2025

ST. BERNARD PARISH

HAZARD MITIGATION PLAN

ST. BERNARD PARISH
HAZARD MITIGATION PLAN UPDATE

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St. Bernard Parish

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1. Introduction

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

In that regard, this plan (a) documents the St. Bernard 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. Bernard Parish less vulnerable and more disaster resilient. It also includes mitigation project scoping to further identify scopes of work, funding sources, and implementation timing requirements of proposed selected mitigation projects. Information in the plan will be used to help guide and coordinate mitigation and local policy decisions affecting future land use.

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

This Hazard Mitigation Plan is a comprehensive plan for disaster resiliency in St. Bernard 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. Bernard 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. Bernard Parish is located in the southeast portion of Louisiana along the state's Gulf of America coastline. A large portion of the development is found between the east bank of the Mississippi River and the west bank of the Mississippi River- Gulf Outlet Canal. St. Bernard Parish is bordered to the north and northwest by Orleans Parish, to the south and southwest by Plaquemines Parish, and to the east by the Gulf of America. Below, *Figure 1-1* shows the geographical location of St. Bernard Parish.

Figure 1-1: Location of St. Bernard Parish within the State of Louisiana

The geography of St. Bernard Parish mainly consists of relatively flat floodplains and marshes, canals, and other bodies of water. The primary areas of urban development are concentrated in the northwestern part of the parish between the east bank of the Mississippi River and the Florida Walk and Forty Arpent Canals. Coincidentally, this is also the area with the highest natural elevation in the parish.

Approximately 90% of the total surface area of St. Bernard Parish is located within FEMA's 100-year floodplain (A zone), although a large portion of the populated areas within the parish lie in FEMA's 500-year floodplain (X zone). However, due to the location of St. Bernard Parish in relation to the numerous bayous, marshes, and canals in the area, as well as the Gulf of America, all portions of St. Bernard Parish are susceptible to flooding of varying degrees.

St. Bernard Parish weather is typically warm and humid. Variations in daily temperature are determined by distance from the Gulf of Mexico and, to a much lesser degree, by differences in elevation. According to the NCEI Data Tools service, the average annual temperature for the state as a whole 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. Bernard Parish in particular, the summer months are usually quite warm, with an average daily maximum temperature in July and August of 91°F. Winters are typically mild. Snowfall averages less than one inch per year. Average annual rainfall for the area is 64 inches. St. Bernard Parish is susceptible to the normal weather dangers, such as thunderstorms and flooding, but due to its location within the state and its proximity to the Gulf of America, the parish is highly susceptible to tropical cyclones. Hurricane season lasts from June 1st to November 30th, with most hurricanes forming in August, September, and October.

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

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

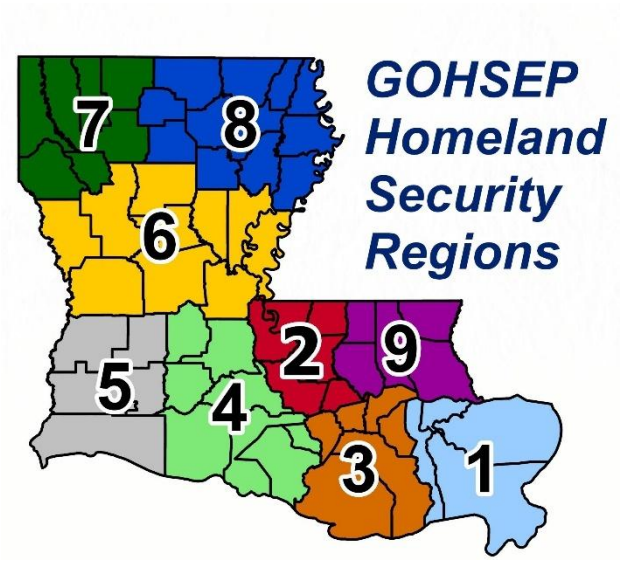

Figure 1-2: Louisiana Homeland Security Regions

Population

The population of St. Bernard Parish is estimated at 44,783 (2024 Estimate) with a population percent change from April 1, 2010 – July 1, 2024 of 23.86%.

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

Parameters	2010 Census	2020 Census	2024 Estimate	Percent Change 2010 -2024
Total Population	35,897	43,746	44,783	24.76%
Population Density (Pop/Sq. Mi.)	95.1	115.9	118	24.08%
Total Housing Units	17,778	17,642	18,523	4.19%
Persons Per Household	2.8	2.7	2.78	-0.71%

History & Economy

St. Bernard Parish is New Orleans' most historic neighbor in a variety of ways. Famously, it was the site of the Battle of New Orleans during the War of 1812. The battlefield, operated by the National Park Service, is open daily for visits to the interpretive center and park ranger chats. St. Bernard Parish (San Bernardo) was originally settled in 1778 by Spanish colonists from the Canary Islands who were recruited by the Spanish Empire which currently had control of New Orleans. These settlers, known as Isleños, brought with them their own culture, history, food, language, and customs. They were a people of the land, hunting and fishing and working on the many sugar plantations in St. Bernard Parish. Over many generations, and through great difficulties, they have succeeded in preserving their heritage and their language and the descendants of the original settlers still maintain a community in the parish today. St. Bernard is just 5 miles from downtown New Orleans, yet its scenic beauty, cultural treasures and beautiful waterways will make you yearn to remain in its tranquil surroundings. Bountiful waterways such as Lake Borgne, the Mississippi River and Breton Sound make this a paradise for fishing, hunting or birdwatching. (St. Bernard Tourism Commission)

The economy of St. Bernard Parish, LA employs 18.9k people. The largest industries in St. Bernard Parish are Retail Trade, Manufacturing, Accommodation & Food Services, and Transportation & Warehousing. From 2021 to 2022, employment in St. Bernard Parish grew at a rate of 0.266%, from 18.8k employees to 18.9k employees. The most

common job groups, by number of people living in St. Bernard Parish are Sales & Related Occupations, Office & Administrative Support Occupations, and Food Preparation & Serving Related Occupations. (Data USA)

Table 1-2: St. Bernard Parish Business Patterns
(Source: US Census, CBP)

Business Description	Number of Establishments	Annual Payroll ($1,000)	Number of Employees
Agriculture, forestry, fishing and hunting	3	55	0
Utilities	6	3,402	32
Construction	91	37,323	685
Manufacturing	32	158,448	1,517
Wholesale trade	23	11,869	275
Retail trade	138	44,676	1,668
Transportation and warehousing	34	31,827	715
Information	7	2,621	107
Finance and insurance	33	8,156	185
Real estate and rental and leasing	24	2,730	41
Professional, scientific, and technical services	48	6,800	160
Administrative and support and waste management and remediation services	34	7,487	211
Educational services	7	1,604	74
Health care and social assistance	58	21,734	595
Arts, entertainment, and recreation	15	1,890	122
Accommodation and food services	85	18,445	1,203
Other services (except public administration)	57	8,869	347

Hazard Mitigation

To fully understand hazard mitigation efforts in St. Bernard 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 1-3 illustrates the basic relationship between these phases of emergency management. While hazard mitigation may occur both before and after a disaster event, it is significantly more effective when implemented before an event occurs. This is one of the key elements of this plan and its overall strategy: reduce risk before disaster strikes in order to minimize the need for post-disaster response and recovery.

As *Figure 1-3* demonstrates, mitigation relies on updating in the wake of disaster. This can give the appearance that mitigation is only reactive rather than proactive. In reality, post-disaster revision is a vital component of improving mitigation. Each hazardous event affords an opportunity to reduce the consequences of future occurrences.

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

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

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

General Strategy

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

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

The 2025 St. Bernard Parish Hazard Mitigation Plan (HMP) maintains much of the information from the 2020 plan version, but it now incorporates the order and methodologies of the 2024 Louisiana State Hazard Mitigation Plan.

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

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

This plan update also coheres with the Plain Writing Act of 2010, which requires federal agencies to use clear communication that is accessible, consistent, understandable, and useful to the public. While the State of Louisiana and its political subdivisions are not required to meet such standards, the Act aligns with best practices in hazard mitigation. Since successful hazard mitigation relies on full implementation and cooperation at all levels of government and community, a successful hazard mitigation plan must also be easily used at all of these levels. Nevertheless, the St. Bernard Parish Hazard Mitigation Planning Committee recognized the benefits from the successful analysis and mitigation planning executed in previous plan updates, as well as improvements to be made in the 2025 update. 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. Bernard Parish Hazard Mitigation Plan. The current goals are as follows:

1. Identify and pursue preventative measures that will reduce future damages from hazards
2. Enhance public awareness and understanding of disaster preparedness
3. Reduce repetitive flood losses in the parish
4. Facilitate sound development and rebuilding in the parish so as to reduce or eliminate the potential impacts of hazards

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 2024. 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 in the same format as the 2020 update, with one minor change to this 2025 update as outlined below. The decision to change the title of Appendix C from Essential Facilities to Critical Facilities was made to better align with FEMA preferred terminology.

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

Table 1-3: 2025 Plan Update Crosswalk

Plan Update Crosswalk	
2020 Update	**2025 Update**
Section 1: Introduction	Section 1: Introduction
Section 2: Hazard Identification and Parish-Wide Risk Assessment	Section 2: Hazard Identification and Parish-Wide Risk Assessment
Section 3: Capability Assessment	Section 3: Capability Assessment
Section 4: Mitigation Strategy	Section 4: Mitigation Strategy
Appendix A: Planning Process	Appendix A: Planning Process
Appendix B: Plan Maintenance	Appendix B: Plan Maintenance
Appendix C: Essential Facilities	Appendix C: Critical Facilities
Appendix D: Plan Adoptions	Appendix D: Plan Adoptions
Appendix E: State Required Worksheets	Appendix E: State Required Worksheets

Despite numerous changes in this plan update, the plan remains consistent in its emphasis on the types of hazards that pose the most risk to loss of life, injury, and property in St. Bernard Parish. The extent of this risk is dictated primarily by its geographic location. Most significantly, St. Bernard Parish remains at high risk of water inundation from various sources, including flooding and tropical cyclone activity. The entire parish is also at high risk of damages from high winds and wind-borne debris. The 2016 flooding events, along with the 2020-2021 hurricane season were both felt heavily in all parts of St. Bernard Parish. Other hazards threaten the parish and/or its communities, although not to such great degrees and not in such widespread ways. In all cases, the relative social vulnerability of areas threatened and affected plays a significant role in how governmental agencies and their partners (local, parish, state and federal) prepare for and respond to disasters.

Mitigation efforts related to particular hazards are highly individualized. Flexibility in response and planning is essential. The most important step forward to improve hazard management capability is to improve coordination and information sharing between the various levels of government regarding hazards.

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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 five 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 29 years (1996 – 2025) 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 28 years (1996 – 2024) worth of data was evaluated to determine the future probability and frequency of a hazard occurring. Additionally, property damage and crop damage estimates from the NCEI Storm Events Database are a "best guess" based on all available data at the time of the event publication.

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

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

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

Identifying Hazards

Several emergency management and hazard mitigation documents at the state and local levels were reviewed to identify a comprehensive list of hazards that may impact the parish. These documents addressed a wide range of hazards including natural, technological, and human-caused. The two main documents referenced in finalizing the parish's comprehensive hazard list were the 2020 Hazard Mitigation Plan for the parish and the state of Louisiana's 2024 Hazard Mitigation Plan. Typically, unless otherwise noted in the plan, all hazards previously identified in the parish's 2020 Hazard Mitigation Plan and all hazards in the state of Louisiana's 2024 Hazard Mitigation Plan identified as medium or high risk by the state are profiled in the risk assessment. The table below provides a comprehensive list of the hazards selected based on the above criteria.

Table 2-1: Hazard Profile Summary.

Hazard	Profiled in 2020 Plan	Considered Medium or High Risk in the State's HM Plan	Profiled in the 2025 Update
Coastal Hazards	X		X
Flooding	X	X	X
Sinkholes	X		X
Thunderstorms (Hail, Lightning, & Thunderstorm Wind)	X	X	X
Tornadoes	X	X	X
Tropical Cyclones	X	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: Presidential Disaster Declarations in the Parish.

Disaster Number	Year	Declaration
208	9/10/1965	Tropical Cyclone - Hurricane Betsy
272	8/19/1969	Tropical Cyclone - Hurricane Camille
374	4/27/1973	Severe Storms & Flooding
556	5/9/1978	Severe Storms & Flooding
616	4/9/1980	Severe Storms & Flooding
679	4/20/1983	Severe Storms & Flooding
752	11/1/1985	Tropical Cyclone - Hurricane Juan
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 - Tropical Storm Allison

Disaster Number	Year	Declaration
1435	9/27/2002	Tropical Cyclone - Tropical Storm Isidore
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 - Tropical Storm 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
1792	9/13/2008	Tropical Cyclone - Hurricane Ike
4041	10/28/2011	Tropical Cyclone - Tropical Storm Lee
4080	8/29/2012	Tropical Cyclone - Hurricane Isaac
3392	10/6/2017	Tropical Cyclone – Tropical Storm Nate
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

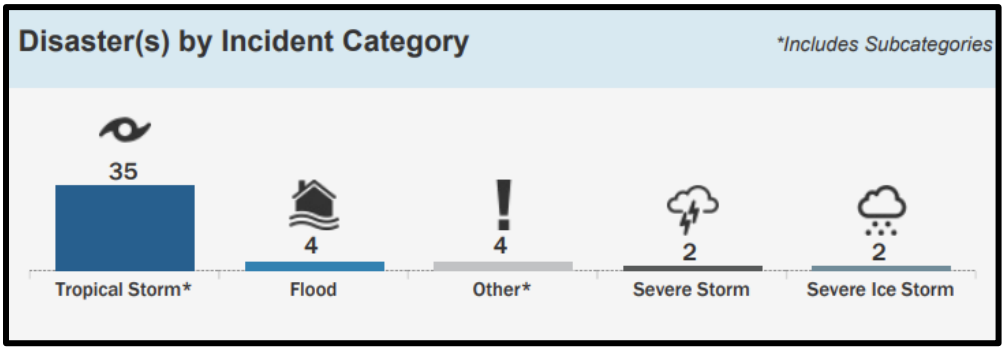

Figure 2-1: Presidential Disaster Declarations for St. Bernard Parish by Disaster Type Since 1950. (Source: FEMA Disaster Declarations Summary: Open Government Dataset)

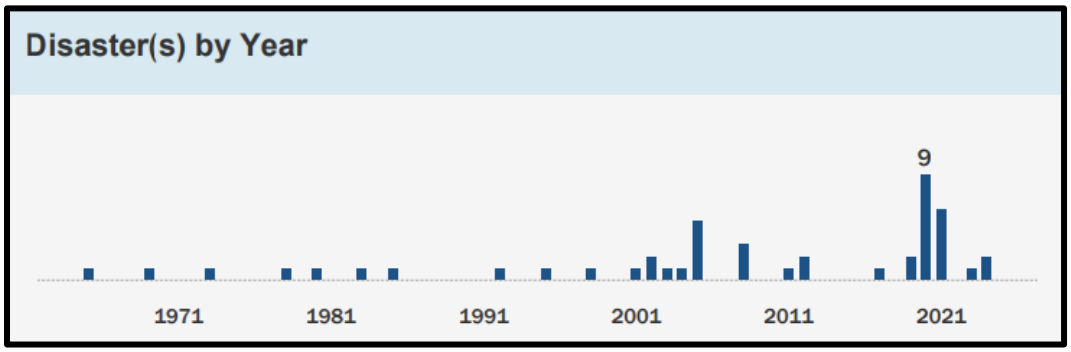

Figure 2-2: Total Presidential Disaster Declarations Yearly Totals for St. Bernard Parish from 1950 to 2024. (Source: FEMA Disaster Declarations Summary: Open Government Dataset)

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.

Hazard	Probability
	St. Bernard Parish
Coastal Hazards	100%
Flooding	83%
Sinkholes	< 1%
Thunderstorm Hail	28%
Thunderstorm Lightning	17%
Thunderstorm Winds	83%
Tornadoes	31%
Tropical Cyclones	100%

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 with the hazard. Expected annual loss and the risk factor are calculated using the following formulas:

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

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

Qualitative Methodology

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

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

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

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

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

Priority Risk Index and Hazard Risk

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

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

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

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

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

Vulnerability Analysis (NRI & PRI)

The first table below is the overall risk associated with each threat and hazard with 2.5 or above deemed high risk, 2.0 to 2.4 deemed medium risk, and less than 2.0 deemed low risk. The 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. Bernard Parish.

Hazard	Probability	Impact	Spatial Extent	Warning Time	Duration	Overall Risk
Coastal Hazards	4	2	4	1	3	**2.9**
Flooding	3	4	3	4	3	**3.4**
Sinkhole	1	2	2	1	4	**1.9**
Thunderstorm Hail	3	2	3	3	1	**2.45**
Thunderstorm Lightning	3	2	2	3	1	**2.25**
Thunderstorm Winds	3	2	3	3	1	**2.45**
Tornadoes	3	3	2	4	3	**2.95**
Tropical Cyclones	3	4	4	1	4	**3.3**

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

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

According to FEMA, St. Bernard 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 **86.61/100.00**. When compared to the state of Louisiana, the parish has a risk index score of **65.60/100.00.** The natural hazards that contributed to a higher overall risk index score include Flooding, Thunderstorms, and Tropical Cyclones.

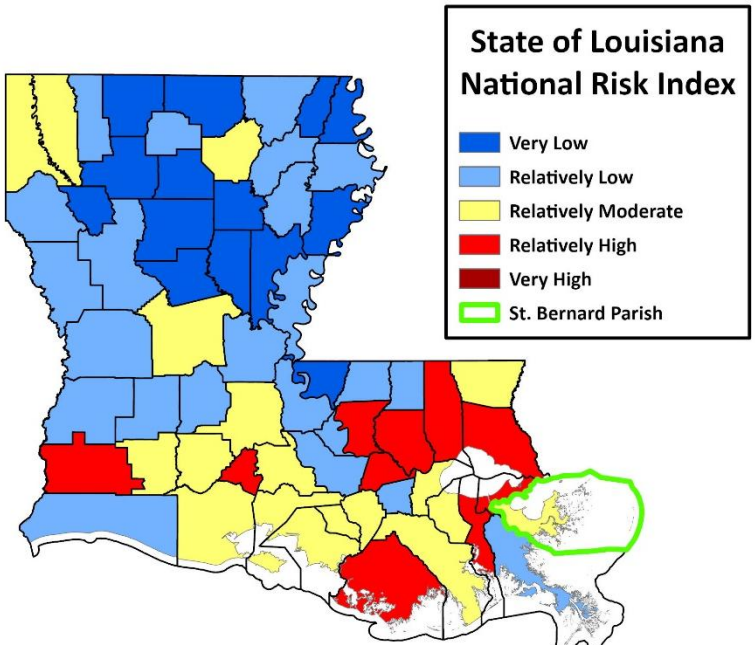

Figure 2-3: Risk Index Ratings for Louisiana

St. Bernard 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 **85.11/100.00.** When compared to the state of Louisiana, the parish has a risk index score of **64.10/100.00.** Again, the natural hazards that account for the most expected annual loss are Flooding, Thunderstorms, and Tropical Cyclones. Lightning is rated as a Relatively High hazard for St. Bernard Parish.

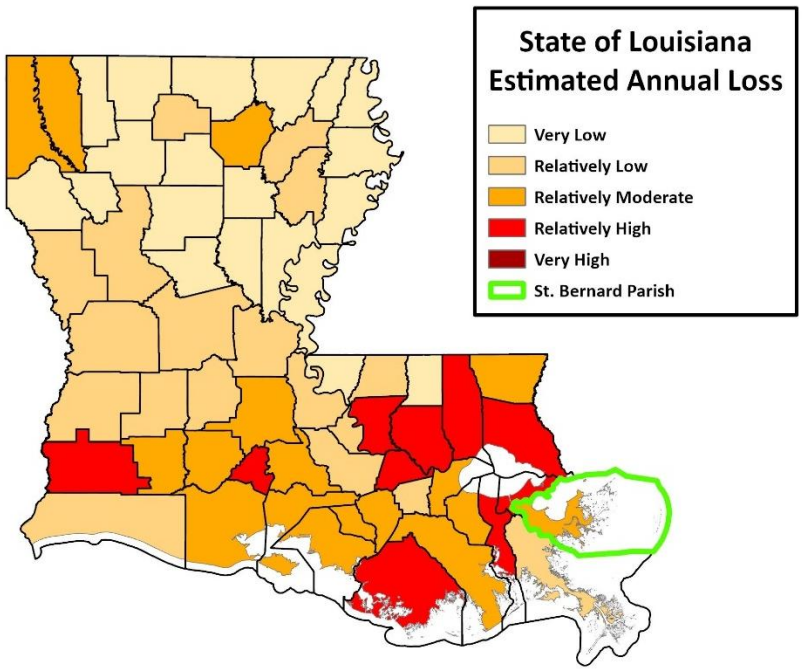

Figure 2-4: Estimated Annual Loss for Louisiana

St. Bernard Parish has a Social Vulnerability Rating of "Very High" when compared to the rest of the US. When communities have a Very 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. section. The parish has a Social Vulnerability rating of **86.66/100.00** when compared to the US. When compared to the state of Louisiana, the parish has a Social Vulnerability rating of **73.40/100.00.**

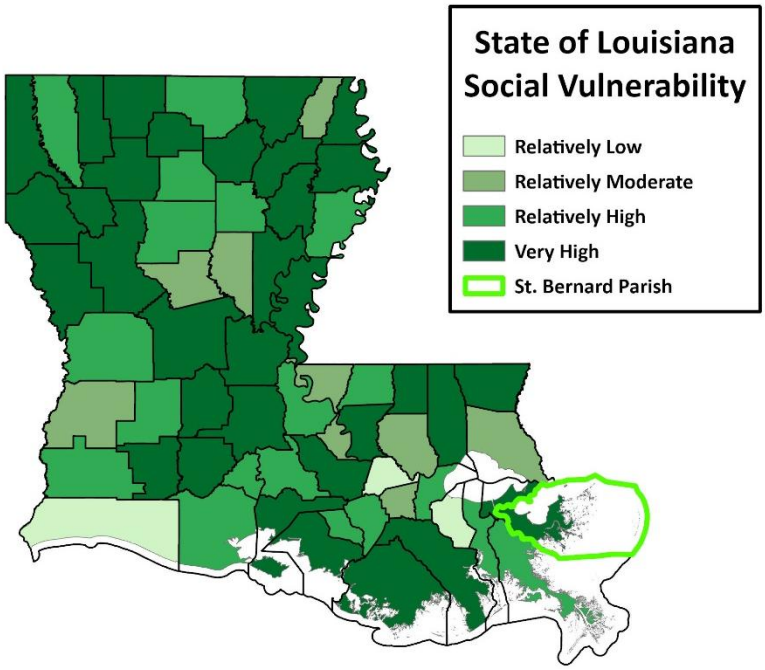

Figure 2-5: Social Vulnerability Ratings for Louisiana

St. Bernard 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. Bernard 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. Bernard Parish has a Community Resilience rating of **91.79/100.00** when compared to the entire US. When compared to the state of Louisiana, St. Bernard has a Community Resilience rating of **87.50/100.00.**

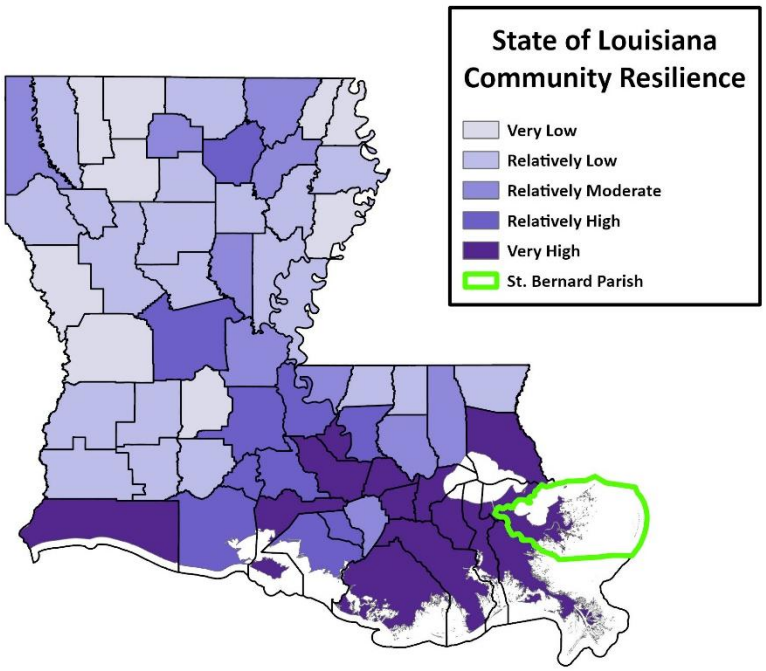

Figure 2-6: Community Resilience Ratings for Louisiana

Socially Vulnerable Populations

The following tables illustrate at risk populations in St. Bernard 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. As seen in the tables below, St. Bernard Parish demonstrate an above average percentage difference than that of the U.S. when dealing with at risk communities.

Depending 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 2023, 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 populations with specific limitations, the table on the following page shows the sample size used to evaluate their respective areas, rather than the total number of people to whom a given indicator applies.

Table 2-8: Limiting Factors in Neighborhoods at Risk Study for St. Bernard Parish

Limiting Factors in Neighborhoods at Risk – Population Sample Size		
Indicators 2023*	**St. Bernard Parish**	**United States**
Families in poverty	10,394	82,220,165
Rental units, mobile homes, households with no car	15,803	127,482,865
People who do not speak English well	41,199	313,447,641
People without a high school degree	29,132	228,434,661
Total Population	**44,172**	**332,387,540**

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

Table 2-9: Neighborhoods at Risk – Socially Vulnerable Populations in St. Bernard Parish

Neighborhoods at Risk – St. Bernard Parish			
Indicators 2022*	**St. Bernard Parish Population**	**St. Bernard Parish Percentage**	**U.S. Percentage**
People under 5 years	2,973	6.7%	5.7%
People over 65 years	5,622	12.7%	16.8%
People of color (including Hispanic)	19,124	43.3%	41.8%
People who do not speak English well	823	2.0%	4.2%
People without a high school degree	5,457	18.7%	10.6%
Families in poverty	1,920	18.5%	8.7%
Housing units that are rentals	4,719	29.9%	35.0%
Housing units that are mobile homes	933	5.9%	5.1%
Households with no cars	1,178	7.5%	8.3%
People with disabilities	8,179	18.6%	13.0%
People without health insurance	3,555	8.1%	8.6%
Population of St. Bernard Parish: *44,172*			

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 $3,681,095,000 in structures throughout the parish. The table below provides the total estimated value for each type of structure by occupancy.

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

Occupancy	St. Bernard Parish
Agricultural	$8,759,000
Commercial	$646,044,000
Government	$15,932,000
Industrial	$133,490,000
Religion	$74,759,000
Residential	$2,741,825,000
Education	$60,286,000
Total	**$3,681,095,000**

Critical Facilities of the Parish

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

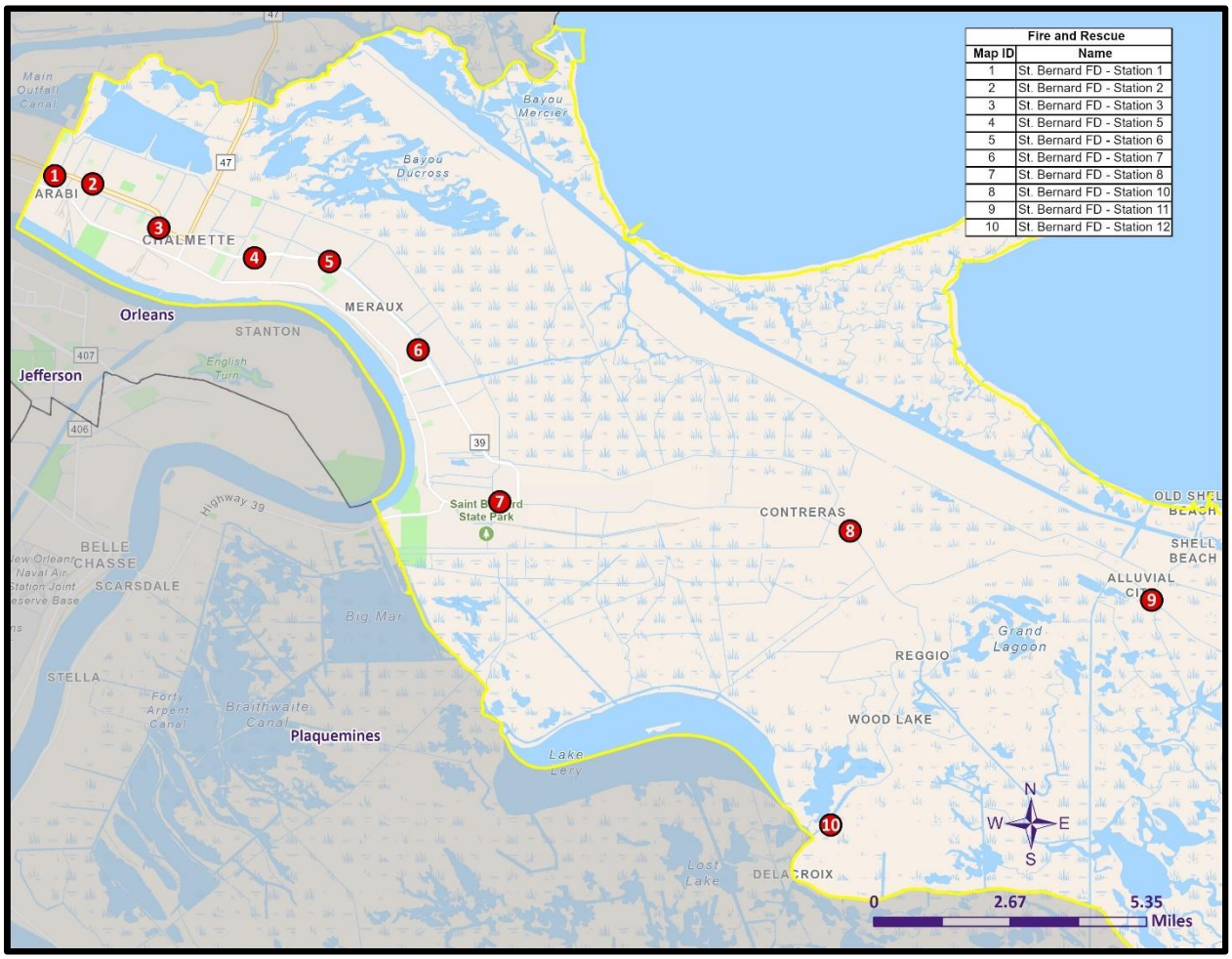

Figure 2-7: Fire and Rescue Facilities in St. Bernard Parish.

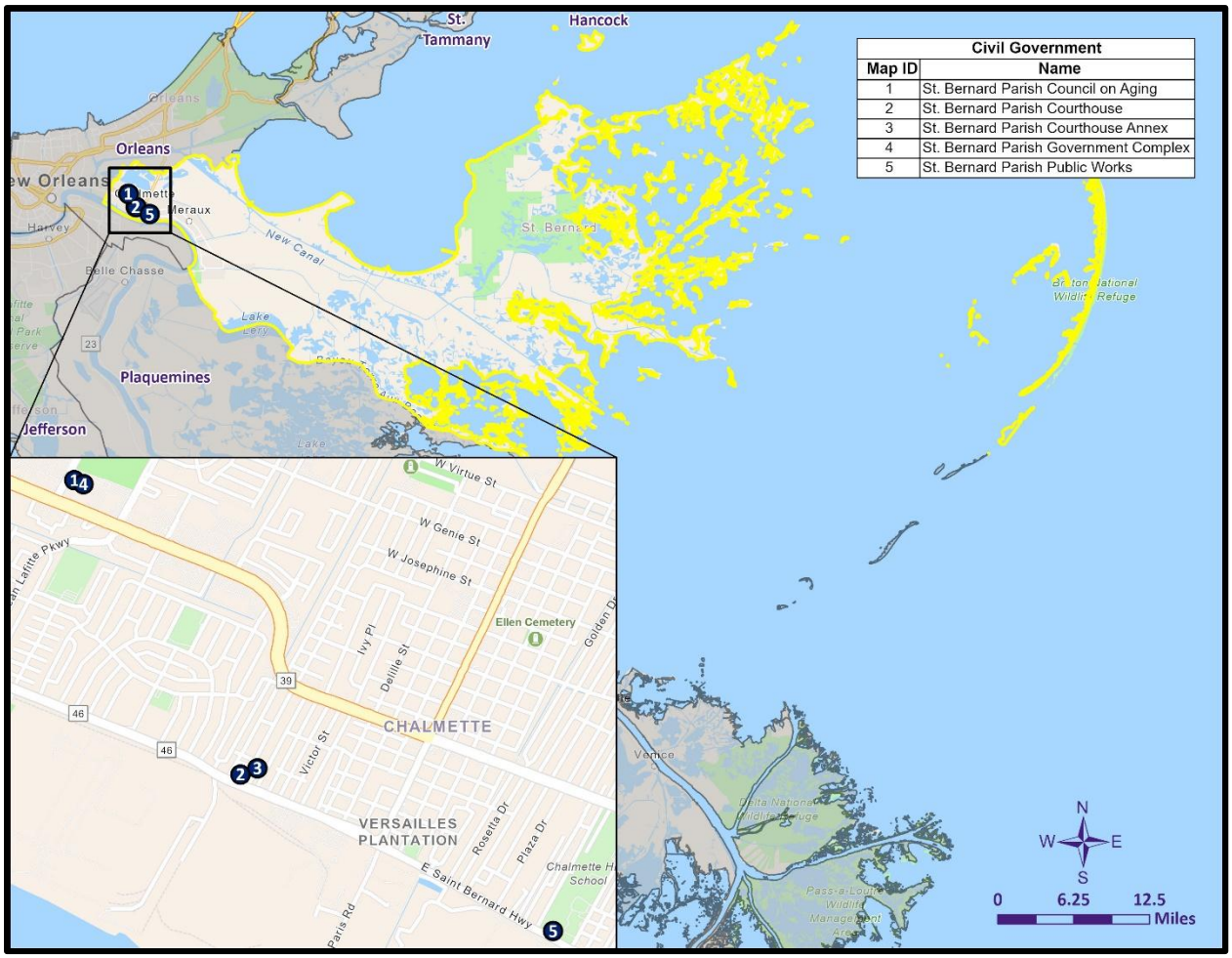

Figure 2-8: Government Facilities in St. Bernard Parish.

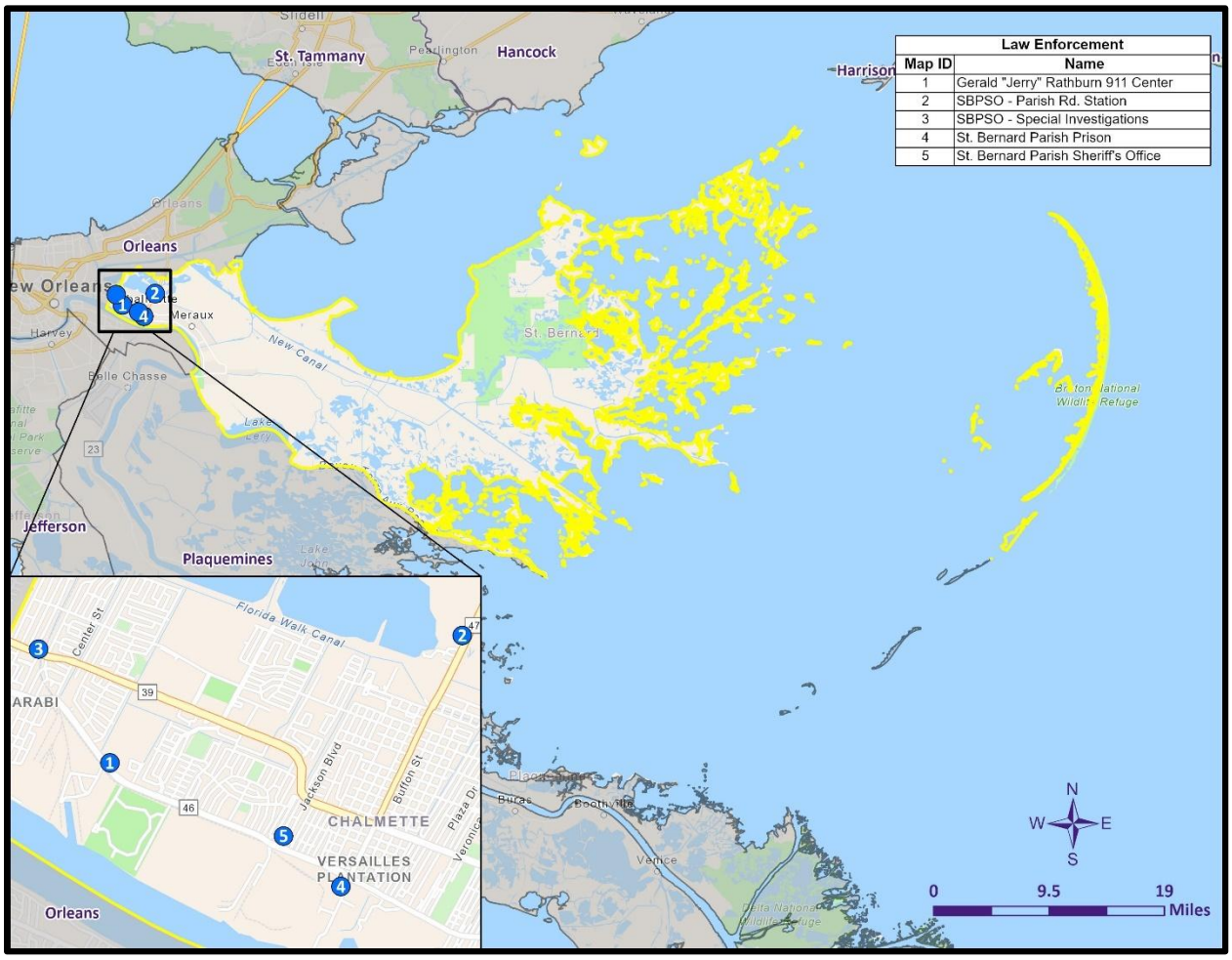

Figure 2-9: Law Enforcement Facilities in St. Bernard Parish.

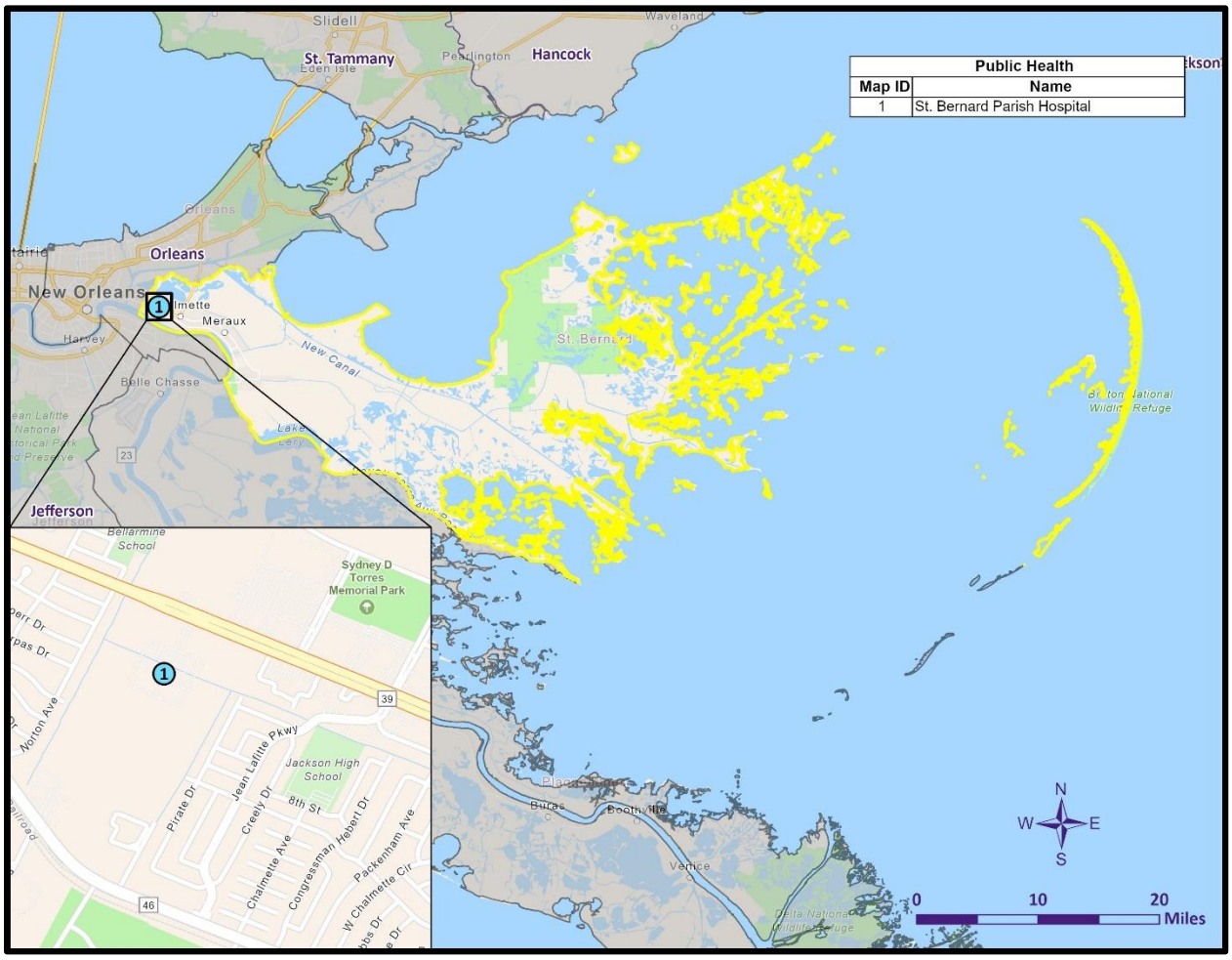

Figure 2-10: Public Health Facilities in St. Bernard Parish.

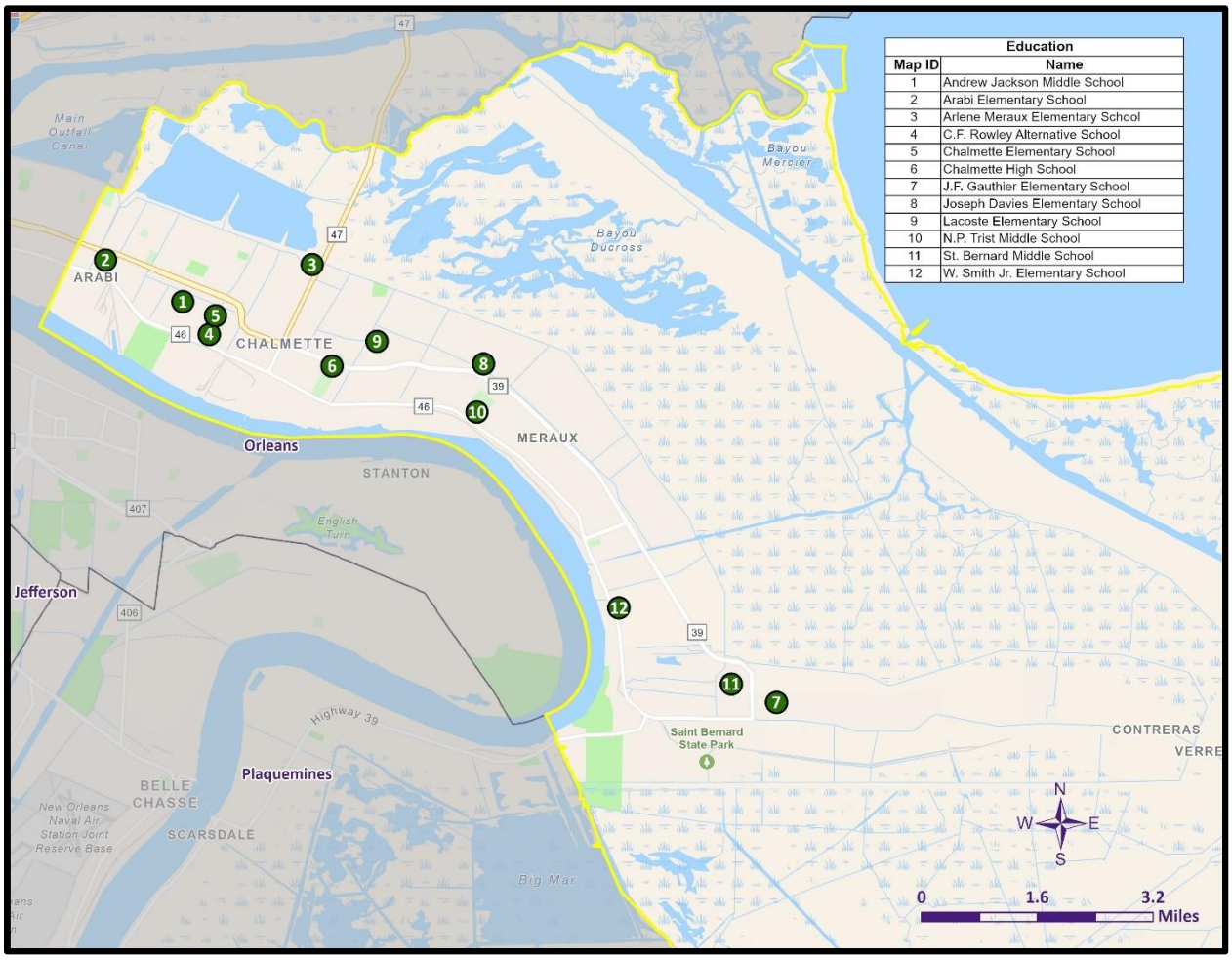

Figure 2-11: Educational Facilities in St. Bernard Parish.

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 2024:

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

Total Population	Parish
1-Apr-10	35,897
1-Apr-20	43,764
1-Jul-24	44,783
Population Growth between 2010 – 2020	21.9%
Average Annual Growth Rate between 2010 – 2020	2.2%
Population Growth between 2020 – 2024	2.3%
Average Annual Growth Rate between 2020 – 2024	0.46%

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

Total Population	Parish
1-Apr-10	17,778
1-Apr-20	17,642
1-Jul-24	18,523
Housing Growth between 2010 – 2020	-0.7%
Average Annual Growth Rate between 2010 – 2020	-0.07%
Housing Growth between 2020 – 2024	5%
Average Annual Growth Rate between 2020 – 2024	1%

Since the previous plan update in 2020, the population and housing development has increased. St. Bernard 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. Bernard Parish. The development that has occurred since 2020 has not in any knowing way altered the parish's vulnerability to natural hazards. St. Bernard 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 below. Residential, commercial, and industrial areas account for only 4% of the parish's land use. Water is the largest category at 1,139,840 acres, accounting for 80% of parish land. At 223,651 acres, wetlands account for 15% of parish lands. The parish also consists of forested areas and agricultural land, accounting for less than 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	4,025	< 1%
Wetlands	223,651	15%
Forest Land (Not including forested wetlands)	2,666	< 1%
Urban/Development	11,151	4%
Water	1,139,840	80%

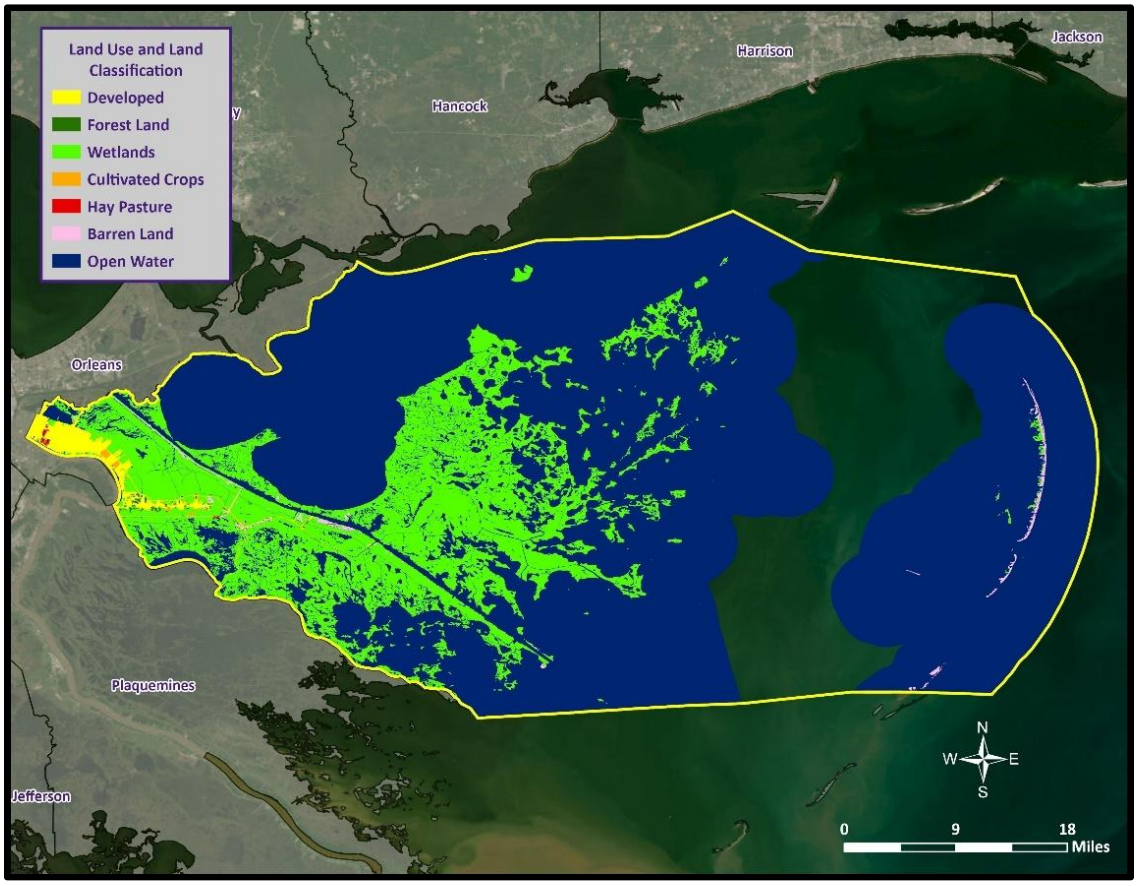

Figure 2-12: Parish Land Use Map.
(Source: USGS Land Use Map)

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.).

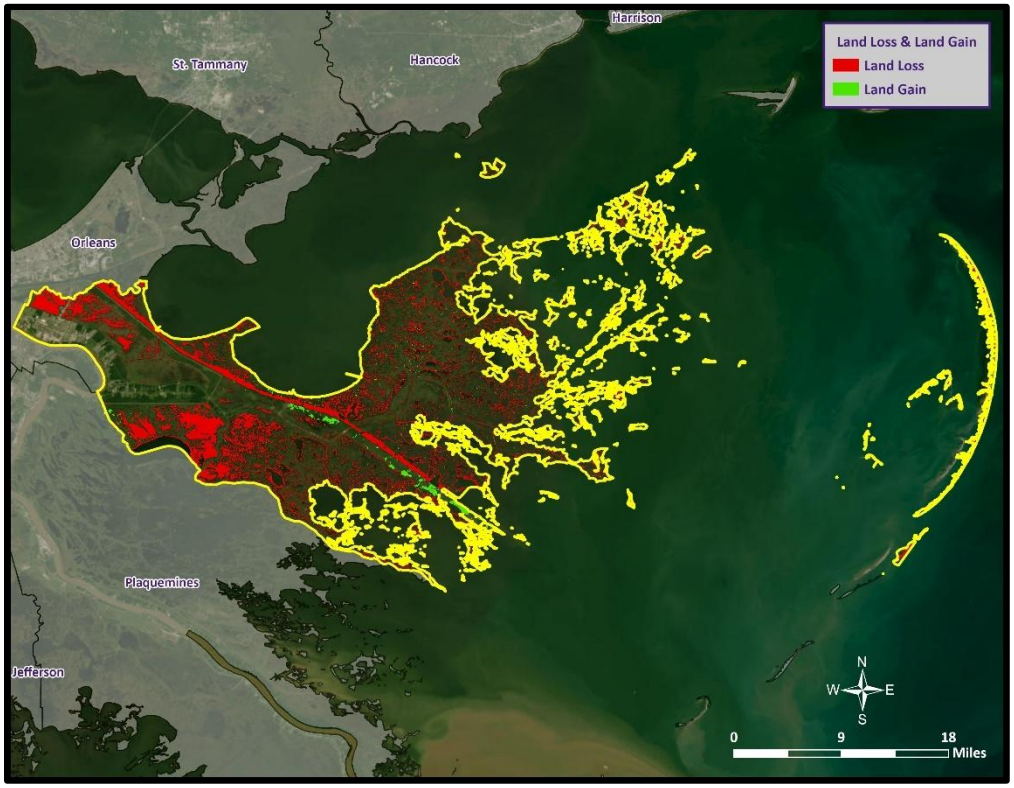

Figure 2-13: Historical Areas of Land Loss and Gain Between 1950 and 2020.

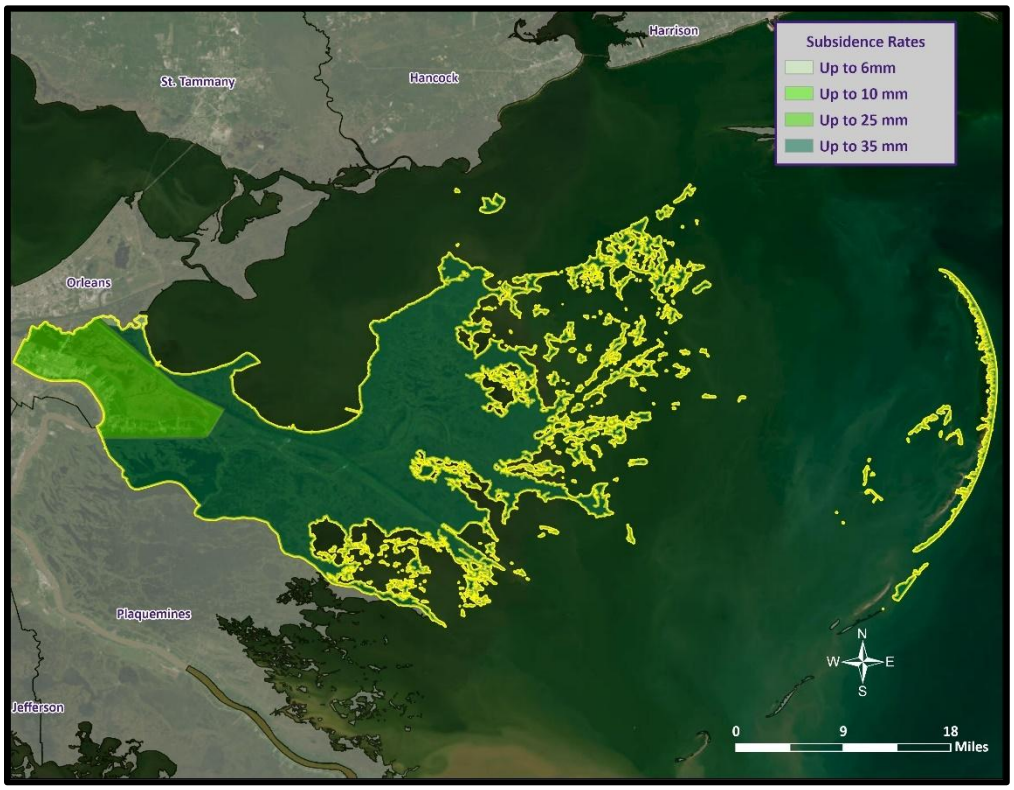

Figure 2-14: Maximum Annual Subsidence Rates Based on Subsidence Zones in Coastal Louisiana.

Climate Change Impacts

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

Future Hazard Impacts

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

Vulnerability Analysis

Estimated Impact and Potential Loss

To determine the estimated potential losses, the methodology implemented in the 2024 Louisiana State Plan Update was used. In the state plan, two parameters were considered to estimate the projected increase in coastal flood losses from storm surge scenarios – global sea level rise and subsidence. A timeframe of 10 years was used for evaluation of future effects of sea level rise and subsidence for comparison with current conditions. The NOAA Sea, Lake and Overland Surges from Hurricanes (SLOSH) model was used to estimate the maximum of maximum (MOM) storm surge elevations for a Category 1 hurricane at mean tide along the coast of Louisiana. The MOM scenario is not designed to describe the storm surge that would result from a particular event, but rather evaluates the impacts of multiple hurricane scenarios with varying forward speeds and storm track trajectories to create the maximum storm surge elevation surface that would occur given the simultaneous occurrence of all hurricane events for a given category.

There are many global sea level rise scenarios from which to select; however, within a 10-year timeframe, methods that predict accelerating sea level rise rates do not deviate significantly from straight line methods. Therefore, a

linear sea level rise projection for the sea level rise occurring in 10 years (SLR2024) using a linear global sea level rise rate of 3.1 mm/year was used (IPCC, 2007), which is also in accordance with the CPRA Coastal Master Plan. This resulted in an increase of 0.1 feet, which was applied to the NOAA MOM storm surge elevation results over the model output domain.

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

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

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

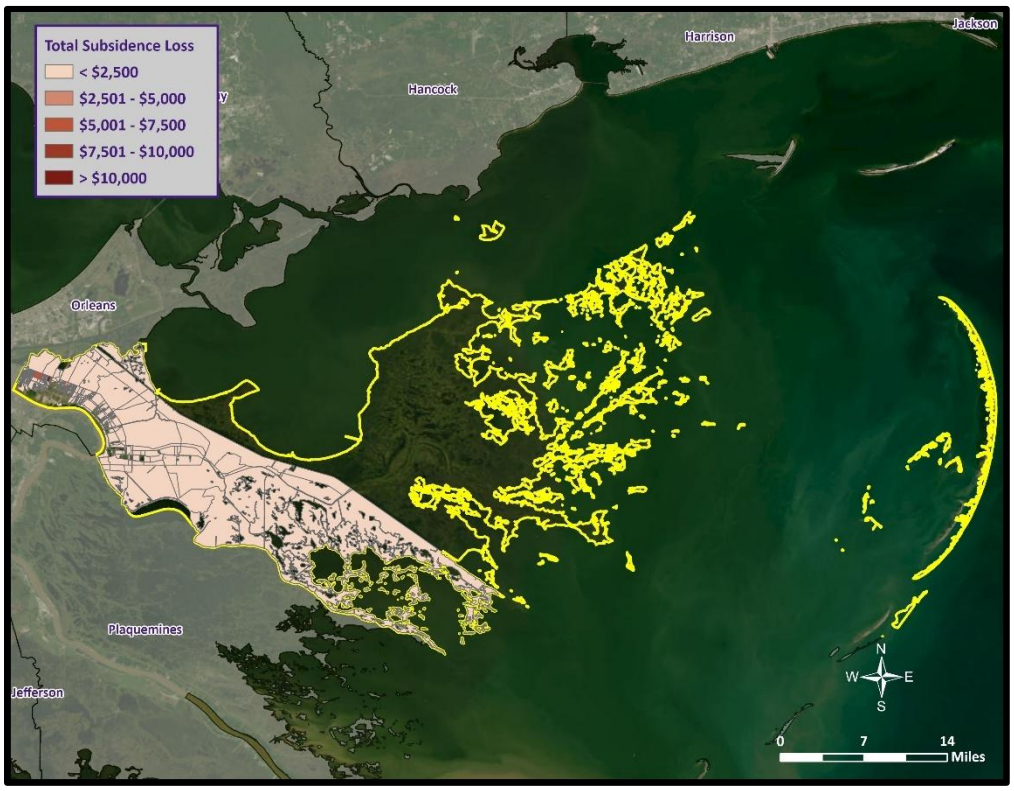

Figure 2-15: Total Losses Due to Subsidence in St. Bernard Parish.

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

Table 2-14: Estimated Annual Losses for Coastal Land Loss in St. Bernard Parish. (Source: Hazus)

Estimated Annual Potential Losses
St. Bernard Parish
$106,400

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 relocate. Long-term sheltering and permanent relocation could be a concern for communities that are at the highest risk for future coastal land loss. The total population within the parish that is susceptible to the effects of coastal land loss are shown in the following table.

Table 2-15: Number of People Susceptible to Coastal Land Loss in St. Bernard Parish.

Number of People Exposed to Coastal Land Loss		
# in Community	**# in Hazard Area**	**% in Hazard Area**
44,783	44,783	100.0%

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

Table 2-16: Population Vulnerable to Coastal Land Loss in St. Bernard Parish.

Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	44,783	100.0%
Persons Under 5 years	3,526	7.9%
Persons Under 18 years	7,839	17.6%
Persons 65 Years and Over	4,073	9.2%
White	32,920	74.0%
Minority	11,543	26.0%

Vulnerability Score

Table 2-17: Vulnerability Score for Coastal Hazards in St. Bernard Parish.

Coastal Hazard Vulnerability Score						
	Probability	**Impact**	**Spatial Extent**	**Warning Time**	**Duration**	**Risk Factor**
Risk Level	4	2	4	1	3	**2.9**

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 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.

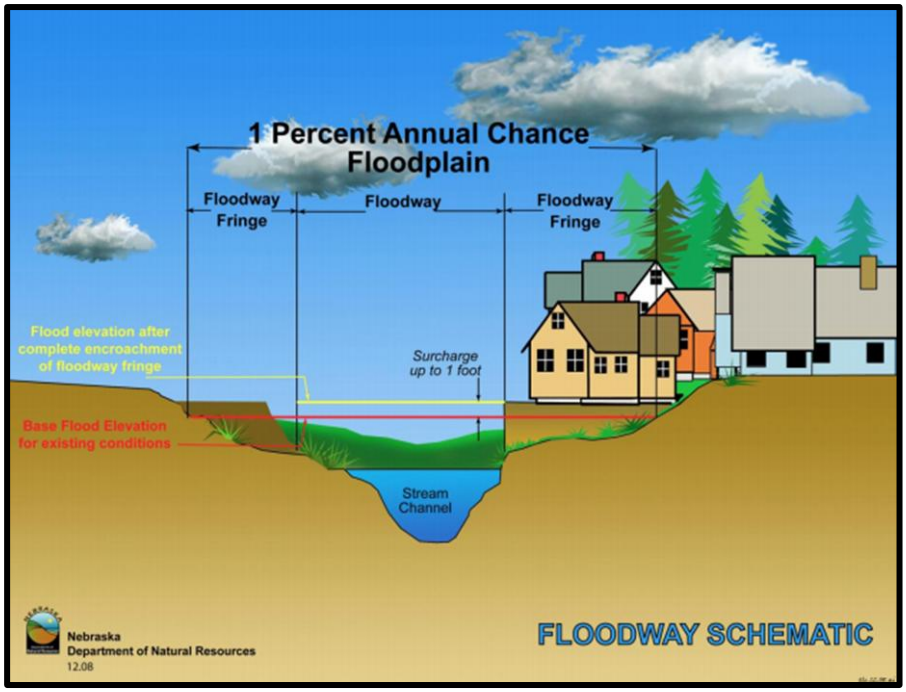

Figure 2-16: Schematic of 100-Year Floodplain.
The Special Flood Hazard Area (SFHA) extends to the end of the floodway fringe
(Source: Nebraska Department of Natural Resources)

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. Flood zones for the parish are shown in the following figure.

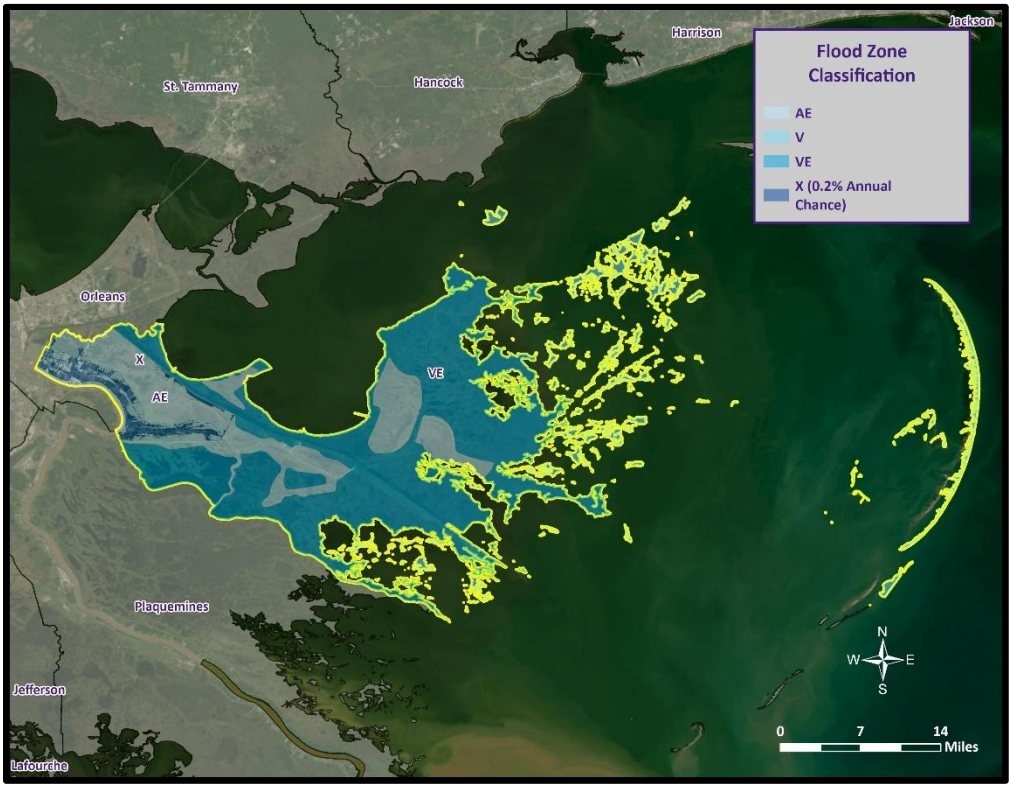

Figure 2-17: Flood Zones within St. Bernard Parish (Source: FEMA)

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 in the parish are provided in the table below:

Table 2-18: Repetitive Loss Structures for St. Bernard Parish.

Number of Structures	Residential	Commercial	Government	Total Claims	Total Claims Paid	Average Claim Paid
2,119	2,072	43	4	5,856	$290,588,337	$49,622

The 2,119 repetitive loss structures were geocoded in order to provide an overview of where the repetitive loss structures are located throughout the parish. The figures on the following page show the approximate locations of the structures and where the highest concentration of repetitive loss structures is located. Through the repetitive loss maps, it is clear the primary concentration of repetitive loss structures is focused around the northwest portion of the parish.

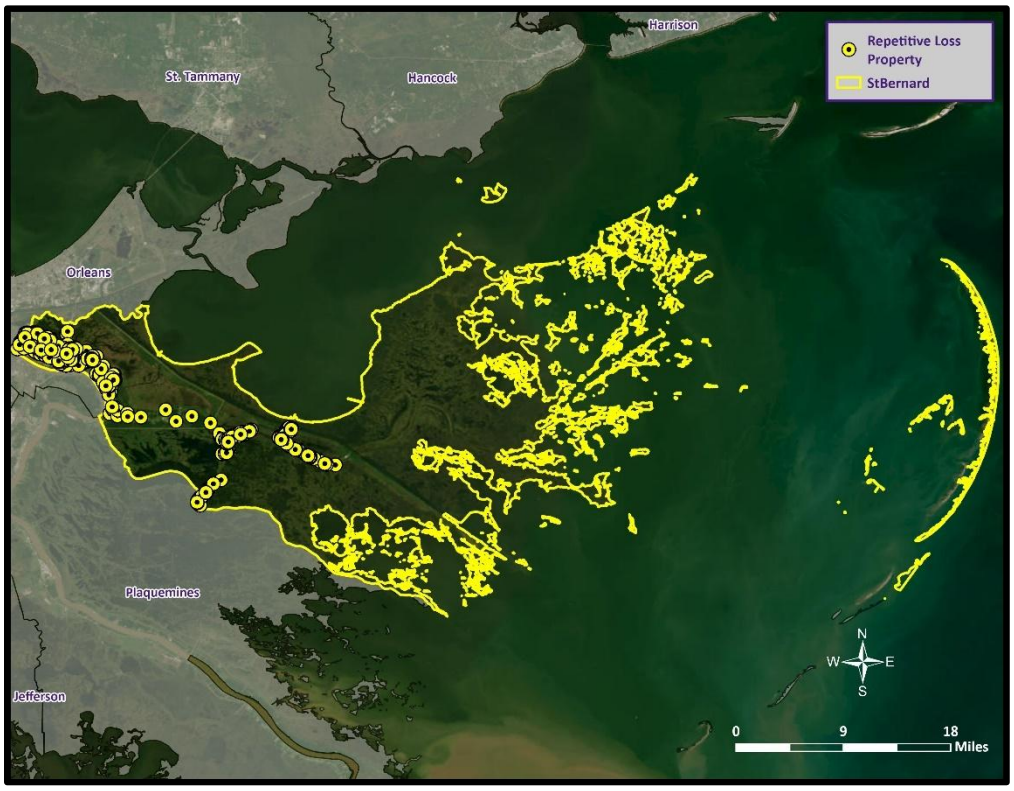

Figure 2-18: Repetitive Loss Properties in St. Bernard Parish.

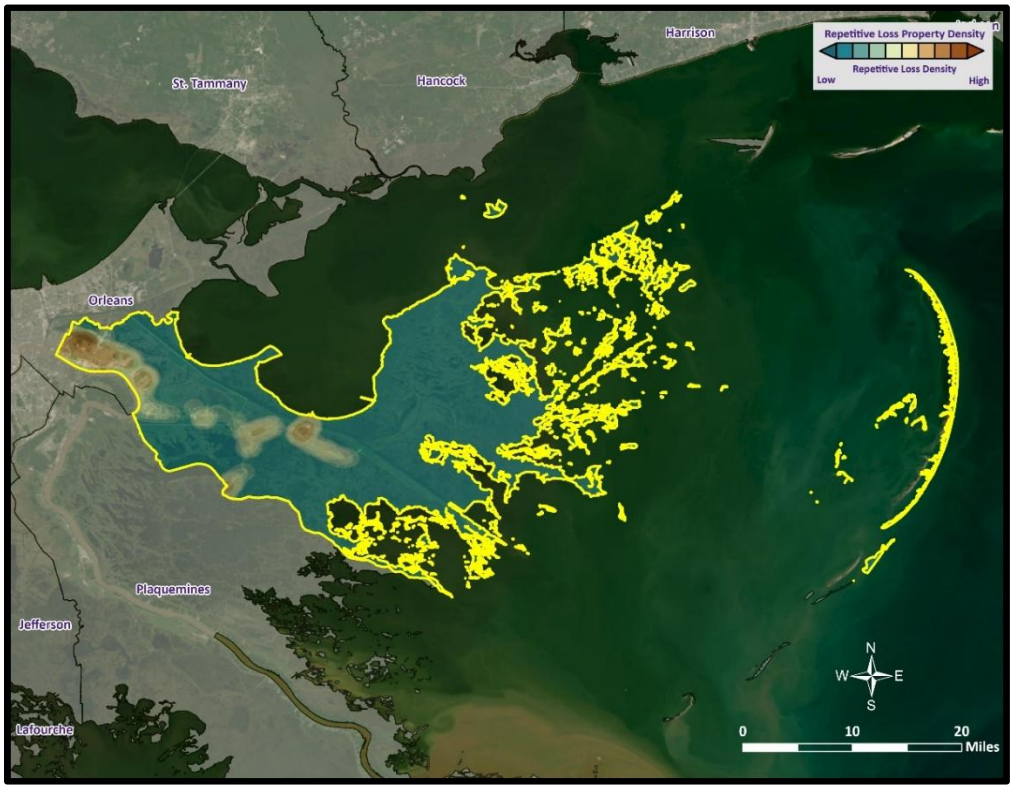

Figure 2-19: Repetitive Loss Property Densities in St. Bernard Parish.

National Flood Insurance Program

Flood insurance statistics indicate that the Parish has 9,803 flood insurance policies with the NFIP, with total annual premiums of $8,164,227. The parish participates in the NFIP and will continue to adopt and enforce floodplain management requirements, including regulating new construction in Special Flood Hazard Areas, making substantial improvement and/or damage determinations, and determining the necessary permits for owners to bring a substantially improved or 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 are provided in the tables to follow.

Table 2-19: Summary of NFIP Policies for St. Bernard Parish.

No. of Insured Structures	Total Insurance Coverage Value	Annual Premiums Paid	No. of Insurance Claims Filed Since 1978	Total Loss Payments
9,803	$3,024,506,000	$8,164,227	23,960	$2,238,663,033

Table 2-20: Summary of Community Flood Maps for St. Bernard Parish.

CID	Initial FHBM Identified	Initial FIRM Identified	Adopted Date	Current Effective Map Date	Date Joined the NFIP	Tribal
225204#	3/13/1970	8/31/1973	12/21/2017	12/21/2017	3/13/1970	No

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

Threat to People

Just as with property damage, depth and velocity are major factors in determining the threat posed to people by flooding. It takes very little depth or velocity for flood waters to become dangerous. A car will float in less than two feet of moving water, and can be swept downstream into deeper waters, trapping passengers within the vehicle. Victims of floods have often put themselves in perilous situations by entering flood waters that they believe to be safe, or by ignoring travel advisories.

Major health concerns are also associated with floods. Flood waters can transport materials such as dirt, oil, animal waste, and chemicals (e.g., farm, lawn, and industrial) that may cause illnesses of various degrees when coming in contact with humans. Flood water can also infiltrate sewer lines and inundate wastewater treatment plants, causing sewage to back up and creating a breeding ground for dangerous bacteria. This infiltration may also cause water supplies to become contaminated and undrinkable.

Elevations in the Parish

The digital elevation model (DEM) for the parish is instructive in visualizing where the low-lying and high-risk areas are for the parish. Elevation averages in the parish range from below sea level to approximately 35 feet (NAVD88). The highest elevations in the parish are approximately 35 feet (NAVD88), located along the Mississippi River.

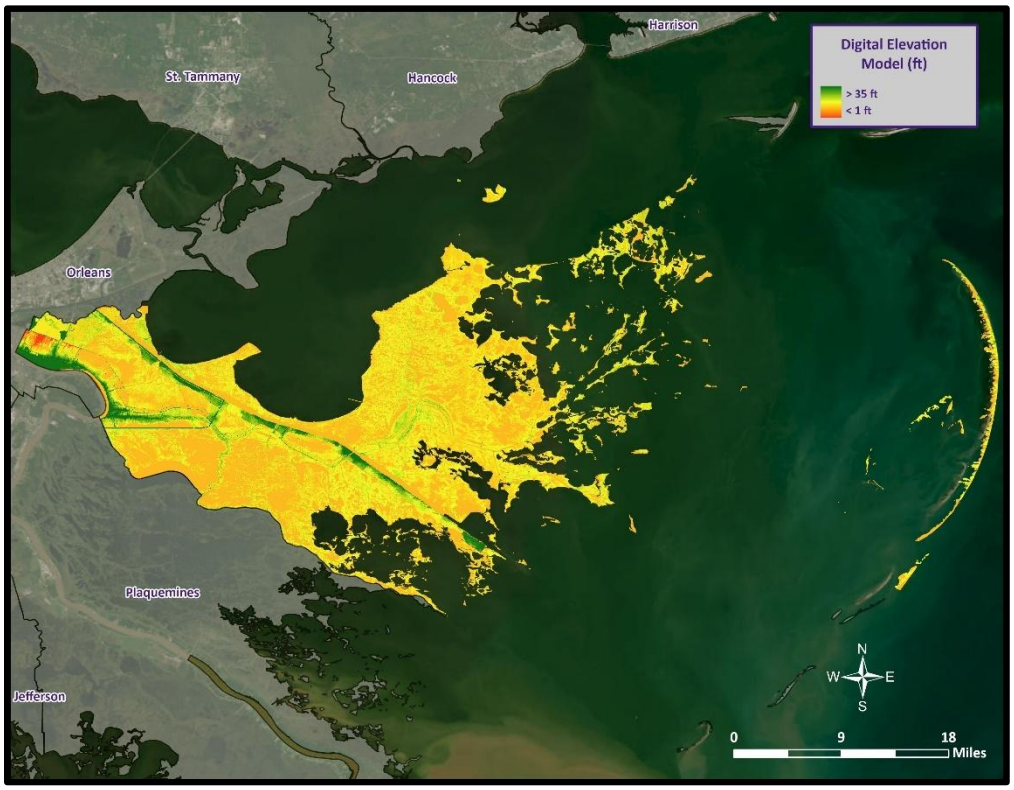

Figure 2-20: Elevations throughout St. Bernard Parish.

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 24 flooding occurrences between the years 1996 and 2024. Since the last update, there have been eight flood occurrences within the boundaries of the parish.

Table 2-21: Historical Flooding Events in St. Bernard Parish since the Last Update.

Date	Area	Type of Flood	Property Damage	Fatalities	Injuries
7/1/2020	ARABI	Flood	$0	0	0
7/3/2021	ARABI	Flash Flood	$0	0	0
7/5/2021	VERSAILLES	Flash Flood	$0	0	0
9/28/2021	VERSAILLES	Flash Flood	$0	0	0
7/30/2022	ARABI	Flash Flood	$0	0	0
2/3/2024	CHALMETTE	Flash Flood	$0	0	0
4/10/2024	ARABI	Flash Flood	$0	0	0
6/28/2024	DOCVILLE	Flash Flood	$100,000	0	0

Probability

The annual return rate (frequency) for periods of flooding in the parish is 0.83 (83% annual probability) or approximately one flood occurrence every one to two years. The table below shows the probability and return frequency for the parish.

Table 2-22: Annual Flood Occurrence Probabilities for St. Bernard Parish.

Annual Probability	Return Frequency
83%	One event every one to two years

Climate Change Impacts

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

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

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

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

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

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

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

mitigation efforts are also necessary to reduce the severity and frequency of floods, ultimately safeguarding both infrastructure and vulnerable populations from the detrimental effects of flooding.

Future Hazard Impacts

Hazard impacts for flood were estimated for the years 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 2-23: 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	18,523	3,921	3,949	3,969
Value of Structures	$3,681,095,000	$779,302,953.80	$842,551,418.20	$890,848,026
# of People	44,783	9,413	9,769	10,032

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 parish level for flooding.

Table 2-24: National Risk Index (NRI) Summarization of Riverine Flood Occurrences for St. Bernard 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 2-25: Estimated Losses in St. Bernard Parish from a 100-Year Flood Event.
(Source: Hazus)

Estimated Losses from a 100-Year Flood
St. Bernard Parish
$3,120,000

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

Table 2-26: Estimated 100-year Flood Losses for St. Bernard Parish by Sector. (Source: Hazus)

St. Bernard Parish	Estimated Total Losses from 100-Year Flood Event
Agricultural	$0
Commercial	$615,000
Government	$111,000
Industrial	$671,000
Religious / Non-Profit	$234,000
Residential	$971,000
Schools	$518,000
Total	**$3,120,000**

Vulnerable Population

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

Table 2-27: Vulnerable Populations Susceptible to a 100-year Flood Event in St. Bernard Parish. (Source: Hazus)

Number of People Exposed to Flood Hazards		
# in Community	# in Hazard Area	% in Hazard Area
44,783	9,413	21.1%

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

Table 2-28: Vulnerable Populations Susceptible to a 100-year Flood Event in St. Bernard Parish. (Source: Hazus)

Category	Total Numbers	Percentage of People in Hazard Area
Number in Hazard Area	9,413	21.1%
Persons Under 5 Years	746	7.9%
Persons Under 18 Years	1,660	17.6%
Persons 65 Years and Over	862	9.2%
White	6,969	74.0%
Minority	2,444	26.0%

Vulnerability Score

Table 2-29: Vulnerability Score for Flooding in St. Bernard Parish.

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

Sinkholes

Profile

Sinkholes are areas of ground—varying in size from a few square feet to hundreds of acres and reaching in depth from 1 to more than 100 ft.—with no natural external surface drainage. Sinkholes are usually found in karst terrain—that is, areas where limestone, carbonate rock, salt beds, and other water-soluble rocks lie below the Earth's surface. Karst terrain is marked by the presence of other uncommon geologic features such as springs, caves, and dry streambeds that lose water into the ground. In general, sinkholes form gradually (in the case of cover subsidence sinkholes), but they can also occur suddenly (in the case of cover-collapse sinkholes).

Sinkhole formation is a very simple process. Whenever water is absorbed through soil, encounters water-soluble bedrock, and then begins to dissolve it, sinkholes start to form. The karst rock dissolves along cracks; as the fissures grow, soil and other particles fill the gaps, loosening the soil above the bedrock. Figure 1 illustrates the development of a cover subsidence sinkhole. As the soil sinks from the surface, a depression forms, which draws in more water, funneling it down to the water-soluble rock. The increase of water and soil in the rock pushes open the cracks, again drawing more soil and water into it. This positive feedback loop continues, unless clay plugs into the cracks in the bedrock, at which time a pond may form. A sudden cover-collapse sinkhole occurs when the topsoil above dissolving bedrock does not sink, but forms a bridge over the soil that is sinking beneath it. Underground soil continues to fill the bedrock fissures, until finally the soil bridge collapses and fills the void beneath it.

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

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

Risk Assessment

Geographic Extent

Currently, there is one identifiable salt dome location in the parish. The figure on the following page displays the location of the salt dome with its relative location. As depicted in the figure, the salt dome is located in the western portion of the parish.

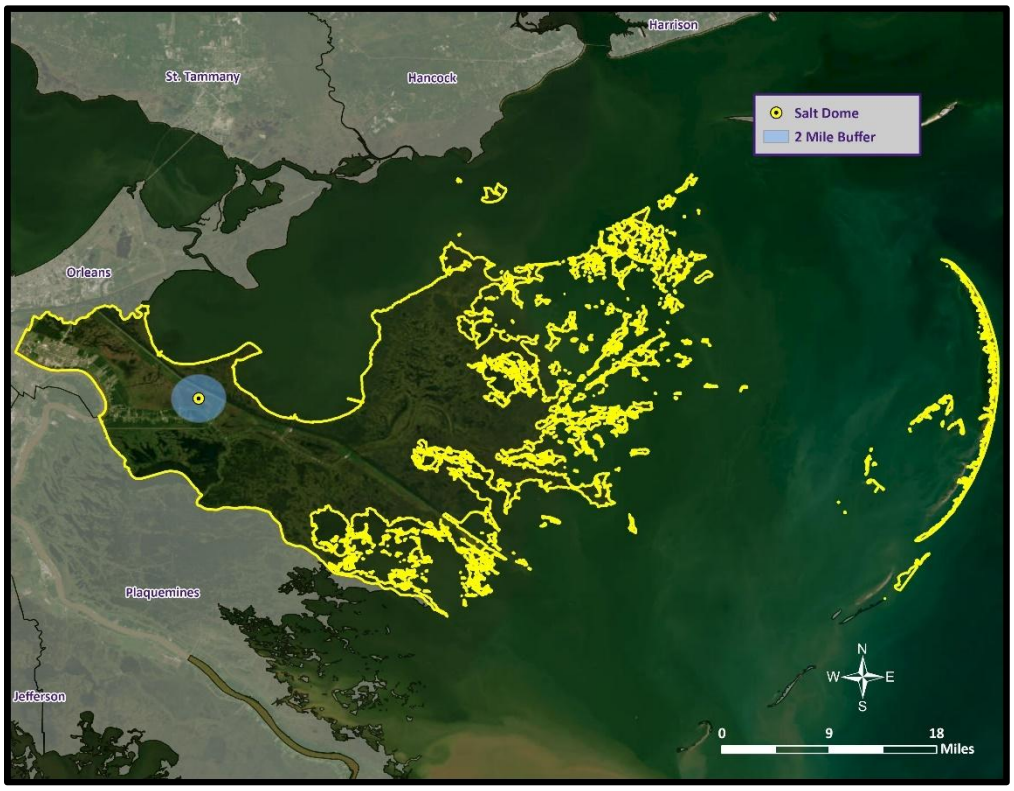

Figure 2-21: Salt Dome Locations in St. Bernard Parish.

Previous Occurrences

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

Probability

Based on historical data for the past 29-years, there has been no incident of a sinkhole formation or salt dome collapse in St. Bernard Parish. The annual chance of occurrence is calculated at less than 1%.

Climate Change Impacts

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

Vulnerability Analysis

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

The environmental consequences are also significant, altering local hydrology, groundwater flow, and potentially causing groundwater contamination if hazardous materials are exposed. As urbanization and climate change further interact with sinkhole dynamics, understanding and managing these impacts becomes increasingly crucial for sustainable development and community resilience.

Estimated Impact and Potential Loss

The one salt dome location was analyzed to determine the number of people and homes that are potentially susceptible to losses from a sinkhole materializing from the salt dome. The following table is based on conducting a two-mile buffer around the center of the salt dome. The values were determined by querying the 2020 U.S. Census block data to determine the number of houses and people located within two miles of the salt dome. Critical facilities were also analyzed to determine if they fell within the two-mile buffer of the salt dome. Total value for all occupancy groups from Hazus was used to estimate a total loss of all facilities that were within two miles of the salt dome.

Table 2-30: Estimated Potential Losses from a Sinkhole Formation.
(Source: U.S. 2020 Census Data and Hazus)

Salt Dome Name	Total Building Exposure	Critical Infrastructure Exposure	Number of People Exposed	Number of Houses Exposed
Plaquemines 3	$19,980,000	0	379	159

Vulnerable Population

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

Vulnerability Score

Table 2-31: Vulnerability Score for Sinkholes in St. Bernard Parish.

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

Thunderstorms (Hail, Lightning, & Thunderstorm Wind)

Overview

The term "thunderstorm" is usually used as a catch-all term for several kinds of storms. Here "thunderstorm" is defined to include any precipitation occurrence in which thunder is heard or lightning is seen. Thunderstorms are often accompanied by heavy rain and strong winds, and occasionally, depending on conditions, by hail or snow. Thunderstorms form when humid air masses are heated, which causes them to become convectively unstable. Consequently, the air masses rise. Upon rising, the air masses' water vapor condenses into liquid water and/or deposits directly into ice when they rise sufficiently to cool to the dew-point temperature.

Thunderstorms are classified into four main types (single-cell, multi-cell, squall line, and supercell) depending on the degree of atmospheric instability, the change in wind speed with height (called wind shear), and the degree to which the storm's internal dynamics are coordinated with those of adjacent storms. There is no such interaction for single-cell thunderstorms, but there is significant interaction with clusters of adjacent thunderstorms in multi-cell thunderstorms, and with a linear "chain" of adjacent storms in squall line thunderstorms. Though supercell storms have no significant interactions with other storms, they have very well-organized and self-sustaining internal dynamics, which allows them to be the longest-lived and most severe of all thunderstorms.

The life of a thunderstorm proceeds through three stages: the developing (or cumulus) stage, the mature stage, and the dissipation stage. During the developing stage, the unstable air mass is lifted as an updraft into the atmosphere. This sudden lift rapidly cools the moisture in the air mass, releasing latent heat as condensation and/or deposition occurs, which warms the surrounding environment, thus making it less dense than the surrounding air. This process intensifies the updraft and creates a localized lateral rush of air from all directions into the area beneath the thunderstorm to feed continued updrafts. At the mature stage, the rising air is accompanied by downdrafts caused by the shear of falling rain (if melted completely), or hail, freezing rain, sleet, or snow (if not melted completely). The dissipation stage is characterized by the dominating presence of the downdraft as the hot surface that gave the updrafts their buoyancy is cooled by precipitation. During the dissipation stage, the moisture in the air mass largely empties out.

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

- **Severe Thunderstorm Watch:** Issued to alert people to the possibility of a severe thunderstorm developing in the area. Expected time frame for these storms is three to six hours.
- **Severe Thunderstorm Warning:** Issued when severe thunderstorms are imminent. This warning is highly localized and covers parts of one to several counties.

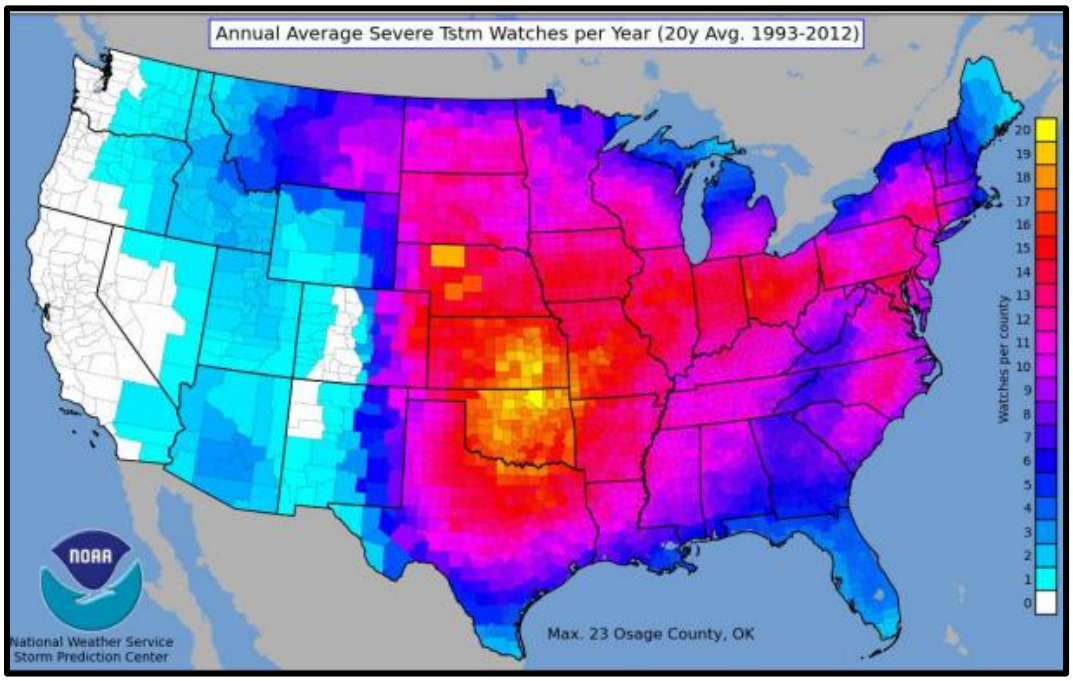

Figure 2-22: County-Level Severe Thunderstorm Watches Issued Per Year on Average.

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 2-32: 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 2-33: Spectrum of Hailstone Diameters and their Everyday Description. (Source: National Weather Service)

Spectrum of Hailstone Diameters	
Hail Diameter Size	**Description**
1/4”	Pea
1/2”	Plain M&M
3/4”	Penny
7/8”	Nickle
1” (severe)	Quarter
1 1/4”	Half Dollar
1 1/2”	Ping Pong Ball / Walnut
1 3/4”	Golf Ball
2”	Hen Egg / Lime
2 1/2"	Tennis Ball
2 3/4"	Baseball
3”	Teacup / Large Apple
4”	Softball
4 1/2"	Grapefruit
4 3/4” – 5”	Computer CD-DVD

Hailstorms can cause widespread damage to homes and other structures, automobiles, and crops. While the damage to individual structures or vehicles is often minor, the cumulative cost to communities, especially across large metropolitan areas, can be quite significant. Hailstorms can also be devastating to crops. Thus, the severity of hailstorms depends on the size of the hailstones, the length of time the storm lasts, and where it occurs. Hail rarely causes loss of life, although large hailstones can cause bodily injury.

Lightning Profile

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

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

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

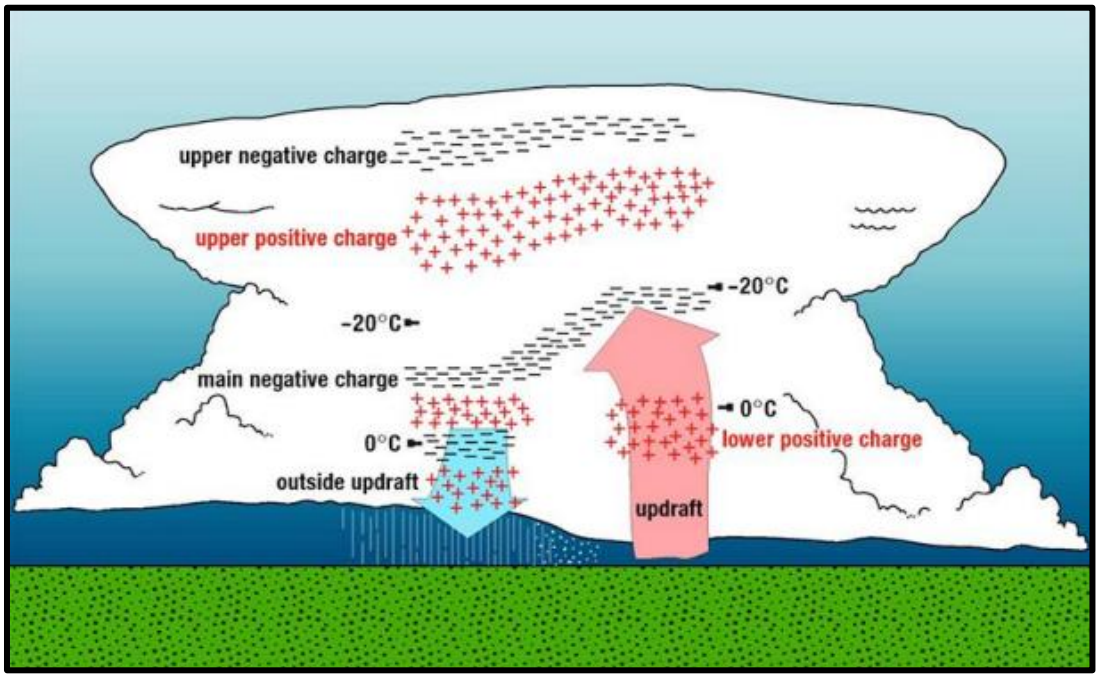

Figure 2-23: Charge Distribution in a Typical Storm Cloud.
(Source: The National Severe Storms Laboratory)

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

Table 2-34: 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 2-35: 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 2-36: 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 for hailstorms. The worst-case scenario for hailstorms is hail up to 1.75 inches in diameter.

Previous Occurrences

The parish experienced eight hail occurrences between the years 1996 and 2024. Since the last update, there have been no hail occurrences within the boundaries of the parish that have been recorded by the NCEI storm events database.

Probability

The annual return rate (frequency) for hail occurrences in the parish is 0.28 (28% annual probability) or approximately one hail occurrence every three to four years. The figures on the following page display the density of hailstorm events and an overview of hailstorm size based on location.

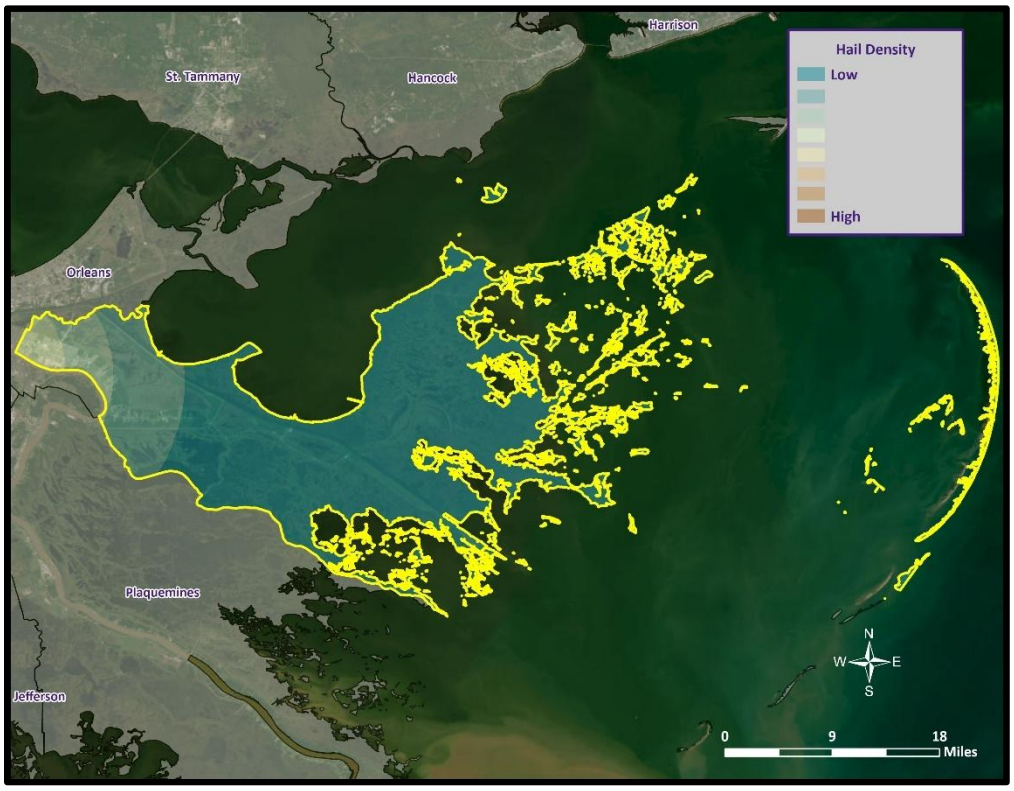

Figure 2-24: Density of Hailstorms by Diameter from 1950-2024.

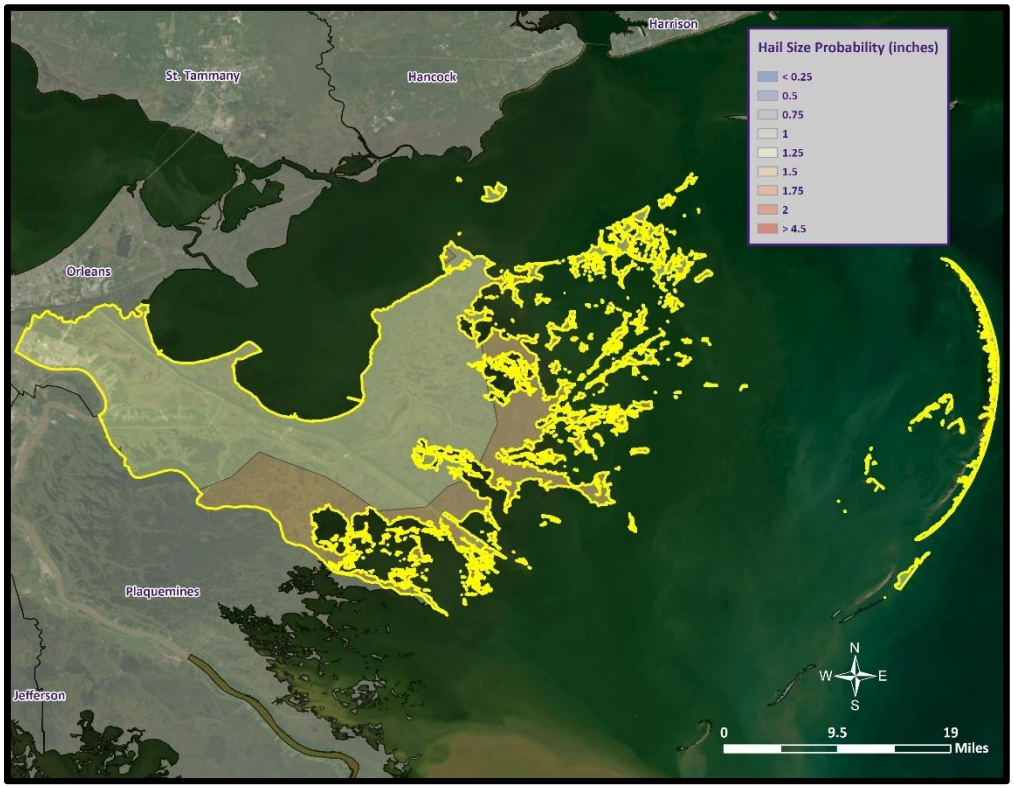

Figure 2-25: Hail Size Probability in Inches for St. Bernard Parish.

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 experienced five lightning occurrences between the years 1996 and 2024. 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 0.17 (17% annual probability) or approximately one lightning occurrence every five to six 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 63 knots.

Previous Occurrences

The parish experienced 24 thunderstorm wind occurrences between the years 1996 and 2024. Since the last update, there have been five thunderstorm wind occurrences within the boundaries of the parish.

Table 2-37: Historical Thunderstorm Wind Occurrences in St. Bernard Parish since the Last Update.

Date	Magnitude (knots)	Property Damage	Crop Damage	Fatalities	Injuries
7/1/2020	50	$0	0	0	0
5/18/2021	50	$0	$0	0	0
6/19/2023	50	$0	$0	0	0
1/9/2024	50	$0	$0	0	0
5/16/2024	63	$0	$0	0	0

Probability

The annual return rate (frequency) for thunderstorm wind occurrences in the parish is 0.83 (83% annual probability) or approximately one thunderstorm wind occurrence every one to two years. The figure on the following page displays the thunderstorm wind speed probability for the parish.

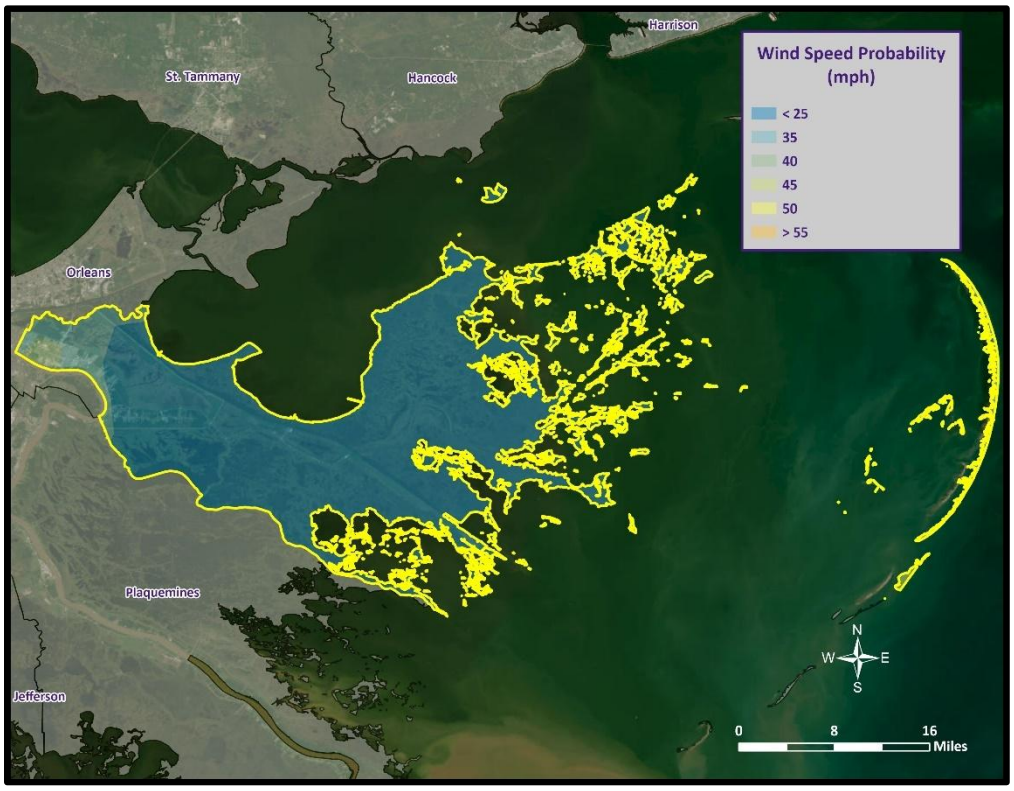

Figure 2-26: Thunderstorm High Wind Speed Probability in Miles Per Hour for St. Bernard Parish.

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 2-38: National Risk Index (NRI) Summarization of Hail Occurrences for St. Bernard Parish. (Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Very Low	Very Low

Estimated Impact and Potential Loss

Since 1996, there have been eight significant hail occurrences per the NCEI Storm Events Database. The total property damage associated with these storms totaled approximately $1,000. To estimate the potential losses on an annual basis, the total damages recorded were divided by the total number of years of available data in the NCEI Storm Events Database (1996 – 2024). This provides an annual estimated potential loss of $34 and $125 per event. The following table provides an estimate of potential property losses for St. Bernard Parish:

Table 2-39: Estimated Annual Property Losses in St. Bernard Parish resulting from Hail Damage.

Estimated Annual Potential Losses from Hail Damage
St. Bernard Parish
$34

Vulnerable Population

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

Vulnerability Score

Table 2-40: Vulnerability Score for Hail in St. Bernard Parish.

Hail Vulnerability Score						
	Probability	Impact	Spatial Extent	Warning Time	Duration	Risk Factor
Risk Level	3	2	3	3	1	2.45

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 2-41: National Risk Index (NRI) Summarization of Lightning Occurrences for St. Bernard Parish. (Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Relatively High	Relatively High

Estimated Impact and Potential Loss

Since 1996, there have been five significant lightning occurrence per the NCEI Storm Events Database. The total property damage associated with this storm totaled approximately $20,500. 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 – 2024). This provides an annual estimated potential loss of $707 and $4,100 per event. The following table provides an estimate of potential property losses for St. Bernard Parish:

Table 2-42: Estimated Annual Property Losses in the Parish resulting from Lightning Damage.

Estimated Annual Potential Losses from Lightning
St. Bernard Parish
$707

Vulnerable Population

Per the NCEI Storm Events Database, there have been one reported fatality and one injury as a result of lightning.

Vulnerability Score

Table 2-43: Vulnerability Score for Lightning in St. Bernard Parish.

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

Thunderstorm Wind Vulnerability Analysis

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

Table 2-44: National Risk Index (NRI) Summarization of Thunderstorm Wind Occurrences for the 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 24 significant thunderstorm wind occurrences per the NCEI Storm Events Database. The total property damage associated with these storms totaled approximately $143,400. 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 – 2024). This provides an annual estimated potential loss of $4,945 and $5,975 per event. The following table provides an estimate of potential property losses for the Parish:

Table 2-45: Estimated Annual Property Losses in St. Bernard Parish resulting from Thunderstorm Wind Damage.

Estimated Annual Potential Losses from Thunderstorm Winds
St. Bernard Parish
$4,945

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 2-46: Vulnerability Score for Thunderstorm Wind in St. Bernard Parish.

Thunderstorm Wind Vulnerability Score						
	Probability	Impact	Spatial Extent	Warning Time	Duration	Risk Factor
Risk Level	3	2	3	3	1	**2.45**

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 2-47: 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 2-48: 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.

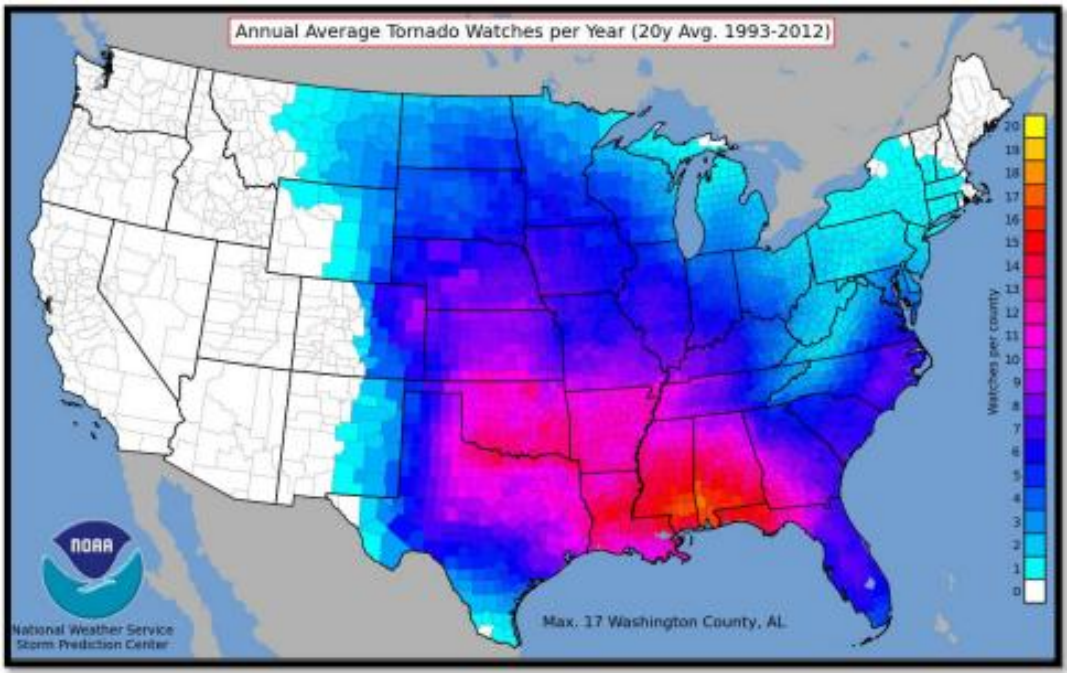

Figure 2-27: County-Level Tornado Watches Issued Per Year on Average (Source: NOAA SPC)

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 nine tornado occurrences between the years 1996 and 2024. Since the last update, there have been three tornado occurrences within the boundaries of the parish.

Table 2-49: Historical Tornado Occurrences in St. Bernard Parish since the Last Update.

Date	Location	Magnitude	Property Damage	Crop Damage	Fatalities	Injuries
3/22/2022	ARABI	EF3	$30,000,000	$0	1	2
12/14/2022	ARABI	EF2	$50,000,000	$0	0	4
12/14/2022	SHELL BEACH	EFU	$0	$0	0	0

Probability

The annual return rate (frequency) for tornado occurrences in the parish is 0.31 (31% annual probability) or approximately one tornado occurrence every three to four years. The following figure displays the tornado touchdowns occurring inside and outside of parish lines that have affected St. Bernard Parish since 1996.

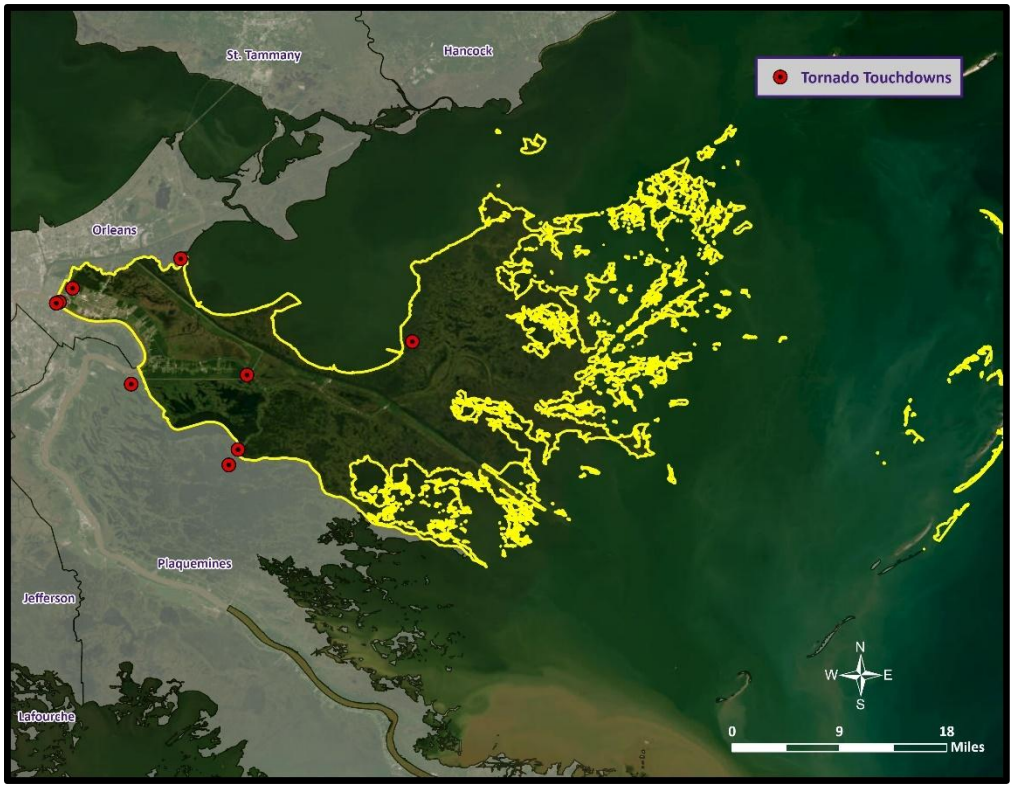

Figure 2-28: Tornado Touchdowns Impacting St. Bernard Parish
(Source: NOAA/SPC Severe Weather Database)

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.

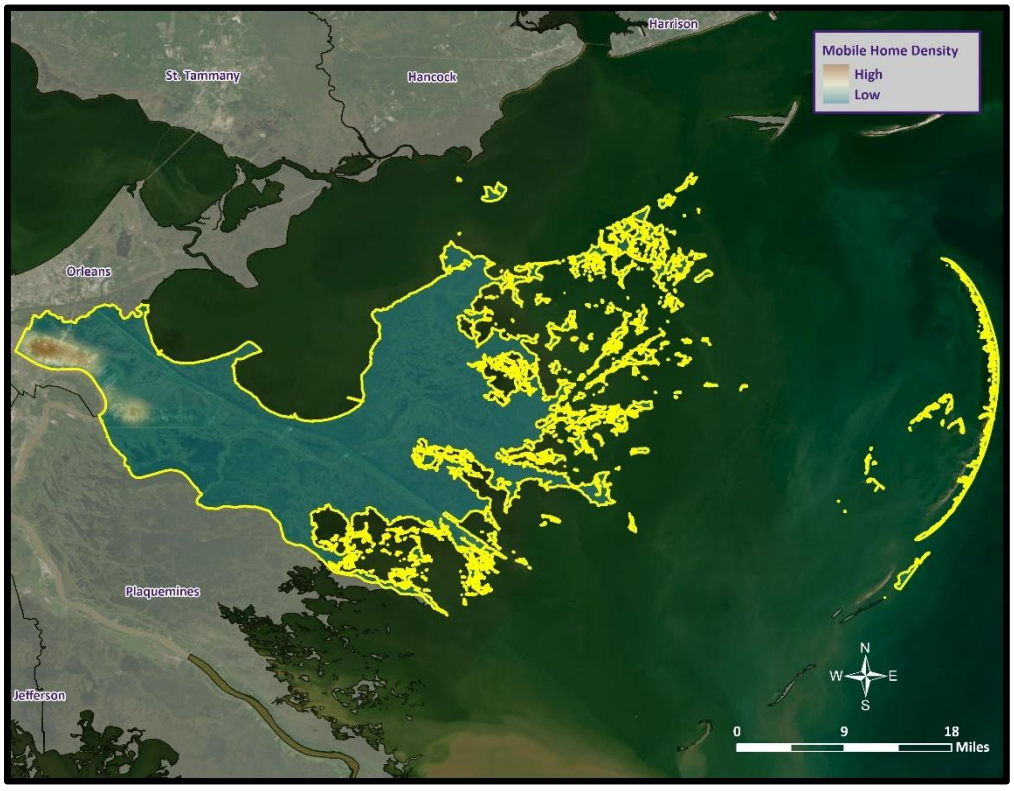

Figure 2-29: Mobile Home Density in St. Bernard Parish

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 2-50: National Risk Index (NRI) Summarization of Tornado Occurrences for St. Bernard 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 nine significant tornado occurrences per the NCEI Storm Events Database. The total property damage associated with these storms totaled approximately $80,245,000. 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 – 2024). This provides an annual estimated potential loss of $2,674,833 and $8,916,111 per event. The following table provides an estimate of potential property losses for the Parish:

Table 2-51: Estimated Annual Property Losses in St. Bernard Parish resulting from Tornado Damage.

Estimated Annual Potential Losses from Tornado Damage
St. Bernard Parish
$2,674,833

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

Table 2-52: Building Exposure by General Occupancy Type for Tornadoes in St. Bernard Parish. (Source: Hazus)

Building Exposure by General Occupancy Type for Tornadoes - Exposure Types ($1,000)							
Residential	Commercial	Industrial	Agricultural	Religion	Government	Education	Mobile Homes (%)
2,741,825	646,044	133,490	8,759	74,759	15,932	60,286	14.4%

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. Manufactured housing accounts for approximately 17.4% of all housing in St. Bernard Parish.

Vulnerability Score

Table 2-53: Vulnerability Score for Tornadoes in St. Bernard 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 cyclones 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.

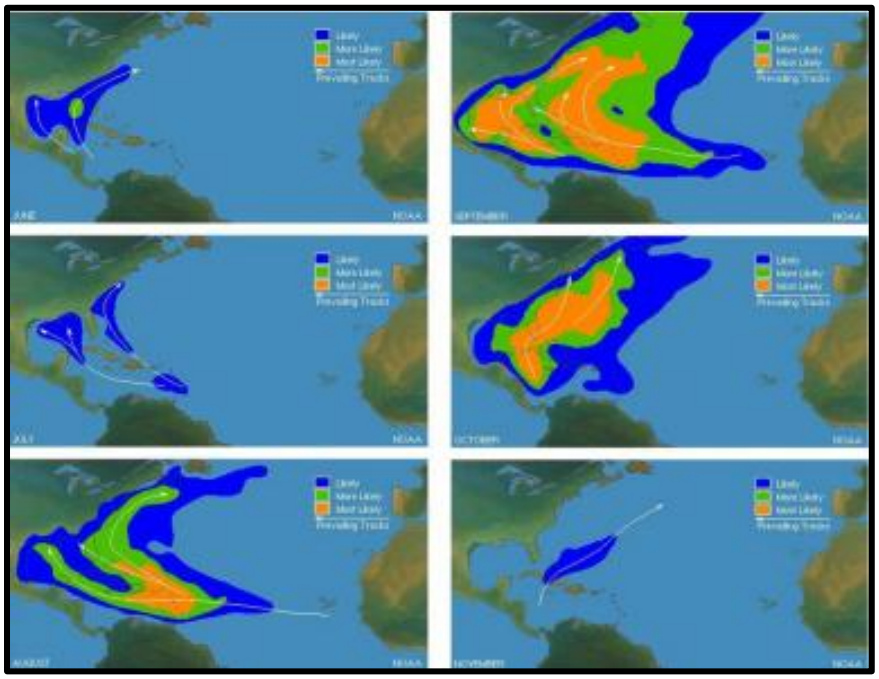

Figure 2-30: Areas of Likely Tropical Cyclone Formation and Tracking (Source: NOAA NHC)

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.

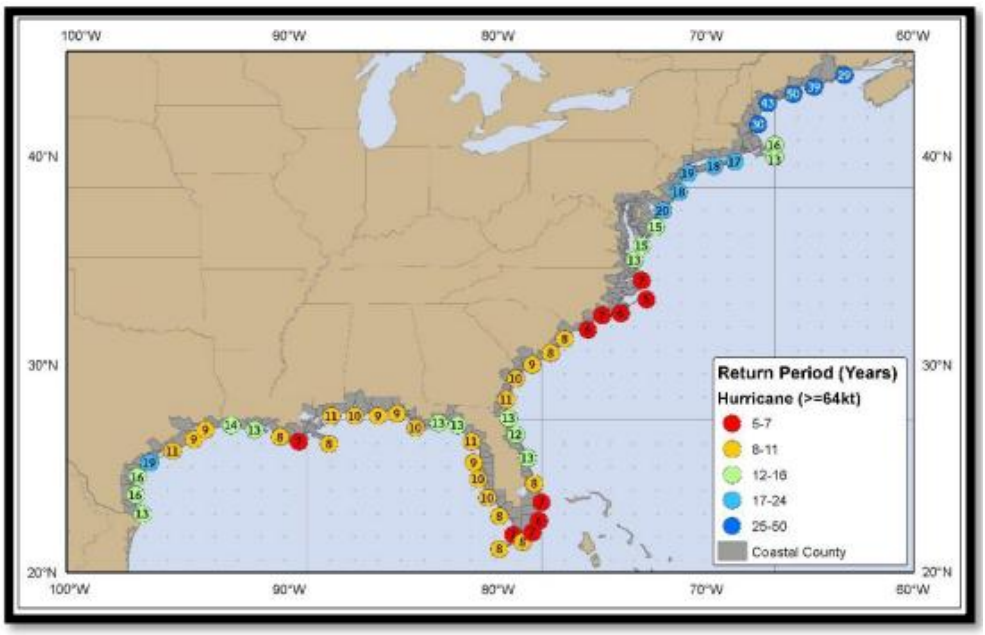

Figure 2-31: Hurricane Return Periods for the Atlantic Basin (USA) (Source: NOAA NHC)

Table 2-54: 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. 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

The parish experienced 24 tropical cyclone occurrences between the years 2002 and 2024. Since the last update, there have been five tropical cyclone occurrences within the boundaries of the parish.

Table 2-55: Historical Tropical Cyclone Occurrences in St. Bernard Parish since the Last Update.

Date	Magnitude	Name	Property Damage	Crop Damage	Fatalities	Injuries
10/9/2020	Tropical Storm	Delta	$50,000	$0	0	0
10/28/2020	Hurricane	Zeta	$25,000,000	$0	0	0
6/19/2021	Tropical Storm	Claudette	$0	$0	0	0
8/29/2021	Hurricane	Ida	$10,000,000	$0	0	0
9/11/2024	Hurricane	Francine	$3,000	$0	0	0

The following figure displays historical hurricanes that have impacted the parish in the past:

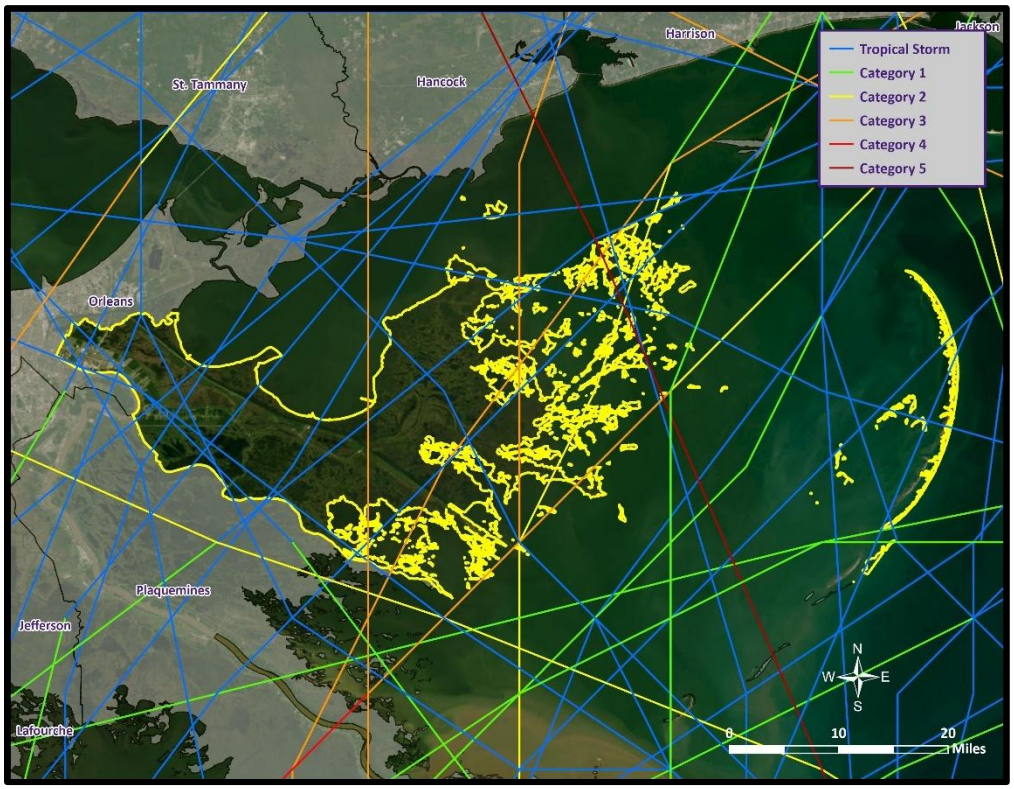

Figure 2-32: Historical Tropical Cyclones Impacting St. Bernard Parish.

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.

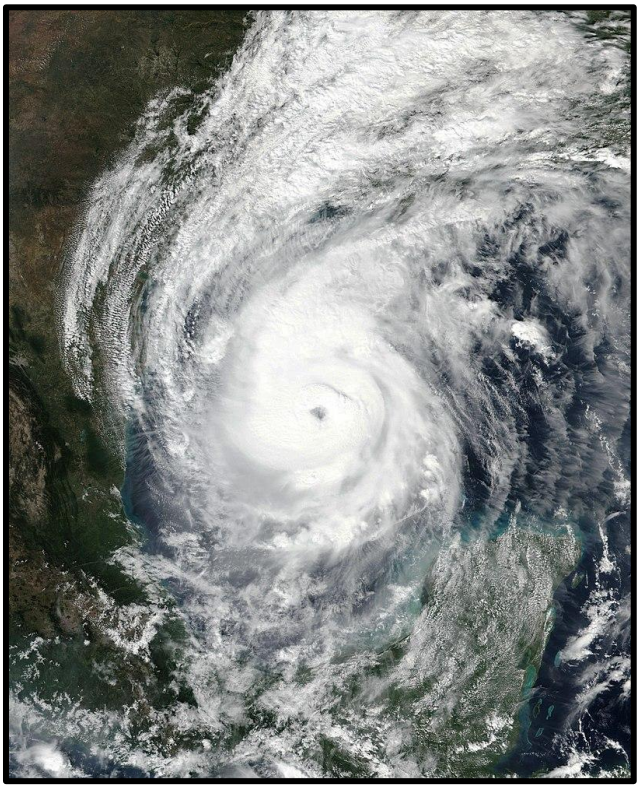

Figure 2-33: Hurricane Delta in the Gulf Coast Area. (Source: NOAA)

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. Bernard Parish, Delta produced occasional tropical storm force wind gusts across the parish. The Belle Chasse ASOS reported a peak gust of 46 mph.

Hurricane 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.

Zeta produced widespread wind damage throughout the parish with trees, power lines and power poles snapping in the wind. Several trees fell on homes and cars. A Weatherflow station near the border of St. Bernard and Orleans parishes on Bayou Bienvenue recorded a maximum sustained wind of 87 mph with peak gust of 112 mph. It should be noted that at 27.4m, the station is elevated higher than the standard observation height of 10m. At the peak, over 90 percent of the parish was without power. Several homes suffered significant roof damage with some losing portions of the roofing structure. Numerous trucks, trailers and boats were flipped along LA HWY 46 where they were parked to avoid storm surge flooding.

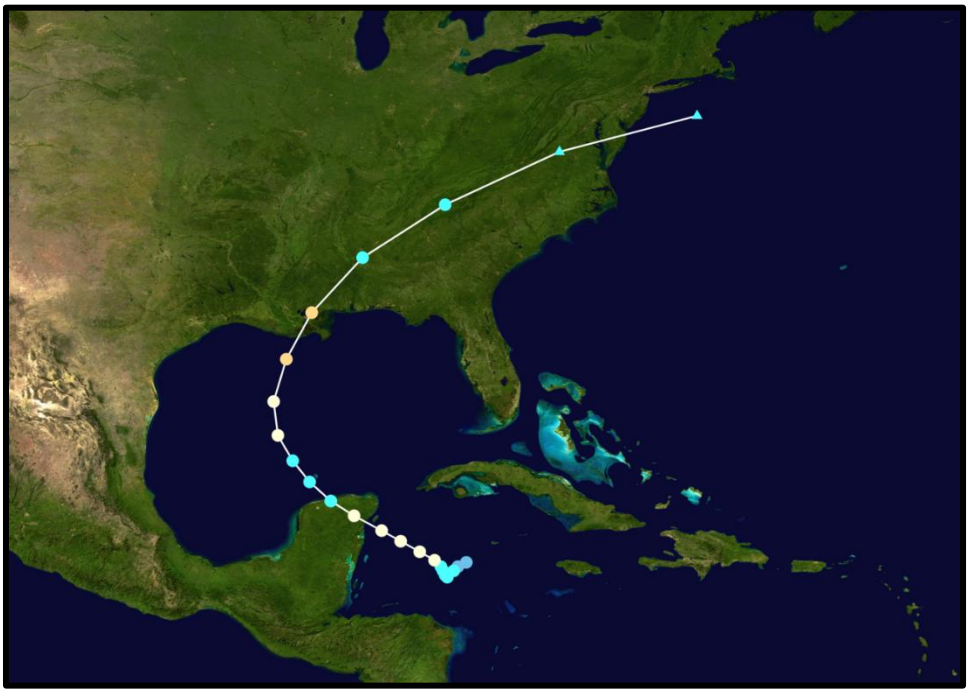

Figure 2-34: Hurricane Zeta Path in the Gulf Coast Area.
(Source: NOAA)

Tropical Storm Claudette (2021)

On June 11th, the National Hurricane Center began monitoring a tropical disturbance in the Bay of Campeche. For the next several days, it meandered, gradually forming a broad and elongated area of low pressure. By 4 PM CDT on June 17th, the National Hurricane Center started issuing advisories on Potential Tropical Cyclone Three. The disturbance produced tropical storm force winds but was not named yet since it lacked a defined low level circulation. By 7 PM CDT June 18th, the National Hurricane Center post storm analysis revealed enough of a closed circulation to be designated a tropical storm. Tropical Storm Claudette made landfall a few hours later across Terrebonne Parish, Louisiana at 11:30 PM CDT.

Claudette continued northeast across Southeast Louisiana and Southern Mississippi before weakening to a tropical depression upon entering Alabama by the evening of June 19th. Tropical Depression Claudette continued east northeast across the remainder of Alabama, Georgia, South Carolina through June 20th. Claudette began strengthening across it passage through North Carolina, and strengthened back to a tropical storm across Eastern North Carolina early on June 21st, a rather rare occurrence after being inland for a few days. Claudette exited the North Carolina and Virginia coastal waters later that morning, heading out to sea.

All of the effects of Claudette were felt east of the Atchafalaya River across Southeastern Louisiana, Mississippi, Alabama, Georgia and the Carolinas. No reports of tropical storm force winds, coastal flooding, or even significant rainfall were reported across South Central Louisiana or adjacent coastal waters. In St. Bernard Parish, a few tropical storm force gusts were measured across the parish, but no significant impacts were reported.

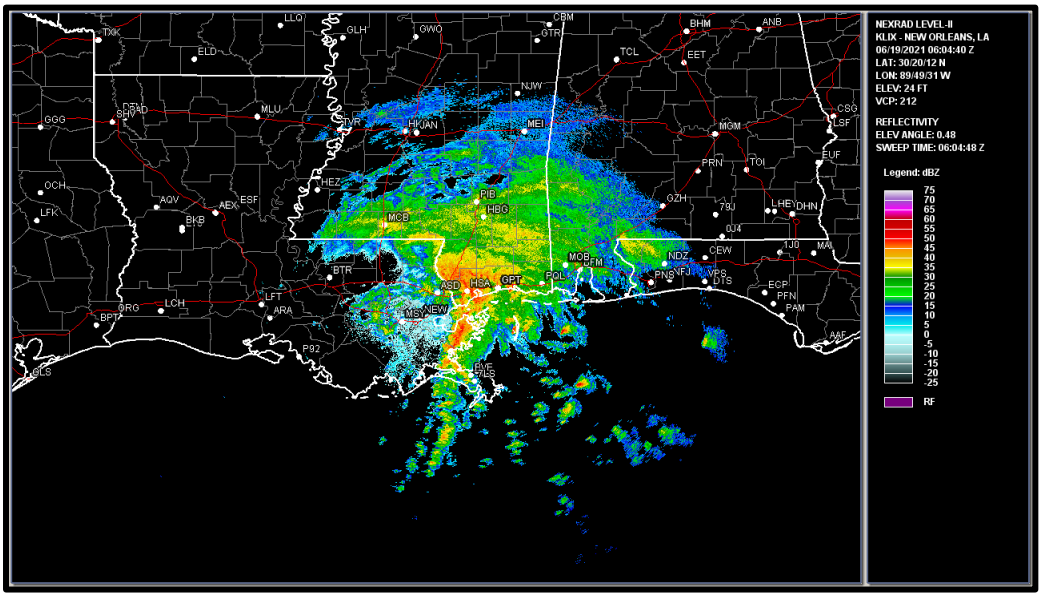

Figure 2-35: Tropical Storm Claudette in the Gulf Coast Area.
(Source: NOAA)

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.

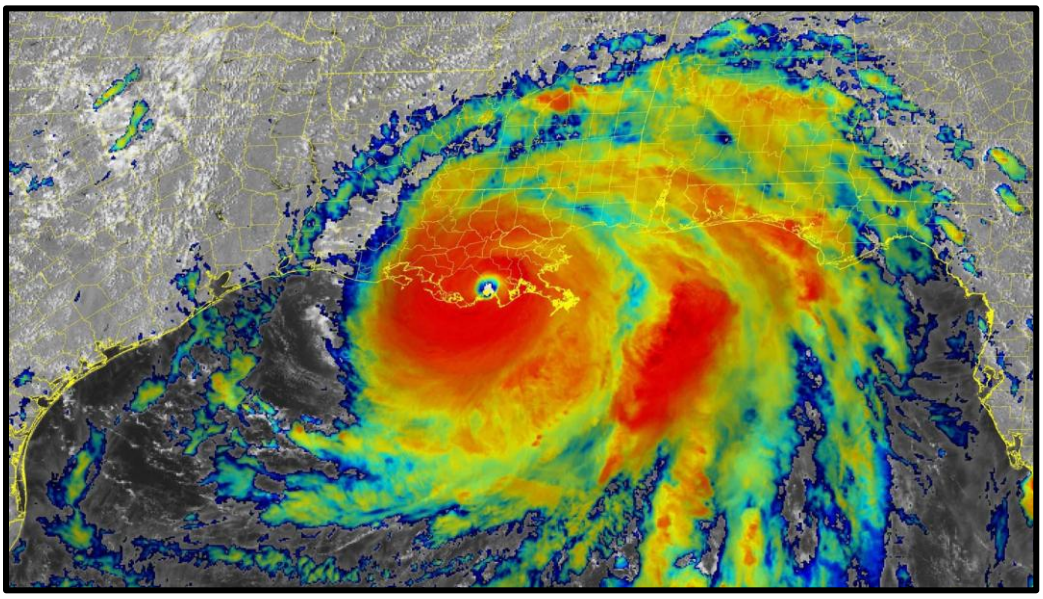

Figure 2-36: Hurricane Ida Rainbands in the Gulf Coast Area.
(Source: NOAA)

In St. Bernard Parish, Ida's winds caused widespread damage to trees, power lines and poles, and some structures as well. Most structural damage was minor to moderate, consisting of shingle damage, carport damage or other fascia damage. A few homes suffered more serious damage from falling trees. 100% of the parish was left without power due to a catastrophic failure of the electric system serving all of the metro New Orleans.

Hurricane Francine (2024)

Hurricane Francine was a significant tropical cyclone that impacted the Gulf Coast in September 2024. Originating from a tropical wave off the West Coast of Africa on August 28, 2024, the system traversed the tropical Atlantic Ocean, reaching the Leeward Islands by September 1. Despite initial unfavorable conditions, it intensified as it moved across the Caribbean Sea, becoming a tropical storm on September 9 and a Category 2 hurricane by September 11.

On September 11, 2024, Hurricane Francine made landfall in Terrebonne Parish, Louisiana, with sustained winds of 100 mph (155 km/h). The storm caused widespread power outages, leaving over 400,000 utility customers in Louisiana and Mississippi without electricity. Severe flooding occurred, particularly in New Orleans, where heavy rainfall led to flash floods and necessitated numerous water rescues. The storm also disrupted oil and natural gas production in the Gulf of Mexico, with approximately 42% of crude oil and 53% of natural gas output shut-in. After landfall, Francine weakened rapidly, transitioning to a tropical depression by September 12 and dissipating by September 14. The storm's rapid intensification, from a tropical storm to a Category 2 hurricane within 24 hours, was noted as a concerning trend linked to climate change.

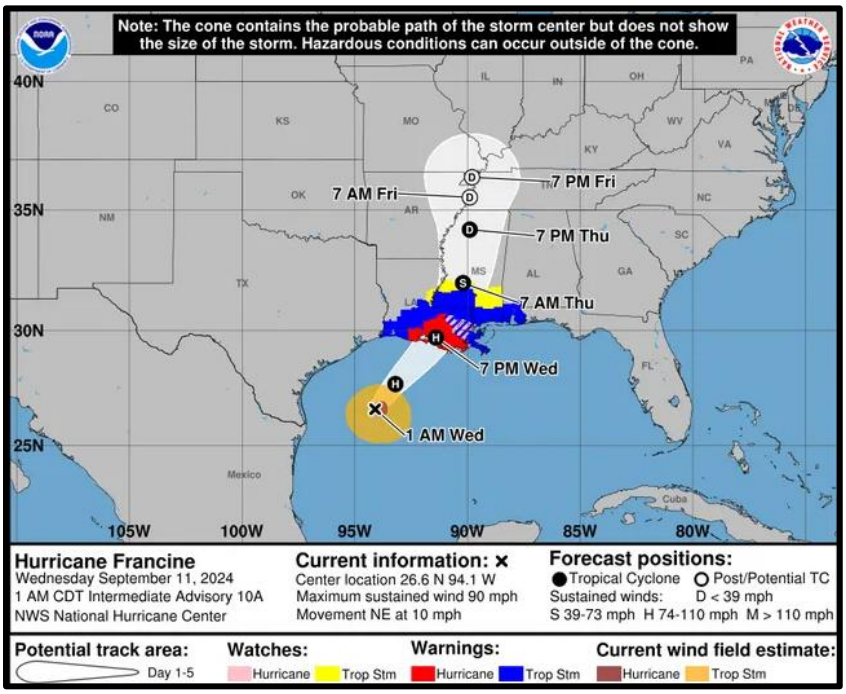

Figure 2-37: Hurricane Francine in the Gulf Coast Area. (Source: NOAA)

In St. Bernard Parish, Francine brought generally minor impacts to the parish. Strong wind gusts damaged a few power lines and poles, but no major damage was reported to any structures.

Probability

The annual return rate (frequency) for tropical cyclone occurrences in the parish is 1.04 (100% annual probability) or approximately one 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 2-56: 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	18,523	18,523	18,653	18,747
Value of Structures	$3,681,095,000	$3,681,095,000	$3,979,853,788.10	$4,207,986,381
# of People	44,783	44,783	46,147	47,388

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 2-57: National Risk Index (NRI) Summarization of Tropical Cyclone Occurrences for St. Bernard Parish
(Source: National Risk Index)

Expected Annual Losses	Overall Risk Rating
Relatively Moderate	Relatively Moderate

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 2-58: Total Estimated Losses for a 100-Year Hurricane Event (Source: Hazus)

Estimated Total Losses from a 100-Year Hurricane Event
St. Bernard 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 2-59: Ratio of Total Losses to Total Estimated Value of Assets for St. Bernard Parish. (Source: Hazus)

Estimated Total Losses from 100-Year Hurricane Event	Total Estimated Value of Assets	Ratio of Estimated Losses to Total Value
$210,776,147	$3,681,095,000	5.7%

Based on the Hazus Hurricane Model, estimated total losses for the parish is 5.7% 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 2-60: Estimated Losses in Unincorporated Area of St. Bernard Parish for a 100-Year Hurricane Event (Source: Hazus)

St. Bernard Parish	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$650,410
Commercial	$3,919,870
Government	$690,777
Industrial	$5,651,799
Religious / Non-Profit	$2,501,099
Residential	$195,405,020
Schools	$1,957,172
Total	**$210,776,147**

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

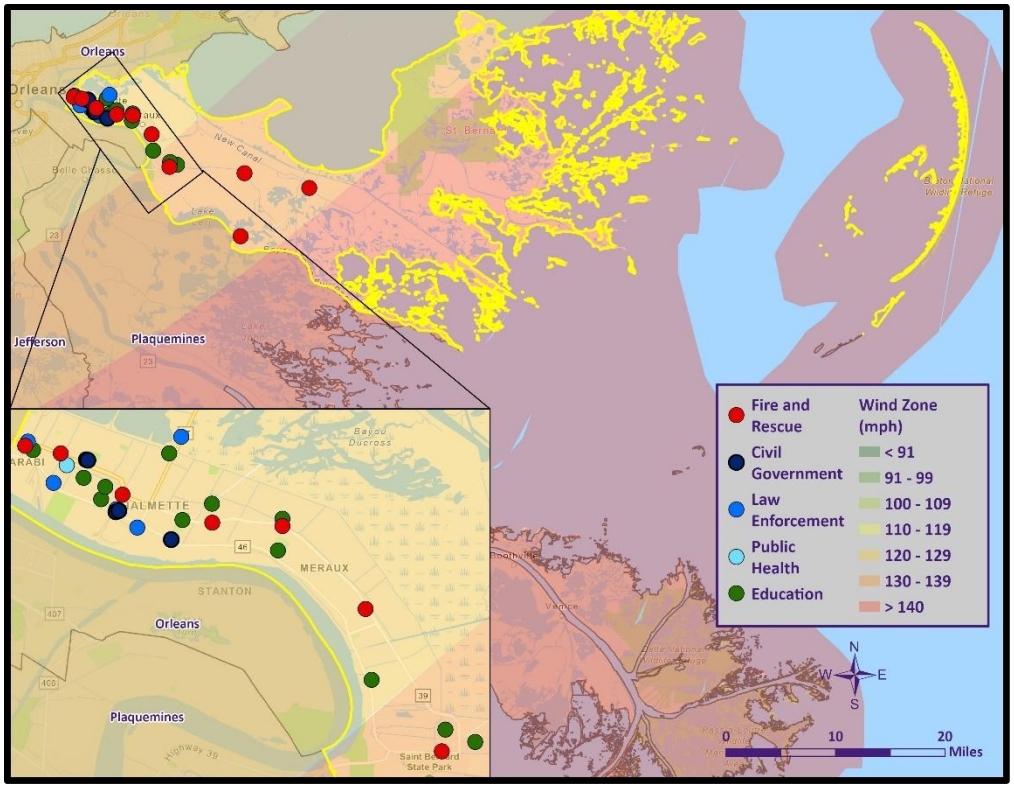

Figure 2-38: Winds Zones for St. Bernard Parish in Relation to Critical Facilities

Vulnerable Population

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

Table 2-61: Number of People Susceptible to a 100-Year Hurricane Event in St. Bernard Parish (Source: Hazus)

Number of People Exposed to Hurricane Hazards		
# in Community	**# in Hazard Area**	**% in Hazard Area**
44,783	44,783	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 table on the following page.

Table 2-62: Vulnerable Populations in St. Bernard Parish for a 100-Year Hurricane Event (Source: Hazus)

St. Bernard Parish		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	44,783	100.0%
Persons Under 5 Years	3,526	7.9%
Persons Under 18 Years	7,839	17.6%
Persons 65 Years and Over	4,073	9.2%
White	32,920	74.0%
Minority	11,543	26.0%

Vulnerability Score

Table 2-63: Vulnerability Score for Tropical Cyclones in St. Bernard Parish.

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

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3. Capability Assessment

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

Through this assessment, St. Bernard Parish are able to identify strengths that could be used to reduce losses and reduce risk throughout the communities. It also identifies areas where mitigation actions might be used to supplement current capabilities and create a more resilient community before, during, and after a hazard event.

Policies, Plans and Programs

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

Table 3-1: Planning and Regulatory Capabilities

Capability Assessment Worksheet - St. Bernard Parish 2025		
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	Community Dev, annually
Capital Improvements Plan	Yes	
Economic Development Plan	Yes	Econ Dev commission, annually
Local Emergency Operations Plan	Yes	2025 - OHSEP, annually
Continuity of Operations Plan	Yes	2025 - OHSEP, annually
Transportation Plan	Yes	2025 - OHSEP, annually
Stormwater Management Plan	Yes	Master Drainage Plan - 2019
Community Wildfire Protection Plan	No	
Other plans (redevelopment, recovery, coastal zone management)	Yes	Redevelopment - comm development, annually; Recovery - recovery dept and OHSEP, annually; Coastal - coastal zone manager in comm dev, annually
Building Code, Permitting and Inspections	**Yes / No**	**Comments**
Building Code	Yes	2021 ICC
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	Application submitted
Fire Department ISO/PIAL rating	Yes	
Site plan review requirements	Yes	Commuity Development
Land Use Planning and Ordinances	**Yes / No**	**Comments**
Zoning Ordinance	Yes	Commuity Development
Subdivision Ordinance	Yes	Commuity Development
Floodplain Ordinance	Yes	Commuity Development
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	Yes	Commuity Development
Flood Insurance Rate Maps	Yes	Commuity Development
Acquisition of land for open space and public recreation uses	Yes	Commuity Development
Other	No	Commuity Development

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

Building Codes, Permitting, Land Use Planning and Ordinances

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

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

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

While local capabilities for mitigation can vary from community to community, the communities within the St. Bernard Parish planning area as a whole have a system in place to coordinate and share these capabilities through the OHSEP and through this Parish Hazard Mitigation Plan.

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

Administration, Technical, and Financial

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

Table 3-2: Administration and Technical Capabilities

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

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

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

Table 3-3: Financial Capabilities

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

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. Bernard 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		
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	LEPC
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	Yes	LEPC
Natural Disaster or safety related school program	No	
Storm Ready certification	Yes	2022
Firewise Communities certification	No	
Public/Private partnership initiatives addressing disaster-related issues	Yes	
Other	No	

As reflected with the above existing regulatory mechanisms, programs and resources within the parish, the communities within the St. Bernard Parish planning area remain committed to expanding and improving on the existing capabilities within the parish. Communities will work together along with St. Bernard Parish toward increased participation in funding opportunities and available mitigation programs. Should funding become available, the hiring of additional personnel to dedicate to hazard mitigation initiatives and programs, as well as increasing ordinances within the parish, will enhance and expand overall risk reduction for the entirety of St. Bernard Parish.

Flood Insurance and Community Rating System

Participation in the CRS strengthens local capabilities by lowering flood insurance premiums for communities that exceed NFIP minimum requirements. As noted in the CRS Eligible Communities List effective October 1, 2024, St. Bernard parish does not participate in the CRS Program.

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

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

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

CLASS	DISCOUNT	CLASS	DISCOUNT
1	45%	6	20%
2	40%	7	15%
3	35%	8	10%
4	30%	9	5%
5	25%	10	–
SFHA (Zones A, AE, A1–A30, V, V1–V30, AO, and AH): Discount varies depending on class.			
SFHA (Zones A99, AR, AR/A, AR/AE, AR/A1–A30, AR/AH, and AR/AO): 10% discount for Classes 1–6; 5% discount for Classes 7–9.*			
Non-SFHA (Zones B, C, X, D): 10% discount for Classes 1–6; 5% discount for Classes 7–9.			

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

As of April 2025, 318 communities in the State of Louisiana participate in the Federal Emergency Management Agency's National Flood Insurance Program (NFIP). Of these communities, 47 (or 13%) participate in the Community Rating System (CRS). Jefferson Parish, the City of Gretna in Jefferson Parish, and the City of Mandeville in St. Tammany Parish lead the state with a rating of Class 5, followed by the Cities of Kenner in Jefferson Parish, the City of Slidell in St. Tammany Parish, and East Baton Rouge Parish with a Class 6 Rating. Of the top fifty Louisiana communities, in terms of total flood insurance policies held by residents, 29 participate in the CRS. The remaining 21 communities present an outreach opportunity for encouraging participation in the CRS.

The CRS provides an incentive not just to start new mitigation programs, but to keep them going. There are two requirements that "encourage" a community to implement flood mitigation activities. Once the parish has obtained a CRS rating and is a participant, the parish will receive CRS credit for this plan when it is adopted. To retain that credit, though, the parish must submit an evaluation report on progress toward implementing this plan to FEMA by October 1 of each year. That report must be made available to the media and the public. Second, the parish must annually recertify to FEMA that it is continuing to implement its CRS credited activities. Failure to maintain the same level of involvement in flood protection can result in a loss of CRS credit points and a resulting increase in flood insurance rates for residents.

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

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

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

In addition to the direct financial reward for participating in the Community Rating System, there are many other reasons to participate in the CRS. As FEMA staff often say, "If you are only interested in saving premium dollars, you're in the CRS for the wrong reason."

The other benefits that are more difficult to measure in dollars include:

1. The activities credited by the CRS provide direct benefits to residents, including:
   - Enhanced public safety
   - A reduction in damage to property and public infrastructure
   - Avoidance of economic disruption and losses
   - Reduction of human suffering
   - Protection of the environment

2. A community's flood programs will be better organized and more formal. Ad hoc activities, such as responding to drainage complaints rather than an inspection program, will be conducted on a sounder, more equitable basis.

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

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

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

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

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

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

NFIP Worksheets

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

4. Mitigation Strategy

Introduction

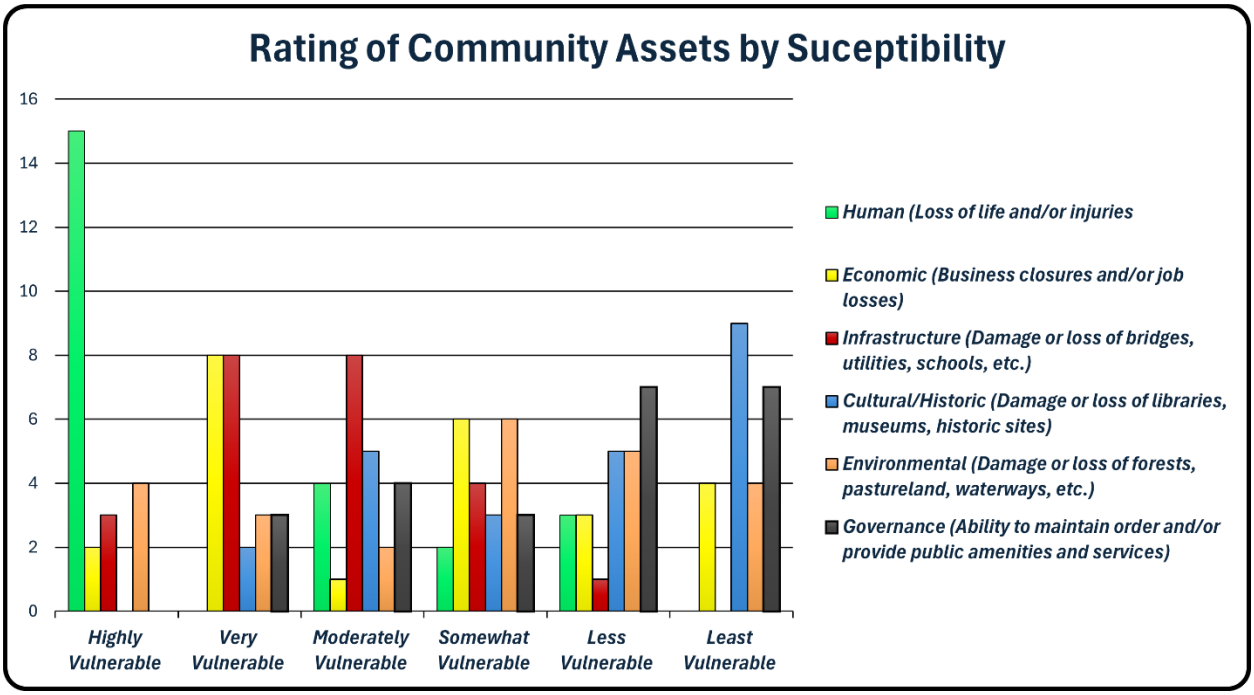
The Hazard Mitigation Strategy for St. Bernard Parish has a common guiding principle and is the demonstration of the parish's commitment to reduce risks from hazards. The strategy also serves as a guide for parish and local decision makers as they commit resources to reducing the effects of hazards.

Officials from the parish confirmed the goals, objectives, actions and projects over the period of the hazard mitigation plan update process. The mitigation actions and projects in this 2025 HMP update are a product of analysis and review of the St. Bernard Parish Hazard Mitigation Plan Planning Committee under the coordination of the St. Bernard Parish Office 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 February 2025 – April 2025.

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

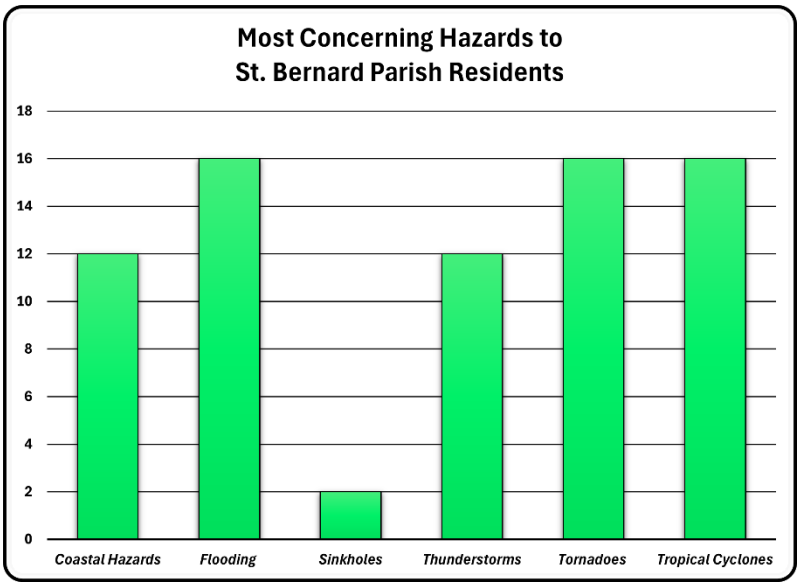
Survey respondents were asked to rank, in their opinion, which community assets were most susceptible to impacts caused by natural hazards. The categories included human, economic, infrastructure, cultural/historic, environmental, and governance. Based on these choices, respondents were asked to rank 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. Human (Loss of life and/or injuries)
2. Infrastructure (Damage or loss of bridges, utilities, schools, etc.)
3. Economic (Business closures and/or job losses)

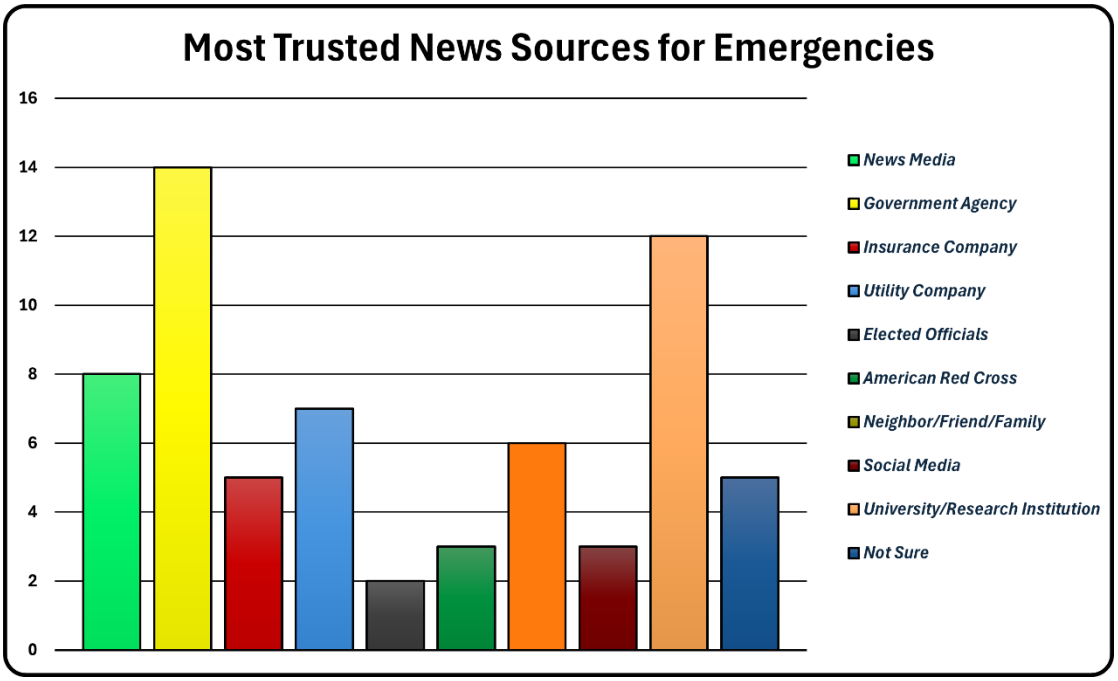


The survey results also indicated which natural disasters citizens were *most concerned* with being affected by in St. Bernard Parish. The top three natural disasters selected were:

1. Tropical Cyclones
2. Flooding/Tornadoes
3. Thunderstorms



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. Bernard Parish most trust government agencies 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. Bernard 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_9QCyzhJGx7X02CG

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

The goals are as follows:

1. Identify and pursue preventative measures that will reduce future damages from hazards
2. Enhance public awareness and understanding of disaster preparedness
3. Reduce repetitive flood losses in the parish
4. Facilitate sound development and rebuilding in the parish so as to reduce or eliminate the potential impacts of hazards

The Mitigation Action Plan focuses on actions to be taken by St. Bernard Parish and its communities. All of the activities in the Mitigation Action Plan will be focused on helping the parish and its communities in developing and funding projects that are not only cost effective but also meet the other DMA 2000 criteria of environmental compatibility and technical feasibility.

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

2025 Mitigation Actions and Update on Previous Plan Actions

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

As outlined in the Local Mitigation Planning Handbook the following are eligible types of mitigation actions:

- **Local Plans and Regulations –** These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.
- **Structure and Infrastructure Projects –** These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area, and also includes projects to construct manmade structures to reduce the impact of hazards.
- **Natural System Protection –** These actions minimize the damage and losses and also preserve or restore the functions of natural systems.
- **Education and Awareness Programs –** These actions inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them.

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

St. Bernard Parish Mitigation Actions

Previous Action Update

St Bernard Parish 2025 Mitigation Action Sheet						
St. Bernard Parish Specific Action Items	**Action Description**	**Funding Source**	**Timeframe**	**Responsible Party, Agency, or Department**	**Hazard**	**Status**
SB1: Building Retrofits	Retrofit public buildings exterior shell to maintain use during and after storm events. Benefits: Reduces damage from high winds, and helps assure that the public buildings can be used, occupied and operable during or after storms.	HGMP, Local	1-5 years	St. Bernard Parish OHSEP/Department of Public Works.	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones	Not Started - Carried Over (See St. Bernard Parish Mitigation Action 1)
SB2: Drainage Improvements	Will relieve flooding problems, reduce flood damage and costs of damage, overtopping of roads with drain water, while also keeping roadways open during periods of high precipitation. Benefits: Relieves Parish or local government and property owners of the continual problems, with closed roadways (loss of function). Saves public funds for road repairs, drainage ditch repairs, sandbagging and blocking of roadways during storm periods.	HGMP, FMA, Local	1-5 years	St. Bernard Parish OHSEP/Department of Public Works.	Flooding, Thunderstorms, Tropical Cyclones	Not Started - Carried Over (See St. Bernard Parish Mitigation Action 2)
SB3: Mitigation of repetitive loss and severe repetitive loss properties and other hazard prone structures	Elevation, acquisition-demolition, acquisition-relocations, and reconstruction of repetitive loss or flooding or other hazard prone properties.	HGMP, FMA, Local	1-5 years	St. Bernard Parish OHSEP/Community Development Director.	Flooding, Thunderstorms, Tropical Cyclones	Not Started - Carried Over (See St. Bernard Parish Mitigation Action 3)
SB4: Safe Room Projects	Construction of a safe room for first responders located in St. Bernard Parish. Other locations will be identified based on funding availability.	HGMP, Local	1-5 years	St. Bernard Parish OHSEP/Department of Public Works.	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones	Completed.

SB5: Education and Outreach	Enhance the public outreach programs for the parish and all communities by increasing awareness of risks and safety for Coastal Hazards, Flooding, Sinkholes, Thunderstorms, Tornadoes, Tropical Cyclones hazards as well as providing information on high risk areas. Informing communities, business and citizens on proper mitigation efforts and activities will create resiliency within the parish and its communities.	HGMP, FMA, Local	1-5 years	St. Bernard Parish OHSEP/Community Development Director.	Coastal Hazards, Flooding, Sinkholes, Thunderstorms Tornadoes, Tropical Cyclones	Not Started - Carried Over (See St. Bernard Parish Mitigation Action 4)
SB6: Generators for continuity of operations and government	Procurement and Installation of generators at public facilities to ensure continued operations during and after events.	HGMP, Local	1-5 years	St. Bernard Parish OHSEP/Department of Public Works.	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones	Not Started - Carried Over (See St. Bernard Parish Mitigation Action 5)
SB7: Lightning Mitigation	Procurement and Installation of Lightning rods and surge protectors for public buildings to preserve life and property	HGMP, Local	1-5 years	St. Bernard Parish OHSEP/Department of Public Works.	Thunderstorms	Not Started - Carried Over (See St. Bernard Parish Mitigation Action 6)
SB8: Warning Systems	Update/upgrade public warning system components throughout St. Bernard Parish as necessary. Install audible and/or reverse 911 warning system(s)	HGMP, Local	1-5 years	St. Bernard Parish OHSEP/Department of Public Works	Coastal Hazards, Flooding, Sinkholes, Thunderstorms, Tornadoes, Tropical Cyclones	Not Started - Carried Over (See St. Bernard Parish Mitigation Action 7)
SB9: Potable Water	Create redundancy of potable water supply to critical facilities, especially hospitals in Parish, and provide protection of potable water supply by acquisition/ installation of backflow preventers at appropriate critical locations.	HGMP, Local	1-5 years	St. Bernard Parish OHSEP/Department of Public Works.	Flooding, Sinkholes, Thunderstorms, Tropical Cyclones, Tornadoes	Not Started - Carried Over (See St. Bernard Parish Mitigation Action 8)
SB10: Promote Flood Insurance	Promote the purchase of flood insurance. Advertise the availability, cost, and coverage of flood insurance through the National Flood Insurance Program (NFIP).	HGMP, FMA, Local	1-5 years	St. Bernard Parish OHSEP/Community Development Director.	Flooding, Tropical Cyclones	Not Started - Carried Over (See St. Bernard Parish Mitigation Action 9)

SB11: Levee Failure Working Group	Create a working group in order to assess the extent and determine the possible effects of levee failure.	HGMP, FMA, Local	1-5 years	St. Bernard Parish Government/St. Bernard Parish OHSEP.	Flooding, Levee Failure	Deleted - Hazard not profiled
SB12: Harden/ Retrofit new and existing Public Buildings	Emergency generators; back-up communications systems; storm shutters; roof tie-downs and additional storm protection features.	Parish Budget, Grant funds (HMGP, PDM, FMA)	1-5 Years	St. Bernard Parish OHSEP/Department of Public Works.	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones	Deleted: Duplicate of SB1 Action
SB13: Harden/ Retrofit new and existing critical infrastructure	Emergency generators; back-up communications systems; storm shutters; roof tiedowns and additional storm protection features.	Parish Budget, Grant funds (HMGP, PDM, FMA)	1-5 Years	St. Bernard Parish OHSEP/Department of Public Works.	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones	Deleted: Duplicate of SB1 Action
SB14: Floodproof existing and new Public Buildings.	Create a more disaster resistant structure, which will prevent interruption of services in times of emergencies. Reduce the losses due to flooding.	Parish Budget, Grant funds (HMGP, PDM, FMA)	1-5 Years	St. Bernard Parish OHSEP/Department of Public Works.	Flooding, Tropical Cyclones	Deleted: Duplicate of SB1 Action
SB15: Floodproof existing and new critical infrastructure	Provide berms/ floodwalls to protect existing and new critical infrastructure and to create a more disaster resistant structure, which will prevent interruption of services in times of emergencies. Reduce the losses due to flooding.	Parish Budget, Grant funds (HMGP, PDM, FMA)	1-5 Years	St. Bernard Parish OHSEP/Department of Public Works.	Flooding, Tropical Cyclones	Deleted: Duplicate of SB1 Action
SB16: Drainage upgrade projects	Widen the canals; stabilize the canal banks to reduce the street flooding and the number of flooded structures by increasing the volume of water pumped out by the drainage pumps. Upgrade the drainage pump stations: elevate the pump station building, generator, control panel, transformers etc.	Parish Budget, Grant funds (HMGP, PDM, FMA)	1-5 Years	St. Bernard Parish OHSEP/Department of Public Works.	Flooding, Thunderstorms, Tropical Cyclones	Deleted: Duplicate of SB2 Action
SB17: Saltwater intrusion prevention	Install screw gates for crossings under LA 624 to prevent saltwater intrusion into Hopedale Basin	Grant funds (HMGP, PDM)	1-5 Years	St. Bernard Parish OHSEP/Department of Public Works.	Coastal Hazards	Not Started - Carried Over (See St. Bernard Parish Mitigation Action 10)

SB18: Participate and pursue projects to result in increased CRS scores and protect homeowners.	Promote the purchase of flood insurance. Conduct fairs and open houses to advertise the NFIP. Maintain a library of flood insurance maps for public review. Benefits: Enables homeowners to financially recover from the devastating effects of flooding as rapidly as possible. Improves CRS score and lower the flood insurance premiums. Implement programs for participation in the CRS program to decrease the flood insurance premiums in the parish.	Parish funding	N/A	St. Bernard Parish OHSEP/Community Development Director.	Flooding, Tropical Cyclones	Not Started - Carried Over (See St. Bernard Parish Mitigation Action 11)
SB19: Pursue elevation projects for repetitive loss structures.	Benefits: Losses due to flooding are reduced considerably as the repetitive loss structures account for majority of the NFIP payments.	Grant funds (HMGP, PDM, FMA, SRL)	1-5 Years	St. Bernard Parish OHSEP/Community Development Director.	Flooding, Tropical Cyclones	Deleted: Duplicate of SB3 Action
SB20: Pursue acquisition projects for repetitive loss structures.	Benefits: Losses due to flooding is reduced considerably as the repetitive loss structures account for majority of the NFIP payments.	Grant funds (HMGP, PDM, FMA, SRL)	1-5 Years	St. Bernard Parish OHSEP/Community Development Director.	Flooding, Tropical Cyclones	Deleted: Duplicate of SB3 Action
SB21: Hazard Mitigation Outreach and Education	Conduct public education and outreach programs. Distribute flyers and brochures regarding hazards, special hazard areas, and potential mitigation measures using public service announcements, local newspaper, utility bill inserts, phone books, and parish website. Benefits: An informed public is better able to respond and protect themselves in times of hazards.	Parish funding	1-5 Years	St. Bernard Parish OHSEP/Community Development Director.	Coastal Hazards, Flooding, Sinkholes, Thunderstorms Tornadoes, Tropical Cyclones	Deleted: Duplicate of SB5 Action
SB22: Generators and Communications Equipment for Essential Facilities	Purchase of generators and communications equipment for emergency response personnel and parish buildings so that day to day operations may continue during events to protect the life and safety of essential personnel and citizens	HMGP, FMA, Local	1-5 years	St. Bernard Parish OHSEP/Department of Public Works.	Coastal Hazards, Flooding, Sinkholes, Thunderstorms Tornadoes, Tropical Cyclones	Deleted: Duplicate of SB6 Action

SB23: Education and Outreach for NFIP	Continue to promote the purchase of flood insurance. Advertise the availability, cost, and coverage of flood insurance through the NFIP. This enables homeowners to financially recover from the devastating effects of flooding as rapidly as possible. Serves to educate area residents that any homeowner, regardless of location, can purchase flood insurance.	HMGP, FMA, Local	1-5 years	St. Bernard Parish OHSEP/Community Development Director.	Coastal Hazards, Flooding, Sinkholes, Thunderstorms Tornadoes, Tropical Cyclones	Deleted: Duplicate of SB5 Action
SB24: Flood Proofing of Critical Facilities	Flood-proof critical structures within the parish unincorporated areas to help promote continuation of critical services during a storm event	HMGP, FMA, Local	1-5 years	St. Bernard Parish OHSEP/Department of Public Works.	Flooding, Tropical Cyclones	Deleted: Duplicate of SB1 Action
SB25: Enhanced Public Awareness Campaigns for All-Hazards	Increase public awareness of hazards and hazardous areas. Actions may include distribution of public awareness information regarding all hazards and potential mitigation measures; implementation of educational program for children and merchants; providing public education on the importance of maintaining the ditches, promotion of the purchase of flood insurance for public. Sponsor a "Multi-Hazard Awareness Week", to educate the public on all hazards. Utilize social media for mass message distribution.	HMGP, FMA, Local	1-5 years	St. Bernard Parish OHSEP/Community Development Director.	Coastal Hazards, Flooding, Sinkholes, Thunderstorms Tornadoes, Tropical Cyclones	Deleted: Duplicate of SB5 Action
SB26: Coastline Restoration Projects	Identify and implement coastline preservation and restoration projects that continue to protect the parish coastline from coastal hazards.	HMGP, FMA, Local	1-5 years	St. Bernard Parish OHSEP/Coastal Department.	Coastal Hazards, Flooding, Tropical Cyclones	Not Started - Carried Over (See St. Bernard Parish Mitigation Action 12)
SB27: Elevate or acquire all RL and SRL structures in St Bernard Parish in flood zones	Elevations parish wide of RL & SRL structures	HMGP, FMA, Local	1-5 years	St. Bernard Parish OHSEP/Department of Public Works.	Flooding, Tropical Cyclones	Deleted: Duplicate of SB3 Action

SB28: Building Retrofits of critical facilities	Retrofit of identified critical facilities throughout parish. Reduces damage from high winds, and helps assure that the public buildings can be used, occupied and operable during or after storms.	HMGP, FMA, Local	1-5 years	St. Bernard Parish OHSEP/Department of Public Works.	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones	Deleted: Duplicate of SB1 Action
SB29: Properties at Risk Study	Conduct and complete a study to determine the effects of risks to parish properties and implement a campaign to alert affected citizens of magnitude potential and provide mitigation suggestions. Identify, develop and implement available technologies.	HMGP, FMA, Local	1-5 years	St. Bernard Parish OHSEP Community Development Director.	Coastal Hazards, Flooding, Sinkholes, Thunderstorms, Tornadoes, Tropical Cyclones	Not Started - Carried Over (See St. Bernard Parish Mitigation Action 13)
SB30: Lake Borgne Marsh Creation - Increment 1	This project will create approximately 2,769 acres of marsh along approximately four miles of the southern rim of Lake Borgne in St. Bernard Parish (extending from Shell Beach to Lena Lagoon) using sediment dredged from Lake Borgne.	CPRA, HMGP, FMA, Local	1-5 years	St. Bernard Parish OHSEP, St. Bernard Parish Coastal Department	Coastal Hazards, Flooding, Tropical Cyclones	**New Action**

New Mitigation Actions

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. BERNARD PARISH	
	DESCRIPTION
ST. BERNARD PARISH MITIGATION ACTION 1	Building Retrofits
LEAD AGENCY	St. Bernard Parish Government
SUPPORTING AGENCIES	St. Bernard Parish OHSEP, Department of Public Works
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, Local
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards 3. Reduce repetitive flood losses in the parish 4. Facilitate sound development and rebuilding in the parish so as to reduce or eliminate the potential impacts of hazards
PRIORITY	Medium
Action Description	Retrofit public buildings exterior shell to maintain use during and after storm events.
Type of Mitigation Action	Structure and Infrastructure Projects
How Action Aligns with Risk Reduction	Reduces damage from high winds, and helps assure that the public buildings can be used, occupied and operable during or after storms.
Current Status of Action	Not Started – Carried Over from 2020 Plan
Hazard Addressed	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. BERNARD PARISH	
	DESCRIPTION
ST. BERNARD PARISH MITIGATION ACTION 2	Drainage Improvements
LEAD AGENCY	St. Bernard Parish Government
SUPPORTING AGENCIES	St. Bernard Parish OHSEP, Department of Public Works
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, FMA, Local
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards 3. Reduce repetitive flood losses in the parish 4. Facilitate sound development and rebuilding in the parish so as to reduce or eliminate the potential impacts of hazards
PRIORITY	High
Action Description	Will relieve flooding problems, reduce flood damage and costs of damage, overtopping of roads with drain water, while also keeping open roadways during periods of high precipitation.
Type of Mitigation Action	Structure and Infrastructure Projects
How Action Aligns with Risk Reduction	Relieves Parish or local government and property owners of the continual problems, with closed roadways (loss of function). Saves public funds for road repairs, drainage ditch repairs, sandbagging and blocking of roadways during storm periods.
Current Status of Action	Not Started – Carried Over from 2020 Plan
Hazard Addressed	Flooding, Thunderstorms, Tropical Cyclones

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. BERNARD PARISH	
	DESCRIPTION
ST. BERNARD PARISH MITIGATION ACTION 3	Mitigation for repetitive loss and severe repetitive loss properties
LEAD AGENCY	St. Bernard Parish Government
SUPPORTING AGENCIES	St. Bernard Parish OHSEP, Community Development Director
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, FMA, Local
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards 3. Reduce repetitive flood losses in the parish 4. Facilitate sound development and rebuilding in the parish so as to reduce or eliminate the potential impacts of hazards
PRIORITY	High
Action Description	Elevation, acquisition-demolition, acquisition-relocations, and reconstruction of repetitive loss or flooding or other hazard prone properties.
Type of Mitigation Action	Structure and Infrastructure Projects
How Action Aligns with Risk Reduction	Mitigating against RL and SRL will reduce the risk to property loss across the community and also reduce the amount of claims/payouts made to the area.
Current Status of Action	Not Started – Carried Over from 2020 Plan
Hazard Addressed	Flooding, Thunderstorms, Tropical Cyclones

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. BERNARD PARISH	
	DESCRIPTION
ST. BERNARD PARISH MITIGATION ACTION 4	Education and Outreach
LEAD AGENCY	St. Bernard Parish Government
SUPPORTING AGENCIES	St. Bernard Parish OHSEP, Community Development Director
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, Local
ASSOCIATED GOALS	2. Enhance public awareness and understanding of disaster preparedness
PRIORITY	Low
Action Description	Enhance the public outreach programs for the parish and all communities by increasing awareness of risks and safety for Coastal Hazards, Flooding, Sinkholes, Thunderstorms, Tornadoes, Tropical Cyclones, hazards as well as providing information on high risk areas
Type of Mitigation Action	Education and Awareness Programs
How Action Aligns with Risk Reduction	Informing communities, business and citizens on proper mitigation efforts and activities will create resiliency within the parish and its communities.
Current Status of Action	Not Started – Carried Over from 2020 Plan
Hazard Addressed	Coastal Hazards, Flooding, Sinkholes, Thunderstorms, Tornadoes, Tropical Cyclones

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. BERNARD PARISH	
	DESCRIPTION
ST. BERNARD PARISH MITIGATION ACTION 5	Generator for continuity of operations and government
LEAD AGENCY	St. Bernard Parish Government
SUPPORTING AGENCIES	St. Bernard Parish OHSEP, Department of Public Works
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, Local
ASSOCIATED GOALS	4. Facilitate sound development and rebuilding in the parish so as to reduce or eliminate the potential impacts of hazards
PRIORITY	Medium
Action Description	Procurement and Installation of generators at public facilities to ensure continued operations during and after events.
Type of Mitigation Action	Structure and Infrastructure Projects
How Action Aligns with Risk Reduction	Acquisition of generators will ensure for the function of day to day operations remain unchanged in the event of a power outage
Current Status of Action	Not Started – Carried Over from 2020 Plan
Hazard Addressed	Flooding, Thunderstorms, Tornadoes, Tropical Cyclones

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. BERNARD PARISH	
	DESCRIPTION
ST. BERNARD PARISH MITIGATION ACTION 6	Lightning Mitigation
LEAD AGENCY	St. Bernard Parish Government
SUPPORTING AGENCIES	St. Bernard Parish OHSEP, Department of Public Works
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, Local
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards 4. Facilitate sound development and rebuilding in the parish so as to reduce or eliminate the potential impacts of hazards
PRIORITY	Medium
Action Description	Procurement and Installation of Lightning rods and surge protectors for public buildings to preserve life and property
Type of Mitigation Action	Structure and Infrastructure Projects
How Action Aligns with Risk Reduction	Acquisition of lightning rods will help ensure no buildings are equipment are damaged at a facility during a lightning event
Current Status of Action	Not Started – Carried Over from 2020 Plan
Hazard Addressed	Thunderstorms

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. BERNARD PARISH	
	DESCRIPTION
ST. BERNARD PARISH MITIGATION ACTION 7	Warning Systems
LEAD AGENCY	St. Bernard Parish Government
SUPPORTING AGENCIES	St. Bernard Parish OHSEP
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, Local
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards 2. Enhance public awareness and understanding of disaster preparedness
PRIORITY	Medium
Action Description	Update/upgrade public warning system components throughout St. Bernard Parish as necessary. Install audible and/or reverse 911 warning system(s)
Type of Mitigation Action	Education and Awareness Programs, Structure and Infrastructure Projects
How Action Aligns with Risk Reduction	Warning systems allow the public to be aware of ongoing hazards and take appropriate actions to reduce the risk to loss of life/property
Current Status of Action	Not Started – Carried Over from 2020 Plan
Hazard Addressed	Coastal Hazards, Flooding, Sinkholes, Thunderstorms, Tornadoes, Tropical Cyclones

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. BERNARD PARISH	
	DESCRIPTION
ST. BERNARD PARISH MITIGATION ACTION 8	Potable Water
LEAD AGENCY	St. Bernard Parish Government
SUPPORTING AGENCIES	St. Bernard Parish OHSEP, Department of Public Works
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, FMA, Local
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards 4. Facilitate sound development and rebuilding in the parish so as to reduce or eliminate the potential impacts of hazards
PRIORITY	Medium
Action Description	Create redundancy of potable water supply to critical facilities, especially hospitals in Parish, and provide protection of potable water supply by acquisition/installation of backflow preventers at appropriate critical locations.
Type of Mitigation Action	Natural Resource Protection
How Action Aligns with Risk Reduction	Redundancy of potable water will ensure the critical facilities have the water they need to remain operable and for residents to have access to clean water during an event
Current Status of Action	Not Started – Carried Over from 2020 Plan
Hazard Addressed	Coastal Hazards, Flooding, Sinkholes, Thunderstorms, Tornadoes, Tropical Cyclones

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. BERNARD PARISH	
	DESCRIPTION
ST. BERNARD PARISH MITIGATION ACTION 9	Promote Flood Insurance
LEAD AGENCY	St. Bernard Parish Government
SUPPORTING AGENCIES	St. Bernard Parish OHSEP, Community Development Director
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, FMA, Local
ASSOCIATED GOALS	2. Enhance public awareness and understanding of disaster preparedness 3. Reduce repetitive flood losses in the parish
PRIORITY	Medium
Action Description	Promote the purchase of flood insurance. Advertise the availability, cost, and coverage of flood insurance through the National Flood Insurance Program (NFIP).
Type of Mitigation Action	Education and Awareness Programs
How Action Aligns with Risk Reduction	Promoting flood insurance can encourage property owners to purchase flood insurance, decreasing the out of pocket costs a property owner would have to incur after a flood event.
Current Status of Action	Not Started – Carried Over from 2020 Plan
Hazard Addressed	Flooding, Tropical Cyclones

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. BERNARD PARISH	
	DESCRIPTION
ST. BERNARD PARISH MITIGATION ACTION 10	Saltwater Intrusion Prevention
LEAD AGENCY	St. Bernard Parish Government
SUPPORTING AGENCIES	St. Bernard Parish OHSEP, Department of Public Works
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, PDM
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards 4. Facilitate sound development and rebuilding in the parish so as to reduce or eliminate the potential impacts of hazards
PRIORITY	High
Action Description	Install screw gates for crossings under LA 624 to prevent saltwater intrusion into Hopedale Basin
Type of Mitigation Action	Structure and Infrastructure Projects, Natural System Protection
How Action Aligns with Risk Reduction	This measure reduces the impact that saltwater intrusion can have on the community and ensures that clean water is provided to the community.
Current Status of Action	Not Started – Carried Over from 2020 Plan
Hazard Addressed	Coastal Hazards

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. BERNARD PARISH	
	DESCRIPTION
ST. BERNARD PARISH MITIGATION ACTION 11	Participate and pursue projects to result in increased CRS scores and protect homeowners
LEAD AGENCY	St. Bernard Parish Government
SUPPORTING AGENCIES	St. Bernard Parish OHSEP, Department of Public Works
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	Parish funding
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards 3. Reduce repetitive flood losses in the parish 4. Facilitate sound development and rebuilding in the parish so as to reduce or eliminate the potential impacts of hazards
PRIORITY	Medium
Action Description	Promote the purchase of flood insurance. Conduct fairs and open houses to advertise the NFIP. Maintain a library of flood insurance maps for public review.
Type of Mitigation Action	Local Plans and Regulations, Education and Awareness Programs
How Action Aligns with Risk Reduction	Enables homeowners to financially recover from the devastating effects of flooding as rapidly as possible. Improves CRS score and lowers the flood insurance premiums. Implement programs for participation in the CRS program to decrease the flood insurance premiums in the parish.
Current Status of Action	Not Started – Carried Over from 2020 Plan
Hazard Addressed	Flooding, Tropical Cyclones

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. BERNARD PARISH	
	DESCRIPTION
ST. BERNARD PARISH MITIGATION ACTION 12	Coastline Restoration Projects
LEAD AGENCY	St. Bernard Parish Government
SUPPORTING AGENCIES	St. Bernard Parish OHSEP, Coastal Department
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, FMA, Local
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards 3. Reduce repetitive flood losses in the parish 4. Facilitate sound development and rebuilding in the parish so as to reduce or eliminate the potential impacts of hazards
PRIORITY	High
Action Description	Identify and implement coastline preservation and restoration projects that continue to protect the parish coastline from coastal hazards.
Type of Mitigation Action	Structure and Infrastructure Projects, Natural System Protection
How Action Aligns with Risk Reduction	Actions that protect the coastline will deter away hazards like subsidence and coastal erosion
Current Status of Action	Not Started – Carried Over from 2020 Plan
Hazard Addressed	Coastal Hazards, Flooding, Tropical Cyclones

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. BERNARD PARISH	
	DESCRIPTION
ST. BERNARD PARISH MITIGATION ACTION 13	Properties at Risk Study
LEAD AGENCY	St. Bernard Parish Government
SUPPORTING AGENCIES	St. Bernard Parish OHSEP, Community Development Director
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	HMGP, FMA, Local
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards 2. Enhance public awareness and understanding of disaster preparedness 3. Reduce repetitive flood losses in the parish 4. Facilitate sound development and rebuilding in the parish so as to reduce or eliminate the potential impacts of hazards
PRIORITY	Medium
Action Description	Conduct and complete a study to determine the effects of risks to parish properties and implement a campaign to alert affected citizens of magnitude potential and provide mitigation suggestions. Identify, develop and implement available technologies.
Type of Mitigation Action	Education and Awareness Programs, Natural Systems Protection, Local Plans and Regulations
How Action Aligns with Risk Reduction	Completion of this study would allow the parish to target areas in the community that could be adversely impacted from hazards
Current Status of Action	Not Started – Carried Over from 2020 Plan
Hazard Addressed	Coastal Hazards, Flooding, Sinkholes, Thunderstorms, Tornadoes, Tropical Cyclones

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. BERNARD PARISH	
	DESCRIPTION
ST. BERNARD PARISH MITIGATION ACTION 14	Lake Borgne Marsh Creation – Increment 1
LEAD AGENCY	St. Bernard Parish OHSEP
SUPPORTING AGENCIES	St. Bernard Parish Coastal Department
TIMELINE	1-5 years
COST ESTIMATE	Unknown
POSSIBLE FUNDING SOURCE(S)	CPRA, HMGP, FMA, Local
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards 3. Reduce repetitive flood losses in the parish 4. Facilitate sound development and rebuilding in the parish so as to reduce or eliminate the potential impacts of hazards
PRIORITY	Medium
Action Description	This project will create approximately 2,769 acres of marsh along approximately four miles of the southern rim of Lake Borgne in St. Bernard Parish (extending from Shell Beach to Lena Lagoon) using sediment dredged from Lake Borgne.
Type of Mitigation Action	Education and Awareness Programs, Natural Systems Protection, Local Plans and Regulations
How Action Aligns with Risk Reduction	Creating marshes around the coastline helps coastal restoration efforts.
Current Status of Action	New Action
Hazard Addressed	Coastal Hazards, Flooding, Tropical Cyclones

Action Prioritization

During the prioritization process, the planning committee considered the costs and relative benefits of each new action. Costs can usually be listed in terms of dollars, although at times it involves staff time rather than the purchase of equipment or services that can be readily measured in dollars. In most cases, benefits, such as lives saved or future damage prevented, are hard to measure in dollars. Therefore, many projects were prioritized with these factors in mind. In addition, prioritization of the mitigation actions was performed based on the following economic criteria: i) whether the action can be performed with the existing parish resources; ii) whether the action requires additional funding from external sources; and iii) relative costs of the mitigation actions.

In all cases, the committee concluded that the benefits (in terms of reduced property damage, lives saved, health problems averted and/or economic harm prevented) outweighed the costs for the recommended action items.

The planning committee prioritized the possible activities that could be pursued. Planning committee members consulted appropriate agencies in order to assist with the prioritizations. The results were items that address the major hazards, are appropriate for those hazards, are cost-effective, and are affordable. The planning committee met internally for mitigation action meetings to review and approve mitigation actions for St. Bernard Parish. On-going actions, as well as actions which will provide maximum benefit that can be undertaken by existing parish staff with or without additional external funding were given high priority. The actions with medium benefit and relatively 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 and would result in limited benefit to the community were given low priority.

St. Bernard 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. This plan is intended to offer priorities based on an examination of hazards.

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Appendix A: Planning Process

Purpose

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

The St. Bernard Parish Hazard Mitigation Plan Update

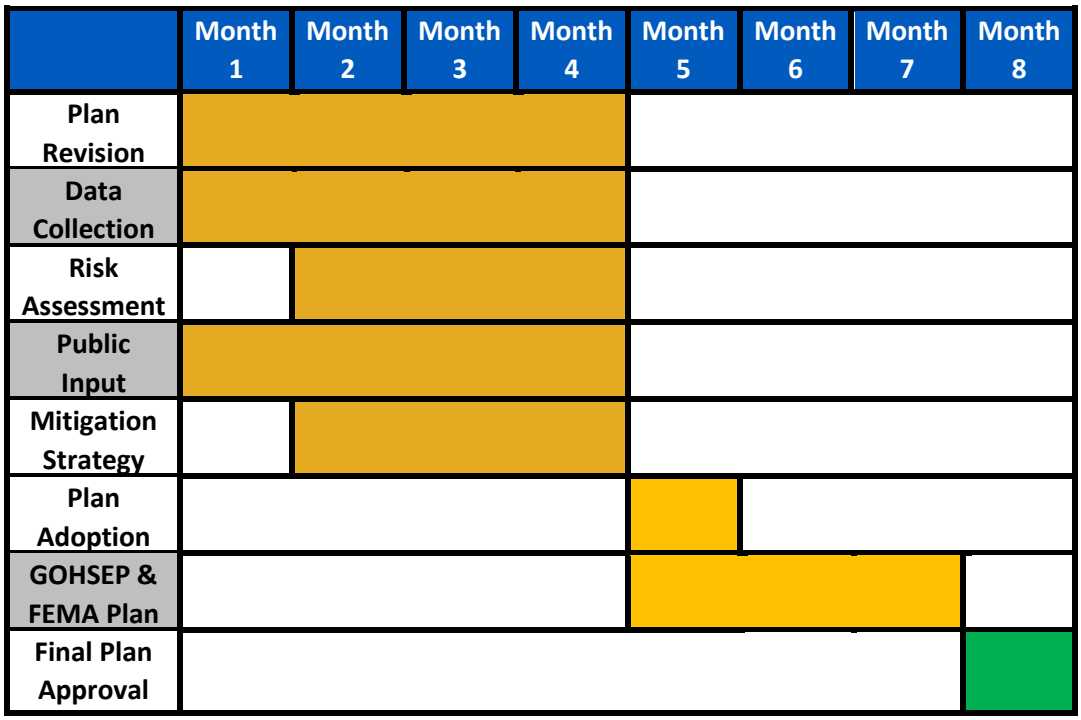
The St. Bernard Parish Hazard Mitigation Plan Update process began in January 2025 with a series of emails, phone calls, meetings, and collaborations between the contractor (SDMI) and a diverse group of participating agencies and stakeholders. Update activities were intended to give each participating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

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

Date	Meeting or Outreach	Location	Public Invited	Purpose
1/14/2025	Kick Off Meeting	Phone Conference	No	Discuss with the Parish OHSEP Director expectations and requirements of the project. Discuss meeting schedules, committee make up, and next steps.
2/19/2025	Initial Planning Committee Meeting	Chalmette, LA	No	Discuss with St. Bernard Parish Hazard Mitigation Planning Committee the process and expectations of plan participants. Discuss timeline and action items for parish
3/27/2025	Planning Committee Risk Assessment Review	Chalmette, LA	Yes	Presentation of Risk Assessment and profiled hazards to Planning Committee.
3/27/2025	Public Meeting	Chalmette, LA	Yes	Presentation of Risk Assessment s and profiled hazards to public. Presentation also includes current mitigation project highlights within communities and public survey discussion.
Ongoing during the plan update process	Public Opinion Survey	Online	Yes	This survey asked participants about public perceptions and opinions regarding natural hazards in St. Bernard 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:



Coordination

The St. Bernard Parish Office of Homeland Security and Emergency Preparedness (OHSEP) oversaw the coordination of the 2025 Hazard Mitigation Plan Update Planning Committee during the update process. The parish OHSEP was responsible for identifying members for the committee. Representatives of relevant local and parish government departments were invited for inclusion in the planning process via email from SDMI and the St. Bernard Parish OHSEP Director. St. Bernard Parish identified and reached out, via email, to representatives of non-profits, local businesses and organizations, and private organizations that provide for the betterment and benefit of populations identified as socially vulnerable and work directly with communities that are deemed as underserved so that they could be involved in the entirety of this plan update process and participate as key stakeholders. Some directors of organizations contacted included the Council on Aging, and the local American Red Cross chapter. Both of these entities were able to be involved in the plan update process. There are no higher education institutions in St. Bernard Parish; therefore, no members of academia could be included in the planning process on a parish level. However, SDMI is an institution under the Louisiana State University system, so this plan update received constant feedback from academia personnel on LSU's campus. Therefore, LSU was able to be included for academic participation during the plan update process.

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

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

Neighboring Community, Local and Regional Planning Process Involvement

From the outset of the planning process, the planning committee encouraged participation from a broad range of parish entities. The involvement of representatives from the city, state, and regional agencies provided diverse perspectives and mitigation ideas.

Formal participation in this plan includes but is not limited to the following activities:

- Participation in Hazard Mitigation planning meetings at the local and parish level
- Sharing local data and information with communities
- Incorporation of other planning documents, studies and efforts
- Action item development and action progress from 2020 update
- Risk Assessment review
- Plan document draft review
- Formal adoption of the Hazard Mitigation Plan

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

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

The 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. Bernard Parish Hazard Mitigation Planning Committee			
Name	**Title**	**Agency**	**Email**
John Rahaim	Director	St. Bernard Parish OHSEP	jrahaim@sbpg.net
Adam Kuehne	Vice President/General Manager	Valero	Adam.Kuehne@valero.com
Alanna Fast	CEO	St. Bernard Parish Hospital	afast@ochsner.org
Amanda Mones	Council Member - District E	St. Bernard Parish Government	amones@sbpg.net
Brandon Brown	Safety Manager	Valero	Brandon.Brown@valero.com
Charol Armond	Principal	OLPS	carmand@olpsschool.org
Chris Scheeler	Lt.	SBSO	cscheeler@sbso.org
Christopher Rippetoe	Program Manager	LSU-SDMI	crippe2@lsu.edu
Collin Arnold	Director	New Orleans OHSEP	cmarnold@nola.gov
Cindi Meyer	Engineer	St. Bernard Parish Fire	cmeyer@sbpg.net
David Fernandez	CFO	St. Bernard Parish School Board	david.fernandez@sbpsb.org
David Jarrell	Attorney	St. Bernard Parish DA Office	djarrell@stbda.org
Donald Bourgeois	CAO	St. Bernard Parish Government	drbourgeois@sbpg.net
Donald Taylor		Entergy	Dtayl27@entergy.com
Donna McClain	Executive Administrator	St. Bernard Parish OHSEP	djmcclain@sbpg.net
Doris Voitier	Superintendent	St. Bernard Parish School Board	Doris.Voitier@sbpsb.org
Drew Heaphy	Executive Director	St. Bernard Port	dheaphy@stbernardport.com
Earl Borden	Fire Chief	St. Bernard Parish FD	eborden@sbpg.net
Elizabeth Ellison-Frost	Procurement Coordinator	Chalmette Refining	edauterive@StBernardChamber.org
Elizabeth Mendonca	VP & General Manager	ASR Domino Sugar Refinery	elizabeth.mendonca@asr-group.com
Fred Everhardt	Council Member, At-large	St. Bernard Parish Government	feverhardt@sbpg.net

Gillis McCloskey	Council Member, At-large	St. Bernard Parish Government	gmccloskey@sbpg.net
Henry Ballard	Pastor	Christian Fellowship Family Worship Center	hballardjr@gmail.com
Hillary Nunez	Director	St. Bernard Public Works	hnunez@sbpg.net
Jared Wimberley	Refinery Manager	PBF Energy	jared.wimberley@pbfenergy.com
Jason Martin	Emergency Management Analyst	LSU-SDMI	jmar293@lsu.edu
Jaylynn Bergeron-Turner	Assessor	St. Bernard Parish Tax Assessor	jturner@stbassessor.org
Jimmy Pohlmann	Sheriff	SBSO	jpohlmann@sbso.org
JJ Vickers	Colonel	SBSO	jvickers@sbso.org
John Lane	Coastal Division Manager	St. Bernard Parish Government	jlane@sbpg.net
Joshua Moran	Council Member - District B	St. Bernard Parish Government	jmoran@sbpg.net
Justin Stephens	Assistant DA	St. Bernard Parish Government	jstephens@sbpg.net
Katherine Tommaseo	Director of Tourism	St. Bernard Parish Government	ktommaseo@sbpgmail.awsapps.com
LaRaunda Hartford	Disaster Program Manager	American Red Cross	laraunda.hartford@redcross.org
Lauren Morgan	Associate Director	LSU-SDMI	lstevens@lsu.edu
Louis Pomes	Parish President	St. Bernard Parish Government	lpomes@sbpg.net
Marion Pearson	Program Coordinator	GOHSEP	marion.pearson@la.gov
Matt Timothy	Supervisor	Atmos Energy	matthew.timothy@atmosenergy.com
Merritt Landry	Director of Community Development	St. Bernard Parish Government	mlandry@sbpg.net
Patrice Cusimano	Council Member - District A	St. Bernard Parish Government	pcusimano@sbpg.net
Patrick Harvey	Director	Plaquemines Parish OSHEP	pharvey@ppgov.net
Ralph Hosch	Superintendent of Quality Control/Compliance	St. Bernard Parish Government	rhosch@sbpg.net
Robert Iles	Geospatial Data Analytical Research Scientist	LSU-SDMI	riles2@lsu.edu
Roger Estopinal, III	Director of Facilities Management	St. Bernard Parish Hospital	roger.estopinal@ochsner.org
Ross Gonzales	Director of Administration	St. Bernard Port	rgonzales@stbernardport.com
Roxanne Adams	Clerk of Council	St. Bernard Parish Government	radams@sbpg.net
Ryan Randall	Council Member - District D	St. Bernard Parish Government	rrandall@sbpg.net
Scott Boyle	District Engineer	LA DOTD	scott.boyle@la.gov
Steve Volante	Trooper	LA State Police	steve.volante@dps.la.gov
Theresa LoGiudice	Environmental Scientist	LA DEQ	Theresa.LoGiudice@LA.GOV
Tina Tinney	Chancellor	Nunez Community College	ttinney@nunez.edu

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. Bernard Parish programs and planning.

A measure of integration and coordination is achieved through the HMPU participation of planning committee members and community stakeholders who administer programs such as: floodplain management under the National Flood Insurance Program (NFIP), Community Rating System, parish planning and zoning and building code enforcement.

Since the last update in 2020, St. Bernard 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. Bernard Parish has used vulnerability statistics and integration strategies within the plan to help guide their mitigation practices. The strategies and practices in this plan update build upon the practices that have been used since the previous update. Those strategies and practices can be found in various sections throughout the risk assessment that address climate change, vulnerable populations, and future development trends. Furthermore, the parish has held and will continue to hold annual meetings to discuss any changes that have occurred within the parish that could alter the vulnerability of St. Bernard Parish, and how to combat any issues that have arisen within the means and regulations of the hazard mitigation plan.

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

The members of the St. Bernard Parish Hazard Mitigation Planning Committee will remain charged with ensuring that the goals and strategies of new and updated local planning documents for their communities or agencies are consistent with the goals and actions of the Hazard Mitigation Plan and will not contribute to increased hazard vulnerability in the parish. Existing plans, studies, and technical information were incorporated in the planning process. Examples include flood data from FEMA and the U. S. Geological Survey. Much of this data was incorporated into the Risk Assessment component of the plan relative to plotting historical events and the magnitude of damages that occurred. The parish's 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.

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

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

Meeting Documentation and Public Outreach Activities

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

Meeting #1: Hazard Mitigation Plan Update Kick-Off

Date: January 14, 2025

Location: Conference Call

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

Public Invitation: No

Meeting Invitees:

St. Bernard Parish Hazard Mitigation Planning Committee		
Name	**Title**	**Agency**
John Rahaim	Director	St. Bernard Parish OHSEP
Chris Rippetoe	Program Manager	LSU-SDMI

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

Date: February 19, 2025

Location: Chalmette, LA

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

Public Invitation: No

Meeting Invitees:

St. Bernard Parish Hazard Mitigation Planning Committee		
Name	**Title**	**Agency**
John Rahaim	Director	St. Bernard Parish OHSEP
Adam Kuehne	Vice President/General Manager	Valero
Alanna Fast	CEO	St. Bernard Parish Hospital
Amanda Mones	Council Member - District E	St. Bernard Parish Government
Brandon Brown	Safety Manager	Valero
Charol Armond	Principal	OLPS
Chris Scheeler	Lt.	SBSO
Christopher Rippetoe	Program Manager	LSU-SDMI
Collin Arnold	Director	New Orleans OHSEP
Cindi Meyer	Engineer	St. Bernard Parish Fire
David Fernandez	CFO	St. Bernard Parish School Board
David Jarrell	Attorney	St. Bernard Parish DA Office
Donald Bourgeois	CAO	St. Bernard Parish Government
Donald Taylor		Entergy
Donna McClain	Executive Administrator	St. Bernard Parish OHSEP
Doris Voitier	Superintendent	St. Bernard Parish School Board
Drew Heaphy	Executive Director	St. Bernard Port

Earl Borden	Fire Chief	St. Bernard Parish FD
Elizabeth Ellison-Frost	Procurement Coordinator	Chalmette Refining
Elizabeth Mendonca	VP & General Manager	ASR Domino Sugar Refinery
Fred Everhardt	Council Member, At-large	St. Bernard Parish Government
Gillis McCloskey	Council Member, At-large	St. Bernard Parish Government
Henry Ballard	Pastor	Christian Fellowship Family Worship Center
Hillary Nunez	Director	St. Bernard Public Works
Jared Wimberley	Refinery Manager	PBF Energy
Jason Martin	Emergency Management Analyst	LSU-SDMI
Jaylynn Bergeron-Turner	Assessor	St. Bernard Parish Tax Assessor
Jimmy Pohlmann	Sheriff	SBSO
JJ Vickers	Colonel	SBSO
John Lane	Coastal Division Manager	St. Bernard Parish Government
Joshua Moran	Council Member - District B	St. Bernard Parish Government
Justin Stephens	Assistant DA	St. Bernard Parish Government
Katherine Tommaseo	Director of Tourism	St. Bernard Parish Government
LaRaunda Hartford	Disaster Program Manager	American Red Cross
Lauren Morgan	Associate Director	LSU-SDMI
Louis Pomes	Parish President	St. Bernard Parish Government
Marion Pearson	Program Coordinator	GOHSEP
Matt Timothy	Supervisor	Atmos Energy
Merritt Landry	Director of Community Development	St. Bernard Parish Government
Patrice Cusimano	Council Member - District A	St. Bernard Parish Government
Patrick Harvey	Director	Plaquemines Parish OSHEP
Ralph Hosch	Superintendent of Quality Control/Compliance	St. Bernard Parish Government
Robert Iles	Geospatial Data Analytical Research Scientist	LSU-SDMI
Roger Estopinal, III	Director of Facilities Management	St. Bernard Parish Hospital
Ross Gonzales	Director of Administration	St. Bernard Port
Roxanne Adams	Clerk of Council	St. Bernard Parish Government
Ryan Randall	Council Member - District D	St. Bernard Parish Government
Scott Boyle	District Engineer	LA DOTD
Steve Volante	Trooper	LA State Police
Theresa LoGiudice	Environmental Scientist	LA DEQ
Tina Tinney	Chancellor	Nunez Community College

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

Date: March 27th, 2025
Location: Chalmette, LA
Purpose: Presentation of Risk Assessment hazards and maps to Planning Committee.
Public Invitation: No
Meeting Invitees:

St. Bernard Parish Hazard Mitigation Planning Committee		
Name	**Title**	**Agency**
John Rahaim	Director	St. Bernard Parish OHSEP
Adam Kuehne	Vice President/General Manager	Valero
Alanna Fast	CEO	St. Bernard Parish Hospital
Amanda Mones	Council Member - District E	St. Bernard Parish Government
Brandon Brown	Safety Manager	Valero
Charol Armond	Principal	OLPS
Chris Scheeler	Lt.	SBSO
Christopher Rippetoe	Program Manager	LSU-SDMI
Collin Arnold	Director	New Orleans OHSEP
Cindi Meyer	Engineer	St. Bernard Parish Fire
David Fernandez	CFO	St. Bernard Parish School Board
David Jarrell	Attorney	St. Bernard Parish DA Office
Donald Bourgeois	CAO	St. Bernard Parish Government
Donald Taylor		Entergy
Donna McClain	Executive Administrator	St. Bernard Parish OHSEP
Doris Voitier	Superintendent	St. Bernard Parish School Board
Drew Heaphy	Executive Director	St. Bernard Port
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Gillis McCloskey	Council Member, At-large	St. Bernard Parish Government
Henry Ballard	Pastor	Christian Fellowship Family Worship Center
Hillary Nunez	Director	St. Bernard Public Works
Jared Wimberley	Refinery Manager	PBF Energy
Jason Martin	Emergency Management Analyst	LSU-SDMI
Jaylynn Bergeron-Turner	Assessor	St. Bernard Parish Tax Assessor
Jimmy Pohlmann	Sheriff	SBSO
JJ Vickers	Colonel	SBSO
John Lane	Coastal Division Manager	St. Bernard Parish Government
Joshua Moran	Council Member - District B	St. Bernard Parish Government
Justin Stephens	Assistant DA	St. Bernard Parish Government
Katherine Tommaseo	Director of Tourism	St. Bernard Parish Government

LaRaunda Hartford	Disaster Program Manager	American Red Cross
Lauren Morgan	Associate Director	LSU-SDMI
Louis Pomes	Parish President	St. Bernard Parish Government
Marion Pearson	Program Coordinator	GOHSEP
Matt Timothy	Supervisor	Atmos Energy
Merritt Landry	Director of Community Development	St. Bernard Parish Government
Patrice Cusimano	Council Member - District A	St. Bernard Parish Government
Patrick Harvey	Director	Plaquemines Parish OSHEP
Ralph Hosch	Superintendent of Quality Control/Compliance	St. Bernard Parish Government
Robert Iles	Geospatial Data Analytical Research Scientist	LSU-SDMI
Roger Estopinal, III	Director of Facilities Management	St. Bernard Parish Hospital
Ross Gonzales	Director of Administration	St. Bernard Port
Roxanne Adams	Clerk of Council	St. Bernard Parish Government
Ryan Randall	Council Member - District D	St. Bernard Parish Government
Scott Boyle	District Engineer	LA DOTD
Steve Volante	Trooper	LA State Police
Theresa LoGiudice	Environmental Scientist	LA DEQ
Tina Tinney	Chancellor	Nunez Community College

Meeting #4: Hazard Mitigation Plan Update Public Meeting

Date: March 27, 2025

Location: Chalmette, LA

Purpose: The Public Meeting allowed the public and community stakeholders to participate and provide input into the hazard mitigation planning process. The presentation also included highlights of current mitigation projects, 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. St. Bernard Parish was involved in the plan update were 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. Bernard Parish and with assistance from SDMI.

Public Invitation: Yes

Meeting Invitees:

St. Bernard Parish Hazard Mitigation Planning Committee		
Name	**Title**	**Agency**
John Rahaim	Director	St. Bernard Parish OHSEP
Adam Kuehne	Vice President/General Manager	Valero
Alanna Fast	CEO	St. Bernard Parish Hospital
Amanda Mones	Council Member - District E	St. Bernard Parish Government
Brandon Brown	Safety Manager	Valero
Charol Armond	Principal	OLPS
Chris Scheeler	Lt.	SBSO
Christopher Rippetoe	Program Manager	LSU-SDMI
Collin Arnold	Director	New Orleans OHSEP
Cindi Meyer	Engineer	St. Bernard Parish Fire
David Fernandez	CFO	St. Bernard Parish School Board
David Jarrell	Attorney	St. Bernard Parish DA Office
Donald Bourgeois	CAO	St. Bernard Parish Government
Donald Taylor		Entergy
Donna McClain	Executive Administrator	St. Bernard Parish OHSEP
Doris Voitier	Superintendent	St. Bernard Parish School Board
Drew Heaphy	Executive Director	St. Bernard Port
Earl Borden	Fire Chief	St. Bernard Parish FD
Elizabeth Ellison-Frost	Procurement Coordinator	Chalmette Refining
Elizabeth Mendonca	VP & General Manager	ASR Domino Sugar Refinery
Fred Everhardt	Council Member, At-large	St. Bernard Parish Government
Gillis McCloskey	Council Member, At-large	St. Bernard Parish Government
Henry Ballard	Pastor	Christian Fellowship Family Worship Center
Hillary Nunez	Director	St. Bernard Public Works
Jared Wimberley	Refinery Manager	PBF Energy

Jason Martin	Emergency Management Analyst	LSU-SDMI
Jaylynn Bergeron-Turner	Assessor	St. Bernard Parish Tax Assessor
Jimmy Pohlmann	Sheriff	SBSO
JJ Vickers	Colonel	SBSO
John Lane	Coastal Division Manager	St. Bernard Parish Government
Joshua Moran	Council Member - District B	St. Bernard Parish Government
Justin Stephens	Assistant DA	St. Bernard Parish Government
Katherine Tommaseo	Director of Tourism	St. Bernard Parish Government
LaRaunda Hartford	Disaster Program Manager	American Red Cross
Lauren Morgan	Associate Director	LSU-SDMI
Louis Pomes	Parish President	St. Bernard Parish Government
Marion Pearson	Program Coordinator	GOHSEP
Matt Timothy	Supervisor	Atmos Energy
Merritt Landry	Director of Community Development	St. Bernard Parish Government
Patrice Cusimano	Council Member - District A	St. Bernard Parish Government
Patrick Harvey	Director	Plaquemines Parish OSHEP
Ralph Hosch	Superintendent of Quality Control/Compliance	St. Bernard Parish Government
Robert Iles	Geospatial Data Analytical Research Scientist	LSU-SDMI
Roger Estopinal, III	Director of Facilities Management	St. Bernard Parish Hospital
Ross Gonzales	Director of Administration	St. Bernard Port
Roxanne Adams	Clerk of Council	St. Bernard Parish Government
Ryan Randall	Council Member - District D	St. Bernard Parish Government
Scott Boyle	District Engineer	LA DOTD
Steve Volante	Trooper	LA State Police
Theresa LoGiudice	Environmental Scientist	LA DEQ
Tina Tinney	Chancellor	Nunez Community College

Meeting Announcement:

ST. BERNARD PARISH OFFICE OF HOMELAND SECURITY & EMERGENCY PREPAREDNESS

PUBLIC MEETING ANNOUNCEMENT

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

St. Bernard 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 St. Bernard Parish Hazard Mitigation Plan. The plan describes the **naturally occurring** risks to the region and outlines strategies to reduce these risks to save lives, reduce property damage, and lessen the impact of future disasters.

Are you passionate about building a more resilient future for your parish? Do you have questions about the natural hazards that threaten your community? Please join us on Thursday, March 27th, for a public meeting at 2:00PM 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. Bernard Parish Council Chambers
8201 W Judge Perez Dr
Chalmette, LA 70043

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

https://lsu.qualtrics.com/jfe/form/SV_9QCyzhJGx7X02CG

The Parish appreciates your input.

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

Outreach Activity #1: Public Opinion Survey

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

As referenced in the *Mitigation Strategy* section of this document, an online public opinion survey for St. Bernard Parish was conducted between January 2024 and April 2025. The survey was designed to capture public perceptions and opinions regarding natural hazards in St. Bernard 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. An overview of the responses to the St. Bernard Parish Hazard Mitigation Public Opinion Survey can be found in the Introduction section of Section 4: *Mitigation Strategy.* The full survey can be found at the following link: https://lsu.qualtrics.com/jfe/form/SV_9QCyzhJGx7X02CG

Outreach Activity #2: Public Meeting Activity - Incident Questionnaire

Date: March 27, 2025
Location: Public Meeting
Public Invitation: Yes

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

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

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

After an initial review by the St. Bernard Parish Planning Committee was completed, the 2025 St. Bernard 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-bernard

ST. BERNARD PARISH PUBLIC MEETING

PUBLIC ACTIVITY: INCIDENT/ ISSUE QUESTIONNAIRE

1. HAZARD TYPE(S):

A. COASTAL HAZARDS
B. FLOODING
C. SINKHOLES
D. THUNDERSTORMS
E. TORNADOES
F. TROPICAL CYCLONES

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."

Implementing, Monitoring, Evaluating, and Updating the Plan

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

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

Responsible Parties

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

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

Methods for Monitoring and Evaluating the Plan and Plan Evaluation Criteria

St. Bernard 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. Bernard Parish OHSEP Director will be responsible for conducting the annual planning committee meetings.

The lead person of the agency responsible for the implementation of a specific mitigation action will submit a progress report to the Director at least thirty days prior to the planning committee meeting. The progress report will provide project status monitoring to include the following: whether the project has started; if not started, reason for not starting; if started, status of the project; if the project is completed, whether it has reduced/eliminated the

problem; and any changes recommended to improve the implementation of the project etc. In addition, the progress report will provide status monitoring on the plan evaluation, changes to the hazard profile, changes to the risk assessment, and public input on the Hazard Mitigation Plan updates and reviews.

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

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

2) What were the results of the implemented action

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

4) Did the results achieve the stated goals and objectives

5) Was the action cost-effective

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

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

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

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

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

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

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

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

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

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

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

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

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

- Ordinances, Resolutions, Regulations
- Floodplain Ordinances
- Master Plans
- Capital Improvement Plans
- Economic Development Plans
- Emergency Operations Plans
- Continuity of Operations Plans
- Transportation Plan
- Stormwater Management Plan
- Redevelopment Plan
- Recovery Plan
- Coastal 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. Bernard Parish Hazard Mitigation Planning Committee and through the five-year review process described herein. The primary means for integrating mitigation strategies into other local planning mechanisms will be through the revision, update and implementation of each individual plan that require specific planning and administrative tasks (e.g. risk assessment, plan amendments, ordinance revisions, capital improvement projects, etc.).

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

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

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

St. Bernard Parish			
Comprehensive Master Plan	Updated annually	St. Bernard Parish Department of Community Development	✓
Capital Improvements Plan	Updated as needed	St. Bernard Parish Government	✓
Continuity of Operations Plan	Updated annually	St. Bernard Parish OHSEP	✓
Local Emergency Operations Plan	Updated annually	St. Bernard Parish OHSEP	✓
Transportation Plan	Updated annually	St. Bernard Parish OHSEP	✓
Economic Development Plan	Updated annually	St. Bernard Parish Economic Development Commission	✓
Stormwater Management Plan	Updated as needed	St. Bernard Parish Government	✓
Redevelopment Plan	Updated annually	St. Bernard Parish Department of Community Development	✓
Recovery Plan	Updated annually	St. Bernard Parish OHSEP	✓
Coastal Plan	Updated annually	St. Bernard Parish Department of Community Development	✓

Continued Public Participation

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

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

Appendix C: Critical Facilities

Critical Facilities within the St. Bernard Parish

St. Bernard Parish Planning Area Critical Facilities							
Type	**Name**	**Coastal Hazards**	**Flooding**	**Sinkholes**	**Thunderstorms**	**Tornadoes**	**Tropical Cyclones**
Civil Government	St. Bernard Parish Council on Aging	X			X	X	X
	St. Bernard Parish Courthouse	X			X	X	X
	St. Bernard Parish Courthouse Annex	X			X	X	X
	St. Bernard Parish Government Complex	X			X	X	X
	St. Bernard Parish Public Works	X			X	X	X
Fire & SAR	St. Bernard FD - Station 1	X			X	X	X
	St. Bernard FD - Station 10	X	X		X	X	X
	St. Bernard FD - Station 11	X	X		X	X	X
	St. Bernard FD - Station 12	X	X		X	X	X
	St. Bernard FD - Station 2	X			X	X	X
	St. Bernard FD - Station 3	X			X	X	X
	St. Bernard FD - Station 5	X	X		X	X	X
	St. Bernard FD - Station 6	X			X	X	X
	St. Bernard FD - Station 7	X	X		X	X	X
	St. Bernard FD - Station 8	X			X	X	X
Law Enforcement	Gerald "Jerry" Rathburn 911 Center	X			X	X	X
	SBPSO - Parish Rd. Station	X			X	X	X
	SBPSO - Special Investigations	X			X	X	X
	St. Bernard Parish Prison	X			X	X	X
	St. Bernard Parish Sheriff's Office	X			X	X	X
Public Health	St. Bernard Parish Hospital	X			X	X	X
Education	Andrew Jackson Middle School	X			X	X	X
	Arabi Elementary School	X			X	X	X
	Arlene Meraux Elementary School	X	X		X	X	X

	C.F. Rowley Alternative School	X			X	X	X
	Chalmette Elementary School	X	X		X	X	X
	Chalmette High School	X	X		X	X	X
	J.F. Gauthier Elementary School	X	X		X	X	X
	Joseph Davies Elementary School	X			X	X	X
	Lacoste Elementary School	X	X		X	X	X
	N.P. Trist Middle School	X	X		X	X	X
	St. Bernard Middle School	X			X	X	X
	W. Smith Jr. Elementary School	X	X		X	X	X

Appendix D: Plan Adoption

FEMA Approval Letter

U.S. Department of Homeland
Security FEMA Region 6
800 N. Loop 288
Denton, TX 76209

FEMA

July 14, 2025

Jeffrey Giering, State Hazard Mitigation Officer
Louisiana Office of Homeland Security
and Emergency Preparedness
1500 North Main Street
Baton Rouge, LA 70802

RE: Approval of the St. Bernard Parish, Louisiana Single Jurisdiction Hazard Mitigation Plan

Dear Mr. Giering:

This office has concluded its review of the referenced plan, and we are pleased to provide our approval of this plan in meeting the criteria set forth by 44 CFR § 201.6. FEMA approval does not include the review or approval of content that exceeds the applicable FEMA mitigation planning requirements. By receiving this approval, eligibility for the Hazard Mitigation Assistance Grants will be ensured for five years from the date of this letter, expiring on July 13, 2030.

This approval does not demonstrate approval of projects contained in the plan. This office has provided the enclosed Local Hazard Mitigation Planning Tool with reviewer's comments, to further assist the community in refining the plan going forward. Please advise the referenced community of this approval.

If you have any questions, please contact David Freeborn, HM Community Planner, at (940) 268-7602.

Sincerely,

RONALD B MOORE

Digitally signed by RONALD B MOORE
Date: 2025.07.14 14:18:38 -05'00'

Roberto E. Ramirez
Acting Chief, Risk Analysis Branch

Enclosures: Approved Participants

GOHSEP Approval Letter

Governor's Office of Homeland Security And Emergency Preparedness
State of Louisiana

JEFF LANDRY
GOVERNOR

JASON P MAHFOUZ
BRIGADIER GENERAL
DIRECTOR

August 13, 2025

Mr. John Rahaim, Director
St. Bernard Parish OHSEP
St. Bernard Parish HM Plan Update
8201 W.Judge Perez Drive
Chalmette, LA 70043

SUBJECT: Hazard Mitigation Plan Approval
St. Bernard Parish Hazard Mitigation Plan Update Multi Jurisdiction
Funding Source: DR-4559-0006-LA

Dear Mr. Rahaim,

Great news! The Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) is pleased to announce that the St. Bernard Parish Hazard Mitigation Plan Update has received official approval following a comprehensive review by both GOHSEP and the Federal Emergency Management Agency (FEMA). With the submission of the adoption resolutions and the electronic copy of the plan update, approval has been granted. The plan was officially approved on July 14, 2025, and will remain in effect until July 13, 2030.

The following participating jurisdictions:

- Unincorporated St. Bernard Parish

Are hereby considered eligible applicants for the following Hazard Mitigation Assistance Grants administered by FEMA

- Hazard Mitigation Grant Program (HMGP), our post-disaster-funding program
- Flood Mitigation Assistance (FMA), a nationally competitive program for Flood Mitigation projects.

All jurisdictions should coordinate with St. Bernard Parish HMP Update on application submittals to the State. We strongly encourage St. Bernard Parish HMP Update Community to perform an annual review and assessment of the effectiveness of their Hazard Mitigation Plan; however, a formal plan update is required at least every five years.

7667 INDEPENDENCE BOULEVARD ⚜ BATON ROUGE, LOUISIANA 70806 ⚜ (225) 925-7500 ⚜ (225)925-7501
AN EQUAL OPPORTUNITY EMPLOYER

Mr. Rahaim
Page 2
August 13, 2025

We sincerely commend and appreciate your dedication and efforts in the successful completion of this important initiative. We also extend our gratitude to all participants in the St. Bernard Parish Hazard Mitigation Plan Update for their contributions in developing a comprehensive and practical plan that will guide Hazard Mitigation efforts in the years ahead.

If you have any questions, please contact Marion Pearson at **marion.pearson@la.gov**.

Sincerely,

Jeffrey Giering
Executive Officer, Hazard Mitigation & Preparedness Grants Division
Governor's Office of Homeland Security and Emergency Preparedness
Office: 225.932.6300

JG:mp
Enclosures: 1) FEMA Approval Letter Dated July 14, 2025
2) St. Bernard Parish Hazard Mitigation Plan Update – Final Plan Review Tool

St. Bernard Parish

St. Bernard Parish Council
8201 West Judge Perez Drive Chalmette, Louisiana, 70043
(504) 278-4228 Fax (504) 278-4209
www.sbpg.net

#14

EXTRACT OF THE OFFICIAL PROCEEDINGS OF THE COUNCIL OF THE PARISH OF ST. BERNARD, STATE OF LOUISIANA, TAKEN AT A REGULAR MEETING HELD IN THE COUNCIL CHAMBERS OF THE ST. BERNARD PARISH GOVERNMENT COMPLEX, 8201 WEST JUDGE PEREZ DRIVE, CHALMETTE, LOUISIANA ON WEDNESDAY, MAY 21, 2025 AT THREE O'CLOCK P.M.

On motion of Mr. Moran, seconded by Ms. Meyer, it was moved to **adopt** the following resolution:

RESOLUTION SBPC #2455-05-25

A RESOLUTION ADOPTING THE PARISH – WIDE 2025 HAZARD MITIGATION PLAN.

WHEREAS, the St. Bernard Parish Government has received grant funds from the Federal Emergency Management Agency, through the Governor's Office of Homeland Security and Emergency Preparedness, for the preparation of a hazard mitigation plan; and,

WHEREAS our community has participated in the process to prepare a DMA compliant Hazard Mitigation Plan based on the FEMA guidance available in the How to Guides; and,

WHEREAS our community wishes to participate in the Hazard Mitigation Plan prepared by the St. Bernard Parish government under the oversight of a Steering Committee comprised of Parish- wide representatives; and,

WHEREAS, St. Bernard Parish has participated in the mitigation planning process; and,

WHEREAS, appropriate opportunity for input by public and community officials has been provided through press releases, open meetings and availability of draft documents; and,

WHEREAS, the Plan has been recommended for adoption by the Steering Committee; and,

WHEREAS, adoption of the Plan is required prior to further consideration for FEMA funding under the following programs:

- Pre-Disaster Mitigation
- Hazard Mitigation Grant Program
- Flood Mitigation Assistance Program

St. Bernard Parish Council
8201 West Judge Perez Drive Chalmette, Louisiana, 70043
(504) 278-4228 Fax (504) 278-4209
www.sbpg.net

The above and foregoing having been submitted to a vote, the vote thereupon resulted as follows:

YEAS: Cusimano, Moran, Meyer, Randall, Everhardt

NAYS: None

ABSENT: Mones

The Council Chair, Mr. McCloskey, cast his vote as **YEA**.

And the motion was declared **adopted** on the 21st day of May, 2025.

CERTIFICATE

I HEREBY CERTIFY that the above and foregoing is a true and correct copy of a motion adopted at a Regular Meeting of the Council of the Parish of St. Bernard, held at Chalmette, Louisiana, on Wednesday, May 21, 2025.

Witness my hand and the seal of the Parish of St. Bernard on this 21st day of May, 2025.

Jennifer L. Imbraguglio
JENNIFER L. IMBRAGUGLIO
DEPUTY CLERK OF COUNCIL

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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. Bernard Parish Hazard Mitigation Planning Committee			
Name	**Title**	**Agency**	**Email**
John Rahaim	Director	St. Bernard Parish OHSEP	jrahaim@sbpg.net
Adam Kuehne	Vice President/General Manager	Valero	Adam.Kuehne@valero.com
Alanna Fast	CEO	St. Bernard Parish Hospital	afast@ochsner.org
Amanda Mones	Council Member - District E	St. Bernard Parish Government	amones@sbpg.net
Brandon Brown	Safety Manager	Valero	Brandon.Brown@valero.com
Charol Armond	Principal	OLPS	carmand@olpsschool.org
Chris Scheeler	Lt.	SBSO	cscheeler@sbso.org
Christopher Rippetoe	Program Manager	LSU-SDMI	crippe2@lsu.edu
Collin Arnold	Director	New Orleans OHSEP	cmarnold@nola.gov
Cindi Meyer	Engineer	St. Bernard Parish Fire	cmeyer@sbpg.net
David Fernandez	CFO	St. Bernard Parish School Board	david.fernandez@sbpsb.org
David Jarrell	Attorney	St. Bernard Parish DA Office	djarrell@stbda.org
Donald Bourgeois	CAO	St. Bernard Parish Government	drbourgeois@sbpg.net
Donald Taylor		Entergy	Dtayl27@entergy.com
Donna McClain	Executive Administrator	St. Bernard Parish OHSEP	djmcclain@sbpg.net
Doris Voitier	Superintendent	St. Bernard Parish School Board	Doris.Voitier@sbpsb.org
Drew Heaphy	Executive Director	St. Bernard Port	dheaphy@stbernardport.com
Earl Borden	Fire Chief	St. Bernard Parish FD	eborden@sbpg.net
Elizabeth Ellison-Frost	Procurement Coordinator	Chalmette Refining	edauterive@StBernardChamber.org
Elizabeth Mendonca	VP & General Manager	ASR Domino Sugar Refinery	elizabeth.mendonca@asr-group.com
Fred Everhardt	Council Member, At-large	St. Bernard Parish Government	feverhardt@sbpg.net
Gillis McCloskey	Council Member, At-large	St. Bernard Parish Government	gmccloskey@sbpg.net
Henry Ballard	Pastor	Christian Fellowship Family Worship Center	hballardjr@gmail.com

Hillary Nunez	Director	St. Bernard Public Works	hnunez@sbpg.net
Jared Wimberley	Refinery Manager	PBF Energy	jared.wimberley@pbfenergy.com
Jason Martin	Emergency Management Analyst	LSU-SDMI	jmar293@lsu.edu
Jaylynn Bergeron-Turner	Assessor	St. Bernard Parish Tax Assessor	jturner@stbassessor.org
Jimmy Pohlmann	Sheriff	SBSO	jpohlmann@sbso.org
JJ Vickers	Colonel	SBSO	jvickers@sbso.org
John Lane	Coastal Division Manager	St. Bernard Parish Government	jlane@sbpg.net
Joshua Moran	Council Member - District B	St. Bernard Parish Government	jmoran@sbpg.net
Justin Stephens	Assistant DA	St. Bernard Parish Government	jstephens@sbpg.net
Katherine Tommaseo	Director of Tourism	St. Bernard Parish Government	ktommaseo@sbpgmail.awsapps.com
LaRaunda Hartford	Disaster Program Manager	American Red Cross	laraunda.hartford@redcross.org
Lauren Morgan	Associate Director	LSU-SDMI	lstevens@lsu.edu
Louis Pomes	Parish President	St. Bernard Parish Government	lpomes@sbpg.net
Marion Pearson	Program Coordinator	GOHSEP	marion.pearson@la.gov
Matt Timothy	Supervisor	Atmos Energy	matthew.timothy@atmosenergy.com
Merritt Landry	Director of Community Development	St. Bernard Parish Government	mlandry@sbpg.net
Patrice Cusimano	Council Member - District A	St. Bernard Parish Government	pcusimano@sbpg.net
Patrick Harvey	Director	Plaquemines Parish OSHEP	pharvey@ppgov.net
Ralph Hosch	Superintendent of Quality Control/Compliance	St. Bernard Parish Government	rhosch@sbpg.net
Robert Iles	Geospatial Data Analytical Research Scientist	LSU-SDMI	riles2@lsu.edu
Roger Estopinal, III	Director of Facilities Management	St. Bernard Parish Hospital	roger.estopinal@ochsner.org
Ross Gonzales	Director of Administration	St. Bernard Port	rgonzales@stbernardport.com
Roxanne Adams	Clerk of Council	St. Bernard Parish Government	radams@sbpg.net
Ryan Randall	Council Member - District D	St. Bernard Parish Government	rrandall@sbpg.net
Scott Boyle	District Engineer	LA DOTD	scott.boyle@la.gov
Steve Volante	Trooper	LA State Police	steve.volante@dps.la.gov
Theresa LoGiudice	Environmental Scientist	LA DEQ	Theresa.LoGiudice@LA.GOV
Tina Tinney	Chancellor	Nunez Community College	ttinney@nunez.edu

Capability Assessment

Capability Assessment Worksheet - St. Bernard Parish 2025		
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 community has in place.		
Plans	**Yes / No**	**Comments**
Comprehensive / Master Plan	Yes	Community Dev, annually
Capital Improvements Plan	Yes	
Economic Development Plan	Yes	Econ Dev commission, annually
Local Emergency Operations Plan	Yes	2025 - OHSEP, annually
Continuity of Operations Plan	Yes	2025 - OHSEP, annually
Transportation Plan	Yes	2025 - OHSEP, annually
Stormwater Management Plan	Yes	Master Drainage Plan - 2019
Community Wildfire Protection Plan	No	
Other plans (redevelopment, recovery, coastal zone management)	Yes	Redevelopment - comm development, annually; Recovery - recovery dept and OHSEP, annually; Coastal - coastal zone manager in comm dev, annually
Building Code, Permitting and Inspections	**Yes / No**	**Comments**
Building Code	Yes	2021 ICC
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	Application submitted
Fire Department ISO/PIAL rating	Yes	
Site plan review requirements	Yes	Community Development
Land Use Planning and Ordinances	**Yes / No**	**Comments**
Zoning Ordinance	Yes	Community Development
Subdivision Ordinance	Yes	Community Development
Floodplain Ordinance	Yes	Community Development
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	Yes	Community Development
Flood Insurance Rate Maps	Yes	Community Development
Acquisition of land for open space and public recreation uses	Yes	Community Development
Other	No	Community Development

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	
Mutual Aid Agreements	Yes	
Staff	**Yes / No**	**Comments**
Chief Building Official	Yes	FT
Floodplain Administrator	Yes	FT
Emergency Manager	Yes	FT
Community Planner	Yes	FT
Civil Engineer	Yes	FT
GIS Coordinator	Yes	PT
Grant Writer	Yes	Contractor
Other	No	
Technical	**Yes / No**	**Comments**
Warning Systems / Service (Reverse 911, Everbridge, AlertFM)	Yes	
Hazard Data & Information	Yes	
Grant Writing	Yes	
Hazus Analysis	Yes	
Other	No	

Financial		
Identify whether your community 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	No	Needs voter approval
Fees for water, sewer, gas, or electric services	Yes	
Impact fees for new development	No	
Stormwater Utility Fee	No	
Community Development Block Grant (CDBG)	Yes	
Other Funding Programs	Yes	BRIC/CPRA/Haz Mit Funding

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	LEPC
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	Yes	LEPC
Natural Disaster or safety related school program	No	
Storm Ready certification	Yes	2022
Firewise Communities certification	No	
Public/Private partnership initiatives addressing disaster-related issues	Yes	
Other	No	

Building Inventory

St. Bernard Parish Owned Building Information								
Name of Building	**Purpose of Building**	**Address**	**City**	**Latitude**	**Longitude**	**Assessed Value**	**Date Built**	**Construction Type**
Aycock Barn Office Bldg, Covered Area and Storage Facility	Administration	409 Aycock St.	Arabi	29.950994489709934	-90.00572495077495	$1,220,505.00	2010	Fire Resistive
Gov't Complex & Equipment	Administration	8201 W. Judge Perez Dr.	Chalmette	29.95621617646376	-89.98229176371403	$10,000,000.00	1977/2008	Fire Resistive
Torres Park Boat House	Administration	8201 W Judge Perez Dr.	Chalmette	29.956468590810342	-89.98271180773787	$64,000.00	2011	Wood
Torres Park Gazebo 30'	Administration	8201 W Judge Perez Dr.	Chalmette	29.95677904440228	-89.98156137025546	$70,000.00	2011	Wood
Torres Park Gazebo 24'	Administration	8201 W Judge Perez Dr.	Chalmette	29.956478245754294	-89.98019806123047	$135,000.00	2011	Wood
Torres Restroom Facility	Administration	8201 W Judge Perez Dr.	Chalmette	29.956788713152992	-89.98117275825967	$126,000.00	1995/2010	Wood
Animal Control Shelter	Animal Control	5455 East Judge Perez Dr.	Violet	29.91569153073611	-89.89922100948161	$792,000.00	2010	Metal
Auditorium & Cultural Center & Equipment	Auditorium	8245 W. Judge Perez Dr.	Chalmette	29.955274921493157	-89.98097088925444	$15,386,000.00	1972/2009	Fire Resistive
Auditorium Marquee/Electronic Sign	Auditorium	8245 W. Judge Perez Dr.	Chalmette	29.955274921493157	-89.98097088925444	$370,000.00	2009	Metal
Grand Ballroom (Behind Auditorium)	Auditorium	8245 W. Judge Perez Dr.	Chalmette	29.955274921493157	-89.98097088925444	$4,557,000.00	2008	Masonry
Council on Aging	Council on Aging	8201 W. Judge Perez Dr. ("B)	Chalmette	29.95643063586779	-89.98279294076895	$1,470,000.00	2009	Fire Resistive
Courthouse Annex - Drug Court Adm. Off.	Courthouse	1009 W. Moreau St.	Chalmette	29.940971880213997	-89.97294901608626	$345,000.00	1964/2009	Masonry
34th Courthouse & Equipment	Courthouse	1101 W. St. Bernard Hwy.	Chalmette	29.940678484093915	-89.97372308100616	$15,662,000.00	1939/2013	Fire Resistive
Sheriff's Office New Annex & Equipment	Courthouse	#2 Courthouse Sq.	Chalmette	29.941425277445006	-89.9736558605853	$3,150,000.00	2011	Fire Resistive
Courthouse Square & Equipment	Courthouse	2118 Jackson Blvd.	Chalmette	29.940726997858768	-89.97371371127511	$3,050,000.00	2012	Fire Resistive
Arabi Elementary School	Education	7200 Alexander Ave	Arabi	29.959304806552300	-89.998962252828200	$19,431,333.00	2012	3

Arlene Meraux Elementary School	Education	4004 Paris Rd	Chalmette	29.958369364534700	-89.957683546412900	$36,290,960.00	2017	3
Chalmette Elementary School	Education	75 E Chalmette Cir	Chalmette	29.948166241979700	-89.976984880916400	$22,905,891.00	2010	3
J.F. Gauthier Elementary School	Education	1200 LA-46	St. Bernard	29.870988646365500	-89.864916352493000	$41,250,000.00	2011	3
Joseph Davies Elementary School	Education	4101 Mistrot St	Meraux	29.938569211900400	-89.923395461122500	$26,240,000.00	2008	3
Lacoste Elementary School	Education	1625 Missouri St	Chalmette	29.943061006593000	-89.944735539287400	$22,420,993.00	2012	3
W. Smith Jr. Elementary School	Education	6701 E St Barnard Hwy	Violet	29.889837199848300	-89.896366943231200	$20,800,000.00	2008	3
Andrew Jackson Middle School	Education	201 8th St	Chalmette	29.950961464352400	-89.983546684776600	$46,161,792.00	1966	3
N.P. Trist Middle School	Education	1 Pirates Cove	Meraux	29.928927290516200	-89.924725004461700	$20,702,868.00	1964	3
St. Bernard Middle School	Education	2601 Torres Dr	St. Bernard	29.874692209765300	-89.873938897205300	$33,402,816.00	1965	3
C.F. Rowley Alternative School	Education	49 Madison Ave	Chalmette	29.944462393521800	-89.978255636934300	$8,138,088.00	2006	3
Chalmette High School	Education	1100 E Judge Perez	Chalmette	29.938160422137000	-89.953668302000900	$105,415,117.00	1961	3
Cultural Arts Building	Education	2600 Palmisano Blvd.	Chalmette	29.93957447902506	-89.95232101816983	$31,420,008.00	2010	4
Fire Station #1	Fire	1500 Aycock St.	Arabi	29.96064984148815	-90.0013201223612	$732,000.00	1991/2008	Metal Stud
Fire Station #2	Fire	7639 W. Judge Perez Dr.	Arabi	29.95830833134227	-89.99052505049767	$815,000.00	2010	Metal
Fire Station #5	Fire	2000 East Judge Perez Dr.	Chalmette	29.937385296905887	-89.94465468875904	$815,000.00	2010	Steel
Fire Station #6	Fire	4119 East Judge Perez Dr.	Chalmette	29.936360653165252	-89.92337954264897	$1,034,000.00	2010	Steel
Fire Station #3	Fire	9240 W. Judge Perez Dr.	Chalmette	29.94580442610491	-89.97178833174407	$1,387,000.00	2013	Non Combustible
Fire Station #7	Fire	5680 E. Judge Perez Dr.	Meraux	29.911227187479263	-89.8981745127346	$1,104,000.00	2009	Metal
Fire Station #8	Fire	613 Bayou Rd.	St. Bernard	29.868195834253576	-89.87503789440193	$1,116,000.00	2011	Metal
Fire Station #10	Fire	3901 Bayou Rd.	St. Bernard	29.859989301003097	-89.77558058712053	$723,000.00	1995/2013	Metal
Fire Station #11	Fire	2424 Florissant Hwy.	St. Bernard	29.84033282847754	-89.690013192622	$935,000.00	2009	Metal
Fire Station #12	Fire	4623 Delacroix Hwy.	St. Bernard	29.77657665274384	-89.78110834328533	$885,837.00	2010	Metal
Jail Complex	Jail	1900 Paris Rd.	Chalmette	29.935872550941568	-89.9673859730189	$7,500,000.00	1985	Fire Resistive
Main Library	Library	2600 Palmisano Blvd.	Chalmette	29.93957447902506	-89.95232101816983	$0.00	Leased to parish	Unknown

New Public Library	Library	3121 E. Judge Perez Dr.	Meraux	29.93783	-89.930152	$12,100,000.00	2025	Metal
911 Building & Equipment	911 Comm Ctr	8001 W. St. Bernard Hwy.	Chalmette	29.949411949012944	-89.99267489641521	$1,100,000.00	2003/2010	Masonry
Road Maintenance & Transit Dept.	Public Works	120 W. Agriculture Rd	Chalmette	29.961176786512233	-89.95562240604262	$992,000.00	1988/2010	Non Combustible
Road Maintenance Bay/Shed (open car ports/bays)	Public Works	120 W. Agriculture Rd	Chalmette	29.961176786512233	-89.95562240604262	$175,000.00	2010	Metal
Public Works Administrative Office (Old Library)	Public Works	1125 E. St. Bernard Hwy.	Chalmette	29.932358001486037	-89.9571186158609	$1,327,000.00	1964/2010	Non Combustible
Public Works/Main Yard New Road Office	Public Works	120 W.Agriculture Rd	Chalmette	29.961176786512233	-89.95562240604262	$1,659,000.00	2011	Metal Stud
Public Work Leased Storage Building (Vicknair Bldg)	Public Works	109 W. Agriculture Rd	Chalmette	29.961176786512233	-89.95562240604262	$0.00	1975	Metal
Public Work Leased Storage Building (Vicknair Bldg)	Public Works	111 W. Agriculture Rd	Chalmette	29.961176786512233	-89.95562240604262	$0.00	1975	Metal
North Flourissant Pump Station & Equipment	Public Works	North Florissant: Located 900 feet east of LA Highway 46 on the North Florissant Levee	St. Bernard	29° 52' 2.3318"	-89° 51' 32.0472"	$805,000.00	2009	Metal
South Flourissant Pump Station & Equipment	Public Works	South Florissant: Located 1,150 feet south of 840 Florissant Highway on South Florissant Levee	St. Bernard	29° 50' 51.6548"	-89° 44' 14.537"	$815,000.00	2009	Metal
Reggio Drainage Pump Station & Equipment	Public Works	Parcel of Land in Section 96, T-14-S, R-14-E Delacroix	St. Bernard	29° 45' 41.7539"	-89° 47' 27.2281"	$235,000.00	2010	Metal
Alluvial City Drainage Station & Equipment	Public Works	2200 Maple St.	St. Bernard	29.84389120771339	-89.69095338987614	$260,000.00	2010	Metal
Jacks Canal Drainage Station & Equipment	Public Works	4352 Delacroix Hwy., St. Bernard	St. Bernard	29° 48' 26.7718"	-89° 45' 51.4631"	$260,000.00	2010	Metal

Delacroix Pump Station & Equipment	Public Works	5565 Delacroix Hwy, Saint Bernard, LA 70085	St. Bernard	29.768200221608215	-89.78912732536433	$598,500.00	2010	Metal
Woodlake Drainage Stations & Equipment	Public Works	4352 Delacroix Hwy., St. Bernard (closest municipal address in the area)	St. Bernard	29.843906642371824	-89.69098547079274	$280,000.00	2010	Metal
Violet Pump Station & Equipment	Public Works	3400 Stacie Dr.	Violet	29.915835921358156	-89.89074703818324	$1,200,000.00	2008	Non-Combustible
Area 4 Administration Bldg.	Public Works	7715 East Judge Perez Dr.	Violet	29.879744442233818	-89.8743521706506	$100,000.00	2011	Metal
Area 4 Storage Bldg.	Public Works	7715 East Judge Perez Dr.	Violet	29.879744442233818	-89.8743521706506	$21,000.00	2011	Metal
Area 4 Guard Building	Public Works	7715 East Judge Perez Dr.	Violet	29.879744442233818	-89.8743521706506	$26,000.00	2011	Metal
Mosquito Control Office Adm. Bldg.	Public Works	3400 Stacie Dr.	Violet	29.915963746146083	-89.89067014015285	$410,000.00	2011	Wood
Mosquito Control Garage/Warehouse	Public Works	3400 Stacie Dr.	Violet	29.915963746146083	-89.89067014015285	$220,000.00	2011	Metal Stud
Violet Pump Station Electrical Room & Equipment	Public Works	3400 Stacie Dr.	Violet	29.915963746146083	-89.89067014015285	$260,000.00	2008	Non-Combustible
Delacroix Fishing Pier & Pavilion	Public Works	5565 Delacroix Hwy.	Delacroix	29.768623	-89.789681	$342,000.00	2017	Wood
Delacroix Fishing Pier Restrooms	Public Works	5565 Delacroix Hwy.	Delacroix	29.768623	-89.789681	$52,000.00	2017	Metal
Progressive Waste Building	Public Works	100 W. Virtue St.	Chalmette	29.9552569	-89.9585317	$777,000.00	1979/2007	Masonry
First Ward Old Jail - Museum	Recreation	242 Hernandez St.	Arabi	29.949526597831536	-90.00596444151961	$318,000.00	1909/2012	Masonry
Edward Kattengall Gymnasium	Recreation	801 Community St.	Arabi	29.952905821749333	-90.00114217068439	$1,085,000.00	1937	Wood
Paul Noel Gym	Recreation	Moreau St. @ Tournefort	Chalmette	29.93687211461151	-89.96437248815906	$1,652,000.00	1983/2009	Masonry
Val Riess Multi-Plex	Recreation	3900 Palmisano Blvd.	Chalmette	29.953898417686407	-89.94509040284176	$9,339,000.00	2014	Non-Combustible
Val Riess Concession Stand, Phase I	Recreation	3900 Palmisano Blvd.	Chalmette	29.953898417686407	-89.94509040284176	$888,000.00	2009	Non-Combustible
Val Riess Concession Stand, Phase II	Recreation	3900 Palmisano Blvd.	Chalmette	29.953898417686407	-89.94509040284176	$1,169,000.00	2010	Non-Combustible

Val Riess Support Facilities (covered pavilion area, bleachers, etc.	Recreation	3900 Palmisano Blvd.	Chalmette	29.953898417686407	-89.94509040284176	$250,000.00	2010	Non-Combustible
Benjamin Street Boat House	Recreation	8300 Benjamin St.	Chalmette	29° 57' 49.5029"	-89° 58' 30.1202"	$329,000.00	2015	Wood
Cypress Garden Gym	Recreation	2900 Bloomquist Dr.	Meraux	29.938634676020374	-89.92199504601452	$3,654,000.00	2009	Metal
Hannan Bldg.	Recreation	2501 Archbishop Hannan Blvd.	Meraux	29.931323856906552	-89.92310402026806	$250,000.00	1990/2009	Metal
Hannan Concession Stand	Recreation	2501 Archbishop Hannan Blvd.	Meraux	29.931323856906552	-89.92310402026806	$134,000.00	1990/2009	Wood
Hannan Bleachers & Score House	Recreation	2501 Archbishop Hannan Blvd.	Meraux	29.931323856906552	-89.92310402026806	$250,000.00	1990/2009	Metal
Gauthier Gym/Kenilworth	Recreation	2214 Bobolink	St. Bernard	29.871651118676944	-89.88831787932214	$2,990,000.00	2009	Metal
Ducros Museum	Recreation	1345 Bayou Rd.	St. Bernard	29.867802255037848	-89.8598601877638	$558,000.00	1800/2010	Wood
Islenos Multi-Purpose Bldg.	Recreation	1357 A Bayou Rd.	St. Bernard	29.867837350335627	-89.8594414849074	$585,000.00	2010	Wood
Cresap/Caserta	Recreation	1357 E. Bayou Rd.	St. Bernard	29.867837350335627	-89.8594414849074	$274,000.00	1900/2010	Wood
Messa/Coconut Hut	Recreation	1357 B Bayou Rd.	St. Bernard	29.867837350335627	-89.8594414849074	$111,000.00	1900/2010	Wood
Trappers Shack	Recreation	1357 F Bayou Rd.	St. Bernard	29.867837350335627	-89.8594414849074	$95,000.00	2010	Wood
Los Islenos Museum	Recreation	1357 Bayou Rd.	St. Bernard	29.867837350335627	-89.8594414849074	$357,000.00	2009	Wood
Esteves House	Recreation	1357 F Bayou Rd.	St. Bernard	29.867837350335627	-89.8594414849074	$264,000.00	1890/2010	Wood
Estopinal-Salles House	Recreation	1357 C Bayou Rd.	St. Bernard	29.867837350335627	-89.8594414849074	$177,000.00	2010	Wood
Estopinal-Salles Kitchen	Recreation	1357 C Bayou Rd.	St. Bernard	29.867837350335627	-89.8594414849074	$93,000.00	2010	wood
Islenos Food Court and Pavilions	Recreation	1357 Bayou Rd.	St. Bernard	29.867837350335627	-89.8594414849074	$250,000.00	2010	Unknown
PGT Beauregard Historic Courthouse & Equipment Bldg.	Recreation	1201 Bayou Rd.	St. Bernard	29.868156909842764	-89.86491056231505	$4,532,000.00	1916/2012	Masonry
Violet Park #2 Concession Stand	Recreation	6609 E. St. Bernard Hwy.	Violet	29.892522494627418	-89.8982117403442	$100,000.00	2013	Cinder Block, metal
Transit Car Wash	Transit	120 W. Agriculture St.	Chalmette	29° 56' 34.0188"	-89° 57' 48.6583"	$201,000.00	2014	Metal

Water Treatment Administrative Office Building	Water	1111 E. St. Bernard Hwy.	Chalmette	29.932586094788842	-89.95688818782864	$900,000.00	1940/2010	Masonry
Water Treatment Plant #1 & Equipment, Generator System	Water	1111 E. St. Bernard Hwy.	Chalmette	29.932586094788842	-89.95688818782864	$1,900,000.00	2010	
Water Treatment Plant #2 & Equipment, Generator System	Water	1111 E. St. Bernard Hwy. (rear)	Chalmette	29.932586094788842	-89.95688818782864	$1,735,000.00	2010	
Dravo Electrical Building & Equipment	Water	4020 Jean Lafitte Blvd.	Chalmette	29.964732007422935	-89.97498189880407	$2,000,000.00	1987/2012	Concrete
Raw Water Pump Station & Equipment	Water	Mobil Oil Access Rd. # 1	Chalmette	29° 56' 34.0188"	-89° 57' 48.6583"	$1,750,000.00	2012	Concrete
Red Cross Building - Storage	Water	2200 Palmisano Blvd.	Chalmette	29.933577815862545	-89.95533635762592	$168,000.00	1980	Metal
Water Treatment Plant #3	Water	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Control Building & Pipe Gallery & Equipment	Water	1111 E. St. Bernard Hwy. (Palmisano Blvd. Entrance)	Chalmette	29.93163151599872	-89.95859958875779	$7,957,032.79	2015	Concrete
Chemical Building & Equipment	Water	1111 E. St. Bernard Hwy. (Palmisano Blvd. Entrance)	Chalmette	29.93163151599872	-89.95859958875779	$4,137,485.48	2015	Concrete
Three Clarifier Tanks	Water	1111 E. St. Bernard Hwy. (Palmisano Blvd. Entrance)	Chalmette	29.93163151599872	-89.95859958875779	$7,384,705.16	2015	Concrete
Clearwell Pump Station	Water	1111 E. St. Bernard Hwy. (Palmisano Blvd. Entrance)	Chalmette	29.93163151599872	-89.95859958875779	$2,051,647.00	2015	Concrete
Waste Transfer Pump Station & Equipment	Water	1111 E. St. Bernard Hwy. (Palmisano Blvd. Entrance)	Chalmette	29.93163151599872	-89.95859958875779	$2,265,099.00	2015	Concrete
Munster Plant-Entire Plant Site & Equipment	Water	3300 Munster Blvd.	Meraux	29.945181462806556	-89.92848281564542	$40,000,000.00	2012	Concrete
Riverbend Oxidation Shed	Water	7501 E. Judge Perez Dr.	Violet	29.9600053	-89.9944974	$15,300.00	2016	metal

Lake Borgne Pump Station #1	Drainage	4200 Jean Lafitte Parkway	Chalmette	29.9663545	-89.9750215	$275,000.00	1974/2009	non-combustible
Lake Borgne Pump Station #2	Drainage	4201 Jean Lafitte Parkway	Chalmette	29.9651392	-89.9743029	$198,000.00	1956/2009	non-combustible
Lake Borgne Pump Station #3	Drainage	3700 Bartolo Dr.	Meraux	29.9464213	-89.92664	$132,000.00	1960/2009	non-combustible
Lake Borgne Pump Station #4	Drainage	3200 Guerra Dr.	Violet	29.9177478	-89.890783	$297,000.00	1974/2009	non-combustible
Lake Borgne Pump Station #5	Drainage	7701 E. Judge Perez Dr.	Violet	29.8799707	-89.8748631	$418,000.00	1984/2009	non-combustible
Lake Borgne Pump Station #6	Drainage	4200 A Jean Lafitte Pkwy.	Chalmette	29.9663545	-89.9750215	$198,000.00	1992/2009	non-combustible
Lake Borgne Pump Station #7	Drainage	3701 Bartolo Dr.	Meraux	29.947311	-89.9257403	$198,000.00	1992/2009	non-combustible
Lake Borgne Pump Station #8	Drainage	3616 Bayou Road	St. Bernard	29.8650763	-89.7857242	$198,000.00	1997/2009	non-combustible

Vulnerable Populations

Vulnerable Populations Worksheet - St. Bernard Parish					
All Hospitals (Private or Public)					
Name	**Street**	**City**	**Zip Code**	**Latitude**	**Longitude**
St. Bernard Parish Hospital	8000 W. Judge Perez Dr.	Chalmette	70043	29° 57' 20.9376"	-89° 59' 10.117"
Assisted Living Facility/Nursing Homes (Private or Public)					
Name	**Street**	**City**	**Zip Code**	**Latitude**	**Longitude**
Hannan Manor	2400 Hannan Blvd.	Meraux	70075	29° 55' 57.0678"	-89° 55' 54.6503"
Mobile Home Parks					
Name	**Street**	**City**	**Zip Code**	**Latitude**	**Longitude**
Chalmette Trailer Park	3224 E. St. Bernard Hwy.	Chalmette	70043	29° 55' 47.8315"	-89° 55' 54.6503"
Colonial Trailer Park	5600 E. St. Bernard Hwy.	Violet	70092	29° 54' 31.8085"	-89° 54' 17.5288"
Dicarlo's Trailer Park	692 Bayou Rd.	St. Bernard	7085	29° 52' 4.1952"	-89° 52' 26.1084"
Fanz Mobile Park	2237 Bayou Rd.	St. Bernard	70085	29° 52' 2.8272"	-89° 50' 5.8862"
Henley's Trailer Park	5012 E. St. Bernard Hwy.	Violet	70092	29° 54' 53.9125"	-89° 54' 39.7894"
Lind's Trailer Park	348 Bayou Rd.	St. Bernard	70085	29° 52' 4.4728"	-89° 52' 53.5397"
Liccardi's Trailer Park	2817 E. St. Bernard Hwy.	Meraux	70075	29° 55' 49.0613"	-89° 56' 15.2542"
Mary Ann Trailer Park	2813 E. St. Bernard Hwy.	Meraux	70075	29° 55' 49.0807"	-89° 56' 15.8525"
Myrtle Grove Trailer Park	2821 E. St. Bernard Hwy.	Meraux	70075	29° 55' 49.0415"	-89° 56' 14.6558"
Nehligs's Trailer Park	3025 Bayou Rd.	St. Bernard	70085	29° 52' 1.596"	-89° 48' 37.872"
Packenham Trailer Park	1408 E. St. Bernard Hwy.	Chalmette	70043	29° 55' 50.1247"	-89° 57' 15.6704"
Paup's Trailer Park	1800 E. St. Bernard Hwy.	Chalmette	70043	29° 55' 49.4738"	-89° 56' 57.2784"
Richard's Trailer Park	350 Bayou Rd.	St. Bernard	70085	29° 51' 57.4574"	-89° 52' 54.5326"
Riveredge Trailer Park	2020 E. St. Bernard Hwy.	Chalmette	70043	29° 55' 49.4879"	-89° 56' 55.4996"
Seelos Trailer Park #1	1300 E. St. Bernard Hwy.	Chalmette	70043	29° 55' 50.1247"	-89° 57' 15.6704"
Seelos Trailer Park #2	1400 E. St. Bernard Hwy.	Chalmette	70043	29° 55' 50.1247"	-89° 57' 15.6704"
Sidlenie Trailer Park	209 E. Urquhart St.	Chalmette	70043	29° 56' 38.5321"	-89° 57' 40.0338"

National Flood Insurance Program (NFIP)

National Flood Insurance Program (NFIP) - St. Bernard Parish		
Insurance Summary		**Comments**
How many NFIP polices are in the community? What is the total premium and coverage?	9,803; The total premium is $8,164,227 and the total coverage is $3,024,506,000	
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	There have not been any claims in the past year, although in 2005 97% of all structures in the parish were flooded	
How many structures are exposed to flood risk with in the community?	Approximately 18,500	
Describe any areas of flood risk with limited NFIP policy coverage.	All areas of the parish have coverage where they are eligible	
Staff Resources		**Comments**
Is the Community FPA or NFIP Coordinator certified?	No	
Is flood plain management an auxiliary function?	Yes	
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	If someone calls or comes to the office, they will be provided with FIRM map data and other questions that we can answer, we also have GIS and other maps available to the public	
What are the barriers to running an effective NFIP program in the community, if any?	A lack of funding	
Compliance History		**Comments**
Is the community in good standing with the NFIP?	Yes	
Are there any outstanding compliance issues(i.e., current violations)?	Yes	Structures outside of the larger levee protection system
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact(CAC)?	2021	
Is a CAV or CAC scheduled or needed? If so when?	N/A	
Regulation		**Comments**
When did the community enter the NFIP?	March 13. 1970	
When was the FIRM adopted by the community?	December 21. 2017	
Are the FIRMs digital or paper?	Digital	
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	New or substantially renovated structures must be built 18 inches above base flood elevation or with an additional 18 inches of freeboard	
Community Rating System (CRS)		**Comments**
Does the community participate in CRS?	No	
What is the community's CRS Class Ranking?	N/A	
Does the plan include CRS planning requirements?	N/A	