinion, which of the following CATEGORIES are most susceptible to the impacts caused by natural hazards in Calcasieu Parish? (Rank the community assets in order of vulnerability, 1 being most vulnerable and 6 being least vulnerable)

- Human (Loss of Life and/or injuries)
- Economic (Business closures and/or job losses)
- Infrastructure (Damage or loss of bridges, utilities, schools, etc.)
- Culture/Historic (Damage or loss of libraries, museums, historic sites)
- Environmental (Damage or loss of forests, pastureland, waterways, etc.)
- Governance (Ability to maintain order and/or provide public amenities and services)

6. Next, we would like to know what specific types of COMMUNITY ASSETS are most important to you (check the corresponding box for each asset)

	Not important	Not very important	Neutral	Somewhat important	Very important
Nursing homes/assisted living facilities	○	○	○	○	○
Other (please specify)					
Schools (K-12)	○	○	○	○	○
Other (please specify)					
Hospitals	○	○	○	○	○
Other (please specify)					
Major Bridges	○	○	○	○	○
Other (please specify)					
Fire/Police Stations	○	○	○	○	○
Other (please specify)					
Museums/historic buildings	○	○	○	○	○
Other (please specify)					
Major Employers	○	○	○	○	○
Other (please specify)					
Small Businesses	○	○	○	○	○
Other (please specify)					
Colleges/Universities	○	○	○	○	○
Other (please specify)					
Parish or City Buildings (City Hall, Courthouse, etc)	○	○	○	○	○
Other (please specify)					

7. A number of activities can reduce Calcasieu Parish's risk from natural hazards. These activities can be both regulatory and non-regulatory. (Check the box that best represents your opinion of the following COMMUNITY-WIDE STRATEGIES to reduce the risk and loss associated with natural disasters)

	Not Important	Not Very Important	Neutral	Somewhat Important	Very Important
I support a regulatory approach to reducing risk	○	○	○	○	○
Other (please specify)					
I support a non-regulatory approach to reducing risk	○	○	○	○	○
Other (please specify)					
I support a mix of both regulatory and non-regulatory approaches to reducing risk	○	○	○	○	○
Other (please specify)					
I support policies to prohibit development in areas subject to natural hazards	○	○	○	○	○
Other (please specify)					

I support protecting historic and cultural structures	○	○	○	○	○

Other (please specify)

I would be willing to make my home more disaster-resistant	○	○	○	○	○

Other (please specify)

I support steps to safeguard the local economy following a disaster event	○	○	○	○	○

Other (please specify)

I support improving the disaster preparedness of local schools	○	○	○	○	○

Other (please specify)

I support a local inventory for at-risk buildings and infrastructure	○	○	○	○	○

Other (please specify)

I support the disclosure of natural hazard risks during real estate transactions	○	○	○	○	○

Other (please specify)

8. Natural hazards can have a significant impact on a community, but planning for these events can help lessen the impacts. The following statements will help determine citizen priorities regarding planning for natural disasters in Calcasieu Parish

	Not Important	Not Very Important	Neutral	Somewhat Important	Very Important
Protecting Private property	○	○	○	○	○
Protecting critical facilities (transportation networks, hospitals, fire stations)	○	○	○	○	○
Preventing development in hazard areas	○	○	○	○	○
Enhancing the function of natural features (bayous, rivers and wetlands)	○	○	○	○	○
Protecting historical and cultural landmarks	○	○	○	○	○
Protecting and reducing damage to utilities (water/power)	○	○	○	○	○
Strengthening emergency services (police, fire, EMS)	○	○	○	○	○
Disclosing natural hazard risks during real estate transactions	○	○	○	○	○
Promoting cooperation among public agencies, citizens, non-profits and businesses	○	○	○	○	○

9. **Mitigation and Preparedness Activities in Your Household**

In the following list, please check those activities that you HAVE DONE in your household ,PLAN TO DO in the near future, HAVE NOT DONE or are UNABLE TO DO. (Check one answer for each preparedness activity)

	Have Done	Plan to Do	Not Done	Unable to Do
Attend meetings or received written information on natural disasters or emergency preparedness?	○	○	○	○
Talked with members in your household about what to do in case of a natural disaster or emergency?	○	○	○	○
Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a disaster?	○	○	○	○
Prepare a "Disaster Supply Kit" (stored extra food, water, batteries or other emergency supplies)?	○	○	○	○
Discussed or created a utility shutoff procedure in the event of a natural disaster?	○	○	○	○

10. In what ZIP code is your home located? (enter 5 digit ZIP code; for example, 70601)

DONE

Outreach Activity #2: Issue Questionnaire

Date: 12/1/2020
Location: Public Meeting
Public Initiation: Yes

Public Meeting
Incident/Issue Questionnaire

1. Hazard Type(s):
    a. Flooding
        i. Riverine
        ii. Storm Surge
        iii. Street
        iv. Other (describe):
    b. High winds (not tropical)
    c. Coastal
        i. Saltwater Intrusion
        ii. Erosion
        iii. Other (describe):
    d. Tropical Systems
    e. Winter Weather
    f. Other: _____
2. Describe incident or issue:
    _____
    _____
    _____
    _____
    _____
3. Location:
    a. City:_____
    b. Address or Area: _____
    c. Localized or dispersed: _____
4. Intensity:
    a. Depth (flooding) or Size (hail, etc.) _____
    b. Wind strength
5. Re-occurring or one-time
    a. If re-occurring, how often? _____
6. What type of interruptions does/did the incident or issue cause? (business closure, damage, evacuation,
    etc.)_____
    _____
7. How long was the interruption (hours, days, weeks, etc.)?_____
8. How could this problem or impact be prevented, fixed or alleviated?
    _____
    _____
    _____
9. Can we contact you if we have further questions about this incident? Yes/No
10. Contact Information (optional)
    a. Name:_____
    b. City: _____
    c. Phone: (_____)_____
    d. Email: _____

Outreach Activity #3: Mapping Activities

Public meeting attendees were asked to identify areas on jurisdictional maps provided that were "problem areas". They were also asked to indicate any areas of new development. This activity gave the public an opportunity to interact with Calcasieu Parish Police Jury staff, 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 Calcasieu Hazard Mitigation Draft Plan was placed on the 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.

Appendix B: Plan Maintenance

Purpose

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

Monitoring, Evaluating, and Updating the Plan

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

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

Responsible Parties

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

- Unincorporated Calcasieu
- City of Lake Charles
- City of DeQuincy
- City of Sulphur
- City of Westlake
- Town of Iowa
- Town of Vinton

Although the people filling the positions may change from year to year, each jurisdiction will have a representative on the Steering Committee. The future Steering Committee will continue to be comprised of the same job functions as currently evident in the Steering Committee. However, the decision of specific job duties will be left to the Parish Emergency Manager to be assigned as deemed appropriate.

Methods for Monitoring and Evaluating the Plan and Plan Evaluation Criteria

Review and revision of the plan will be directed by the Assistant Director within the Calcasieu Parish Police Jury Division of Planning and Development. Progress on the Mitigation Action Plan will be monitored and evaluated by the Planning Department. The CPPJ's Planning Department, OHSEP and the Steering Committee will meet annually and/or following disasters to monitor and evaluate the plan. Following disasters, a meeting will be called to monitor and evaluate the Risk Assessment. The annual meetings will involve gathering necessary information and discussion of progress of action items and implementation. A review of the planning process will also be done at this time to ensure any changes needed in the steering committee or overall process is needed.

Due to each jurisdiction in Calcasieu Parish being heavily impacted by both Hurricanes Laura and Delta, it is imperative a special review of this plan be reviewed and updated in 2021 once the full impacts of these disasters are known and our jurisdictions have had an opportunity to assess their recovery and mitigation needs for the future.

The annual meetings will assist in developing a progress report designed to monitor the state of the projects and evaluate the success of each mitigation item. The report should list each action item and answers several very important questions, such as has the project begun? If not, why not? The status of project; is it complete? If so, did it eliminate the problem? Are there changes needed to better implement the mitigation actions? These questions serve to address the progress being made on each of the mitigation action items.

Copies of the Annual Progress Reports will be maintained by the Division of Planning and Development. If during this process of reviewing the Annual Progress Report, the Parish Emergency Manager determines that the Steering Committee should be reconvened for discussion, he or she has the option of doing so. He or she will use the following criteria to determine if a meeting needs to be held:

- Are there any changes in mitigation plan requirements for federal mitigation grant funding programs?
- Are any changes or revision required to the Mitigation Action Plan? (i.e., Have any action items been completed? Are there any new specific mitigation action items? Have any new specific mitigation action items been identified?)
- Are there any changes within the Steering Committee membership?

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

In addition to monitoring the progress of projects, the Plan Update is required to be evaluated, then revised or updated at least every five years from the date of FEMA approval. If a disaster occurs or as action items are completed, the Plan Update will be reviewed, revised, and updated sooner than the required five years, using the process outlined in this section.

Once approval from FEMA is received for an updated plan, the above process will begin again starting a new five-year cycle. This will ensure that the plan is continually updated on a five-year cycle. This new

cycle will begin upon the date of FEMA approval. This process is further discussed in the below sub-section entitled "Updating the Plan".

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

- ID Hazard – Are there new hazards that affect your community? Has a disaster occurred?
- Profile Hazard Events – Are additional maps or new hazard studies available? Have chances of future events changed? Have recent and future development in the community been checked for their exposure to hazards?
- Inventory Assets – Have inventories of existing structures in hazard areas been updated? Are there any new special high risk populations? Is future land development accounted for in the inventories?
- Estimate Losses – Have losses been updated to account for recent changes?

If the answer to any of the above questions is a "Yes", then the hazard mitigation plan will be updated accordingly. The hazard mitigation plan review and update will be accomplished by reviewing each goal and action item to determine their relevance to changing situations in the parish and in each municipality, as well as changes to state or federal policy, and to ensure that they are addressing current and expected conditions. The Steering Committee will also review the risk assessment portion and determine if this information should be updated or modified.

The Steering Committee will work together as a team, with each member sharing responsibility for completing the evaluation and updates. Each member of the Steering Committee is an equal member of the process. It will be the responsibility of the representative from each community to ensure that their section of this plan is updated to meet the required deadline.

The Parish Emergency Manager is responsible for including all changes into the plan after the Steering Committee has met and decided on the changes. Any required revisions will be implemented into existing plans, as applicable, within six months following the review process. This process will be repeated for each five year review of the plan.

After the update process is completed, the final plan will be submitted to GOHSEP's Hazard Mitigation Officer for review and then on to FEMA for review and approval to remain eligible for continued Hazard Mitigation Grant Program (HMGP) funding.

FEMA and GOHSEP have the authority to evaluate the progress of existing mitigation plans to determine if the plan is fulfilling program requirements.

The following basic schedule will be undertaken for monitoring, evaluating and updating the plan:

- At a minimum, monitoring activities by the Calcasieu Parish OHSEP should be done every six months;
- Best practice is that the update should start a year and a half prior to plan expiration date, taking into consideration one year of development and six months to receive plan approval.

Updating the Plan

Updates will follow the original planning process outlined in Appendix A. The update process will entail a detailed and structured re-examination of all aspects of the original plan, followed by recommended updates. The update process will be undertaken by the Calcasieu Parish OHSEP in coordination with the Calcasieu Parish Hazard Mitigation Steering Committee. The recommendations will be presented to the Calcasieu Parish Hazard Mitigation Steering Committee for consideration and approval. It is expected that the parish and each jurisdiction's administration and will issue a letter of adoption for each update of the plan.

At a minimum, the plan will be updated and re-submitted to FEMA for re-approval every five years, as required by DMA 2000. The five-year update for FEMA re-approval requires that all the original steps outlined in Appendix A be revisited to make sure the plan assumptions and results remain valid as a basis for further decision-making and priority-setting.

The plan will also be subject to amendments as significant changes or new information is identified in the periodic evaluations described above. The degree to which the entire process is repeated will depend on the circumstances that precipitate the update.

Calcasieu Parish Steering Committee, led by the Calcasieu Parish OHSEP will initiate, coordinate and lead all plan updates in collaboration with each jurisdiction.

2015 Plan Version Plan Method and Schedule Evaluation

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

Incorporation into Existing Planning Programs

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

- Ordinances, Resolutions, Regulations
- Floodplain Ordinances (Parish and Jurisdictions)
- Emergency Operations Plan (Parish and Jurisdictions)
- Comprehensive Master Plan (Entire Parish)
- Economic Development Plan (Parish and Jurisdictions)
- Stormwater Management Plan
- Continuity of Operations Plan

Opportunities to integrate the requirements of this plan into other local planning mechanisms will continue to be identified through future meetings of the Calcasieu Parish Hazard Mitigation Steering Committee and through the five-year review process described herein. The primary means for integrating mitigation strategies into other local planning mechanisms will be through the revision, update and

implementation of each jurisdiction's individual plans that require specific planning and administrative tasks (e.g. risk assessment, plan amendments, ordinance revisions, capital improvement projects, etc.). The members of the Steering Committee will remain charged with ensuring that the goals and strategies of new and updated local planning documents for their jurisdictions or agencies are consistent with the goals and actions of the Calcasieu 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 City of Lake Charles, City of DeQuincy, City of Sulphur, City of Westlake, Town of Iowa, Town of Vinton, Calcasieu Parish has the authority to incorporate the contents of the Hazard Mitigation Plan into the parish's existing regulatory mechanisms. Agreements are currently in place with jurisdictions to allow for the parish incorporation mechanisms to take place.

The following parish and local plans incorporate requirements of this Hazard Mitigation Plan Update as follows through Steering Committee member and jurisdiction representation throughout the planning process as described above:

Calcasieu Unincorporated
Capital Improvement Plan/Updated Annually/CPPJ
Economic Development Plan/Updated as needed/SWLA Alliance for Economic Development
Local Emergency Operations Plan/Updated annually/Calcasieu OHSEP
Continuity of Operations Plan/Updated as needed/CPPJ/Calcasieu OHSEP
Transportation Plan/Updated as needed/CPPJ/Calcasieu OHSEP
Stormwater Management Plan/Updated As needed/CPPJ/Calcasieu OHSEP

City of DeQuincy
Comprehensive Master Plan/Updated as needed/City DeQuincy
Capital Improvement Plan/Updated as needed/City of DeQuincy
Economic Development Plan/Updated as needed/SWLA Alliance for Economic Development
Local Emergency Operations Plan/Updated annually/City DeQuincy
Continuity of Operations Plan/Updated as needed/CPPJ/Calcasieu OHSEP
Stormwater Management Plan/Updated As needed/CPPJ/Calcasieu OHSEP

City of Lake Charles
Comprehensive Master Plan/Updated as needed/City of Lake Charles
Capital Improvement Plan/Updated as needed/City of Lake Charles
Economic Development Plan/Updated as needed/SWLA Alliance for Economic Development
Local Emergency Operations Plan/Updated annually/City of Lake Charles/Lake Charles Fire Department
Continuity of Operations Plan/Updated as needed/CPPJ/Calcasieu OHSEP
Transportation Plan/Updated as needed/CPPJ/Calcasieu OHSEP
Stormwater Management Plan/Updated As needed/CPPJ/Calcasieu OHSEP

City of Sulphur
Comprehensive Master Plan/Updated As needed/City of Sulphur
Capital Improvement Plan/Updated as needed/City of Sulphur
Local Emergency Operations Plan/Updated Annually/Calcasieu OHSEP
Continuity of Operations Plan/Updated as needed/City of Sulphur
Stormwater Management Plan/Updated as needed/CPPJ, Calcasieu OHSEP

City of Westlake
Capital Improvement Plan/Updated as needed/City of Westlake
Local Emergency Operations Plan/Updated Annually/Calcasieu OHSEP
Continuity of Operations Plan/Updated as needed/City of Westlake
Stormwater Management Plan/Updated as needed/CPPJ, Calcasieu OHSEP
Community Wildfire Protection Plan/Updated as needed/City of Westlake

Town of Vinton
Capital Improvement Plan/Updated as needed/Town of Vinton
Economic Development Plan/Updated as needed/SWLA Alliance for Economic Development
Local Emergency Operations Plan/Updated annually/Calcasieu OHSEP

Town of Iowa
Local Emergency Operations Plan/Updated annually/Calcasieu OHSEP

Continued Public Participation

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

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

Appendix C: Essential Facilities

Calcasieu Parish Essential Facilities – All Jurisdictions

Calcasieu Unincorporated Essential Facilities												
Type	**Name**	**Drought**	**Extreme Heat**	**Floods**	**Sinkholes**	**Hail**	**Wind**	**Lightning**	**Tornado**	**Tropical Cyclones**	**Wildfire**	**Winter Storm**
Fire and Rescue	Bell City - Hayes Fire Station			X	X	X	X	X	X	X		
	Carlyss Fire Department Station 3					X	X	X	X	X		
	Carlyss Fire Department Station 4					X	X	X	X	X		
	Carlyss Volunteer Fire Department					X	X	X	X	X		
	Carlyss Volunteer Fire Department Station No. 2					X	X	X	X	X		
	Fire District 3				X	X	X	X	X	X	X	
	Fire Protection District No. 1 - Station No. 3			X		X	X	X	X	X		
	Fire Protection District No. 2 of Ward 3			X		X	X	X	X	X		
	Fire Station			X	X	X	X	X	X	X		
	Gillis Station					X	X	X	X	X	X	
	Holmwood Fire Station			X		X	X	X	X	X		
	LeBleu Settlement Fire Department					X	X	X	X	X		
	Manchester Fire Department					X	X	X	X	X		

Calcasieu Unincorporated Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter Storm
Fire and Rescue	Moss Bluff Fire Station					X	X	X	X	X		
	Northeast Ward 3 Fire Station					X	X	X	X	X		
	Opal Gray Substation Ward 7 FPD #1			X		X	X	X	X	X		
	Southeast Ward 3 Fire Station			X		X	X	X	X	X		
	Starks Volunteer Fire Department					X	X	X	X	X		
	Sulphur Fire Station					X	X	X	X	X		
	Sutherland Station					X	X	X	X	X		
	Ward 1 Fire Rescue - Birdnest Station					X	X	X	X	X	X	
	Ward 5 Fire Department					X	X	X	X	X	X	
	Ward 5 FPD #1 - Big Woods Substation			X		X	X	X	X	X		
	Ward 5 FPD #1 - Green Moore Substation					X	X	X	X	X		
	Ward 6 Fire Protection					X	X	X	X	X		
	Ward 6 Fire Protection District 1					X	X	X	X	X	X	
	Ward 6 Fire Protection District 1					X	X	X	X	X	X	
	Ward 7 Fire Department					X	X	X	X	X	X	
	Ward 7 FPD #1 - Edgerly Station					X	X	X	X	X		
	Ward 8 Fire District No. 2			X		X	X	X	X	X	X	
	Westlake Fire			X		X	X	X	X	X	X	

Calcasieu Unincorporated Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter Storm
Fire and Rescue	Calcasieu Parish Department of Special Services					X	X	X	X	X	X	
	Calcasieu Parish Public Works					X	X	X	X	X	X	
	Calcasieu Waterworks Ward 5 District 14			X		X	X	X	X	X		
	East Maintenance Facility					X	X	X	X	X		
	Louisiana DOTD District 7 Headquarters					X	X	X	X	X		
	NOAA National Weather Service					X	X	X	X	X		
	Trash Facility					X	X	X	X	X		
	US Department of Energy					X	X	X	X	X		
	USDA					X	X	X	X	X		
	Water Works District No. 1					X	X	X	X	X	X	
Law Enforcement	Calcasieu Parish Sheriff's Office					X	X	X	X	X		
	Calcasieu Parish Sheriff's Office			X	X	X	X	X	X	X		
	Calcasieu Parish Sheriff's Office			X		X	X	X	X	X		
	Calcasieu Parish Sheriff's Office Carlyss Law Enforcement Ctr			X		X	X	X	X	X	X	
	Calcasieu Parish Sherriff Office			X		X	X	X	X	X		
	Calcasieu Parish Sherriff Office			X		X	X	X	X	X		

Calcasieu Unincorporated Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter Storm
	Calcasieu Police Jury/Emergency Response Training Center					X	X	X	X	X		
	Calcasieu Sheriff Office					X	X	X	X	X		
	Police Impound Lot					X	X	X	X	X		
Public Health	Lake Charles Memorial Hospital for Women					X	X	X	X	X		
Schools	Bee Haven Childcare & Learning Center, LLC.					X	X	X	X	X		
	Bell City School			X	X	X	X	X	X	X	X	
	Cypress Cove Elementary School					X	X	X	X	X		
	Gillis Elementary					X	X	X	X	X		
	Kaufman Elementary			X		X	X	X	X	X		
	LeBeau Settlement Elementary School					X	X	X	X	X		
	Moss Bluff Elementary					X	X	X	X	X		
	Moss Bluff Middle School					X	X	X	X	X		
	Moss Bluff Middle School 2					X	X	X	X	X		
	Parkview Baptist School					X	X	X	X	X		
	Sam Houston High					X	X	X	X	X		
	St. John Elementary			X		X	X	X	X	X		
	St. Theodore					X	X	X	X	X	X	
	Starks Elementary School			X		X	X	X	X	X	X	
	Starks High School					X	X	X	X	X	X	

Calcasieu Unincorporated Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter Storm
Schools	Victory Baptist Academy			X		X	X	X	X	X		
	Vincent Settlement Elementary School			X		X	X	X	X	X	X	

Lake Charles Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter Storm
Fire and Rescue	Company No. Five					X	X	X	X	X		
	Engine Company No 3					X	X	X	X	X		
	Fire Station					X	X	X	X	X		
	Fire Station					X	X	X	X	X		
	Lake Charles Fire Administration					X	X	X	X	X		
	Lake Charles Fire Department No. 2					X	X	X	X	X		
	Lake Charles Fire Department No. 7					X	X	X	X	X		
	Lake Charles Fire Department Station No. 4			X		X	X	X	X	X		
	Lake Charles Fire Department Training Division					X	X	X	X	X		
	Lake Charles Station No. 8					X	X	X	X	X		
Government	Allen P. August Sr. Multi-Purpose Building - Calcasieu Parish Police Jury					X	X	X	X	X		
	Allen P. August, Sr. Multi-Purpose Annex – Calcasieu Parish Police Jury					X	X	X	X	X		

Lake Charles Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter Storm
Government	Armed Forces Career Center					X	X	X	X	X		
	Calcasieu Parish Government Building			X		X	X	X	X	X		
	Calcasieu Judicial Center					X	X	X	X	X		
	Calcasieu Parish Police Jury Animal Services					X	X	X	X	X		
	Calcasieu Parish Police Jury M.A.R.C.			X		X	X	X	X	X		
	Calcasieu Parish Police Jury Office Of Juvenile Justice Services			X		X	X	X	X	X		
	Calcasieu Parish Police Jury Public Works					X	X	X	X	X		
	Calcasieu Parish Public Defender's Office					X	X	X	X	X		
	Calcasieu Parish Sales Tax Office			X		X	X	X	X	X		
	Calcasieu Parish School Board			X		X	X	X	X	X		
	Calcasieu Parish School Board Assessment					X	X	X	X	X		
	Calcasieu Parish Schoolboard Warehouse & Maintenance					X	X	X	X	X		
	Carl Shetler Army Reserve Center			X		X	X	X	X	X		
	City Hall					X	X	X	X	X		

Lake Charles Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter Storm
Government	City of Lake Charles Department of Public Works					X	X	X	X	X		
	City of Lake Charles Transit and Customer Service Center					X	X	X	X	X		
	City Recycle Center					X	X	X	X	X		
	Department of Child and Family Services					X	X	X	X	X		
	Department of Homeland Security Immigration & Customs Enforcement					X	X	X	X	X		
	Department of Public Safety & Corrections Probation & Patrol			X		X	X	X	X	X		
	Department of Social Services					X	X	X	X	X		
	Edwin F. Hunter Jr. U.S. Courthouse					X	X	X	X	X		
	Family & Juvenile Court					X	X	X	X	X		
	Lake Charles City Court			X		X	X	X	X	X		
	Lake Charles Green Recycling Station					X	X	X	X	X		
	Lake Charles Housing Authority					X	X	X	X	X		
	Lake Charles Housing Authority Central Office					X	X	X	X	X		
	Lake Charles Housing Authority Maintenance Facility					X	X	X	X	X		
	Louisiana Court of Appeal Third Circuit					X	X	X	X	X		

Lake Charles Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter Storm
Government	Louisiana Department of Children & Family Services					X	X	X	X	X		
	Louisiana Department of Environmental Quality					X	X	X	X	X		
	Louisiana Department of Motor Vehicles					X	X	X	X	X		
	Louisiana Department of Wildlife and Fisheries			X		X	X	X	X	X		
	Louisiana DNR L.E.R.C.at McNeese State University					X	X	X	X	X		
	Louisiana National Guard					X	X	X	X	X		
	National Guard Recruitment Center					X	X	X	X	X		
	Office of the District Attorney					X	X	X	X	X		
	Parish Police Jury					X	X	X	X	X		
	Police Impound Lot					X	X	X	X	X		
	Public Defender's Office					X	X	X	X	X		
	Safety Council SWLA - Safety Training Complex			X		X	X	X	X	X		
	Social Security Administration			X		X	X	X	X	X		
	Social Security Administration Office					X	X	X	X	X		
	The Magnolia Building					X	X	X	X	X		

Lake Charles Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter Storm
Government	U.S. Customs and Border Protection			X		X	X	X	X	X		
	U.S. Customs And Border Protection Station			X		X	X	X	X	X		
	United States Coast Guard Station					X	X	X	X	X		
	USDA Service Center			X		X	X	X	X	X		
Law Enforcement	Calcasieu Parish Reg Law Enforcement Training Academy					X	X	X	X	X		
	Central Police Station					X	X	X	X	X		
	Lake Charles Police					X	X	X	X	X		
	Lake Charles Police					X	X	X	X	X		
	Lake Charles Police					X	X	X	X	X		
	Lake Charles Police Annex					X	X	X	X	X		
	Lake Charles Police Dept. K-9 Training Division					X	X	X	X	X		
	Lake Charles Police Detective Division					X	X	X	X	X		
	Louisiana State Police Troop D					X	X	X	X	X		
	McNeese Police					X	X	X	X	X		
	Port of Lake Charles Harbor Police Security Center					X	X	X	X	X		
	Wilbert Shepard Building - Calcasieu Parish Sheriff's Office			X		X	X	X	X	X		
Public Health	Christus St. Patrick Hospital			X		X	X	X	X	X		
	Lake Charles Memorial Hospital					X	X	X	X	X		

Lake Charles Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter Storm
Public Health	Lake Charles Memorial Hospital					X	X	X	X	X		
	Lake Charles Memorial Hospital - Intensive Outpatient Services					X	X	X	X	X		
Schools	A.A. Nelson Elementary					X	X	X	X	X		
	Academy of Acadiana			X		X	X	X	X	X		
	Alfred M. Barbe High School					X	X	X	X	X		
	Barbe Elementary			X		X	X	X	X	X		
	Brenda Hunter's Headstart					X	X	X	X	X		
	Brentwood Elementary School					X	X	X	X	X		
	Calcasieu Parish Alternative School					X	X	X	X	X		
	Central School			X		X	X	X	X	X		
	College Oaks Elementary					X	X	X	X	X		
	College st Vocational Center			X		X	X	X	X	X		
	Combre-Fondel Elementary School			X		X	X	X	X	X		
	Dolby Elementary					X	X	X	X	X		
	F. K. White Middle School					X	X	X	X	X		
	Fairview Elementary School					X	X	X	X	X		
	Hamilton Christian Academy					X	X	X	X	X		
	Henry Heights Elementary			X		X	X	X	X	X		

Lake Charles Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter Storm
Schools	Immaculate Conception Cathedral School			X		X	X	X	X	X		
	Jessie D. Clifton Elementary School					X	X	X	X	X		
	John F. Kennedy Elementary School					X	X	X	X	X		
	John Johnson II Elementary					X	X	X	X	X		
	Lagrange Senior High			X		X	X	X	X	X		
	Lake Charles Charter Academy					X	X	X	X	X		
	Oak Park Elementary School					X	X	X	X	X		
	Oak Park Middle School					X	X	X	X	X		
	OLQH School					X	X	X	X	X		
	Our Lady Queen of Heaven School					X	X	X	X	X		
	Our Lady Queen of Heaven School Extension					X	X	X	X	X		
	Pearl Watson Elementary					X	X	X	X	X		
	Prien Lake Elementary					X	X	X	X	X		
	Ralph F. Wilson Elementary School					X	X	X	X	X		
	Ray D. Molo Middle School					X	X	X	X	X		
	Reynaud Middle School					X	X	X	X	X		
	Rosteet Junior High					X	X	X	X	X		
	S.J. Welsh Middle School					X	X	X	X	X		

Lake Charles Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter Storm
Schools	Sacred Heart Elementary					X	X	X	X	X		
	Southwest Louisiana Charter					X	X	X	X	X		
	Southwest Louisiana Charter Academy					X	X	X	X	X		
	St. Louis Catholic					X	X	X	X	X		
	T.H. Watkins Elementary					X	X	X	X	X		
	The Robinswood School					X	X	X	X	X		
	TS Cooley Elementary					X	X	X	X	X		
	Washington-Marion Magnet High School					X	X	X	X	X		
Nursing Homes	Carriage House			X		X	X	X	X	X		
	Emeritus					X	X	X	X	X		
	Grand Cove			X		X	X	X	X	X		
	Harbor Hospice					X	X	X	X	X		
	Landmark of Lake Charles					X	X	X	X	X		
	Resthaven					X	X	X	X	X		
	St. Martin de Porres Multi-Care Center					X	X	X	X	X		
	The Gardens					X	X	X	X	X		

Sulphur Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter Storm
Fire and Rescue	East Side Fire Station				X	X	X	X	X	X		
	Fire Station				X	X	X	X	X	X	X	
	Fire Station				X	X	X	X	X	X	X	
Government	Automotive Service Center					X	X	X	X	X	X	

Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter Storm
Government	Business Center					X	X	X	X	X		
	City Council Chambers					X	X	X	X	X		
	City Hall					X	X	X	X	X		
	City of Sulphur Municipal Business Center					X	X	X	X	X		
	DMV					X	X	X	X	X		
	DOTD			X		X	X	X	X	X		
	Office of City Prosecutor					X	X	X	X	X		
	Sabine River Authority					X	X	X	X	X		
	Sulphur Judicial Center					X	X	X	X	X		
	Traffic Division Warehouse					X	X	X	X	X		
Law Enforcement	Calcasieu Sheriff's Office			X	X	X	X	X	X	X		
	Law Enforcement Center				X	X	X	X	X	X		
Public Health	West Calcasieu Cameron Hospital				X	X	X	X	X	X		
	West Calcasieu Cameron Hospital				X	X	X	X	X	X		
Schools	DS Perkins Elementary				X	X	X	X	X	X		
	E K Key Elementary					X	X	X	X	X		
	Frasch Elementary					X	X	X	X	X		
	Hope Christian School				X	X	X	X	X	X		
	Jake Drost School for Exceptional Children			X		X	X	X	X	X	X	
	Leblanc Middle School					X	X	X	X	X		

Sulphur Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter Storm
Schools	Maplewood Middle School				X	X	X	X	X	X		
	Our Lady's School					X	X	X	X	X		
	Sulphur High			X		X	X	X	X	X		
	Sulphur High 2			X		X	X	X	X	X	X	
	Vincent Elementary School					X	X	X	X	X		
	W W Lewis Middle School					X	X	X	X	X		
	WT Henning Elementary			X		X	X	X	X	X	X	

Iowa Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter storm
Fire and Rescue	Iowa Fire District 1					X	X	X	X	X		
	Iowa Volunteer Fire Dept.					X	X	X	X	X		
Government	Calcasieu Parish Gravity Drainage Dist. #7 Ward 8					X	X	X	X	X		
	Housing Authority of the Town of Iowa					X	X	X	X	X		
	Iowa City Hall					X	X	X	X	X		
Law Enforcement	Calcasieu Parish Sheriff's Office					X	X	X	X	X		
	Iowa Police Department					X	X	X	X	X		
Schools	Iowa High School					X	X	X	X	X		
	J.I. Watson Elementary School					X	X	X	X	X		
	J.I. Watson Middle School					X	X	X	X	X		

Vinton Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter storm
Fire and Rescue	Vinton Fire Station			X		X	X	X	X	X		
	Vinton South Side Fire Station					X	X	X	X	X		
Government	Housing Authority of the Town of Vinton					X	X	X	X	X		
	Town of Vinton Maintenance Building			X		X	X	X	X	X		
	Vinton Municipal Center					X	X	X	X	X		
Law Enforcement	Calcasieu Parish Sheriff's Office			X		X	X	X	X	X		
	Courville-Dupre Law Enforcement Center					X	X	X	X	X		
Schools	Lions Den Day School					X	X	X	X	X		
	Vinton Elementary School					X	X	X	X	X		
	Vinton High School					X	X	X	X	X		
	Vinton Middle School					X	X	X	X	X		
Nursing Homes	Vinton Senior Manor					X	X	X	X	X		

Fire and Rescue	Westlake Fire			X	X	X	X	X	X	X	X	
Government	Westlake City Hall			X		X	X	X	X	X	X	

Westlake Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter storm
Schools	SP Arnett Middle School			X	X	X	X	X	X	X	X	
	Western Heights Elementary			X	X	X	X	X	X	X	X	
	Westlake High			X	X	X	X	X	X	X	X	
	Westwood Elementary			X	X	X	X	X	X	X	X	

DeQuincy Essential Facilities												
Type	Name	Drought	Extreme Heat	Floods	Sinkholes	Hail	Wind	Lightning	Tornado	Tropical Cyclones	Wildfire	Winter storm
Fire and Rescue	DeQuincy Fire Station					X	X	X	X	X	X	
	DeQuincy Fire Station					X	X	X	X	X	X	
Government	Community Outreach Center					X	X	X	X	X	X	
	DeQuincy City Hall					X	X	X	X	X		
	Historic Municipal Building					X	X	X	X	X		
	Louisiana National Guard Armory			X		X	X	X	X	X	X	
	Public Service and Safety Building					X	X	X	X	X		
Law Enforcement	Calcasieu Parish Sheriff's Office			X		X	X	X	X	X	X	
Schools	DeQuincy Elementary School					X	X	X	X	X		
	DeQuincy High School					X	X	X	X	X		
	DeQuincy Middle School					X	X	X	X	X		
	DeQuincy Primary School					X	X	X	X	X	X	
	Toddler Junction					X	X	X	X	X		

Unincorporated Calcasieu Prior Mitigation Review

Unincorporated Calcasieu Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
CP1 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, BRIC, CDBG Local	5-10 years	Calcasieu Parish/ Planning & Development	High Wind, Tropical Cyclone, Tornado, Hail	1,2,3,4	Ongoing
CP2 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, BRIC, CDBG-MIT, (LWI), FMA, CDBG-DR Local	1-10 years	Calcasieu Parish/ Planning & Development	Flooding, Tropical Cyclone, Subsidence	1,2,5	Ongoing
CP3 Flood Mitigation of Severe Repetitive Loss and Repetitive Loss Properties and Other Hazard Prone Structures	Elevation, acquisition-demolition, acquisition-relocations, and reconstruction of repetitive loss and severe repetitive loss or other hazard prone properties.	FEMA, BRIC, CDBG-MIT, (LWI), FMA, CDBG-DR Local	1-5 years	Calcasieu Parish/ Planning & Development	Flooding, Tropical Cyclone, Subsidence	1,2	Ongoing
CP4 Safe Room Projects	Construction of a safe room for first responders located in Calcasieu Parish. Other locations will be identified based on funding availability.	FEMA, BRIC, CDBG-MIT, CDBG-DR Local	1-10 years	Calcasieu Parish/ Planning & Development	Tornado, High wind, tropical cyclone, hail	1,2	Ongoing

Unincorporated Calcasieu Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
CP5 Flood Mitigation: Smart Growth Planning and Infrastructure Construction	Conduct study to determine areas for growth that promote flood risk reduction; develop infrastructure plans and construct infrastructure to encourage growth in these areas	FEMA BRIC, HMGP, CDBG-DR, CDBG-MIT	10-20 years	Calcasieu Parish Planning and Development, Administration, Engineering and Public Works Departments	Flooding, Tropical Cyclone, Subsidence	1,2	Ongoing
CP6 Utility Mitigation	Hardening/retrofitting of existing and future critical utilities such as electrical, water, and sewer	FEMA BRIC, HMGP, CDBG-DR, CDBG-MIT, Local	1-10 years	Calcasieu Parish Police Jury, Local Utility Companies	Flooding, Tropical Cyclone, Tornados, Thunderstorms	1,2,3,5	Ongoing
CP7 Pump Station Upgrades	Upgrading existing pump stations throughout Calcasieu Parish by installing systems that will allow employees to monitor and control pump stations from any secured mobile device	FEMA BRIC, HMGP, CDBG-DR, CDBG-MIT, Local	1-5 years	Calcasieu Parish Police Jury, Drainage Districts	Flooding, Tropical Cyclone, Tornados, Thunderstorms	1,2,3,5	Ongoing
CP8 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, tornadoes, wildfire, wildfire, drought, excessive heat, sinkholes, thunderstorms (lightning, high wind, hail), a n d 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. Also promoting the use of NOAA "All Hazards" radios for early warning and post event information.	FEMA, CDBG-MIT (LWI) Local	1-5 years	Calcasieu Parish OHSEP	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorms (lightning, high wind, hail), winter storms, subsidence	1,2, 3,4, 5,6, 7	Ongoing

Unincorporated Calcasieu Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
CP9 Properties at Risk	Conduct and complete a study to determine the effects of risks to parish properties and implement a campaign to alert affected citizens of magnitude potential and provide mitigation suggestions	FEMA, CDBG-MIT (LWI), CDBG-DR Local, USACE	1-5 years	Calcasieu Parish OHSEP	Tropical Cyclone, high wind, hail, lightning, flooding, tornado, sinkhole, wildfire, subsidence	1,2, 3,4, 5,6, 7	Ongoing
CP10 Continuity of Operations for Parish, Cooperative Agreements, Communications Equipment	Purchase of communications equipment for emergency response personnel and parish buildings so that day to day operations may continue during events to protect the life and safety of residents	FEMA, Local	1-5 years	Calcasieu Parish OHSEP	Tropical Cyclone, high wind, tornado, sinkhole, wildfire, winter storms	1,2	Ongoing
CP11 Water Rationing Program	Implement a water rationing program with an emphasis on capabilities and enforcement.	FEMA, Local	1-5 years	CPPJ OHSEP, Public Works, Water Districts	Drought	1,2	Ongoing
CP12 Water Distribution Plan	Work with local businesses/water suppliers to develop and implement a water distribution plan for vulnerable populations in advance of periods of excessive heat.	FEMA, Local	1-5 years	CPPJ OHSEP	Excessive heat	1,2	Ongoing

Unincorporated Calcasieu Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
CP13 Community Shelter Construction	Set up of community shelters for the public throughout the parish to shelter public during disasters. Retrofit existing critical infrastructure to utilize as shelter as needed	FEMA, Local	1-5 years	CPPJ OHSEP, Public Works	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorms (lightning, high wind, hail), winter storms	1,2	Ongoing Note: Calcasieu Parish Sheltering Plan was finalized in 2020
CP14 NFIP Initiatives	Continue Calcasieu Parish's participation in the National Flood Insurance Program (NFIP). Identify and implement necessary actions and steps to further the participation of Calcasieu Parish in the NFIP and Community Rating System including but not limited to floodplain mapping, higher regulatory standards, protecting building utilities, stormwater management standards, drainage system maintenance, and flood warning programs.	FEMA, Local	5 years	CPPJ Planning & Development	Flooding, Tropical Cyclone	1,2	Ongoing Note: Activity 610 completed annually
CP15 Flood Proofing of Critical Facilities	Flood-proof critical structures within the Parish to help promote continuation of critical services during a storm event	FEMA, Local	1-5 years	CPPJ Planning & Development	Flooding, Tropical Cyclone	1,2, 3,4, 5	Ongoing
CP16 Lightning Protection for Parish Facilities	Installation of lightning rods and surge protectors to facilities. Upgrade critical facilities database and communications systems including data back-up and surge protection to mitigate losses due to lightning strikes and electrical blackouts.	FEMA, Local	2-3 years	CPPJ OHSEP, Planning & Development	Lightning	1,2, 3,4	Ongoing Notes: Completed at Primary Parish Facilities

Unincorporated Calcasieu Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
CP17 Wildfire Mitigation Plan	Develop and implement a regional interagency wildfire mitigation plan	FEMA, Local	1-3 years	CPPJ, Fire Districts	Wildfire	1,2	Ongoing
CP18 Emergency Warning System and Communications Equipment	Improve communication within the parish by purchasing, installing, and implementing outdoor warning systems and communications equipmentto include Incident Management Information Sharing Software.	FEMA, Local	1-5 years	CPPJ OHSEP	High wind, hail, lightning, flooding, tornado, sinkhole, Tropical Cyclone	1,2, 3,4, 5,6	Ongoing
CP19 GIS Hazard Mitigation Planning	Develop a regional Geographic Information System (GIS) database to support future hazard mitigation planning.	FEMA, CDBG-MIT(LWI), CDBG-DR, BRIC, Local	1-3 years	CPPJ, Participating cities,	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorms (lightning, high wind, hail), winter storms	1,2, 3,4, 5,6, 7	Ongoing Note: Purchased and implemented Orion Software in 2017. Completing watershed modeling effort currently.
CP20 Interoperable Communications Plan	Develop an interoperability/communications plan identifying resources and equipment needed to establish a single, interagency, mobile incident and communications command post.	HMGP and Parish	1-5 Years	Calcasieu Parish OHSEP	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorms (lightning, high wind, hail), winter storms	1,2	Complete Note: Calcasieu Multi-Hazard Communications Plan Finalized in 2018

Unincorporated Calcasieu Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
CP21 Volunteer Training Program	Create a program that recruits and trains volunteers to provide support in safeguarding the parish before, during and after any disaster or in the event of a large scale emergency.	CTPGP, HMGP	1-2 Years	CPPJ OHSEP	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorms (lightning, high wind, hail), winter storms	1	Ongoing – Coordinating with SWLA VOAD
CP22 Generator Installation	Purchase generators and install at critical facilities to continue essential operations paris-hwide during events.	FEMA BRIC, HMGP, CDBR-DR, CDBG-MIT	1-2 Years	CPPJ OHSEP	Flooding, tropical cyclones, wildfire, winter storms	1,2, 3,4	Ongoing Note: Primary Parish Facilities arecomplete
CP23 Disaster Travel Planning	Review and update current evacuation routes and improve evacuation route signing. Post-Laura study on functionality and benefit of traffic circles during times of evacuations and post-disaster response	FEMA BRIC, HMGP, CDBG-DR, CDBG-MIT	1-10 years	CPPJ OHSEP, Public Works, Engineering	Tropical Cyclone	1	Ongoing Note: Routes have been established. Signage improvements are ongoing
CP24 Tornado Mitigation Initiatives	Provide community facilities and government buildings with a tornado preparation checklist. Require each facility to update their existing tornado response plan in accordance with the list and associated recommendations.	FEMA HMGP, 5 percent initiative, FEMA BRIC, CDBG-DR, CDBG-MIT	1-2 Years	CPPJ OHSEP	Tornado	1,2	Ongoing
CP25 Wildfire Ordinance	Strengthen penalties and improve enforcement capabilities of burn ban ordinance.	FEMA HMGP, Local	1-5 Years	CPPJ, Fire Districts	Wildfire	1,2	Ongoing

City of DeQuincy Prior Mitigation Action Review

City of DeQuincy Mitigation Actions							
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, Local	2-5 years	Calcasieu Parish OHSEP/ City of DeQuincy	High Wind, Tropical Cyclone, Tornado, Hail	1,2,3, 4	Ongoing
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, Local	1-10 years	Calcasieu Parish OHSEP/ City of DeQuincy	Flooding, Tropical Cyclone	1,2,5	Ongoing
D3 Flood mitigation of severe repetitive loss and repetitive loss properties and other hazard prone structures	Elevation, acquisition-demolition, acquisition- relocations, and reconstruction of repetitive loss and severe repetitive loss or other hazard prone properties.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of DeQuincy	Flooding, Tropical Cyclone	1,2	Ongoing
D4 Safe Room Projects	Construction of a safe room for first responders located in the Parish. Other locations will be identified based on funding availability.	FEMA, Local	1-10 years	Calcasieu Parish OHSEP/ City of DeQuincy	Tornado, High Wind, Tropical Cyclone, Hail	1,2	Ongoing
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, tornadoes, wildfire, wildfire, drought, excessive heat, sinkholes, thunderstorms (lightning, high wind, hail), 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. Also promoting the use of NOAA "All Hazards" radios for early warning and post event information.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of DeQuincy	Flooding, Tropical Cyclone, Tornados, Wildfire, Drought, Excessive Heat, Sinkholes, thunderstorm (lightning, High wind, hail), winter storms	1,2,3, 4,5,6, 7	Ongoing
D6 Properties at Risk	Conduct and complete a study to determine the effects of risks to parish properties and implement a campaign to alert affected citizens of magnitude potential and provide mitigation suggestions	FEMA, Local, USACE	1-5 years	Calcasieu Parish OHSEP/ City of DeQuincy	Tropical Cyclone, High Wind, hail, lightning, flooding, tornado, sinkhole, wildfire	1,2,3, 4,5,6, 7	Ongoing

City of DeQuincy Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
D7 Continuity of Operations for Parish, Cooperative Agreements, Communications Equipment	Purchase of communications equipment for emergency response personnel and parish buildings so that day to day operations may continue during events to protect the life and safety of residents	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of DeQuincy	Tropical Cyclone, high wind, tornado, sinkhole, wildfire, winter storms, hail	1,2	Completed
D8 Water Rationing Program	Implement a water rationing program with an emphasis on capabilities and enforcement.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of DeQuincy	Drought	1,2	Ongoing
D9 Community Shelter Construction	Set up of community shelters for the public throughout the parish to shelter public during disasters.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of DeQuincy	Excessive heat, thunderstorm (lightning, high wind, hail), winter storms, sinkhole	1,2	Ongoing
D10 NFIP Initiatives	Continue the Parish's and its jurisdictions participation in the National Flood Insurance Program (NFIP). Identify and implement necessary actions and steps to further the participation of Calcasieu Parish in the NFIP and Community Rating System including but not limited to floodplain mapping, higher regulatory standards, protecting building utilities, stormwater management standards, drainage system maintenance, and flood warning programs.	FEMA, Local	5 years	Calcasieu Parish OHSEP/ City of DeQuincy	Flooding, Tropical Cyclone	1,2	Ongoing
D11 Lightning Protection for Parish Facilities	Installation of lightning rods and surge protectors to facilities. Upgrade critical facilities database and communications systems including data back-up and surge protection to mitigate losses due to lightning strikes and electrical blackouts.	FEMA, Local	2-3 years	Calcasieu Parish OHSEP/ City of DeQuincy	Lightning	1,2,3, 4	Completed
D12 Wildfire Mitigation Plan	Develop and implement a regional interagency wildfire mitigation plan	FEMA, Local	1-3 years	Calcasieu Parish OHSEP/ City of DeQuincy	Wildfire	1,2	Ongoing
D13 Emergency Warning System and Communications Equipment	Improve communication within the parish by purchasing, installing, and implementing outdoor warning systems and communications equipment to include Incident Management Information Sharing Software.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of DeQuincy	High wind, hail, lightning, flooding, tornado, sinkhole, Tropical Cyclone	1,2,3, 4,5,6	Ongoing

City of DeQuincy Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
D14 GIS Hazard Mitigation Planning	Develop a regional Geographic Information System (GIS) database to support future hazard mitigation planning.	HMGP and Parish	1-3 years	Calcasieu Parish OHSEP/ City of DeQuincy	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), winter storms	1,2,3, 4,5,6, 7	Ongoing
D15 Interoperable Communications Plan	Develop an interoperability/communications plan identifying resources and equipment needed to establish a single, interagency, mobile incident and communications command post.	HMPG and Parish	1-5 Years	Calcasieu Parish OHSEP/ City of DeQuincy	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), winter storms	1,2	Ongoing
D16 Vehicle Location System	Install automatic vehicle locator systems in all public-school buses and other critical transportation vehicles to ensure continuity of operations and situational awareness during and following disasters.	HMGP	2-3 years	Calcasieu Parish OHSEP/ City of DeQuincy	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), winter storms	1	Ongoing
D17 Generator Installation	Purchase generators and install at critical facilities to continue essential operations parish-wide	HMGP	1-2 Years	Calcasieu Parish OHSEP/ City of DeQuincy	Flooding, tropical cyclones, wildfire, winter storms	1,2,3, 4	Completed
D18 Parish Evacuation Initiatives	Produce a map of evacuation routes and improve evacuation route signing.	HMGP, PDM	1-10 years	Calcasieu Parish OHSEP/ City of DeQuincy	Tropical Cyclone	1	Ongoing

City of DeQuincy Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
D19 Tornado Mitigation Initiatives	Provide community facilities and government buildings with a tornado preparation checklist. Require each facility to update their existing tornado response plan in accordance with the list and associated recommendations.	HMGP, 5 percent initiative	1-2 Years	Calcasieu Parish OHSEP/ City of DeQuincy	Tornado	1,2	Ongoing
D20 Wildfire Ordinance	Strengthen penalties and improve enforcement capabilities of burn ban ordinance.	PDM, General funds, HMGP	1-5 Years	Calcasieu Parish OHSEP/ City of DeQuincy	Wildfire	1,2	Ongoing

City of Sulphur Prior Mitigation Action Review

City of Sulphur Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
S1 Building Retrofits	Retrofit public buildings exterior shell to maintain use during and after storm events. Benefits: Reduces damage from high winds, and helps assure that the public buildings can be used, occupied and operable during or after storms.	FEMA, Local	2-5 years	Calcasieu Parish OHSEP/ City of Sulphur	High Wind, Tropical Cyclone, Tornado, hail	1,2,3, 4	Ongoing
S2 Drainage Improvement	Will relieve flooding problems, reduce flood damage and costs of damage, overtopping of roads with drain water, while also keeping open roadways during periods of high precipitation. Benefits: Relieves Parish or local government and property owners of the continual flooding problems, with closed roadways (loss of function). Saves public funds for road repairs, drainage ditch repairs, sandbagging and blocking of roadways during storm periods.	FEMA, Local	1-10 years	Calcasieu Parish OHSEP/ City of Sulphur	Flooding, Tropical Cyclone, Subsidence	1,2,5	Ongoing
S3 Flood mitigation of severe repetitive loss and repetitive loss properties and other hazard prone structures	Elevation, acquisition-demolition, acquisition- relocations, and reconstruction of repetitive loss and severe repetitive loss or other hazard prone properties.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of Sulphur	Flooding, Tropical Cyclone, Subsidence	1,2	Ongoing
S4 Safe Room Projects	Construction of a safe room for first responders located in the Parish. Other locations will be identified based on funding availability.	FEMA, Local	1-10 years	Calcasieu Parish OHSEP/ City of Sulphur	Tornado, high wind, tropical cyclone, hail	1,2	Ongoing
S5 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, tornadoes, wildfire, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), 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. Also promoting the use of NOAA "All Hazards" radios for early warning and post event information.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of Sulphur	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), winter storms, subsidence	1,2,3, 4,5,6, 7	Ongoing

City of Sulphur Mitigation Actions							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
S6 Properties at Risk	Conduct and complete a study to determine the effects of risks to parish properties and implement a campaign to alert affected citizens of magnitude potential and provide mitigation suggestions	FEMA, Local, USACE	1-5 years	Calcasieu Parish OHSEP/ City of Sulphur	Tropical Cyclone, high wind, hail, lightning, flooding, tornado, sinkhole,	1,2,3, 4,5,6, 7	Ongoing
S7 Continuity of Operations for Parish, Cooperative Agreements, Communications Equipment	Purchase of communications equipment for emergency response personnel and parish buildings so that day to day operations may continue during events to protect the life and safety of residents	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of Sulphur	Tropical Cyclone, high wind, tornado, sinkhole, wildfire, winter storms, hail	1,2	Ongoing
S8 Water Rationing Program	Implement a water rationing program with an emphasis on capabilities and enforcement.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of Sulphur	Drought	1,2	Ongoing
S9 Community Shelter Construction	Set up of community shelters for the public throughout the parish to shelter public during disasters.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of Sulphur	Excessive heat, thunderstorm (lightning, high wind, hail), winter storms, sinkhole	1,2	Ongoing
S10 NFIP Initiatives	Continue the Parish's and its jurisdictions participation in the National Flood Insurance Program (NFIP). Identify and implement necessary actions and steps to further the participation of Calcasieu Parish in the NFIP and Community Rating System including but not limited to floodplain mapping, higher regulatory standards, protecting building utilities, stormwater management standards, drainage system maintenance, and flood warning programs.	FEMA, Local	5 years	Calcasieu Parish OHSEP/ City of Sulphur	Flooding, Tropical Cyclone	1,2	Ongoing

City of Sulphur Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
S11 Lightning Protection for Parish Facilities	Installation of lightning rods and surge protectors to facilities. Upgrade critical facilities database and communications systems including data back-up and surge protection to mitigate losses due to lightning strikes and electrical blackouts.	FEMA, Local	2-3 years	Calcasieu Parish OHSEP/ City of Sulphur	Lightning	1,2,3, 4	Ongoing
S12 Wildfire Mitigation Plan	Develop and implement a regional interagency wildfire mitigation plan	FEMA, Local	1-3 years	Calcasieu Parish OHSEP/ City of Sulphur	Wildfire	1,2	Ongoing
S13 Emergency Warning System and Communications Equipment	Improve communication within the parish by purchasing, installing, and implementing outdoor warning systems and communications equipment to include Incident Management Information Sharing Software.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of Sulphur	High wind, hail, lightning, flooding, tornado, sinkhole, Tropical Cyclone	1,2,3, 4,5,6	Ongoing
S14 GIS Hazard Mitigation Planning	Develop a regional Geographic Information System (GIS) database to support future hazard mitigation planning.	HMGP and Parish	1-3 years	Calcasieu Parish OHSEP/ City of Sulphur	Flooding, Tropical Cyclone, tornados, wildfire, , drought, excessive heat, sinkholes, thunderstorm	1,2,3, 4,5,6, 7	Ongoing
S15 Interoperable Communications Plan	Develop an interoperability/communications plan identifying resources and equipment needed to establish a single, interagency, mobile incident and communications command post.	HMPG and Parish	1-5 Years	Calcasieu Parish OHSEP/ City of Sulphur	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorm	1,2	Ongoing
S16 Vehicle Location System	Install automatic vehicle locator systems in all public school buses and other critical transportation vehicles to ensure continuity of operations and situational awareness during and following disasters.	HMGP	2-3 years	Calcasieu Parish OHSEP/ City of Sulphur	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), winter storms	1	Ongoing

City of Sulphur Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
S17 Generator Installation	Purchase generators and install at critical facilities to continue essential operations parishwide during events.	HMGP	1-2 Years	Calcasieu Parish OHSEP/ City of Sulphur	Flooding, tropical cyclones, wildfire, winter storms	1,2,3, 4	Ongoing
S18 Parish Evacuation Initiatives	Produce a map of evacuation routes and improve evacuation route signing.	HMGP, PDM	1-10 years	Calcasieu Parish OHSEP/ City of Sulphur	Tropical Cyclone	1	Ongoing
S19 Tornado Mitigation Initiatives	Provide community facilities and government buildings with a tornado preparation checklist. Require each facility to update their existing tornado response plan in accordance with the list and associated recommendations.	HMGP, 5 percent initiative	1-2 Years	Calcasieu Parish OHSEP/ City of Sulphur	Tornado	1,2	Ongoing
S20 Wildfire Ordinance	Strengthen penalties and improve enforcement capabilities of burn ban ordinance.	PDM, General funds, HMGP	1-5 Years	Calcasieu Parish OHSEP/ City of Sulphur	Wildfire	1,2	Ongoing

Town of Vinton Prior Mitigation Action Review

Town of Vinton Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
V1 Building Retrofits	Retrofit public buildings exterior shell to maintain use during and after storm events. Benefits: Reduces damage from high winds, and helps assure that the public buildings can be used, occupied and operable during or after storms.	FEMA, Local	2-5 years	Calcasieu Parish OHSEP/ Town of Vinton	High Wind, Tropical Cyclone, Tornado, Hail	1,2,3, 4	Ongoing
V2 Drainage Improvement	Will relieve flooding problems, reduce flood damage and costs of damage, overtopping of roads with drain water, while also keeping open roadways during periods of high precipitation. Benefits: Relieves Parish or local government and property owners of the continual flooding problems, with closed roadways (loss of function). Saves public funds for road repairs, drainage ditch repairs, sandbagging and blocking of roadways during storm periods.	FEMA, Local	1-10 years	Calcasieu Parish OHSEP/ Town of Vinton	Flooding, Tropical Cyclone, Subsidence	1,2,5	Ongoing
V3 Flood mitigation of severe repetitive loss and repetitive loss properties and other hazard prone structures	Elevation, acquisition-demolition, acquisition- relocations, and reconstruction of repetitive loss and severe repetitive loss or other hazard prone properties.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ Town of Vinton	Flooding, Tropical Cyclone, Subsidence	1,2	Ongoing
V4 Safe Room Projects	Construction of a safe room for first responders located in the Parish. Other locations will be identified based on funding availability.	FEMA, Local	1-10 years	Calcasieu Parish OHSEP/ Town of Vinton	Tornado, high wind, tropical cyclone, hail	1,2	Ongoing

Town of Vinton Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
V5 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, tornadoes, wildfire, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), 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. Also promoting the use of NOAA "All Hazards" radios for early warning and post event information.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ Town of Vinton	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), winter storms, subsidence	1,2,3, 4,5,6, 7	Completed
V6 Properties at Risk	Conduct and complete a study to determine the effects of risks to parish properties and implement a campaign to alert affected citizens of magnitude potential and provide mitigation suggestions	FEMA, Local, USACE	1-5 years	Calcasieu Parish OHSEP/ Town of Vinton	Tropical Cyclone, high wind, hail, lightning, flooding, tornado, sinkhole,	1,2,3, 4,5,6, 7	Ongoing
V7 Continuity of Operations for Parish, Cooperative Agreements, Communications Equipment	Purchase of communications equipment for emergency response personnel and parish buildings so that day to day operations may continue during events to protect the life and safety of residents	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ Town of Vinton	Tropical Cyclone, high wind, tornado, sinkhole, wildfire, winter storms	1,2	Ongoing
V8 Water Rationing Program	Implement a water rationing program with an emphasis on capabilities and enforcement.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ Town of Vinton	Drought	1,2	Ongoing
V9 Community Shelter Construction	Set up of community shelters for the public throughout the parish to shelter public during disasters.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ Town of Vinton	Excessive heat, thunderstorm (lightning, high wind, hail), winter storms, sinkhole	1,2	Ongoing

Town of Vinton Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
V10 NFIP Initiatives	Continue the Parish's and its jurisdictions participation in the National Flood Insurance Program (NFIP). Identify and implement necessary actions and steps to further the participation of Calcasieu Parish in the NFIP and Community Rating System including but not limited to floodplain mapping, higher regulatory standards, protecting building utilities, stormwater management standards, drainage system maintenance, and flood warning programs.	FEMA, Local	5 years	Calcasieu Parish OHSEP/ Town of Vinton	Flooding, Tropical Cyclone	1,2	Ongoing
V11 Lightning Protection for Parish Facilities	Installation of lightning rods and surge protectors to facilities. Upgrade critical facilities database and communications systems including data back-up and surge protection to mitigate losses due to lightning strikes and electrical blackouts.	FEMA, Local	2-3 years	Calcasieu Parish OHSEP/ Town of Vinton	Lightning	1,2,3, 4	Ongoing
V12 Wildfire Mitigation Plan	Develop and implement a regional interagency wildfire mitigation plan	FEMA, Local	1-3 years	Calcasieu Parish OHSEP/ Town of Vinton	Wildfire	1,2	Ongoing
V13 Emergency Warning System and Communications Equipment	Improve communication within the parish by purchasing, installing, and implementing outdoor warning systems and communications equipment to include Incident Management Information Sharing Software.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ Town of Vinton	High wind, hail, lightning, flooding, tornado, sinkhole, Tropical Cyclone	1,2,3, 4,5,6	Completed
V14 GIS Hazard Mitigation Planning	Develop a regional Geographic Information System (GIS) database to support future hazard mitigation planning.	HMGP and Parish	1-3 years	Calcasieu Parish OHSEP/ Town of Vinton	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat,	1,2,3, 4,5,6, 7	Completed
V15 Interoperable Communications Plan	Develop an interoperability/communications plan identifying resources and equipment needed to establish a single, interagency, mobile incident and communications command post.	HMPG and Parish	1-5 Years	Calcasieu Parish OHSEP/ Town of Vinton	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat,	1,2	Completed
V16 Vehicle Location System	Install automatic vehicle locator systems in all public school buses and other critical transportation vehicles to ensure continuity of operations and situational awareness during and following disasters.	HMGP	2-3 years	Calcasieu Parish OHSEP/ Town of Vinton	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat,	1	Ongoing

Town of Vinton Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
V17 Generator Installation	Purchase generators and install at critical facilities to continue essential operations parishwide during events.	HMGP	1-2 Years	Calcasieu Parish OHSEP/ Town of Vinton	Flooding, tropical cyclones, wildfire, winter storms	1,2,3, 4	Ongoing
V18 Parish Evacuation Initiatives	Produce a map of evacuation routes and improve evacuation route signing.	HMGP, PDM	1-10 years	Calcasieu Parish OHSEP/ Town of Vinton	Tropical Cyclone	1	Ongoing
V19 Tornado Mitigation Initiatives	Provide community facilities and government buildings with a tornado preparation checklist. Require each facility to update their existing tornado response plan in accordance with the list and associated recommendations.	HMGP, 5 percent initiative	1-2 Years	Calcasieu Parish OHSEP/ Town of Vinton	Tornado	1,2	Completed
V20 Wildfire Ordinance	Strengthen penalties and improve enforcement capabilities of burn ban ordinance.	PDM, General funds, HMGP	1-5 Years	Calcasieu Parish OHSEP/ Town of Vinton	Wildfire	1,2	Completed

City of Westlake Prior Mitigation Action Reivew

City of Westlake Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or**	**Hazard**	**Goal**	**Status**
W1 Building Retrofits	Retrofit public buildings exterior shell to maintain use during and after storm events. Benefits: Reduces damage from high winds, and helps assure that the public buildings can be used, occupied and operable during or after storms.	FEMA, Local	2-5 years	Calcasieu Parish OHSEP/ City of Westlake	High Wind, Tropical Cyclone, Tornado, Hail	1,2, 3,4	Ongoing
W2 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,	FEMA, Local	1-10 years	Calcasieu Parish OHSEP/ City of Westlake	Flooding, Tropical Cyclone, Subsidence	1,2, 5	Ongoing
W3 Flood mitigation of severe repetitive loss and repetitive loss properties and other hazard prone structures	Elevation, acquisition-demolition, acquisition- relocations, and reconstruction of repetitive loss and severe repetitive loss or other hazard prone properties.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of Westlake	Flooding, Tropical Cyclone, Subsidence	1,2	Ongoing
W4 Safe Room Projects	Construction of a safe room for first responders located in the Parish. Other locations will be identified based on funding availability.	FEMA, Local	1-10 years	Calcasieu Parish OHSEP/ City of Westlake	Tornado, high wind, tropical cyclone, hail	1,2	Ongoing
W5 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, tornadoes, wildfire, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), 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. Also promoting the use of NOAA "All Hazards" radios for early warning and post event information.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of Westlake	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), winter storms, subsidence	1,2, 3,4, 5,6, 7	Ongoing

City of Westlake Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or**	**Hazard**	**Goal**	**Status**
W6 Properties at Risk	Conduct and complete a study to determine the effects of risks to parish properties and implement a campaign to alert affected citizens of magnitude potential and provide mitigation suggestions	FEMA, Local, USACE	1-5 years	Calcasieu Parish OHSEP/ City of Westlake	Tropical Cyclone, wind, hail, lightning, flooding, tornado, sinkhole, wildfire, hail, subsidence	1,2, 3,4, 5,6, 7	Ongoing
W7 Continuity of Operations for Parish, Cooperative Agreements, Communications Equipment	Purchase of communications equipment for emergency response personnel and parish buildings so that day to day operations may continue during events to protect the life and safety of residents	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of Westlake	Tropical Cyclone, high wind, tornado, sinkhole, wildfire, winter storms	1,2	Ongoing
W8 Water Rationing Program	Implement a water rationing program with an emphasis on capabilities and enforcement.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of Westlake	Drought	1,2	Ongoing
W9 Community Shelter Construction	Set up of community shelters for the public throughout the parish to shelter public during disasters.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of Westlake	Excessive heat, thunderstorm (lightning, high wind, hail), winter storms, sinkhole	1,2	Ongoing

City of Westlake Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or**	**Hazard**	**Goal**	**Status**
W10 NFIP Initiatives	Continue the Parish's and its jurisdictions participation in the National Flood Insurance Program (NFIP). Identify and implement necessary actions and steps to further the participation of Calcasieu Parish in the NFIP and Community Rating System including but not limited to floodplain mapping, higher regulatory standards, protecting building utilities, stormwater management standards, drainage system maintenance, and flood warning programs.	FEMA, Local	5 years	Calcasieu Parish OHSEP/ City of Westlake	Flooding, Tropical Cyclone	1,2	Ongoing
W11 Lightning Protection for Parish Facilities	Installation of lightning rods and surge protectors to facilities. Upgrade critical facilities database and communications systems including data back-up and surge protection to mitigate losses due to lightning strikes and electrical blackouts.	FEMA, Local	2-3 years	Calcasieu Parish OHSEP/ City of Westlake	Lightning	1,2, 3,4	Ongoing
W12 Wildfire Mitigation Plan	Develop and implement a regional interagency wildfire mitigation plan	FEMA, Local	1-3 years	Calcasieu Parish OHSEP/ City of Westlake	Wildfire	1,2	Ongoing
W13 Emergency Warning System and Communications Equipment	Improve communication within the parish by purchasing, installing, and implementing outdoor warning systems and communications equipment to include Incident Management Information Sharing Software.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of Westlake	High wind, hail, lightning, flooding, tornado, sinkhole, Tropical Cyclone	1,2, 3,4, 5,6	Ongoing

City of Westlake Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or**	**Hazard**	**Goal**	**Status**
W14 GIS Hazard Mitigation Planning	Develop a regional Geographic Information System (GIS) database to support future hazard mitigation planning.	HMGP and Parish	1-3 years	Calcasieu Parish OHSEP/ City of Westlake	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), winter storms	1,2, 3,4, 5,6, 7	Ongoing
W15 Interoperable Communications Plan	Develop an interoperability/communications plan identifying resources and equipment needed to establish a single, interagency, mobile incident and communications command post.	HMPG and Parish	1-5 Years	Calcasieu Parish OHSEP/ City of Westlake	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), winter storms	1,2	Ongoing
W16 Vehicle Location System	Install automatic vehicle locator systems in all public school buses and other critical transportation vehicles to ensure continuity of operations and situational awareness during and following disasters.	HMGP	2-3 years	Calcasieu Parish OHSEP/ City of Westlake	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), winter storms	1	Ongoing
W17 Generator Installation	Purchase generators and install at critical facilities to continue essential operations parishwide during events.	HMGP	1-2 Years	Calcasieu Parish OHSEP/ City of Westlake	Flooding, tropical cyclones, wildfire, winter storms	1,2, 3,4	Completed

City of Westlake Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or**	**Hazard**	**Goal**	**Status**
W18 Parish Evacuation Initiatives	Produce a map of evacuation routes and improve evacuation route signing.	HMGP, PDM	1-10 years	Calcasieu Parish OHSEP/ City of Westlake	Tropical Cyclone	1	Ongoing
W19 Tornado Mitigation Initiatives	Provide community facilities and government buildings with a tornado preparation checklist. Require each facility to update their existing tornado response plan in accordance with the list and associated recommendations.	HMGP, 5 percent initiative	1-2 Years	Calcasieu Parish OHSEP/ City of Westlake	Tornado	1,2	Ongoing
W20 Wildfire Ordinance	Strengthen penalties and improve enforcement capabilities of burn ban ordinance.	PDM, General funds, HMGP	1-5 Years	Calcasieu Parish OHSEP/ City of Westlake	Wildfire	1,2	Ongoing

Town of Iowa Prior Mitigation Action Review

Town of Iowa Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
W1 Building Retrofits	Retrofit public buildings exterior shell to maintain use during and after storm events. Benefits: Reduces damage from high winds and helps assure that the public buildings can be used, occupied and operable during or after storms.	FEMA, Local	2-5 years	Calcasieu Parish OHSEP/ Town of Iowa	High Wind, Tropical Cyclone, Tornado, Hail	1,2, 3,4	Ongoing
W2 Drainage Improvement	Will relieve flooding problems, reduce flood damage and costs of damage, overtopping of roads with drain water, while also keeping open roadways during periods of high precipitation. Benefits: Relieves Parish or local government and property owners of the continual flooding problems, with closed roadways (loss of function). Saves public funds for road repairs, drainage ditch repairs, sandbagging and blocking of roadways during storm periods.	FEMA, Local	1-10 years	Calcasieu Parish OHSEP/ Town of Iowa	Flooding, Tropical Cyclone	1,2, 5	Ongoing
W3 Flood mitigation of severe repetitive loss and repetitive loss properties and other hazard prone structures	Elevation, acquisition-demolition, acquisition- relocations, and reconstruction of repetitive loss and severe repetitive loss or other hazard prone properties.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ Town of Iowa	Flooding, Tropical Cyclone	1,2	Ongoing
W4 Safe Room Projects	Construction of a safe room for first responders located in the Parish. Other locations will be identified based on funding availability.	FEMA, Local	1-10 years	Calcasieu Parish OHSEP/ Town of Iowa	Tornado, high wind, tropical cyclone, hail	1,2	Ongoing
W5 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, tornadoes, wildfire, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), 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. Also promoting the use of NOAA "All Hazards" radios for early warning and post event information.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ Town of Iowa	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), winter storms	1,2, 3,4, 5,6, 7	Ongoing

Town of Iowa Mitigation Actions							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
W6 Properties at Risk	Conduct and complete a study to determine the effects of risks to parish properties and implement a campaign to alert affected citizens of magnitude potential and provide mitigation suggestions	FEMA, Local, USACE	1-5 years	Calcasieu Parish OHSEP/ Town of Iowa	Tropical Cyclone, wind, hail, lightning, flooding, tornado, sinkhole, wildfire, hail	1,2, 3,4, 5,6, 7	Ongoing
W7 Continuity of Operations for Parish, Cooperative Agreements, Communications Equipment	Purchase of communications equipment for emergency response personnel and parish buildings so that day to day operations may continue during events to protect the life and safety of residents	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ Town of Iowa	Tropical Cyclone, high wind, tornado, sinkhole, wildfire, winter storms	1,2	Ongoing
W8 Water Rationing Program	Implement a water rationing program with an emphasis on capabilities and enforcement.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ Town of Iowa	Drought	1,2	Ongoing
W9 Community Shelter Construction	Set up of community shelters for the public throughout the parish to shelter public during disasters.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ Town of Iowa	Excessive heat, thunderstorm (lightning, high wind, hail), winter storms, sinkhole	1,2	Ongoing
W10 NFIP Initiatives	Continue the Parish's and its jurisdictions participation in the National Flood Insurance Program (NFIP). Identify and implement necessary actions and steps to further the participation of Calcasieu Parish in the NFIP and Community Rating System including but not limited to floodplain mapping, higher regulatory standards, protecting building utilities, stormwater management standards, drainage system maintenance, and flood warning programs.	FEMA, Local	5 years	Calcasieu Parish OHSEP/ Town of Iowa	Flooding, Tropical Cyclone	1,2	Ongoing
W11 Lightning Protection for Parish Facilities	Installation of lightning rods and surge protectors to facilities. Upgrade critical facilities database and communications systems including data back-up and surge protection to mitigate losses due to lightning strikes and electrical blackouts.	FEMA, Local	2-3 years	Calcasieu Parish OHSEP/ Town of Iowa	Lightning	1,2, 3,4	Ongoing

Town of Iowa Mitigation Actions							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
W12 Wildfire Mitigation Plan	Develop and implement a regional interagency wildfire mitigation plan	FEMA, Local	1-3 years	Calcasieu Parish OHSEP/ Town of Iowa	Wildfire	1,2	Ongoing
W13 Emergency Warning System and Communications Equipment	Improve communication within the parish by purchasing, installing, and implementing outdoor warning systems and communications equipment to include Incident Management Information Sharing Software.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ Town of Iowa	High wind, hail, lightning, flooding, tornado, sinkhole, Tropical Cyclone	1,2, 3,4, 5,6	Ongoing
W14 GIS Hazard Mitigation Planning	Develop a regional Geographic Information System (GIS) database to support future hazard mitigation planning.	HMGP and Parish	1-3 years	Calcasieu Parish OHSEP/ Town of Iowa	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), winter storms	1,2, 3,4, 5,6, 7	Ongoing
W15 Interoperable Communications Plan	Develop an interoperability/communications plan identifying resources and equipment needed to establish a single, interagency, mobile incident and communications command post.	HMPG and Parish	1-5 Years	Calcasieu Parish OHSEP/ Town of Iowa	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), winter storms	1,2	Ongoing

Town of Iowa Mitigation Actions							
Action	Action Description	Funding Source	Target Completion Date	Responsible Party, Agency, or Department	Hazard	Goal	Status
W16 Vehicle Location System	Install automatic vehicle locator systems in all public school buses and other critical transportation vehicles to ensure continuity of operations and situational awareness during and following disasters.	HMGP	2-3 years	Calcasieu Parish OHSEP/ Town of Iowa	Flooding, Tropical Cyclone, tornados, wildfire, drought, excessive heat, sinkholes, thunderstorm (lightning, high wind, hail), winter storms	1	Partial Completed/ Ongoing
W17 Generator Installation	Purchase generators and install at critical facilities to continue essential operations parishwide during events.	HMGP	1-2 Years	Calcasieu Parish OHSEP/ Town of Iowa	Flooding, tropical cyclones, wildfire, winter storms	1,2, 3,4	Ongoing
W18 Parish Evacuation Initiatives	Produce a map of evacuation routes and improve evacuation route signing.	HMGP, PDM	1-10 years	Calcasieu Parish OHSEP/ Town of Iowa	Tropical Cyclone	1	Ongoing
W19 Tornado Mitigation Initiatives	Provide community facilities and government buildings with a tornado preparation checklist. Require each facility to update their existing tornado response plan in accordance with the list and associated recommendations.	HMGP, 5 percent initiative	1-2 Years	Calcasieu Parish OHSEP/ Town of Iowa	Tornado	1,2	Ongoing
W20 Wildfire Ordinance	Strengthen penalties and improve enforcement capabilities of burn ban ordinance.	PDM, General funds, HMGP	1-5 Years	Calcasieu Parish OHSEP/ Town of Iowa	Wildfire	1,2	Ongoing

City of Lake Charles Prior Mitigation Action Review

City of Lake Charles Mitigation Actions Update							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
LC1 Public Building wind hardening	Retrofit public buildings exterior shells to maintain use during and after storm events. Benefits: Reduces damage from high winds and hail, and helps assure that the identified public buildings can be used, occupied and operable during or after natural hazard events.	HMGP and Parish funding	1-3 years	City of Lake Charles	High Wind, Tropical Cyclone, Tornado, hail	1,2,3, 4	Ongoing
LC2 Drainage - flood relief projects	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 city 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	HMGP and Parish funding	1-3 years	City of Lake Charles	Flooding, Tropical Cyclone, Subsidence	1,2,5	Ongoing
LC3 Lift Station Hardening and Upgrades	Lift Station elevation, hardening and retrofits of five (5) unit stations. Replace and raise controls, provide and install submersible pumps, coat wells. Ability to control and better monitor sewer pumps remotely to avoid sewer flooding and back ups during emergency events. Provide for reliable wastewater removal during hazardous weather events. Reduces loss of life or property by preventing hazardous backups into	HMGP, City and other funds	1-3 years	City of Lake Charles	Flooding, Tropical Cyclone, thunderstorm, lightening, high wind, hail	1,2,5	Ongoing
LC4 Residential elevations and acquisitions for repetitive loss properties and severe repetitive loss properties	Elevation or acquisition-demolition of repetitive loss or severe repetitive loss properties. Benefits: Relieves property owners of the continual flooding problems. Saves flood relief and damage repayment for each property.	HMGP	1-3 years	City of Lake Charles	Flooding, tropical cyclone, subsidence	1,2	Ongoing
LC5 Pump Station Upgrades	Upgrading existing pump stations throughout Calcasieu Parish by installing systems that will allow employees to monitor and control pump stations from any secured mobile device	FEMA BRIC, HMGP, CDBG-DR, CDBG-MIT, Local	1-5 years	Calcasieu Parish Police Jury, Drainage Districts	Flooding, Tropical Cyclone, Tornados, Thunderstorms	1,2,3,5	Ongoing

City of Lake Charles Mitigation Actions Update							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
LC6 Safe Room Projects	Construction of a safe room for first responders located in Lake Charles. Other locations will be identified based on funding availability.	HMGP and Parish	1-3 years 1-3 years	City of Lake Charles	Tornado, high wind, tropical cyclone	1,2	Ongoing
LC7 Mitigation Public Outreach	Enhance the public outreach programs for the city and all communities by increasing awareness of risks and safety for flooding, tropical cyclone, tornadoes, excessive heat, sinkholes, wind, lightning, hail, winter storms and wildfire 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	HMPG and Parish	1-3 years	City of Lake Charles	Flooding, Tropical Cyclone, tornados, wildfire, excessive heat, sinkholes, high wind, lightning, hail, winter storms, subsidence	1,2,3, 4,5,6, 7	Ongoing
LC8 City Sewer mitigation project	Clean, camera and repair city mainlines for sewer to mitigate inflow and infiltration from flooding and storm related waters. Reduces loss of life or property by preventing hazardous backups into homes. Protects public facilities and thoroughfares from sanitary sewer overflows, protects natural resources from contamination from overflows.	HMGP and City	1-3 years	City of Lake Charles	Flooding, Tropical Cyclone, thunderstorm, high wind, winter storm, Drought	1,2,5	Ongoing
LC9 Plant A Final Clarifier Replacement/ City Wastewater Plant Mitigation	Replace undersized final clarification units at wastewater plant. Provides for fewer suspended solids released into environment during hazardous weather events. Protects public waterways from sanitary sewer treatment exceedances, protects natural resources from contamination. Allows for better plant operation and efficiency by returning solids to plant operations not environment	HMGP and City	1-3 years	City of Lake Charles	Flooding, Tropical Cyclone, thunderstorm, high wind, winter storm	1,2,5	Ongoing Note: In design
LC10 Water Plant Retrofits	The City of Lake Charles proposes to harden the water plants of Chennault, Center East, Center West, and McNeese, with siding retrofits, storm shutters, and doors. This will allow the water plants to withstand and minimize damage during natural disaster weather events. The structural integrity of the sites will be improved, thereby lessening the chance of loss of critical services during pre and post disaster events. These facilities are	HMGP and City	1-9 years	City of Lake Charles	Flooding, Tropical Cyclone, thunderstorm, high wind, hail	1,2,3, 4	Ongoing

City of Lake Charles Mitigation Actions Update							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
LC11 Generator Retrofit	Retrofit existing emergency generator which supplies the wastewater plant with emergency power during power outages. Retrofit will allow generator to supply both facilities during power outages. Retrofit to include electrical lines, wiring, and control panels. Supplying emergency power generation to site will ensure the operation of the facility during natural disaster weather events. This facility is	HMGP and City	1-9 years	City of Lake Charles	Flooding, Tropical Cyclone, thunderstorm , high wind, winter storm, wildfire, tornado, hail	1,2,3, 4	Ongoing
LC 12 Lightning Rod Installation	Purchase and Installation of lightning rods for public facilities and buildings to mitigate the loss of property and life from lightning events	HMGP and City	1-4 years	City of Lake Charles	Lightning	1,2,3, 4	Ongoing
LC13 Community Shelter Construction	Set up of community shelters for the public in the City Of Lake Charles to shelter public during disasters.	FEMA, Local	1-5 years	CPPJ OHSEP, City of Lake Charles	Excessive heat, winter storms, sinkhole	1,2	Ongoing
LC14 Wildfire Mitigation Initiative	Develop and implement a regional interagency wildfire mitigation plan	FEMA, Local	1-3 years	CPPJ OHSEP, Fire Districts, City of Lake Charles	Wildfire	1,2	Ongoing
LC15 Emergency Warning System and Communication Equipment	Improve communication within the parish by purchasing, installing, and implementing outdoor warning systems and communications equipment to include Incident Management Information Sharing Software.	FEMA, Local	1-5 years	CPPJ OHSEP, City of Lake Charles	High wind, hail, lightning, flooding, tornado, sinkhole, Tropical Cyclone	1,2,3, 4,5,6	Ongoing

City of Lake Charles Mitigation Actions Update							
Action	**Action Description**	**Funding Source**	**Target Completion Date**	**Responsible Party, Agency, or Department**	**Hazard**	**Goal**	**Status**
LC16 Lift Station Radio Upgrades	Replace communication radios to upgraded units to allow for pump controls during emergency and day to day operations. (38 Units). This provides ability to control and better monitor sewer pumps remotely to avoid backups during emergencies.	FEMA, Local	1 year	City of Lake Charles	Flooding, Tropical Cyclone, thunderstorm , high wind, winter storm, tornado, hail	1,2,3, 4	Ongoing
LC17 Plant D Generator Replacement	Replace wastewater plant generator. This will reduce the loss of life and property by preventing hazardous backups into homes during events. It also protects public facilities and thoroughfares from sanitary sewer overflows and protects natural resources from contamination from overflows.	FEMA, Local	1 year	City of Lake Charles	Flooding, Tropical Cyclone, thunderstorm, high wind, winter storm, tornado, hail	1,2,3, 4	Ongoing
LC18 Water Rationing Program	Implement a water rationing program with an emphasis on capabilities and enforcement.	FEMA, Local	1-5 years	Calcasieu Parish OHSEP/ City of Lake Charles	Drought	1,2	Ongoing

Calcasieu Parish Hazard Mitigation Plan Update Steering Committee
2020 Update
12/1/2020

Nam11	A&ency	Po1ltion	Email	Phone number
Dkk Gremillion	Calcasi eu OHSEP	Emergency Pr eparedness Director	dgrem1lhon@ulcasieu rish.g2v	(337) 721-3800
t:ade Mclemore	Cii k asle u OHSEP	Emergency Response Technki.in	cmclemore c lcas1eu ansh ov	(337) 721-3800
Marc Fer1 uson	Calc.u leu OHSEP	Emeri:ency Responde Spe cialist	mfergu s.on@c ;alcas1e upansh.cov	(337) 721-3800
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Laune Corm ier	Calasleu P rfsh Go ve-m ment	ProJMt Coo rdinato r	lcorm1er@cakas1eupansh.gov	(33 7)721-3645
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Dana Watkins	Cal casleu Parish Government	Permit Coord fn.u or	dwat k1QS1!! a1, asieu,Qan sh.g2v	(337) 721-3600
Alberto Galan	Calc.u le:u Par lsh Gov ernment	Assfst ant to Parish Admlnlttrator	iilKal.tn@ a al•eu,Qamh.£0\I	(337) 7213510
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Stacy Dowden	City of Sulphur	Public Works Directo r	sdowd n@s vlphur .o rg	33 7-527-4504
Rick f iru (President}	Consolidated Gravity Oril lna ge #1	President	ric k.. fitts.gb1n @state farm.com	337-625-3820
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M ike Naquin	Consol ida ted Gravity Drain age #2	Assistan t Su perintendent	Mnagu in@1d2Zf ast.c2m	33 7-855-4388
Hannah Bor ill	Chy of We,,-t l alo.e	Permit Coordi nat or	12ermit s@;;ill'.o estl ake.i;;2m	337-433-0691 ext 2
Andre Mflhfouz	City of Wutlake	City Clerk	c!!Ycler k@ lt(of'wes tlak.e.com	337-433-0691
Mary Vice	Town of Vinton	City Cle ric	c!!):c.terk cl!Yofv1nton . com	337-589•7453
Terry Vice	Town o'f Vinton	Pub lic Works Dir ector	2wdlr t2r@; 1tyofv 1n t on . com	337-589-7453
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Lennie LaFteur	Lake Charles Fir e Depan ment	Gr.ant Specialis1	lenn1e.lafleur@s;;1J;tQflC.!,=!	337-491-1360
Gene Guidry	Sabine River Au th orirv	Staff Engineer	gene.gu1d ry@J!..K.Q't	318-256-4112
Cynthia M,llett	Town of Iowa	City Clerk	to!!!n cie\ @t0wala.org	337-582 -3535
Heath Allen	Uke Char1es. Reg ion al Airport	Re1ional Airpo rt Director	hallen@fl:r:l.i lcg li:hi rles i:om	337-477-6051

Appendix D: State Required Worksheets
Building Inventory

Critical Facility (If Yes, Mark X)	Name of Building	Purpose of Building	Address	City	Latitude	Longitude	Assessed Value	Date Built	Contstruction Type
Unicorporated Calcasieu									
	Concession Stand	Concession Stand	831A-1 Third St.	Bell City	30.113507	-92.961219	$16,800.00	1980	Wood
	Baseball Dugout	dugout	831C Third St.	Bell City	30.113507	-92.961219	$735.00	1980	Metal
	Baseball Dugout	dugout	831D Third St.	Bell City	30.113507	-92.961219	$735.00	1980	Metal
	Rossignol Boat Launch Pavilion	Pavilion	Rossignol Rd	Bell City	30.129764	-92.908113	$2,500.00	1980	Wood
	Alligator Park Pavilion	Pavilion	5316 Alligator Park Rd	Starks	30.363447	-93.722375	$127,519.00	2006	Wood
	Alligator Park Caretakers Residence	Caretakers Residence	5316 Alligator Park Rd	Starks	30.363447	-93.722375	$88,982.00	2006	Wood
	Alligator Park Fencing	Fencing	5316 Alligator Park Rd	Starks	30.363447	-93.722375	$12,000.00	2006	Metal
	Irby Gore Baseball Park Recreation Building	restrooms	220 Ball Park Rd	Starks	30.313288	-93.673391	$32,350.00	1975	Wood
	Irby Gore Baseball Park Grandstands	grandstands	220 Ball Park Rd	Starks	30.313288	-93.673391	$13,650.00	1975	Wood
	Irby Gore Baseball Park Dugout	dugout	220 Ball Park Rd	Starks	30.313288	-93.673391	$735.00	1975	Wood
	Irby Gore Baseball Park Dugout	dugout	220 Ball Park Rd	Starks	30.313288	-93.673391	$735.00	1975	Wood
	Irby Gore Baseball Park Restroom/Concession	restroom/concession	220 Ball Park Rd	Starks	30.313288	-93.673391	$32,327.00	1975	Steel
	Library	Library	113 South Hwy. 109	Starks	30.318261	-93.661813	$165,104.00	1968	Wood
	Library	Library	7709 Perier Street	Hayes	30.107874	-92.921524	$98,009.00	1958	Wood
	Loraine Park Restrooms Bldg	Restrooms	7803 Lorain Road	Hayes	30.07775	-92.54498	$71,089.00	2006	Concrete
	Loraine Park Storage Bldg	Storage	7803 Lorain Road	Hayes	30.07775	-92.54498	$995.00	2006	Metal
	Loraine Park Covered Pavilion	Pavilion	7803 Lorain Road	Hayes	30.07775	-92.54498	$3,800.00	2006	Wood
	Loraine Park Storage Bldg with Overhang	Storage	7803 Lorain Road	Hayes	30.07775	-92.54498	$1,400.00	2006	Wood
	Loraine Park Covered Picnic Area	Picnic Area	7803 Lorain Road	Hayes	30.07775	-92.54498	$2,500.00	2006	Wood
	Lorraine Park	Park Keeper Residence	7803 Lorain Road	Hayes	30.07775	-92.54498	$88,477.00	2006	Wood
X	WD1 Fire Station	Fire Station	1000 Topsy Road	Gillis	30.373702	-93.191767	$171,947.00	2010	Steel
X	WD1 Fire Station	Fire Station	1738 Southerland Rd.	Moss Bluff	30.328502	-93.258092	$177,135.00	2000	Steel
X	WD1 Fire Station	Fire Station	134 Firehouse Rd.	Moss Bluff	30.300167	-93.208142	$427,402.00	2000	Steel
X	WD1 Fire Station Bird's Nest	Fire Station	2888 Cardinal Ln	Moss Bluff	30.361178	-93.141582	$171,947.00	2000	Steel
X	WD1 Fire Station	Fire Station	1240 Joe Miller Rd	Moss Bluff	30.345343	-93.224728	$584,253.00	2007	Steel

Dequincy									
X	Sheriff's Office	Law Enforcement	618 E. Center St.	Dequincy	30.450064	-93.428488	$263,447.00	1958	Reinforced Masonry
	Library - DeQuincy	Library	102 W. Harrison St.	Dequincy	30.448987	-93.435725	$335,141.00	1993	Wood
X	City Hall	City Administrative Office	30 North Holly	Dequincy	30.2706.63	93.2602.64	$800,000.00	1977	Concrete
X	Public Safety Building	Public building open for rent/holding events	101 South Pine	DeQuincy	30.2658.87	932607.45	1,000,000	2003	Metal
	DeQuincy Railroad Museum	Tourism revenue	400 Lake Charles Ave	DeQuincy	30.2700.64	93.2607.60	500,000.00	1923	Unreinforced Masonry
	Old town Hall Museum	Tourism revenue	218 East 4th Street	DeQuincy	30.2652.61	93.2601.49	300,000.00	1951	Reinforced Masonry

Sulphur									
X	Health Unit Sulphur	Medical	201 Edgar	Sulphur	30.241296	-93.375926	$786,055.00	1958	Reinforced Masonry
	Holbrook Caretaker Dwelling	Caretaker Dwelling	1868 A Holbrook Park Rd	Sulphur	30.348419	-93.294745	$60,920.00	1990	Wood
	Holbrook Park Pavilion 1	Pavilion	1868 C Holbrook Park Rd	Sulphur	30.348419	-93.294745	$49,394.00	2000	Wood
	Holbrook Park Pavilion 2	Pavilion	1868 B Holbrook Park Rd	Sulphur	30.348419	-93.294745	$6,300.00	2000	Wood
	Holbrook Park Pavilion 3	Pavilion	1868 F Holbrook Park Rd.	Sulphur	30.348419	-93.294745	$7,350.00	2000	Wood
	Holbrook Park Restroom Building	Restrooms	1868 G Holbrook Park Rd	Sulphur	30.348419	-93.294745	$50,031.00	2000	Reinforced Masonry
	Holbrook Park Shop Building	Shop	1868 J Holbrook Park Rd	Sulphur	30.348419	-93.294745	$3,300.00	1970	Wood
	Holbrook Park Main Pavilion	Pavilion	1868 K Holbrook Park Rd	Sulphur	30.348419	-93.294745	$49,394.00	1970	Wood
	Holbrook Park Picnic Shelter	Picnic Shelter	1868 L Holbrook Park Rd.	Sulphur	30.348419	-93.294745	$3,150.00	1970	Wood
	Public Works West Pavillion Post Oak	Pavilion	2911 Post Oak Rd.	Sulphur	30.21018	-93.349688	$424,184.00	2007	Steel
	Library - Maplewood	Library	91 Center St.	Sulphur	30.233658	-93.317692	$413,228.00	1993	Wood
	Library - Sulphur	Library	1160 Cypress St.	Sulphur	30.231882	-93.364294	$3,004,108.00	1993	Steel
	Intracoastal Park Keeper's Residence	Caretaker Dwelling	7955 Intercoastal Park R	Sulphur	30.074846	-93.338314	$90,002.00	2003	Reinforced Masonry
	Intracoastal Park Restroom 2	Restrooms	7955 Intercoastal park R	Sulphur	30.074846	-93.338314	$121,636.00	2005	Reinforced Masonry
	Intracoastal Park Restroom 1	Restrooms	7955 Intercoastal Park R	Sulphur	30.074846	-93.338314	$44,137.00	1998	Concrete
	Intracoastal Park Covered Picnic Pavilion 1	Picnic Pavilion	7955 Intercoastal Park R	Sulphur	30.074846	-93.338314	$16,075.00	2005	Reinforced Masonry
	Intracoastal Park Covered Picnic Pavilion 2	Picnic Pavilion	7955 Intercoastal Park R	Sulphur	30.074846	-93.338314	$16,075.00	1998	Reinforced Masonry
	Intracoastal Park Large covered Picnic Pavilion	Picnic Pavilion	7955 Intercoastal Park R	Sulphur	30.074846	-93.338314	$11,586.00	1998	Steel
	Intracoastal Park Activity Center	Activity center	7955 Intercoastal Park R	Sulphur	30.074846	-93.338314	$207,415.00	2005	Reinforced Masonry
	Intracoastal Park Playground Area	Playground	7955 Intercoastal Park R	Sulphur	30.074846	-93.338314	$33,250.00	1998	Steel
	Intracoastal Park Storage Building	Shop	7955 Intercoastal Park R	Sulphur	30.074846	-93.338314	$8,000.00	1998	Wood
	Intracoastal Park Picnic Pavilion 3	Pavilion	7955 Intercoastal Park R	Sulphur	30.074846	-93.338314	$17,713.00	2007	Reinforced Masonry
	Intracoastal Park Picnic Pavilion 1	Pavilion	7955 Intercoastal Park R	Sulphur	30.074846	-93.338314	$5,801.00	2007	Metal
	Intracoastal Park Picnic Pavilion 2	Pavilion	7955 Intercoastal Park R	Sulphur	30.074846	-93.338314	$5,801.00	2007	Metal
	Intracoastal Park Picnic Pavilion 3	Pavilion	7955 Intercoastal Park R	Sulphur	30.074846	-93.338314	$5,801.00	2007	Metal
	Intracoastal Park Picnic Pavilion 4	Pavilion	7955 Intercoastal Park R	Sulphur	30.074846	-93.338314	$5,801.00	2007	Metal
	Intracoastal Park Picnic Pavilion 5	Pavilion	7955 Intercoastal Park R	Sulphur	30.074846	-93.338314	$5,801.00	2007	Metal
	Intracoastal Park Picnic Pavilion 6	Pavilion	7955 Intercoastal Park R	Sulphur	30.074846	-93.338314	$5,801.00	2007	Metal
X	CERTC - Training Center	Fire/Training	1601 Holbrook Park Rd	Sulphur	30.354058	-93.319	$310,836.00	2012	Steel
	CERTC - Shed	Fire/Training	1601 Holbrook Park Rd	Sulphur	30.354058	-93.319	$22,117.00	2012	Steel
	CERTC Rescue Training Tower	Fire/Training	1601 Holbrook Park Rd	Sulphur	30.354058	-93.319	$126,385.00	2012	Steel
	CERTC Training Equipment Storage	Fire/Training	1601 Holbrook Park Rd	Sulphur	30.354058	-93.319	$80,057.00	2012	Metal
	CERTC Oil/Water Separation Plant	Fire/Training	1601 Holbrook Park Rd	Sulphur	30.354058	-93.319	$22,535.00	2012	Metal
X	CERTC Emergency Response Fuel Storage	Fire/Training	1601 Holbrook Park Rd	Sulphur	30.354058	-93.319	$35,865.00	2012	Metal
	CERTC Trailer Storage	Fire/Training	1601 Holbrook Park Rd	Sulphur	30.354058	-93.319	$25,000.00	2012	Steel

Sulphur

	CERTC Pump House	Fire/Training	1601 Holbrook Park Rd	Sulphur	30.354058	-93.319	$126,000.00	2012	Steel
	CERTC Pump House	Fire/Training	1601 Holbrook Park Rd	Sulphur	30.354058	-93.319	$13,379.00	2012	Steel
X	Public Works West Administration Bldg	Public Works	2915 Post Oak Road	Sulphur	30.211403	-93.350779	$418,331.00	2007	Steel
X	Public Works West-Crew Building	Public Works	2915 Post Oak Road	Sulphur	30.211403	-93.350779	$403,662.00	2007	Steel
X	Public Works West-Equipment Shed	Public Works	2915 Post Oak Road	Sulphur	30.211403	-93.350779	$155,680.00	2007	Steel
X	Public Works West-Fuel Storage/Wash Bldg	Public Works	2915 Post Oak Road	Sulphur	30.211403	-93.350779	$183,402.00	2007	Steel
X	Public Works West-Shop/Chemical Shed	Public Works	2915 Post Oak Road	Sulphur	30.211403	-93.350779	$1,202,344.00	2007	Steel
X	Public Works West-Storage	Public Works	2915 Post Oak Road	Sulphur	30.211403	-93.350779	$149,110.00	2007	Steel
X	Public Works West-Truck Shed	Public Works	2915 Post Oak Road	Sulphur	30.211403	-93.350779	$364,285.00	2007	Steel
	West Calcasieu Business Center	Business Office	500 North Huntington	Sulphur	30.242869	93.377074	info not available	not available	Reinforced Masonry
X	Law Enforcement Center	Police Department	500 B North Huntington	Sulphur	30.243034	93.376738	info not available	not available	Reinforced Masonry
X	City Hall	Administration Building	101 North Huntington	Sulphur	30.238059	93.377633	info not available	2009	Reinforced Masonry
X	City of Sulphur Business Center	Inspections/Permits	110 North Huntington	Sulphur	30.238122	93.377288	info not available	2009	Reinforced Masonry
	Storage Building	Storage	105 West Verdine	Sulphur	30.238094	93.376216	info not available	not available	Metal
	Judicial Center	Court House	802 South Huntington	Sulphur	30.231719	93.376988	info not available	not available	Wood
	Marshal's Office	Marshal's Office	800 South Huntington	Sulphur	30.231953	93.376809	info not available	not available	Wood
	Vacant Building	Vacant Building	810 Ruth Street	Sulphur	30.23167	93.375782	info not available	not available	Reinforced Masonry
	Senior Citizens Center	Senior Citizens Center	601 Maple Street	Sulphur	30.23412	93.368179	info not available	not available	Reinforced Masonry
	Portable Building 25X20	Storage	601 Maple Street	Sulphur	30.233755	93.368023	info not available	not available	Metal
x	Central Fire Station	Fire Station	602 North Huntington Str	Sulphur	30.243412	93.377274	info not available	not available	Reinforced Masonry
x	Southside Fire Station	Fire Station	201 West Darbonne	Sulphur	30.225477	93.377791	info not available	not available	Reinforced Masonry
	Training Tower	Fire Training	201 West Darbonne	Sulphur	30.225124	93.378001	info not available	2002	Steel
	Portable Building 23x25	Storage	602 North Huntington Str	Sulphur	30.243412	93.377274	info not available	not available	Metal
	SPD Detective Building	Detective Office	622 Live Oak Street	Sulphur	30.243269	93.3762	info not available	not available	Wood
	Storage Building	Storage Building	210 East Burton	Sulphur	30.242292	93.37623	info not available	not available	Metal
	Maintenance Office	maintenance	220 East Burton	Sulphur	30.242292	93.37623	info not available	not available	Wood
	Equipment Garage	Storage of Equipment	220 East Burton	Sulphur	30.242292	93.37623	info not available	not available	Metal
X	Mechanic Shop	Mechanic Shop	610 Live Oak	Sulphur	30.242702	93.375916	info not available	2003	Steel
X	Water Treatment Plant	Water Plant	119 East Verdine Street	Sulphur	30.238025	93.376029	info not available	not available	Metal

Sulphur

	Radio Tower	Communication Tower	3400 Bayou D'inde	Sulphur	30.193166	93.304776	info not available	2005	Steel
	Sludge Metal Building	Water Plant	3400 Bayou D'inde	Sulphur	30.193166	93.304776	info not available	2005	Metal
	WareHouse/Auto Storage	Storage	604 Live Oak	Sulphur	30.242995	93.375968	info not available	not available	Metal
	Animal Control Office (Mobile Home)	Office	3410 Bayou D'inde	Sulphur	30.198119	93.305807	info not available	2007	Wood
	Metal Building	Dog Pins	3410 Bayou D'inde	Sulphur	30.198119	93.305807	info not available	not available	Metal
	Incinerator Building	incinerator	3410 Bayou D'inde	Sulphur	30.198119	93.305807	info not available	2011	Metal
	Eastside Fire Station	Fire Station	3504 Maplewood Drive	Sulphur	30.228375	93.336762	info not available	not available	Steel
	Sewer Pump Building	Sewer Pump	Shasta Street	Sulphur	30.22291	93.346369	info not available	not available	Unreinforced Masonry
	Pump Building	Pumps	Driftwood	Sulphur	30.225015	93.318964	info not available	2003	Metal
	Police Training	Poice Training	600 Live Oak	Sulphur	30.243009	93.375947	info not available	not available	Wood
	Pump Building	Pumps	Hildebrandt Street	Sulphur	30.241378	93.374618	info not available	2003	Wood
	Sewer Pump Building	Pumps	1590 South Huntington	Sulphur	30.2259	93.377076	info not available	2010	Unreinforced Masonry
	Pump Building	Pumps	Est End Avenue	Sulphur	30.227691	93.31332	info not available	not available	Metal
	Pump Building	Pumps	4114 Maplewood Drive	Sulphur	30.227896	93.324191	info not available	2003	Metal
	Pump Building	Pumps	Kingston Road	Sulphur	30.230325	93.329046	info not available	2003	Unreinforced Masonry
	Pump Building	Pumps	C/O Francis and Bernade	Sulphur	N/A	N/A	info not available	not available	Wood
	Pump Building	Pumps	945 Starlin	Sulphur	30.220573	93.364851	info not available	2005	
	Pump Building	Pumps	1110 West Napoleon	Sulphur	30.236687	93.386372	info not available	2003	Metal
	Pump Building	Pumps	Center Avenue & Lee Stree	Sulphur	30.234458	93.31749	info not available	2003	Metal
	Pump Building	Pumps	4000 Petro Drive	Sulphur	30.204148	93.327851	info not available	not available	Wood
	Pump Building	Pumps	South Beglis Parkway	Sulphur	N/A	N/A	info not available	not available	Wood
	Pump Building	Pumps	East Napoleon	Sulphur	N/A	N/A	info not available	not available	Wood
	Tower	Communication Tower	East Burton	Sulphur	N/A	N/A	info not available	not available	Steel
	Radio Equipment	Communication Tower	East Burton	Sulphur	N/A	N/A	info not available	not available	Unreinforced Masonry

Westlake									
	Library-Westlake	Library	937 Mulberry St.	Westlake	30.253155	-93.260681	$681,511.00	1993	Wood
	Westlake Police Department	Police Department	701 Johnson Street	Westlake	N/A	N/A	info not available	not available	not available
	Westlake Senior Center	Senior Center	2001 Jones Street	Westlake	N/A	N/A	info not available	not available	not available
	Westlake Water Filter Plant	Water Filter Plant	1002 Shady Lane	Westlake	N/A	N/A	info not available	not available	not available
	Water Treatment Plant	Water Plant/Office	1004 Hilma Street	Westlake	N/A	N/A	info not available	not available	not available
	Water Treatment Plant	Water Treatment Plant	1004 Hilma Street	Westlake	N/A	N/A	info not available	not available	not available
	Westlake Post Office	Post Office	1504 Guillory Street	Westlake	N/A	N/A	info not available	not available	not available
	Westlake City Hall	City Hall	1001 Mulberry Street	Westlake	N/A	N/A	info not available	not available	not available
	Mechanic Shop	Mechanic Shop	512 Cedar Street	Westlake	N/A	N/A	info not available	not available	not available
	Water Treatment Plant	Water Treatment Plant	1907 Jones Street	Westlake	N/A	N/A	info not available	not available	not available
Iowa									
	Library-Iowa	Library	107 First St.	Iowa	30.236806	-93.014265	$298,283.00	1993	Wood
X	Iowa Town Hall	Town administrative office/ police department	115 N. Thomson Ave.	Iowa	N/A	N/A	1,000,000	2005	not available
	Community Center	Iowa Community Center open for rent/holding events	207 W. Hwy. 90	Iowa	N/A	N/A	1,000,000	2005	not available
	Iowa Fire Department	Iowa Fire Department	105 S. Thomson Ave.	Iowa	N/A	N/A	250,000	1975	not available
	Substation	Iowa Fire Department Substation	797 W. Miller	Iowa	N/A	N/A	350,000	2015	not available
	Public Works	Iowa Public Works Maintenance Bldg/yard	102 S. Kenney Ave.	Iowa	N/A	N/A	250,000	2003	not available
Vinton									
	Library-Fontenot	Library	1402 Center St	Vinton	30.190908	-93.579983	$280,506.00	1993	Wood
X	VINTON CITY HALL	MUNICIPAL BUILDING	1200 HORRIDGE STREET	VINTON, LA	30.192367	93.581828	N/A	2005	Reinforced Masonry
X	VINTON POLICE DEPARTMENT	POLICE DEPARTMENT	1201 HORRIDGE STRE	VINTON, LA	30.192353	93.581123	N/A	1963	Reinforced Masonry
X	MAINTENANCE SHOP	PUBLIC WORKS	1300 HAMPTON STREE	VINTON, LA	30.193116	93.579726	N/A	2007	Metal
X	FIRE STATION	HOUSE TRUCK	1405 HAMPTON STREE	VINTON, LA	30.193116	93.579726	N/A	2006	Metal
X	SOUTHSIDE FIRE STATION	MAIN FIRE STATION	1301-1303 SOUTH STR	VINTON, LA	30.185192	93.579103	N/A	1996	Metal
	SENIOR CENTER	MEETING PLACE FOR SR	915 WEST STREET	VINTON, LA	30.197913	93.587062	N/A	2000	Metal
X	SEWER PLANT	SEWER TREATMENT	1010 WASTEWATER A	VINTON, LA	30.195783	93.563811	N/A	1990	Unreinforced Masonry
X	CENTER STREET LIFT PUMP STATION	WATER/SEWER	1611 CENTER STREET	VINTON, LA	30.190768	93.584322	N/A		Unreinforced Masonry

Appendix D: Capability Assessment

Worksheet 4.1: Capability Assessment Worksheet - Unincorporated Calcasieu

Planning and Regulatory		
Please indicate which of the following plans and regulatory capabilities your jurisdiction has in place.		
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	Yes	
Community Wildfire Protection Plan	No	
Other plans (redevelopment, recovery, coastal zone management)	Yes	Coastal Management Plan
Building Code, Permitting and Inspections	Yes / No	
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	Yes / No	
Zoning Ordinance	Yes	
Subdivision Ordinance	Yes	
Floodplain Ordinance	Yes	
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	Yes	
Flood Insurance Rate Maps	Yes	Adopted Feb 2011
Acquisition of land for open space and public recreation uses	Yes	
Other		
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	
Planning Commission	Yes	P&Z Board
Mitigation Planning Committee	Yes	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	Public Works

Staff	Yes / No; FT/PT; % Hazard	
Chief Building Official	Yes	FT, 5%
Floodplain Administrator	Yes	FT, 15%
Emergency Manager	Yes	FT, 20%
Community Planner	Yes	FT, 5%
Civil Engineer	Yes	FT, 5%
GIS Coordinator	Yes	FT, 5%
Grant Writer	Yes	FT, 75%
Other	Yes	Coastal Zone Manager; FT, 60%
Technical	Yes / No	
Warning Systems / Service (Reverse 911, outdoor warning signals)	Yes	
Hazard Data & Information	Yes	
Grant Writing	Yes	
Hazus Analysis	No	
Other		

Financial

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

Funding Resource	Yes / No	
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	Yes	
Stormwater Utility Fee	Yes	
Community Development Block Grant (CDBG)	Yes	
Other Funding Programs		RESTORE Act, CPRA

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	
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	No	
Public/Private partnership initiatives addressing disaster-related issues		
Other		

Worksheet 4.1: Capability Assessment Worksheet - DeQuincy

Planning and Regulatory

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

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

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	
Planning Commission	No	Work with parish
Mitigation Planning Committee	No	Work with parish
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	City Crew Does This

Staff	Yes / No; FT/PT; % Hazard	
Chief Building Official	No	Work with parish
Floodplain Administrator	No	Work with parish
Emergency Manager	No	Work with parish & OEP
Community Planner	No	Work with parish
Civil Engineer	No	Work with parish
GIS Coordinator	No	Work with parish
Grant Writer	Yes	PT City Planner
Other	N/A	
Technical	**Yes / No**	
Warning Systems / Service (Reverse 911, outdoor warning signals)	No	
Hazard Data & Information	Yes	
Grant Writing	Yes	Consultants
Hazus Analysis	No	Work with Parish
Other	N/A	

Financial

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

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

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	
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	City Council
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	No	
Natural Disaster or safety related school program	No	Work with Parish
Storm Ready certification	Yes	Yes through WWTP
Firewise Communities certification	Yes	Vol Fire Dept
Public/Private partnership initiatives addressing disaster-related issues	Yes	Work with Parish/ Consulting Firm
Other		

Worksheet 4.1: Capability Assessment Worksheet - Lake Charles

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

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	
Planning Commission	Yes	
Mitigation Planning Committee	Yes	Dept Heads make up committee
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	

Staff	Yes / No; FT/PT; % Hazard	
Chief Building Official	Yes	
Floodplain Administrator	Yes	
Emergency Manager	Yes	CoLC, LCFD
Community Planner	Yes	
Civil Engineer	Yes	Consultant
GIS Coordinator	Yes	
Grant Writer	Yes	
Other	Yes	
Technical	**Yes / No**	
Warning Systems / Service (Reverse 911, outdoor warning signals)	Yes	CAER
Hazard Data & Information	Yes	HMP and Plan
Grant Writing	Yes	
Hazus Analysis	No	
Other	Yes	
Financial		
Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.		
Funding Resource	**Yes / No**	
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	Yes	
Community Development Block Grant (CDBG)	Yes	
Other Funding Programs	Yes	
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**	
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Team Green and others
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	Yes	LCFD
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	CPPJ OEP EOC
Other	N/A	

Worksheet 4.1: Capability Assessment Worksheet - City of Sulphur

Planning and Regulatory

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

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

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	
Planning Commission	Yes	
Mitigation Planning Committee	No	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	

Staff	Yes / No; FT/PT; % Hazard	
Chief Building Official	Yes	
Floodplain Administrator	Yes	
Emergency Manager	Yes	
Community Planner	No	
Civil Engineer	Yes	
GIS Coordinator	Yes	
Grant Writer	Yes	
Other	N/A	
Technical	**Yes / No**	
Warning Systems / Service (Reverse 911, outdoor warning signals)	Yes	
Hazard Data & Information	Yes	
Grant Writing	Yes	
Hazus Analysis	No	
Other	N/A	

Financial

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

Funding Resource	Yes / No	
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	N/a	

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	
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	No	
Firewise Communities certification	No	
Public/Private partnership initiatives addressing disaster-related issues	Yes	
Other	N/A	

Worksheet 4.1: Capability Assessment Worksheet - City of Westlake

Planning and Regulatory

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

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

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	
Planning Commission	No	
Mitigation Planning Committee	No	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	

Staff	Yes / No; FT/PT; % Hazard	
Chief Building Official	No	
Floodplain Administrator	Yes	
Emergency Manager	Yes	
Community Planner	No	
Civil Engineer	Yes	
GIS Coordinator	No	
Grant Writer	No	
Other	N/A	
Technical	Yes / No	
Warning Systems / Service (Reverse 911, outdoor warning signals)	No	
Hazard Data & Information	No	
Grant Writing	No	
Hazus Analysis	No	
Other	N/A	

Financial

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

Funding Resource	Yes / No	
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	N/A	

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	
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	No	
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	Yes	
Natural Disaster or safety related school program	No	
Storm Ready certification	No	
Firewise Communities certification	No	
Public/Private partnership initiatives addressing disaster-related issues	No	
Other	N/A	

Worksheet 4.1: Capability Assessment
Worksheet - Town of Iowa

Planning and Regulatory

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

Plans	Yes / No	Comments
Comprehensive / Master Plan	No	
Capital Improvements Plan	No	
Economic Development Plan	No	
Local Emergency Operations Plan	Yes	Through the Police Dept.
Continuity of Operations Plan	Yes	
Transportation Plan	No	
Stormwater Management Plan	No	
Community Wildfire Protection Plan	No	Fire Dept Protects All
Other plans (redevelopment, recovery, coastal zone management)	N/A	
Building Code, Permitting and Inspections	**Yes / No**	
Building Code	Yes	
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	
Fire Department ISO/PIAL rating	Yes	
Site plan review requirements	Yes	
Land Use Planning and Ordinances	**Yes / No**	
Zoning Ordinance	No	
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	N/A	

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	
Planning Commission	No	
Mitigation Planning Committee	No	CPPJ
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	Gravity Drainage District and DeQuincy Public Works

Staff		
Chief Building Official	No	CPPJ
Floodplain Administrator	Yes	
Emergency Manager	No	Mayor would be responsible
Community Planner	No	
Civil Engineer	No	Town has Town Engineer
GIS Coordinator	No	CPPJ
Grant Writer	No	
Other	N/A	
Technical	Yes / No	
Warning Systems / Service (Reverse 911, outdoor warning signals)	No	
Hazard Data & Information	No	CPPJ
Grant Writing	No	
Hazus Analysis	No	
Other	N/A	

Financial

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

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

Education and Outreach

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

Program / Organization	Yes / No	
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Resiliency Team
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	Yes	Town works on keeping citizens informed
Natural Disaster or safety related school program	No	
Storm Ready certification	No	
Firewise Communities certification	No	
Public/Private partnership initiatives addressing disaster-related issues	No	Town works with Parish
Other	N/A	

Worksheet 4.1: Capability Assessment
Worksheet - Town of Vinton

Planning and Regulatory

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

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	No	
Transportation Plan	No	
Stormwater Management Plan	No	
Community Wildfire Protection Plan	No	
Other plans (redevelopment, recovery, coastal zone management)	N/A	
Building Code, Permitting and Inspections	**Yes / No**	
Building Code	Yes	
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	
Fire Department ISO/PIAL rating	Yes	
Site plan review requirements	Yes	
Land Use Planning and Ordinances	**Yes / No**	
Zoning Ordinance	No	
Subdivision Ordinance	No	
Floodplain Ordinance	Yes	
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	No	
Flood Insurance Rate Maps	No	
Acquisition of land for open space and public recreation uses	No	
Other	N/A	

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	
Planning Commission	No	
Mitigation Planning Committee	No	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	

Staff		
Chief Building Official	Yes	
Floodplain Administrator	No	
Emergency Manager	Yes	
Community Planner	No	
Civil Engineer	No	
GIS Coordinator	No	
Grant Writer	Yes	
Other	N/A	
Technical	Yes / No	
Warning Systems / Service (Reverse 911, outdoor warning signals)	Yes	
Hazard Data & Information	No	
Grant Writing	Yes	
Hazus Analysis	No	
Other	N/A	

Financial

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

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

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	
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	No	
Storm Ready certification	No	
Firewise Communities certification	No	
Public/Private partnership initiatives addressing disaster-related issues	No	
Other	N/A	

ELEMENT D: STATE REQUIREMENT

National Flood Insurance Program (NFIP)

Parish: Calcasieu Parish		
Insurance Summary		**Comments**
How many NFIP polices are in the community? What is the total premium and coverage?	NFIP Policies: 8,559 Premium - $5,445,801 Coverage - $2,241,800,800	
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?	Total Losses - 4,002 Total Payments - $88,305,976	As of 11/2/2020
How many structures are exposed to flood risk with in the community?	SFHA areas are abundant in the Parish. There are many bayous, rivers, and drainage laterals that contribute to flooding.	
Describe any areas of flood risk with limited NFIP policy coverage.	There are no areas in which NFIP is not available or limited.	
Staff Resources		
Is the Community FPA or NFIP Coordinator certified?	Yes	
Is flood plain management an auxiliary function?	No	
Provide an explanation of NFIP administration	The Parish has permit review, GIS,	
What are the barriers to running an effective NFIP program in the community, if any?	No	
Compliance History		
Is the community in good standing with the NFIP?	Yes	
Are there any outstanding compliance issues(i.e., current violations)?	None noted	
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?	2013	
Is a CAV or CAC scheduled or needed? If so when?	None noted	
Regulation		
When did the community enter the NFIP?	1978	
Are the FIRMs digital or paper?	Digital	
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Yes. Regulations are adhered to with no noted exceptions.	
Community Rating System (CRS)		
Does the community participate in CRS?	Yes	
What is the community's CRS Class Ranking?	Class 8	
Does the plan include CRS planning requirements?	Yes	

ELEMENT D: STATE REQUIREMENT

National Flood Insurance Program (NFIP)

Parish: Calcasieu City: DeQuincy

Insurance Summary		**Comments**
How many NFIP polices are in the community? What is the total premium and coverage?	Policies 53; Premium: $44,607 Coverage: $12,341,300.00	
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?	Paid Claims: 21; Total Payments: $352,114.00	
How many structures are exposed to flood risk with in the community?	53	
Describe any areas of flood risk with limited NFIP policy coverage.	n/a	
Staff Resources		
Is the Community FPA or NFIP Coordinator certified?	Parish Representative	
Is flood plain management an auxiliary function?	No	
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Depend on the Parish	
What are the barriers to running an effective NFIP program in the community, if any?	No Staff	
Compliance History		
Is the community in good standing with the NFIP?	Yes	
Are there any outstanding compliance issues(i.e., current violations)?	No	
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?	2005	
Is a CAV or CAC scheduled or needed? If so when?	No	
Regulation		
When did the community enter the NFIP?	7/16/1971	
Are the FIRMs digital or paper?	Digital	
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Yes	
Community Rating System (CRS)		
Does the community participate in CRS?	28947	
What is the community's CRS Class Ranking?	N/A	
Does the plan include CRS planning requirements?	N/A	

ELEMENT D: STATE REQUIREMENT

National Flood Insurance Program (NFIP)

Parish: Calcasieu City: Lake Charles

Insurance Summary		**Comments**
How many NFIP polices are in the community? What is the total premium and coverage?	Total NFIP Policies: 6156 Total Premiums: $4,142,182 Insurance Coverage: $1,778,302,700	
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?	Total Claims Paid: 2889 Total Amount Paid: $67,563,456.82; SD 400+/-	
How many structures are exposed to flood risk with in the community?	6,156	
Describe any areas of flood risk with limited NFIP policy coverage.	N/A	
Staff Resources		
Is the Community FPA or NFIP Coordinator certified?	no	
Is flood plain management an auxiliary function?	No	
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	permits, review, outreach, inspections, GIS	
What are the barriers to running an effective NFIP program in the community, if any?	staffing	
Compliance History		
Is the community in good standing with the NFIP?	Yes	
Are there any outstanding compliance issues(i.e., current violations)?	No	
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?	2019	
Is a CAV or CAC scheduled or needed? If so when?	No	
Regulation		
When did the community enter the NFIP?	10/16/1979	
Are the FIRMs digital or paper?	Both	
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Yes; 10' min FF elevation for AE zones less than 9' MSL	
Community Rating System (CRS)		
Does the community participate in CRS?	Yes	
What is the community's CRS Class Ranking?	9	
Does the plan include CRS planning requirements?	yes	

ELEMENT D: STATE REQUIREMENT

National Flood Insurance Program (NFIP)

Parish: Calcasieu City: Sulphur

Insurance Summary		**Comments**
How many NFIP polices are in the community? What is the total premium and coverage?	Policies: 994 Total Coverage: $241,038,600	
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?	Paid Claims: 596; Total Losses: $11,838,687.29	
How many structures are exposed to flood risk with in the community?	994	
Describe any areas of flood risk with limited NFIP policy coverage.	None	
Staff Resources		
Is the Community FPA or NFIP Coordinator certified?	Yes	Keith Barry
Is flood plain management an auxiliary function?	No	
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Outreach	
What are the barriers to running an effective NFIP program in the community, if any?	n/a	
Compliance History		
Is the community in good standing with the NFIP?	Yes	
Are there any outstanding compliance issues(i.e., current violations)?	No	
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?	CAV: 3/14/2013 CAC: 9/22/2008	
Is a CAV or CAC scheduled or needed? If so when?	No	
Regulation		
When did the community enter the NFIP?	8/16/1988	
Are the FIRMs digital or paper?	Digital	
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Yes	
Community Rating System (CRS)		
Does the community participate in CRS?	No	
What is the community's CRS Class Ranking?	N/A	
Does the plan include CRS planning requirements?	N/A	

ELEMENT D: STATE REQUIREMENT

National Flood Insurance Program (NFIP)

Parish: Calcasieu City: Westlake

Insurance Summary		**Comments**
How many NFIP polices are in the community? What is the total premium and coverage?	Total NFIP Policies: 306 Total Premium: $172,007 Total Coverage: $73,935,900	
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?	Total Number of Claims Paid: 187 Amount of Claims Paid: $4,264,431	
How many structures are exposed to flood risk with in the community?	306	
Describe any areas of flood risk with limited NFIP policy coverage.	None	
Staff Resources		
Is the Community FPA or NFIP Coordinator certified?	Yes	Terri Hawes
Is flood plain management an auxiliary function?	No	
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Outreach	
What are the barriers to running an effective NFIP program in the community, if any?	n/a	
Compliance History		
Is the community in good standing with the NFIP?	Yes	
Are there any outstanding compliance issues(i.e., current violations)?	No	
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?	CAV: 1/22/2013 CAC: 1/28/2009	
Is a CAV or CAC scheduled or needed? If so when?	No	
Regulation		
When did the community enter the NFIP?	2/3/1982	
Are the FIRMs digital or paper?	Digital	
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Yes	
Community Rating System (CRS)		
Does the community participate in CRS?	No	
What is the community's CRS Class Ranking?	N/A	
Does the plan include CRS planning requirements?	N/A	

ELEMENT D: STATE REQUIREMENT

National Flood Insurance Program (NFIP)

Parish: Calcasieu City: Iowa

Insurance Summary		**Comments**
How many NFIP polices are in the community? What is the total premium and coverage?	Policies: 169; Total Coverage: $30,468,300	
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	Paid Claims: 47; Total Payments: 763,632	
How many structures are exposed to flood risk with in the community?	169	
Describe any areas of flood risk with limited NFIP policy coverage.	None	
Staff Resources		
Is the Community FPA or NFIP Coordinator certified?	Yes	
Is flood plain management an auxiliary function?	No	
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Outreach	
What are the barriers to running an effective NFIP program in the community, if any?	None Noted	
Compliance History		
Is the community in good standing with the NFIP?	Yes	
Are there any outstanding compliance issues(i.e., current violations)?	No	
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?	2008	
Is a CAV or CAC scheduled or needed? If so when?	No	
Regulation		
When did the community enter the NFIP?		
Are the FIRMs digital or paper?		
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Meet	
Community Rating System (CRS)		
Does the community participate in CRS?	No/Parish	
What is the community's CRS Class Ranking?	N/A	
Does the plan include CRS planning requirements?	N/A	

ELEMENT D: STATE REQUIREMENT

National Flood Insurance Program (NFIP)

Parish: Calcasieu City: Vinton

Insurance Summary		**Comments**
How many NFIP polices are in the community? What is the total premium and coverage?	Total Policies: 47; Total Premium: $69,493 Total Coverage: $21,852,700	
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?	Total Losses: 11; Total Payments: $199,668.99	
How many structures are exposed to flood risk with in the community?	Not sure	
Describe any areas of flood risk with limited NFIP policy coverage.	N/A	
Staff Resources		
Is the Community FPA or NFIP Coordinator certified?	Yes	
Is flood plain management an auxiliary function?	No	
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Outreach	
What are the barriers to running an effective NFIP program in the community, if any?	N/A	
Compliance History		
Is the community in good standing with the NFIP?	Yes	
Are there any outstanding compliance issues(i.e., current violations)?	No	
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?	CAV: 1/11/2011 CAC: 1/18/2008	
Is a CAV or CAC scheduled or needed? If so when?	No	
Regulation		
When did the community enter the NFIP?	7/16/1971	
Are the FIRMs digital or paper?	Digital	
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Yes	
Community Rating System (CRS)		
Does the community participate in CRS?	No	
What is the community's CRS Class Ranking?	N/A	
Does the plan include CRS planning requirements?	N/A	

City of Lake Charles

326 Pujo Steet
P.O Box 1178
Lake Charles, LA
70602-1178

Signature Copy

Ordinance: 18920

FIie Number: 216-21 Enactment Number: 18920

An ordinance authorizing the City of Lake Charles to participate in the **Calcasieu Parish Multi.Jurisdiction Hazard Mitigation Plan (update 2020) and adopting said plan as the City of Lake Charles' Hazard Mitigation Plan.**

WHEREAS, Calcasieu Parish is subject to tropical storms, hurricanes, flooding, tornadoes and other natural hazards that can damage property, close businesses, disrupt traffic and present a public health and safety hazard; and

WHEREAS, several Federal programs require that the Parish and jurisdictions have an adopted hazard mitigation plan to qualify for Federal benefits; and

WHEREAS, the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) required that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, the adopted plan required the participation and support of different public and private agencies and organizations that are impacted by natural hazards and/or that can help mitigate the impacts of natural disasters; and

WHEREAS, this Calcasieu Parish – Multi-Jurisdictional Hazard Mitigation Plan (update 2020) has been completed, forwarded to FEMA and GOHSEP for review and has received Approval Pending Adoption status. The APA status requires the final document adoption by the parish and participating municipal councils; and

THEREFORE, BE IT ORDAINED BY THE CITY OF LAKE CHARLES, LOUISIANA. in regular session convened, that:

SECTION 1: The City of Lake Charles is hereby ordained to participate in the comprehensive parish wide Calcasieu Parish - Multi-Jurisdictional Hazard Mitigation Plan (update 2020) and to adopt said plan as the City of Lake Charles' Hazard Mitigation Plan.

SECTION 2: The City of Lake Charles, Louisiana is further authorized to appoint a Plan Coordinator to assure that the Hazard Mitigation Plan be reviewed at least annually and that any required adjustments to the City's addendum to the Hazard Mitigation Plan be developed and presented to the Lake Charles City Council and Calcasieu Parish for consideration.

At a meeting of the City Council on 7/21/2021, this Ordinance was adopted by the following vote.

For: 5 Luvertha August, Mark Eckard, Rodney Geyen, Craig Marks, and Stuart Weatherford

Against: 0

Absent: 2 John leyoub and Mary Morris

Passed and Adopted Rodney Geyen, President or Presiding Officer **Date** 7-21-21

Attest Lynn F. Thibodeaux, Clerk of the Council **Date** 7-21-21

Approved by Nicholas E. Hunter, Mayor City of Lake Charles, Louisiana Date 7-22-21

After a discussion on the Parish Hazard Mitigation Plan, it was moved by Council Member Loyd to adopt the following Resolution. The motion was seconded by Council Member Stanley and the vote cast thereon was as follows:

YEAS: Council Members Conner, Hardy, Loyd, Stanley, and Wright

NAYS: one

ABS ENT : None

RESOLUTION

BE IT RESOLVED by the Governing Authority of the Town of Vinton, Louisiana m regular session convened that it does hereby approve the Calcasieu Parish Multi-Hazard Mitigation plan, as revised .

BE IT RESOLVED AND FINALLY RESOLVED that the President of the Police Jury, or his des ignee , when appropriate and the Director of Homeland Security and Emergency Preparedness, are author ized to execute all documents related the reto .

APPROVED A D ADOPTED this 20th day of July 2021.

M. E. Renfrow
Marcus E. Renfrow, Mayor

Attes t:

Justin W. Sittig
Justin W. Sittig, City Clerk

RESOLUTION NO. 3398, M-C SERIES

Resolution approving the Calcasieu Parish Multi-Hazard Mitigation Plan as revised.

BE IT RESOLVED by the City Council of the City of Sulphur, Louisiana, the governing authority thereof, that they do hereby approve the Calcasieu Parish Multi-Hazard Mitigation Plan as revised.

APPROVED AND ADOPTED by the City Council of the City of Sulphur, Louisiana, on this 12th day of July, 2021.

JOY ABSHIRE, Chairman

ATTEST:

ARLENE BLANCHARD, Clerk

RESOLUTION 2021-10

**Resolution adopting the 2021 Calcasieu Parish Hazard Mitigation Plan
As required by the State of Louisiana and FEMA.**

BE IT RESOLVED by the governing authority of the Town of Iowa, Louisiana in regular session convened on the 12th day of July, 2021, that they do hereby adopt the 2021 Calcasieu Parish Hazard Mitigation Plan as required by the State of Louisiana and FEMA.

APPROVED AND ADOPTED this 12th day of July, 2021

MAYOR PAUL HESSE

Cynthia Mallett

CYNTHIA MALLETT, TOWN CLERK

RESOLUTION

The City Council of the City of DeQuincy, State of Louisiana, met in regular session on the 12th day of July 2021, and adopted the following resolution:

BE IT RESOLVED that the City of DeQuincy does hereby approve the Calcasieu Parish Multi-Hazard Mitigation Plan as revised.

BE IT FURTHER AND FINALLY RESOLVED that Riley Smith, Mayor of DeQuincy, when appropriate, is authorized to execute all documents related thereto.

This Resolution was adopted this 12th day of July 2021, in regular session, and the votes were recorded as follows:

Year: 3 Nays: 0 Absent: 2

Riley Smith, Mayor

Pat Brummett

Pat Brummett, Secretary to the Council and City Clerk

****

I certify that the above and foregoing constitutes a true and correct copy of a resolution duly adopted at a meeting of the City Council of the City of DeQuincy held on July 12, 2021, at which meeting a quorum was present and voted in favor of said resolution, and said resolution has never been modified or rescinded and is still in full force and effect.

Date: July 12, 2021

Pat Brummett

Pat Brummett, Secretary to the Council and City Clerk

RESOLUTION NO. 3543

A RESOLUTION APPROVING THE CALCASIEU PARISH MULTI-HAZARD MITIGATION PLAN.

BE IT RESOLVED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF WESTLAKE, LOUISIANA, in Regular Session convened on the 21st day of June, 2021, that:

WHEREAS, on June 21, 2021 the Mayor and City Council of the City of Westlake, Louisiana, in Regular Session convened, do hereby approve the Calcasieu Parish Multi-Hazard Mitigation Plan, as revised.

NOW THEREFORE BE IT RESOLVED, that the Mayor and City Council of the City of Westlake, Louisiana do hereby approve the Calcasieu Parish Multi-Hazard Mitigation Plan.

THIS RESOLUTION having been read section by section, and as a whole, and having been submitted to a vote, the vote thereon was as follows:

YEAS: Hayes, Cryer, Bergeron, Racca and Brown

NAYS: None.

ABSENT: None

THUS ADOPTED AND APPROVED by the City Council of the City of Westlake, Louisiana, on the 21st day of June, 2021.

ROBERT "BOB" HARDEY, MAYOR

ATTEST:

ANDREA MAHFOUZ, CITY CLERK

PARISH OF CALCASIEU

State of Louisiana

RESOLUTION

BE IT RESOLVED BY THE POLICE JURY OF CALCASIEU PARISH, LOUISIANA, convened in Regular Session on the 1st day of July, 2021, that it does hereby approve the final update for the Calcasieu Parish Hazard Mitigation Plan.

BE IT FURTHER AND FINALLY RESOLVED that the President of the Police Jury, or his designee, when appropriate, is authorized to execute all documents related thereto.

THUS DONE AND PASSED on the date above inscribed.

* * * * * * * * * * * *

STATE OF LOUISIANA
PARISH OF CALCASIEU

I HEREBY CERTIFY that the foregoing is a true and correct copy of the original resolution as adopted by the Calcasieu Parish Police Jury in Regular Session convened on the 1st day of July, 2021.

IN TESTIMONY WHEREOF, witness my official signature and the seal of the Parish of Calcasieu, Louisiana, on this the 2nd day of July, 2021.

Kathy P. Smith

Kathy P. Smith, Parish Secretary