2025 ST. CHARLES PARISH HAZARD MITIGATION PLAN

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ST. CHARLES PARISH

HAZARD MITIGATION PLAN UPDATE

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

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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 St. Charles 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 St. Charles 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 and Rita environment in south Louisiana.

The St. Charles Parish Hazard Mitigation Plan is a single jurisdiction plan. This Hazard Mitigation Plan is a comprehensive plan for disaster resiliency in St. Charles 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 St. Charles Parish and its communities with a blueprint for reducing the impacts of these natural hazards on people and property.

Geography, Population and Economy

Geography

St. Charles Parish is located in southeastern Louisiana. It is bisected entirely by the Mississippi River, which runs mostly west to east through the Parish. This creates the odd situation in which the northern half of the Parish is referred to as the "East Bank" and the southern half of the Parish is referred to as the "West Bank." St. Charles Parish is bordered by St. John the Baptist Parish to the west, Lafourche Parish to the south, Jefferson Parish to the east, and Lake Pontchartrain to the north. The Parish encompasses 410 square mile of mostly flat land. According to the U.S. Geological Survey, elevations in the Parish range from approximately less than one foot to 20 feet above sea level.

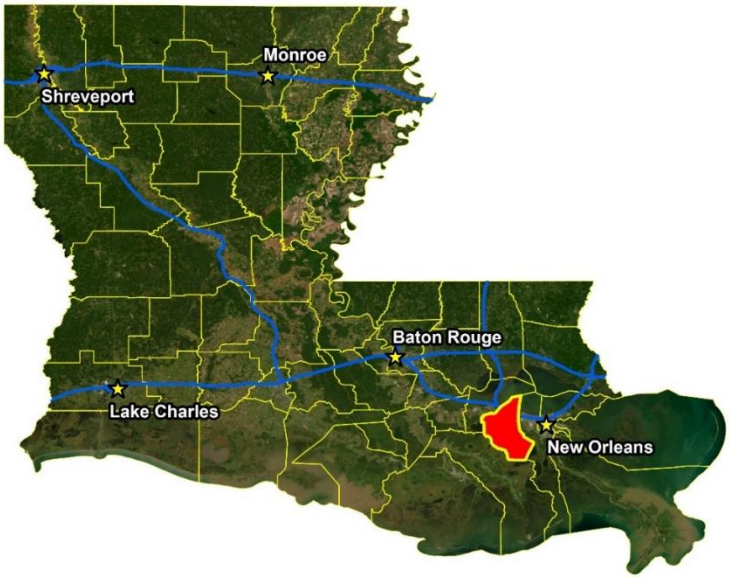


Figure 1-1: Location of St. Charles Parish

St. Charles 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. The average annual temperature for the state as a whole is 68ºF. January is typically the coldest month for Louisiana, averaging approximately 54ºF, while July is typically the warmest at an average of 83ºF. Winter months are usually mild with cold spells of short duration. For St. Charles Parish in particular, the summer months are usually quite warm, with an average daily maximum temperature in July and August of 92°F. Winters are typically mild. Snowfall averages less than one inch per year. Average annual rainfall for the area is 63 inches. St. Charles 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 Mexico, 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.

St. Charles Parish is located in Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) Region 3 (*Figure 1-3*).

As noted above, St. Charles Parish is located in the south-east region of Louisiana.

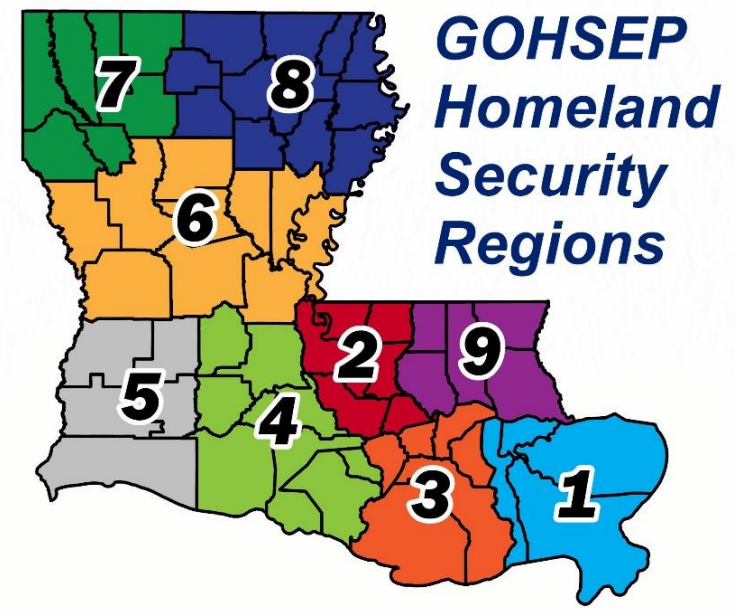


Figure 1-2: Louisiana Homeland Security Regions

Population

The population of St. Charles Parish is estimated at 50,998 (2023 estimate) with a population percent change from April 1, 2010 – July 1, 2019 of 1.96%.

Table 1-1: St. Charles Parish Population
(Source: US Census)

	2010 Census	2020 Census	2023 Estimate	Percent Change 2010 -2023
Total Population	52,780	52,549	50,998	-3.49%
Population Density (Pop/Sq. Mi.)	190	189.2	183.6	-3.49%
Total Households	---	18,591	19,212	---
Persons Per Household	---	2.78	---	---

Economy

St. Charles Parish is part of the New Orleans metropolitan area. It is located approximately 25 miles from New Orleans and approximately 70 miles from Baton Rouge, allowing businesses to take advantage of these nearby markets.

Due to its proximity to the Gulf of Mexico and the large reserves of natural gas and oil that can be found in the Parish, St. Charles Parish's economy is dominated by the energy and petrochemical industries. The largest sectors of the economy are manufacturing, services, and construction. Recently, however, the Parish has diversified its economy by attracting transportation and technology- related companies, along with an ever-growing retail trade expansion. Government employment also plays a major role in St. Charles Parish's economy. Almost 15 percent of all workers in the Parish are employed by the government at some level.

Industry data for business patterns in St. Charles Parish can be found in the table on the following page.

Table 1-2: St. Charles 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	6	12,812	117
Utilities	18	143,032	1,129
Construction	82	85,945	1,391
Manufacturing	41	608,740	4,714
Wholesale trade	88	124,787	1,800
Retail trade	115	38,880	1,420
Transportation and warehousing	90	202,558	2,853
Information	10	4,987	97
Finance and insurance	60	33,396	546
Real estate and rental and leasing	30	25,850	413
Professional, scientific, and technical services	99	81,476	1,212
Management of companies and enterprises	4	30,206	303
Administrative and support and waste management and remediation services	60	43,414	1,260
Educational services	8	3,765	150
Health care and social assistance	75	95,242	2,009
Arts, entertainment, and recreation	20	2,768	231
Accommodation and food services	76	14,301	1,075
Other services (except public administration)	88	19,442	496

Hazard Mitigation

To fully understand hazard mitigation efforts in St. Charles 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, however, post-disaster revision is a vital component of improving mitigation. Each hazardous event affords an opportunity to reduce the consequences of future occurrences.

Unfortunately, this cycle can be painful for a community. For instance, the risks of disasters that could create catastrophic incidents in Louisiana were thought to be relatively well-understood prior to 2005. However, the impact of the 2005 hurricane season on the Gulf Coast region of the United States prompted a new level of planning and engagement related to disaster response, recovery, and hazard mitigation. Hurricanes Katrina and Rita hit three weeks apart and together caused astonishing damage to human life and to property. The two storms highlighted a hurricane season that spawned 28 storms—unparalleled in American history. The 2005 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 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 2025 St. Charles Parish Hazard Mitigation Plan (HMP) maintains much of the information from the 2020 plan version in regard to the profiling of natural hazards, however; this update does not carry over pre-existing information about hazardous materials that were profiled in the 2020 plan. The 2025 St. Charles HMP now reflects the order and methodologies of the 2019 Louisiana State Hazard Mitigation Plan.

The sections in the 2020 St. Charles HMP were as follows:

- Section 1 Introduction
- Section 2 Parish Profile
- Section 3 Planning Process
- Section 4 Risk Assessment
- Section 5 Mitigation Strategy
- Section 6 Community Capabilities
- Section 7 Plan Maintenance Procedures
- Section 8 Action Plan
- Appendix A Action Ranking Criteria
- Appendix B Critical Facility Tabular Data
- Appendix C Meeting Materials and Sign-in Sheets
- Appendix D FEMA Approval Documents

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 St. Charles Parish Hazard Mitigation Steering Committee was not ignorant or dismissive of the successful analysis and mitigation planning executed in previous plan updates. This plan update remains coherent with those documents, retaining language and content when needed, deleting it when appropriate, and augmenting it when constructive.

2025 Plan Update

This 2025 plan update proceeds with the previous goals of the St. Charles Parish Hazard Mitigation Plan. The current goals are as follows:

1. Reduce losses to existing and future property due to hazards
   a) Target FEMA/NFIP repetitive loss structures for property protection measures
   b) Evaluate existing regulations that might impact the vulnerability of property and persons to hazards and how well those regulations are enforced
   c) Improve the ability of property owners in hazard areas to undertake mitigation actions
   d) Enhance the Parish's information base to support future hazard mitigation planning
   e) Reduce the impacts of hazards on St. Charles Parish through structural measures
   f) Increase the capacity of the Parish to use existing infrastructure in an efficient manner
   g) Protect the continuity of important Parish records
   h) Increase public awareness of potential damages to property from natural hazards

2. Protect the health and well-being of the people of St. Charles Parish from the negative effects of hazards
   a) Increase awareness of appropriate actions to take in the case of a hazard event
   b) Seek effective and efficient methods and technology for notifying residents of hazards and severe weather events

3. Ensure the ability of emergency services provides and facilities, including essential facilities, to continue operating during hazard events
   a) Enhance property protection measures at emergency services facilities and other critical facilities
   b) Evaluate the interdependencies between emergency service provides during hazard events

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 2023. 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 2025 plan update is organized a different format than that of the 2020 plan update. The changes to the plans format are detailed below and on the following page:

- 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
- Appendix F CRS Activity 510

Table 1-3: 2025 Plan Update Crosswalk

Plan Update Crosswalk	
2020 Update	**2025 Update**
Section 1: Introduction; Section 2: Parish Profile	Section 1: Introduction
Section 4: Risk Assessment	Section 2: Hazard Identification and Risk Assessment
Section 6: Community Capabilities	Section 3: Capability Assessment
Section 5: Mitigation Strategy; Section 8: Action Plan; Appendix A: Action Ranking Criteria	Section 4: Mitigation Strategy
Section 3: Planning Process; Appendix C: Meeting Materials and Sign-in Sheets	Appendix A: Planning Process
Section 7: Plan Maintenance Procedures	Appendix B: Plan Maintenance
Appendix B: Critical Facility Tabular Data	Appendix C: Critical Facilities
Appendix D: FEMA Approval Letter and Plan Adoption Documents	Appendix D: Plan Adoptions
---	Appendix E: State Required Worksheets
---	Appendix F: CRS Activity 510

Despite changes in this plan update, the plan remains consistent in its emphasis on the few types of hazards that pose the most risk to loss of life, injury, and property in St. Charles Parish. The extent of this risk is dictated primarily by its geographic location. Most significantly, St. Charles 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 damage from high winds and wind-borne debris caused by various meteorological phenomena. The 2016 flooding events, along with the 2020 hurricane season were both felt heavily in all parts of St. Charles Parish. Other hazards threaten the parish 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 31 years (1993 – 2023) to determine the future probability and frequency of a hazard occurring when data was 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 contain 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 27 years (1996 – 2023) 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 hurricane 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 2019 Hazard Mitigation Plan for the parish and the state of Louisiana's 2019 Hazard Mitigation Plan. Typically, unless otherwise noted in the plan, all hazards previously identified in the parish's 2019 Hazard Mitigation Plan and all hazards in the state of Louisiana's 2019 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 2020 Plan	Considered Medium or High Risk in the State's HM Plan	Profiled in the 2025 Update
Coastal Hazards	X		X
Drought	X		X
Excessive Heat	X		X
Flooding	X	X	X
Levee Failure	X		X
Saltwater Intrusion	X		X
Thunderstorms (Hail, Lightning, & Thunderstorm Wind)	X	X	X
Tornadoes	X	X	X
Tropical Cyclones	X	X	X
Wildfires	X		X
Winter Weather	X		X

Historical Context and Previous Occurrences

The following table and figures display past Presidential Declaration occurrences and provides background on the type of natural disasters that have affected the parish in the past.

Table 2-2: Major Disaster Declarations in St. Charles Parish.

Disaster Number	Year	Declaration
208	9/10/1965	Tropical Cyclone – Hurricane Betsy
315	10/13/1971	Tropical Cyclone – Hurricane Edith
374	4/27/1973	Severe Storms and Flooding
616	4/9/1980	Severe Storms and Flooding
752	11/1/1985	Tropical Cyclone – Hurricane Juan
849	11/22/1989	Severe Storms and Flooding
904	5/3/1991	Severe Storms, Tornadoes, and Flooding
956	8/26/1992	Tropical Cyclone – Hurricane Andrew
1049	5/10/1995	Severe Storms and Flooding
1246	9/23/1998	Tropical Cyclone – Hurricane Georges/TS Frances
1380	6/11/2001	Tropical Cyclone – TS Allison
1435	9/27/2002	Tropical Cyclone – TS Isidore

Disaster Number	Year	Declaration
1437	10/3/2002	Tropical Cyclone – Hurricane Lili
3172	2/1/2003	Loss of Space Shuttle Columbia
1548	9/15/2004	Tropical Cyclone – Hurricane Ivan
1601	8/23/2005	Tropical Cyclone – TS Cindy
1603	8/29/2005	Tropical Cyclone – Hurricane Katrina
1607	9/24/2005	Tropical Cyclone – Hurricane Rita
1786	9/2/2008	Tropical Cyclone – Hurricane Gustav
3322	5/6/2011	Flooding
4015	8/18/2011	Flooding
4080	8/29/2012	Tropical Cyclone – Hurricane Isaac
4277	8/14/2016	Severe Storms and Flooding
3392	10/6/2017	Tropical Cyclone – TS Nate
4345	10/16/2017	Tropical Cyclone – TS Harvey
4458	8/27/2019	Tropical Cyclone – Hurricane Barry
4484	3/24/2020	COVID-19 Pandemic
3527	6/7/2020	Tropical Cyclone – Tropical Storm Cristobal
3538	8/23/2020	Tropical Cyclone – Tropical Storms Laura and Marco
4559	8/28/2020	Tropical Cyclone – Hurricane Laura
3543	9/14/2020	Tropical Cyclone – Hurricane Sally
4570	10/16/2020	Tropical Cyclone – Hurricane Delta
3549	10/27/2020	Tropical Cyclone – Tropical Storm Zeta
3556	2/18/2021	Severe Winter Storm
4590	3/9/2021	Severe Winter Storms
3568	8/27/2021	Tropical Cyclone – TS Ida
4611	8/29/2021	Tropical Cyclone – Hurricane Ida
3574	9/13/2021	Tropical Cyclone – Tropical Storm Nicholas

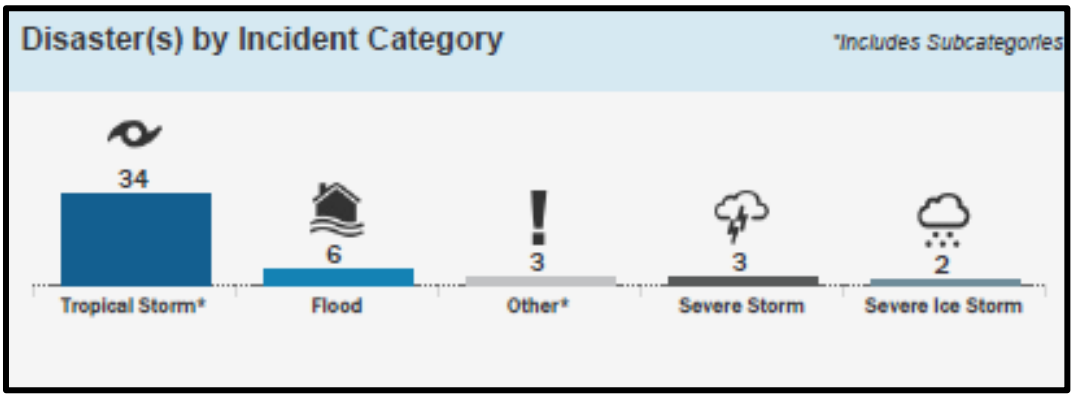


Figure 2-1: Presidential Disaster Declarations for the Parish by Disaster Type Since 1950. (Source: FEMA Disaster Declarations Summary: Open Government Dataset)

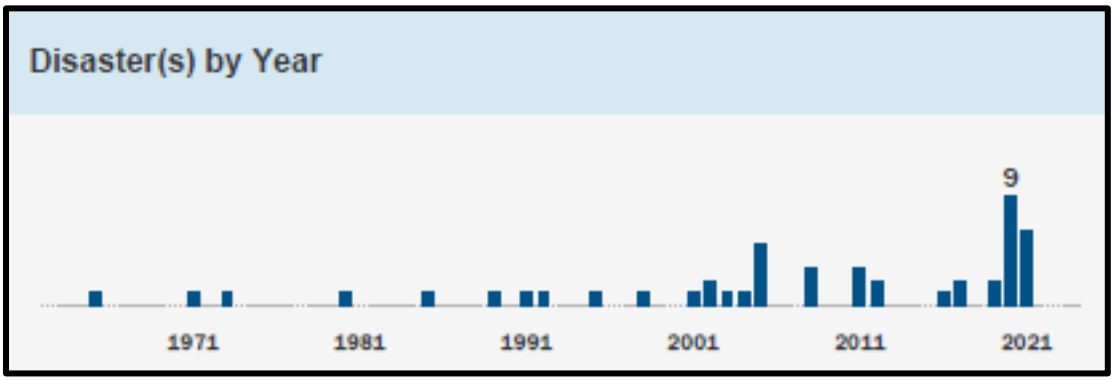


Figure 2-2: Total Presidential Disaster Declarations Yearly Totals for the Parish from 1950 to 2023. (Source: FEMA Disaster Declarations Summary: Open Government Dataset)

Probability of Future Threats and Hazards

The probability of each hazard occurring in the parish is estimated in the following table:

Table 2-3: Probability of Future Hazard Reoccurrence in St. Charles Parish.

Hazard	Probability
Coastal Hazards	100%
Drought	32%
Excessive Heat	79%
Flooding	100%
Levee Failure	< 1%
Saltwater Intrusion	100%
Thunderstorm Hail	100%
Thunderstorm Lightning	7%
Thunderstorm Winds	100%
Tornadoes	54%
Tropical Cyclones	100%
Wildfires	< 1%
Winter Weather	11%

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

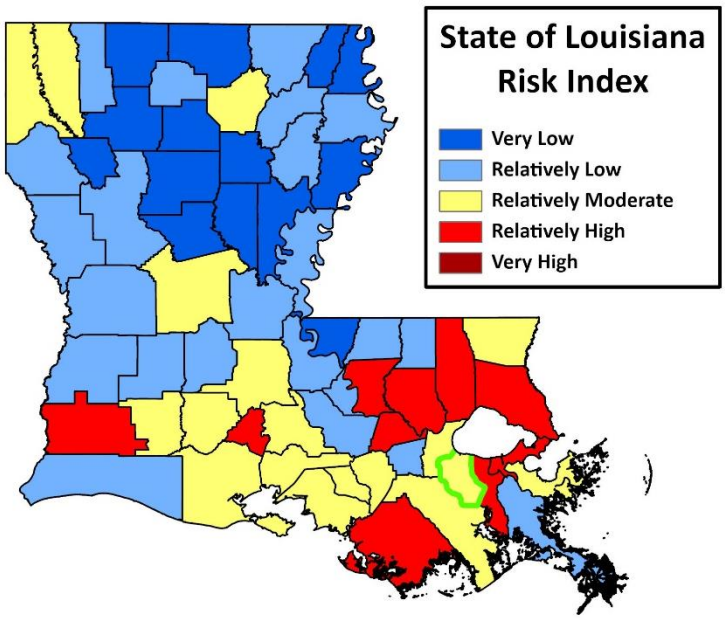
The quantitative methodology consists of utilizing Hazus, a geographic information system (GIS)-based loss estimation software available from the Federal Emergency Management Agency (FEMA), as well as a detailed GIS-based approach independent of the Hazus software. These two GIS-based studies together 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 to include 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:

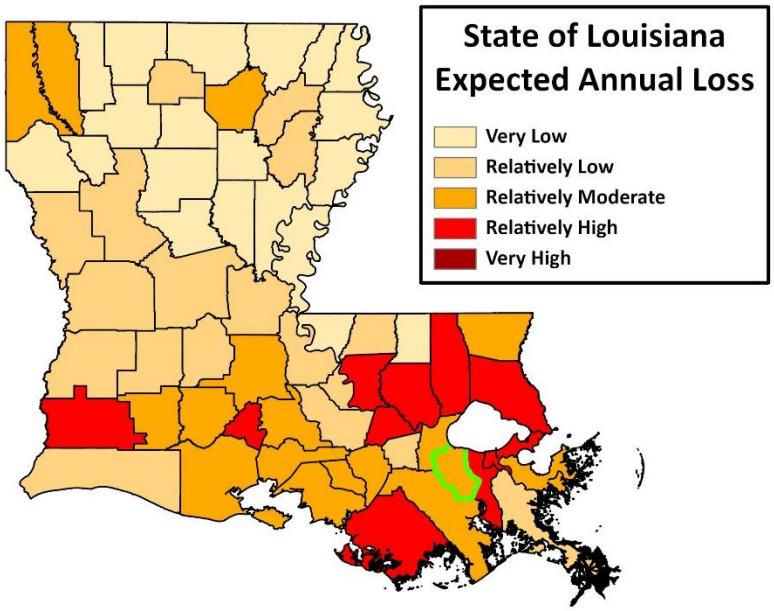
Expected Annual Loss = Exposure * Annualized Frequency * Historic Loss Ratio

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

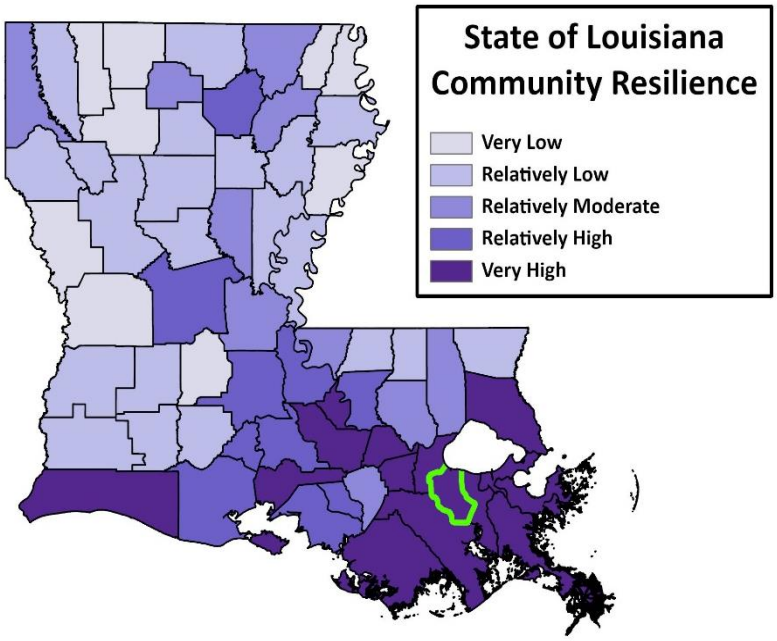
St. Charles Parish has a Community Risk Index Rating of "Relatively Moderate," when compared to the rest of the US. The parish has a community risk index score of **90.33/100.00**. When compared to the state of Louisiana, the parish has a risk index score of **75.00/100.00.** The natural hazards that contributed to a higher overall risk index score include Coastal and Riverine Flooding, Thunderstorms, Tornadoes, and Tropical Cyclones.



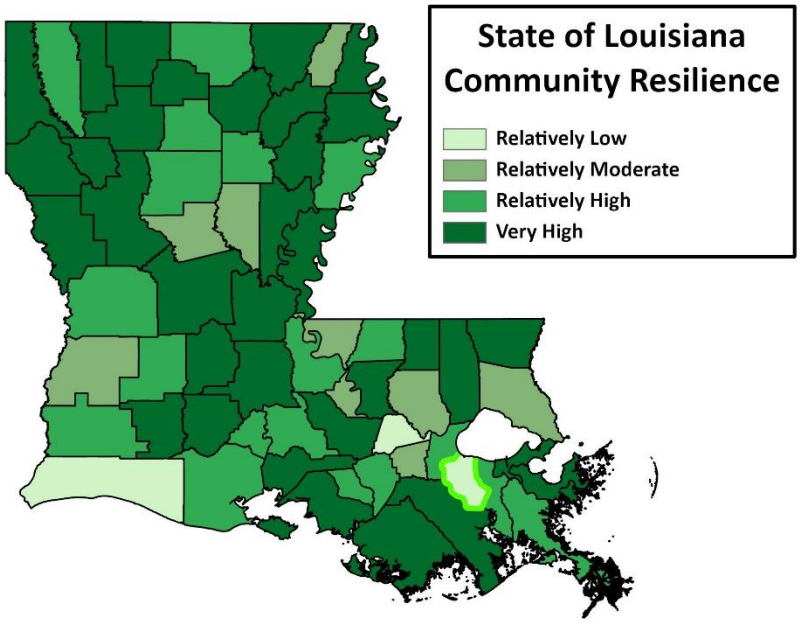
St. Charles Parish has an Expected Annual Loss rating, in relation to natural hazards, of "Relatively Moderate" when compared to the rest of the US. The parish has an Expected Annual Loss rating of **91.43/100.00.** When compared to the state of Louisiana, the parish has a risk index score of **79.70/100.00.** Again, the natural hazards that account for the most expected annual loss are Coastal and Riverine Flooding, Thunderstorms, Tornadoes, and Tropical Cyclones.



St. Charles Parish has a Community Resilience rating of "Very High" when compared to the rest of the US. A "Very High" Community Resilience Rating indicates that St. Charles Parish has an advanced ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from "disruptions" when compared to the rest of the US. These Community Resilience values are measured via the *University of South Carolina's Hazard and Vulnerability Research Institute Baseline Resilience Indicators for Communities (HVRI BRIC).* Some indicators include human well-being, economic/financial assets, infrastructure, governance, community capacity, natural resources, and overall environmental conditions. Based on all the above factors and characteristics, St. Charles Parish has a Community Resilience rating of **99.97/100.00** when compared to the entire US. When compared to the state of Louisiana, St. Charles Parish has a Community Resilience rating of **100.00/100.00.** St. Charles ranks first in the state of Louisiana and second in the entire United States for Community Resilience.



St. Charles Parish has a Social Vulnerability Rating of "Relatively Low" when compared to the rest of the US. When communities have a Relatively Moderate or High Social Vulnerability rating, the area may be susceptible to adverse impacts brought about by natural hazards. Factors regarding social vulnerability include poverty, lack of transportation, persons per household, etc. For a more in depth look into social vulnerability statistics on St. Charles Parish, refer to the *Socially Vulnerable Populations* section on the following pages. The parish has a Social Vulnerability rating of **31.57/100.00** when compared to the US. When compared to the state of Louisiana, the parish has a Social Vulnerability rating of **3.1/100.00.** These scores are the second best in the state of Louisiana, ranking behind only Cameron Parish.



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 employ 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 table on the next page. 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 on the next page displays the overall risk associated with each 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 subsequent 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 St. Charles Parish.

Hazard	Probability	Impact	Spatial Extent	Warning Time	Duration	Overall Risk
Coastal Hazards	4	2	4	2	3	**3.05**
Drought	3	2	4	2	3	**2.8**
Excessive Heat	3	2	4	1	2	**2.5**
Flooding	4	4	3	4	3	**3.65**
Levee Failure	1	3	4	1	3	**2.4**
Saltwater Intrusion	4	3	2	1	4	**2.9**
Thunderstorm Hail	4	2	3	3	1	**2.7**
Thunderstorm Lightning	2	2	2	3	1	**2**
Thunderstorm Winds	4	2	3	3	1	**2.7**
Tornadoes	3	3	2	4	3	**2.95**
Tropical Cyclones	4	4	4	1	4	**3.55**
Wildfires	1	3	4	1	2	**2.25**
Winter Weather	3	4	4	1	2	**3**

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

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

Socially Vulnerable Populations

The following tables illustrate at risk populations in St. Charles Parish compared to the United States as a whole. The data displayed below was taken directly from Headwater Economics, via a social vulnerability tool titled *Neighborhoods at Risk.* This tool was created to help communities identify specific areas that may be adversely impacted by ongoing climate change and other natural hazard events.

Based on the parish, reliability of the information presented becomes a factor. To combat misinformation and skewed values when dealing with socially vulnerable populations, the U.S. Census Bureau along with Headwater Economics, has denoted values by color and given them a reliability denotation. Any values in **black** are denoted as "high reliability". This means that error in data based off of the sampling size for that specific population is relatively small and should not be cause for concern. Any values in **orange** are denoted as "medium reliability". This means that values could be skewed based off of the sampling size being inaccurately examined. Populations and values in orange should be interpreted with caution. Any values in **red** are denoted as "low reliability". This means that population values and data taken from the census are very unreliable as the sample size included for this data incorporation were very small or insufficient. An emphasis has been placed on values in red in that anyone using them for studies, local plans and regulatory measures, or projects, should consult the respective community for a more comprehensive evaluation of said population(s). *Neighborhoods at Risk* also cites a data limitation to any community with less than 1,000 people residing in it. (US Census Beau 2021, Headwater Economics)

Additionally, there are some limitations to the data that is provided below. Families in poverty are based upon the amount families within the identifiable area. Rental units, mobile homes, and households with no car are based upon the amount of housing units within the identifiable area. People who do not speak English well is based upon the population of the identifiable area who are five years of age or older. People without a high school degree are based upon the population of the identifiable area who are 25 years of age or older. All other indicators used to identify neighborhoods at risk are based upon the identifiable area's total population. For reference to populations with specific limitations, the table on the following page illustrates the population sample size used to evaluate their respective areas, not the total number of people a specific indicator applies to.

Table 2-8: Limiting Factors in Neighborhoods at Risk

Limiting Factors in Neighborhoods at Risk – Population Sample Size (2022)		
Indicators 2022*	**St. Charles Parish**	**United States**
Families in poverty	13,859	80,755,759
Rental units, mobile homes, households with no car	18,591	124,010,992
People who do not speak English well	49,352	310,302,360
People without a high school degree	35,224	225,152,317
Total Population	**52,191**	**329,725,481**

**The American Community Survey Office (ACS) estimates values over a 5-year period. 2022 indicators represent average statistics from 2018-2022.*

Table 2-9: Socially Vulnerable Populations in St. Charles Parish

Neighborhoods at Risk – St. Charles Parish				
Indicators 2022*	**St. Charles Parish Population**	**St. Charles Parish Percentage**	**U.S. Percentage**	**Percentage Difference (St. Charles vs U.S.)**
People under 5 years	2,839	5.4%	5.9%	-9%
People over 65 years	7,513	14.4%	16.0%	-11%
People of color (including Hispanic)	18,655	35.7%	40.6%	-13%
People who do not speak English well	639	1.3%	4.1%	-104%
People without a high school degree	3,279	9.3%	11.1%	-18%
Families in poverty	1,037	7.5%	8.9%	-17%
Housing units that are rentals	3,242	17.4%	35.4%	-68%
Housing units that are mobile homes	1,674	9.0%	5.2%	54%
Households with no cars	620	3.3%	8.3%	-86%
People with disabilities	7,987	15.5%	12.6%	21%
People without health insurance	3,140	6.1%	8.5%	-33%
Population of St. Charles Parish: *52,191*				

Inventory of Assets for the Entire Parish

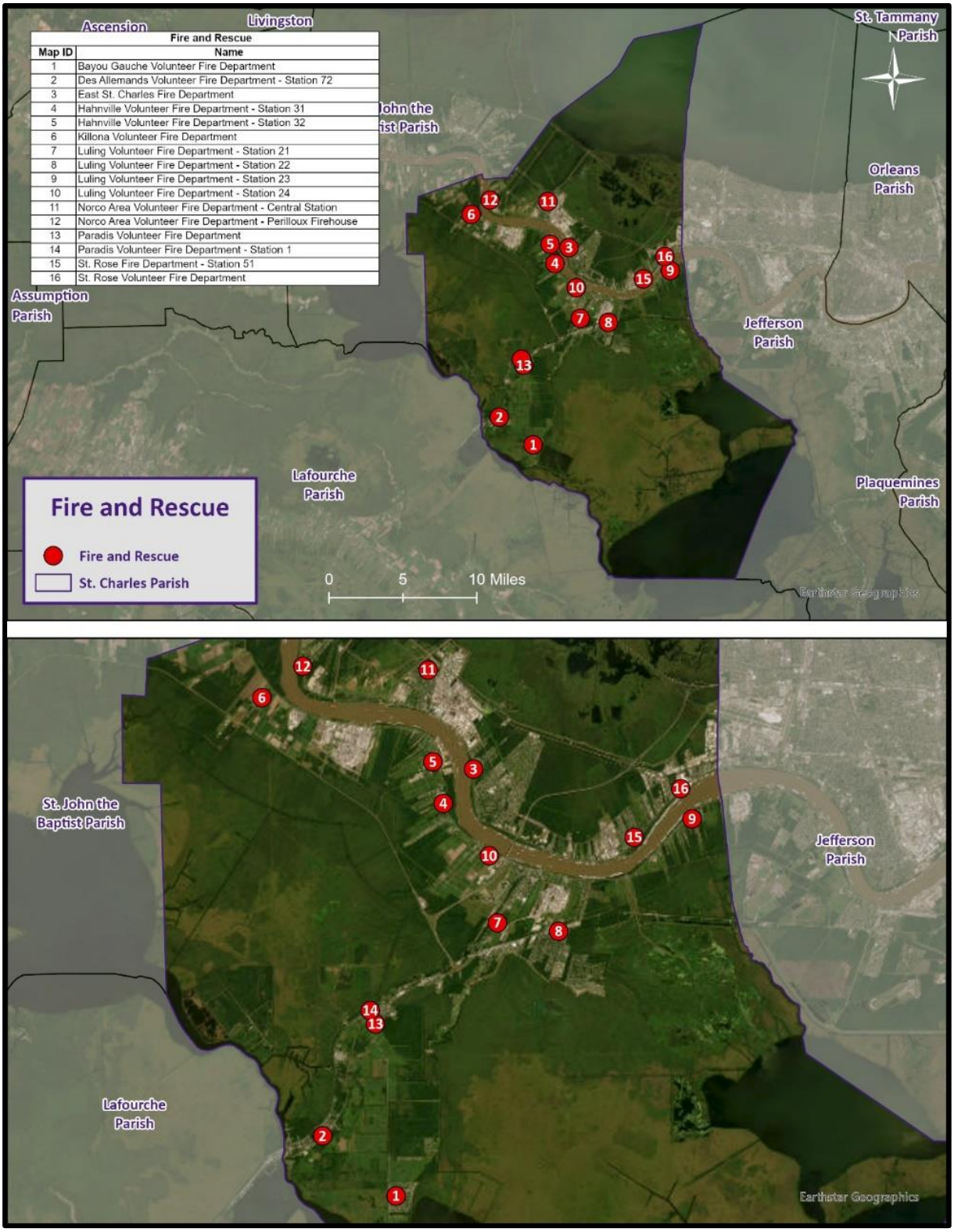
As part of the Risk Assessment, the planning team identified essential facilities throughout the parish. Within the entire planning area, there is an estimated value of $8,228,063,000 in structures throughout the parish. The table below provides the total estimated value for each type of structure by occupancy.

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

Occupancy	St. Charles Parish
Agricultural	$3,439,000
Commercial	$1,604,868,000
Government	$101,698,000
Industrial	$250,231,000
Religion	$82,583,000
Residential	$5,800,732,000
Education	$384,512,000
Total	$8,228,063,000

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	Bayou Gauche Volunteer Fire Department
2	Des Allemands Volunteer Fire Department - Station 72
3	East St. Charles Fire Department
4	Hahnville Volunteer Fire Department - Station 31
5	Hahnville Volunteer Fire Department - Station 32
6	Killona Volunteer Fire Department
7	Luling Volunteer Fire Department - Station 21
8	Luling Volunteer Fire Department - Station 22
9	Luling Volunteer Fire Department - Station 23
10	Luling Volunteer Fire Department - Station 24
11	Norco Area Volunteer Fire Department - Central Station
12	Norco Area Volunteer Fire Department - Perilloux Firehouse
13	Paradis Volunteer Fire Department
14	Paradis Volunteer Fire Department - Station 1
15	St. Rose Fire Department - Station 51
16	St. Rose Volunteer Fire Department

Figure 2-3: Fire and Rescue Facilities in St. Charles Parish.

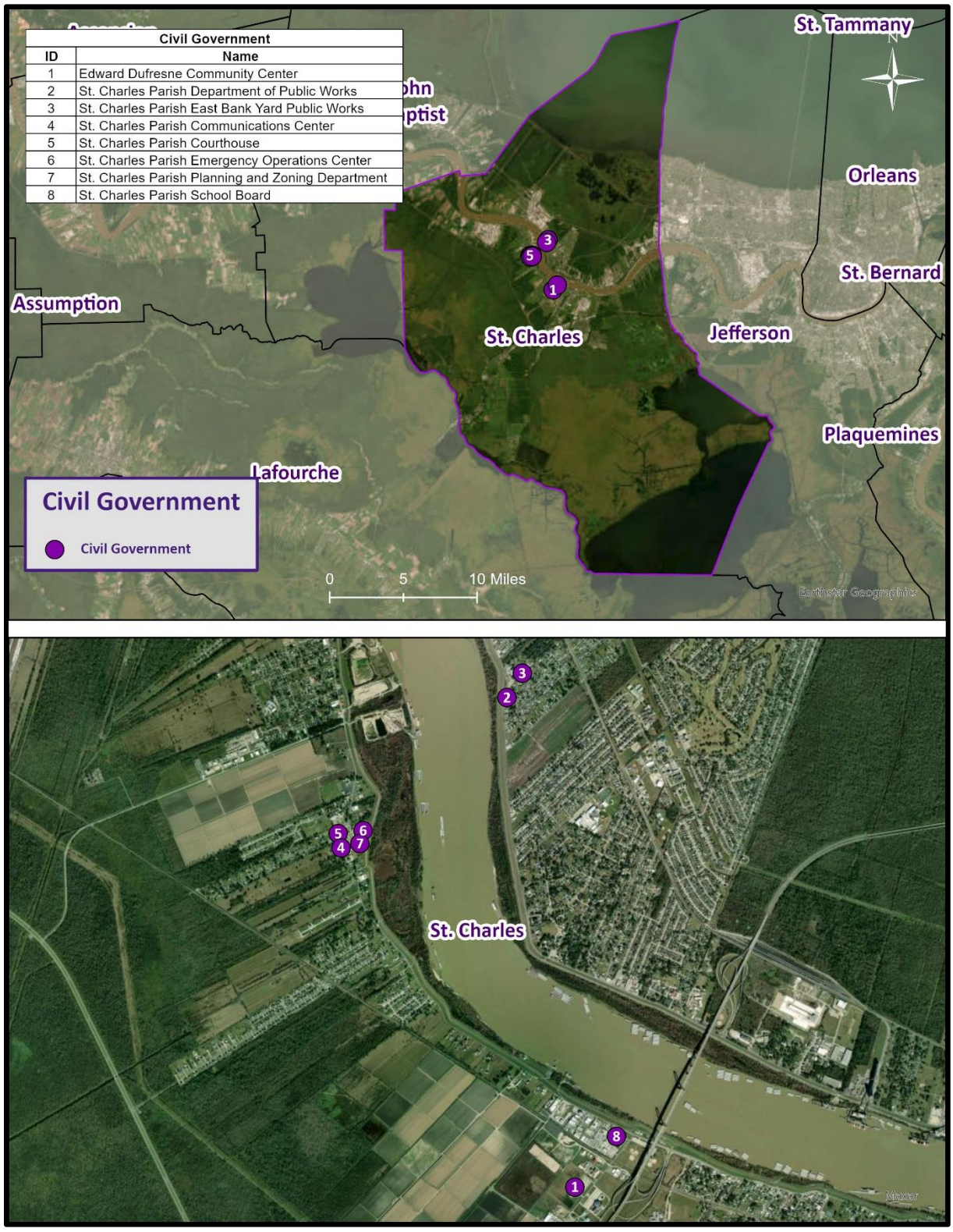


Figure 2-4: Government Buildings in St. Charles Parish.

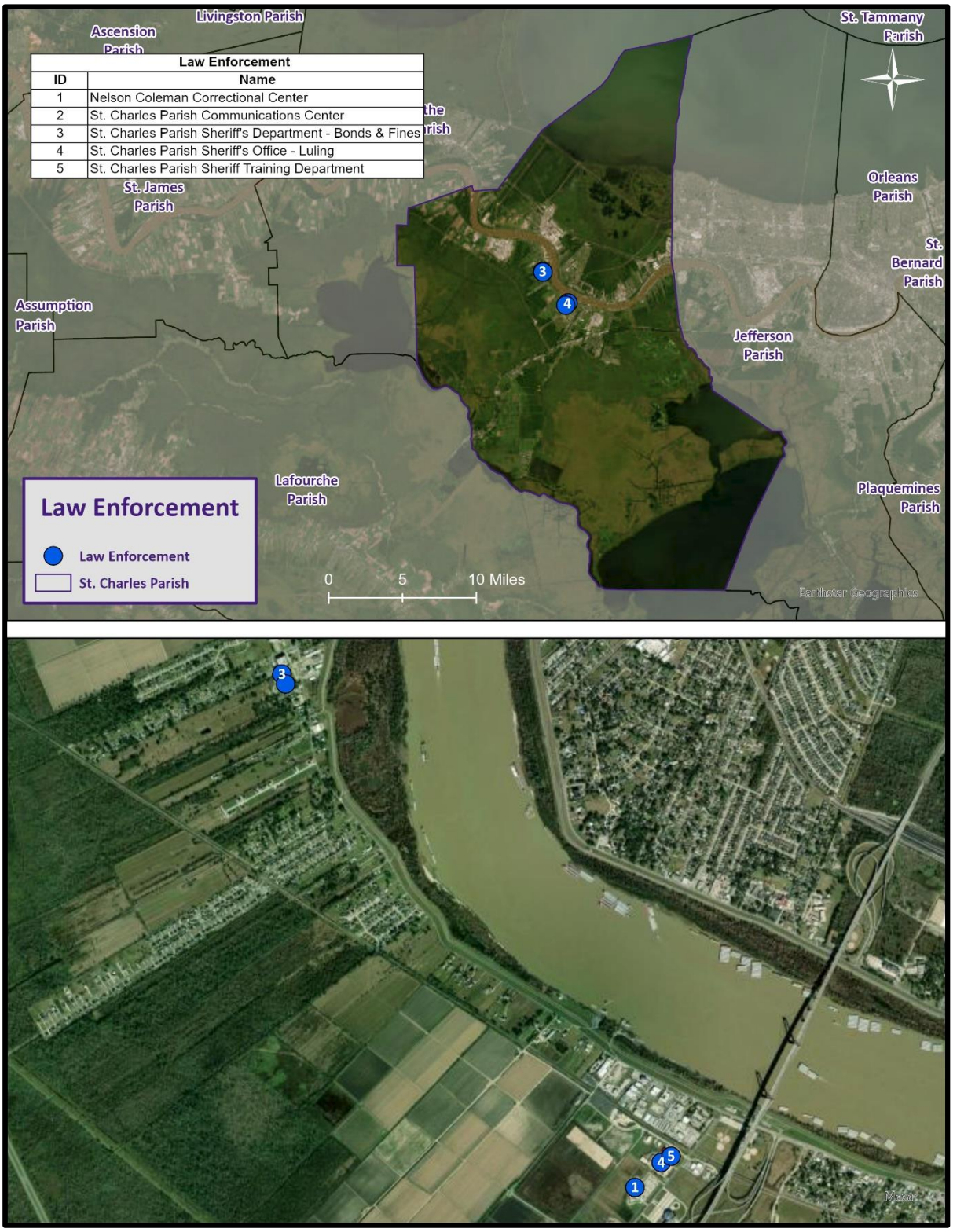


Figure 2-5: Law Enforcement in St. Charles Parish.

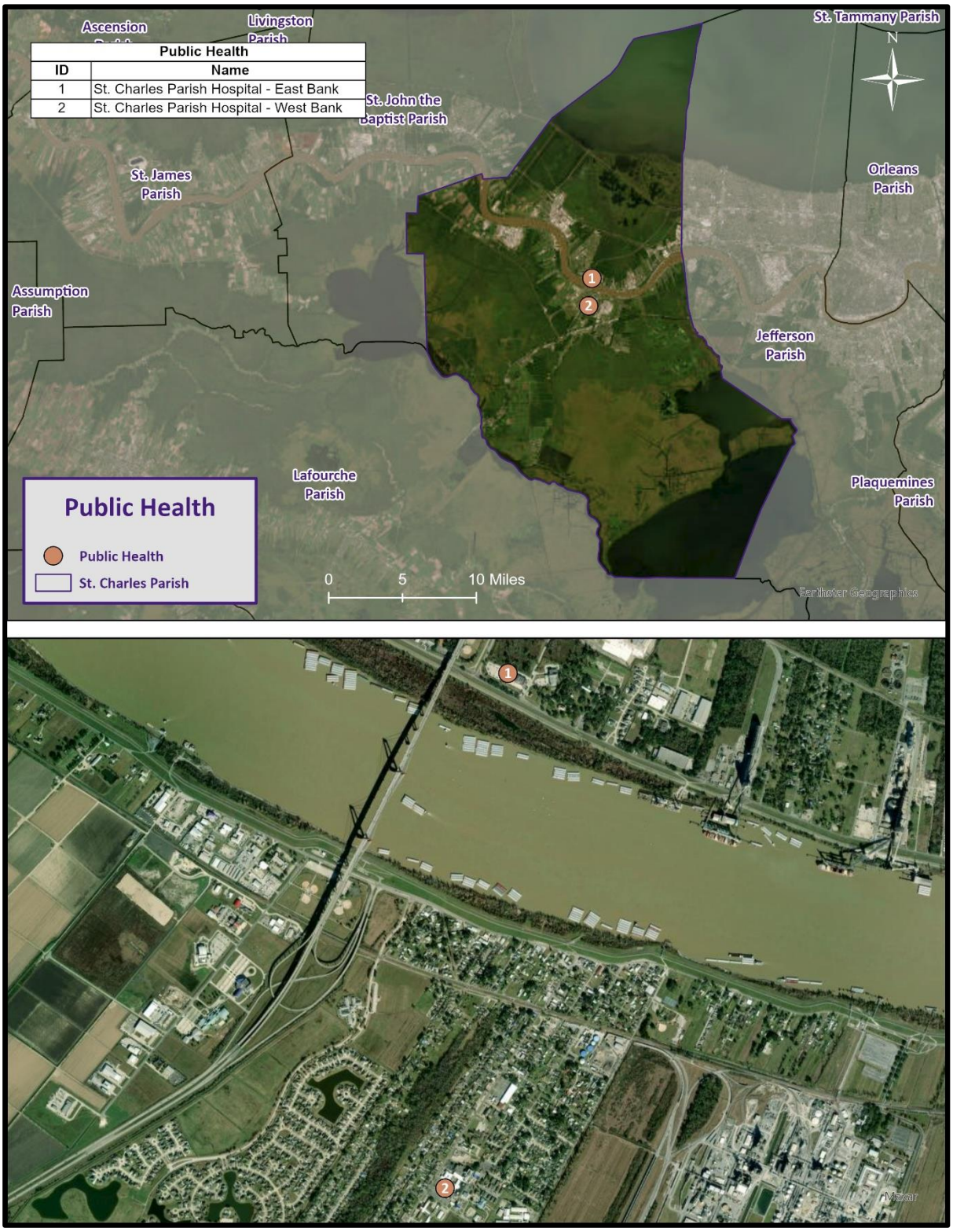
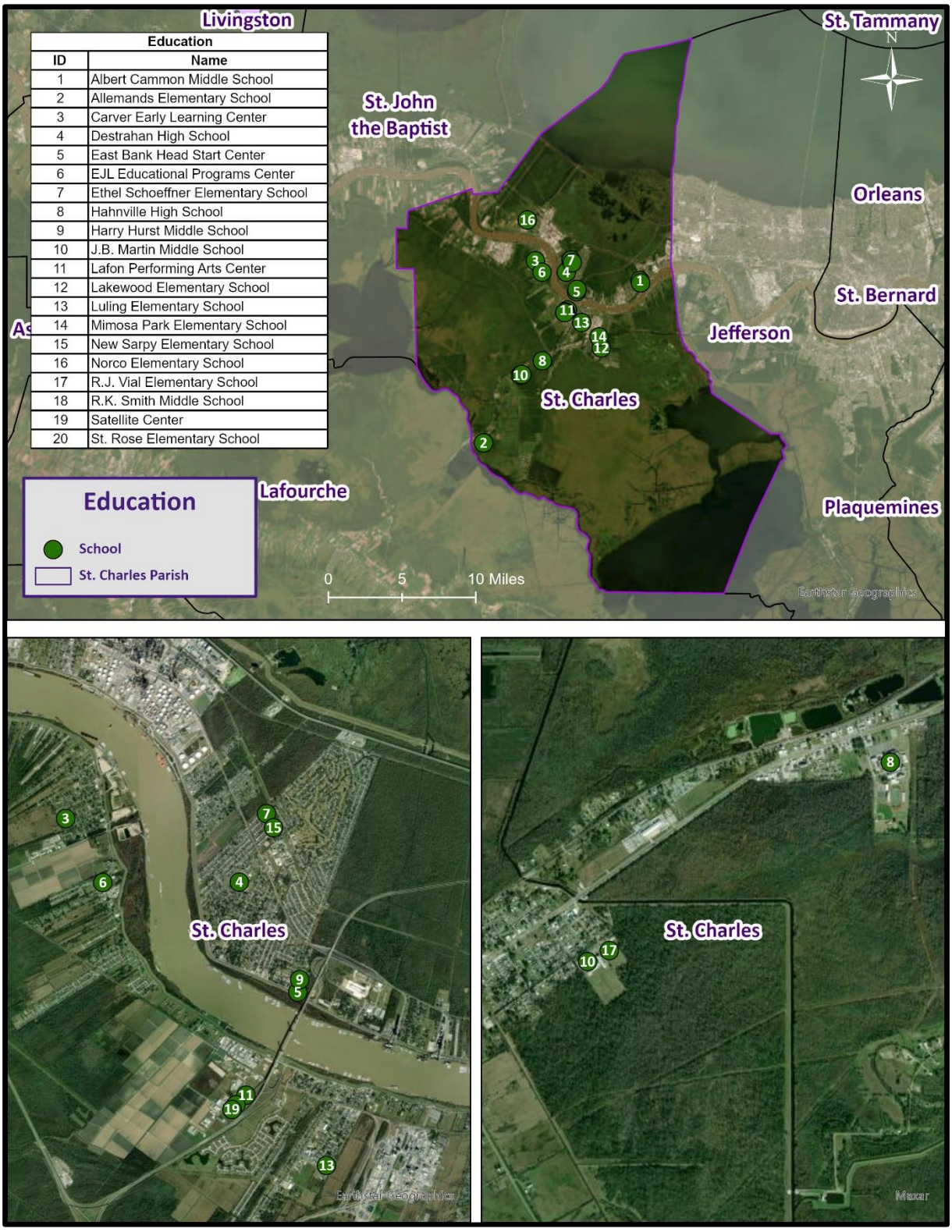
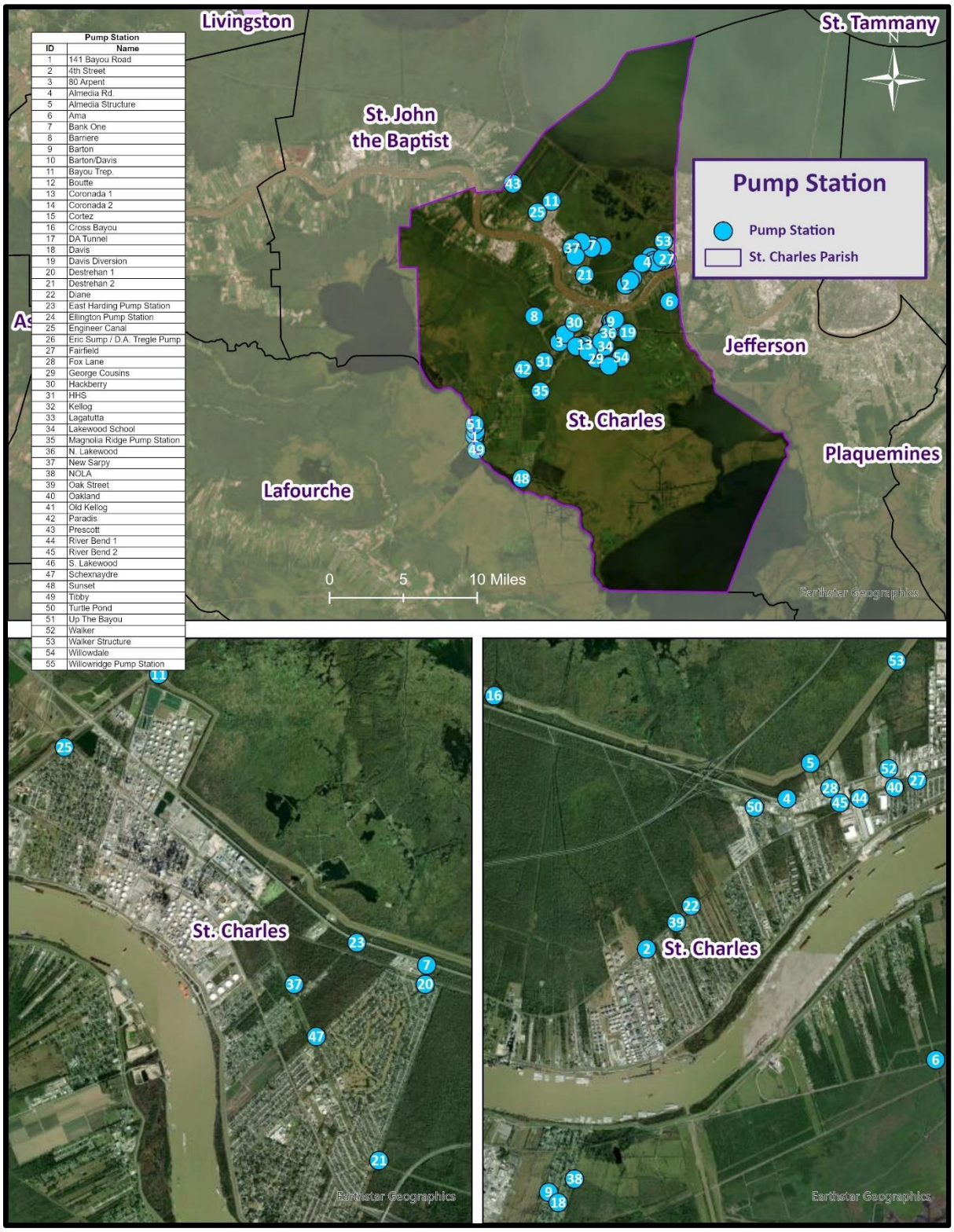


Figure 2-6: Public Health Facilities in St. Charles Parish.



Education	
ID	Name
1	Albert Cammon Middle School
2	Allemands Elementary School
3	Carver Early Learning Center
4	Destrahan High School
5	East Bank Head Start Center
6	EJL Educational Programs Center
7	Ethel Schoeffner Elementary School
8	Hahnville High School
9	Harry Hurst Middle School
10	J.B. Martin Middle School
11	Lafon Performing Arts Center
12	Lakewood Elementary School
13	Luling Elementary School
14	Mimosa Park Elementary School
15	New Sarpy Elementary School
16	Norco Elementary School
17	R.J. Vial Elementary School
18	R.K. Smith Middle School
19	Satellite Center
20	St. Rose Elementary School

Figure 2-7: Educational Facilities in St. Charles Parish.



Pump Station ID	Name
1	141 Bayou Road
2	4th Street
3	80 Arpent
4	Almedia Rd
5	Almedia Structure
6	Ama
7	Bank One
8	Barriere
9	Barton
10	Barton/Davis
11	Bayou Trep.
12	Boutte
13	Coronada 1
14	Coronada 2
15	Cortez
16	Cross Bayou
17	DA Tunnel
18	Davis
19	Davis Diversion
20	Destrehan 1
21	Destrehan 2
22	Diane
23	East Harding Pump Station
24	Ellington Pump Station
25	Engineer Canal
26	Eric Sump / D.A. Tregle Pump
27	Fairfield
28	Fox Lane
29	George Cousins
30	Hackberry
31	HHS
32	Kellog
33	Lagatutta
34	Lakewood School
35	Magnolia Ridge Pump Station
36	N. Lakewood
37	New Sarpy
38	NOLA
39	Oak Street
40	Oakland
41	Old Kellog
42	Paradis
43	Prescott
44	River Bend 1
45	River Bend 2
46	S. Lakewood
47	Schexnaydre
48	Sunset
49	Tibby
50	Turtle Pond
51	Up The Bayou
52	Walker
53	Walker Structure
54	Willowdale
55	Willowridge Pump Station

Figure 2-8: Pump Stations in St. Charles Parish

Population and Development Trends

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

Table 2-11: Population Growth Rate for St. Charles Parish.

Total Population	St. Charles Parish
1-Apr-10	52,780
1-Apr-20	52,549
1-Apr-23	50,620
Population Growth between 2010 – 2020	-0.4%
Average Annual Growth Rate between 2010 – 2020	< -0.1%
Population Growth between 2020 – 2023	-3.7%
Average Annual Growth Rate between 2020 – 2023	-1.22%

Table 2-12: Housing Growth Rate for St. Charles Parish.

Total Housing	St. Charles Parish
1-Apr-10	19,896
1-Apr-20	20,445
1-Apr-23	20,788
Housing Growth between 2010 – 2020	2.8%
Average Annual Growth Rate between 2010 – 2020	0.3%
Housing Growth between 2020 – 2023	1.7%
Average Annual Growth Rate between 2020 – 2023	0.6%

Since the previous plan update in 2020, the population has decreased while housing development has increased. St. Charles Parish 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 St. Charles Parish. The development that has occurred since 2020 has not in any knowing way altered the parish's vulnerability to natural hazards. St. Charles 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.

Land Use

The Parish Land Use table is provided on the next page. Residential, commercial, and industrial areas account for only 16% of the parish's land use. Wetlands is the largest category at 78,087 acres, accounting for 66% of parish land. At 14,018 acres, agricultural lands account for 12% of parish lands, while 6,247 acres of water areas account for 5% of parish lands. The parish also consists of 787 acres of forested areas, accounting for 1% of all parish lands.

Table 2-13: Parish Land Use.
(Source: USGS Land Use Map)

Land Use	Acres	Percentage
Agricultural Land, Cropland, and Pasture	10,661	9%
Wetlands	68,756	58%
Forest Land (Not including forested wetlands)	787	1%
Urban/Development	14,225	12%
Water	23,709	20%

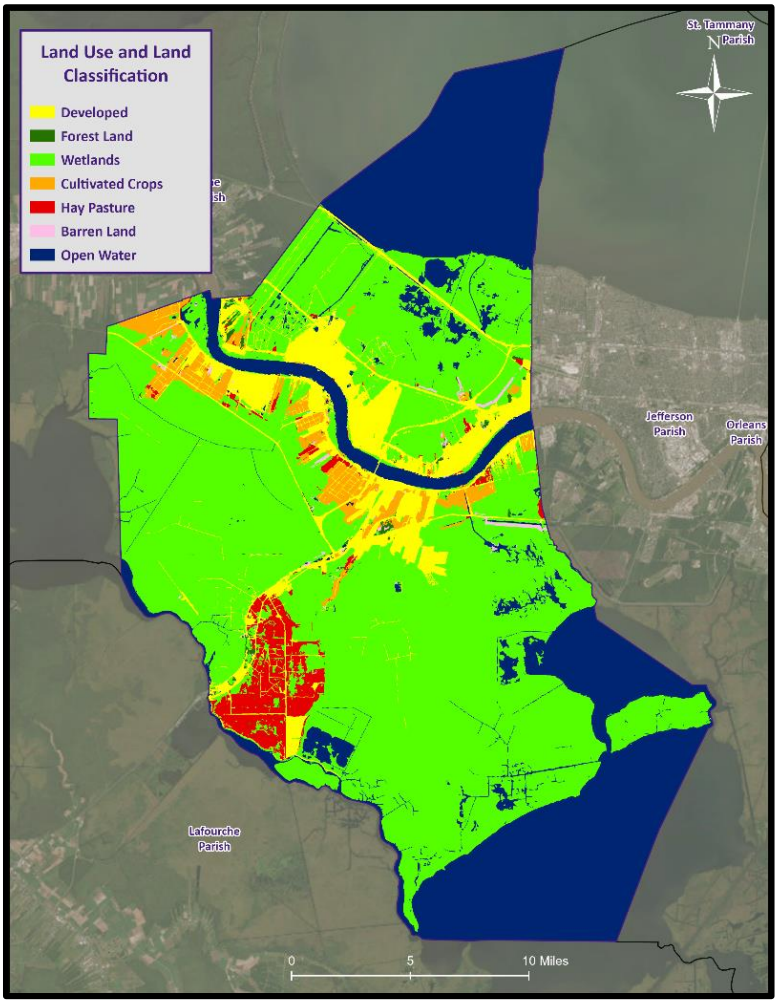


Figure 2-9: Parish Land Use Map.
(Source: USGS Land Use Map)

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. Geologic Survey and 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 assessment of the added flood impacts caused by land loss is quantified in the following sections. The southwestern portion of the 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.).

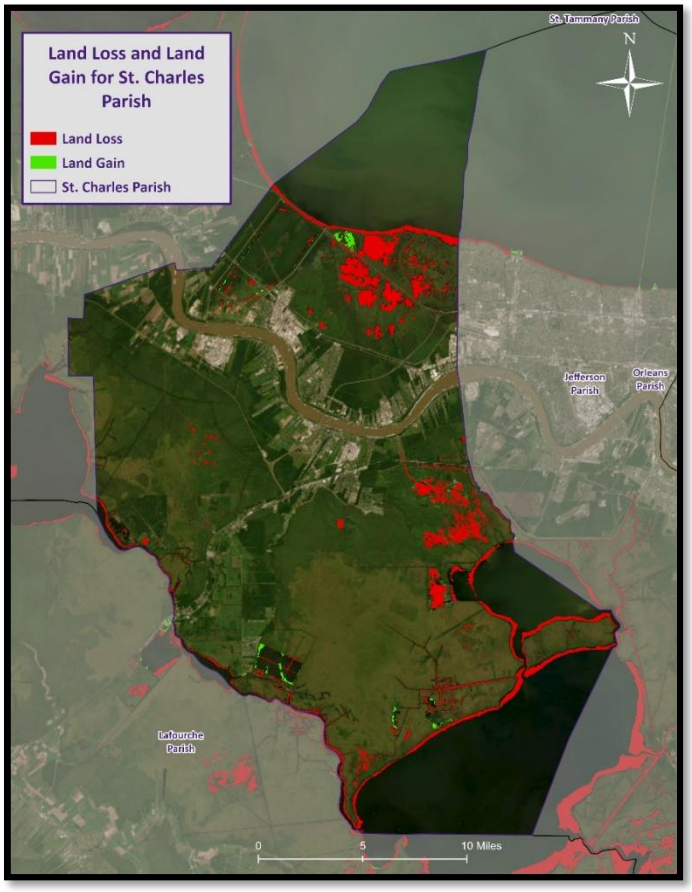


Figure 2-10: Historical Areas of Land Loss and Gain Between 1950 and 2020.

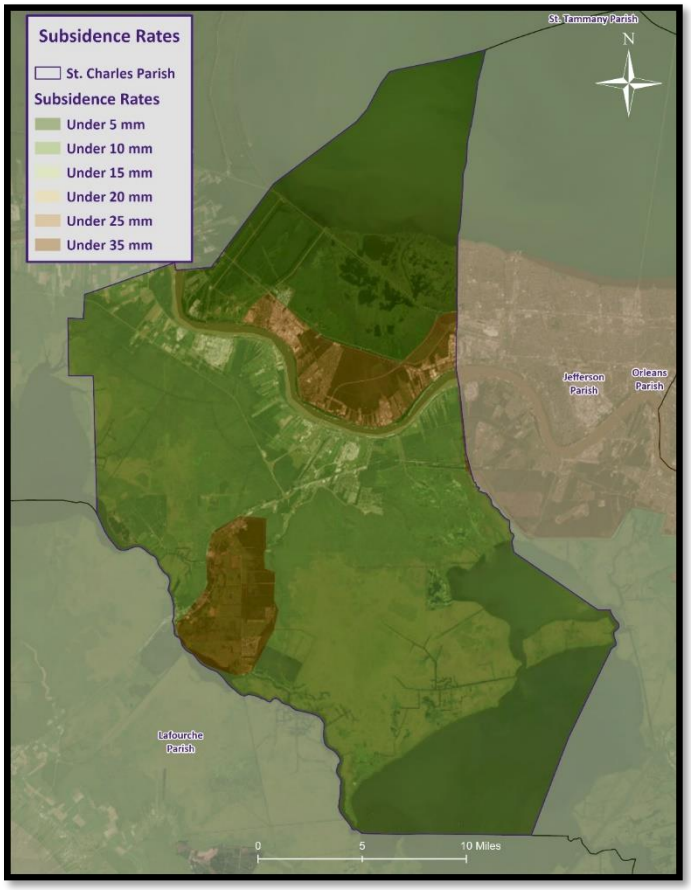


Figure 2-11: Maximum Annual Subsidence Rates Based on Subsidence Zones in Coastal Louisiana.

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 in coastal areas can exacerbate existing hazards such as sea level rise and storm surges 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

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 2-14: National Risk Index (NRI) Summarization of Drought Occurrences for the Parish. (Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Very Low	Very Low

Estimated Impact and Potential Loss

To determine the estimated potential losses, the methodology implemented in the 2019 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 figure on the following page shows the projected increase in total flood loss resulting from a SLOSH Category 1 MOM in the year 2019, with many areas expecting an increase in losses. Some areas that would be currently unaffected by a SLOSH Category 1 MOM would be impacted in ten years based on subsidence and sea level rise projections.

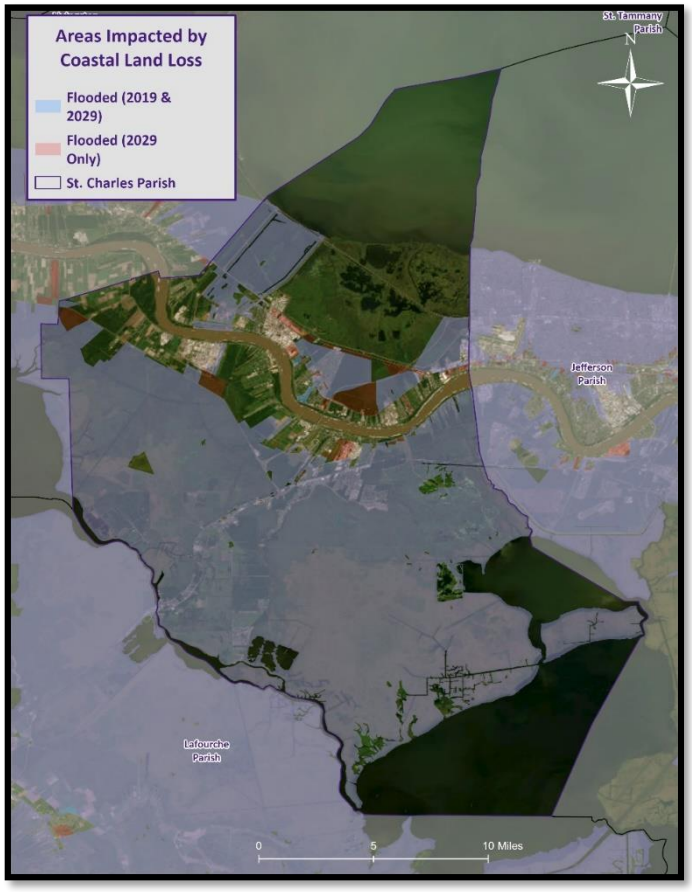


Figure 2-12: Census Block Groups not Currently Impacted by Category 1 Hurricane Storm Surge but Expected to be Impacted in 2029 are Shown in Red.

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

Table 2-15: Estimated Annual Losses for the Parish Due to Coastal Land Loss. (Source: Hazus)

Estimated Annual Potential Losses from Coastal Land Loss
$121,000

Vulnerable Population

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

Table 2-16: Number of People Susceptible to Coastal Hazards in St. Charles Parish.

Number of People Exposed to Coastal Hazards			
Location	**# in Community**	**# in Hazard Area**	**% in Hazard Area**
St. Charles Parish	**52,549**	**52,549**	**100%**

The Hazus hurricane model was used to identify populations vulnerable to coastal land loss throughout St. Charles Parish in the table below:

Table 2-17: Population Vulnerable to Coastal Land Loss in the Parish.

St. Charles Parish		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	52,549	100.0%
Persons Under 5 years	2,943	5.6%
Persons Under 18 years	12,559	23.9%
Persons 65 Years and Over	8,145	15.5%
White	37,100	70.6%
Minority	15,449	29.4%

Vulnerability Score

Table 2-18: Coastal Hazard Vulnerability Score for the Parish.

Coastal Hazard Vulnerability Score						
	Probability	**Impact**	**Spatial Extent**	**Warning Time**	**Duration**	**Risk Factor**
Risk Level	**4**	**2**	**4**	**2**	**3**	**3.05**

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 tables on the following page display the range and Palmer classifications of the PDSI index, and the United States Drought Monitor Intensity scale.

Table 2-19: 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 2-20: 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 parish at the time this plan went to publication.

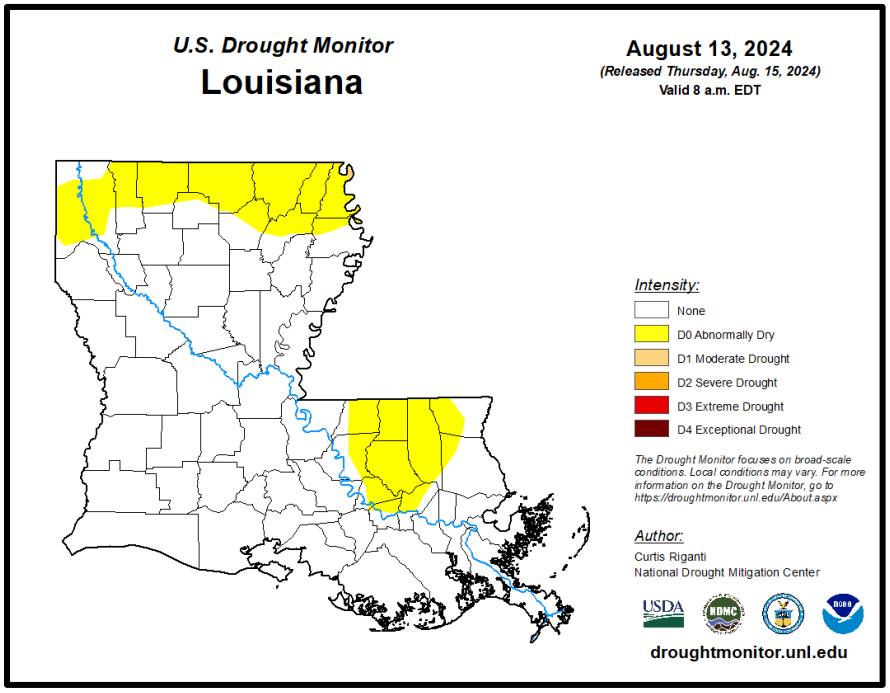


Figure 2-13: United States Drought Monitor for the State of Louisiana and its Parishes.
(Source: The National Drought Mitigation Center)

Risk Assessment

Geographic Extent

Drought typically impacts a region and not one specific parish. 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 would be a exceptional drought (D4).

Previous Occurrences

The parish experienced nine drought occurrences between the years 1996 and 2023. Since the last update in 2020, there have been two drought occurrences within the boundaries of the parish.

Table 2-21: Historical Droughts in St. Charles Parish since the Last Update.

Date	Impacts	Crop Damage	Magnitude
June – November 2022	Severe (D2) to Extreme (D3) drought conditions expanded across southcentral and southeast Louisiana. For the months of September and October, some accessed locations did not measure more than one inch of rainfall.	$0	D2-D3
August – December 2023	Severe (D2) to Exceptional (D4) drought conditions expanded across all parts of Louisiana during late 2023. Multiple sites across Louisiana experienced a 10 to 30 inch deficit in average rain totals. September-October brought about the worst drought conditions with the entire state experiencing some magnitude of drought and more than 50% of the state experiencing Exceptional drought.	$0	D2-D4

Probability

The annual return rate (frequency) for periods of drought in the parish is 0.32 (32% annual probability) or approximately 1 drought occurrence every 3 to 4 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 intensify 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 2-22: National Risk Index (NRI) Summarization of Drought Occurrences for St. Charles Parish. (Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Very Low	Very Low

Estimated Impact and Potential Loss

The following table presents an analysis of agricultural exposure that is susceptible to drought by major crop type for the parish.

Table 2-23: Agricultural Exposure by Crop Type for Droughts in St. Charles Parish. (Source: LSU Ag Center 2022 Parish Totals)

Agricultural Exposure by Type for Drought			
Hay	Fruits	Sugarcane	Vegetables
$468,270	$80,400	$2,438,167	$365,973

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 2-24: Drought Vulnerability Score for St. Charles Parish.

Drought Vulnerability Score						
	Probability	Impact	Spatial Extent	Warning Time	Duration	Risk Factor
Risk Level	3	2	4	2	3	2.8

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. Excessive 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, excessive 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 2-25: 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.

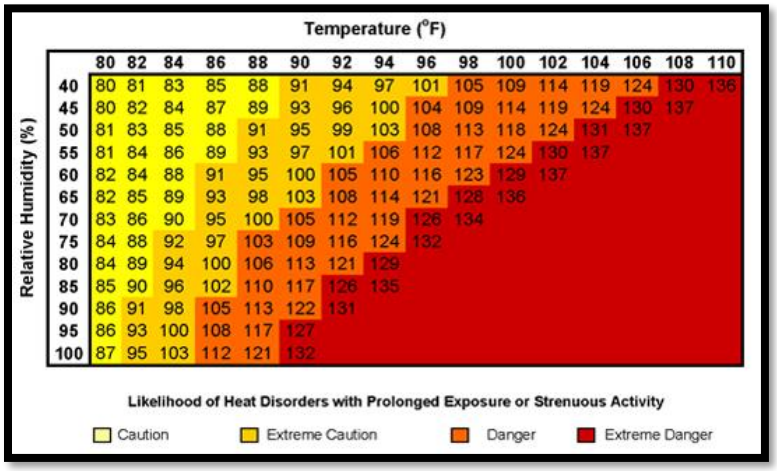


Figure 2-14: Heat Index Advisor based on Air Temperature (°F) and Relative Humidity. (Source: National Weather Service)

Risk Assessment

Geographic Extent

Excessive heat typically impacts a region and not one specific parish. Because excessive heat is a climatological 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 excessive heat. Based on historical data, the worst-case scenario for the parish involving excessive heat would be a high-risk level on the HI scale with temperatures ranging from 110°F to 118°F.

Previous Occurrences

St. Charles Parish experienced one excessive heat occurrence between the years 1996 and 2022. Since the last update, there have been 22 excessive heat occurrences within the boundaries of the parish.

Table 2-26: Historical Excessive Heat Occurrences in St. Charles Parish since the Last Update.

Date	Crop Damage	Magnitude (°F)
7/16/2023	$0	113 – 118
7/16/2023	$0	113
7/31/2023	$0	113 – 115
8/1/2023	$0	113 – 115
8/2/2023	$0	113 – 115
8/4/2023	$0	113 – 115
8/5/2023	$0	113 – 115
8/6/2023	$0	113 – 115
8/7/2023	$0	113 - 115
8/8/2023	$0	113 – 115
8/9/2023	$0	113 – 115
8/10/2023	$0	113 – 115
8/11/2023	$0	113 – 115
8/12/2023	$0	113 – 115
8/13/2023	$0	113 – 115
8/14/2023	$0	113 - 115
8/15/2023	$0	113 – 115
8/19/2023	$0	113 – 115
8/23/2023	$0	113 – 115
8/24/2023	$0	113 – 115
8/26/2023	$0	113 – 115
8/27/2023	$0	113 – 115

Probability

The annual return rate (frequency) for excessive heat occurrences in the parish is 0.79 (79% annual probability) or approximately 1 excessive heat event every 1 to 2 years.

Climate Change Impacts

Climate change has caused a rise in excessive heat events within St. Charles Parish, 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 excessive heat (days over 95° F) than compared to 50 years ago. With the rise in excessive 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 excessive heat events, reshaping the very fabric of our environment. Rising greenhouse gas emissions are enhancing the greenhouse effect, trapping heat within the atmosphere. Consequently, excessive 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 excessive 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 excessive heat.

Table 2-27: National Risk Index (NRI) Summarization of Excessive Heat Occurrences for the Parish. (Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Relatively Moderate	Relatively Moderate

Estimated Impact and Potential Loss

Since 1996, there have been 22 significant excessive heat events that have resulted in property damage according to NCEI Storm Events Database. The total property damage associated with those events have totaled approximately $5,000. To estimate the potential losses of an excessive heat event on an annual basis, the total damages recorded for these events was divided by the total number of years of available data in the NCEI Storm Events Database (1996 - 2023). This provides an annual estimated potential loss of $179 and $227 per event. The table on the following page provides an estimate of potential property losses for the parish:

Table 2-28: Estimated Annual Losses in St. Charles Parish Resulting from Excesive Heat.

Estimated Annual Potential Losses from Excessive Heat
St. Charles Parish
$179

Vulnerable Population

There have been no reported fatalities or injuries due to excessive heat in the parish. However, excessive 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 excessive 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 2-29: Excessive Heat Vulnerability Score for St. Charles Parish.

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

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 storm water drainage systems cannot keep pace with heavy precipitation, and water accumulates on the surface. Most urban flooding is caused by slow-moving thunderstorms or torrential rainfall.
- **Coastal flooding** can appear similar to any of the other flood types, depending on its cause. It occurs when normally dry coastal land is flooded by seawater, but may be caused by direct inundation (wen the sea level exceeds the elevation of the land), overtopping of a natural or artificial barrier, or the breaching of a natural or artificial barrier (i.e., when the barrier is broken down by the sea water). Coastal flooding is typically caused by storm surge, tsunamis, or gradual sea level rise.

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 which equals or exceeds the highest stage or discharge at a given site during the period of record keeping.
- Flood Warning
  - Issued along larger streams when there is a serious threat to life or property.
- Flood Watch
  - Issued when current and developing hydrometeorological conditions are such that there is a threat of flooding, but the occurrence is neither certain nor imminent.

Floods are measured mainly by probability of occurrence. A 10-year flood 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.

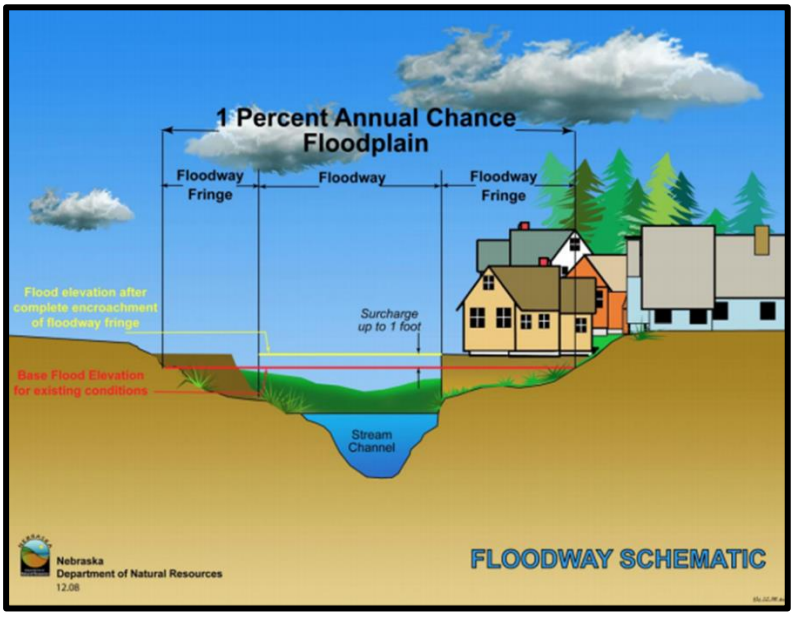


Figure 2-15: Schematic of 100-Year Floodplain.
The Special Flood Hazard Area (SFHA) extends to the end of the floodway fringe.
(Source: Nebraska Department of Natural Resources)

A SFHA is the land area covered by the floodwaters of the base flood (red line in the above figure), where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. The flood hazard boundary map for the parish is shown below.

Figure 2-16: Parish Areas within the 100-Year Flood Boundary (Source: Hazus)

The map below shows a preliminary Flood Insurance Rate Map (FIRM) for St. Charles Parish. This is not the effective flood map for St. Charles Parish as it has not been fully adopted by the community but is one that is used as supplemental information when making determinations on minimum building heights for new construction and substantial improvements to pre-existing structures.

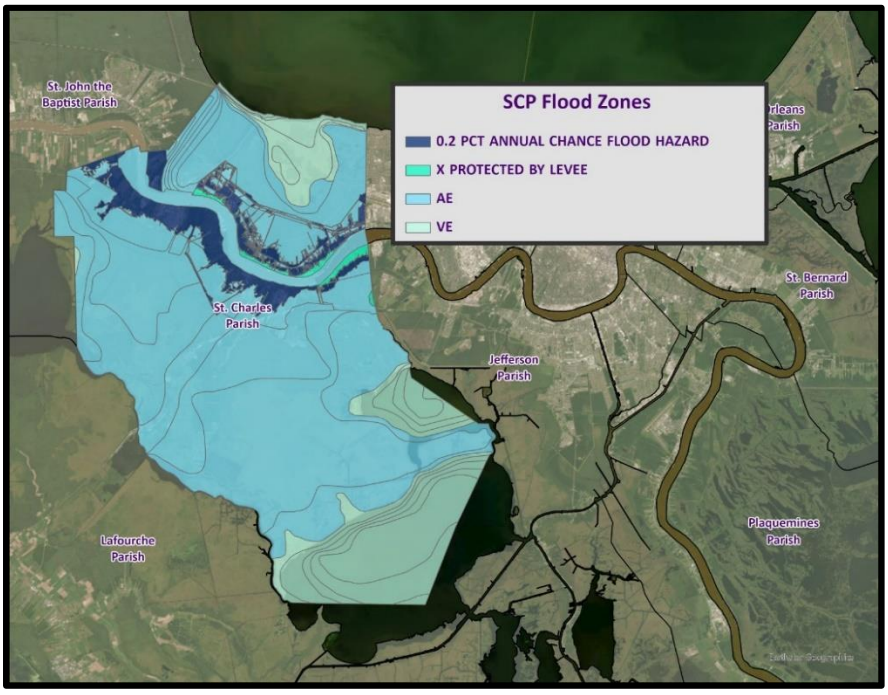


Figure 2-17: Parish Areas within the Flood Zones

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 claim's 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 2-30: Repetitive Loss Structures for St. Charles Parish.

Location	Number of Structures	Residential	Commercial	Government	Total Claims	Total Claims Paid	Average Claim Paid
St. Charles Parish	819	796	23	0	2,284	$85,292,755	$37,344

The 819 repetitive loss structures were geocoded in order to provide an overview of where the repetitive loss structures are located throughout the parish. The following figures show the approximate locations of the structures

and where the highest concentration of repetitive loss structures is located. Through the repetitive loss maps, it is clear the primary concentration of repetitive loss structures is focused around the central portion of the parish.

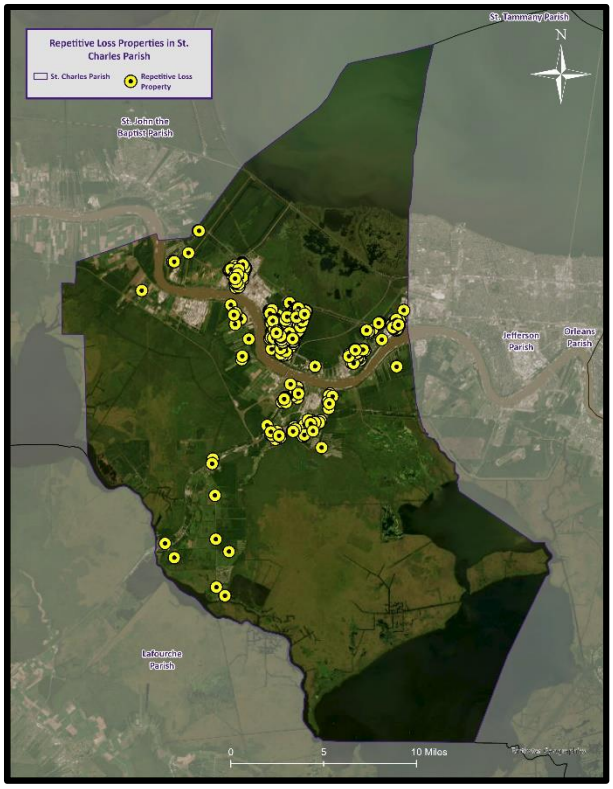


Figure 2-18: Repetitive Loss Properties in the Parish.

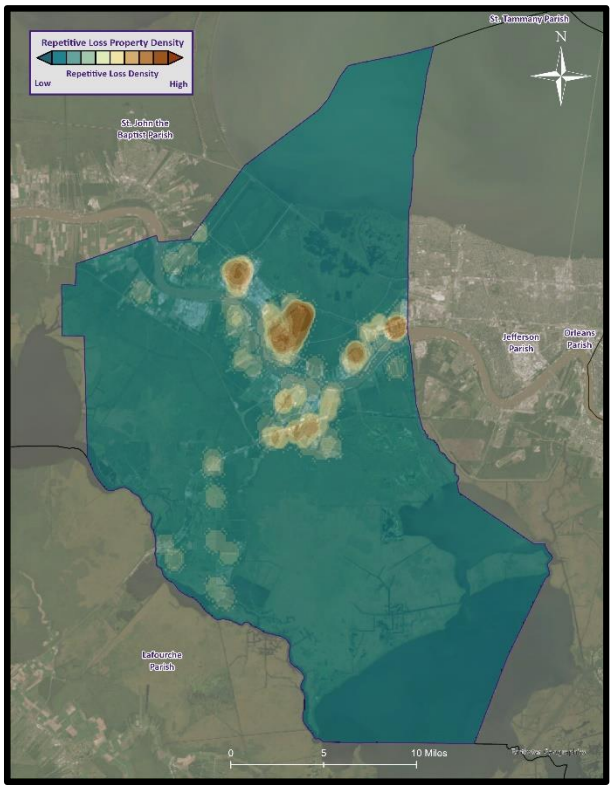


Figure 2-19: Repetitive Loss Property Densities in the Parish.

National Flood Insurance Program

Flood insurance statistics indicate that the Parish has 11,382 flood insurance policies with the NFIP, with total annual premiums of $9,878,974. St. Charles Parish participates in the NFIP. 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 2-31: Summary of NFIP Policies for the Parish.

Location	No. of Insured Structures	Total Insurance Coverage Value	Annual Premiums Paid	No. of Insurance Claims Paid Since 1980	Total Loss Payments
St. Charles Parish	11,281	$3,559,906,000	$9,878,974	4,781	$145,695,181.55

Table 2-32: 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
220160	St. Charles Parish	11/1/1974	5/2/1983	6/16/1992	6/16/1992	5/2/1983	No

According to the Community Rating System (CRS) list of eligible communities, St. Charles Parish does participate in the CRS program and carries a class rating of 7.

Table 2-33: Summary of CRS Participation

CID	Community Name	CRS Entry Date	Current Effective Date	Current Class	% Discount for SFHA	% Discount for Non-SFHA
220160	St. Charles Parish	10/1/1991	10/1/2021	7	15	5

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 the parish range from less than one foot (NAVD88) to approximately 20 feet (NAVD88). The highest elevations in the parish are approximately 20 feet (NAVD88), located along the Mississippi River.

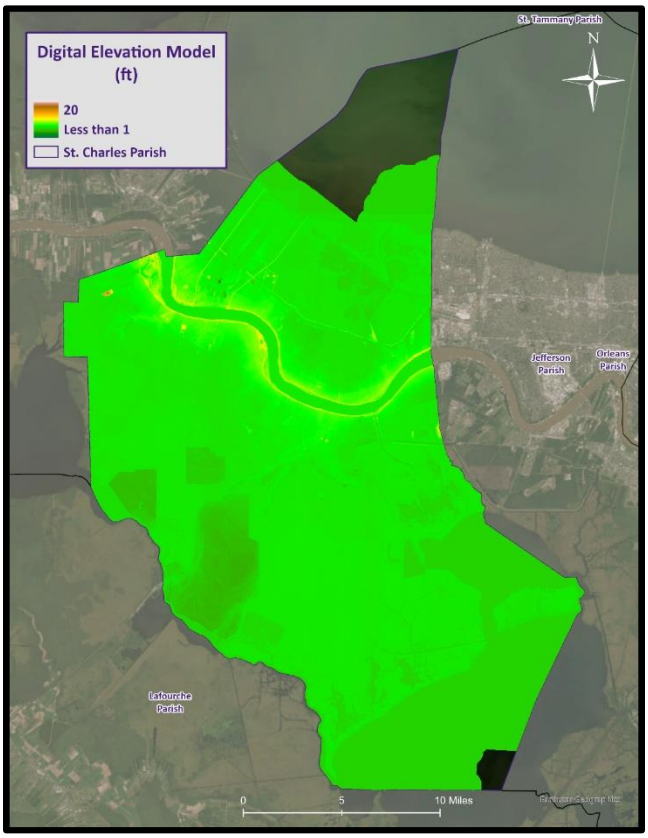


Figure 2-20: Elevation throughout the Parish.

Risk Assessment

Geographic Extent

The parish has experienced significant flooding in its history and can expect more in the future. Stormwater excesses caused by large amounts of rainfall in a short period of time occur frequently in the parish. Topography, poor drainage, and an extensive levee system mean that storm water cannot flow out of many areas of the parish. Generally, the most damaging storm water events are a function of a tropical storm or hurricane.

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

Previous Occurrences

The parish experienced 47 flooding occurrences between the years 1996 and 2024. Since the last update, there have been sixteen flood occurrences within the boundaries of the parish.

Table 2-34: Historical Flooding Events in St. Charles Parish since the Last Update.

Date	Area	Type of Flood	Property Damage	Fatalities	Injuries
5/14/2020	NEW SARPY	Flash Flood	$50,000	0	0
7/2/2020	DES ALLEMANDS	Flash Flood	$0	0	0
7/3/2020	DES ALLEMANDS	Flash Flood	$0	0	0
7/5/2020	DESTREHAN	Flash Flood	$0	0	0
7/28/2020	DESTREHAN	Flash Flood	$7,000	0	0
4/13/2021	BOUTTE	Flash Flood	$0	0	0
4/13/2021	DESTREHAN	Flash Flood	$0	0	0
4/13/2021	LULING	Flash Flood	$0	0	0

Date	Area	Type of Flood	Property Damage	Fatalities	Injuries
5/18/2021	NORCO	Flash Flood	$0	0	0
5/18/2021	HAHNVILLE	Flash Flood	$0	0	0
5/18/2021	DUFRESNE	Flash Flood	$0	0	0
8/29/2021	MONTZ	Flash Flood	$0	0	0
9/14/2021	GYPSY	Flash Flood	$20,000	0	0
9/15/2021	LULING	Flash Flood	$500,000	0	0
5/25/2022	GYPSY	Flash Flood	$0	0	0
4/10/2024	AMA	Flash Flood	$0	0	0

Probability

The annual return rate (frequency) for periods of flooding in the parish is 1.68 (100% annual probability) or approximately 1 to 2 flood occurrences every year. The table below shows the probability and return frequency for St. Charles Parish.

Table 2-35: Annual Flood Probabilities for St. Charles Parish.

Location	Annual Probability	Return Frequency
St. Charles Parish	100%	1 to 2 events every year

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 2025 and 2030. 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 2030. 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 2-36: Estimated Future Impacts, 2020 - 2030.
(Source: Hazus, US Census Bureau)

Hazard / Impact	Total in Parish (2020)	Hazard Area (2020)	Hazard Area (2025)	Hazard Area (2030)
Flood Damage				
Structures	20,445	4,939	5,079	5,193
Value of Structures	$8,358,471,876	$1,974,895,561	$2,136,439,110	$2,275,137,393
# of People	52,549	11,972	12,032	12,080

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 2-37: National Risk Index (NRI) Summarization of Riverine Flood Occurrences for St. Charles Parish.
(Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Relatively Moderate	Relatively Moderate

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 2-38: Estimated Losses in St. Charles Parish from a 100-Year Flood Event
(Source: Hazus)

Location	Estimated Loss
St. Charles Parish	$39,827,000

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

Table 2-39: Estimated 100-year Flood Losses St. Charles Parish by Sector. (Source: Hazus)

St. Charles Parish	Estimated Total Losses from 100-Year Flood Event
Agricultural	$1,000
Commercial	$13,892,000
Government	$1,468,000
Industrial	$49,000
Religious / Non-Profit	$6,621,000
Residential	$16,320,000
Schools	$1,476,000
Total	$39,827,000

Vulnerable Population

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

Table 2-40: 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
St. Charles Parish	52,549	12,416	23.6%

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

Table 2-41: Vulnerable Populations Susceptible to a 100-year Flood Event in St. Charles Parish. (Source: Hazus)

St. Charles Parish		
Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	12,416	23.6%
Persons Under 5 Years	695	5.6%
Persons Under 18 Years	2,967	23.9%
Persons 65 Years and Over	1,924	15.5%
White	8,766	70.6%
Minority	3,650	29.4%

Vulnerability Score

Table 2-42: Flooding Vulnerability Score for the Parish.

Flooding Vulnerability Score						
	Probability	Impact	Spatial Extent	Warning Time	Duration	Risk Factor
Risk Level	4	4	3	4	3	3.65

Levee Failure

Profile

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

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

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

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

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

The Mississippi River levee system is constantly monitored during high water events by federal, state, and parish officials. Any potential failure of the Mississippi River levee would be observed long before a failure took place. Once observed, it would be mitigated to prevent any failure in the levee. As a slowly developing hazard, there is significant lead time to warn and evacuate the population in the event of a potential failure. The more likely scenario involving a potential level failure would be an overtopping event for a major precipitation event taking place during a tropical cyclone, similar to Tropical Storm Allison in 2001. An event of this nature is less likely to produce an early warning and most likely to subject more people to flooding.

Risk Assessment

Geographic Extent

Per the National Inventory of Levees, there are 14 levee systems located within the parish. The figure on the following page displays the levee systems located in the parish and the inundation areas of the levees.

Figure 2-21: Levee Systems in the Parish.

Previous Occurrences

There have been no reported levee failure occurrences within St. Charles Parish.

Probability

It is nearly impossible to predict and model levee failure and its impact on the parish. Due to the unpredictability of levee failures, it is calculated that the probability of a levee failure is less than 1% annually for the unincorporated areas of the parish.

Climate Change Impacts

Extreme precipitation, primarily the type that contributes to flash flooding and not widespread areal flooding, is expected to increase due to climate change. While this may not contribute to the traditional definition of a levee failure, it could increase the chances of a levee overtopping.

Future Hazard Impacts

Population growth and urban development exert significant pressure on levees, as more people and infrastructure depend on their protection from floods. Rapid development often leads to alterations in natural drainage patterns and increased impermeable surfaces, exacerbating flood risks. Expanding urban areas may also encroach upon floodplains and wetlands, reducing natural buffers against floodwaters.

Vulnerability Analysis

Estimated Impact and Potential Loss

The figure on the following page displays Determining the annualized loss as a result of a levee failure is difficult in the parish due to the availability of data on past levee failure events. The National Inventory of Levees was utilized to determine the levees within the parish, the risk level, and the height of the levee. The table on the following page provides an extensive list of the levees in the parish with the risks associated with each system.

Table 2-43: Levees and Risk Associated with each in the Parish.
(Source: National Inventory of Levees)

System	Length (miles)	Height (ft)	Population	Buildings	Property Value
Bayou Saules West Guide	3.323	No Data	0	0	$0
Davis Pond East Guide	0.814	No Data	0	0	$0
Des Allemands North	1.762	No Data	224	67	$20 million
East of Martins Island Levee	6.68	No Data	0	0	$0
Grand Ridge Levee	3.599	No Data	1,363	525	$300 million
Magnolia Ridge	12.163	No Data	13,888	5,489	$3 billion
Mississippi River East Bank	107.108	19	429,480	178,846	$60 billion
Mississippi River West Bank	58.386	26	73,459	36,223	$9 billion
New Orleans East Bank	179.259	17	849,393	323,422	$70 billion
New Orleans West Bank	110.122	15	248,334	90,436	$20 billion
New Sarpy Levees	1.285	No Data	1,323	322	$50 million
North of Cajun Paradis Road Levee	6.627	No Data	2	1	$500,000
Ormond Levee	4.364	No Data	5,552	1,911	$400 million
Sunset Levee	18.283	No Data	4,966	1,713	$700 million

Vulnerable Population

There have been no reported fatalities or injuries due to levee failure in the parish.

Vulnerability Score

Table 2-44: Levee Vulnerability Score for St. Charles Parish.

Levee Vulnerability Score						
	Probability	**Impact**	**Spatial Extent**	**Warning Time**	**Duration**	**Risk Factor**
Risk Level	**1**	**3**	**4**	**1**	**3**	**2.4**

Saltwater Intrusion

Profile

Saltwater intrusion occurs when seawater infiltrates freshwater aquifers or surface water bodies, posing significant risks to natural ecosystems and human activities. In coastal areas where freshwater and saltwater meet, excessive extraction of groundwater for agriculture, industry, or municipal use can lower freshwater levels enabling seawater to encroach inland. This intrusion threatens the availability of drinking water essential for agriculture, local economies, and communities dependent on freshwater resources. Ecologically, it disrupts habitats vital for freshwater species, endangering biodiversity. The infiltration of saltwater can degrade soil quality by increasing salinity, compromising crop yields and agricultural sustainability.

Saltwater intrusion presents a formidable challenge to Louisiana, primarily due to its expansive coastline and low-lying terrain factors that heighten susceptibility to rising sea levels and coastal erosion. Louisiana's vital coastal wetlands play a crucial role in mitigating storm surges and sustaining diverse ecosystems, yet they are particularly vulnerable to the encroachment of saltwater. The southeastern region of Louisiana, including the Mississippi River Delta, faces significant threats from saltwater intrusion. This area is home to essential freshwater marshes and swamps that provide critical habitats for numerous plant and animal species. The intrusion of saltwater into these ecosystems disrupts the delicate ecological balance required for the survival of native species adapted to specific freshwater conditions, posing risks of biodiversity loss.

The state's reliance on groundwater from underground aquifers for agriculture, industry, and municipal water supplies exacerbates the issue. Excessive pumping of groundwater can deplete freshwater levels, creating a gradient that draws seawater into the aquifers. This phenomenon jeopardizes the quality and quantity of available freshwater resources, impacting local communities, agricultural productivity, and industrial operations alike.

Louisiana has responded to these challenges with various mitigation strategies. These efforts include initiatives focused on coastal restoration, aimed at rebuilding and maintaining natural defenses such as barrier islands and marshlands that serve as buffers against saltwater intrusion. The state has enhanced monitoring and regulation of groundwater use to promote sustainable management practices and preserve freshwater resources for future generations.

Despite these proactive measures, Louisiana continues to confront persistent challenges exacerbated by saltwater intrusion and exacerbated by climate change. Anticipated increases in sea levels and storm intensity associated with climate change are expected to escalate the impacts of saltwater intrusion, underscoring the critical need for ongoing adaptation and resilience-building efforts. These efforts are essential to safeguarding both the natural ecosystems and the communities reliant on Louisiana's coastal resources.

Risk Assessment

Geographic Extent

Saltwater intrusion in the parish primarily affects areas along its southern boundary adjacent to the Gulf of Mexico and areas along the Mississippi River. The parish is susceptible to saltwater intrusion due to its low-lying coastal geography and proximity to both saline water bodies. The extent of intrusion can vary depending on factors such as sea level rise, groundwater extraction rates, and hydrological conditions.

Previous Occurrences

Saltwater intrusion has been a recurring issue in the parish primarily affecting its southern and southeastern areas. Historically, the parish has experienced instances of saltwater encroachment into freshwater aquifers due to a combination of factors including sea level rise, hydrological changes, and land subsidence.

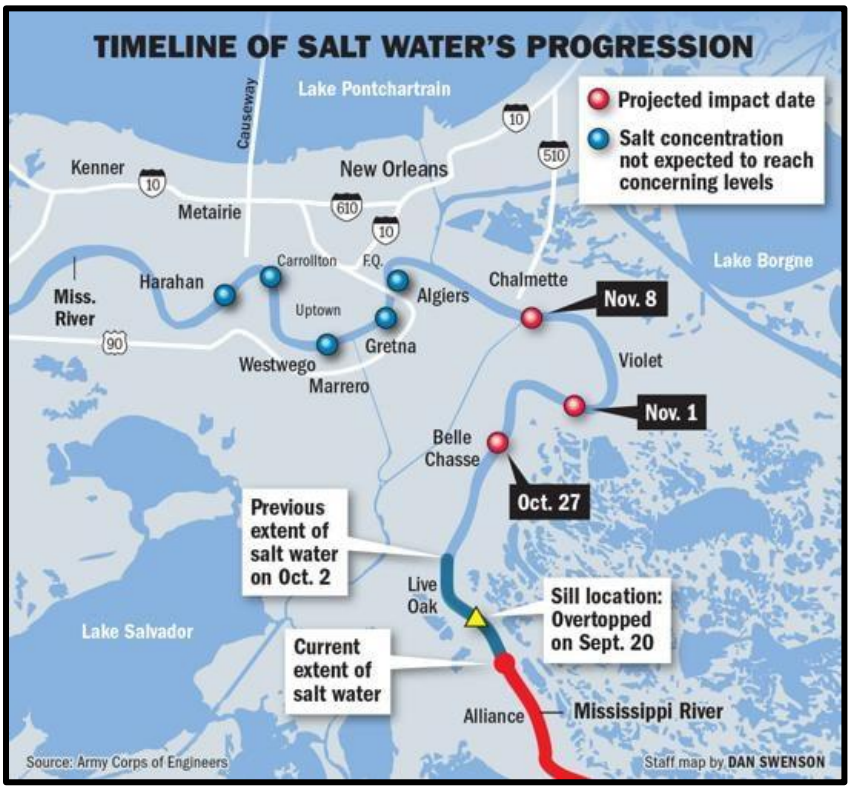


Figure 2-22: Saltwater Intrusion Wedge in the Mississippi River October 10, 2023. (Source: NOLA.com)

Probability

Due to the parish's geographical location, it is calculated that the probability of saltwater intrusion is 100% annually for the unincorporated areas of the parish.

Climate Change Impacts

Climate change intensifies saltwater intrusion by raising sea levels, which increases pressure on coastal aquifers and pushes saltwater further inland. Changes in precipitation patterns and increased evaporation rates due to higher temperatures also reduce freshwater recharge into aquifers, exacerbating the problem.

Future Hazard Impacts

Population growth and urban development can exacerbate saltwater intrusion into freshwater aquifers in several ways. Increased water demand from growing populations often leads to excessive groundwater extraction, lowering water tables and allowing seawater to intrude into coastal aquifers. Additionally, urbanization often involves the construction of impermeable surfaces like roads and buildings, which reduce natural recharge of aquifers and further exacerbate saltwater intrusion. Climate change, which can lead to sea level rise and altered precipitation patterns may also intensify these impacts.

Vulnerability Analysis

Estimated Impact and Potential Loss

Determining the annualized loss as a result of a saltwater intrusion is difficult in the parish due to availability of data on past events. However, saltwater intrusion has the potential to corrode infrastructure such as wells, pipes, and pumps necessitating costly repairs and replacements. Saltwater intrusion can contaminate freshwater aquifers reducing the availability of potable water for drinking and agriculture. The Mississippi River is a vital resource for St. Charles Parish and plays a crucial role in the region's water supply through its connection to aquifers. The health of the river is essential to the community as saltwater intrusion poses a significant threat to drinking water. Maintaining

the health of the Mississippi River is not only essential for sustaining local ecosystems but also for ensuring the continued safety and reliability of the water supply for St. Charles Parish.

Agriculture could also be adversely affected leading to decreased crop yields and economic losses for farmers. The coast of Louisiana and along the banks of the Mississippi River are dominated by wetland areas. Marsh plants, which are for the most part salt-tolerant, have begun to move inland and have been found encroaching on farms. This is referred to as marsh migration. Encroaching marsh life brings upon various nutrients that sponsor algae growth. When the algae die off, the remaining bacteria in the water will break down plant life. Plant life in water is responsible for attributing numerous amounts of oxygen to marine life in water bodies. With plants beginning to deteriorate and the presence of oxygen becoming less abundant, marine life will begin to die out as well. This has a big economic impact not only in coastal regions but also in any region along the Mississippi River.

Vulnerable Population

There have been no reported fatalities or injuries due to saltwater intrusion in the parish. Residents and businesses will face disruptions in daily life and economic activities due to water shortages and quality issues. This could drastically impact tourism, real estate values, and the overall community well-being.

Vulnerability Score

Table 2-45: Saltwater Intrusion Vulnerability Score for St. Charles Parish.

Saltwater Intrusion Vulnerability Score						
	Probability	Impact	Spatial Extent	Warning Time	Duration	Risk Factor
Risk Level	4	3	2	1	4	2.9

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.

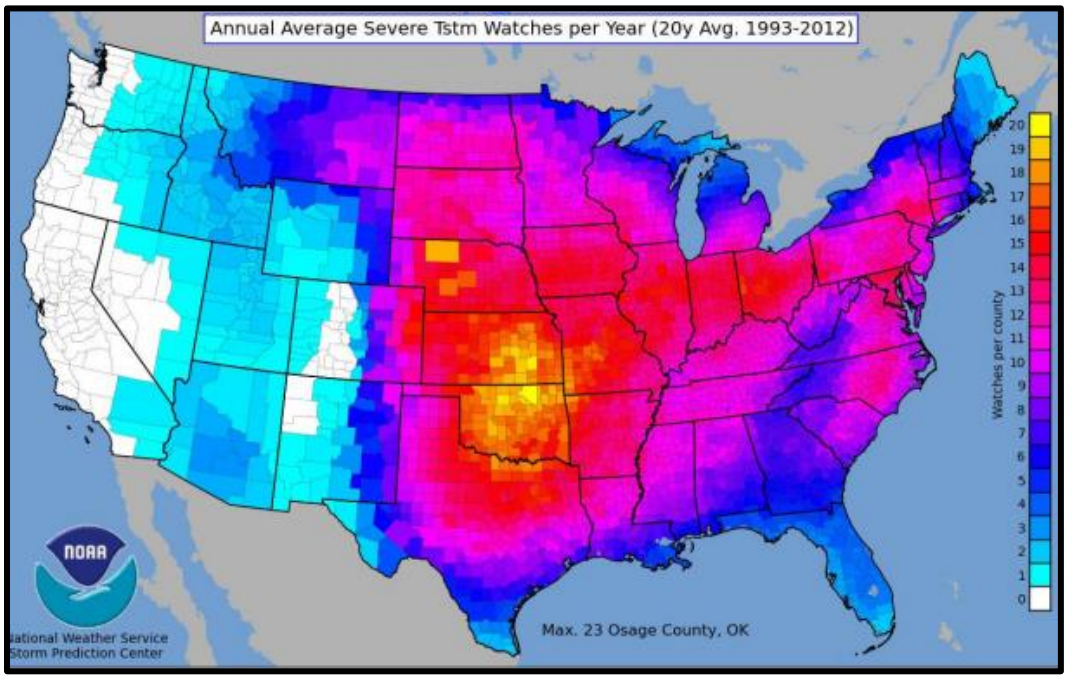


Figure 2-23: County-Level Severe Thunderstorm Watches Issued Per Year on Average.

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 2-46: 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 2-47: 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-negatively 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.

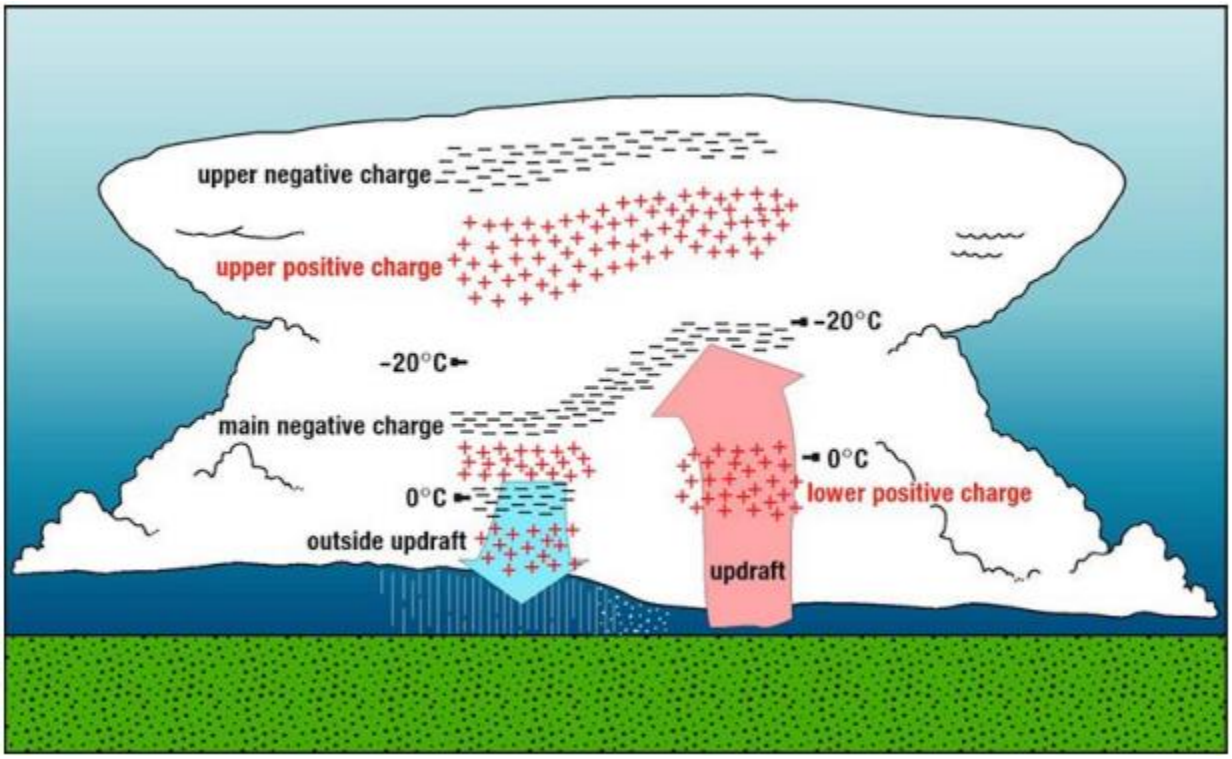


Figure 2-24: Charge Distribution in a Typical Storm Cloud
(Source: The National Severe Storms Laboratory)

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 following table outlines the lightning activity level and intensity scale:

Table 2-48: 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 2-49: High Winds Categorized by Source.
(Source: Making Critical Facilities Safe from High Wind, FEMA)

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 2-50: 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 climatological based occurrence that can occur anywhere, the entire planning area is at risk from hailstorms. The worst-case scenario for hailstorms is hail up to 1.75 inches in diameter.

Previous Occurrences

The parish experienced 31 hail occurrences between the years 1996 and 2023. Since the last update, there have been four hail occurrences within the boundaries of the parish.

Table 2-51: Historical Hail Occurrences in St. Charles Parish since the Last Update.

Date	Location	Magnitude (inches)	Property Damage	Fatalities	Injuries
3/11/2022	DES ALLEMANDS	1.75	$0	0	0
6/20/2023	GYPSY	1	$0	0	0
6/20/2023	NORCO	1.75	$0	0	0
6/20/2023	DES ALLEMANDS	1	$0	0	0

Probability

The annual return rate (frequency) for hail occurrences in the parish is 1.11 (100% annual probability) or approximately 1 to 2 hail occurrences every year. The figures on the following page display the density of hailstorm events and an overview of hailstorm size based on location.

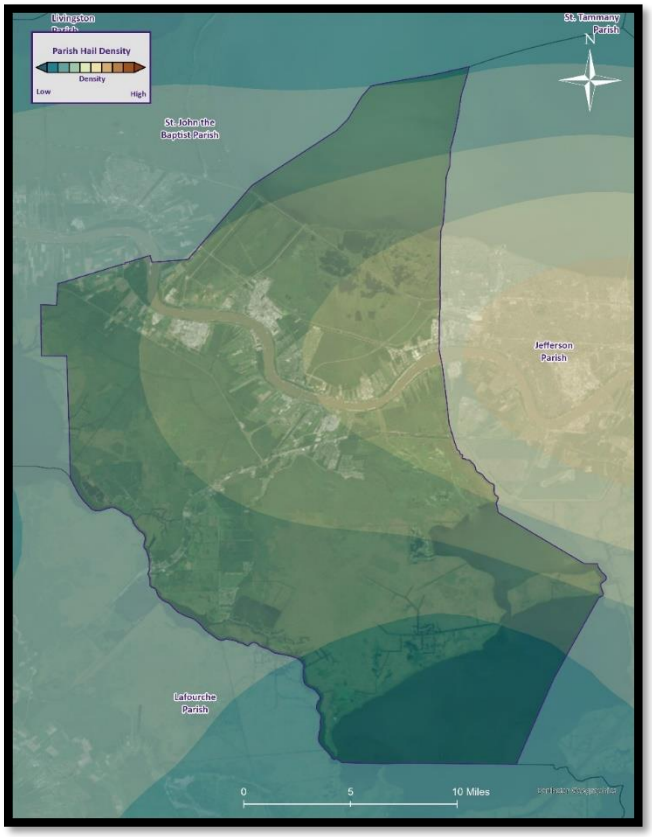


Figure 2-25: Density of Hailstorms by Diameter from 1950-2019.

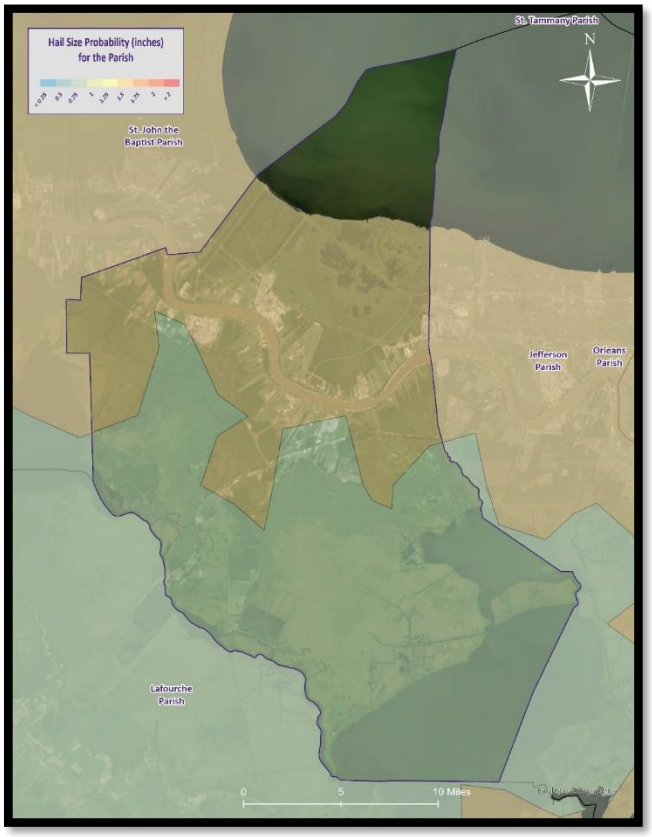


Figure 2-26: Hail Size Probability in Inches for St. Charles Parish.

Lightning Risk Assessment

Geographic Extent

Because lightning strikes are a climatological 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 has experienced two lightning occurrences between the years 1996 and 2023. Since the last update, there have been no significant lightning occurrences within the boundaries of the parish.

Probability

The annual return rate (frequency) for lightning occurrences in the parish is 0.07 (7% annual probability) or approximately 1 lightning occurrence every 14 years.

Thunderstorm Wind Risk Assessment

Geographic Extent

Because thunderstorm winds are a climatological-based occurrence that can occur anywhere, the entire planning area is at risk from thunderstorm wind. The worst-case scenario for thunderstorm wind occurrences is hail wind speeds of approximately 70 knots.

Previous Occurrences

The parish experienced 73 thunderstorm wind occurrences between the years 1996 and 2023. Since the last update, there have been eight thunderstorm wind occurrences within the boundaries of the parish.

Table 2-52: Historical Thunderstorm Wind Occurrences in St. Charles Parish since the Last Update.

Date	Location	Magnitude (knots)	Property Damage	Crop Damage	Fatalities	Injuries
6/23/2020	GYPSY	50	$5,000	$0	0	0
7/15/2020	DESTREHAN	50	$0	$0	0	0
7/15/2020	LULING	50	$0	$0	0	1
5/6/2023	KILLONA	52	$2,000	$0	0	0
5/6/2023	GYPSY	52	$3,000	$0	0	0
5/6/2023	PARADIS	52	$1,000	$0	0	0
5/6/2023	MIMOSA PARK	52	$1,000	$0	0	0
9/7/2023	NORCO	52	$36,000	$0	0	0

Probability

The annual return rate (frequency) for thunderstorm wind occurrences in the parish is 2.61 (100% annual probability) or approximately 2 to 3 thunderstorm wind occurrences every year. The figure on the following page displays the thunderstorm wind speed probability for the parish.

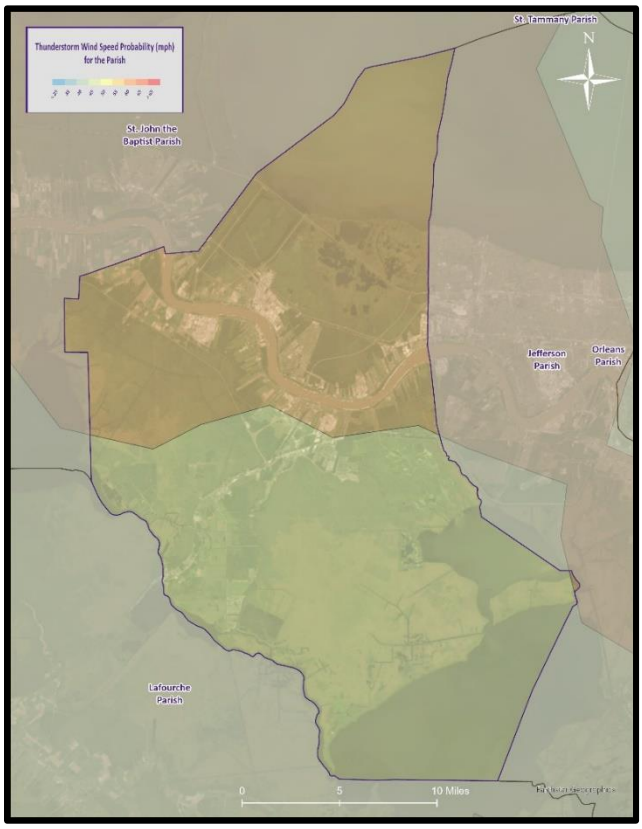


Figure 2-27: Thunderstorm High Wind Speed Probability in Miles Per Hour for St. Charles Parish.

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 2-53: National Risk Index (NRI) Summarization of Hail Occurrences for St. Charles 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 31 significant hail occurrences per the NCEI Storm Events Database. The total property damage associated with these storms totaled approximately $5,000. 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 – 2023). This provides an annual estimated potential loss of $179 and $161 per event. The following table provides an estimate of potential property losses for the Parish:

Table 2-54: Estimated Annual Property Losses in St. Charles Parish resulting from Hail Damage.

Estimated Annual Potential Losses from Hail Damage
St. Charles Parish
$179

Vulnerable Population

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

Vulnerability Score

Table 2-55: Hail Vulnerability Score for the 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 2-56: National Risk Index (NRI) Summarization of Lightning Occurrences for St. Charles Parish (Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Relatively Low	Relatively Low

Estimated Impact and Potential Loss

Since 1996, there has been two significant lightning occurrence per the NCEI Storm Events Database. The total property damage associated with this storm totaled approximately $500,000. 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 – 2023). This provides an annual estimated potential loss of $17,857 and $250,000 per event. The following table provides an estimate of potential property losses for the Parish:

Table 2-57: Estimated Annual Property Losses in St. Charles Parish resulting from Lightning Damage.

Estimated Annual Potential Losses from Lightning
St. Charles Parish
$17,857

Vulnerable Population

Per the NCEI Storm Events Database, there have been no reported fatalities and four injuries as a result of lightning.

Vulnerability Score

Table 2-58: Lightning Vulnerability Score for the Parish.

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

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 following table provides an overview of each category at the county level for thunderstorm wind.

Table 2-59: National Risk Index (NRI) Summarization of Thunderstorm Wind Occurrences for St. Charles Parish (Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Relatively Moderate	Relatively Moderate

Estimated Impact and Potential Loss

Since 1996, there have been 73 significant thunderstorm wind occurrences per the NCEI Storm Events Database. The total property damage associated with these storms totaled approximately $312,900. 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 – 2023). This provides an annual estimated potential loss of $11,175 and $4,286 per event. The following table provides an estimate of potential property losses for the Parish:

Table 2-60: Estimated Annual Property Losses in St. Charles Parish resulting from Thunderstorm Wind Damage.

Estimated Annual Potential Losses from Wind Damage
St. Charles Parish
$11,175

Vulnerable Population

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

Vulnerability Score

Table 2-61: Thunderstorm Wind Vulnerability Score for St. Charles 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 2-62: 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 2-63: 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.

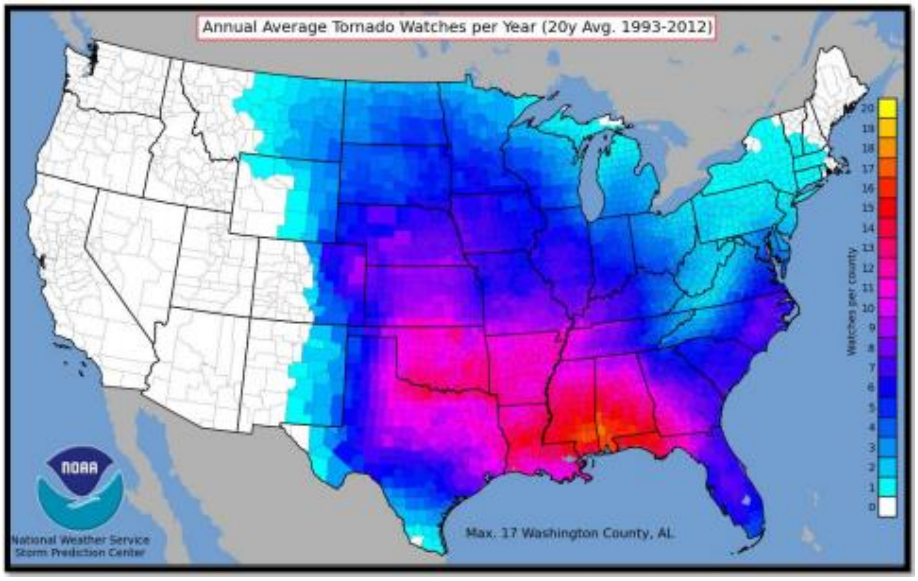


Figure 2-28: County-Level Tornado Watches Issued Per Year on Average. (Source: NOAA SPC)

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-cast scenario of a tornado occurrence is an EF3 tornado.

Previous Occurrences

The parish experienced 15 tornado occurrences between the years 1996 and 2023. Since the last update, there have been four tornado occurrences within the boundaries of the parish.

Table 2-64: Historical Tornado Occurrences in St. Charles Parish since the Last Update.

Date	Location	Magnitude	Property Damage	Crop Damage	Fatalities	Injuries
5/19/2021	MIMOSA PARK	EF0	$35,000	$0	0	0
11/26/2022	PARADIS	EF1	$35,000	$0	0	0
12/14/2022	KILLONA	EF2	$250,000	$0	1	8
6/20/2023	BOUTTE	EF1	$0	$0	0	0

Probability

The annual return rate (frequency) for tornado occurrences in the parish is 0.54 (54% annual probability) or approximately 1 tornado occurrence every 1 to 2 years. The following figure displays the tornado density for the parish.

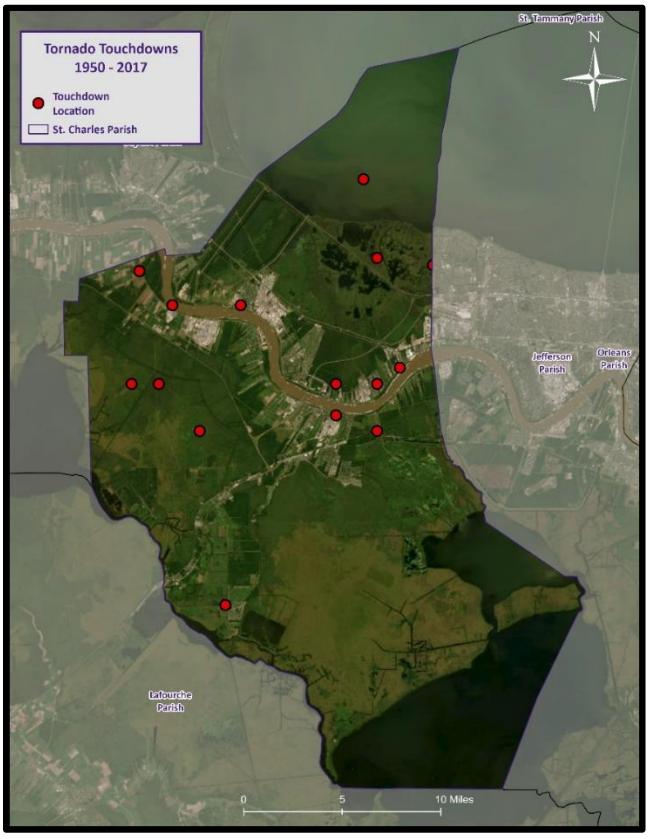


Figure 2-29: Location of Tornadoes to Touchdown in St. Charles Parish (Source: NOAA/SPC Severe Weather Database)

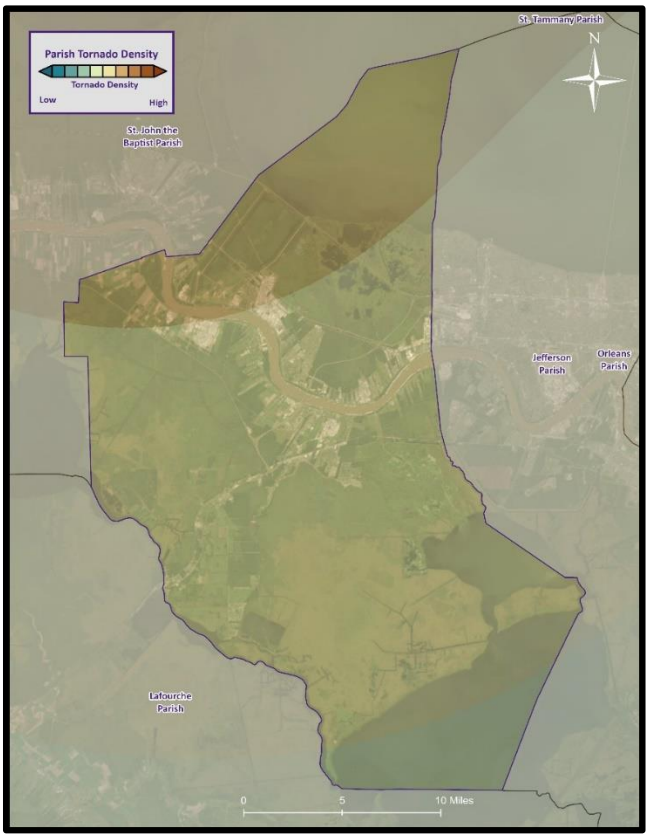


Figure 2-30: Density of Tornadoes to Touchdown in St. Charles Parish (Source: NOAA/SPC Severe Weather Database)

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 2-65: National Risk Index (NRI) Summarization of Tornado Occurrences for St. Charles 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 15 significant tornado occurrences per the NCEI Storm Events Database. The total property damage associated with these storms totaled approximately $470,000. 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 – 2023). This provides an annual estimated potential loss of $16,786 and $31,333 per event. The following table provides an estimate of potential property losses for the Parish:

Table 2-66: Estimated Annual Property Losses in St. Charles Parish resulting from Tornado Damage.

Estimated Annual Potential Losses from Tornadoes
St. Charles Parish
$16,786

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

Table 2-67: Building Exposure by General Occupancy Type for Tornadoes in St. Charles Parish. (Source: Hazus)

Building Exposure by General Occupancy Type for Tornadoes ($1,000)							
Residential	Commercial	Industrial	Agricultural	Religion	Government	Education	Mobile Homes (%)
5,800,732	1,604,868	250,231	3,439	82,583	101,698	384,512	17.4

Vulnerable Population

Per the NCEI Storm Events Database, there have been one reported fatality and 11 injuries as a result of tornadoes. In accessing the overall risk to population, the most vulnerable population throughout the parish are those residing in manufacturing housing. Approximately 17.4% of all housing in the Parish consists of manufactured housing.

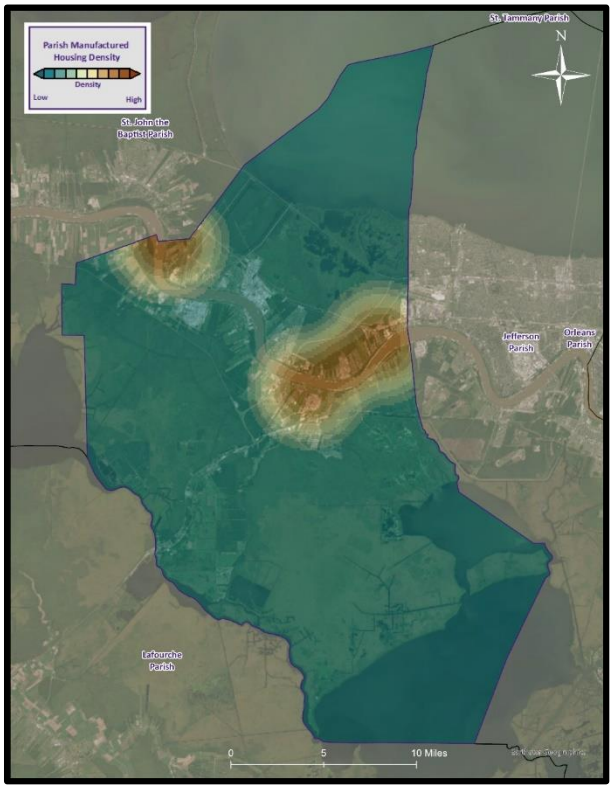


Figure 2-31: Manufactured Home Density in St. Charles Parish

Vulnerability Score

Table 2-68: Tornado Vulnerability Score for St. Charles Parish.

Tornado Vulnerability Score						
	Probability	Impact	Spatial Extent	Warning Time	Duration	Risk Factor
Risk Level	3	3	2	4	3	2.95

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 counter-clockwise 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.

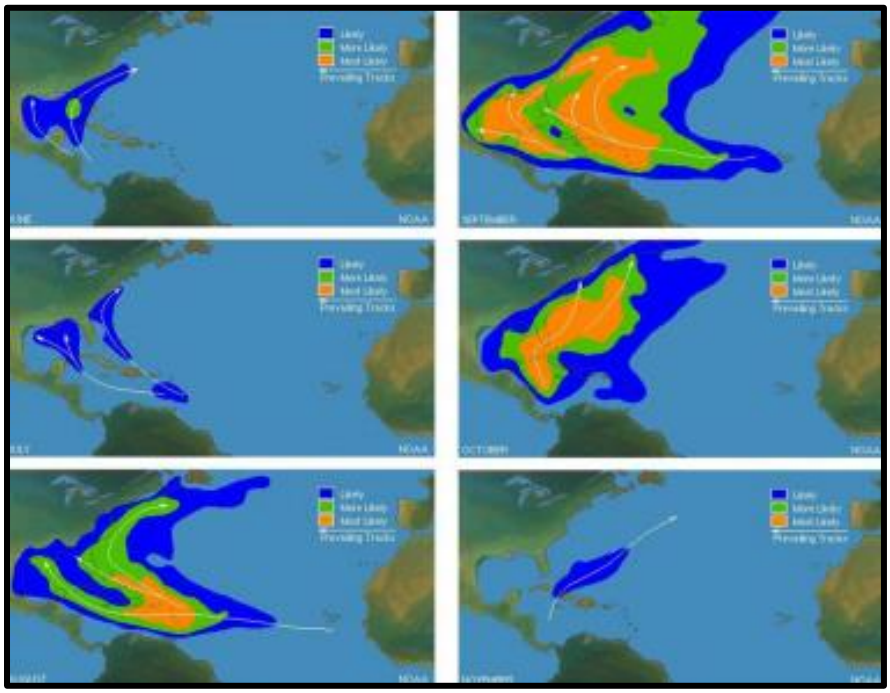


Figure 2-32: Areas of Likely Tropical Cyclone Formation and Tracking (Source: NOAA NHC)

Hurricane 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.

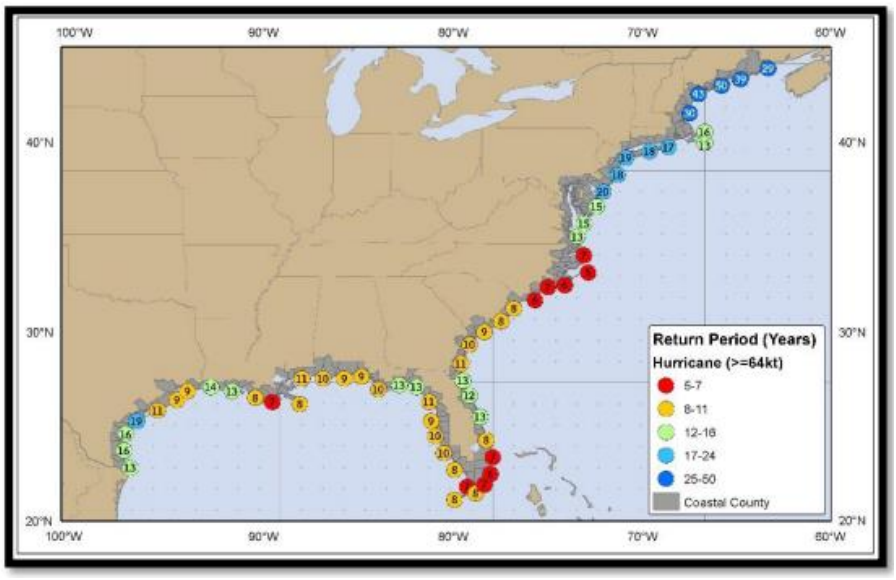


Figure 2-33: Hurricane Return Periods for the Atlantic Basin (USA). (Source: NOAA NHC)

Table 2-69: 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 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. Salt water 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 parish. Because of this, all of the planning area is susceptible to the effects of tropical cyclones. Tropical cyclones are the single biggest threat to all of South Louisiana. With any single tropical cyclone event having the potential to devastate multiple parishes at once, tropical cyclones are a significant threat to the entire parish planning area. The worst-case scenario for a tropical cyclone event in the parish is a category 3 hurricane.

Previous Occurrences

St. Charles Parish experienced 20 tropical cyclone occurrences between the years 2002 and 2023. Since the last update, there have been three tropical cyclone occurrences within the boundaries of the parish.

Table 2-70: Historical Tropical Cyclone Occurrences in St. Charles Parish since the Last Update.

Date	Magnitude	Name	Property Damage	Crop Damage	Fatalities	Injuries
10/9/2020	Tropical Storm	Delta	$100,000	$0	0	0
10/28/2020	Tropical Storm	Zeta	$10,000,000	$0	0	0
8/29/2021	Hurricane	Ida	$500,000,000	$0	0	0

The following figure displays historical hurricanes that have impacted St. Charles Parish in the past:

Figure 2-34: Historical Tropical Cyclones Impacting St. Charles Parish.

Tropical Storm Delta (2020)

Hurricane Delta was the record-tying fourth named storm of 2020 to strike Louisiana, as well as the record-breaking tenth named storm to strike the United States in that year. The twenty-sixty tropical cyclone, twenty-fifth named storm, ninth hurricane, and third major hurricane of the record breaking 2020 Atlantic hurricane season, Delta formed from a tropical wave which was first monitored by the National Hurricane Center on October 1. As it tracked across the western Caribbean, it rapidly intensified into a Category 4 hurricane. In fact, intensifying from tropical depression to Category strength in 40 hours is the fastest rate of intensification of any storm on record in the Atlantic Basin and accomplished by Delta. Delta quickly weakened to a category 1 hurricane after making its first landfall on the Yucatan Peninsula. It gradually recurved north towards the Louisiana coastline, fluctuating in intensity between category 2 and 3. Hurricane Delta made landfall around 5 pm as a category 2 storm east of Cameron, Louisiana or about 15 miles east of where category 4 Hurricane Laura made landfall just a couple of months earlier of the same year. Local impacts included 50 to 70 mph wind gusts across the area, storm surge of 2 to 3 feet above ground, and widespread tree and structural damage. There were six injuries due to Hurricane Delta. In addition, outer bands of Delta produced a significant amount of rainfall on the north side of Baton Rouge Metro. Upwards of five to 10 inches of rain fell, causing street flooding in Baton Rouge and moderate river flooding in the region. Delta caused approximately $100 million worth of damage across southeast Louisiana.

In St. Charles Parish, minor impact occurred from tropical storm force wind gusts. Peak gusts across the parish were estimated in the 40 to 50 mph range resulting in power outages to roughly 1,500 homes.

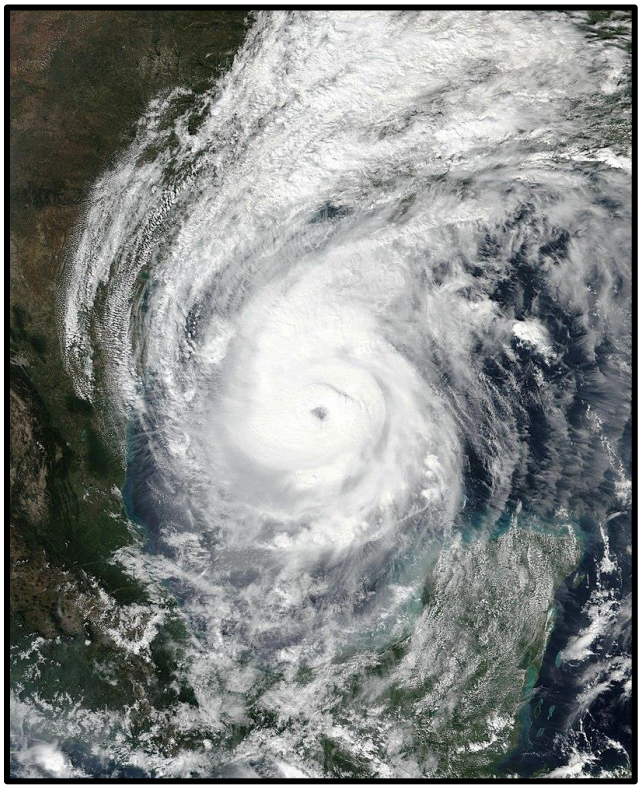


Figure 2-35: Hurricane Delta in the Gulf Coast Area. (Source: NOAA)

Tropical Storm Zeta (2020)

A tropical depression formed in the northwestern Caribbean on the afternoon of October 24th. Nine hours later, it became the twenty-seventh named storm and eleventh hurricane of the exceptionally active 2020 Atlantic hurricane season. After meandering virtually in the same place, Zeta finally began moving northwest and slowly strengthening before making its first landfall on the Yucatan Peninsula on October 26th. Zeta exited the Yucatan Peninsula weaker but still a strong tropical storm. The path of the storm began shifting from the northwest to northeast and heading

straight towards the state of Louisiana. In terms of intensity, Zeta slowly but steadily strengthened from this point all the way up until landfall. It reached the highest wind speed possible of a Category 2 storm, 110 mph. Zeta produced extensive wind damage across southeast Louisiana with measured sustained winds up to 87 mph and gusts up to 110 mph. Thousands of power poles were downed, and thousands of homes experienced minor damage. Storm surge ranged from a few feet to several feet. There was a total of one fatality and one injury. Hurricane Zeta caused approximately $1 billion worth of damage. Zeta was the record-tying sixth hurricane to make landfall in the United States and the record fifth named storm to strike Louisiana in 2020.

In St. Charles Parish, Zeta produced tropical storm force winds which downed trees and power lines across the parish with sporadic minor structural damage. At the peak, nearly 80 percent of the parish was without power. The parish opened one shelter as a result of the storm.

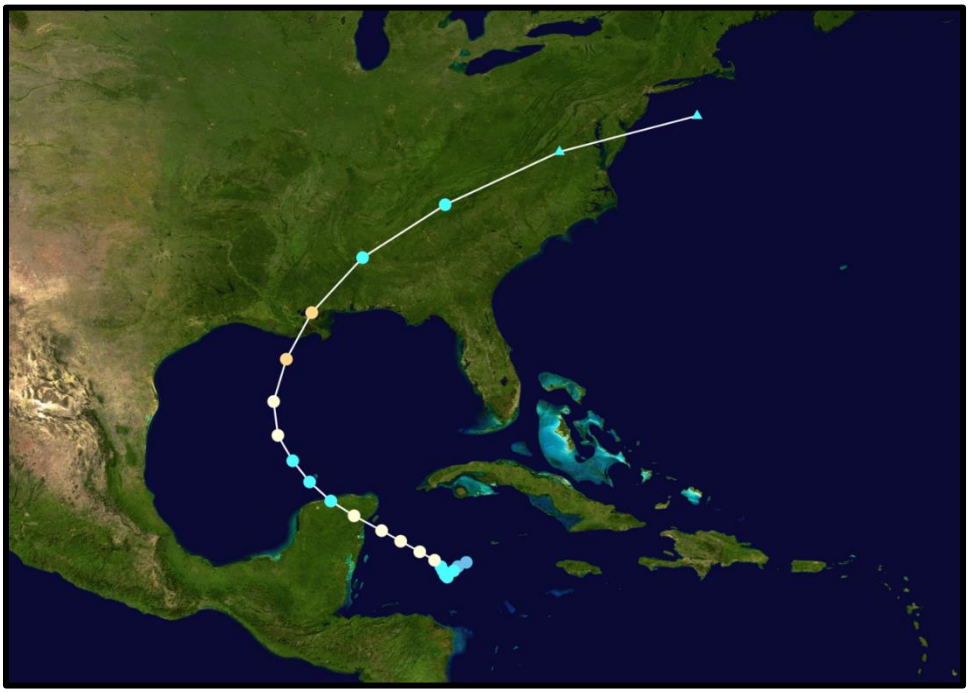


Figure 2-36: Hurricane Zeta Path in the Gulf Coast Area.
(Source: NOAA)

Hurricane Ida (2021)

Ida formed from a combination of multiple low-latitude weather systems, starting with a tropical wave emerging from the coast of Africa on 14 August. This wave was weak and hard to track as it moved slowly westward through the monsoon trough environment over the eastern tropical Atlantic. The wave moved into the trade wind environment west of 45°W on 21 August, accompanied by an area of convection that was elongated from east to west, and this convection increased in coverage as the wave moved through the Windward Islands on 23 August. By 24 August, the wave was near Aruba, Bonaire, and Curacao, and it began to interact with a broad area of low pressure located along the northern coast of South America. This interaction resulted in a large area of pressures near or below 1006 mb by late that day, along with widespread heavy rains over portions of Venezuela. The next day, the convection became more concentrated near a vorticity maximum on the eastern side of a broad low-pressure area over the southwestern Caribbean Sea. The disturbance turned north-northwestward on 26 August on the southwestern side of the subtropical ridge, and the associated convection became better organized while the circulation became better defined. It is estimated that a tropical depression formed near 1200 UTC that day about 150 n mi southwest of Kingston, Jamaica.

The cyclone was moving north-northwestward at the time of genesis. A few hours later, it turned northwestward as it was steered by the flow on the southwestern side of the subtropical ridge, and this general motion continued for

the next three days. The cyclone strengthened to a tropical storm 6 h after genesis, and slow strengthening continued as the center passed northeast of Grand Cayman Island early on 27 August. Rapid strengthening occurred after the center passed Grand Cayman, and Ida became a hurricane with 70-kt winds before the center reached the Isle of Youth, Cuba, at 1800 UTC 27 August. After crossing the Isle of Youth, the center made landfall in mainland Cuba near Playa Dayaniguas in the province of Pinar del Rio near 2325 UTC that day. Continuing northwestward, Ida's center subsequently emerged over the southeastern Gulf of Mexico between 0100–0200 UTC 28 August. Passage over land and entrainment of dry air into the hurricane's southwestern quadrant halted intensification as Ida crossed Cuba, and little change in strength occurred during the first several hours after the hurricane reached the Gulf of Mexico. However, during this time microwave satellite imagery and radar data from Cuba showed the central core reorganizing with the formation of a convective ring around the center. This, combined with the favorable conditions of light vertical wind shear (near 10 kt) and sea surface temperatures at or above 30°C, led to a second round of rapid strengthening that started at 1200 UTC 28 August and continued for the next 24 h. During this intensification phase, the maximum winds increased from 70 kt to 90 kt in the first 12 h, and then from 90 kt a peak of 130 kt in the next 12 h. Additionally, the central pressure fell from 986 to 929 mb. By the end of this rapid intensification period, Ida had moved northwestward to a position not far southwest of the Mouth of the Mississippi River. A continued northwestward motion brought the 15-n-mi-wide eye to the Louisiana coast at Port Fourchon at 1655 UTC 29 August. The maximum winds at landfall were 130 kt – category 4 on the Saffir-Simpson Hurricane Wind Scale – and the central pressure was near 931 mb. As best as can be determined, the 130-kt landfall intensity is equal to that of Hurricane Laura of August 2020 and the Last Island Hurricane of August 1856, with these three category 4 storms tied for the strongest on record to make landfall in Louisiana west of the Mouth of the Mississippi River.

Shortly after landfall, Ida turned north-northwestward, and this motion brought the eye across southeastern Louisiana between Houma and New Orleans. A continued north-northwestward motion early on 30 August brought the center just west of LaPlace and then between Baton Rouge and Hammond. The cyclone's intensity steadily decreased as it moved inland, and it weakened to a tropical storm before the center moved into southwestern Mississippi between 0600–1200 UTC that day. Ida then turned northeastward as it moved around the western end of the subtropical ridge, with the center passing just west of Jackson, Mississippi, around 1800 UTC. Soon thereafter, the cyclone weakened to a tropical depression as it moved into northeastern Mississippi. The system then accelerated northeastward across northwestern Alabama, central and eastern Tennessee, and portions of Kentucky and Virginia before reaching southern West Virginia near 1200 UTC 1 September. Ida began an extratropical transition as it moved through the Tennessee Valley, and the system became an extratropical low as it moved over West Virginia later that day.

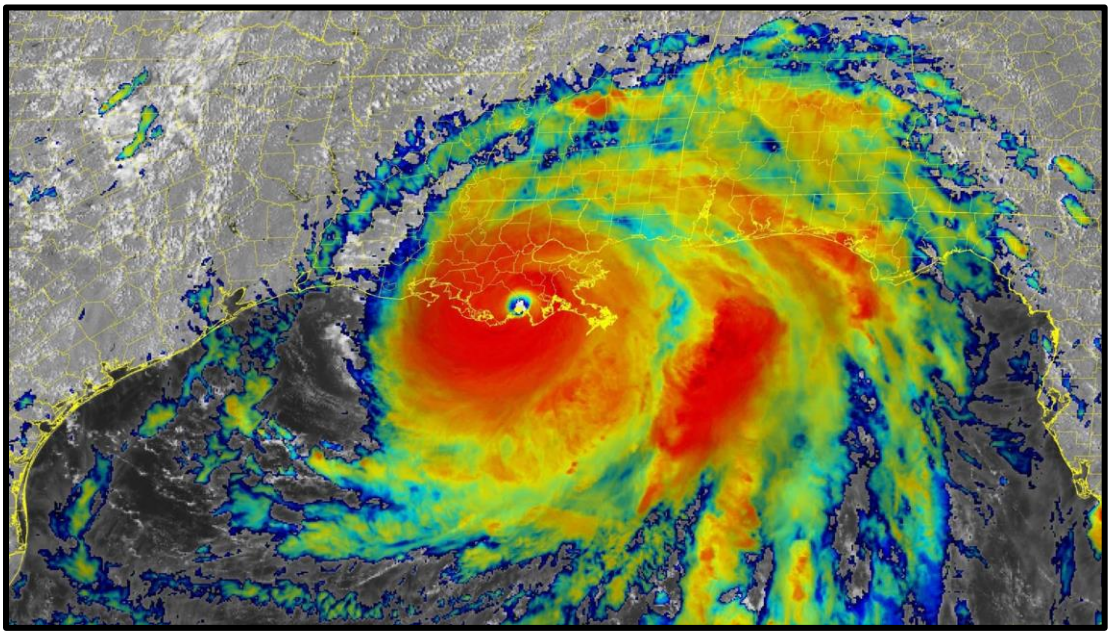


Figure 2-37: Hurricane Ida Rainbands in the Gulf Coast Area.
(Source: NOAA)

In St. Charles Parish, Ida resulted in widespread wind damage across the parish. Numerous trees and powerlines were downed. Most homes in the parish suffered at least minor to moderate roof or other damage while several were destroyed. The parish's main hospital suffered major damage to its emergency room and operating room areas with every parish school suffering damage ranging from cosmetic to catastrophic.

Probability

The annual return rate (frequency) for tropical cyclone occurrences in the parish is 1.00 (100% annual probability) or approximately 1 tropical cyclone occurrence every year.

Climate Change Impacts

Climate change has the potential to alter the prevalence and severity of extreme incidents such as tropical cyclones. 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 seal 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 tropical cyclone 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 tropical cyclones on both infrastructure and vulnerable populations, making them more frequent and severe. As ocean temperatures rise due to global warming, tropical cyclones 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 tropical cyclones 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 tropical cyclones, 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, tropical cyclones 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 tropical cyclones, 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 tropical cyclones and protecting both infrastructure and vulnerable populations from their devastating effects.

Future Hazard Impacts

Hazard impacts for flood and tropical cyclones were estimated for the years 2025 and 2030. Yearly population and housing decline rates were applied to parish inventory assets for composite floods and tropical cyclones. Based on

a review of available information, it is assumed that population and housing units will decrease within the parish from the present until 2030. 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 2-71: Estimated Future Impacts, 2020 - 2030.
(Source: Hazus, US Census Bureau)

Hazard / Impact	Total in Parish (2020)	Hazard Area (2020)	Hazard Area (2025)	Hazard Area (2030)
Tropical Cyclone Damage				
Structures	4,316	4,316	4,119	3,968
Value of Structures	$1,590,783,158	$1,590,783,158	$1,597,159,237	$1,602,278,496
# of People	10,025	10,025	10,075	10,116

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 tropical cyclones.

Table 2-72: National Risk Index (NRI) Summarization of Tropical Cyclone Occurrences for St. Charles Parish.
(Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Very Low	Very 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 2-73: Total Estimated Losses for a 100-Year Hurricane Event
(Source: Hazus)

Location	Estimated Total Losses from 100-Year Hurricane Event
St. Charles Parish	$270,021

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 2-74: Ratio of Total Losses to Total Estimated Value of Assets for St. Charles Parish.
(Source: Hazus)

Location	Estimated Total Losses from 100-Year Hurricane Event	Total Estimated Value of Assets	Ratio of Estimated Losses to Total Value
St. Charles Parish	$396,570,678	$8,228,063,000	4.8%

Based on the Hazus Hurricane Model, estimated total losses for the parish is 4.8% 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 2-75: Estimated Losses in Unincorporated Area of St. Charles Parish for a 100-Year Hurricane Event (Source: Hazus)

St. Charles Parish	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$192,465
Commercial	$44,051,247
Government	$508,985
Industrial	$7,848,296
Religious / Non-Profit	$2,161,684
Residential	$340,899,928
Schools	$908,073
Total	**$396,570,678**

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

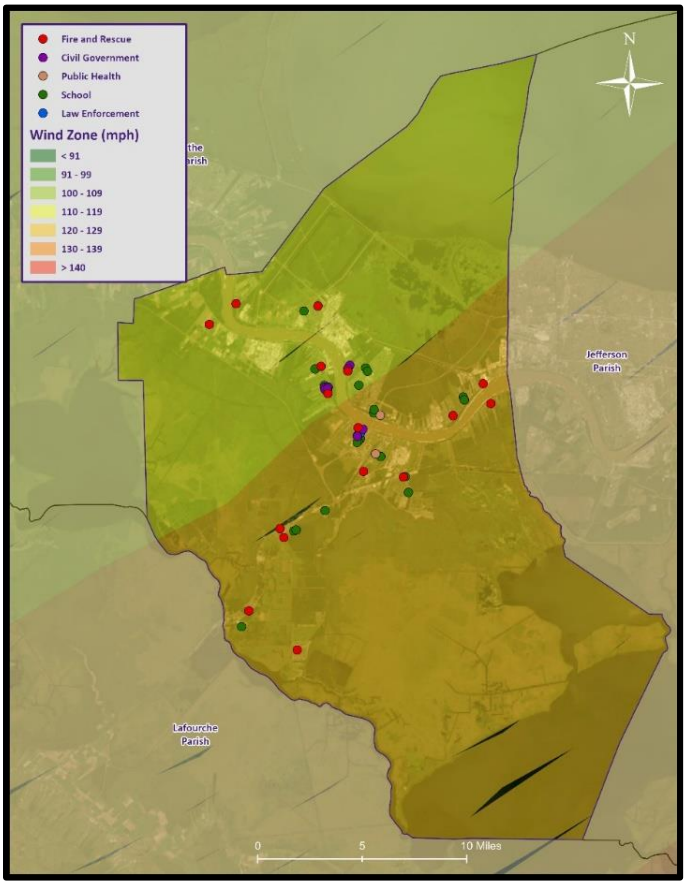


Figure 2-38: Winds Zones for St. Charles Parish in Relation to Critical Facilities

Vulnerable Population

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

Table 2-76: Number of People Susceptible to a 100-Year Hurricane Event in St. Charles Parish (Source: Hazus)

Number of People Exposed to Hurricane Hazards			
Location	**# in Community**	**# in Hazard Area**	**% in Hazard Area**
St. Charles Parish	52,549	52,549	100.0%

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

Table 2-77: Vulnerable Populations in Unincorporated Area of St. Charles Parish for a 100-Year Hurricane Event (Source: Hazus)

St. Charles Parish		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	52,549	100.0%
Persons Under 5 Years	2,943	5.6%
Persons Under 18 Years	12,559	23.9%
Persons 65 Years and Over	8,145	15.5%
White	37,100	70.6%
Minority	15,449	29.4%

Vulnerability Score

Table 2-78: Tropical Cyclone Vulnerability Score for St. Charles Parish.

Tropical Cyclone Vulnerability Score						
	Probability	**Impact**	**Spatial Extent**	**Warning Time**	**Duration**	**Risk Factor**
Risk Level	4	4	4	1	4	3.55

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.

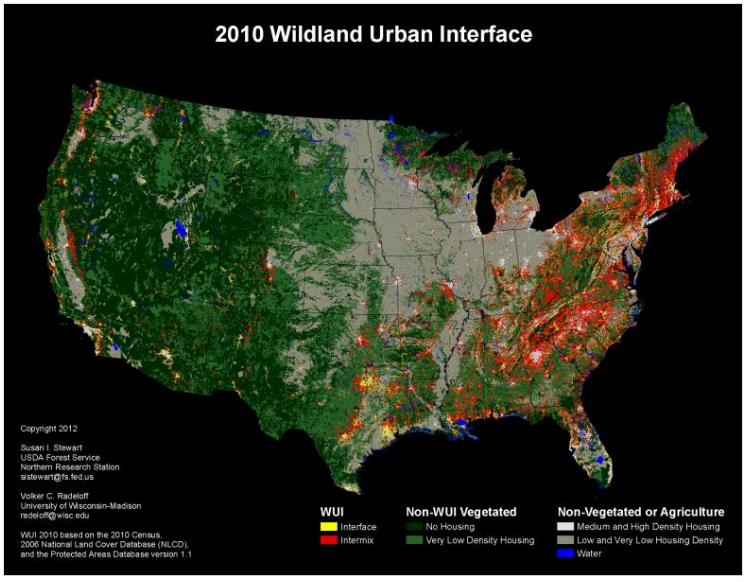


Figure 2-39: Contiguous USA Wildland Urban Interface Map.

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 below summarizes the intensity levels assigned to areas in the Southern Wildfire Assessment Portal.

Table 2-79: 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 following figure displays the areas of wildland-urban interface and intermix in St. Charles Parish

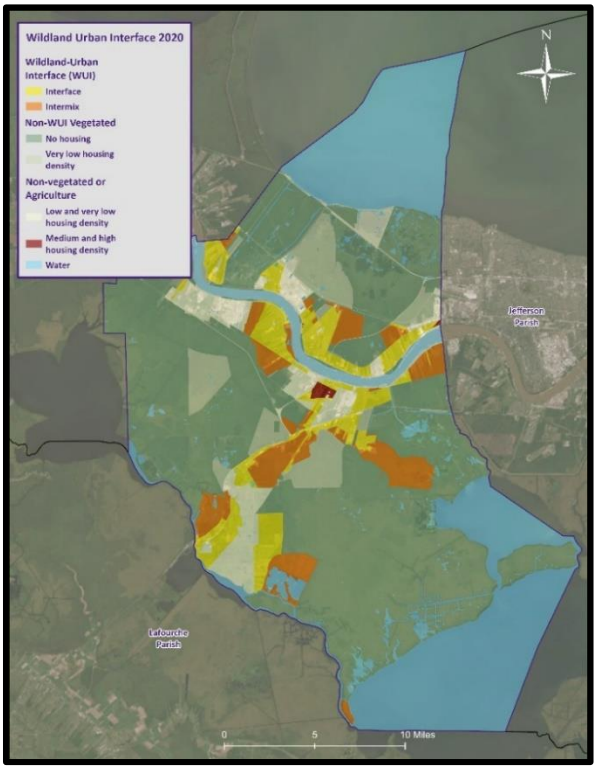


Figure 2-40: Wildland-Urban Interaction in St. Charles Parish.

Previous Occurrences

The parish has experienced no significant wildfire occurrences between the years 1996 and 2023 per the NCEI Storm Events Database.

Probability

The annual return rate (frequency) for wildfire occurrences in the parish is less than 0.01 (< 1% annual probability) or 1 wildfire event approximately every 28 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.

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 2-80: National Risk Index (NRI) Summarization of Wildfire Occurrences for St. Charles Parish. (Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Very Low	Very Low

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 2-81: Total Building Exposure by Wildland-Urban Interaction Areas. (Source: Hazus)

Location	Estimated Total Building Exposure
St. Charles Parish	$208,380,000

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

Table 2-82: Estimated Exposure for Unincorporated Area of St. Charles Parish by Sector. (Source: Hazus)

St. Charles Parish	Estimated Total Building Exposure by Sector
Agricultural	$1,478,000
Commercial	$2,147,000
Government	$128,000
Industrial	$114,000
Religious / Non-Profit	$1,504,000
Residential	$201,111,000
Schools	$1,898,000
Total	**$208,380,000**

Vulnerable Population

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

Table 2-83: Population Located within a 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**
St. Charles Parish	52,549	14,788	28.1%

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

Table 2-84: Population in St. Charles Parish Located within a Wildland-Urban Interaction Area. (Source: 2020 Census Data)

St. Charles Parish		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	14,788	28.1%
Persons Under 5 Years	828	5.6%
Persons Under 18 Years	3,534	23.9%
Persons 65 Years and Over	2,292	15.5%
White	10,440	70.6%
Minority	4,348	29.4%

Vulnerability Score

Table 2-85: Wildfire Vulnerability Score for St. Charles Parish.

Wildfire Vulnerability Score						
	Probability	**Impact**	**Spatial Extent**	**Warning Time**	**Duration**	**Risk Factor**
Risk Level	1	3	4	1	2	2.25

Winter Weather

Profile

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

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

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

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

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

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

Table 2-86: Sperry-Piltz Ice Accumulation Index

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

Risk Assessment

Geographic Extent

All of the parish planning area is susceptible to the effects of winter storms. The worst-case scenario for winter storms is a 2 on the Sperry-Piltz Ice Accumulation Index.

Previous Occurrences

The parish has experienced four winter storm occurrences between the years 1996 and 2024 per the NCEI Storm Events Database. There have been one winter storm events since the last update.

Date	Type	Property Damage	Crop Damage	Fatalities	Injuries
01/16/2024	Winter Weather	$0	$0	0	0

Probability

The annual return rate (frequency) for winter storm occurrences in the parish is 0.14 (14% annual probability) or approximately 1 winter storm event every 7 years

Climate Change Impacts

Winter weather is likely to become less frequent as the winter season decreases in length over the next century due to an increase in ambient and sea surface temperatures. By the end of the century, Louisiana is expected to experience a 5°F to 10°F increase in average ambient temperatures which will drastically reduce the number of days below freezing and lower the chance of winter weather. Precipitation is expected to increase during the winter months.

Climate change is influencing winter weather patterns, leading to significant impacts on both infrastructure and vulnerable populations. While it may seem counterintuitive, global warming can cause more frequent and intense winter storms. The warming of the Arctic and the disruption of the polar jet stream can result in polar vortex shifts, causing freezing temperatures and extreme winter conditions in regions that typically experience milder winters.

Winter weather impacts infrastructure in various ways. Freezing temperatures can damage roads, bridges, and other transportation networks, leading to increased maintenance costs and travel disruptions. Ice and snow accumulation on power lines can cause blackouts and outages, leaving communities without electricity and heating during frigid

temperatures. Water supply systems can also be affected, as frozen pipes can burst, leading to water shortages and damage to properties.

Vulnerable populations are particularly at risk during severe winter weather events. Homeless individuals may struggle to find shelter and protection from the cold, leading to an increased risk of hypothermia and frostbite. Low-income households may face difficulties in affording heating costs, potentially exposing them to unsafe living conditions. The elderly and those with limited mobility may find it challenging to access essential services and resources during snowstorms, leading to isolation and health risks.

Moreover, winter storms can have economic consequences for vulnerable populations. Closures of schools and businesses during severe weather can lead to loss of income and educational disruptions, impacting families already facing financial challenges. In regions where winter tourism is vital, extreme winter weather can affect local economies, leading to job losses and reduced economic opportunities for vulnerable communities.

To address the impacts of climate change on infrastructure and vulnerable populations concerning winter weather, various measures are essential. Investing in winter-ready infrastructure, such as weather-resistant roads and insulated power lines, can help mitigate damage and improve resilience. Implementing programs to support vulnerable populations, such as providing emergency shelters, fuel assistance, and resources for winter preparedness, can protect them during extreme winter events. Climate change mitigation efforts to reduce greenhouse gas emissions are also crucial to addressing the root causes of extreme winter weather patterns, helping to protect both infrastructure and vulnerable populations from the adverse effects of winter storms in the long run.

Future Hazard Impacts

Population growth and development trends can affect winter weather in various ways. Urbanization and increased human activity can create localized urban heat islands, which may alter temperature patterns and affect the distribution of winter precipitation types. Changes in land use, such as deforestation or construction, can modify surface albedo and thermal properties potentially influencing regional climate patterns and snowfall amounts. Additionally, urban areas with more impervious surfaces can experience altered drainage patterns, affecting snow accumulation and melt rates.

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 winter storms.

Table 2-87: National Risk Index (NRI) Summarization of Winter Storm Occurrences for St. Charles 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 three significant winter storm occurrences per the NCEI Storm Events Database. The total property damage associated with these storms totaled approximately $5,000. 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 – 2023). This provides an annual estimated potential loss of $179 and $1,667 per event. The table on the next page provides an estimate of potential property losses for the Parish.

Table 2-88: Estimated Annual Property Losses in the Parish resulting from Winter Weather Damage.

Estimated Annual Potential Losses from Winter Weather
St. Charles Parish
$179

Vulnerable Population

Per the NCEI Storm Events Database, there have been no reported fatalities or injuries as a result of winter weather. However, winter storms can have a significant impact the population. They can cause physical injuries and even fatalities. High winds, falling trees, and structural collapses can pose immediate risks to people's safety during a storm. These storms can displace individuals and families from their homes, either temporarily or permanently. In cases of extensive property damage, people may be forced to evacuate or seek emergency shelter. The displacement can result in temporary homelessness or the need for long-term housing solutions.

Winter storms can disrupt critical infrastructure such as transportation systems, power grids, and water supply networks. Disruption in these services could lead to health issues or the inability to access essential services that are needed to meet basic needs. This can lead to not only physical issues but psychological effects as well.

Everyone in the parish is vulnerable to the impacts of winter storms; however, they can have a disproportionate impact on vulnerable populations exacerbating existing social, economic, and health disparities. Vulnerable populations, including low-income individuals, the homeless, and those living in standardized housing, are often more susceptible to the effects of winter storms.

Vulnerability Score

Table 2-89: Winter Weather Vulnerability Score for St. Charles Parish.

Winter Weather Vulnerability Score						
	Probability	Impact	Spatial Extent	Warning Time	Duration	Risk Factor
Risk Level	3	4	4	1	2	3

3. Capability Assessment

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

Through this assessment, St. Charles Parish is 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

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

Table 3-1: Planning and Regulatory Capabilities

Capability Assessment Worksheet - St. Charles 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**	**Comments**
Comprehensive / Master Plan	Yes	
Capital Improvements Plan	Yes	
Economic Development Plan	Yes	
Local Emergency Operations Plan	Yes	
Continuity of Operations Plan	Yes	
Transportation Plan	Yes	
Stormwater Management Plan	Yes	
Community Wildfire Protection Plan	No	
HHPD Emergency Action Plan	N/A	
management)	Yes	Management
Building Code, Permitting and Inspections	**Yes/No**	**Comments**
Building Code	Yes	Sound Infrastructure System
Building Code Effectiveness Grading Schedule (BCEGS) Score	Yes	
Fire Department ISO/PIAL rating	PIAL	**Class 3:** East St. Charles, Luling, Paradis & St. Rose **Class 4:** Bayou Gauche, Des Allemands, Hahnville, Killona, & Norco
Site plan review requirements	Yes	
Land Use Planning and Ordinances	**Yes/No**	**Comments**
Zoning Ordinance	Yes	
Subdivision Ordinance	Yes	
Floodplain Ordinance	Yes	
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	Yes	Storm Water Management Ordinance, Erosion and Sediment Control, Levee Protection System
Flood Insurance Rate Maps	Yes	
Acquisition of land for open space and public recreation uses	Yes	
Other	Yes	

St. Charles 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 commitment 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

The St. Charles Parish Planning and Zoning Office is responsible for all Building Code, Permitting, Land Use Planning and Ordinances. St. Charles Parish follows the National Electrical Code, Louisiana State Plumbing Code, International Residential Code, International Building Code (for commercial work), International Mechanical Code, and the International Fuel Gas Code, and will require all building, mechanical, gas, electrical, and plumbing work to comply with these codes. The Parish also has a Flood Damage Prevention Ordinance, Coastal Use Permits, and a Coastal Zone Program that are followed. Permitting and inspections capabilities are in place within the Parish.

As of the 2025 update, St. Charles Parish and its communities ensure that all adopted building codes are enforced and in compliance relating to the construction of any structure within the boundaries of the parish. Building permits are required prior to beginning any type of construction or renovation projects, installation of electrical wiring, plumbing or gas piping, moving manufactured/modular or portable buildings, and reroofing or demolitions.

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

The St. Charles 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, St. Charles Parish as a whole has a system in place to coordinate and share these capabilities through the DHSEP and through this Parish Hazard Mitigation Plan.

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

Administration, Technical, and Financial

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

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

Financial capabilities are the resources that St. Charles 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 St. Charles Parish:

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

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.

St. Charles 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-related information.		
Program / Organization	**Yes/No**	**Comments**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	
water use, fire safety, household preparedness, environmental education)	Yes	
Natural Disaster or safety related school program	Yes	
Storm Ready certification	Yes	
Firewise Communities certification	Yes	
Public/Private partnership initiatives addressing disaster-	Yes	
Other		

As reflected with above existing regulatory mechanisms, programs and resources within the parish, St. Charles Parish remains committed to expanding and improving on the existing capabilities within the parish. Communities, along with St. Charles Parish will work together 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 all enhance and expand risk reduction for all of St. Charles Parish.

Flood Insurance and Community Rating System

Participation in the CRS strengthens local capabilities by lowering flood insurance premiums for municipalities that exceed NFIP minimum requirements. As noted in the CRS Eligible Communities List effective April 1, 2024, St. Charles Parish is a participant in the CRS program and has attained a Class 7 rating.

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 2024, 316 communities in the State of Louisiana participate in the Federal Emergency Management Agency's National Flood Insurance Program (NFIP). Of these communities, 47 (or 13%) participate in the Community Rating System (CRS). Jefferson Parish and the City of Mandeville in St. Tammany Parish leads the state with a rating of Class 5, followed by three cities with a rating of Class 6: the Cities of Gretna and Kenner in Jefferson Parish and the City of Slidell in St. Tammany Parish. 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 to 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

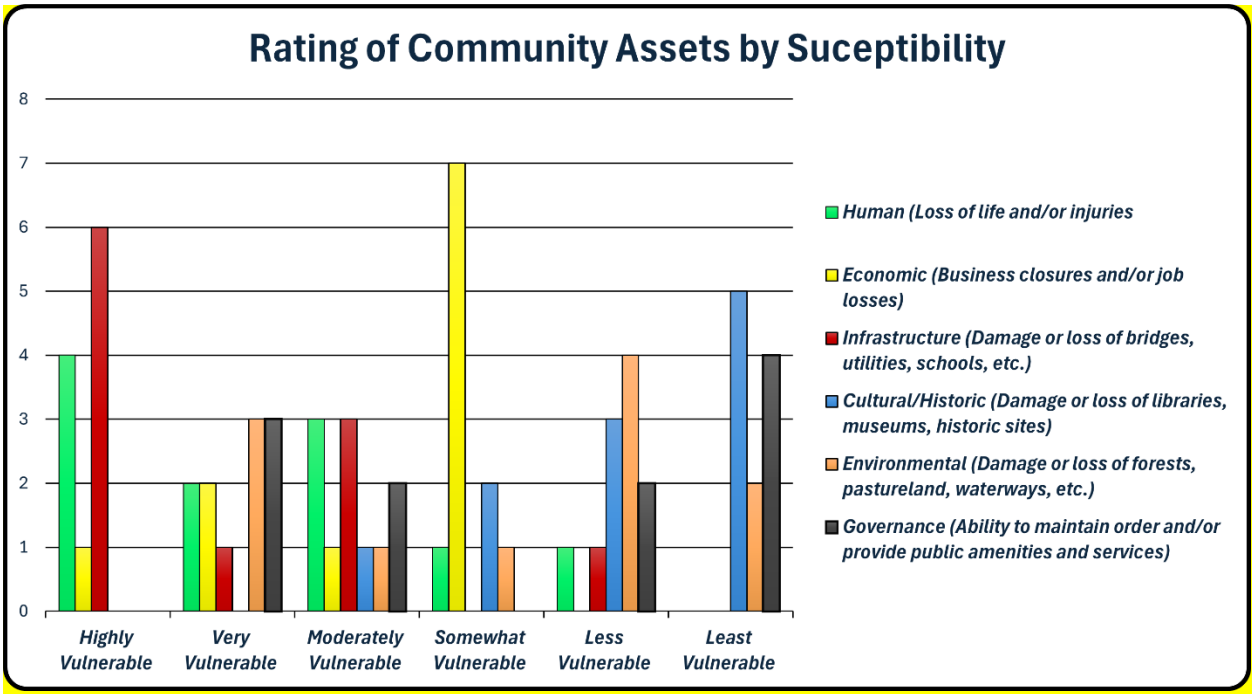
St. Charles Parish's Hazard Mitigation Strategy has a common guiding principle and is the demonstration of the parish's commitment to reduce risks from hazards. The strategy also serves as a guide for parish and local decision makers as they commit resources to reducing the effects of hazards.

St. Charles 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 2025 HMP update are a product of analysis and review of the St. Charles Parish Hazard Mitigation Plan Steering Committee under the coordination of the St. Charles Parish Department of Homeland Security and Emergency Preparedness. The committee was presented a list of projects and actions, new and from the 2020 plan, for review from March 2024 – August 2024

An online public opinion survey of St. Charles Parish residents was conducted between February 2024 and September 2024. The survey was designed to capture public perceptions and opinions regarding natural hazards in St. Charles Parish. In addition, the survey collected information regarding the methods and techniques preferred by the respondents for reducing the risks and losses associated with local hazards.

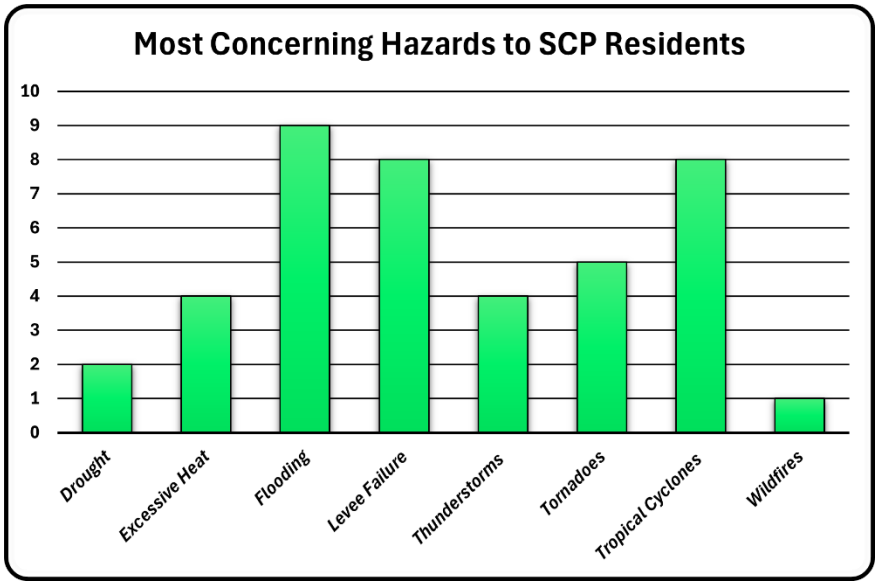
Survey respondents were asked to rank, in their opinion, which community assets were most susceptible to impacts caused by natural hazards. The categories included human, economic, infrastructure, cultural/historic, environmental, and governance. Based on these choices, respondents were asked to rank each of these categories on a scale of one to six, one being highly vulnerable and six being least vulnerable. After collecting all the responses, the top three categories selected were:

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

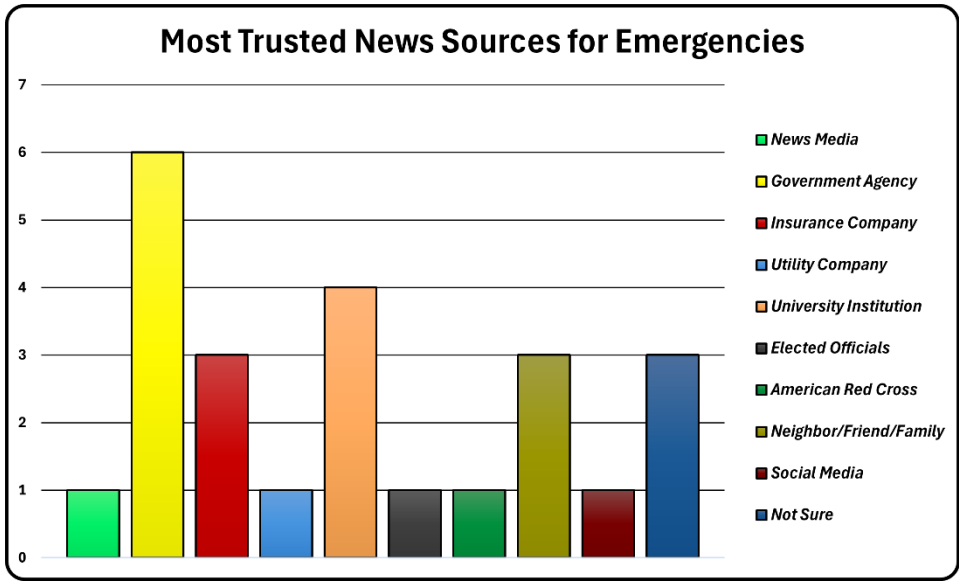


The survey results also indicated which natural disasters citizens were *most concerned* with being affected by in St. Charles Parish. The top three natural disasters selected were:

1. Flooding
2. Tropical Cyclones
3. Levee Failure



Decision makers need to understand the importance of relaying emergency information to the public and distributing such information in a manner that is reliable and trustworthy to the residents of the area. According to the survey, the residents of St. Charles Parish most trust government agencies and research institutions for the distribution of emergency related information These results are encouraging because it shows that the public has high confidence in the information being disseminated by local government agencies. Implementation of the outreach activities put forth by parish officials and offices seem to have been executed in a successful manner



This activity confirms that the goals and action items developed by the St. Charles Parish Hazard Mitigation Plan Steering Committee are representative of the outlook of the community at large. Full survey questions and information can be found at the following link:

https://lsu.qualtrics.com/jfe/form/SV_0xfGyPobXEld7BI

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 St. Charles 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, St. Charles 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 St. Charles Parish Hazard Mitigation Plan Update Steering 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 losses to existing and future property due to hazards**
   a) Target FEMA/NFIP repetitive loss structures for property protection measures
   b) Evaluate existing regulations that might impact the vulnerability of property and persons to hazards and how well those regulations are enforced
   c) Improve the ability of property owners in hazard areas to undertake mitigation actions
   d) Enhance the Parish's information base to support future hazard mitigation planning
   e) Reduce the impacts of hazards on St. Charles Parish through structural measures
   f) Increase the capacity of the Parish to use existing infrastructure in an efficient manner
   g) Protect the continuity of important Parish records
   h) Increase public awareness of potential damages to property from natural hazards

2. **Protect the health and well-being of the people of St. Charles Parish from the negative effects of hazards**
   a) Increase awareness of appropriate actions to take in the case of a hazard event
   b) Seek effective and efficient methods and technology for notifying residents of hazards and severe weather events

3. **Ensure the ability of emergency services provides and facilities, including essential facilities, to continue operating during hazard events**
   a) Enhance property protection measures at emergency services facilities and other critical facilities
   b) Evaluate the interdependencies between emergency service provides during hazard events

The Mitigation Action Plan focuses on actions to be taken by St. Charles Parish. 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 Steering 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.

2025 Mitigation Actions and Update on Previous Plan Actions

The St. Charles Parish Hazard Mitigation Plan Steering Committee identified new actions that would reduce and/or prevent future damage within St. Charles Parish and their respective communities. In that effort, the parish 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 St. Charles 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.

The established and agreed upon parish actions relative to the parish-wide goals are listed in the tables on the following pages. Additionally, action updates from the previous plan updates can be found in the same tables.

Emergency Services Actions (ES)

Previous Action Update

St. Charles Parish Mitigation Action Sheet - Emergency Services (ES)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
ES-1: Evaluate Emergency Response Procedures	Coordinate with the Southeast Louisiana Hurricane Task Force to comprehensively evaluate the effectiveness of current evacuation and emergency response procedures. Drawing upon empirical evacuation data and assembled technical expertise, improve hurricane evacuation procedures.	Staff Time	High	1-5 years	2	St. Charles Parish DHSEP, Neighboring Parishes, FEMA, GOHSEP	Tropical Cyclones	Ongoing
Comments: HES completed in 2019**.**								
ES-2: Improve Technical Infrastructure	Coordinate with the National Weather Service to improve the Parish's technical infrastructure for forecasting weather-related hazards in the Parish and improve the technical and administrative communication linkages between the Parish and the National Weather Service.	Staff Time	High	1-5 years	1,2,3	St. Charles Parish President's Office, St. Charles Parish DHSEP, NWS	Coastal Hazards, Drought, Excessive Heat, Flooding, Levee Failure, Thunderstorms, Tornadoes, Tropical Cyclones, Wildfires, Winter Weather	Ongoing
Comments: Maintained Storm Ready Status, purchase new weather station, and added HAM radio capabilities to the emergency operations center.								
ES-4: Electrical Infrastructure Procurement	Acquire the necessary infrastructure and equipment to ensure both an uninterrupted power supply at critical Parish facilities and improved surge protection for critical Parish computer and communications equipment.	Statewide Generator Program (HMGP)	High	1-5 years	1,2,3	St. Charles Parish DHSEP	Coastal Hazards, Drought, Excessive Heat, Flooding, Levee Failure, Thunderstorms, Tornadoes, Tropical Cyclones, Wildfires, Winter Weather	Ongoing
Comments: Community Center completed in January 2014, Emergency Operations Center completed in June 2012, East Bank completed in September 2013, Sheriff's office completed, and Library (DSNAP site) install complete. New equipment will be added to critical facilities as technology changes and funding become available.								

ES-5: Emergency Services Technology Improvement	Improve both technological and administrative communication capabilities among fire, police, 911, and other state and local emergency operations through improved planning and the upgrading of communication infrastructure and equipment.	Staff Time	High	1-5 years	1,2,3	St. Charles Parish DHSEP, St. Charles Parish Fire Departments, EMS, &Sheriff's Office	Coastal Hazards, Drought, Excessive Heat, Flooding, Levee Failure, Thunderstorms, Tornadoes, Tropical Cyclones, Wildfires, Winter Weather	Ongoing
Comments: Upgrading of communication infrastructure and equipment will be implemented as technology changes and funding becomes available.								
ES-6: Raise Hospital Generator and Switch Gears	Raise generator and switch gear to slab level, which is plus 10'. Current elevation is plus 7'. This will prevent the hospital from having to be shut down for all switch gears to be replaced in the event that the equipment would be damaged by flood waters.	Parish Budget, Statewide Generator Program (HMGP)	Medium	1-5 years	1,2	St. Charles Parish Hospital Service District No. 1	Flooding	Ongoing
Comments: Partially complete, awaiting funding								
ES-9: Raise Communication System Structures	Raise existing structures that will house the Parish and regional communications systems.	Parish Budget, Statewide Generator Program (HMGP)	High	1-5 years	1,3	St. Charles Parish Sheriff's Office	Flooding	Not Started - Carried Over from 2020 Plan
Comments: Since this project is still awaiting funding, this action is labeled as not started and will be carried over from the previous plan.								
ES-11: EMS Satellite Communications	Back up satellite communications system for phone and internet in order to have access to patient medical records and to maintain communications with primary care health providers of patients who evacuate to the hospital.	Parish Budget, Grant Funding	Medium	1-5 years	3	St. Charles Parish Hospital Service District No. 1	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones,	In Progress
ES-12: Potable Water	Addition of a potable water storage system. Loss of water will stop all surgical and dialysis services and cause an increased risk of infection to all patients.	Parish Budget, Grant Funding	Medium	1-5 years	1,2,3	St. Charles Parish Hospital Service District No. 1	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones,	Not Started - Carried Over from 2020 Plan
Comments: Since this project is still awaiting funding, this action is labeled as not started and will be carried over from the previous plan.								
ES-13: Generator Switches	Manual transfer generator switches installed at all public school sites (starting with potential evacuation / public entity housing for emergencies)	Parish Budget, Statewide Generator Program (HMGP)	Medium	1-5 years	1,2,3	St. Charles Parish DHSEP	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones,	Not Started - Carried Over from 2020 Plan
Comments: Since this project is still awaiting funding, this action is labeled as not started and will be carried over from the previous plan.								

ES-16: Central Office Complex Generator Replacement	Replace main 350KW generators at Central Office Complex	Parish Budget, Statewide Generator Program (HMGP)	Medium	1-5 years	1,2,3	St. Charles Parish DHSEP	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones,	Not Started - Carried Over from 2020 Plan
Comments: Since this project is still awaiting funding, this action is labeled as not started and will be carried over from the previous plan.								
ES-18: Fuel Tank Procurement	Acquisition and installation of 30,000-gallon unleaded fuel storage tank to provide a backup fuel supply for generators so that critical facilities can continue essential operations.	Parish Budget, Grant Funding	Medium	1-5 years	3	St. Charles Parish School District	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones,	Not Started - Carried Over from 2020 Plan
Comments: Since this project is still awaiting funding, this action is labeled as not started and will be carried over from the previous plan.								
ES-23: Fuel Storage	For the two diesel-only generators, add fuel storage capacity to increase amount stored to 4,000 gallons to enable the hospital to operate for 96 hours without outside assistance.	Parish Budget, Grant Funding	High	1-5 years	3	St. Charles Parish Hospital Service District No. 1	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones,	Not Started - Carried Over from 2020 Plan
Comments: Since this project is still awaiting funding, this action is labeled as not started and will be carried over from the previous plan.								

New Mitigation Actions

St. Charles Parish Mitigation Action Sheet - Emergency Services (ES)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
ES-7: East Bank EMS Generator	Replace current generator at the east bank EMS office	Parish Budget, Statewide Generator Program (HMGP)	Medium	1-5 years	1,2,3	EMS/St. Charles Parish DHSEP	Flooding, Tropical Cyclones, Thunderstorms	NEW
ES-8: West Bank EMS Generator	Purchase and install a generator at the west bank EMS office	Parish Budget, Statewide Generator Program (HMGP)	Medium	1-5 years	1,2,3	EMS/St. Charles Parish DHSEP	Flooding, Tropical Cyclones, Thunderstorms	NEW
ES-10: Plantation View Generator	Purchase and install a generator at the Plantation View medical office	Statewide Generator Program (HMGP)	Medium	1-5 years	1,2,3	St. Charles Parish DHSEP	Flooding, Tropical Cyclones, Thunderstorms	NEW
ES-22: Retrofit Radio Communications System	Retrofit the backup radio communications system at 911 Communications District and Bayou Gauche Tower	Parish Budget, Grant Funding	Medium	1-5 years	3	St. Charles Parish Sheriff's Office/ St. Charles Parish DHSEP	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones,	NEW
ES-24: Generator Replacement	Replace older generators with newer ones at the hospital campus	Parish Budget, Statewide Generator Program (HMGP)	Medium	1-5 years	1,2,3	St. Charles Parish Hospital Service District No. 1	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones,	NEW

Natural Resources Protection Actions (NR)

Previous Action Update

St. Charles Parish Mitigation Action Sheet - Natural Resources Protection (NR)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
NR-1: Prioritization of Coastal Hazard Projects	Prioritize those projects outlined in the Coastal Wetlands Planning, Protection, and Restoration Act; the Louisiana Coast Area (LCA) study and the Coast 2050 Feasibility Study that address the Parish's most pressing restoration needs. This exercise should culminate in a formal plan that identifies high priority projects and justifies their priority status. Particular attention should be given to utilizing the Bonnet Carre Spillway for wetlands restoration and implementing terracing and planting projects in the LaBranche Wetlands.	Staff Time	High	1-5 years	1,2	St. Charles Parish President's Office	Coastal Hazards	Not Started - Carried Over from 2020 Plan
Comments: CPRA master plan approved, continued construction of St. Charles Parish portion of Upper Barataria Protection, with planning and engineering work toward Lafourche Parish. Work with Army Corps of Engineers on Bonnet Carre is ongoing. Due to the priority plan having not been started, this action is labeled as not started and will be carried over from the previous plan.								
NR-2: Explore Funding Sources	Conduct a comprehensive analysis of both existing and potential Parish revenue sources to identify adequate local funding mechanisms for meeting any potential local funding requirements for the coastal restoration projects outlined in the Coastal Wetlands Planning, Protection, and Restoration Act; the LCA study; and the Coast 2050 Feasibility Study. Incorporate findings into the aforementioned "priority plan" for coastal restoration in St. Charles Parish.	Staff Time	High	1-5 years	1,2	St. Charles Parish President's Office	Coastal Hazards	Not Started - Carried Over from 2020 Plan
Comments: Local Revenue priorities and tracking set up through the grants department. Future needs met through levee millage. Conduct annual analysis of resources. Due to the priority plan having not been started, this action is labeled as not started and will be carried over from the previous plan.								

NR-4: Tree Removal	Shallow-rooted tree removal at all public-school sites and administrative facilities.	Parish Budget, Grant Funding	Medium	1-5 years	1,2,3	St. Charles Parish School District	Thunder-storms, Tornadoes Tropical Cyclones	In Progress
Comments: Strategic and selected tree removal has taken place throughout the district utilizing district funds. Many more trees still need to be removed. Shallow rooted tree removal will be implemented as funds become available.								
NR-5: Davis Pond Freshwater Diversion	Continue operation of the Davis Pond Freshwater Diversion Project to introduce fresh water, sediment, and nutrients into the Barataria Estuary.	Parish Budget, USACE Grant Funding (secured)	High	1-5 years	2	St. Charles Parish Planning & Zoning Office, Coastal Zone Management, DNR, US Army Corps of Engineers	Coastal Hazards	Ongoing
Comments: Davis Pond Project operating as designed								
NR-6: East LaBranche Shoreline Protection Project	Complete the East LaBranche Shoreline Protection Project to restore marsh that has been converted to open water.	Parish Budget, Grant Funding	High	1-5 years	2	St. Charles Parish Planning & Zoning Office, Coastal Zone Management, NRCS, CPRA	Coastal Hazards	Ongoing
Comments: Initial phase completed in 2015. New phase is out to bid with the state as of 2023.								

New Mitigation Actions

St. Charles Parish Mitigation Action Sheet - Natural Resources Protection (NR)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
NR-7: Zoning Ordinances	Review and Implement Comprehensive Zoning Ordinance to reduce development in areas more susceptible to Land Subsidence.	Staff Time	High	1-5 years	1,2	St. Charles Parish DHSEP/ St. Charles Parish Planning & Zoning Office	Coastal Hazards	NEW
NR-8: Saltwater Intrusion Planning Measures	Look for alternative draft sources for fresh water	HMGP, BRIC, FMA, Parish Budget	Medium	1-5 years	2	St. Charles Parish Planning & Zoning Office, Coastal Zone Management, NRCS, CPRA	Saltwater Intrusion	NEW
NR-9: Saltwater Intrusion Response Measures	Mitigate saltwater intrusion through the introduction of fresh water through barging operations.	HMGP, BRIC, FMA, Parish Budget	Medium	1-5 years	2	St. Charles Parish Planning & Zoning Office, Coastal Zone Management, NRCS, CPRA	Saltwater Intrusion	NEW

Prevention Measures Actions (P)

Previous Action Update

St. Charles Parish Mitigation Action Sheet - Prevention Measures (P)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
P-1: Flood Protection Regulations	Review and update the provisions and standards of Section XX, Flood Damage Prevention, of the St. Charles Parish Zoning Ordinance to devise more effective flood protection regulations, such as freeboard requirements and more stringent zoning designations for flood prone areas.	Staff Time	High	1-5 years	1,2	St. Charles Parish Planning and Zoning Office, St. Charles Parish DHSEP	Flooding	Ongoing
Comments: St. Charles Parish has adopted the preliminary DFIRMs as construction requirements. The parish will continue to monitor the increased cost of insurance and offset with freeboard requirements.								
P-2: CRS Activities	Identify, schedule, and conduct activities, above and beyond those required under the National Flood Insurance Program (NFIP), to improve the Parish's ranking under the NFIP's Community Rating System. Conducting public outreach and education efforts and providing elevation certificates in non-hazard areas should be considered as potential activities to lower the Parish's CRS rating.	Staff Time	High	1-5 years	1,2	St. Charles Parish Planning and Zoning Office, St. Charles Parish DHSEP	Flooding	Ongoing
Comments: PPI plan adopted in 2020. Issue new public information mailings from floodplain management staff and others. Continue to hold training with Insurance and real estate professionals.								
P-3: Sewer System Regulations	Review and update Section IV B, Sewage Systems, of the St. Charles Parish Subdivision Regulations (Ordinance 81-8-2) in order to develop more stringent regulations requiring new and replacement sanitary sewage systems to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into flood waters.	Staff Time	High	1-5 years	1,2	St. Charles Parish Planning and Zoning Office, St. Charles Parish DHSEP	Flooding	Ongoing
Comments: Sewer department continues to perform testing to identify infiltration and to repair them. New wastewater regulations were adopted in 2015 and 2017.								

P-4: Retrofit Sewer Infrastructure	Study the feasibility of implementing an impact fee program or similar mechanism to retrofit existing sewage lift stations, sewer lines, and treatment plants to improve the effectiveness and the capacity of the existing wastewater treatment infrastructure.	Staff Time	High	1-5 years	1,2,3	St. Charles Parish Planning and Zoning Office, Agricultural Center	Flooding	Not Started - Carried Over from 2020 Plan
Comments: While this action item has been discussed, no structural progress has been made. Therefore, this action is labeled as not started and will be carried over from the previous plan.								
P-5: Develop GIS Capabilities	Develop and maintain a comprehensive Geographic Information System that will include the following data: 1. All properties and parcels in the parish 2. Hazard areas 3. Service districts 4. Public works facilities 5. Transportation infrastructure 6. Special needs residents.	Staff Time	High	1-5 years	3	St. Charles Parish Planning and Zoning Office, GIS Department	Coastal Hazards, Drought, Excessive Heat, Flooding, Levee Failure, Thunderstorms, Tornadoes, Tropical Cyclones, Wildfires, Winter Weather	Ongoing
Comments: New structures will be added as changes occur								
P-7: Levee Map	Prepare a levee map with accurate information pertaining to all federal and non-federal levees within the parish.	Staff Time	Medium	1-5 years	3	GIS Department, St. Charles Parish Planning and Zoning Office	Levee Failure	Ongoing
Comments: Ongoing, will continue to update as levee systems are assessed within the parish.								
P-8: Cooling Measures	Develop an ongoing program to provide air-conditioners to elderly and disadvantaged St. Charles Parish citizens who are unable to obtain one on their own.	Parish Budget/ Local Grant Funding: Entergy, DOW, United Way, etc.	Medium	1-5 years	2,3	St. Charles Parish DHSEP, St. Charles Parish Planning and Zoning Office, Fire Department, Sheriff's Office	Excessive Heat	Ongoing
Comments: A case basis through Community Services Health and Safety Program has been identified.								

New Mitigation Actions

St. Charles Parish Mitigation Action Sheet - Prevention Measures (P)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
P-9: Cooling Areas	Identify locations to install cooling/misting stations in areas with higher concentrations of vulnerable populations.	Parish Budget/ Local Grant Funding: Entergy, DOW, United Way, etc.	High	1-5 years	2,3	St. Charles Parish DHSEP, St. Charles Parish Planning and Zoning Office, Fire Department, Sheriff's Office	Excessive Heat	NEW

Public Information Activities Actions (PI)

Previous Action Update

St. Charles Parish Mitigation Action Sheet - Public Information Activities (PI)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
PI-1: RPL Property Education	Provide brochures and other publications through media, mail, libraries, Post Offices, and/or the Internet that explain (1) the definition of "repetitive loss structure" and (2) the options available to owners of repetitive loss structures.	Local Funding; est. $50,000	High	1-5 years	1,2,3	St. Charles Parish DHSEP	Flooding	Ongoing
Comments: Education on repetitive loss structures is available via the All Hazards Guide. Brochures should be updated to include new programs (BRIC)								
PI-2: Tropical Cyclone Education	Coordinate a public education campaign to keep Parish residents informed about ongoing changes and improvements to the hurricane evacuation contra-flow transportation plan.	Staff Time	High	1-5 years	1,2	St. Charles Parish DHSEP, Public Information Office	Tropical Cyclones	Ongoing
Comments: A public education campaign has been completed through presentations and printable materials. A youth education program began in 2019.								
PI-3: Tornado Education	Develop a tornado awareness brochure that includes hazard information and measures that may be taken to protect life and property during a tornado event. Make brochures available throughout the parish.	Local Funding; est. $10,000	Medium	1-5 years	1,2	St. Charles Parish DHSEP, Public Information Office	Tornadoes	Ongoing
Comments: Education on tornadoes is available via the All Hazards Guide.								
PI-4: All Hazards Education Seminar	Develop a public-speaking series to include topics such as types of natural disasters, how to develop a family disaster plan, how to develop a business continuity plan, and simple types of mitigation projects for homeowners. Offer these engagements to civic groups, church groups, business groups and others throughout St Charles Parish	Staff Time	Medium	1-5 years	1,2	St. Charles Parish DHSEP, Public Information Organizations	Coastal Hazards, Drought, Excessive Heat, Flooding, Levee Failure, Thunderstorms, Tornadoes, Tropical Cyclones, Wildfires, Winter Weather	Ongoing
Comments: This exercise is completed annually by the parish.								

PI-5: Drought Education	Publish and distribute pamphlets on agricultural drought management strategies.	Local Funding; est. $10,000	Low	1-5 years	1,2	St. Charles Parish DHSEP	Drought	Ongoing
Comments: Drought education is ongoing and being conducted at county agents office.								
PI-7: All Hazards Education	Educate St. Charles Parish residents regarding all hazards in the form of forums, brochures, or web pages.	Staff Time	Medium	1-5 years	1,2	St. Charles Parish DHSEP, Public Information Office	Coastal Hazards, Drought, Excessive Heat, Flooding, Levee Failure, Thunderstorms, Tornadoes, Tropical Cyclones, Wildfires, Winter Weather	Ongoing
Comments: St. Charles Parish's All Hazards Guide is published and mailed bi-annually to residents. Numerous presentations are held throughout the community annually and videos are played daily on public access channel.								

New Mitigation Actions

St. Charles Parish Mitigation Action Sheet - Public Information Activities (PI)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
PI-8: Water Saving Ordinances	Encourage voluntary water conservation during times of Extreme Heat and/or Drought Conditions via Public Service Announcement/Apparatus.	Staff Time	High	1-5 years	1,2,3	St. Charles Parish DHSEP	Drought, Excessive Heat	NEW
PI-9: Coastal Hazards Education	Develop and disseminate information related to best practices for land fill materials to remediate potential impacts of land subsidence in identified vulnerable areas.	Staff Time	High	1-5 years	1,2	St. Charles Parish DHSEP	Coastal Hazards	NEW
PI-10: Levee Failure Education	Create public educational material on levee purpose, safety, and construction.	Staff Time	High	1-5 years	1,2	St. Charles Parish DHSEP	Levee Failure	NEW
PI-11: Wildfire Education	Community Outreach in cooperation with Louisiana State Fire Marshall's Office on the dangers and illegality of marsh fires. (This is our biggest wildfire concern as these are intentionally set by commercial trappers and hunters annually).	Staff Time	High	1-5 years	1,2	St. Charles Parish DHSEP	Wildfires	NEW

Property Protection Measures Actions (PP)

Previous Action Update

St. Charles Parish Mitigation Action Sheet - Property Protection Measures (PP)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
PP-1: RPL Property Acquisition	At the discretion of the property owners, either acquire or elevate repetitive loss structures throughout the Parish, giving priority to "target" repetitive loss structures.	Parish Budget/ FEMA Hazard Mitigation Funding	Medium	1-5 years	1,2	St. Charles Parish Grants Office	Flooding	Ongoing
Comments: All severe repetitive loss and repetitive loss properties have all been given the opportunity to participate. Add new RL/SRL properties to funding list as designations change.								
PP-2: Crop Protection	In association with Louisiana State University Cooperative Extension Services, provide technical assistance to St. Charles Parish farmers in the form of forums, brochures, or web pages regarding possible funding sources for and the installation of irrigation systems to protect crops from drought conditions.	Staff Time	Low	1-5 years	1	St. Charles Parish DHSEP, LSU Agricultural Extension	Drought	Not Started - Carried Over
Comments: Since this project is still awaiting funding, this action is labeled as not started and will be carried over from the previous plan.								
PP-3: Storm Equipment Procurement	Addition of storm screens to the Community Health Center Loss of windows will damage the facility and render it unusable for some time. Include the addition of an emergency generator.	Parish Budget/ HMGP Grant Funding	Medium	1-5 years	3	St. Charles Parish Community Health Center	Flooding, Thunderstorms, Tropical Cyclones	Not Started - Carried Over
Comments: Since this project is still awaiting funding, this action is labeled as not started and will be carried over from the previous plan.								
PP-4: Hurricane Shutter Procurement	Acquisition and installation of Hurricane Shutters on all public school sites.	Parish Budget/ HMGP Grant Funding	High	1-5 years	1,2,3	St. Charles Parish School District, St. Charles Parish Grants Office	Flooding, Thunderstorms, Tropical Cyclones	In Progress
Comments: Action is partially complete. The plan is to add shutters to schools as funding becomes available								

PP-5: Hurricane Shutter Procurement	Acquisition and installation of Hurricane Shutters on all public school administrative facilities.	Parish Budget/ HMGP Grant Funding	High	1-5 years	1,2,3	St. Charles Parish School District, St. Charles Parish Grants Office	Flooding, Thunderstorms, Tropical Cyclones	Not Started - Carried Over
Comments: Since this project is still awaiting funding, this action is labeled as not started and will be carried over from the previous plan.								
PP-6: Public School Retrofit/Generator	Harden / Retrofit the public school maintenance facility, include the addition of an emergency generator set.	Parish Budget/ HMGP Grant Funding	Low	1-5 years	1,2	St. Charles Parish School District, St. Charles Parish Grants Office	Flooding, Thunderstorms, Tropical Cyclones	In Progress
Comments: The public school maintenance facility has received and installed a generator. However, the parish is waiting on additional funding to harden/retrofit other facilities.								
PP-7: New Construction Retrofit	Consider mitigation measures that will enhance the performance of new buildings, expansions, or infrastructure during high wind and flood events, as these projects are proposed. This may include hardening structures, installing hurricane clips, or elevating utilities.	Parish Budget/ Grant Funding	High	1-5 years	1,2,3	St. Charles Planning and Zoning Office, St. Charles Parish DHSEP, St. Charles Parish President's Office	Flooding, Thunderstorms, Tropical Cyclones	Ongoing
Comments: St. Charles Parish continues to enforce the Louisiana Uniform Building Code. St. Charles Parish also continues to encourage improved building techniques through discussion and literature distribution, but so far, only on a volunteer basis								
PP-9: Storm Shelters	Consider providing storm shelters at critical facility sites.	Parish Budget/ BRIC, HMGP Grant Funding	Low	1-5 years	1,2,3	St. Charles Parish President's Office	Flooding, Thunderstorms, Tropical Cyclones	Not Started - Carried Over
Comments: Since this project is still awaiting funding, this action is labeled as not started and will be carried over from the previous plan.								
PP-10: RPL Structure Elevations	Elevation of Repetitive Loss Structures	Parish Budget/ FEMA Hazard Mitigation Funding	High	1-5 years	1,2	St. Charles Parish Grants Office	Flooding	In Progress
Comments: Update new RL structures as property statuses change.								
PP-11: Severe RPL Structure Elevations	Elevation of Severe Repetitive Loss Structures	Parish Budget/ FEMA Hazard Mitigation Funding	High	1-5 years	1,2	St. Charles Parish Grants Office	Flooding	In Progress
Comments: Update new SRL structures as property statuses change.								

New Mitigation Actions

St. Charles Parish Mitigation Action Sheet - Public Protection Measures (PP)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
PP-12: Vegetation Implementation	Vegetate coastal shore areas with appropriate grasses where feasible to reduce the risk of Coastal Erosion and Saltwater Intrusion for "At Risk" areas identified in the Coastal Wetlands Planning, Protection, and Restoration Act; the Louisiana Coast Area (LCA) study and the Coast 2050	Parish Budget/ Grant Funding	High	1-5 years	1,2	St. Charles Parish Planning and Zoning Office, Coastal Zone Management	Coastal Hazards	NEW
PP-13: Shore Structures	Harden coastal shore areas with permanent structures such as sea walls where feasible to reduce the risk of Coastal Erosion and Saltwater Intrusion for "At Risk" areas identified in the Coastal Wetlands Planning, Protection, and Restoration Act; the Louisiana Coast Area (LCA) study and the Coast 2050 Feasibility Study.	Parish Budget/ Grant Funding	High	1-5 years	1,2,3	St. Charles Parish Planning and Zoning Office, Coastal Zone Management	Coastal Hazards	NEW
PP-14: Levee Area Drainage Improvements	Seek to implement flood control and drainage improvements/ measures in levee protected areas so as to reduce losses and impacts due to levee structural failure.	Parish Budget/ BRIC, HMGP, FMA, CDBG, Statewide Flood Control, GOMESA, CPRA, LGAP, Capital Outlay	High	1-5 years	1,2,3	St. Charles Parish Planning and Zoning Office	Levee Failure	NEW
PP-15: Defensible Space	Implement areas of defensible space for critical assets located in Moderate to High wildfire vulnerability areas.	Parish Budget/ Grant Funding	High	1-5 years	1,2	St. Charles Parish Planning and Zoning Office	Wildfires	NEW
PP-16: Public Works Protection	Implement the defensible space methodology around all public works infrastructure to ensure protection from tree/limb breakage during winter storm events.	Parish Budget/ Grant Funding	High	1-5 years	1,3	St. Charles Parish Planning and Zoning Office	Winter Weather	NEW

PP-17: Winter Weather Equipment	Review inventory and obtain equipment to assist Louisiana Department of Transportation and Development in keeping roadways open to allow for free movement of emergency service vehicles.	Parish Budget/ Grant Funding	High	1-5 years	3	St. Charles Parish DHSEP	Winter Weather	NEW
PP-18: Saltwater Intrusion Study	Study areas impacted by saltwater intrusion to determine how salinities are changing	Parish Budget/ Grant Funding	High	1-5 years	2,3	St. Charles Parish Planning and Zoning Office	Coastal Hazards	NEW
PP-19: Hurricane Proofing - EMS	Install hurricane proof windows and shutters at the east bank and west bank EMS offices	Parish Budget/ BRIC, HMGP Grant Funding	Medium	1-5 years	1,2,3	EMS/ St. Charles Parish DHSEP	Flooding, Tropical Cyclones, Thunderstorms	NEW
PP-20: Hurricane Proofing - Landry Alternative Center	Harden Landry Alternative Center for hurricane resistance	Parish Budget/ BRIC, HMGP Grant Funding	Medium	1-5 years	1,2,3	St. Charles Parish School District/St. Charles Parish DHSEP	Flooding, Tropical Cyclones, Thunderstorms	NEW
PP-21: Hayden Hurst Hurricane Hardening	Harden Harry Hurst Middle School for hurricane resistance	Parish Budget/ BRIC, HMGP Grant Funding	Medium	1-5 years	1,2,3	St. Charles Parish School District/St. Charles Parish DHSEP	Flooding, Tropical Cyclones, Thunderstorms	NEW
PP-22: Hospital Hurricane Proofing	Inspection and upgrade of hospital windows across the campus to be hurricane proof	Parish Budget/BRIC, HMGP Grant Funding	Medium	1-5 years	1,2,3	St. Charles Parish Hospital Service District 1/St. Charles Parish DHSEP	Flooding, Tropical Cyclones, Thunderstorms	NEW
PP-23: Maintenance Plan Retrofitting	Secure or retrofit outdoor maintenance plant area	Parish Budget/ BRIC, HMGP Grant Funding	Medium	1-5 years	1,2,3	St. Charles Parish Hospital Service District 1/St. Charles Parish DHSEP	Flooding, Tropical Cyclones, Thunderstorms	NEW
PP-24: Hospital Hurricane Retrofitting	Retrofit three main entrances with hurricane proof vestibules	Parish Budget/ BRIC, HMGP Grant Funding	Medium	1-5 years	1,2,3	St. Charles Parish Hospital Service District 1/St. Charles Parish DHSEP	Flooding, Tropical Cyclones, Thunderstorms	NEW
PP-25: New Gym Construction	Construct new gymnasiums and harden existing gymnasiums throughout the parish to provide shelters during severe weather	Parish Budget/ BRIC, HMGP Grant Funding	Low	1-5 years	1,2,3	Parks and Recreation/ St. Charles Parish DHSEP	Flooding, Tropical Cyclones, Thunderstorms	NEW

Structural Projects (S)

Previous Action Update

St. Charles Parish Mitigation Action Sheet - Structural Projects (S)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
S-1: Drainage Evaluations	Evaluate drainage patterns throughout the Parish in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both newly developing areas of the Parish and more established areas.	Staff Time	High	1-5 years	1,2	St. Charles Parish Public Works	Flooding	Ongoing
S-2: Draining and Culvert Implementations	Implement the Riverbend Jack and Bore project, consisting of the installation of a 60" and 48" diameter steel drainage culvert under the KCS railroad and a 48" diameter steel culvert under the CN/IC railroad in order to improve stormwater drainage in the St. Rose community.	Parish Budget, CDBG, Statewide Flood Control, GOMESA, CPRA, LGAP, Capital Outlay	High	1-5 years	1,2	St. Charles Parish Public Works	Flooding	Ongoing
S-3: Stormwater Drainage Improvement	Implement the Delta Drive Jack and Bore project, consisting of the installation of two 42" diameter steel drainage culverts under the CN/IC railroad in order to improve stormwater drainage in the St. Rose community.	Parish Budget, CDBG, Statewide Flood Control, GOMESA, CPRA, LGAP, Capital Outlay Grant Funding	Medium	1-5 years	1,2	St. Charles Parish Public Works	Flooding	Ongoing
S-7: Enhanced Drainage in Destrehan	Ormond: Complete final design work and subsequently implement the "Canal A" and Dunleith Canal Intersection Upgrade in order to realign and stabilize "Canal A" at the Dunleith Canal in Destrehan. This project will result in enhanced drainage flow in the Destrehan community.	Parish Budget, CDBG, Statewide Flood Control, GOMESA, CPRA, LGAP, Capital Outlay Grant Funding	High	1-5 years	1,2	St. Charles Parish Public Works	Flooding	Ongoing
Comments: Engineering work has been completed. Implement Canal A and Dunleith Canal Intersection Upgrade. However, the parish is awaiting on the funding to complete this project. Because of this, the action will be carried over into this new plan.								

S-8: Vial Pump Station	Design and construct the Vial Pump Station. This project will provide a new pump station along the Vial Canal to improve drainage capacity in the Hahnville community.	Parish Budget, CDBG, GOMESA, LGAP, Capital Outlay, BRIC, HMGP, FMA Grant Funding	Low	1-5 years	1,2	St. Charles Parish Public Works	Flooding	Not Started - Carried Over
Comments: While temporary pumps have been in place since the previous plan, the parish is still awaiting funding to construct this pump station. Because of this, the action has been labeled as not started and will be carried over into this new plan.								
S-10: Tibby Pump Station	Des Allemands: Design and install the Tibby Pump Station Bar Screen Cleaner, Pump Station Cover, and Deck in order to upgrade the functioning of the Tibby Pump Station in Des Allemands.	Parish Budget, CDBG, Statewide Flood Control, GOMESA, CPRA, LGAP, Capital Outlay, HMGP, FMA Grant Funding	Low	1-5 years	1,2	St. Charles Parish Public Works	Flooding	Not Started - Carried Over
Comments: Since this project is still awaiting funding, this action is labeled as not started and will be carried over from the previous plan.								
S-17: Ormond Drainage Improvement	Ormond: Design and implement the Ormond Drainage Improvement project, which will entail making general drainage enhancements in the vicinity of the Ormond Nursing Home in Destrehan.	Parish Budget, CDBG, LGAP, State General Fund Grant Funding	High	1-5 years	1,2	St. Charles Parish Public Works	Flooding	Ongoing
Comments: The parish has already improved drainage around Ormond Nursing Home with the addition of two culverts.								
S-18: Oakland Jack and Bore	Almedia: Design and construct the Oakland Jack and Bore project, consisting of the installation of steel culverts under the CN/IC railroad to improve drainage in the vicinity of Oakland Ridge Lane in St. Rose.	Parish Budget, CDBG Grant Funding	Low	1-5 years	1,2	St. Charles Parish Public Works	Flooding	Not Started - Carried Over
Comments: While the design has been complete for the project, the parish is still awaiting funding to install culverts under the CN/IC railroad. For that reason, this action is labeled as not started and will be carried over into this new plan.								
S-19: Fairfield Jack and Bore	Almedia: Design and implement the Fairfield Jack and Bore project which will entail the installation of steel culverts under the CN/IC railroad at the Fairfield Pump Station in St. Rose.	Parish Budget, CDBG Grant Funding	Low	1-5 years	1,2	St. Charles Parish Public Works	Flooding	Not Started - Carried Over
Comments: While the design has been complete for the project, the parish is still awaiting funding to install culverts under the CN/IC railroad. For that reason, this action is labeled as not started and will be carried over into this new plan.								
S-35: Engineer's Canal Pump	NORCO Increase pump capacity at the Engineer's Canal pump station.	Parish Budget, GOMESA Bond Funding	Medium	1-5 years	1,2	St. Charles Parish Public Works	Flooding	Not Started - Carried Over
Comments: Design and permitting has been completed for this action. However, since no structural progress has been made towards this action, it is labeled as not started and will be carried over from the previous plan.								

New Mitigation Actions

St. Charles Parish Mitigation Action Sheet - Structural Projects (S)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
S-36: All Hazards Safe Room	Saferoom- 2-story multi-use saferoom	Parish Budget, HMGP Grant Funding	Medium	1-5 years	1,2,3	St. Charles Parish Office of Emergency Management	Coastal Hazards, Drought, Excessive Heat, Flooding, Levee Failure, Saltwater Intrusion, Thunderstorms, Tornadoes, Tropical Cyclones, Wildfires, Winter Weather	NEW
S-37: Hospital Emergency Power	Hospital Emergency Power – Purchase generator equipped to handle the electric load of the entire hospital, install new switch gear and other related equipment.	Parish Budget, Statewide Generator Program Funding, Hospital	Medium	1-5 years	1,2,3	St. Charles Parish Hospitals	Coastal Hazards, Drought, Excessive Heat, Flooding, Levee Failure, Thunderstorms, Tornadoes, Tropical Cyclones, Wildfires, Winter Weather	NEW
S-38: Retrofit Parish Facilities	Retrofit existing facilities throughout parish	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,2,3	St. Charles Parish Public Works	Coastal Hazards, Drought, Excessive Heat, Flooding, Levee Failure, Saltwater Intrusion, Thunderstorms, Tornadoes, Tropical Cyclones, Wildfires, Winter Weather	NEW

S-39: Montz Drainage Area (2021 East Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, CPRA Surplus, CPRA GOMESA Grant Funding	Medium	1-5 years	1,2	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following: • Montz - CNRR Jack and Bores • Montz Pump Station Number 1 at CNRR • Montz Pump Station Number 1 at KCSRR • Montz - Coulee Canal Improvements								
S-40: Norco Drainage Area (2021 East Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following: • Norco - Canal and Drainage Improvements • Norco- Clayton Pond Improvements • Norco - Engineers Canal Sheetpile Project								

S-41: New Sarpy Drainage Area (2021 East Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following: • New Sarpy - Upgrade of Schexnaydre Pump Station • New Sarpy - CNRR Jack and Bores • New Sarpy - Canal Improvements (Troxclair, Vans Lane, Shexnyder Lane, New East Canal) • New Sarpy - Upgrade of New Sarpy Pump Station								
S-42: Ormond Drainage Area (2021 East Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding, CDBG-MIT Funding, LGAP Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following: • Ormond - Canal A Improvements • Drainage Structure for Carriage/Houmas & A Canals • Carriage Canal Widening • Carriage/Dunleith Drainage Canal Structure • CNRR Culvert Crossing in Ormond • Ormond - Destrahan Number 2 Pump Station Improvements • Murray Hill and Destrahan Dr. Drainage Improvements • Ormond Oaks Channel								

S-43: St. Rose Drainage Area (2021 East Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following: • St. Rose Watershed (Canal Widening) • Replace and upgrade Oak Street Pump Station • Replace and upgrade 4th Street Pump Station								
S-44: Dianne Place Drainage Area (2021 East Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following: • Diane Pump Station and Sump Upgrade • Diane Place - CNRR Jack and Bores								

S-45: Bar None Drainage Area (2021 East Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following: • Bar None - CNRR Jack and Bores								
S-46: Turtle Pond Drainage Area (2021 East Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following: • Turtle Pond Watershed Drainage Improvements								

S-47: Almedia Drainage Area (2021 East Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following: • Almedia Watershed Drainage Improvements								
S-48: Destrehan Plantation Area (2021 East Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following:								

S-49: Plantation Business Center Area (2021 East Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following:								
S-50: Destrehan West Area (2021 East Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following:								

S-51: Destrehan East Area (2021 East Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following:								
S-52: Ama - Sellers Watershed (2021 West Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following: • Ama - Kennedy St. Pump Station • Ama - Kennedy St. Pump Station Outfit Canals • Ama - UPR Drainage Ditch and Outfall Drainage Improvements • Lemoine Lane/Hirsch/St. Mark St. Drainage Improvements • Zeller St. Drainage Improvements • Ama Pump Station Generator								

S-53: Hahnville #1 Watershed (2021 West Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding, STORM Act Revolving Loan	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following: • River Park Drive and Sunset Court Drainage Improvements • King and Hahn St. Drainage Improvements • River Road Estates Drainage Improvements • UPRR Jack and Bore Hahnville • Hahnville Drainage Canals Maintenance								
S-54: Hahnville #2 Watershed (2021 West Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding, STORM Act Revolving Loan	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following: • Bamboo St. Drainage Improvements • Fashion Plantation Estates, Avalon Subdivision, Courthouse Lane Drainage Improvements • Riverplace Estates Drainage Improvements • Hahnville Drainage Canals Maintenance								

S-55: Luling / Luling I-310 Watershed (2021 West Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following: • Old Luling UPRR Jack and Bores • Barriere Pump Station Upgrade • Lone Star Drive Drainage Improvements								
S-56: Mimosa / Willowdale Watershed (2021 West Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following: • Grand Ridge Hole 2 Drainage Improvements • Davis Drive Drainage Improvements • Mimosa Avenue Box Culvert • Willowdale Pump Station Sump and Canal Improvement • Peterson Canal Channel Widening • Asphodel Drive Drainage Improvements • Primrose Canal Cleaning and Improvements								

S-57: Paradis, Des Allemands, Sunset Watershed (2021 West Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding, SCP GOMESA, Capital Outlay Grant Funding, CPRA Surplus Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following: • Des Allemands Bulkhead Phase 1 Permanent Repair • Des Allemands Bulkhead Phase 2 • Sunset Auto Bar Screen • Sunset Pump Station Upgrade								
S-58: Killona / Taft Watershed (2021 West Bank Master Drainage Plan)	Evaluate drainage patterns for the area in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both new developments and more established areas. Identify projects to be completed to implement drainage improvements.	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Flooding	NEW
Comments: Projects including but not limited to the following:								
S-59: Saltwater Intrusion Infrastructure	Install Reverse Osmosis equipment at water treatment facilities and retrofit existing treatment plants to accept equipment	Parish Budget, BRIC, HMGP Grant Funding	Medium	1-5 years	1,3	St. Charles Parish Public Works	Saltwater Intrusion	NEW

Completed Actions

Emergency Services Actions (ES)

St. Charles Parish Mitigation Action Sheet - Emergency Services Actions (COMPLETED)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
ES-15: Drinking Water Initiatives	Installation of distribution monitoring panels in order for the parish to provide safe drinking water to schools, hospitals, nursing homes, shelters, etc.	Parish Budget, Grant Funding	Medium	N/A	2	St. Charles Parish Waterworks	Flooding, Thunderstorms, Tropical Cyclones, Tornadoes	Completed
Comments: Six additional panels installed with the completion of this project								
ES-17: Fuel Storage Tank	Acquisition and installation of a diesel fuel storage tank (up to 30,000) to provide a backup fuel supply for generators so that critical facilities can continue essential operations.	Parish Budget, Grant Funding	Medium	N/A	3	St. Charles Parish School District	Flooding, Thunderstorms, Tropical Cyclones, Tornadoes	Completed
ES-19: Emergency Fueling Pad	Engineer and construct an emergency fueling pad to allow the establishment of an emergency vehicle refueling site during disaster recovery. This will afford Emergency Services the ability to continue operations and services during disaster events when electrical utilities are not available.	Parish Budget, Grant Funding	Medium	N/A	3	St. Charles Parish Sheriff's Office	Flooding, Thunderstorms, Tropical Cyclones, Tornadoes	Completed
ES-20: Generator Elevation	Elevate the East Bank Water Plant generator	Parish Budget, Grant Funding	Medium	N/A	2,3	St. Charles Parish Waterworks	Flooding	Completed
ES-21: Generator Elevation	Elevate the West Bank Water Plant generator	Parish Budget, Grant Funding	Medium	N/A	2,3	St. Charles Parish Waterworks	Flooding	Completed

Natural Resource Protection Actions (NR)

St. Charles Parish Mitigation Action Sheet - Natural Resource Protection Actions (COMPLETED)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
NR-3: Coastal Restoration Projects	Coordinate with the elected officials and relevant staff of neighboring parish governments to identify high-priority regional coastal restoration projects that are most critical to the economic and environmental well-being of the entire southeast Louisiana region. Submit final list of regional coastal restoration priorities to all relevant state and federal parties, such as the Army Corps of Engineers.	Staff Time	High	N/A	1,2,3	St. Charles Parish Planning and Zoning, Coastal Zone Management, St. Charles Parish President's Office	Coastal Hazards	Completed
Comments: Coordination was conducted through Parishes Against Coastal Erosion (PACE). Priorities routed through CPRA								

Prevention Measures Actions (P)

St. Charles Parish Mitigation Action Sheet - Prevention Measures Actions (COMPLETED)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
P-6: Property Damage Database	Maintain a database of all properties that sustain damage as a result of a hazard. Include information about the nature and extent of the damage. Incorporate this database into the Parish Geographic Information System. Increase communication between EOC and GIS Dept. for this information	Staff Time	Medium	N/A	1,3	St. Charles Parish Planning and Zoning, St. Charles Parish GIS Dept., St. Charles Parish DHSEP	Coastal Hazards, Drought, Excessive Heat, Flooding, Levee Failure, Thunderstorms, Tornadoes, Tropical Cyclones, Wildfires, Winter Weather	Completed
Comments: The GIS department has developed a live update application. The app can accept public input for the hazards and is mainly used for damage assessment after disasters. The records are verified by the EOC and floodplain staff and kept as a layer for each event.								

Public Information Activities Actions (PI)

St. Charles Parish Mitigation Action Sheet - Public Information Actions (COMPLETED)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
No actions were completed from this section								

Property Protection Measures Actions (PP)

St. Charles Parish Mitigation Action Sheet - Property Protection Actions (COMPLETED)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
PP-8: Communications Center Renovations	Construction of new or retrofit old Communications Center with mitigation measures that protect during high wind and flood events. This may include hardening structures, installing hurricane clips, or elevating utilities.	Parish Budget, Grant Funding	Medium	N/A	1,2,3	St. Charles Parish Sheriff's Office	Flooding, Thunderstorms, Tropical Cyclones, Tornadoes	Completed
Comments: Completed in 2022								

Structural Projects Actions (S)

St. Charles Parish Mitigation Action Sheet - Structural Projects Actions (COMPLETED)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
S-4: Willowdale Pump Station	Evaluate drainage patterns throughout the Parish in the context of recent drainage improvements and in light of anticipated land use changes. Evaluate the need for additional drainage and flood control measures for both newly developing areas of the Parish and more established areas.	Parish Budget, Grant Funding	Medium	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed
S-5: Erosion Stabilization	Stabilization of the Dunleith Canal Bank to protect it from scouring and erosion.	Parish Budget, Grant Funding	High	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed

S-9: Willowdale Pump Station	Finalize the design of and subsequently construct the Willowdale Pump Station Bank Stabilization II project, consisting of embankment refurbishment, fill placement, reseeding/resodding, concrete slope paving, and splash back construction to improve pumping capacity and flow from the Willowdale Pump Station. This project is part of the West Bank Hurricane Protection Levee Project	Parish Budget, Grant Funding	Medium	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed
S-11: Bayou Pump Station	Design and install the Up the Bayou Pump Station Bar Screen Cleaner, Pump Station Cover and Deck in order to upgrade the functioning of the Up the Bayou Pump Station in Des Allemands.	Parish Budget, Grant Funding	Low	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed
S-13: Tregle Pump Station	Design and install the Tregle Pump Station (Eric Pump Station) Bar Screen Cleaner, Pump Station Cover and Deck in order to upgrade the functioning of the Tregle Pump Station located in Des Allemands.	Parish Budget, Grant Funding	Low	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed
S-14: Cortez Pump Station	Design and install the Cortez Pump Station Bar Screen Cleaner, Pump Station Cover and Deck in order to upgrade the functioning of the Cortez Pump Station located in Des Allemands.	Parish Budget, Grant Funding	High	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed
S-15: Fairfield Pump Station	Design and implement the Fairfield Pump Station Upgrade project, consisting of increasing the pump station capacity and improving the structural components of the Fairfield Pump Station in St. Rose.	Parish Budget, Grant Funding	High	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed

S-16: Oakland Pump Station	Design and implement the Oakland Pump Station Upgrade project, consisting of increasing the pump station capacity and improving the structural components of the Oakland Pump Station in St. Rose.	Parish Budget, Grant Funding	High	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed
S-20: Bayou Gauche Drainage Improvement	Evaluate Engineering options and design to alleviate the flooding problem along Canal #10 and improve drainage in the Bayou Gauche community. Design will include the construction of a new Pump Station with location to be determined from the Engineering study.	Parish Budget, Grant Funding	Low	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed
S-22: Coronado Park	Design and Implement improvements to increase capacity and efficiency of the Coronado Park drainage system.	Parish Budget, Grant Funding	High	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed
S-23: Riverbend Park	Design and implement installation of a new Pump Station for Riverbend Park.	Parish Budget, Grant Funding	High	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed
S-24: Blouin Canal	Design and implement improved capacity and stabilization of the Blouin Canal in order to reduce erosion and improve pumping capacity. This project is part of the West Bank Hurricane Protection Levee Project	Parish Budget, Grant Funding	Medium	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed
S-25: Primrose Canal Upgrade	Complete final design work and implement the Primrose Canal Upgrade in order to increase efficiency and stabilization of the canal. This project will result in enhanced drainage flow for the West Bank community.	Parish Budget, Grant Funding	High	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed

S-27: Cousins Canal Upgrade	Complete final design work and implement the Cousins Canal Upgrade in order to increase efficiency and stabilization of the canal. This project will result in enhanced drainage flow for the West Bank community. This is part of the West Bank Hurricane Protection Levee Project	Parish Budget, Grant Funding	Medium	1-5 years	1,2	St. Charles Parish Public Works	Flooding	Completed
S-28: Rolling Canal	Boring of Rolling Canal Crossing/Distribution Lines	Parish Budget, Grant Funding	Low	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed
S-29: Blouin Canal	Blouin Canal Road Crossing Culvert Improvements. This is part of the West Bank Hurricane Protection Levee Project.	Parish Budget, Grant Funding	Medium	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed
S-30: NOLA Pump Station	NOLA Pump Station Auto Bar Screen Cleaner	Parish Budget, Grant Funding	High	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed
S-31: Sunset Pump Station	Design and Implement improvements to increase capacity and efficiency of the Sunset Pump Station.	Parish Budget, Grant Funding	High	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed
S-32: Magnolia Pump Station	Design and construct Magnolia Pump Station. This is part of the West Bank Hurricane Protection Levee Project.	Parish Budget, Grant Funding	Medium	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed
S-33: Mimosa Drainage Improvements	Design and implement Mimosa drainage improvements to increase conveyance and construct new pump station.	Parish Budget, Grant Funding	Medium	N/A	1,2	St. Charles Parish Public Works	Flooding	Completed

Deleted Actions

Emergency Services Actions (ES)

St. Charles Parish Mitigation Action Sheet - Emergency Services Actions (DELETED)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
ES-3: Hazardous Materials Sites	Coordinate with the Coast Guard, Department of Homeland Security, and private industry to develop a program of regular, comprehensive evaluations of security surrounding fixed hazardous material sites. Coordinate with local, state, and federal law enforcement agencies as well as private sector security entities to implement suggested measures to improve security around these facilities.	Staff Time	High	N/A	1,2,3	St. Charles Parish DHSEP, U.S. Coast Guard, Industry, Port of South Louisiana	Hazardous Materials	Deleted - Not a profiled hazard
Comments: Participate in Area Maritime Security Committee and FSO Monthly Meeting								
ES-14: Electric Actuators	Installation of Electric Actuators in the Distribution System to maintain essential supplies of water to continue essential operations at critical facilities.	Parish Budget, Grant Funding	Low	N/A	2,3	St. Charles Parish Waterworks	Flooding, Thunderstorms, Tropical Cyclones, Tornadoes	Deleted
Comments: Additional research revealed that this project is not feasible due to initial costs and cost of ongoing maintenance. This project is deleted from further consideration.								
ES-25: Cybersecurity	Increase network resilience in case of cybersecurity attack	Parish Budget, Grant Funding	Low	N/A	3	St. Charles Parish Dept. of Technology	Cybersecurity	Deleted - Not a profiled hazard

Natural Resource Protection Actions (NR)

St. Charles Parish Mitigation Action Sheet - Natural Resource Protection Actions (DELETED)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
No actions were deleted from this section								

Prevention Measures Actions (P)

St. Charles Parish Mitigation Action Sheet - Prevention Measures Actions (DELETED)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
No actions were deleted from this section								

Public Information Activities Actions (PI)

St. Charles Parish Mitigation Action Sheet - Public Information Actions (DELETED)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
PI-6: Hazardous Materials Education	Publish and distribute information on hazardous materials routes and fixed sites so that the public becomes more aware of both the risks and recommended protective actions. Include a chart on warning symbols and terms in the publication.	Local Funding; est. $10,000	Medium	N/A	1,2	St. Charles Parish DHSEP, Public Information Office	Hazardous Materials	Deleted - Not a profiled hazard
Comments: Industry Aware Bulletin Published 2017, St. Charles Parish All Hazards Guide Published and mailed bi-annually								

Property Protection Measures Actions (PP)

St. Charles Parish Mitigation Action Sheet - Property Protection Actions (DELETED)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
No actions were deleted from this section								

Structural Projects Actions (S)

St. Charles Parish Mitigation Action Sheet - Structural Projects Actions (DELETED)								
Mitigation Action	**Action Description**	**Funding Source**	**Priority**	**Target Completion Date**	**Goals**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
S-6: New Culverts Under HWY 61	Complete design work and subsequently implement the Airline Culvert Enhancement and Replacement project. This project will provide enhanced drainage along US Highway 61 (Airline Highway) at Engineers Canal by installing new culverts under Highway 61.	Parish Budget, Grant Funding	Medium	N/A	1,2	St. Charles Parish Public Works	Flooding	Deleted - Action no longer need
Comments: Implement Airline Culvert Enhancement and Replacement Project								
S-12: Des Allemands Pump Station	Design and install the Des Allemands Pump Station Bar Screen Cleaner, Pump Station Cover and Deck in order to upgrade the functioning of the Des Allemands Pump Station located in Des Allemands.	Parish Budget, Grant Funding	Low	N/A	1,2	St. Charles Parish Public Works	Flooding	Deleted - Added in error
S-21: Montz Drainage	Complete final design work and construct the remaining recommended drainage improvements from the 2005 Montz Drainage Plan. The outstanding recommendations consist of installing culverts under Evangeline Road at the ICG Railroad and grading the ICG Canal, CC Canal, Scott Canal and KCS Canal.	Parish Budget, Grant Funding	High	N/A	1,2	St. Charles Parish Public Works	Flooding	Deleted
Comments: This action is no longer viable because the pretenses for the completion of the action were made under the guidance of the 2005 Montz Drainage Plan, which has since been superseded by the 2021 Montz Drainage Plan.								

S-26: New Sarpy Mid and Midwest Canal	Complete final design work and implement the New Sarpy Mid Canal and New Sarpy Midwest Canal Upgrades in order to increase efficiency and stabilization of the canal. This project will result in enhanced drainage flow for the East Bank community.	Parish Budget, Grant Funding	Low	N/A	1,2	St. Charles Parish Public Works	Flooding	Deleted
Comments: This action is no longer viable because the pretenses for the completion of the action were made under the guidance of the previous New Sarpy Drainage Plan, which has since been superseded by the 2021 New Sarpy Drainage Plan.								
S-34: Norco Drainage Improvements	Install additional culverts under railroad tracks at Highway 61 to increase drainage in the Norco area	Parish Budget, Grant Funding	Medium	N/A	1,2	St. Charles Parish Public Works	Flooding	Deleted
Comments: This action is no longer viable because the pretenses for the completion of the action were made under the guidance of the previous Norco Drainage Plan, which has since been superseded by the 2021 Norco Drainage Plan.								

Action Prioritization

During the prioritization process, the steering committee considered the costs and relative benefits of each new action. Costs can usually be listed in terms of dollars, although at times it involves staff time rather than the purchase of equipment or services that can be readily measured in dollars. In most cases, benefits, such as lives saved or future damage prevented, are hard to measure in dollars. 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 steering committee prioritized the possible activities that could be pursued. Steering 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 steering committee met internally for mitigation action meetings to review and approve St. Charles Parish mitigation actions. On-going actions, as well as actions which can be undertaken by existing parish staff without need for additional funding, were given high priority. The actions with high benefit and low cost, political support, and public support but require additional funding from parish or external sources were given medium priority. The actions that require substantial funding from external sources with relatively longer completion time were given low priority.

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

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Appendix A: Planning Process

Purpose

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

The St. Charles Parish Hazard Mitigation Plan Update

The St. Charles Parish Hazard Mitigation Plan Update process began in January 2024 with a series of emails and collaborations between the contractor (SDMI) and the participating agencies. Update activities were intended to give each participating agency the opportunity to shape the plan to best fit their community's goals. Community stakeholders and the general public were invited to attend and contribute information to the planning process during specific time periods or meetings.

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

Date	Meeting or Outreach	Location	Public Invited	Purpose
2/20/2024	Kick Off Meeting	Hahnville, LA	No	Discuss with Parish DHSEP Director the expectations and requirements of the project.
4/9/2024	Initial Planning Meeting	Hahnville, LA	No	Discuss with the Planning Committee expectations and requirements of the project. Assign plan worksheets to Parish.
8/8/2024	Risk Assessment Overview	Hahnville, LA	Yes	Discuss and review the Risk Assessment with the Steering Committee. Discuss and review expectations for Public Meeting.
8/8/2024	Public Meeting	Hahnville, LA	Yes	The Public Meeting allowed the public and community stakeholders to participate and provide input into the hazard mitigation planning process. Maps of the St. Charles Parish communities were provide for the meeting attendees to identify specific areas where localized hazards occur.
Ongoing	Public Survey Tool	Online	Yes	This survey asked participants about public perceptions and opinions regarding natural hazards in St. Charles 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 and Actions											
Plan Review by GOHSEP and FEMA											
Plan Adoption											
Plan Approval											

Coordination

The St. Charles Parish Department of Homeland Security and Emergency Preparedness (DHSEP) oversaw the coordination of the 2025 Hazard Mitigation Plan Update Planning Committee during the update process. The parish DHSEP 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 St. Charles Parish DHSEP Director. St. Charles Parish identified and reached out, via email, to representatives of non-profits, local business and organization owner/managers, 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. A representative from the St. Charles Parish Council on Aging attended various meetings and was able to provide feedback throughout the entirety of the plan update process. There are no higher education institutions in St. Charles 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 and SDMI were jointly responsible for inviting the steering committees and key stakeholders to planned meetings and activities. SDMI assisted the Parish Director with press releases and social media statements for notification to the media and general public for public meetings and public outreach activities.

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

Neighboring Community, Local and Regional Planning Process Involvement

From the outset of the planning process, the steering 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 other municipalities
- Incorporation of other planning documents, studies and efforts
- Action item development and action progress from 2017 update
- Risk Assessment review
- Plan document draft review
- Formal adoption of the Hazard Mitigation Plan

The Lafourche Parish OHSEP Director was invited to attend the Initial Planning and Risk Assessment Meetings for St. Charles Parish in an effort to coordinate mitigation efforts where possible as neighboring communities. The Lafourche Parish OHSEP Director was invited via email and phone call to participate in an effort to collaborate with neighboring communities. SDMI assisted St. Charles Parish with encouraging the collaboration with these neighboring communities via email by extending an invitation to the Madison 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 2025 Hazard Mitigation Plan Update Planning Committee consisted of representatives from the following parish, municipal or community stakeholders. Below is a detailed list of the 2025 HMPU Planning Committee:

St. Charles Parish Hazard Mitigation Planning Committee			
Name	**Title**	**Agency**	**Email**
Jason Tastet	Director	SCP DHSEP	jtastet@stcharlesgov.net
Steve Sirmon	Senior EM Coordinator	SCP DHSEP	jsirmon@stcharlesgove.net
Danielle Honor-Young	CRS Specialist	SCP Planning and Zoning	dhonor@stcharlesgov.net
Marny Stein	Coastal Zone Management	SCP Planning and Zoning	mstein@stcharlesgov.net
George Dugas	Emergency Coordinator	SCP DHSEP	gdugas@stcharlesgov.net
Stacy Dugas	Grants Specialist	SCP Grants Dept.	sdugas@stcharlesgov.net
Blaise Kenney	Grants Specialist	SCP Grants Dept.	bkenney@stcharlesgov.net
Carla Chiasson	Grants Officer	SCP Grants Dept.	cchiasson@stcharlesgov.net
Samantha de Castro	Deputy Chief Administrative Officer	SCP Government	sdecastro@stcharlesgov.net
Holly Fonseca	Councilwoman-at-Large	SCP Government	hfonseca@stcharlesgov.net
Miles Bingham	Director	SCP Public Works	mbingham@stcharlesgov.net
Brandon Bernard	Assistant Director	SCP Public Works	bbernard@stcharlesgov.net
Greg Gorden	Director	SCP Waterworks	ggorden@scpwater.org
Rickey Robert	Operations Manager	SCP Waterworks	rrobert@scpwater.org
David deGeneres	Director	SCP Wastewater	ddegeneres@stcharlesgov.net
Duane Foret	Director	SCP Parks and Recreation	dforet@stcharlesgov.net
Luis Martinez	GIS Coordinator	SCP GIS	lmartinez@stcharlesgov.net
Troy Whitney	Commander of Adm. Services	SCP Sheriff's Office	twhitney@stcharlessheriff.org
Greg Oehldrich	Detective	SCP Sheriff's Office	goehldrich@stcharlessheriff.org
Kade Rogers	Adm. Of Safety, Security, & Athletics	SCP Public Schools	krogers@stcharles.k12.la.us
John Rome	Chief Plant Services & Security Officer	SCP Public Schools	jrome@stcharles.k12.la.us
Huey Marcel III	Director	SCP EMS	huey.marceliii@ochsner.org
Michael Guillot	Director of EM	SCP Ochsner Health	michael.guillot@ochsner.org
Ashley Beetz	Region 3 Coordinator	GOHSEP	ashley.beetz@la.gov
April Keller	Executive Director	SCP Council on Aging	akeller@stcharlescoa.com
Francesca Blanchard	Public Information Officer	SCP Government	fblanchard@stcharlesgov.net
Dustin Vinet	Safety & Security Coordinator	SCP Public Schools	dvinet@stcharles.k12.la.us
Chelsea Green	Administrative Assistant	SCP GIS	cgreen@stcharlesgov.net

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 St. Charles Parish programs and planning.

A measure of integration and coordination is achieved through the HMPU participation of Steering Committee members and community stakeholders who administer programs such as: floodplain management under the National Flood Insurance Program (NFIP), coastal protection and restoration, parish planning and zoning and building code enforcement. Since the last update in 2020, St. Charles 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, St. Charles Parish also uses vulnerability statistics and integration strategies to help guide their mitigation practices. These strategies and practices can be found at the end of each profiled hazard in the risk assessment. Furthermore, the parish holds annual meetings to discuss any changes that have occurred within the parish that could alter the vulnerability of St. Charles Parish and how to combat any issues that have arisen.

St. Charles 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 the *Appendix B: Plan Maintenance* section. The primary means for integrating mitigation strategies into other local planning mechanisms will be through the revision, update and implementation of any individual city/town plans that require specific planning and administrative tasks (e.g. risk assessment, plan amendments, ordinance revisions, capital improvement projects, etc.).

The members of the St. Charles Parish Hazard Mitigation Steering 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 2020 Hazard Mitigation Plan was also used in the planning process. Other existing data and plans used in the planning process include those listed below.

- Louisiana Coastal Master Plan
- Parish Emergency Operations Plan
- State of Louisiana Hazard Mitigation Plan
- Flood Insurance Rate Maps

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 for St. Charles Parish.

Meeting #1: Hazard Mitigation Plan Update Kick-Off

Date: February 20, 2024

Location: SCP Emergency Operations Center – Hahnville, LA

Purpose: Discuss expectations and requirements of the project, as well as meeting schedules, committee make up, and next steps.

Public Initiation: No

Meeting Invitees:

St. Charles Parish Hazard Mitigation Planning Committee		
Name	**Title**	**Agency**
Jason Tastet	Director	SCP DHSEP
Steve Sirmon	Senior EM Coordinator	SCP DHSEP
Danielle Honor-Young	CRS Specialist	SCP Planning and Zoning
Marny Stein	Coastal Zone Management	SCP Planning and Zoning
George Dugas	Emergency Coordinator	SCP DHSEP
Stacy Dugas	Grants Specialist	SCP Grants Dept.
Blaise Kenney	Grants Specialist	SCP Grants Dept.
Carla Chiasson	Grants Officer	SCP Grants Dept.
Chris Rippetoe	Program Manager	LSU-SDMI
Jason Martin	Emergency Management Analyst	LSU-SDMI

Meeting #2: Hazard Mitigation Plan Update Planning Committee Meeting

Date: April 9, 2024

Location: SCP Emergency Operations Center – Hahnville, LA

Purpose: Discuss expectations and requirements of the project. Assign plan worksheets to Parish.

Public Initiation: No

Meeting Invitees:

St. Charles Parish Hazard Mitigation Planning Committee		
Name	**Title**	**Agency**
Jason Tastet	Director	SCP DHSEP
Steve Sirmon	Senior EM Coordinator	SCP DHSEP
Danielle Honor-Young	CRS Specialist	SCP Planning and Zoning
Marny Stein	Coastal Zone Management	SCP Planning and Zoning
George Dugas	Emergency Coordinator	SCP DHSEP
Stacy Dugas	Grants Specialist	SCP Grants Dept.
Blaise Kenney	Grants Specialist	SCP Grants Dept.
Carla Chiasson	Grants Officer	SCP Grants Dept.
Samantha de Castro	Deputy Chief Administrative Officer	SCP Government
Holly Fonseca	Councilwoman-at-Large	SCP Government
Miles Bingham	Director	SCP Public Works
Brandon Bernard	Assistant Director	SCP Public Works
Greg Gorden	Director	SCP Waterworks
Rickey Robert	Operations Manager	SCP Waterworks
David deGeneres	Director	SCP Wastewater
Duane Foret	Director	SCP Parks and Recreation
Luis Martinez	GIS Coordinator	SCP GIS
Troy Whitney	Commander of Adm. Services	SCP Sheriff's Office
Greg Oehldrich	Detective	SCP Sheriff's Office
Kade Rogers	Adm. Of Safety, Security, & Athletics	SCP Public Schools
John Rome	Chief Plant Services & Security Officer	SCP Public Schools
Huey Marcel III	Director	SCP EMS
Michael Guillot	Director of EM	SCP Ochsner Health
Ashley Beetz	Region 3 Coordinator	GOHSEP
April Keller	Executive Director	SCP Council on Aging
Francesca Blanchard	Public Information Officer	SCP Government
Dustin Vinet	Safety & Security Coordinator	SCP Public Schools
Chelsea Green	Administrative Assistant	SCP GIS

Meeting #3: Hazard Mitigation Plan Update Risk Assessment Meeting

Date: August 8, 2024
Location: SCP Emergency Operations Center – Hahnville, LA
Purpose: Discuss and review the Risk Assessment with the Steering Committee.
Public Initiation: Yes
Meeting Invitees:

St. Charles Parish Hazard Mitigation Planning Committee		
Name	**Title**	**Agency**
Jason Tastet	Director	SCP DHSEP
Steve Sirmon	Senior EM Coordinator	SCP DHSEP
Danielle Honor-Young	CRS Specialist	SCP Planning and Zoning
Marny Stein	Coastal Zone Management	SCP Planning and Zoning
George Dugas	Emergency Coordinator	SCP DHSEP
Stacy Dugas	Grants Specialist	SCP Grants Dept.
Blaise Kenney	Grants Specialist	SCP Grants Dept.
Carla Chiasson	Grants Officer	SCP Grants Dept.
Samantha de Castro	Deputy Chief Administrative Officer	SCP Government
Holly Fonseca	Councilwoman-at-Large	SCP Government
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David deGeneres	Director	SCP Wastewater
Duane Foret	Director	SCP Parks and Recreation
Luis Martinez	GIS Coordinator	SCP GIS
Troy Whitney	Commander of Adm. Services	SCP Sheriff's Office
Greg Oehldrich	Detective	SCP Sheriff's Office
Kade Rogers	Adm. Of Safety, Security, & Athletics	SCP Public Schools
John Rome	Chief Plant Services & Security Officer	SCP Public Schools
Huey Marcel III	Director	SCP EMS
Michael Guillot	Director of EM	SCP Ochsner Health
Ashley Beetz	Region 3 Coordinator	GOHSEP
April Keller	Executive Director	SCP Council on Aging
Francesca Blanchard	Public Information Officer	SCP Government
Dustin Vinet	Safety & Security Coordinator	SCP Public Schools
Chelsea Green	Administrative Assistant	SCP GIS

Meeting #4: Hazard Mitigation Plan Update Public Meeting

Date: August 8, 2024

Location: SCP Emergency Operations Center – Hahnville, LA

Purpose: The Public Meeting allowed the public and community stakeholders to participate and provide input into the hazard mitigation planning process. Presentation also included highlights of current mitigation projects highlights, as well as public survey discussion. 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, published in the local newspaper, and posted via social media. 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 and those areas that have been deemed as underserved. The parish was in charge of identifying these specific organizations so that they may be invited to participate at this public meeting and in the plan update process as a whole. This effort was carried out by St. Charles Parish, with assistance from SDMI.

Public Initiation: Yes

Meeting Invitees:

St. Charles Parish Hazard Mitigation Planning Committee		
Name	**Title**	**Agency**
Jason Tastet	Director	SCP DHSEP
Steve Sirmon	Senior EM Coordinator	SCP DHSEP
Danielle Honor-Young	CRS Specialist	SCP Planning and Zoning
Marny Stein	Coastal Zone Management	SCP Planning and Zoning
George Dugas	Emergency Coordinator	SCP DHSEP
Stacy Dugas	Grants Specialist	SCP Grants Dept.
Blaise Kenney	Grants Specialist	SCP Grants Dept.
Carla Chiasson	Grants Officer	SCP Grants Dept.
Samantha de Castro	Deputy Chief Administrative Officer	SCP Government
Holly Fonseca	Councilwoman-at-Large	SCP Government
Miles Bingham	Director	SCP Public Works
Brandon Bernard	Assistant Director	SCP Public Works
Greg Gorden	Director	SCP Waterworks
Rickey Robert	Operations Manager	SCP Waterworks
David deGeneres	Director	SCP Wastewater
Duane Foret	Director	SCP Parks and Recreation
Luis Martinez	GIS Coordinator	SCP GIS
Troy Whitney	Commander of Adm. Services	SCP Sheriff's Office
Greg Oehldrich	Detective	SCP Sheriff's Office
Kade Rogers	Adm. Of Safety, Security, & Athletics	SCP Public Schools
John Rome	Chief Plant Services & Security Officer	SCP Public Schools
Huey Marcel III	Director	SCP EMS
Michael Guillot	Director of EM	SCP Ochsner Health
Ashley Beetz	Region 3 Coordinator	GOHSEP
April Keller	Executive Director	SCP Council on Aging
Francesca Blanchard	Public Information Officer	SCP Government
Dustin Vinet	Safety & Security Coordinator	SCP Public Schools
Chelsea Green	Administrative Assistant	SCP GIS

Meeting Announcement:

ST. CHARLES PARISH OFFICE OF HOMELAND SECURITY & EMERGENCY PREPAREDNESS

PUBLIC MEETING ANNOUNCEMENT

St. Charles Parish and its partners are seeking community input for the 2025 St. Charles Parish Hazard Mitigation Plan update!

St. Charles 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 plan. The St. Charles Parish Hazard Mitigation 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 your community is at risk to? Please join us on Thursday, August 8th for a public meeting at 11 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:
St. Charles Parish EOC
15026 River Rd
Hahnville, LA

Residents of St. Charles 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:

https://lsu.qualtrics.com/jfe/form/SV_0xfGyPobXEld7BI

The Parish appreciates your input.

If you have questions, please contact the St. Charles Parish OHSEP Office.

Outreach Activity #1: Public Opinion Survey

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

As referenced in the *Mitigation Strategy* section of this document, an online public opinion survey of St. Charles Parish residents was conducted between February 2024 and September 2024. The survey was designed to capture public perceptions and opinions regarding natural hazards in St. Charles Parish. In addition, the survey collected information regarding the methods and techniques preferred by the respondents for reducing the risks and losses associated with local hazards. As of September 2, 2024, there have been 16 responses to the survey. A link to the full St. Charles Parish survey can be found here: *https://lsu.qualtrics.com/jfe/form/SV_0xfGyPobXEld7BI*

Outreach Activity #2: Incident Questionnaire

Date: August 8, 2024
Location: Public Meeting
Public Initiation: Yes

An incident/issue questionnaire was provided at the public meeting in an effort to collect additional information from residents of St. Charles Parish regarding hazard events and their localized impacts. While the information collected via the questionnaire was to be integrated into this planning document, the public who attended the meeting did not participate in this activity, therefore; additional information cannot be incorporated into the plan at this time. A copy of the incident questionnaire can be found on the next page.

Outreach Activity #3: 2025 St. Charles Parish Hazard Mitigation Plan Public Review

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

After an initial review by the St. Charles Parish Planning Committee was completed, the 2025 St. Charles 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/st-charles*

Public Meeting Activity:

ST. CHARLES PARISH PUBLIC MEETING

PUBLIC ACTIVITY: INCIDENT/ ISSUE QUESTIONNAIRE

1. HAZARD TYPE(S):

A. COASTAL HAZARDS
B. DROUGHT
C. EXCESSIVE HEAT
D. FLOODING
E. LEVEE FAILURE
F. SALTWATER INTRUSION
G. THUNDERSTORMS
H. TORNADOES
I. TROPICAL CYCLONES
J. WILDFIRES
K. WINTER WEATHER

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?

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."

Implementation, Monitoring, Evaluating, and Updating the Plan

The St. Charles Parish Hazard Mitigation Planning Committee will be responsible for implementing, monitoring, evaluating, and documenting the plan's progress throughout the five effective years of the hazard mitigation plan. St. Charles Parish will be responsible for conducting multiple evaluations each year to access the validity of verbiage set forth in this plan and to access the progress of ongoing or not started actions. 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 the SDMI HM 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
- Schedule for monitoring and evaluating the plan

On a quarterly basis, the plan administrator will monitor the plan to assess if significant changes have occurred in the premises upon which the plan was updated. The plan administrator will look at items such as:

- Changes in data used to determine vulnerabilities and loss estimates, in terms of quality and availability
- Changes in Federal or state plans that could affect the continued implementation of any mitigation actions
- The identification of new hazards requiring new mitigation actions
- Changes in the parish residents' perceptions relative to specific hazards
- Review and update any incorporation of existing or new planning programs
- Review and update the solicitation of public input
- Overview and documentation of any updates to sections of the plan that occurred over the last year.

Responsible Parties

St. Charles 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 DHSEP Director to be assigned as deemed appropriate.

Methods for Monitoring and Evaluating the Plan and Plan Evaluation Criteria

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

2025 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 2025 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 St. Charles Parish Hazard Mitigation Plan Planning Committee to determine additional implementation procedures when appropriate. This may include integrating the requirements of the St. Charles Parish Hazard Mitigation Plan into each municipalities planning documents, processes, or mechanisms as follows:

- Ordinances, Resolutions, Regulations
- Comprehensive Master Plan
- Capital Improvements Plan
- Economic Development Plan
- Continuity of Operations Plan
- Local Emergency Operations Plan
- Transportation Plan
- Stormwater Management Plan
- Disaster Recovery Plan
- Coastal Zone Management Plan

Opportunities to integrate the requirements of this plan into other local planning mechanisms will continue to be identified through future meetings of the St. Charles 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 municipality's individual plans 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, the municipalities 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.

On behalf of the census designated communities, St. Charles Parish has the authority to incorporate the contents of the Hazard Mitigation Plan into the parish's existing regulatory mechanisms. Agreements are currently in place with said communities to allow for the parish incorporation mechanisms to take place. The following parish and local plans incorporate requirements of this HMP Update as follows through planning committee member and representation throughout the planning process as described above:

St. Charles Parish			
Comprehensive Master Plan	Updated as needed	St. Charles Parish DHSEP	✓
Capital Improvements Plan	Updated as needed	St. Charles Parish DHSEP	✓
Economic Development Plan	Updated as needed	St. Charles Parish DHSEP	✓
Continuity of Operations Plan	Updated as needed	St. Charles Parish DHSEP	✓
Local Emergency Operations Plan	Updated as needed	St. Charles Parish DHSEP	✓
Transportation Plan	Updated as needed	St. Charles Parish DHSEP	✓
Stormwater Management Plan	Updated as needed	St. Charles Parish DHSEP	✓
Disaster Recovery Plan	Updated as needed	St. Charles Parish DHSEP	✓
Coastal Zone Management Plan	Updated as needed	St. Charles Parish DHSEP	✓

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 annually at the steering committee meeting. 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 the St. Charles Parish Planning Area

St. Charles Parish Planning Area Critical Facilities												
Type	**Name**	**Coastal Hazards**	**Drought**	**Excessive Heat**	**Flooding**	**Levee Failure**	**Saltwater Intrusion**	**Thunderstorms**	**Tornadoes**	**Tropical Cyclones**	**Wildfires**	**Winter Weather**
Civil Government	St. Charles Parish Courthouse	X	X	X	X			X	X	X	X	X
	St. Charles Parish Emergency Operations Center	X	X	X	X			X	X	X	X	X
	St. Charles Parish East Bank Yard Public Works	X	X	X	X			X	X	X	X	X
	St. Charles Parish Department of Public Works	X	X	X	X			X	X	X		X
	St. Charles Parish Communications Center	X	X	X				X	X	X		X
	St. Charles Parish Planning and Zoning Department	X	X	X				X	X	X	X	X
	Edward Dufresne Community Center	X	X	X				X	X	X	X	X
	St. Charles Parish School Board	X	X	X				X	X	X	X	X
Fire & SAR	Bayou Gauche Volunteer Fire Department	X	X	X	X			X	X	X		X
	Des Allemands Volunteer Fire Department - Station 72	X	X	X				X	X	X	X	X
	East St. Charles Fire Department	X	X	X				X	X	X	X	X
	Hahnville Volunteer Fire Department - Station 31	X	X	X				X	X	X	X	X
	Hahnville Volunteer Fire Department - Station 32	X	X	X				X	X	X	X	X
	Killona Volunteer Fire Department	X	X	X	X			X	X	X		X
	Luling Volunteer Fire Department - Station 21	X	X	X	X			X	X	X		X
	Luling Volunteer Fire Department - Station 22	X	X	X	X			X	X	X	X	X
	Luling Volunteer Fire Department - Station 23	X	X	X	X			X	X	X	X	X
	Luling Volunteer Fire Department - Station 24	X	X	X	X			X	X	X	X	X
	Norco Area Volunteer Fire Department - Central Station	X	X	X				X	X	X	X	X

	Norco Area Volunteer Fire Department - Perilloux Firehouse	X	X	X	X			X	X	X	X	X
	Paradis Volunteer Fire Department	X	X	X				X	X	X		X
	Paradis Volunteer Fire Department - Station 1	X	X	X				X	X	X		X
	St. Rose Fire Department - Station 51	X	X	X	X			X	X	X	X	X
	St. Rose Volunteer Fire Department	X	X	X				X	X	X	X	X
Law Enforcement	St. Charles Parish Sheriff's Office - Luling	X	X	X	X			X	X	X		X
	St. Charles Parish Sheriff's Department - Bonds & Fines	X	X	X				X	X	X		X
	St. Charles Parish Communications Center	X	X	X	X			X	X	X	X	X
	St. Charles Parish Sheriff Training Department	X	X	X				X	X	X		X
	Nelson Coleman Correctional Center	X	X	X				X	X	X		X
Public Health	St. Charles Parish Hospital - East Bank	X	X	X	X			X	X	X		X
	St. Charles Parish Hospital - West Bank	X	X	X	X			X	X	X	X	X
Schools	Albert Cammon Middle School	X	X	X				X	X	X		X
	Allemands Elementary School	X	X	X				X	X	X		X
	Carver Early Learning Center	X	X	X	X			X	X	X	X	X
	Destrehan High School	X	X	X				X	X	X	X	X
	East Bank Head Start Center	X	X	X	X			X	X	X	X	X
	EJL Educational Programs Center	X	X	X	X			X	X	X		X
	Ethel Schoeffner Elementary School	X	X	X	X			X	X	X		X
	Hahnville High School	X	X	X	X			X	X	X		X
	Harry Hurst Middle School	X	X	X	X			X	X	X		X
	J.B. Martin Middle School	X	X	X				X	X	X		X
	Lafon Performing Arts Center	X	X	X				X	X	X		X
	Lakewood Elementary School	X	X	X				X	X	X		X

	Luling Elementary School	X	X	X	X			X	X	X	X	X
	Mimosa Park Elementary School	X	X	X	X			X	X	X		X
	New Sarpy Elementary School	X	X	X	X			X	X	X		X
	Norco Elementary School	X	X	X				X	X	X		X
	R.J. Vial Elementary School	X	X	X				X	X	X	X	X
	R.K. Smith Middle School	X	X	X	X			X	X	X		X
	Satellite Center	X	X	X	X			X	X	X	X	X
	St. Rose Elementary School	X	X	X	X			X	X	X		X
Pump Stations	141 Bayou Road	X	X	X				X	X	X	X	X
	4th Street	X	X	X				X	X	X	X	X
	80 Arpent	X	X	X				X	X	X	X	X
	Almedia Rd.	X	X	X	X			X	X	X	X	X
	Almedia Structure	X	X	X	X			X	X	X	X	X
	Ama	X	X	X	X			X	X	X	X	X
	Bank One	X	X	X	X			X	X	X	X	X
	Barriere	X	X	X	X			X	X	X	X	X
	Barton	X	X	X	X			X	X	X	X	X
	Barton/Davis	X	X	X				X	X	X	X	X
	Bayou Trep.	X	X	X				X	X	X	X	X
	Boutte	X	X	X				X	X	X	X	X
	Coronada 1	X	X	X	X			X	X	X	X	X
	Coronada 2	X	X	X				X	X	X	X	X
	Cortez	X	X	X				X	X	X	X	X
	Cross Bayou	X	X	X				X	X	X	X	X
	DA Tunnel	X	X	X	X			X	X	X	X	X
	Davis	X	X	X	X			X	X	X	X	X
	Davis Diversion	X	X	X	X			X	X	X	X	X
	Destrehan 1	X	X	X				X	X	X	X	X
	Destrehan 2	X	X	X				X	X	X	X	X
	Diane	X	X	X				X	X	X	X	X
	East Harding Pump Station	X	X	X	X			X	X	X	X	X
	Ellington Pump Station	X	X	X				X	X	X	X	X
	Engineer Canal	X	X	X				X	X	X	X	X

	Eric Sump / D.A. Tregle Pump	X	X	X				X	X	X	X	X
	Fairfield	X	X	X	X			X	X	X	X	X
	Fox Lane	X	X	X				X	X	X	X	X
	George Cousins	X	X	X				X	X	X	X	X
	Hackberry	X	X	X	X			X	X	X	X	X
	HHS	X	X	X				X	X	X	X	X
	Kellog	X	X	X				X	X	X	X	X
	Lagatutta	X	X	X				X	X	X	X	X
	Lakewood School	X	X	X	X			X	X	X	X	X
	Magnolia Ridge Pump Station	X	X	X				X	X	X	X	X
	N. Lakewood	X	X	X				X	X	X	X	X
	New Sarpy	X	X	X				X	X	X	X	X
	NOLA	X	X	X	X			X	X	X	X	X
	Oak Street	X	X	X				X	X	X	X	X
	Oakland	X	X	X				X	X	X	X	X
	Old Kellog	X	X	X				X	X	X	X	X
	Paradis	X	X	X				X	X	X	X	X
	Prescott	X	X	X	X			X	X	X	X	X
	River Bend 1	X	X	X	X			X	X	X	X	X
	River Bend 2	X	X	X	X			X	X	X	X	X
	S. Lakewood	X	X	X	X			X	X	X	X	X
	Schexnaydre	X	X	X				X	X	X	X	X
	Sunset	X	X	X	X			X	X	X	X	X
	Tibby	X	X	X				X	X	X	X	X
	Turtle Pond	X	X	X				X	X	X	X	X
	Up The Bayou	X	X	X	X			X	X	X	X	X
	Walker	X	X	X				X	X	X	X	X
	Walker Structure	X	X	X				X	X	X	X	X
	Willowdale	X	X	X	X			X	X	X	X	X
	Willowridge Pump Station	X	X	X	X			X	X	X	X	X

Appendix D: Plan Adoption

St. Charles Parish

******WILL INCLUDE AFTER PLAN HAS BEEN GRANTED APA STATUS******

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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

St. Charles Parish Hazard Mitigation Planning Committee			
Name	**Title**	**Agency**	**Email**
Jason Tastet	Director	SCP DHSEP	jtastet@stcharlesgov.net
Steve Sirmon	Senior EM Coordinator	SCP DHSEP	jsirmon@stcharlesgove.net
Danielle Honor-Young	CRS Specialist	SCP Planning and Zoning	dhonor@stcharlesgov.net
Marny Stein	Coastal Zone Management	SCP Planning and Zoning	mstein@stcharlesgov.net
George Dugas	Emergency Coordinator	SCP DHSEP	gdugas@stcharlesgov.net
Stacy Dugas	Grants Specialist	SCP Grants Dept.	sdugas@stcharlesgov.net
Blaise Kenney	Grants Specialist	SCP Grants Dept.	bkenney@stcharlesgov.net
Carla Chiasson	Grants Officer	SCP Grants Dept.	cchiasson@stcharlesgov.net
Samantha de Castro	Deputy Chief Administrative Officer	SCP Government	sdecastro@stcharlesgov.net
Holly Fonseca	Councilwoman-at-Large	SCP Government	hfonseca@stcharlesgov.net
Miles Bingham	Director	SCP Public Works	mbingham@stcharlesgov.net
Brandon Bernard	Assistant Director	SCP Public Works	bbernard@stcharlesgov.net
Greg Gorden	Director	SCP Waterworks	ggorden@scpwater.org
Rickey Robert	Operations Manager	SCP Waterworks	rrobert@scpwater.org
David deGeneres	Director	SCP Wastewater	ddegeneres@stcharlesgov.net
Duane Foret	Director	SCP Parks and Recreation	dforet@stcharlesgov.net
Luis Martinez	GIS Coordinator	SCP GIS	lmartinez@stcharlesgov.net
Troy Whitney	Commander of Adm. Services	SCP Sheriff's Office	twhitney@stcharlessheriff.org
Greg Oehldrich	Detective	SCP Sheriff's Office	goehldrich@stcharlessheriff.org
Kade Rogers	Adm. Of Safety, Security, & Athletics	SCP Public Schools	krogers@stcharles.k12.la.us
John Rome	Chief Plant Services & Security Officer	SCP Public Schools	jrome@stcharles.k12.la.us
Huey Marcel III	Director	SCP EMS	huey.marceliii@ochsner.org
Michael Guillot	Director of EM	SCP Ochsner Health	michael.guillot@ochsner.org
Ashley Beetz	Region 3 Coordinator	GOHSEP	ashley.beetz@la.gov
April Keller	Executive Director	SCP Council on Aging	akeller@stcharlescoa.com
Francesca Blanchard	Public Information Officer	SCP Government	fblanchard@stcharlesgov.net
Dustin Vinet	Safety & Security Coordinator	SCP Public Schools	dvinet@stcharles.k12.la.us
Chelsea Green	Administrative Assistant	SCP GIS	cgreen@stcharlesgov.net

Capability Assessment

Capability Assessment Worksheet - St. Charles 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 parish has in place.		
Plans	**Yes/No**	**Comments**
Comprehensive / Master Plan	Yes	
Capital Improvements Plan	Yes	
Economic Development Plan	Yes	
Local Emergency Operations Plan	Yes	
Continuity of Operations Plan	Yes	
Transportation Plan	Yes	
Stormwater Management Plan	Yes	
Community Wildfire Protection Plan	No	
HHPD Emergency Action Plan	N/A	
Other plans (redevelopment, recovery, coastal zone management)	Yes	Disaster Recovery Plan, Coastal Zone Management
Building Code, Permitting and Inspections	**Yes/No**	**Comments**
Building Code	Yes	Sound Infrastructure System
Building Code Effectiveness Grading Schedule (BCEGS) Score	Yes	
Fire Department ISO/PIAL rating	PIAL	**Class 3:** East St. Charles, Luling, Paradis & St. Rose **Class 4:** Bayou Gauche, Des Allemands, Hahnville, Killona, & Norco
Site plan review requirements	Yes	
Land Use Planning and Ordinances	**Yes/No**	**Comments**
Zoning Ordinance	Yes	
Subdivision Ordinance	Yes	
Floodplain Ordinance	Yes	
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	Yes	Storm Water Management Ordinance, Erosion and Sediment Control, Levee Protection System
Flood Insurance Rate Maps	Yes	
Acquisition of land for open space and public recreation uses	Yes	
Other	Yes	

Administration and Technical		
Identify whether your community has the following administrative and technical capabilities.		
Administration	**Yes/No**	**Comments**
Planning Commission	Yes	
Mitigation Planning Committee	Yes	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	
Staff	**Yes/No**	**Comments**
Chief Building Official	Yes	
Floodplain Administrator	Yes	
Emergency Manager	Yes	
Community Planner	Yes	
Civil Engineer	Yes	
GIS Coordinator	Yes	
Grant Writer	Yes	
Other		
Technical	**Yes/No**	**Comments**
Warning Systems / Service (Reverse 911, outdoor warning signals)	Yes	NOAA Tide Stations/Flood Warning System
Hazard Data & Information	Yes	
Grant Writing	Yes	
Hazus Analysis	Yes	
Other		

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

Education and Outreach		
Identify education and outreach programs and methods, already in place that could be used to implement mitigation activities and communicate hazard-related information.		
Program / Organization	**Yes/No**	**Comments**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	Yes	
Natural Disaster or safety related school program	Yes	
Storm Ready certification	Yes	
Firewise Communities certification	Yes	
Public/Private partnership initiatives addressing disaster-related issues	Yes	
Other		

Building Inventory

Building Inventory - St. Charles Parish									
Name of Building	**Purpose of Building**	**Address**	**City**	**Latitude**	**Longitude**	**Assessed Value**	**Date Built**	**Construction Type**	**Parcel Number**
St. Charles Parish Courthouse	Civil Government	15045 River Road	Hahnville	29.96373318	-90.40665852	29,301,020			100600100147
St. Charles Parish Emergency Operations Center	Civil Government	15026 River Road	Hahnville	29.96398884	-90.40426937	5,530,602			150600L00001
St Charles Parish East Bank Yard Public Works	Civil Government	168 Troxclair Lane	Destrehan	29.97701729	-90.38904615	681,998			N/A
St Charles Parish Department of Public Works	Civil Government	14530 River Road	Destrehan	29.97500126	-90.39052151	2,469,642			302101000005
St. Charles Parish Communications Center	Civil Government	222 Joe Louis Lane	Hahnville	29.96256731	-90.40638233	4,074,722			N/A
St. Charles Department of Economic Development	Civil Government	15012 River Road	Hahnville	29.96312949	-90.40512503	398,973			Reference 150600L00001
St. Charles Parish Planning and Zoning Department	Civil Government	14996 River Road	Hahnville	29.96291023	-90.40456626	243,546			Reference 150600L00001
St. Charles Parish Office of Motor Vehicles	Civil Government	15012A River Road	Hahnville	29.96314255	-90.40514076	244,963			Reference 150600L00001
St. Charles Parish Council on Aging	Civil Government	282 Judge Edwards Dufresne Parkway	Luling	29.93239434	-90.38545091				15560005A-1A
St. Charles Parish Animal Shelter	Civil Government	921 Deputy Jeff G Watson Drive	Luling	29.93521359	-90.37944108	1,837,756			15560000001A
Center for Family and Youth Services	Civil Government	13101 River Road	Luling	29.93357692	-90.36001378				N/A
Edward Dufresne Community Center	Civil Government	274 Judge Edwards Dufresne Parkway	Luling	29.93447311	-90.38400789	11,096,309			155300004B-1
St. Charles Parish School Board	Civil Government	13855 River Road	Luling	29.93866943	-90.38003367				100200006018
Bayou Gauche Volunteer Fire Department	Fire & Search and Rescue	410 1st Street	Des Allemands	29.8061386	-90.42569079	2,298,553			4034957B-1A1

Des Allemands Volunteer Fire Department - Station 72	Fire & Search and Rescue	16960 US-90	Des Allemands	29.82962847	-90.45892864	763,627			4003041041-F
East St. Charles Fire Department	Fire & Search and Rescue	14494 River Road	Destrehan	29.97358182	-90.39058283	2,464,613			302100500009
Hahnville Volunteer Fire Department - Station 31	Fire & Search and Rescue	14890 River Road	Hahnville	29.96009849	-90.40432534	573,033			1012L2300001
Hahnville Volunteer Fire Department - Station 32	Fire & Search and Rescue	169 Lincoln Street	Hahnville	29.97646622	-90.40900939	573,027			201700300011
Killona Volunteer Fire Department	Fire & Search and Rescue	216 Adams Street	Killona	30.00159442	-90.48637375	239,287			100500V00005
Luling Volunteer Fire Department - Station 21	Fire & Search and Rescue	1603 Paul Maillard	Luling	29.91337855	-90.37972997	3,061,500			22500000000A
Luling Volunteer Fire Department - Station 22	Fire & Search and Rescue	67 St. Anthony Street	Luling	29.91004247	-90.3520608	252,153			702405A00009
Luling Volunteer Fire Department - Station 23	Fire & Search and Rescue	104 Ellen Street	Ama	29.95409315	-90.29170037	790,653			20470AA00004
Luling Volunteer Fire Department - Station 24	Fire & Search and Rescue	17 Dufresne Loop	Luling	29.9395606	-90.38353125	183,120			1502BDP17C-1
Norco Area Volunteer Fire Department - Central Station	Fire & Search and Rescue	651 W B Street	Norco	30.01249403	-90.41121023	1,339,080			605100N0FS-1
Norco Area Volunteer Fire Department - Perilloux Firehouse	Fire & Search and Rescue	17832 River Road	Montz	30.01388408	-90.46784583	104,040			605200003655
Paradis Volunteer Fire Department	Fire & Search and Rescue	813 Barber Road	Paradis	29.87366695	-90.43495772	1,573,313			40345160516A
Paradis Volunteer Fire Department - Station 1	Fire & Search and Rescue	603 Fonda Street	Paradis	29.87895694	-90.43740663	247,413			402900100006
St. Rose Fire Department - Station 51	Fire & Search and Rescue	516 Bart Street	St. Rose	29.94689879	-90.31785897	1,747,133			504100100015

St. Rose Volunteer Fire Department	Fire & Search and Rescue	10574 River Road	St. Rose	29.96595793	-90.29685276	326,040			50180001-A-2
St. Charles Parish Sheriff's Office - Luling	Law Enforcement	260 Judge Edward Dufresne Parkway	Luling	29.93601091	-90.3823512				155300004B-2
St. Charles Parish Sheriff's Department - Bonds & Fines	Law Enforcement	15025 River Road	Hahnville	29.96309076	-90.4066128				N/A
St. Charles Parish Communications Center	Law Enforcement	222 River Road	Hahnville	29.96254688	-90.40637792				15560000001B
St. Charles Parish Sheriff Training Department	Law Enforcement	220 Judge Edward Dufresne Parkway	Luling	29.93636551	-90.38170933				154100000J-1
Nelson Coleman Correctional Center	Law Enforcement	5061 LA-3127	Killona	29.99244704	-90.50238075				352800C00C-1
St. Charles Parish Hospital - East Bank	Public Health	13100 River Road	Destrehan	29.94701587	-90.36808149	11,056,960			202200000300
St. Charles Parish Hospital - West Bank	Public Health	1057 Paul Maillard Road	Luling	29.9238551	-90.371334				3529000B-1-A
Ormond Nursing and Care Center	Public Health	22 Plantation Road	Destrehan	29.96658385	-90.37535506				251700B0000B
Luling Living Center	Public Health	1125 Paul Maillard Road	Luling	29.92281784	-90.37262953	2,662,931			252300D00027
St. Charles Parish Community Health Center	Public Health	843 Milling Ave	Luling	29.92353781	-90.37031484	11,467,853			5025000123-A
Albert Cammon Middle School	Education	234 Pirate Drive	St. Rose	29.95791189	-90.31078708	6,998,880			40342580258A
Allemands Elementary School	Education	1471 WPA Road	Des Allemands	29.82007498	-90.46409957	4,658,720			102400000553
Carver Early Learning Center	Education	37 Gum Street	Hahnville	29.97475012	-90.41330733	48,083,993			3025DES0HIGH
Destrehan High School	Education	1 Wildcat Lane	Destrehan	29.96514375	-90.38299712	17,259,033			352800CHHMSB
East Bank Head Start Center	Education	13292 River Road	Destrehan	29.94850197	-90.37279828	4,543,167			10210010002B
EJL Educational Programs Center	Education	171 Keler Street	Hahnville	29.96507504	-90.40678968	10,022,800			30390000234B
Ethel Schoeffner Elementary School	Education	140 Plantation Road	Destrehan	29.97544709	-90.37823815	49,923,547			7108SW20P003
Hahnville High School	Education	200 Tiger Drive	Boutte	29.88988374	-90.40633659				Reference 352800CHHMSB

Harry Hurst Middle School	Education	184 Church Street	Destrehan	29.95039218	-90.37244594	27,376,133			40347580758A
J.B. Martin Middle School	Education	434 South Street	Paradis	29.87752091	-90.4279817	48,205,253			1553000010B1
Lafon Performing Arts Center	Education	275 Judge Edwards Dufresne Parkway	Luling	29.93292777	-90.38186616	13,221,547			70280000000G
Lakewood Elementary School	Education	501 E Heather Drive	Luling	29.90065701	-90.34859505	19,309,873			2024000000LE
Luling Elementary School	Education	904 Sugarhouse Road	Luling	29.92229656	-90.36777292	14,125,660			76040460SB-1
Mimosa Park Elementary School	Education	222 Birch Street	Luling	29.91024007	-90.35088017	18,545,440			3539000006-B
New Sarpy Elementary School	Education	130 Plantation Road	Destrehan	29.97333464	-90.37700677	13,714,460			60000006095
Norco Elementary School	Education	102 5th Street	Norco	30.00951875	-90.42098569				Reference 40347580758A
R.J. Vial Elementary School	Education	510 Louisiana Street	Paradis	29.87821293	-90.42642173				Reference 1553000010B1
R.K. Smith Middle School	Education	281 Judge Edward Dufresne Parkway	Luling	29.93147497	-90.38355312				Reference 1553000010B1
Satellite Center	Education	285 Judge Edward Dufresne Parkway	Luling	29.93078932	-90.3843011				Reference 5025000123-A
St. Rose Elementary School	Education	230 Pirate Drive	St. Rose	29.95622075	-90.31001033				
141 Bayou Road	Pump Station	1075 E Harding St	New Sarpy	29.823948	-90.475591				
4th Street	Pump Station	688 W Pine St	Norco	29.953233	-90.327797	1,818,149			
80 Arpent	Pump Station	375 Tiger Dr	Boutte	29.904517	-90.392868				
Almedia Rd.	Pump Station	444 Tinney St	Luling	29.972542	-90.307017				
Almedia Structure	Pump Station	500 Willowdale Blvd	Luling	29.97714	-90.303507				
Ama	Pump Station	503 E Heather Dr	Luling	29.938968	-90.284932				
Bank One	Pump Station	188 Lakewood Dr	Luling	29.986787	-90.360738				
Barriere	Pump Station	106 Lakewood Dr	Luling	29.926471	-90.417388				

Barton	Pump Station	499 Davis Dr	Luling	29.921938	-90.342378				
Barton/Davis	Pump Station	331 Davis Dr	Luling	29.91543	-90.34147	1,765,592			
Bayou Trep.	Pump Station	329 Barton Ave	Luling	30.024162	-90.400514				
Boutte	Pump Station	408 Nola St	Luling	29.91137	-90.387273				
Coronada 1	Pump Station	501 Hackberry St	Luling	29.902547	-90.367904				
Coronada 2	Pump Station	101 Willowdale Blvd	Luling	29.901715	-90.370385				
Cortez	Pump Station	20 Pats Ct	Ama	29.827902	-90.475376				
Cross Bayou	Pump Station	498 Steve St	St. Rose	29.985825	-90.350466				
DA Tunnel	Pump Station	301 W Oakland St	St. Rose	29.825197	-90.475907				
Davis	Pump Station	821 Oak St	St. Rose	29.920574	-90.340937				
Davis Diversion	Pump Station	571 Fourth St	St. Rose	29.91265	-90.325655	1,897,732			
Destrehan 1	Pump Station	88 Dunleith Ct	Destrehan	29.984326	-90.360952	2,138,988			
Destrehan 2	Pump Station	12509 Airline Dr	Destrehan	29.961651	-90.367813				
Diane	Pump Station	478 Lower Guide Levee Rd	Norco	29.958756	-90.321218				
East Harding Pump Station	Pump Station	14799 Hwy 90	Paradis	29.989679	-90.371104	1,334,894			
Ellington Pump Station	Pump Station	1088 Primrose Dr	Luling	29.900945	-90.37629				
Engineer Canal	Pump Station	1058 Primrose Dr	Luling	30.01478	-90.414509				
Eric Sump / D.A. Tregle Pump	Pump Station	523 Monsanto Ave	Luling	29.828925	-90.474667				
Fairfield	Pump Station	540 River Oaks Dr	Luling	29.974906	-90.287636				
Fox Lane	Pump Station	301 Primrose Dr	Luling	29.973919	-90.300608	2,159,007			
George Cousins	Pump Station	840 Texaco Rd	Boutte	29.890407	-90.357025				
Hackberry	Pump Station	150 Boutte Estates Dr	Boutte	29.921027	-90.378091				

HHS	Pump Station	10344 Airline Dr	St. Rose	29.888055	-90.407543	763,908			
Kellog	Pump Station	10424 Airline Dr	St. Rose	29.896223	-90.363925				
Lagatutta	Pump Station	10598 Airline Dr	St. Rose	29.900145	-90.35661				
Lakewood School	Pump Station	167 I-310 Service Rd	St. Rose	29.900774	-90.347944	1,190,724			
Magnolia Ridge Pump Station	Pump Station	802 St. Rose Ave	St. Rose	29.862873	-90.411077				
N. Lakewood	Pump Station	197 Love Ln	Destrehan	29.91225	-90.345033				
New Sarpy	Pump Station	1074 E Harding St	Destrehan	29.984295	-90.380409				
NOLA	Pump Station	1057 Down The Bayou Rd	Des Allemands	29.923629	-90.338522				
Oak Street	Pump Station	101 Up The Bayou Rd	Des Allemands	29.956617	-90.323418				
Oakland	Pump Station	192 Up The Bayou Rd	Des Allemands	29.973994	-90.291007				
Old Kellog	Pump Station	240 Up The Bayou Rd	Des Allemands	29.896696	-90.364632				
Paradis	Pump Station	462 Up The Bayou Rd	Des Allemands	29.881451	-90.428264				
Prescott	Pump Station	198 Kerry'S Pointe West	Bayou Gauche	30.038922	-90.438193				
River Bend 1	Pump Station	1270 Hwy 3127	Luling	29.972614	-90.296178				
River Bend 2	Pump Station	101 Prescott Rd	Montz	29.972024	-90.299112				
S. Lakewood	Pump Station	12149 Airline Dr	Destrehan	29.905459	-90.351346				
Schexnaydre	Pump Station	10408 Airline Dr	St Rose	29.977575	-90.377111	2,045,283			
Sunset	Pump Station	399 James Dr West	St Rose	29.788558	-90.429762				
Tibby	Pump Station	900 Riverbend Dr	St Rose	29.812978	-90.474029				
Turtle Pond	Pump Station	923 Riverbend Dr	St Rose	29.971468	-90.311806				
Up The Bayou	Pump Station	120 Montgomery Dr	Luling	29.834786	-90.475793				

Walker	Pump Station	1099 Primrose Dr	Luling	29.976421	-90.291886				
Walker Structure	Pump Station	435 Fahrig Ln	Boutte	29.990281	-90.290726	1,101,559			
Willowdale	Pump Station	141 Bayou Rd	Des Allemands	29.891545	-90.332394	1,297,716			
Willowridge Pump Station	Pump Station	12731 Airline Dr	New Sarpy	29.884481	-90.344045				

Vulnerable Populations

Vulnerable Populations - St. Charles Parish					
All Hospitals (Private or Public)					
Name	**Street**	**City**	**Zip Code**	**Latitude**	**Longitude**
St. Charles Parish Hospital - East Bank	13100 River Road	Destrehan	70047	29.94701587	-90.36808149
St. Charles Parish Hospital - West Bank	1057 Paul Maillard Road	Luling	70070	29.9238551	-90.371334
St. Charles Parish Community Health Center	843 Milling Ave	Luling	70070	29.92353781	-90.37031484
Nursing Homes (Private or Public)					
Name	**Street**	**City**	**Zip Code**	**Latitude**	**Longitude**
Ormond Nursing and Care Center	22 Plantation Road	Destrehan	70047	29.96658385	-90.37535506
Luling Living Center	1125 Paul Maillard Road	Luling	70070	29.92281784	-90.37262953
Summerhouse Ashton Manner	270 Ashton Plantation Blvd	Luling	70070	29.9313521	-90.3762804
Mobile Home Parks					
Name	**Street**	**City**	**Zip Code**	**Latitude**	**Longitude**
Riverland Estates	Bonura Dr	St. Rose	70087	29.9628878	-90.30098985
Hollywood Park	Hollywood Park Dr	Montz	70068	30.03089862	-90.4677237
Dees Mobile Home Park	Dees Lane	Luling	70070	29.9327828	-90.35686427

National Flood Insurance Program (NFIP)

National Flood Insurance Program (NFIP)		
St. Charles Parish		
Insurance Summary	**Information**	**Comments**
How many NFIP polices are in the community? What is the total premium and coverage?	11382 policies $9,878,974 premiums +FPF $3,559,906,000 coverage	nfip_policy-information-by-state_20240229_0.xlsx (live.com)
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?	4780 claims have been paid Amount paid in claims = $147,081,596	NFIP claims data lists approx. 108 claims for losses that occurred between 5/1/1978 and 4/6/1983 (other documents & the Planning Administrator say the Parish entered the program 5/1/1983). Staff have not completed a review for how many claims identified substantial [flood] damage.
How many structures are exposed to flood risk with in the community?	12053	7/1/2023 enumeration of buildings in SFHAs identified on effective map
Describe any areas of flood risk with limited NFIP policy coverage.	Belle Ormond Subdivision; Carriage Lane; Southwest Ormond Community; north end of Carolyn Drive (all in Destrehan) Luling Estates Drive (Luling)	There seems to be a lag in the "Active Policies" data for our subdivisions that are building out: no policies on Belle Ormond Circle or Pretty Acres Ave
Staff Resources	**Information**	**Comments**
Is the Community FPA or NFIP Coordinator certified?	Yes	
Is flood plain management an auxiliary function?	No	
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	CFMs work with private sector--surveyors, property owners, realtors, lenders, and insurance providers to certify flood zones and help in assessing flood risk; with PIO to manage a robust program of public information to all of the above as well as residents of repetitive loss areas; with GIS to maintain flood risk, flood insurance, and flood mitigation datasets including drainage, levees and other protection structures,	
What are the barriers to running an effective NFIP program in the community, if any?	Perceived premium increases; perceived inconsistencies with rating premiums; lack of transparency with Risk Rating 2.0 methodology; perceived inconsistencies in enforcement of mandatory purchase requirement; perceived errors in risk assessments and flood risk mapping.	

Compliance History	Information	Comments
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)?	3/18/2014	
Is a CAV or CAC scheduled or needed? If so when?	No	Technical Assistance Visit from the ISO staff rating Parish CRS program June 14, 2024
Regulation	**Information**	**Comments**
When did the community enter the NFIP?	5/1/1983	
Are the FIRMs digital or paper?	Paper	Parish digitized the 1992 FIRMs in 2008; Parish received DFIRM from FEMA in 2012; see comment below
When did the community adopt the FIRMs?	Apr-92	July 2013, the Parish Council adopted a Preliminary DFIRM & FIS dated November 9, 2012, **for minimum building elevation only,** and only when it exceeds effective FIRMs
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Exceed FEMA minimum requirements with min. elevation 12 in. above centerline of street in X and A99 zones; State min. requirement is now 1 ft. freeboard in SFHAs; Parish building official coordinates with CFMs to enforce freeboard	
Community Rating System (CRS)	**Information**	**Comments**
Does the community participate in CRS?	Yes	
What is the community's CRS Class Ranking?	7	
Does the plan include CRS planning requirements?	Yes	