2026

CAMERON PARISH HAZARD MITIGATION PLAN

2026 CAMERON PARISH HAZARD MITIGATION PLAN UPDATE

Prepared for:

Cameron Parish

Prepared by:

Stephenson Disaster Management Institute

Mr. Brant Mitchell, CEM
Mr. Chris Rippetoe, CFM
Dr. Joseph B. Harris, PhD
Mr. Jason Martin

Louisiana State University – Louisiana Digital Media Center
Baton Rouge, LA 70803

THIS PAGE LEFT INTENTIONALLY BLANK

ACKNOWLEDGMENTS

This 2026 Cameron Hazard Mitigation Plan Update was coordinated by the Cameron Hazard Mitigation Plan Update Planning Committee, in collaboration with community stakeholders and the general public.

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

Danny Lavergne	Cameron Parish OHSEP
Ashley Buller	Cameron Parish OHSEP
Chris Savoie	Cameron Parish Sheriff's Office
Chris Rippetoe	LSU-SDMI
Jake McClain	Cameron Parish Sheriff's Office
Jason Martin	LSU-SDMI
Kara Bonsall, CFM	Cameron Parish Police Jury
Katie Armentor	Cameron Parish Police Jury
Kim Montie	Cameron Parish Port
Lennie Lafleur	GOHSEP
Scott Lavergne	Cameron Parish Assessor's Office
Scott Miano	Cameron Parish School Board
Shane Manuel	Cameron Parish Police Jury
Susan Racca	Cameron Parish Government

The 2026 Cameron Parish Hazard Mitigation Plan Update was written by the Stephenson Disaster Management Institute, Louisiana State University. Further comments should be directed to the Cameron Parish Office of Homeland Security and Emergency Preparedness: 184 Smith Circle, Cameron, LA 70631.

Contents

1. Introduction

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

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

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

This Hazard Mitigation Plan is a comprehensive plan for disaster resiliency in Cameron Parish. The parish is subject to natural hazards that threaten life and health and have caused extensive property damage. To better understand these hazards and their impacts on people and property, and to identify ways to reduce those impacts, the parish's Office of Homeland Security and Emergency Preparedness undertook this Natural Hazards Mitigation Plan. "Hazard mitigation" does not mean that all hazards are stopped or prevented. It does not suggest complete elimination of the damage or disruption caused by such incidents. Natural forces are powerful and most natural hazards are well beyond our ability to control. Mitigation does not mean quick fixes. It is a long-term approach to reduce hazard vulnerability. As defined by FEMA, "hazard mitigation" means any sustained action taken to reduce or eliminate the long-term risk to life and property from a hazard event.

Every community faces different hazards, and every community has different resources and interests to bring to bear on its problems. Because there are many ways to deal with natural hazards and many agencies that can help, there is no one solution for managing or mitigating their effects. Planning is one of the best ways to correct these shortcomings and produce a program of activities that will best mitigate the impact of local hazards and meet other local needs. A well-prepared plan will ensure that all possible activities are reviewed and implemented so that the problem is addressed by the most appropriate and efficient solutions. It can also ensure that activities are coordinated with each other and with other goals and programs, preventing conflicts and reducing the costs of implementing each individual activity.

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 (CRS), a program that reduces flood insurance premiums in participating communities. This program is further described in Section Three: Capability Assessment.

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 CRS credit, and provides Cameron Parish and its communities with a blueprint for reducing the impacts of these natural hazards on people and property.

Geography, Population and Economy

Geography

Cameron Parish, originally called Leesburg, is a land of abundance, unique in formation, with miles of beautiful beaches, abundant wildlife and fisheries, and a vast unspoiled wilderness just waiting to be enjoyed. Located in the southwest corner of Louisiana, Cameron Parish has a land area of about 1,313 square miles representing 840,343 acres and a water area of approximately 619 square miles representing 395,986 acres with an average elevation of 5 feet above sea level. Cameron Parish, Louisiana's largest parish in terms of land area, is almost entirely gulf marshland with approximately 40% of the parish covered by water. The coastal town of Cameron has been the nation's leading commercial fishing port. The unincorporated communities of Creole, Grand Chenier, Grand Lake, Hackberry, Holly Beach, Johnson Bayou, and Sweet Lake comprise the rest of the parish.

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

Cameron Parish is bound by Calcasieu Parish to the north, the Gulf of America to the south, Jefferson Davis and Vermilion Parishes to the east, and the Sabine River/Newton and Orange County, Texas to the west. Cameron Parish lives up to the term of "Sportsman's Paradise" with its 26 miles of easily accessible public beaches, many miles of waterways, four wildlife refuges comprised of approximately 284,000 acres of both fresh and saltwater marshes and a bird sanctuary. Activities such as fishing, hunting, crabbing, swimming, shelling, photography, and bird watching are beyond compare.

Three National Wildlife Refuges – Sabine, Cameron Prairie, and Lacassine; and one State Refuge – Rockefeller – are located in Cameron Parish. The National Wildlife Refuges (NWRs) are managed by the U.S. Fish and Wildlife Service and the state refuge is owned by the state and managed by the L.A. Department of Wildlife and Fisheries.

The Sabine National Wildlife Refuge was established in 1937 and consists of 124,511 acres, 39,844 acres of open water, and 84,667 acres of grassland/herbaceous/marsh. The refuge is located eight miles south of Hackberry on State Highway 27, the Creole Nature Trail All- American Road, in Cameron Parish, LA. The refuge occupies the marshes between Calcasieu and Sabine lakes in southwest Louisiana, containing large concentrations of ducks, geese, alligators, muskrats, nutrias, raptors, wading birds, shorebirds, blue crabs, and shrimp in addition to olivaceous cormorant, snowy egret, and common egret rookeries being present.

The objectives of the refuge are to provide a habitat for migratory waterfowl and other birds, preserve and enhance coastal marshes for fish and wildlife, and provide outdoor recreation and environmental education for the public. Refuge visitors contribute to the local economy through the purchase of gasoline, food items, and fishing/hunting license sales. Gas and oil exploration activities generate financial returns to the local economy during oil well drilling and seismic exploration activities, and in the form of federally mandated excise tax revenues to local governments from oil extraction active.

The Cameron Prairie NWR was established in 1988 and consists of 9,621 acres. The refuge is located in Cameron Parish, 25 miles southeast of Lake Charles, Louisiana on the LA Highway 27, the Creole Nature Trail All-American Road. Abundant migratory birds and fresh marsh are the dominant features of the area. Old rice fields have been converted to moist soil management areas, utilizing existing levees and pump system. Over 45,000 ducks and 10,000 geese are present in peak populations during the winter months. The refuge provides excellent habitat for native wildlife including alligators, furbearers, white-tailed deer, as well as numerous migratory birds throughout the year. The refuge is crucial to meeting goals set by the North American Waterfowl Management Plan, an international agreement to restore lost wetland habitats.

The Lacassine NWR was established on December 30, 1937 and consists of 34,886 acres in Cameron and Evangeline Parishes. The refuge is located at 209 Nature Road, at the end of Highway 3056, eleven miles southwest of Lake Arthur, Louisiana off Hwy. 14. The Lacassine NWR is responsible for managing a 3,345 acre wilderness area and an 8,000 acre private lands mini-refuge program for migrating waterfowl in six parishes. Wintering populations of ducks and geese are among the largest in the National Wildlife Refuge System. The refuge management is responsible for negotiating with oil and gas industries for mineral exploration/extraction, establishing prairie restoration programs, exotic Chinese tallow tree control programs, and wetland easements in Jefferson Davis Parish.

Rockefeller Wildlife Refuge, located in eastern Cameron and western Vermilion Parishes, is owned and maintained by the State of Louisiana. When deeded to the state this refuge encompassed approximately 86,000 acres, but beach erosion has taken a heavy toll and the most recent surveys indicate only 76,042 acres remaining. This area borders the Gulf of Mexico for 26.5 miles and extends inland toward the Grand Chenier ridge, a stranded beach ridge, and six miles from the Gulf. The Rockefeller Refuge is a flat, treeless area with highly organic soils which are capable of producing immense quantities of waterfowl foods in the form of annual emergent and submerged aquatics. Since 1954, Rockefeller Refuge has been a test site for various marsh management strategies, including levees, weirs, and several types of water control structures utilized to enhance marsh health and waterfowl food production. Rockefeller Wildlife Refuge is one of the most biologically diverse wildlife areas in the nation. Located at the terminus of the vast Mississippi Flyway, south Louisiana winters about four million waterfowl annually. Historically, Rockefeller wintered as many as 400,000-plus waterfowl annually, but severe declines in the continental duck population due to drought and poor habitat quality on the breeding grounds have altered Louisiana's wintering population. More recent surveys indicate a wintering waterfowl population on Rockefeller Wildlife Refuge reaching 160,000. In addition to ducks, geese, and coots, numerous shorebirds and wading birds either migrate through or over winter in Louisiana's coastal marshes. Neo-tropical migrant passerines also use the shrubs and trees on levees and other "upland" areas of the refuge as a rest stop on their trans-Gulf journeys to and from Central and South America. Although Canada geese no longer migrate to the refuge from breeding areas in the north as they once did, a resident flock of giant Canada geese was established in the early 1960s. Recreational shrimping, crabbing, fishing, and bird-watching are common on the refuge accounting for an annual visitation rate of nearly 80,000 people.

The Planning Committee, in communication with parish civic and government leaders, does not expect any significant changes in land use for the next five years. Timber and Agribusiness will continue to play a significant role in the allocation and use of the parish's land. There are no significant commercial and/or residential developments in the update.

This plan will discuss hazards affecting Cameron Parish. Hazard Profiles 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.

Cameron Parish weather is typically warm and humid. Variations in daily temperature are determined by distance from the Gulf of Mexico and, to a much lesser degree, by differences in elevation. According to the NCEI Data Tools service, the average annual temperature for the state as a whole ranges anywhere from 66-69ºF, with northern portions of the state running cooler than southern portions. January is typically the coldest month for Louisiana, averaging approximately 52ºF, while July is typically the warmest at an average of 83ºF. Winter months are usually mild with cold spells of short duration. For Cameron Parish in particular, the summer months are usually quite warm, with an average daily maximum temperature in July and August of 91°F. Winters are typically mild. Snowfall averages less than one inch per year. Average annual rainfall for the area is 69.5 inches. Cameron Parish is susceptible to the normal weather dangers, such as thunderstorms and flooding, but due to its location within the state and its proximity to the Gulf of America, the parish is highly susceptible to tropical cyclones. Hurricane season lasts from June 1st to November 30th, with most hurricanes forming in August, September, and October.

Cameron Parish is located in Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) Region 5 (*Figure 1-2*).

As noted above, Cameron Parish is located in the south-western region of Louisiana.

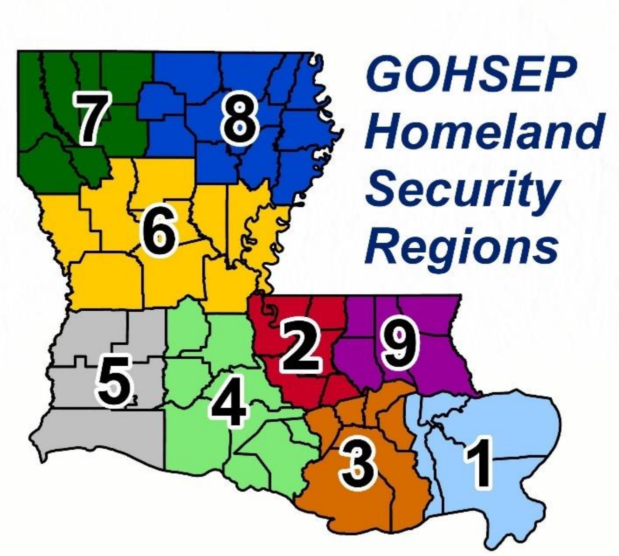


Figure 1-2: Louisiana Homeland Security Regions

Population

The population of Cameron Parish is estimated at 5,222 (2023 Estimate) with a population percent change from April 1, 2010 – July 1, 2023 of 23.64%.

Table 1-1: Cameron Parish Population
(Source: US Census)

Variables	2010 Census	2020 Census	2023 Estimate	Percent Change 2010 - 2023
Total Population	6,839	5,617	5,222	-23.64%
Population Density (Pop/Sq. Mi.)	5.3	4.4	4.1	-23.64%
Total Households	3,593	4,175	3,447	-4.06%
Persons Per Household	1.90	1.35	1.51	-20.41%

History & Economy

Cameron Parish, located in the southwestern corner of Louisiana along the Gulf Coast, is the state's largest parish by land area. Its history is deeply intertwined with its coastal geography and the natural challenges that come with it. The land was originally inhabited by Native American tribes, including the Atakapa, long before European settlers arrived. The parish itself was officially established in 1870, carved out of the larger Calcasieu Parish. It was named after Simon Cameron, who served as the U.S. Secretary of War under President Lincoln during the Civil War era. This formation reflected the need for more localized governance in a remote and difficult-to-access region.

The economy of Cameron Parish has historically centered around its abundant natural resources. Early settlers and residents made their living through fishing, shrimping, crabbing, oyster harvesting, cattle ranching, and agriculture. The marshes and wetlands provided a rich environment for these activities, forming the backbone of the parish's economy and culture.

However, Cameron Parish's location along the Gulf of America has exposed it to frequent and often devastating hurricanes. Over the decades, powerful storms such as Hurricane Audrey in 1957, Hurricane Rita in 2005, Hurricane Ike in 2008, and most recently Hurricane Laura in 2020 have caused significant destruction. These storms have led to widespread damage to homes, infrastructure, and the local economy, forcing many residents to relocate and prompting ongoing rebuilding efforts. The repeated impacts of hurricanes have contributed to a steady decline in population, particularly since 2005.

Despite these challenges, Cameron Parish remains a vital part of Louisiana's coastal identity. It is home to important wildlife refuges, including the Cameron Prairie and Sabine National Wildlife Refuges, which protect critical wetland habitats and diverse wildlife species. Additionally, the parish plays a role in offshore oil and gas production, contributing to the state's energy industry. Cameron Parish is also rich in cultural traditions that reflect the diverse heritage of its residents. The parish is strongly influenced by Cajun and Creole cultures, which are celebrated through music, food, and festivals. Traditional Cajun music remains an important part of community life and social gatherings and food is central to the culture, with dishes like gumbo, crawfish étouffée, and jambalaya served around the community.

Table 1-2: Cameron Parish Business Patterns
(Source: US Census, CBP)

Business Description	Number of Establishments	Annual Payroll ($1,000)	Number of Employees
Mining, quarrying, and oil and gas extraction	7	27	1,144
Utilities	3	29	4,732
Construction	18	168	8,714
Wholesale trade	8	82	4,932
Retail trade	20	119	2,156
Transportation and warehousing	18	609	113,267
Finance and insurance	4	15	1,236
Real estate and rental and leasing	5	175	5,636
Professional, scientific, and technical services	18	152	32,368
Arts, entertainment, and recreation	5	55	1,858
Accommodation and food services	8	32	748
Other services (except public administration)	13	59	932
Industries not classified	3	6	64

Hazard Mitigation

To fully understand hazard mitigation efforts in Cameron 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 in advance of 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.

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

Unfortunately, this cycle can be painful for a community. For instance, the risks of disasters that could create catastrophic incidents in Louisiana were thought to be relatively well-understood prior to 2005. However, the impact of the 2005 hurricane season on the Gulf Coast region of the United States prompted a new level of planning and engagement related to disaster response, recovery, and hazard mitigation. Hurricanes Katrina and Rita hit three weeks apart and together caused astonishing damage to human life and to property. The two storms highlighted a hurricane season that spawned 28 storms—unparalleled in American history. The 2005 hurricane season confirmed Louisiana's extreme exposure to natural disasters and both the positive effects and the concerns resulting from engineered flood-protection solutions. More recently, the historically impactful 2020 hurricane season reinforced the need for proper planning and mitigation strategies.

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

The catastrophic tropical events of 2005 and 2020, coupled with the unprecedented flooding events of 2016 have had profound impacts on emergency management and hazard mitigation throughout Louisiana. As detailed later in this document, significant funding has been made available to the State of Louisiana and its parishes for the purpose of hazard mitigation planning. The storms also raised awareness of the importance of hazard mitigation among decision-makers and the general population, which has been particularly important since natural hazards will likely be increasing in frequency, magnitude, and impact in the coming years due to climate change.

General Strategy

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

Part of the ongoing integration process is that the Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) encourages the parishes and the local communities with independent hazard mitigation plans to utilize the same plan format and methodologies as the State Hazard Mitigation Plan in order to create continuity of information from local to state mitigation plans and programs.

The 2026 Cameron Parish Hazard Mitigation Plan (HMP) maintains much of the information from the 2021 plan version, but it now incorporates the order and methodologies of the 2024 Louisiana State Hazard Mitigation Plan.

The sections in the 2021 Cameron Parish HMP were as follows:

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

This plan update also coheres with the Plain Writing Act of 2010, which requires federal agencies to use clear communication that is accessible, consistent, understandable, and useful to the public. While the State of Louisiana and its political subdivisions are not required to meet such standards, the Act aligns with best practices in hazard mitigation. Since successful hazard mitigation relies on full implementation and cooperation at all levels of government and community, a successful hazard mitigation plan must also be easily used at all of these levels. Nevertheless, the Cameron Parish Hazard Mitigation Planning Committee recognized the benefits from the successful analysis and mitigation planning executed in previous plan updates, as well as improvements to be made in the 2026 update. This plan update remains coherent with those documents, retaining language and content when needed, deleting it when appropriate, and augmenting it when constructive.

2026 Plan Update

This 2026 plan update proceeds with the previous goals of the Cameron Parish Hazard Mitigation Plan. The current goals are as follows:

1. Reduce the loss of life or property
2. Protect critical public facilities and thoroughfares
3. Ensure post-disaster operability of strategic facilities and thoroughfares
4. Develop incentive and community outreach/education programs that assist homeowners in protecting residential properties
5. Provide a long term mitigation solution in locations which experience repetitive hazard damage
6. Provide a cooperative, inter-jurisdictional / inter-agency solution to a problem
7. Show development and implementation of comprehensive programs, standards, and regulations that reduce future hazard damage
8. Avoid inappropriate future development in areas that are vulnerable to hazard damage
9. Reduce the level of hazard vulnerability in existing structures and developed property
10. Restore or protect natural resources, recreational areas, open space, or other environmental values

This plan update makes a number of textual changes throughout, but the most obvious changes are data related and structural edits. First, the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information's (NCEI) Storm Events Database was used in the analysis, which provides historical hazard data from 1950 to 2025. The planning committee was also instrumental in providing detailed data where appropriate to more accurately reflect hazard impacts on the parish. Furthermore, all of the sections were updated to reflect the most current information and the most current vision of the plan update. The most significant changes are the newly developed hazard profiles and risk assessments, as well as the removal of much repetition between sections from the previous plan updates.

The 2026 plan update is organized in the same format as the 2021 update, with one minor change to this 2026 update as outlined below. The decision to change the title of Appendix C from Essential Facilities to Critical Facilities was made to better align with FEMA preferred terminology.

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

Table 1-3: 2026 Plan Update Crosswalk

Plan Update Crosswalk	
2021 Update	**2026 Update**
Section 1: Introduction	Section 1: Introduction
Section 2: Hazard Identification and Parish-Wide Risk Assessment	Section 2: Hazard Identification and Parish-Wide Risk Assessment
Section 3: Capability Assessment	Section 3: Capability Assessment
Section 4: Mitigation Strategy	Section 4: Mitigation Strategy
Appendix A: Planning Process	Appendix A: Planning Process
Appendix B: Plan Maintenance	Appendix B: Plan Maintenance
Appendix C: Essential Facilities	Appendix C: Critical Facilities
Appendix D: Plan Adoptions	Appendix D: Plan Adoptions
Appendix E: State Required Worksheets	Appendix E: State Required Worksheets

Despite numerous changes in this plan update, the plan remains consistent in its emphasis on the types of hazards that pose the most risk to loss of life, injury, and property in Cameron Parish. The extent of this risk is dictated primarily by its geographic location. Most significantly, Cameron Parish remains at high risk of water inundation from various sources, including flooding and tropical cyclone activity. The entire parish is also at high risk of damages from high winds and wind-borne debris. The 2016 flooding events, along with the 2020 hurricane season were both felt heavily in all parts of Cameron Parish. Other hazards threaten the parish and/or its communities, 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. Flexibility in response and planning is essential. The most important step forward to improve hazard management capability is to improve coordination and information sharing between the various levels of government regarding hazards.

2. Hazard Identification and Parish-Wide Risk Assessment

Overview

The risk assessment identifies and assesses a large variety of threats and hazards that impact the parish to identify a strategy for mitigation. Having identified the categories of hazards, emergencies, disasters, and catastrophes, this section describes the risks associated with each identified hazard of concern. Each section (1) defines the hazard, (2) explains how each hazard is measured, (3) provides the hazard's geographic extent, (4) analyzes the previous occurrences, (5) evaluates each hazard's future likelihood of occurrence, and (6) identifies the worst-case scenario for each hazard.

The following steps were used to define the risk of each hazard:

- Profile and describe each hazard
  - Geographic areas most affected by the hazard
  - Previous occurrences and detailed description of events occurring in the last 5 years
  - Occurrence probability/frequency estimates
  - Worst-case scenarios
- Determine exposure to each hazard
  - Exposure was determined by overlaying hazard maps with an inventory of structures, facilities, and systems to determine which of them would be exposed to each hazard
  - Vulnerability analysis for people and infrastructure

The primary source for historical data used throughout the risk assessment is the National Centers for Environmental Information (NCEI) Storm Events Database, which provides natural hazard event data from 1950 to the present. In staying consistent with climatological studies, the NCEI Storm Events Database was evaluated for the past 30 years (1996 – 2025) to determine the future probability and frequency of a hazard occurring when data were available.

Data Limitations

Throughout the planning process, every effort was made to use the best available data. Much of the historic natural-hazard occurrence information was obtained through the National Oceanic and Atmospheric Administration's (NOAA) NCEI. The NCEI Storm Events Database contains data from January 1950 to the present (i.e., within the past few months); however, there are some issues with events recorded prior to 1996. From the years 1950 to 1954, the NCEI Storm Events Database only contained information on tornado events, until thunderstorm wind and hail events were added to the database for the time period between 1955 and 1992. All event types identified in the National Weather Service (NWS) Directive 10-1605 (48 in total) are recorded from 1996 to the present. For these hazards, only 30 years (1996 – 2025) worth of data was evaluated to determine the future probability and frequency of a hazard occurring. Additionally, property damage and crop damage estimates from the NCEI Storm Events Database are a "best guess" based on all available data at the time of the event publication.

The NCEI Storm Events Database does not record all events, only occurrences that have sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce. Even then, there are events that may not be covered due to changes in data collection and processing procedures over time. Also, events such as tornadoes or hailstorms rely heavily on eye-witness accounts, which creates a reporting bias in urban areas. The inception of Doppler radar in 1980 significantly decreased this bias, especially for tornado events, but records prior to 1980 are not as detailed or complete as post-1980 records.

The Storm Prediction Center (SPC) National Severe Weather Database browser examines convective/thunderstorm-related winds only and does not include wind data from hurricanes or non-thunderstorm wind damage. This data contains measured and estimated wind gusts, including wind damage, without estimated wind speeds. For many observations, this results in several thunderstorm wind events with no estimated or actual wind speed estimates.

The vulnerability estimates provided herein use the best data currently available, and the methodologies applied result in an approximation of risk. These estimates may be used to understand the relative risk from hazards and potential losses. However, uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning hazards and their effects on the built environment, as well as approximations and simplifications that are necessary for a comprehensive analysis.

Identifying Hazards

Several emergency management and hazard mitigation documents at the state and local levels were reviewed to identify a comprehensive list of hazards that may impact the parish. These documents addressed a wide range of hazards, including natural, technological, and human-caused. The two main documents referenced in finalizing the parish's comprehensive hazard list were the 2021 Hazard Mitigation Plan for the parish and the state of Louisiana's 2024 Hazard Mitigation Plan. Typically, unless otherwise noted in the plan, all hazards previously identified in the parish's 2021 Hazard Mitigation Plan and all hazards in the state of Louisiana's 2024 Hazard Mitigation Plan identified as medium or high risk by the state are profiled in the risk assessment. The table below provides a comprehensive list of the hazards selected based on the above criteria.

Table 2-1: Hazard Profile Summary.

Hazard	Profiled in the Previous Plan	Profiled in the 2025 Update
Coastal Hazards	X	X
Drought	X	X
Excessive Heat	X	X
Flooding	X	X
Sinkholes	X	X
Thunderstorms – Hail	X	X
Thunderstorms – Lightning	X	X
Thunderstorms – Winds	X	X
Tornadoes	X	X
Tropical Cyclones	X	X
Wildfires	X	X

Historical Context and Previous Occurrences

The following table and figures display past disaster declaration occurrences and provide background on the type of natural disasters that have affected the parish in the past.

Table 2-2: Disaster Declarations in Cameron Parish.
(Source: FEMA Disaster Declarations Summary: Open Government Database)

Disaster Number	Year	Type	Declaration
DR-315-LA	1972	DR	HURRICANE EDITH
DR-374-LA	1973	DR	SEVERE STORMS & FLOODING
DR-752-LA	1986	DR	HURRICANE JUAN
DR-956-LA	1992	DR	HURRICANE ANDREW
DR-1169-LA	1997	DR	SEVERE WINTER STORM
DR-1246-LA	1998	DR	HURRICANE GEORGES/TS FRANCES

Disaster Number	Year	Type	Declaration
DR-1437-LA	2003	DR	HURRICANE LILI
EM-3260-LA	2005	EM	HURRICANE RITA
EM-3212-LA	2005	EM	HURRICANE KATRINA
DR-1607-LA	2005	DR	HURRICANE RITA
DR-1603-LA	2005	DR	HURRICANE KATRINA
EM-3295-LA	2008	EM	HURRICANE IKE
EM-3289-LA	2008	EM	HURRICANE GUSTAV
DR-1792-LA	2008	DR	HURRICANE IKE
DR-1786-LA	2008	DR	HURRICANE GUSTAV
DR-4080-LA	2012	DR	HURRICANE ISAAC
EM-3347-LA	2012	EM	TROPICAL STORM ISAAC
DR-4277-LA	2016	DR	SEVERE STORMS AND FLOODING
EM-3382-LA	2017	EM	TROPICAL STORM HARVEY
DR-4345-LA	2018	DR	TROPICAL STORM HARVEY
DR-4458-LA	2019	DR	HURRICANE BARRY
EM-3416-LA	2019	EM	TROPICAL STORM BARRY
DR-4559-LA	2020	DR	HURRICANE LAURA
DR-4484-LA	2020	DR	COVID-19 PANDEMIC
EM-3538-LA	2020	EM	TROPICAL STORMS LAURA AND MARCO
EM-3527-LA	2020	EM	TROPICAL STORM CRISTOBAL
EM-3459-LA	2020	EM	COVID-19
EM-3543-LA	2020	EM	HURRICANE SALLY
DR-4611-LA	2021	DR	HURRICANE IDA
DR-4590-LA	2021	DR	SEVERE WINTER STORMS
DR-4577-LA	2021	DR	HURRICANE ZETA
EM-3568-LA	2021	EM	TROPICAL STORM IDA
DR-4570-LA	2021	DR	HURRICANE DELTA
EM-3574-LA	2021	EM	TROPICAL STORM NICHOLAS
EM-3556-LA	2021	EM	SEVERE WINTER STORM
EM-3549-LA	2021	EM	TROPICAL STORM ZETA
EM-3547-LA	2021	EM	HURRICANE DELTA
EM-3614-LA	2024	EM	TROPICAL STORM FRANCINE

Probability of Future Threats and Hazards

The probability of each occurring hazard in the parish is estimated in the table based on data analyzed in the Risk Assessment. For further explanation of these calculations, please refer to the Probability section of each corresponding hazard profile in the risk assessment.

Table 2-3: Probability of Future Hazard Reoccurrence.

Hazard	Probability
	Cameron Parish
Coastal Hazards/Subsidence	100%
Drought	3%
Excessive Heat	< 1%
Flooding	40%
Sinkholes	< 1%
Thunderstorms – Hail	100%
Thunderstorms – Lightning	33%
Thunderstorms – Winds	100%
Tornadoes	100%
Tropical Cyclones	38%
Wildfires	3%

Assessing Vulnerability Overview

The purpose of assessing vulnerability is to quantify and/or qualify exposure and determine how various threats and hazards impact life, property, the environment, and critical operations of the parish. Vulnerability can be defined as the manifestation of the inherent states of the system (e.g., physical, technical, organizational, cultural) that can be exploited to adversely affect (cause harm or damage to) that system. For example, identifying areas within the parish that suffer disproportional damage compared to other areas, or overall exposure of the entire parish to flooding. Identifying and understanding vulnerability to each threat and hazard provides a strong foundation for developing and pursuing mitigation actions.

The vulnerability analysis builds upon the information provided in the risk assessment by assessing the potential impact and amount of damage that each hazard has on the parish. To complete the analysis, the best available data were collected from a variety of sources, including local, state, and federal agencies, and multiple analyses were performed qualitatively and quantitatively. The estimates provided in the vulnerability analysis should be used to understand the relative risk from each hazard and the potential losses that may be incurred; however, uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning specific hazards and their effects on the built environment, as well as incomplete datasets and from approximations and simplifications that are necessary to provide a meaningful and complete analysis. Further, most datasets used in this assessment contain relatively short periods of records, which increases the uncertainty of any statistically based analysis.

Vulnerability Analysis Methodology

To direct the vulnerability analysis effort for the parish, two distinct methodologies were applied. The first includes a quantitative analysis that relies upon the best available data and technology, while the second methodology includes a qualitative analysis that relies more on local knowledge and rational decision-making. Upon completion, the methodologies are combined to create a vulnerability analysis that allows for some degree of quality control and assurance. The quantitative assessment focuses on potential hazard loss estimates, while the qualitative assessment is comprised of a scoring system built around values assigned by the Planning Team as to the likelihood of occurrence, spatial extent, and potential impact of each hazard.

Quantitative Methodology

The quantitative methodology consists of utilizing Hazus, a geographic information system (GIS)-based loss estimation software available from the Federal Emergency Management Agency (FEMA), as well as a detailed GIS-based approach independent of the Hazus software. These two GIS-based studies together help form a quantitative vulnerability analysis. GIS technology allows for the identification and analysis of potentially at-risk community assets such as people and infrastructure. This analysis was completed for hazards that can be spatially defined in a meaningful manner (i.e., hazards with an official and scientifically determined geographic extent) and for which GIS data were readily available.

Additionally, the National Risk Index developed by FEMA was utilized to determine the composite risk to 18 natural hazards, including avalanche, coastal flooding, cold wave, drought, earthquake, hail, heat wave, hurricane, ice storm, landslide, lightning, riverine flooding, strong wind, tornado, tsunami, volcanic activity, wildfire, and winter weather. Historic loss ratio, expected annual loss, and overall risk factor for any of the above hazards which are profiled in this plan are provided in the vulnerability analysis to provide further context on the risk associated to the hazard. Expected annual loss and the risk factor are calculated using the following formulas:

Expected Annual Loss = Exposure * Annualized Frequency * Historic Loss Ratio

Risk Index = Expected Annual Loss * Social Vulnerability / Community Resilience

Qualitative Methodology

The qualitative assessment relies less on technology, but more on historical and anecdotal data regarding expected hazard impacts. The qualitative assessment completed for the parish is based on the Priority Risk Index (PRI). The purpose of the PRI is to prioritize all potential hazards, and then group them into three categories of high, moderate, or low risk to identify and prioritize mitigation opportunities.

The PRI is a good practice to use when prioritizing hazards because it provides a standardized numerical value for hazards to be compared. Adapted PRI scores were calculated using five categories:

- Probability
- Impact
- Spatial Extent
- Warning Time
- Duration

Each degree of risk is assigned a value (1-4) and a weighting factor. To calculate the Risk Factor for a given hazard, the assigned risk value for each category is multiplied by the weighted factor, and the sum of all five categories is totaled together for a final score. The highest possible Risk Factor is a 4.0.

Risk Factor = [(Probability * 0.25) + (Impact * 0.25) + (Spatial Extent * 0.20) + (Warning Time *0.15) + (Duration * 0.15)]

Priority Risk Index and Hazard Risk

Hazard risk is determined by calculating the Risk Factor for each hazard impacting the parish. A summary of the PRI is found in the following table. The conclusions drawn from the qualitative and quantitative assessments are fitted into three categories based on High, Moderate, or Low designations. Hazards identified as high risk have a risk factor of 2.5 or greater. Risk factors ranging from 2.0 to 2.4 are deemed moderate risk hazards while hazards with risk factors less than 2.0 are considered low risk.

Table 2-4: Summary of the Priority Risk Index.

PRI Category	Degree of Risk			Assigned Weighting Factor
	Level	Criteria	Index Value	
Probability	Unlikely	Less than 1% annual probability	1	25%
	Possible	Between 1 and 10% annual probability	2	
	Likely	Between 10 and 100% probability	3	
	Highly Likely	100% annual probability	4	
Impact	Minor	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of critical facilities.	1	25%
	Limited	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one day.	2	
	Critical	Multiple deaths/injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than a week.	3	
	Catastrophic	High number of deaths/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.	4	
Spatial Extent	Negligible	Less than 1% of area affected	1	20%
	Small	Between 1 and 10% of area affected	2	
	Moderate	Between 10 and 50% of area affected	3	
	Large	Between 50 and 100% of area affected	4	
Warning Time	More than 24 hours	Self-explanatory	1	15%
	12 to 24 hours	Self-explanatory	2	
	6 to 12 hours	Self-explanatory	3	
	Less than 6 hours	Self-explanatory	4	
Duration	Less than 6 hours	Self-explanatory	1	15%
	Less than 24 hours	Self-explanatory	2	
	Less than one week	Self-explanatory	3	
	More than one week	Self-explanatory	4	

Table 2-5: Associated Risk Factor with PRI Value Range.

Risk Factor	PRI Range
High Risk	2.5 to 4.0
Moderate Risk	2.0 to 2.4
Low Risk	0 to 1.9

Vulnerability Analysis (NRI & PRI)

The first table is the overall risk associated with each threat and hazard with 2.5 or above deemed high risk, 2.0 to 2.4 deemed medium risk, and less than 2.0 deemed low risk. The final table summarizes the composite risk of 18 natural hazards outlined previously on the parish by expected annual loss, social vulnerability, community resilience, and overall risk rating.

Table 2-6: PRI Vulnerability Analysis for the Parish.

Hazards	Probability	Impact	Spatial Extent	Warning Time	Duration	Overall Risk
Coastal Hazards	4	2	2	1	2	**2.35**
Drought	2	2	4	2	3	**2.55**
Excessive Heat	1	2	4	1	2	**2**
Flooding	3	4	3	4	3	**3.4**
Sinkholes	1	2	2	1	4	**1.9**
Thunderstorms – Hail	4	2	3	3	1	**2.7**
Thunderstorms – Lightning	3	2	2	3	1	**2.25**
Thunderstorms – Winds	4	2	3	3	1	**2.7**
Tornadoes	4	3	2	4	3	**3.2**
Tropical Cyclones	3	4	4	1	4	**3.3**
Wildfires	2	3	4	1	2	**2.5**

Table 2-7: National Risk Index (NRI) Summarization of Risk to Eighteen Natural Hazards for the Parish. (Source: National Risk Index)

Expected Annual Loss	Social Vulnerability	Community Resilience	Overall Risk Rating
Relatively Low	Relatively Low	Very High	Relatively Low

Population and Development Trends

The future population and number of buildings can be estimated using U.S. Census Bureau housing and population data. The tables below and on the following pages show population and housing unit estimates from 2010 to 2023:

Table 2-8: Population Growth Rate for the Parish.

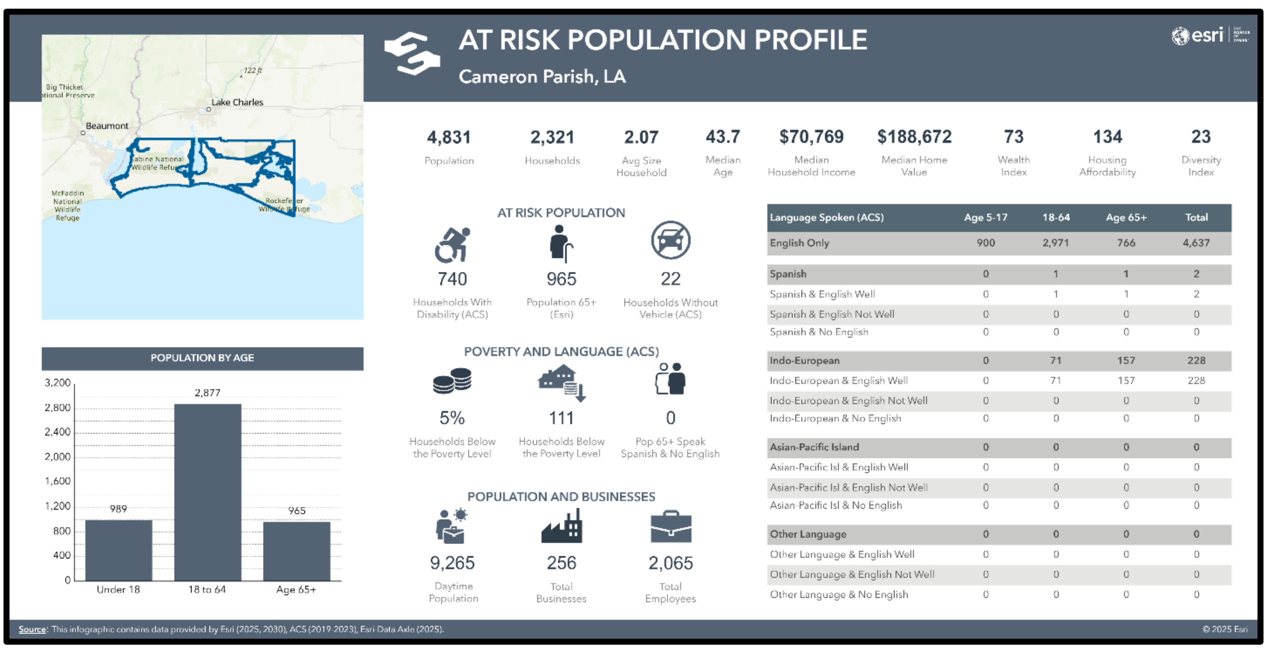
Total Population	Cameron Parish
1-Apr-10	6,839
1-Apr-20	5,617
1-Jul-23	5,222
Population Growth between 2010 – 2020	-17.9%
Average Annual Growth Rate between 2010 – 2020	-1.95%
Population Growth between 2020 – 2023	-7.0%
Average Annual Growth Rate between 2020 – 2023	-2.4%

Table 2-9: Housing Growth Rate for the Parish.

Total Housing Units	Cameron Parish
1-Apr-10	3,593
1-Apr-20	4,175
1-Jul-23	3,447
Housing Growth between 2010 – 2020	16.2%
Average Annual Growth Rate between 2010 – 2020	1.5%
Housing Growth between 2020 – 2023	-17.4%
Average Annual Growth Rate between 2020 – 2023	-6.2%

Since the previous plan update in 2021, the population and housing development has decreased. Cameron Parish and its communities will continue to be vigilant in offsetting any new development around the parish with appropriate mitigative actions. Initiatives such as active floodplain management have regulated the development of flood prone areas to continue supporting and encouraging safer communities within Cameron Parish. The development that has occurred since 2021 has not in any knowing way altered the parish's vulnerability to natural hazards. Cameron Parish will continue to monitor the rise of development and ensure that any new planning project is within the limitations of this hazard mitigation plan and for the best interest of the public, especially socially vulnerable populations.

Population and development trends can vary across the parish. The figure below outlines the diverse populations of the parish along with the social vulnerability.



Inventory of Assets for the Entire Parish

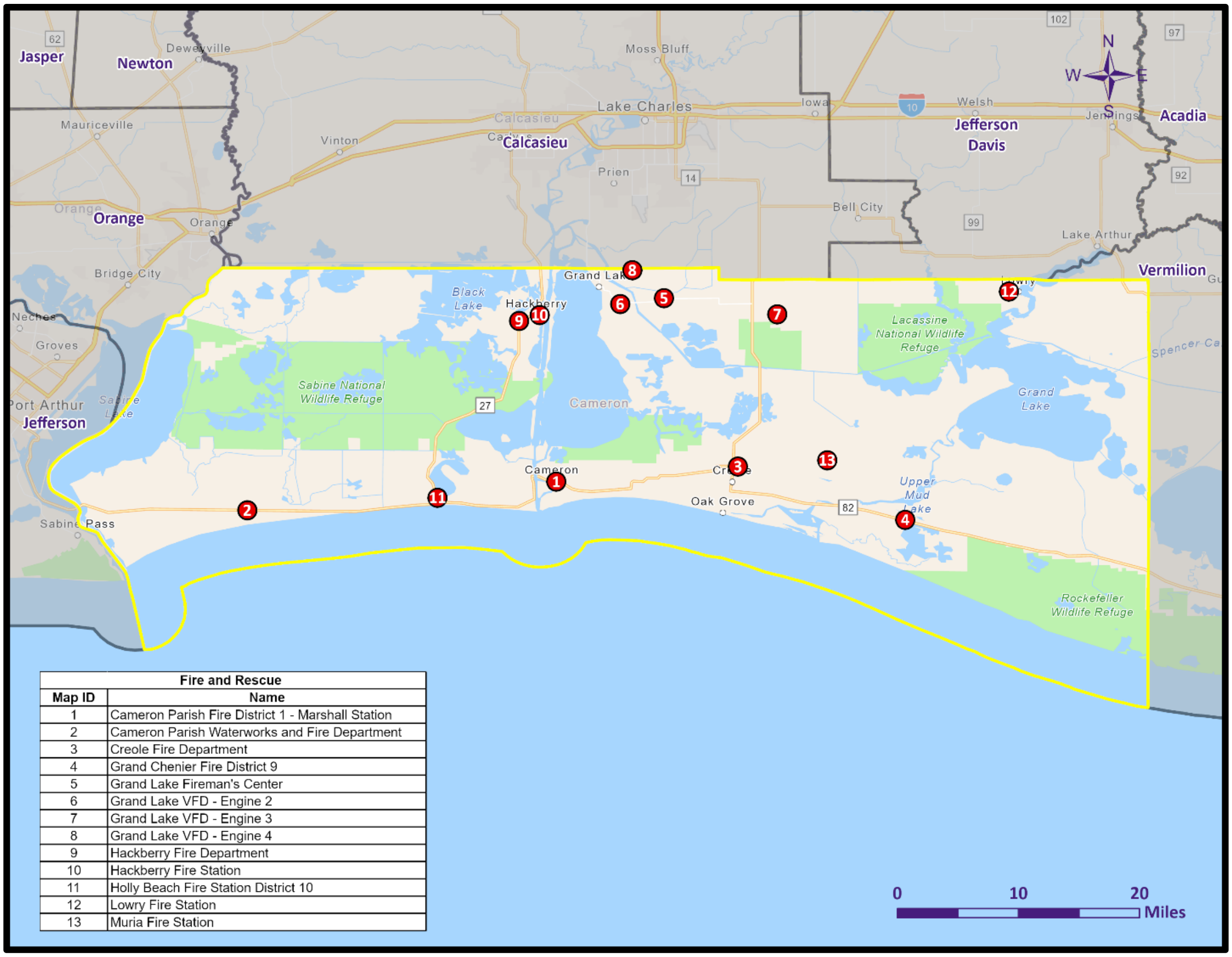
As part of the Risk Assessment, the planning team identified essential facilities throughout the parish. Within the entire planning area, there is an estimated value of $885,444,000 in structures throughout the parish. The table below provides the total estimated value for each type of structure by occupancy.

Table 2-10: Estimated Total of Potential Losses throughout the Parish.

Occupancy	Cameron Parish
Agricultural	$3,114,000
Commercial	$118,987,000
Government	$8,989,000
Industrial	$57,412,000
Religion	$22,696,000
Residential	$669,521,000
Education	$4,725,000
Total	**$885,444,000**

Critical Facilities of the Parish

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



Fire and Rescue	
Map ID	Name
1	Cameron Parish Fire District 1 - Marshall Station
2	Cameron Parish Waterworks and Fire Department
3	Creole Fire Department
4	Grand Chenier Fire District 9
5	Grand Lake Fireman's Center
6	Grand Lake VFD - Engine 2
7	Grand Lake VFD - Engine 3
8	Grand Lake VFD - Engine 4
9	Hackberry Fire Department
10	Hackberry Fire Station
11	Holly Beach Fire Station District 10
12	Lowry Fire Station
13	Muria Fire Station

Figure 2-1: Fire and Rescue Facilities in the Parish.

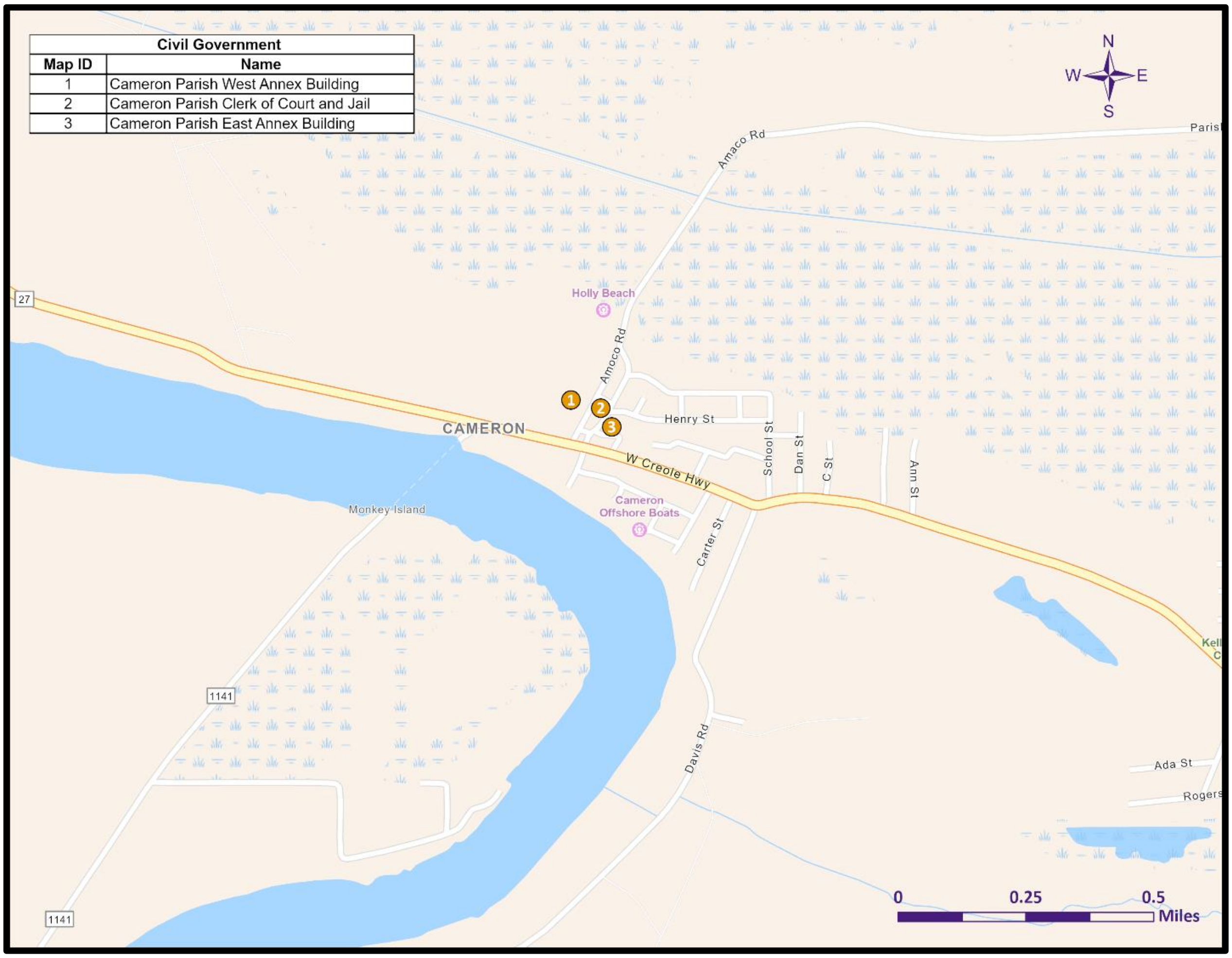


Figure 2-2: Government Buildings in the Parish.

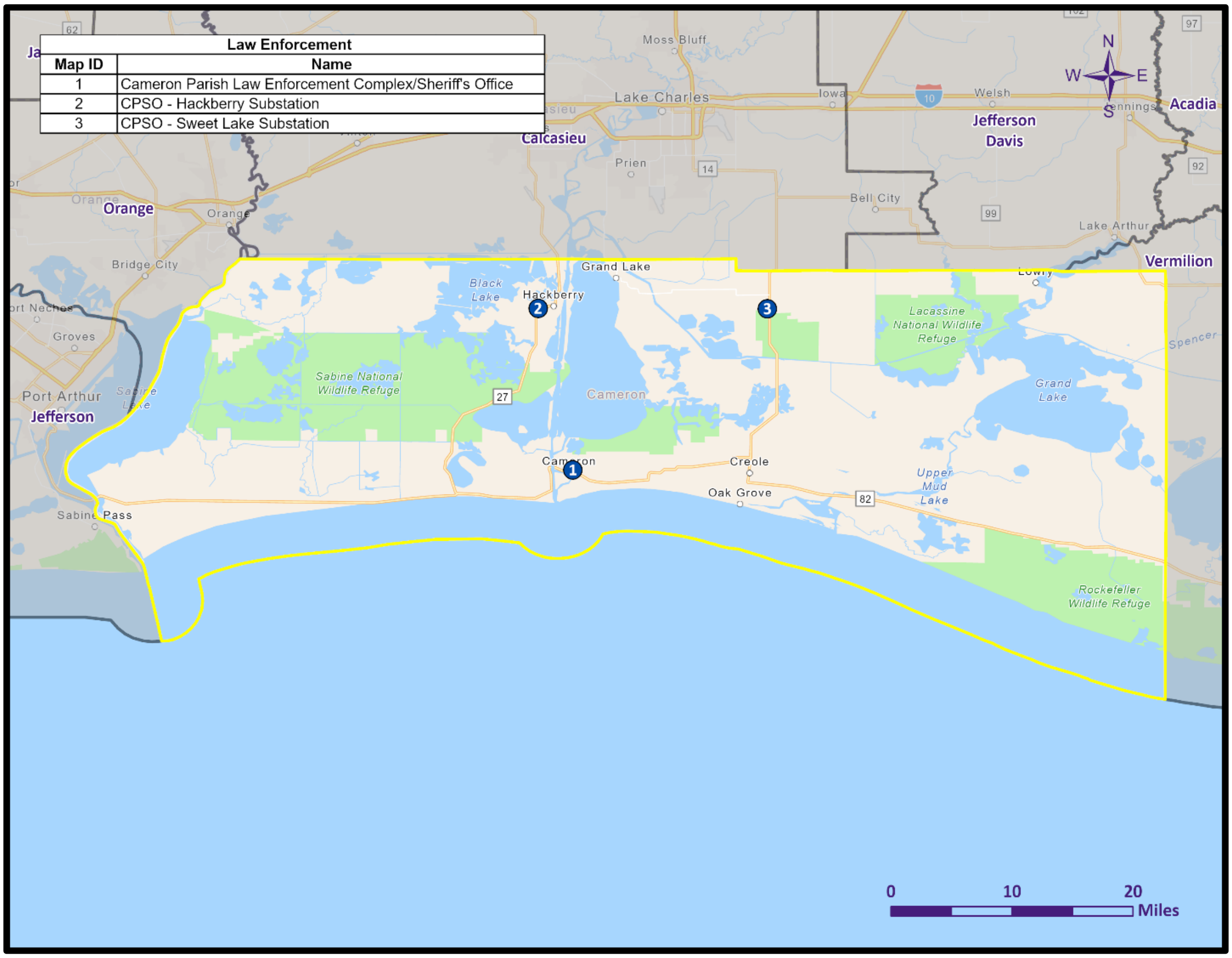


Figure 2-3: Law Enforcement in the Parish.

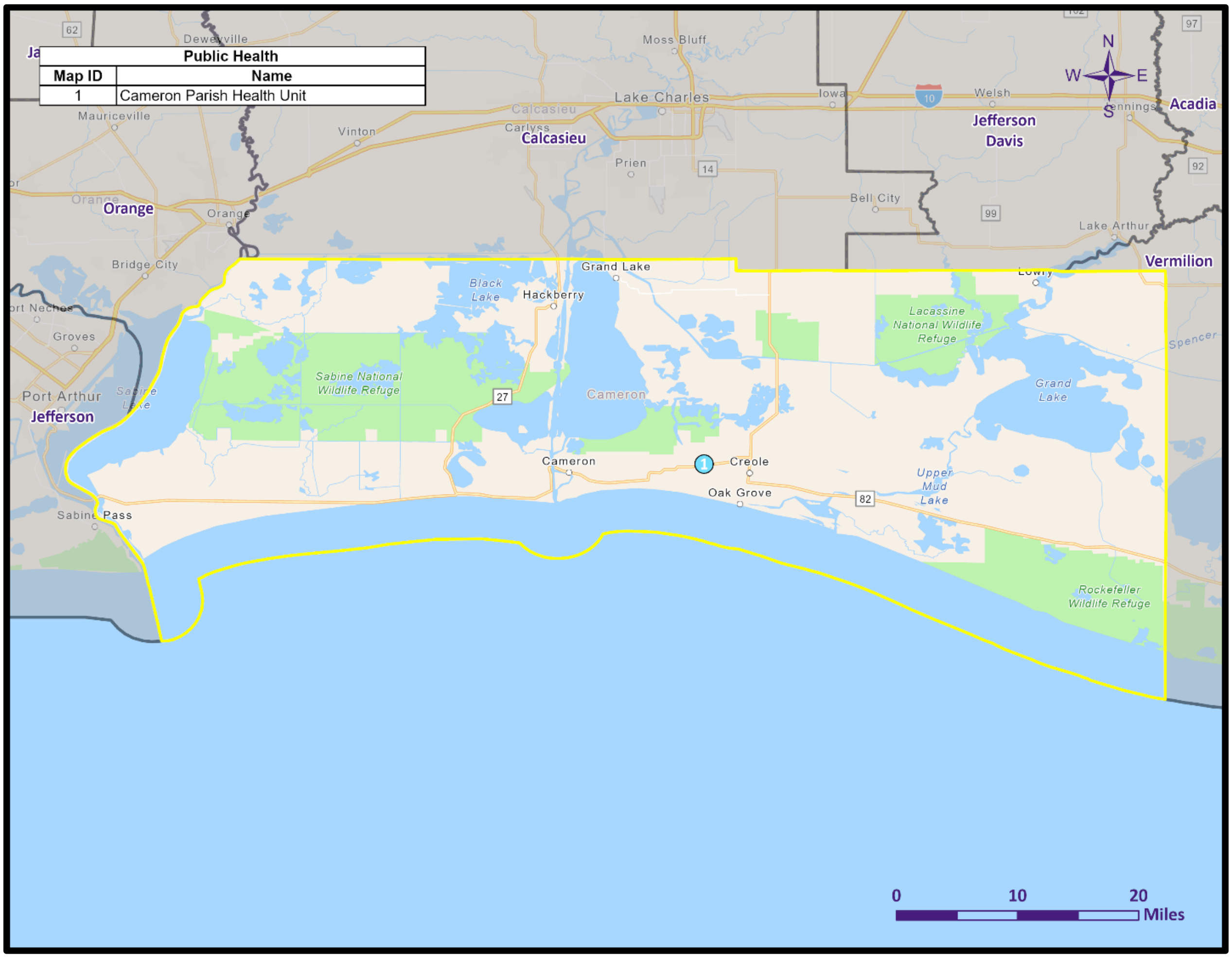


Figure 2-4: Public Health Facilities in the Parish.

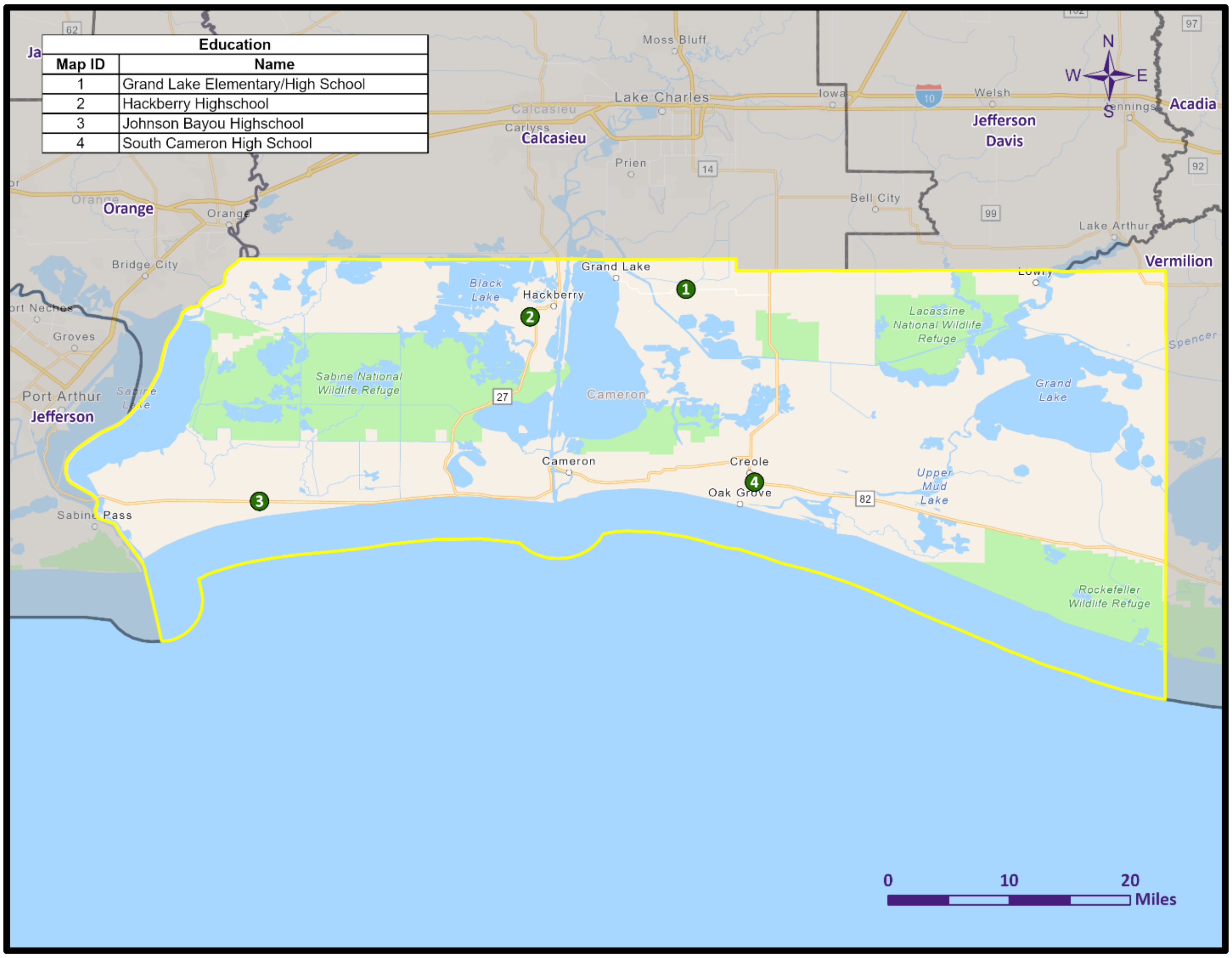


Figure 2-5: Educational Facilities in the Parish.

Land Use

The Parish Land Use table is provided below. Residential, commercial, and industrial areas account for only 1% of the parish's land use. Wetland areas make up the largest area at 656,089 acres, accounting for 53% of parish land. At 464,107 acres, open water accounts for 39% of parish lands, while agricultural accounts for 7% and forested lands account for less than 1% of all parish lands.

Table 2-11: Parish Land Use.
(Source: USGS Land Use Map)

Land Use	Acres	Percentage
Agricultural Land, Cropland, and Pasture	82,329	7%
Wetlands	656,089	53%
Forest Land (Not including forested wetlands)	4,472	< 1%
Urban/Development	16,723	1%
Water	464,107	39%

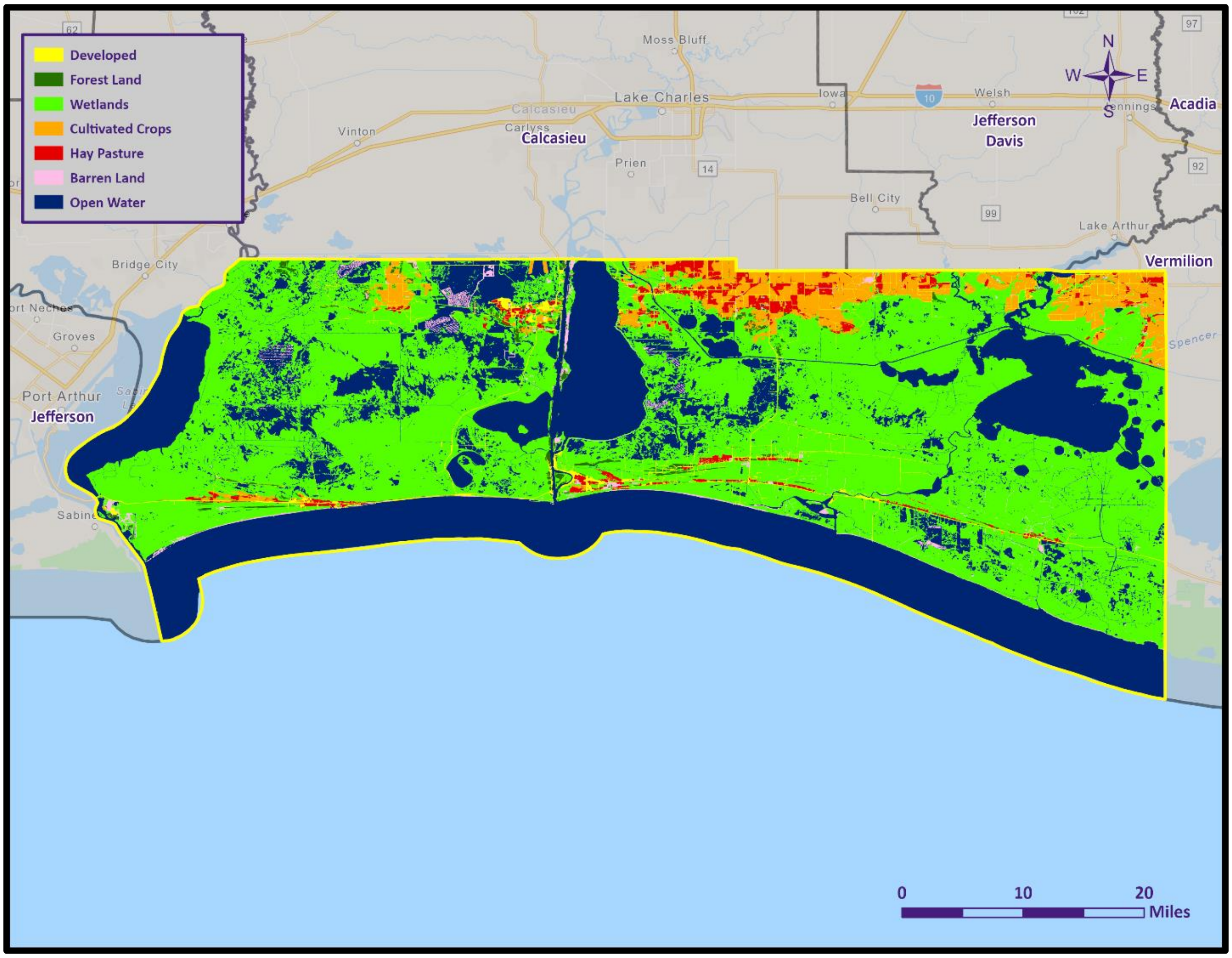


Figure 2-6: Parish Land Use Map.
(Source: USGS Land Use Map)

Hazard Profile, Risk Assessment, and Vulnerability Analysis

Coastal Hazards

Profile

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. Consistent with the 2019 State Hazard Mitigation Plan Update, coastal land loss is considered in terms of two of the most dominant factors: sea level rise and subsidence.

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 a number of 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.

Risk Assessment

Geographic Extent

Historic areas of coastal land loss and gain and subsidence rates have been quantified for the parish using data from the U.S. Geological Survey and the Louisiana Coastal Protection and Restoration Authority (CPRA). Since 1932, the average annual land loss in Louisiana is 35 square miles, while the average annual land gain has been 3 square miles for a net loss of 32 square miles per year. Land loss is occurring throughout the entire area of the Parish. Subsidence is also occurring throughout the parish further exacerbating land loss.

Previous Occurrences

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 the assessment of the added flood impacts caused by land loss is quantified in the following sections. The southwestern portion of Cameron Parish can expect to experience subsidence rates of approximately 35 mm annually while the remainder of the parish can expect subsidence rates of approximately 10 mm annually.

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 the parish 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.).

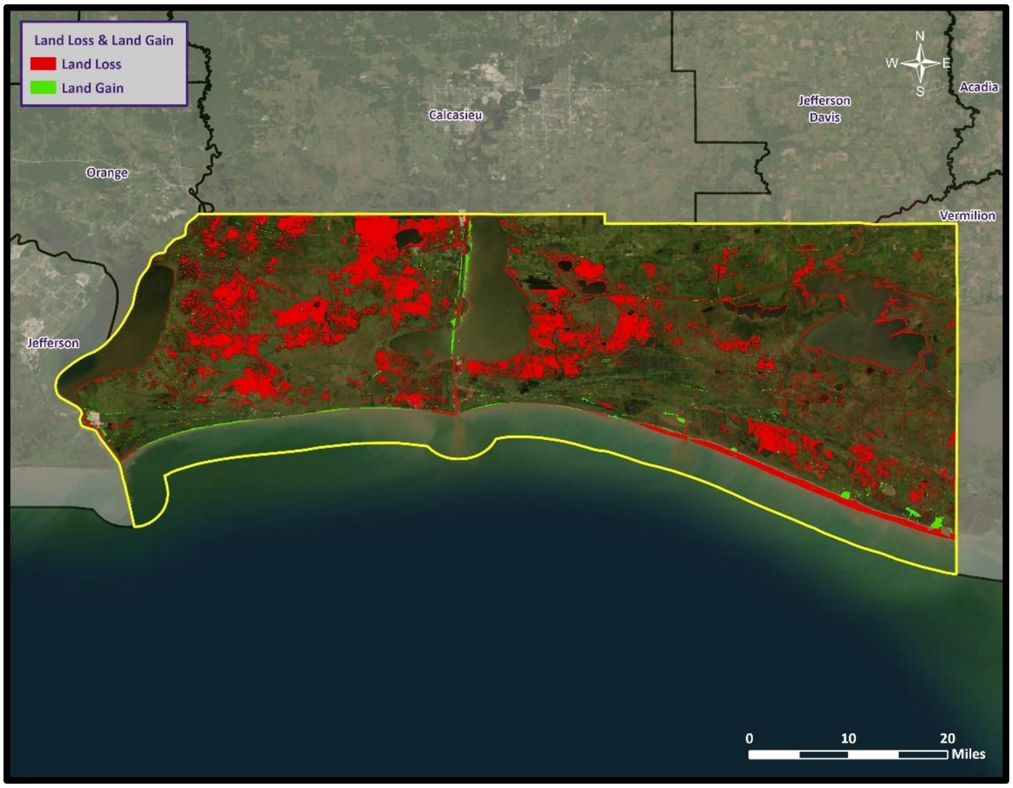


Figure 2-7: Historical Areas of Land Loss and Gain Between 1950 and 2020.

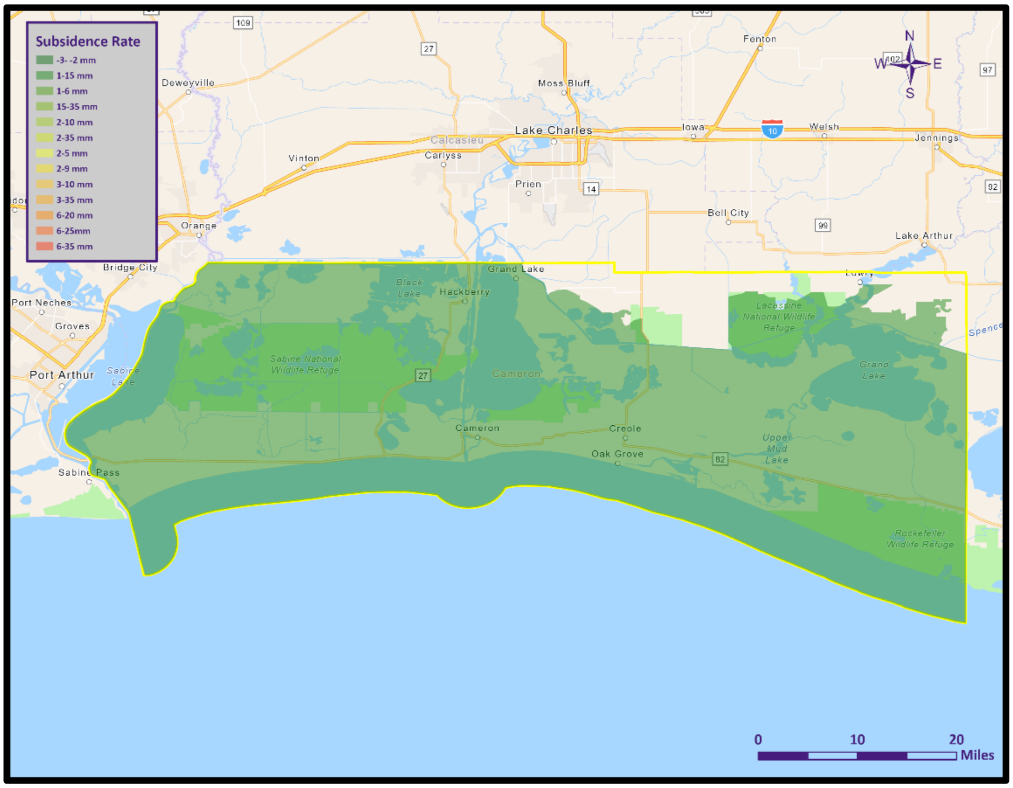


Figure 2-8: Maximum Annual Subsidence Rates Based on Subsidence Zones in Coastal Louisiana.

Climate Change Impacts

Climate change has a significant impact on coastal hazards especially the state of Louisiana as increased coastal erosion due to sea level rise will increase as higher sea levels push against the shoreline of Louisiana. Loss of land will occur in low-lying areas and areas below sea level. Saltwater intrusion into freshwater aquifers will occur as sea levels rise impacting drinking water supplies and agriculture in the state and parish.

Future Hazard Impacts

Future development in coastal areas can exacerbate existing hazards such as sea level rise and subsidence by increasing vulnerability through urbanization disrupting natural coastal buffers and altering sediment processes. Population growth in coastal areas can also intensify coastal hazards due to increased urbanization, infrastructure demands, and land-use changes.

Vulnerability Analysis

Estimated Impact and Potential Loss

To determine the estimated potential losses, the methodology implemented in the 2024 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. The following figure shows the total dollar amount of subsidence and land loss on the parish based on the above model.

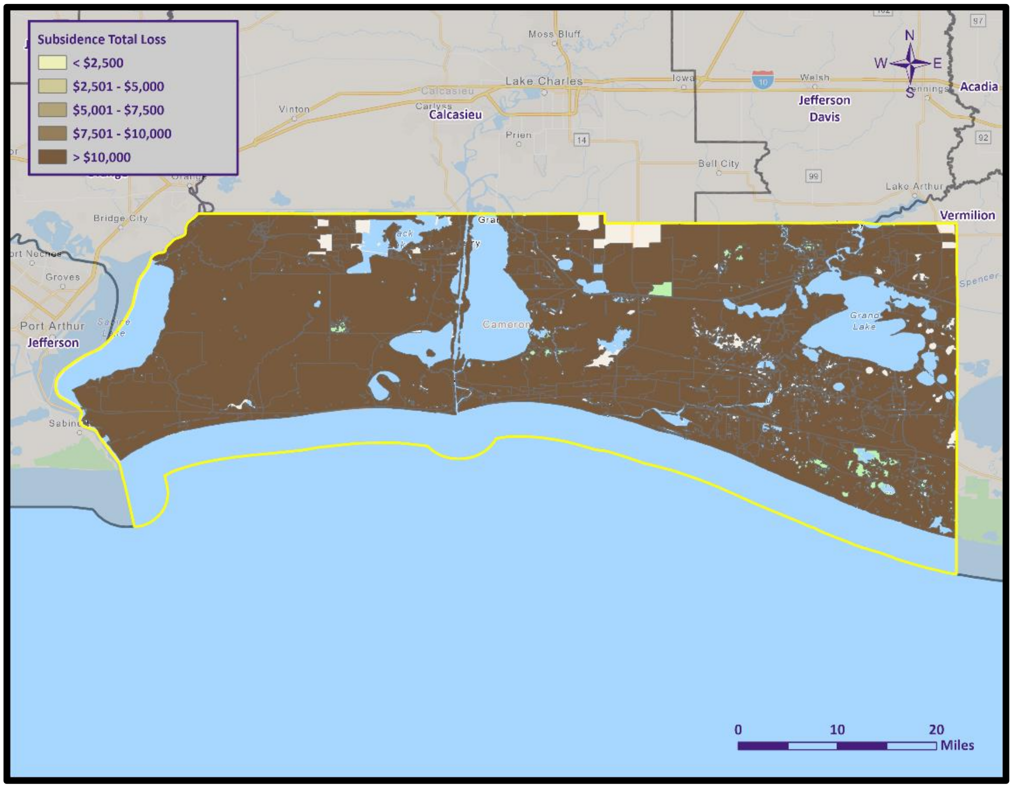


Figure 2-9: Total Losses Due to Subsidence in Cameron Parish.

The following table shows the current and future exposure potential based on the Hazus inventory database.

Table 2-12: Estimated Annual Losses for Coastal Land Loss in Cameron Parish. (Source: Hazus)

Estimated Annual Potential Losses
Cameron Parish
$1,379,000

Vulnerable Population

Coastal land loss can impact all demographics and age groups. Buildings located within highly vulnerable coastal land loss areas could eventually be permanently shut down and forced to relocate. 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 is shown in the following table.

Table 2-13: Number of People Susceptible to Coastal Land Loss in Cameron Parish.

Number of People Exposed to Coastal Land Loss			
Community	**# in Community**	**# in Hazard Area**	**% in Hazard Area**
Cameron Parish	5,222	4,079	78.1%

The Hazus Flood Model was used to identify populations vulnerable to coastal land loss throughout the parish in the table below:

Table 2-14: Population Vulnerable to Coastal Land Loss in Cameron Parish.

Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	4,079	78.1%
Persons Under 5 years	277	6.8%
Persons Under 18 years	979	24.0%
Persons 65 Years and Over	722	17.7%
White	3,496	85.7%
Minority	583	14.3%

Vulnerability Score

Table 2-15: Vulnerability Score for Coastal Hazards in Cameron Parish.

Coastal Hazards Vulnerability Score						
	Probability	**Impact**	**Spatial Extent**	**Warning Time**	**Duration**	**Risk Factor**
Risk Level	4	2	2	1	2	**2.35**

Drought

Profile

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

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

Table 2-16: Palmer Drought Severity Index Classification and Range.

Range	Palmer Classification
4.0 or more	Extremely Wet
3.0 to 3.99	Very Wet
2.0 to 2.99	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

Table 2-17: U.S. Drought Monitor Drought Intensity Scale
(Source: National Drought Mitigation Center)

Range/Category	Description	PDSI Equivalent
D0	Abnormally Dry	-1.0 to -1.99
D1	Moderate Drought	-2.0 to -2.99
D2	Severe Drought	-3.0 to -3.99
D3	Extreme Drought	-4.0 to -4.99
D4	Exceptional Drought	-5.0 or less

The following figure displays the drought conditions in the state of Louisiana. Data compiled by the National Drought Mitigation Center indicates normal conditions exist in the central portions of the parish and abnormally dry conditions exist in all other areas at the time this plan went to publication.

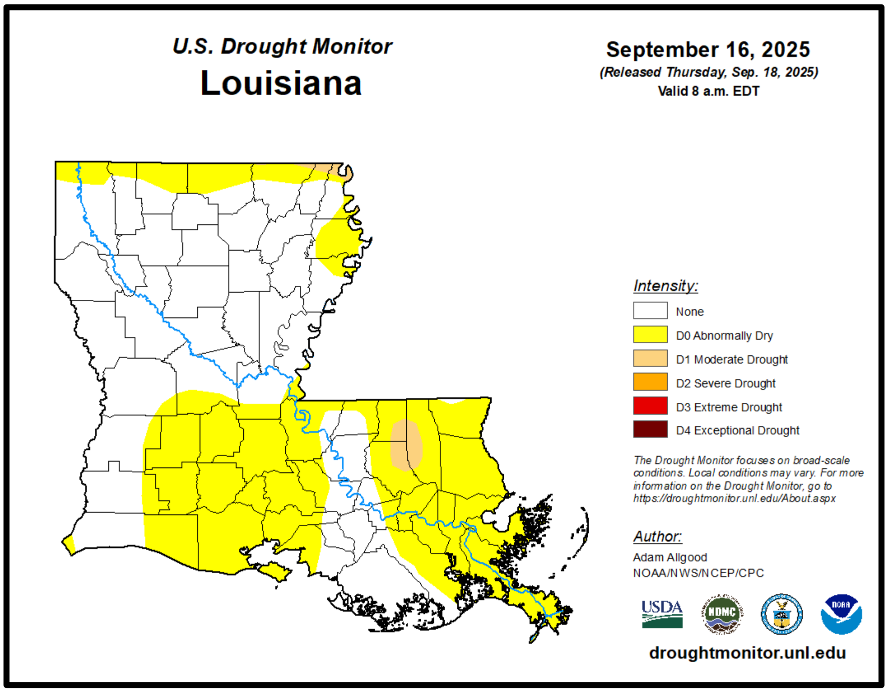


Figure 2-10: United States Drought Monitor for the State of Louisiana and its Parishes
(Source: The National Drought Mitigation Center)

Risk Assessment

Geographic Extent

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 occurrence in the parish is on the agricultural community. The worst-case drought scenario for the parish and the jurisdictions of the parish would be a exceptional drought (D4).

Previous Occurrences

The parish experienced one drought occurrence between the years 1996 and 2025. Since the last update, there has been one drought occurrence within the boundaries of the parish. The following table provides a summary of the event.

Table 2-18: Historical Drought Occurrences in the Parish since the Last Update.

Date	Crop Damage	Summary
11/2023	$0	A prolonged drought that began earlier in the year peaked during the first week of November. Thunderstorms returned to Cameron Parish by the 10th with more regular rains following after that date. Crawfish suffered considerable die offs plus rice and hay yields were reduced, but specific dollar estimates are unknown at this time.

Probability

The annual return rate (frequency) for drought in the parish is 0.03, which means there is an 3% probability of an drought event occurring in any given year. This translates to an average of one drought event occurring approximately every 33-34 years over the long term.

- Annual Return Rate (Frequency): 0.03 (3%), which represents the likelihood of an event happening in any given year.
- Average Interval Between Events: On average, one drought event is expected to occur approximately every 33.3 years. This is the inverse of the return rate (1 / 0.03 = ~33.3 years)

Climate Change Impacts

Climate change is expected to increase the number and intensity of droughts in the state of Louisiana. Drought can be caused by both a reduction in precipitation, as well as by heat that results in increased evaporation. Changes in temperature and types of precipitation in the state of Louisiana will affect drought characteristics. An increase in rain and a decrease in winter weather events with increased temperatures will cause peak streamflow to occur earlier in the year. This change in the hydrologic cycle will have significant impacts on natural systems in Louisiana including the intensity, duration, and frequency of droughts.

Future Hazard Impacts

Future development can exacerbate drought conditions by increasing demand for water resources through urbanization, industrialization, and agricultural expansion potentially leading to water scarcity and increased competition for limited freshwater supplies. Similarly, population growth can intensity droughts by increasing demand for water resources for domestic, agricultural, and industrial purposes.

Vulnerability Analysis

The NRI includes data on the expected annual losses to individual natural hazards, historical losses, and overall risk at the county and Census tract level. The following table provides an overview of each category at the county level for drought.

Table 2-19: National Risk Index (NRI) Summarization of Drought Occurrences for the Parish
(Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Relatively Low	Relatively Low

Estimated Impact and Potential Loss

The parish and the jurisdictions of the parish are vulnerable to drought by means of soil desiccation (drying out), which causes foundation damage to structures as well as buckling of roads. However, the main impact of a drought occurrence is on the agricultural community. The following table presents an analysis of agricultural exposure that is susceptible to drought by major crop type for the parish.

Table 2-20: Agricultural Exposure by Crop Type for Droughts in the Parish
(Source: LSU Ag Center 2022 Parish Totals)

Agricultural Exposure by Type for Drought			
Rice	Soybeans	Crawfish	Alligators
$10,707,111	$250,701	$7,666,672	$3,261,780

Vulnerable Population

As mentioned previously, the main impact of drought is on the agricultural community and certain infrastructure. There is no direct impact on the populace of the parish. There have been no reported deaths or injuries as a result of drought within the parish.

Vulnerability Score

Table 2-21: Drought Vulnerability Score for the Parish.

Drought Vulnerability Score						
	Probability	Impact	Spatial Extent	Warning Time	Duration	Risk Factor
Risk Level	2	2	4	2	3	**2.55**

Excessive Heat

Profile

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 the following tables. 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 2-22: 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.

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution | Extreme Caution | Danger | Extreme Danger

Figure 2-11: Heat Index Advisor based on Air Temperature (°F) and Relative Humidity (Source: National Weather Service)

Risk Assessment

Geographic Extent

Extreme heat typically impacts a region and not one specific parish. Because extreme heat is a climatologically based hazard, it has the same probability of occurring in the parish as all of the adjacent parishes. The entire planning area of the parish is equally at risk for extreme heat. Based on historical data, the worst-case scenario for the parish involving extreme heat would be a high-risk level on the HI scale with temperatures ranging from 110°F to 118°F.

Previous Occurrences

Per the NCEI Storm Events Database, there have been no significant occurrences of excessive heat events in the parish since 1996.

Probability

The annual return rate (frequency) for extreme heat in the parish is < 0.01, which means there is less than 1% probability of an extreme heat event occurring in any given year. This translates to an average of one extreme heat event occurring approximately every 100 years over the long term.

- Annual Return Rate (Frequency): < 0.01 (< 1%), which represents the likelihood of an event happening in any given year.
- Average Interval Between Events: On average, one extreme heat event is expected to occur approximately every 100 years. This is the inverse of the return rate (1 / < 0.01 = ~100 years)

Climate Change Impacts

Climate change has caused a rise in extreme heat events within Cameron Parish and its jurisdictions, especially in urban areas that experience higher temperatures due to the urban heat island effect. Cities in Louisiana are experiencing, at a minimum, two more weeks of extreme heat (days over 95° F) than compared to 50 years ago. With the rise in extreme heat events, there will be several environmental and economic implications within the state of Louisiana including the disruption of the natural system such as agriculture, forestry, fishing, mining, manufacturing, transportation, and utilities.

Climate change is driving a relentless escalation in extreme heat events, reshaping the very fabric of our environment. Rising greenhouse gas emissions are enhancing the greenhouse effect, trapping heat within the atmosphere. Consequently, extreme heat occurrences have become more frequent, intense, and prolonged.

Heatwaves, once sporadic, have transformed into enduring episodes, subjecting regions to temperatures that push the boundaries of historical records. Urban areas, already prone to heat island effects due to concrete and asphalt, are rendered even more stifling. These elevated temperatures pose an array of challenges to ecosystems, agriculture, infrastructure, and human health. Vulnerable populations bear the brunt, as their reduced capacity to adapt heightens the risks of heat-related illnesses, mortality, and displacement. In addition, elevated heat negatively impacts economies, straining energy demand, reducing worker productivity, and exacerbating health care costs.

Future Hazard Impacts

Population growth and future development can amplify extreme heat events by creating urban heat islands—areas where temperatures are higher than in surrounding rural areas due to human activities and infrastructure like buildings, roads, and reduced green spaces. As populations grow, urbanization increases, leading to more heat-absorbing surfaces and less evaporative cooling, which exacerbates heat retention. Energy demand also rises with development, increasing heat emissions from power generation and transportation, further contributing to local and regional heat intensification.

Vulnerability Analysis

The NRI includes data on the expected annual losses to individual natural hazards, historical losses, and overall risk at the county and Census tract level. The following table provides an overview of each category at the county level for extreme heat.

Table 2-23: National Risk Index (NRI) Summarization of Extreme Heat Occurrences for the Parish (Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Very Low	Very Low

Estimated Impact and Potential Loss

Since 1996, there have been no significant extreme heat events that have resulted in property damage according to NCEI Storm Events Database.

Vulnerable Population

There have been no reported fatalities or injuries due to excessive heat in the parish. However, extreme heat poses a dire threat to vulnerable populations, magnifying existing disparities and triggering a cascade of health, social, and economic challenges. The elderly, children, low-income individuals, and those with underlying health conditions are particularly susceptible. Their compromised physiological resilience makes them more prone to heat-related illnesses, including life-threatening conditions like heat stroke. Mortality rates surge, disproportionately affecting the elderly, as soaring temperatures strain their already fragile health. Economic strain intensifies for low-income communities, unable to afford proper cooling measures, leading to discomfort and potential productivity losses. Inadequate housing exacerbates the issue, as substandard dwellings lack insulation and ventilation, turning homes into heat traps. Moreover, social isolation heightens vulnerability, as limited social connections hinder access to aid and cooler environments. The lack of resources, clean water, and medical care amplifies risks. Environmental injustices come to the fore, as marginalized neighborhoods, trapped in urban heat islands, experience even higher temperatures due to scant greenery. This extreme heat can induce migration and displacement, straining resources and instigating social tensions. Utility disruptions during heatwaves further compromise their well-being, and overburdened healthcare systems struggle to cope with the influx of heat-related cases.

Vulnerability Score

Table 2-24: Excessive Heat Vulnerability Score for the Parish.

Excessive Heat Vulnerability Score						
	Probability	Impact	Spatial Extent	Warning Time	Duration	Risk Factor
Risk Level	1	2	4	1	2	**2**

Flooding

Profile

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.

Extreme precipitation, produced from mid-latitude cyclones, thunderstorms, or hurricanes, is often the major initiating condition for flooding. During the cooler months, slow-moving frontal weather systems produce heavy rainfalls, while the summer and autumn seasons produce major precipitation in isolated thunderstorm occurrences (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.

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. For example, 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.
- **Urban flooding** is similar to flash flooding but is specific to urbanized areas. It takes place when stormwater 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 seawater). Coastal flooding is typically caused by storm surge, tsunamis, or gradual sea level rise.

Based on stream gauge levels and precipitation forecasts, the 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 that 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 occurrence, for example, is an occurrence of small magnitude (in terms of stream flow or precipitation) but with a relatively high annual probability of recurrence (10%). A 100-year flood occurrence 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 occurrence and a 10-year occurrence, 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 occurrence does not mean an occurrence of that magnitude occurs only once in X years. Instead, it means that on average, we can expect a flood occurrence 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 occurrence as having a 25% chance of occurring over the life of a 30-year mortgage.

The 100-year flood occurrence 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 the following figure.

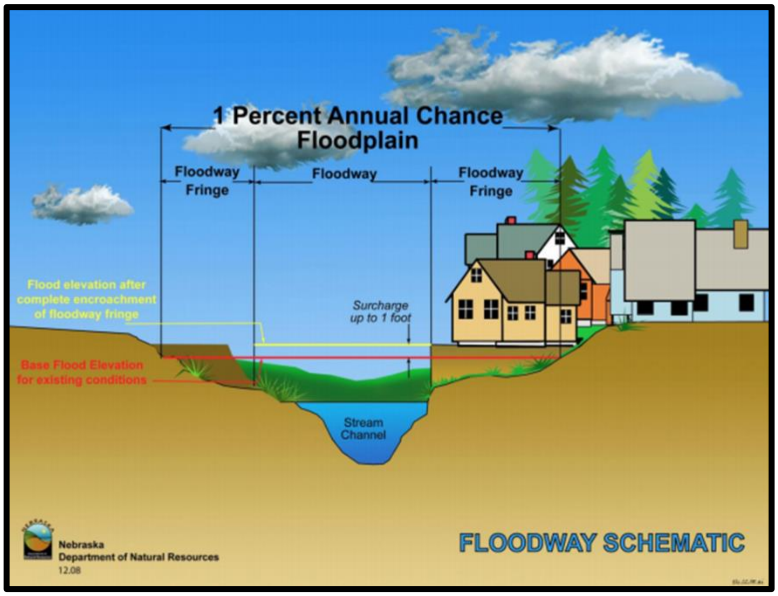


Figure 2-12: Schematic of 100-Year Floodplain.
The Special Flood Hazard Area (SFHA) extends to the end of the floodway fringe
(Source: Nebraska Department of Natural Resources)

A SFHA is the land area covered by the floodwaters of the base flood (red line in the previous figure), where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. Flood zones for the parish are shown in the following figure.

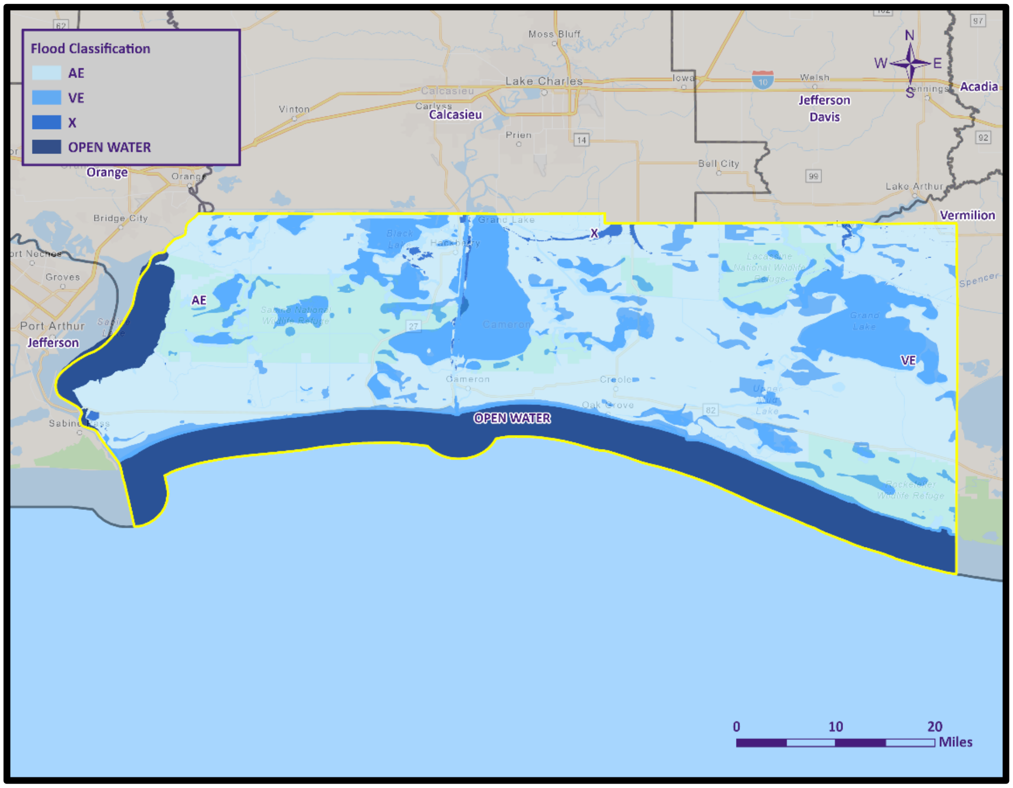


Figure 2-13: Flood Zones Across the Entirety of Cameron Parish

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

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

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

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

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

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

Table 2-25: Repetitive Loss Structures for the Parish.

Jurisdiction	Number of Structures	Residential	Commercial	Government	Total Claims	Total Claims Paid	Average Claim Paid
Cameron Parish	495	448	47	0	1,136	$90,645,408	$79,794

The 495 repetitive loss structures were geocoded in order to provide an overview of where the repetitive loss structures are located throughout the parish. The figures on the following page show the approximate locations of the structures and where the highest concentration of repetitive loss structures is located. Through the repetitive loss map, it is clear the primary concentrated area of repetitive loss structures is focused around the unincorporated area of Hackberry along the western shoreline of Calcasieu Lake and along the southern coast near the unincorporated area of Cameron in close proximity to the Gulf.

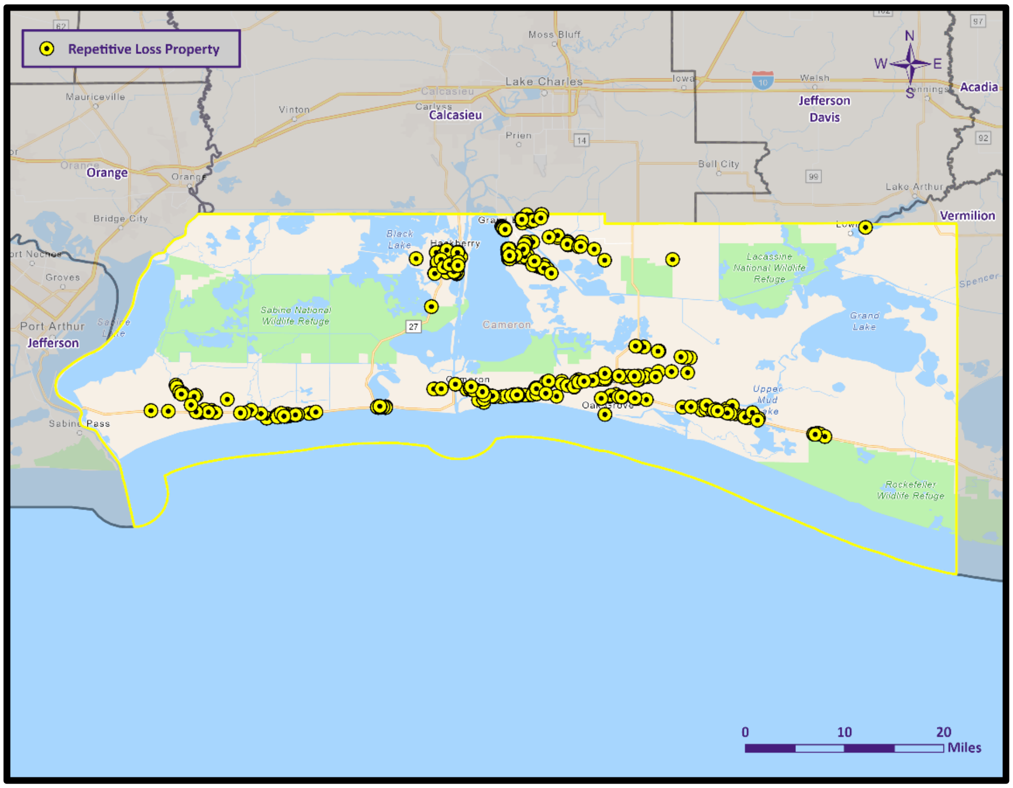


Figure 2-14: Repetitive Loss Properties in the Parish.

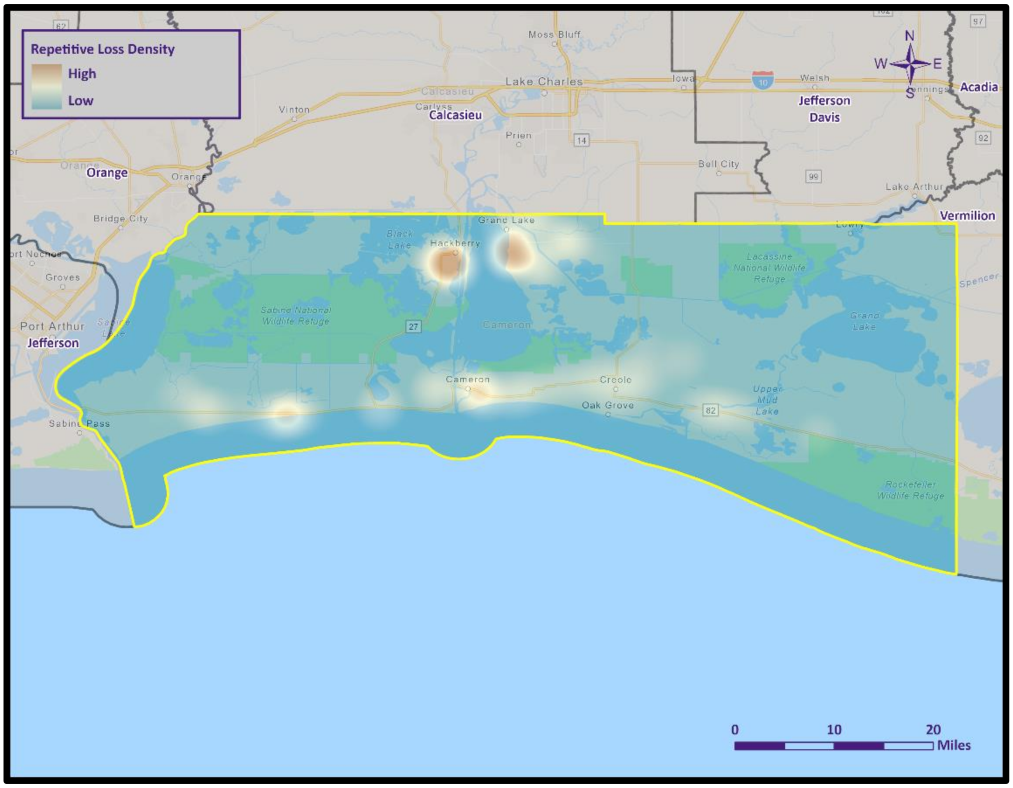


Figure 2-15: Repetitive Loss Property Densities in the Parish.

National Flood Insurance Program

Flood insurance statistics indicate that the Parish has 849 flood insurance policies with the NFIP, with total annual premiums of $1,328,191. The parish will continue to adopt and enforce floodplain management requirements, including regulating new construction Special Flood Hazard Areas, making substantial improvement and/or damage determinations, or determining the necessary permits required of owners to bring a substantially improved/damaged structure back into compliance. The parish will continue to monitor activities including local requests for new map updates. Flood insurance statistics and additional NFIP participation details for the parish is provided in the tables to follow.

Table 2-26: Summary of NFIP Policies for the Parish.

Location	No. of Insured Structures	Total Insurance Coverage Value	Annual Premiums Paid	No. of Insurance Claims Filed Since 1978	Total Loss Payments
Cameron Parish	849	$245,460,000	$1,328,191	3,749	$214,098,703

Table 2-27: Summary of Community Flood Maps for the Parish.

CID	Community Name	Initial FHBM Identified	Initial FIRM Identified	Adopted Date	Current Effective Map Date	Date Joined the NFIP	Tribal
225194	Cameron Parish	9/1/1970	9/4/1970	11/16/2012	11/16/2012	9/4/1970	No

According to the Community Rating System (CRS) list of eligible communities, Cameron Parish does not participate in the CRS program.

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 water can also infiltrate sewer lines and inundate wastewater treatment plants, causing sewage to back up and creating a breeding ground for dangerous bacteria. This infiltration may also cause water supplies to become contaminated and undrinkable.

Elevations in the Parish

The digital elevation model (DEM) for the parish is instructive in visualizing where the low-lying and high-risk areas are for the parish. Elevations in Cameron Parish are extremely lower than those of the surrounding parishes such as Vermilion Parish. The highest elevations in the parish are approximately 30 feet (NAVD88). These higher elevations are sporadically located throughout the parish, with the majority of these areas located in the northern portion of the parish.

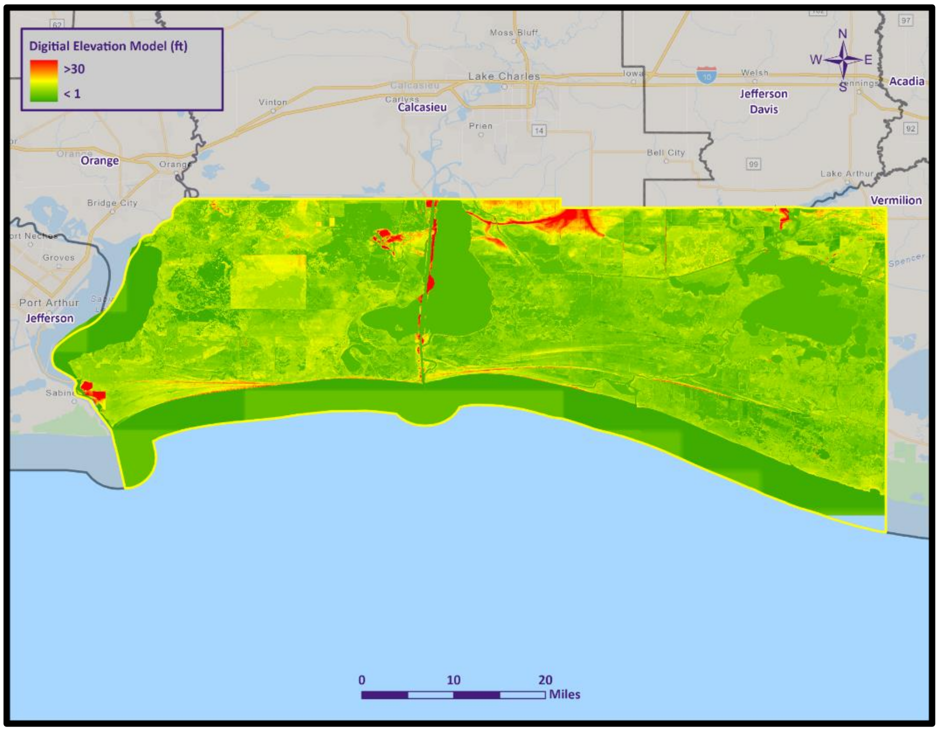


Figure 2-16: Elevation throughout the Parish.

Risk Assessment

Geographic Extent

Cameron Parish has experienced significant flooding in its history and can expect more in the future. Cameron Parish is located along the eastern portion of the Sabine River Basin, which makes the parish susceptible to riverine flooding. The Sabine River is formed by three tributaries, which begin in Collin County and Hunt County in northeast Texas, and it becomes the boundary between Texas and Louisiana near Logansport, Louisiana. Cameron Parish is also susceptible to storm surge in the southern areas of the parish from the Gulf. The worst-case scenarios for the unincorporated areas of Cameron Parish are flood depths of approximately 18 feet.

Previous Occurrences

The parish experienced 12 flooding occurrences between the years 1996 and 2025. Since the last update, there have been three flood occurrences within the boundaries of the parish.

Table 2-28: Historical Flooding Events in the Parish since the Last Update.

Date	Area	Type of Flood	Property Damage	Fatalities	Injuries
8/24/2022	GRAND LAKE	Flash Flood	$0	0	0
4/6/2023	HACKBERRY	Flash Flood	$10,000	0	0
1/24/2024	GRAND LAKE	Flash Flood	$0	0	0

Probability

The annual return rate (frequency) for periods of flooding in the parish is 0.4, which means there is a 40% probability of a flooding event occurring in any given year. This translates to an average of one flooding event occurring every two to three years over the long term.

- Annual Return Rate (Frequency): 0.40, which represents the likelihood of an event happening in any given year.
- Average Interval Between Events: On average, one flooding event occurs approximately every 2.5 years, or about every two to three years. This is the inverse of the return rate (1 / 0.40 = 2.5 years)

Climate Change Impacts

Atmospheric moisture, precipitation, and atmospheric circulation can be affected by climate change, since radiative forcing alters heating, which affects evaporation and sensible heating at the Earth's surface. This process alters the amount, frequency, intensity, duration, and type of precipitation, which is part of the hydrological cycle. The Intergovernmental Panel on Climate Change reports that over 105-year period (1901 – 2005) precipitation has increased 5 to 10%. Additionally, water resource managers observed the following:

- Historical hydrological patterns can no longer be solely relied upon to forecast the water future.
- Precipitation and runoff patterns are changing, increasing the uncertainty for water supply quality, flood management, and ecosystem functions.
- Extreme climatic events will become more frequent, necessitating improvement in flood protection and emergency response.

Climate change poses significant threats to both infrastructure and vulnerable populations in the context of flooding. Rising global temperatures have led to the intensification of extreme weather events, such as heavy rainfall and storms, which increase the frequency and severity of floods. Infrastructure, such as roads, bridges, and buildings, designed to withstand historical weather patterns, is now facing greater stress and damage due to the increased volume and intensity of floodwaters.

One of the most pressing impacts of climate change on infrastructure is the increased risk of damage and disruption to critical lifeline systems, such as water supply networks, energy grids, and transportation systems. Floods can compromise the integrity of these systems, leading to widespread power outages, disrupted water access, and road closures, hindering emergency response and recovery efforts. As floods become more frequent and severe, the cost of repairing and reinforcing infrastructure becomes a significant burden on governments and communities.

Furthermore, climate change disproportionately affects vulnerable populations, including low-income communities, the elderly, and those with limited mobility or access to resources. These communities often reside in flood-prone areas with inadequate infrastructure and limited capacity to adapt to changing conditions. Floods can exacerbate existing social inequalities, displacing vulnerable populations and exposing them to health risks, property loss, and economic hardship. Lack of access to timely information and limited evacuation resources can further endanger their lives during extreme flooding events.

Additionally, climate change can disrupt local economies in flood-affected regions. Agricultural lands can be damaged, leading to reduced crop yields and affecting livelihoods. Businesses, particularly those without insurance or financial resilience, may face bankruptcy due to flood-related losses. The overall economic impacts ripple beyond immediate flood-affected regions, affecting supply chains and markets globally.

Addressing the impacts of climate change on infrastructure and vulnerable populations requires a comprehensive approach. Building more resilient infrastructure, incorporating climate adaptation measures, and enforcing zoning regulations to prevent development in flood-prone areas are essential steps. Additionally, governments must prioritize support and resources for vulnerable communities, providing them with better access to early warning systems, evacuation plans, and social safety nets to cope with flood-related challenges. Long-term climate change mitigation efforts are also necessary to reduce the severity and frequency of floods, ultimately safeguarding both infrastructure and vulnerable populations from the detrimental effects of flooding.

Future Hazard Impacts

Hazard impacts for flood were estimated for the years 2030 and 2035. Yearly population and housing rates were applied to parish inventory assets for composite floods. Based on a review of available information, it is assumed that population and housing units will increase within the parish from the present until 2035. A summary of estimated future impacts is shown in the table below. Dollar values are expressed in future costs and assume an annual rate of inflation of 1.02%

Table 2-29: Estimated Future Impacts, 2025-2035.
(Source: Hazus, US Census Bureau)

Hazard / Impact	Total in Parish (2025)	Hazard Area (2025)	Hazard Area (2030)	Hazard Area (2035)
Flood Damage				
Structures	3,447	3,110	3,132	3,147
Value of Structures	$885,444,000	$798,798,675	$863,629,418	$913,134,257
# of People	5,222	4,711	4,161	3,808

Vulnerability Analysis

The NRI includes data on the expected annual losses to individual natural hazards, historical losses, and overall risk at the county and Census tract level. The following table provides an overview of each category at the county level for flooding.

Table 2-30: National Risk Index (NRI) Summarization of Riverine Flood Occurrences for the Parish
(Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Relatively Low	Relatively Low

Estimated Impact and Potential Loss

Using the Hazus Flood Model, the 100-year flood scenario was analyzed to determine losses from this scenario. The following table shows the total economic losses that would result from a 100-year flood occurrence.

Table 2-31: Estimated Losses in the Parish from a 100-Year Flood Event
(Source: Hazus)

Jurisdiction	Estimated Loss
Cameron Parish	$744,672,000

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

Table 2-32: Estimated 100-year Flood Losses for the Unincorporated Area of the Parish by Sector.
(Source: Hazus)

Unincorporated Cameron Parish	Estimated Total Losses from 100-Year Flood Event
Agricultural	$1,911,000
Commercial	$101,431,000
Government	$5,145,000
Industrial	$33,910,000
Religious / Non-Profit	$12,471,000
Residential	$551,610,000
Schools	$38,194,000
Total	**$744,672,000**

Vulnerable Population

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

Table 2-33: 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**
Cameron Parish	5,222	4,711	90.2%

The Hazus Flood model was also extrapolated to provide an overview of the vulnerable populations throughout the parish in the following tables:

Table 2-34: Vulnerable Populations Susceptible to a 100-year Flood Event in the Parish.
(Source: Hazus)

Cameron Parish		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	4,711	90.2%
Persons Under 5 Years	320	6.8%
Persons Under 18 Years	1,131	24.0%
Persons 65 Years and Over	834	17.7%
White	4,037	85.7%
Minority	674	14.3%

Vulnerability Score

Table 2-35: Flooding Vulnerability Score for the Parish.

Flooding Vulnerability Score						
	Probability	**Impact**	**Spatial Extent**	**Warning Time**	**Duration**	**Risk Factor**
Risk Level	3	4	3	4	3	**3.4**

Sinkholes

Profile

Sinkholes are areas of ground—varying in size from a few square feet to hundreds of acres and reaching in depth from 1 to more than 100 ft.—with no natural external surface drainage. 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, encounters water-soluble bedrock, and then begins to dissolve it, sinkholes start to form. The karst rock dissolves along cracks; as the fissures grow, soil and other particles fill the gaps, loosening the soil above the bedrock. Figure 1 illustrates the development of a cover subsidence sinkhole. 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 topsoil above dissolving bedrock does not sink, but forms a bridge over the soil that is sinking beneath it. 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 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 land in the United States 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.

Risk Assessment

Geographic Extent

Currently, there are nine identifiable salt dome locations in the parish. The figure on the following page displays the locations of the salt domes with their relative location. As depicted in the figure, the location of the salt domes is dispersed throughout Cameron Parish. Of the nine salt dome locations, four have no people, homes, or essential infrastructure within a two-mile buffer of the salt dome location. While the majority of salt domes are located in areas of the parish that are uninhabited, there are five salt domes located near populated areas. These five locations were analyzed to determine the potential loss exposure if a sinkhole were to occur.

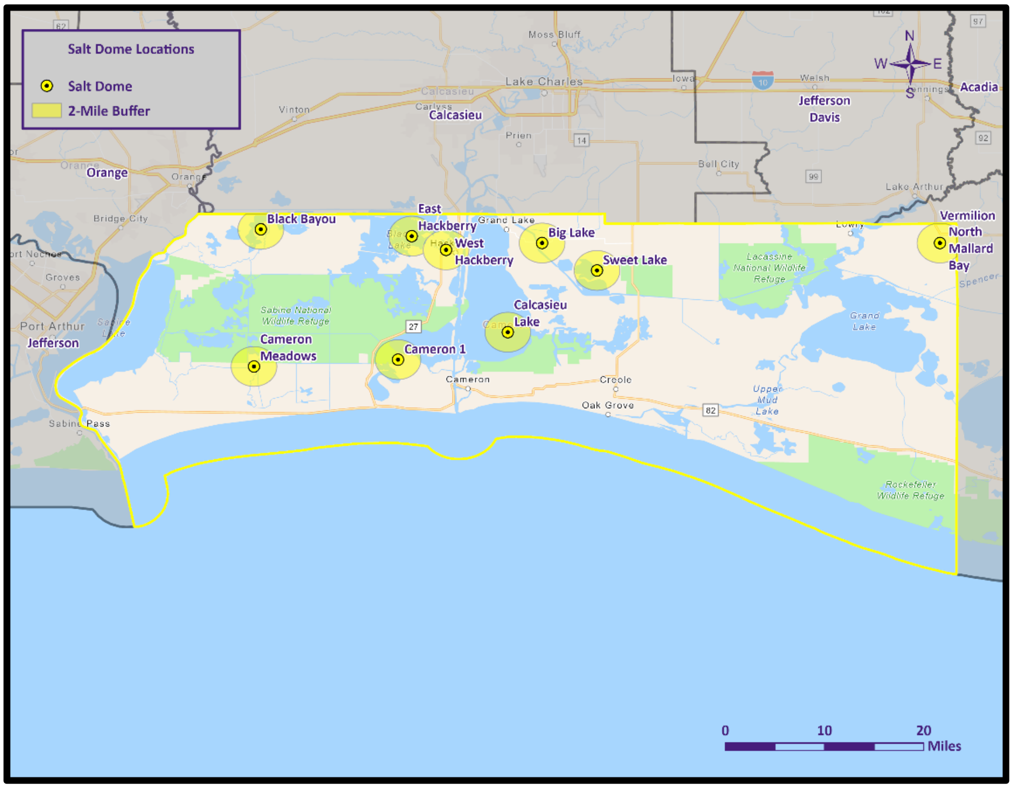


Figure 2-17: Salt Dome Locations in Cameron Parish.

Previous Occurrences

There have been no recorded incidents of sinkholes or salt dome collapses in the parish to date.

Probability

Based on historical data for the past 30-years, there has been no incident of a sinkhole formation or salt dome collapse in Cameron Parish. The annual chance of occurrence is calculated at less than 1%.

Climate Change Impacts

Climate change is exerting significant impacts on the occurrence and behavior of sinkholes, geological formations characterized by ground collapse. Altered precipitation patterns, intensified by climate change, result in increased infiltration of water into the ground, eroding underground rock layers and forming voids that can lead to sinkhole formation. Rising sea levels, another consequence of climate change, contribute to the intrusion of saltwater into coastal aquifers, accelerating the dissolution of underground rocks and enhancing the likelihood of sinkhole development. Furthermore, shifting hydrological patterns and extreme weather events, both exacerbated by climate change, disrupt natural water movement and contribute to the instability of soil and rock formations, increasing the susceptibility of sinkhole formation. As climate change continues to reshape ecosystems and exacerbate these processes, adequate mitigation strategies, including improved urban planning, infrastructure design, and geological assessments, become essential to curbing the escalating impacts of sinkholes on both natural landscapes and human settlements.

Vulnerability Analysis

Sinkholes can have profound and wide-ranging impacts on both natural environments and human communities. These sudden depressions in the Earth's surface can pose serious risks to infrastructure, causing damage to roads, buildings, and utility lines. The resulting economic losses can be substantial, affecting businesses, disrupting local economies, and straining resources for repairs and recovery. Human populations can be directly affected through displacement due to sinkhole-related damage, leading to temporary or permanent evacuations and upending lives.

Public safety concerns also arise as sinkholes can appear with little warning, endangering individuals and vehicles. The environmental consequences are also significant, altering local hydrology, groundwater flow, and potentially causing groundwater contamination if hazardous materials are exposed. As urbanization and climate change further interact with sinkhole dynamics, understanding and managing these impacts become increasingly crucial for sustainable development and community resilience.

Estimated Impact and Potential Loss

The nine salt dome locations were analyzed to determine the number of people and homes that are potentially susceptible to losses from a sinkhole materializing from the salt dome. Five of the salt domes contained people or homes within them, with the other four having no impact on people or homes. The following table is based on conducting a two-mile buffer around the center of the salt domes. The values were determined by querying the 2020 U.S. Census block data to determine the number of houses and people located within two miles of the salt dome. Critical facilities were also analyzed to determine if they fell within the two-mile buffer of the salt domes. The total value for all occupancy groups from Hazus was used to estimate a total loss of all facilities that were within two miles of the salt dome.

Table 2-36: Estimated Potential Losses from a Sinkhole Formation.
(Source: U.S. 2020 Census Data and Hazus)

Salt Dome Name	Total Building Exposure	Critical Infrastructure Exposure	Number of People Exposed	Number of Houses Exposed
Big Lake	$155,874,000	3	1049	327
East Hackberry	$2,879,000	0	106	30
North Mallard Bay	$6,111,000	0	82	24
Sweet Lake	$32,291,000	0	179	51
West Hackberry	$201,199,000	4	971	284

Vulnerable Population

Per the NCEI Storm Events Database, there have been no reported fatalities or injuries as a result of sinkholes. However, sinkholes pose particularly severe and disproportionate impacts on vulnerable populations, exacerbating existing social disparities. Low-income communities often lack the resources to adequately prepare for and recover from sinkhole-related events. These populations may reside in areas prone to sinkhole formation due to limited housing options or historical settlement patterns. When sinkholes occur, they can destroy homes, disrupt essential services, and force displacement, leaving vulnerable individuals without stable housing and access to necessary amenities. Additionally, marginalized communities might face barriers in receiving timely assistance and information, compounding the challenges they face in the aftermath of sinkhole incidents. Limited financial means can hinder the ability to rebuild or relocate, trapping vulnerable populations in unsafe environments.

Vulnerability Score

Table 2-37: Vulnerability Score for Sinkholes in Cameron Parish.

Sinkholes Vulnerability Score						
	Probability	**Impact**	**Spatial Extent**	**Warning Time**	**Duration**	**Risk Factor**
Risk Level	1	2	2	1	4	**1.9**

Thunderstorms (Hail, Lightning, & Thunderstorm Wind)

Overview

The term "thunderstorm" is usually used as a catch-all term for several kinds of storms. Here "thunderstorm" is defined to include any precipitation occurrence in which thunder is heard or lightning is seen. Thunderstorms are often accompanied by heavy rain and strong winds, and occasionally, depending on conditions, 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 counties.

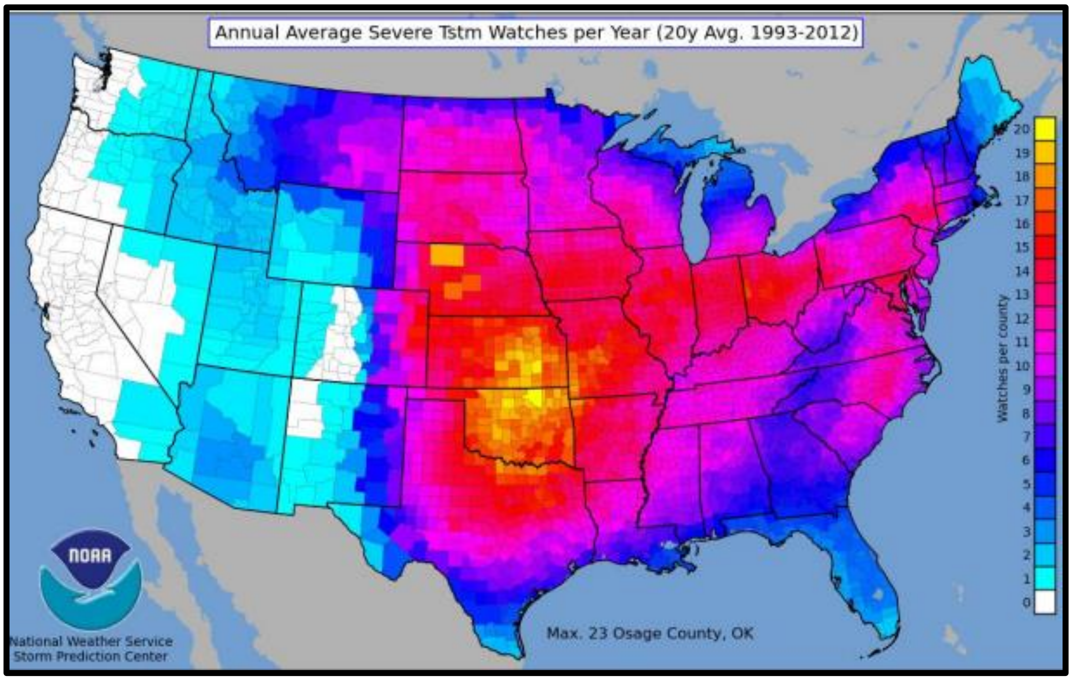


Figure 2-18: County-Level Severe Thunderstorm Watches Issued Per Year on Average.

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) characterize 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 individually within this report; therefore, for the purpose of thunderstorms, the sub-hazards of hail, high winds, and lightning will be profiled.

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

Climate Change Impacts

The impact of climate change on thunderstorms is not well understood at this time. However, thunderstorms are complex, dynamic systems fueled by heat and moisture which can be measured with CAPE (convective available potential energy). It is predicted that CAPE will increase across the Eastern United States by the second half of the 21st century, meaning there is more energy to fuel severe thunderstorms. In this same time frame, there would be a small decrease in vertical wind shear, which helps produce long-lived severe storms. However, the increase in energy outweighs the decreasing shear to produce a net increase in environmental favorability for severe thunderstorms by the end of the century. Some climate models maintained by the Goddard Institute for Space Studies indicate that the number of severe thunderstorms will not change much, but the severe storms that do occur would have stronger winds and more intense precipitation.

Climate change is influencing the frequency and severity of thunderstorms, resulting in significant impacts on infrastructure and vulnerable populations. As global temperatures rise, the atmosphere becomes more energized, leading to an increase in the intensity of thunderstorm activity. Thunderstorms bring heavy rainfall, strong winds, hail, and lightning, all of which can cause substantial damage to various types of infrastructure.

One of the most significant impacts of thunderstorms on infrastructure is the damage to power and communication lines. Strong winds and lightning strikes can lead to power outages, disrupting essential services and communication networks. This can have severe consequences for communities that rely on electricity for medical equipment, communication, and daily living. Additionally, damage to power infrastructure can result in economic losses due to business interruptions and increased repair costs.

Furthermore, heavy rainfall associated with thunderstorms can lead to flash flooding, overwhelming stormwater drainage systems and causing road and bridge damage. This not only disrupts transportation networks but also poses a safety hazard for motorists and pedestrians. Flooded roads can isolate communities and hinder emergency response efforts, leaving vulnerable populations at higher risk during and after thunderstorm events.

Vulnerable populations, such as low-income communities and the elderly, often lack access to resources and live in areas with inadequate infrastructure. They are disproportionately affected by the impacts of thunderstorms. For instance, substandard housing in flood-prone regions can suffer severe damage during storms, displacing already marginalized individuals and families. The elderly and people with limited mobility may face difficulties evacuating during severe weather events, putting their lives at risk.

Moreover, thunderstorms can lead to an increase in lightning-related accidents and wildfires. Lightning strikes can cause fires that spread rapidly, threatening communities and posing additional risks to vulnerable populations living in areas prone to wildfires. These events not only endanger lives but also strain emergency response resources and increase the financial burden on affected communities.

To address the impacts of climate change on infrastructure and vulnerable populations concerning thunderstorms, several measures are crucial. Investment in resilient infrastructure, such as strengthening power grids and stormwater drainage systems, can help mitigate damage and improve response capabilities. Additionally, raising awareness and providing resources to vulnerable communities can enhance preparedness and evacuation plans. Climate change mitigation efforts to reduce greenhouse gas emissions are also essential in curbing the intensification of thunderstorms, ultimately safeguarding both infrastructure and vulnerable populations from the adverse effects of these severe weather events.

Future Hazard Impacts

Population growth and development trends can influence thunderstorm dynamics in several ways. Urban heat islands generated by increased development can enhance local convection and thunderstorm activity. Urbanization can alter land cover, increasing impermeable surfaces that reduce natural drainage and potentially exacerbate localized flooding during thunderstorms. Increased human activity can also introduce aerosols and pollutants into the atmosphere which may influence cloud formation and precipitation patterns, possibly intensifying thunderstorm characteristics.

Hail Profile

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

Table 2-38: TORRO Hailstorm Intensity Scale.

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

Table 2-39: 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
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 homes and other 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.

Lightning Profile

Lightning is defined by the National Weather Service as any and all of the various forms of visible electrical discharge caused by thunderstorms. Thunderstorms and lightning are usually (but not always) accompanied by rain. Cloud-to-ground lightning can kill or injure people by direct or indirect means. Objects can be struck directly, which may result in an explosion, burn, or total destruction. Damage may also be indirect which occurs when the current passes through or near an object.

Intra-cloud lightning is the most common type of discharge. This occurs between oppositely charged centers within the same cloud. Usually it transpires inside the cloud and looks from the outside of the cloud like a diffuse brightening that flickers. However, the flash may exit the boundary of the cloud, and a bright channel, similar to a cloud-to-ground flash, can be visible for many miles.

Cloud-to-ground lightning is the most damaging and dangerous type of lightning, though it is also less common. Most flashes originate near the lower-negative charged center and deliver negative charge to the earth. However, a large minority of flashes carry a positive charge to earth. These positive flashes often occur during the dissipating stage of a thunderstorm. Positive flashes are also more common as a percentage of total ground strikes during the winter months. This type of lightning is particularly dangerous for several reasons. It frequently strikes away from the rain core, either ahead or behind the thunderstorm. It can strike five to ten miles from the storm in areas that most people do not consider a threat. Positive lightning also has a longer duration, so fires are more easily ignited. When positive lightning strikes, it usually carries a high peak electrical current, which can potentially result in greater damage.

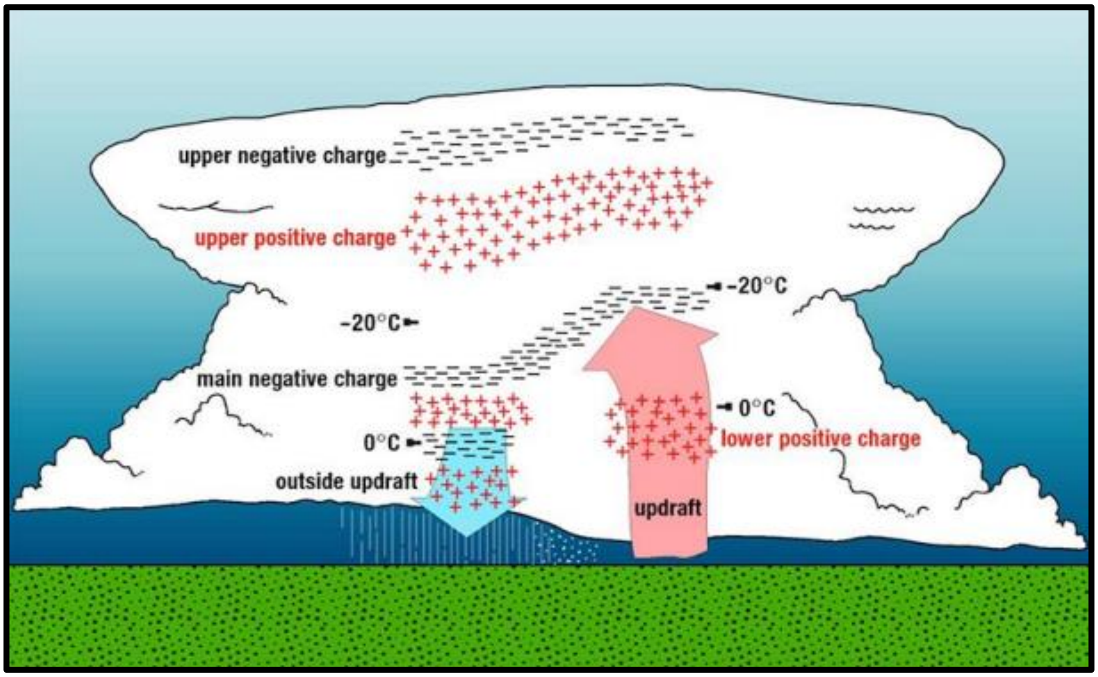


Figure 2-19: Charge Distribution in a Typical Storm Cloud.
(Source: The National Severe Storms Laboratory)

Lightning continues to be one of the top three storm-related killers in the United States per FEMA, but if not fatal, it also has the ability to cause negative long-term health effects to the individual that is struck. The table on the next page outlines the lightning activity level and intensity scale:

Table 2-40: Lightning Activity Level (LAL) Grids.

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

Thunderstorm Wind Profile

In general, high winds occur in a number of different ways, with and without thunderstorms. Similar to hailstorms (and often associated with the same storm), high wind damage densities and reports resulting from severe thunderstorms vary spatially across Louisiana. The only high winds of present concern from the following table are thunderstorm winds and downbursts. Straight-line winds are common but are a relatively insignificant hazard (on land) compared to other high winds. Downslope winds are common, but relatively insignificant in Louisiana. Nor'easters are cyclonic low-pressure systems that have a minimal impact if any on Louisiana while hurricane winds have a significant impact on the state due to its location.

Table 2-41: High Winds Categorized by Source.

High Wind Type	Description
Straight-Line Winds	Wind blowing in straight line; usually associated with intense low-pressure area
Downslope Winds	Wind blowing down the slope of a mountain; associated with temperature and pressure gradients
Thunderstorm Winds	Wind blowing due to thunderstorms, and thus associated with temperature and pressure gradients
Downbursts	Sudden wind blowing down due to downdraft in a thunderstorm; spreads out horizontally at the ground, possible forming horizontal vortex rings around the downdraft.
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 Ocean and land
Hurricane Winds	Wind blowing in spirals, converging with increasing speed toward eye; associated with temperature and pressure gradients between the Atlantic Ocean, Gulf of Mexico, and land
Tornado Winds	Violently rotating column of air from base of thunderstorm to the ground with rapidly decreasing winds at greater distances from center; associated with extreme temperature gradient

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, increased vulnerability to fire, food spoilage, and other losses that might be sustained by a loss of power. The following table presents the Beaufort Wind Scale, first developed in 1805 by Sir Francis Beaufort, which aids in determining relative force and wind speed based on the appearance of wind effects:

Table 2-42: Beaufort Wind Scale.
(Source: NOAA's SPC)

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

Hail Risk Assessment

Geographic Extent

Because hailstorms are a climatologically based occurrence that can occur anywhere, the entire planning area is at risk for hailstorms. The worst-case scenario for hailstorms is hail up to 2 inches in diameter.

Previous Occurrences

The parish experienced 43 hail occurrences between the years 1996 and 2025. Since the last update, there have been five hail occurrences within the boundaries of the parish that have been recorded by the NCEI storm events database. Below is a brief synopsis of those events.

Table 2-43: Historical Thunderstorm Hail Occurrences in Cameron Parish since the Last Update.

Date	Hail Size (inches)	Property Damage	Crop Damage	Fatalities	Injuries
4/10/2021	1.25	$0	0	0	0
4/14/2021	1	$0	$0	0	0
5/12/2024	0.88	$0	$0	0	0
5/12/2024	1.75	$0	$0	0	0
5/28/2024	1	$0	$0	0	0

Probability

The annual return rate (frequency) for hail occurrences in the parish is 1.43 (100% annual probability) or approximately one to two hail occurrences every year.

- Annual Return Rate (Frequency): 1.43, which represents the likelihood of an event happening in any given year.

- Average Interval Between Events: On average, one to two hail events occur approximately every year, or about every one to two years. This is the inverse of the return rate (1 / 1.43 = 0.7 years)

The figures below display the density of hailstorm events and an overview of hailstorm size based on location.

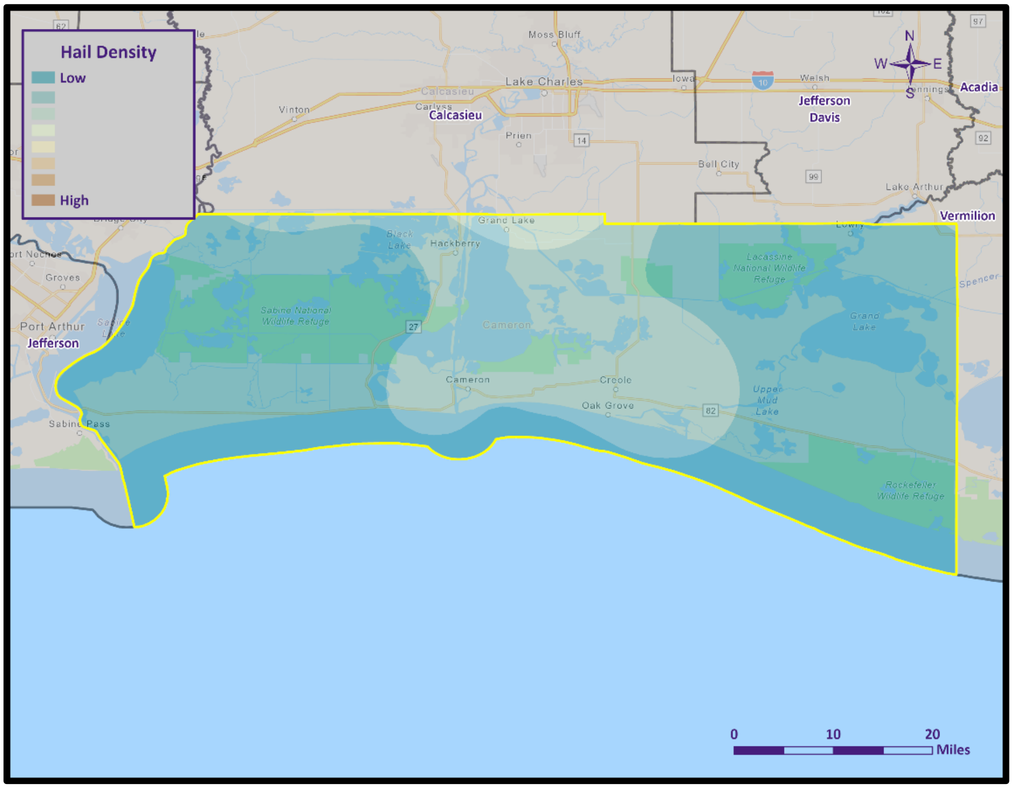


Figure 2-20: Density of Hailstorms by Diameter from 1950-2024.

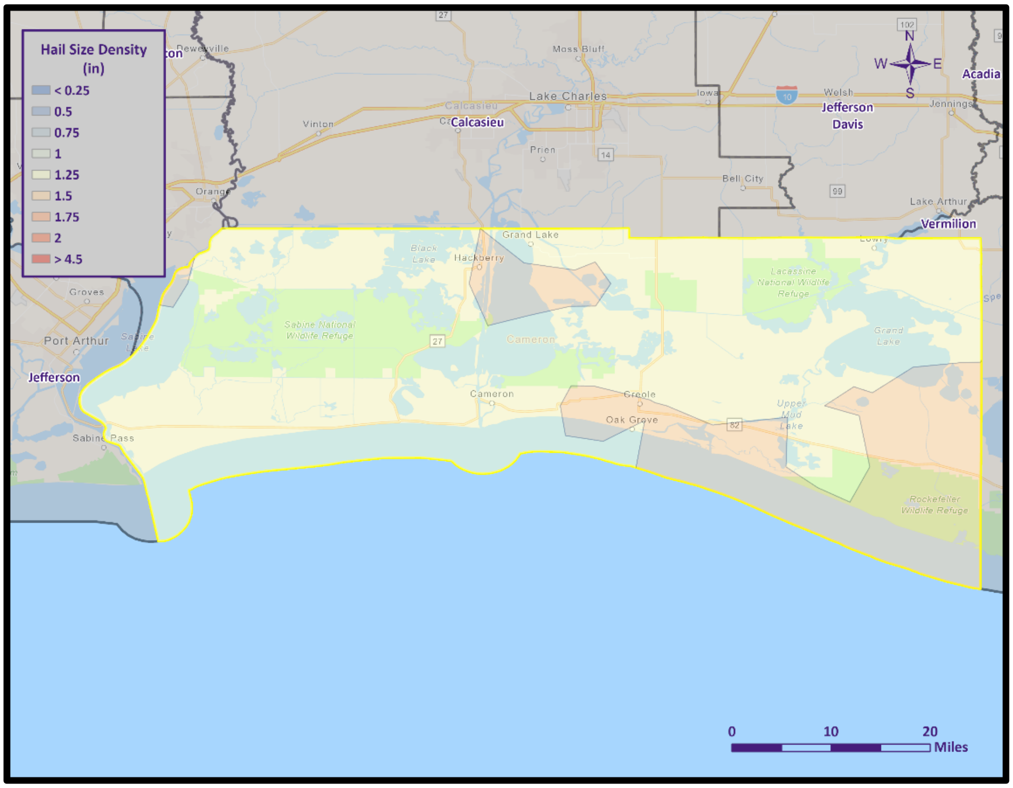


Figure 2-21: Hail Size Probability in Inches for Cameron Parish.

Lightning Risk Assessment

Geographic Extent

Because lightning strikes are a climatologically based occurrence that can occur anywhere, the entire planning area is at risk from lightning strikes. The worst-case scenario for lightning incidents is a lightning activity level of 4, which is approximately 16 to 25 lightning strikes every 15 minutes.

Previous Occurrences

The parish experienced 10 significant lightning occurrences between the years 1996 and 2025. Since the last update, there has been one significant lightning occurrence within the boundaries of the parish. Below is a brief synopsis of those events.

Table 2-44: Historical Thunderstorm Lightning Occurrences in Cameron Parish since the Last Update.

Date	Property Damage	Crop Damage	Fatalities	Injuries
6/7/2023	$5,000	$0	0	0

Probability

The annual return rate (frequency) for lightning occurrences in the parish is 0.33 (33% annual probability) or approximately one lightning occurrence every 3 years.

- Annual Return Rate (Frequency): 0.33, which represents the likelihood of an event happening in any given year.
- Average Interval Between Events: On average, one lightning event occurs approximately every 3 years. This is the inverse of the return rate (1 / 0.33 = 3.03 years)

Thunderstorm Wind Risk Assessment

Geographic Extent

Because thunderstorm winds are a climatologically based occurrence that can occur anywhere, the entire planning area is at risk from thunderstorm winds. The worst-case scenario for thunderstorm wind occurrences is hail wind speeds of approximately 65 knots.

Previous Occurrences

The parish experienced 93 thunderstorm wind occurrences between the years 1996 and 2025. Since the last update, there have been 14 thunderstorm wind occurrences within the boundaries of the parish.

Table 2-45: Historical Thunderstorm Wind Occurrences in Cameron Parish since the Last Update.

Date	Magnitude (knots)	Property Damage	Crop Damage	Fatalities	Injuries
5/24/2022	53	$0	$0	0	0
5/24/2022	50	$0	$0	0	0
1/24/2023	50	$0	$0	0	0
4/15/2023	50	$0	$0	0	0
9/8/2023	52	$0	$0	0	0
1/8/2024	50	$3,000	$0	0	0
3/22/2024	52	$0	$0	0	0
3/22/2024	53	$0	$0	0	0
4/10/2024	52	$0	$0	0	0

Date	Magnitude (knots)	Property Damage	Crop Damage	Fatalities	Injuries
4/10/2024	50	$0	$0	0	0
4/10/2024	72	$0	$0	0	0
3/24/2025	57	$0	$0	0	0
5/27/2025	70	$250,000	$0	0	0
5/27/2025	53	$0	$0	0	0

Probability

The annual return rate (frequency) for thunderstorm wind occurrences in the parish is 3.1 (100% annual probability) or approximately three to four thunderstorm wind occurrences every year.

- Annual Return Rate (Frequency): 3.1, which represents the likelihood of an event happening in any given year.
- Average Interval Between Events: On average, three to four wind events occur every year. This is the inverse of the return rate (1 / 3.1 = 0.32 years)

The figure below displays the thunderstorm wind speed probability for the parish.

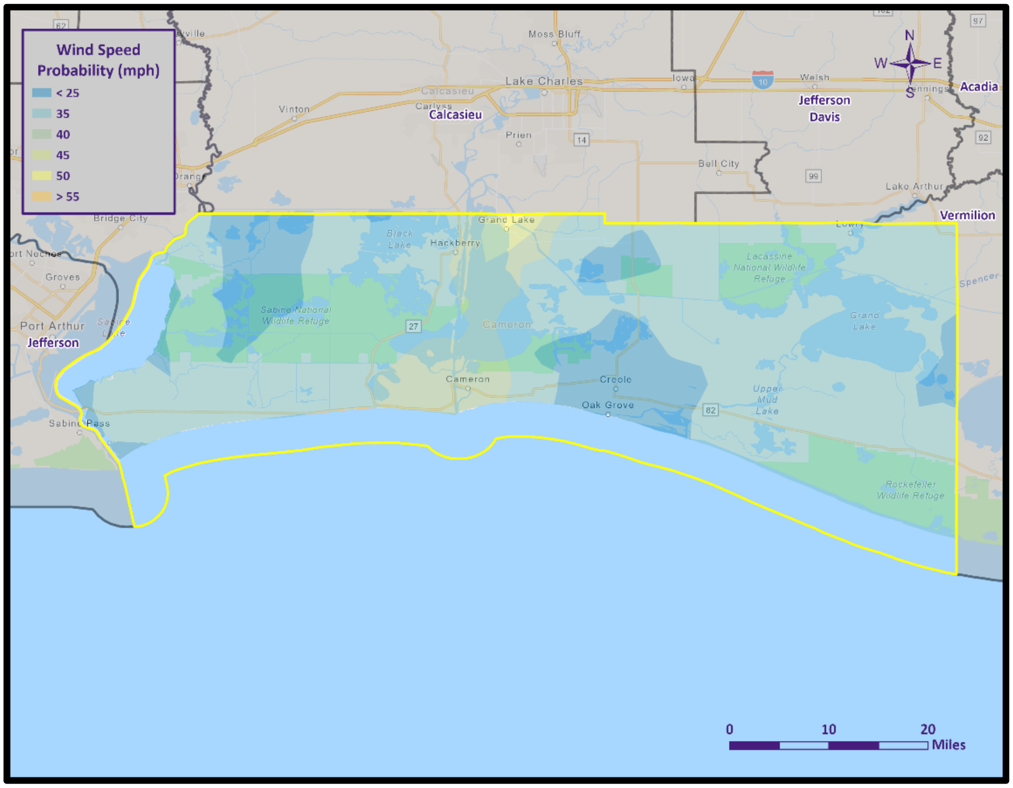


Figure 2-22: Thunderstorm High Wind Speed Probability in Miles Per Hour for Cameron Parish.

Hail Vulnerability Analysis

The NRI includes data on the expected annual losses to individual natural hazards, historical losses, and overall risk at the county and Census tract level. The following table provides an overview of each category at the county level for hail.

Table 2-46: National Risk Index (NRI) Summarization of Hail Occurrences for Cameron Parish. (Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Very Low	Very Low

Estimated Impact and Potential Loss

Since 1996, there have been 43 significant hail occurrences per the NCEI Storm Events Database. The total property damage associated with these storms totaled approximately $1,000. To estimate the potential losses on an annual basis, the total damages recorded were divided by the total number of years of available data in the NCEI Storm Events Database (1996 – 2025). This provides an annual estimated potential loss of $23 and $33 per event. The following table provides an estimate of potential property losses for Cameron Parish:

Table 2-47: Estimated Annual Property Losses in Cameron Parish resulting from Hail Damage.

Estimated Annual Potential Losses from Hail Damage
Cameron Parish
$33

Vulnerable Population

Per the NCEI Storm Events Database, there have been no reported injuries or fatalities as a result of hail.

Vulnerability Score

Table 2-48: Vulnerability Score for Hail in Cameron Parish.

Hail Vulnerability Score						
	Probability	Impact	Spatial Extent	Warning Time	Duration	Risk Factor
Risk Level	4	2	3	3	1	**2.7**

Lightning Vulnerability Analysis

The NRI includes data on the expected annual losses to individual natural hazards, historical losses, and overall risk at the county and Census tract level. The following table provides an overview of each category at the county level for lightning.

Table 2-49: National Risk Index (NRI) Summarization of Lightning Occurrences for Cameron Parish. (Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Relatively Low	Relatively Low

Estimated Impact and Potential Loss

Since 1996, there have been 10 significant lightning occurrences per the NCEI Storm Events Database. The total property damage associated with this storm totaled approximately $6,000. To estimate the potential losses on an annual basis, the total damages recorded were divided by the total number of years of available data in the NCEI Storm Events Database (1996 – 2025). This provides an annual estimated potential loss of $200 and $600 per event. The following table provides an estimate of potential property losses for Cameron Parish:

Table 2-50: Estimated Annual Property Losses in the Parish resulting from Lightning Damage.

Estimated Annual Potential Losses from Lightning Damage
Cameron Parish
$200

Vulnerable Population

Per the NCEI Storm Events Database, there have been three reported fatalities and four injuries as a result of lightning.

Vulnerability Score

Table 2-51: Vulnerability Score for Lightning in Cameron Parish.

Lightning Vulnerability Score						
	Probability	Impact	Spatial Extent	Warning Time	Duration	Risk Factor
Risk Level	3	2	2	3	1	**2.25**

Thunderstorm Wind Vulnerability Analysis

The NRI includes data on the expected annual losses to individual natural hazards, historical losses, and overall risk at the county and Census tract level. The table on the next page provides an overview of each category at the county level for thunderstorm wind.

Table 2-52: National Risk Index (NRI) Summarization of Thunderstorm Wind Occurrences for the Parish (Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Very Low	Very Low

Estimated Impact and Potential Loss

Since 1996, there have been 93 significant thunderstorm wind occurrences per the NCEI Storm Events Database. The total property damage associated with these storms totaled approximately $2,368,000. To estimate the potential losses on an annual basis, the total damages recorded were divided by the total number of years of available data in the NCEI Storm Events Database (1996 – 2025). This provides an annual estimated potential loss of $78,933 and $25,462 per event. The following table provides an estimate of potential property losses for the Parish:

Table 2-53: Estimated Annual Property Losses in Cameron Parish resulting from Thunderstorm Wind Damage.

Estimated Annual Potential Losses from Wind Damage
Cameron Parish
$78,933

Vulnerable Population

Per the NCEI Storm Events Database, there has been one reported injury and no fatalities as a result of thunderstorm winds.

Vulnerability Score

Table 2-54: Vulnerability Score for Thunderstorm Wind in Cameron Parish.

Thunderstorm Wind Vulnerability Score						
	Probability	Impact	Spatial Extent	Warning Time	Duration	Risk Factor
Risk Level	4	2	3	3	1	**2.7**

Tornadoes

Profile

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 occurrences, 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. The following table shows the EF scale in comparison with the original Fujita (F) Scale, which was used prior to February 1, 2007. When discussing past tornadoes, the scale used at the time of the hazard is used. Damage and adjustment between scales can be made using the following tables.

Table 2-55: Comparison of the Enhanced Fujita (EF) Scale to the Fujita (F) Scale.

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

Table 2-56: Fujita and Enhanced Fujita Tornado Damage Scale.

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

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

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

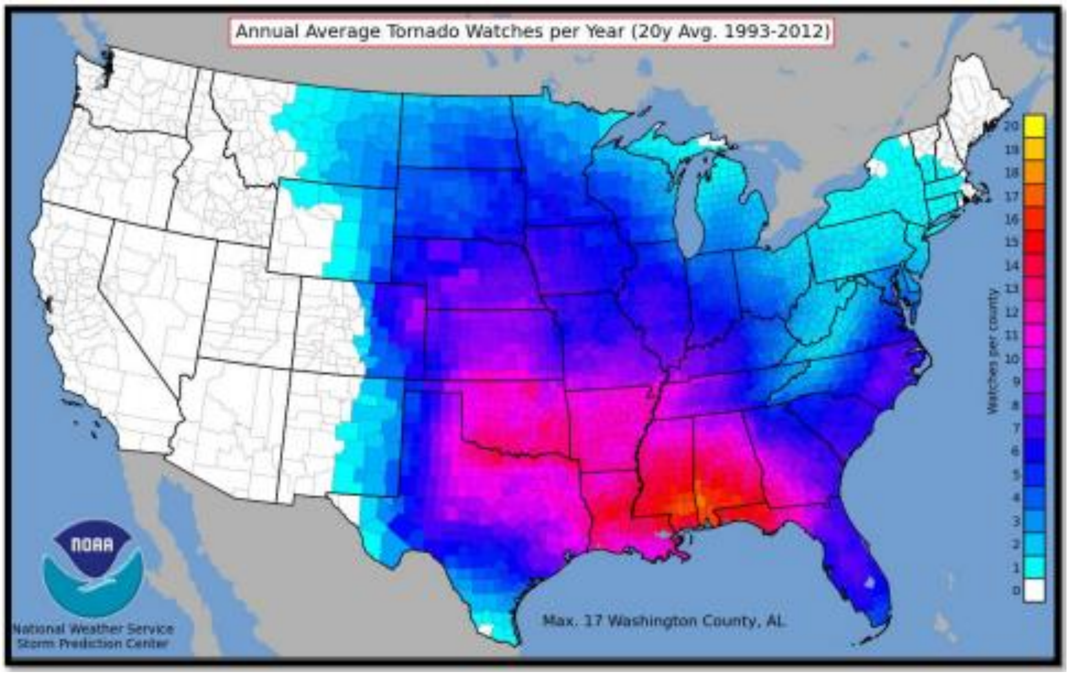


Figure 2-23: County-Level Tornado Watches Issued Per Year on Average (Source: NOAA SPC)

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. Tornadoes have historically impacted all areas of Louisiana.

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.

Risk Assessment

Geographic Extent

Tornadoes occur sporadically throughout the parish and the occurrence of a tornado in the parish is highly unpredictable, making it impossible to forecast the exact time and locations of when a tornado will touch down or the path it will take. Because of this, the entire planning area is considered equally at risk for a tornadic incident. The worst-case scenario of a tornado occurrence is an EF2 tornado.

Previous Occurrences

The parish experienced 31 tornado occurrences between the years 1996 and 2025. Since the last update, there have been six tornado occurrences within the boundaries of the parish.

Table 2-57: Historical Tornado Occurrences in Cameron Parish since the Last Update.

Date	Magnitude	Property Damage	Crop Damage	Fatalities	Injuries
8/18/2022	EF0	$0	$0	0	0
4/10/2024	EF1	$250,000	$0	0	0
4/10/2024	EF1	$10,000	$0	0	0
5/29/2024	EFU	$0	$0	0	0
12/28/2024	EFU	$0	$0	0	0
12/28/2024	EFU	$0	$0	0	0

Probability

The annual return rate (frequency) for tornado events in the parish is 1.03, which means there is a 100% probability of one to two events occurring every year over the long term.

- Annual Return Rate (Frequency): 1.03 (100%), which represents the likelihood of an event happening in any given year.
- Average Interval Between Events: On average, one to two tornado events are expected to occur approximately every year. This is the inverse of the return rate (1 / 1.03= 0.97 years)

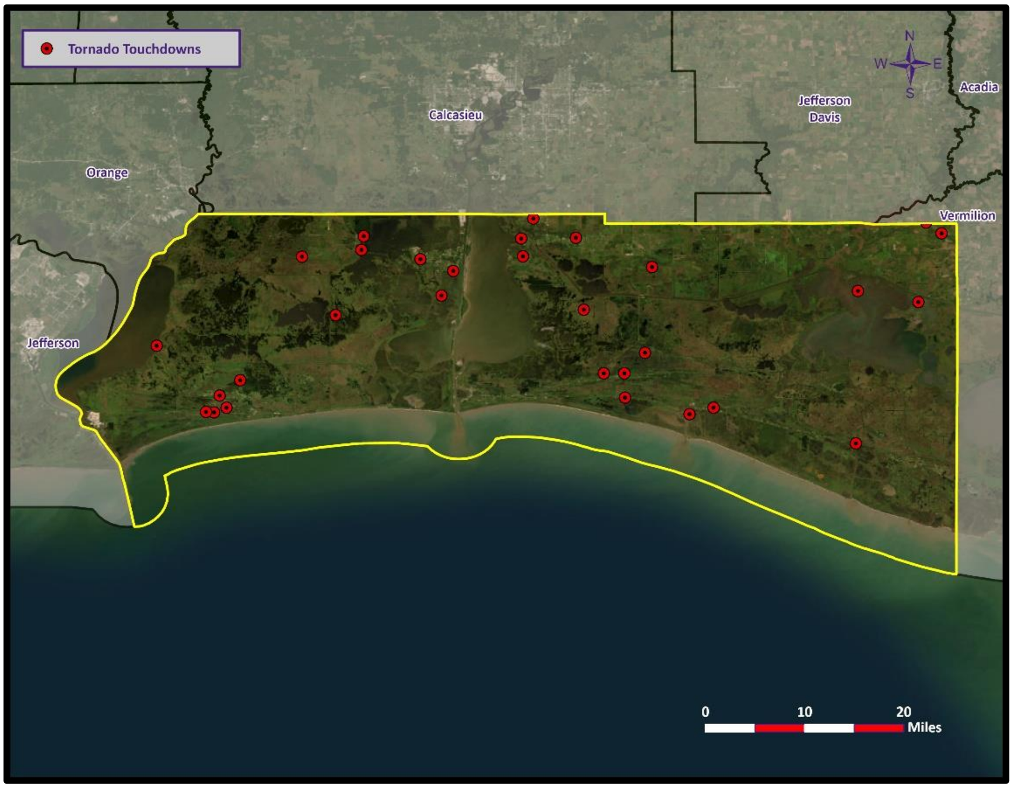


Figure 2-24: Location of Tornadoes to Touchdown and Tornado Density in the Parish (Source: NOAA/SPC Severe Weather Database)

Climate Change Impacts

Similar to thunderstorms, the impacts of climate change on the occurrence and strength of tornadoes is not well understood at this time, but is an area of ongoing research. While only about 1% of thunderstorms will produce a tornado, preliminary research and climate models indicate that the environmental suitability for severe thunderstorms, and therefore tornadoes, could increase over the Eastern United States by the end of the century.

Climate change is contributing to the increasing frequency and intensity of tornadoes, leading to significant impacts on both infrastructure and vulnerable populations. As global temperatures rise, the atmosphere becomes more unstable, creating conditions favorable for the development of severe thunderstorms and tornadoes. Tornadoes are powerful and destructive, capable of causing widespread damage to various types of infrastructure.

One of the most significant impacts of tornadoes on infrastructure is the destruction of buildings and critical facilities. Tornadoes can flatten homes, schools, hospitals, and businesses, leaving communities devastated and in need of urgent assistance. The damage to infrastructure disrupts essential services, such as electricity, water supply, and communication networks, exacerbating the challenges faced by affected communities during recovery and rebuilding efforts.

Vulnerable populations are particularly at-risk during tornadoes. Low-income communities often live in substandard housing and lack access to proper storm shelters, leaving them more exposed to the destructive forces of tornadoes. Furthermore, elderly individuals and people with disabilities may struggle to seek shelter and escape the path of these fast-moving storms, increasing their vulnerability to injury or death. Tornadoes can also disproportionately affect marginalized communities due to limited access to emergency response services and resources.

Moreover, tornadoes can lead to economic hardships for vulnerable populations. Homes and properties are often uninsured or underinsured in these areas, leaving residents with significant financial burdens after tornadoes strike.

As a result, vulnerable communities may face challenges in recovering and rebuilding their lives, perpetuating cycles of poverty and inequality.

To address the impacts of climate change on infrastructure and vulnerable populations concerning tornadoes, proactive measures are essential. Building tornado-resistant infrastructure and implementing better early warning systems can help minimize the damage caused by tornadoes. For vulnerable populations, providing accessible storm shelters and ensuring access to emergency resources and support are critical to saving lives and reducing the long-term impacts of tornadoes. Additionally, climate change mitigation efforts are crucial to addressing the root causes of tornado intensification, as reducing greenhouse gas emissions can help stabilize the climate and potentially mitigate the future increase in tornado frequency and severity.

Future Hazard Impacts

Population growth and development trends can influence tornado impacts in several ways. As urban areas expand, there is a higher likelihood of tornadoes affecting densely populated regions, increasing the potential for damage and casualties. Urbanization also alters land cover, creating more obstacles and structures that can disrupt tornado paths and increase the likelihood of tornado-related damage to infrastructure. Additionally, changes in land use can affect atmospheric conditions, potentially influencing tornado formation and intensity.

Vulnerability Analysis

The NRI includes data on the expected annual losses to individual natural hazards, historical losses, and overall risk at the county and Census tract level. The following table provides an overview of each category at the county level for tornadoes.

Table 2-58: National Risk Index (NRI) Summarization of Tornado Occurrences for the Parish (Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Very Low	Very Low

Estimated Impact and Potential Loss

Since 1996, there have been 31 significant tornado occurrences per the NCEI Storm Events Database. The total property damage associated with these storms totaled approximately $797,000. To estimate the potential losses on an annual basis, the total damages recorded were divided by the total number of years of available data in the NCEI Storm Events Database (1996 – 2025). This provides an annual estimated potential loss of $26,567 and $25,710 per event. The following table provides an estimate of potential property losses for the Parish:

Table 2-59: Estimated Annual Losses Due to Tornadoes in the Parish. (Source: Hazus)

Estimated Annual Potential Losses Due to Tornadoes
Cameron Parish
$26,567

The following table presents an analysis of building exposure that is susceptible to tornadoes by general occupancy type for the parish, along with the percentage of building stock that are mobile homes.

Table 2-60: Building Exposure by General Occupancy Type for Tornadoes in the Parish. (Source: Hazus)

Building Exposure by General Occupancy Type for Tornadoes - Exposure Types ($1,000)							
Residential	Commercial	Industrial	Agricultural	Religion	Government	Education	Mobile Homes (%)
669,521	118,987	57,412	3,114	22,696	8,989	4,725	30.6%

Vulnerable Population

Per the NCEI Storm Events Database, there has been no reported fatalities and five injuries as a result of tornadoes. In assessing the overall risk to the population, the most vulnerable population throughout the parish is those residing in manufactured housing. Approximately 30.6% of all housing in the Parish consists of manufactured housing.

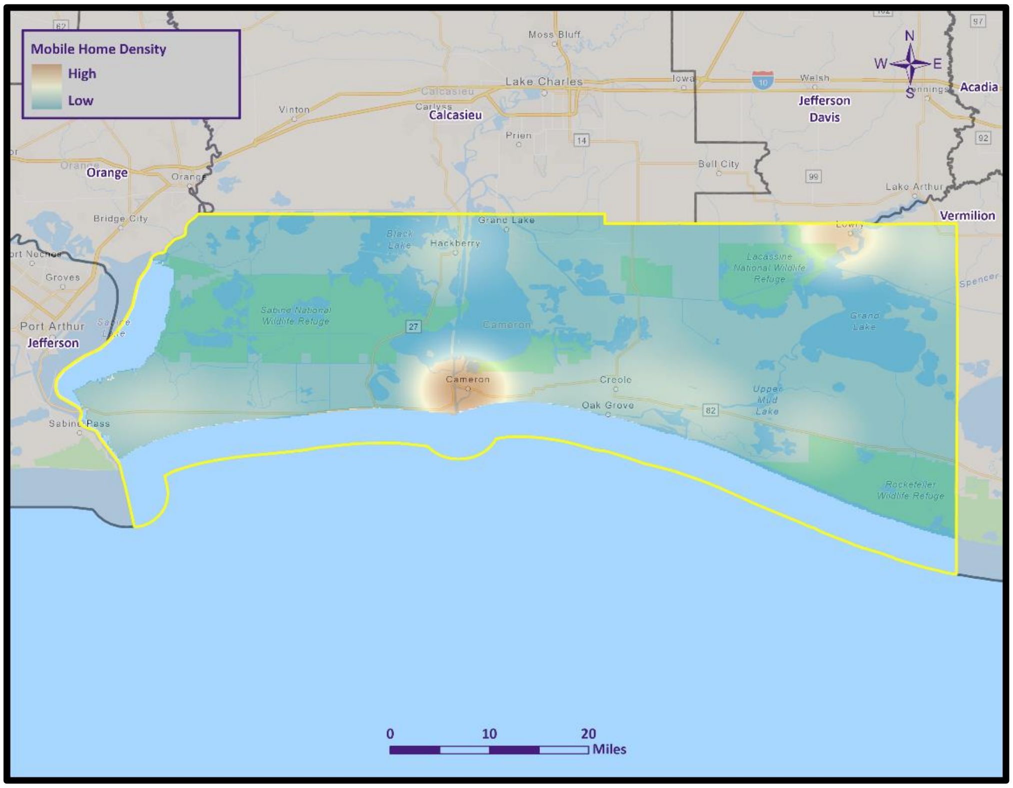


Figure 2-25: Density of Manufactured Homes in the Parish

Vulnerability Score

Table 2-61: Tornado Vulnerability Score for the Parish.

Tornado Vulnerability Score						
	Probability	Impact	Spatial Extent	Warning Time	Duration	Risk Factor
Risk Level	4	3	2	4	3	3.2

Tropical Cyclones

Profile

Hurricanes, typhoons, and cyclones are names for powerful tropical storms in which winds rotate around a closed circulation of low-pressure. In the Atlantic and eastern Pacific basins, they are known as hurricanes, in Asia (western Pacific), they are known as typhoons, and in Australia, they are called cyclones. In the Northern Hemisphere, hurricane winds rotate in a counterclockwise direction (clockwise in the Southern Hemisphere). The key energy source for a hurricane is the release of latent heat energy from condensation.

This energy is found where there is a deep layer of warm water to fuel the system. Conditions for hurricane formation include warm waters, rotational force from the earth's spin (Coriolis Effect), and the absence of vertical wind shear (stability in the lower atmosphere). Tropical disturbances that affect North America typically originate off the west coast of Africa. If the tropical disturbance lowers in pressure and starts to rotate around a low pressure center, it may turn into a tropical depression. Barometric pressure (measured in millibars or inches) continues to fall in the center as these storm systems develop in intensity. When sustained wind speeds reach 39 mph, the system becomes a tropical storm and is given a name by the National Hurricane Center. When sustained wind speeds reach 74 mph, it becomes a hurricane. Hurricanes are much larger and powerful storms with an average diameter of 350 miles. The start of the official Atlantic hurricane season is June 1st and ends November 30th. Peak hurricane season is August and September in the Northern Hemisphere, when water temperatures and evaporation rates are greatest. Associated with these storms are damaging winds, heavy precipitation, and tornadoes. Coastal areas are also vulnerable to storm surge, wind-driven waves, and tidal flooding, which can cause more destruction than cyclone winds.

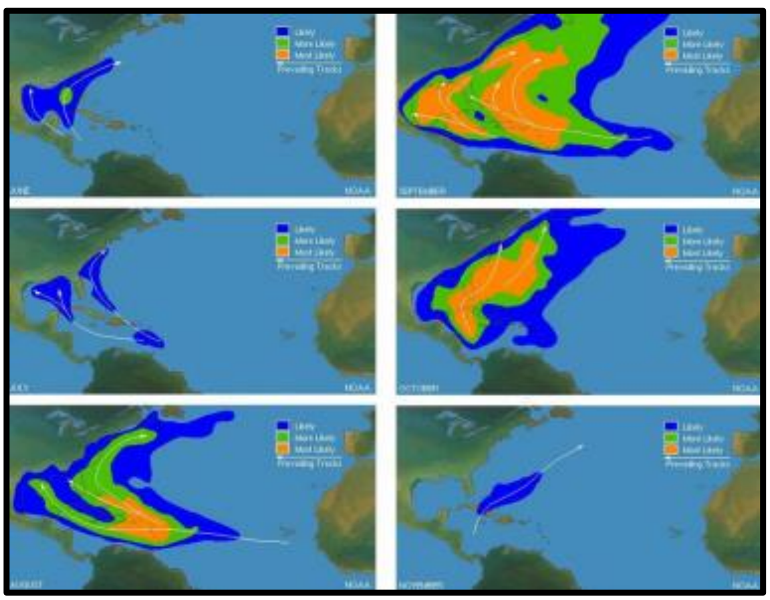


Figure 2-26: Areas of Likely Hurricane Formation and Tracking (Source: NOAA NHC)

Tropical cyclone intensity is classified by the Saffir-Simpson Scale, which categorizes hurricane intensity based upon maximum sustained wind speeds on a scale of one to five, with five being the most intense. Typically, higher category hurricanes have lower pressure and greater storm surge. Categories three, four, and five are classified as "major" hurricanes, and while hurricanes within this range comprise only 20 percent of total landfalls, they account for over 70 percent of the damage incurred in the United States. Hurricane (Category 1 or higher) return periods are shown the figure on the following page.

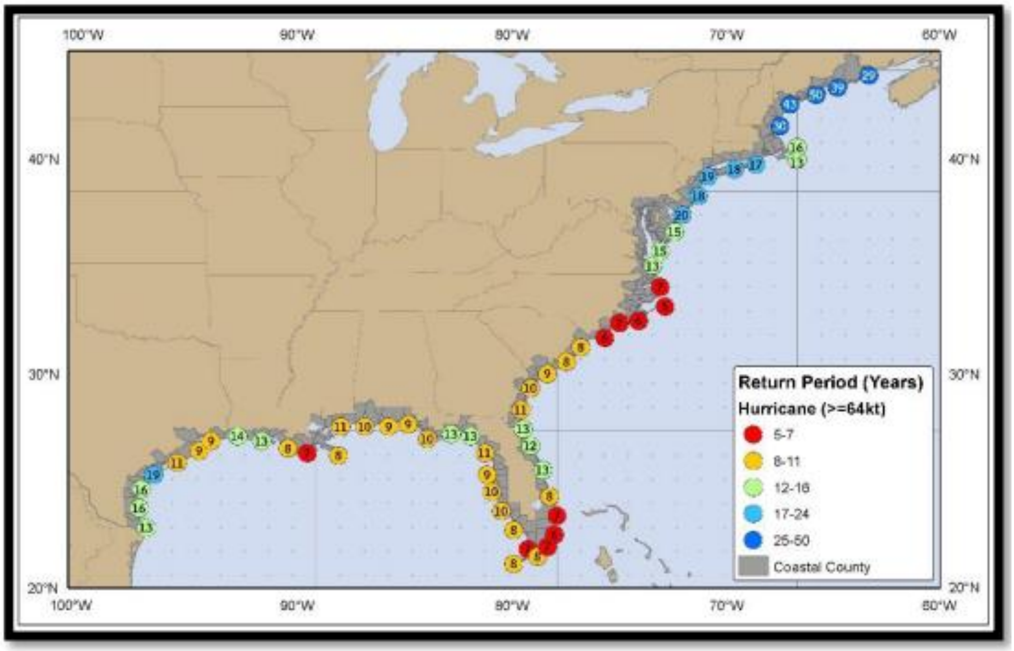


Figure 2-27: Hurricane Return Periods for the Atlantic Basin (USA)
(Source: NOAA NHC)

Table 2-62: 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.

Storm surge is an elevated water level that is pushed towards the shore by the force of strong winds that result in the piling up of water. The advancing surge combines with the normal tides, which in extreme cases can increase the normal water height over 20 feet. The storm surge arrives ahead of the storm's actual landfall and the more intense the hurricane is, the sooner the surge arrives. Water rise can be very rapid and can move far inland, posing a serious threat to those who have not yet evacuated flood-prone areas. Debris carried by the waves can also contribute to the devastation. As the storm approaches shore, the greatest storm surge will be to the north of the hurricane eye, in the right-front quadrant of the direction in which the hurricane is moving. Such a surge of high water topped by waves driven by hurricane force winds can be devastating to coastal regions, causing severe beach erosion and property damage along the immediate coast. Storm sure heights, and associated waves, are dependent upon the shape of the continental shelf (narrow or wide) and the depth of the ocean bottom (bathymetry). A narrow shelf, or one that drops steeply from the shoreline and subsequently produces deep water close to the shoreline, tends to produce a lower surge but higher and more powerful storm waves. While disassociated with the Saffir-Simpson Scale, storm surge remains the leading killer of residents along immediate coastal areas. Researchers at the Southern Regional Climate Center have indicated that hurricane strength at approximately 12-18 hours prior to landfall is a better indicator of storm surge strength (compared to wind speeds at landfall).

Many other associated hazards can occur during a hurricane, including heavy rains, flooding, high winds, and tornadoes. A general rule of thumb in coastal Louisiana is that the number of inches of rainfall to be expected from a tropical cyclone is approximately 100 divided by the forward velocity of the storm in mph; so, a fast-moving storm (20 mph) might be expected to drop five inches of rain while a slow-moving (5 mph) storm could produce totals of around 20 inches. However, no two storms are alike, and such generalizations have limited utility for planning purposes.

Hurricane Beulah, which struck Texas in 1967, spawned 115 confirmed tornadoes. In recent years, extensive coastal development has increased the storm surge resulting from these storms so much that this has become the greatest natural hazard threat to property and loss of life in the state. Storm surge is a temporary rise in sea level generally caused by reduced air pressure and strong onshore winds associated with a storm system near the coast. Although storm surge can technically occur at any time of the year in Louisiana, surges caused by hurricanes can be particularly deadly and destructive. Such storm surge events are often accompanied by large, destructive waves (exceeding ten meters in some places) that can inflict a high number of fatalities and economic losses. In 2005, Hurricane Katrina clearly demonstrated the destructive potential of this hazard, as it produced the highest modern-day storm surge levels in the State of Louisiana, reaching up to 18.7 feet near Alluvial City in St. Bernard Parish.

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

Nine out of ten deaths during hurricanes are caused by storm surge flooding. Falling tree limbs and flying debris caused by high winds have the ability to cause injury or death. Downed trees and damaged buildings are a potential health hazard due to instability, electrical system damage, broken pipelines, chemical releases, and gas leaks. Sewage and water lines may also be damaged. Saltwater and freshwater intrusions from storm surge send animals, such as snakes, into areas occupied by humans.

Risk Assessment

Geographic Extent

Tropical cyclones typically impact multiple regions and not one specific jurisdiction or campus. Because of this, all of the entire planning area is susceptible to the effects of hurricanes. Hurricanes are the single biggest threat to all of South Louisiana. With any single hurricane event having the potential to devastate multiple parishes at once, hurricanes are a significant threat to the entire parish planning area. The worst-case scenario for a hurricane event in the parish is a Category 5 hurricane.

Previous Occurrences

The parish has experienced nine tropical cyclone occurrences between the years 2002 and 2025. Since the last update, there have been two tropical cyclone occurrences within the boundaries of the parish.

Table 2-63: Historical Tropical Cyclone Occurrences in the Parish since the Last Update.

Date	Magnitude	Name	Property Damage	Crop Damage	Fatalities	Injuries
9/14/2021	Tropical Storm	Nicholas	$0	$0	0	0
7/8/2024	Tropical Storm	Beryl	$0	$0	0	0

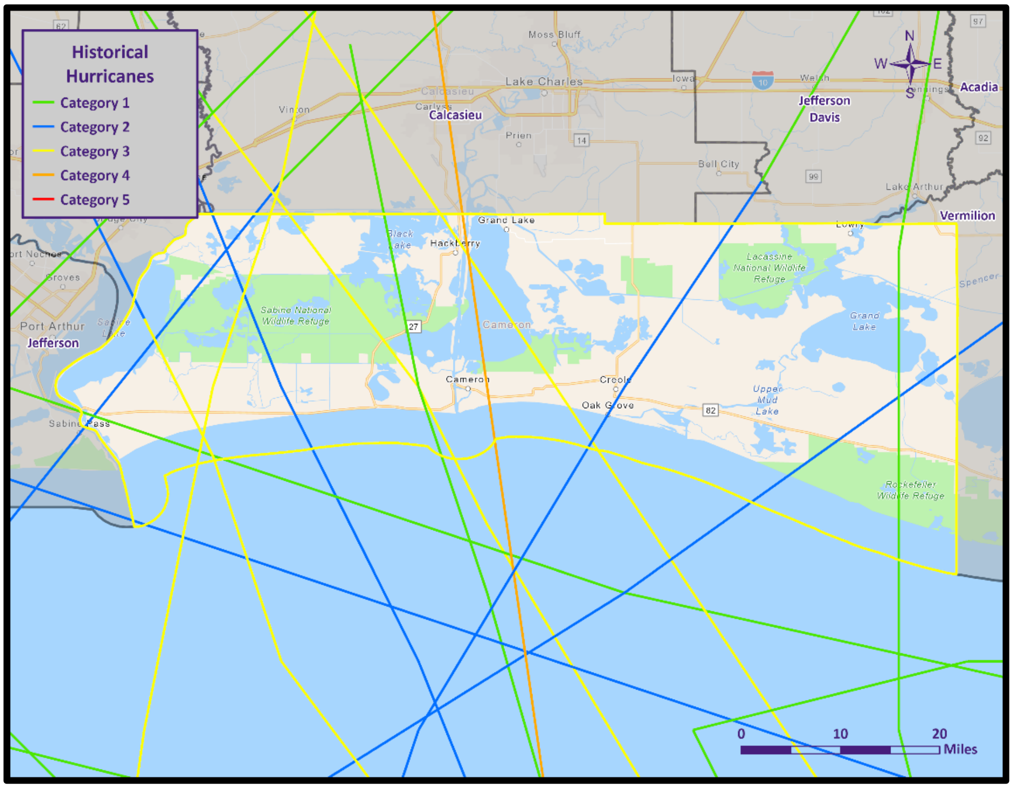


Figure 2-28: Map of Historical Hurricane Paths through Cameron Parish

Tropical Storm Nicholas (2021)

The origin of Tropical Storm Nicholas can be traced to a tropical wave that emerged off the west coast of Africa on 28 August 2021. The wave's associated showers and thunderstorms remained disorganized as it moved westward across the tropical Atlantic and then across the Caribbean Sea through early September. By 9 September, the disturbance crossed Central America, leaving behind a surface trough over the western Caribbean. This trough drifted into the Bay of Campeche (southwestern Gulf of Mexico) by 11 September, where a small area of thunderstorms developed and began to show signs of organization as it moved northwestward. Early on 12

September, convection increased substantially, and data from an Air Force Reserve Hurricane Hunter aircraft indicated that a well-defined low-level circulation had formed. The aircraft also observed sustained surface winds of tropical-storm force, marking the formation of Tropical Storm Nicholas around 1200 UTC 12 September about 115 nautical miles northeast of Veracruz, Mexico.

For the first 24 hours after genesis, Nicholas moved generally north-northwestward around a subtropical ridge over the southeastern United States. Its forward motion was somewhat erratic at times, with multiple small swirls within a broad circulation and at least two center re-formations noted over the western Gulf. Moderate south-southwesterly wind shear prevented a rapid organization initially, but the cyclone was over very warm waters and in a moist, unstable atmosphere, which allowed steady strengthening despite the shear. On 13 September, Nicholas gradually turned northward, then north-northeastward toward a weakness in the ridge, putting the storm on a path toward the central Texas coast. The strengthening trend continued, and by 0000 UTC 14 September, Nicholas had intensified into a Category 1 hurricane with maximum sustained winds of about 65 knots, when it was located roughly 25 mi south-southwest of Matagorda, Texas. A few hours later, at approximately 0530 UTC 14 September, Nicholas made landfall at peak intensity on the eastern portion of the Matagorda Peninsula, near Sargent Beach in Matagorda County, Texas. At landfall, Nicholas's maximum winds were around 65 kt, making it a borderline Category 1 hurricane on the Saffir–Simpson scale.

Nicholas's forward speed slowed dramatically after landfall as the steering flow collapsed. The cyclone quickly began to weaken as it moved inland over southeastern Texas, and it fell back below hurricane strength. By 1200 UTC 14 September (roughly 6–7 hours after landfall), Nicholas had weakened to a tropical storm while centered about 25 mi south-southwest of Alexandria, Louisiana. Continuing to drift generally northeastward, Nicholas further weakened to a tropical depression by 0000 UTC 15 September, when it was located roughly 20 nmi west of Port Arthur, Texas. The dissipating cyclone meandered over southern Louisiana from 15–17 September, and its low-level circulation became increasingly broad and ill-defined by 17 September. Nicholas degenerated into a post-tropical remnant low as it lost a coherent center, though its remnants continued to produce heavy rainfall over parts of Louisiana and Mississippi. The remnant low of Nicholas persisted for several more days and was ultimately absorbed into another larger extratropical system by 20 September.

Figure 2-29: Path of Nicholas in the Gulf Coast Area.
(Source: AccuWeather)

The impacts to Cameron Parish were minimal compared to Hurricanes Laura and Delta that rocked the coastal region the year before in 2020. Heavy rain, strong winds, and minor coastal flooding impacted Cameron Parish after Nicholas made initial landfall in eastern Texas. While Nicholas never made direct landfall in Cameron Parish, the easterly bands of the tropical system slammed Cameron with high winds up to 50 miles per hour, resulting in widespread power outages and minor damage to trees and other structures. Nicholas provided the area with prolonged rainfall producing rain totals between four and eight inches, with higher totals in some isolated areas.

Tropical Storm Beryl (2024)

Beryl's origins can be traced to a vigorous tropical wave that departed the west coast of Africa on June 23, 2024, accompanied by disorganized showers and thunderstorms. Over the next several days, the wave traversed the eastern tropical Atlantic with little development. By June 27, however, satellite imagery showed persistent convective organization, and a well-defined low-level vorticity center emerged early on June 28. At 1200 UTC June 28, the National Hurricane Center classified the system as a tropical depression about 1,200 nautical miles east of Barbados. The disturbance benefited from an unusually favorable atmospheric environment, including low wind shear and a deep easterly flow, which immediately promoted further organization. Within 12 hours of genesis, the nascent cyclone strengthened into Tropical Storm Beryl, and continued development set the stage for rapid intensification.

Steered westward to west-northwestward by a subtropical ridge to its north, Beryl found ideal conditions over the warm central Atlantic and began a phase of explosive deepening. Having reached tropical storm strength on June 28, Beryl intensified into a hurricane by 0000 UTC June 30. Once at hurricane status, the compact cyclone accelerated its strengthening. Over the following 18 hours on June 30, Beryl's maximum sustained winds surged from 70 kt to about 115 kt, making it a Category 4 major hurricane by 1800 UTC that day. During this rapid intensification, the central pressure plummeted (falling below 960 mb by late June 30), and a small eye likely became apparent on satellite images as the inner core consolidated. By that evening, Beryl was located roughly 260 mi east-southeast of Barbados at its initial peak intensity (115 kt winds). Around this time, the cyclone leveled off in strength, signaling the onset of an eyewall replacement cycle (ERC). A secondary outer eyewall had begun forming around the tiny inner eyewall, causing Beryl to temporarily weaken as the original eye collapsed. Peak winds dipped to about 100 kt by 0600 UTC July 1 during the ERC, and the storm's forward motion bent slightly to the west-northwest as it approached the Windward Islands south of Barbados.

Beryl completed its ERC by the morning of July 1 and emerged with a larger eye about 20 mi in diameter. Almost immediately, the hurricane took advantage of the uninterrupted oceanic heat and relaxed shear to rapidly re-intensify with the new, larger eye contracting. By midday on July 1, Beryl's sustained winds were again on the rise, and an aerial reconnaissance mission along with satellite images indicated a solid ring of intense convection around the eye. Beryl regained Category 4 strength and reached about 120 kt just before striking the Grenadine island of Carriacou (northern Grenada) at ~1520 UTC July 1. The hurricane's eye tracked directly over Carriacou, making Beryl one of the most intense hurricanes on record to impact the Windward Islands. At the time of this landfall, the central pressure was estimated near 950 mb and maximum winds were ~120 kt (around 140 mph). Despite some disruption of the small core by the island's terrain, Beryl continued strengthening once it entered the southeastern Caribbean Sea later that day. Deep convective cloud tops cooled further, and the eye soon became very well-defined on satellite imagery, highlighting the storm's robust structure.

Moving west-northwest across the warm Caribbean waters, Beryl achieved its greatest intensity in the early hours of July 2. Rapid intensification resumed overnight, and Beryl attained Category 5 status by 0600 UTC July 2 with maximum sustained winds of 145 kt (270 km/h) and an estimated minimum central pressure of 932 mb. This made Beryl the earliest Category 5 hurricane ever observed in the Atlantic, surpassing the previous July record set by Hurricane Emily (2005). Around its peak, satellite and microwave data showed a symmetric storm with a clear, well-formed eye surrounded by a solid ring of intense thunderstorms. For several hours on July 2, Beryl maintained this extreme intensity as it moved through the eastern Caribbean, but by late morning the first signs of weakening appeared. The hurricane encountered increasing westerly wind shear associated with an upper-level trough (TUTT) over the central Caribbean. Under the influence of this shear, Beryl's core convection became less symmetric – heavy thunderstorms were displaced to the cyclone's north side – and a slow weakening trend began. By the end of July 2, Beryl had weakened slightly to a high-end Category 4 hurricane (winds ~135 kt) as it approached the central Caribbean.

On July 3, Beryl's weakening was gradual while the storm pressed west-northwestward at a brisk 18–20 kt south of Hispaniola. The combination of persistent shear and a partial eyewall replacement (with a more ragged eye) led to a steady erosion of the storm's peak winds. By the afternoon of July 3, Beryl's maximum sustained winds had fallen to about 90–95 kt (just below major hurricane strength). Around 1800 UTC that day, the hurricane's large eye passed roughly 15–20 mi south of Jamaica's southern coast, sparing Jamaica a direct landfall but still bringing strong outer eyewall winds and heavy rains to the island's southern regions. Despite the hostile shear, Beryl remained a sizable and powerful Category 2–3 hurricane as it traversed the central Caribbean. The storm's forward speed and the continued influx of dry, stable air limited any rapid collapse; Beryl only slowly lost strength through July 3 into early July 4. By early July 4, the system's core convection had become somewhat fragmented, and its peak winds decreased to ~90 kt (Category 2) as it passed just south of the Cayman Islands pre-dawn on July 4.

Late on July 4, Beryl briefly halted its weakening trend. An observed reduction in shear or a moistening of the environment allowed convection to flare near the center once again. Overnight, the hurricane managed a short-lived burst of re-intensification: by 0000 UTC July 5 Beryl's winds had risen back to 100 kt, regaining a low-end Category 3 intensity despite ongoing moderate shear. This uptick in strength was not sustained for long. As Beryl closed in on the Yucatán Peninsula, increased land interaction and another bout of dry air entrainment caused its compact core to deteriorate quickly. The system rapidly weakened on approach to the coast. Beryl made landfall on the Yucatán just northeast of Tulum, Mexico around 1100 UTC July 5 as a Category 1 hurricane. At landfall, estimated winds were on the order of 75–80 kt and the central pressure around 977 mb. The once-formidable cyclone had a disorganized appearance on radar and satellite at this time, with the eye disappearing as the core convection collapsed over land.

Beryl weakened significantly over the Yucatán Peninsula on July 5. The combination of continued vertical shear and the disruption of the low-level circulation by the Yucatán's landmass proved devastating to Beryl's inner core. By the time the system's center cleared the Yucatán and emerged over the Bay of Campeche (southwestern Gulf of Mexico) that evening, Beryl had degenerated to a tropical storm with much diminished convection. Surface observations and aircraft reconnaissance indicated the cyclone's low-level center had become ill-defined and partially decoupled from the mid-level circulation. Essentially, Beryl's tight inner eyewall was completely destroyed by its passage over land, leaving a weak and disorganized vortex over the warm Gulf waters.

Once over the Gulf of Mexico on July 6, Beryl initially struggled to reorganize. An upper-level trough near the northeast Mexico coast imposed continued southwesterly shear, and dry air wrapping into the circulation further inhibited convective development. As a result, Beryl's thunderstorm activity remained intermittent and poorly organized through most of July 6 while the storm drifted northwestward over the Bay of Campeche and western Gulf. Despite the very warm Gulf sea surface temperatures, the hostile upper-air environment kept Beryl's intensity nearly steady-state as a moderate tropical storm (with peak winds generally 50–60 kt) that day. By July 7, however, conditions began to improve aloft. Beryl reached the western Gulf where vertical shear lessened and mid-level moisture increased ahead of an approaching mid-latitude trough over the central United States. Responding to this large trough, the storm also turned north-northwestward on July 7 into a weakness in the subtropical ridge, and its forward speed slowed to around 10 mph (17 km/h) as it angled toward the northwest Gulf Coast.

Throughout July 7, signs of reorganization became evident. Persistent deep convection redeveloped near Beryl's center by mid-day, and Doppler radar from Texas began to detect coherent banding features wrapping toward the storm's core. Although dry air still lingered on the periphery, the central pressure gradually fell as Beryl's structure improved. By late on July 7, the cyclone's satellite presentation featured a central dense overcast with cooling cloud tops and hints of an eye trying to reform. Just before midnight (around 0400 UTC July 8), Beryl finally re-attained hurricane strength over the northwestern Gulf of Mexico. At that time, the hurricane was centered about 50–60 n mi off the middle Texas coast, and a primitive eye ~50 km (30 mi) wide became apparent on both infrared satellite and coastal radar imagery. Beryl was now on a more northerly course, accelerating slightly in response to the amplifying upper trough over Texas. In the hours just before landfall, rapid strengthening occurred once again. Despite being so close to land, Beryl's maximum winds increased from minimal hurricane force to roughly 80 kt

(90 mph) in the early hours of July 8. Radar imagery showed an intense eyewall on the eastern side of the cyclone coming ashore along the mid-Texas coast.

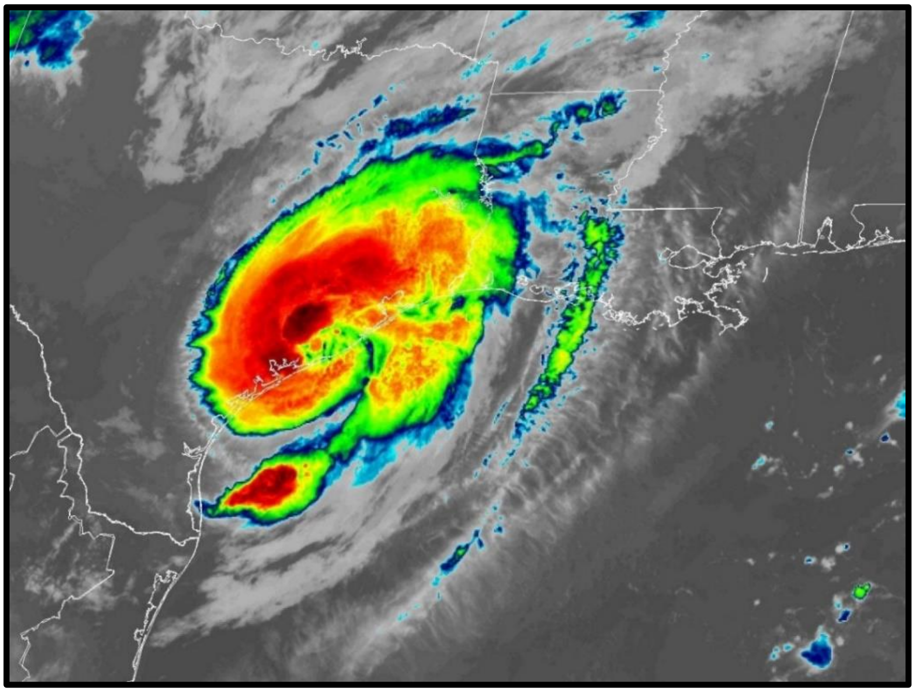


Figure 2-30: Beryl Rain Bands in the Gulf Coast Area.
(Source: NOAA)

Hurricane Beryl made its final landfall near Matagorda, Texas, around 0840 UTC on July 8 (3:40 AM local time) at peak intensity for its Gulf phase. The hurricane came ashore as a solid Category 1 storm with estimated winds of ~80 kt and a minimum central pressure near 978 mb at landfall. The east side of Beryl's eyewall pushed across coastal Matagorda Bay into Brazoria County, delivering hurricane-force wind gusts (measured up to 85–95 mph) and torrential rain along the immediate coast. After landfall, the cyclone's center tracked northward, passing just west of the Houston metropolitan area by late morning on July 8. Beryl weakened steadily over land: it dropped to tropical storm status by ~1600 UTC (late morning) as it moved near Houston, where widespread power outages and 200–300 mm of rainfall were reported under its rainbands. Continuing to arc north-northeast, the storm was downgraded to a tropical depression by 0000 UTC July 9 over northeastern Texas. Around this time the system lost its tropical characteristics, merging with a frontal boundary and transitioning into an extratropical low over central Arkansas by ~1200 UTC on July 9.

Once extratropical, the remnants of Beryl accelerated northeastward ahead of the trough. The sprawling low-pressure system tracked through the Mississippi and Ohio Valleys on July 10, then across the Great Lakes region into Canada by July 11. Although winds had diminished considerably by this stage (no longer of gale force over a broad area), the extratropical cyclone produced a swath of heavy rainfall from Arkansas north-eastward into the Ohio Valley and New England. Moisture from Beryl's remnants contributed to rainfall totals exceeding 4–6 inches (100–150 mm) in some areas of the Midwest and up to 8+ inches (200+ mm) in parts of eastern Texas and Louisiana during its passage. The system also spawned numerous tornadoes – especially across portions of Texas, Louisiana, and Arkansas – as tropical moisture and wind shear interacted along the storm's path. By July 11, Beryl's extratropical low began to occlude and weaken over the northeastern United States. The remnant low was finally absorbed into a frontal zone over upstate New York between 1200–1800 UTC on July 11, marking the definitive end of Tropical Storm Beryl's long journey. Beryl's 13-day lifespan saw it evolve from a Cape Verde tropical wave into a record-breaking early-season Category 5 hurricane, traverse the entire Caribbean, strike land twice, and eventually dissipate over North America – a remarkable and complex meteorological history.

In Cameron Parish, the highest winds recorded within the area occurred at Sabine Pass, Texas, with a maximum sustained wind of 55 mph (48 knots) and a peak wind gust of 70 mph (61 knots) around 11 AM CDT July 8th. Winds at Cameron briefly became sustained at 38 knots at 10:36 AM CST.

Probability

The annual return rate (frequency) for hurricane events in the parish is 0.38, which means there is a 38% probability of a hurricane event occurring in any given year. This translates to an average of one hurricane event occurring approximately every two to three years over the long term.

- Annual Return Rate (Frequency): 0.38 (38%), which represents the likelihood of an event happening in any given year.
- Average Interval Between Events: On average, one hurricane event is expected to occur approximately every two to three years. This is the inverse of the return rate (1 /0.38 = 2.63 years)

Climate Change Impacts

Climate change has the potential to alter the prevalence and severity of extreme incidents such as hurricanes. Louisiana is expected to experience more days with temperatures above 95°F this century, which means an increase in sea surface and ambient temperatures, alterations in the hydrological cycle, and an increase in sea level, which collectively may increase the frequency of large storm incidents and impacts. Research indicates that the warming climate will increase the frequency of Category 4 and 5 hurricanes but decrease the frequency of less severe hurricane incidents by the end of the century. This increase in the frequency of Category 4 and 5 hurricanes will lead to an increase in damage to the built environment and increased negative effects on the economy and ecosystem.

Climate change is amplifying the impacts of hurricanes on both infrastructure and vulnerable populations, making them more frequent and severe. As ocean temperatures rise due to global warming, hurricanes have access to greater energy, leading to stronger and more destructive storms. The intensification of cyclones poses significant risks to infrastructure located in coastal regions.
One of the primary impacts of hurricanes on infrastructure is the damage caused by strong winds and storm surges. Cyclones can rip apart buildings, topple power lines, and uproot trees, leading to widespread destruction of homes, businesses, and public facilities. Coastal areas are particularly vulnerable to storm surges, which can inundate low-lying regions and cause severe flooding, damaging roads, bridges, and critical lifeline infrastructure such as water and sewage systems.

Vulnerable populations face disproportionate risks during hurricanes, especially in low-lying coastal communities. People with limited mobility, the elderly, and low-income households often lack resources and access to evacuation options, making them more susceptible to the devastating impacts of cyclones. Displacement, property damage, and loss of livelihoods are common consequences for vulnerable populations affected by cyclones, exacerbating existing social inequalities and pushing them further into hardship.

Moreover, hurricanes can have long-lasting effects on the mental and physical health of vulnerable populations. The trauma caused by experiencing such extreme weather events can lead to long-term psychological distress. Lack of access to healthcare and resources after cyclones can also result in a higher risk of waterborne diseases and malnutrition for vulnerable communities.

To mitigate the impacts of climate change on infrastructure and vulnerable populations concerning hurricanes, several actions are crucial. Investing in more resilient infrastructure that can withstand stronger storms and higher storm surges is essential to minimize damage and ensure the continuity of critical services. Enhancing early warning systems and evacuation plans can save lives and improve the preparedness of vulnerable populations. Additionally, providing social safety nets and support to vulnerable communities can aid in their recovery and reduce the long-term impacts of cyclones on their well-being. Mitigating climate change by reducing greenhouse gas emissions is also vital to curbing the intensification of hurricanes and protecting both infrastructure and vulnerable populations from their devastating effects.

Future Hazard Impacts

Tropical cyclone impacts for floods and hurricanes were estimated for the years 2030 and 2035. Yearly population and housing decline rates were applied to parish inventory assets for composite floods and hurricanes. Based on a review of available information, it is assumed that population and housing units will decrease within the parish from the present until 2035. A summary of estimated future impacts is shown in the table below. Dollar values are expressed in future costs and assume an annual rate of inflation of 1.02%.

Table 2-64: Estimated Future Impacts, 2025-2035.
(Source: Hazus, US Census Bureau)

Hazard / Impact	Total in Parish (2025)	Hazard Area (2025)	Hazard Area (2030)	Hazard Area (2035)
Hurricane Damage				
Structures	3,447	3,447	3,471	3,489
Value of Structures	$885,444,000	$885,444,000	$957,306,903	$1,012,181,509
# of People	5,222	5,222	4,612	4,221

Vulnerability Analysis

The NRI includes data on the expected annual losses to individual natural hazards, historical losses, and overall risk at the county and Census tract level. The following table provides an overview of each category at the county level for hurricanes.

Table 2-65: National Risk Index (NRI) Summarization of Hurricane Occurrences for the Parish
(Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Relatively Low	Relatively Low

Estimated Impact and Potential Loss

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

Table 2-66: Total Estimated Losses for a 100-Year Hurricane Event
(Source: Hazus)

Jurisdiction	Estimated Total Losses from 100-Year Hurricane Event
Cameron Parish	$107,486,000

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

Table 2-67: Ratio of Total Losses to Total Estimated Value of Assets for the Parish.
(Source: Hazus)

Jurisdiction	Estimated Total Losses from 100-Year Hurricane Event	Total Estimated Value of Assets	Ratio of Estimated Losses to Total Value
Cameron Parish	$107,486,000	$885,444,000	12.1%

Based on the Hazus Hurricane Model, the estimated total losses for the parish is 12.1% of the total estimated value of all assets.

The Hazus Hurricane Model also provides a breakdown for seven primary sectors (Hazus occupancy) throughout the parish. The losses for the parish by sector are listed in the table below.

Table 2-68: Estimated Losses in Unincorporated Area of the Parish for a 100-Year Hurricane Event (Source: Hazus)

Cameron Parish	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$438,000
Commercial	$10,359,000
Government	$916,000
Industrial	$4,452,000
Religious / Non-Profit	$1,540,000
Residential	$89,564,000
Schools	$217,000
Total	**$107,486,000**

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

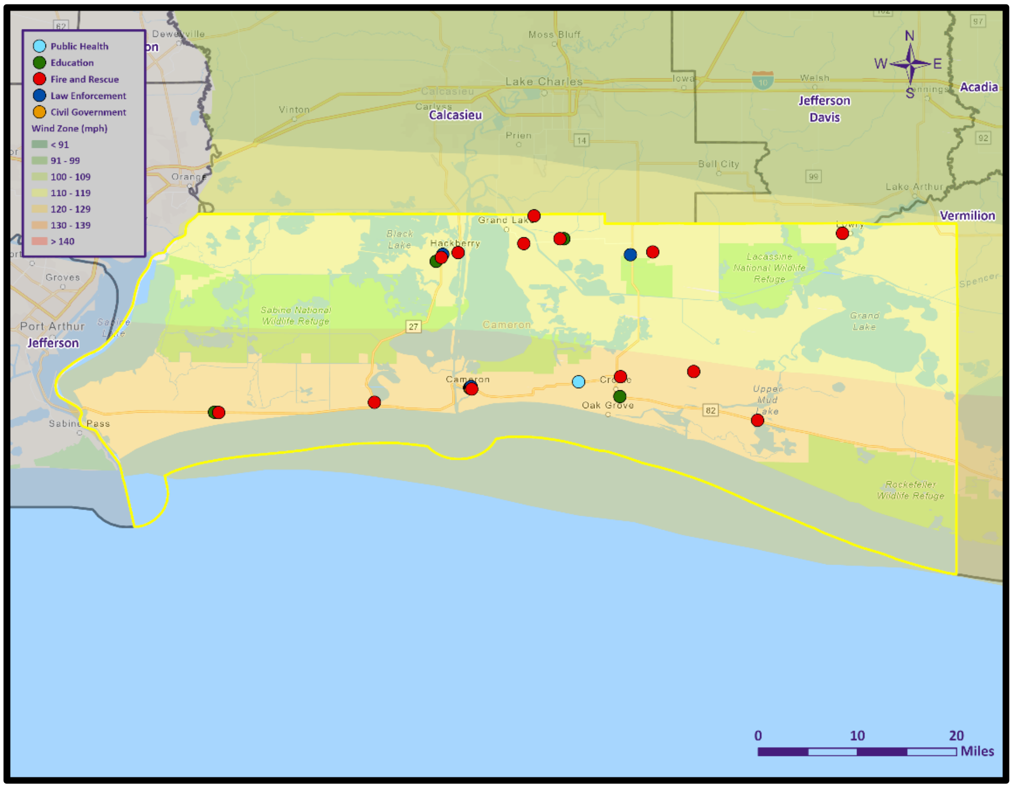


Figure 2-31: Winds Zones for the Parish in Relation to Critical Facilities

Vulnerable Population

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

Table 2-69: Number of People Susceptible to a 100-Year Hurricane Event in the Parish (Source: Hazus)

Number of People Exposed to Hurricane Hazards			
Location	**# in Community**	**# in Hazard Area**	**% in Hazard Area**
Cameron Parish	5,222	5,222	100%

The Hazus hurricane model was also extrapolated to provide an overview of vulnerable populations throughout the parish. These populations are illustrated in the following tables:

Table 2-70: Vulnerable Populations in Unincorporated Area of the Parish for a 100-Year Hurricane Event (Source: Hazus)

Cameron Parish		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	5,222	100.0%
Persons Under 5 Years	355	6.8%
Persons Under 18 Years	1,253	24.0%
Persons 65 Years and Over	924	17.7%
White	4,475	85.7%
Minority	747	14.3%

Vulnerability Score

Table 2-71: Hurricane Vulnerability Score for the Parish.

Hurricane Vulnerability Score						
	Probability	**Impact**	**Spatial Extent**	**Warning Time**	**Duration**	**Risk Factor**
Risk Level	3	4	4	1	4	**3.3**

Wildfires

Profile

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 (e.g., leaves, small sticks) 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 aims 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).

The wildland-urban interface and intermix land cover surface, developed by the SILVIS Lab at the University of Wisconsin in Madison, can be used to determine areas at risk. Wildland-urban interface is defined as the zone of transition between unoccupied land and human development. This usually includes communities or areas of human development that are within 0.5 miles of the zone. Wildland-urban intermix is defined as areas in which human development is intermixed with wildland fuels. Intermix and interface areas are at risk of wildfires.

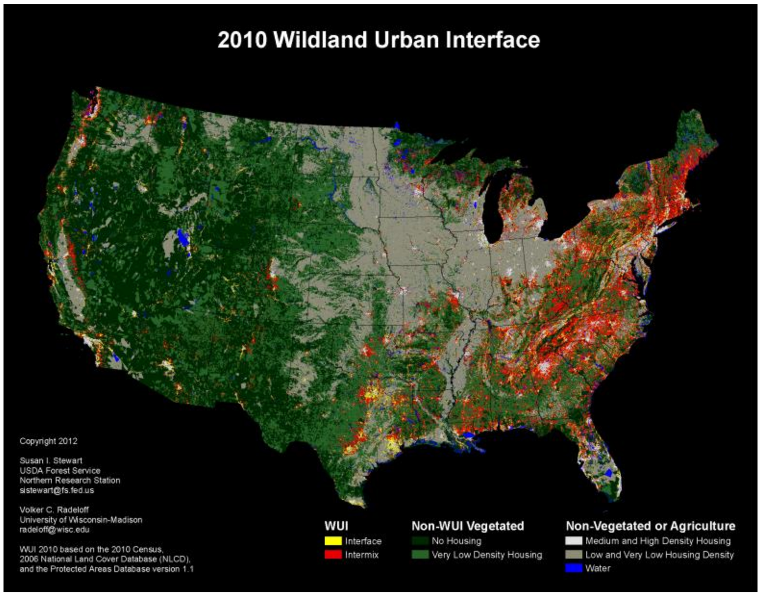


Figure 2-32: Contiguous USA Wildland Urban Interface Map.

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.

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 2-72: Southern Group of State Foresters Wildfire Risk Assessment Fire Intensity Scale. (Source: Southern Wildfire Assessment Portal)

Fire Intensity	
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.

Risk Assessment

Geographic Extent

Wildfires impact areas that are populated with forests and grasslands. The worst-case scenario for the unincorporated area of the parish is a level 5. The figure on the following pages display the areas of wildland-urban interface and intermix in the parish.

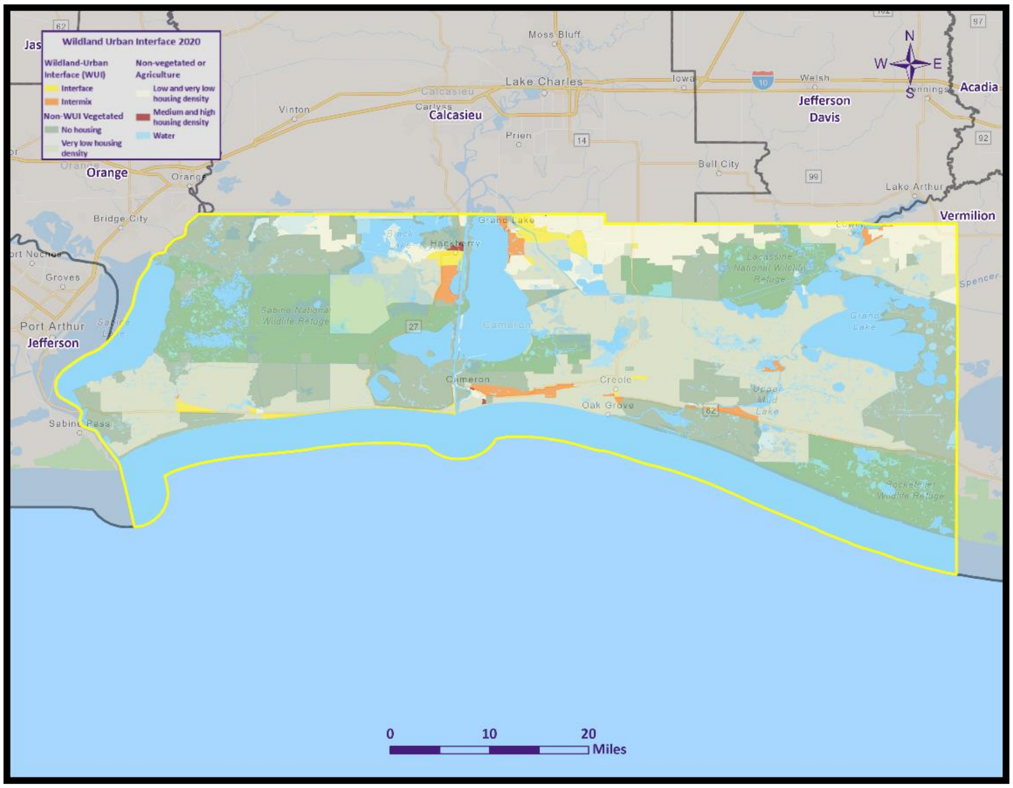


Figure 2-33: Wildland-Urban Interaction in the Parish.

Previous Occurrences

The parish has experienced one significant wildfire occurrence between the years 1996 and 2025 per the NCEI Storm Events Database. Since the previous update, there have been no significant wildfire events within the boundaries of the parish.

Probability

The annual return rate (frequency) for wildfire occurrences in the parish is approximately 0.03, which means there is approximately a 3% probability of a wildfire occurring in any given year. This translates to an average of one wildfire event occurring approximately every 33 to 34 years over the long term.

- Annual Return Rate (Frequency): 0.03 (3%), which represents the likelihood of an event happening in any given year.
- Average Interval Between Events: On average, one wildfire event is expected to occur approximately every 33 to 34 years. This is the inverse of the return rate (1 / 0.03 = ~33.3 years)

Climate Change Impacts

The increasing probability and intensity of drought caused by climate change across Louisiana indicates that the risk of wildfires will also increase. The presence of drought or prolonged dry spells will lead to an increase in dry grasses, brush, and forests that act as fuel for fires.

Climate change is playing a significant role in the increasing frequency and severity of wildfires, resulting in substantial impacts on infrastructure and vulnerable populations. Rising temperatures, prolonged droughts, and altered precipitation patterns create ideal conditions for wildfires to ignite and spread rapidly. The destruction of critical infrastructure is one of the most profound consequences of wildfires. Roads, power lines, telecommunication networks, and water supply systems are vulnerable to damage, hindering emergency response efforts and disrupting access to essential services for communities affected by wildfires.

Vulnerable populations face unique challenges during wildfires. Those living in fire-prone areas often lack the means to adequately protect their homes and properties, making them more susceptible to property loss and displacement. Low-income communities may also have limited access to resources for evacuation and recovery, further exacerbating the impacts of wildfires on their well-being. Additionally, the elderly, children, and individuals with respiratory conditions are at heightened health risks due to poor air quality caused by wildfire smoke, which can lead to respiratory problems and other health issues.

Furthermore, wildfires can have long-term social and economic impacts on vulnerable populations. Displacement and property loss can force people to leave their homes and communities, leading to disruptions in education, employment, and social connections. The loss of livelihoods, particularly for those dependent on agriculture or tourism in affected regions, can exacerbate poverty and economic inequality.

To address the impacts of climate change on infrastructure and vulnerable populations concerning wildfires, various strategies are necessary. Investing in fire-resistant infrastructure and implementing better land use planning can help reduce the risk of infrastructure damage during wildfires. Creating and improving evacuation plans and warning systems can aid in ensuring the safety of vulnerable communities. Additionally, providing support and resources for those affected by wildfires, such as temporary housing, healthcare, and financial assistance, is essential for their recovery and well-being. To mitigate future wildfires and their impacts, it is imperative to take urgent action on climate change by reducing greenhouse gas emissions and implementing sustainable land management practices to protect both infrastructure and vulnerable populations from the increasing threats of wildfires.

The following figure shows the wildfire likelihood within Cameron Parish. According to the US Forest Service and the Department of Agriculture Cameron parish ranks first in the State of Louisiana and is 99% more likely to have wildfire occurrence than all other counties in the United States. In terms of likelihood Cameron parish ranks in the 97th percentile, the same as Los Angeles County in California. Cameron Parish's flat landscape along with its vast vegetation across the parish allows the area to be highly susceptible to wildfire risks.

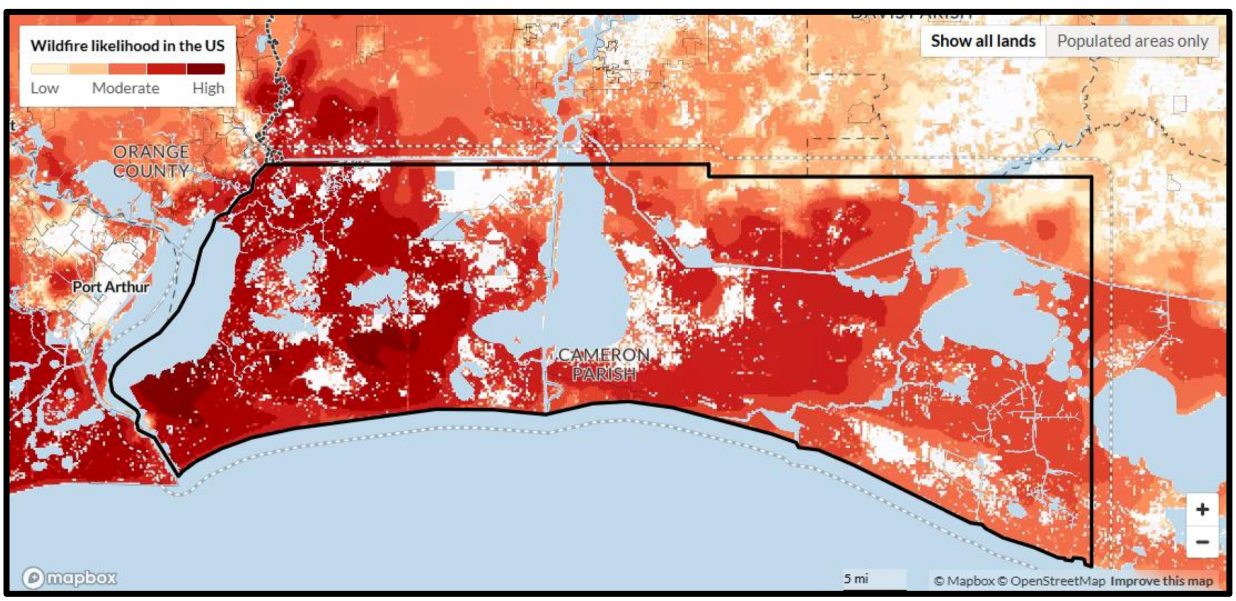


Figure 2-34: Wildfire Likelihood in Cameron Parish
(Source: US Forest Services, US Department of Agriculture)

Future Hazard Impacts

Population growth and development trends can significantly impact wildfire risks and impacts in several ways. As more people move into wildland-urban interface areas, there is an increased likelihood of human-caused fires due to activities like outdoor recreation or accidental ignition. Urban sprawl into fire-prone areas also increases the need for fire suppression and evacuation efforts during wildfire events, putting more lives and property at risk.

Furthermore, development can alter natural fire regimes and vegetation patterns, potentially leading to more intense and difficult-to-control wildfires.

Vulnerability Analysis

The NRI includes data on the expected annual losses to individual natural hazards, historical losses, and overall risk at the county and Census tract level. The following table provides an overview of each category at the county level for wildfires.

Table 2-73: National Risk Index (NRI) Summarization of Wildfire Occurrences for the Parish (Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Relatively Moderate	Relatively Moderate

Estimated Impact and Potential Loss

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

Table 2-74: Total Building Exposure by Wildland-Urban Interaction Areas. (Source: Hazus)

Jurisdiction	Estimated Total Building Exposure
Cameron Parish	$5,316,000

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.

Table 2-75: Estimated Exposure for Unincorporated Area of the Parish by Sector. (Source: Hazus)

Cameron Parish	Estimated Total Building Exposure by Sector
Agricultural	$155,000
Commercial	$1,415,000
Government	$120,000
Industrial	$376,000
Religious / Non-Profit	$105,000
Residential	$3,145,000
Schools	$0
Total	**$5,316,000**

Vulnerable Population

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

Table 2-76: Population Located within Wildland-Urban Interaction Areas.
(Source: 2020 U.S. Census Data)

Number of People Located in Wildland-Urban Interaction Areas			
Location	**# in Community**	**# in Hazard Area**	**% in Hazard Area**
Cameron Parish	5,222	658	13%

The 2020 U.S. Census data was also extrapolated to provide an overview of populations located within wildland-urban interaction areas throughout the jurisdictions. The date is illustrated in the following tables:

Table 2-77: Population in Unincorporated Area of the Parish Located within a Wildland-Urban Interaction Area.
(Source: 2020 Census Data)

Cameron Parish		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	658	12.6%
Persons Under 5 Years	45	6.8%
Persons Under 18 Years	158	24.0%
Persons 65 Years and Over	116	17.7%
White	564	85.7%
Minority	94	14.3%

Vulnerability Score

Table 2-78: Wildfire Vulnerability Score for the Parish.

Wildfire Vulnerability Score						
	Probability	**Impact**	**Spatial Extent**	**Warning Time**	**Duration**	**Risk Factor**
Risk Level	2	3	4	1	2	**2.5**

******THIS PAGE LEFT INTENTIONALLY BLANK******

3. Capability Assessment

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

Through this assessment, Cameron Parish are able to identify strengths that could be used to reduce losses and reduce risk throughout the communities. 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

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

Table 3-1: Planning and Regulatory Capabilities

Capability Assessment Worksheet - Cameron Parish		
Local mitigation capabilities are existing authorities, polices and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible.		
Planning and Regulatory		
Please indicate which of the following plans and regulatory capabilities your jurisdiction has in place.		
Plans	**Yes / No**	
Comprehensive / Master Plan	Yes	Parish has a Coastal Restoration Committee to update yearly
Capital Improvements Plan	No	
Economic Development Plan	Yes	Comprehensive Economic Development Strategy
Local Emergency Operations Plan	Yes	Yearly
Continuity of Operations Plan	Yes	
Transportation Plan	No	Evacuation Planning
Stormwater Management Plan	No	
Community Wildfire Protection Plan	No	
Other plans (redevelopment, recovery, coastal zone management)	No	
Building Code, Permitting and Inspections	**Yes / No**	
Building Code	Yes	I CODES 2012
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	
Fire Department ISO/PIAL rating	5	
Site plan review requirements	No	
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	No	

Cameron Parish will work to expand their capabilities by adding to these plans, as well as work to create new plans that will address a long-term recovery and resiliency framework. In instances where there are no existing plans, there will be a concerted effort to explore opportunities to create new plans that will address long-term recovery and resiliency framework as parish and local resources allow.

Building Codes, Permitting, Land Use Planning and Ordinances

Cameron Parish Government provides oversight for building permits and codes, land use planning, and all parish ordinances.

As of the 2026 update, Cameron Parish ensures that all adopted building codes are enforced and in compliance relating to the construction of any structure within the boundaries of the parish. Building permits are required prior to beginning any type of construction or renovation projects, installation of electrical wiring, plumbing or gas piping, moving manufactured/modular or portable buildings, and reroofing or demolitions.

The Cameron Parish Government is also responsible for enforcing the parish ordinances related to health and safety, property maintenance standards, and condemnation of unsafe structures.

The Cameron Parish Government meets regularly to consider any proposed ordinance changes, and to take final actions on proposed changes.

While local capabilities for mitigation can vary from community to community, the communities within the Cameron Parish planning area as a whole have a system in place to coordinate and share these capabilities through the OHSEP 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

Cameron Parish have administrative and technical capabilities in place that may be utilized in reducing hazard impacts or implementing hazard mitigation activities. Such capabilities include staff, skillset, and tools available in the community that may be accessed to implement mitigation activities and to effectively coordinate resources. The ability to access and coordinate these resources is also important. The table on the following page shows examples of resources in place.

Table 3-2: Administration and Technical Capabilities

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

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

The following financial resources are available to fund mitigation actions in the Cameron Parish planning area:

Table 3-3: Financial Capabilities

Financial		
Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.		
Funding Resources	**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	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 communities and the parish as a whole to maximize opportunities for implementation of activities through greater acceptance and consensus of the community.

Cameron Parish has existing education and outreach programs to implement mitigation activities, as well as 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:

Table 3-4: Education and Outreach Capabilities

Education and Outreach		
Identify education and outreach programs and methods, already in place that could be used to implement mitigation activities and communicate hazard-		
Program / Organization	**Yes / No**	
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Cameron Community Action Agency also assists with getting information to Head Starts and low income families
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	No	

As reflected with the above existing regulatory mechanisms, programs and resources within the parish, the communities within the Cameron Parish planning area remain committed to expanding and improving on the existing capabilities within the parish. Communities will work together along with Cameron Parish 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 parish, will enhance and expand overall risk reduction for the entirety of Cameron Parish.

Flood Insurance and Community Rating System

Participation in the CRS strengthens local capabilities by lowering flood insurance premiums for communities that exceed NFIP minimum requirements. As noted in the CRS Eligible Communities List effective April 1, 2025, Cameron parish does not participate in the CRS Program.

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

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

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

CLASS	DISCOUNT	CLASS	DISCOUNT
1	45%	6	20%
2	40%	7	15%
3	35%	8	10%
4	30%	9	5%
5	25%	10	–

SFHA (Zones A, AE, A1–A30, V, V1–V30, AO, and AH): Discount varies depending on class.

SFHA (Zones A99, AR, AR/A, AR/AE, AR/A1–A30, AR/AH, and AR/AO): 10% discount for Classes 1–6; 5% discount for Classes 7–9.*

Non-SFHA (Zones B, C, X, D): 10% discount for Classes 1–6; 5% discount for Classes 7–9.

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

As of April 2025, 318 communities in the State of Louisiana participate in the Federal Emergency Management Agency's National Flood Insurance Program (NFIP). Of these communities, 39 (or 12%) participate in the Community Rating System (CRS). Jefferson Parish, the City of Gretna in Jefferson Parish, and the City of Mandeville in St. Tammany Parish lead the state with a rating of Class 5, followed by the Cities of Kenner in Jefferson Parish, the City of Slidell in St. Tammany Parish, and East Baton Rouge Parish with a Class 6 Rating. Of the top fifty Louisiana communities, in terms of total flood insurance policies held by residents, 29 participate in the CRS. The remaining 21 communities present an outreach opportunity for encouraging participation in the CRS.

The CRS provides an incentive not just to start new mitigation programs, but to keep them going. There are two requirements that "encourage" a community to implement flood mitigation activities. Once the parish has obtained a CRS rating and is a participant, 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 1 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 for residents.

In 2011[1], the National Flood Insurance Program (NFIP) completed a comprehensive review of the Community Rating System (CRS) that resulted in the release of a new CRS Coordinator's Manual. The changes to the 2013 CRS Coordinator's Manual are the result of a multi-year program evaluation that included input from a broad group of contributors to evaluate the CRS and refine the program to meet its stated goals. The changes helped to drive new achievements in the following six core flood loss reduction areas important to the NFIP: (1) reduce liabilities to the NFIP Fund; (2) improve disaster resiliency and sustainability of communities; (3) integrate a Whole Community approach to addressing emergency management; (4) promote natural and beneficial functions of floodplains; (5) increase understanding of risk, and; (6) strengthen adoption and enforcement of disaster-resistant building codes.

Since the revision of the 2013 Coordinator's Manual, FEMA released the 2017 CRS Coordinator's Manual which continued the evolution of the CRS program and its mission to reward communities that prioritize mindful floodplain regulations. As with the 2013 manual, the changes made in the 2017 manual impact each CRS community differently. Some communities see an increase in the points they receive since points for certain activities have increased (e.g., Activity 420 Open Space Preservation). Other communities receive fewer points for certain activities (e.g., Activity 320 Map Information Service). It is likely that some communities with marginal CRS Class 9 programs have to identify new CRS credits in order to remain in the CRS class. Most notably, as it relates to this hazard mitigation plan, more credit was made available for Activity 410 Floodplain Mapping.

Typically, CRS communities do not request credit for all the activities they are currently implementing unless it would earn enough credit to advance the community to a higher CRS Class. A community that finds itself losing CRS credit with the 2017 manual could likely identify activities deserving credit they had not previously received. Due to the changes in both activities and CRS points, community CRS coordinators should speak with their ISO/CRS Specialist to understand how the 2017 manual will impact their community and when.

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.

---

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

3. A community can evaluate the effectiveness of its flood program against a nationally recognized benchmark.

4. Technical assistance in designing and implementing a number of activities is available at no charge from the Insurance Services Office.

5. The public information activities will build a knowledgeable constituency interested in supporting and improving flood protection measures.

6. A community would have an added incentive to maintain its flood programs over the years. The fact that its CRS status could be affected by the elimination of a flood related activity or a weakening of the regulatory requirements for new developments would be taken into account by the governing board when considering such actions.

7. Every time residents pay their insurance premiums, they are reminded that the community is working to protect them from flood losses, even during dry years.

NFIP Worksheets

Parish NFIP worksheets can be found in *Appendix E: State Required Worksheets*.

4. Mitigation Strategy

Introduction

The Hazard Mitigation Strategy for Cameron Parish has a common guiding principle and is the demonstration of the parish's 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.

Officials from the parish confirmed the goals, objectives, actions and projects over the period of the hazard mitigation plan update process. The mitigation actions and projects in this 2026 HMP update are a product of analysis and review of the Cameron Parish Hazard Mitigation Plan Planning Committee under the coordination of the Cameron Parish Office of Homeland Security and Emergency Preparedness. The committee was presented a list of projects and actions, new and from the 2021 plan, for review from March 2025 – August 2025.

Goals

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

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

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

The current goals of the Cameron Parish Hazard Mitigation Plan Update Planning Committee represent long-term commitments by the parish. After assessing these goals, the committee decided that the current remain valid.

The goals are as follows:

1. Reduce the loss of life or property
2. Protect critical public facilities and thoroughfares
3. Ensure post-disaster operability of strategic facilities and thoroughfares
4. Develop incentive and community outreach/education programs that assist homeowners in protecting residential properties
5. Provide a long term mitigation solution in locations which experience repetitive hazard damage
6. Provide a cooperative, inter-jurisdictional / inter-agency solution to a problem
7. Show development and implementation of comprehensive programs, standards, and regulations that reduce future hazard damage
8. Avoid inappropriate future development in areas that are vulnerable to hazard damage
9. Reduce the level of hazard vulnerability in existing structures and developed property
10. Restore or protect natural resources, recreational areas, open space, or other environmental values

The Mitigation Action Plan focuses on actions to be taken by Cameron Parish and its communities. All of the activities in the Mitigation Action Plan will be focused on helping the parish and its communities 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 Planning Committee 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.

2026 Mitigation Actions and Update on Previous Plan Actions

The Cameron Parish Hazard Mitigation Plan Planning Committee identified new actions that would reduce and/or prevent future damage within the Cameron Parish planning area. In that effort, the committee focused on a comprehensive range of specific mitigation actions. These actions were identified in thorough fashion by the consultant team and the committee by way of frequent and open communications and meetings held throughout the planning process. The addition of these new actions, coupled with any ongoing and/or carried over projects from their previous update, provide Cameron Parish with a solid mitigation strategy through which risk and losses will be reduced throughout the parish and its communities.

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.

Status updates for actions included in the previous plan can be found on the following pages. Additionally, new mitigation actions agreed upon by the parish are included.

Cameron Parish Mitigation Actions

Previous Action Update

Cameron Parish Mitigation Action Sheet						
Jurisdiction-Specific Action	**Action Description**	**Funding Source**	**Timeframe**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
CAM1: 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.	HMGP, FMA, Local	1-5 years	Cameron Parish Police Jury/Cameron Parish OHSEP	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones	Completed
CAM2: Drainage Improvements	Will relieve flooding problems, reduce flood damage and costs of damage, overtopping of roads with drain water, while also keeping open roadways during periods of high precipitation. Benefits: Relieves Parish or local government and property owners of the continual problems, with closed roadways (loss of function). Saves public funds for road repairs, drainage ditch repairs, sandbagging and blocking of roadways during storm periods.	HMGP, FMA, Local	1-5 years	Cameron Parish Police Jury/Cameron Parish OHSEP	Coastal Hazards, Flooding, Thunderstorms, Tropical Cyclones	Ongoing
CAM3: Mitigation of repetitive loss and severe repetitive loss properties and other hazard prone structures	Elevation, acquisition-demolition, acquisition-relocations, and reconstruction of repetitive loss or flooding or other hazard prone properties.	HMGP, FMA, Local	1-5 years	Cameron Parish Police Jury/Cameron Parish OHSEP	Coastal Hazards, Flooding, Thunderstorms, Tropical Cyclones	In Progress
CAM4: Safe Room Projects	Construction of a safe room for first responders located in Cameron Parish. Other locations will be identified based on funding availability.	HMGP, FMA, Local	1-5 years	Cameron Parish Police Jury/Cameron Parish OHSEP	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones, Wildfires	In Progress

CAM5: Education and Outreach	Enhance the public outreach programs for the parish and all communities by increasing awareness of risks and safety for Coastal Hazards, Flooding, Sinkholes, Thunderstorms, Tornadoes, Tropical Cyclones, 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.	HMGP, FMA, Local	1-5 years	Cameron Parish Police Jury/Cameron Parish OHSEP	Coastal Hazards, Drought, Excessive Heat, Flooding, Sinkholes, Thunderstorms Tornadoes, Tropical Cyclones, Wildfires	Ongoing
CAM6: Generators for continuity of operations and government	Procurement and Installation of generators at public facilities to ensure continued operations during and after events.	HMGP, FMA, Local	1-5 years	Cameron Parish Police Jury/Cameron Parish OHSEP	Drought, Excessive Heat, Flooding, Thunderstorms, Tornadoes, Tropical Cyclones	Completed
CAM7: Lightning Mitigation	Procurement and Installation of Lightning rods and surge protectors for public buildings to preserve life and property	HMGP, Local	1-5 years	Cameron Parish Police Jury/Cameron Parish OHSEP	Thunderstorms	Not Started – Carried Over (See Cameron Parish Mitigation Action1)
CAM8: Warning Systems	Update/upgrade public warning system components throughout Cameron Parish as necessary. Install audible and/or reverse 911 warning system(s)	HMGP, FMA, Local	1-5 years	Cameron Parish Police Jury/Cameron Parish OHSEP	Coastal Hazards, Drought, Excessive Heat, Flooding, Sinkholes, Thunderstorms Tornadoes, Tropical Cyclones, Wildfires	Ongoing
CAM9: Potable Water	Create redundancy of potable water supply to critical facilities, especially hospitals in Parish, and provide protection of potable water supply by acquisition/installation of backflow preventers at appropriate critical locations.	HMGP, FMA, Local	1-5 years	Cameron Parish Police Jury/Cameron Parish OHSEP	Coastal Hazards, Drought, Excessive Heat, Flooding, Sinkholes, Thunderstorms Tornadoes, Tropical Cyclones, Wildfires	Ongoing
CAM10: Promote Flood Insurance	Promote the purchase of flood insurance. Advertise the availability, cost, and coverage of flood insurance through the National Flood	HMGP, FMA, Local	1-5 years	Cameron Parish Police Jury/Cameron Parish OHSEP	Coastal Hazards, Flooding, Tropical Cyclones	Ongoing

	Insurance Program (NFIP).					
CAM11: Building Retrofits	Benefits: Reduces damage from high winds, and helps assure that the public buildings can be used, occupied and operable during or after storms.	HMGP, FMA, Local	1-5 years	Cameron Parish Public Works/Cameron Parish OHSEP	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones	Deleted - Duplicate of CAM1 Action
CAM12: Drainage Improvements	Ensure usability of roads and buildings that serve a public purpose such as government, healthcare, and school districts by retrofitting and improving drainage structures to reduce flood risk	HMGP, FMA, Local	1-10 years	Cameron Parish Public Works/Cameron Parish OHSEP	Coastal Hazards, Flooding, Thunderstorms, Tropical Cyclones	Deleted - Duplicate of CAM2 Action
CAM13: Elevation of Severe Repetitive Loss Properties	Mitigate parish flood damage by elevating homes and buildings throughout the parish.	HMGP, FMA, Local	1-5 years	Cameron Parish Public Works/Cameron Parish OHSEP	Coastal Hazards, Flooding, Thunderstorms, Tropical Cyclones	Deleted - Duplicate of CAM3 Action
CAM14: Safe Room Project	Construction of a safe room for first responders located in Cameron Parish.	HMGP, FMA, Local	1-10 years	Cameron Parish Public Works/Cameron Parish OHSEP	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones, Wildfires	Deleted - Duplicate of CAM4 Action
CAM15: Properties at Risk Study	Conduct and complete a study to determine the effects of risks to parish properties and implement a campaign to alert affected citizen of magnitude potential and provide mitigation suggestions.	HMGP, FMA, Local	1-5 years	Cameron Parish Police Jury/Cameron Parish OHSEP	Coastal Hazards, Drought, Excessive Heat, Flooding, Sinkholes, Thunderstorms Tornadoes, Tropical Cyclones, Wildfires	Ongoing
CAM16: Water Rationing Program Implementation	Implement water rationing program for times of drought	HMGP, Local	1-5 years	Cameron Parish Police Jury/Cameron Parish OHSEP	Drought, Wildfires	Not Started – Carried Over (See Cameron Parish Mitigation Action 2)
CAM17: Development of Drought and Excessive Heat Emergency Plan	Development and implementation of a long-term emergency plan for drought and excessive heat	HMGP, Local	1-5 years	Cameron Parish Police Jury/Cameron Parish OHSEP	Drought, Excessive Heat, Wildfires	Not Started – Carried Over (See Cameron Parish Mitigation Action 3)
CAM18: Reduction of Future Development	Reduce future development in floodplains and correct in appropriate development already in floodplains. This may includes modification of	HMGP, FMA, Local	1-5 years	Cameron Parish OHSEP, Local Agencies, Public Works	Coastal Hazards, Flooding, Tropical Cyclones	Not Started – Carried Over (See Cameron Parish

	codes, new zoning and ordinances.					Mitigation Action 4)
CAM19: Capitol Improvement Projects for Sabine River	Carry out long-range capital improvement projects to support implementation of projects recommended by the US Army Corps of Engineers related to the Sabine River in relation to drainage improvements	HMGP, FMA, Local	1-5 years	Cameron Parish Public Works/Cameron Parish OHSEP	Coastal Hazards, Flooding, Tropical Cyclones	Not Started – Carried Over (See Cameron Parish Mitigation Action 5)
CAM20: Generators and Communications Equipment for Essential Facilities	Purchase of generators and 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 essential personnel and citizens	HMGP, FMA, Local	1-5 years	Cameron Parish Public Works/Cameron Parish OHSEP	Drought, Excessive Heat, Flooding, Thunderstorms, Tornadoes, Tropical Cyclones	Deleted - Duplicate of CAM6 Action
CAM21: Education and Outreach for NFIP	Continue to promote the purchase of flood insurance. Advertise the availability, cost, and coverage of flood insurance through the NFIP. This enables homeowners to financially recover from the devastating effects of flooding as rapidly as possible. Serves to educate area residents that any homeowner, regardless of location, can purchase flood insurance.	HMGP, FMA, Local	1-5 years	Cameron Parish Public Works/Cameron Parish OHSEP	Coastal Hazards, Flooding, Tropical Cyclones	Deleted - Duplicate of CAM 10
CAM22: Potable Water Supplies to Critical Facilities	Create redundancy of potable water supply to critical facilities, especially hospitals in the parish, and provide protection of potable water supply by acquisition/installation of backflow preventers at appropriate critical locations in the unincorporated areas	HMGP, FMA, Local	1-5 years	Cameron Parish Public Works/Cameron Parish OHSEP	Coastal Hazards, Drought, Excessive Heat, Flooding, Sinkholes, Thunderstorms Tornadoes, Tropical Cyclones, Wildfires	Deleted - Duplicate of CAM9 Action
CAM23: Flood Proofing of Critical Facilities	Flood-proof critical structures within the parish unincorporated areas to help promote continuation of critical services during a storm event	HMGP, FMA, Local	1-5 years	Cameron Parish Police Jury/Cameron Parish OHSEP	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones	Deleted - Duplicate of CAM1 Action

CAM24: Enhanced Public Awareness Campaigns for All-Hazards	Increase public awareness of hazards and hazardous areas. Actions may include distribution of public awareness information regarding all hazards and potential mitigation measures; implementation of educational program for children and merchants;, providing public education on the importance of maintaining the ditches, promotion of the purchase of flood insurance for public. Sponsor a "Multi-Hazard Awareness Week", to educate the public on all hazards. Utilize social media for mass message distribution.	HMGP, FMA, Local	1-5 years	Cameron Parish Police Jury/Cameron Parish OHSEP	Coastal Hazards, Drought, Excessive Heat, Flooding, Sinkholes, Thunderstorms Tornadoes, Tropical Cyclones, Wildfires	Deleted - Duplicate of CAM5 Action
CAM25: Coastline Restoration Projects	Identify and implement coastline preservation and restoration projects that continue to protect the parish coastline from coastal hazards.	HMGP, FMA, Local	1-5 years	Cameron Parish Police Jury/Cameron Parish OHSEP	Coastal Hazards, Flooding, Tropical Cyclones	In Progress
CAM26: Elevate or acquire all RL and SRL structures in Cameron Parish in flood zones	Elevations parish wide of RL & SRL structures	HMGP, FMA, Local	1-5 years	Cameron Parish OHSEP/Grants Administrator	Coastal Hazards, Flooding, Thunderstorms, Tropical Cyclones	Deleted - Duplicate of CAM3 Action

New Mitigation Actions

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS CAMERON PARISH	
	DESCRIPTION
CAMERON PARISH MITIGATION ACTION 1	Lightning Mitigation
LEAD AGENCY	Cameron Parish Police Jury
SUPPORTING AGENCIES	Cameron Parish OHSEP
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, Local
ASSOCIATED GOALS	1. Reduce the loss of life or property 2. Protect critical public facilities and thoroughfares 5. Provide a long term mitigation solution in locations which experience repetitive hazard damage 9. Reduce the level of hazard vulnerability in existing structures and developed property
PRIORITY	Medium
Action Description	Procurement and Installation of Lightning rods and surge protectors for public buildings to preserve life and property
Type of Mitigation Action	Structure and Infrastructure Projects
How Action Aligns with Risk Reduction	Installation of lightning rods will help protect the physical structures of a facility and all operational functions maintained in said building.
Current Status of Action	Not Started – Carried Over from 2021 Plan
Hazard Addressed	Thunderstorms

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS CAMERON PARISH	
	DESCRIPTION
CAMERON PARISH MITIGATION ACTION 2	Water Rationing Program Implementation
LEAD AGENCY	Cameron Parish Police Jury
SUPPORTING AGENCIES	Cameron Parish OHSEP
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, Local
ASSOCIATED GOALS	1. Reduce the loss of life or property 3. Ensure post-disaster operability of strategic facilities and thoroughfares 6. Provide a cooperative, inter-jurisdictional / inter-agency solution to a problem 10. Restore or protect natural resources, recreational areas, open space, or other environmental values
PRIORITY	Medium
Action Description	Implement water rationing program for times of drought
Type of Mitigation Action	Local Plans and Regulations
How Action Aligns with Risk Reduction	Water rationing programs can set the standard for the amount of water that is to be saved for essential personnel/operations during a drought event. Water can be used to fight fires or to be distributed to vulnerable populations around the parish
Current Status of Action	Not Started – Carried Over from 2021 Plan
Hazard Addressed	Drought, Wildfires

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS CAMERON PARISH	
	DESCRIPTION
CAMERON PARISH MITIGATION ACTION 3	Development of Drought and Excessive Heat Emergency Plan
LEAD AGENCY	Cameron Parish Police Jury
SUPPORTING AGENCIES	Cameron Parish OHSEP
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, Local
ASSOCIATED GOALS	1. Reduce the loss of life or property 2. Protect critical public facilities and thoroughfares 3. Ensure post-disaster operability of strategic facilities and thoroughfares 4. Develop incentive and community outreach/education programs that assist homeowners in protecting residential properties 5. Provide a long term mitigation solution in locations which experience repetitive hazard damage 6. Provide a cooperative, inter-jurisdictional / inter-agency solution to a problem 7. Show development and implementation of comprehensive programs, standards, and regulations that reduce future hazard damage 8. Avoid inappropriate future development in areas that are vulnerable to hazard damage 9. Reduce the level of hazard vulnerability in existing structures and developed property 10. Restore or protect natural resources, recreational areas, open space, or other environmental values
PRIORITY	Medium
Action Description	Development and implementation of a long-term emergency plan for drought and excessive heat
Type of Mitigation Action	Local Plans and Regulations
How Action Aligns with Risk Reduction	An emergency plan tailored towards drought and excessive heat will allow officials to operate effectively and efficiently during this hazard event. This plan will reduce the risk of loss of life and property within the parish.
Current Status of Action	Not Started – Carried Over from 2021 Plan
Hazard Addressed	Drought, Excessive Heat, Wildfires

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS CAMERON PARISH	
	DESCRIPTION
CAMERON PARISH MITIGATION ACTION 4	Reduction of Future Development
LEAD AGENCY	Cameron Parish Police Jury
SUPPORTING AGENCIES	Cameron Parish OHSEP
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, FMA, Local
ASSOCIATED GOALS	4. Develop incentive and community outreach/education programs that assist homeowners in protecting residential properties 5. Provide a long term mitigation solution in locations which experience repetitive hazard damage 6. Provide a cooperative, inter-jurisdictional / inter-agency solution to a problem 7. Show development and implementation of comprehensive programs, standards, and regulations that reduce future hazard damage 8. Avoid inappropriate future development in areas that are vulnerable to hazard damage 9. Reduce the level of hazard vulnerability in existing structures and developed property
PRIORITY	Medium
Action Description	Reduce future development in floodplains and correct in appropriate development already in floodplains. This may include modification of codes, new zoning and ordinances.
Type of Mitigation Action	Local Plans and Regulations
How Action Aligns with Risk Reduction	Restricting the development in floodplains reduced the risk to flooding public and private property throughout the parish
Current Status of Action	Not Started – Carried Over from 2021 Plan
Hazard Addressed	Coastal Hazards, Flooding, Tropical Cyclones

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS CAMERON PARISH	
	DESCRIPTION
CAMERON PARISH MITIGATION ACTION 5	Capital Improvement Projects for the Sabine River
LEAD AGENCY	Cameron Parish Police Jury
SUPPORTING AGENCIES	Cameron Parish OHSEP
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, FMA, Local
ASSOCIATED GOALS	1. Reduce the loss of life or property 2. Protect critical public facilities and thoroughfares 5. Provide a long term mitigation solution in locations which experience repetitive hazard damage 9. Reduce the level of hazard vulnerability in existing structures and developed property 10. Restore or protect natural resources, recreational areas, open space, or other environmental values
PRIORITY	Medium
Action Description	Carry out long-range capital improvement projects to support implementation of projects recommended by the US Army Corps of Engineers related to the Sabine River in relation to drainage improvements
Type of Mitigation Action	Local Plans and Regulations
How Action Aligns with Risk Reduction	Implementation of drainage improvement projects for the Sabine River will reduce the risk of flooding throughout the parish
Current Status of Action	Not Started – Carried Over from 2021 Plan
Hazard Addressed	Coastal Hazards, Flooding, Tropical Cyclones

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS CAMERON PARISH	
	DESCRIPTION
CAMERON PARISH MITIGATION ACTION 6	Restrictions for Development and Relocation of CI in Sinkhole Areas
LEAD AGENCY	Cameron Parish Police Jury
SUPPORTING AGENCIES	Cameron Parish OHSEP
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, Local
ASSOCIATED GOALS	1. Reduce the loss of life or property 2. Protect critical public facilities and thoroughfares 5. Provide a long term mitigation solution in locations which experience repetitive hazard damage 9. Reduce the level of hazard vulnerability in existing structures and developed property
PRIORITY	Medium
Action Description	Reduce/restrict future development in areas within close proximity to sinkholes. The parish will also relocate all critical infrastructure located within the 2-mile buffer zone associated with identified salt domes.
Type of Mitigation Action	Local Plans and Regulations
How Action Aligns with Risk Reduction	Restricting the development and relocation of infrastructure in sinkhole hazard areas will reduce the risk of property damage
Current Status of Action	New
Hazard Addressed	Sinkholes

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS CAMERON PARISH	
	DESCRIPTION
CAMERON PARISH MITIGATION ACTION 7	Adopt and Enforce Up to Date Building Codes
LEAD AGENCY	Cameron Parish Police Jury
SUPPORTING AGENCIES	Cameron Parish OHSEP
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, FMA, Local
ASSOCIATED GOALS	1. Reduce the loss of life or property 2. Protect critical public facilities and thoroughfares 7. Show development and implementation of comprehensive programs, standards, and regulations that reduce future hazard damage 8. Avoid inappropriate future development in areas that are vulnerable to hazard damage 9. Reduce the level of hazard vulnerability in existing structures and developed property
PRIORITY	Medium
Action Description	The parish will adopt and enforce the most current edition of the International Building Code (IBC) and International Residential Code (IRC), as amended by the State of Louisiana.
Type of Mitigation Action	Local Plans and Regulations
How Action Aligns with Risk Reduction	Enforcing building code regulations will make existing and future development more sound and allow for the reduction of property loss and the risk to loss of life.
Current Status of Action	New
Hazard Addressed	Coastal Hazards, Flooding, Thunderstorms, Tornadoes, Tropical Cyclones

Action Prioritization

During the prioritization process, the planning 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. Therefore, many projects were prioritized with these factors in mind. In addition, prioritization of the mitigation actions was performed based on the following economic criteria: i) whether the action can be performed with the existing parish resources; ii) whether the action requires additional funding from external sources; and iii) relative costs of the mitigation actions.

In all cases, the committee 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 planning committee prioritized the possible activities that could be pursued. Planning committee members consulted appropriate agencies in order to assist with the prioritizations. The results were items that address the major hazards, are appropriate for those hazards, are cost-effective, and are affordable. The planning committee met internally for mitigation action meetings to review and approve mitigation actions for Cameron Parish. The parameters of action prioritization were determined based on impact, feasibility, strategic fit, and funding. When these parameters were defined, the community then made the decision on whether to deem certain actions as low, medium or high priorities. The parameters below defines the criteria for each prioritization rating.

- **High**
  - **Impact:** Addresses significant or ongoing risk to life, property or infrastructure
  - **Feasibility:** Implemented with existing capacity or minimal external support
  - **Strategic Fit:** Strong alignment with community goals & regulatory requirements
  - **Funding:** Requires minimal additional funding or has guaranteed financial support

- **Medium**
  - **Impact:** Provides meaningful benefits but is less critical
  - **Feasibility:** Feasible with moderate effort or interdepartmental coordination
  - **Strategic Fit:** Supports goals but is not essential to core objectives
  - **Funding:** May require new funding sources that are accessible but not guaranteed

- **Low**
  - **Impact:** Limited or speculative long-term benefit
  - **Feasibility:** Difficult to implement or requires complex coordination
  - **Strategic Fit:** Indirectly related to core planning goals
  - **Funding:** Depends on substantial, uncertain or competitive external funding

Cameron Parish and the incorporated 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. This plan is intended to offer priorities based on an examination of hazards.

******THIS PAGE LEFT INTENTIONALLY BLANK******

Appendix A: Planning Process

Purpose

The Hazard Mitigation Plan Update process prompts local jurisdictions to keep their hazard mitigation plan current and moving toward a more resilient community. The plan update builds on the research and planning efforts of previous plans while reviewing recent trends. The planning 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 Cameron Parish Hazard Mitigation Plan Update

The Cameron Parish Hazard Mitigation Plan Update process began in January 2025 with a series of emails, phone calls, meetings, and collaborations between the contractor (SDMI) and a diverse group of participating agencies and stakeholders. Update activities were intended to give each participating agency and stakeholder the opportunity to shape the plan to best fit their community's mitigation goals. Community stakeholders and the general public were invited to attend and contribute information to the planning process during specific time periods or meetings.

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

Date	Meeting or Outreach	Location	Public Invited	Purpose
3/14/2025	Kick Off Meeting	Phone Conference	No	Discuss with the Parish OHSEP Director expectations and requirements of the project. Discuss meeting schedules, committee make up, and next steps.
5/29/2025	Initial Planning Committee Meeting	Cameron, LA	No	Discuss with Cameron Parish Hazard Mitigation Planning Committee the process and expectations of plan participants. Discuss timeline and action items for parish
10/7/2025	Planning Committee Risk Assessment Review	Cameron, LA	Yes	Presentation of Risk Assessment and profiled hazards to Planning Committee.
10/7/2025	Public Meeting	Cameron, LA	Yes	Presentation of Risk Assessment s and profiled hazards to public. Presentation also includes current mitigation project highlights within communities and public survey discussion.
Ongoing during the plan update process	Public Opinion Survey	Online	Yes	This survey asked participants about public perceptions and opinions regarding natural hazards in Cameron Parish. In addition, questions covered the methods and techniques preferred for reducing the risks and losses associated with these hazards.

Planning

The plan update process consisted of several phases:

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

Coordination

The Cameron Parish Office of Homeland Security and Emergency Preparedness (OHSEP) oversaw the coordination of the 2026 Hazard Mitigation Plan Update Planning Committee during the update process. The parish OHSEP was responsible for identifying members for the committee. Representatives of relevant local and parish government departments were invited for inclusion in the planning process via email from SDMI and the Cameron Parish OHSEP Director. Cameron Parish identified and reached out, via email, to representatives of non-profits, local businesses and organizations, and private organizations that provide for the betterment and benefit of populations identified as socially vulnerable and work directly with communities that are deemed as underserved so that they could be involved in the entirety of this plan update process and participate as key stakeholders. Some directors of organizations contacted included the Council on Aging, and the local American Red Cross chapter. Both of these entities were able to be involved in the plan update process. There are no higher education institutions in Cameron Parish; therefore, no members of academia could be included in the planning process on a parish level. However, SDMI is an institution under the Louisiana State University system, so this plan update received constant feedback from academia personnel on LSU's campus. Therefore, LSU was able to be included for academic participation during the plan update process.

The Parish Director was responsible for inviting the planning committee and key stakeholders to scheduled meetings and activities via phone call and/or email. SDMI assisted the Parish Director with press releases and social media statements for notification to the media and general public for public meetings and public outreach activities.

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

Neighboring Community, Local and Regional Planning Process Involvement

From the outset of the planning process, the planning committee encouraged participation from a broad range of parish 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 planning meetings at the local and parish level
- Sharing local data and information with communities
- Incorporation of other planning documents, studies and efforts
- Action item development and action progress from 2021 update
- Risk Assessment review
- Plan document draft review
- Formal adoption of the Hazard Mitigation Plan

The Jefferson Davis and Vermilion Parish OHSEP Directors were invited to attend the Initial Planning and Risk Assessment Meetings for Cameron Parish in an effort to coordinate mitigation efforts where possible as neighboring communities. The Plaquemines and Orleans OHSEP Directors were invited via email and phone call to participate in an effort to collaborate with neighboring communities. SDMI assisted Cameron Parish with encouraging the collaboration with these neighboring communities via email by extending an invitation to the Cameron Parish Hazard Mitigation Plan Update Meetings.

As part of the coordination and planning process, the parish was provided the State Required Hazard Mitigation Plan Update Worksheet. The completed worksheets can be found in *Appendix E: State Required Worksheets*.

The 2026 Hazard Mitigation Plan Update Planning Committee consisted of representatives from the following parish, municipal or community stakeholders. Below is a detailed list of the 2026 HMPU Planning Committee:

Cameron Parish Hazard Mitigation Planning Committee			
Name	**Title**	**Agency**	**Email**
Danny Lavergne	Director	Cameron Parish OHSEP	OEP@cameronpj.org
Ashley Buller	Asst. Director	Cameron Parish OHSEP	abuler@cameronpj.org
Chris Savoie	Sheriff	Cameron Parish Sheriff's Office	chris@cameronso.org
Chris Rippetoe	Program Manager	LSU-SDMI	crippe2@lsu.edu
Jake McClain	Chief Deputy	Cameron Parish Sheriff's Office	jake@cameronso.org
Jason Martin	Emergency Management Analyst	LSU-SDMI	jmar293@lsu.edu
Kara Bonsall, CFM	Coastal Zone Director	Cameron Parish Police Jury	kbonsall@cameronpj.org
Katie Armentor	Administrator	Cameron Parish Police Jury	karmentor@cameronpj.org
Kim Montie	Director	Cameron Parish Port	kim@cameronparishport.com
Lennie Lafleur	HM Program Coordinator	GOHSEP	lennie.lafleur@la.gov
Scott Lavergne	Assessor	Cameron Parish Assessor's Office	scott@cameronassessor.org
Scott Miano	Asst. Maintenance Supervisor	Cameron Parish School Board	scott_miano@camsch.org
Shane Manuel	Public Works	Cameron Parish Police Jury	smanuel@cameronpj.org
Susan Racca	Clerk of Court	Cameron Parish Government	sracca@cameroncoc.com

Program Integration

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

A measure of integration and coordination is achieved through the HMPU participation of planning committee members and community stakeholders who administer programs such as: floodplain management under the

National Flood Insurance Program (NFIP), Community Rating System, parish planning and zoning and building code enforcement.

Since the last update in 2021, Cameron Parish has used the hazard mitigation plan as a reference point to various projects and mitigation strategies that take place throughout the planning area. Along with the mitigation actions outlined for each parish, Cameron Parish has used vulnerability statistics and integration strategies within the plan to help guide their mitigation practices. The strategies and practices in this plan update build upon the practices that have been used since the previous update. Those strategies and practices can be found in various sections throughout the risk assessment that address climate change, vulnerable populations, and future development trends. Furthermore, the parish has held and will continue to hold annual meetings to discuss any changes that have occurred within the parish that could alter the vulnerability of Cameron Parish, and how to combat any issues that have arisen within the means and regulations of the hazard mitigation plan.

Cameron Parish will continue to integrate the requirements of this Hazard Mitigation Plan into other local planning mechanisms that are to be identified through future meetings of the parish, and through the five-year review process described in *Appendix B: Plan Maintenance*. The primary means for integrating mitigation strategies into other local planning mechanisms will be through the revision, update and implementation of any individual municipal plans that require specific planning and administrative tasks (e.g. risk assessment, plan amendments, ordinance revisions, capital improvement projects, etc.).

The members of the Cameron Parish Hazard Mitigation Planning Committee will remain charged with ensuring that the goals and strategies of new and updated local planning documents for their communities 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 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 2021 Hazard Mitigation Plan was also used in the planning process. Other existing data and plans used in the planning process include those listed below.

- Parish Emergency Operations Plan
- Stormwater Management Plan
- Flood Insurance Rate Maps
- State of Louisiana Hazard Mitigation Plan

Further information on the plans can be found in *Section 3: Capability Assessment*.

Meeting Documentation and Public Outreach Activities

The following pages contain documentation of the meetings and public outreach activities conducted during this hazard mitigation plan update.

Meeting #1: Hazard Mitigation Plan Update Kick-Off

Date: March 14, 2025

Location: Conference Call

Purpose: Discuss with the Parish OHSEP Director expectations and requirements of the project. Discuss meeting schedules, committee make up, and next steps.

Public Invitation: No

Meeting Invitees:

Cameron Parish Hazard Mitigation Planning Committee		
Name	**Title**	**Agency**
Danny Lavergne	Director	Cameron Parish OHSEP
Ashely Buller	Asst. Director	Cameron Parish OHSEP
Lauren Morgan	Associate Director	LSU-SDMI
Chris Rippetoe	Program Manager	LSU-SDMI
Jason Martin	Emergency Management Analyst	LSU-SDMI
Lennie Lafleur	HM Program Coordinator	GOHSEP
Marion Pearson	HM Program Coordinator	GOHSEP
Amy Michiels	Regional Coordinator	GOHSEP

Meeting #2: Hazard Mitigation Plan Update Initial Planning Committee Meeting

Date: May 29, 2025

Location: Cameron, LA

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

Public Invitation: No

Meeting Invitees:

Cameron Parish Hazard Mitigation Planning Committee		
Name	**Title**	**Agency**
Danny Lavergne	Director	Cameron Parish OHSEP
Ashley Buller	Asst. Director	Cameron Parish OHSEP
Chris Savoie	Sheriff	Cameron Parish Sheriff's Office
Chris Rippetoe	Program Manager	LSU-SDMI
Jake McClain	Chief Deputy	Cameron Parish Sheriff's Office
Jason Martin	Emergency Management Analyst	LSU-SDMI
Kara Bonsall, CFM	Coastal Zone Director	Cameron Parish Police Jury
Katie Armentor	Administrator	Cameron Parish Police Jury
Kim Montie	Director	Cameron Parish Port
Lennie Lafleur	HM Program Coordinator	GOHSEP
Scott Lavergne	Assessor	Cameron Parish Assessor's Office
Scott Miano	Asst. Maintenance Supervisor	Cameron Parish School Board
Shane Manuel	Public Works	Cameron Parish Police Jury
Susan Racca	Clerk of Court	Cameron Parish Government

Meeting #3: Hazard Mitigation Plan Update Planning Committee Risk Assessment Review

Date: October 7, 2025

Location: Cameron, LA

Purpose: Presentation of Risk Assessment hazards and maps to Planning Committee.

Public Invitation: No

Meeting Invitees:

Cameron Parish Hazard Mitigation Planning Committee		
Name	**Title**	**Agency**
Danny Lavergne	Director	Cameron Parish OHSEP
Ashley Buller	Asst. Director	Cameron Parish OHSEP
Chris Savoie	Sheriff	Cameron Parish Sheriff's Office
Chris Rippetoe	Program Manager	LSU-SDMI
Jake McClain	Chief Deputy	Cameron Parish Sheriff's Office
Jason Martin	Emergency Management Analyst	LSU-SDMI
Kara Bonsall, CFM	Coastal Zone Director	Cameron Parish Police Jury
Katie Armentor	Administrator	Cameron Parish Police Jury
Kim Montie	Director	Cameron Parish Port
Lennie Lafleur	HM Program Coordinator	GOHSEP
Scott Lavergne	Assessor	Cameron Parish Assessor's Office
Scott Miano	Asst. Maintenance Supervisor	Cameron Parish School Board
Shane Manuel	Public Works	Cameron Parish Police Jury
Susan Racca	Clerk of Court	Cameron Parish Government

Meeting #4: Hazard Mitigation Plan Update Public Meeting

Date: October 7, 2025

Location: Cameron, LA

Purpose: The Public Meeting allowed the public and community stakeholders to participate and provide input into the hazard mitigation planning process. The public meeting notice on the following page was presented to stakeholders as well as the general public, including those in underserved communities and those populations deemed as socially vulnerable. This notice was distributed via email as well as posted on the front door of the courthouse. This public meeting was also open to many different representatives from private, local community-based organizations and businesses, and non-profits that provide for the betterment of socially vulnerable populations.

Public Invitation: Yes

Meeting Invitees:

Cameron Parish Hazard Mitigation Planning Committee		
Name	**Title**	**Agency**
Danny Lavergne	Director	Cameron Parish OHSEP
Ashley Buller	Asst. Director	Cameron Parish OHSEP
Chris Savoie	Sheriff	Cameron Parish Sheriff's Office
Chris Rippetoe	Program Manager	LSU-SDMI
Jake McClain	Chief Deputy	Cameron Parish Sheriff's Office
Jason Martin	Emergency Management Analyst	LSU-SDMI
Kara Bonsall, CFM	Coastal Zone Director	Cameron Parish Police Jury
Katie Armentor	Administrator	Cameron Parish Police Jury
Kim Montie	Director	Cameron Parish Port
Lennie Lafleur	HM Program Coordinator	GOHSEP
Scott Lavergne	Assessor	Cameron Parish Assessor's Office
Scott Miano	Asst. Maintenance Supervisor	Cameron Parish School Board
Shane Manuel	Public Works	Cameron Parish Police Jury
Susan Racca	Clerk of Court	Cameron Parish Government

Meeting Announcement:

CAMERON PARISH OFFICE OF HOMELAND SECURITY & EMERGENCY PREPAREDNESS

PUBLIC MEETING ANNOUNCEMENT

Cameron Parish and its partners are seeking community input for the 2026 Cameron Parish Hazard Mitigation Plan update!

Cameron Parish OHSEP, in partnership with The Louisiana Governor's Office of Homeland Security and Emergency Preparedness and the Stephenson Disaster Management Institute at LSU, is leading the process to update the Cameron Parish Hazard Mitigation Plan. The plan describes the **naturally occurring** risks to the region and outlines strategies to reduce these risks to save lives, reduce property damage, and lessen the impact of future disasters.

Are you passionate about building a more resilient future for your parish? Do you have questions about the natural hazards that threaten your community? Please join us on Tuesday, October 7th for a public meeting at 11:00 AM to learn more about the plan and share your input on the risks and vulnerabilities that most impact you and your community.

Meeting Location:
Cameron Parish Police Jury
148 Smith Cir.
Cameron, LA 70631

Residents of Cameron Parish are asked to participate in a survey about public perceptions and opinions regarding natural hazards in the parish. The survey results will be used in the development of the plan. This short web-based survey can be found at the following link or by scanning the QR code:

https://lsu.qualtrics.com/jfe/form/SV_88EBWgRGEG5umkC

The Parish appreciates your input.

If you have questions, please contact the Cameron Parish OHSEP.

Outreach Activity #1: Public Opinion Survey

Date: Ongoing throughout planning process
Location: Web survey
Public Invitation: Yes

An online public opinion survey of Cameron Parish residents was conducted between March 2025 – October 2025. The survey was designed to capture public perceptions and opinions regarding natural hazards in the Cameron Parish planning area. In addition, the survey collected information regarding the methods and techniques preferred by the respondents for reducing the risks and losses associated with local hazards.

This activity was created in an effort to confirm that the goals and action items developed by the Cameron Parish Hazard Mitigation Plan Planning Committee are representative of the outlook of the community at large. However, because there was minimal public input, this public feedback could not be incorporated into the plan. The Cameron Parish survey can be found at the following link:

https://lsu.qualtrics.com/jfe/form/SV_88EBWgRGEG5umkC

Outreach Activity #2: Public Meeting Activity - Incident Questionnaire

Date: October 7, 2025
Location: Public Meeting
Public Invitation: Yes

An incident/issue questionnaire was provided at the public meeting in an effort to collect additional information from residents of Cameron Parish regarding hazard events and their localized impacts. While the information collected via the questionnaire was to be integrated into this planning document, no members of the public filled out the incident questionnaire at the public meeting. A copy of the incident questionnaire can be found on the next page.

Outreach Activity #3: 2026 Cameron Parish Hazard Mitigation Plan Public Review

Date: Ongoing
Location: SDMI Hazard Mitigation Website
Public Initiation: Yes

After an initial review by the Cameron Parish Planning Committee was completed, the 2026 Cameron Parish Hazard Mitigation Plan was made available for public review and comment. The plan was hosted on SDMI's Hazard Mitigation website: https://hmplans.sdmi.lsu.edu/Home/Parish/cameron

CAMERON PARISH PUBLIC OUTREACH

PUBLIC ACTIVITY: INCIDENT/ ISSUE QUESTIONNAIRE

1. HAZARD TYPE(S):

A. COASTAL HAZARDS
B. DROUGHT
C. EXCESSIVE HEAT
D. FLOODING
E. SINKHOLES
F. THUNDERSTORMS
G. TORNADOES
H. TROPICAL CYCLONES
I. WILDFIRES

2. DESCRIBE INCIDENT OR ISSUE:

3. LOCATION:

A. CITY:

B. ADDRESS OR AREA:

4. INTENSITY:

A. DEPTH (FLOODING) OR SIZE (HAIL ETC.):

B. WIND STRENGTH

5. RECURRING OR ONE TIME:

A. IF RECURRING, HOW OFTEN:

6. WHAT TYPE OF INTERRUPTIONS DOES/DIDTHE INCIDENT OR ISSUE CAUSE? (BUSINESS CLOSURE,DAMAGE, EVACUATION, ETC.)

7.HOW LONG WAS THE INTERRUPTION (HOURS, DAYS, WEEKS ETC.)

8. HOW COULD THIS HAZARD OR IMPACT BE PREVENTED, FIXED OR ALLEVIATED?

******THIS PAGE LEFT INTENTIONALLY BLANK******

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."

Implementing, Monitoring, Evaluating, and Updating the Plan

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

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

Responsible Parties

Cameron Parish has developed a method to ensure that a regular review and update of this Hazard Mitigation Plan occurs. This will be the responsibility of the planning committee, which consists of representatives from governmental organizations, local businesses, and private citizens, who will be involved in the process of monitoring, evaluating and updating the plan. All committee members in this plan will remain active in the planning committee.

Although the people filling the positions may change from year to year, the parish and its stakeholders will have representatives on the planning committee. The future planning committee will continue to be comprised of the same job functions as currently evident in the planning committee. However, the decision of specific job duties will be left to the Parish OHSEP Director to be assigned as deemed appropriate.

Methods for Monitoring and Evaluating the Plan and Plan Evaluation Criteria

Cameron Parish has developed a method to ensure implementation, monitoring, evaluating, and updating of the HMP occurs during the five-year cycle of the plan. Implementation will be accomplished through constant and transparent efforts to network and highlight the multi-objective, win-win benefits of each project proposed in the *Mitigation Strategy* section. These efforts include the routine actions of monitoring agendas, attending meetings, and promoting a safe and resilient community. The planning committee will seek to become a permanent body and will be responsible for monitoring, evaluating, and updating of the plan. The planning committee meeting will be held annually in order to monitor, evaluate, and update the plan. The Cameron Parish OHSEP Director will be responsible for conducting the annual planning committee meetings.

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

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

1) Whether the action was implemented and reasons, if the action was not implemented

2) What were the results of the implemented action

3) Were the outcomes as expected, and reasons if the outcomes were not as expected

4) Did the results achieve the stated goals and objectives

5) Was the action cost-effective

6) What were the losses avoided after completion of the project

7) In case of a structural project, did it change the hazard profile

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

1) Any local staffing changes that would warrant inviting different members to the planning committee

2) Any new organizations that would be valuable in the planning process or project implementation need to be included in the planning committee

3) Any new or existing procedures that can be done more efficiently

4) Any additional ways to gain more diverse and widespread cooperation

5) Any different or additional funding sources available for mitigation planning and implementation

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

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

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

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

2026 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 2026 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 Cameron Parish Hazard Mitigation Plan Planning Committee to determine additional implementation procedures when appropriate. This may include integrating the requirements of the Cameron Parish Hazard Mitigation Plan into each planning documents, processes, or mechanisms as follows:

- Ordinances, Resolutions, Regulations
- Floodplain Ordinances
- Master Plans
- Comprehensive Economic Development Strategy
- Emergency Operations Plans/Evacuation Planning
- Continuity of Operations Plans

Opportunities to integrate the requirements of this plan into other local planning mechanisms will continue to be identified through future meetings of the Cameron Parish Hazard Mitigation Planning 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 individual plan that require specific planning and administrative tasks (e.g. risk assessment, plan amendments, ordinance revisions, capital improvement projects, etc.).

During the planning process for new and updated local planning documents at the parish level, such as a risk assessment, comprehensive plan, capital improvements plan, or emergency operations plan, Cameron Parish 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 planning mechanisms, the development and maintenance of this stand-alone Hazard Mitigation Plan is deemed by the planning committee to be the most effective and appropriate method to ensure implementation of Parish and local hazard mitigation actions.

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

Cameron Parish		
Plan/Ordinance/Action	**Update Frequency**	**Lead Agency**
Comprehensive Master Plan	Updated annually	Cameron Parish Government
Comprehensive Economic Development Strategy	Updated annually	Cameron Parish Government
Continuity of Operations Plan	Updated as needed	Cameron Parish OHSEP
Emergency Operations Plan/ Evacuation Planning	Updated annually	Cameron Parish 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: Critical Facilities

Critical Facilities within Cameron Parish

Cameron Parish Planning Area Critical Facilities										
Type	**Name**	**Coastal Hazards**	**Drought**	**Excessive Heat**	**Flooding**	**Sinkholes**	**Thunderstorms**	**Tornadoes**	**Tropical Cyclones**	**Wildfires**
Civil Government	Cameron Parish West Annex Building	X	X	X	X		X	X	X	
	Cameron Parish Clerk of Court and Jail	X	X	X	X		X	X	X	X
	Cameron Parish East Annex Building	X	X	X	X		X	X	X	X
Fire & SAR	Cameron Parish Fire District 1 - Marshall Station	X	X	X	X		X	X	X	X
	Muria Fire Station	X	X	X	X		X	X	X	
	Grand Chenier Fire District 9	X	X	X	X		X	X	X	X
	Hackberry Fire Department	X	X	X	X	X	X	X	X	X
	Hackberry Fire Station	X	X	X	X	X	X	X	X	X
	Cameron Parish Waterworks and Fire Department	X	X	X	X		X	X	X	
	Holly Beach Fire Station District 10	X	X	X	X		X	X	X	
	Grand Lake VFD - Engine 2	X	X	X	X	X	X	X	X	X
	Grand Lake Fireman's Center	X	X	X	X	X	X	X	X	X
	Grand Lake VFD - Engine 3	X	X	X	X		X	X	X	
	Grand Lake VFD - Engine 4	X	X	X	X		X	X	X	
	Lowry Fire Station	X	X	X	X		X	X	X	
	Creole Fire Department	X	X	X	X		X	X	X	
Law Enforcement	Cameron Parish Law Enforcement Complex/Sheriff's Office	X	X	X	X		X	X	X	X
	CPSO - Hackberry Substation	X	X	X	X	X	X	X	X	X
	CPSO - Sweet Lake Substation	X	X	X	X		X	X	X	
Public Health	Cameron Parish Health Unit	X	X	X	X		X	X	X	
Education	Grand Lake Elementary/High School	X	X	X		X	X	X	X	X
	Hackberry Highschool	X	X	X	X	X	X	X	X	
	Johnson Bayou Highschool	X	X	X	X		X	X	X	
	South Cameron High School	X	X	X	X		X	X	X	

******THIS PAGE LEFT INTENTIONALLY BLANK******

Appendix D: Plan Adoption

FEMA Approval Letter

******THIS SECTION TO BE COMPLETED FOLLOWING THE APPROVAL OF THE PLAN BY FEMA******

GOHSEP Approval Letter

Cameron Parish

Appendix E: State Required Worksheets

During the planning process (Appendix A: Planning Process), the Hazard Mitigation Plan Update Planning Committee was provided state-required plan update process worksheets to be filled out. The worksheets were presented at the Initial Planning Meeting by SDMI as tools for assisting in the update of the Hazard Mitigation Plan, but also as a state requirement for the update. The plan update worksheets allowed for collection of information such as planning team members, community capabilities, community infrastructure, vulnerable populations and NFIP information. The following pages contain documentation of the state required worksheets.

Mitigation Planning Team

Cameron Parish Hazard Mitigation Planning Committee			
Name	**Title**	**Agency**	**Email**
Danny Lavergne	Director	Cameron Parish OHSEP	OEP@cameronpj.org
Ashley Buller	Asst. Director	Cameron Parish OHSEP	abuler@cameronpj.org
Chris Savoie	Sheriff	Cameron Parish Sheriff's Office	chris@cameronso.org
Chris Rippetoe	Program Manager	LSU-SDMI	crippe2@lsu.edu
Jake McClain	Chief Deputy	Cameron Parish Sheriff's Office	jake@cameronso.org
Jason Martin	Emergency Management Analyst	LSU-SDMI	jmar293@lsu.edu
Kara Bonsall, CFM	Coastal Zone Director	Cameron Parish Police Jury	kbonsall@cameronpj.org
Katie Armentor	Administrator	Cameron Parish Police Jury	karmentor@cameronpj.org
Kim Montie	Director	Cameron Parish Port	kim@cameronparishport.com
Lennie Lafleur	HM Program Coordinator	GOHSEP	lennie.lafleur@la.gov
Scott Lavergne	Assessor	Cameron Parish Assessor's Office	scott@cameronassessor.org
Scott Miano	Asst. Maintenance Supervisor	Cameron Parish School Board	scott_miano@camsch.org
Shane Manuel	Public Works	Cameron Parish Police Jury	smanuel@cameronpj.org
Susan Racca	Clerk of Court	Cameron Parish Government	sracca@cameroncoc.com

Capability Assessment

Capability Assessment Worksheet - Cameron Parish		
Local mitigation capabilities are existing authorities, polices and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible.		
Planning and Regulatory		
Please indicate which of the following plans and regulatory capabilities your jurisdiction has in place.		
Plans	**Yes / No**	
Comprehensive / Master Plan	Yes	Parish has a Coastal Restoration Committee to update yearly
Capital Improvements Plan	No	
Economic Development Plan	Yes	Comprehensive Economic Development Strategy
Local Emergency Operations Plan	Yes	Yearly
Continuity of Operations Plan	Yes	
Transportation Plan	No	Evacuation Planning
Stormwater Management Plan	No	
Community Wildfire Protection Plan	No	
Other plans (redevelopment, recovery, coastal zone management)	No	
Building Code, Permitting and Inspections	**Yes / No**	
Building Code	Yes	I CODES 2012
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	
Fire Department ISO/PIAL rating	5	
Site plan review requirements	No	
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	No	
Administration and Technical		
Identify whether your community has the following administrative and technical capabilities. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, indicate so in your comments.		
Administration	**Yes / No**	
Planning Commission	No	
Mitigation Planning Committee	No	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	
Mutual Aid Agreements	Yes	

Staff	Yes / No	
Chief Building Official	Yes	
Floodplain Administrator	Yes	
Emergency Manager	Yes	
Community Planner	No	
Civil Engineer	No	
GIS Coordinator	Yes	
Grant Writer	Yes	
Other	No	
Technical	**Yes / No**	
Warning Systems / Service (Reverse 911, outdoor warning signals)	Yes	
Hazard Data & Information	No	
Grant Writing	No	
Hazus Analysis	No	
Other	No	
Financial		
Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.		
Funding Resources	**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	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	Cameron Community Action Agency also assists with getting information to Head Starts and low income families
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	No	

Building Inventory

Cameron Parish Owned Building Inventory								
Name of Building	**Purpose of Building**	**Address**	**City**	**Latitude**	**Longitude**	**Assessed Value**	**Date Built**	**Construction Type**
Ambulance Station 5	Ambulance	122 Smith Lane	Lake Charles	30.01395618	-93.19579444			
Ambulance Station 7	Ambulance	127 Brister Lane	Lake Charles	29.99052664	-93.25435875			
Cameron FD No.1 - Marshall Station	Fire Station	449 Marshall Street	Cameron	29.79692017	-93.32254519	210,000	12/16/2009	Reinforced Masonry
Cameron Multi Purpose	Recreational	122 Recreation Center Lane	Cameron	29.80071503	-93.3234242	257,625	8/20/2012	Metal
Cameron Parish Clerk of Court and Jail	office	119 Smith Circle	Cameron	29.79850004	-93.32495411	648,000	1937	Reinforced Masonry
Cameron Parish East Annex Building	office	110 Smith Circle	Cameron	29.79799747	-93.32465071	435,300	1/8/2010	Reinforced Masonry
Cameron Parish Health Unit	Medical Office	107 Recreation Center	Cameron	29.79796033	-93.32456576	90,000	3/2/2009	Reinforced Masonry
Cameron Parish Law Enforcement Complex/Sheriff's Office	Law Enforcement	124 Recreation Center Lane	Cameron	29.80069901	-93.32342693			Reinforced Masonry
Cameron Parish Port Office	office	180 Henry Street	Cameron	29.7985815	-93.32345619	90,300	12/5/2012	Reinforced Masonry
Cameron Parish Waterworks and Fire Department	Fire Station	6246 Gulf Beach Hwy	Johnson Bayou	29.76297472	-93.69157231	157,358	10/8/2012	Metal
Cameron Parish West Annex Building	office	148 Smith Circle	Cameron	29.79872156	-93.32568033	713,250	8/14/2012	Reinforced Masonry
Cameron Waterworks	office	126 Ann Street	Cameron	29.79662989	-93.31594502	41,038	9/7/2006	Metal
Correctional Facility	office	124 Recreation Center Lane	Cameron	29.80071503	-93.3234242	1,672,800	4/9/2015	Reinforced Masonry
CPSO - Hackberry Substation	Law Enforcement	983 Main Street	Hackberry	29.99474555	-93.35310852	7,500	unknown	Reinforced Masonry
CPSO - Sweet Lake Substation	Law Enforcement	299 Rita Dr	Bell City	29.99302371	-93.09124951			Reinforced Masonry
Creole Ambulance Station	Ambulance	137 Oliver Road	Creole	29.80788041	-93.16673497			
Creole Community Center & Fire Station	Fire Station	184 E Creole Hwy B	Creole	29.81501137	-93.10565475	15,120	5/16/2009	Metal
East Cameron Maintenance Facility	Maintenance Building	153 LeBlanc Road	Creole	29.79092876	-93.21464826	305,379	5/20/2009	Metal
Grand Chenier Ambulance Station	Ambulance	117 Crain Lane	Grand Chenier	29.76031159	-92.94064658			

Grand Chenier Fire District 9	Fire Station	4011 Grand Chenier	Grand Chenier	29.75164314	-92.9059906	210,000	5/30/2008	Reinforced Masonry
Grand Chenier Library	Library	2863 Grand Chenier Hwy	Grand Chenier	29.76725241	-92.97649077	90,375	12/11/2012	Metal
Grand Chenier Maint. Barn	Maintenance Building	205 Recreation	Grand Chenier	29.75351626	-92.90011302	25,313	9/14/2007	Metal
Grand Chenier Recreation	recreational	113 Recreation Lane	Grand Chenier	29.75026314	-92.90028031	100,000	10/22/2010	Metal
Grand Lake Conference Center	office	10098 Gulf Hwy	Grand Lake	30.03933788	-93.21318808	7,914	2/4/2013	Metal
Grand Lake Elementary/High School	Education	1039 LA-384	Grand Lake	30.01654713	-93.18841294			Reinforced Masonry
Grand Lake Fire Station	Fire Station	957 Hwy 384B	Grand Lake	30.01637205	-93.1939934	39,077	12/20/2023	Metal
Grand Lake Library	Library	10200 Gulf Hwy	Grand Lake	30.02390203	-93.21325088	22,553	8/16/2012	Metal
Grand Lake Recreation	Recreational	108 Recreation Lane	Grand Lake	30.01616938	-93.18549475	100,000	unknown	Metal
Grand Lake VFD - Engine 2	Fire Station	158 Big Pasture Road	Big Lake	30.00922058	-93.24646925	14,100	9/17/2009	Metal
Grand Lake VFD - Engine 3	Fire Station	142 Mhires Lane	Bell City	29.99711292	-93.05889544	14,100	unknown	Metal
Grand Lake VFD - Engine 4	Fire Station	961 Granger Lane	Grand Lake	30.04962952	-93.2318338	3,750	unknown	Metal
Grand Lake Waterworks	office	111 Dennis Lane	Bell City	30.02010712	-93.12988419	21,547	8/1/1999	Metal
Hackberry Ambulance Station 6	Ambulance	979 Main Street	Hackberry	29.99334919	-93.36493036			
Hackberry Community Center	Recreational	1250B Recreation Lane	Hackberry	29.99484321	-93.36384726	269,000	7/1/2018	Metal
Hackberry Fire Department	Fire Station	1025 Main Street	Hackberry	29.98896778	-93.36706282	559,125	11/5/2017	Metal
Hackberry Fire Station	Fire Station	110 Volunteer Lane	Hackberry	29.99621944	-93.34248455	35,100	3/15/2010	Metal
Hackberry High School	Education	1390 School St	Hackberry	29.98338554	-93.37457609			Reinforced Masonry
Hackberry Library	Library	613 Main Street	Hackberry	29.99515	-93.35324	1,362,183	3/10/2023	Reinforced Masonry
Hackberry Maint Barn	Maintenance Building	105 Parish Road	Hackberry	29.99316712	-93.36540215	51,000	unknown	Metal
Hackberry Multi Purpose Building	Recreational	986 Main Street	Hackberry	29.99457407	-93.36486658	75,000	unknown	Metal
Hackberry Recreation Center	Recreational	1250A Recreation Lane	Hackberry	29.98469191	-93.38766727	100,000	unknown	Metal
Hackberry Waterworks	office	1190 Main Street	Hackberry	29.98679907	-93.36776116	52,136	11/1/2007	Metal
Holly Beach Ambulance Station 9	Ambulance	2416 Heron Street	Cameron	29.7713949	-93.4548789			

Holly Beach Fire Station District 10	Fire Station	6051 Holly Beach Fire	Johnson Bayou	29.77796698	-93.4644392	208,500	11/4/2011	Metal
Johnson Bayou Ambulance Station	Ambulance	153 Berwick Roa	Cameron	29.76899232	-93.7027574			
Johnson Bayou High School	Education	6304 Gulf Beach Hwy	Cameron	29.76346113	-93.69735579			Reinforced Masonry
Johnson Bayou Library	Library	4586 Gulf Beach Hwy	Johnson Bayou	29.76192064	-93.58238668	98,700	11/3/2010	Reinforced Masonry
Johnson Bayou Maint. Barn	Maintenance Building	881 Smith Ridge	Johnson Bayou	29.7835502	-93.7002218	34,904	9/14/2007	Metal
Johnson Bayou Multi Purpose Building	Recreational	5556 Gulf Beach Hwy	Johnson Bayou	29.76212328	-93.6434109	210,000	7/10/2008	Metal
Johnson Bayou Recreation Center	Recreational	135 Berwick Road	Johnson Bayou	29.76899575	-93.70099915	200,000	5/22/2013	Metal
Klondike Barn	Maintenance Building	440 Veterans Memorial Dr.	Gueydan	30.0254761	-92.50974428	25,220	11/20/2014	Metal
Little Chenier Fire Garage	Fire Station	3289 Little Chenier Road	Creole	29.82367	-92.90233	$ 45,993.00	12/20/2023	Metal
Lowry Fire Station	Fire Station	460 Lowry Hwy	Lake Arthur	30.02425052	-92.78195889	18,000	7/15/2011	Metal
Muria Fire Station	Fire Station	129 Muria Road	Creole	29.82279407	-92.99919387	243,958	8/13/2012	Reinforced Masonry
North Cameron Emergency Operations Center	SAR	963 LA-384	Lake Charles	30.01631	-93.19375	$ 3,000,000.0 0	9/1/2025	Reinforced Masonry
Rockefeller Fire Garage	Fire Station	5520 Grand Chenier Hwy	Grand Chenier	29.72866	-92.81502	$ 31,217.00	12/20/2023	Metal
South Cameron Fire Garage	Fire Station	322 Lebleu Camp Road	Creole	29.783363	-93.23105	$ 91,623.00	12/21/21	Metal
South Cameron High School	Education	753 Oak Grove Hwy	Grand Chenier	29.78596035	-93.10659865			Reinforced Masonry

Vulnerable Populations

Vulnerable Populations Worksheet - Cameron Parish					
All Hospitals (Private or Public)					
Name	**Address**	**City**	**Zip Code**	**Latitude**	**Longitude**
South Cameron Memorial Hospital	5360 West Creole Hwy	Cameron	70631	29.80820752	-93.16557286
Cameron Parish Health Unit	137 Oliver Rd	Cameron	70631	29.80784725	-93.16665427
Johnson Bayou Rural Health	6240 Gulf Beach Hwy	Cameron	70631	29.76315263	-93.69077701
Nursing Homes (Private or Public)					
Nursing Homes (Private or Public)	**Address**	**City**	**Zip Code**	**Latitude**	**Longitude**
No Nursing Homes in Cameron Parish					
Mobile Home Parks					
Mobile Home Parks	**Address**	**City**	**Zip Code**	**Latitude**	**Longitude**
Hebert Trailer Park	207 Hebert Trailer Park Rd	Grand Lake	70607	30.0109511	-93.22670573
Shandy Acres	1471 Hwy 384	Grand Lake	70607	30.01711853	-93.16025546
Twin Oaks Trailer Park	111 Twin Oaks Rd	Grand Lake	70607	30.02250837	-93.21321425

National Flood Insurance Program (NFIP)

National Flood Insurance Program (NFIP) - Cameron Parish	
Insurance Summary	
How many NFIP polices are in the community? What is the total premium and coverage?	# of Policies: 849; Total Premiums: $1,328,191; Total Coverage: $245,460,000
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?	# of Paid claims: 3,749; Total amount of paid claims: $214,098,703; Substantial Damage: 1,742
How many structures are exposed to flood risk with in the community?	
Describe any areas of flood risk with limited NFIP policy coverage.	
Staff Resources	
Is the Community FPA or NFIP Coordinator certified?	
Is flood plain management an auxiliary function?	
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	
What are the barriers to running an effective NFIP program in the community, if any?	
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:** 01/30/2024; **CAC:** 05/07/2021
Is a CAV or CAC scheduled or needed? If so when?	No
Regulation	
When did the community enter the NFIP?	**E=** 06/12/1970; **R=** 09/04/1970
Are the FIRMs digital or paper?	Digital
When did the community adopt the latest FIRM?	11/16/2012
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Meets
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?	